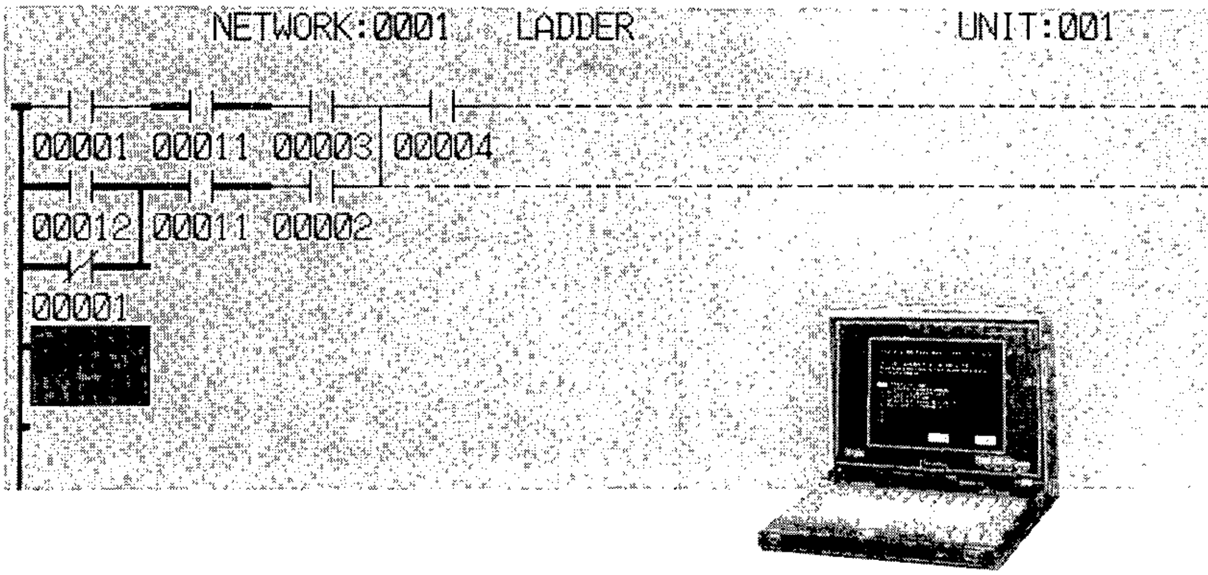
YASKAWA

MEMOCON-SC GL60S, GL60H, GL70H

P120 PROGRAMMING PANEL
USER'S MANUAL


NETWORK:0001 LADDER
UNIT:001
00001
00011
00003
00004
00012
00011
00002
00001

YASKAWA

MANUAL NO. SIE-C825-60.14

Manual Contents

This manual describes specifications and applications of P120 Programming Panel for the MEMOCON-SC GL60S-, GL60H-, and GL70H-series Programmable Controllers

Please read this manual carefully and be sure you understand the information provided before attempting to install or use the P120 Programming Panel.

Visual Aids

The following aids are used to indicate certain types of information for easier reference.

☞	Indicates references for additional information.
IMPORTANT	Indicates important information that should be memorized.
◀EXAMPLE▶	Indicates application examples.
INFO	Indicates supplemental information.
➧ **SUMMARY**	Indicates a summary of the important points of explanations.
Note	Indicates inputs, operations, and other information required for correct operation but that will not cause damage to the device.
TERMS	Indicates definitions of terms used in the manual.

NOTICE

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in injury to people or damage to the products.

⚠ **WARNING**	Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.
⚠ **Caution**	Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

©Yaskawa, 1997

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of Yaskawa. No patent liability is assumed with respect to the use of the information contained herein. Moreover, because Yaskawa is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, Yaskawa assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

CONTENTS

Introduction and Precautions **1**
- I.1 Introduction 2
- I.2 Precautions 3
  - I.2.1 Wiring Precautions 4
  - I.2.2 Applications Precautions 4
  - I.2.3 Safety Precautions 4

CHAPTER 1 P120 Configuration **1-1**
- 1.1 Appearance 1-2
- 1.2 Connecting the P120 to the GL60S, GL60H, or GL70H 1-3
- 1.3 Setting the Transmission Parameters for the GL60S, GL60H and GL70H 1-4

CHAPTER 2 Keyboard **2-1**
- 2.1 P120 Keyboard 2-2
- 2.2 Keys 2-3
  - 2.2.1 Cursor Keys 2-3
  - 2.2.2 Variable Function Keys 2-3
  - 2.2.3 Fixed Function Keys 2-3
  - 2.2.4 Fn Key 2-6
  - 2.2.5 Special Keys 2-6

CHAPTER 3 P120 Specifications **3-1**
- 3.1 General Specifications 3-2
- 3.2 Performance Specifications 3-3
- 3.3 PP Port 1 (RS-232) Specifications 3-4
- 3.4 Printer Port Specifications 3-5
- 3.5 Cable Specifications 3-6
  - 3.5.1 Communications Cables 3-6
  - 3.5.2 Printer Cables 3-7

CHAPTER 4 System Installation **4-1**
- 4.1 Preparing for Installation 4-2
- 4.2 Installation 4-2

CHAPTER 5 Setup **5-1**
- 5.1 Interconnection of Devices 5-2
- 5.2 Connection to Components 5-3

CONTENTS

CHAPTER 6 Online Operation (Basic Editing) 6-1
6.1 Network Screen 6-2
6.2 Ladder Programs 6-4
  6.2.1 Ladder Programming 6-4
  6.2.2 Operating Modes 6-18
  6.2.3 Attach (Going Online) 6-20
  6.2.4 Supervisory Operation 6-22
  6.2.5 Monitoring Programming 6-91
  6.2.6 Traceback 6-188
6.3 Motion Programs 6-196
  6.3.1 Creating and Modifying Motion Programs 6-196
  6.3.2 Program Monitor 6-213
  6.3.3 Setting Parameters 6-214
  6.3.4 Position Monitor 6-220
  6.3.5 Program Load 6-221
  6.3.6 Parameter Load 6-227
  6.3.7 Error Messages 6-235
6.4 File Management 6-236
  6.4.1 File Management Procedures 6-236
  6.4.2 P120 Transmission Parameters 6-237
  6.4.3 Disk Operations 6-240
  6.4.4 File Operations 6-244

CHAPTER 7 Online Operations: SFC Editing 7-1
7.1 SFC Flow Screen 7-2
7.2 Programming 7-4
7.3 Mode 7-5
  7.3.1 The Mode Screen Display 7-5
  7.3.2 Setting Conditions 7-7
  7.3.3 Status Display 7-15
7.4 SFC Programming Operations 7-22
  7.4.1 SFC Flow Processing 7-24
  7.4.2 SFC Action Circuits 7-83
  7.4.3 SFC Transition Circuits 7-90

APPENDIX

A List of Messages A-1
A.1 Operating Error Messages A-2
A.2 Operating Messages A-9
A.3 System Error Messages A-10
A.4 Fatal Error Messages A-12
A.5 Subsystem Troubles A-14

Introduction and Precautions

This chapter introduces general information, including basic information and precautions for the use of this manual and the software. **You must read this chapter before attempting to read the rest of the manual or using the product.**

I.1 Introduction 2

I.2 Precautions 3

I.2.1 Wiring Precautions 4
I.2.2 Applications Precautions 4
I.2.3 Safety Precautions 4

I.1 Introduction

The P120 Programming Panel, referred to as the P120, is a portable, high-performance Programming Panel for MEMOCON-SC-series Programmable Controllers, including the 484, 684, R84, R84H, R84H-M, U84, U84S, U84J, GL20, GL40S, GL60S, GL60H, and GL70H.

The P120 incorporates a high-performance 486SX microprocessor and uses the MS-DOS version 6.0 operating system. It also uses the same operating procedures as the existing P150 Programming Panel, eliminating the need to learn new ones.

This manual explains how to operate the P120. For information on fundamental questions associated with the PLC itself and how to operate it, see the following documents.

References

SIE-C815-10.1	MEMOCON-SC U84 Design and Maintenance Manual
SIE-C815-14.1	MEMOCON-SC GL60S Design and Maintenance Manual
SIE-C815-15.1	MEMOCON-SC GL40S Design and Maintenance Manual
SIE-C815-17.1	MEMOCON-SC GL60H, GL70H Design and Maintenance Manual

Note

(1) The contents of this manual may be changed without prior notice in the future as a result of factors such as product improvements.

(2) If anything is unclear in this manual, please contact one of the addresses given at the end of the manual.

(3) Any unauthorized reproduction of this manual is prohibited.

(4) MS-DOS is a trademark of Microsoft Corporation.

I.2 Precautions

Please read this documentation and the other associated documentation carefully before operating the equipment or carrying out any maintenance work or inspections on it. It is advisable to use the equipment only after gaining a fully proficient knowledge of the equipment, the safety information about it, and matters that demand special attention.

After reading this manual, keep it in a safe location readily accessible to users of the equipment.

Safety Precautions

- Some of the diagrams in this documentation show devices with covers or safety guards removed, in order to show detail. When using this product, please follow the instructions and make sure that all covers are properly in place.
- The drawings and photographs presented in this manual are typical examples and may not match the product you received.
- This manual may be subject to change due to product improvement, specification modifications, and manual improvement.
- When this manual is revised, the manual number is updated and the new manual is published as a next edition.
- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order a new manual whenever this manual is damaged or lost. Please provide the manual number listed on the front cover of this manual when ordering.
- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order new nameplates whenever a nameplate becomes worn or damaged.
- Unauthorized modification of this product is beyond the scope of our quality assurance. Yaskawa shall not be liable for any damage or trouble resulting from unauthorized modification.

I.2.1 Wiring Precautions

Ensure the interface cable is firmly inserted.

- **Make sure that the connectors of all interface cables connected to MEMOCON PLC are firmly inserted into the MEMOCON communications ports and locked into place.**

Incorrect connection may cause a malfunction in MEMOCON PLC.

I.2.2 Applications Precautions

- **Take care with operations such as run, stop, and forced output program modifications while in operation.**

The above can cause malfunctions leading to breakdowns and damage to the equipment.

- **If the power to the slave is connected or cut while the power to the modem is ON, the modem will output a spurious signal on the twisted-pair cable for 10 ms.**

The spurious signal will in turn cause a transmission error if transmission is in progress with another modem. To avoid this situation, we recommend only turning ON power to the modem after power to the slave has been turned ON, and only turning OFF power to the slave once the modem has been turned OFF. Alternatively, the power to both devices can be turned OFF simultaneously.

I.2.3 Safety Precautions

- MEMOCON PLCs were not designed or manufactured for use in devices or systems that concern human lives. Users who intend to use the product described in this manual for special purposes such as devices or systems relating to transportation, medical, space aviation, atomic power control, or underwater use must contact Yaskawa Electric Corporation beforehand.

- This product has been manufactured under strict quality control guidelines. However, if this product is to be installed in any location in which a failure of a MEMOCON PLC involves a life-and-death situation or in a facility where failure may cause a serious accident, safety devices MUST be installed to minimize the likelihood of any accident.

P120 Configuration

1

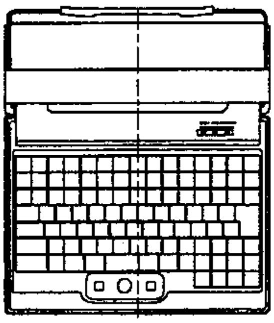
This chapter describes the configuration for connection between the P120 Programming Panel and a Programmable Controller. The procedure for setting transmission conditions is described and an example is given.

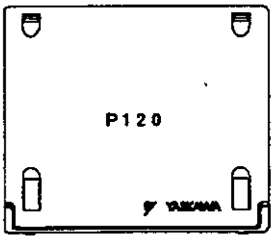
1.1 Appearance **1-2**

1.2 Connecting the P120 to the GL60S, GL60H, or GL70H **1-3**

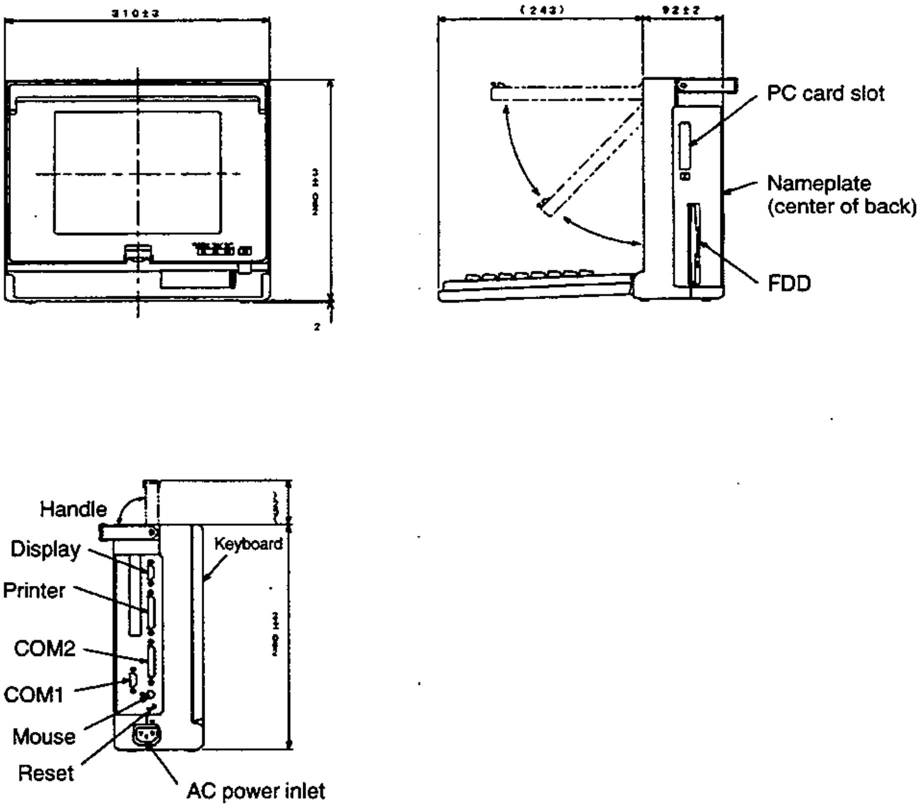
1.3 Setting the Transmission Parameters for the GL60S, GL60H and GL70H **1-4**

1.1 Appearance





Front View with Keyboard Closed


310±3
(243)
92±2
PC card slot
Nameplate
(center of back)
FDD
Handle
Display
Keyboard
Printer
COM2
COM1
Mouse
Reset
AC power inlet

Side View with Keyboard Closed

Figure 1.1

1.2 Connecting the P120 to the GL60S, GL60H, or GL70H

The COM1 port of the P120 is connected by cable to port 1 or port 2 of a IOP Module or to port 3 or port 4 of a COMM Module on the GL60S, GL60H, or GL70H.

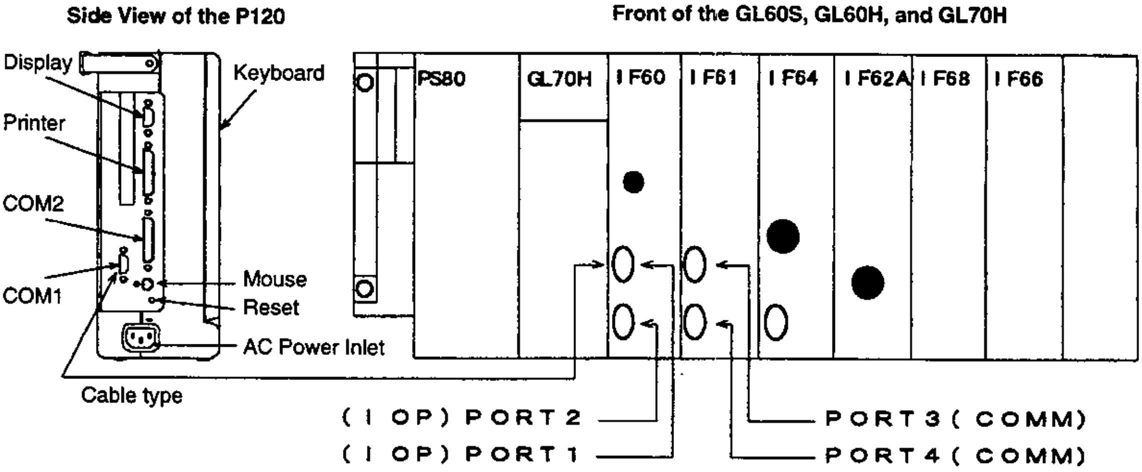

Side View of the P120
Front of the GL60S, GL60H, and GL70H
Display
Printer
COM2
COM1
Keyboard
Mouse
Reset
AC Power Inlet
Cable type
PS80
GL70H
I F60
I F61
I F64
I F62A
I F68
I F66
(I OP) PORT 2
(I OP) PORT 1
PORT 3 (COMM)
PORT 4 (COMM)

Figure 1.2

Note (1) Always turn OFF the power switch on the P120 before connecting or disconnecting the cable.

(2) Secure the connector with the screws so that it does not come loose.

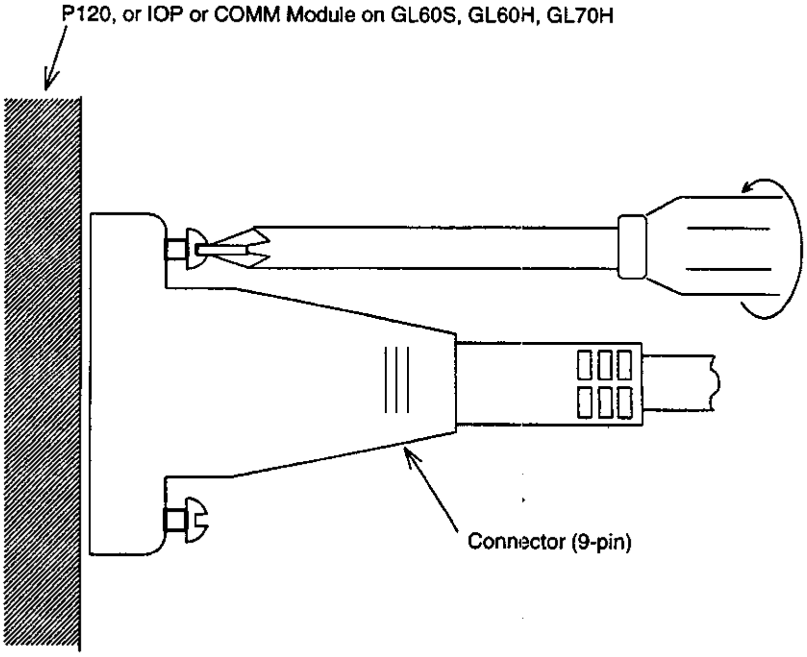

P120, or IOP or COMM Module on GL60S, GL60H, GL70H
Connector (9-pin)

Figure 1.3 Connecting P120, GL60S, GL60H, or GL70H

1.3 Setting the Transmission Parameters for the GL60S, GL60H and GL70H

This section describes setting transmission parameters when equipment such as a host computer or the P120 is connected for communications to the GL60S, GL60H, or GL70H via the IOP or COMM Module ports.

The default settings for ports 1 and 2 (IOP Module) and ports 3 and 4 (COMM Module) are set so that they can be connected with the P120. It is not necessary to set new transmission parameters, however, it is recommended to check that the correct settings have been made.

The contents cannot be modified unless the Enter Key is pressed.

Table 1.1 Transmission Parameters Items Set by RAP

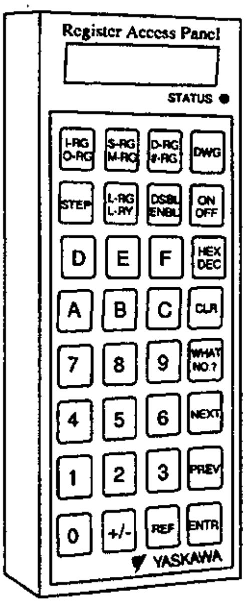
Item	Parameter	Display	Default Settings
6 X 0001	Unit number	1	1
6 X 0002	Baud rate	9,600 bps	9,600 bps
6 X 0003	Parity check yes Parity check no	Parity ON No parity	ON
6 X 0004	Even number parity Odd number parity	Even Odd	Even
6 X 0005	1 stop bit 2 stop bits	1 2	1
6 X 0006	RTU Mode (8-bit data)	RTU	RTU
	ASCII Mode (7-bit data)	ASCII	
6 X 0007	Delay count (units: ms)	000	0

Note (1) The second digit of the item (X) represents the port number (from 1 to 4).

(2) When the item is entered, it will be displayed on the screen. If an error is made, press Clear and re-enter the item.

(3) If the Ref Key is pressed after the item has been input, the parameter will be displayed on the screen. If the Next Key is pressed, the next parameter will be displayed on the screen.

(4) To change the setting for the device address, baud rate, or delay count, change the setting and press the Enter Key. Other parameters will not change when the Enter Key is pressed.


Register Access Panel
STATUS
I-RG O-RG
S-RG M-RG
D-RG #-RG
DWG
STEP
L-RG L-RY
DSBL ENBL
ON OFF
D
E
F
HEX DEC
A
B
C
CLR
7
8
9
WHAT NO?
4
5
6
NEXT
1
2
3
PREV
0
+/-
REF
ENTR
YASKAWA

Register Access Panel

The following example shows how to set transmission parameters when connecting the P120 to a Programmable Controller when initial settings have not been made.

1) Connect power to GL60S, GL60H, or GL70H.

	G	L	6	0	H		

2) Turn OFF the Memory Protect Switch.

3) Press the Clear Key.

4) Set the unit number (from 1 to 247): Set 610001 for port 1, or 620001 for port 2.

		6	1	0	0	0	1

5) Press the Ref Key.

Indeterminate

6) Set 1.

7) Press the Enter Key.

							1

8) Set the baud rate: Press the Next Key.

Indeterminate

9) Set 9600.

10) Press the Enter Key.

D			0	9	6	0	0

11) Specify a parity check or no parity check: Press the Next Key.

Indeterminate

12) If the display shows NO PARITY, press the Enter Key.

P	A	R	I	T	Y	O	N

13) Specify even number or odd number parity: Press the Next Key.

Indeterminate

14) If display shows ODD, press the Enter Key.

E	V	E	N				

15) Specify the number of stop bits: Press the Next Key.

Indeterminate

16) If display shows 00002, press the Enter Key.

S	T	O	P				1

17) Specify the mode: Press the Next Key.

Indeterminate

18) Press the Enter Key until RTU is displayed.

R	T	U					

19) Set the delay count: Press the Next Key.

Indeterminate

20) Set 0 and press the Enter Key.

							0

Note The delay count causes a set time delay to occur from when the GL60S, GL60H, or GL70H transmission signal is received until the reply is transmitted. Normally there will be no problem if the delay count is set to 0.

Keyboard

2

This chapter describes the keyboard of the P120 and gives an explanation of special and fixed function keys needed for operation.

2.1 P120 Keyboard **2-2**

2.2 Keys **2-3**

- 2.2.1 Cursor Keys 2-3
- 2.2.2 Variable Function Keys 2-3
- 2.2.3 Fixed Function Keys 2-3
- 2.2.4 Fn Key 2-6
- 2.2.5 Special Keys 2-6

2.1 P120 Keyboard

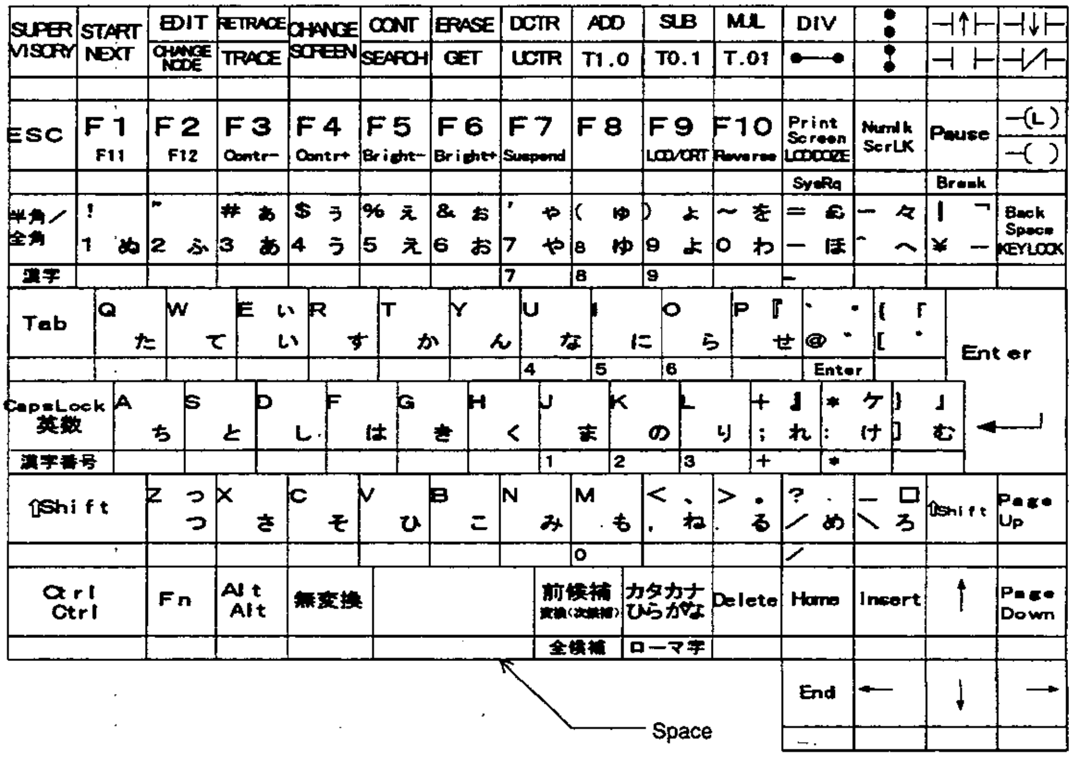

SUPER VISORY
START NEXT
EDIT CHANGE NODE
RETRACE TRACE
CHANGE SCREEN
CONT SEARCH
ERASE GET
DCTR UCTR
ADD T1.0
SUB T0.1
MUL T.01
DIV
ESC
F1 F11
F2 F12
F3 Contr-
F4 Contr+
F5 Bright-
F6 Bright+
F7 Suspend
F8
F9 LCD/CRT
F10 Reverse
Print Screen LCDDOZE
SysRq
NumLk ScrLK
Pause
Break
半角／全角
漢字
Back Space KEYLOCK
Tab
Enter
CapsLock 英数
漢字番号
Shift
Page Up
Ctrl
Fn
Alt
無変換
前候補 変換(次候補)
全候補
カタカナ ひらがな
ローマ字
Delete
Home
Insert
Page Down
End
Space

Figure 2.1

2.2 Keys

2.2.1 Cursor Keys 2-3
2.2.2 Variable Function Keys 2-3
2.2.3 Fixed Function Keys 2-3
2.2.4 Fn Key 2-6
2.2.5 Special Keys 2-6

2.2.1 Cursor Keys

The Up Cursor Key (↑) moves the cursor one position up. If the key is held down, the cursor will move continuously.

The Down Cursor Key (↓) moves the cursor one position down. If the key is held down, the cursor will move continuously.

The Left Cursor Key (←) moves the cursor one position left. If the key is held down, the cursor will move continuously.

The Right Cursor Key (→) moves the cursor one position right. If the key is held down, the cursor will move continuously.

2.2.2 Variable Function Keys

There are eight variable function keys from F1 to F8. The function of these keys is shown by the labels on the screen. F9 and F10 are not used.

2.2.3 Fixed Function Keys

Table 2.1 Functions of the Fixed Function Keys

Key	Function
SUPERVISORY	When pressed in Program Mode or Monitor Mode, this key brings up the Supervisory Functions Screen (start, stop and so on for the GL60S, GL60H, or GL70H).
Shift + SUPERVISORY	If these two keys are pressed at the same time, the Initial Display will appear. Use these key to change the mode.
START NEXT	• Logic Screen A new network is added after the network being displayed. The power line and cursor for creating the new network are displayed on the left-hand side of the screen. • SFC Screen When this key is pressed after zooming in on a macro step when the expanded-screen has not yet been stored, the macrostep expanded-screen is created. A macro entry and cursor are displayed on the screen for use in creating a new expanded-screen.

Key	Function
Delete	• Logic Screen Deletes the element in the displayed network being indicated by the cursor. Also deletes at the same time any vertical short circuit that may exist. • SFC Screen Deletes the element in the displayed SFC being indicated by the cursor. Also deletes at the same time any branch or loop that may exist.
Shift + Delete	• Logic Screen When these two keys are pressed at the same time, the entire displayed network is deleted, and the next network is automatically displayed on the screen. If the last network has been deleted, the screen before will be displayed. • SFC Screen When these two keys are pressed at the same time, the entire SFC being displayed is deleted, and the screen returns to the state prior to the SFC being stored.
Shift + EDIT/CHANGE NODE	When these two keys are pressed at the same time, the following editing operations can be carried out. • Logic Screen Expanding a horizontal or vertical network, moving a contracted network, or copying a network • SFC Screen Deleting an action circuit or transition circuit
RETRACE/TRACE	If the cursor is placed over a contact element in a network and this key is pressed, the network will be displayed, including the coil of that contact. If the cursor is again moved over a contact element of that network and the key pressed, the successive networks, together with their coils, can all be displayed. This function is referred to as tracing.
Shift + RETRACE/TRACE	When these two keys are pressed at the same time, the network can be displayed in the opposite direction from the trace function. This function is referred to as retrace.
CHANGE/SCREEN	This key changes the screen's display mode. When this key is pressed while the Logic Screen or the Comment Screen is being displayed, the screen will change to the Expanded Reference Screen.
Shift + CHANGE/SCREEN	When these two keys are pressed at the same time when the Logic Screen or the Expanded Reference Screen is being displayed, the screen will change to the Comment Screen.
CONT/SEARCH	• When this key is pressed, previously defined search data is searched for. If an SFC or network containing that search data is located, it will be displayed. • When this key is pressed, the cursor moves to the search data section.
Shift + CONT/SEARCH	When these two keys are pressed at the same time, a search is made of the next network or SFC after the one displayed on the screen.
Tab	When this key is pressed, the cursor will move to another area. If the cursor is in the search data section, it will move to the logic area or the SFC area.

Key	Function
ERASE/GET	When this key is pressed and a network number or reference number has been entered previously in the AR (assembly register), the specified network (when the cursor is in the logic area or the SFC area) or the reference number (when the cursor is in the reference area) will be displayed.
Shift + ERASE/GET	When these two keys are pressed at the same time, the display of the network (when the cursor is in the logic area) or the reference area indicated by the cursor will be cleared from the screen. The contents of the memory remains unchanged.
Page Down	When this key is pressed, the screen displays the next network (when the cursor is in the logic area) or the next reference number (when the cursor is in the reference area).
Page Up	When this key is pressed the screen displays the previous network or reference number.
EDIT/CHANGE NODE	Used when creating or modifying a network, or setting search data. When this key is pressed, the label area display changes to the display used for selecting function groups.
PRINT SCREEN LCD DOZE	When this key is pressed, the current screen is printed out in hard copy. Be sure that the printer specified for the parallel port is connected.
Esc	When this key is pressed, it erases the error message displayed in the message area. After the key is pressed, make sure that the operation that was being performed, when the error message appeared, is completed successfully.
Enter	When the cursor is in the logic area or the SFC area, using this key stores the contents of the AR (assembly register) as the reference number of the elements indicated by the cursor or a value for arithmetic processing. If there is nothing at the cursor's location, it is necessary to specify beforehand the type of element and the vertical short circuit (if any). If the cursor is at the location of a number of the reference area holding register, this key will store the contents of the AR in the holding register.
┤↑├ / ┤ ├ See Note	This key selects normally open relay.
Shift + ┤↑├ / ┤ ├ See Note	When these two keys are pressed at the same time, a positive transitional relay is selected.
┤↓├ / ┤/├ See Note	This key selects a normally closed relay.
Shift + ┤↓├ / ┤/├ See Note	When these two keys are pressed at the same time, a negative transitional relay is selected.
-(L)- / -( )- See Note	When this key is pressed, a normal coil is selected.
Shift + -(L)- / -( )- See Note	When these two keys are pressed at the same time,a latched coil is selected.
⁚ / ┃ See Note	When this key is pressed, a vertical short bar is selected.
Shift + ⁚ / ┃ See Note	When these two keys are pressed at the same time, the vertical short bar is cleared.
DIV/ •—• See Note	When this key is pressed, a horizontal short bar is selected. (NTWK DELETE NODE is used to clear horizontal short bars.
Shift + DIV/ •—• See Note	When these two keys are pressed at the same time, the divide instruction DIV is selected.
DCTR/UCTR	When this key is pressed, the UP COUNTER instruction, UCTR, is selected.
Shift + DCTR/UCTR	When these two keys are pressed at the same time, the DOWN COUNTER instruction, DCTR, is selected.
ADD/T1.0	When this key is pressed, the ONE-SECOND TIMER instruction, T1.0, is selected.

Key	Function
Shift + ADD/T1.0	When these two keys are pressed at the same time, the UNSIGNED SINGLE PRECISION DECIMAL ADDITION instruction, ADD, is selected.
SUB/T0.1	When these two keys are pressed at the same time, the 0.1-SECOND TIMER instruction, T0.1, is selected.
Shift + SUB/T0.1	When these two keys are pressed at the same time, the UNSIGNED SINGLE PRECISION DECIMAL SUBTRACTION instruction, SUB, is selected.
MUL/T.01	When this key is pressed, the 0.01-SECOND TIMER, T.01, is selected.
Shift + MUL/T.01	When these two keys are pressed at the same time, the UNSIGNED SINGLE PRECISION DECIMAL MULTIPLICATION instruction, MUL, is selected.

Note Variable function keys with the same functions as the above keys are also provided in the P150. Either key can be used.

2.2.4 Fn Key

Table 2.2 Overview of Functions of the Fn Key

Symbol	Function
Fn + F3 (Contr–)	When these two keys are pressed at the same time, it lowers the LCD contrast. (Cannot be used on color monitors.)
Fn + F4 (Contr+)	When these two keys are pressed at the same time, it raises the LCD contrast. (Cannot be used on color monitors.)
Fn + F5 (Bright–)	When these two keys are pressed at the same time, it makes the LCD backlight darker.
Fn + F6 (Bright+)	When these two keys are pressed at the same time, it makes the LCD backlight brighter.
Fn + F7 (Suspend)	When these two keys are pressed at the same time as the power switch, the system will go into an idle status. The screen will go dark, but the power indicator will remain lit. Press any key to restore normal operation.
Fn + F9 (LCD/CRT)	When these two keys are pressed at the same time, it switches between the LCD and CRT monitor as the display device.
Fn + F10 (Reverse)	When these two keys are pressed at the same time, it reverses black and white display on the LCD.
Fn + Print (Screen LCD DOZE)	When these two keys are pressed at the same time, it makes the LCD backlight the darkest possible. If they are pressed again when it is in the dark condition, the screen returns to its original brightness.

2.2.5 Special Keys

- **The Caps Lock Key**

When this key is pressed and stays locked in position, all characters are input in capital letters. Press it a second time to release it.

- **The Shift Key**

Use the Shift Key to input each key's Shift-position characters. There are two Shift Keys, and either of them may be used.

- **The BackSpace Key**

Use the BackSpace Key to correct characters being input.

- **Numeric Keys**

If the Caps Lock Key is pressed and locked in position, the following keys can be used as a ten-key input pad.

M_0 J_1 K_2 L_3 U_4 I_5 O_6 7_7 8_8 9_9

It is also used when inputting the top functions of other keys. The Shift Key cannot be used when the Caps Lock Key is in the locked position.

P120 Specifications

3

This chapter describes the general, performance, port, and cable specifications of the P120.

3.1 General Specifications 3-2

3.2 Performance Specifications 3-3

3.3 PP Port 1 (RS-232) Specifications 3-4

3.4 Printer Port Specifications 3-5

3.5 Cable Specifications 3-6

3.5.1 Communications Cables 3-6
3.5.2 Printer Cables 3-7

3.1 General Specifications

Table 3.1 General Specifications

Item	Specifications
Power Supply	Single phase, 85 to 264 VAC (47 to 440 Hz)
Power Consumption	12 VA (typical)
Ambient Operating Temperature	0 to 45°C
Storage Temperature	–25 to 60°C
Humidity	30% to 90% (with no condensation)
Altitude	Less than 2,000 m above sea level
Vibration Resistance	When operating: 0.5G When not operating: 2.0G
Shock Resistance	When operating: 10G (11 ms) When not operating: 50G (11 ms)
Drop Resistance	1 m max. (when packaged for shipment)
Environment	No flammable or corrosive gases Pollution level 1 (Note) No excessive dust
Dielectric Strength	AC connected to chassis ground: 1,500 VAC for one minute
Insulation Resistance	AC connected to chassis ground: 1,500 VAC At 500 VDC, 50 MΩ min.
EIM Rating	Equivalent to VCCI type 1
Ground	Ground to 100Ω or less

Note The pollution level is a measure to decide how much the equipment needs to be isolated. A pollution level of 1 means there is no pollution.

3.2 Performance Specifications

Table 3.2 Performance Specifications

Item	Specifications	
CPU	80486SX, 33 MHz, SL Enhanced	
	Main memory: 4 Mbytes	
Memory	BIOS Flash ROM (256 Kbytes)	
	VRAM (512 Kbytes)	
Keyboard	Special keyboard (106 stroke keys)	
	Printer	One Centronics-compatible port
	Serial Ports	One RS-232C port, one RS-422 port
Interfaces	Expansion bus	One ISA bus slot (AT half size) port
	CRT	Conforms to VGA, DB connector 15-pin
	Mouse	One PS/2 mouse (Mini DIN 6-pin) port
	Floppy Disk	One (3 mode) 3.5 inch
Auxiliary Storage	Hard Disk	256 Mb
	IC Cards	Conforms to JEIDA V4.1 (for two Type 2, or one Type 3) For future use
Display	LCD with backlight, VGA 640 pixels × 480 pixels	
	TFT color, STN monochrome (16 gradations)	
Element Status Display	1 point (For GL120 or GL130)	
Clock	Yes (with battery backup)	
Approximate Mass	4.7 kg	
External Dimensions	260(W) × 310(H) × 105(D) mm	

3.3 PP Port 1 (RS-232) Specifications

D-sub 9-pin (male)
Connector model: DESP-JB9PF made by JAE (inch screws are used for mounting)

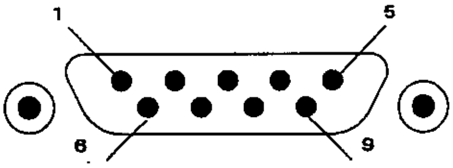


Figure 3.1 RS-232 Connector

Table 3.3 Connector Signal Arrangement

Pin Number	Signal Designation	Details	I/O
1	CD	Carrier detector	I
2	RD	Receive data	I
3	TD	Transmit data	O
4	DTR	Data terminal ready	O
5	GND	Signal ground	–
6	DSR	Data set ready	I
7	RTS	Request transmission	O
8	CTS	Transmit enable	I
9 See Note	EI	Element status	I

Note The element status on pin 9 only becomes valid when connected to the CPU20 or CPU30 RS-232 (MEMOBUS) port.

3.4 Printer Port Specifications

D-sub 25-pin (female)
Connector model: DBLC-J25SAF-20L9 made by JAE (inch screws are used for mounting)

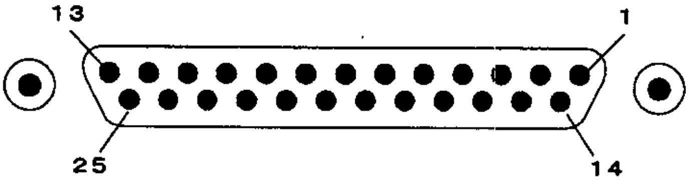


Figure 3.2 Printer Connector

Table 3.4 Printer Connector Signal Arrangement

Pin Number	Signal Designation	I/O
1	–STROBE	O
2	DATA0	O
3	DATA1	O
4	DATA2	O
5	DATA3	O
6	DATA4	O
7	DATA5	O
8	DATA6	O
9	DATA7	O
10	–ACKNLG	I
11	BUSY	I
12	PE	I
13	SLCT	I
14	–AUTOFD	O
15	–ERROR	I
16	–INIT	O
17	–SLCTIN	O
18 to 25	GND	–

Table 3.5 P120 System Disk

Model	Designation	Use
FMSC-PP3	Programmer for MEMOCON-SC PLC	Online programming for use with the R84, U84, GL20, GL40, GL60, and GL70

3.5 Cable Specifications

3.5.1 Communications Cables 3-6
3.5.2 Printer Cables 3-7

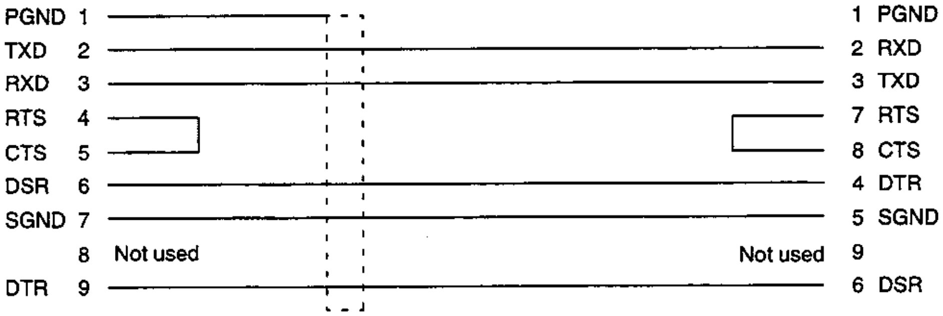
3.5.1 Communications Cables

1) Models

Table 3.6 Cable Models

Cable Length	Model
2.5 m	JZMSZ-120W0260-03
15 m	JZMSZ-120W0260-15

2) Connection Diagram


PGND 1
TXD 2
RXD 3
RTS 4
CTS 5
DSR 6
SGND 7
8 Not used
DTR 9
1 PGND
2 RXD
3 TXD
7 RTS
8 CTS
4 DTR
5 SGND
Not used 9
6 DSR

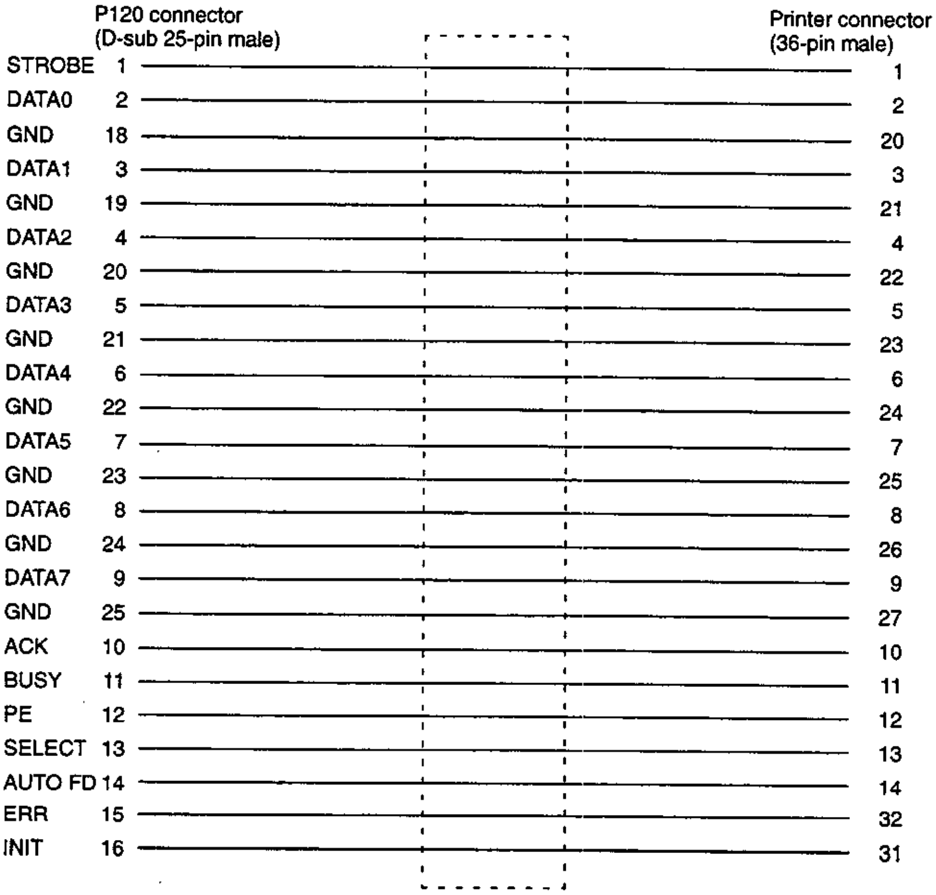
3.5.2 Printer Cables

1) Models

Table 3.7 Cable Models

Cable Length	Model
3 m	JZMSZ-120W0700-03
5 m	JZMSZ-120W0700-05

2) Connection Diagram



	P120 connector (D-sub 25-pin male)	Printer connector (36-pin male)
STROBE	1	1
DATA0	2	2
GND	18	20
DATA1	3	3
GND	19	21
DATA2	4	4
GND	20	22
DATA3	5	5
GND	21	23
DATA4	6	6
GND	22	24
DATA5	7	7
GND	23	25
DATA6	8	8
GND	24	26
DATA7	9	9
GND	25	27
ACK	10	10
BUSY	11	11
PE	12	12
SELECT	13	13
AUTO FD	14	14
ERR	15	32
INIT	16	31

System Installation

4

This chapter describes preparations and procedures for installing the P120.

4.1 Preparing for Installation **4-2**

4.2 Installation **4-2**

4.1 Preparing for Installation

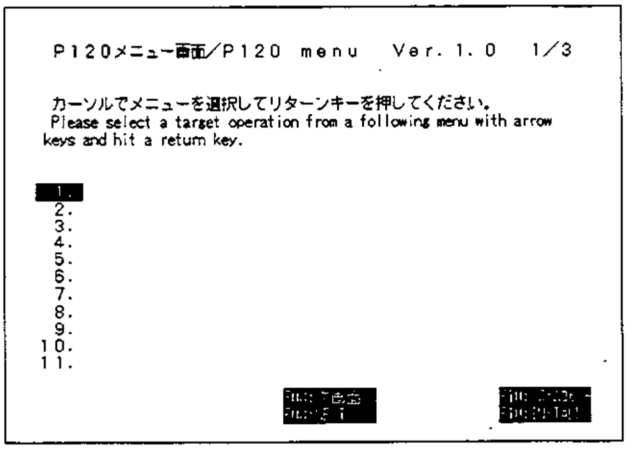
Have the following ready in advance:

- P120 Programming Panel: Model DISCT-P120□
- System disk: FMSC-PP3

4.2 Installation

Transfer the system software to the P120 hard drive using the following procedure.

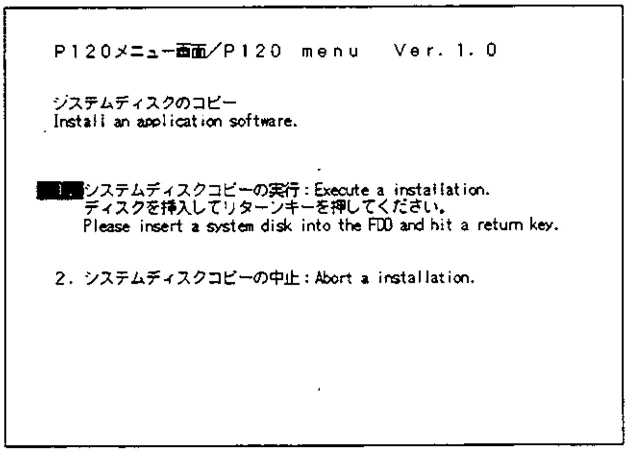
1) Connect power to the P120. The menu screen will be displayed.



```
P120メニュー画面/P120 menu   Ver. 1. 0   1/3

カーソルでメニューを選択してリターンキーを押してください。
Please select a target operation from a following menu with arrow
keys and hit a return key.

 1.
 2.
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.
11.
```

Figure 4.1

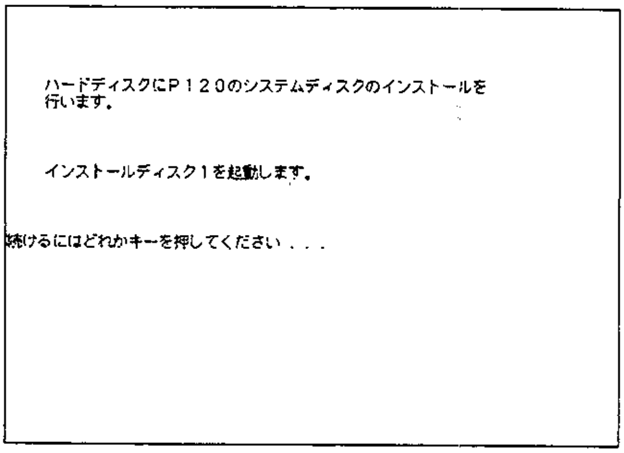
2) Press F10 (Install).



```
P120メニュー画面/P120 menu   Ver. 1. 0

システムディスクのコピー
Install an application software.

1. システムディスクコピーの実行：Execute a installation.
   ディスクを挿入してリターンキーを押してください。
   Please insert a system disk into the FDD and hit a return key.

2. システムディスクコピーの中止：Abort a installation.
```

Figure 4.2

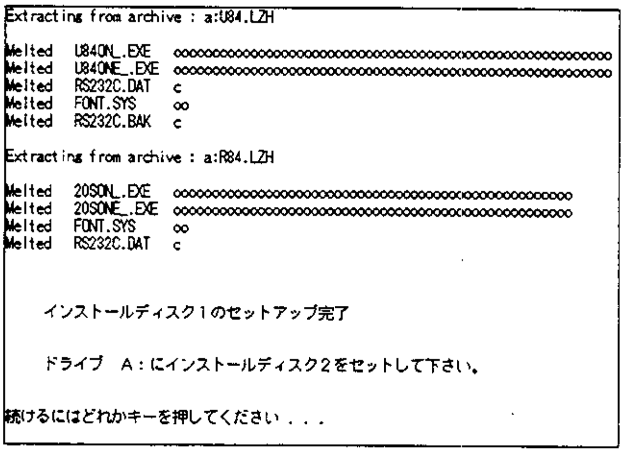
3) Insert Disk 1 and press the Enter Key.



```
    ハードディスクにＰ１２０のシステムディスクのインストールを
    行います。


    インストールディスク１を起動します。


続けるにはどれかキーを押してください . . .
```

Figure 4.3

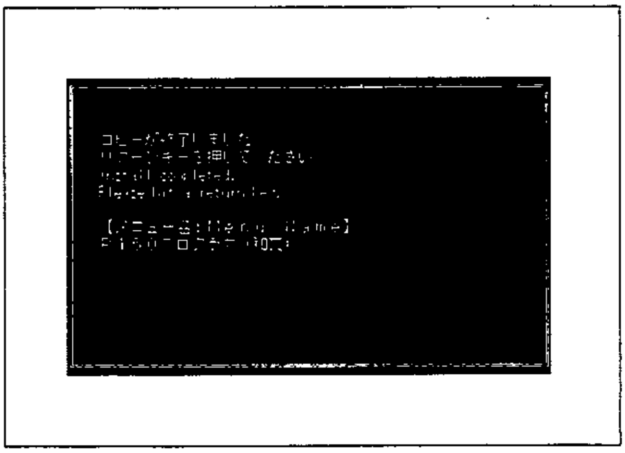
4) Press the Enter Key.



```
Extracting from archive : a:U84.LZH

Melted   U840NL_.EXE   ooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
Melted   U840NE_.EXE   ooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
Melted   RS232C.DAT    c
Melted   FONT.SYS      oo
Melted   RS232C.BAK    c

Extracting from archive : a:R84.LZH

Melted   20SONL_.EXE   oooooooooooooooooooooooooooooooooooooooooooooooooooooooo
Melted   20SONE_.EXE   oooooooooooooooooooooooooooooooooooooooooooooooooooooooo
Melted   FONT.SYS      oo
Melted   RS232C.DAT    c


    インストールディスク１のセットアップ完了


    ドライブ　Ａ：にインストールディスク２をセットして下さい。


続けるにはどれかキーを押してください . . .
```

Figure 4.4

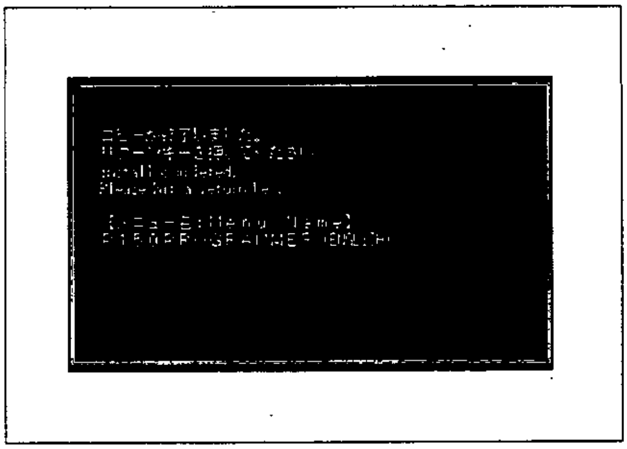
5) Insert Disk 2 and press the Enter Key.



```
コピーが終了しました。
リターンキーを押してください。
Install completed.
Please hit a return key.

【メニュー名:Menu Name】
F150プログラマ(日本語)
```

Figure 4.5

6) Press the Enter Key.



```
コピーが終了しました。
リターンキーを押してください。
Install completed.
Please hit a return key.

【メニュー名:Menu Name】
F150 PROGRAMMER (ENGLISH)
```

Figure 4.6

7) Press the Enter Key.

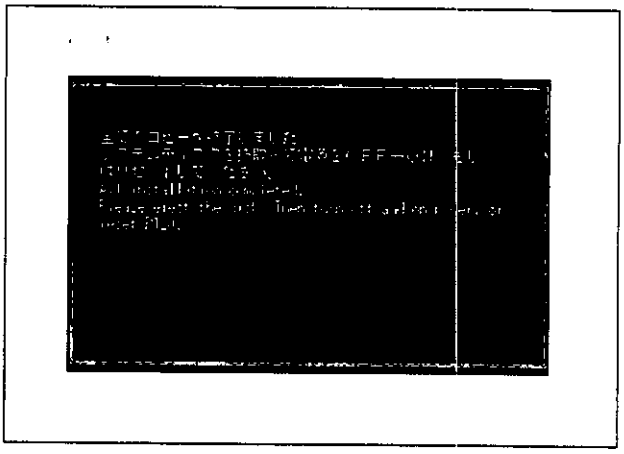


Figure 4.7

8) Installation is now complete.

Reset the P120 or turn OFF the power then turn it ON again.
The P120 can be reset by pressing the Ctrl + Alt + Delete Keys.

Setup

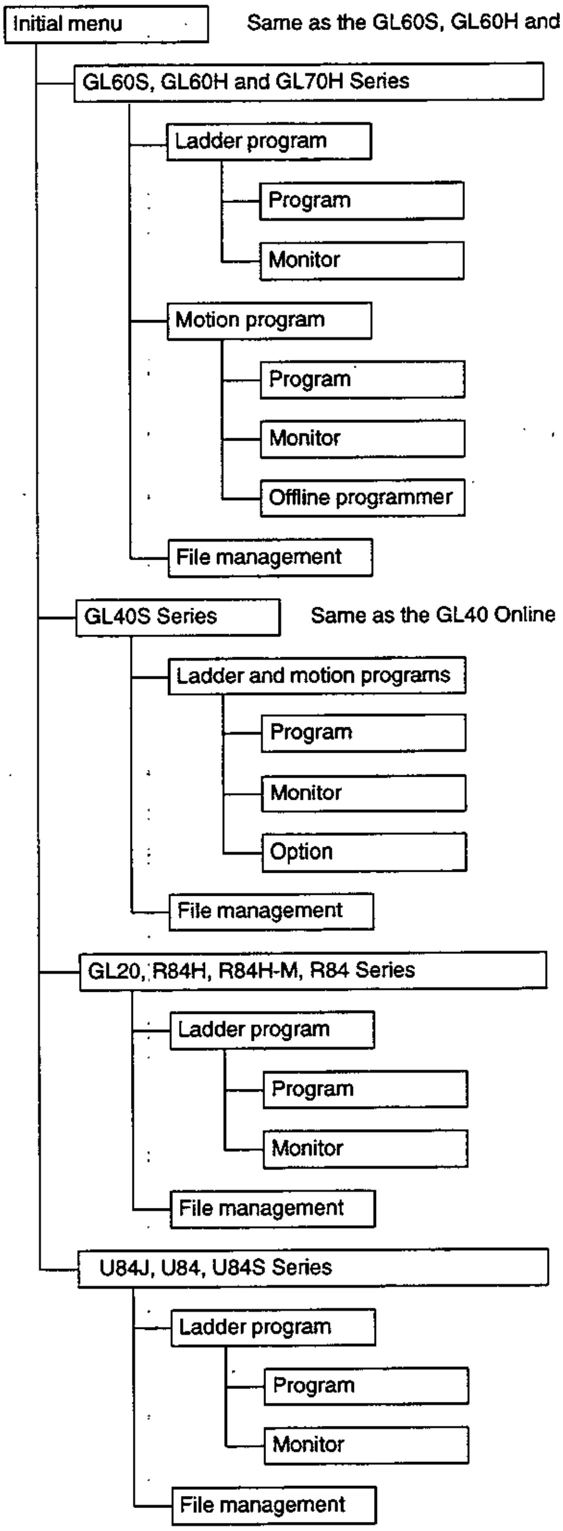
5

This chapter provides details on the connection of the P120 with other components.

5.1 Interconnection of Devices 5-2

5.2 Connection to Components 5-3

5.1 Interconnection of Devices


Initial menu
GL60S, GL60H and GL70H Series
Ladder program
Program
Monitor
Motion program
Program
Monitor
Offline programmer
File management
GL40S Series
Ladder and motion programs
Program
Monitor
Option
File management
GL20, R84H, R84H-M, R84 Series
Ladder program
Program
Monitor
File management
U84J, U84, U84S Series
Ladder program
Program
Monitor
File management

Same as the GL60S, GL60H and GL70H Online Programmer.

Same as the GL40 Online Programmer.

Same as the R84 Online Programmer.

Same as the U84 Online Programmer.

5.2 Connection to Components

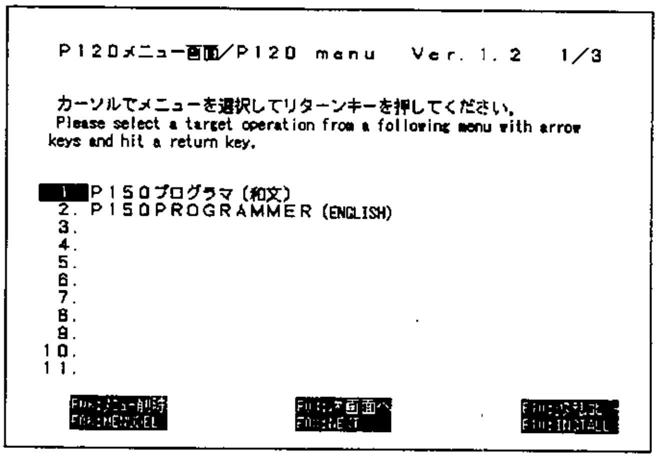
The FMSC-PP3 System Disk can be connected to the following Programmable Controllers.

- GL60S, GL60H and GL70H Series
- GL40S Series
- GL20, R84H, R84H-M, R84 Series
- U84, U84J, U84S Series

The following procedure describes how to activate the Online Programmer (for ladder programming) for GL60S-series Programmable Controllers.

1) Connect the P120 and the GL60S.

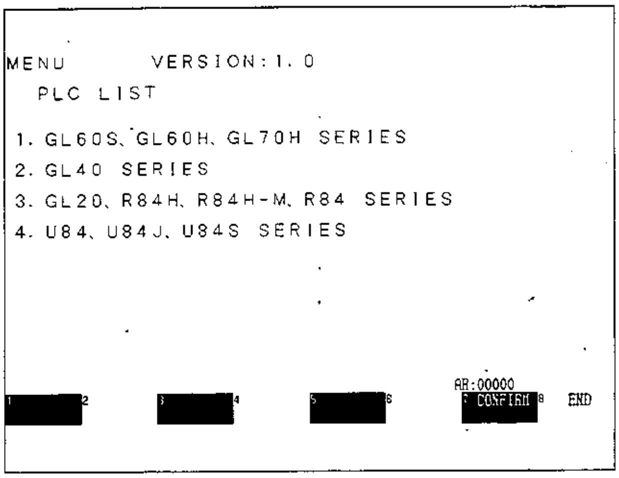
2) When the P120 starts up, the menu screen will be displayed.



```
P120メニュー画面/P120 menu   Ver. 1. 2   1/3

カーソルでメニューを選択してリターンキーを押してください。
 Please select a target operation from a following menu with arrow
keys and hit a return key.

  1 P150プログラマ (和文)
  2. P150PROGRAMMER (ENGLISH)
  3.
  4.
  5.
  6.
  7.
  8.
  9.
 10.
 11.
```

Figure 5.1

3) Select **2. P150 Programmer (English)** with the Up or Down Cursor Key and press the Enter Key.



MENU VERSION: 1. 0

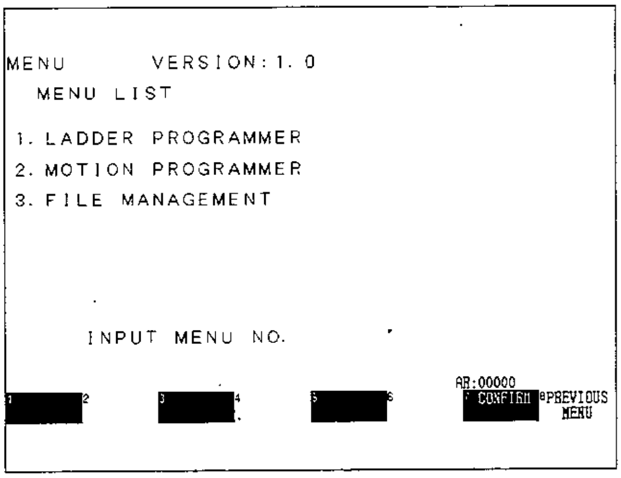
PLC LIST

1. GL60S、GL60H、GL70H SERIES
2. GL40 SERIES
3. GL20、R84H、R84H-M、R84 SERIES
4. U84、U84J、U84S SERIES

AR:00000
1
2
3
4
5
6
7 CONFIRM
8 END

Figure 5.2

4) Select **1. GL60S, GL60H. GL70H Series** with the Up or Down Cursor Key and select Confirm.



MENU VERSION: 1. 0

MENU LIST

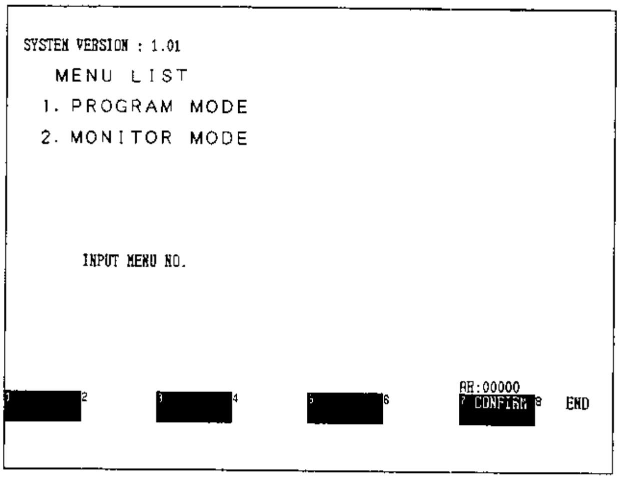
1. LADDER PROGRAMMER
2. MOTION PROGRAMMER
3. FILE MANAGEMENT

INPUT MENU NO.

AR:00000
1
2
3
4
5
6
7 CONFIRM
8 PREVIOUS MENU

Figure 5.3

5) Select **1. Ladder Programmer** with the Up or Down Cursor Key and select Confirm.



SYSTEM VERSION : 1.01

MENU LIST

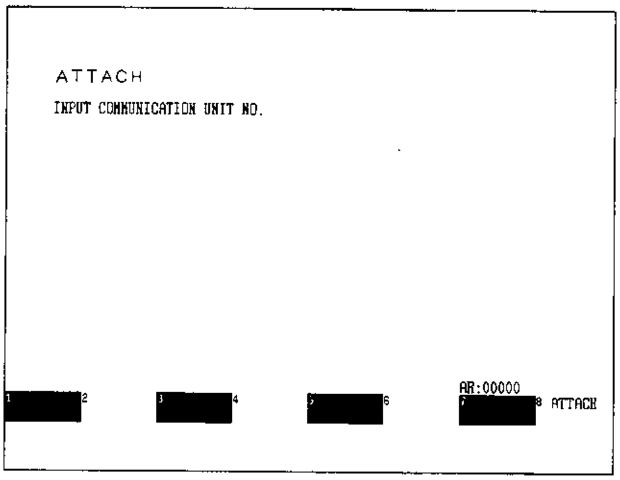
1. PROGRAM MODE
2. MONITOR MODE

INPUT MENU NO.

AR:00000

Figure 5.4

6) Select **1. Program Mode** with the Up or Down Cursor Key and select Confirm.



ATTACH

INPUT COMMUNICATION UNIT NO.

AR:00000

Figure 5.5

7) Enter **1** and select Attach to connect online to the PLC.

The remainder of the operation is the same as for the P150.

Online Operation (Basic Editing)

6

This chapter describes the basic online operation of the P120 Programming Panel. It explains ladder programs, motion programs, and file management, plus the various procedures and conditions needed to carry out these tasks.

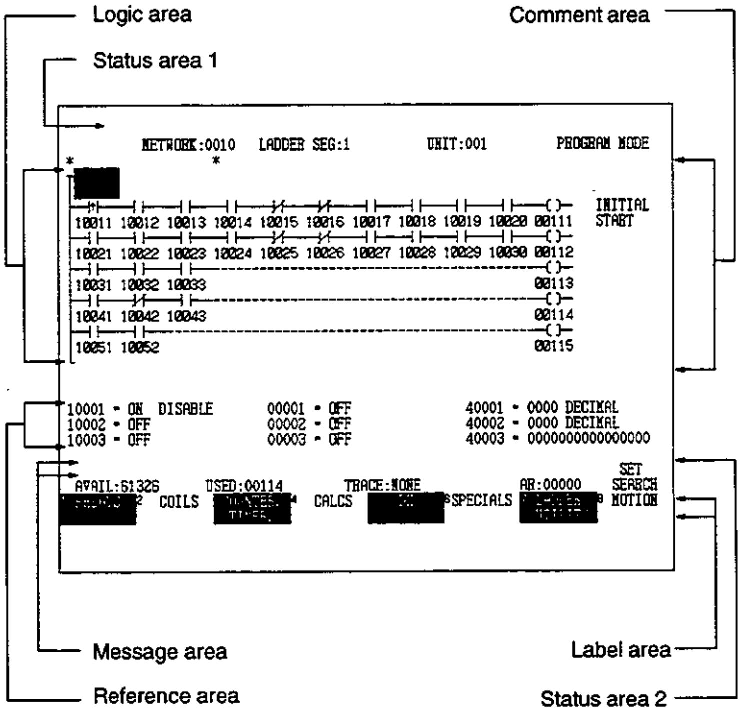
6.1 Network Screen **6-2**

6.2 Ladder Programs **6-4**
- 6.2.1 Ladder Programming 6-4
- 6.2.2 Operating Modes 6-18
- 6.2.3 Attach (Going Online) 6-20
- 6.2.4 Supervisory Operation 6-22
- 6.2.5 Monitoring Programming 6-91
- 6.2.6 Traceback 6-188

6.3 Motion Programs **6-196**
- 6.3.1 Creating and Modifying Motion Programs 6-196
- 6.3.2 Program Monitor 6-213
- 6.3.3 Setting Parameters 6-214
- 6.3.4 Position Monitor 6-220
- 6.3.5 Program Load 6-221
- 6.3.6 Parameter Load 6-227
- 6.3.7 Error Messages 6-235

6.4 File Management **6-236**
- 6.4.1 File Management Procedures 6-236
- 6.4.2 P120 Transmission Parameters 6-237
- 6.4.3 Disk Operations 6-240
- 6.4.4 File Operations 6-244

6.1 Network Screen



```
        NETWORK:0010   LADDER SEG:1         UNIT:001        PROGRAM MODE
*              *
 10011 10012 10013 10014 10015 10016 10017 10018 10019 10020 00111   INITIAL
                                                                     START
 10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 00112
 10031 10032 10033                                           00113
 10041 10042 10043                                           00114
 10051 10052                                                 00115

10001 = ON  DISABLE     00001 = OFF        40001 = 0000 DECIMAL
10002 = OFF             00002 = OFF        40002 = 0000 DECIMAL
10003 = OFF             00003 = OFF        40003 = 0000000000000000
                                                                SET
 AVAIL:61326    USED:00114      TRACE:NONE           AR:00000  SEARCH
           2 COILS           4 CALCS            6SPECIALS      8 MOTION
```

Figure 6.1 Network Screen

1) Logic Area

This area displays the networks stored in the GL60S, GL60H, or GL70H. It can display only one specific network at a time.

2) Reference Area

This area displays the conditions of the discrete signals handled by the GL60S, GL60H, or GL70H, as well as the contents of the register. It can display up to 9 items (3 rows × 3 columns) at a time. Also, by changing the screen, the logic area becomes the expansion reference area or the expanded comment area. The expansion reference area can display a maximum of 51 items (17 rows × 3 columns) and the expanded comment area can display a maximum of 27 items (9 rows × 3 columns) at a time.

3) Comment Area

This area automatically displays comments for coils used in the displayed network.

4) Message Area

This area displays operator instructions, various messages showing the operational status of the P120, and error messages.

5) Label Area

This area displays the functions of F1 to F8 on the uppermost row of the Function Keyboard.

6) Status Area

The following 8 items are displayed in this area.

a) Normal ladder circuits .... Network: □□□□ Segment: □
Action circuits .... Network: □□□□ Action step: □□□
Transition circuits .... T□□□
Subroutine circuits .... Network: □□□□ Subroutine: □□□

b) Unit number: □□□ .... The unit number of the GL60S, GL60H, or GL70H that is connected.

c) □□□□□□□ mode .... Displays the operating mode.

d) Available memory: □□□□□□ .... Amount of free memory remaining.

e) Used memory: □□□□□ .... Amount of memory being used.

f) Trace: □□□□ .... Number of the network on which a trace is performed.

g) AR □□□□□ .... Displays the contents of the assembly register which keeps the values input from the keyboard.

h) Search data .... Displays the search parameters.

6.2 Ladder Programs

6.2.1 Ladder Programming 6-4
6.2.2 Operating Modes 6-18
6.2.3 Attach (Going Online) 6-20
6.2.4 Supervisory Operation 6-22
6.2.5 Monitoring Programming 6-91
6.2.6 Traceback 6-188

6.2.1 Ladder Programming

Perform the following procedures to perform ladder programming.

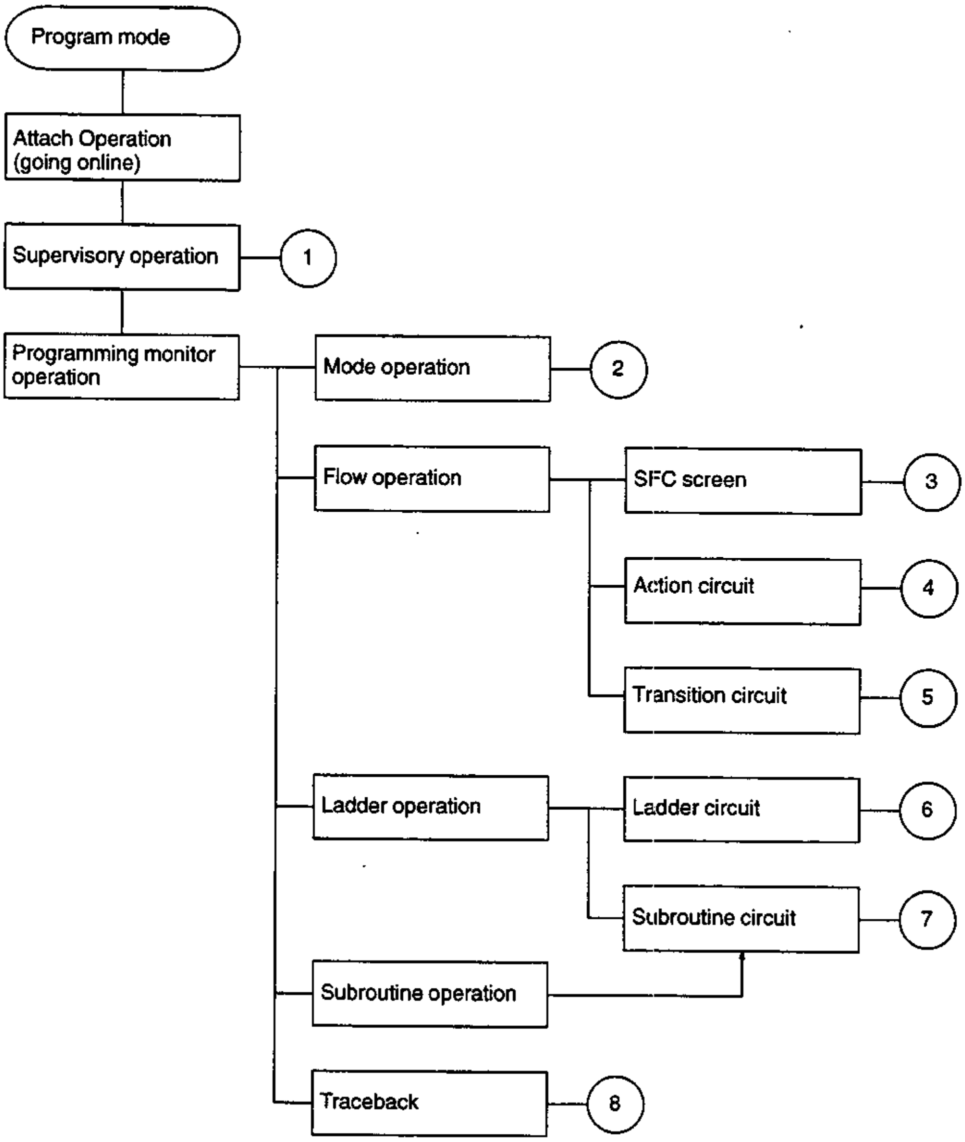
1) Connect the P120 to the GL60S, GL60H, or GL70H.

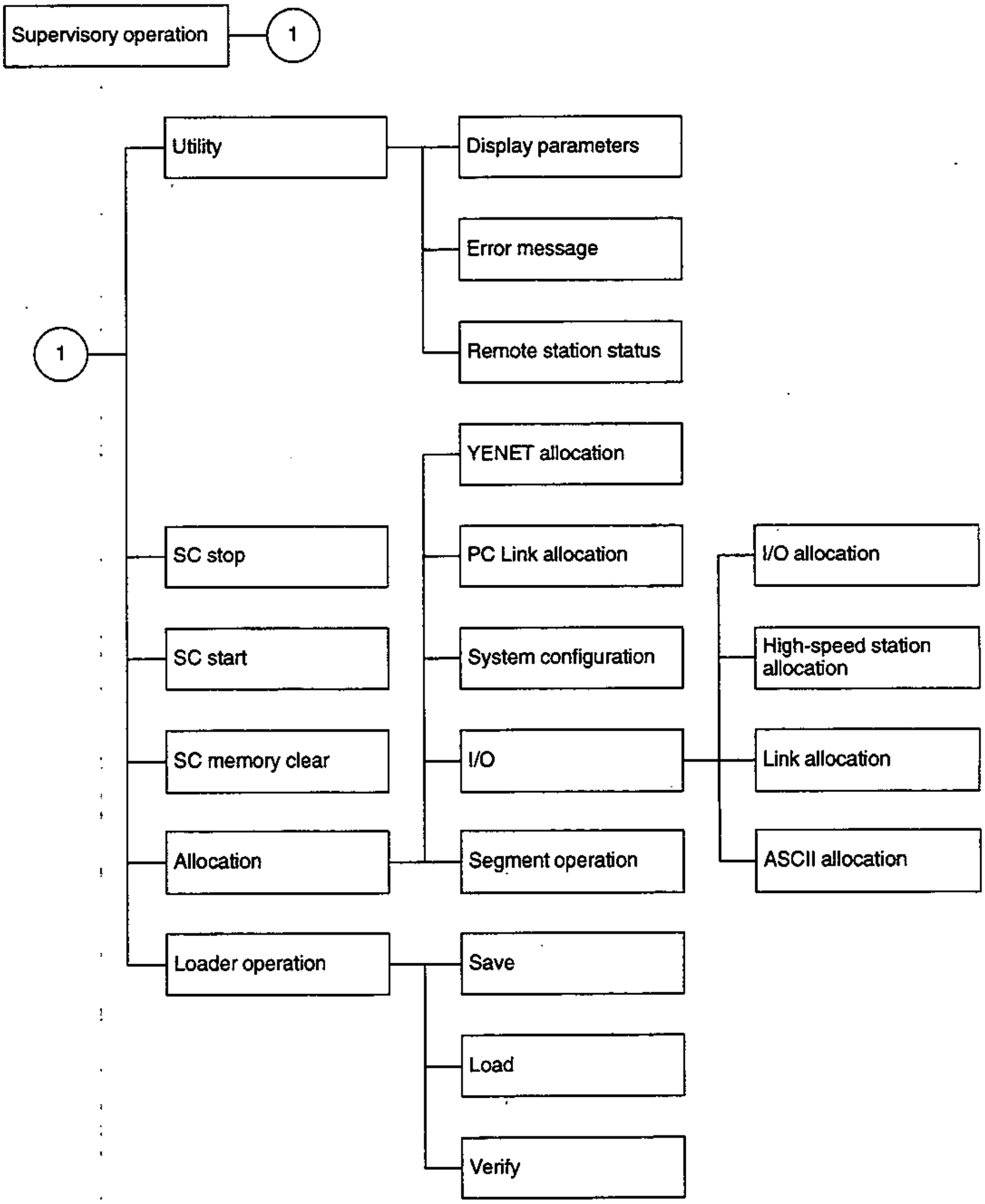
2) Connect power to the P120.

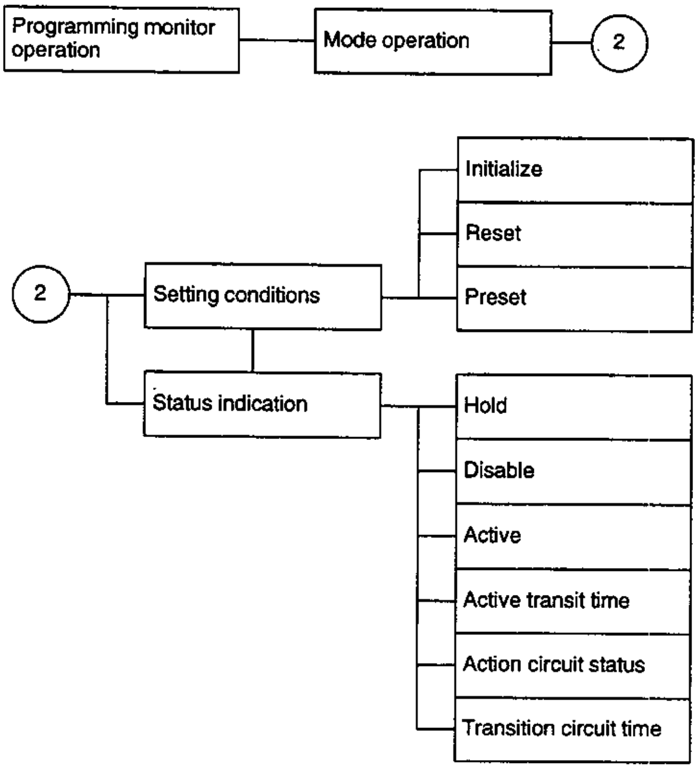
3) From the Select Device Type Menu, select **1. GL60S, GL60H, and GL70H Series**.

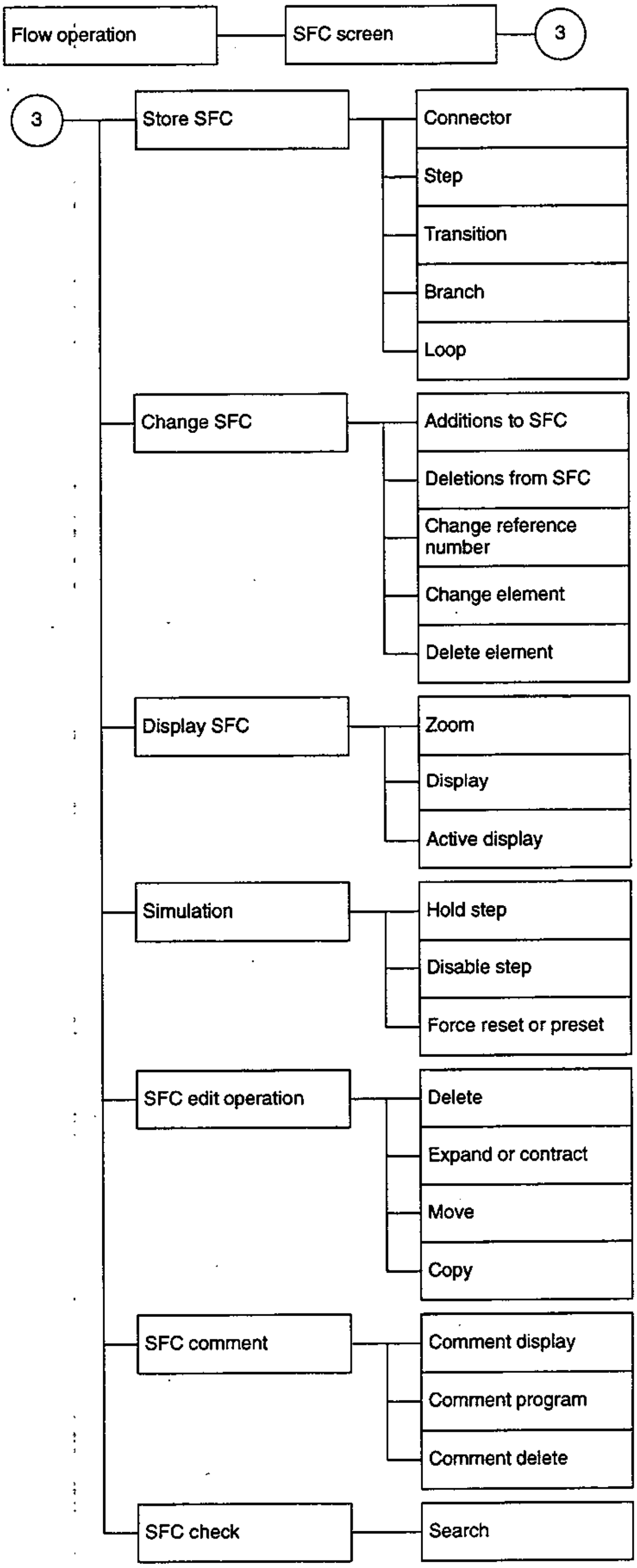
4) From the Menu List, select **1. Ladder Programmer.**

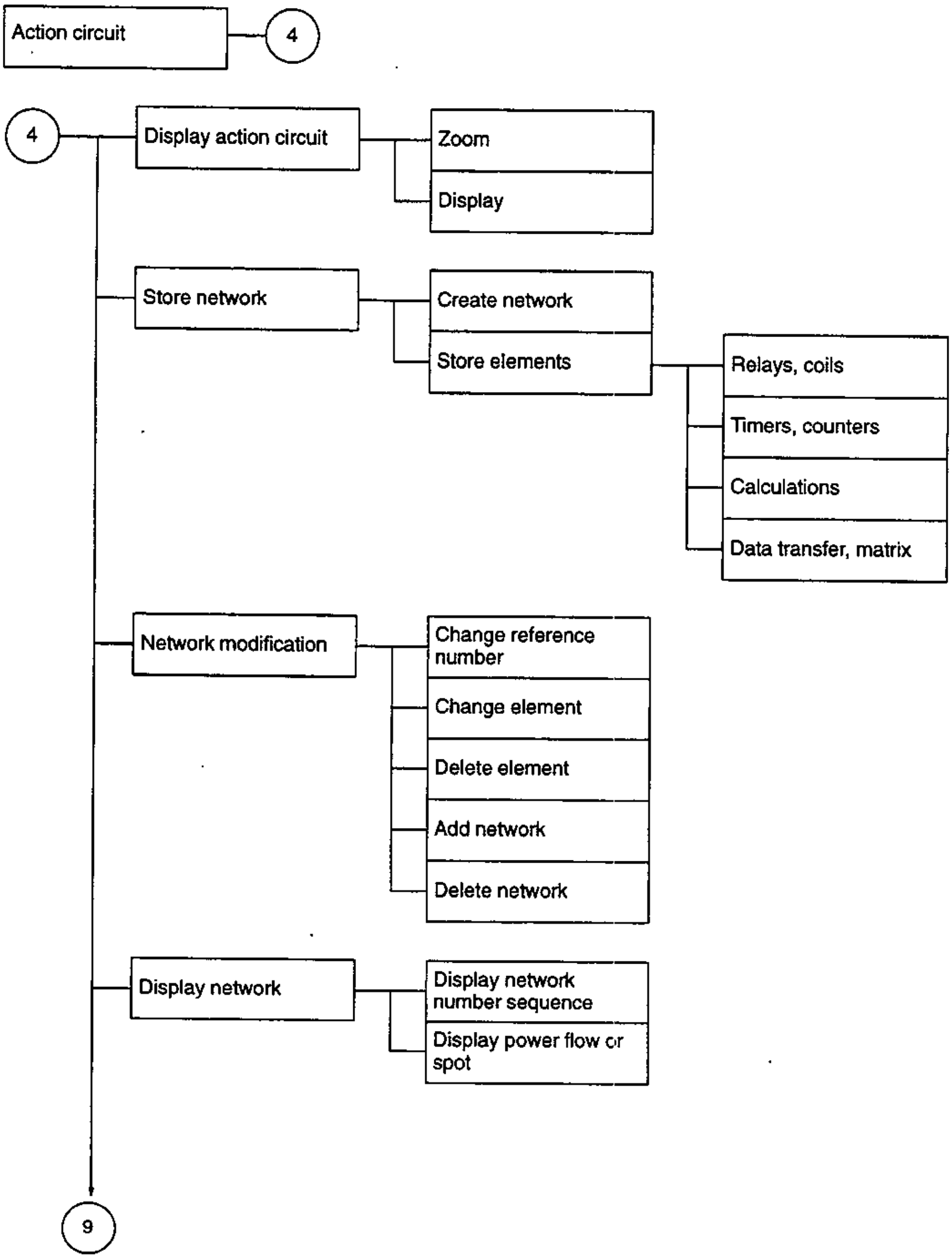
5) From the Menu List, select Program Mode or Monitor Mode.

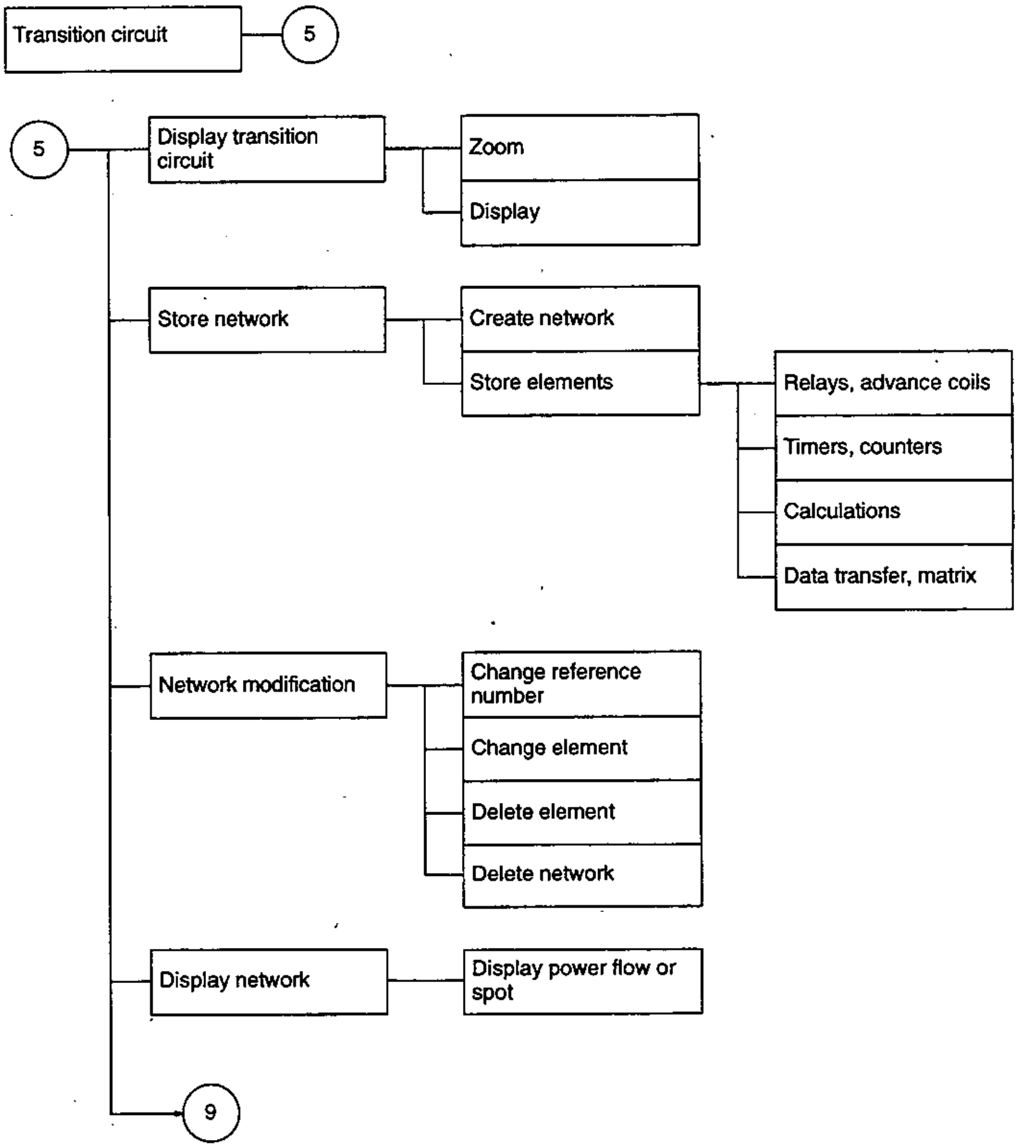

Program mode
Attach Operation (going online)
Supervisory operation
1
Programming monitor operation
Mode operation
2
Flow operation
SFC screen
3
Action circuit
4
Transition circuit
5
Ladder operation
Ladder circuit
6
Subroutine circuit
7
Subroutine operation
Traceback
8

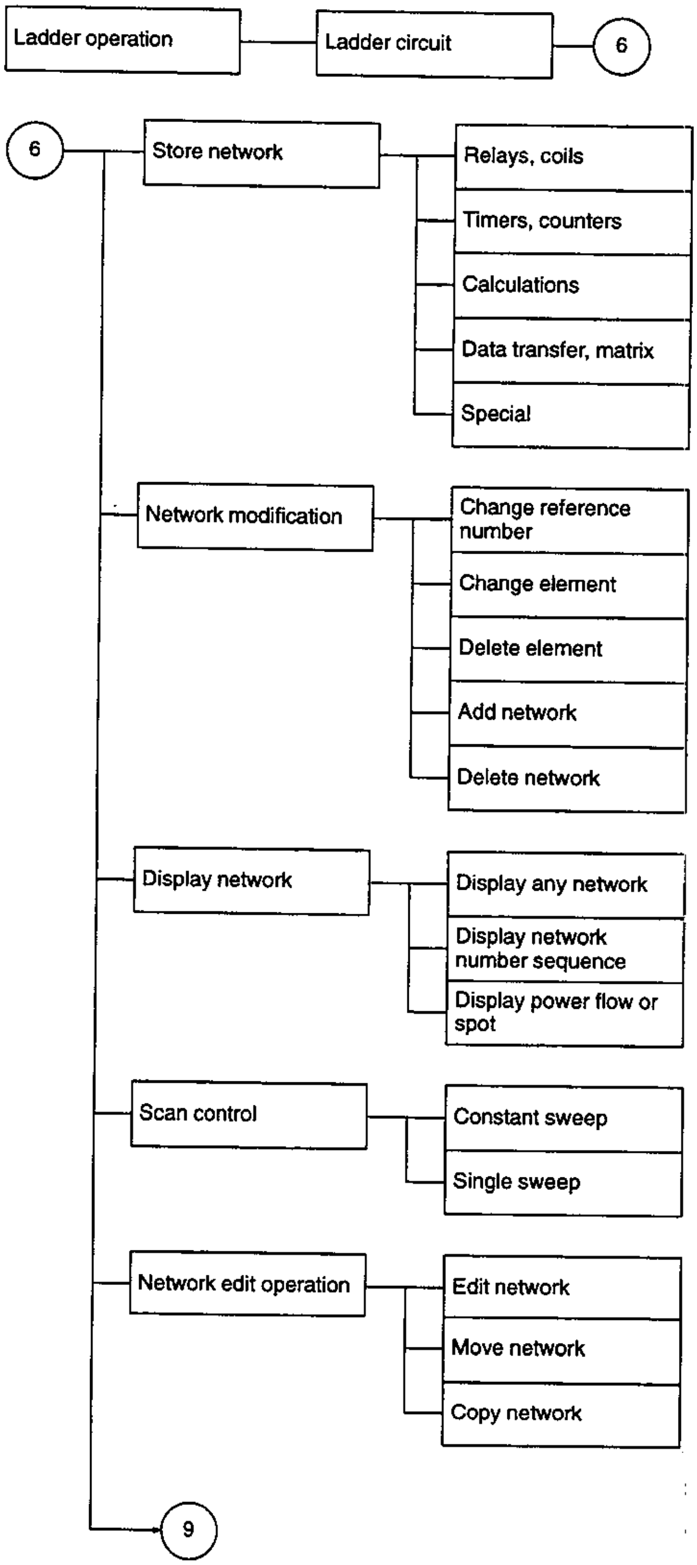

Supervisory operation
1
1
Utility
Display parameters
Error message
Remote station status
YENET allocation
SC stop
PC Link allocation
I/O allocation
SC start
System configuration
High-speed station allocation
SC memory clear
I/O
Link allocation
Allocation
Segment operation
ASCII allocation
Loader operation
Save
Load
Verify

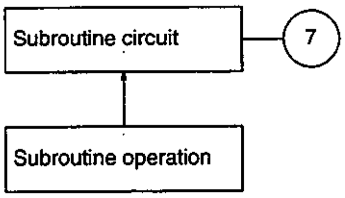

Programming monitor operation
Mode operation
2
2
Setting conditions
Initialize
Reset
Preset
Status indication
Hold
Disable
Active
Active transit time
Action circuit status
Transition circuit time

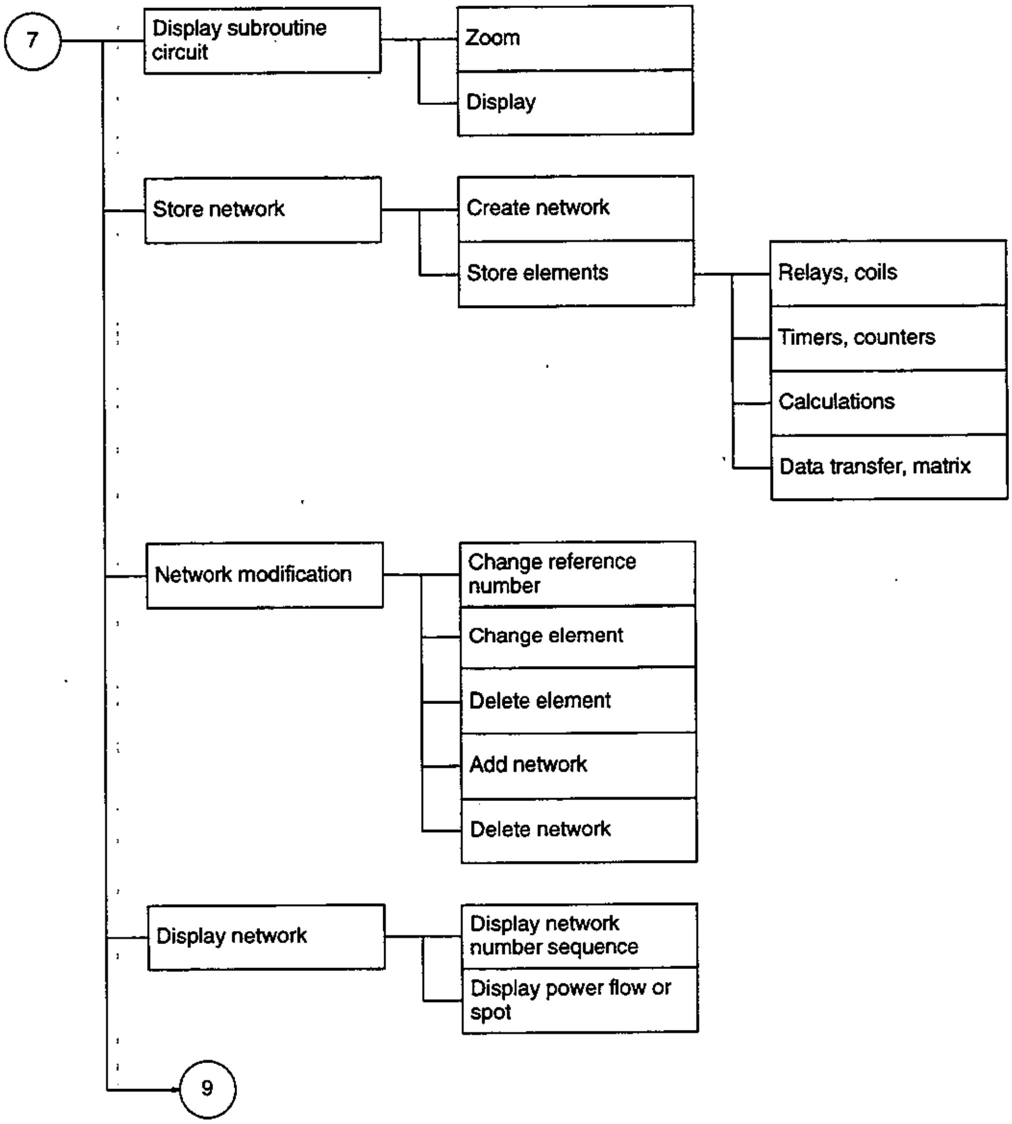

Flow operation
SFC screen
3
3
Store SFC
Connector
Step
Transition
Branch
Loop
Change SFC
Additions to SFC
Deletions from SFC
Change reference number
Change element
Delete element
Display SFC
Zoom
Display
Active display
Simulation
Hold step
Disable step
Force reset or preset
SFC edit operation
Delete
Expand or contract
Move
Copy
SFC comment
Comment display
Comment program
Comment delete
SFC check
Search

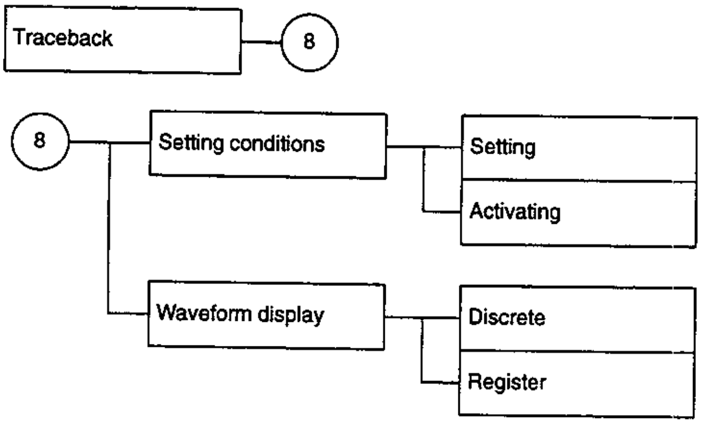

Action circuit
4
4
Display action circuit
Zoom
Display
Store network
Create network
Store elements
Relays, coils
Timers, counters
Calculations
Data transfer, matrix
Network modification
Change reference number
Change element
Delete element
Add network
Delete network
Display network
Display network number sequence
Display power flow or spot
9

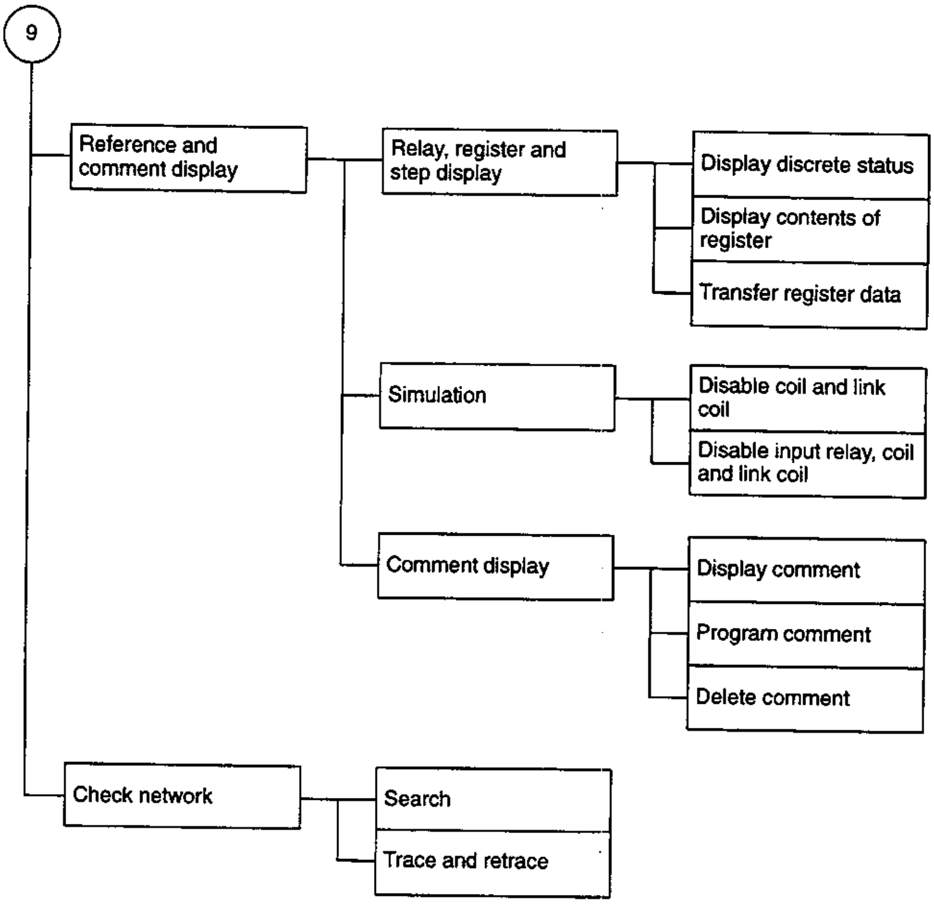

Transition circuit
5
5
Display transition circuit
Zoom
Display
Store network
Create network
Store elements
Relays, advance coils
Timers, counters
Calculations
Data transfer, matrix
Network modification
Change reference number
Change element
Delete element
Delete network
Display network
Display power flow or spot
9

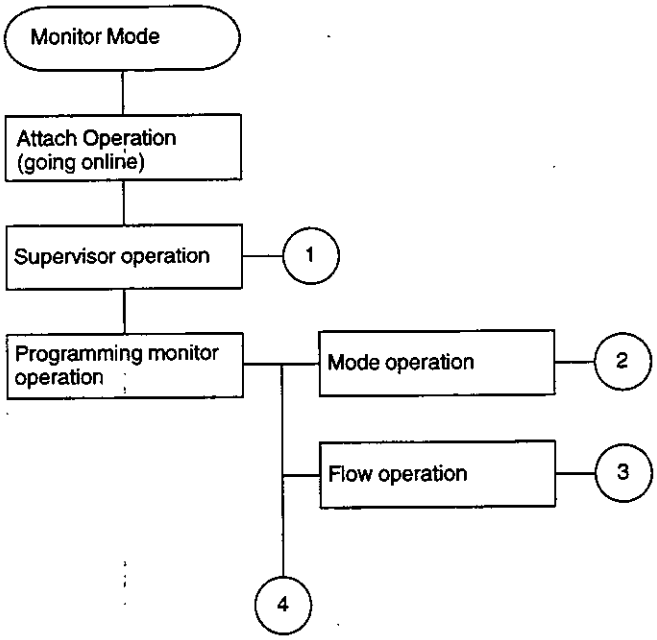

Ladder operation
Ladder circuit
6
6
Store network
Relays, coils
Timers, counters
Calculations
Data transfer, matrix
Special
Network modification
Change reference number
Change element
Delete element
Add network
Delete network
Display network
Display any network
Display network number sequence
Display power flow or spot
Scan control
Constant sweep
Single sweep
Network edit operation
Edit network
Move network
Copy network
9

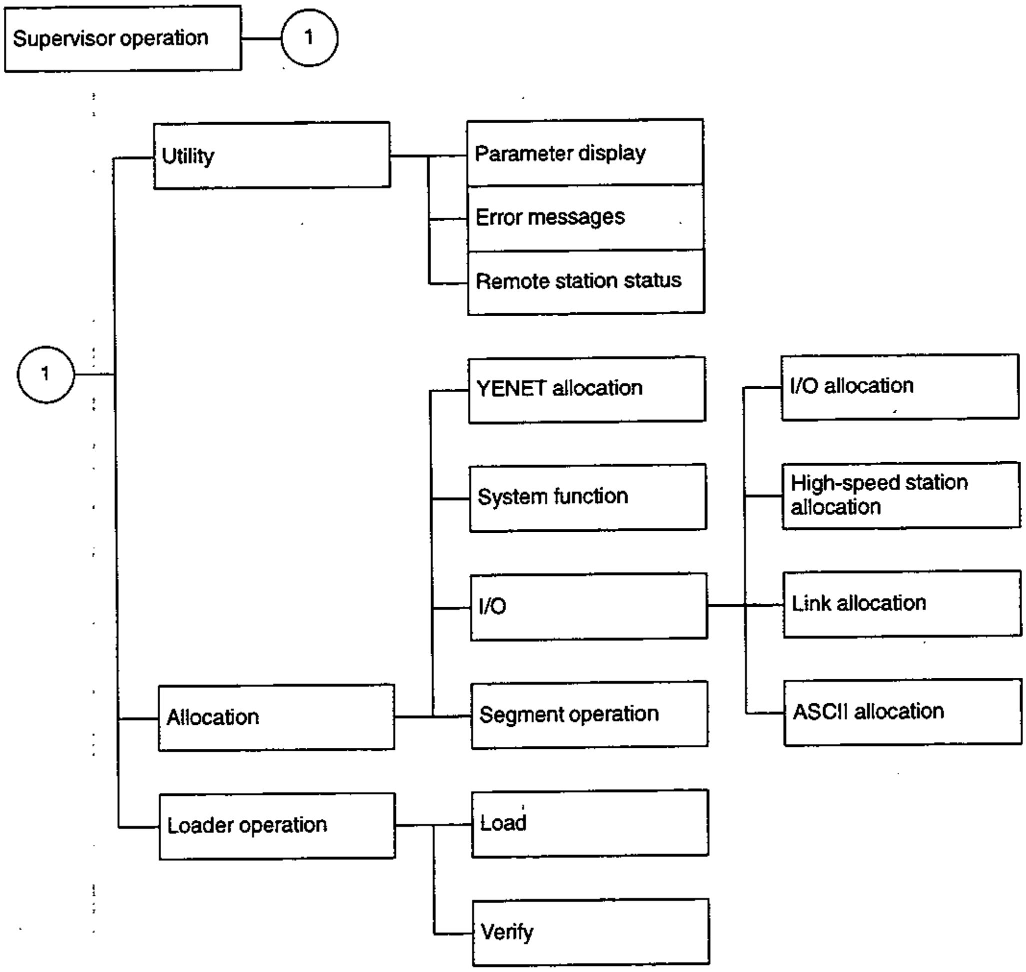

Subroutine circuit
7
Subroutine operation

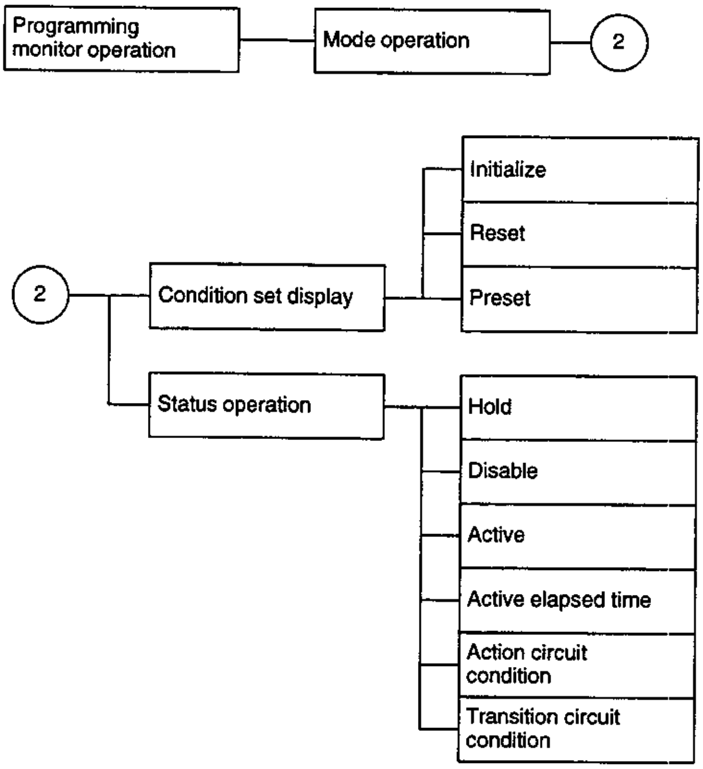

7
Display subroutine circuit
Zoom
Display
Store network
Create network
Store elements
Relays, coils
Timers, counters
Calculations
Data transfer, matrix
Network modification
Change reference number
Change element
Delete element
Add network
Delete network
Display network
Display network number sequence
Display power flow or spot
9

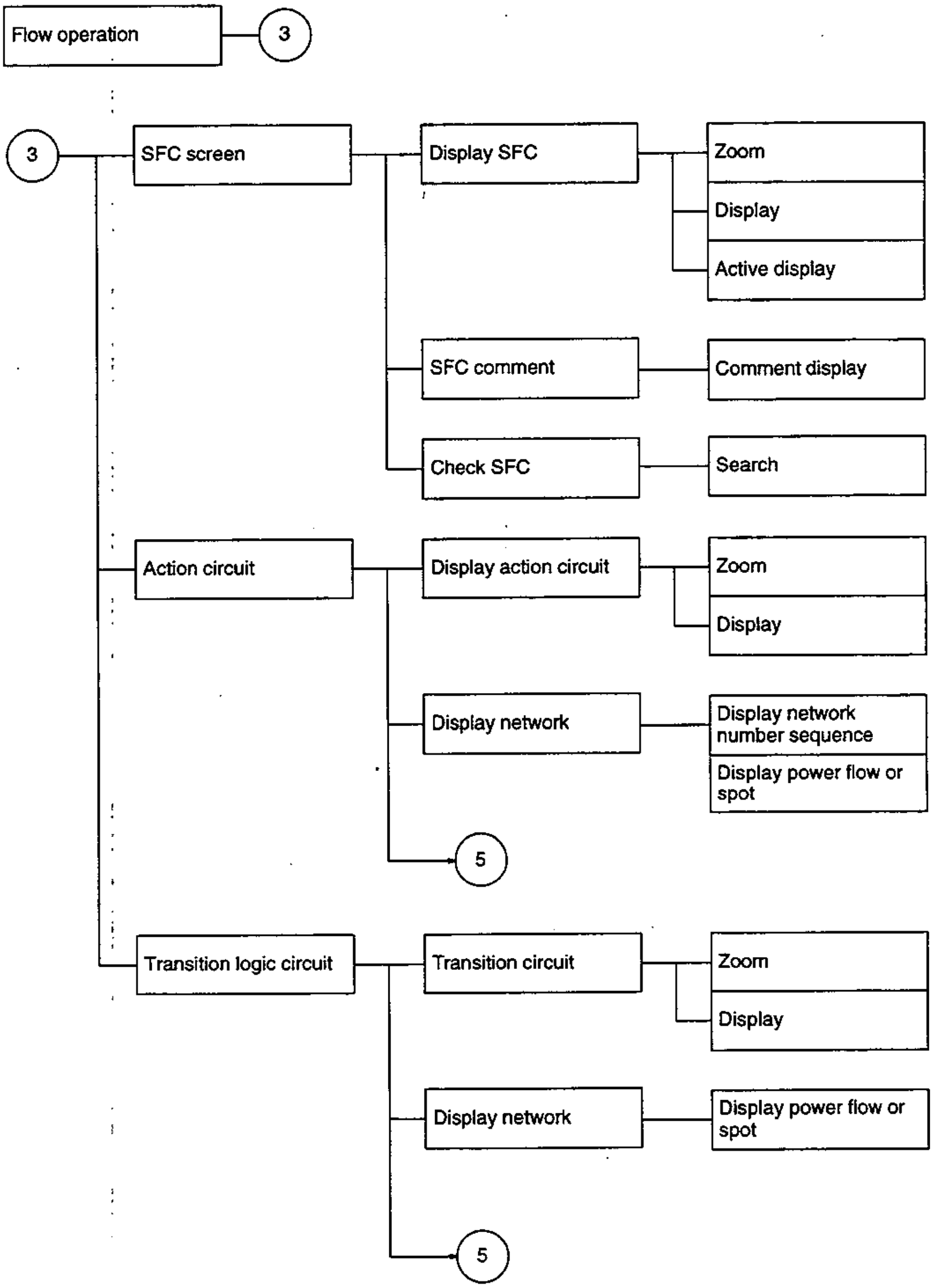

Traceback
8
8
Setting conditions
Setting
Activating
Waveform display
Discrete
Register

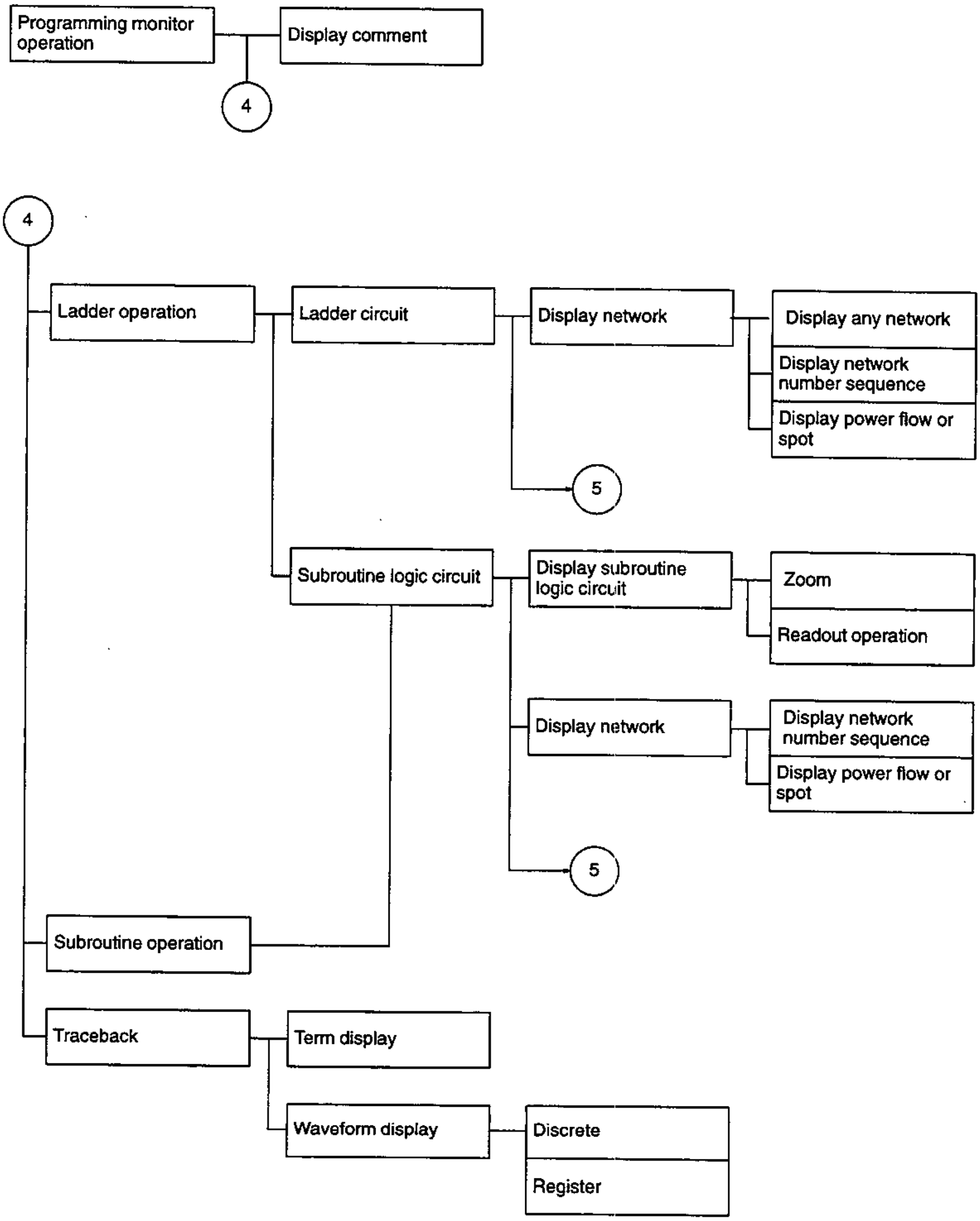

9
Reference and comment display
Relay, register and step display
Display discrete status
Display contents of register
Transfer register data
Simulation
Disable coil and link coil
Disable input relay, coil and link coil
Comment display
Display comment
Program comment
Delete comment
Check network
Search
Trace and retrace

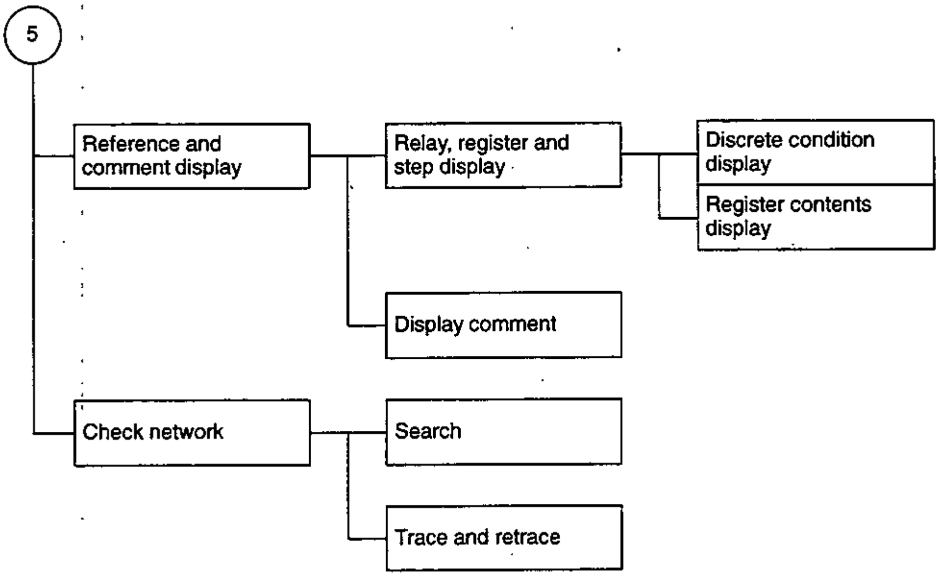

Monitor Mode
Attach Operation (going online)
Supervisor operation
1
Programming monitor operation
Mode operation
2
Flow operation
3
4


Supervisor operation
1
1
Utility
Parameter display
Error messages
Remote station status
YENET allocation
I/O allocation
System function
High-speed station allocation
I/O
Link allocation
Allocation
Segment operation
ASCII allocation
Loader operation
Load
Verify


Programming monitor operation
Mode operation
2
2
Condition set display
Initialize
Reset
Preset
Status operation
Hold
Disable
Active
Active elapsed time
Action circuit condition
Transition circuit condition


Flow operation
3
3
SFC screen
Display SFC
Zoom
Display
Active display
SFC comment
Comment display
Check SFC
Search
Action circuit
Display action circuit
Zoom
Display
Display network
Display network number sequence
Display power flow or spot
5
Transition logic circuit
Transition circuit
Zoom
Display
Display network
Display power flow or spot
5


Programming monitor operation
Display comment
4
4
Ladder operation
Ladder circuit
Display network
Display any network
Display network number sequence
Display power flow or spot
5
Subroutine logic circuit
Display subroutine logic circuit
Zoom
Readout operation
Display network
Display network number sequence
Display power flow or spot
5
Subroutine operation
Traceback
Term display
Waveform display
Discrete
Register


5
Reference and comment display
Relay, register and step display
Discrete condition display
Register contents display
Display comment
Check network
Search
Trace and retrace

6.2.2 Operating Modes

There are two modes of operation available: Program and Monitor.

Program Mode is selected to modify the contents of the memory, such as storing and modifying SFCs and networks, and modifying the status of the GL60S, GL60H, and GL70H. All program operations, including Monitor Mode operations, are carried out in Program Mode.

Monitor Mode is selected to display SFCs and networks, and the activity status of the GL60S, GL60H, and GL70H. It cannot be used to modify the contents of the memory of GL60S, GL60H, and GL70H. (It can thus prevent destruction of the memory by incorrect operation).

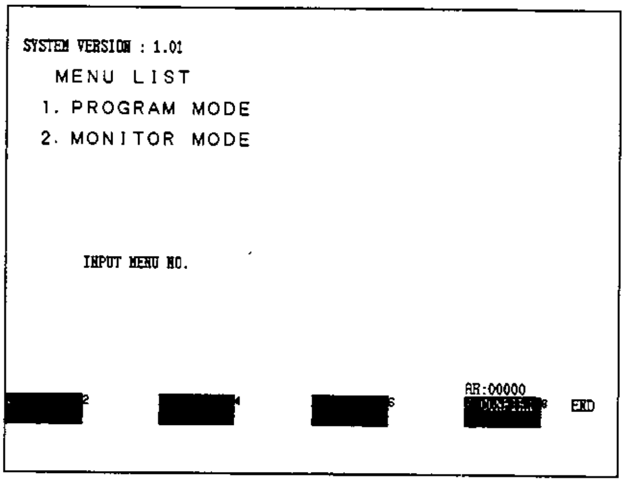
The choice of operating mode is made from the Initial Menu List Screen. According to the mode selected, set the Memory Protect Switch of the GL60S, GL60H, and GL70H as shown in *Table 6.1 Setting the Protect Switch of the GL60S, GL60H, and GL70H.*

Table 6.1 Setting the Protect Switch of the GL60S, GL60H, and GL70H

Menu Item	Operating Mode	GL60S, GL60H, or GL70H Protect Switch
1	Program Mode	OFF
2	Monitor Mode	ON (or OFF)

Use the following procedure to select the operating mode.

1) Enter the Menu number in the AR.



```
SYSTEM VERSION : 1.01
  MENU LIST
 1. PROGRAM MODE
 2. MONITOR MODE


     INPUT MENU NO.


                                        AR:00000
```

Figure 6.2

2) Select 1. Program Mode or 2. Monitor Mode.

3) Select Confirm.

4) Select Program Mode or Monitor Mode.

5) Perform the Attach Operation to go online. (See *6.2.3 Attach (Going Online).*)

Note (1) To clear the AR, press Shift and CLR AR/CLR ERR Keys at the same time.

(2) To change the mode after completing the Attach Operation, return to the Initial Display (see *Figure 6.2*) and select the mode from the Menu List.

(3) To return to the initial display, either press the Supervisory Key and then select Initial Display, or press the Shift + Supervisory Keys.

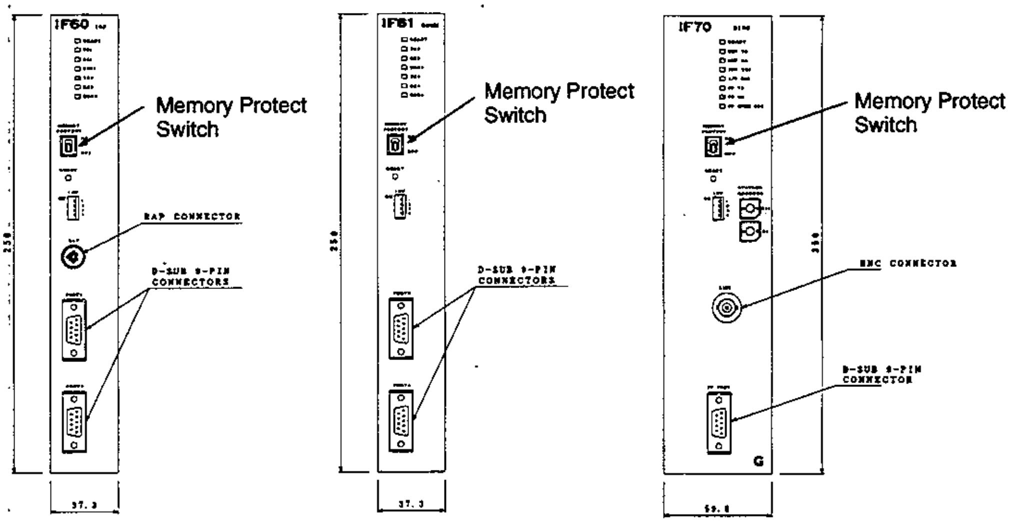

IF60
Memory Protect Switch
RAP CONNECTOR
D-SUB 9-PIN CONNECTORS
250
37.3
IF61
Memory Protect Switch
D-SUB 9-PIN CONNECTORS
250
37.3
IF70
Memory Protect Switch
BNC CONNECTOR
D-SUB 9-PIN CONNECTOR
G
250

Figure 6.3 The GL60S, GL60H, and GL70H Memory Protect Switch

Note (1) Up to six P120s can be connected to the GL60S, GL60H, and GL70H. Only one of them can be used in Program Mode, and the other five must be used in Monitor Mode.

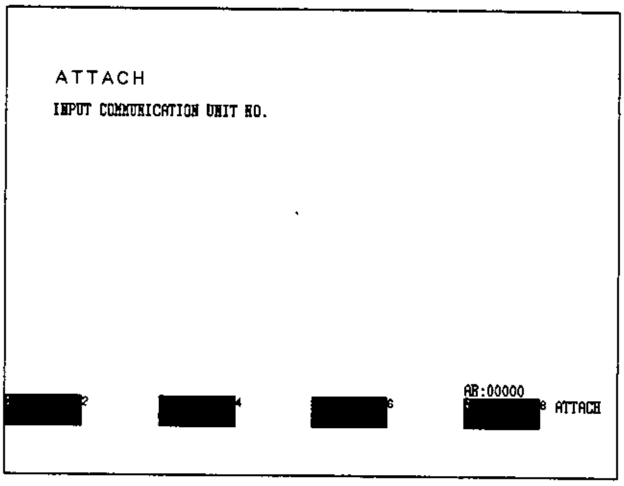
(2) Program Mode can be selected even when the Memory Protect Switch is turned ON. Operations that change the contents of the memory, such as storing or modifying SFCs and networks, and operations that modify the status of the GL60S, GL60H, or GL70H cannot be performed.

6.2.3 Attach (Going Online)

Attach means the P120 going online with the GL60S, GL60H, or GL70H after the system disk has been imported to the P120. If the P120 is only physically connected with the GL60S, GL60H, or GL70H by a cable, communications are not possible. The Attach Operation (going online) makes communications possible. Going online is essential for Program Mode and Monitor Mode, but is not necessary for File Management Mode. Perform the following procedure to go online with the P120.

1) Select the operating mode.

2) Enter the GL60S, GL60H, or GL70H unit number in the AR and select Attach.



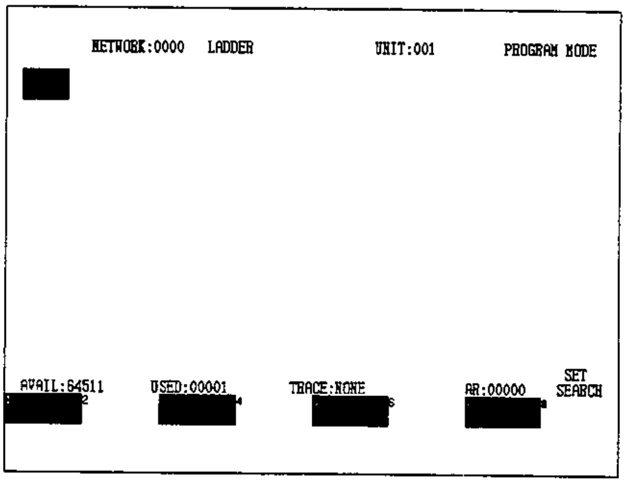
ATTACH

INPUT COMMUNICATION UNIT NO.

AR:00000

Figure 6.4

When the online connection has been established, the Logic Screen will be displayed.



NETWORK:0000 LADDER UNIT:001 PROGRAM MODE

AVAIL:64511 USED:00001 TRACE:NONE AR:00000

Figure 6.5

Note (1) When the network is already stored in the GL60S, GL60H, or GL70H, Network 1 will be displayed after going online.

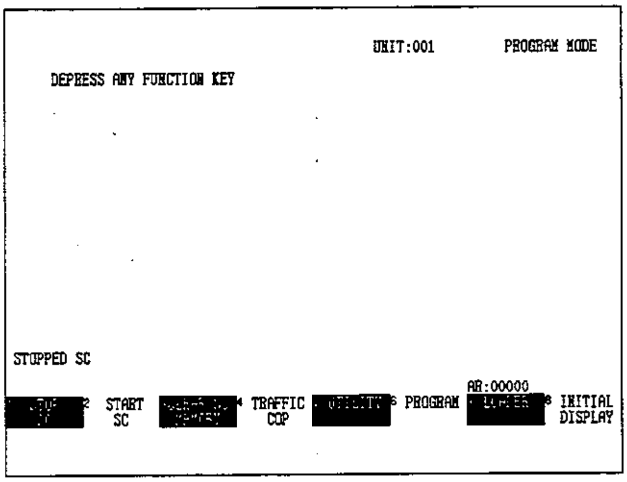
(2) When the Attach Operation has been performed once, there is no need to run it again as long as you do not return to the screen before going online (the Initial Display).

(3) The unit numbers range from 1 to 247. At shipment, GL60S, GL60H, and GL70H have their unit number set to "1."

(4) Ladder Program operation can be carried out at the screen shown in *Figure 6.5.* The screen displays Program Mode or Monitor Mode in the upper right corner.

6.2.4 Supervisory Operation

After going online, press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed. The supervisory functions will be displayed in the label area.



```
                                     UNIT:001      PROGRAM MODE
   DEPRESS ANY FUNCTION KEY





STOPPED SC
                                                 AR:00000
```

Figure 6.6

In Monitor Mode, the labels Stop SC, Start SC, and Clear SC Memory are displayed. To return to the Initial Display (*Figure 6.2*) either select Initial Display or press the Shift + Supervisory Keys.

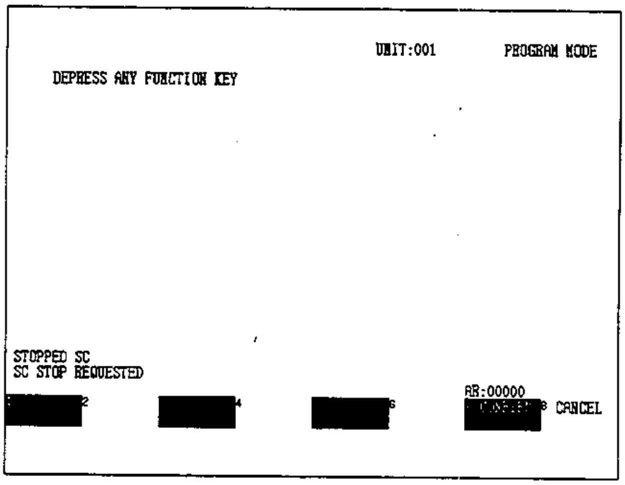
1. <u>Stopping the GL60S, GL60H, or GL70H</u>

This operation stops the GL60S, GL60H, or GL70H. When the GL60S, GL60H, or GL70H has been stopped, the Run indicator light on the body of the device will go out. Perform the following procedure to stop the GL60S, GL60H, or GL70H.

1) Perform the Attach Operation. (See Note (2))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Select Stop SC. SC Stop Requested will be displayed.



UNIT:001 PROGRAM MODE

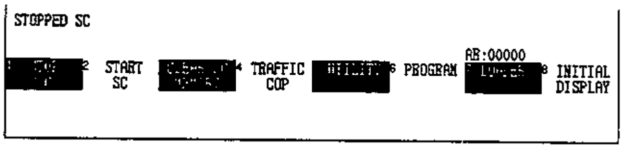
DEPRESS ANY FUNCTION KEY

STOPPED SC
SC STOP REQUESTED

AR:00000

Figure 6.7

4) Select Confirm. Stopped SC will be displayed.



STOPPED SC

AR:00000

Figure 6.8

Note (1) When the GL60S, GL60H, or GL70H is stopped, all operations can be carried out. In particular, Clear Memory, Modify Allocation, Move Network, Single Sweep, and Load can be carried out only while the PLC is stopped.

(2) The Attach Operation is not required when the PLC is already online.

(3) If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the condition shown in *Figure 6.6.*

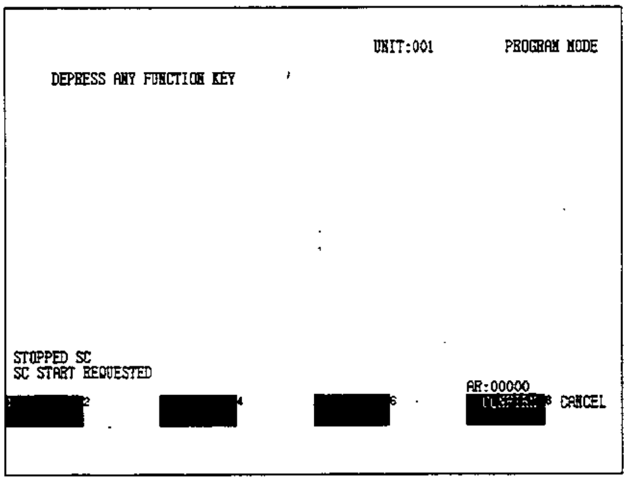
2. Starting the GL60S, GL60H, or GL70H

This operation starts the GL60S, GL60H, or GL70H from the stopped condition. When GL60S, GL60H, or GL70H is started, the Run indicator light on the body of the device will light. Perform the following procedure to start the GL60S, GL60H, or GL70H.

1) Perform the Attach Operation. (See Note (2))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

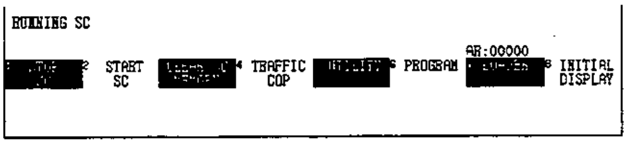
3) Select Start SC. SC Start Requested will be displayed.



```
                                          UNIT:001      PROGRAM MODE
   DEPRESS ANY FUNCTION KEY

STOPPED SC
SC START REQUESTED
                                                      AR:00000
                                                      CONFIRM   CANCEL
```

Figure 6.9

4) Select Confirm. Running SC will be displayed.



```
RUNNING SC
                                                      AR:00000
            START               TRAFFIC            PROGRAM           INITIAL
             SC                   COP                                DISPLAY
```

Figure 6.10

Note

(1) Program modification and storage can be performed when the GL60S, GL60H, or GL70H is either running or stopped. Clear Memory, Modify Allocation, Move Network, Single Sweep, and Load can be carried out only while the PLC is stopped.

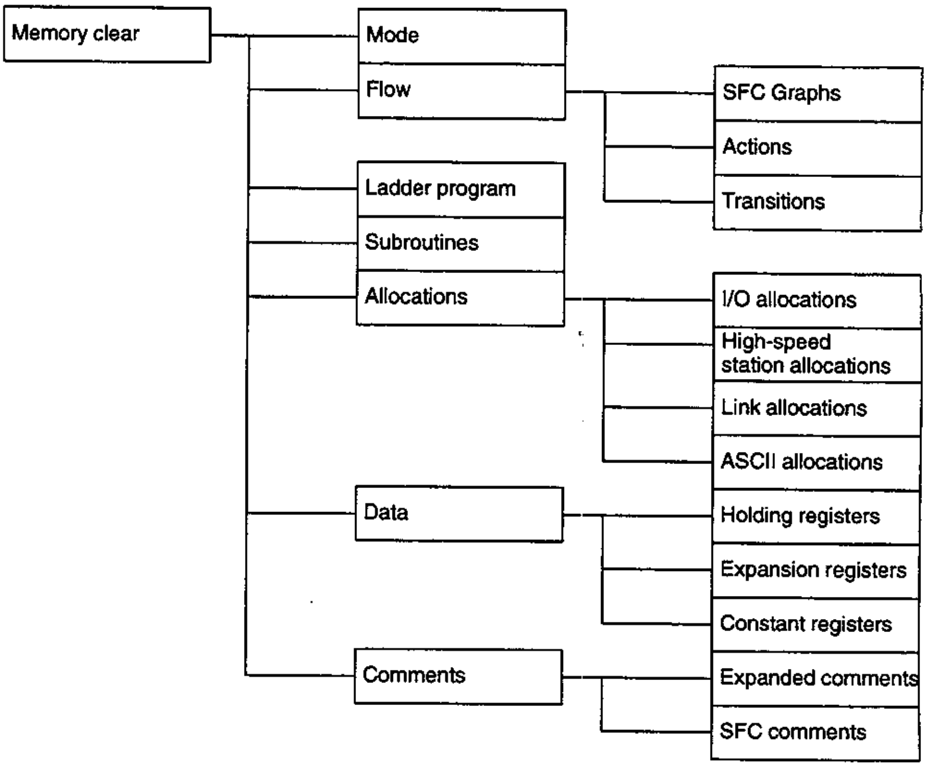
(2) The Attach Operation is not required when the PLC is already online.

(3) If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the condition shown in *Figure 6.6.*

(4) About 5 to 10 seconds elapses between selecting Confirm and the Run indicator lighting.

3. Clearing the Memory of the GL60S, GL60H, or GL70H

This operation clears SFC memory, ladder memory, subroutine program memory, registers, and allocation table comments. Each GL60S, GL60H, or GL70H memory can be cleared individually as illustrated in the following tree diagram.


Memory clear
Mode
Flow
SFC Graphs
Actions
Transitions
Ladder program
Subroutines
Allocations
I/O allocations
High-speed station allocations
Link allocations
ASCII allocations
Data
Holding registers
Expansion registers
Constant registers
Comments
Expanded comments
SFC comments

Note (1) Stop the GL60S, GL60H, or GL70H before clearing memory.

(2) The following table shows the Label Keys and their functions.

Label Key	Function
Clear Mode	Clears SFC initialize, reset, and preset condition settings as well as the display of conditions, such as hold, disable and active.
Clear SFC Graph	Clears the contents of the SFC graphic program memory.
Clear Action	Clears the contents of the SFC action program memory.
Clear Transition	Clears the contents of the SFC transition program memory.
Clear All SFC	Clears all three SFC memories, the graphic, action and transition memories.
Clear Ladder	Clears the contents of the ladder program memory.
Clear Subroutine	Clears the contents of the subroutine program memory.
Clear I/O Allocation	Clears the contents of the I/O allocation memory.
Clear ASCII	Clears the ASCII port number.
Clear All Allocation	Clears the I/O allocation, ASCII port number, and high-speed station allocations simultaneously.
Clear High-speed Station	Clears the high-speed station settings.
Clear Holding Register	Clears the contents of the holding registers.
Clear Constant Register	Clears the contents of the constant registers.
Clear All Data	Clears the contents of all registers.
Clear SFC Comment	Clears the contents of SFC comments.
Clear All Comments	Clears the contents of all comments.
Clear All	Clears all GL60S, GL60H, or GL70H memory.

- **Clearing the Mode Memory**

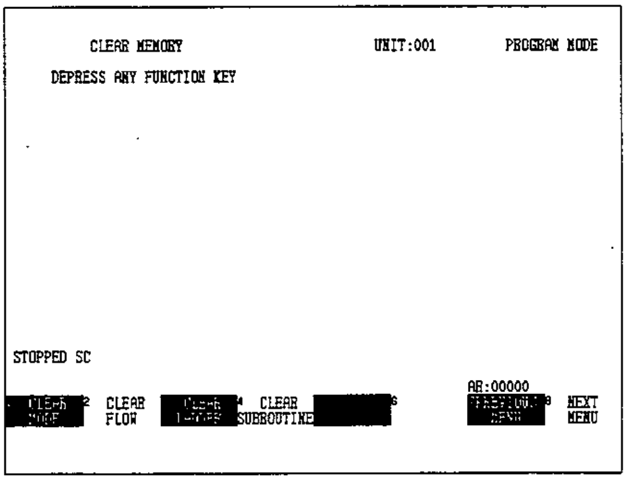
Use the following procedure to clear the Mode Memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

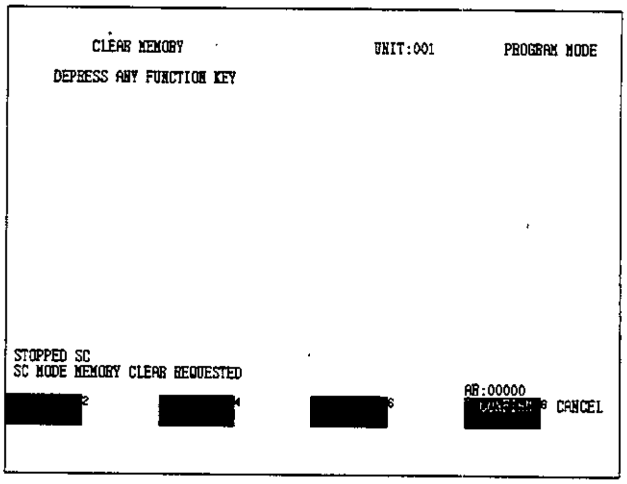
4) Select Clear SC Memory.



```
     CLEAR MEMORY                        UNIT:001        PROGRAM MODE
  DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                     AR:00000
```

Figure 6.11

5) Select Clear Mode. The screen shown in *Figure 6.12* will be displayed.



```
CLEAR MEMORY                    UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
SC MODE MEMORY CLEAR REQUESTED
                                           AR:00000
```

Figure 6.12

6) Select Confirm. (See Note (3))

Note (1) The Attach Operation is not required when the PLC is already online.

(2) The memory requested is cleared when Confirm is selected. If Cancel is selected instead of Confirm, no operation will be carried out and the display will return to the screen at the time the Clear request was made.

(3) For messages displayed, refer to *Appendix A.2 Operational Messages.*

- **Clearing the Flow Memory**

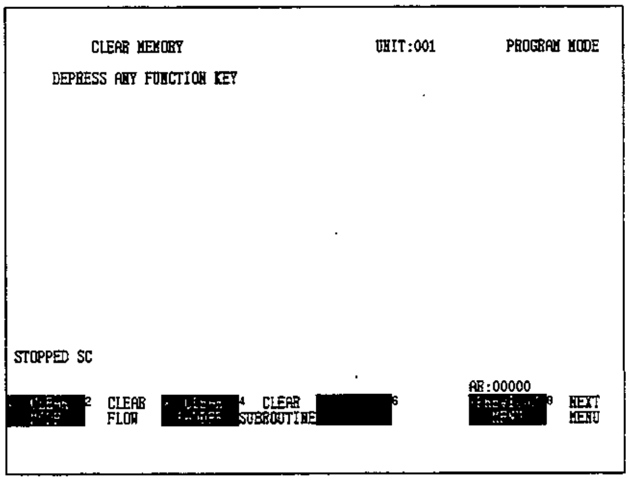
Use the following procedure to clear the flow memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

4) Select Clear SC Memory.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

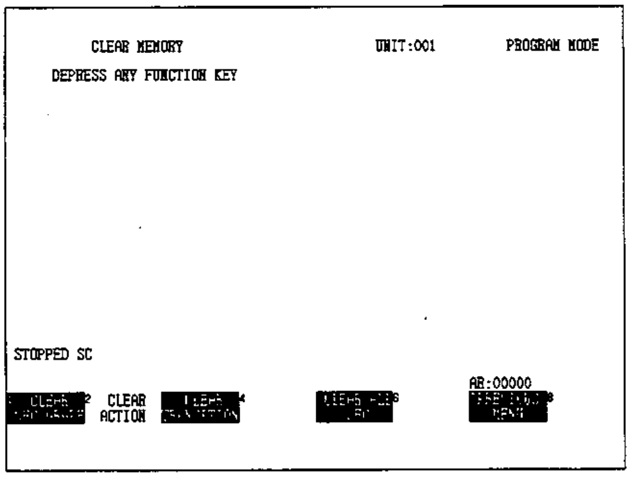
STOPPED SC

AR:00000

2
CLEAR FLOW
4
CLEAR SUBROUTINE
6
8
NEXT MENU

Figure 6.13

5) Select Clear Flow. The screen shown in *Figure 6.14* will be displayed.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

STOPPED SC

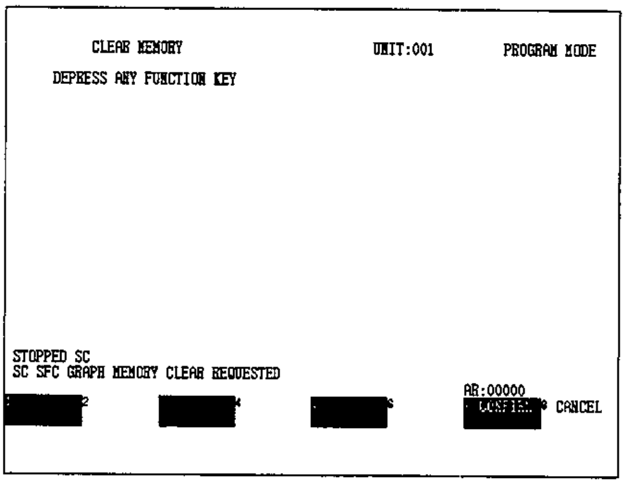
AR:00000

2
CLEAR ACTION
4
6
8

Figure 6.14

6) Select any one of Clear SFC Graph, Clear Action, Clear Transition, or Clear All SFC.

7) The screen shown in *Figure 6.15* will displayed depending on the Label Key that was input. (See Note (5))



```
CLEAR MEMORY                    UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
SC SFC GRAPH MEMORY CLEAR REQUESTED
                                        AR:00000
```

Figure 6.15

8) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) To clear the SFC, action, and transition memories all at the same time, select Clear All SFC as shown in *Figure 6.14*.

(3) Selecting Previous Menu as shown in *Figure 6.14*, returns the screen to *Figure 6.13*.

(4) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(5) See *Appendix A.2 Operational Messages* for information on the messages displayed.

- **Clearing the Ladder Memory**

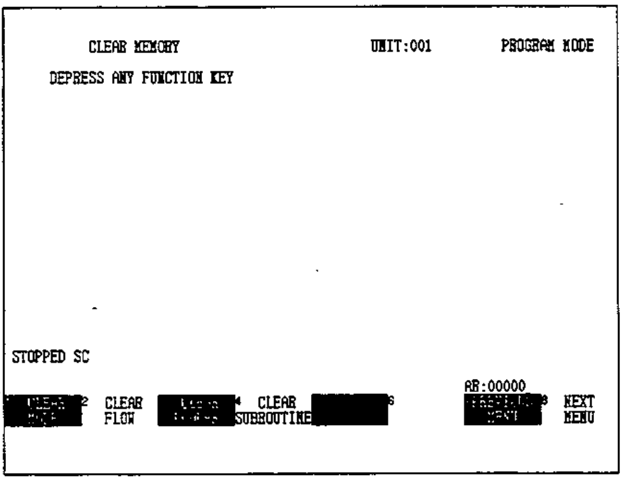
Use the following procedure to clear the ladder memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

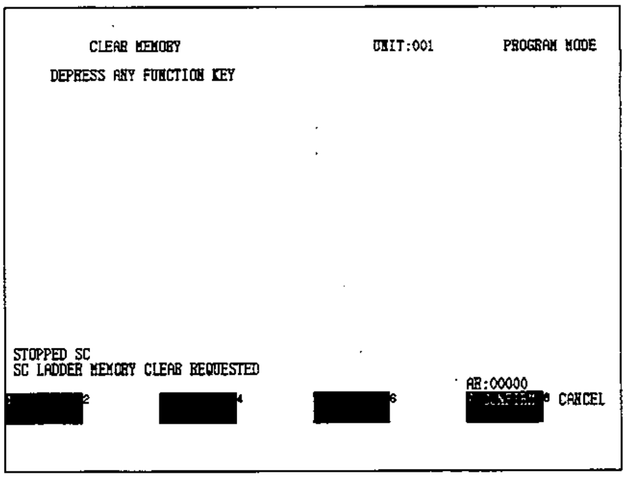
4) Select Clear SC Memory.



```
CLEAR MEMORY                 UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                             AR:00000
```

Figure 6.16

5) Select Clear Ladder. The screen shown in *Figure 6.17* will be displayed. (See Note (3))



```
CLEAR MEMORY                 UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
SC LADDER MEMORY CLEAR REQUESTED
                                             AR:00000
```

Figure 6.17

6) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(3) See *Appendix A.2 Operational Messages* for information on the messages displayed.

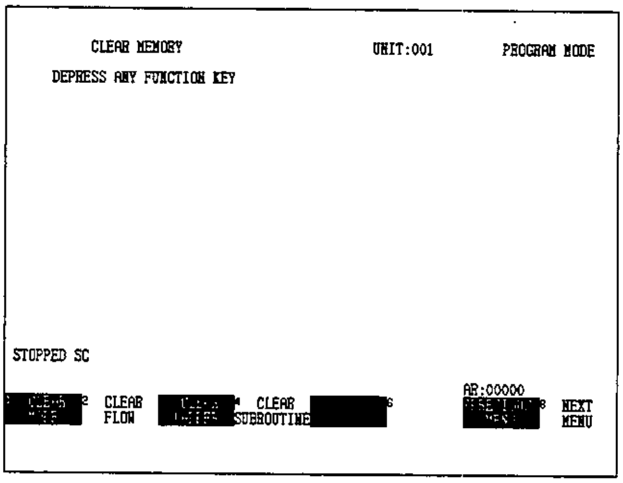
- **Clearing the Subroutine Memory**

Use the following procedure to clear the subroutine memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

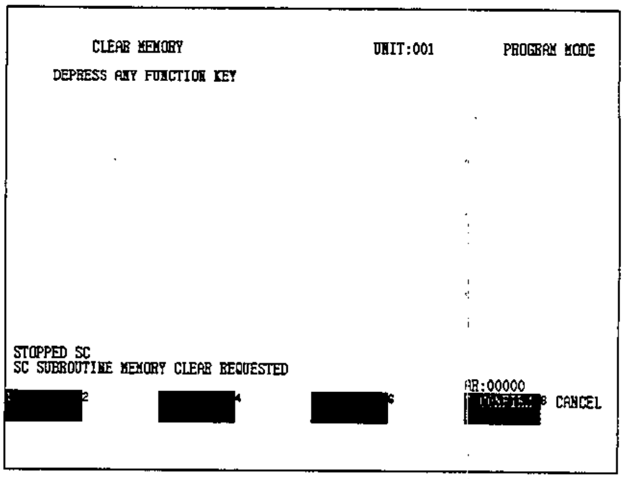
STOPPED SC

AR:00000

Figure 6.18

4) Select Clear SC Memory.

5) Select Clear Subroutine. The screen shown in *Figure 6.19* will be displayed. (See Note (3))



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

STOPPED SC

SC SUBROUTINE MEMORY CLEAR REQUESTED

AR:00000

Figure 6.19

6) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(3) See *Appendix A.2 Operational Messages* for information on the messages displayed.

- **Clearing the Allocation Memory**

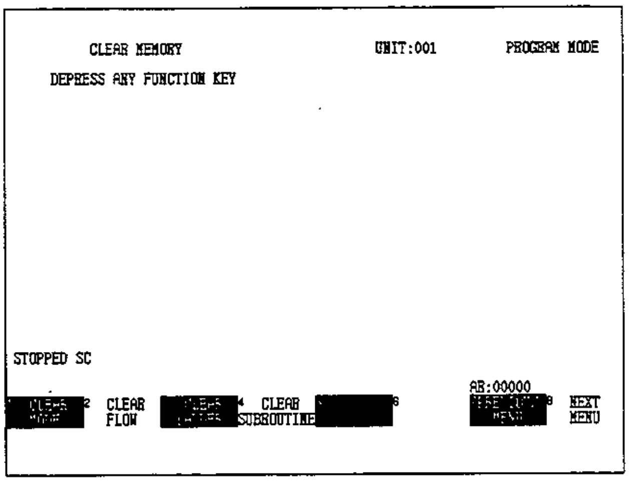
Use the following procedure to clear the allocation memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

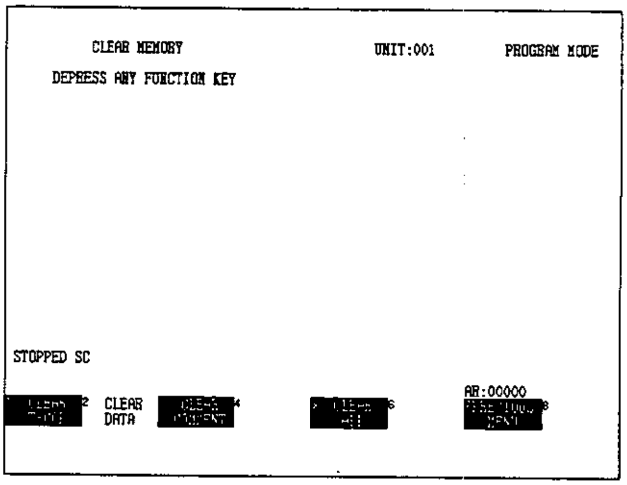
4) Select Clear SC Memory.



```
CLEAR MEMORY                UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                            AB:00000
```

Figure 6.20

5) Select Next Menu.



CLEAR MEMORY UNIT:001 PROGRAM MODE

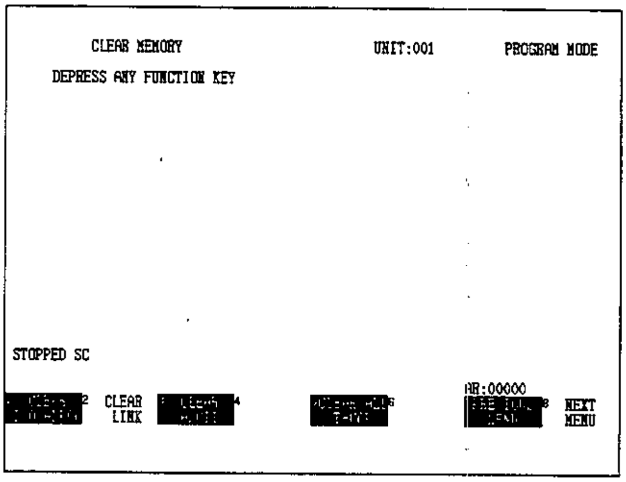
DEPRESS ANY FUNCTION KEY

STOPPED SC

AR:00000

Figure 6.21

6) Select Clear T-Cop (Traffic Cop). The screen shown in *Figure 6.22* will be displayed.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

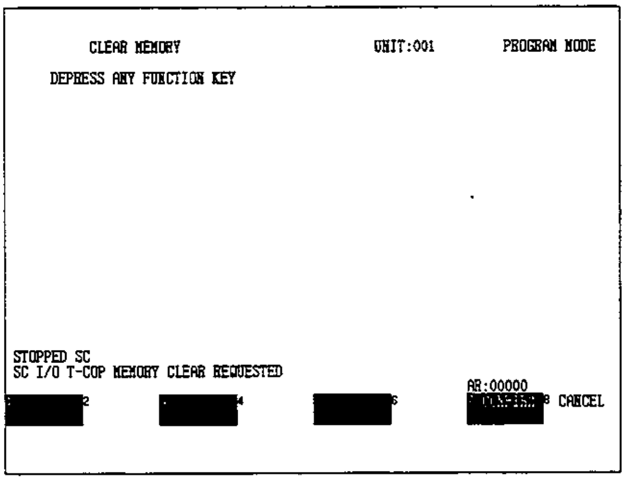
STOPPED SC

AR:00000

Figure 6.22

7) Select any one of Clear I/O Allocation, Clear Link, Clear ASCII, or Clear All T-Cop (all allocations).

8) The screen shown in *Figure 6.23* will be displayed depending on the Label Key that was pressed. (See Note (5))



```
        CLEAR MEMORY                        UNIT:001        PROGRAM MODE
     DEPRESS ANY FUNCTION KEY




STOPPED SC
SC I/O T-COP MEMORY CLEAR REQUESTED
                                                   AR:00000
          2              4              6          CONFIRM 8 CANCEL
```

Figure 6.23

9) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) To clear all memories at the same time, select Clear All as shown in *Figure 6.21*.

(3) Selecting Previous Menu as shown in *Figure 6.22* returns the screen to *Figure 6.21*.

(4) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(5) See *Appendix A.2 Operational Messages* for information on the messages displayed.

- **Clearing the Data Memory**

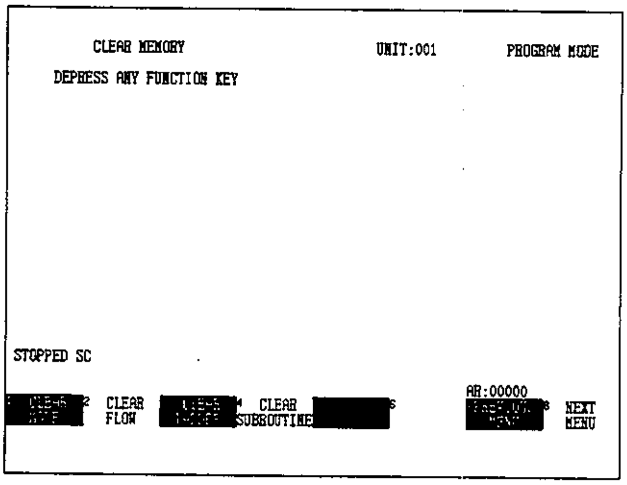
Use the following procedure to clear the data memory.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

4) Select Clear SC Memory.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

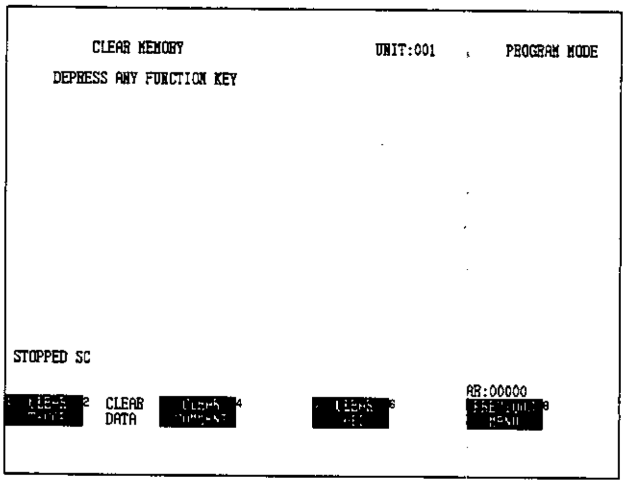
STOPPED SC

AR:00000

2
CLEAR
FLOW
4
CLEAR
SUBROUTINE
5
8
NEXT
MENU

Figure 6.24

5) Select Next Menu.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

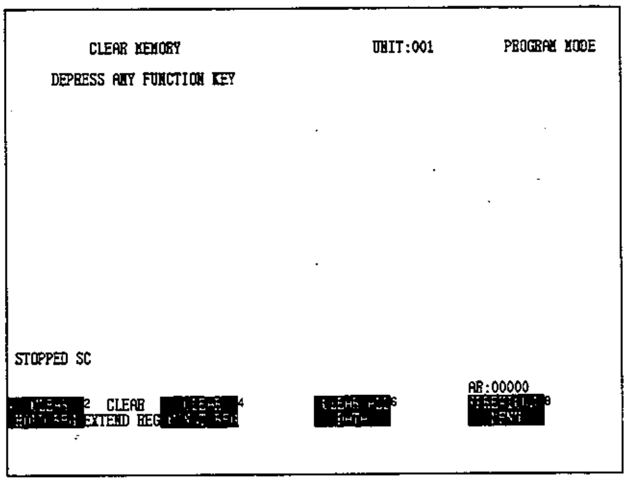
STOPPED SC

AR:00000

2
CLEAR
DATA
4
6
8

Figure 6.25

6) Select Clear Data. The screen shown in *Figure 6.26* will be displayed.

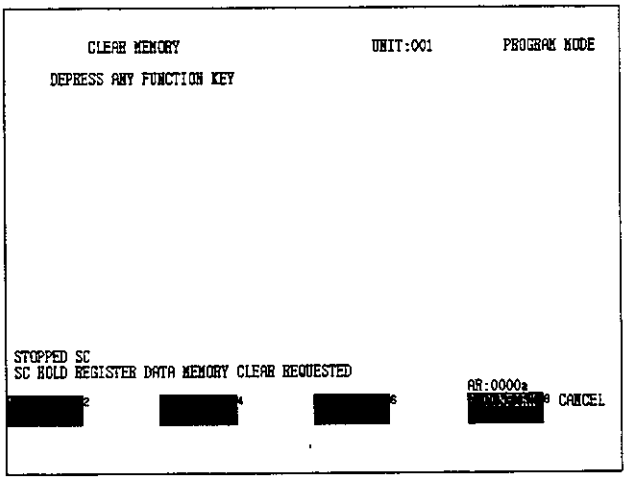


```
   CLEAR MEMORY                      UNIT:001        PROGRAM MODE
 DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                  AR:00000
```

Figure 6.26

7) Select any one of Clear Holding Register, Clear Expansion Register, Clear Constant Register or Clear All Data.

8) The screen shown in *Figure 6.27* will be displayed depending on the Label Key that was pressed. (See Note (5))



```
   CLEAR MEMORY                      UNIT:001        PROGRAM MODE
 DEPRESS ANY FUNCTION KEY

STOPPED SC
SC HOLD REGISTER DATA MEMORY CLEAR REQUESTED
                                                  AR:0000a
```

Figure 6.27

9) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) To clear all memories at the same time, select Clear All as shown in *Figure 6.25*.

(3) Selecting Previous Menu as shown in *Figure 6.26* returns the screen to *Figure 6.25.*

(4) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(5) See *Appendix A.2 Operational Messages* for information on the messages displayed.

- **Clearing Comment Memory**

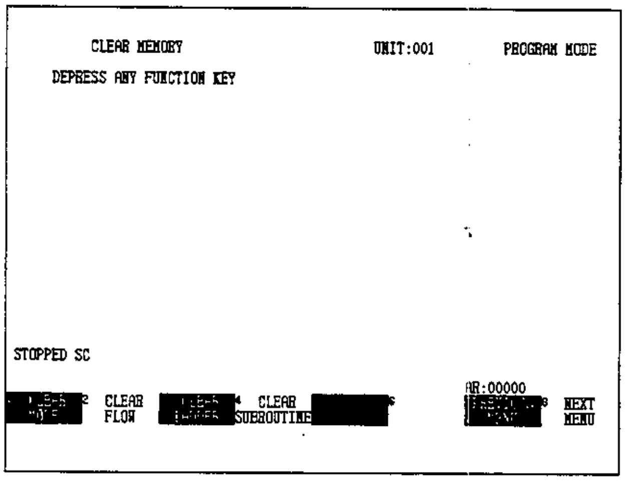
Use the following procedure to clear the comment memory.

1) Perform the Attach Operation. (Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

4) Select Clear SC Memory.


CLEAR MEMORY UNIT:001 PROGRAM MODE

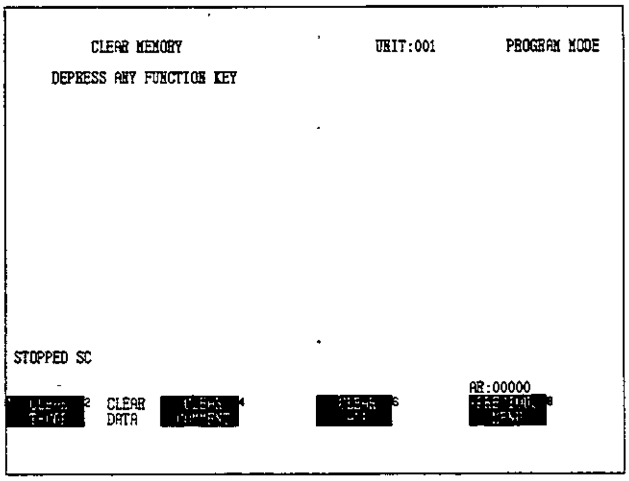
DEPRESS ANY FUNCTION KEY

STOPPED SC

AR:00000

Figure 6.28

5) Select Next Menu.



CLEAR MEMORY UNIT:001 PROGRAM MODE

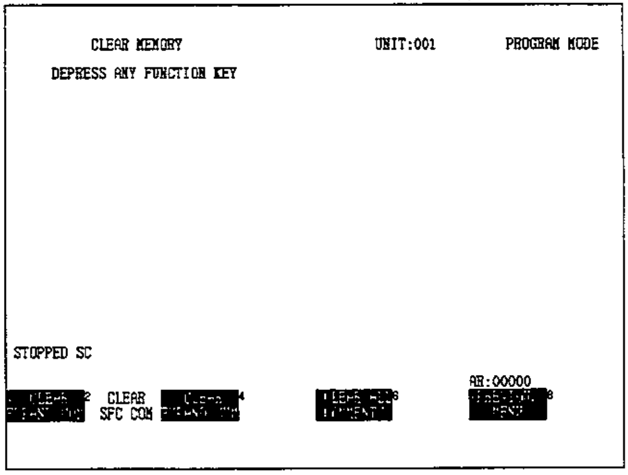
DEPRESS ANY FUNCTION KEY

STOPPED SC

AR:00000
CLEAR
2
CLEAR DATA
CLEAR
4
CLEAR
6
8

Figure 6.29

6) Select Clear Comment. The screen shown in *Figure 6.30* will be displayed.



CLEAR MEMORY UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

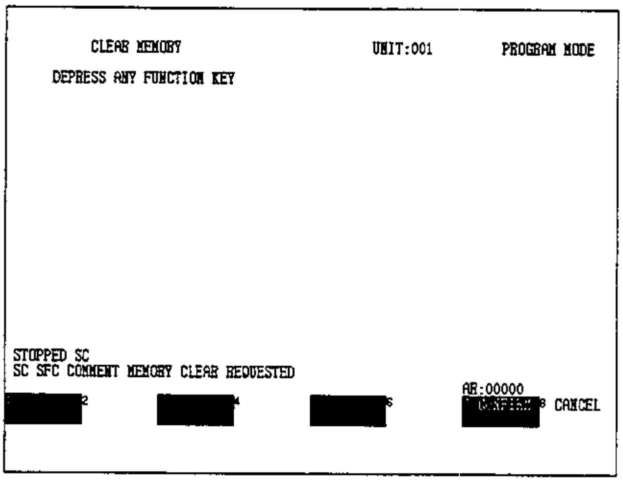
STOPPED SC

AR:00000
CLEAR
2
CLEAR SFC COM
4
6
8

Figure 6.30

7) Select any one of Clear Expansion Comment, Clear SFC Comment, Clear Expansion Symbol, or Clear All Comments.

8) The screen shown in *Figure 6.31* will be displayed depending on the Label Key that was pressed. (See Note (5))



```
      CLEAR MEMORY                      UNIT:001        PROGRAM MODE
   DEPRESS ANY FUNCTION KEY

STOPPED SC
SC SFC COMMENT MEMORY CLEAR REQUESTED
                                            AR:00000
          2            4            6       CONFIRM 8 CANCEL
```

Figure 6.31

9) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) To clear all memories at the same time, select Clear All as shown in *Figure 6.29.*

(3) Selecting Previous Menu as shown in *Figure 6.30* returns the screen to *Figure 6.29.*

(4) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(5) See *Appendix A.2 Operational Messages* for information on the messages displayed.

- **Clearing all memories**

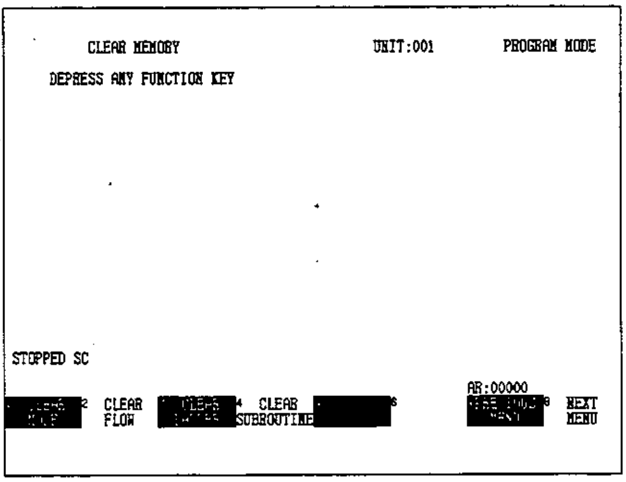
Use the following procedure to clear all memories.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H. (See *6.2.4 Supervisory Operation*)

4) Select Clear SC Memory.

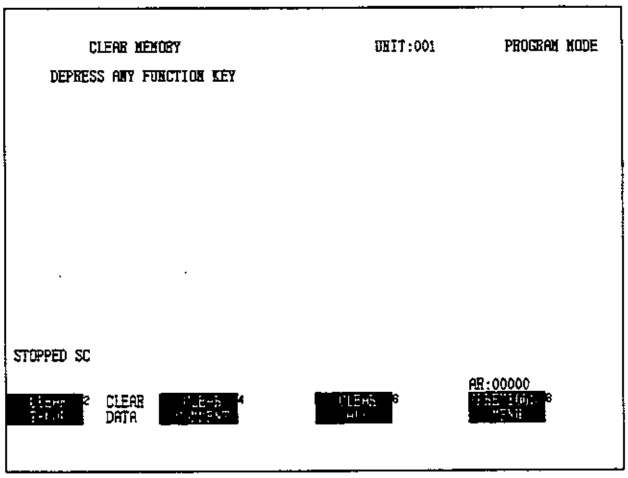


```
     CLEAR MEMORY                    UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                   AR:00000
```

2 CLEAR FLOW
4 CLEAR SUBROUTINE
6
8 NEXT MENU

Figure 6.32

5) Select Next Menu.

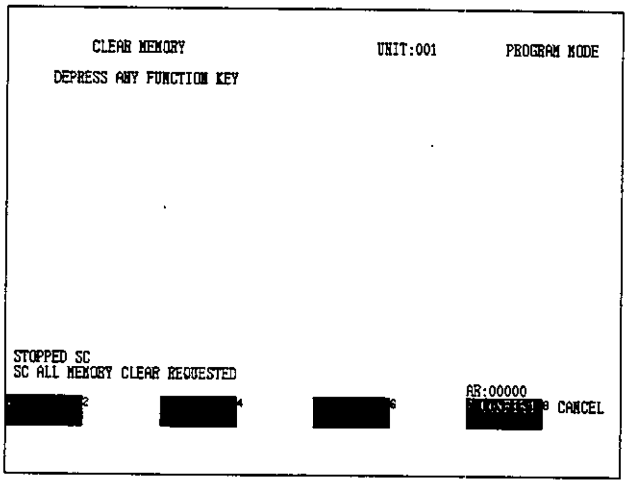


```
     CLEAR MEMORY                    UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                   AR:00000
```

2 CLEAR DATA
4
CLEAR 6
8

Figure 6.33

6) Select Clear All. The screen shown in *Figure 6.34* will be displayed. (See Note (4))



```
    CLEAR MEMORY                        UNIT:001        PROGRAM MODE
  DEPRESS ANY FUNCTION KEY

STOPPED SC
SC ALL MEMORY CLEAR REQUESTED
                                                  AR:00000
```

Figure 6.34

7) Select Confirm.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) To clear all memories at the same time, select Clear All as shown in *Figure 6.33.*

(3) Select Confirm and the selected memory will be cleared. If Cancel is selected instead of Confirm, no operation will be carried out and the screen will return to the one from which the Clear request was made.

(4) See *Appendix A.2 Operational Messages* for information on the messages displayed.

4. Allocation

There are two types of allocation: System configuration related to the GL60S, GL60H, and GL70H application program memory configuration, and I/O allocation related to system I/O. As part of allocation operations, it is also possible to display the status of divided segments and segment transfers. The following tree diagram illustrates the allocation process.

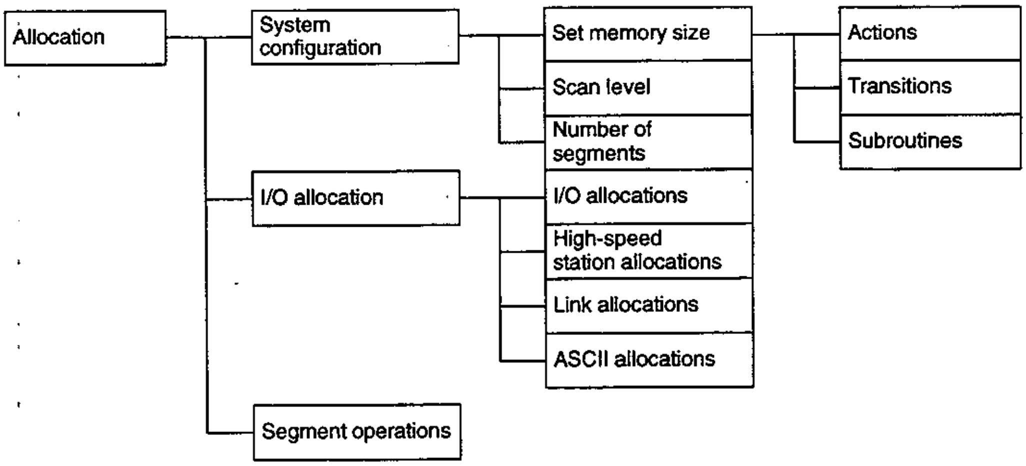

Allocation
System configuration
Set memory size
Actions
Transitions
Subroutines
Scan level
Number of segments
I/O allocation
I/O allocations
High-speed station allocations
Link allocations
ASCII allocations
Segment operations

Figure 6.35 Allocation Operations

A. System Configuration

The application program memory of the GL60S, GL60H, and GL70H CPU can be divided into the four areas of ladder area, action area, transition area, and subroutine area. When the two-level scan has been selected on the GL60S, GL60H, and GL70H, the ladder area can be divided into a maximum of 8 segments. When the one-level scan has been selected, the segment number is automatically fixed at 1.

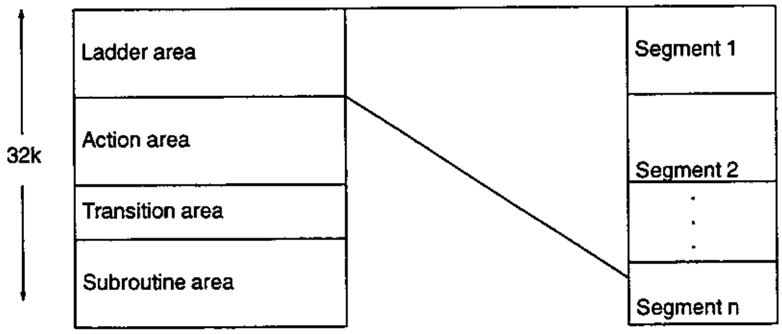

32k
Ladder area
Action area
Transition area
Subroutine area
Segment 1
Segment 2
Segment n

Figure 6.36 Application Program Memory Map

Note (1) To modify the system configuration, first stop the GL60S, GL60H, or GL70H.

(2) The system configuration cannot be modified while the GL60S, GL60H, or GL70H is in Operation or Monitor Mode. It is possible to see the details of the system configuration.

(3) Be sure to select Write System when storing or modifying the system configuration.

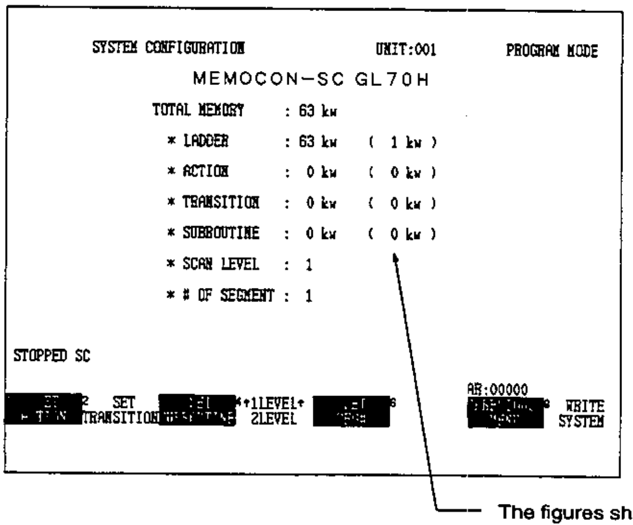
(4) The size of each application program area is set within the following limits.

Area	Setting Range
Action circuits	0 to 16 Kwords in 1-Kword increments
Transition circuits	0 to 16 Kwords in 1-Kword increments
Subroutines	0 to 16 Kwords in 1-Kword increments
Ladder	Total memory minus above (calculated automatically)

(5) The following table shows the setting ranges for the scan level and number of segments.

Item	Setting Range
Scan level	1 or 2
Number of segments	1 to 8

(6) *Figure 6.37* shows the screen in its initial cleared condition.



```
SYSTEM CONFIGURATION              UNIT:001          PROGRAM MODE
                    MEMOCON-SC GL70H
            TOTAL MEMORY     : 63 kw
             * LADDER        : 63 kw    (  1 kw )
             * ACTION        :  0 kw    (  0 kw )
             * TRANSITION    :  0 kw    (  0 kw )
             * SUBROUTINE    :  0 kw    (  0 kw )
             * SCAN LEVEL    :  1
             * # OF SEGMENT  :  1

STOPPED SC
                                                   AR:00000
```

The figures shown in brackets are the amount of memory already used.

Figure 6.37 Screen in Initial Condition

(7) When the screen in the initial condition shown in *Figure 6.37*, modify the system configuration if programming SFC, using subroutines, or performing the 2-level scan.

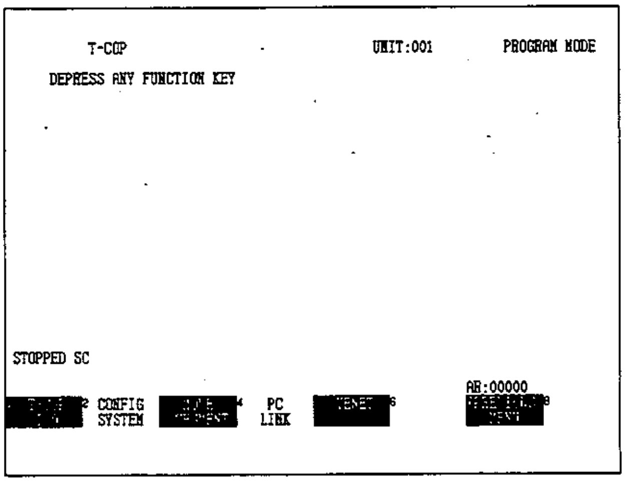
• Displaying the System Configuration

Use the following procedure to display the system configuration.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

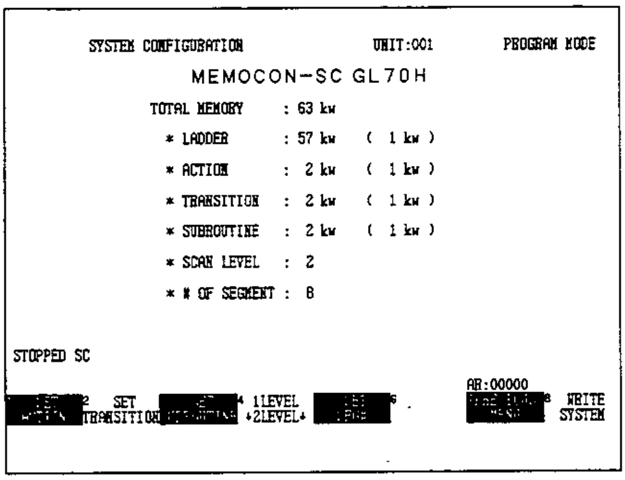
3) Select I/O Allocation.



```
T-COP                        UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                              AR:00000
```

Figure 6.38

4) Select System Allocation (Config System).



```
SYSTEM CONFIGURATION              UNIT:001        PROGRAM MODE
                 MEMOCON-SC GL70H
           TOTAL MEMORY    : 63 kw
            * LADDER       : 57 kw   ( 1 kw )
            * ACTION       :  2 kw   ( 1 kw )
            * TRANSITION   :  2 kw   ( 1 kw )
            * SUBROUTINE   :  2 kw   ( 1 kw )
            * SCAN LEVEL   :  2
            * # OF SEGMENT :  8

STOPPED SC
                                              AR:00000
```

Figure 6.39

Note (1) The Attach Operation is not required when the PLC is already online.

(2) Selecting Previous Menu as shown in *Figure 6.39* returns the screen to *Figure 6.38.*

(3) Selecting Previous Menu as shown in *Figure 6.38* returns the screen to the supervisory screen shown in *Figure 6.6.*

(4) The sample screen shown is for a GL70H. With the GL60S and GL60H, the memory is 32 Kwords.

(5) The GL70H's 63-Kword memory is actually 64,512 words.

- **Storing the System Configuration**

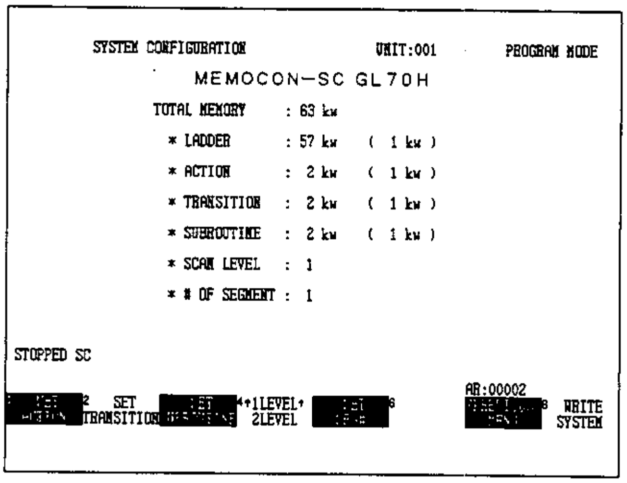
Use the following procedure to store the system configuration.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

4) Select System Allocation (Config System).



```
SYSTEM CONFIGURATION              UNIT:001        PROGRAM MODE
                 MEMOCON-SC GL70H
          TOTAL MEMORY    : 63 kw
           * LADDER       : 57 kw   ( 1 kw )
           * ACTION       :  2 kw   ( 1 kw )
           * TRANSITION   :  2 kw   ( 1 kw )
           * SUBROUTINE   :  2 kw   ( 1 kw )
           * SCAN LEVEL   :  1
           * # OF SEGMENT :  1

STOPPED SC
                                                  AR:00002
```

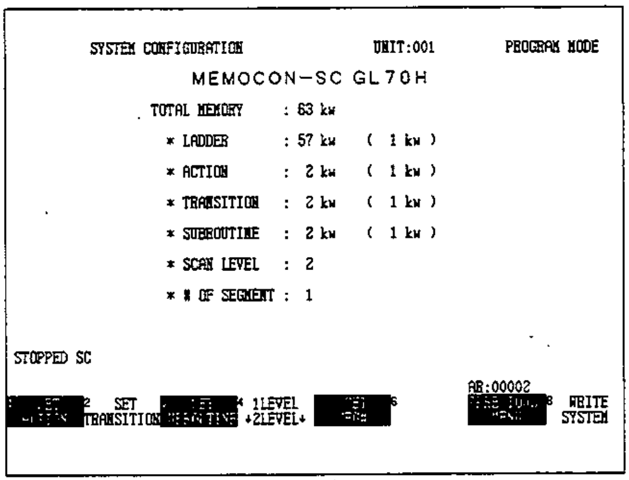
Figure 6.40

5) Set the size of the Action Memory in the AR and select Set Action.

6) Set the size of the Transition Memory in the AR and select Set Transition.

7) Set the size of the Subroutine Memory in the AR and select Set Subroutine.

8) Select 1 or 2 Levels using the Cursor Keys.

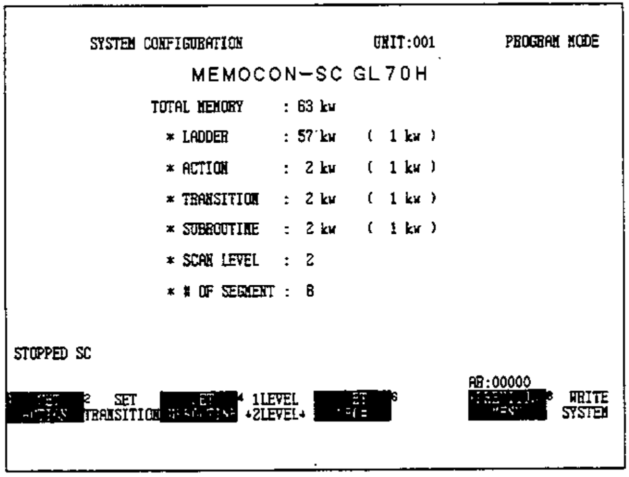


```
SYSTEM CONFIGURATION              UNIT:001          PROGRAM MODE
                  MEMOCON-SC GL70H
            TOTAL MEMORY      : 63 kw
              * LADDER        : 57 kw    ( 1 kw )
              * ACTION        :  2 kw    ( 1 kw )
              * TRANSITION    :  2 kw    ( 1 kw )
              * SUBROUTINE    :  2 kw    ( 1 kw )
              * SCAN LEVEL    :  2
              * # OF SEGMENT  :  1

STOPPED SC
                                                   AR:00002
        2   SET              4 1LEVEL            6              8 WRITE
       TRANSITION             ↓2LEVEL↓                            SYSTEM
```

Figure 6.41

9) Set the number of segments in the AR and select Set Segment Number.

10) Select Write System.



```
SYSTEM CONFIGURATION              UNIT:001          PROGRAM MODE
                  MEMOCON-SC GL70H
            TOTAL MEMORY      : 63 kw
              * LADDER        : 57 kw    ( 1 kw )
              * ACTION        :  2 kw    ( 1 kw )
              * TRANSITION    :  2 kw    ( 1 kw )
              * SUBROUTINE    :  2 kw    ( 1 kw )
              * SCAN LEVEL    :  2
              * # OF SEGMENT  :  8

STOPPED SC
                                                   AR:00000
        2   SET              4 1LEVEL            6              8 WRITE
       TRANSITION             ↓2LEVEL↓                            SYSTEM
```

Figure 6.42

11) Selecting Write System stores the settings in the GL60S, GL60H, or GL70H memory.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) When changing the number of segments from n to n–1, it is essential that no network is stored in segment n.

(3) After setting, data is not stored in GL60S, GL60H, or GL70H unless Write System is selected. Make sure Write System is selected.

(4) If Previous Menu is selected at the System Configuration screen, the display will return to the Allocation Menu shown in *Figure 6.38.*

(5) If Previous Menu is selected at the Allocation Menu screen, the display will return to the supervisory screen shown in *Figure 6.6.*

B. I/O Allocation

(i) I/O Allocation

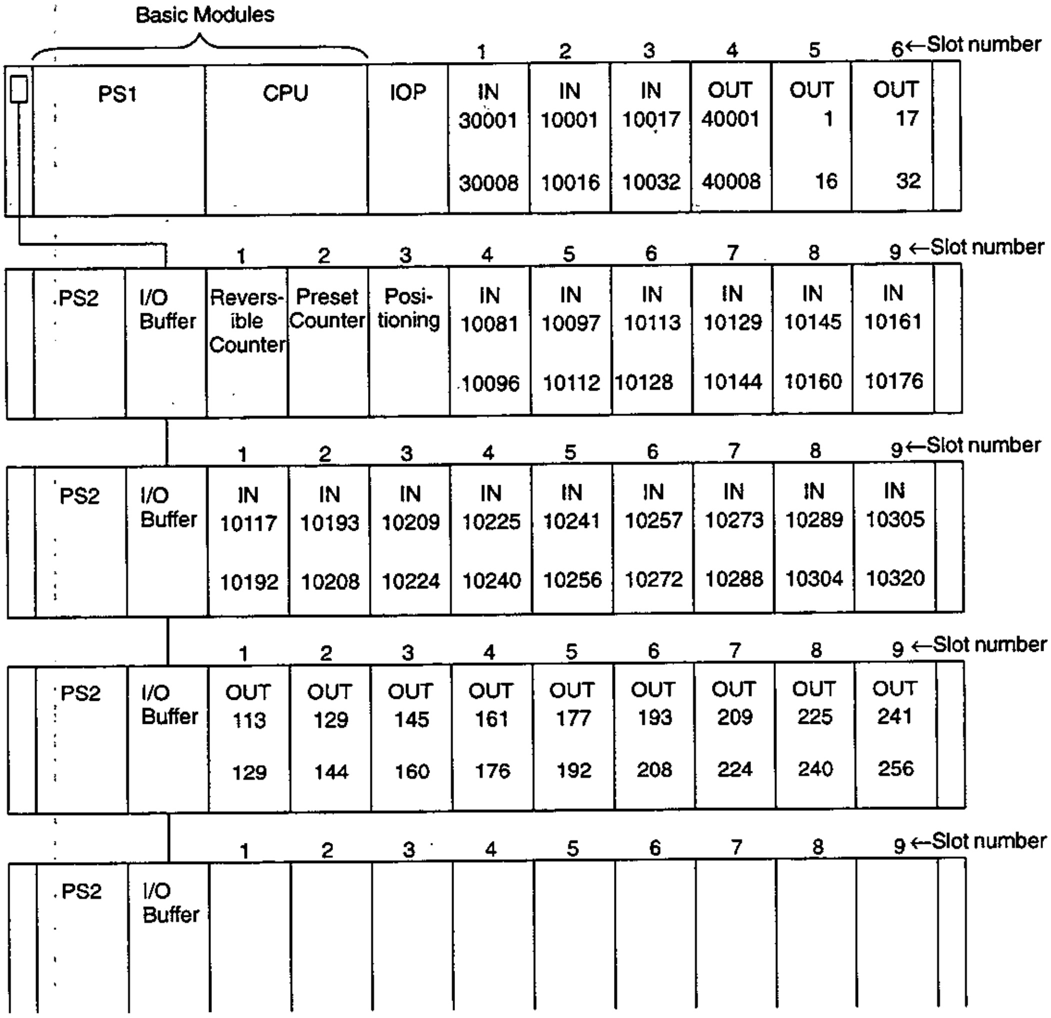
The I/O section in the GL60S, GL60H, and GL70H uses a "free location" independent allocation method. Any I/O Module can be installed in any slot (installed base location). As a result, I/O numbers must be allocated in advance to the slots according to the type of I/O Module installed in each slot. This process is referred to as I/O allocation. A leading reference number and I/O points are set for each slot.

Independent Allocation:
When the allocation to an intermediate slot is changed, the reference numbers of other slots do not shift because the allocation to each slot is completely independent.

Free Location Method:
I/O Modules can be mounted to any slot.

Note (1) The GL60S, GL60H, or GL70H must be stopped when the I/O allocations are being modified.

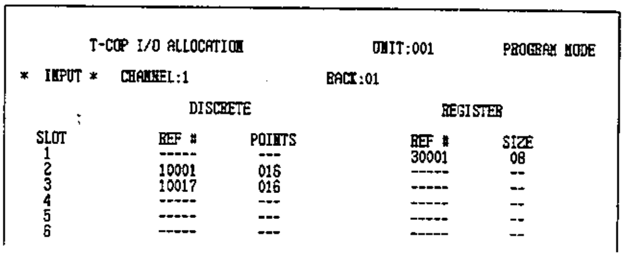
(2) I/O allocations cannot be modified in Monitor Mode or when the GL60S, GL60H, or GL70H is in operation, although the I/O allocations can be viewed.


Basic Modules
1 2 3 4 5 6←Slot number
PS1
CPU
IOP
IN 30001 30008
IN 10001 10016
IN 10017 10032
OUT 40001 40008
OUT 1 16
OUT 17 32
1 2 3 4 5 6 7 8 9 ←Slot number
PS2
I/O Buffer
Revers-ible Counter
Preset Counter
Posi-tioning
IN 10081 10096
IN 10097 10112
IN 10113 10128
IN 10129 10144
IN 10145 10160
IN 10161 10176
1 2 3 4 5 6 7 8 9←Slot number
PS2
I/O Buffer
IN 10117 10192
IN 10193 10208
IN 10209 10224
IN 10225 10240
IN 10241 10256
IN 10257 10272
IN 10273 10288
IN 10289 10304
IN 10305 10320
1 2 3 4 5 6 7 8 9 ←Slot number
PS2
I/O Buffer
OUT 113 129
OUT 129 144
OUT 145 160
OUT 161 176
OUT 177 192
OUT 193 208
OUT 209 224
OUT 225 240
OUT 241 256
1 2 3 4 5 6 7 8 9←Slot number
PS2
I/O Buffer

IN: ...... Input Module
OUT: .... Output Module
Number: . Reference number
PS1: ..... Main Power Module
PS2: ..... Auxiliary Power Module
CPU: .... CPU Module
IOP: ..... I/O Control Module
I/O Buffer: I/O Buffer Module

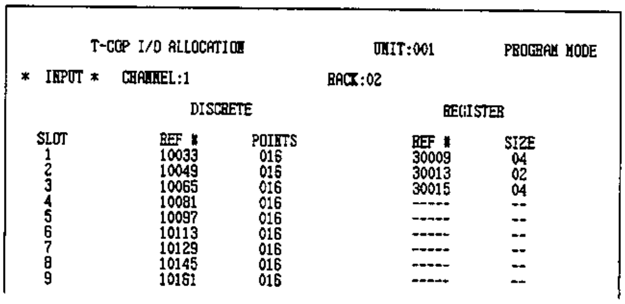
Figure 6.43 Example of I/O Allocation

There are both input and output allocation screens for Racks 1 to 4, and for each channel there are between 8 and 10 I/O allocation screens, as shown in *Figure 6.44*.



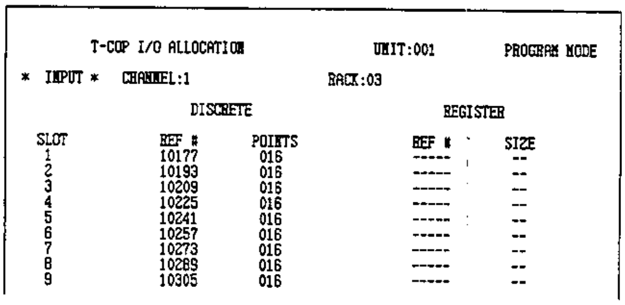
```
        T-COP I/O ALLOCATION            UNIT:001        PROGRAM MODE
* INPUT *  CHANNEL:1                  RACK:01
                    DISCRETE                      REGISTER

  SLOT            REF #      POINTS           REF #       SIZE
   1              -----       ---             30001        08
   2              10001       016             -----        --
   3              10017       016             -----        --
   4              -----       ---             -----        --
   5              -----       ---             -----        --
   6              -----       ---             -----        --
```

Rack 1 Input Allocations



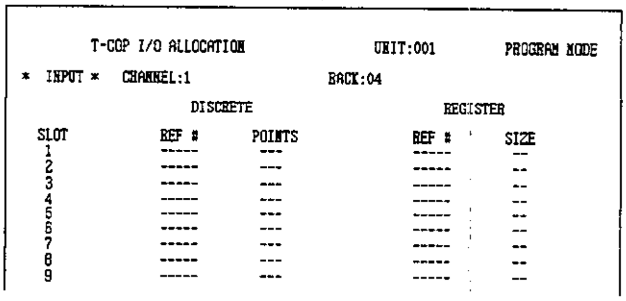
```
        T-COP I/O ALLOCATION            UNIT:001        PROGRAM MODE
* INPUT *  CHANNEL:1                  RACK:02
                    DISCRETE                      REGISTER

  SLOT            REF #      POINTS           REF #       SIZE
   1              10033       016             30009        04
   2              10049       016             30013        02
   3              10065       016             30015        04
   4              10081       016             -----        --
   5              10097       016             -----        --
   6              10113       016             -----        --
   7              10129       016             -----        --
   8              10145       016             -----        --
   9              10161       016             -----        --
```

Rack 2 Input Allocations



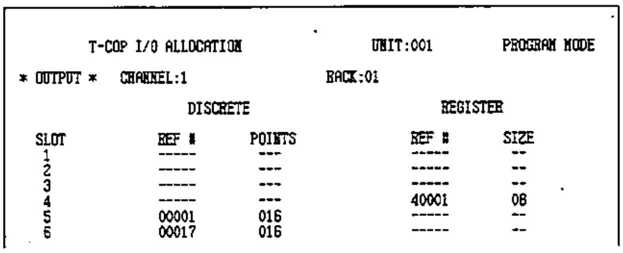
```
        T-COP I/O ALLOCATION            UNIT:001        PROGRAM MODE
* INPUT *  CHANNEL:1                  RACK:03
                    DISCRETE                      REGISTER

  SLOT            REF #      POINTS           REF #       SIZE
   1              10177       016             -----        --
   2              10193       016             -----        --
   3              10209       016             -----        --
   4              10225       016             -----        --
   5              10241       016             -----        --
   6              10257       016             -----        --
   7              10273       016             -----        --
   8              10289       016             -----        --
   9              10305       016             -----        --
```

Rack 3 Input Allocations



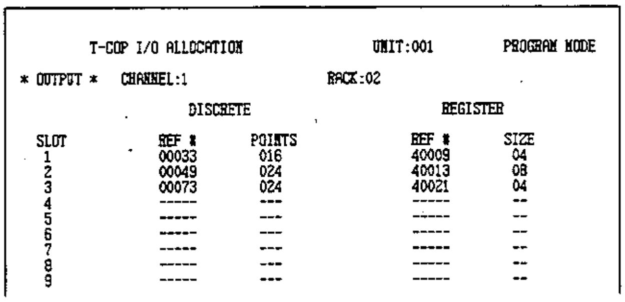
```
        T-COP I/O ALLOCATION            UNIT:001        PROGRAM MODE
* INPUT *  CHANNEL:1                  RACK:04
                    DISCRETE                      REGISTER

  SLOT            REF #      POINTS           REF #       SIZE
   1              -----       ---             -----        --
   2              -----       ---             -----        --
   3              -----       ---             -----        --
   4              -----       ---             -----        --
   5              -----       ---             -----        --
   6              -----       ---             -----        --
   7              -----       ---             -----        --
   8              -----       ---             -----        --
   9              -----       ---             -----        --
```

Rack 4 Input Allocations



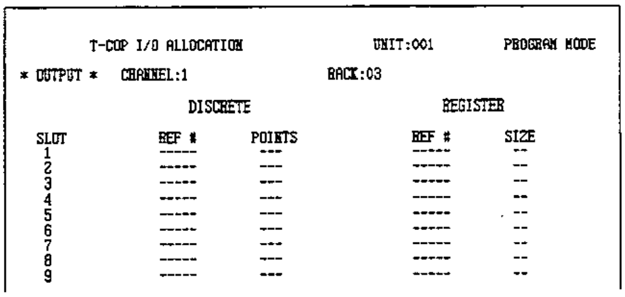
```
        T-COP I/O ALLOCATION                 UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:1                  RACK:01
                    DISCRETE                           REGISTER
 SLOT              REF #        POINTS              REF #        SIZE
  1                -----         ---                -----         --
  2                -----         ---                -----         --
  3                -----         ---                -----         --
  4                -----         ---                40001         08
  5                00001         016                -----         --
  6                00017         016                -----         --
```

Rack 1 Output Allocations



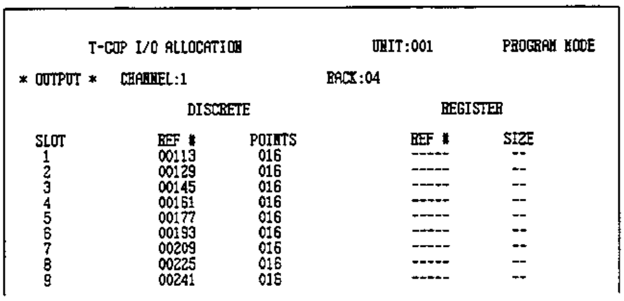
```
        T-COP I/O ALLOCATION                 UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:1                  RACK:02
                    DISCRETE                           REGISTER
 SLOT              REF #        POINTS              REF #        SIZE
  1                00033         016                40009         04
  2                00049         024                40013         08
  3                00073         024                40021         04
  4                -----         ---                -----         --
  5                -----         ---                -----         --
  6                -----         ---                -----         --
  7                -----         ---                -----         --
  8                -----         ---                -----         --
  9                -----         ---                -----         --
```

Rack 2 Output Allocations



```
        T-COP I/O ALLOCATION                 UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:1                  RACK:03
                    DISCRETE                           REGISTER
 SLOT              REF #        POINTS              REF #        SIZE
  1                -----         ---                -----         --
  2                -----         ---                -----         --
  3                -----         ---                -----         --
  4                -----         ---                -----         --
  5                -----         ---                -----         --
  6                -----         ---                -----         --
  7                -----         ---                -----         --
  8                -----         ---                -----         --
  9                -----         ---                -----         --
```

Rack 3 Output Allocations



```
        T-COP I/O ALLOCATION                 UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:1                  RACK:04
                    DISCRETE                           REGISTER
 SLOT              REF #        POINTS              REF #        SIZE
  1                00113         016                -----         --
  2                00129         016                -----         --
  3                00145         016                -----         --
  4                00161         016                -----         --
  5                00177         016                -----         --
  6                00193         016                -----         --
  7                00209         016                -----         --
  8                00225         016                -----         --
  9                00241         016                -----         --
```

Rack 4 Output Allocations

Figure 6.44 I/O Allocation Screens

Allocation means calling up the input and output screens for each rack of each station of each channel and making a setting for each Module installed for each slot that can take an I/O Module (see *Table 6.2 Overview of Slot Numbers*). The number of racks and slots differs depending on the channel and station.

Table 6.2 Overview of Slot Numbers

Channel		Rack				
		1	2	3	4	5
1		6	9	9	9	9
2	ST1	8	9	9	9	–
	ST2	8	9	9	9	–
	---			---	Station numbers from ST1 to ST31	
	ST31	8	9	9	9	–
3	ST1	8	9	9	9	–
	ST2	8	9	9	9	–
	---			---		
	ST31	8	9	9	9	–

Note (1) The following Interface Modules can be installed in slots 1 to 6 of rack 1 of channel 1. Do not make allocations to Interface Modules.

- Remote I/O Modules
- PC Link Modules
- Expansion Communications Modules
- YENET3200 Modules
- Servo Interface Modules (GL60H and GL70H Series)
- ME-NET Modules (GL60HT and GL70HT only)
- ROM Modules (GL60H1 and GL70H1 only)

(2) There is a maximum of 256 slots which can be allocated, including Discrete Input, Discrete Output, Register Input, and Register Output.

- **Discrete I/O (ON-OFF Signals)**

	Reference Number	Number of Points	
Input	10001	016	← When 16 points are allocated from 10001 (10001 to 10016)
	10017	032	← When 32 points are allocated from 10017 (10017 to 10048)
Output	00001	016	← When 16 points are allocated from 1 (1 to 16)
	00017	032	← When 32 points are allocated from 17 (17 to 48)
	.....	...	← No allocation

In this way, the leading reference number of the reference number that are to be allocated is set.

Input relays: . . 10001 + 8N
Output coils: . 00001 + 8N, N=0, 1, 2, . . . 511

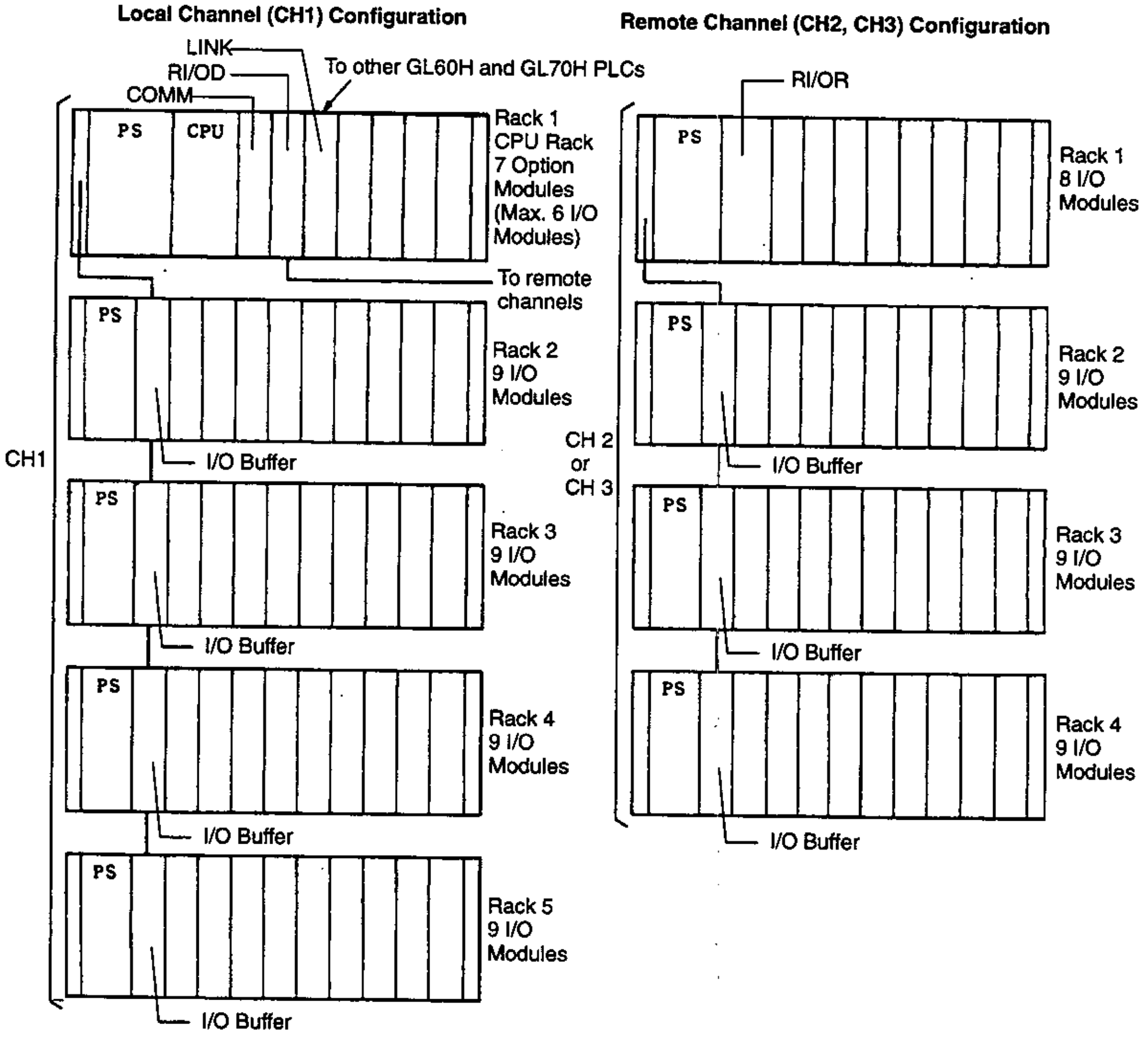
Note The number of input relays plus the number of output coils must be equal to or less than 4,096.

- **Register Numbers (16-bit Numeric Signals)**

	Reference Number	Number of Registers	
Input	30001	08	← When 8 registers are allocated from 30001 (30001 to 30008)
	30009	08	← When 8 registers are allocated from 30009 (30009 to 30016)
Output	40001	08	← When 8 registers are allocated from 40001 (40001 to 40008)
	40009	08	← When 8 registers are allocated from 40009 (40009 to 40016)
	.....	...	← No allocation

There is a limit on the number of registers that can be allocated to the same slot. The number of registers must be between 1 and 8.

Note The number of input registers plus the number of output registers must be equal to or less than 512.


Local Channel (CH1) Configuration
Remote Channel (CH2, CH3) Configuration
LINK
RI/OD
COMM
To other GL60H and GL70H PLCs
PS
CPU
Rack 1
CPU Rack
7 Option
Modules
(Max. 6 I/O
Modules)
To remote
channels
PS
Rack 2
9 I/O
Modules
I/O Buffer
CH1
PS
Rack 3
9 I/O
Modules
I/O Buffer
PS
Rack 4
9 I/O
Modules
I/O Buffer
PS
Rack 5
9 I/O
Modules
I/O Buffer
CH 2
or
CH 3
RI/OR
PS
Rack 1
8 I/O
Modules
PS
Rack 2
9 I/O
Modules
I/O Buffer
PS
Rack 3
9 I/O
Modules
I/O Buffer
PS
Rack 4
9 I/O
Modules
I/O Buffer

Note PS: . . . Power Supply Module
CPU: . CPU Module
COMM: Communications Module
RIOD: . Remote I/O Driver
LINK: . PC Link Module
RIOR: . Remote I/O Receiver

Figure 6.45 Configuration of GL60S, GL60H, or GL70H I/O Section

Table 6.3 Number of I/O Allocation Points by Module

Module	Model	Number of Input Points		Number of Output Points	
		Discrete	Registers	Discrete	Registers
16-point Discrete Input Module	B2501, B2503 B2601	16	0	0	0
		0	1	0	0
32-point Discrete Input Module	B2505, B2507 B2603, B2607	32	0	0	0
		0	2	0	0
64-point Discrete Input Module	B2605	64	0	0	0
		0	4	0	0
Register Input Module	B2701	0	8	0	0
Analog Input Module	B27□3	0	8	0	0
16-point Discrete Output Module	B2500, B2600 B2900, B2904	0	0	16	0
		0	0	0	1
32-point Discrete Output Module	B2504, B2602 B2606, B2902	0	0	32	0
		0	0	0	2
64-point Discrete Output Module	B2604	0	0	64	0
		0	0	0	4
Register Output Module	B2700	0	0	0	8
Analog Output Module	B27□2	0	0	0	2
Reversible Counter Module	B2801	16	2 or 4	8 or 16	2 or 4
Preset Counter Module	B2802	16	2	16 or 24	2 to 8
Positioning Module	B2803, B2813	16	4	24	4

- **I/O Allocation Display**

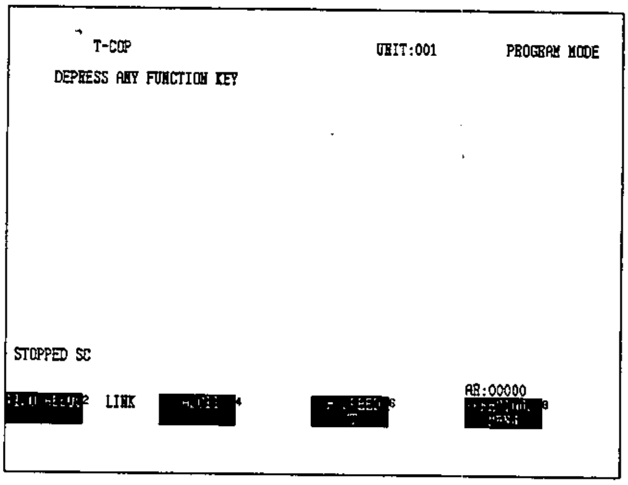
Use the following procedure to display the I/O allocations.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

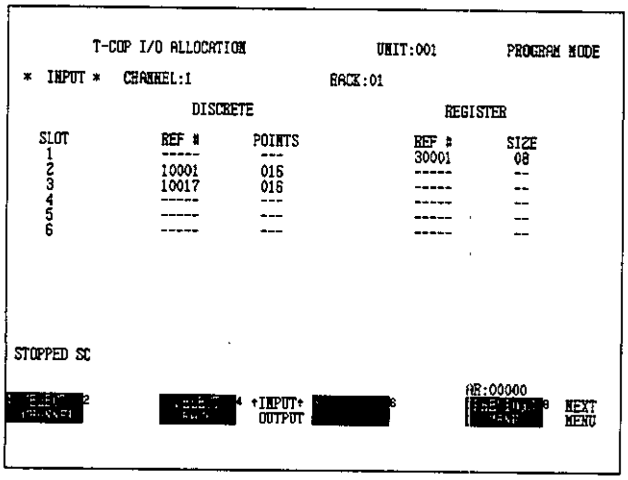
4) Select I/O Allocation.



```
T-COP                                   UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                        AR:00000
           LINK
```

Figure 6.46

5) Select I/O Allocation.



```
        T-COP I/O ALLOCATION                 UNIT:001       PROGRAM MODE
 * INPUT *   CHANNEL:1                    RACK:01
                   DISCRETE                          REGISTER
 SLOT            REF #      POINTS                REF #      SIZE
  1              -----       ---                  30001       08
  2              10001       016                  -----       --
  3              10017       016                  -----       --
  4              -----       ---                  -----       --
  5              -----       ---                  -----       --
  6              -----       ---                  -----       --

STOPPED SC
                                                       AR:00000
                            ↑INPUT↑                                 NEXT
                             OUTPUT                                 MENU
```

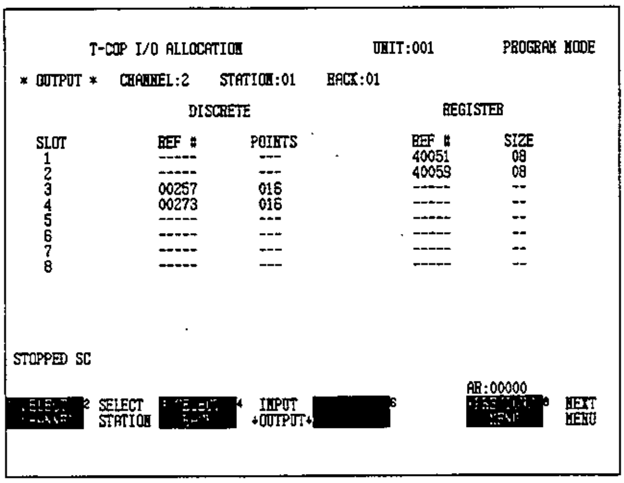
Figure 6.47

6) Enter the number of the channel to be displayed in the AR and choose Select Channel.

7) Enter the number of the station to be displayed in the AR and choose Select Station. (See Note (2))

8) Enter the number of the rack to be displayed in the AR and choose Select Rack.

9). Select either input or output by choosing ↑ Input ↑ or ↓ Output ↓.



```
      T-COP I/O ALLOCATION             UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:2    STATION:01    RACK:01
                  DISCRETE                          REGISTER
 SLOT           REF #        POINTS             REF #       SIZE
  1             -----         ---               40051        08
  2             -----         ---               40059        08
  3             00257         016               -----        --
  4             00273         016               -----        --
  5             -----         ---               -----        --
  6             -----         ---               -----        --
  7             -----         ---               -----        --
  8             -----         ---               -----        --

STOPPED SC
```

Figure 6.48

Note (1) The Attach Operation is not required when the PLC is already online.

(2) There is no need to select a station number for channel 1, which has no stations.

(3) After checking the desired screen, press Previous Menu and the screen will return to the one shown in *Figure 6.46*.

- **Input Allocations for Rack 1 of Channel 1**

Use the following procedure to allocate inputs for rack 1 of channel 1.

1) Perform the Attach Operation.

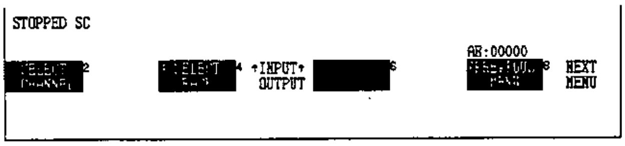
2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.

6) Select I/O Allocation.

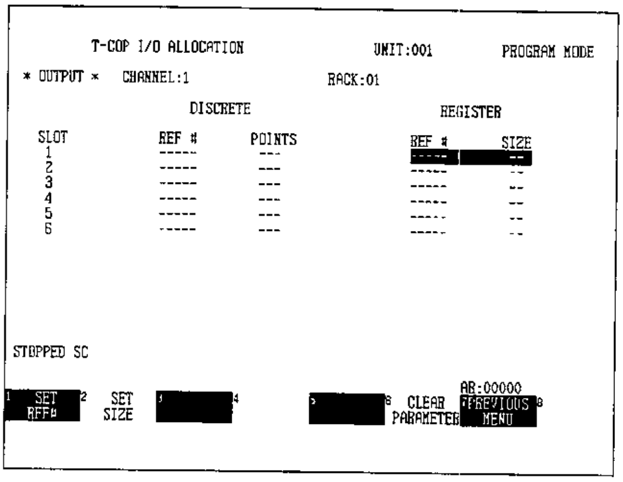


```
STOPPED SC
```

Figure 6.49

7) Select Next Menu.

8) Move the cursor to the right.

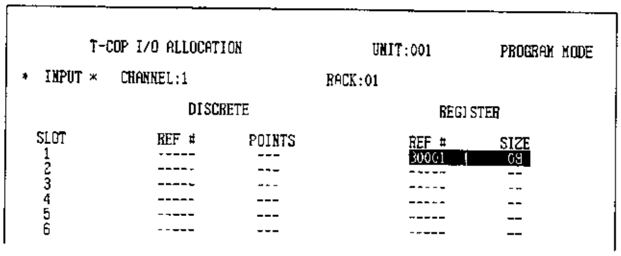


```
        T-COP I/O ALLOCATION                    UNIT:001        PROGRAM MODE
 * OUTPUT *   CHANNEL:1                     RACK:01
                      DISCRETE                            REGISTER
   SLOT              REF #        POINTS               REF #        SIZE
    1                -----         ---                 -----         --
    2                -----         ---                 -----         --
    3                -----         ---                 -----         --
    4                -----         ---                 -----         --
    5                -----         ---                 -----         --
    6                -----         ---                 -----         --

STOPPED SC
                                                              AR:00000
1  SET   2  SET    3         4            5         6  CLEAR    7PREVIOUS 8
   REF#     SIZE                                     PARAMETER     MENU
```

Figure 6.50

9) Enter **30001** in the AR and select Set Reference Number.

10) Enter **8** in the AR and select Set Size.

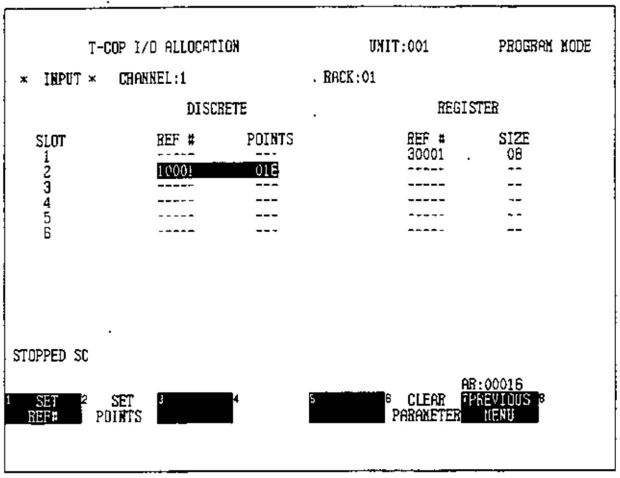


```
        T-COP I/O ALLOCATION                    UNIT:001        PROGRAM MODE
 *  INPUT *   CHANNEL:1                     RACK:01
                      DISCRETE                            REGISTER
   SLOT              REF #        POINTS               REF #        SIZE
    1                -----         ---                 30001         08
    2                -----         ---                 -----         --
    3                -----         ---                 -----         --
    4                -----         ---                 -----         --
    5                -----         ---                 -----         --
    6                -----         ---                 -----         --
```

Figure 6.51

11) Move the cursor to the lower left, enter **10001** in the AR, and select Set Reference Number.

12) Enter **16** in the AR and select Set Points.

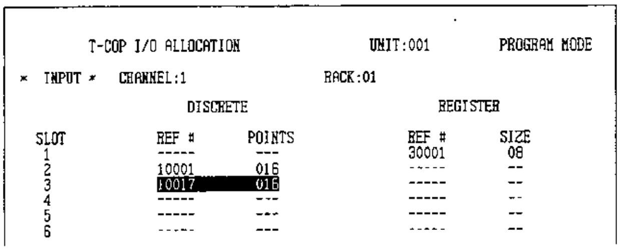


```
        T-COP I/O ALLOCATION                 UNIT:001       PROGRAM MODE
 *  INPUT *   CHANNEL:1                  RACK:01
                    DISCRETE                         REGISTER
  SLOT           REF #       POINTS             REF #        SIZE
   1             -----        ---               30001         08
   2             10001        016               -----         --
   3             -----        ---               -----         --
   4             -----        ---               -----         --
   5             -----        ---               -----         --
   6             -----        ---               -----         --



STOPPED SC
                                                          AR:00016
1  SET   2  SET    3          4           5          6  CLEAR   7PREVIOUS 8
   REF#     POINTS                                    PARAMETER    MENU
```

Figure 6.52

13) Move the cursor down, enter **10017** in the AR, and select Set Reference Number.

14) Enter **16** in the AR and select Set Points.



```
        T-COP I/O ALLOCATION                 UNIT:001       PROGRAM MODE
 *  INPUT *   CHANNEL:1                  RACK:01
                    DISCRETE                         REGISTER
  SLOT           REF #       POINTS             REF #        SIZE
   1             -----        ---               30001         08
   2             10001        016               -----         --
   3             10017        016               -----         --
   4             -----        ---               -----         --
   5             -----        ---               -----         --
   6             -----        ---               -----         --
```

Figure 6.53

15) Select Previous Menu.

- **Output Allocations for Rack 1 of Channel 1**

Use the following procedure to allocate outputs for rack 1 of channel 1.

1) Perform the Attach Operation.

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.

6) Select I/O Allocation.

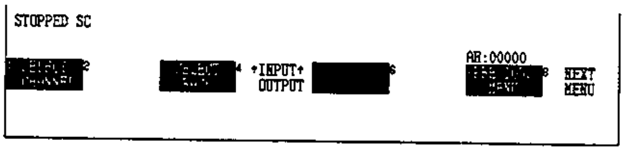
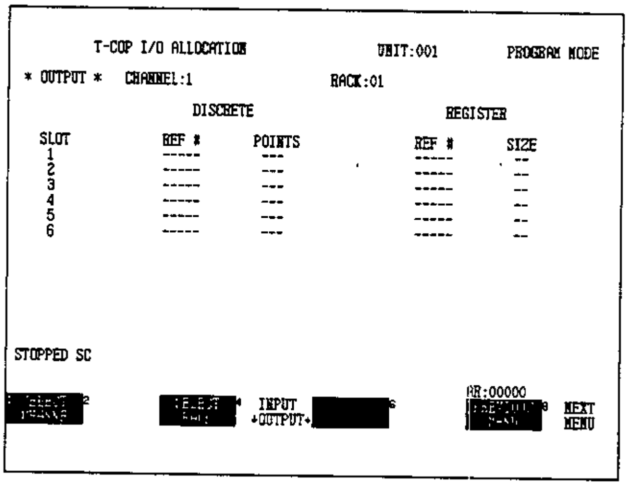

STOPPED SC
SELECT CHANNEL 2
SELECT RACK 4
↑INPUT↑
OUTPUT
6
AR:00000
PREVIOUS MENU 8
NEXT
MENU

Figure 6.54

7) Select ↑ Input ↑ or ↓ Output ↓.



```
       T-COP I/O ALLOCATION                   UNIT:001        PROGRAM MODE
* OUTPUT *   CHANNEL:1                   RACK:01
                      DISCRETE                          REGISTER
  SLOT               REF #      POINTS              REF #      SIZE
   1                 -----       ---                -----       --
   2                 -----       ---                -----       --
   3                 -----       ---                -----       --
   4                 -----       ---                -----       --
   5                 -----       ---                -----       --
   6                 -----       ---                -----       --
```

STOPPED SC
SELECT CHANNEL 2
SELECT RACK 4
INPUT
↓OUTPUT↓
6
AR:00000
PREVIOUS MENU 8
NEXT
MENU

Figure 6.55

8) Select Next Menu and complete the remainder of the rack output allocation.

9) Upon completion, select Previous Menu.

- **I/O Allocation for Other Racks of Channel 1**

Use the following procedure to allocate I/O for other racks of channel 1.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.

6) Select I/O Allocation.

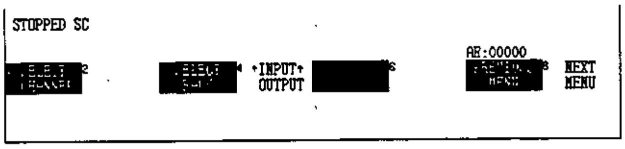


Figure 6.56

7) Enter the rack number (from 1 to 5) in the AR and choose Select Rack.

8) Select Next Menu and complete the remainder of the rack I/O allocation.

9) Upon completion, select Previous Menu.

10) Complete the remainder of the I/O allocations in the same way. Enter the channel number (2 or 3) the station number (from 1 to 31) and the rack number (from 1 to 4) in the AR, and chose Select Channel to change the channel, Set Station to change the station and Select Rack to change the rack.

11) On completion, select Previous Menu.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) If reference numbers, points,or sizes are set, the allocation data for that slot will be stored in the GL60S, GL60H, or GL70H allocation memory when Next Menu is selected.

(3) The label of the Next Menu is not displayed in Monitor Mode.

(4) Selecting Clear Parameter clears the allocation where the cursor is located.

(5) If a reference number is set which is already being used in another slot, an error message will be displayed which says "Caution: Reference Multiply in Traffic Cop." If you still wish to proceed with that setting, select Continue. If not, select Clear Parameter.

(6) If Previous Menu is selected without setting the discrete points or registers, an error message will be displayed which reads "Set Points or Size." Check and set the number of points or registers.

(ii) High-speed Station Allocations

High-speed and low-speed I/O processing is performed by station. High-speed station allocations specify which stations of which channels will use high-speed I/O processing.

This operation is necessary when 2-level scan has been selected. When 1-level scan is being used, all channels and stations are automatically used for high-speed I/O processing, and so the operation can be omitted.

In addition, to enable high-speed I/O processing, it is essential that the I/O references allocated to each high-speed station are consecutive within the station. This is why the leading reference and size allocations are performed at the same time.

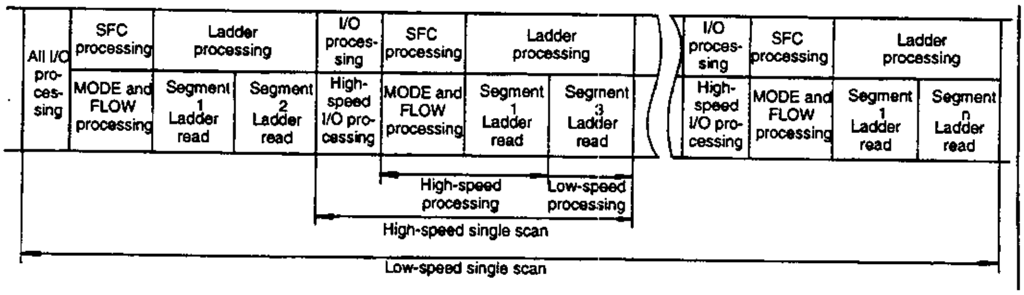
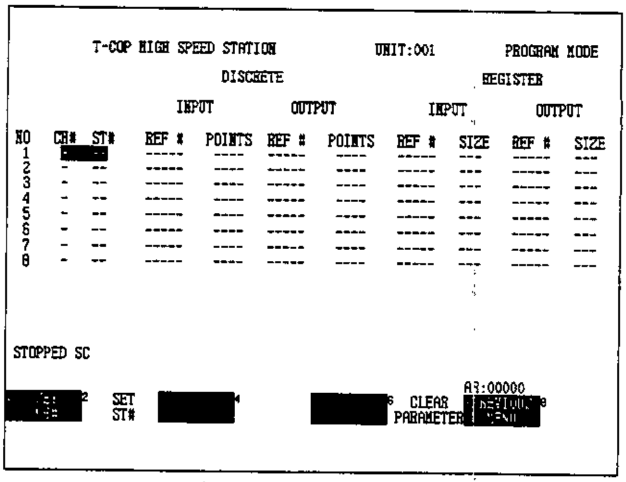

All I/O processing
SFC processing
MODE and FLOW processing
Ladder processing
Segment 1 Ladder read
Segment 2 Ladder read
I/O processing
High-speed I/O processing
SFC processing
MODE and FLOW processing
Ladder processing
Segment 1 Ladder read
Segment 3 Ladder read
I/O processing
High-speed I/O processing
SFC processing
MODE and FLOW processing
Ladder processing
Segment 1 Ladder read
Segment n Ladder read
High-speed processing
Low-speed processing
High-speed single scan
Low-speed single scan

Figure 6.57 High-speed/Low-speed Scan Processing

- **Allocating High-speed Stations**

Use the following procedure to allocate high-speed stations.

1) Perform the Attach Operation. (See Note (6))
2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.
3) Stop the GL60S, GL60H, or GL70H.
4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.
5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.
6) Select High-speed Station Allocation.



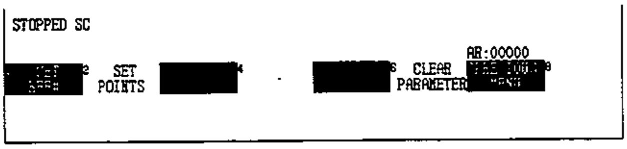
```
        T-COP HIGH SPEED STATION          UNIT:001        PROGRAM MODE
                        DISCRETE                          REGISTER
                  INPUT          OUTPUT             INPUT          OUTPUT
NO  CH#  ST#   REF #   POINTS  REF #   POINTS    REF #   SIZE   REF #   SIZE
1    -   --    -----   ----    -----   ----      -----   ---    -----   ---
2    -   --    -----   ----    -----   ----      -----   ---    -----   ---
3    -   --    -----   ----    -----   ----      -----   ---    -----   ---
4    -   --    -----   ----    -----   ----      -----   ---    -----   ---
5    -   --    -----   ----    -----   ----      -----   ---    -----   ---
6    -   --    -----   ----    -----   ----      -----   ---    -----   ---
7    -   --    -----   ----    -----   ----      -----   ---    -----   ---
8    -   --    -----   ----    -----   ----      -----   ---    -----   ---


STOPPED SC

                                                          AR:00000
          2  SET            4                6  CLEAR     PREVIOUS 8
             ST#                                PARAMETER MENU
```

Figure 6.58

7) Enter the channel number (2 or 3) in the AR and select Set Channel.

8) Enter the station number (from 1 to 31) in the AR and select Set Station.

9) Move the cursor to the right and make a discrete input allocation. Enter the leading reference and number of points in the AR. To set the reference, select Set Reference Number. To change the number of points, select Set Points.



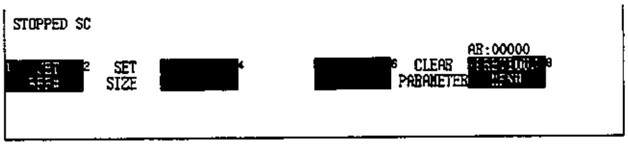
STOPPED SC

AR:00000

Figure 6.59

10) At the same time, allocate discrete output.

11) Move the cursor to the right and allocate the register inputs. Enter the leading reference and size (number of registers) in the AR. To set the reference, select Set Reference Number. To set the size, select Set Size.



STOPPED SC

AR:00000

Figure 6.60

12) Allocate the register outputs in the same way.

Note (1) When changing high-speed station allocations, make sure the GL60S, GL60H, or GL70H is stopped.

(2) All stations apart from those allocated for high-speed processing will be low-speed stations.

(3) Up to a maximum of 8 stations can be allocated as high-speed stations.

(4) Segment 1 is automatically assigned as a high-speed station.

(5) Each station can be allocated the following maximum sizes.

• Discrete I/O:	4,096 points
• Registers:	512 sets

(6) The Attach Operation is not required when the PLC is already online.

(7) When the channel number, station number, reference number, and the reference size are all complete, they are stored in the GL60S, GL60H, or GL70H allocation memory.

(8) If an allocation is duplicated (i.e., the same reference is allocated more than once), an error message will be displayed which reads "Caution: Reference Multiply in Traffic Cop." If you still wish to proceed with that setting, select Continue. If not, select Clear Parameter.

(iii) Link Allocation

A PC Link, which is one of the link functions of the GL60S, GL60H, and GL70H, can link together a maximum of 32 GL60S, GL60H, and GL70H Programmable Controllers on the one network. Link Allocation determines the references and sizes for the PC Link coils and link registers from other PLCs that can be accessed from inside the program.

• Storing Link Allocations

Use the following procedure for storing link allocations.

1) Perform the Attach Operation. (See Note (4))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.

6) Select Link Allocation.

7) Move the cursor to location of the unit number to be accessed.

8) Enter a discrete reference in the AR and select Set Reference Number.

9) Enter the number of discrete points in the AR and select Set Points.

10) Move the cursor to the right, enter a register reference in the AR, and select Set Reference Number.

11) Enter the number of registers in the AR and select Set Size.

12) Repeat the above operation until the allocations have been completed for all unit numbers connected to the PC Link.

Note (1) Make sure the GL60S, GL60H, or GL70H has been stopped when modifying link allocations.

(2) Duplicated link allocations are not allowed.

(3) Link allocations are possible up to a maximum of 1,024 discrete points and 1,024 registers.

(4) The Attach Operation is not required when the PLC is already online.

(5) When the Set Points and Set Size are complete, the allocations are stored in GL60S, GL60H, or GL70H allocation memory.

(6) When Previous Menu is selected, the display will return to the screen shown in *Figure 6.46.*

(7) Selecting Clear Parameter clears the allocation where the cursor is located.

(iv) ASCII Allocations

A maximum of eight ASCII Modules (16 ports) can be connected to a remote line. ASCII allocation specifies the channels used by each ASCII Module.

• Storing ASCII Allocations

Use the following procedure for ASCII allocations.

1) Perform the Attach Operation. (See Note (2))

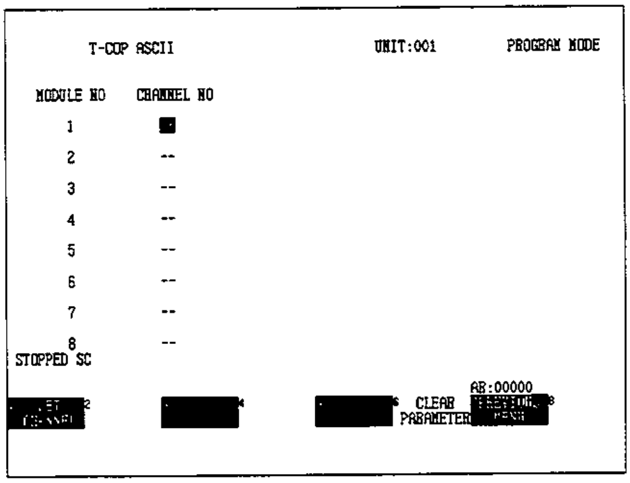
2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select I/O Allocation. The screen shown in *Figure 6.46* will be displayed.

6) Select ASCII Allocation.



```
        T-COP ASCII                          UNIT:001          PROGRAM MODE

   MODULE NO    CHANNEL NO
        1           ■
        2           --
        3           --
        4           --
        5           --
        6           --
        7           --
        8           --
STOPPED SC
                                                          AB:00000
```

Figure 6.61

7) Enter the channel number in the AR (2 or 3) and select Set Channel.

8) Repeat the above operation until the allocation of all the connected Modules has been completed.

Note (1) Make sure the GL60S, GL60H, or GL70H has been stopped before modifying ASCII allocations.

(2) The Attach Operation is not required when the PLC is already online.

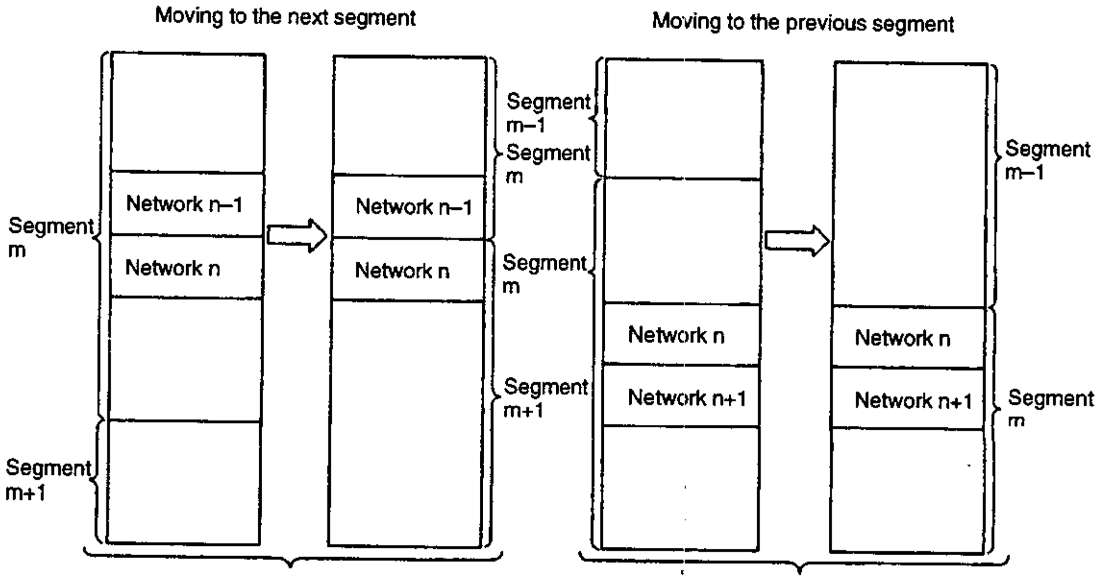
(3) When the channel numbers have been input, they are stored in GL60S, GL60H, or GL70H allocation memory.

(4) When Previous Menu is selected, the display will return to the screen shown in *Figure 6.46.*

(5) Selecting Clear Parameter clears the allocation where the cursor is located.

C. Segment Operation

When segments have been partitioned, the memory and the network numbers used by each segment can be displayed. It is also possible to move forward to the next segment, or to move back to the preceding segment.


Moving to the next segment
Segment m
Network n–1
Network n
Segment m+1
Network n–1
Network n
Segment m–1
Segment m
Segment m
Segment m+1
Moving to the previous segment
Network n
Network n+1
Segment m–1
Network n
Network n+1
Segment m

Enter "n" in the AR and select Move to Next Segment.

Enter "n+1" in the AR and select Move to Previous Segment.

Note Make sure the GL60S, GL60H, or GL70H has been stopped before carrying out the Segment Operation.

- **Moving to the Next Segment**

Use the following procedure to move to the next segment.

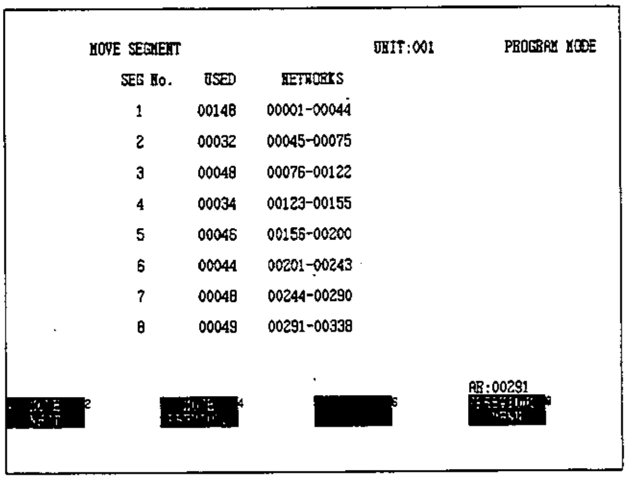
1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select Segment Allocation.



```
MOVE SEGMENT                          UNIT:001        PROGRAM MODE
    SEG No.    USED      NETWORKS
       1       00148    00001-00044
       2       00032    00045-00075
       3       00048    00076-00122
       4       00034    00123-00155
       5       00046    00156-00200
       6       00044    00201-00243
       7       00048    00244-00290
       8       00049    00291-00338

                                              AR:00291
```

Figure 6.62

6) Enter the network number n of the network to be moved to in the AR and select Move Next.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) If Previous Menu is selected, the display will return to screen shown in *Figure 6.38*.

- **Moving to the Previous Segment**

Use the following procedure to move to the previous segment.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select I/O Allocation. The screen shown in *Figure 6.38* will be displayed.

5) Select Segment Allocation. The screen shown in *Figure 6.62* will be displayed.

6) Enter the network number n+1 of the network to be moved in the AR and select Move Previous.

Note (1) The Attach Operation is not required when the PLC is already online.

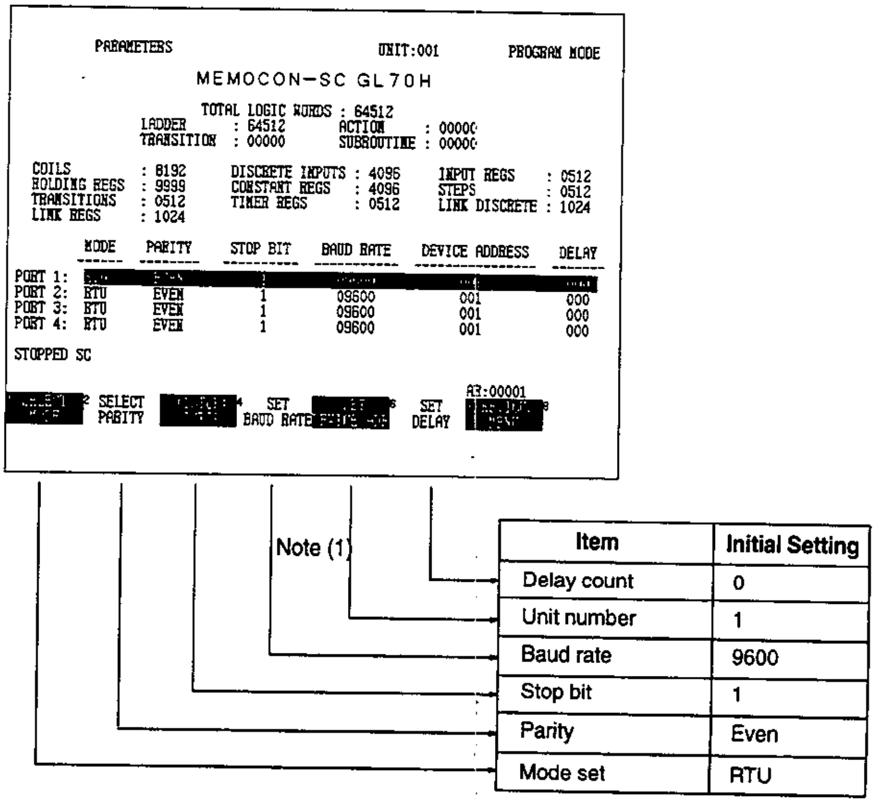
(2) To move the final network to the previous segment, enter the final network number +1 in the AR and select Move Previous.

(3) If Previous Menu is selected, the display will return to screen shown in *Figure 6.38*.

5. Utility Operations

A. Displaying GL60S, GL60H, or GL70H Parameters

This function displays the memory capacity, number of coils, number of registers, and communications port parameters of the GL60S, GL60H, or GL70H.



```
        PARAMETERS                          UNIT:001          PROGRAM MODE
                           MEMOCON-SC GL70H
                         TOTAL LOGIC WORDS : 64512
                    LADDER      : 64512      ACTION     : 00000
                    TRANSITION  : 00000      SUBROUTINE : 00000
  COILS          : 8192    DISCRETE INPUTS : 4096    INPUT REGS    : 0512
  HOLDING REGS   : 9999    CONSTANT REGS   : 4096    STEPS         : 0512
  TRANSITIONS    : 0512    TIMER REGS      : 0512    LINK DISCRETE : 1024
  LINK REGS      : 1024
           MODE    PARITY    STOP BIT   BAUD RATE   DEVICE ADDRESS   DELAY
          ------  --------  ----------  ----------  ---------------  ------
PORT 1:
PORT 2:    RTU     EVEN         1         09600          001           000
PORT 3:    RTU     EVEN         1         09600          001           000
PORT 4:    RTU     EVEN         1         09600          001           000
STOPPED SC
                                                         A3:00001
          2 SELECT        4    SET            6    SET           8
            PARITY          BAUD RATE             DELAY
```

Item	Initial Setting
Delay count	0
Unit number	1
Baud rate	9600
Stop bit	1
Parity	Even
Mode set	RTU

Figure 6.63 Display of GL60S, GL60H, or GL70H Parameters

(The above example is taken for a GL70H.)

Use the following procedure to display GL60S, GL60H, or GL70H parameters.

1) Perform the Attach Operation. (See Note (2))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Select Utility.

4) Select Parameters. The GL60S, GL60H, or GL70H parameters display screen shown in *Figure 6.63* will be displayed.

Note (1) The delay counter causes a set delay between when a GL60S, GL60H, or GL70H receives a transmission signal and when it begins to send a response. Usually there is no problem if this is set at "0."

(2) The Attach Operation is not required when the PLC is already online.

(3) If Previous Menu is selected, the display will return to condition shown in *Figure 6.6.*

B. Setting GL60S, GL60H, and GL70H Port Parameters

Data is exchanged between devices such as host computers, P120s, and ACGCs via communications ports 1 to 4 of the GL60S, GL60H, and GL70H. The communications parameters are set as follows:

Item	Setting Ranges
Unit number	1 to 247
Baud rate	150, 300, 600, 1200, 2400, 4800, 9600, 19200 (bps)
Parity	Disable, even, odd
Stop bits	1 or 2
Mode	RTU (8-bit) or ASCII (7-bit)
Delay count	0 to 255 ms (in 10-ms increments)

Use the following procedure to set the port parameters for the GL60S, GL60H, and GL70H.

1) Perform the Attach Operation. (Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

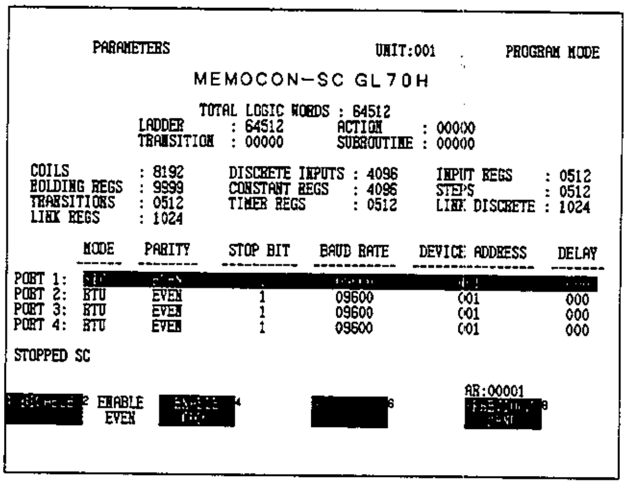
3) Select Utility.

4) Select Parameters. The GL60S, GL60H, or GL70H parameters screen shown in *Figure 6.63* will be displayed.

5) Set the unit number by entering a number between 1 and 247 in the AR and selecting Set Device Address.

6) Set the baud rate by entering a value in the AR and selecting Set Baud Rate.

7) Set the parity by choosing Select Parity.



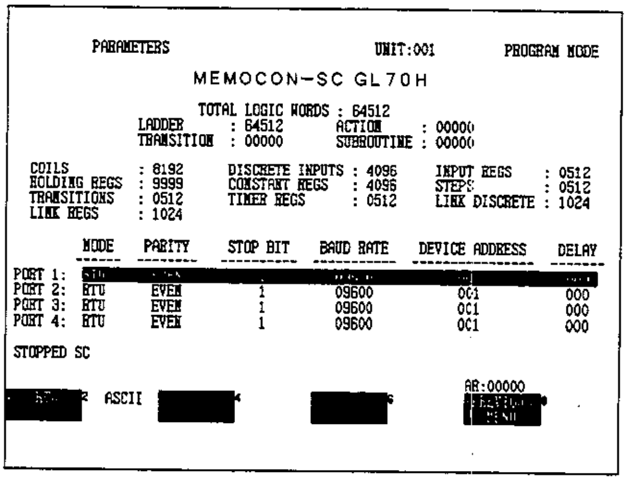
```
        PARAMETERS                        UNIT:001        PROGRAM MODE
                         MEMOCON-SC GL70H
                        TOTAL LOGIC WORDS : 64512
                  LADDER     : 64512      ACTION     : 00000
                  TRANSITION : 00000      SUBROUTINE : 00000

   COILS        : 8192     DISCRETE INPUTS : 4096    INPUT REGS    : 0512
   HOLDING REGS : 9999     CONSTANT REGS   : 4096    STEPS         : 0512
   TRANSITIONS  : 0512     TIMER REGS      : 0512    LINK DISCRETE : 1024
   LINK REGS    : 1024

          MODE     PARITY    STOP BIT   BAUD RATE   DEVICE ADDRESS   DELAY
          ------   -------   --------   ---------   --------------   -----
 PORT 1:
 PORT 2:  RTU      EVEN         1         09600          001          000
 PORT 3:  RTU      EVEN         1         09600          001          000
 PORT 4:  RTU      EVEN         1         09600          001          000
 STOPPED SC
                                                        AR:00001
```

Figure 6.64

If no parity is desired, select Disable. For even parity, select Enable Even. For odd parity, select Enable Odd.

8) Set the number of stop bits by selecting ↑ 1 Stop/2 Stop ↑ on the GL60S, GL60H, or GL70H Parameter Display Screen shown in *Figure 6.63.* (See Note (2))

9) To select the mode, choose Select Mode on the GL60S, GL60H, or GL70H Parameter Display Screen shown in *Figure 6.63.*



```
        PARAMETERS                        UNIT:001        PROGRAM MODE
                         MEMOCON-SC GL70H
                        TOTAL LOGIC WORDS : 64512
                  LADDER     : 64512      ACTION     : 00000
                  TRANSITION : 00000      SUBROUTINE : 00000

   COILS        : 8192     DISCRETE INPUTS : 4096    INPUT REGS    : 0512
   HOLDING REGS : 9999     CONSTANT REGS   : 4096    STEPS         : 0512
   TRANSITIONS  : 0512     TIMER REGS      : 0512    LINK DISCRETE : 1024
   LINK REGS    : 1024

          MODE     PARITY    STOP BIT   BAUD RATE   DEVICE ADDRESS   DELAY
          ------   -------   --------   ---------   --------------   -----
 PORT 1:
 PORT 2:  RTU      EVEN         1         09600          001          000
 PORT 3:  RTU      EVEN         1         09600          001          000
 PORT 4:  RTU      EVEN         1         09600          001          000
 STOPPED SC
                                                        AR:00000
```

Figure 6.65

10) For RTU select RTU. For ASCII, select ASCII.

11) To set the delay count, go to the GL60S, GL60H, or GL70H Parameter Display Screen shown in *Figure 6.63* and enter a value for the delay count between 0 and 255 in the AR, then select Set Delay.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) Each time the ↑ 1 Stop/2 Stop ↑ Label Key is selected, the arrows point alternately up and down.

(3) When the settings have been completed, select Previous Menu and the display will return to the supervisory screen shown in *Figure 6.6*.

C. System Status Allocations

The system status allocations enable monitoring the CPU error state and the status of each Module, even when the CPU is stopped. Use the following procedure to store system status allocations.

1) Perform the Attach Operation. (See Note (2))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

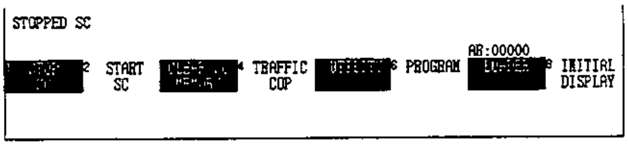


Figure 6.66

4) Select Utility.

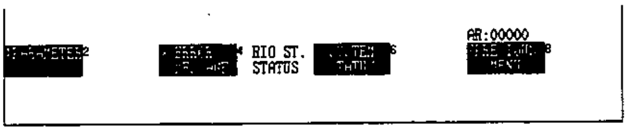
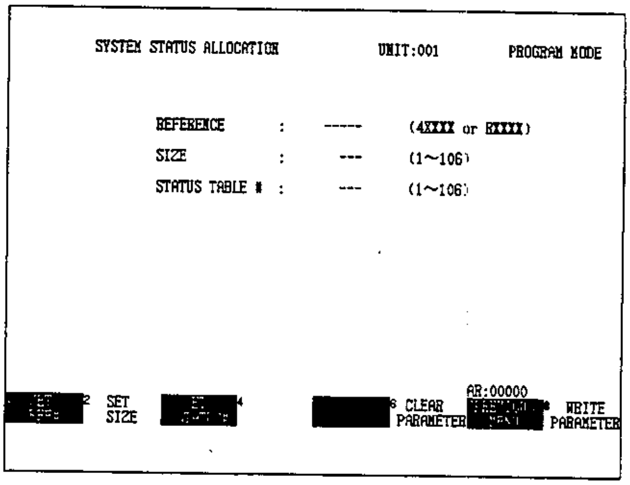


Figure 6.67

5) Select System Status.



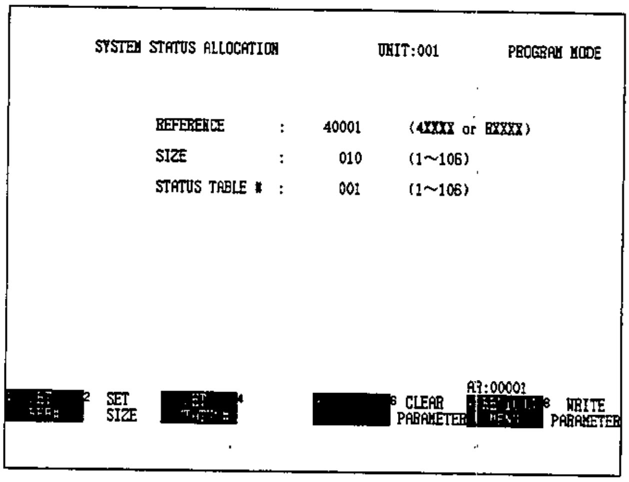
```
SYSTEM STATUS ALLOCATION          UNIT:001        PROGRAM MODE

        REFERENCE      :   -----    (4XXXX or RXXXX)
        SIZE           :    ---     (1~106)
        STATUS TABLE # :    ---     (1~106)

                                   AR:00000
         2 SET                  6 CLEAR          8 WRITE
           SIZE                   PARAMETER        PARAMETER
```

Figure 6.68

6) Enter the reference number in the AR and select Set Reference Number.

7) Enter the number of registers in the AR and select Set Size.

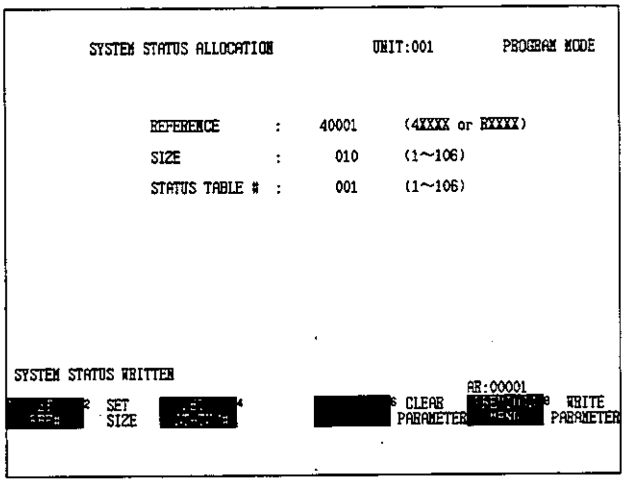
8) Enter the status table number in the AR and select Set Status Number.



```
SYSTEM STATUS ALLOCATION          UNIT:001        PROGRAM MODE

        REFERENCE      :   40001    (4XXXX or RXXXX)
        SIZE           :     010    (1~106)
        STATUS TABLE # :     001    (1~106)

                                   AR:00001
         2 SET                  6 CLEAR          8 WRITE
           SIZE                   PARAMETER        PARAMETER
```

Figure 6.69

9) Select Write Parameter.



```
SYSTEM STATUS ALLOCATION          UNIT:001       PROGRAM MODE

        REFERENCE      :   40001    (4XXXX or RXXXX)
        SIZE           :     010    (1~106)
        STATUS TABLE # :     001    (1~106)

SYSTEM STATUS WRITTEN
```

AR:00001
SET SIZE
CLEAR PARAMETER
WRITE PARAMETER

Figure 6.70

10) Selecting Write Parameter stores the information in the GL60S, GL60H, or GL70H memory.

Note (1) Make sure the GL60S, GL60H, or GL70H is stopped before modifying system status allocations.

(2) The Attach Operation is not required when the PLC is already online.

(3) After the data has been entered, it is not stored in the GL60S, GL60H, or GL70H until Write Parameter is selected.

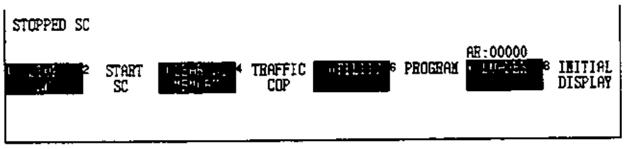
(4) Select Clear Parameter to clear an allocation.

D. Remote I/O Station Status

The status of a remote I/O station can be monitored. Use the following procedure.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key.



```
STOPPED SC
```

AR:00000
START SC
TRAFFIC COP
PROGRAM
INITIAL DISPLAY

Figure 6.71

3) Select Utility.

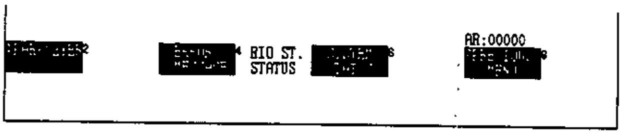
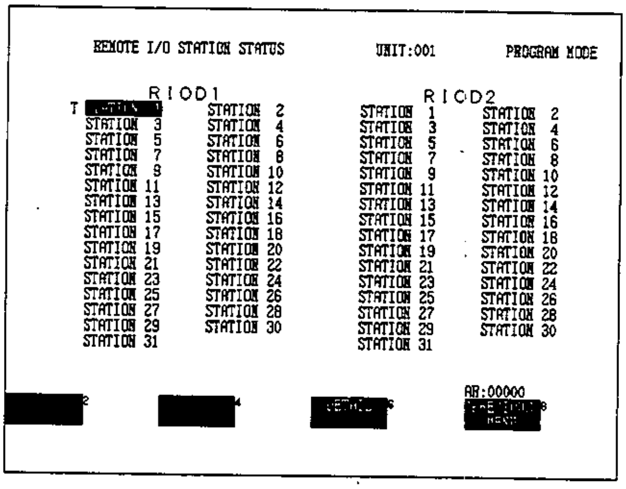


Figure 6.72

4) Select RIO St Status.



```
REMOTE I/O STATION STATUS           UNIT:001        PROGRAM MODE

          RIOD1                              RIOD2
T STATION  1     STATION  2        STATION  1     STATION  2
  STATION  3     STATION  4        STATION  3     STATION  4
  STATION  5     STATION  6        STATION  5     STATION  6
  STATION  7     STATION  8        STATION  7     STATION  8
  STATION  9     STATION 10        STATION  9     STATION 10
  STATION 11     STATION 12        STATION 11     STATION 12
  STATION 13     STATION 14        STATION 13     STATION 14
  STATION 15     STATION 16        STATION 15     STATION 16
  STATION 17     STATION 18        STATION 17     STATION 18
  STATION 19     STATION 20        STATION 19     STATION 20
  STATION 21     STATION 22        STATION 21     STATION 22
  STATION 23     STATION 24        STATION 23     STATION 24
  STATION 25     STATION 26        STATION 25     STATION 26
  STATION 27     STATION 28        STATION 27     STATION 28
  STATION 29     STATION 30        STATION 29     STATION 30
  STATION 31                       STATION 31

                                                 AR:00000
```

Figure 6.73

Note (1) The Attach Operation is not required when the PLC is already online.

(2) A "T" on the screen means that there is an allocation to that station.

(3) An asterisk on the screen means that there is something unusual about that station.

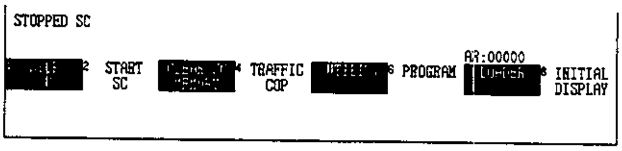
(4) To see more information about each station, select the station with the cursor and select Detail.

E. Error Messages

The error codes displayed when the CPU is down are displayed as messages on the P120 screen. Use the following procedure to display error messages.

1) Perform the Attach Operation. (See Note (1))

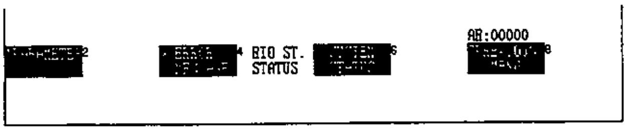
2) Press the Supervisory Key.



```
STOPPED SC
```

Figure 6.74

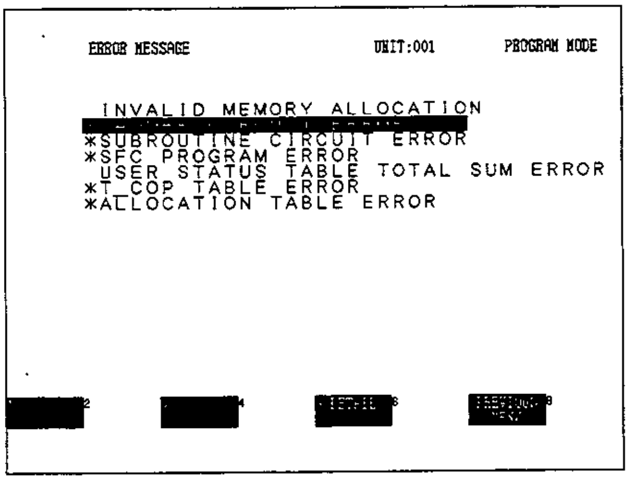
3) Select Utility.



BIO ST.
STATUS
AR:00000
2
4
6
8

Figure 6.75

4) Select Error Message.



ERROR MESSAGE UNIT:001 PROGRAM MODE

INVALID MEMORY ALLOCATION
*SUBROUTINE CIRCUIT ERROR
*SFC PROGRAM ERROR
USER STATUS TABLE TOTAL SUM ERROR
*T COP TABLE ERROR
*ALLOCATION TABLE ERROR

Figure 6.76

Note (1) The Attach Operation is not required when the PLC is already online.

(2) An asterisk on the screen means that there is more information about that error.

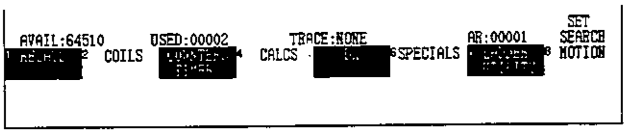
(3) When there is more information, select Detail.

F. Displaying Status

The usage and disabled status of coils and link coils, and the disabled status of input relays and motion relays can all be displayed together. Use the following procedure.

1) Perform the Attach Operation. (See Note)

2) Display the network.



AVAIL:64510
USED:00002
TRACE:NONE
AR:00001
SET
SEARCH
2 COILS
4 CALCS
6 SPECIALS
8 MOTION

Figure 6.77

3) Select Ladder Utility.

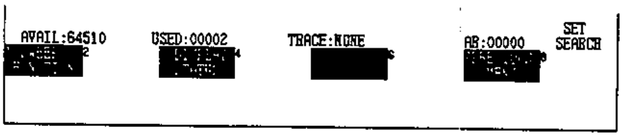

AVAIL:64510
USED:00002
TRACE:NONE
AR:00000
SET
SEARCH

Figure 6.78

4) Select Display Status.

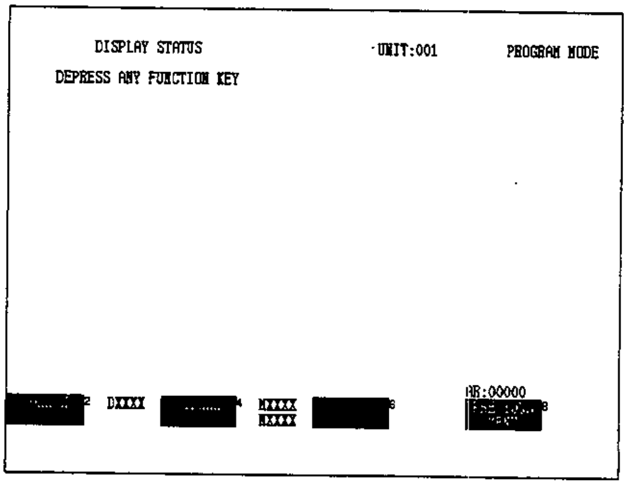
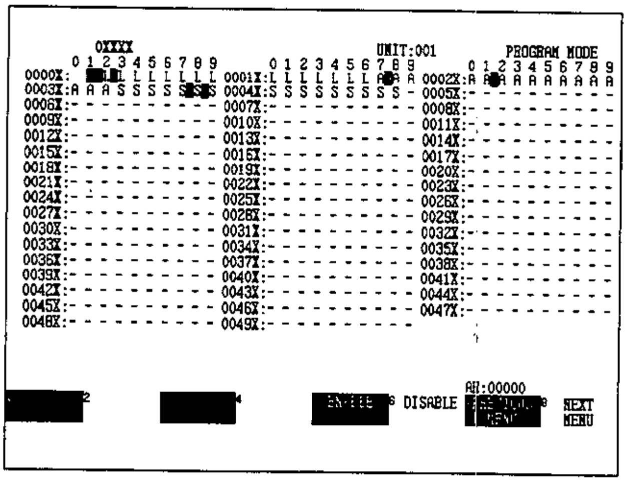

DISPLAY STATUS
UNIT:001
PROGRAM MODE
DEPRESS ANY FUNCTION KEY
DXXXX
MXXXX
NXXXX
AR:00000

Figure 6.79

5) Press the Function Key of the reference to be displayed.

6) Enter the reference number to be displayed in the AR and press the Erase/Get Key.



```
          0XXXX                                      UNIT:001            PROGRAM MODE
        0 1 2 3 4 5 6 7 8 9          0 1 2 3 4 5 6 7 8 9          0 1 2 3 4 5 6 7 8 9
0000X:    L L L L L L L L L  0001X:L L L L L L L A A A  0002X:A A A A A A A A A A
0003X:A A A S S S S S S S  0004X:S S S S S S S S S -  0005X:- - - - - - - - - -
0006X:- - - - - - - - - -  0007X:- - - - - - - - - -  0008X:- - - - - - - - - -
0009X:- - - - - - - - - -  0010X:- - - - - - - - - -  0011X:- - - - - - - - - -
0012X:- - - - - - - - - -  0013X:- - - - - - - - - -  0014X:- - - - - - - - - -
0015X:- - - - - - - - - -  0016X:- - - - - - - - - -  0017X:- - - - - - - - - -
0018X:- - - - - - - - - -  0019X:- - - - - - - - - -  0020X:- - - - - - - - - -
0021X:- - - - - - - - - -  0022X:- - - - - - - - - -  0023X:- - - - - - - - - -
0024X:- - - - - - - - - -  0025X:- - - - - - - - - -  0026X:- - - - - - - - - -
0027X:- - - - - - - - - -  0028X:- - - - - - - - - -  0029X:- - - - - - - - - -
0030X:- - - - - - - - - -  0031X:- - - - - - - - - -  0032X:- - - - - - - - - -
0033X:- - - - - - - - - -  0034X:- - - - - - - - - -  0035X:- - - - - - - - - -
0036X:- - - - - - - - - -  0037X:- - - - - - - - - -  0038X:- - - - - - - - - -
0039X:- - - - - - - - - -  0040X:- - - - - - - - - -  0041X:- - - - - - - - - -
0042X:- - - - - - - - - -  0043X:- - - - - - - - - -  0044X:- - - - - - - - - -
0045X:- - - - - - - - - -  0046X:- - - - - - - - - -  0047X:- - - - - - - - - -
0048X:- - - - - - - - - -  0049X:- - - - - - - - - -
```

DISABLE
AR:00000
NEXT
MENU

Figure 6.80

Note The Attach Operation is not required when the program can be stored.

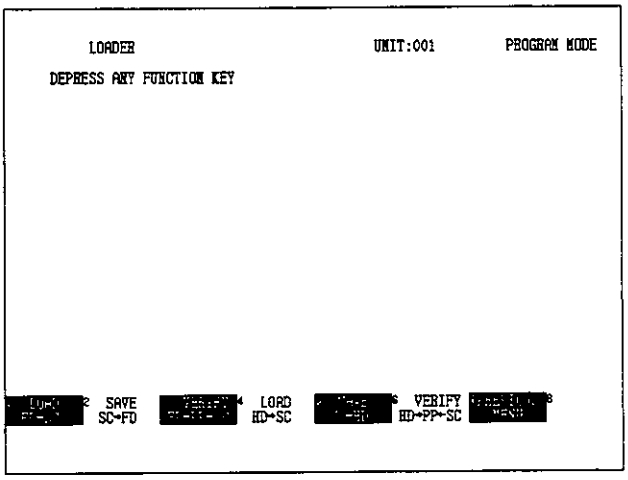
6. Loader

This operation loads, saves, and verifies programs for the GL60S, GL60H, and GL70H. The load operation is carried out as follows:

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Select Loader.



LOADER UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

Figure 6.81

4) Select any one of Load FD→SC, Save SC→FD, Verify FD→PP←SC, Load HD→SC, Save SC→HD, or Verify HD→PP←SC.

Load FD→SC	GL60S, GL60H, or GL70H	←	FD Load operation
Save SC→FD	GL60S, GL60H, or GL70H	→	FD Save operation
Verify FD→PP←SC	GL60S, GL60H, or GL70H	←→	FD Verify operation
Load HD→SC	GL60S, GL60H, or GL70H	←	HD Load operation
Save SC→HD	GL60S, GL60H, or GL70H	←	HD Save operation
Verify HD→PP←SC	GL60S, GL60H, or GL70H	←	HD Verify operation

Note (1) The Attach Operation is not required when the PLC is already online.

(2) When the GL60S, GL60H, or GL70H is in Monitor Mode, Load FD→SC and Load HD→SC will be shown in the label display area.

(3) If Previous Menu is selected, the display will return to the screen shown in *Figure 6.6*.

(4) See *6.4 File Management* for details on the Disk File operation.

(5) Only disks which have been initialized for use with the P120 can be used. See *6.4.3 Disk Operations* for details about initialization.

7. Types of Loader Operation

A. Saving to a FD or HD from a GL60S, GL60H, or GL70H

This operation saves the contents of the GL60S, GL60H, or GL70H memory onto disk. When the ladder program has been stored, save the stored program to disk as a backup in case the original becomes corrupted.

- **Saving CPU Programs**

Use the following procedure to save a CPU program.

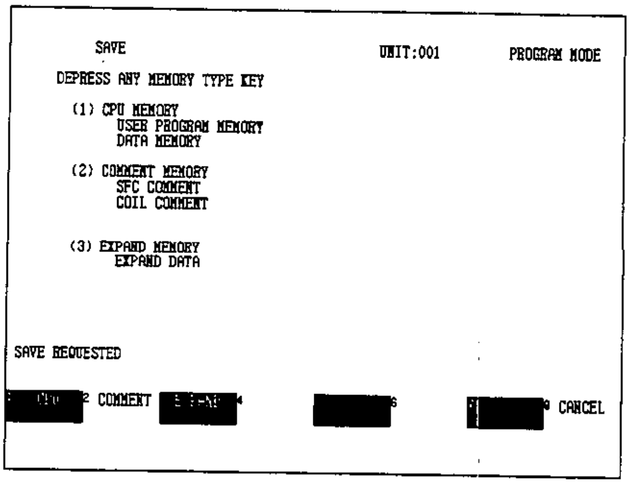
1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select Loader. The screen shown in *Figure 6.81* will be displayed.

5) To save to floppy disk, select Save SC→FD. To save to hard disk, select Save SC→HD.



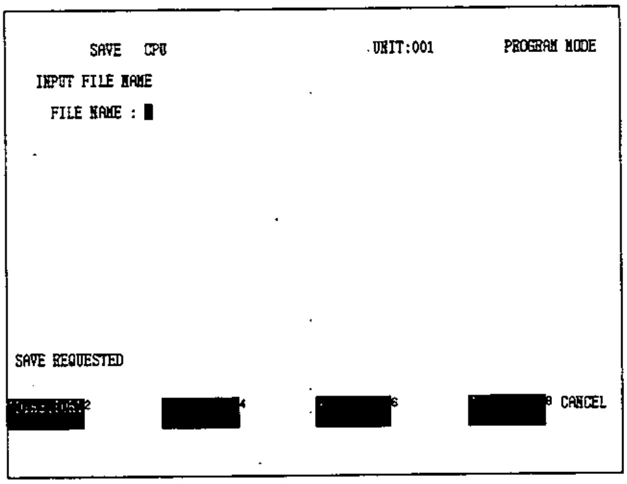
```
      SAVE                              UNIT:001        PROGRAM MODE
   DEPRESS ANY MEMORY TYPE KEY
     (1) CPU MEMORY
           USER PROGRAM MEMORY
           DATA MEMORY
     (2) COMMENT MEMORY
           SFC COMMENT
           COIL COMMENT

     (3) EXPAND MEMORY
           EXPAND DATA


SAVE REQUESTED
```

Figure 6.82

6) Select CPU Memory.

7) Select All CPU Memory.

8) Insert the disk into Drive A. (Not necessary in the case of SC→HD)



```
     SAVE   CPU                    UNIT:001        PROGRAM MODE
 INPUT FILE NAME
   FILE NAME : █




SAVE REQUESTED
            2           4           6           8 CANCEL
```

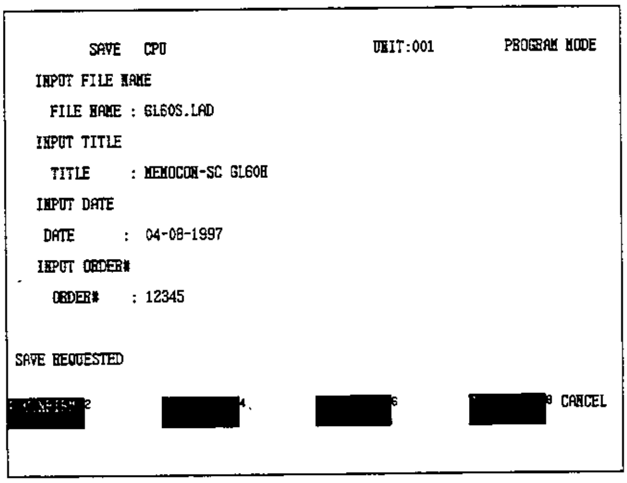
Figure 6.83

9) Input the file name and press the Enter Key.

10) Input the title (or leave blank) and press the Enter Key.

11) Input the date (or leave blank) and press the Enter Key.

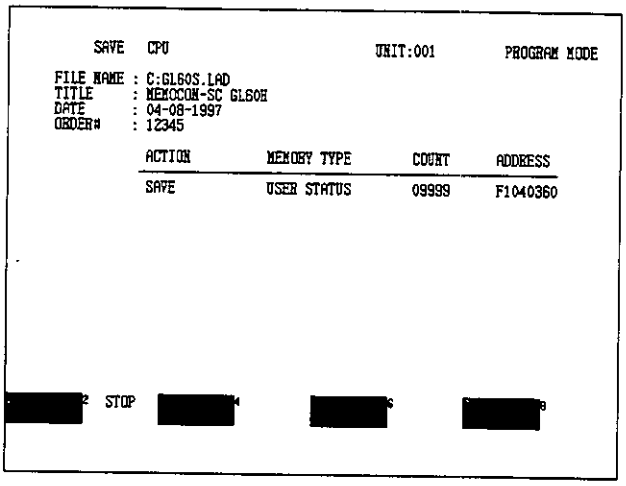
12) Input the order number (or leave blank) and press the Enter Key.



```
     SAVE   CPU                    UNIT:001        PROGRAM MODE
 INPUT FILE NAME
   FILE NAME : GL60S.LAD
 INPUT TITLE
   TITLE     : MEMOCON-SC GL60H
 INPUT DATE
   DATE      :  04-08-1997
 INPUT ORDER#
   ORDER#    : 12345

SAVE REQUESTED
  CONFIRM   2           4           6           8 CANCEL
```

Figure 6.84

13) Select Confirm.

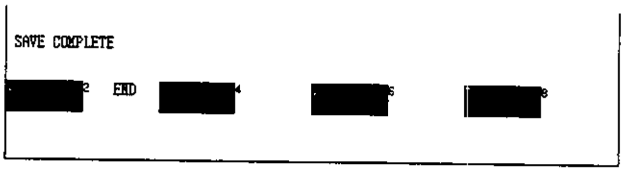


```
        SAVE  CPU                       UNIT:001        PROGRAM MODE

FILE NAME : C:GL60S.LAD
TITLE     : MEMOCON-SC GL60H
DATE      : 04-08-1997
ORDER#    : 12345
            ACTION        MEMORY TYPE     COUNT     ADDRESS
            SAVE          USER STATUS     09999     F1040360

            STOP
```

Figure 6.85

The save operation will begin. (It takes approximately 20 minutes to complete 32 Kwords).

When the save operation is complete, the message "Save Complete" will be displayed and a buzzer will sound for approximately 2 seconds.



```
SAVE COMPLETE
            END
```

Figure 6.86

14) Select End.

Note (1) Make sure the disk can be written to.

(2) The file name in ANK can be a maximum of 8 characters long with an extension of a maximum of 3 characters long.

TESTLDR1.	60S
File name	Extension

(3) The title in ANK can be a maximum of 52 characters long.

- **Saving Comments**

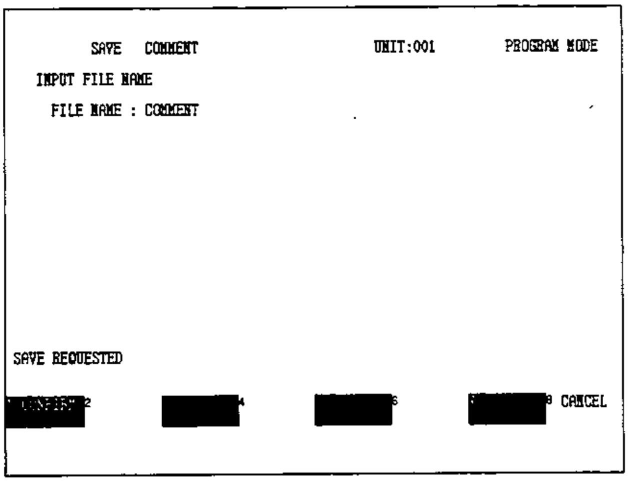
Use the following procedure to save comments.

1) Complete the procedure for saving the CPU program from steps 1) to 3).

2) Select Comment Memory.

3) Insert the disk in Drive A. (Not necessary in the case of SC→HD)

4) Input the file name and press the Enter Key.



```
      SAVE   COMMENT                     UNIT:001        PROGRAM MODE
  INPUT FILE NAME
    FILE NAME : COMMENT






SAVE REQUESTED
```

Figure 6.87

5) Select Confirm.

The save operation will begin. (It will take about 10 minutes to complete.)

When the save operation is complete, the message “Save Complete” will be displayed and a buzzer will sound for approximately 2 seconds.

6) Select End.

- **Saving Extended Memory**

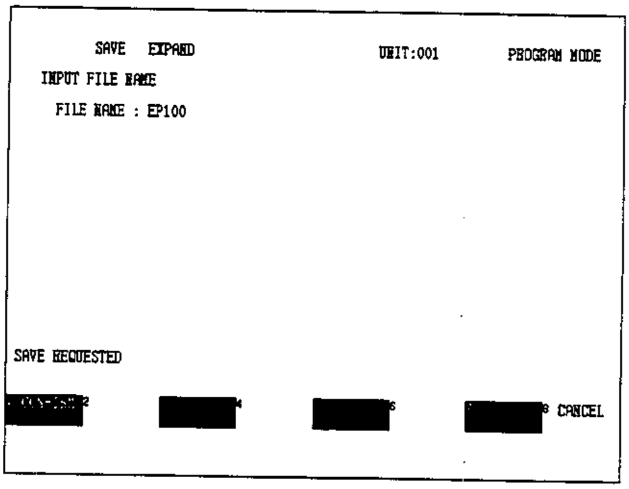
Use the following procedure to save extended memory.

1) Complete the procedure for saving a CPU program from steps 1) to 3).

2) Select Expand Memory.

3) Insert the disk in Drive A. (Not necessary in the case of SC→HD)

4) Input the file name and press the Enter Key.



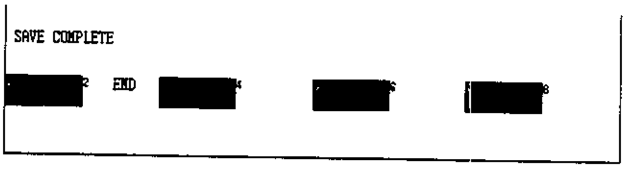
```
      SAVE   EXPAND                        UNIT:001       PROGRAM MODE
INPUT FILE NAME
  FILE NAME : EP100

SAVE REQUESTED
```

Figure 6.88

5) Select Confirm.

The save operation will begin. (It will take about 5 minutes to complete.)

When the save operation is complete, the message "Save Complete" will be displayed and a buzzer will sound for approximately 2 seconds.



```
SAVE COMPLETE
```

Figure 6.89

6) Select End.

Note (1) The Attach Operation is not required when the PLC is already online.

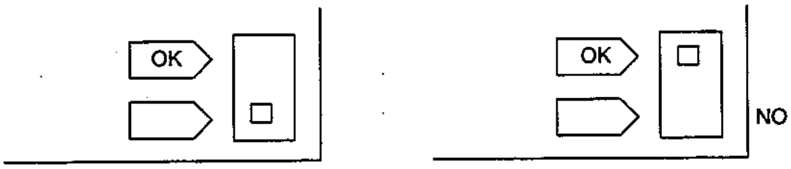
(2) Select File Overview. The file name will be displayed. (See *Figure 6.89*)

(3) Press Cancel, and the display will return to the screen shown in *Figure 6.81*.

(4) To stop the save process when running, select Stop. The labels will change to those shown in *Figure 6.85*. Select Continue and the save process will continue. Select Abort and the display will return to the screen shown in *Figure 6.81*.

(5) Save can be performed even while the GL60S, GL60H, or GL70H is starting. However, if Verify is executed, a mismatch can be caused.

(6) Make sure the disk is not write protected.



(a) Write protected (b) Write enabled

B. Downloading to a GL60S, GL60H, or GL70H from a FD or HD

This operation writes a program saved on disk to the GL60S, GL60H, or GL70H. It writes a completed ladder program into a GL60S, GL60H, or GL70H and activates the program. It can also be used to restore a corrupted program.

• Loading CPU Programs

Use the following procedure to load a CPU program.

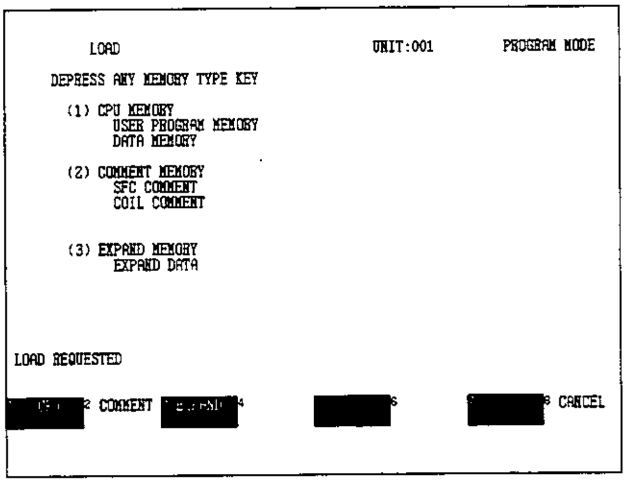
1) Perform the Attach Operation. (See Note (2))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select Loader. The screen shown in *Figure 6.81* will be displayed.

5) When loading from a floppy disk, select Load FD→SC. When loading from a hard disk, select Load HD→SC.



```
     LOAD                                    UNIT:001        PROGRAM MODE
  DEPRESS ANY MEMORY TYPE KEY
    (1) CPU MEMORY
          USER PROGRAM MEMORY
          DATA MEMORY
    (2) COMMENT MEMORY
          SFC COMMENT
          COIL COMMENT

    (3) EXPAND MEMORY
          EXPAND DATA



LOAD REQUESTED

   CPU   2 COMMENT   EXPAND 4             6               8 CANCEL
```

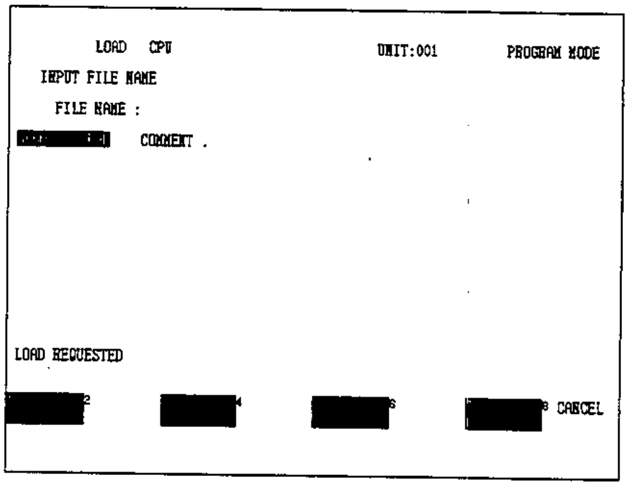
Figure 6.90

6) Select CPU Memory.

7) Select All CPU Memory.

8) Insert the disk in Drive A. (Not necessary in the case of HD→SC)

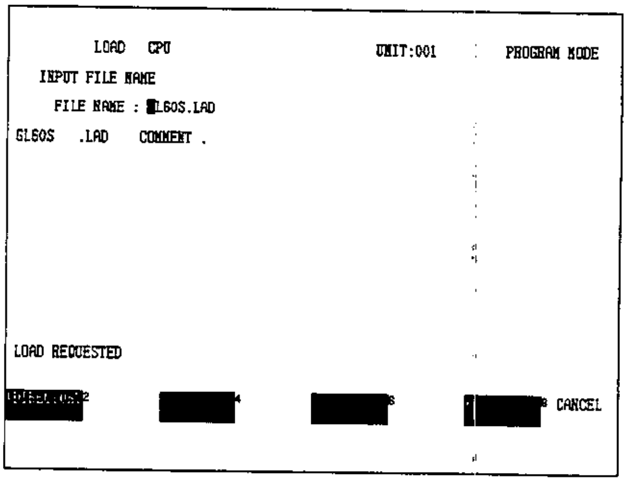
9) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.



```
        LOAD    CPU                       UNIT:001        PROGRAM MODE
   INPUT FILE NAME
     FILE NAME :
                COMMENT .



LOAD REQUESTED
```

Figure 6.91

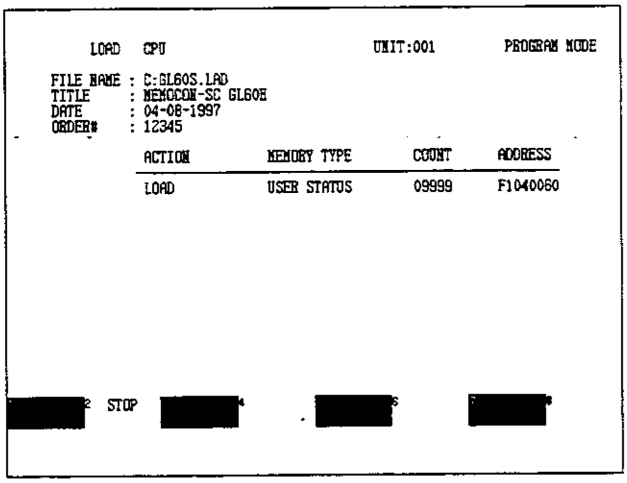
10) Press the Enter Key.



```
        LOAD    CPU                       UNIT:001        PROGRAM MODE
   INPUT FILE NAME
     FILE NAME : GL60S.LAD
GL60S   .LAD    COMMENT .



LOAD REQUESTED
```

Figure 6.92

11) Select Confirm.

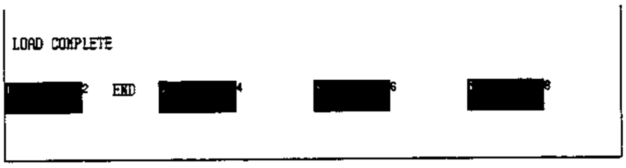


```
      LOAD   CPU                        UNIT:001        PROGRAM MODE

FILE NAME : C:GL60S.LAD
TITLE     : MEMOCON-SC GL60H
DATE      : 04-08-1997
ORDER#    : 12345
            ACTION        MEMORY TYPE       COUNT     ADDRESS
            -------------------------------------------------
            LOAD          USER STATUS       09999     F1040060




            STOP
```

Figure 6.93

The load operation will begin. (It takes approximately 20 minutes to complete 32 Kwords).

When the load operation is complete, the message "Load Complete" will be displayed and a buzzer will sound for approximately 2 seconds.



```
LOAD COMPLETE

            END
```

Figure 6.94

12) Select End.

• Loading Comments

Use the following procedure to load comments.

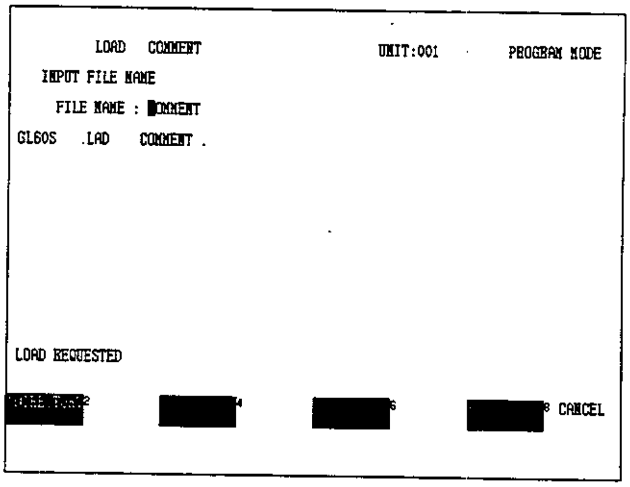
1) Complete the procedures for loading the CPU program from steps 1) to 4).

2) Select Comment Memory.

3) Press the Enter Key. (Not necessary in the case of HD→SC)

4) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.

5) Press the Enter Key.



```
        LOAD    COMMENT                      UNIT:001        PROGRAM MODE
   INPUT FILE NAME
     FILE NAME : COMMENT
GL60S   .LAD    COMMENT .




LOAD REQUESTED

          2           4           6           8 CANCEL
```

Figure 6.95

6) Select Confirm.

7) The load operation will begin. (It will take about 10 minutes to complete.)

8) When the load operation is complete, the message "Load Complete" will be displayed and a buzzer will sound for approximately 2 seconds.

9) Select End.

- **Loading Extended Memory**

Use the following procedure to load extended memory.

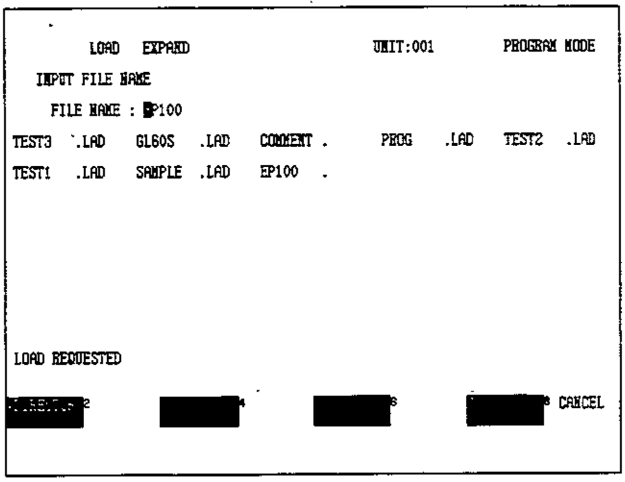
1) Complete the procedures for loading the CPU program from steps 1) to 4).

2) Select Expand Memory.

3) Insert the disk in Drive A. (Not necessary in the case of HD→SC)

4) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.

5) Press the Enter Key.



```
        LOAD   EXPAND                        UNIT:001        PROGRAM MODE
   INPUT FILE NAME
     FILE NAME : EP100
TESTS  `.LAD    GL60S   .LAD    COMMENT .       PROG    .LAD    TEST2   .LAD
TEST1   .LAD    SAMPLE  .LAD    EP100   .

LOAD REQUESTED
```

Figure 6.96

6) Select Confirm.

The load operation will begin. (It will take about 5 minutes to complete.)

When the load operation is complete, the message “Load Complete” will be displayed and a buzzer will sound for approximately two seconds.

7) Select End.

Note (1) Stop the GL60S, GL60H, or GL70H beforehand.

(2) The Attach Operation is not required when the PLC is already online.

(3) If Cancel is selected, the display will return to the screen shown in *Figure 6.81*.

(4) To stop the load process when running, select Stop. The labels displayed will change to those shown in *Figure 6.93*. Select Continue and the load process will continue. Select Abort and the display will return to the screen shown in *Figure 6.81*.

C. Verifying a FD or HD to GL60S, GL60H, or GL70H

This operation verifies the contents of a disk against the contents of the memory of a GL60S, GL60H, or GL70H.

• Verifying a CPU Program

Use the following procedure to verify a CPU program.

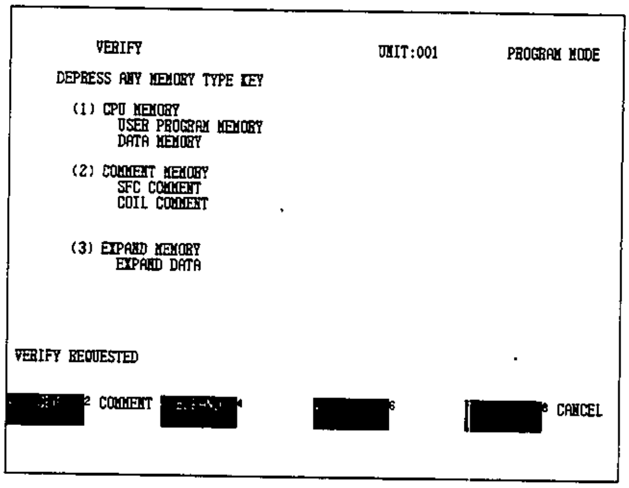
1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. The screen shown in *Figure 6.6* will be displayed.

3) Stop the GL60S, GL60H, or GL70H.

4) Select Loader. The screen shown in *Figure 6.81* will be displayed.

5) When verifying a floppy disk, select Verify FD→PP←SC. When verifying a hard disk, select Verify HD→PP←SC.



```
      VERIFY                          UNIT:001        PROGRAM MODE
   DEPRESS ANY MEMORY TYPE KEY
     (1) CPU MEMORY
           USER PROGRAM MEMORY
           DATA MEMORY
     (2) COMMENT MEMORY
           SFC COMMENT
           COIL COMMENT

     (3) EXPAND MEMORY
           EXPAND DATA

VERIFY REQUESTED
```

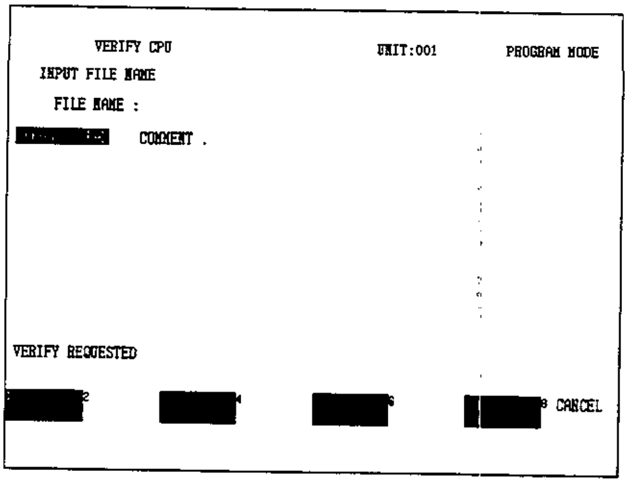
Figure 6.97

6) Select CPU Memory.

7) Select All CPU Memory.

8) Insert the disk in Drive A. (Not necessary in the case of HD→PP←SC)

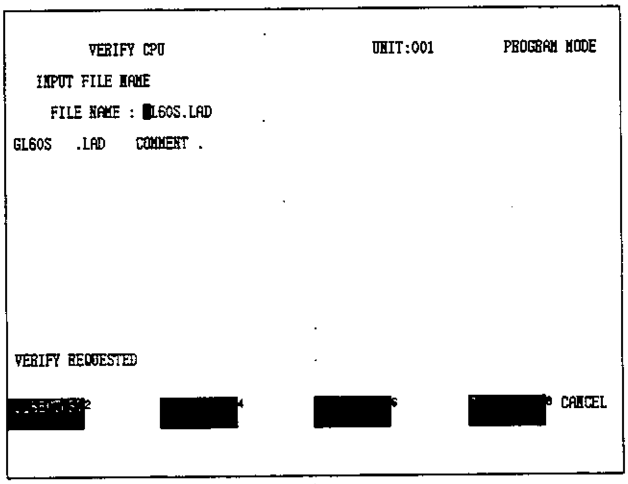
9) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.



```
      VERIFY CPU                      UNIT:001        PROGRAM MODE
  INPUT FILE NAME
    FILE NAME :
               COMMENT .

VERIFY REQUESTED
```

Figure 6.98

10) Press the Enter Key.

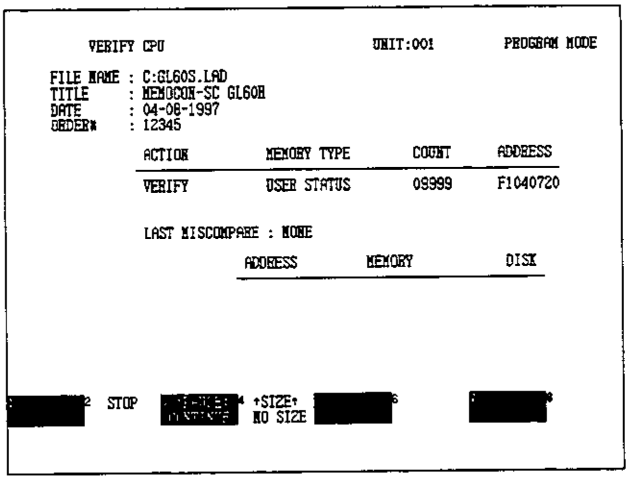


```
      VERIFY CPU                     UNIT:001      PROGRAM MODE
  INPUT FILE NAME
    FILE NAME : GL60S.LAD
GL60S   .LAD    COMMENT .



VERIFY REQUESTED
                                                    CANCEL
```

Figure 6.99

11) Select Confirm.

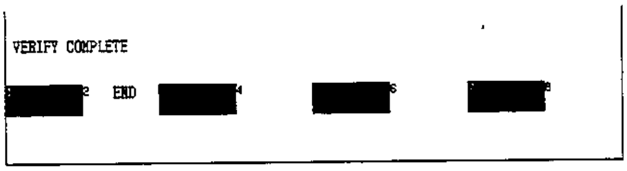
The verify process will begin. (It will take about 10 minutes to complete.)



```
      VERIFY CPU                      UNIT:001      PROGRAM MODE
   FILE NAME : C:GL60S.LAD
   TITLE     : MEMOCON-SC GL60H
   DATE      : 04-08-1997
   ORDER#    : 12345
              ACTION      MEMORY TYPE    COUNT    ADDRESS
              VERIFY      USER STATUS    09999    F1040720

              LAST MISCOMPARE : NONE
                         ADDRESS     MEMORY          DISK



          2  STOP          4 ↑SIZE↑          6                8
                             NO SIZE
```

Figure 6.100

When the verify operation is complete, the message "Verify Complete" will be displayed and a buzzer will sound for approximately 2 seconds.



```
VERIFY COMPLETE
          2  END          4               6               8
```

Figure 6.101

12) Select End.

- **Verifying Comments**

Use the following procedure to verify comments.

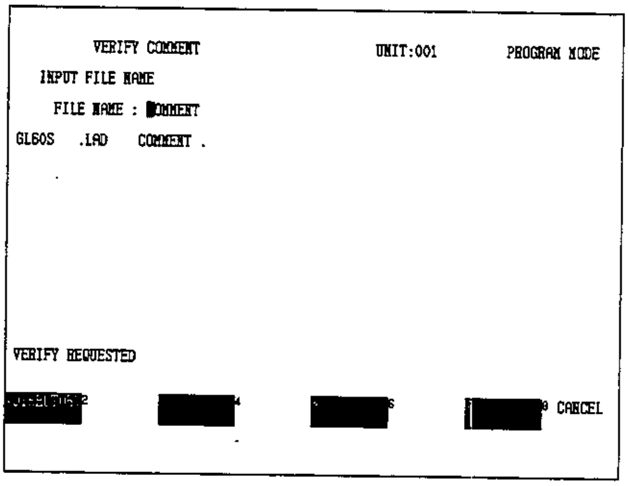
1) Perform the procedures for verifying a CPU program from steps 1) to 5).

2) Select Comment.

3) Insert the disk in Drive A. (Not necessary in the case of HD→PP←SC)

4) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.

5) Press the Enter Key.



```
        VERIFY COMMENT                    UNIT:001        PROGRAM MODE
   INPUT FILE NAME
     FILE NAME : COMMENT
GL60S   .LAD    COMMENT .





VERIFY REQUESTED
```

Figure 6.102

6) Select Confirm.

The verify process will begin. (It will take about 10 minutes to complete.)

When the verify operation is complete, the message "Verify Complete" will be displayed and a buzzer will sound for approximately 2 seconds.

7) Select End.

- **Verifying Extended Memory**

Use the following procedure to verify extended memory.

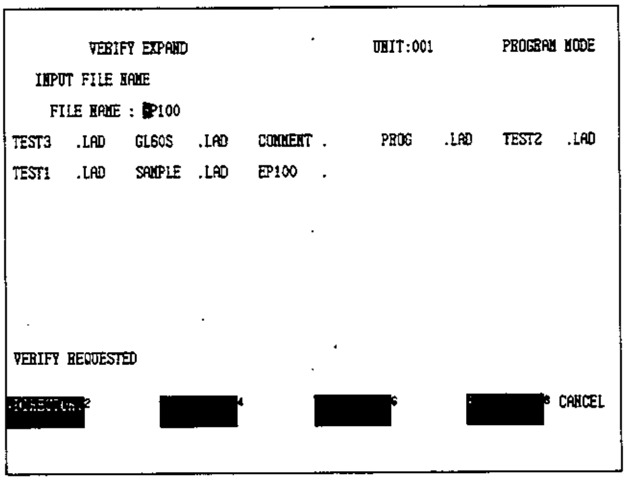
1) Perform the procedures for verifying a CPU program from steps 1) to 5).

2) Select Expand.

3) Insert the disk in Drive A. (Not necessary in the case of HD→PP←SC)

4) Select File Overview and move the cursor to select the name of the file to be loaded. Alternatively, input the name of the file directly.

5) Press the Enter Key.



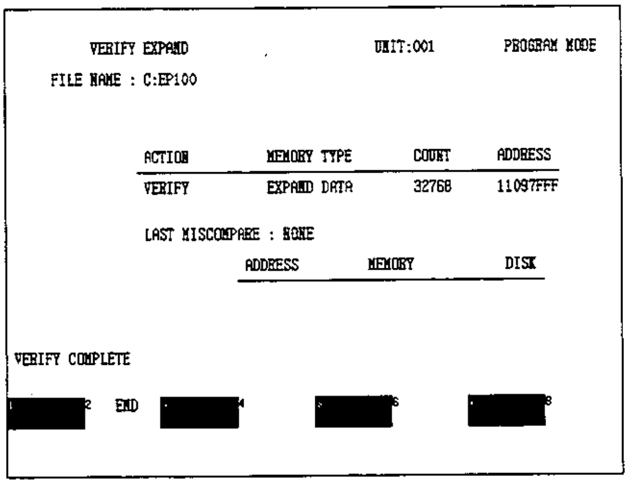
```
      VERIFY EXPAND                      UNIT:001       PROGRAM MODE
   INPUT FILE NAME
     FILE NAME : EP100
TEST3   .LAD   GL60S  .LAD   COMMENT .      PROG   .LAD   TEST2  .LAD
TEST1   .LAD   SAMPLE .LAD   EP100   .



VERIFY REQUESTED
```

Figure 6.103

6) Select Confirm.

The verify process will begin. (It will take about 5 minutes to complete.)

When the verify operation is complete, the message "Verify Complete" will be displayed and a buzzer will sound for approximately 2 seconds.



```
      VERIFY EXPAND                      UNIT:001       PROGRAM MODE
   FILE NAME : C:EP100

                ACTION         MEMORY TYPE       COUNT     ADDRESS
                VERIFY         EXPAND DATA       32768     11097FFF

                LAST MISCOMPARE : NONE
                               ADDRESS        MEMORY          DISK


VERIFY COMPLETE
```

Figure 6.104

7) Select End.

Note (1) The Attach Operation is not required when the PLC is already online.

(2) If Cancel is selected, the display will return to the screen shown in *Figure 6.81.*

(3) A clear mismatch ("miscompare") is when the memory required by a program and the size of the GL60S, GL60H, or GL70H memory do not match. If a clear mismatch is found during the verify process, then the verify process will be aborted and the buzzer will sound intermittently for 10 seconds. If Abort is selected, the display will return to the screen shown in *Figure 6.81.*

(4) If a mismatch other than the one described above is found during the verify process, the verify process will be aborted and the Labels shown in *Figure 6.100* will be displayed. If Continue is selected, the verification can continue. If Abort is selected, the display will return to the screen shown in *Figure 6.81*. If the mismatch is a fatal one (See Note (7)) the buzzer will sound intermittently for about 2 seconds and you will need to abort and retry.

(5) If the label ↑ Pause/Continue ↑ is selected it will change to ↓ Pause/Continue↓ and even when there has been a mismatch such as that described in (4) above, the check will be completed to the end. In this case, the messages "Last mismatch 1" and "Verify Complete" are displayed in the message area.

(6) The label ↑ Size/No Size ↑ is for future use.

(7) A "fatal mismatch" means that a mismatch has occurred in one of the following areas.

- The logic area (where a ladder program or SFC is stored)
- The traffic cop area (where system configuration or I/O allocation is stored)
- The system area

6.2.5 Monitoring Programming

1. Mode Operations

See *7.3 Mode.*

2. Flow Operations

See *7.1 SFC Flow Screen.*

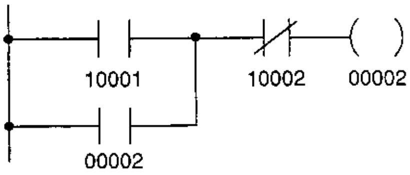
3. Ladder Operations

A. Ladder

(i) Storing Networks

- **Relays and Coils: Part 1**

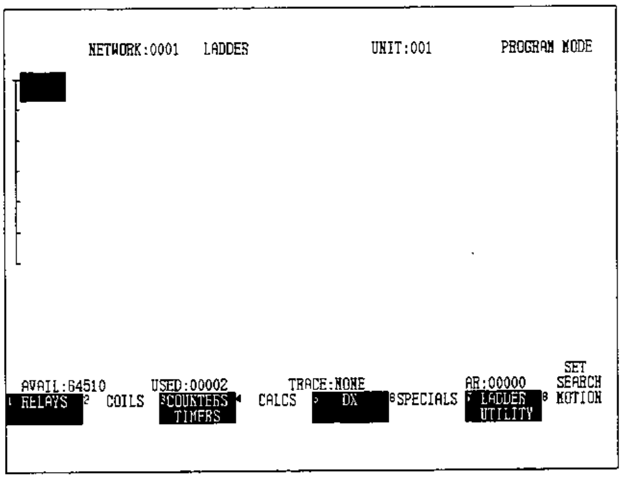
Example: Relay Circuits


10001
10002
00002
00002

Use the following procedure to store relays and coils.

1) Perform the Attach Operation. (See Note (3))

2) Press the Start Next Key.



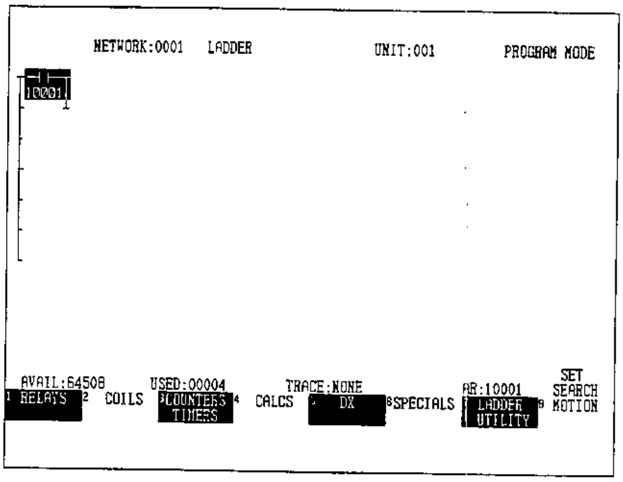
```
        NETWORK:0001   LADDER                  UNIT:001          PROGRAM MODE

 AVAIL:64510      USED:00002        TRACE:NONE             AR:00000
```

1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.105

3) Enter **10001** in the AR and press the -|↑|- Key.

4) Press the ⊣⊢ Key.



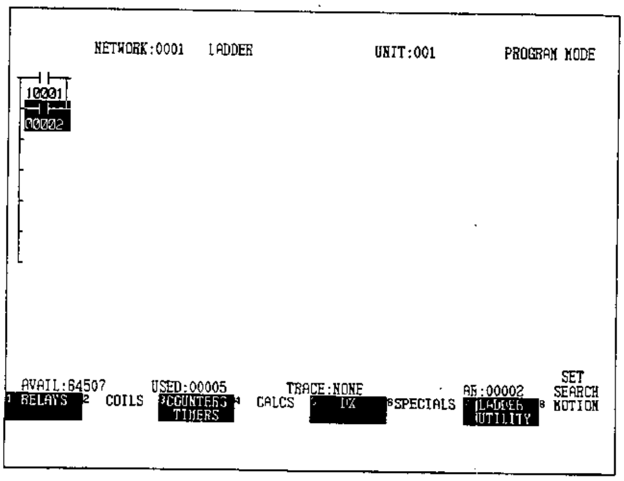
```
       NETWORK:0001   LADDER                 UNIT:001        PROGRAM MODE
10001

 AVAIL:64508      USED:00004        TRACE:NONE          AR:10001       SET
                                                                    SEARCH
```

1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 MOTION

Figure 6.106

5) Move the cursor down.

6) Enter **2** in the AR and press the ⊣↑⊢ Key.



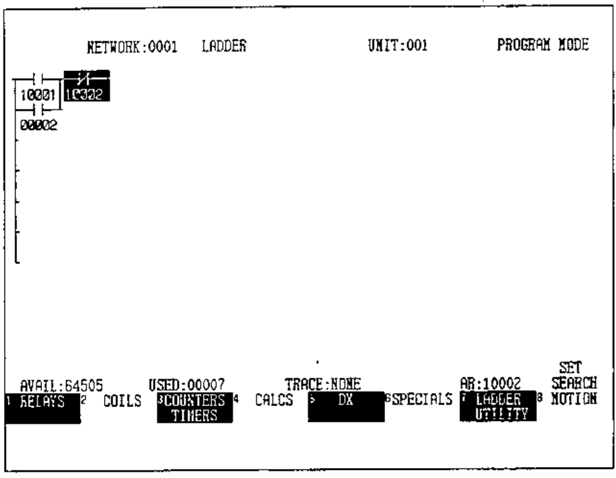
```
       NETWORK:0001   LADDER                 UNIT:001        PROGRAM MODE
10001
00002

 AVAIL:64507      USED:00005        TRACE:NONE          AR:00002       SET
                                                                    SEARCH
```

1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 MOTION

Figure 6.107

7) Move the cursor to the upper right.

8) Enter **10002** in the AR and press the -|/|- Key.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

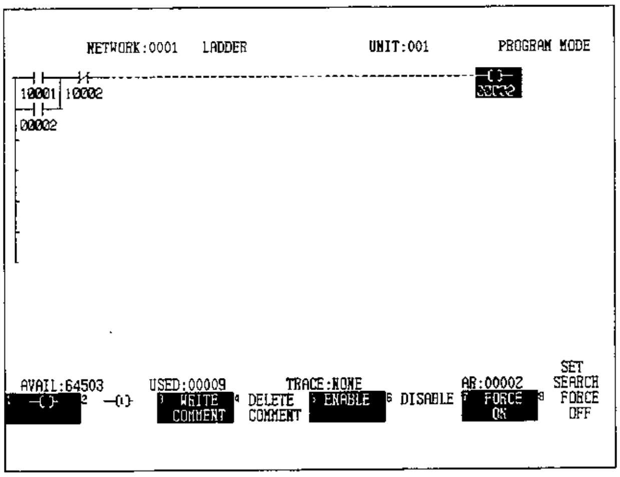
AVAIL:64505 USED:00007 TRACE:NONE AR:10002

10001
10002
00002
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
SET SEARCH
8 MOTION

Figure 6.108

9) Move the cursor to the right.

10) Enter **2** in the AR and press the -( )- Key.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

AVAIL:64503 USED:00009 TRACE:NONE AR:00002

10001
10002
00002
00002
1 —( )—
2 —(L)—
3 WRITE COMMENT
4 DELETE COMMENT
5 ENABLE
6 DISABLE
7 FORCE ON
SET SEARCH
8 FORCE OFF

Figure 6.109

Note (1) The same coil cannot be used for the same reference twice, but any number of contacts can be used for the same reference as long as the capacity of the memory allows.

(2) Place the cursor in the logic area.

(3) The Attach Operation is not required if program storage is already possible.

(4) The storage, modification, and so on, of elements is reflected immediately in the GL60S, GL60H, or GL70H memory as a result of that operation.

(5) Programs can be stored and modified while the GL60S, GL60H, or GL70H is in operation or stopped.

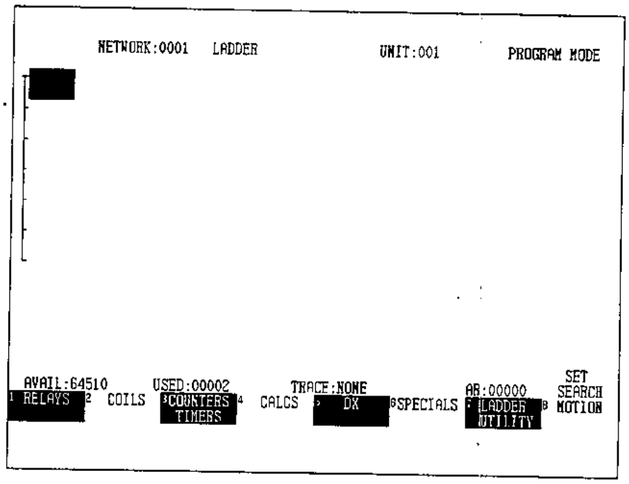
(6) Relay contact and coil storage can be done with variable function keys.

- **Relays and Coils: Part 2**

Use the following procedure to store the same relays and coils as in *Relays and Coils: Part 1* using the variable function keys.

1) Perform the Attach Operation. (See Note)

2) Press the Start Next Key.



```
NETWORK:0001   LADDER              UNIT:001           PROGRAM MODE

AVAIL:64510        USED:00002         TRACE:NONE             AR:00000
```

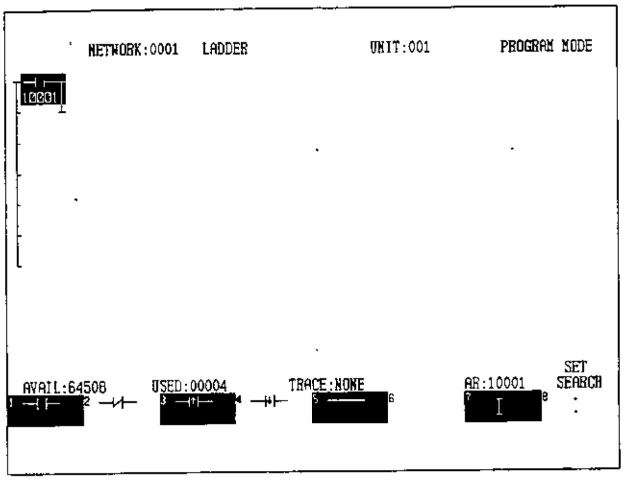
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.110

3) Select Relays.

4) Enter **10001** in the AR and press the ⊣ ⊢ Key.

5) Press the [I] Key.

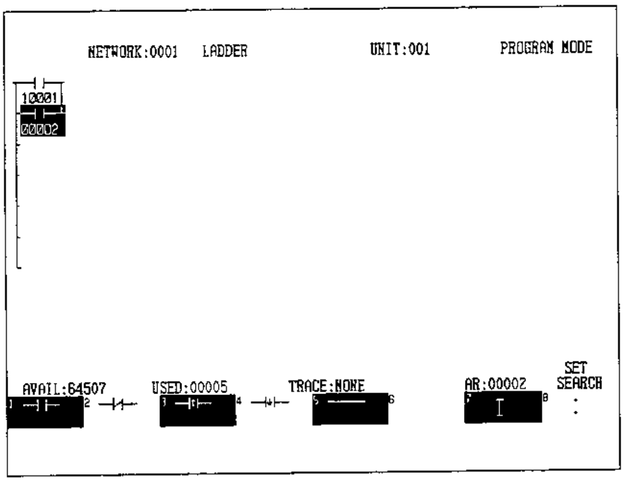


```
NETWORK:0001   LADDER              UNIT:001        PROGRAM MODE

10001

                                                              SET
AVAIL:64508    USED:00004    TRACE:NONE        AR:10001     SEARCH
```

Figure 6.111

6) Move the cursor down.

7) Enter **2** in the AR and press the H H Key.



```
NETWORK:0001   LADDER              UNIT:001        PROGRAM MODE

10001
00002

                                                              SET
AVAIL:64507    USED:00005    TRACE:NONE        AR:00002     SEARCH
```

Figure 6.112

8) Move the cursor to the upper right.

9) Enter **10002** in the AR and press the ┤├ Key.

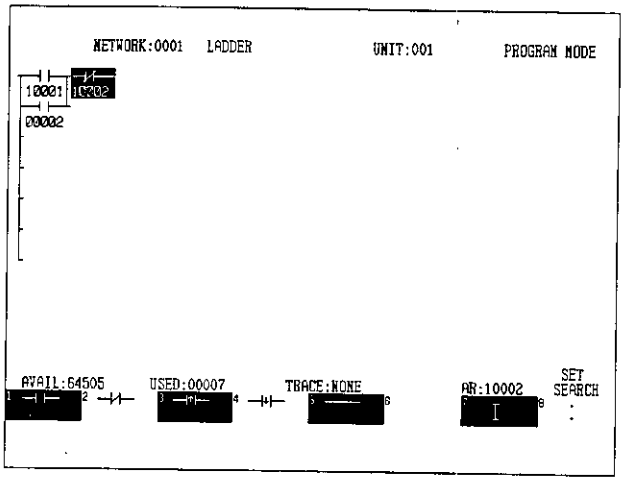

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001
10002
00002
AVAIL:64505
USED:00007
TRACE:NONE
AR:10002
SET
SEARCH

Figure 6.113

10) Move the cursor to the right.

11) Press the Edit/Change Node Key.

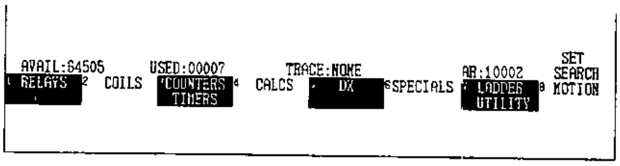

AVAIL:64505
USED:00007
TRACE:NONE
AR:10002
RELAYS
COILS
COUNTERS TIMERS
CALCS
DX
SPECIALS
LADDER UTILITY
SET
SEARCH
MOTION

Figure 6.114

12) Select Coils.

13) Enter **2** in the AR and press the ┤( )├ Key.

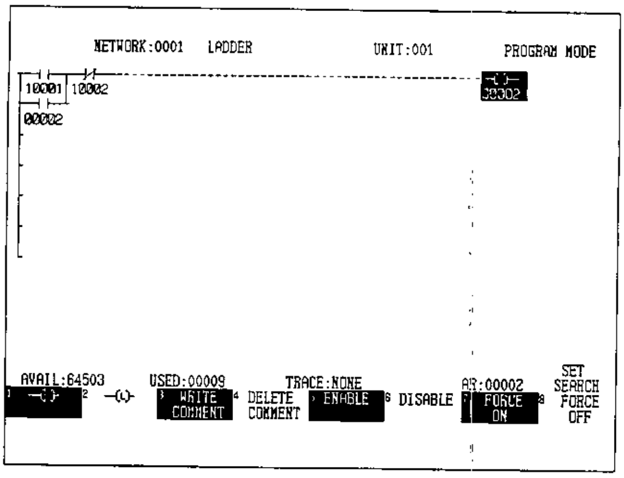
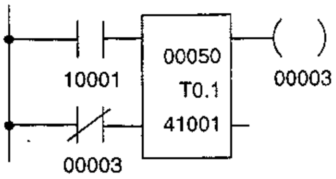

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001
10002
00002
00002
AVAIL:64503
USED:00009
TRACE:NONE
AR:00002
WRITE COMMENT
DELETE COMMENT
ENABLE
DISABLE
FORCE ON
SET
SEARCH
FORCE
OFF

Figure 6.115

Note The Attach Operation is not required if program storage is already possible.

- **Timers and Counters**

Example: Timer Circuit

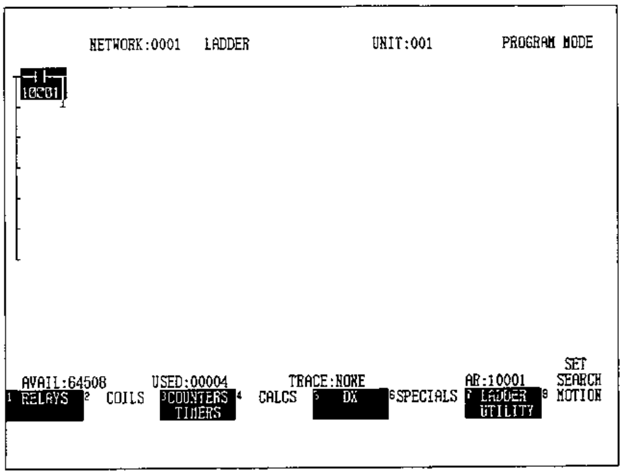


Use the following procedure to store timers and counters.

1) Perform the Attach Operation. (See Note (3))

2) Press the Start Next Key.

3) Enter **10001** in the AR and press the Key.

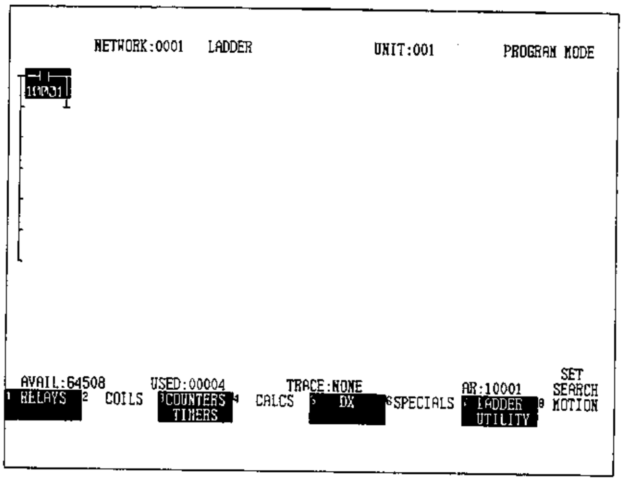


```
        NETWORK:0001   LADDER            UNIT:001        PROGRAM MODE
 10001

 AVAIL:64508     USED:00004      TRACE:NONE          AR:10001      SET
                                                                   SEARCH
1 RELAYS  2 COILS  3 COUNTERS  4 CALCS  5 DX  6 SPECIALS  7 LADDER  8 MOTION
                     TIMERS                               UTILITY
```

Figure 6.116

4) Move the cursor down.

5) Enter **3** in the AR and press the ⊣⊢ Key.


NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

AVAIL:64508 USED:00004 TRACE:NONE AR:10001

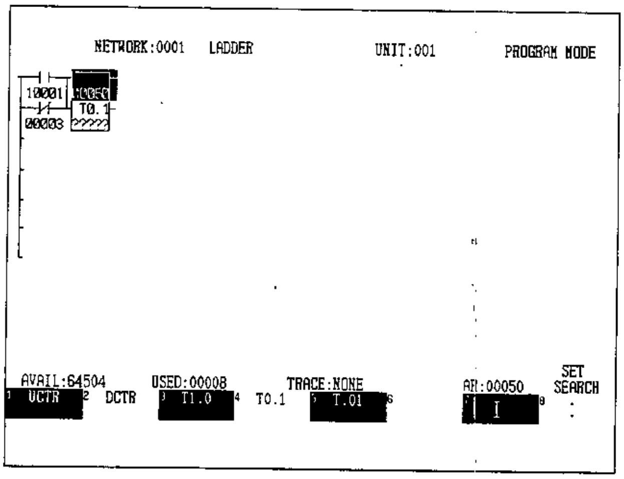
10001
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.117

6) Move the cursor to the upper right.

7) Select Counters Timers.

8) Enter **50** in the AR and then select T0.1.


NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

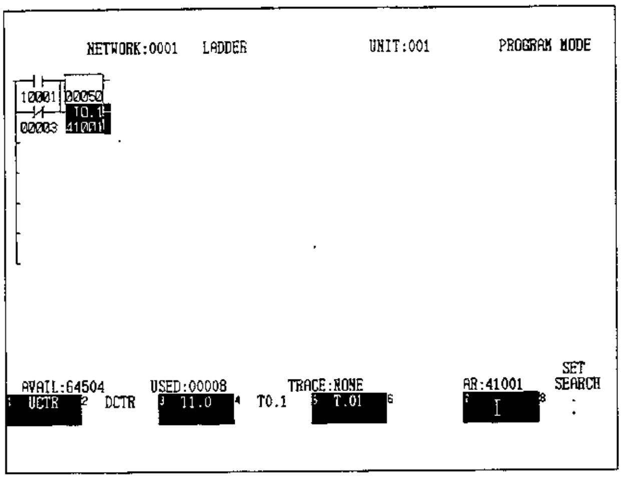
AVAIL:64504 USED:00008 TRACE:NONE AR:00050

10001
00003
00050
T0.1
?????
1 UCTR
2 DCTR
3 T1.0
4 T0.1
5 T.01
6
7 I
8 SET SEARCH

Figure 6.118

9) Move the cursor down.

10) Enter **41001** in the AR and press the Enter Key.



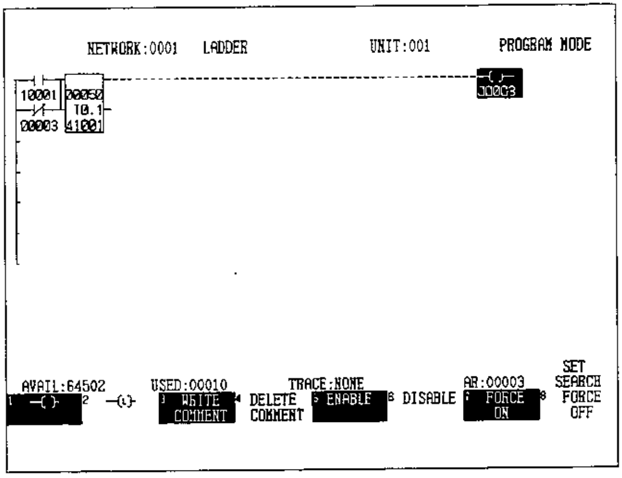
```
        NETWORK:0001   LADDER                 UNIT:001         PROGRAM MODE

AVAIL:64504     USED:00008        TRACE:NONE            AR:41001   SET
                                                                   SEARCH
```

10001
00050
00003
T0.1
41001
1 UCTR
2 DCTR
3 11.0
4 T0.1
5 T.01
6
7 I
8 :

Figure 6.119

11) Move the cursor to the upper right.

12) Enter **3** in the AR and press the –(L)– Key.



```
        NETWORK:0001   LADDER                 UNIT:001         PROGRAM MODE

AVAIL:64502     USED:00010        TRACE:NONE            AR:00003   SET
                                                                   SEARCH
```

10001
00050
00003
T0.1
41001
00003
1 –( )–
2 –(L)–
3 WRITE COMMENT
4 DELETE COMMENT
5 ENABLE
6 DISABLE
7 FORCE ON
8 FORCE OFF

Figure 6.120

Note (1) Place the cursor in the logic area.

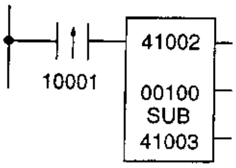
(2) Store the timer and counter elements within rungs 1 to 6.

(3) The Attach Operation is not required if program storage is already possible.

(4) Relay contact and coil storage can be performed using variable function keys.

- **Calculations: Part 1**

Example: UNSIGNED SINGLE PRECISION DECIMAL SUBTRACTION Circuit

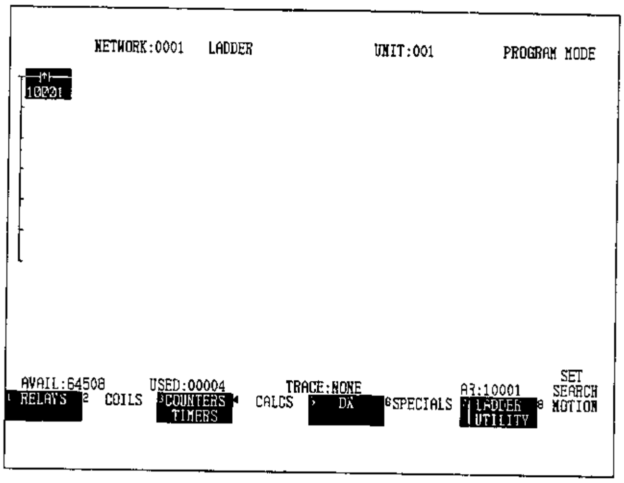

10001
41002
00100
SUB
41003

Use the following procedure to store an UNSIGNED SINGLE PRECISION DECIMAL SUBTRACTION circuit.

1) Perform the Attach Operation. (See Note (3))

2) Press the Start Next Key.

3) Enter **10001** in the AR and press the Shift + ⊣↑⊢ Keys.


NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

AVAIL:64508 USED:00004 TRACE:NONE AR:10001

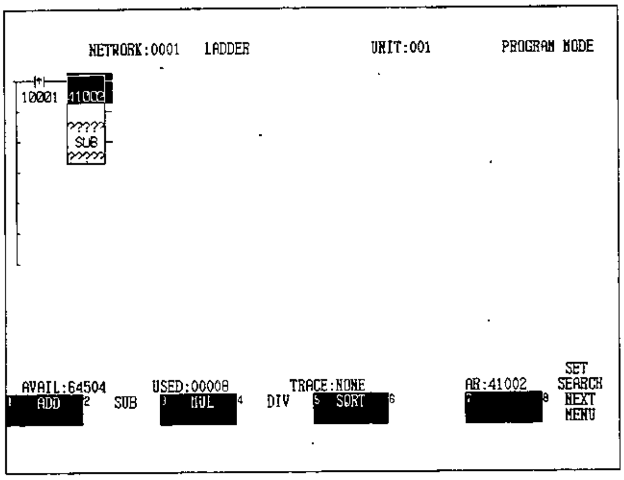
10001
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.121

4) Move the cursor to the right.

5) Select Calculations.

6) Enter **41002** in the AR and select Subtract.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

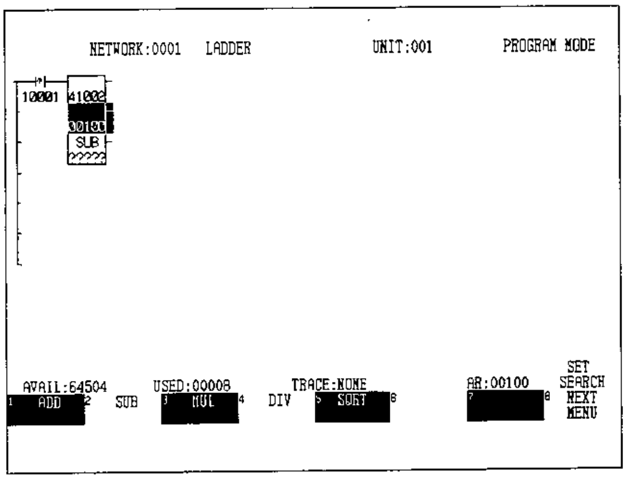
AVAIL:64504 USED:00008 TRACE:NONE AR:41002

10001
41002
?????
SUB
?????
1 ADD
2 SUB
3 MUL
4 DIV
5 SORT
6
7
8
SET
SEARCH
NEXT
MENU

Figure 6.122

7) Move the cursor down.

8) Enter **100** in the AR and press the Enter Key.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

AVAIL:64504 USED:00008 TRACE:NONE AR:00100

10001
41002
00100
SUB
?????
1 ADD
2 SUB
3 MUL
4 DIV
5 SORT
6
7
8
SET
SEARCH
NEXT
MENU

Figure 6.123

9) Move the cursor down.

10) Enter **41003** in the AR and press the Enter Key.

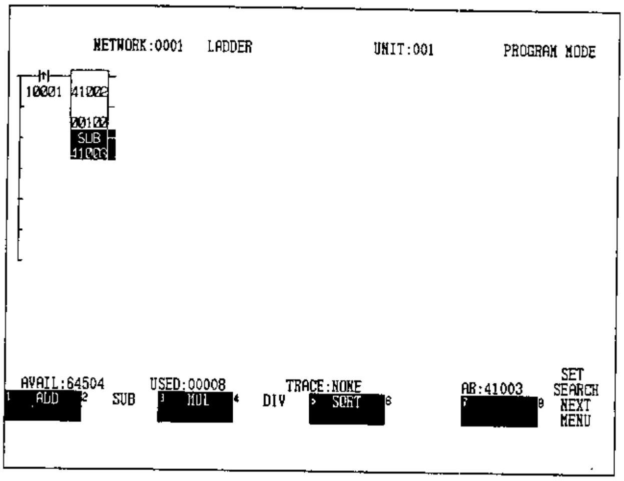

NETWORK:0001
LADDER
UNIT:001
PROGRAM MODE
10001
41002
00100
SUB
41003
AVAIL:64504
USED:00008
TRACE:NONE
AR:41003
1 ADD
2 SUB
3 MUL
4 DIV
5 SQRT
6
7
8
SET SEARCH
NEXT MENU

Figure 6.124

11) Press the Edit/Change Node Key. The labels will return to those used for selecting functions. (This step can be omitted).

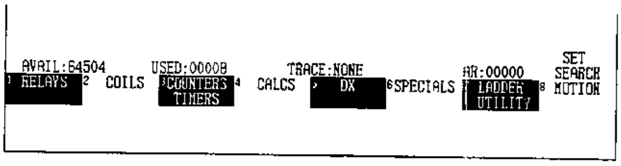

AVAIL:64504
USED:00008
TRACE:NONE
AR:00000
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 MOTION
SET SEARCH

Figure 6.125

Note (1) Place the cursor in the logic area.

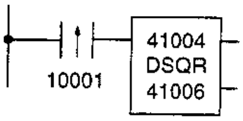
(2) Store the calculation elements within rungs 1 to 5.

(3) The Attach Operation is not required if program storage is already possible.

(4) Relay contact and coil storage can be performed using variable function keys.

- **Calculations: Part 2**

Example: DOUBLE PRECISION SQUARE ROOT Circuit

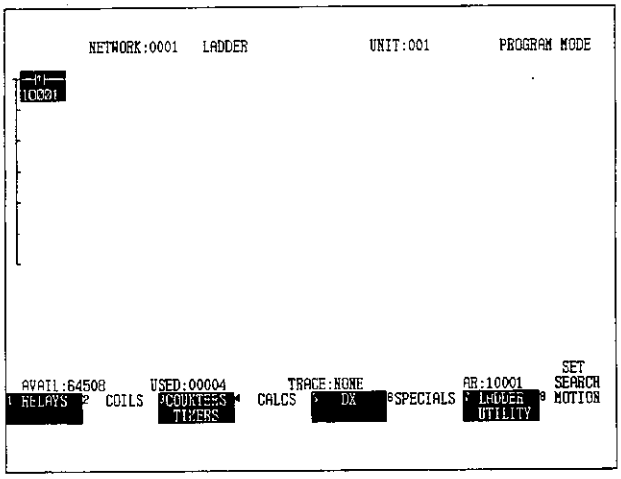

10001
41004
DSQR
41006

Use the following procedure to store a DOUBLE PRECISION SQUARE ROOT circuit.

1) Perform the Attach Operation. (See Note (3))

2) Press the Start Next Key.

3) Enter **10001** in the AR and press the Shift + ⊣↑⊢ Keys.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

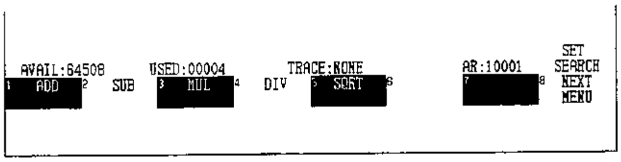
AVAIL:64508 USED:00004 TRACE:NONE AR:10001

10001
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.126

4) Move the cursor to the right.

5) Select Calculations.

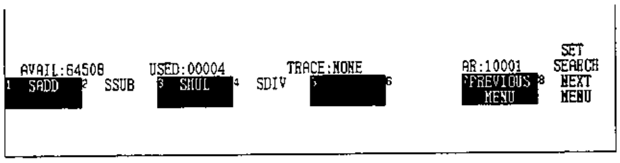


AVAIL:64508 USED:00004 TRACE:NONE AR:10001

1 ADD
2 SUB
3 MUL
4 DIV
5 SQRT
6
7
8 SET SEARCH NEXT MENU

Figure 6.127

6) Select Next Menu.



AVAIL:64508 USED:00004 TRACE:NONE AR:10001

1 SADD
2 SSUB
3 SMUL
4 SDIV
5
6
7 PREVIOUS MENU
8 SET SEARCH NEXT MENU

Figure 6.128

7) Select Next Menu.

8) Enter **41004** in the AR and select DSQR.

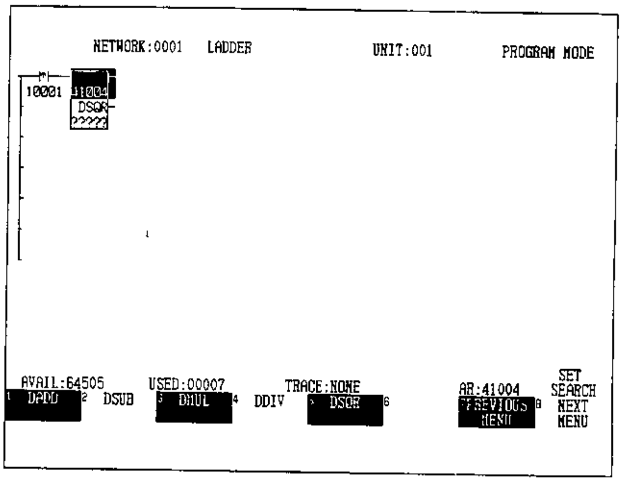

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001
41004
DSQR
?????
AVAIL:64505
USED:00007
TRACE:NONE
AR:41004
1 DADD
2 DSUB
3 DMUL
4 DDIV
5 DSQR
6
7 PREVIOUS MENU
8 NEXT MENU
SET SEARCH

Figure 6.129

9) Move the cursor down.

10) Enter **41006** in the AR and press the Enter Key.

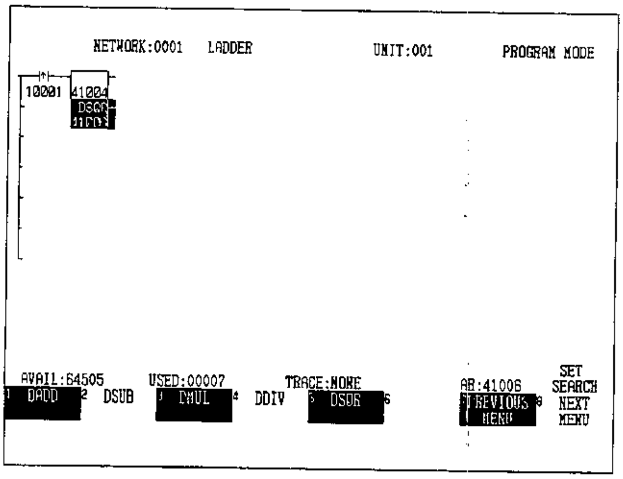

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001
41004
DSQR
41006
AVAIL:64505
USED:00007
TRACE:NONE
AR:41006
1 DADD
2 DSUB
3 DMUL
4 DDIV
5 DSQR
6
7 PREVIOUS MENU
8 NEXT MENU
SET SEARCH

Figure 6.130

11) Press the Edit/Change Node Key and the labels return to those used for selecting functions. (This step can be omitted).

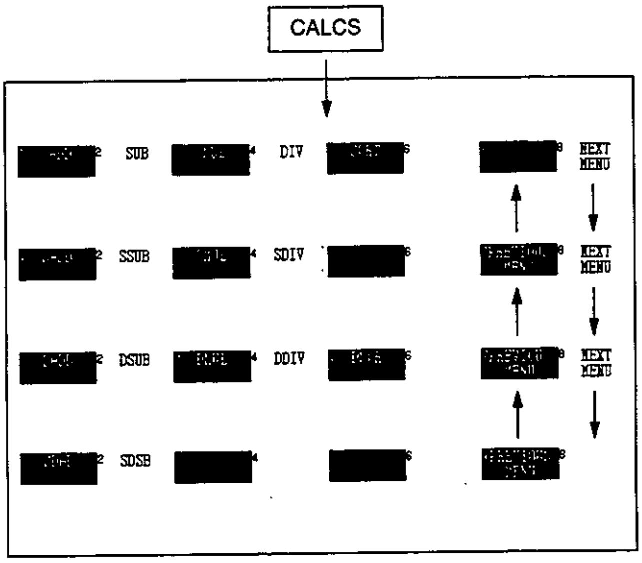

CALCS
SUB
DIV
NEXT MENU
SSUB
SDIV
NEXT MENU
DSUB
DDIV
NEXT MENU
SDSB

Figure 6.131

Note (1) Place the cursor in the logic area.

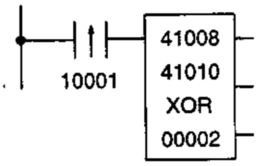
(2) Store the square root elements within rungs 1 to 6.

(3) The Attach Operation is not required if program storage is already possible.

(4) Relay contact and coil storage can be performed using variable function keys.

- **Data Transfer and Matrices**

Example: LOGICAL EXCLUSIVE OR (XOR) Circuit


10001
41008
41010
XOR
00002

Use the following procedure to store a LOGICAL EXCLUSIVE OR Circuit.

1) Perform the Attach Operation. (See Note (3))

2) Press the Start Next Key.

3) Enter **10001** in the AR and press the Shift + Keys.

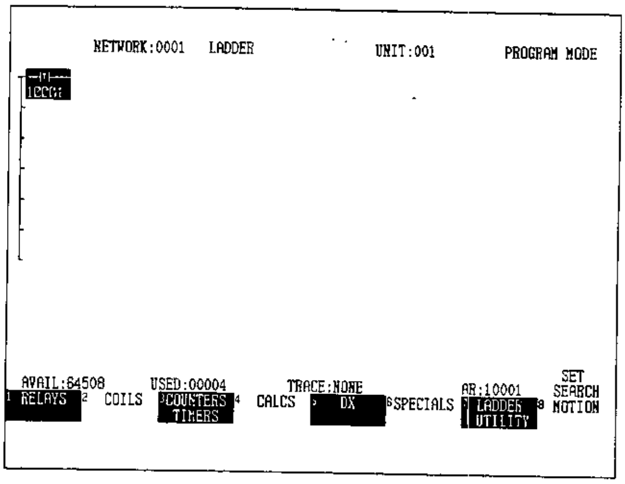

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001
AVAIL:64508
USED:00004
TRACE:NONE
AR:10001
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.132

4) Move the cursor to the right.

5) Select DX (Data Transfer Matrix).

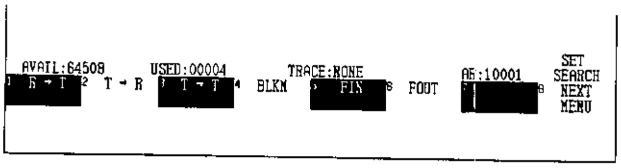

AVAIL:64508
USED:00004
TRACE:NONE
AR:10001
1 R → T
2 T → R
3 T → T
4 BLKM
5 FIN
6 FOUT
7
8 SET SEARCH NEXT MENU

Figure 6.133

6) Select Next Menu.

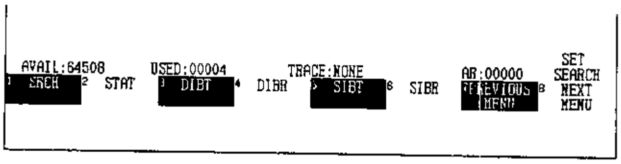

AVAIL:64508
USED:00004
TRACE:NONE
AR:00000
1 SRCH
2 STAT
3 DIBT
4 DIBR
5 SIBT
6 SIBR
7 PREVIOUS MENU
8 SET SEARCH NEXT MENU

Figure 6.134

7) Select Next Menu.

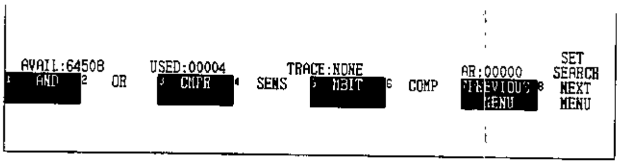
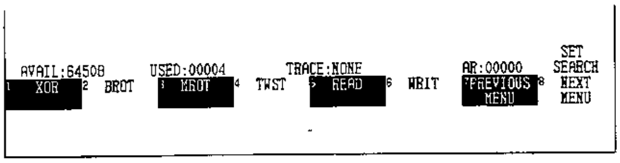

AVAIL:64508
USED:00004
TRACE:NONE
AR:00000
1 AND
2 OR
3 CMPR
4 SENS
5 MBIT
6 COMP
7 PREVIOUS MENU
8 SET SEARCH NEXT MENU

Figure 6.135

8) Select Next Menu.

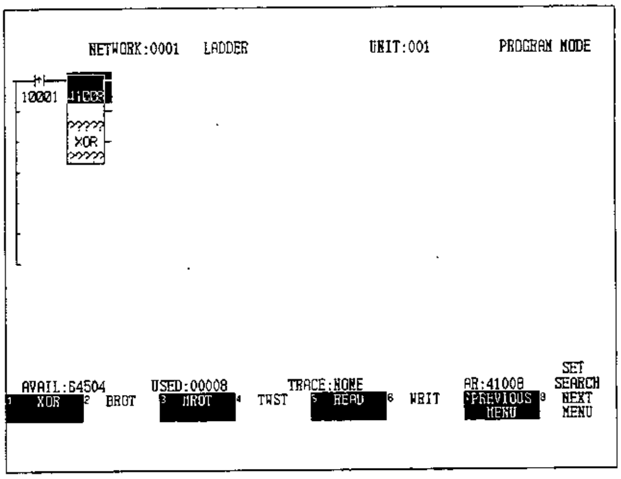


AVAIL:64508 USED:00004 TRACE:NONE AR:00000

1 XOR
2 BROT
3 MROT
4 TWST
5 READ
6 WRIT
7 PREVIOUS MENU
8 NEXT MENU
SET SEARCH

Figure 6.136

9) Enter **41008** in the AR and select XOR.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

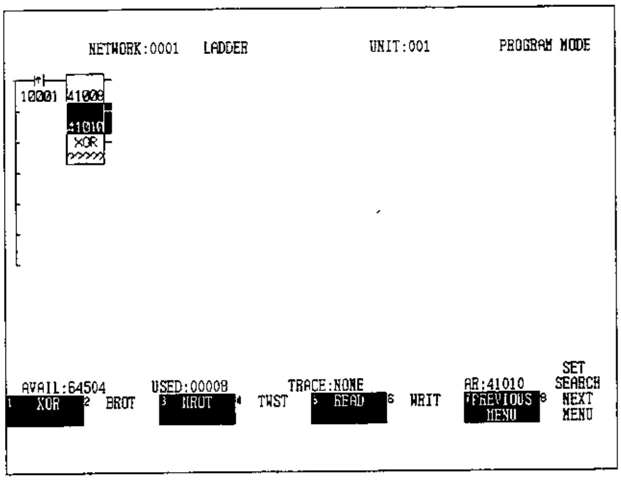
AVAIL:64504 USED:00008 TRACE:NONE AR:41008

10001
41008
?????
XOR
?????
1 XOR
2 BROT
3 MROT
4 TWST
5 READ
6 WRIT
7 PREVIOUS MENU
8 NEXT MENU
SET SEARCH

Figure 6.137

10) Move the cursor down.

11) Enter **41010** in the AR and press the Enter Key.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

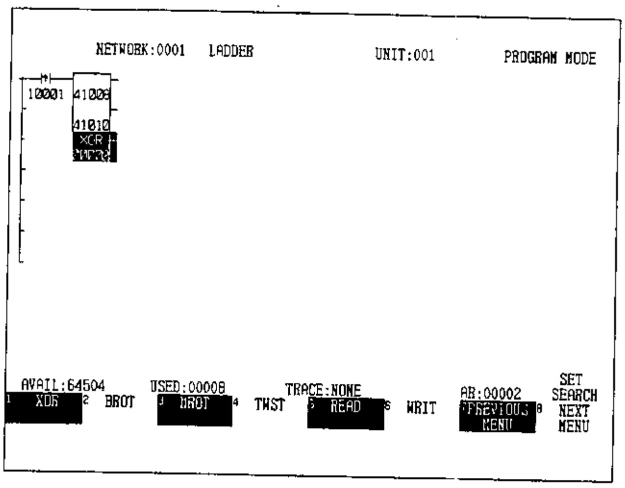
AVAIL:64504 USED:00008 TRACE:NONE AR:41010

10001
41008
41010
XOR
?????
1 XOR
2 BROT
3 MROT
4 TWST
5 READ
6 WRIT
7 PREVIOUS MENU
8 NEXT MENU
SET SEARCH

Figure 6.138

12) Move the cursor down.

13) Enter **2** in the AR and press the Enter Key.



```
NETWORK:0001   LADDER                 UNIT:001          PROGRAM MODE

AVAIL:64504     USED:00008      TRACE:NONE           AR:00002       SET
1  XOR   2 BROT  3  WROT   4 TWST  5  READ   6 WRIT   PREVIOUS  8  SEARCH
                                                        MENU         NEXT
                                                                     MENU
```

Figure 6.139

14) Press the Edit/Change Node Key and the labels return to those used for selecting functions. (This step can be omitted).

Note (1) Place the cursor in the logic area.

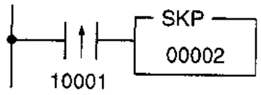
(2) Store the data transfer elements within rungs 1 to 5. But store "STAT," "TWST," "LOG," "SIN"and "COS" elements within rungs 1 to 6.

(3) The Attach Operation is not required if program storage is already possible.

(4) Relay contact and coil storage can be performed using variable function keys.

- **Special Circuits**

Example: SKIP Circuit



Use the following procedure to store SKIP circuits.

1) Perform the Attach Operation. (See Note (2))

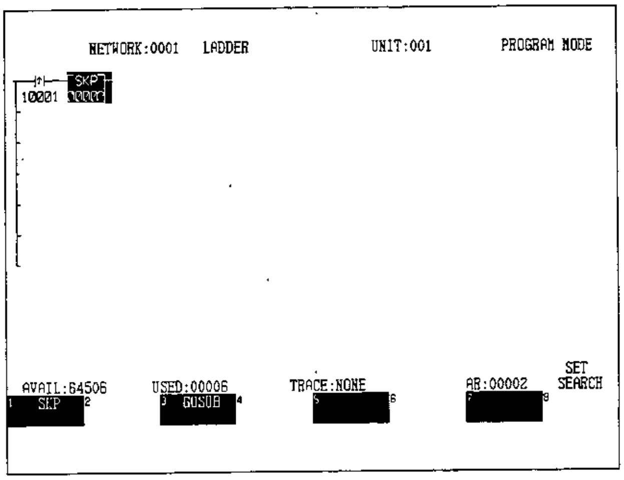
2) Press the Start Next Key.

3) Enter **10001** in the AR and press the Shift + ⊣↑⊢ Keys.

4) Move the cursor to the right.

5) Select Specials.

6) Enter **2** in the AR and select SKP.

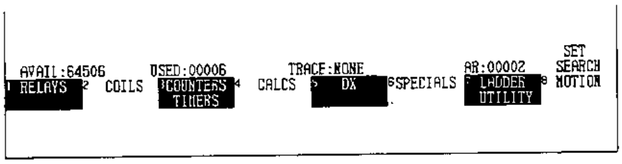

NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

AVAIL:64506 USED:00006 TRACE:NONE AR:00002

SKP
10001
00002
1 SKP
2
3 GOSUB
4
5
6
7
8
SET SEARCH

Figure 6.140

7) Press the Edit/Change Node Key and the CRT labels change back to those used for selecting functions. (This step can be omitted).


AVAIL:64506 USED:00006 TRACE:NONE AR:00002

1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.141

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

(3) Relay contact and coil storage can be performed using variable function keys.

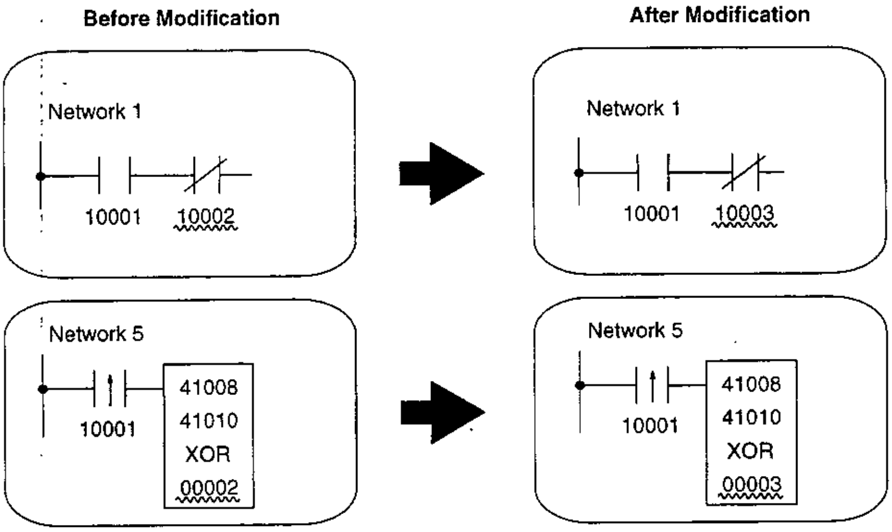
Display of CRT Labels for Instruction Selection

	1 Relay	2 Coil	3 Counter Timer	4 Calculation	5 Data Transfer Matrix	6 Specials	7 Ladder Utility	8 Motion
1 Relay	1 ┤├	2 ┤/├	3 ┤↑├	4 ┤↓├	5 —	6	7 I	8 :
2 Coil	1 -( )-	2 -(L)-	3	4	5 Enable	6 Disable	7 Forced On	8 Forced Off
3 Counter Timer	1 UCTR	2 DCTR	3 T1.0	4 T0.1	5 T0.1	6	7 I	8 :
4 Calculation	1 ADD	2 SUB	3 MUL	4 DIV	5 SQRT	6	7	8 Next Menu
	1 SADD	2 SSUB	3 SMUL	4 SDIV	5	6	7 Previous Menu	8 Next Menu
	1 DADD	2 DSUB	3 DMUL	4 DDIV	5 DSQR	6	7 Previous Menu	8 Next Menu
	1 SDAD	2 SDSB	3	4	5	6	7 Previous Menu	8
5 Data Transfer Matrix	1 R→T	2 T→R	3 T→T	4 BLKM	5 FIN	6 FOUT	7	8 Next Menu
	1 SRCH	2 STAT	3 DIBT	4 DIBR	5 SIBT	6 SIBR	7 Previous Menu	8 Next Menu
	1 AND	2 OR	3 CMPR	4 SENS	5 MBIT	6 COMP	7 Previous Menu	8 Next Menu
	1 XOR	2 BROT	3 MROT	4 TWST	5 READ	6 WRIT	7 Previous Menu	8 Next Menu
	1 BIN	2 BCD	3	4 COMM	5	6	7 Previous Menu	8 Next Menu
	1 FRED	2 FWRT	3 SIN	4 COS	5 SWAP	6 SORT	7 Previous Menu	8 Next Menu
	1 BCNT	2 TSET	3 BYLS	4 BYCM	5 BADD	6	7 Previous Menu	8 Next Menu
	1 MBUS	2 PEER	3 BROD	4 BOOK	5 POLL	6 DIAG	7 Previous Menu	8 Next Menu
	1 SND	2 RCV	3	4	5	6	7 Previous Menu	8
6 Specials	1 SKP	2	3 GOSUB	4	5	6	7	8
8 Motion	1 MOVI	2 MVIS	3 MOVM	4 MOVL	5 MVLS	6 ZRN	7	8 Next Menu
	1 JOG	2 HNDL	3 MON	4 POS	5 PRM	6 VAR	7 Previous Menu	8 Next Menu
	1 ARES	2 SVON	3 ADJ	4	5	6	7 Previous Menu	8

(ii) Modifying Networks

• Modifying Reference Numbers

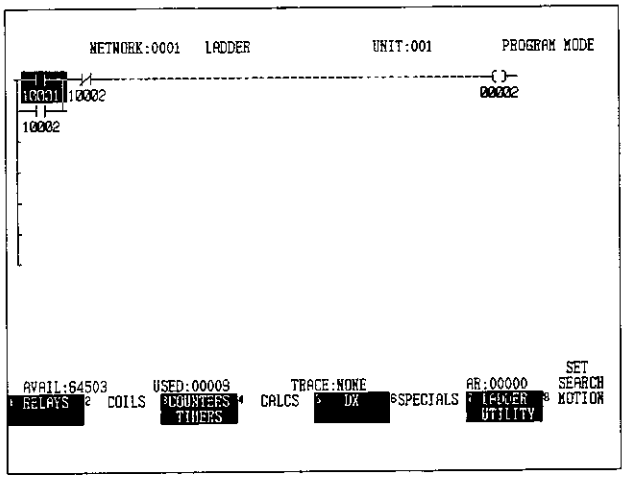
Examples: Reference Numbers and Constants


Before Modification
After Modification
Network 1
10001
10002
Network 1
10001
10003
Network 5
10001
41008
41010
XOR
00002
Network 5
10001
41008
41010
XOR
00003

Use the following procedure to modify reference numbers and constants.

1) Perform the Attach Operation. (See Note (2))

2) Enter **1** in the AR and press the Erase/Get Key.

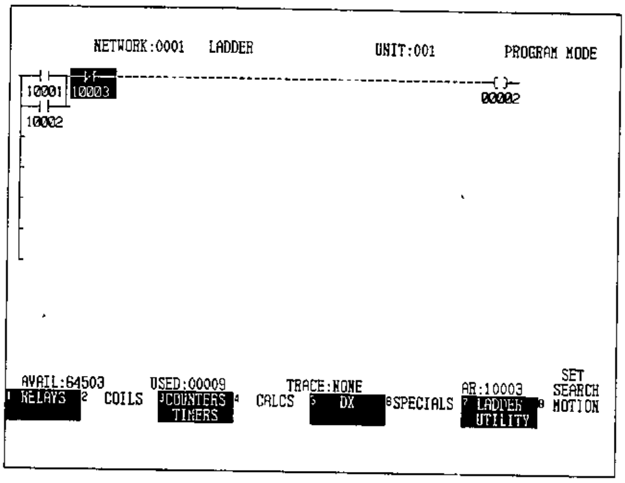


```
        NETWORK:0001   LADDER                 UNIT:001        PROGRAM MODE
10001 10002                                                     00002
10002

                                                                       SET
AVAIL:64503    USED:00009       TRACE:NONE              AR:00000     SEARCH
1 RELAYS  2 COILS  3 COUNTERS  4 CALCS  5 DX  6 SPECIALS  7 LADDER  8 MOTION
                     TIMERS                                 UTILITY
```

Figure 6.142

3) Move the cursor to the right.

4) Enter **10003** in the AR and press the Enter Key.



NETWORK:0001 LADDER UNIT:001 PROGRAM MODE

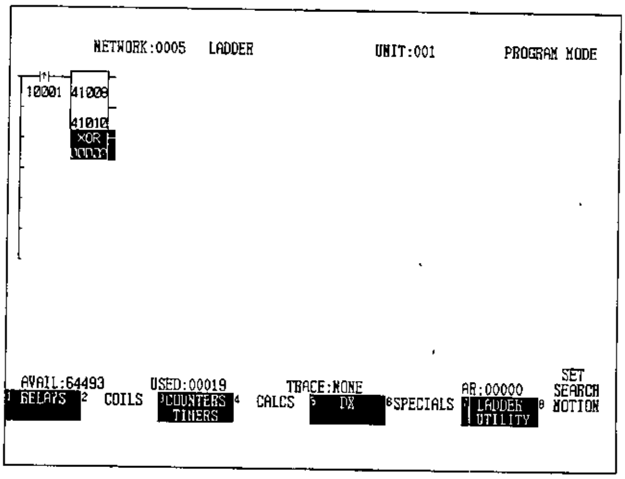
AVAIL:64503 USED:00009 TRACE:NONE AR:10003

10001
10003
00002
10002
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.143

5) Enter **5** in the AR and press the Erase/Get Key.

6) Move the cursor to the location to be modified.



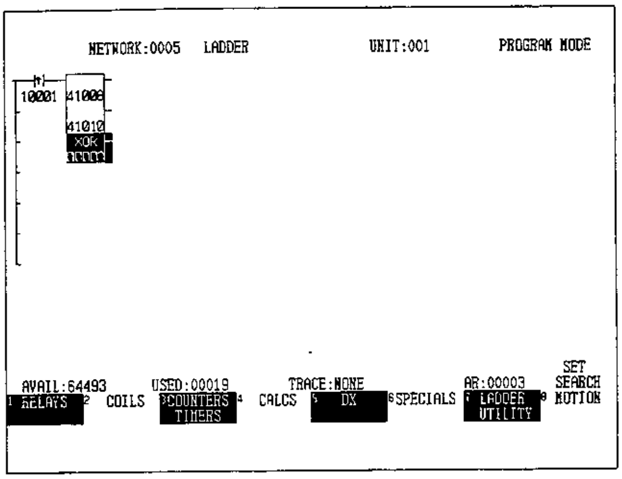
NETWORK:0005 LADDER UNIT:001 PROGRAM MODE

AVAIL:64493 USED:00019 TRACE:NONE AR:00000

10001
41008
41010
XOR
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.144

7) Enter **3** in the AR and press the Enter Key.



```
NETWORK:0005   LADDER                UNIT:001        PROGRAM MODE

AVAIL:64493   USED:00019    TRACE:NONE          AR:00003
```

10001
41008
41010
XOR
00000
SET SEARCH
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 MOTION

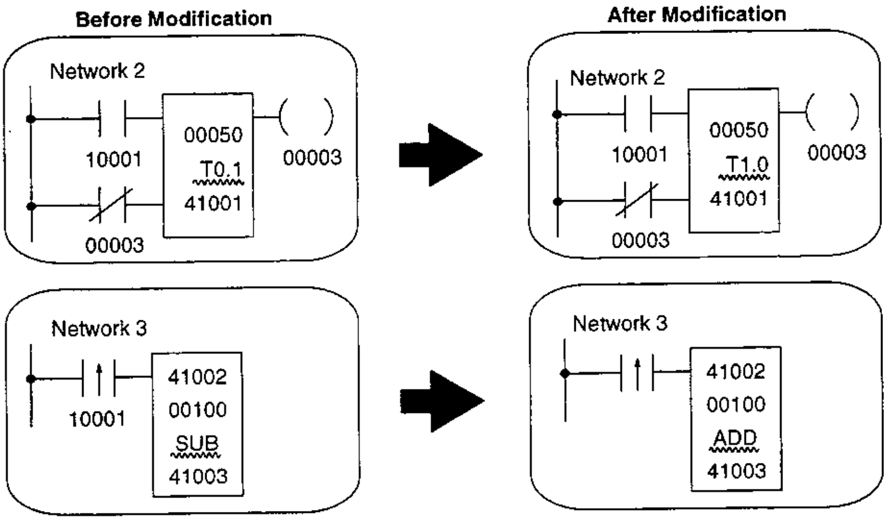
Figure 6.145

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

- **Modifying Elements: Part 1**

Examples: Time Units of Timers, Subtract Circuit to Add Circuit

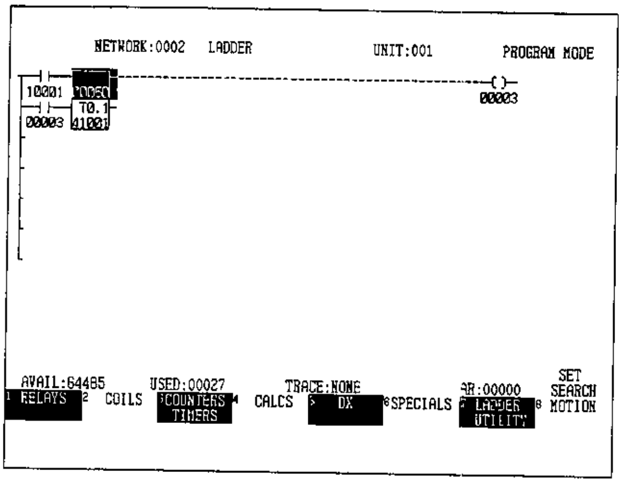


Before Modification
After Modification
Network 2
10001
00003
00050
T0.1
41001
00003
Network 2
10001
00003
00050
T1.0
41001
00003
Network 3
10001
41002
00100
SUB
41003
Network 3
41002
00100
ADD
41003

Use the following procedures to change the time units of timers, and to change from a subtract circuit to an add circuit.

1) Perform the Attach Operation. (See Note (2))

2) Enter **2** in the AR and press the Erase/Get Key.



NETWORK:0002 LADDER UNIT:001 PROGRAM MODE

AVAIL:64485 USED:00027 TRACE:NONE AR:00000

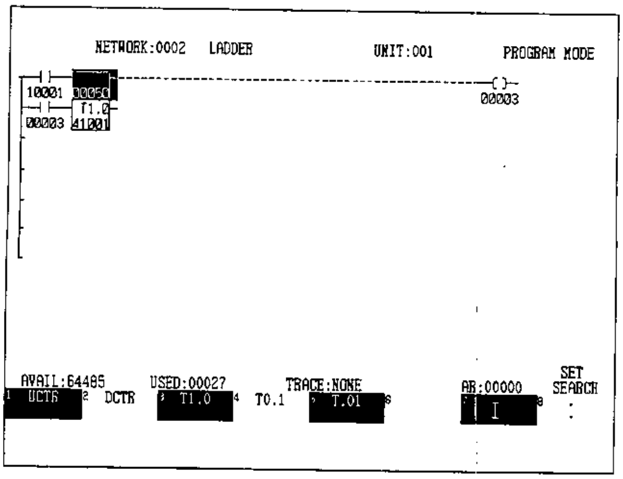
10001
00050
00003
T0.1
41001
00003
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 MOTION
SET SEARCH

Figure 6.146

3) Move the cursor to the location of the timer element.

4) Select Counters Timers.

5) Select T1.0. The time unit will be changed to T1.0.



NETWORK:0002 LADDER UNIT:001 PROGRAM MODE

AVAIL:64485 USED:00027 TRACE:NONE AR:00000

10001
00050
00003
T1.0
41001
00003
1 UCTR
2 DCTR
3 T1.0
4 T0.1
5 T.01
6
7 I
8
SET SEARCH

Figure 6.147

6) Press Page Down and the next network will be displayed.

7) Move the cursor to the location of the subtract element.

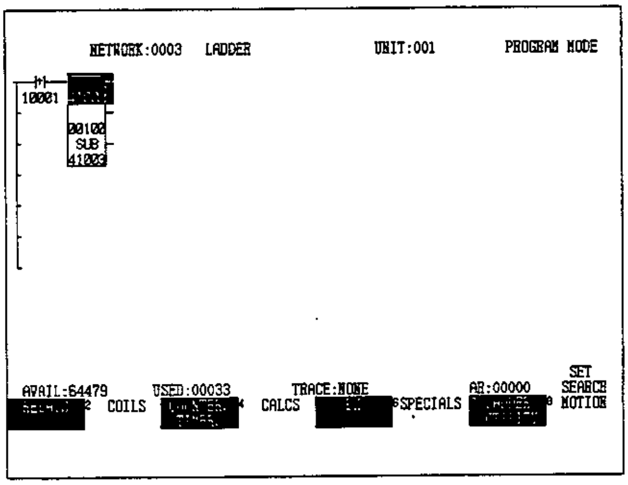

NETWORK:0003 LADDER
UNIT:001
PROGRAM MODE
10001
00100
SUB
41003
AVAIL:64479
USED:00033
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.148

8) Select Calculations.

9) Select Add. The subtract circuit will be changed to an add circuit.

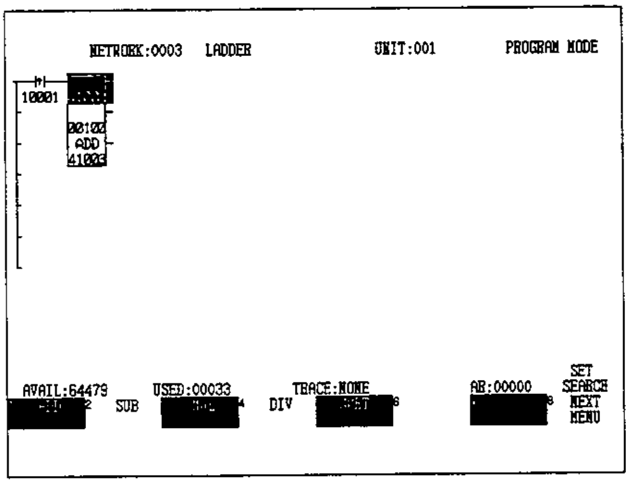

NETWORK:0003 LADDER
UNIT:001
PROGRAM MODE
10001
00100
ADD
41003
AVAIL:64479
USED:00033
TRACE:NONE
AR:00000
SUB
DIV
SET
SEARCH
NEXT
MENU

Figure 6.149

Note (1) Place the cursor in the logic area.

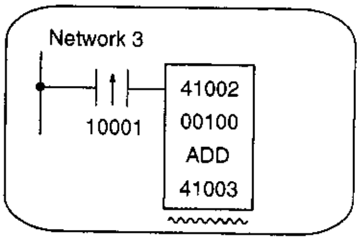
(2) The Attach Operation is not required if program storage is already possible.

(3) When a symbol cannot be changed immediately, an error message will be displayed saying “Invalid replacement.” In this event, first press the Delete Key once to delete, and then store a new element.

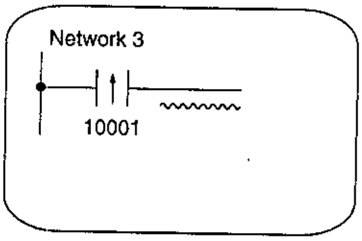
- **Modifying Elements: Part 2**

Example: Add Circuit to a Horizontal Short Circuit

Before Modification


Network 3
10001
41002
00100
ADD
41003

After Modification

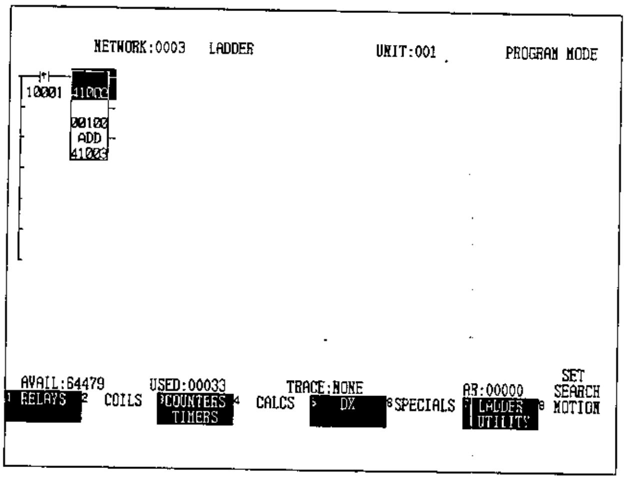

Network 3
10001

Use the following procedures to change an add circuit to a horizontal short circuit.

1) Perform the Attach Operation. (See Note (2))

2) Enter **3** in the AR and press the Erase/Get Key.

3) Move the cursor to the location of the add element.

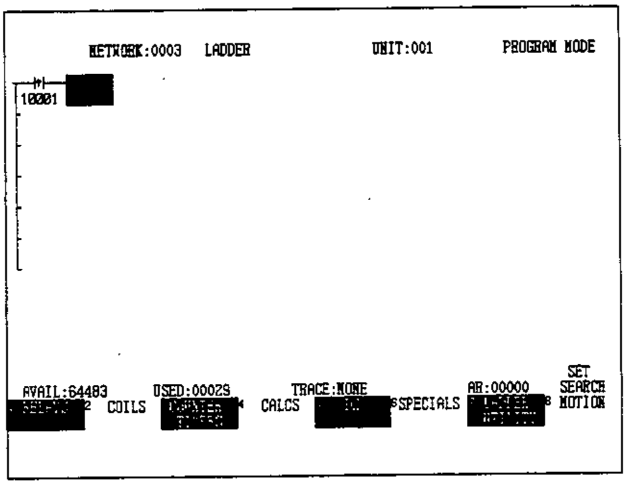


```
NETWORK:0003   LADDER                    UNIT:001          PROGRAM MODE
AVAIL:64479    USED:00033    TRACE:NONE              AR:00000
```

10001
41002
00100
ADD
41003
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.150

4) Press the Delete Key. The add circuit will be deleted.

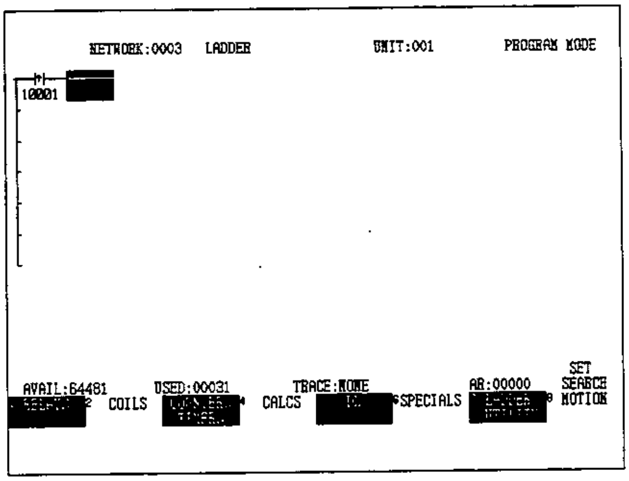


```
NETWORK:0003   LADDER              UNIT:001         PROGRAM MODE
10001

AVAIL:64483    USED:00029        TRACE:NONE         AR:00000
```

COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.151

5) Press the [—] Key.



```
NETWORK:0003   LADDER              UNIT:001         PROGRAM MODE
10001

AVAIL:64481    USED:00031        TRACE:NONE         AR:00000
```

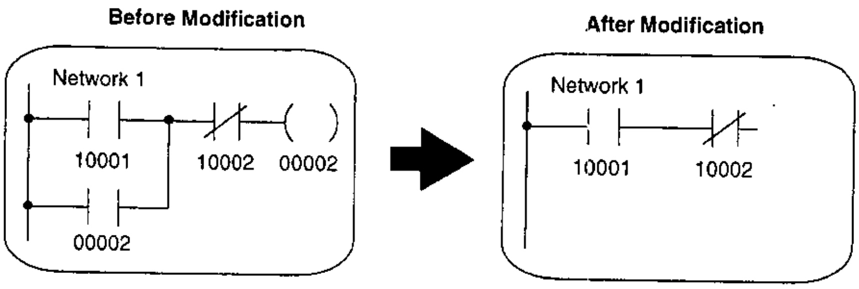
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.152

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

- **Deleting Elements**


Before Modification

After Modification

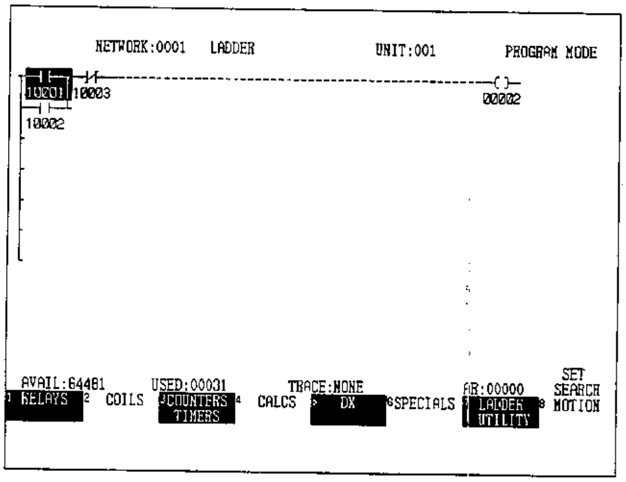
Network 1
10001
10002
00002
00002
Network 1
10001
10002

Use the following procedures to delete elements.

1) Perform the Attach Operation. (See Note (2))

2) Enter **1** in the AR and press the Erase/Get Key.

Network 1 will be displayed. (Omit when already displayed).


```
NETWORK:0001    LADDER                    UNIT:001         PROGRAM MODE
AVAIL:64481      USED:00031      TRACE:NONE      AR:00000
```

10001
10003
00002
10002
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.153

3) When deleting a vertical short circuit, press the Shift + ┣╋┫ Keys. Then move the cursor down and press the Delete Key.

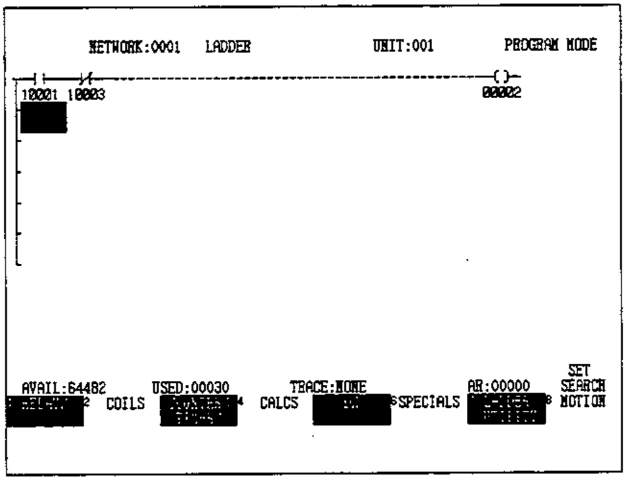

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001 10003
00002
AVAIL:64482
USED:00030
TRACE:NONE
AR:00000
2 COILS
4 CALCS
6 SPECIALS
8 SET SEARCH MOTION

Figure 6.154

4) To delete coil 00002, move the cursor to the location of coil 00002.

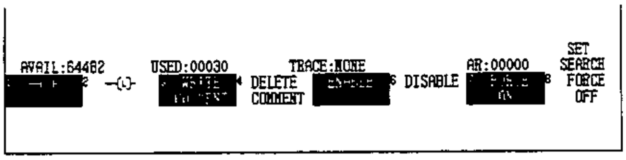

AVAIL:64482
USED:00030
TRACE:NONE
AR:00000
2 —(L)-
4 DELETE COMMENT
6 DISABLE
8 SET SEARCH FORCE OFF

Figure 6.155

5) Press the Delete Key.

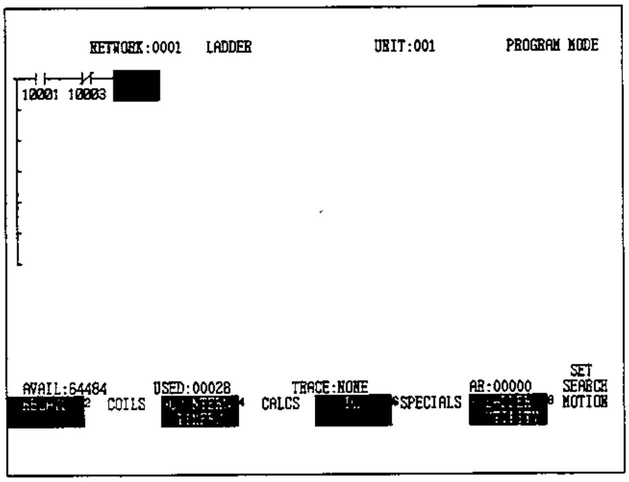

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10001 10003
AVAIL:64484
USED:00028
TRACE:NONE
AR:00000
2 COILS
4 CALCS
6 SPECIALS
8 SET SEARCH MOTION

Figure 6.156

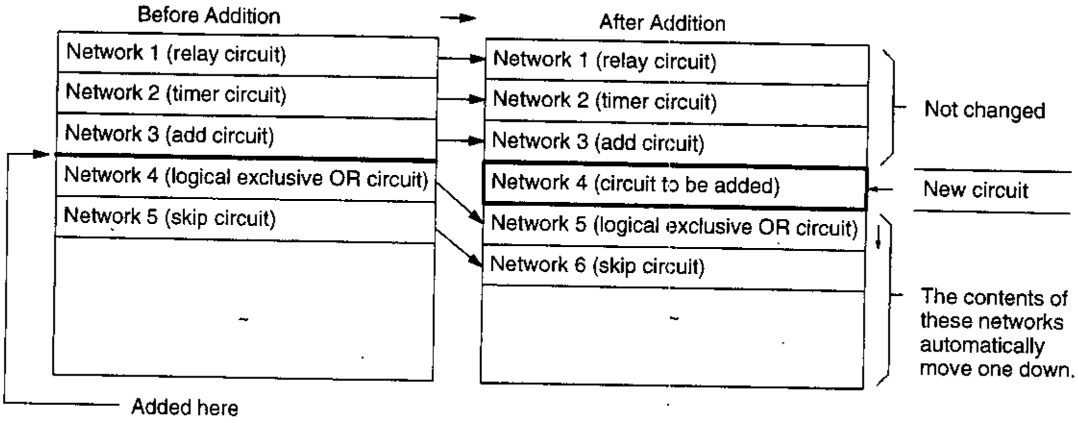
Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

(3) Storing or deleting a vertical short circuit can be performed using variable function keys.

- **Adding a Network**

Example: New Network After Network 3

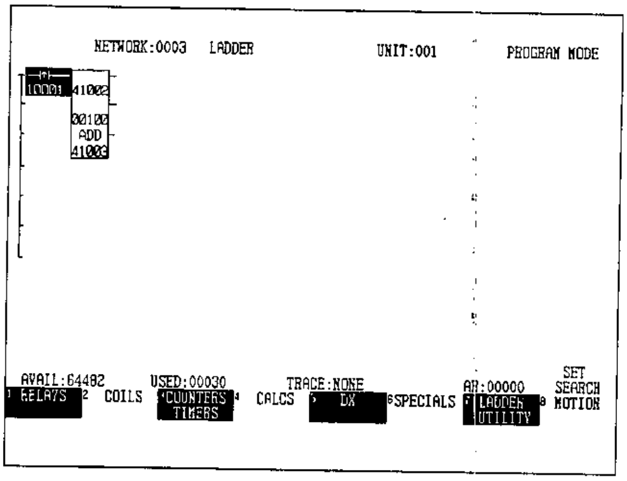

Before Addition
Network 1 (relay circuit)
Network 2 (timer circuit)
Network 3 (add circuit)
Network 4 (logical exclusive OR circuit)
Network 5 (skip circuit)
Added here
After Addition
Network 1 (relay circuit)
Network 2 (timer circuit)
Network 3 (add circuit)
Network 4 (circuit to be added)
Network 5 (logical exclusive OR circuit)
Network 6 (skip circuit)
Not changed
New circuit
The contents of these networks automatically move one down.

Use the following procedure to add another network after network 3.

1) Perform the Attach Operation. (See Note (3))

2) Enter **3** in the AR and press the Erase/Get Key.

The contents of network 3 will be displayed.



```
NETWORK:0003   LADDER                UNIT:001        PROGRAM MODE

AVAIL:64482   USED:00030   TRACE:NONE   AR:00000
```

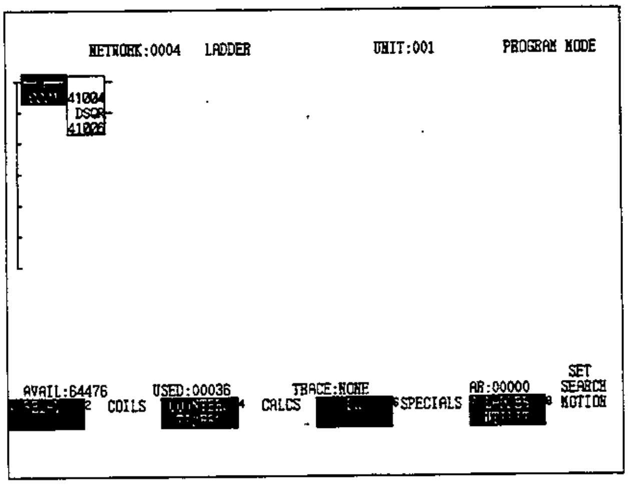
10001
41002
00100
ADD
41003
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.157

3) Press the Start/Next Key.

A new network 4 will be created.

4) Store the target circuit.



NETWORK:0004 LADDER UNIT:001 PROGRAM MODE

AVAIL:64476 USED:00036 TRACE:NONE AR:00000

41004
DSQR
41006
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.158

Note (1) To display the network before the network to be added, simply press the Start Next Key.

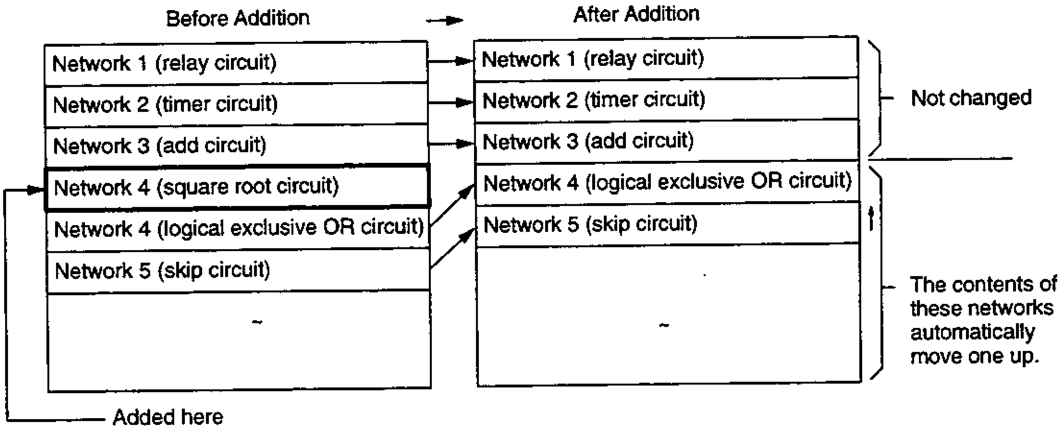
(2) Place the cursor in the logic area.

(3) The Attach Operation is not required if program storage is already possible.

(4) Press the Shift + Erase/Get Keys to add a new network 1, and when network 0 is displayed, press the Start Next Key. A new network 1 will be created.

- **Deleting a Network**

Example: Entire Contents of Network 4 (Square Root Circuit)



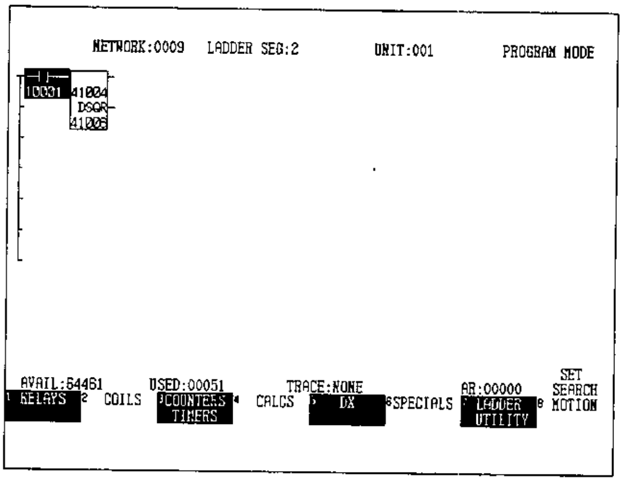
Before Addition
After Addition
Network 1 (relay circuit)
Network 2 (timer circuit)
Network 3 (add circuit)
Network 4 (square root circuit)
Network 4 (logical exclusive OR circuit)
Network 5 (skip circuit)
Network 1 (relay circuit)
Network 2 (timer circuit)
Network 3 (add circuit)
Network 4 (logical exclusive OR circuit)
Network 5 (skip circuit)
Not changed
The contents of these networks automatically move one up.
Added here

Use the following procedure to delete the entire contents of network 4 (a square root circuit).

1) Perform the Attach Operation. (See Note (3))

2) Enter **4** in the AR and press the Erase/Get Key.

The contents of network 4 will be displayed.



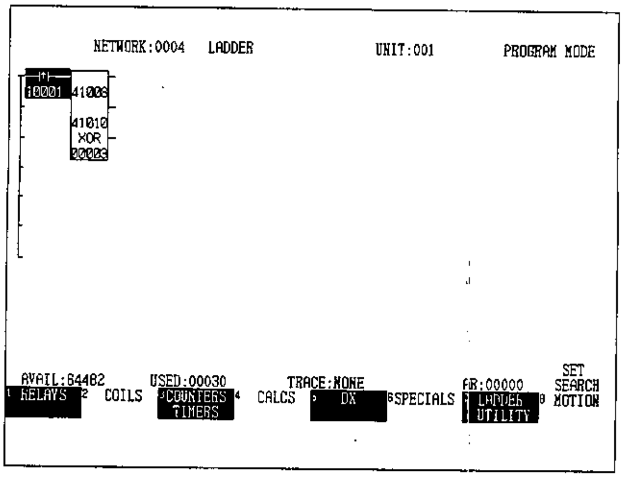
```
NETWORK:0009   LADDER SEG:2          UNIT:001          PROGRAM MODE
AVAIL:64461    USED:00051      TRACE:NONE          AR:00000
```

10001
41004
DSQR
41006
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.159

3) Press the Shift + Delete Keys.

The next network after the one deleted will be displayed.



```
NETWORK:0004   LADDER                UNIT:001          PROGRAM MODE
AVAIL:64482    USED:00030      TRACE:NONE          AR:00000
```

10001
41006
41010
XOR
00003
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.160

Note (1) Display the network to be deleted on the screen, and then press the Shift + Delete Keys.

(2) Place the cursor in the logic area.

(3) The Attach Operation is not required if program storage is already possible.

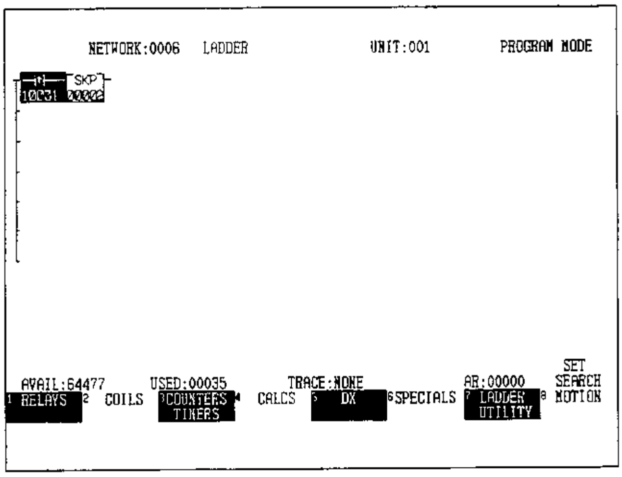
(iii) Displaying Networks

• Any Network

This procedure displays any program network with the Erase/Get Key. Use the following procedure to display a network.

1) Perform the Attach Operation. (See Note (2))

2) Enter the number of the network to be displayed in the AR and press the Erase/Get Key. In the example, **6** is entered in the AR and the network displayed is network 6.

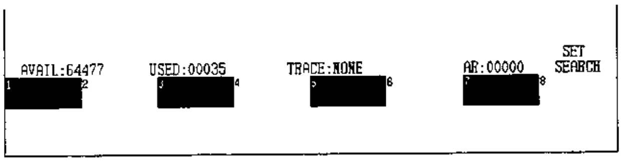


```
NETWORK:0006   LADDER                UNIT:001          PROGRAM MODE

AVAIL:64477        USED:00035        TRACE:NONE        AR:00000
```

SKP
10031
00002
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 SPECIALS
7 LADDER UTILITY
8 SET SEARCH MOTION

Figure 6.161

3) Press the Shift + Erase/Get Keys. (This will display network 0).



```
AVAIL:64477        USED:00035        TRACE:NONE        AR:00000
```

1
2
3
4
5
6
7
8
SET SEARCH

Figure 6.162

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required when the PLC is already online.

(3) Network 0 is displayed when adding a new Network 1. That is, a new network 1 is created by pressing the Start Next Key after displaying Network 0.

(4) If a numeric value is set which is larger than the highest network number and the Erase/Get Key is pressed, an error message will be displayed which says: "Network Not Found. Highest #: XXXXX."

- **Network Number Sequence**

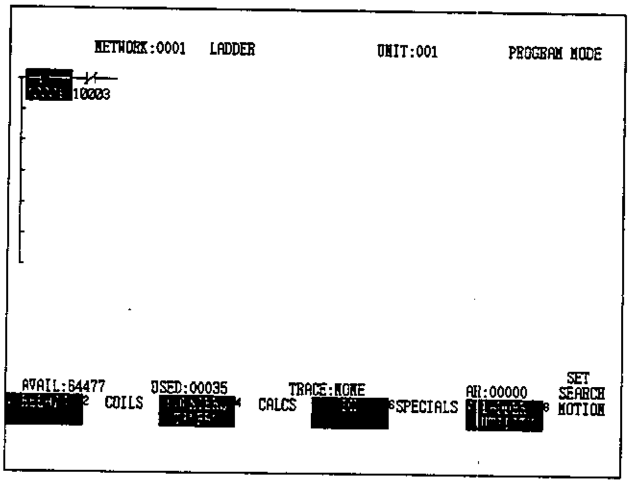
This operation displays networks in network number sequence. It displays the network after the one displayed, or the one before the one displayed.

Display next network: Page Down Key
Display previous network: Page Up Key

Use the following procedure to display the networks in network number sequence.

1) Perform the Attach Operation. (See Note (2))

2) Display any network.



```
NETWORK:0001   LADDER              UNIT:001          PROGRAM MODE
        10003

AVAIL:64477      USED:00035        TRACE:NONE       AR:00000    SET
              2 COILS           4 CALCS          6SPECIALS    8 SEARCH
                                                                MOTION
```

Figure 6.163

3) Press the Page Down Key. The next network will be displayed.

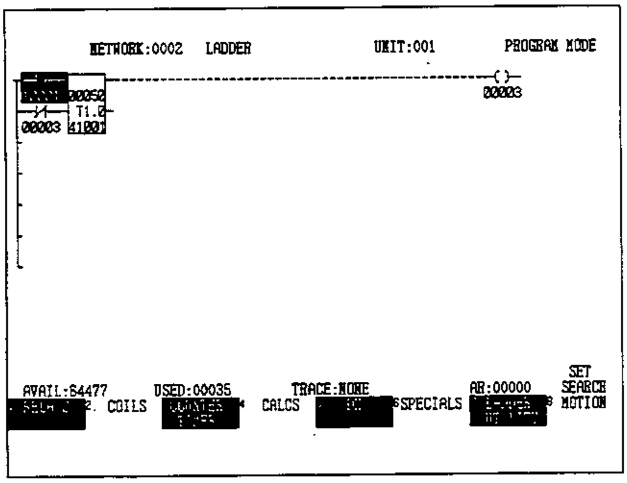

NETWORK:0002 LADDER
UNIT:001
PROGRAM MODE
00052
T1.0
00003
41001
00003
AVAIL:64477
USED:00035
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET SEARCH MOTION

Figure 6.164

4) Press the Page Up Key. The previous network will be displayed.

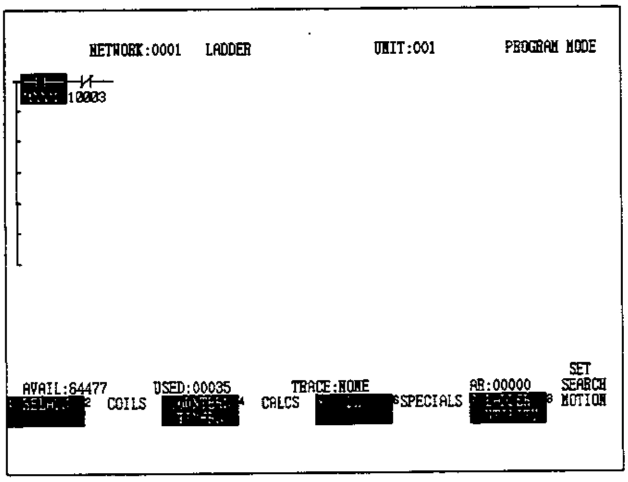

NETWORK:0001 LADDER
UNIT:001
PROGRAM MODE
10003
AVAIL:64477
USED:00035
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET SEARCH MOTION

Figure 6.165

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required when the PLC is already online.

(3) The power flow is only displayed when the GL60S, GL60H, or GL70H is in operation. Even when the GL60S, GL60H, or GL70H is in operation, the power flow of any network that has been skipped is not displayed.

- **Displaying the Leading of Last Network of a Segment**

This operation displays the leading network of segment 2 and the last network of segment 3. First, it displays the boundary between the segments.

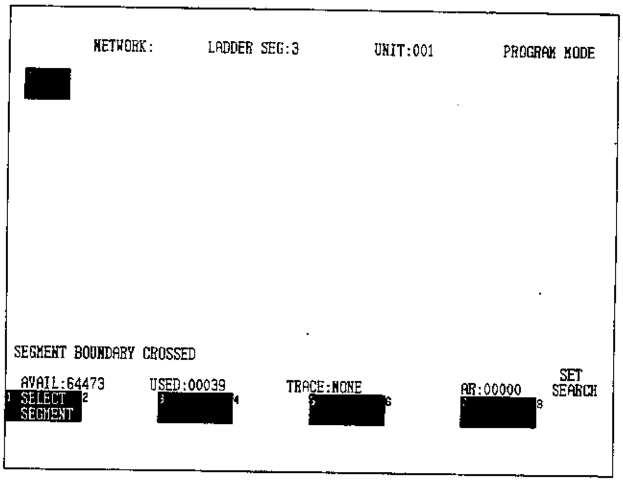
Segment 1	Networks 1 to 3
Segment 2	Networks 4 to 6
Segment 3	Networks 7 to 8

Use the following procedure to display the leading and last networks of a segment.

1) Perform the Attach Operation. (See Note (1))

2) Enter **8** in the AR and press the Erase/Get Key.

3) Press the Prev Get Next Key.

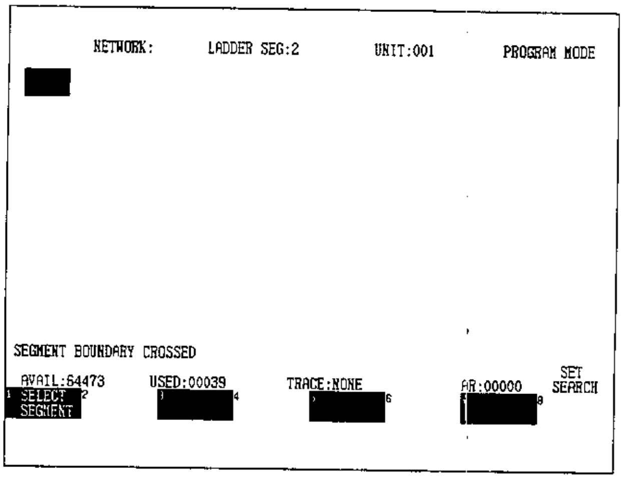


```
     NETWORK:      LADDER SEG:3        UNIT:001        PROGRAM MODE

SEGMENT BOUNDARY CROSSED
 AVAIL:64473      USED:00039       TRACE:NONE          AR:00000
```

SET
SEARCH
1 SELECT
SEGMENT
2
3
4
5
6
7
8

Figure 6.166

4) Enter **2** in the AR and select Select Segment.

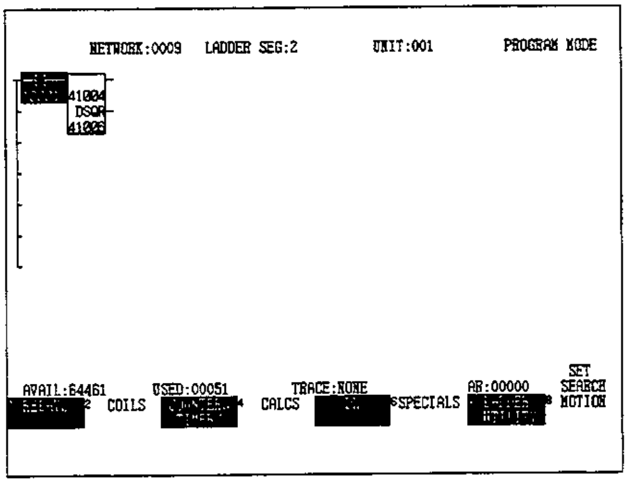


```
     NETWORK:      LADDER SEG:2        UNIT:001        PROGRAM MODE

SEGMENT BOUNDARY CROSSED
 AVAIL:64473      USED:00039       TRACE:NONE          AR:00000
```

SET
SEARCH
1 SELECT
SEGMENT
2
3
4
5
6
7
8

Figure 6.167

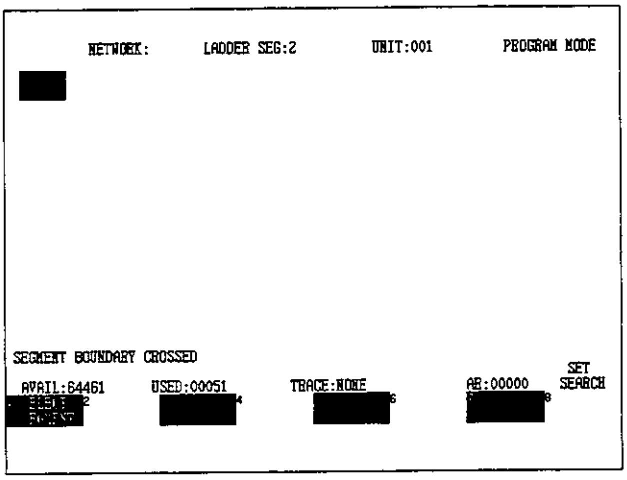
5) Press the Prev Get Next Key.



```
        NETWORK:0009   LADDER SEG:2        UNIT:001        PROGRAM MODE

            41004
             DSQR
            41005

                                                                      SET
AVAIL:64461     USED:00051      TRACE:NONE          AR:00000      SEARCH
            2 COILS           4 CALCS            6SPECIALS        8 MOTION
```

Figure 6.168

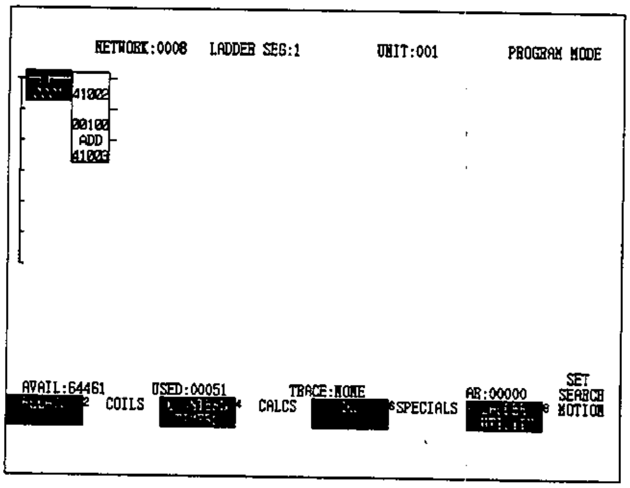
6) Press the Shift + Prev Get Next Keys.



```
        NETWORK:       LADDER SEG:2        UNIT:001        PROGRAM MODE

SEGMENT BOUNDARY CROSSED
                                                                      SET
AVAIL:64461     USED:00051      TRACE:NONE          AR:00000      SEARCH
            2                 4                  6                8
```

Figure 6.169

7) Press the Shift + Prev Get Next Keys.



NETWORK:0008 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:64461 USED:00051 TRACE:NONE AR:00000

41002
00100
ADD
41003
2 COILS
4 CALCS
6 SPECIALS
8
SET
SEARCH
MOTION

Figure 6.170

Note (1) The Attach Operation is not required if program storage is already possible.

(2) It is assumed that the initial settings for the segment have already been made.

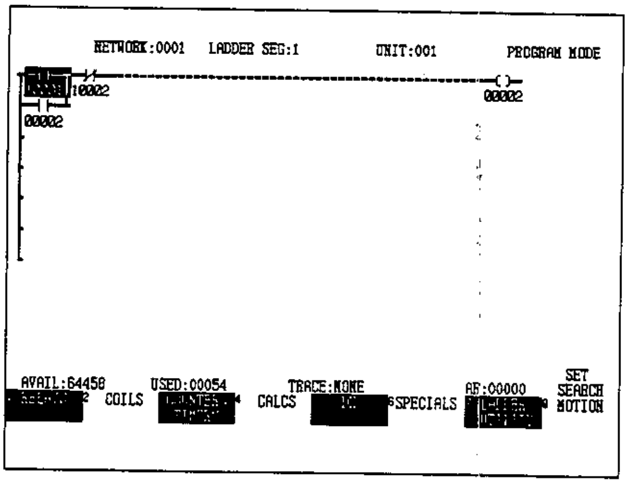
- **Displaying Power Flow and Spot**

The contact power flow status can be displayed for each element. Use the following procedure to display the power flow and spot.

1) Perform the Attach Operation. (See Note (1))

2) Display any network.

3) Elements with thick lines have power flow, and elements with thin lines have no power flow.



NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:64458 USED:00054 TRACE:NONE AR:00000

10002
00002
00002
2 COILS
4 CALCS
6 SPECIALS
8
SET
SEARCH
MOTION

Figure 6.171

Note (1) The Attach Operation is not required if program storage is already possible.

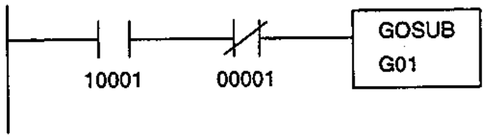
(2) If the ON and OFF status is changed at high speed, the display at the top of the screen may not always be correct. Use the Register Access Panel (RAP) to see it correctly.

B. Subroutines

(i) Displaying Subroutines

- **The Zoom Function: Part 1**

Example: GOSUB Circuit


10001
00001
GOSUB
G01

Use the following procedure to store a GOSUB circuit when the subroutine already exists.

1) Perform the Attach Operation. (See Note (2))

2) Display any network.

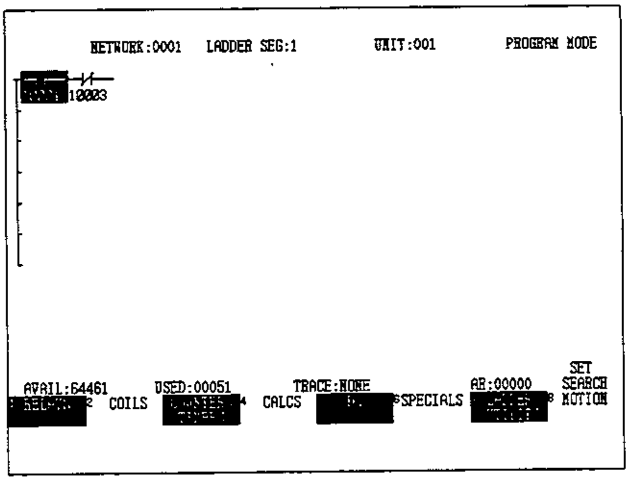

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10003
AVAIL:64461
USED:00051
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.172

3) Move the cursor to the network to be stored.

4) Select Specials.

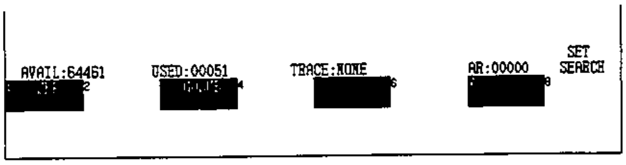
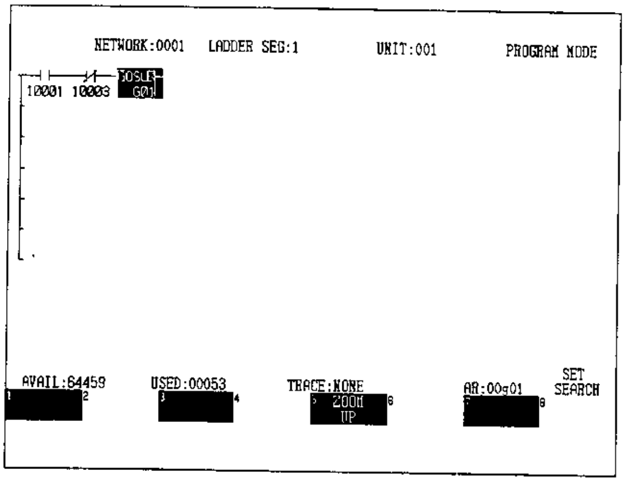

AVAIL:64461
USED:00051
TRACE:NONE
AR:00000
SET
SEARCH

Figure 6.173

5) Enter **G01** in the AR and select GOSUB.



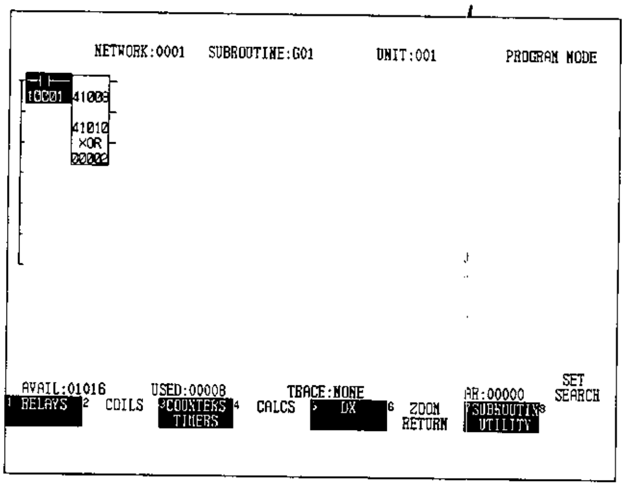
NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:64459 USED:00053 TRACE:NONE AR:00g01

10001
10003
GOSUB
G01
1
2
3
4
5 ZOOM UP
6
7
8
SET SEARCH

Figure 6.174

6) Select Zoom Up.



NETWORK:0001 SUBROUTINE:G01 UNIT:001 PROGRAM MODE

AVAIL:01016 USED:00008 TRACE:NONE AR:00000

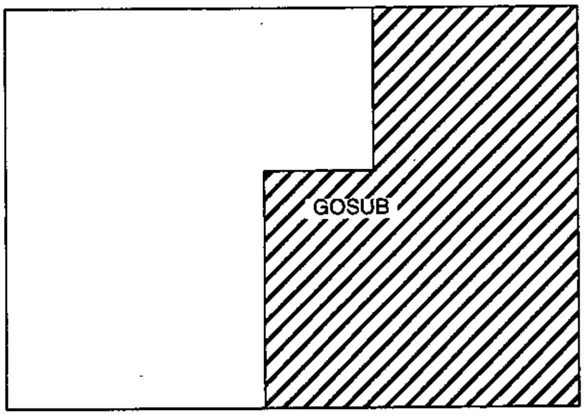
10C01
41009
41010
XOR
00002
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 ZOOM RETURN
7 SUBROUTINE UTILITY
8
SET SEARCH

Figure 6.175

Note (1) Place the cursor in the logic area.

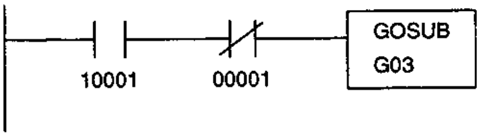
(2) The Attach Operation is not required if program storage is already possible.

(3) If a GOSUB circuit has been stored in the position shown below, elements cannot be stored in the diagonally shaded area.



- **The Zoom Function: Part 2**

Example: GOSUB Circuit


10001
00001
GOSUB
G03

Use the following procedure to store a GOSUB circuit when the appropriate subroutine does not already exist.

1) Perform the Attach Operation. (See Note (2))

2) Display any network.

3) Move the cursor to the network to be stored.

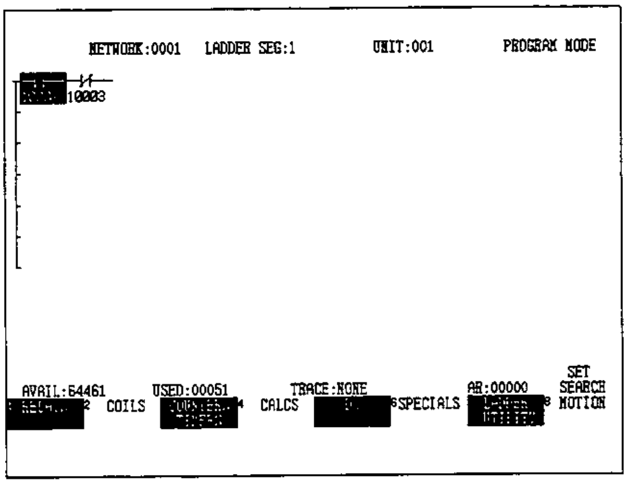
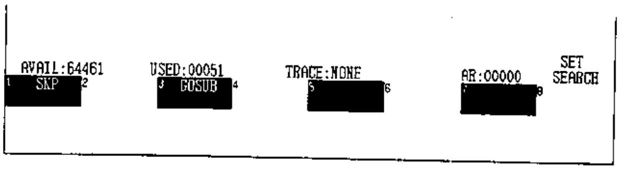

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10003
AVAIL:64461
USED:00051
TRACE:NONE
AR:00000
2 COILS
4 CALCS
6 SPECIALS
8 SET SEARCH MOTION

Figure 6.176

4) Select Specials.

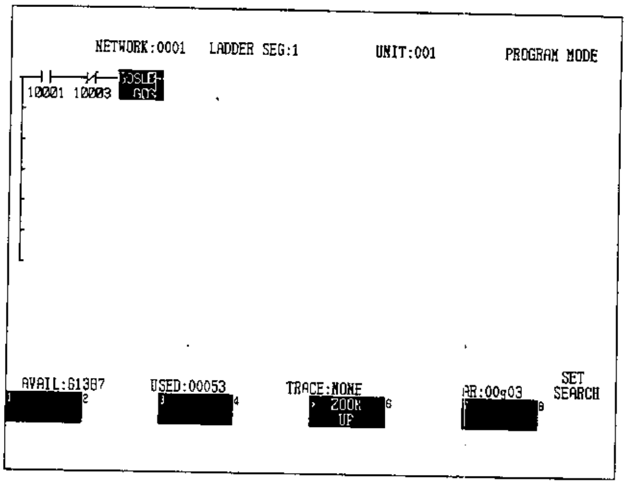


AVAIL:64461 USED:00051 TRACE:NONE AR:00000

SKP
GOSUB
SET SEARCH

Figure 6.177

5) Enter **G03** in the AR and select GOSUB.



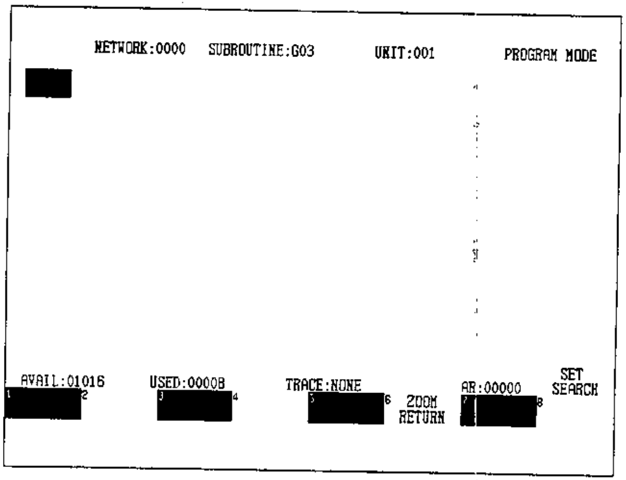
NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61387 USED:00053 TRACE:NONE AR:00G03

10001 10003
GOSUB G03
ZOOM UP
SET SEARCH

Figure 6.178

6) Select Zoom Up.



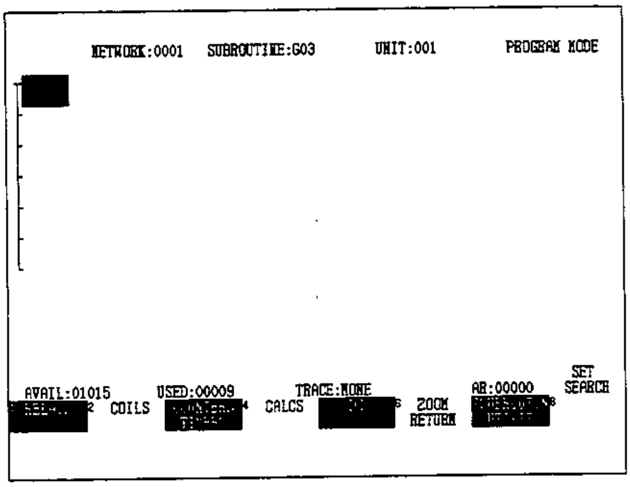
NETWORK:0000 SUBROUTINE:G03 UNIT:001 PROGRAM MODE

AVAIL:01016 USED:0000B TRACE:NONE AR:00000

ZOOM RETURN
SET SEARCH

Figure 6.179

7) Press the Start Next Key.



```
     NETWORK:0001   SUBROUTINE:G03        UNIT:001          PROGRAM MODE

AVAIL:01015       USED:00009        TRACE:NONE              AR:00000
```

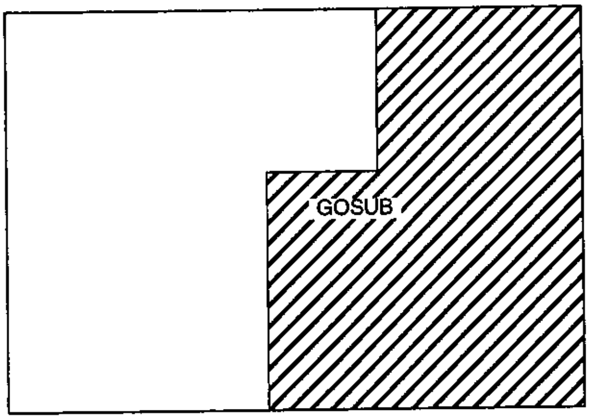
Figure 6.180

8) Perform normal ladder program operations.

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

(3) If a GOSUB circuit has been stored in the position shown below, elements cannot be stored in the diagonally shaded area.

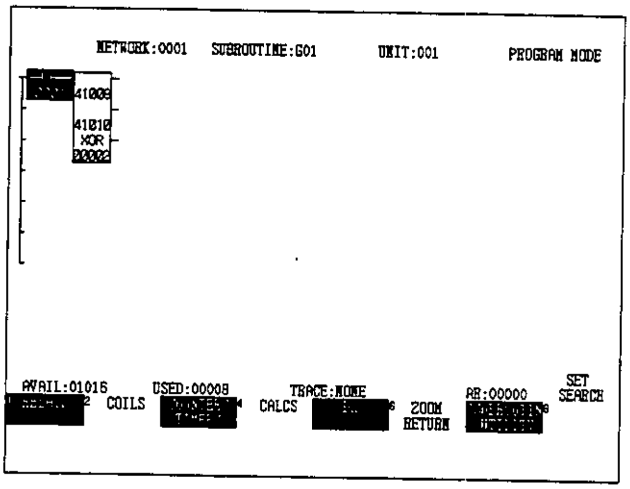


- **Reading Out**

This operation displays any program network with the Erase/Get Key. Use the following procedure for the read-out operation.

1) Perform the Attach Operation. (See Note (2))

2) Enter in the AR the number of the subroutine to be displayed and press the Erase/Get Key.



NETWORK:0001 SUBROUTINE:G01 UNIT:001 PROGRAM MODE

AVAIL:01016 USED:00008 TRACE:NONE AR:00000

41009
41010
XOR
00002
2
COILS
4
CALCS
6
ZOOM RETURN
8
SET SEARCH

Figure 6.181

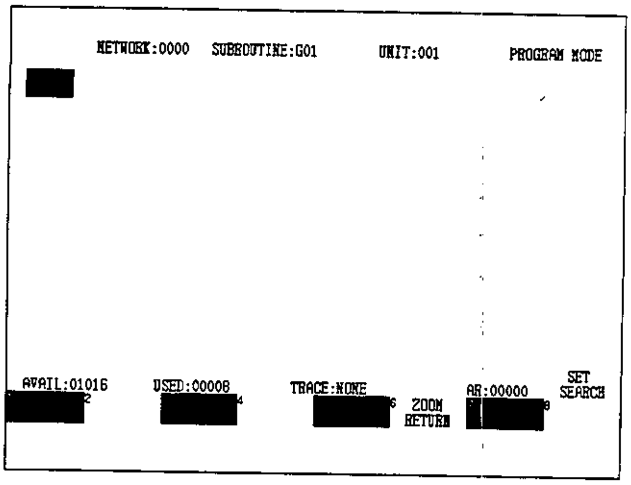
3) Select Zoom Return.

Note (1) Place the cursor in the logic area.

(2) The Attach Operation is not required if program storage is already possible.

(3) When Zoom Return is selected, the most recent network that calls that subroutine will be displayed.

(4) If a subroutine that has not been programmed is displayed, the network will be displayed in its initial condition.



NETWORK:0000 SUBROUTINE:G01 UNIT:001 PROGRAM MODE

AVAIL:01016 USED:00008 TRACE:NONE AR:00000

2
4
6
ZOOM RETURN
8
SET SEARCH

Figure 6.182

(ii) Network Storage

See *(i) Storing Networks* on page *6-92.*

(iii) Network Modification

See *(ii) Modifying the Network* on page *6-112.*
There is no function to display a particular network.

(iv) Network Display

See *(iii) Displaying Networks* on page *6-124.*
There is no display of the leading and last networks of a segment.

4. Subroutine Operations

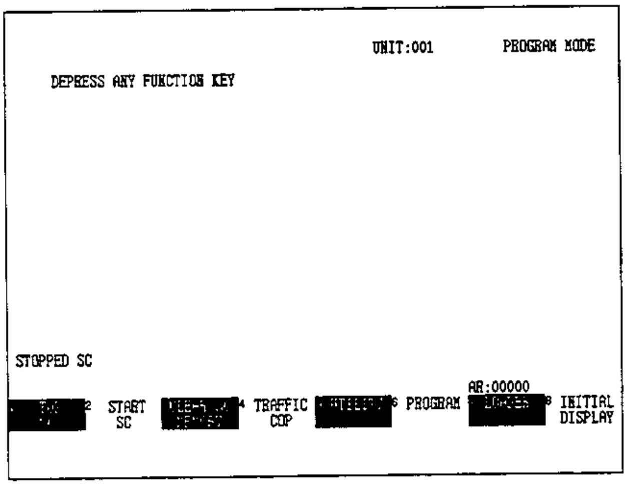
A. Displaying Subroutines

• Reading Out

A subroutine is read out using the Supervisory Key. Use the following procedure for the read-out operation.

1) Perform the Attach Operation.

2) Press the Supervisory Key.



UNIT:001 PROGRAM MODE

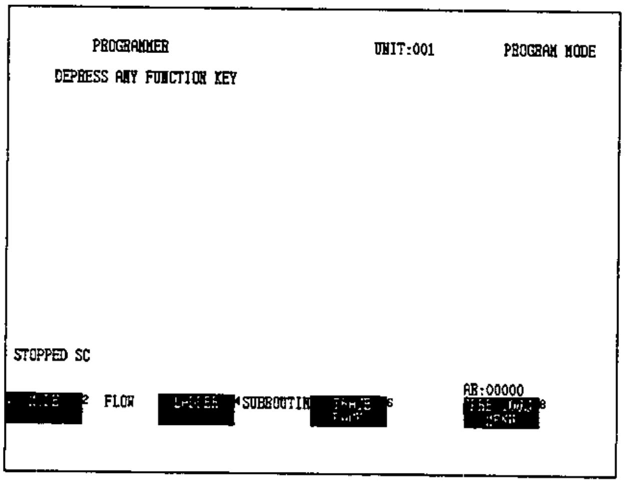
DEPRESS ANY FUNCTION KEY

STOPPED SC

AR:00000

Figure 6.183

3) Select Program.



PROGRAMMER UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

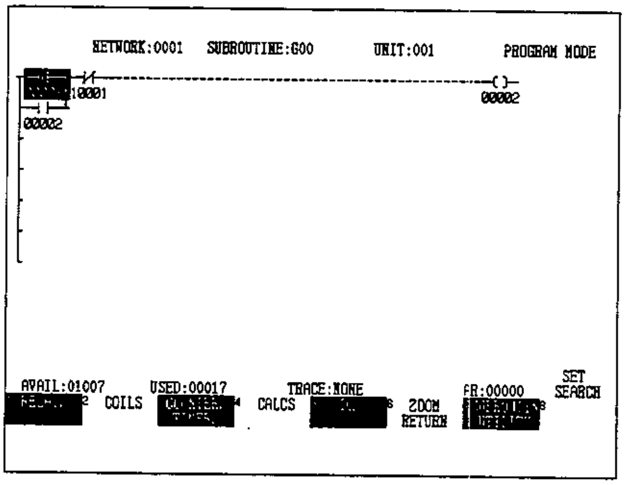
STOPPED SC

AR:00000

2
FLOW
4
SUBROUTIN
6
8

Figure 6.184

4) Select Subroutine.



NETWORK:0001 SUBROUTINE:G00 UNIT:001 PROGRAM MODE

AVAIL:01007 USED:00017 TRACE:NONE AR:00000

10001
00002
00002
2
COILS
4
CALCS
6
ZOOM
RETURN
8
SET
SEARCH

Figure 6.185

- **Network Storage**

See *(i) Storing Networks* on page *6-92.*

- **Network Modification**

See *(ii) Modifying the Network* on page *6-112.*
There is no function to display a particular network.

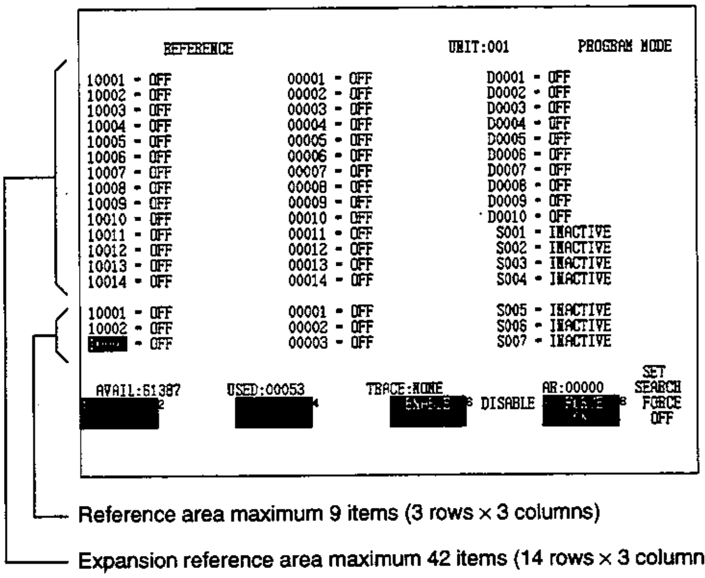
- **Network Display**

See *(iii) Displaying Networks* on page *6-124.*
There is no display of the leading and last networks of a segment.

5. Displaying Reference Comments

A. Relays, Registers, Steps, and Link Coils

- **Displaying the Status of Coils, Input Relays, Steps, and Link Coils: Part 1**



```
        REFERENCE                                    UNIT:001        PROGRAM MODE

10001 - OFF            00001 - OFF            D0001 - OFF
10002 - OFF            00002 - OFF            D0002 - OFF
10003 - OFF            00003 - OFF            D0003 - OFF
10004 - OFF            00004 - OFF            D0004 - OFF
10005 - OFF            00005 - OFF            D0005 - OFF
10006 - OFF            00006 - OFF            D0006 - OFF
10007 - OFF            00007 - OFF            D0007 - OFF
10008 - OFF            00008 - OFF            D0008 - OFF
10009 - OFF            00009 - OFF            D0009 - OFF
10010 - OFF            00010 - OFF            D0010 - OFF
10011 - OFF            00011 - OFF              S001 - INACTIVE
10012 - OFF            00012 - OFF              S002 - INACTIVE
10013 - OFF            00013 - OFF              S003 - INACTIVE
10014 - OFF            00014 - OFF              S004 - INACTIVE

10001 - OFF            00001 - OFF              S005 - INACTIVE
10002 - OFF            00002 - OFF              S006 - INACTIVE
      - OFF            00003 - OFF              S007 - INACTIVE
                                                                  SET
  AVAIL:61387       USED:00053       TRACE:NONE           AR:00000  SEARCH
               2                4              6 DISABLE          8  FORCE
                                                                     OFF
```

Reference area maximum 9 items (3 rows × 3 columns)

Expansion reference area maximum 42 items (14 rows × 3 columns)

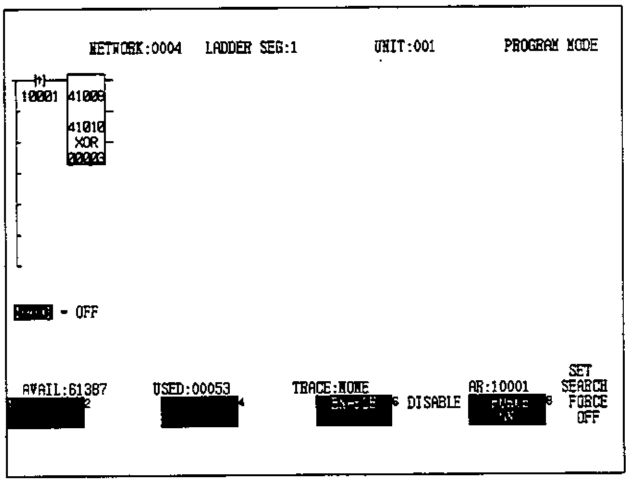
Figure 6.186

Use the following procedure to display the status of coils, input relays, steps and link coils.

1) Perform the Attach Operation.

2) Display a network.

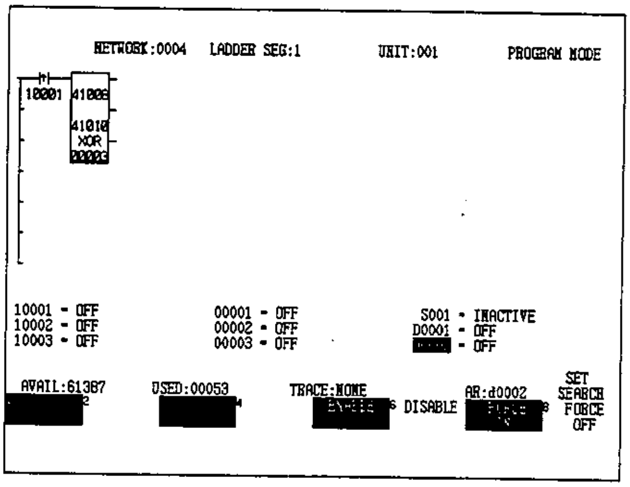
3) Move the cursor into the reference area, enter "10001" in the AR, and then press the Erase/Get Key.



```
         NETWORK:0004   LADDER SEG:1          UNIT:001         PROGRAM MODE

      - OFF

                                                                   SET
  AVAIL:61387       USED:00053        TRACE:NONE           AR:10001  SEARCH
               2                4               6 DISABLE          8  FORCE
                                                                      OFF
```

Figure 6.187

4) In the same way, the status of the target coils, input relays, steps, and link coils can be displayed in the reference area.

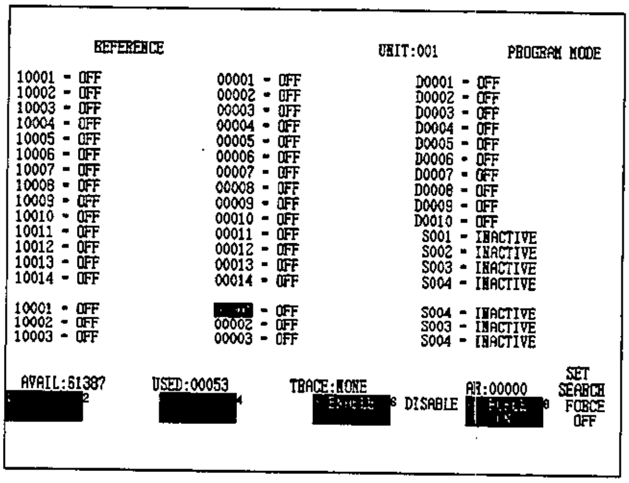


```
          NETWORK:0004   LADDER SEG:1          UNIT:001         PROGRAM MODE
 10001  41008
        41010
         XOR
        00003

10001 - OFF                 00001 - OFF                  S001 - INACTIVE
10002 - OFF                 00002 - OFF                 D0001 - OFF
10003 - OFF                 00003 - OFF                       - OFF

 AVAIL:61387       USED:00053       TRACE:NONE            AR:d0002      SET
                                               DISABLE                 SEARCH
                                                                        FORCE
                                                                         OFF
```

Figure 6.188

5) To display more, press the Page Up Key.

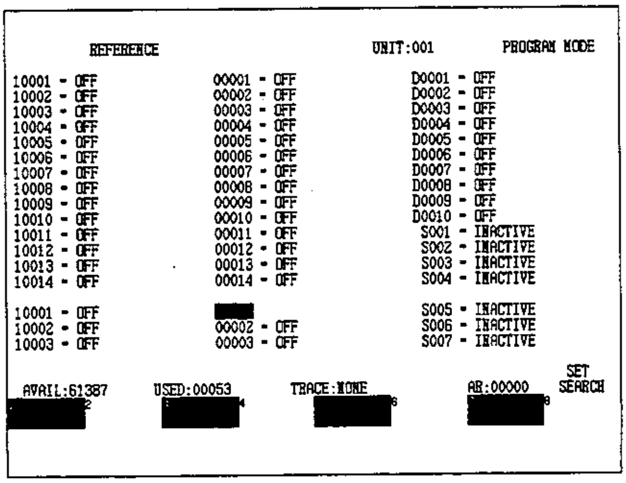
6) The reference number at the cursor will be decremented by 1. The contents displayed up to this point will move down one each, but the items displayed above the cursor and items in other columns will not move.



```
         REFERENCE                                  UNIT:001        PROGRAM MODE
10001 - OFF                 00001 - OFF               D0001 - OFF
10002 - OFF                 00002 - OFF               D0002 - OFF
10003 - OFF                 00003 - OFF               D0003 - OFF
10004 - OFF                 00004 - OFF               D0004 - OFF
10005 - OFF                 00005 - OFF               D0005 - OFF
10006 - OFF                 00006 - OFF               D0006 - OFF
10007 - OFF                 00007 - OFF               D0007 - OFF
10008 - OFF                 00008 - OFF               D0008 - OFF
10009 - OFF                 00009 - OFF               D0009 - OFF
10010 - OFF                 00010 - OFF               D0010 - OFF
10011 - OFF                 00011 - OFF                S001 - INACTIVE
10012 - OFF                 00012 - OFF                S002 - INACTIVE
10013 - OFF                 00013 - OFF                S003 - INACTIVE
10014 - OFF                 00014 - OFF                S004 - INACTIVE

10001 - OFF                       - OFF                S004 - INACTIVE
10002 - OFF                 00002 - OFF                S003 - INACTIVE
10003 - OFF                 00003 - OFF                S004 - INACTIVE

 AVAIL:61387      USED:00053      TRACE:NONE            AR:00000      SET
                                             DISABLE                SEARCH
                                                                     FORCE
                                                                      OFF
```

Figure 6.189

7) To delete the details from the screen, press the Shift + Erase/Get Keys. New information can be displayed in the same location even if this step is not performed.



```
          REFERENCE                                  UNIT:001        PROGRAM MODE

10001 - OFF               00001 - OFF               D0001 - OFF
10002 - OFF               00002 - OFF               D0002 - OFF
10003 - OFF               00003 - OFF               D0003 - OFF
10004 - OFF               00004 - OFF               D0004 - OFF
10005 - OFF               00005 - OFF               D0005 - OFF
10006 - OFF               00006 - OFF               D0006 - OFF
10007 - OFF               00007 - OFF               D0007 - OFF
10008 - OFF               00008 - OFF               D0008 - OFF
10009 - OFF               00009 - OFF               D0009 - OFF
10010 - OFF               00010 - OFF               D0010 - OFF
10011 - OFF               00011 - OFF                S001 - INACTIVE
10012 - OFF               00012 - OFF                S002 - INACTIVE
10013 - OFF               00013 - OFF                S003 - INACTIVE
10014 - OFF               00014 - OFF                S004 - INACTIVE

10001 - OFF                                          S005 - INACTIVE
10002 - OFF               00002 - OFF                S006 - INACTIVE
10003 - OFF               00003 - OFF                S007 - INACTIVE
                                                                    SET
 AVAIL:61387       USED:00053        TRACE:NONE            AR:00000   SEARCH
```

Figure 6.190

Note (1) If the ON and OFF status is changed at high speed, the display at the top of the screen may not always be correct. Use the Register Access Panel (RAP) to see it correctly.

(2) Place the cursor in the reference area or the expansion reference area.

(3) When the Tab Key is pressed, the cursor will move from the logic area to the reference area.

(4) Make sure either 3-digit or 4-digit numbers are used for steps and link coils.

(5) Using the Page Up and Page Down Keys
To display the status of a series of coils from 1 to 7 (using the expansion reference area), display coil 1 on the lowest level of the reference area and press the Page Down Key 16 times. It is also possible to display coil 17 on the highest level of the expansion reference area and press the Page Up Key 16 times.

(6) In Monitor Mode, Enable, Disable, Forced On and Forced Off are not displayed.

- **Displaying the Status of Coils, Input Relays, Steps and Link Coils: Part 2.**

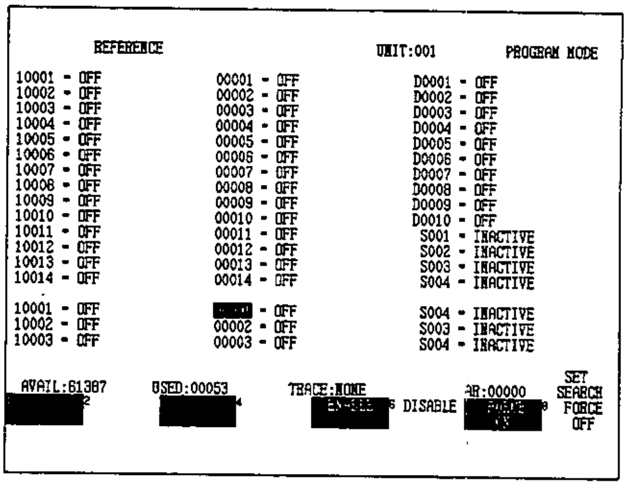
This operation displays the status of coils, input relays, steps, and link coils in the order of their reference numbers. It displays the next reference number after the one displayed, or the one before it.

To display the next reference number, press the Page Down Key.
To display the previous reference number, press the Page Up Key.

Use the following procedure to display the status of coils, input relays, steps, and link coils in the order of their reference numbers.

1) First, make sure that the reference numbers are displayed in the reference area.

2) Move the cursor to the location of the target reference number.

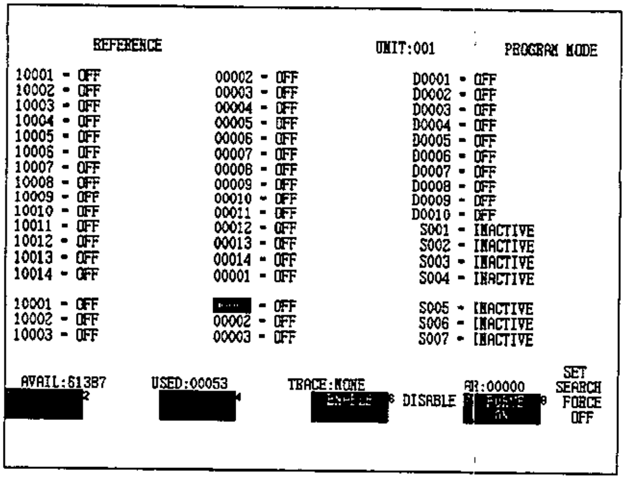


```
          REFERENCE                              UNIT:001        PROGRAM MODE
10001 - OFF               00001 - OFF               D0001 - OFF
10002 - OFF               00002 - OFF               D0002 - OFF
10003 - OFF               00003 - OFF               D0003 - OFF
10004 - OFF               00004 - OFF               D0004 - OFF
10005 - OFF               00005 - OFF               D0005 - OFF
10006 - OFF               00006 - OFF               D0006 - OFF
10007 - OFF               00007 - OFF               D0007 - OFF
10008 - OFF               00008 - OFF               D0008 - OFF
10009 - OFF               00009 - OFF               D0009 - OFF
10010 - OFF               00010 - OFF               D0010 - OFF
10011 - OFF               00011 - OFF                S001 - INACTIVE
10012 - OFF               00012 - OFF                S002 - INACTIVE
10013 - OFF               00013 - OFF                S003 - INACTIVE
10014 - OFF               00014 - OFF                S004 - INACTIVE

10001 - OFF                     - OFF                S004 - INACTIVE
10002 - OFF               00002 - OFF                S003 - INACTIVE
10003 - OFF               00003 - OFF                S004 - INACTIVE

                                                                   SET
 AVAIL:61387       USED:00053       TRACE:NONE           AR:00000  SEARCH
           2                 4      ENABLE  6 DISABLE     FORCE  8  FORCE
                                                          ON        OFF
```

Figure 6.191

3) Press the Page Down Key.

4) The reference number at the cursor will be incremented by 1. The contents displayed up to this point will move up one each, but the items displayed below the cursor and items in other columns will not move.

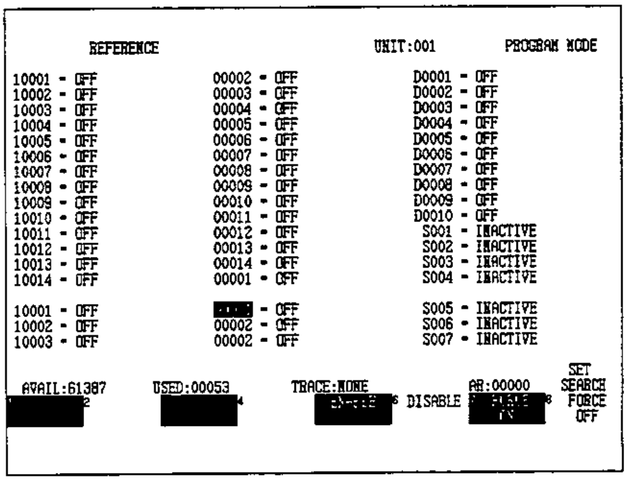


```
          REFERENCE                              UNIT:001        PROGRAM MODE
10001 - OFF               00002 - OFF               D0001 - OFF
10002 - OFF               00003 - OFF               D0002 - OFF
10003 - OFF               00004 - OFF               D0003 - OFF
10004 - OFF               00005 - OFF               D0004 - OFF
10005 - OFF               00006 - OFF               D0005 - OFF
10006 - OFF               00007 - OFF               D0006 - OFF
10007 - OFF               00008 - OFF               D0007 - OFF
10008 - OFF               00009 - OFF               D0008 - OFF
10009 - OFF               00010 - OFF               D0009 - OFF
10010 - OFF               00011 - OFF               D0010 - OFF
10011 - OFF               00012 - OFF                S001 - INACTIVE
10012 - OFF               00013 - OFF                S002 - INACTIVE
10013 - OFF               00014 - OFF                S003 - INACTIVE
10014 - OFF               00001 - OFF                S004 - INACTIVE

10001 - OFF                     - OFF                S005 - INACTIVE
10002 - OFF               00002 - OFF                S006 - INACTIVE
10003 - OFF               00003 - OFF                S007 - INACTIVE

                                                                   SET
 AVAIL:61387       USED:00053       TRACE:NONE           AR:00000  SEARCH
           2                 4      ENABLE  6 DISABLE     FORCE  8  FORCE
                                                          ON        OFF
```

Figure 6.192

5) Press the Page Up Key.

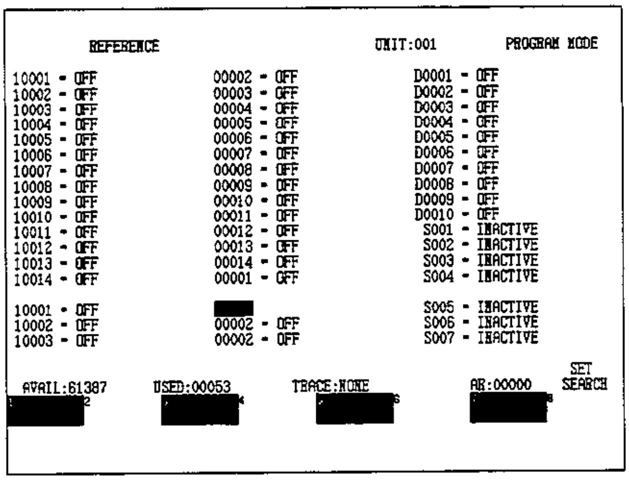
6) The reference number at the cursor will be decremented by 1. The contents displayed up to this point will move down one each, but the items displayed above the cursor and items in other columns will not move.



```
        REFERENCE                                   UNIT:001        PROGRAM MODE

10001 - OFF              00002 - OFF               D0001 - OFF
10002 - OFF              00003 - OFF               D0002 - OFF
10003 - OFF              00004 - OFF               D0003 - OFF
10004 - OFF              00005 - OFF               D0004 - OFF
10005 - OFF              00006 - OFF               D0005 - OFF
10006 - OFF              00007 - OFF               D0006 - OFF
10007 - OFF              00008 - OFF               D0007 - OFF
10008 - OFF              00009 - OFF               D0008 - OFF
10009 - OFF              00010 - OFF               D0009 - OFF
10010 - OFF              00011 - OFF               D0010 - OFF
10011 - OFF              00012 - OFF                S001 - INACTIVE
10012 - OFF              00013 - OFF                S002 - INACTIVE
10013 - OFF              00014 - OFF                S003 - INACTIVE
10014 - OFF              00001 - OFF                S004 - INACTIVE

10001 - OFF                    - OFF                S005 - INACTIVE
10002 - OFF              00002 - OFF                S006 - INACTIVE
10003 - OFF              00002 - OFF                S007 - INACTIVE
                                                                      SET
  AVAIL:61387       USED:00053       TRACE:NONE            AR:00000   SEARCH
              2                 4               6 DISABLE          8  FORCE
                                                              ON       OFF
```

Figure 6.193

7) To delete the information on the screen, press the Shift + Erase/Get Keys. New information can be displayed in the same location even if this step is not performed.



```
        REFERENCE                                   UNIT:001        PROGRAM MODE

10001 - OFF              00002 - OFF               D0001 - OFF
10002 - OFF              00003 - OFF               D0002 - OFF
10003 - OFF              00004 - OFF               D0003 - OFF
10004 - OFF              00005 - OFF               D0004 - OFF
10005 - OFF              00006 - OFF               D0005 - OFF
10006 - OFF              00007 - OFF               D0006 - OFF
10007 - OFF              00008 - OFF               D0007 - OFF
10008 - OFF              00009 - OFF               D0008 - OFF
10009 - OFF              00010 - OFF               D0009 - OFF
10010 - OFF              00011 - OFF               D0010 - OFF
10011 - OFF              00012 - OFF                S001 - INACTIVE
10012 - OFF              00013 - OFF                S002 - INACTIVE
10013 - OFF              00014 - OFF                S003 - INACTIVE
10014 - OFF              00001 - OFF                S004 - INACTIVE

10001 - OFF                                         S005 - INACTIVE
10002 - OFF              00002 - OFF                S006 - INACTIVE
10003 - OFF              00002 - OFF                S007 - INACTIVE
                                                                      SET
  AVAIL:61387       USED:00053       TRACE:NONE            AR:00000   SEARCH
              2                 4               6                  8
```

Figure 6.194

Note (1) If the ON and OFF status is changed at high speed, the display at the top of the screen may not always be correct. Use the Register Access Panel (RAP) to see it correctly.

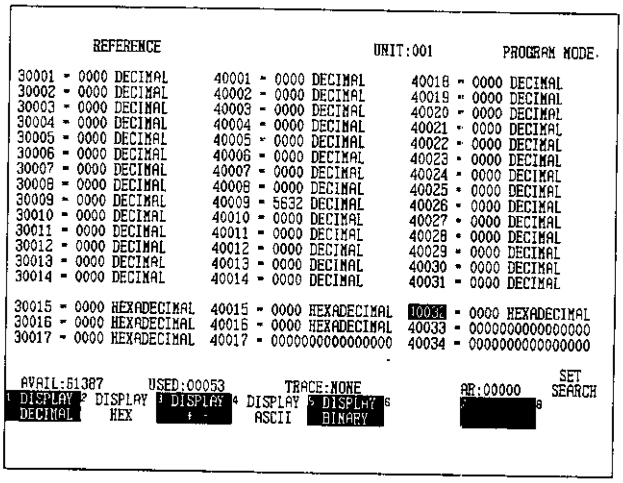
(2) Put the cursor in the reference area or the expansion reference area.

(3) Using the Page Up and Page Down Keys
To display the status of a series of coils from 1 to 17 (using the expansion reference area), display coil 1 on the lowest level of the reference area and press the Page Down Key 16 times. Alternatively, display coil 17 on the highest level of the expansion reference area and press the Page Up Key 16 times.

(4) In Monitor Mode, Enable, Disable, Forced On, and Forced Off are not displayed.

- **Displaying the Contents of a Register: Part 1**

This operation displays the contents of an input register or a holding (output) register. The contents of the register can be displayed in either decimal, hexadecimal, binary, or ASCII format. Display in signed decimal format is also possible.



```
          REFERENCE                                         UNIT:001          PROGRAM MODE.

30001 = 0000 DECIMAL      40001 = 0000 DECIMAL      40018 = 0000 DECIMAL
30002 = 0000 DECIMAL      40002 = 0000 DECIMAL      40019 = 0000 DECIMAL
30003 = 0000 DECIMAL      40003 = 0000 DECIMAL      40020 = 0000 DECIMAL
30004 = 0000 DECIMAL      40004 = 0000 DECIMAL      40021 = 0000 DECIMAL
30005 = 0000 DECIMAL      40005 = 0000 DECIMAL      40022 = 0000 DECIMAL
30006 = 0000 DECIMAL      40006 = 0000 DECIMAL      40023 = 0000 DECIMAL
30007 = 0000 DECIMAL      40007 = 0000 DECIMAL      40024 = 0000 DECIMAL
30008 = 0000 DECIMAL      40008 = 0000 DECIMAL      40025 = 0000 DECIMAL
30009 = 0000 DECIMAL      40009 = 5632 DECIMAL      40026 = 0000 DECIMAL
30010 = 0000 DECIMAL      40010 = 0000 DECIMAL      40027 = 0000 DECIMAL
30011 = 0000 DECIMAL      40011 = 0000 DECIMAL      40028 = 0000 DECIMAL
30012 = 0000 DECIMAL      40012 = 0000 DECIMAL      40029 = 0000 DECIMAL
30013 = 0000 DECIMAL      40013 = 0000 DECIMAL      40030 = 0000 DECIMAL
30014 = 0000 DECIMAL      40014 = 0000 DECIMAL      40031 = 0000 DECIMAL

30015 = 0000 HEXADECIMAL  40015 = 0000 HEXADECIMAL  40032 = 0000 HEXADECIMAL
30016 = 0000 HEXADECIMAL  40016 = 0000 HEXADECIMAL  40033 = 0000000000000000
30017 = 0000 HEXADECIMAL  40017 = 0000000000000000  40034 = 0000000000000000

 AVAIL:61387       USED:00053          TRACE:NONE                AR:00000     SET
1 DISPLAY 2 DISPLAY 3 DISPLAY 4 DISPLAY 5 DISPLAY 6                           SEARCH
  DECIMAL     HEX       + -      ASCII     BINARY               7          8
```

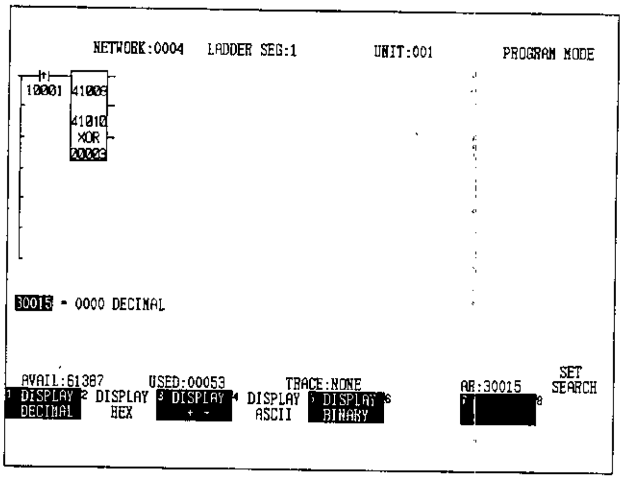
Figure 6.195

Use the following procedure to display the contents of a register.

1) Perform the Attach Operation. (See Note (2))

2) Display a network.

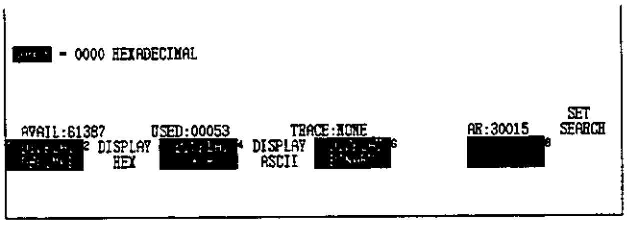
3) Move the cursor to the reference area, enter **30015** in the AR, and press the Erase/Get Key. (Initially, the display is in decimal format.)



```
            NETWORK:0004   LADDER SEG:1          UNIT:001          PROGRAM MODE

30015 = 0000 DECIMAL

 AVAIL:61387       USED:00053          TRACE:NONE                AR:30015     SET
1 DISPLAY 2 DISPLAY 3 DISPLAY 4 DISPLAY 5 DISPLAY 6                           SEARCH
  DECIMAL     HEX       + -      ASCII     BINARY               7          8
```

Figure 6.196

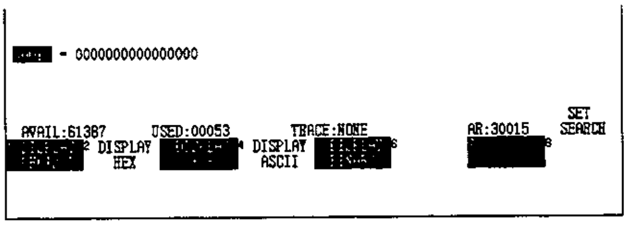
4) To display in hexadecimal format, select Display Hex.



```
 - 0000 HEXADECIMAL

 AVAIL:61387      USED:00053        TRACE:NONE              AR:30015   SET
                                                                       SEARCH
          2 DISPLAY          4 DISPLAY          6                    8
            HEX                ASCII
```

Figure 6.197

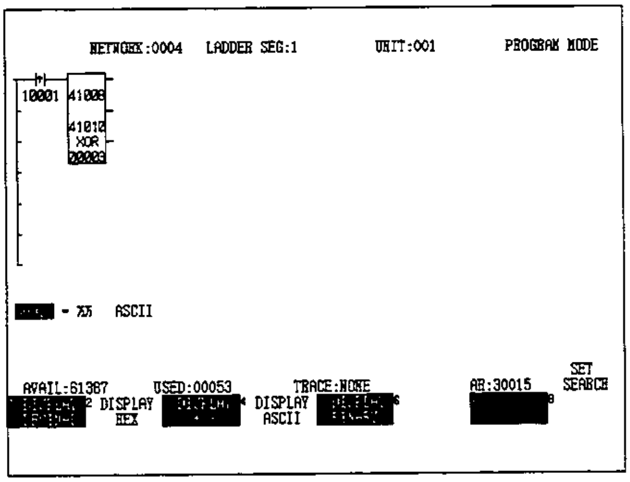
5) To display in binary format, select Binary.



```
 - 0000000000000000

 AVAIL:61387      USED:00053        TRACE:NONE              AR:30015   SET
                                                                       SEARCH
          2 DISPLAY          4 DISPLAY          6                    8
            HEX                ASCII
```

Figure 6.198

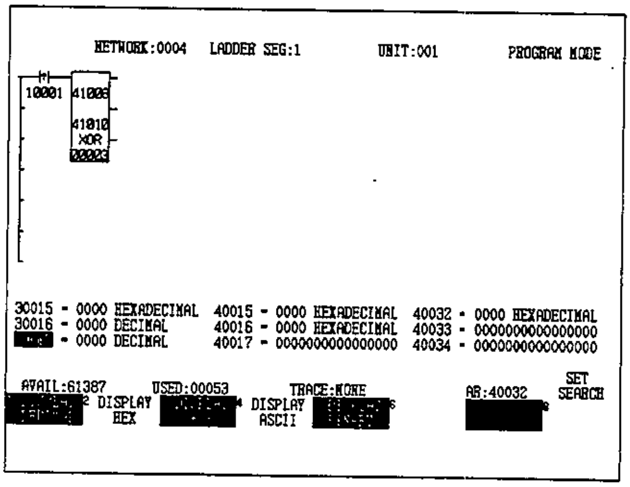
6) To display in ASCII format, select ASCII. (If a change to ASCII characters is not possible, the message "No ASCII" will be displayed.



```
        NETWORK:0004   LADDER SEG:1        UNIT:001        PROGRAM MODE

 10001  41008

        41010
         XOR
        20003

 - %5   ASCII

 AVAIL:61387      USED:00053        TRACE:NONE              AR:30015   SET
                                                                       SEARCH
          2 DISPLAY          4 DISPLAY          6                    8
            HEX                ASCII
```

Figure 6.199

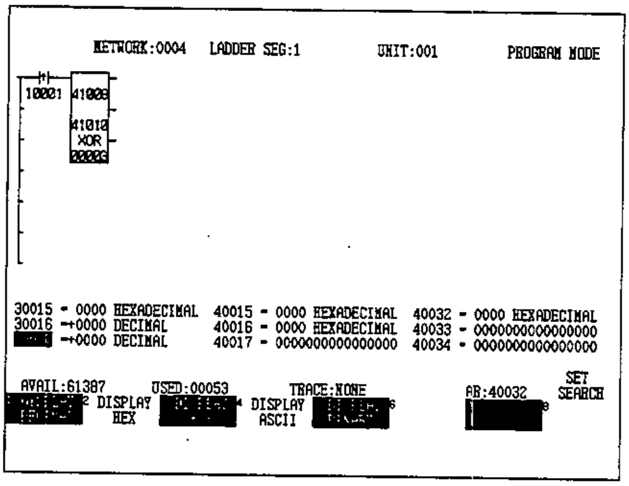
7) To display in decimal format, select Display Decimal.


10001
41008
41010
XOR
00003
2 DISPLAY HEX
4 DISPLAY ASCII
6
8
SET SEARCH

```
NETWORK:0004   LADDER SEG:1          UNIT:001          PROGRAM MODE

30015 - 0000 HEXADECIMAL  40015 - 0000 HEXADECIMAL  40032 - 0000 HEXADECIMAL
30016 - 0000 DECIMAL      40016 - 0000 HEXADECIMAL  40033 - 0000000000000000
[illegible] - 0000 DECIMAL      40017 - 0000000000000000  40034 - 0000000000000000

AVAIL:61387       USED:00053         TRACE:NONE           AR:40032
```

Figure 6.200

8) To display in signed decimal format, select Display + –.


10001
41008
41010
XOR
00003
2 DISPLAY HEX
4 DISPLAY ASCII
6
8
SET SEARCH

```
NETWORK:0004   LADDER SEG:1          UNIT:001          PROGRAM MODE

30015 - 0000 HEXADECIMAL  40015 - 0000 HEXADECIMAL  40032 - 0000 HEXADECIMAL
30016 -+0000 DECIMAL      40016 - 0000 HEXADECIMAL  40033 - 0000000000000000
[illegible] -+0000 DECIMAL      40017 - 0000000000000000  40034 - 0000000000000000

AVAIL:61387       USED:00053         TRACE:NONE           AR:40032
```

Figure 6.201

Note
(1) Place the cursor in the reference area or the expansion reference area.

(2) The Attach Operation is not required when the PLC is already online.

(3) The Change Screen Key toggles. (It will not erase the data on a display).

(4) The cursor that moves on bits, Set Bits, Clear Bits, Set All ,and Clear All are only displayed in Program Mode when the contents of a Hold Register is in binary format.

(5) When the contents of a register exceeds 9999, it will be displayed in decimal format as follows:
Example: 40100 => 9999 overflow

• Displaying the Contents of a Register: Part 2

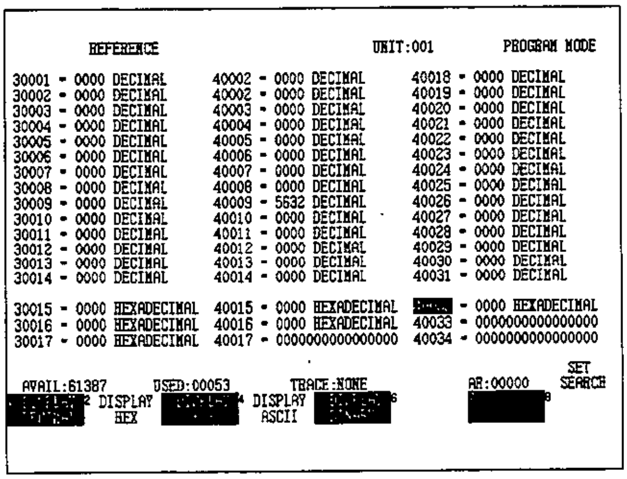
This operation displays the contents of registers in the order of reference numbers. It displays the next or previous reference number to the one currently displayed.

To display the next reference number, press the Page Down Key.
To display the previous reference number, press the Page Up Key.

Use the following procedure to display the contents of registers in the order of reference numbers.

1) First, make sure that the reference numbers are displayed in the reference area.

2) Move the cursor to the location of the target reference number.

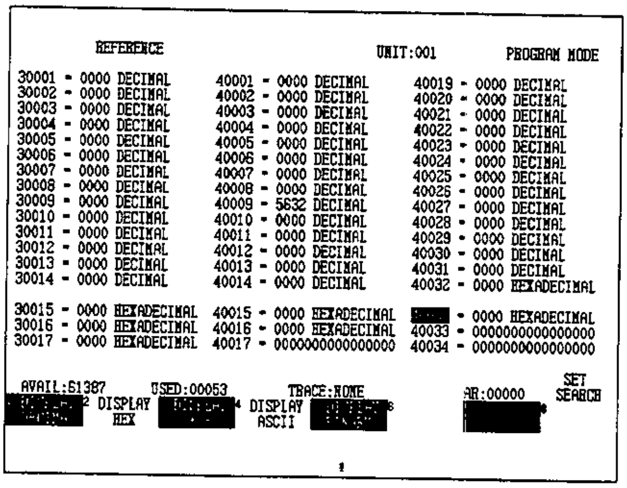


```
            REFERENCE                                           UNIT:001        PROGRAM MODE

30001 - 0000 DECIMAL      40002 - 0000 DECIMAL      40018 - 0000 DECIMAL
30002 - 0000 DECIMAL      40002 - 0000 DECIMAL      40019 - 0000 DECIMAL
30003 - 0000 DECIMAL      40003 - 0000 DECIMAL      40020 - 0000 DECIMAL
30004 - 0000 DECIMAL      40004 - 0000 DECIMAL      40021 - 0000 DECIMAL
30005 - 0000 DECIMAL      40005 - 0000 DECIMAL      40022 - 0000 DECIMAL
30006 - 0000 DECIMAL      40006 - 0000 DECIMAL      40023 - 0000 DECIMAL
30007 - 0000 DECIMAL      40007 - 0000 DECIMAL      40024 - 0000 DECIMAL
30008 - 0000 DECIMAL      40008 - 0000 DECIMAL      40025 - 0000 DECIMAL
30009 - 0000 DECIMAL      40009 - 5632 DECIMAL      40026 - 0000 DECIMAL
30010 - 0000 DECIMAL      40010 - 0000 DECIMAL      40027 - 0000 DECIMAL
30011 - 0000 DECIMAL      40011 - 0000 DECIMAL      40028 - 0000 DECIMAL
30012 - 0000 DECIMAL      40012 - 0000 DECIMAL      40029 - 0000 DECIMAL
30013 - 0000 DECIMAL      40013 - 0000 DECIMAL      40030 - 0000 DECIMAL
30014 - 0000 DECIMAL      40014 - 0000 DECIMAL      40031 - 0000 DECIMAL

30015 - 0000 HEXADECIMAL  40015 - 0000 HEXADECIMAL  40032 - 0000 HEXADECIMAL
30016 - 0000 HEXADECIMAL  40016 - 0000 HEXADECIMAL  40033 - 0000000000000000
30017 - 0000 HEXADECIMAL  40017 - 0000000000000000  40034 - 0000000000000000

                                                                        SET
 AVAIL:61387     USED:00053        TRACE:NONE               AR:00000   SEARCH
          2 DISPLAY          4 DISPLAY          6                    8
              HEX                ASCII
```

Figure 6.202

3) Press the Page Down Key.

4) The reference number at the cursor will be incremented by 1. The contents displayed up to this point will move up one each, but the items displayed below the cursor and items in other columns will not move.

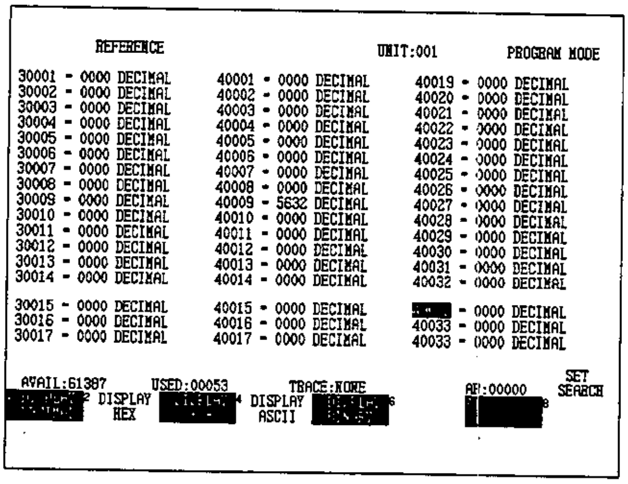


```
           REFERENCE                                   UNIT:001          PROGRAM MODE

30001 - 0000 DECIMAL       40001 - 0000 DECIMAL       40019 - 0000 DECIMAL
30002 - 0000 DECIMAL       40002 - 0000 DECIMAL       40020 - 0000 DECIMAL
30003 - 0000 DECIMAL       40003 - 0000 DECIMAL       40021 - 0000 DECIMAL
30004 - 0000 DECIMAL       40004 - 0000 DECIMAL       40022 - 0000 DECIMAL
30005 - 0000 DECIMAL       40005 - 0000 DECIMAL       40023 - 0000 DECIMAL
30006 - 0000 DECIMAL       40006 - 0000 DECIMAL       40024 - 0000 DECIMAL
30007 - 0000 DECIMAL       40007 - 0000 DECIMAL       40025 - 0000 DECIMAL
30008 - 0000 DECIMAL       40008 - 0000 DECIMAL       40026 - 0000 DECIMAL
30009 - 0000 DECIMAL       40009 - 5632 DECIMAL       40027 - 0000 DECIMAL
30010 - 0000 DECIMAL       40010 - 0000 DECIMAL       40028 - 0000 DECIMAL
30011 - 0000 DECIMAL       40011 - 0000 DECIMAL       40029 - 0000 DECIMAL
30012 - 0000 DECIMAL       40012 - 0000 DECIMAL       40030 - 0000 DECIMAL
30013 - 0000 DECIMAL       40013 - 0000 DECIMAL       40031 - 0000 DECIMAL
30014 - 0000 DECIMAL       40014 - 0000 DECIMAL       40032 - 0000 HEXADECIMAL

30015 - 0000 HEXADECIMAL   40015 - 0000 HEXADECIMAL         - 0000 HEXADECIMAL
30016 - 0000 HEXADECIMAL   40016 - 0000 HEXADECIMAL   40033 - 0000000000000000
30017 - 0000 HEXADECIMAL   40017 - 0000000000000000   40034 - 0000000000000000

 AVAIL:61387       USED:00053       TRACE:NONE              AR:00000     SET
           2 DISPLAY        4 DISPLAY            6                        SEARCH
               HEX            ASCII                              8
```

Figure 6.203

5) Press the Page Up Key.

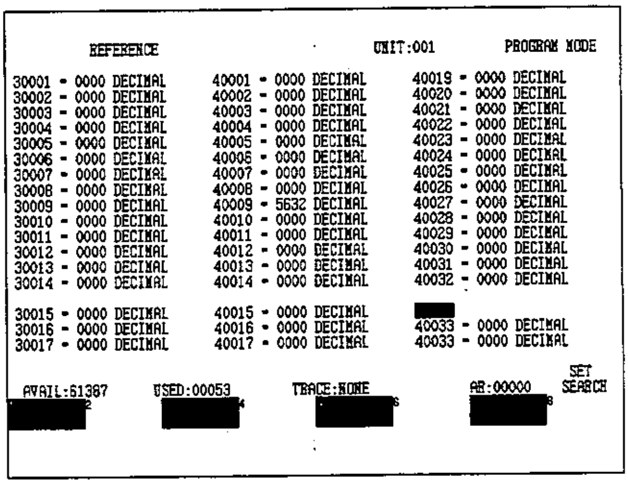
6) The reference number at the cursor will be decremented by 1. The contents displayed up to this point will move down one each, but the items displayed above the cursor and items in other columns will not move.



```
           REFERENCE                                   UNIT:001          PROGRAM MODE

30001 - 0000 DECIMAL       40001 - 0000 DECIMAL       40019 - 0000 DECIMAL
30002 - 0000 DECIMAL       40002 - 0000 DECIMAL       40020 - 0000 DECIMAL
30003 - 0000 DECIMAL       40003 - 0000 DECIMAL       40021 - 0000 DECIMAL
30004 - 0000 DECIMAL       40004 - 0000 DECIMAL       40022 - 0000 DECIMAL
30005 - 0000 DECIMAL       40005 - 0000 DECIMAL       40023 - 0000 DECIMAL
30006 - 0000 DECIMAL       40006 - 0000 DECIMAL       40024 - 0000 DECIMAL
30007 - 0000 DECIMAL       40007 - 0000 DECIMAL       40025 - 0000 DECIMAL
30008 - 0000 DECIMAL       40008 - 0000 DECIMAL       40026 - 0000 DECIMAL
30009 - 0000 DECIMAL       40009 - 5632 DECIMAL       40027 - 0000 DECIMAL
30010 - 0000 DECIMAL       40010 - 0000 DECIMAL       40028 - 0000 DECIMAL
30011 - 0000 DECIMAL       40011 - 0000 DECIMAL       40029 - 0000 DECIMAL
30012 - 0000 DECIMAL       40012 - 0000 DECIMAL       40030 - 0000 DECIMAL
30013 - 0000 DECIMAL       40013 - 0000 DECIMAL       40031 - 0000 DECIMAL
30014 - 0000 DECIMAL       40014 - 0000 DECIMAL       40032 - 0000 DECIMAL

30015 - 0000 DECIMAL       40015 - 0000 DECIMAL             - 0000 DECIMAL
30016 - 0000 DECIMAL       40016 - 0000 DECIMAL       40033 - 0000 DECIMAL
30017 - 0000 DECIMAL       40017 - 0000 DECIMAL       40033 - 0000 DECIMAL

 AVAIL:61387       USED:00053       TRACE:NONE              AR:00000     SET
           2 DISPLAY        4 DISPLAY            6                        SEARCH
               HEX            ASCII                              8
```

Figure 6.204

7) To delete information from the screen, press the Shift + Erase/Get Keys. New information can be displayed in the same location even if this step is not performed.



```
            REFERENCE                                       UNIT:001          PROGRAM MODE

30001 - 0000 DECIMAL        40001 - 0000 DECIMAL        40019 - 0000 DECIMAL
30002 - 0000 DECIMAL        40002 - 0000 DECIMAL        40020 - 0000 DECIMAL
30003 - 0000 DECIMAL        40003 - 0000 DECIMAL        40021 - 0000 DECIMAL
30004 - 0000 DECIMAL        40004 - 0000 DECIMAL        40022 - 0000 DECIMAL
30005 - 0000 DECIMAL        40005 - 0000 DECIMAL        40023 - 0000 DECIMAL
30006 - 0000 DECIMAL        40006 - 0000 DECIMAL        40024 - 0000 DECIMAL
30007 - 0000 DECIMAL        40007 - 0000 DECIMAL        40025 - 0000 DECIMAL
30008 - 0000 DECIMAL        40008 - 0000 DECIMAL        40026 - 0000 DECIMAL
30009 - 0000 DECIMAL        40009 - 5632 DECIMAL        40027 - 0000 DECIMAL
30010 - 0000 DECIMAL        40010 - 0000 DECIMAL        40028 - 0000 DECIMAL
30011 - 0000 DECIMAL        40011 - 0000 DECIMAL        40029 - 0000 DECIMAL
30012 - 0000 DECIMAL        40012 - 0000 DECIMAL        40030 - 0000 DECIMAL
30013 - 0000 DECIMAL        40013 - 0000 DECIMAL        40031 - 0000 DECIMAL
30014 - 0000 DECIMAL        40014 - 0000 DECIMAL        40032 - 0000 DECIMAL

30015 - 0000 DECIMAL        40015 - 0000 DECIMAL
30016 - 0000 DECIMAL        40016 - 0000 DECIMAL        40033 - 0000 DECIMAL
30017 - 0000 DECIMAL        40017 - 0000 DECIMAL        40033 - 0000 DECIMAL
                                                                              SET
  AVAIL:61387        USED:00053         TRACE:NONE              AR:00000    SEARCH
```

Figure 6.205

Note (1) Place the cursor in either the reference area or the expansion reference area.

(2) A new display will take on the same display format. If the display in the location of the cursor is binary, then the new display will be binary.

(3) Using the Page Down and Page Up Keys
To display the contents of a series of registers from 40001 to 40017 (using the expansion reference area), display "40001" in the lowest level of the reference area and press the Page Down Key 16 times. Alternatively, display "40017" in the uppermost level of the expansion reference area and press the Page Up Key 16 times.

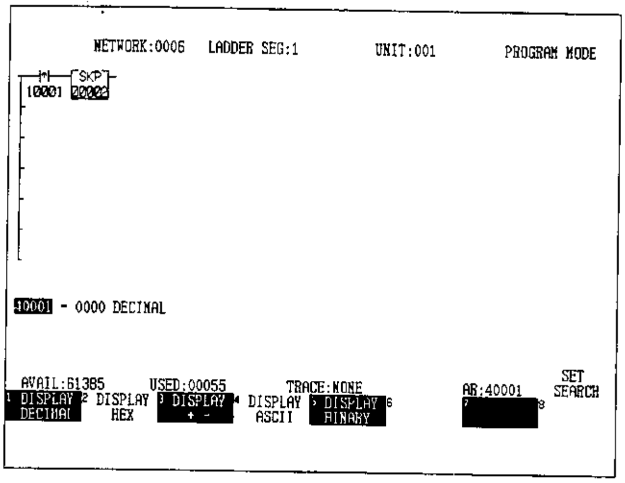
- **Storing Decimal Data in a Holding Register**

This operation stores any numeric value from 0000 to 9999 in a holding (output) register that is displayed in the reference area or in the expansion reference area. Use the following procedure to store data in decimal format.

1) Perform the Attach Operation. (See Note (3))

2) Display a network.

3) Move the cursor to the reference area, enter **40001** in the AR and press the Erase/Get Key.

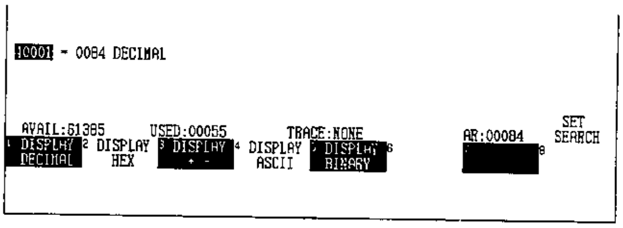


```
NETWORK:0006   LADDER SEG:1        UNIT:001        PROGRAM MODE

40001 - 0000 DECIMAL

AVAIL:61385     USED:00055      TRACE:NONE        AR:40001
```

SKP
10001
00002
1 DISPLAY DECIMAL
2 DISPLAY HEX
3 DISPLAY + -
4 DISPLAY ASCII
5 DISPLAY BINARY
6
7
8
SET SEARCH

Figure 6.206

4) Enter **84** in the AR and press the Enter Key.



```
40001 - 0084 DECIMAL

AVAIL:61385     USED:00055      TRACE:NONE        AR:00084
```

1 DISPLAY DECIMAL
2 DISPLAY HEX
3 DISPLAY + -
4 DISPLAY ASCII
5 DISPLAY BINARY
6
8
SET SEARCH

Figure 6.207

5) Move the cursor to the logic area.

Note (1) Place the cursor in the reference area.

(2) Numeric values cannot be stored in input registers from the P120.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the contents of a register exceeds 9999, it will be displayed in decimal format as follows:
Example: 40100 => 9999 overflow

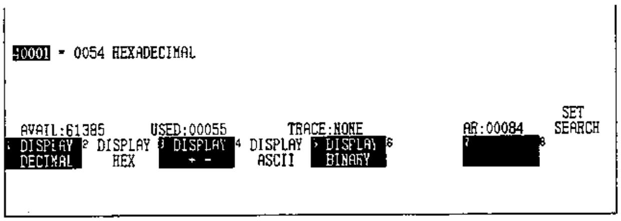
- **Storing Hexadecimal Data in a Holding Register**

This operation stores any numeric value from 0000 to FFFF in any holding (output) register that is displayed in the reference area or in the expansion reference area. Use the following procedure to store hexadecimal data.

1) Perform the Attach Operation. (See Note (3))

2) Display a network.

3) Select Display Hexadecimal.

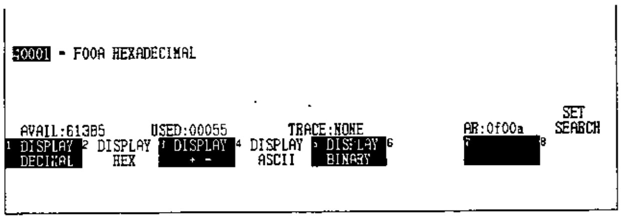


```
40001 - 0054 HEXADECIMAL

AVAIL:61385      USED:00055        TRACE:NONE            AR:00084
```

SET
SEARCH
1 DISPLAY DECIMAL
2 DISPLAY HEX
3 DISPLAY + -
4 DISPLAY ASCII
5 DISPLAY BINARY
6
7
8

Figure 6.208

4) Enter **F00A** in the AR and press the Enter Key.



```
40001 - F00A HEXADECIMAL

AVAIL:61385      USED:00055        TRACE:NONE            AR:0f00a
```

SET
SEARCH
1 DISPLAY DECIMAL
2 DISPLAY HEX
3 DISPLAY + -
4 DISPLAY ASCII
5 DISPLAY BINARY
6
7
8

Figure 6.209

5) Move the cursor to the logic area.

Note (1) Place the cursor in the reference area.

(2) Numeric values cannot be stored in input registers from the P120.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the contents of a register exceeds 9999, it will be displayed in hexadecimal format as follows:
Example: 40100 => 9999 overflow

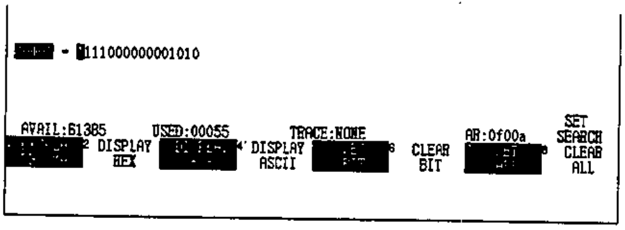
- **Storing Binary Data in a Holding Register**

This operation stores any numeric value (any 16-bit pattern) in any holding (output) register that is displayed in the reference area or in the expansion reference area. Use the following procedure to store binary data.

1) Perform the Attach Operation. (See Note (1))

2) Display a network.

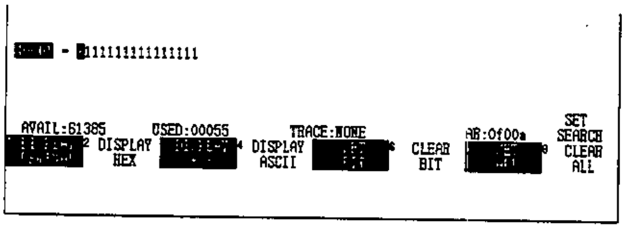
3) Select Display Binary.



```
 - 111000000001010

AVAIL:61385    USED:00055      TRACE:NONE        AR:0f00a    SET
             2 DISPLAY       4 DISPLAY       6 CLEAR       8 SEARCH
               HEX             ASCII           BIT           CLEAR
                                                             ALL
```

Figure 6.210

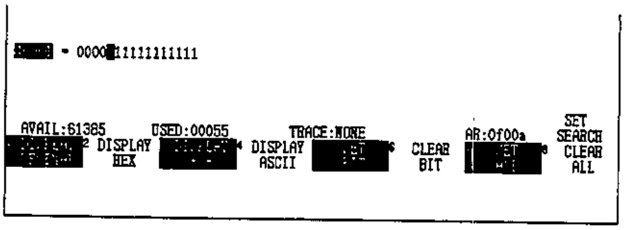
4) Select Set All. All bits will set to "1."



```
 - 111111111111111

AVAIL:61385    USED:00055      TRACE:NONE        AR:0f00a    SET
             2 DISPLAY       4 DISPLAY       6 CLEAR       8 SEARCH
               HEX             ASCII           BIT           CLEAR
                                                             ALL
```

Figure 6.211

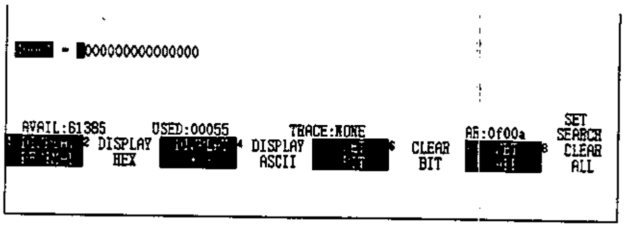
5) Select Clear Bit four times. The bits will be cleared and the cursor will move to the right.



```
 - 0000 11111111111

AVAIL:61385    USED:00055      TRACE:NONE        AR:0f00a    SET
             2 DISPLAY       4 DISPLAY       6 CLEAR       8 SEARCH
               HEX             ASCII           BIT           CLEAR
                                                             ALL
```

Figure 6.212

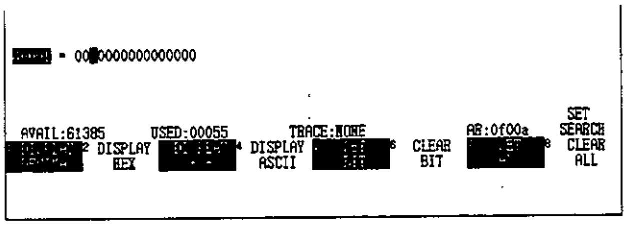
6) Select Clear All. All bits will be cleared to "0."



```
 - 000000000000000

AVAIL:61385    USED:00055      TRACE:NONE        AR:0f00a    SET
             2 DISPLAY       4 DISPLAY       6 CLEAR       8 SEARCH
               HEX             ASCII           BIT           CLEAR
                                                             ALL
```

Figure 6.213

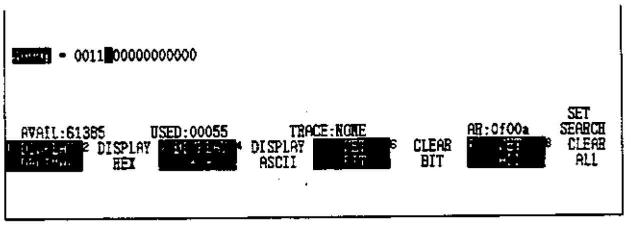
7) Press the Shift + Right Cursor Keys twice. The small cursor will move two items to the right.



```
 = 00█0000000000000

                                                              SET
 AVAIL:61385     USED:00055        TRACE:NONE        AR:0f00a  SEARCH
             2 DISPLAY        4 DISPLAY          6  CLEAR         8 CLEAR
                 HEX              ASCII              BIT             ALL
```

Figure 6.214

8) Select Set Bit twice. The bit will be set and the cursor will move to the right.



```
 = 0011█00000000000

                                                              SET
 AVAIL:61385     USED:00055        TRACE:NONE        AR:0f00a  SEARCH
             2 DISPLAY        4 DISPLAY          6  CLEAR         8 CLEAR
                 HEX              ASCII              BIT             ALL
```

Figure 6.215

9) Move the cursor to the logic area.

Note (1) Place the cursor in the reference area.

(2) Numeric values cannot be stored in input registers from the P120.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the contents of a register exceeds 9999, it will be displayed in decimal format as follows:
Example: 40100 => 9999 overflow

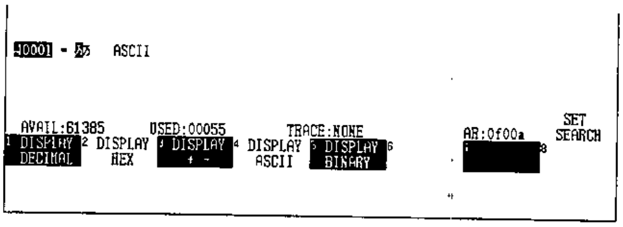
- **Storing ASCII Data in a Holding Register**

This operation stores numeric values (any two ASCII characters) in a holding (output) register that is displayed in the reference area or in the expansion reference area. Use the following procedure to store ASCII data.

1) Perform the Attach Operation. (See Note (3))

2) Display a network.

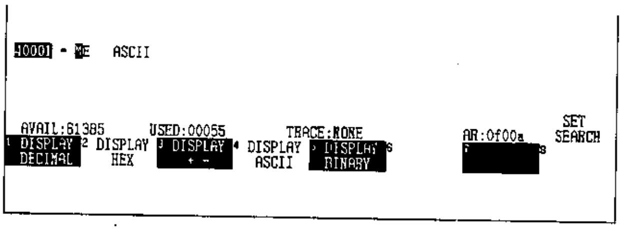
3) Select Display ASCII.



```
40001 - 万万   ASCII

 AVAIL:61385       USED:00055         TRACE:NONE              AR:0f00a   SET
1 DISPLAY 2 DISPLAY 3 DISPLAY 4 DISPLAY 5 DISPLAY 6         7          8 SEARCH
  DECIMAL     HEX       + -       ASCII     BINARY
```

Figure 6.216

4) Enter **ME.**



```
40001 - ME   ASCII

 AVAIL:61385       USED:00055         TRACE:NONE              AR:0f00a   SET
1 DISPLAY 2 DISPLAY 3 DISPLAY 4 DISPLAY 5 DISPLAY 6         7          8 SEARCH
  DECIMAL     HEX       + -       ASCII     BINARY
```

Figure 6.217

5) Move the cursor to the logic area.

Note (1) Place the cursor in the reference area.

(2) Numeric values cannot be stored in input registers from the P120.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the contents of a register exceeds 9999, it will be displayed in decimal format as follows:
Example: 40100 => 9999 overflow

(5) If the contents of the register cannot be converted to ASCII, it will be displayed as follows in ASCII.
Example: 40100 = "万万 ASCII."

- **Storing Signed Decimal Data in a Holding Register**

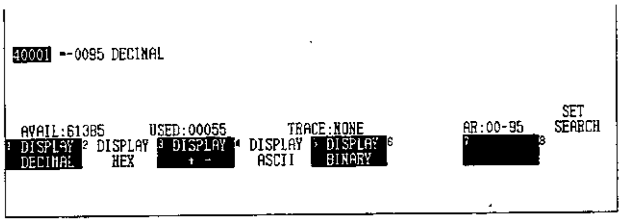
This operation stores a numeric value (from −9999 to +9999) in a holding (output) register that is displayed in the reference area or in the expansion reference area. Use the following procedure to store signed decimal data.

1) Perform the Attach Operation. (See Note (3))

2) Display a network.

3) Select Display Signed Decimal.

4) Enter **95** in the AR and press the Enter Key.



```
40001 --0095 DECIMAL

 AVAIL:61385      USED:00055        TRACE:NONE             AR:00-95
```

Figure 6.218

5) Move the cursor to the logic area.

Note (1) Place the cursor in the reference area.

(2) Numeric values cannot be stored in input registers from the P120.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the contents of a register exceeds 9999, it will be displayed in decimal format as follows:
Example: 40100 => 9999 overflow

B. Disable Operations

• Disabling Coils and Link Coils (Logic Area)

This operation is used to simulate the operation of a network or for troubleshooting the system. Use the following procedure to disable coils and link coils in the logic area.

1) Perform the Attach Operation. (See Note (3))

2) Display the network containing the coil to be disabled.

3) Move the cursor to the coil to be disabled.

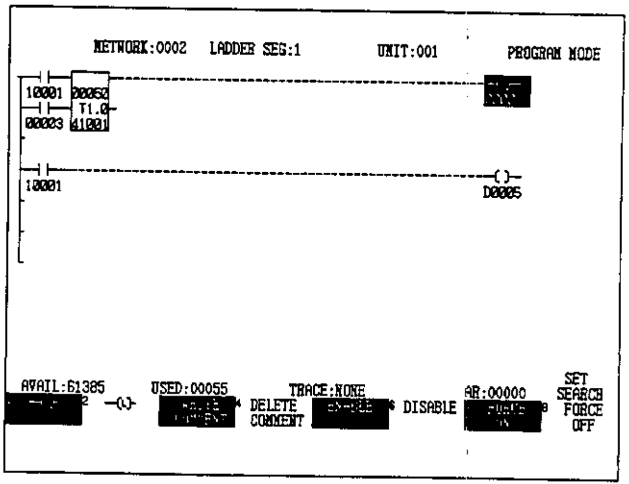

NETWORK:0002 LADDER SEG:1 UNIT:001 PROGRAM MODE
10001
00052
T1.0
00003
41001
10001
D0005
AVAIL:61385
USED:00055
TRACE:NONE
AR:00000
2 —(L)-
DELETE COMMENT
DISABLE
SET SEARCH
FORCE OFF

Figure 6.219

4) Select Disable.

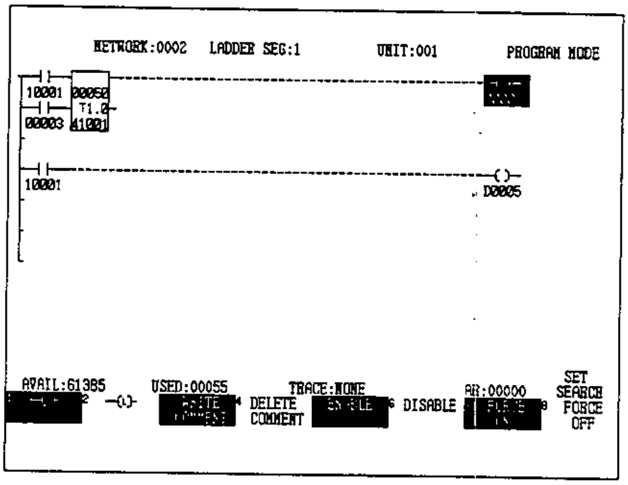
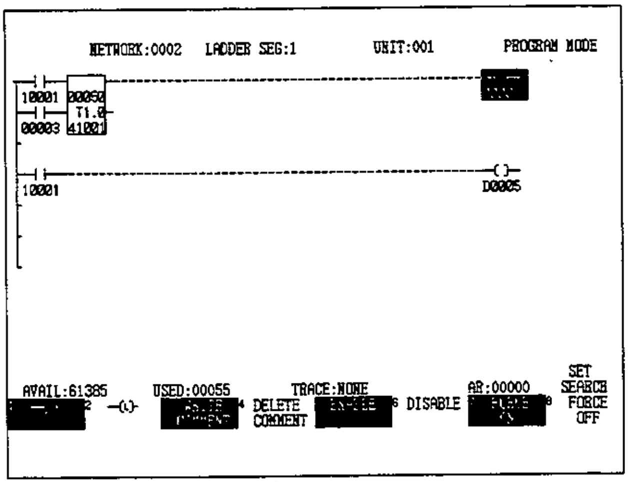

NETWORK:0002 LADDER SEG:1 UNIT:001 PROGRAM MODE
10001
00050
T1.0
00003
41001
10001
D0005
AVAIL:61385
USED:00055
TRACE:NONE
AR:00000
2 —(L)-
DELETE COMMENT
DISABLE
SET SEARCH
FORCE OFF

Figure 6.220

5) To force it ON, select Force On. To force it OFF, select Force Off.

6) Select Enable.



NETWORK:0002 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61385 USED:00055 TRACE:NONE AR:00000

10001
00050
T1.0
00003
41001
10001
D0005
—(L)-
4 DELETE COMMENT
6 DISABLE
SET SEARCH FORCE OFF

Figure 6.221

Note (1) Place the cursor in the logic area.

(2) This method is only valid for coils displayed as ‹ › or ‹L› in the logic area.

(3) The Attach Operation is not required if program storage is already possible.

(4) When the disabled coil is not longer required, be sure to enable it so that it will operate normally.

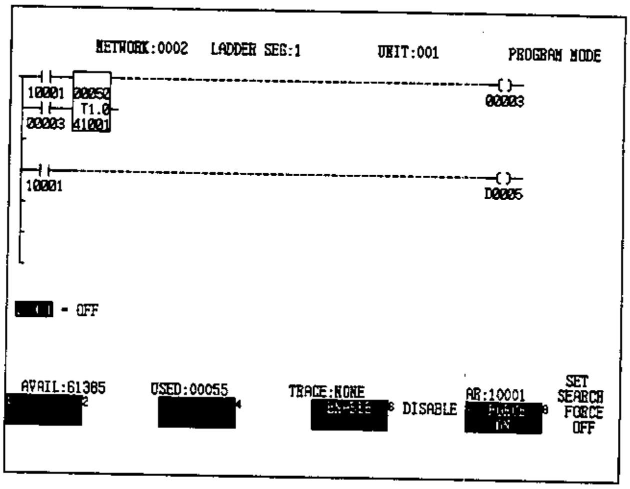
- **Disabling Input Relays, Coils, and Link Coils in the Reference Area**

Use the following procedure for disabling items in the reference area.

1) Perform the Attach Operation. (See Note (4))

2) Display a network.

3) Move the cursor to the reference area, enter "10001" in the AR, and press the Erase/Get Key.



NETWORK:0002 LADDER SEG:1 UNIT:001 PROGRAM MODE

- OFF

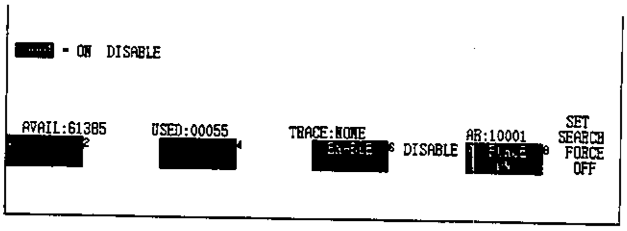
AVAIL:61385 USED:00055 TRACE:NONE AR:10001

10001
00052
T1.0
00003
41001
00003
10001
D0005
ENABLE
DISABLE
FORCE ON
SET
SEARCH
FORCE OFF

Figure 6.222

4) Select Disable.

5) To force it ON, select Force On. To force it OFF, select Force Off.



- ON DISABLE

AVAIL:61385 USED:00055 TRACE:NONE AR:10001

ENABLE
DISABLE
FORCE ON
SET
SEARCH
FORCE OFF

Figure 6.223

6) Select Enable.

Note (1) Place the cursor in the reference area or the expansion reference area.

(2) Make sure Disable is put ON and OFF when an input relay is used as the destination for a data transfer function.

(3) When a coil is used as the destination for a data transfer function, perform the Disable operation only after being sure that the data transfer function will not be executed. Usually, data transfers have priority, but the disabled status will have priority the instance the coil is disabled or the instance it is changed between ON and OFF.

(4) The Attach Operation is not required if program storage is already possible.

(5) When the disabled coil is not longer required, be sure to enable it so that it will operate normally.

6. Comments

When a network with coils is displayed, comments are displayed at the right of the coils. Also, network comments are displayed above the networks. Coil comments can be written and deleted.

A. Comment Operation on the Logic Screen

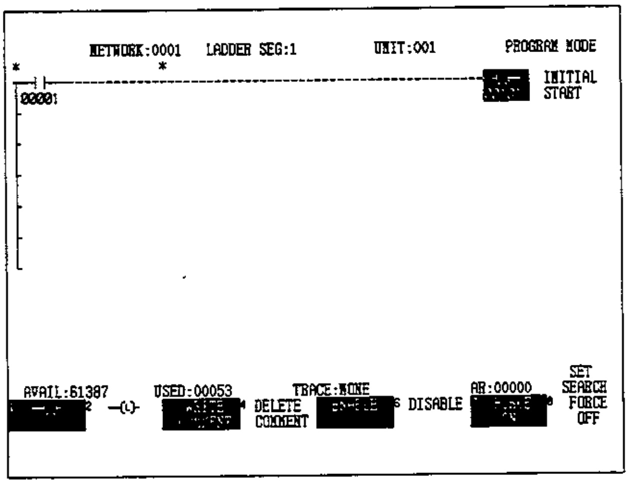

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00001
INITIAL
START
AVAIL:61387
USED:00053
TRACE:NONE
AR:00000
2
—(L)-
WRITE
COMMENT
4
DELETE
COMMENT
ENABLE
6
DISABLE
FORCE
ON
8
SET
SEARCH
FORCE
OFF

Figure 6.224

Use the following procedure to write and delete comments on the Logic Screen.

1) Perform the Attach Operation. (See Note (1))

2) Display a network with stored coils.

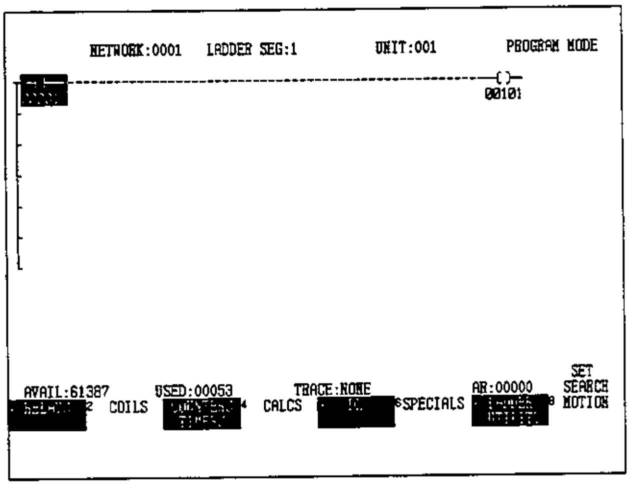

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00101
AVAIL:61387
USED:00053
TRACE:NONE
AR:00000
RELAYS
2
COILS
COUNTERS
TIMERS
4
CALCS
DX
6
SPECIALS
LADDER
OTHERS
8
SET
SEARCH
MOTION

Figure 6.225

3) Move the cursor to the location of a coil.

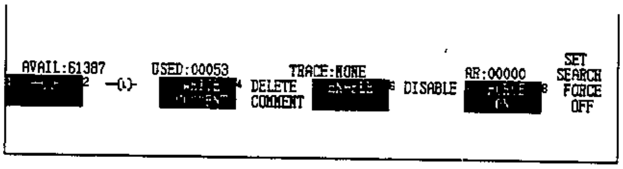

AVAIL:61387
USED:00053
TRACE:NONE
AR:00000
—(L)-
DELETE COMMENT
DISABLE
SET SEARCH
FORCE OFF

Figure 6.226

4) Select Write Comment.

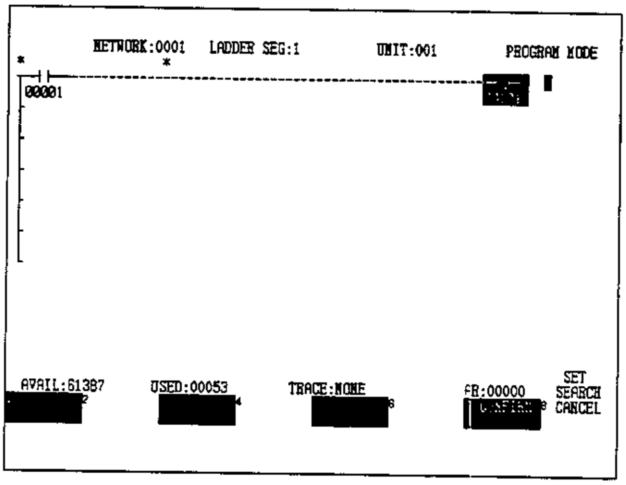

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00001
AVAIL:61387
USED:00053
TRACE:NONE
AR:00000
SET SEARCH
CANCEL

Figure 6.227

5) Enter the comment and select Confirm.

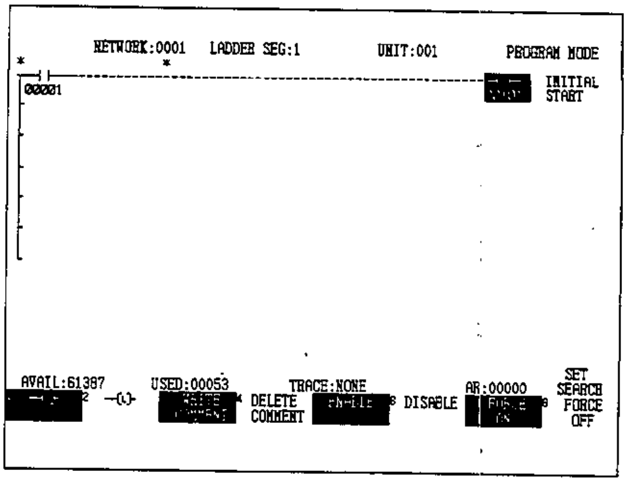

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00001
INITIAL START
AVAIL:61387
USED:00053
TRACE:NONE
AR:00000
—(L)-
DELETE COMMENT
DISABLE
SET SEARCH
FORCE OFF

Figure 6.228

6) Select Delete Comment.

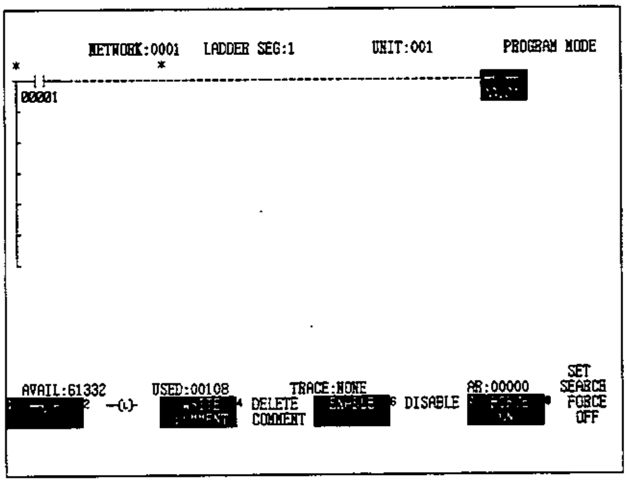

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00001
AVAIL:61332
USED:00108
TRACE:NONE
AR:00000
—(L)-
DELETE COMMENT
DISABLE
SET SEARCH FORCE OFF

Figure 6.229

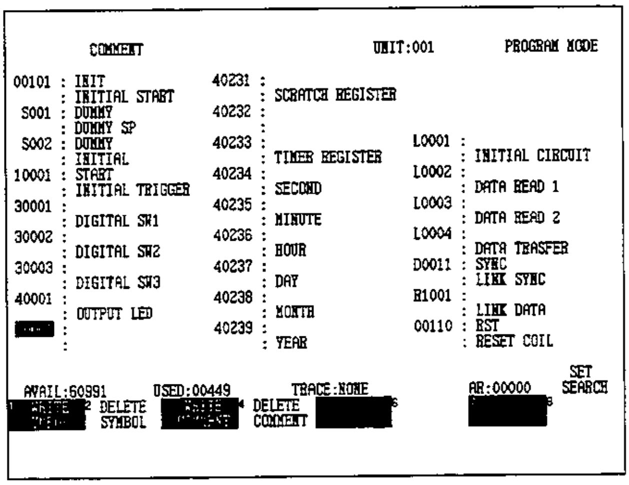
Note (1) The Attach Operation is not required when the PLC is already online.

(2) If Cancel is selected instead of Confirm when a comment has been input, the comment will not be stored and the screen will return to the display before the input was made.

(3) Coil comments are displayed on two rows.

B. Comments in the Expanded Comment Area

In the Expanded Comment Area, symbols and comments for coils, input relays, link relays, and steps can be displayed, written, and deleted. Comments for input registers, holding registers, link registers, and networks can also be displayed, written, and deleted. Up to 27 items (9 rows × 3 columns) can be displayed in the Expanded Comment Area.



```
        COMMENT                                   UNIT:001       PROGRAM MODE

00101 : INIT                40231 :
      : INITIAL START             : SCRATCH REGISTER
 S001 : DUMMY               40232 :
      : DUMMY SP                  :
 S002 : DUMMY               40233 :                  L0001 :
      : INITIAL                   : TIMER REGISTER         : INITIAL CIRCUIT
10001 : START               40234 :                  L0002 :
      : INITIAL TRIGGER           : SECOND                 : DATA READ 1
30001 :                     40235 :                  L0003 :
      : DIGITAL SW1               : MINUTE                 : DATA READ 2
30002 :                     40236 :                  L0004 :
      : DIGITAL SW2               : HOUR                   : DATA TRASFER
30003 :                     40237 :                  D0011 : SYNC
      : DIGITAL SW3               : DAY                    : LINK SYNC
40001 :                     40238 :                  R1001 :
      : OUTPUT LED                : MONTH                  : LINK DATA
      :                     40239 :                  00110 : RST
      :                           : YEAR                   : RESET COIL

  AVAIL:60991     USED:00449        TRACE:NONE              AR:00000     SET
                                                                        SEARCH
```

DELETE SYMBOL
DELETE COMMENT

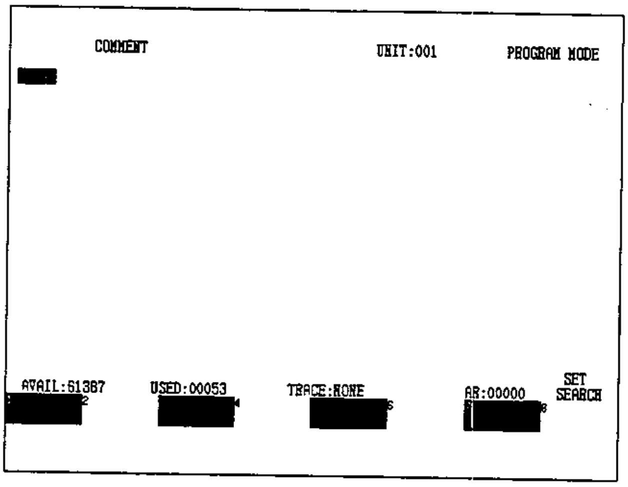
Figure 6.230

Use the following procedure to display, write, and delete comments in the Expanded Comment Area.

1) Perform the Attach Operation. (See Note (1))

2) Display a network.

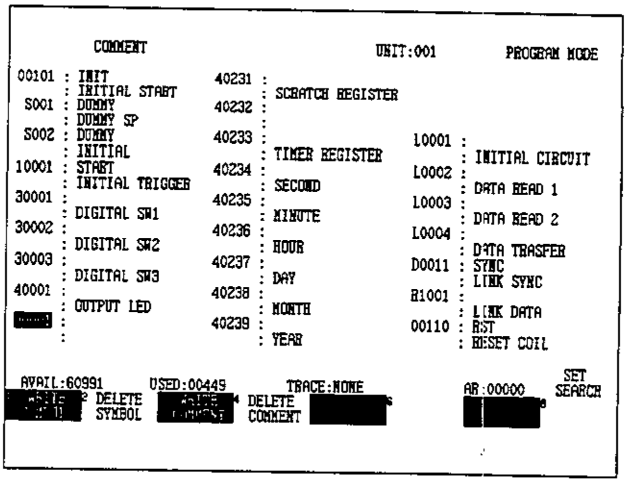
3) Press the Shift + Change Screen Keys.



```
         COMMENT                          UNIT:001          PROGRAM MODE

 AVAIL:61387     USED:00053      TRACE:NONE          AR:00000   SET
                                                                SEARCH
```

Figure 6.231

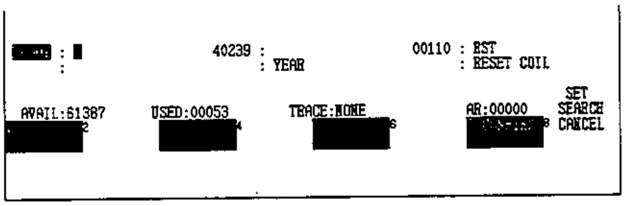
4) Enter the reference in the AR and press the Erase/Get Key. Repeat this operation to display another network.



```
         COMMENT                            UNIT:001          PROGRAM MODE
00101 : INIT                40231 :
      : INITIAL START             : SCRATCH REGISTER
 S001 : DUMMY               40232 :
      : DUMMY SP                  :
 S002 : DUMMY               40233 :                  L0001 :
      : INITIAL                   : TIMER REGISTER         : INITIAL CIRCUIT
10001 : START               40234 :                  L0002 :
      : INITIAL TRIGGER           : SECOND                 : DATA READ 1
30001 :                     40235 :                  L0003 :
      : DIGITAL SW1               : MINUTE                 : DATA READ 2
30002 :                     40236 :                  L0004 :
      : DIGITAL SW2               : HOUR                   : DATA TRASFER
30003 :                     40237 :                  D0011 : SYNC
      : DIGITAL SW3               : DAY                    : LINK SYNC
40001 :                     40238 :                  R1001 :
      : OUTPUT LED                : MONTH                  : LINK DATA
      :                     40239 :                  00110 : RST
      :                           : YEAR                   : RESET COIL

 AVAIL:60991     USED:00449       TRACE:NONE         AR:00000    SET
           DELETE           DELETE                               SEARCH
           SYMBOL           COMMENT
```

Figure 6.232

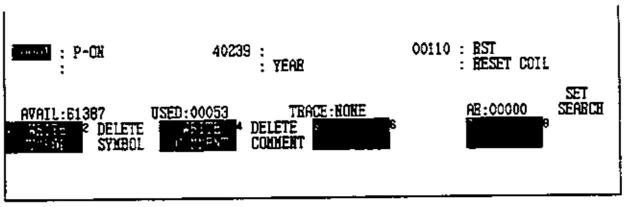
5) Move the cursor to the location of the relevant reference and select Write Symbol.



```
      :                  40239 :              00110 : RST
      :                        : YEAR               : RESET COIL
                                                                  SET
 AVAIL:61387     USED:00053     TRACE:NONE        AR:00000      SEARCH
                                                                CANCEL
```

Figure 6.233

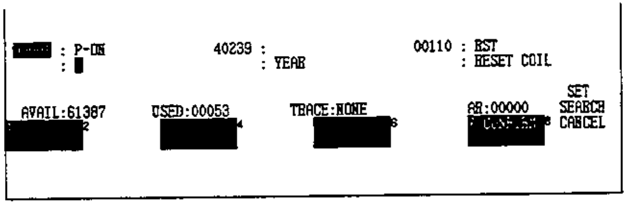
6) Enter the symbol and select Confirm.



```
      : P-ON             40239 :              00110 : RST
      :                        : YEAR               : RESET COIL
                                                                  SET
 AVAIL:61387     USED:00053     TRACE:NONE        AR:00000      SEARCH
          DELETE          DELETE
          SYMBOL          COMMENT
```

Figure 6.234

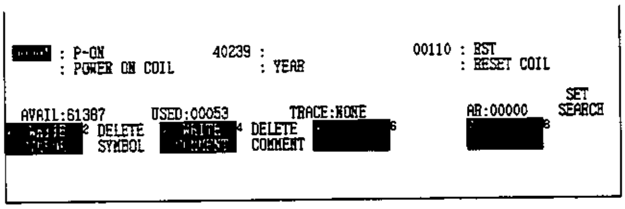
7) Select Write Comment.



```
      : P-ON             40239 :              00110 : RST
      :                        : YEAR               : RESET COIL
                                                                  SET
 AVAIL:61387     USED:00053     TRACE:NONE        AR:00000      SEARCH
                                                                CANCEL
```

Figure 6.235

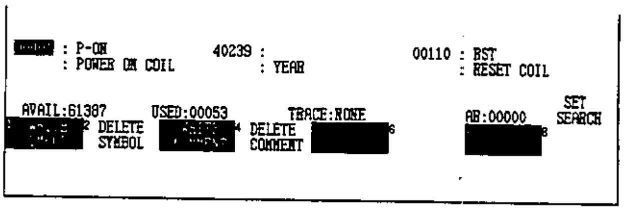
8) Input the comment and select Confirm.



```
      : P-ON             40239 :              00110 : RST
      : POWER ON COIL          : YEAR               : RESET COIL
                                                                  SET
 AVAIL:61387     USED:00053     TRACE:NONE        AR:00000      SEARCH
          DELETE          DELETE
          SYMBOL          COMMENT
```

Figure 6.236

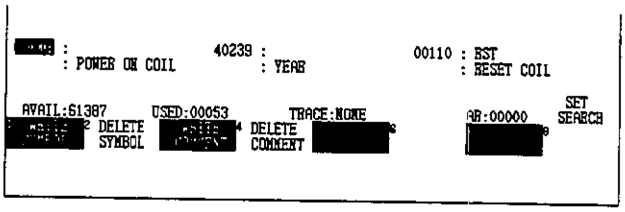
9) To delete the symbol or the comment, move the cursor to the reference.



```
      : P-ON            40239 :                00110 : BST
      : POWER ON COIL         : YEAR                 : RESET COIL

 AVAIL:61387     USED:00053      TRACE:NONE       AR:00000    SET
          2 DELETE        4 DELETE         6             8  SEARCH
            SYMBOL          COMMENT
```

Figure 6.237

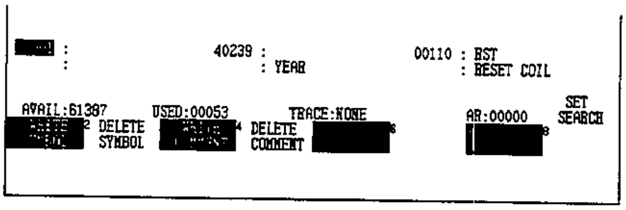
10) Select Delete Symbol.



```
      :                 40239 :                00110 : BST
      : POWER ON COIL         : YEAR                 : RESET COIL

 AVAIL:61387     USED:00053      TRACE:NONE       AR:00000    SET
          2 DELETE        4 DELETE         6             8  SEARCH
            SYMBOL          COMMENT
```

Figure 6.238

11) Select Delete Comment.



```
      :                 40239 :                00110 : BST
      :                       : YEAR                 : RESET COIL

 AVAIL:61387     USED:00053      TRACE:NONE       AR:00000    SET
          2 DELETE        4 DELETE         6             8  SEARCH
            SYMBOL          COMMENT
```

Figure 6.239

Note (1) The Attach Operation is not required when the PLC is already online.

(2) If Cancel is selected instead of Confirm after the comment has been input, the comment will not be stored and the screen will return to the display before the input was made.

(3) Continuous Display (e.g., Displaying Comments for a Series of Coils from 1 to 9)

Using the Page Down Key:
Move the cursor to the lowest level of the Expanded Comment Area, display the symbol and comments for coil 1 and then press the Page Down Key 8 times.

Using the Page Up Key:
Move the cursor to the highest level of the Expanded Comment Area, display the symbol and comments for coil 9 and then press the Page Up Key 8 times.

(4) The Write Symbol and Delete Symbol labels are not displayed for registers and networks.

(5) The Write Symbol, Delete Symbol, Write Comment, and Delete Comment labels are not displayed in Monitor Mode.

7. Checking Networks

A. Searching: Part 1

This operation searches for a network which uses a specified element and displays that network. Move the cursor to the location of the specified element. (10001 is used as an example). Three different types of elements can be specified.

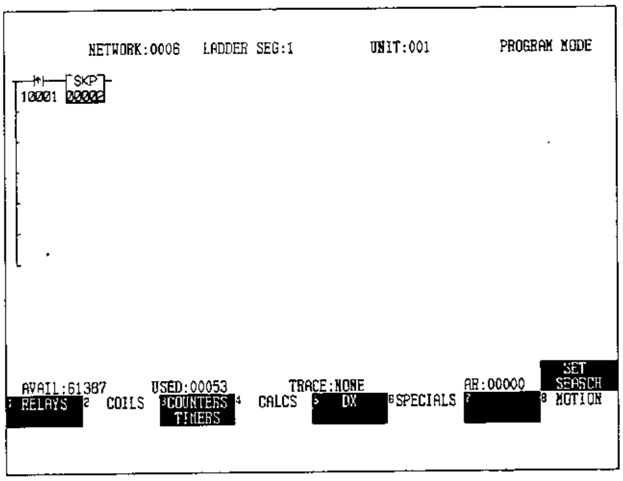
- Symbols (elements)
- Reference numbers
- Symbols and reference numbers together

Use the following procedure to search.

1) Perform the Attach Operation. (See Note (3))

2) Display a network.

3) Press the Cont/Search Key and move the cursor to the Set Search location.



NETWORK:0006 LADDER SEG:1 UNIT:001 PROGRAM MODE

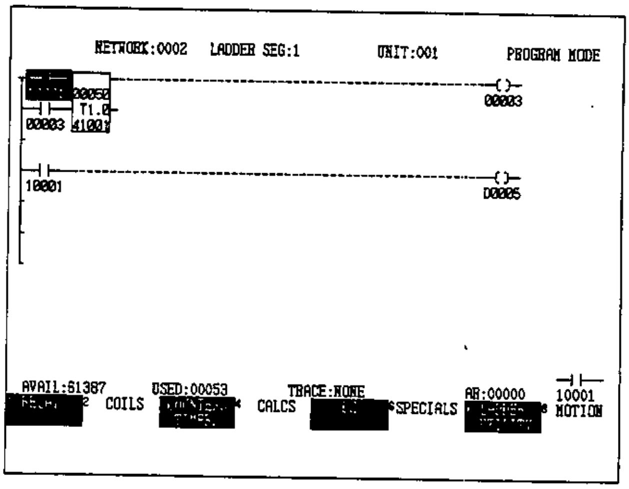
AVAIL:61387 USED:00053 TRACE:NONE AR:00000

Figure 6.240

4) Enter **10001** in the AR and press the Enter Key.

5) Press the ⊣↑⊢ Key.

6) Press the Cont/Search Key and the search begins, starting from network 1.


NETWORK:0002 LADDER SEG:1 UNIT:001 PROGRAM MODE

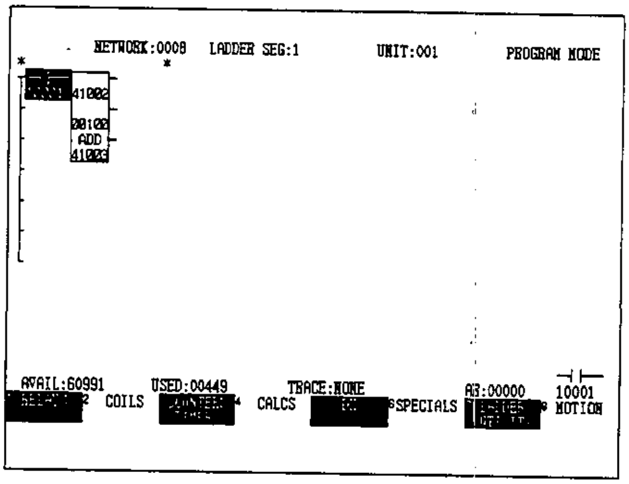
AVAIL:61387 USED:00053 TRACE:NONE AR:00000

00050
T1.0
41001
00003
00003
10001
D0005
2 COILS
4 CALCS
6 SPECIALS
8 MOTION
10001

Figure 6.241

7) Press the Cont/Search Key again if a further search is required.

When a search has been completed, the following screen will be displayed.

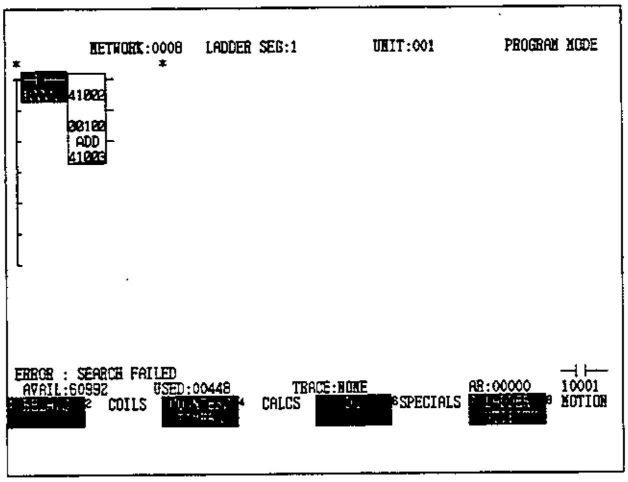

NETWORK:0008 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:60991 USED:00449 TRACE:NONE AR:00000

*
*
41002
00100
ADD
41003
2 COILS
4 CALCS
6 SPECIALS
8 MOTION
10001

Figure 6.242

When a search fails to find anything, the following screen will be displayed.



```
      NETWORK:0008   LADDER SEG:1          UNIT:001          PROGRAM MODE

ERROR : SEARCH FAILED
 AVAIL:60992       USED:00448        TRACE:NONE          AR:00000    10001
```

Figure 6.243

8) Press the Cont/Search Key.

9) Press the Shift + Erase/Get Keys.

The screen will return to Set Search.

Cases where Searching is Not Possible

- Searching for constants
- Searching for a destination-side reference used in a DIBT or DIBR element; or a source-side reference used in an SIBT or SIBR element
- Searching when specifying both a symbol in a 2-element or 3-element function as well as a reference number. (It is possible if the reference number is a lower-level reference.)

Note (1) A reference number that does not appear on the network screen can be searched for except in special circumstances.

(2) Steps 8) and 9) can be omitted because previous settings are deleted when new ones are made.

(3) The Attach Operation is not required if program storage or monitoring is already possible.

(4) If the label key used for selecting functions is not displayed when the cursor is at the Set Search location, press the Change Screen Key.

(5) When a symbol has been set first using a reference number, "All" will be displayed instead of the reference number. Also, after the symbol has been set, the reference number will change to "All" to enable the setting to be changed to the symbol of another function group. The following are some examples of setting search parameters.

Example 1: Disable/All
Searches for all coils and input relays that are in the disabled condition.
Example 2: 40084
Searches for Holding Register 40084.
Example 3: WRITALL
Searches for all WRIT elements.
Example 4: -(L)-/All
Searches for all latched coils.

(6) Press the Tab Key to move the cursor from Set Search to the logic area.

B. Searching: Part 2

This operation searches for disabled coils and input relays. It can be used to find coils and input relays where cancelling the disabled status has been forgotten and to re-enable them. Use the following procedure to conduct the search.

1) Move the cursor to the location of Set Search in the same was as in *A. Searching: Part 1* above.

2) Select Coil. If Coil is not displayed, press the Edit/Change node Key.

3) Select Disable.

4) Press the Cont/Search Key.

5) Press the Shift + Cont/Search Keys.

6) Repeat the above operation until the error message "No other coil disabled" is displayed.

Error Message	Meaning
Discrete 0XXX disabled (in use)	Coil 0XXXX is being used and it is disabled.
Discrete 0XXX disabled (not in use)	Coil 0XXXX is not being used and it is disabled.
Discrete 1XXXX disabled	Input relay 1XXXX is disabled.
Coil DXXXX disabled (in use)	Link coil DXXXX is being used and it is disabled.
Coil DXXXX disabled (not in use)	Link coil DXXXX is not being used and it is disabled.
No more disabled coils or input relays	There are no more coils, input relays, or link coils which have been disabled.

Note (1) This operation is essentially the same as A. Searching: Part 1 above.

(2) When the search has been completed, a message showing the status will be displayed and not the network.

(3) The display in the logic area, the reference area and the expansion reference area does not change.

(4) The following shows how the labels for function selection are displayed.

Display of Labels for Function Selection for Search Use

	1 Relay	2 Coil	3 Counter Timer	4 Calculation	5 Data Transfer Matrix	6 Specials	7 Ladder Utility	8 Motion
1 Relay	1 ┤├	2 ┤/├	3 ┤↑├	4 ┤↓├	5 —	6	7 I	8 :
2 Coil	1 { }	2 {L}	3	4	5 Enable	6 Disable	7 Force On	8 Force Off
3 Counter Timer	1 UCTR	2 DCTR	3 T1.0	4 T0.1	5 T0.1	6	7	8 :
4 Calculation	1 ADD	2 SUB	3 MUL	4 DIV	5 SQRT	6	7	8 Next Menu
	1 SADD	2 SSUB	3 SMUL	4 SDIV	5	6	7 Previous Menu	8 Next Menu
	1 DADD	2 DSUB	3 DMUL	4 DDIV	5 DSQR	6	7 Previous Menu	8 Next Menu
	1 SDAD	2 SDSB	3	4	5	6	7 Previous Menu	8
5 Data Transfer Matrix	1 R→T	2 T→R	3 T→T	4 BLKM	5 FIN	6 FOUT	7	8 Next Menu
	1 SRCH	2 STAT	3 DIET	4 DIBR	5 SIBT	6 SIBR	7 Previous Menu	8 Next Menu
	1 AND	2 OR	3 CMPR	4 SENS	5 MBIT	6 COMP	7 Previous Menu	8 Next Menu
	1 XOR	2 BROT	3 MROT	4 TWST	5 READ	6 WRIT	7 Previous Menu	8 Next Menu
	1 BIN	2 BCD	3	4 COMM	5	6	7 Previous Menu	8 Next Menu
	1 FRED	2 FWRT	3 SIN	4 COS	5 SWAP	6 SORT	7 Previous Menu	8 Next Menu
	1 BCNT	2 TSET	3 BYLS	4 BYCM	5 BADD	6	7 Previous Menu	8 Next Menu
	1 MBUS	2 PEER	3 BROD	4 BOOK	5 POLL	6 DIAG	7 Previous Menu	8 Next Menu
	1 SND	2 RCV	3	4	5	6	7 Previous Menu	8
6 Specials	1 SKP	2	3 GOSUB	4	5	6	7	8
8 Motion	1 MOVI	2 MVIS	3 MOVM	4 MOVL	5 MVLS	6 ZRN	7	8 Next Menu
	1 JOG	2 HNDL	3 MON	4 POS	5 PRM	6 VAR	7 Previous Menu	8 Next Menu
	1 ARES	2 SVON	3 ADJ	4	5	6	7 Previous Menu	8

C. Tracing and Retracing

When tracing a particular contact (0XXXX) displayed on the screen, it is possible to display the network containing that contact including corresponding coils. By specifying and tracing that contact point in the network, one contact point after another can be specified. and the corresponding coils tracked down.

After the trace is completed, retracing can be performed to display the networks in the opposite order. If a trace is carried out for specific input relays or registers displayed on the screen, the condition of the reference specified in the reference area will be displayed and no further trace can be performed. (The condition of the specified reference can be seen if the cursor is placed in the logic area). Use the following procedures to conduct the trace and retrace operations.

1) Perform the Attach Operation. (See Note (2))

2) Display the target network.

3) Move the cursor to the location of the contact to be traced.

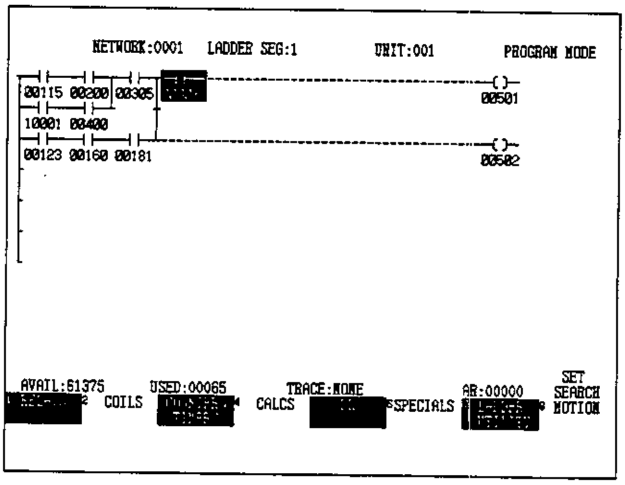
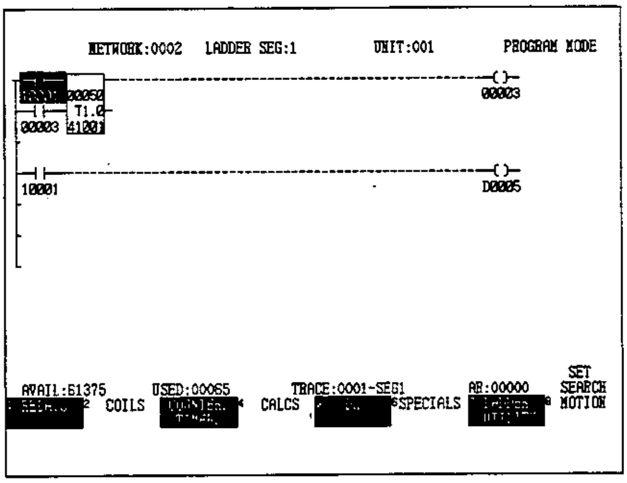

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
00115
00200
00305
00501
10001
00400
00123
00160
00181
00502
AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET SEARCH MOTION

Figure 6.244

4) Press the Trace/Retrace Key.

5) The network number displayed before the trace was performed, 0001–SEG1, will be displayed.



```
NETWORK:0002   LADDER SEG:1          UNIT:001          PROGRAM MODE

AVAIL:61375     USED:00065          TRACE:0001-SEG1          AR:00000
```

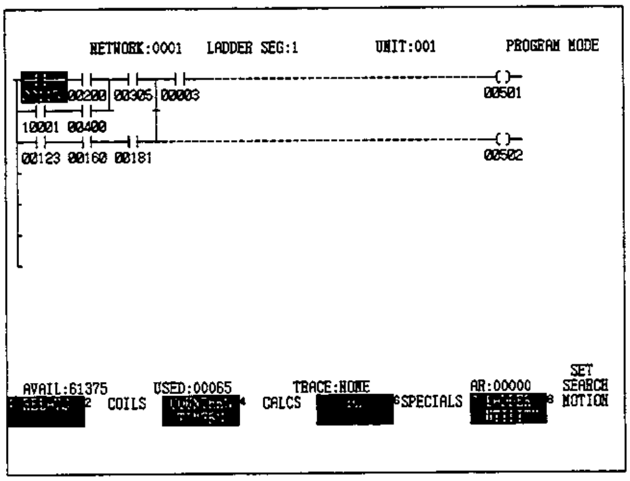
00050
T1.0
00003
41001
00003
10001
D0005
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.245

6) Continue the trace operation.

7) Press the Shift + Retrace/Trace Keys.

The last retrace is carried out. When the message “Trace: None” will be displayed, meaning that it is not possible to retrace any more.



```
NETWORK:0001   LADDER SEG:1          UNIT:001          PROGRAM MODE

AVAIL:61375     USED:00065          TRACE:NONE          AR:00000
```

00200
00305
00003
00501
10001
00400
00123
00160
00181
00502
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.246

Note (1) Contacts (0XXXX) of coils used in Data Transfer elements cannot be traced.

(2) The Attach Operation is not required if program storage or monitoring is already possible.

8. Scan Control

A. Constant Sweep

This function regulates the scan time by setting a target value for the scan time of the GL60S, GL60H, or GL70H PLCs. By regulating the scan time, it is possible to reduce inconsistencies in simple positioning control times and other operations (with, for example, a target sweep of 50 ms). Use the following procedure to perform a constant sweep.

1) Perform the Attach Operation. (See Note (4))

2) Display a network.

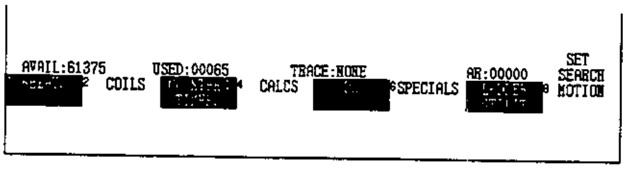

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
MOTION
2
COILS
4
CALCS
6
SPECIALS
8

Figure 6.247

3) Select Ladder Utility.

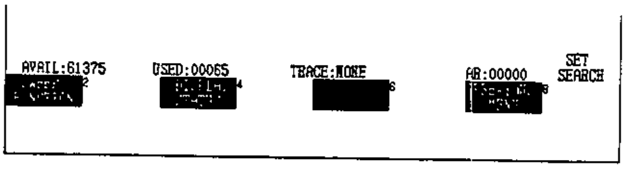

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
2
4
6
8

Figure 6.248

4) Select Sweep Function.

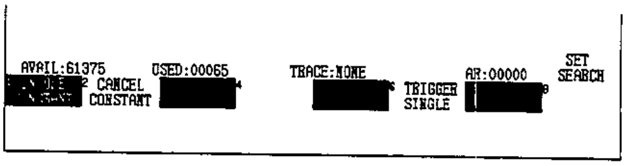

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
2
CANCEL
CONSTANT
4
6
TRIGGER
SINGLE
8

Figure 6.249

5) Select Invoke Constant.

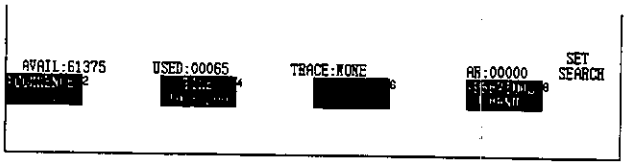

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
2
4
6
8

Figure 6.250

6) Enter "50" in the AR and select Time 10 – 200.

7) Select Confirm. The message "Executing Constant Sweep" will appear in the Message Area.

8) Press the Edit/Change Node Key. The labels for function selection will be displayed.

Note (1) Make the target value more than the actual scan time, choosing a value between 10 ms and 200 ms, in increments of 10 ms.

(2) If the target value is made less than the actual scan time, it will be ignored.

(3) The constant sweep function uses the following two registers.
49998 .... Target value setting
49999 .... Time used for processing actual scan (units are ms and the time is updated every 10 ms).
When the constant sweep function is not being used, the above registers can be used for another purpose.

(4) The Attach Operation is not required if program storage is already possible.

(5) If the labels for function selection are not displayed, press the Edit/Change Node Key.

(6) Do not use holding registers 49998 and 49999 for any other purpose when a constant sweep is being used.

(7) Even if a value above 200 is set in holding register 49998 for a constant sweep, it will be treated as 200.

(8) To cancel the constant sweep, select Cancel Constant Sweep.

(9) If detailed scan times are required, create a ladder circuit to measure scan times.

B. Single Sweep

This function solves a network for a single scan. Use it to simulate network operation and logic. Use the following procedure to perform a single sweep.

1) Perform the Attach Operation. (See Note (4))

2) Press the Supervisory Key.

3) Stop the GL60S, GL60H, or GL70H.

4) Select Program.

5) Select Ladder.

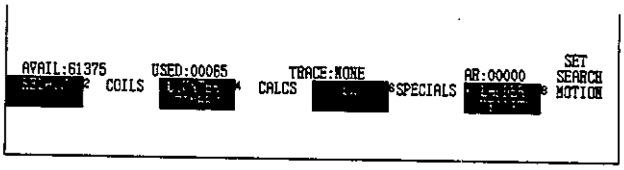

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
MOTION
2
COILS
4
CALCS
6
SPECIALS
8

Figure 6.251

6) Select Ladder Utility.

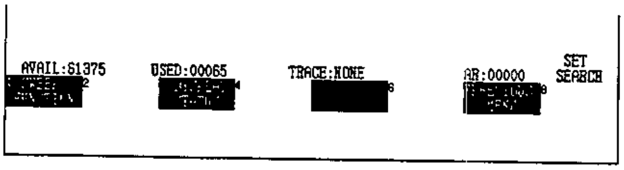

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
2
4
6
8

Figure 6.252

7) Select Sweep Function.

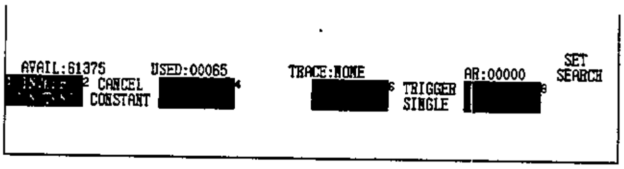

AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
SET
SEARCH
2
CANCEL
CONSTANT
4
6
TRIGGER
SINGLE
8

Figure 6.253

8) Select Trigger Single. The message "Executing Single Sweep" will appear in the Message Area.

9) Thereafter, select Trigger Single the required number of times. The message "Executing Single Sweep" will appear in the Message Area each time.

10) Press the Edit/Change Node Key. The labels for function selection will be displayed.

Note (1) Stop the GL60S, GL60H, or GL70H before executing a single sweep.

(2) The I/O Modules will not be serviced. (Disabling input relays and other preparations may be necessary when actually running a simulation).

(3) When conducting a single sweep, it is recommended to display in advance the reference or network to be viewed in the logic area or reference area.

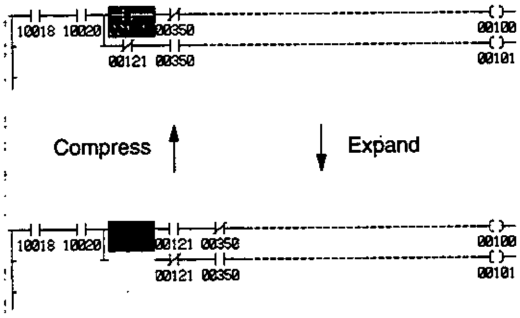
(4) The Attach Operation is not required if program storage is already possible.

(5) If the labels for function selection are not displayed, press the Edit/Change Node Key.

9. Network Editing

A. Editing Networks: Part 1

This function involves expanding and compressing horizontally. It is useful when modifying column units.


10018
10020
00350
00100
00121
00350
00101
Compress
Expand
10018
10020
00121
00350
00100
00121
00350
00101

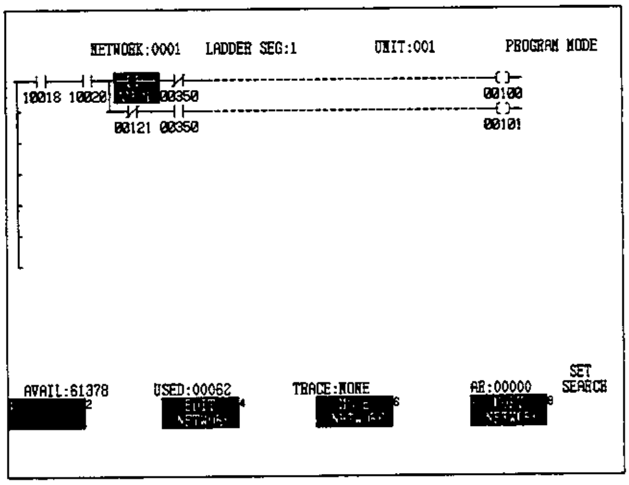
Use the following procedure for horizontal network editing.

1) Perform the Attach Operation. (See Note (1))

2) Display the network to be modified.

3) Move the cursor to the column where an element is to be added.

4) Press the Shift + Edit/Change Node Keys.



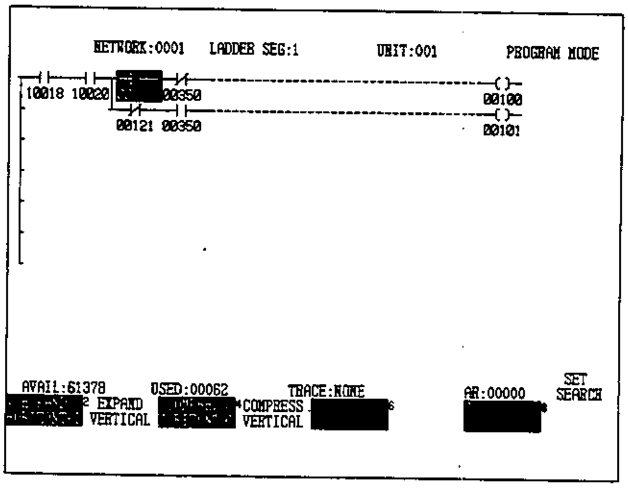
NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61378 USED:00062 TRACE:NONE AR:00000 SET SEARCH

10018
10020
00350
00100
00121
00350
00101
2
4
6
8

Figure 6.254

5) Select Edit Network.

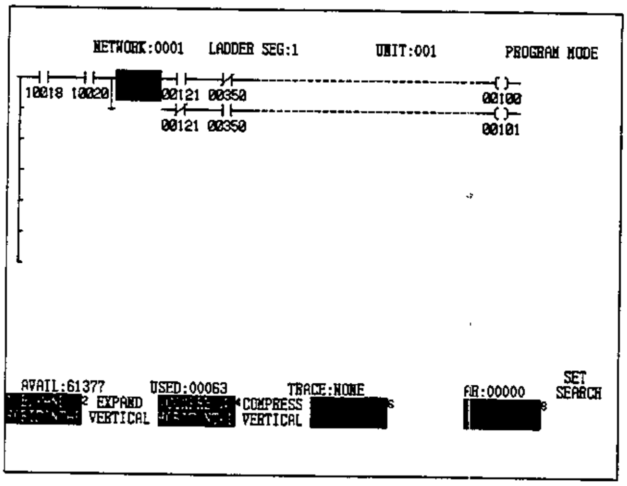


```
NETWORK:0001   LADDER SEG:1          UNIT:001         PROGRAM MODE
AVAIL:61378        USED:00062        TRACE:NONE            AR:00000
```

10018
10020
00350
00121
00350
00100
00101
EXPAND VERTICAL
COMPRESS VERTICAL
SET SEARCH

Figure 6.255

6) Select Expand Horizontal.



```
NETWORK:0001   LADDER SEG:1          UNIT:001         PROGRAM MODE
AVAIL:61377        USED:00063        TRACE:NONE            AR:00000
```

10018
10020
00121
00350
00121
00350
00100
00101
EXPAND VERTICAL
COMPRESS VERTICAL
SET SEARCH

Figure 6.256

7) Select Compress Horizontal.

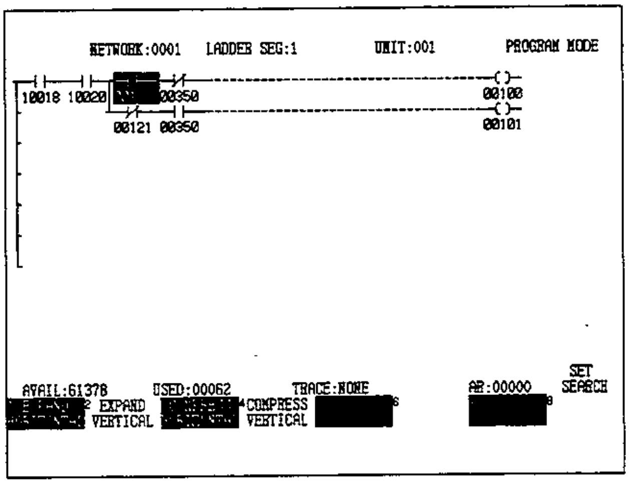

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00350
00100
00121
00350
00101
AVAIL:61378
USED:00062
TRACE:NONE
AR:00000
SET
SEARCH
2 EXPAND
VERTICAL
4 COMPRESS
VERTICAL
6
8

Figure 6.257

8) Select Expand Horizontal.

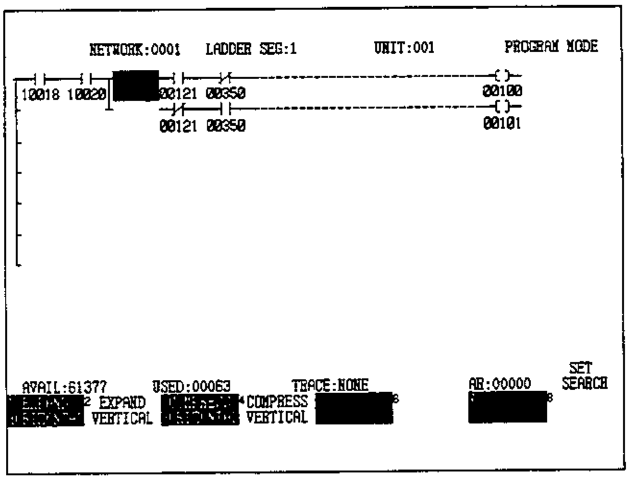

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00121
00350
00100
00121
00350
00101
AVAIL:61377
USED:00063
TRACE:NONE
AR:00000
SET
SEARCH
2 EXPAND
VERTICAL
4 COMPRESS
VERTICAL
6
8

Figure 6.258

9) Press the Print/Change Node Key.

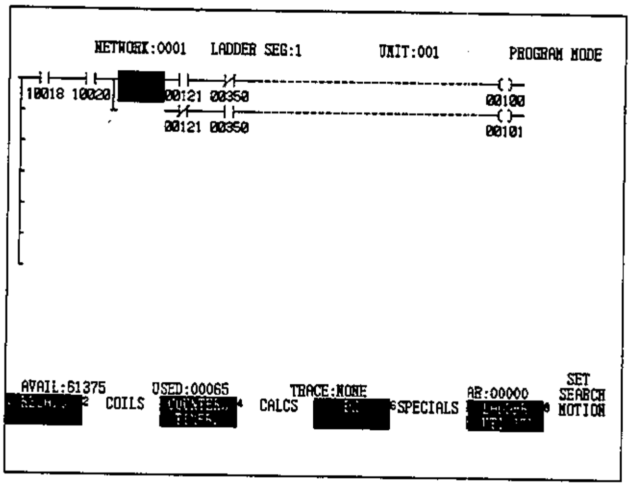

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00121
00350
00100
00121
00350
00101
AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.259

10) Add the target circuit.

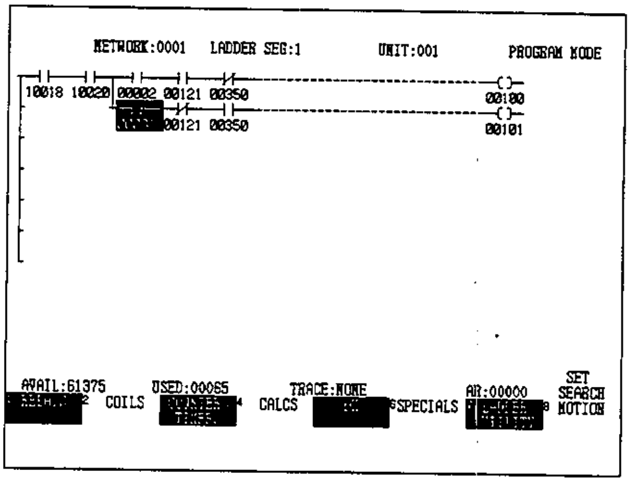

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00002
00121
00350
00100
00121
00350
00101
AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.260

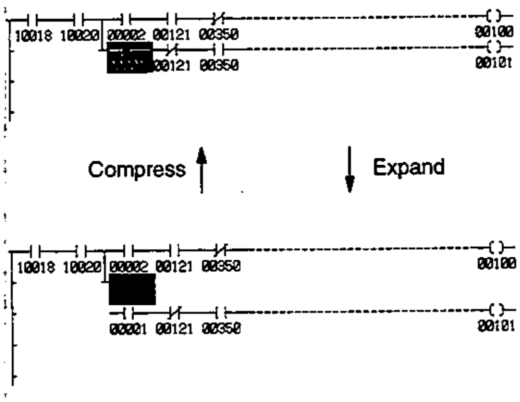
Note (1) The Attach Operation is not required if program storage is already possible.

(2) The amount of memory used increases with horizontal expansion and reduces with horizontal compression.

(3) To return to the labels for function selection, press the Edit/Change Node.

B. Editing Networks: Part 2

This function involves expanding and compressing vertically. It is useful when modifying line units.


10018 10020 00002 00121 00350
00100
00121 00350
00101
Compress
Expand
10018 10020 00002 00121 00350
00100
00001 00121 00350
00101

Use the following procedure for vertical network editing.

1) Perform the Attach Operation. (See Note (1))

2) Display the network to be modified.

3) Move the cursor to the row where an element is to be added.

4) Press the Shift + Edit/Change Node Keys.

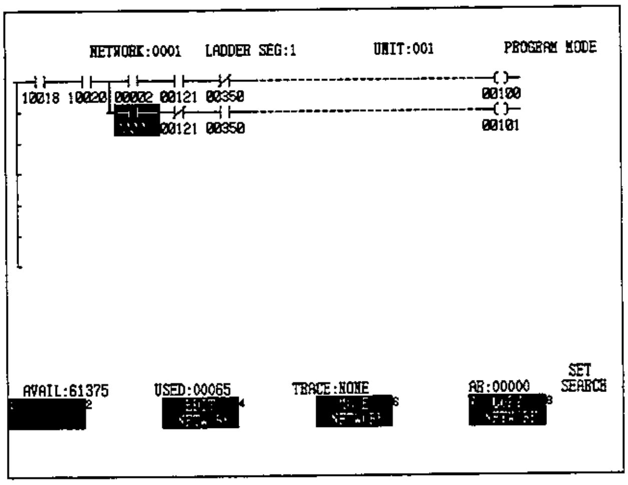

NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE
10018 10020 00002 00121 00350
00100
00121 00350
00101
AVAIL:61375
USED:00065
TRACE:NONE
AB:00000
SET SEARCH

Figure 6.261

5) Select Edit Network.

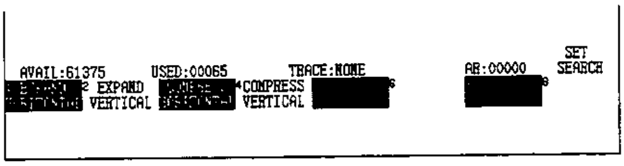

AVAIL:61375
USED:00065
TRACE:NONE
AB:00000
SET SEARCH
EXPAND VERTICAL
COMPRESS VERTICAL

Figure 6.262

6) Select Expand Vertical.

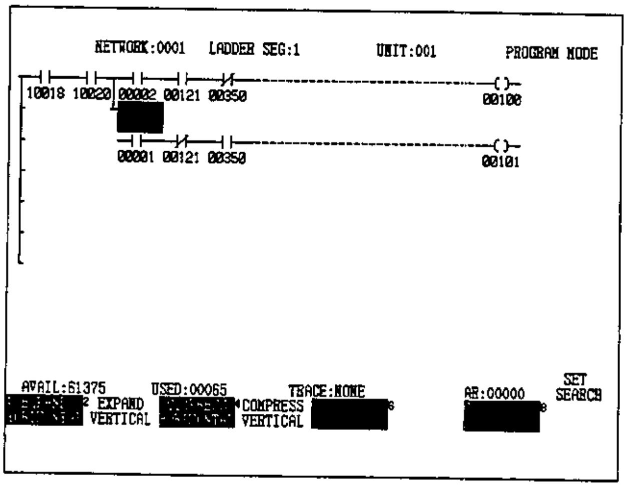

NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE
10018 10020 00002 00121 00350
00100
00001 00121 00350
00101
AVAIL:61375 USED:00065 TRACE:NONE
EXPAND VERTICAL
COMPRESS VERTICAL
AR:00000
SET SEARCH

Figure 6.263

7) Select Compress Vertical.

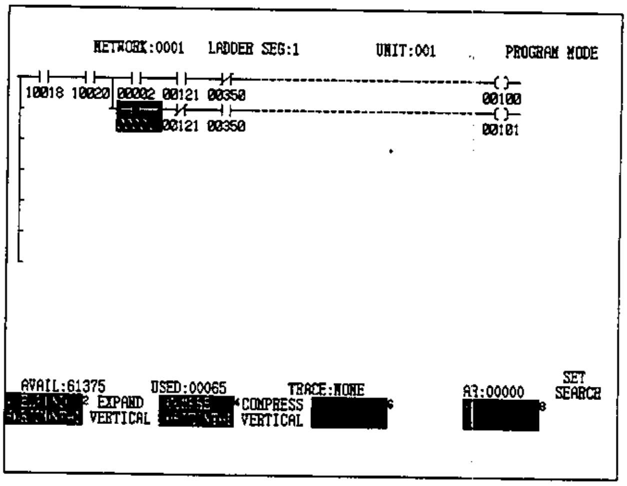

NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE
10018 10020 00002 00121 00350
00100
00121 00350
00101
AVAIL:61375 USED:00065 TRACE:NONE
EXPAND VERTICAL
COMPRESS VERTICAL
AR:00000
SET SEARCH

Figure 6.264

8) Select Expand Vertical.

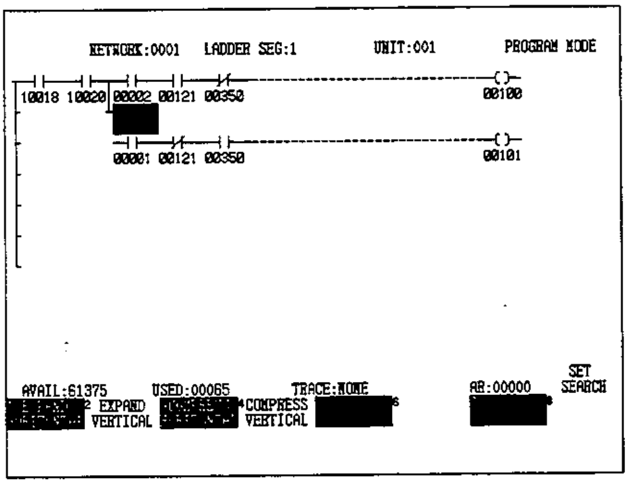

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00002
00121
00350
00100
00001
00121
00350
00101
AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
2 EXPAND VERTICAL
4 COMPRESS VERTICAL
6
8
SET SEARCH

Figure 6.265

9) Press the Print/Change Node Key.

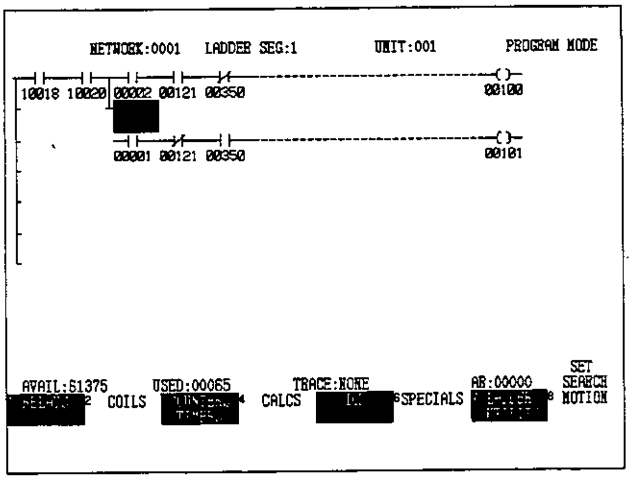

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00002
00121
00350
00100
00001
00121
00350
00101
AVAIL:61375
USED:00065
TRACE:NONE
AR:00000
2 COILS
4 CALCS
6 SPECIALS
8 MOTION
SET SEARCH

Figure 6.266

10) Add the target circuit.

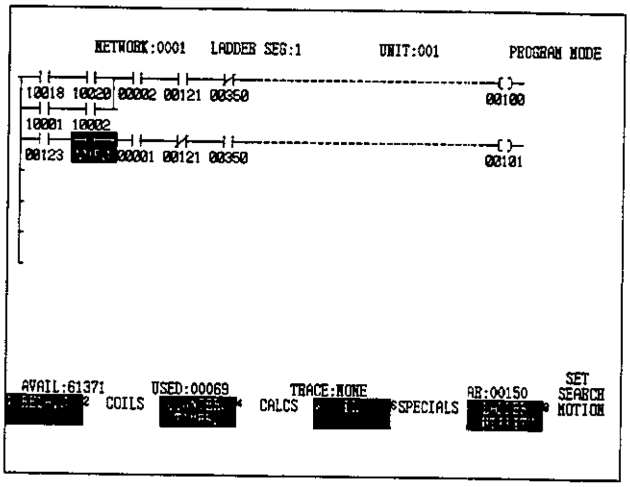

NETWORK:0001
LADDER SEG:1
UNIT:001
PROGRAM MODE
10018
10020
00002
00121
00350
00100
10001
10002
00123
00001
00121
00350
00101
AVAIL:61371
USED:00069
TRACE:NONE
AR:00150
COILS
CALCS
SPECIALS
SET
SEARCH
MOTION

Figure 6.267

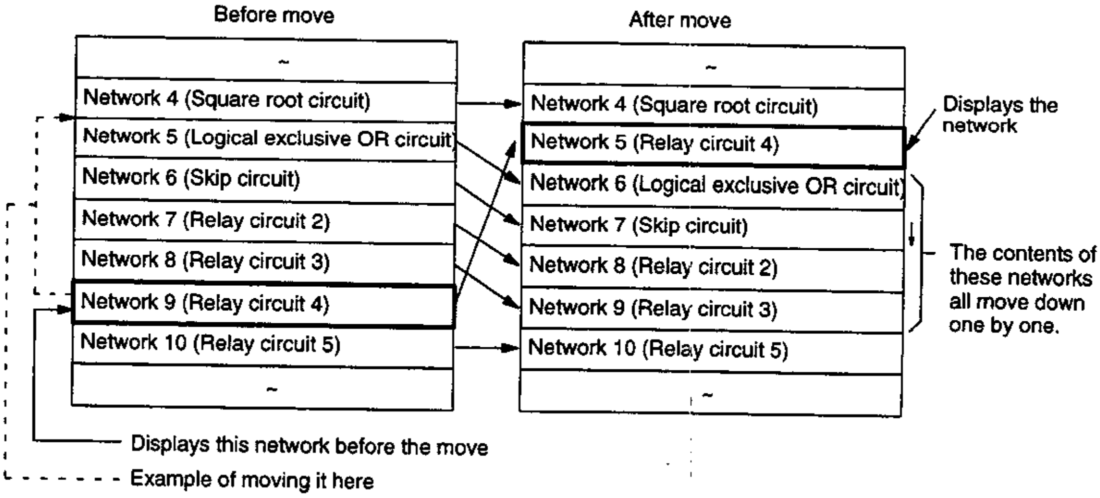
Note (1) The Attach Operation is not required if program storage is already possible.

(2) The amount of memory used does not change with vertical expansion or compression.

(3) To return to the labels for function selection, press the Edit/Change Node.

C. Moving a Network: Part 1

This is an example of moving the contents from the current network number to a smaller network number.


Before move
~
Network 4 (Square root circuit)
Network 5 (Logical exclusive OR circuit)
Network 6 (Skip circuit)
Network 7 (Relay circuit 2)
Network 8 (Relay circuit 3)
Network 9 (Relay circuit 4)
Network 10 (Relay circuit 5)
~
After move
~
Network 4 (Square root circuit)
Network 5 (Relay circuit 4)
Network 6 (Logical exclusive OR circuit)
Network 7 (Skip circuit)
Network 8 (Relay circuit 2)
Network 9 (Relay circuit 3)
Network 10 (Relay circuit 5)
~
Displays the network
The contents of these networks all move down one by one.
Displays this network before the move
Example of moving it here

Use the following procedure to move the network.

1) Perform the Attach Operation. (See Note (3))

2) Press the Supervisory Key.

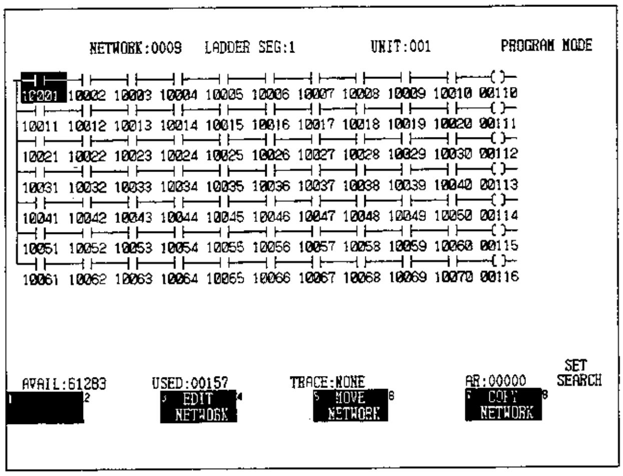
3) Stop the GL60S, GL60H, or GL70H.

4) Select Program.

5) Select Ladder.

6) Display the network to be moved.

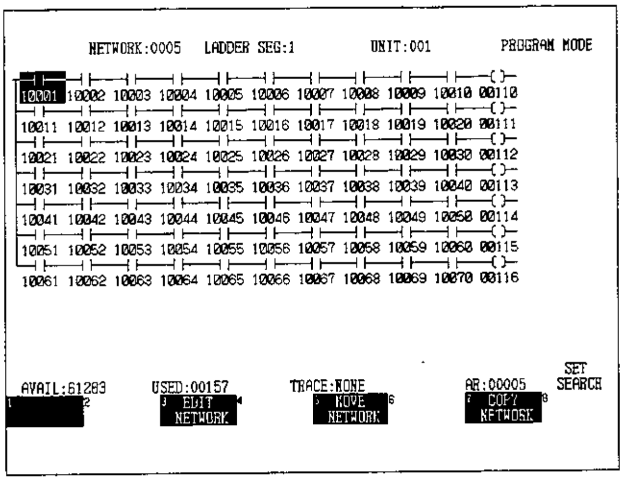
7) Press the Shift + Edit/Change Node Keys.



```
      NETWORK:0009   LADDER SEG:1          UNIT:001         PROGRAM MODE

10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 00110
10011 10012 10013 10014 10015 10016 10017 10018 10019 10020 00111
10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 00112
10031 10032 10033 10034 10035 10036 10037 10038 10039 10040 00113
10041 10042 10043 10044 10045 10046 10047 10048 10049 10050 00114
10051 10052 10053 10054 10055 10056 10057 10058 10059 10060 00115
10061 10062 10063 10064 10065 10066 10067 10068 10069 10070 00116

                                                                    SET
AVAIL:61283      USED:00157       TRACE:NONE            AR:00000  SEARCH
1          2    3  EDIT    4     5  MOVE    6       7  COPY    8
                  NETWORK           NETWORK            NETWORK
```

Figure 6.268

8) To move a network after network **4**, enter **5** in the AR and select Move Network. (The only thing to change on the screen is the network number)



```
      NETWORK:0005   LADDER SEG:1          UNIT:001         PROGRAM MODE

10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 00110
10011 10012 10013 10014 10015 10016 10017 10018 10019 10020 00111
10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 00112
10031 10032 10033 10034 10035 10036 10037 10038 10039 10040 00113
10041 10042 10043 10044 10045 10046 10047 10048 10049 10050 00114
10051 10052 10053 10054 10055 10056 10057 10058 10059 10060 00115
10061 10062 10063 10064 10065 10066 10067 10068 10069 10070 00116

                                                                    SET
AVAIL:61283      USED:00157       TRACE:NONE            AR:00005  SEARCH
1          2    3  EDIT    4     5  MOVE    6       7  COPY    8
                  NETWORK           NETWORK            NETWORK
```

Figure 6.269

9) Press the Edit/Change Node Key and the labels for function selection are displayed.

Note (1) To move to the next position after network N, enter N+1 in the AR.

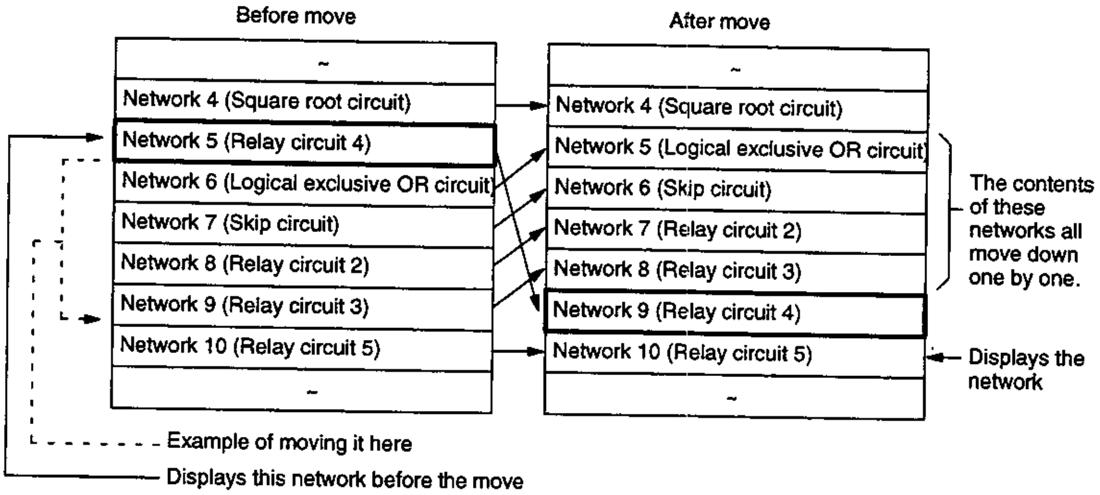
(2) Make sure the GL60S, GL60H, or GL70H is stopped.

(3) The Attach Operation is not required when the PLC is already online.

(4) To display the labels for function selection without selecting Move Network, press the Edit/Change Node Key.

D. Moving a Network: Part 2

This is an example of moving the contents from the current network number to a larger network number.


Before move
After move
~
Network 4 (Square root circuit)
Network 5 (Relay circuit 4)
Network 6 (Logical exclusive OR circuit)
Network 7 (Skip circuit)
Network 8 (Relay circuit 2)
Network 9 (Relay circuit 3)
Network 10 (Relay circuit 5)
~
~
Network 4 (Square root circuit)
Network 5 (Logical exclusive OR circuit)
Network 6 (Skip circuit)
Network 7 (Relay circuit 2)
Network 8 (Relay circuit 3)
Network 9 (Relay circuit 4)
Network 10 (Relay circuit 5)
~
The contents of these networks all move down one by one.
Displays the network
Example of moving it here
Displays this network before the move

Use the following procedure to move the network.

1) Perform the Attach Operation. (Note (3))

2) Press the Supervisory Key.

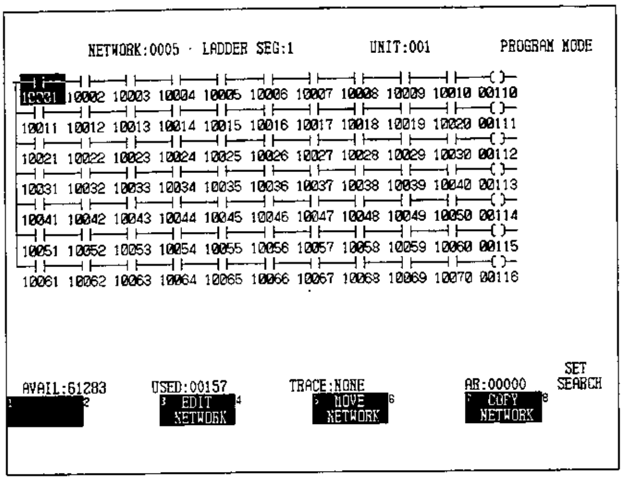
3) Stop the GL60S, GL60H, or GL70H.

4) Select Program.

5) Select Ladder.

6) Display the network to be moved.

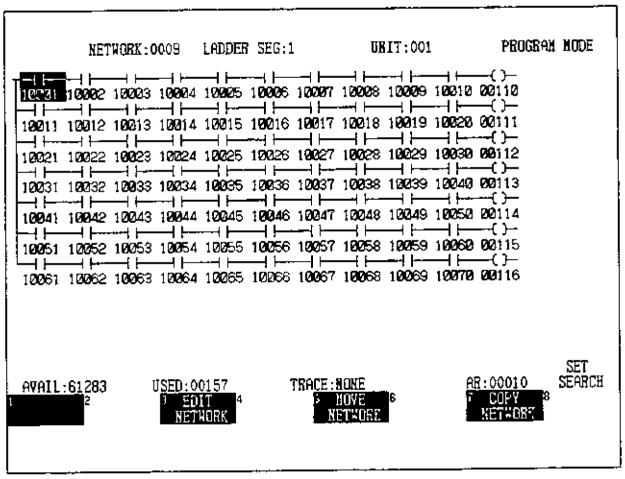
7) Press the Shift + Edit/Change Node Keys.



```
NETWORK:0005 · LADDER SEG:1          UNIT:001          PROGRAM MODE

10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 00110
10011 10012 10013 10014 10015 10016 10017 10018 10019 10020 00111
10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 00112
10031 10032 10033 10034 10035 10036 10037 10038 10039 10040 00113
10041 10042 10043 10044 10045 10046 10047 10048 10049 10050 00114
10051 10052 10053 10054 10055 10056 10057 10058 10059 10060 00115
10061 10062 10063 10064 10065 10066 10067 10068 10069 10070 00116

                                                               SET
AVAIL:61283      USED:00157      TRACE:NONE       AR:00000    SEARCH
```

Figure 6.270

8) To move a network after network 4, enter **5** in the AR and select Move Network. (The only thing to change on the screen is the network number)



```
NETWORK:0009   LADDER SEG:1          UNIT:001          PROGRAM MODE

10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 00110
10011 10012 10013 10014 10015 10016 10017 10018 10019 10020 00111
10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 00112
10031 10032 10033 10034 10035 10036 10037 10038 10039 10040 00113
10041 10042 10043 10044 10045 10046 10047 10048 10049 10050 00114
10051 10052 10053 10054 10055 10056 10057 10058 10059 10060 00115
10061 10062 10063 10064 10065 10066 10067 10068 10069 10070 00116

                                                               SET
AVAIL:61283      USED:00157      TRACE:NONE       AR:00010    SEARCH
```

Figure 6.271

9) Press the Edit/Change Node Key.

Note (1) To move to the next position after network N, enter N+1 in the AR.

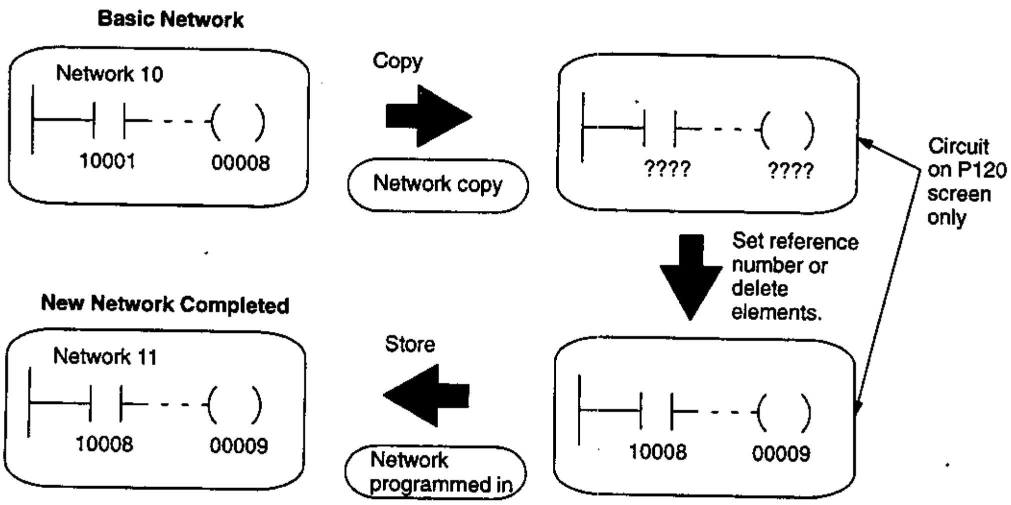
(2) Make sure the GL60S, GL60H, or GL70H is stopped.

(3) The Attach Operation is not required when the PLC is already online.

(4) To display the labels for function selection without selecting Move Network, press the Edit/Change Node Key.

E. Copying Networks

It is simple to use a network already programmed into the memory of a GL60S, GL60H, or GL70H to create another network with a similar circuit pattern.

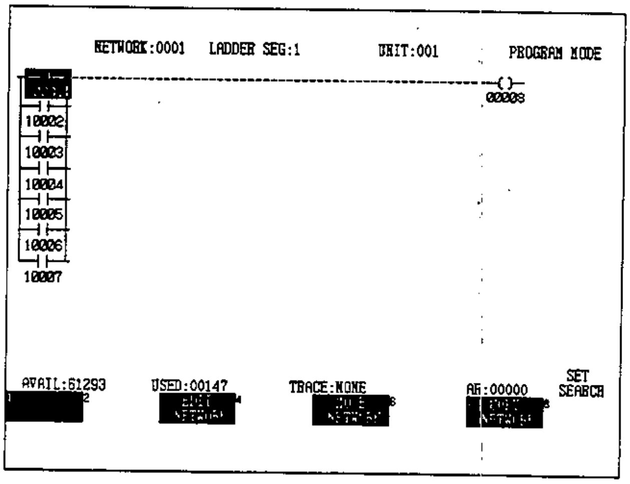

Basic Network
Network 10
10001
00008
Copy
Network copy
????
????
Circuit on P120 screen only
Set reference number or delete elements.
New Network Completed
Network 11
10008
00009
Store
Network programmed in
10008
00009

Use the following procedure to copy a network.

1) Perform the Attach Operation. (Note (4))

2) Display the network to be used as a basis.

3) Press the Shift + Edit/Change Node Keys.


NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61293 USED:00147 TRACE:NONE AR:00000

00008
10002
10003
10004
10005
10006
10007
SET SEARCH

Figure 6.272

4) Select Copy Network and the screen can be copied.

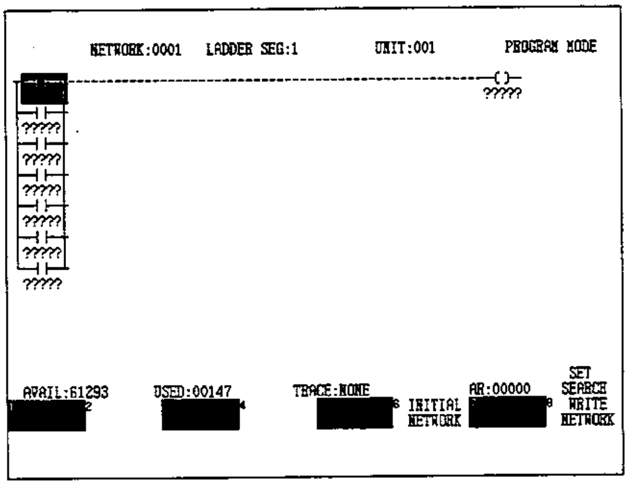

NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE
?????
?????
?????
?????
?????
?????
?????
AVAIL:61293
USED:00147
TRACE:NONE
INITIAL NETWORK
AR:00000
SET SEARCH WRITE NETWORK

Figure 6.273

5) Enter the reference number in the AR, move the cursor to the target location and press the Enter Key. Continue this operation until the ????? are gone.

6) To return to the screen immediately after the screen was copied (when all the references were ?????), select Initial Network.

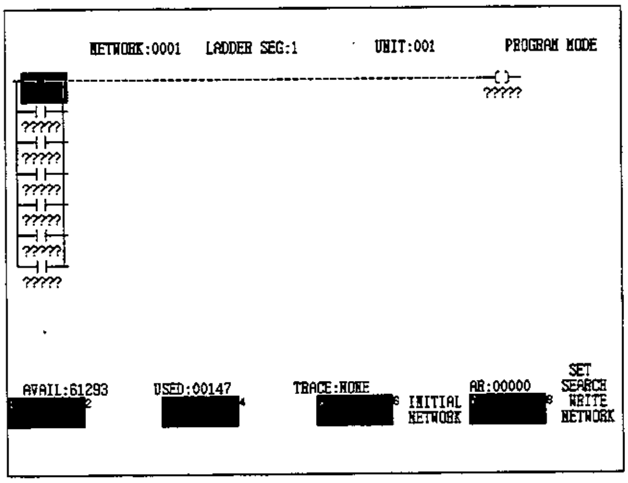
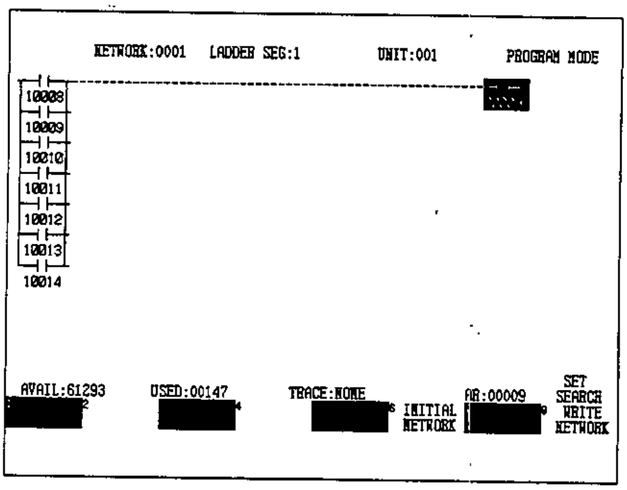

NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE
?????
?????
?????
?????
?????
?????
?????
AVAIL:61293
USED:00147
TRACE:NONE
INITIAL NETWORK
AR:00000
SET SEARCH WRITE NETWORK

Figure 6.274

7) Enter the reference number in the AR, move the cursor to the target location, and press the Enter Key. Continue this operation until the ????? are gone.



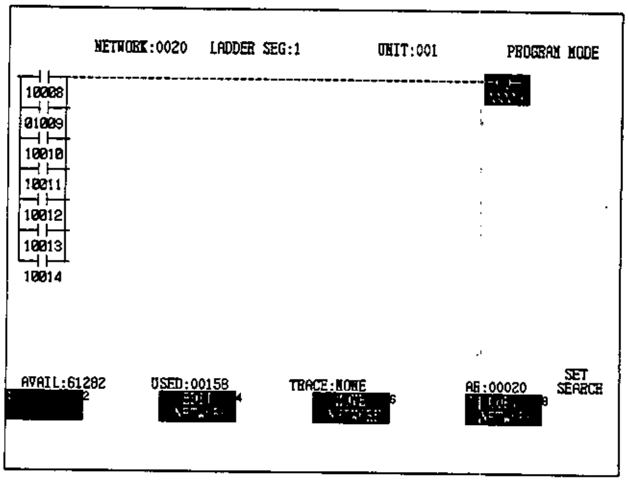
NETWORK:0001 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61293 USED:00147 TRACE:NONE AR:00009

10008
10009
10010
10011
10012
10013
10014
2
4
6
INITIAL NETWORK
8
SET SEARCH
WRITE NETWORK

Figure 6.275

8) Enter the network number of the target storage network in the AR and select Write Network. A few seconds later, the details of the network specified will be displayed. (These are stored in the memory of the GL60S, GL60H, or GL70H.)



NETWORK:0020 LADDER SEG:1 UNIT:001 PROGRAM MODE

AVAIL:61282 USED:00158 TRACE:NONE AR:00020

10008
01009
10010
10011
10012
10013
10014
2
EDIT NETWORK
4
6
8
SET SEARCH

Figure 6.276

Note (1) Selecting Write Network writes the data into the CPU memory.

(2) Do not add elements at the Copy Screen. Add them at the screen after storage.

(3) When network N is stored, the network number (N) of any network after this will be increased by one (N+1.)

(4) The Attach Operation is not required if program storage is already possible.

(5) To return to the original screen from the Copy Screen without selecting Write Network, press the Shift + Edit/Change Node Keys and then press the Edit/Change Node Key.

(6) Network storage occurs when Write Network is selected. If there is not enough memory in the GL60S, GL60H, or GL70H to store the information on the screen, storage does not occur and the message "No avail memory" will be displayed.

6.2.6 Traceback

The ON and OFF status of coils and numeric values in registers on GL60S, GL60H, or GL70H can be displayed on the screen in chronological order.

1. Setting Conditions

A. Setting

The following set values need to be input before a waveform display of a traceback can be performed.

- Sampling cycle
- Trigger points
- Conditions for trigger
  Discrete I/O: 8 points maximum
  Registers: 1 maximum

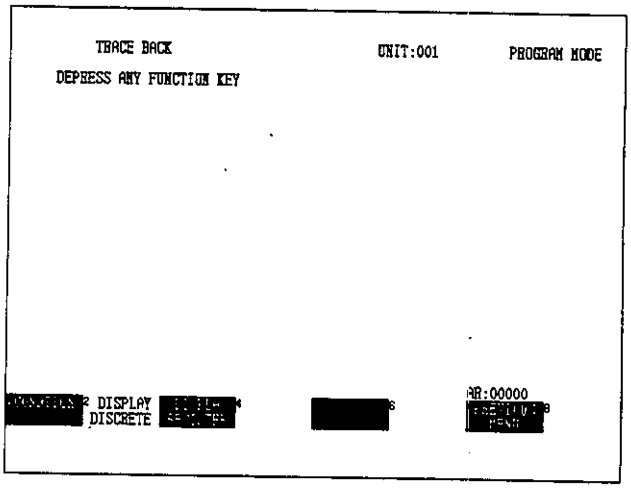
Use the following procedure to set the conditions for a traceback.

1) Perform the Attach Operation. (See Note (3))

2) Press the Supervisory Key.

3) Select Program.

4) Select Traceback.

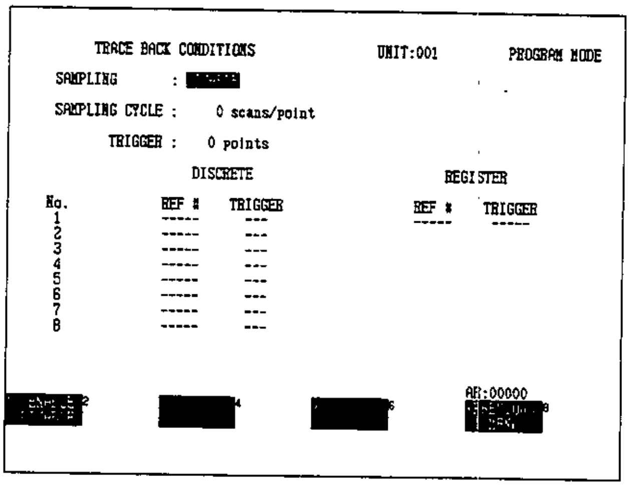


```
TRACE BACK                        UNIT:001        PROGRAM MODE
DEPRESS ANY FUNCTION KEY
```

2 DISPLAY
DISCRETE
4
6
AR:00000
8

Figure 6.277

5) Select Condition.

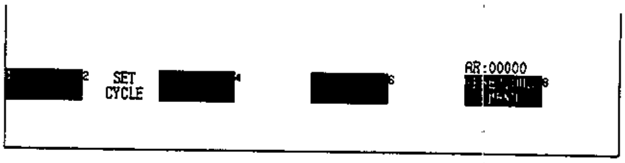


```
TRACE BACK CONDITIONS                 UNIT:001        PROGRAM MODE
SAMPLING        :
SAMPLING CYCLE :     0 scans/point
      TRIGGER :    0 points
                DISCRETE                          REGISTER
No.          REF #   TRIGGER                   REF #    TRIGGER
1            -----     ---                     -----     -----
2            -----     ---
3            -----     ---
4            -----     ---
5            -----     ---
6            -----     ---
7            -----     ---
8            -----     ---
```

2
4
6
AR:00000
8

Figure 6.278

6) Press the Down Cursor Key. The cursor will move down one line.



2 SET
CYCLE
4
6
AR:00000
8

Figure 6.279

7) Set Sampling Cycle **1** in the AR and select Set Cycle.

8) Press the Down Cursor Key. The cursor will move down one line.

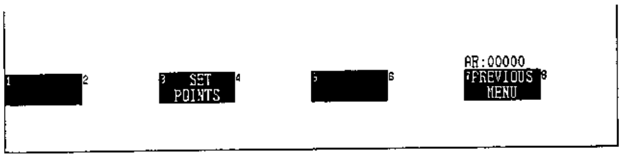
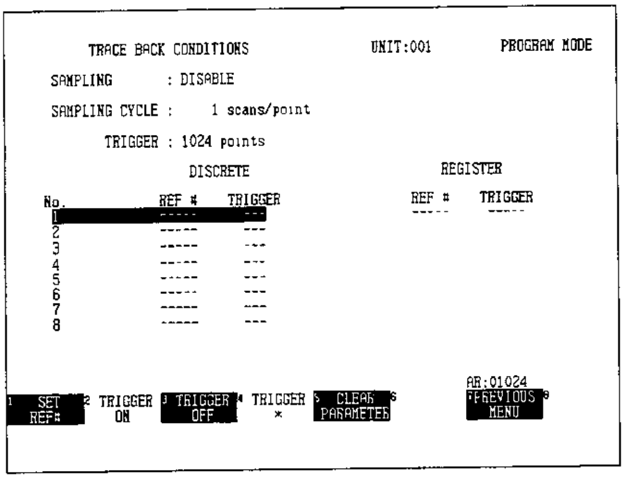

AR:00000
1
2
3 SET POINTS
4
5
6
7 PREVIOUS MENU
8

Figure 6.280

9) Set Trigger Point **1024** in the AR and select Set Points.

10) Press the Down Cursor Key. The cursor will move down one line.



```
TRACE BACK CONDITIONS          UNIT:001        PROGRAM MODE
SAMPLING       : DISABLE
SAMPLING CYCLE :     1 scans/point
      TRIGGER : 1024 points
               DISCRETE                        REGISTER
No.            REF #   TRIGGER             REF #   TRIGGER
1              -----    ---                -----   -----
2              -----    ---
3              -----    ---
4              -----    ---
5              -----    ---
6              -----    ---
7              -----    ---
8              -----    ---
```

AR:01024
1 SET REF#
2 TRIGGER ON
3 TRIGGER OFF
4 TRIGGER *
5 CLEAR PARAMETER
6
7 PREVIOUS MENU
8

Figure 6.281

11) Enter **1** in the AR and select Set Reference Number.

12) Move the cursor down one line, enter **10010** in the AR, and select Set Reference Number.

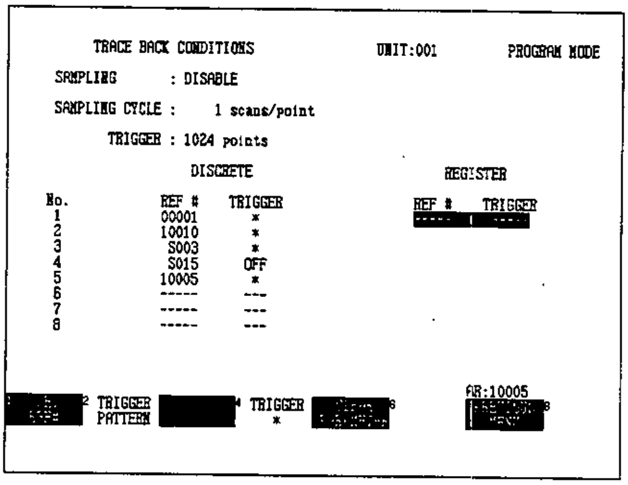
13) Move the cursor down one line, enter **S003** in the AR, and select Set Reference Number.

14) Move the cursor down one line, enter **S015** in the AR, and select Set Reference Number.

15) Select Trigger Off.

16) Move the cursor down one line, enter **10005** in the AR, and select Set Reference Number.

17) Press the Down Cursor Key. The cursor will move to the upper right.



```
    TRACE BACK CONDITIONS                     UNIT:001      PROGRAM MODE
 SAMPLING        : DISABLE
 SAMPLING CYCLE :     1 scans/point
       TRIGGER : 1024 points
                    DISCRETE                           REGISTER
No.             REF #    TRIGGER                  REF #     TRIGGER
1               00001       *                     -----     -----
2               10010       *
3                S003       *
4                S015      OFF
5               10005       *
6               -----      ---
7               -----      ---
8               -----      ---

                                                       AR:10005
```

2 TRIGGER PATTERN
4 TRIGGER *
6
8

Figure 6.282

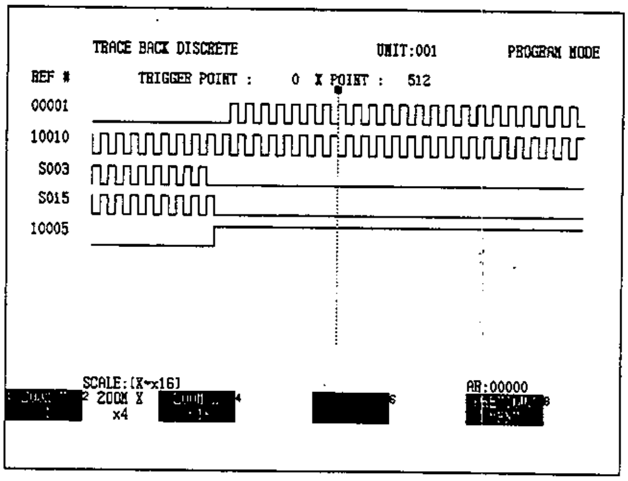
18) Enter “40001” in the AR and select Set Reference Number.

19) Select Trigger Pattern.

Note (1) A traceback can be displayed by selecting 0 for the 1024 state immediately after the trigger point.

(2) A traceback can be performed for a maximum of 8 discrete point and 1 register.

- Discrete I/O

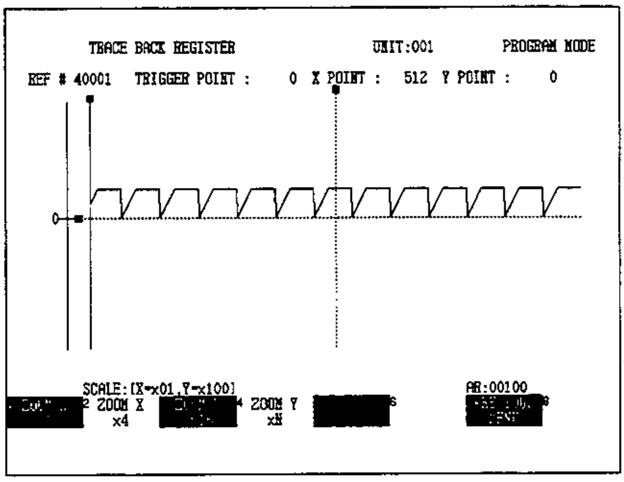


```
    TRACE BACK DISCRETE                       UNIT:001      PROGRAM MODE
REF #     TRIGGER POINT :     0  X POINT :   512

                                                       AR:00000
```

00001
10010
S003
S015
10005
SCALE:[X÷x16]
2 ZOOM X
x4
4
6
8

Figure 6.283

- Register



TRACE BACK REGISTER UNIT:001 PROGRAM MODE

REF # 40001 TRIGGER POINT : 0 X POINT : 512 Y POINT : 0

SCALE:[X=x01,Y=x100]

AR:00100

Figure 6.284

(3) The Attach Operation is not required when the PLC is already online.

(4) The sampling cycle setting determines how many scans are required in one cycle of sampling.

(5) The trigger point setting is needed to determine the scope of the trace data. This numeric value shows the location of the trigger point for the purposes of display. It can be set within the range from the actual trigger point up to the previous 1,024 points.
Examples
If set at "0," it will display the condition of the 1,024 points before the trigger point.
If set at "1024," it will display the condition of the 1024 points after the trigger point.

(6) The discrete trigger conditions can be set to the first scan in which the point turns ON (set Trigger On) or the first scan in which the point turns OFF (set Trigger Off).

(7) The register trigger conditions is set as the numeric value of the register. Enter the trigger point numeric value in the AR and select Trigger Pattern.

(8) In setting the trigger conditions, "Trigger" automatically becomes "*" when the reference is set. This indicates that there are no trigger conditions. Also, if Trigger is selected even when the trigger conditions have been set, "*" will be displayed and the trigger conditions become invalid.

(9) Setting up the trigger conditions is valid when all the trigger conditions including discrete and register have been fulfilled (an AND of all conditions).

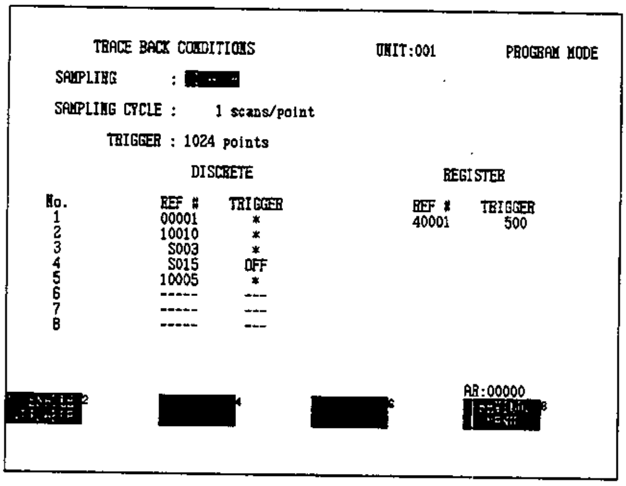
(10) If Clear Parameter is selected in setting trigger conditions, the condition where the cursor is will be cleared.

(11) If All Menu is selected, the display will return to the screen shown in *Figure 6.277.*

B. Activation

Once the traceback conditions have been set, traceback can be started. Use the following procedure to start the traceback.

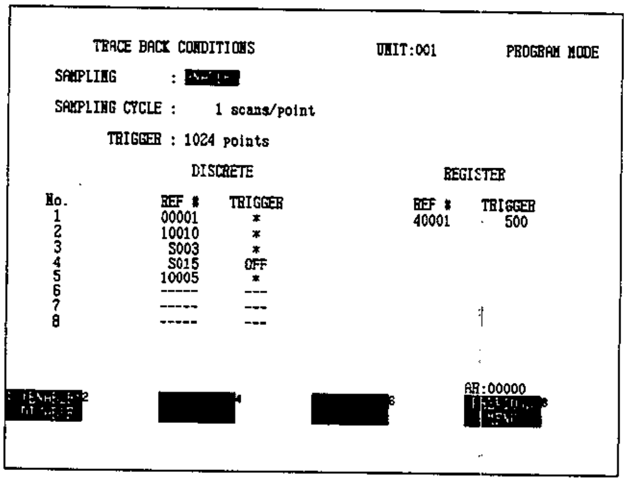
1) Press the Up Cursor Key. The cursor will move to the topmost sampling position.



```
       TRACE BACK CONDITIONS              UNIT:001        PROGRAM MODE
    SAMPLING        :
    SAMPLING CYCLE :      1 scans/point
         TRIGGER : 1024 points
                       DISCRETE                     REGISTER
No.                 REF #    TRIGGER           REF #     TRIGGER
1                   00001       *              40001        500
2                   10010       *
3                    S003       *
4                    S015      OFF
5                   10005       *
6                   -----      ---
7                   -----      ---
8                   -----      ---

                                                AR:00000
```

Figure 6.285

2) Select ↓ Enable/Disable ↓. Sampling will begin.



```
       TRACE BACK CONDITIONS              UNIT:001        PROGRAM MODE
    SAMPLING        :
    SAMPLING CYCLE :      1 scans/point
         TRIGGER : 1024 points
                       DISCRETE                     REGISTER
No.                 REF #    TRIGGER           REF #     TRIGGER
1                   00001       *              40001        500
2                   10010       *
3                    S003       *
4                    S015      OFF
5                   10005       *
6                   -----      ---
7                   -----      ---
8                   -----      ---

                                                AR:00000
```

Figure 6.286

3) Select Previous Menu.

Note (1) When set to Enable, the sampling of trace data will begin. If trigger conditions are already met at this time, sampling will be canceled automatically.

(2) If sampling is ended by selecting ↓ Enable/Disable ↓, the sampling of the trace data will be canceled. If a forced disable is followed by a waveform display, part of the waveform will be displayed incorrectly.

2. Waveform Display

Trace data are displayed in a waveform when the trigger conditions have been met. Select which is to be displayed, discrete or register.

A. Discrete

Use the following procedure to display a discrete waveform.

1) Select Display Discrete on the screen shown in *Figure 6.277.*

2) Trace data is displayed in a waveform when the trigger conditions have been met.

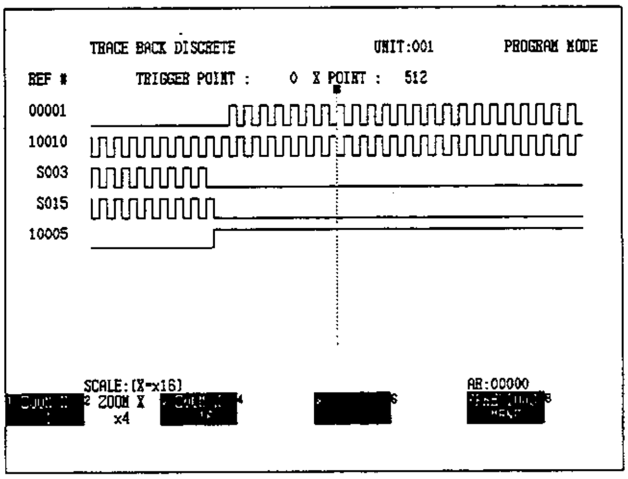


Figure 6.287

Note (1) The dotted line "T" shows the location of the trigger point. The numeric values for the trigger point show its coordinates.

(2) The dotted line "O" shows the location of the moving cursor. The numeric value of the X point show its coordinates. The location of each reference can be easily seen using the moving cursor.

(3) The waveform trace data can enlarged across the width of the screen to a maximum of 16 times. Select Zoom X × 4 to enlarge it 4 times and Zoom X × 16 to enlarge it 16 times. To display the entire waveform once more, select Zoom Z × 1.

(4) Select Previous Menu to return to the screen shown in *Figure 6.277.*

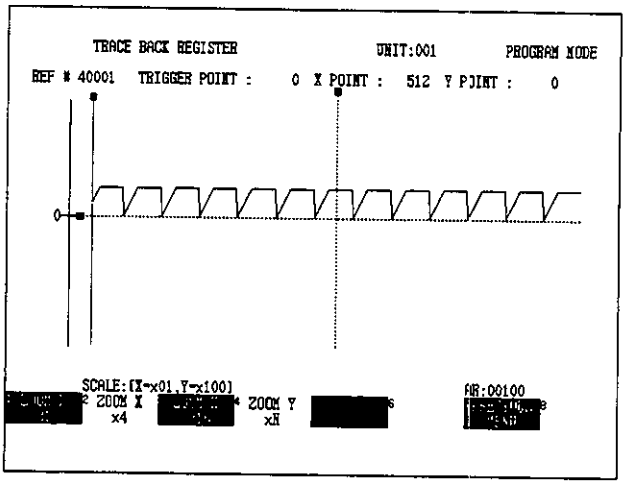
(5) The waveform is not displayed if the trigger conditions have not been met. Also, if a forced end is followed by a waveform display, part of the waveform will be displayed incorrectly.

B. Register

Use the following procedure to display a register waveform.

1) Select Display Register on the screen shown in *Figure 6.277.*

2) Trace data can be displayed in waveform when the trigger conditions have been met.



TRACE BACK REGISTER　UNIT:001　PROGRAM MODE

REF # 40001　TRIGGER POINT : 0　X POINT : 512　Y PJINT : 0

SCALE:[X-x01,Y-x100]

AR:00100

Figure 6.288

Note (1) The dotted line "T" shows the location of the trigger point. The numeric values for the trigger point show its coordinates.

(2) The dotted line "O" is the cursor which moves horizontally. The dotted line "S" is the cursor which moves vertically. The numeric values of the X point and Y point show the coordinates.

(3) The waveform of the trace data can be enlarged to a maximum of 16 times horizontally and 500 times vertically. Horizontal enlargement expands the sampling figures and vertically enlargement expands the contents of the register. Select Zoom X × 4 to enlarge it 4 times horizontally and Zoom X × 16 to enlarge it 16 times horizontally. To display the entire waveform once more horizontally, select Zoom Z × 1.

Select Zoom Y × N times to enlarge the data from 1 to 500 times vertically in units of 10. Enter the number of times in the AR and select Zoom Y × N times to enlarge it. To display the entire waveform once again horizontally, enter "1" in the AR and select Zoom Y × N times.

(4) Select Previous Menu to return to the screen shown in *Figure 6.277.*

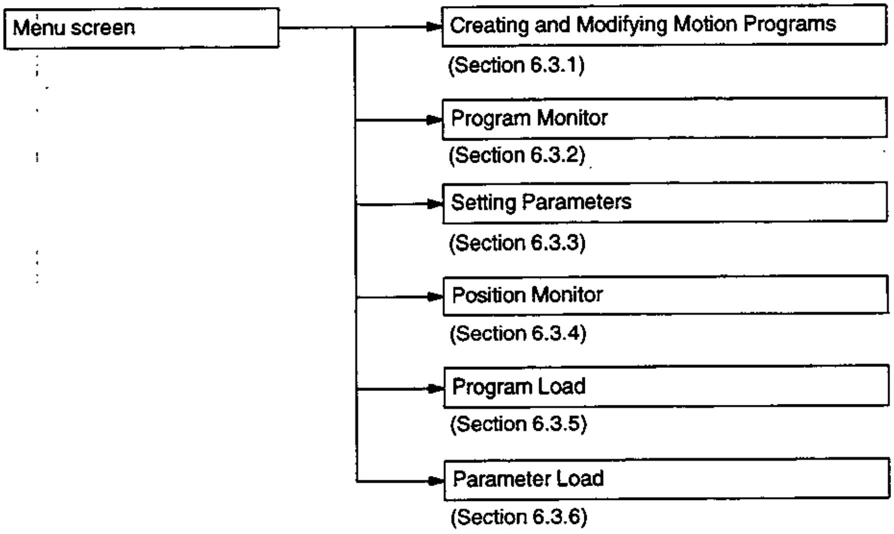
(5) The waveform is not displayed if the trigger conditions have not been met. Also, if a forced end is followed by a waveform display, part of the waveform will be displayed incorrectly.

6.3 Motion Programs

This section covers using the P120 Programming Panel to create and modify motion programs, and to set parameters, in Editing Mode and Operating Mode.

Motion programs and parameter data can be be read from a floppy disk, written to a floppy disk, and output to a printer.

Motion programs can be created and parameters set while the CPU of the GL60S, GL60H, or GL70H is in Run Mode. Be sure to load programs and parameters for the Servopack with the motor stopped and in a mode in which motion commands will not be executed.


Menu screen
Creating and Modifying Motion Programs
(Section 6.3.1)
Program Monitor
(Section 6.3.2)
Setting Parameters
(Section 6.3.3)
Position Monitor
(Section 6.3.4)
Program Load
(Section 6.3.5)
Parameter Load
(Section 6.3.6)

6.3.1 Creating and Modifying Motion Programs 6-196
6.3.2 Program Monitor 6-213
6.3.3 Setting Parameters 6-214
6.3.4 Position Monitor 6-220
6.3.5 Program Load 6-221
6.3.6 Parameter Load 6-227
6.3.7 Error Messages 6-235

6.3.1 Creating and Modifying Motion Programs

This section covers editing and operating motion programs.

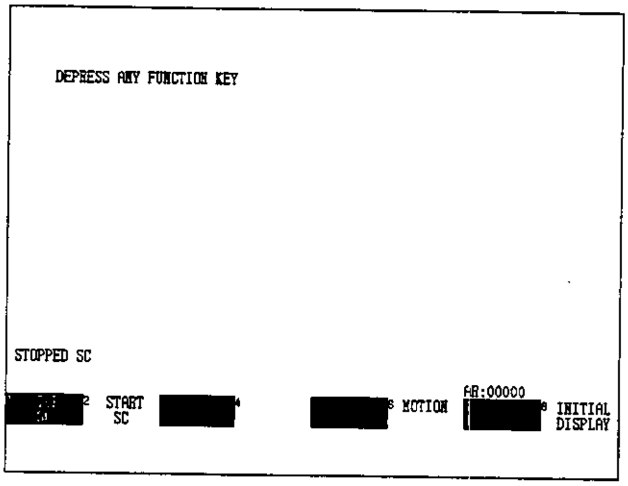
1. Displaying the Menu Screen

Display the Motion Menu Screen. The screen has 6 modes. Use the following procedure to display the Menu Screen.

1) Perform the Attach Operation.

2) Press the Supervisory Key.

3) Select Program.



DEPRESS ANY FUNCTION KEY

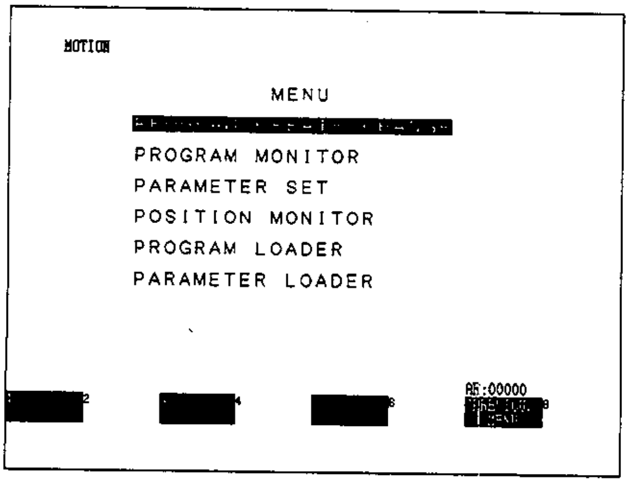
STOPPED SC

2
START
SC
4
6
MOTION
AR:00000
8
INITIAL
DISPLAY

Figure 6.289

4) Select Motion.

The menu will be displayed.



MOTION
MENU
[illegible]
PROGRAM MONITOR
PARAMETER SET
POSITION MONITOR
PROGRAM LOADER
PARAMETER LOADER
2
4
6
AR:00000
8

Figure 6.290

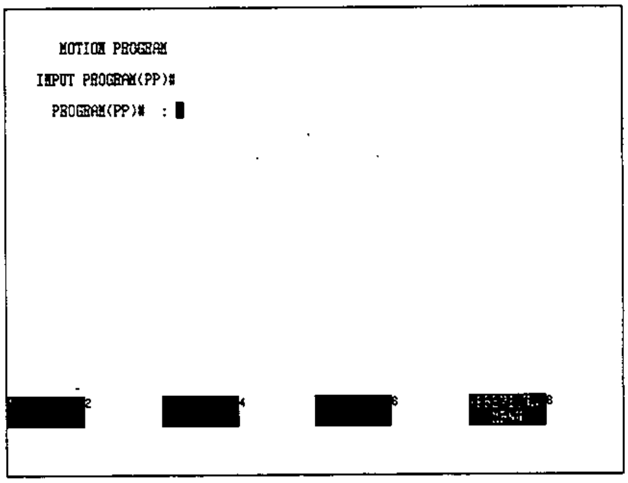
Note Select Previous Menu and the screen will return to the previous screen.

2. Preparing to Create a Program

This section describes how to create a motion program. The menu has six choices. Use the following procedure to prepare for creating a program.

1) Display the menu shown in *Figure 6.290.*

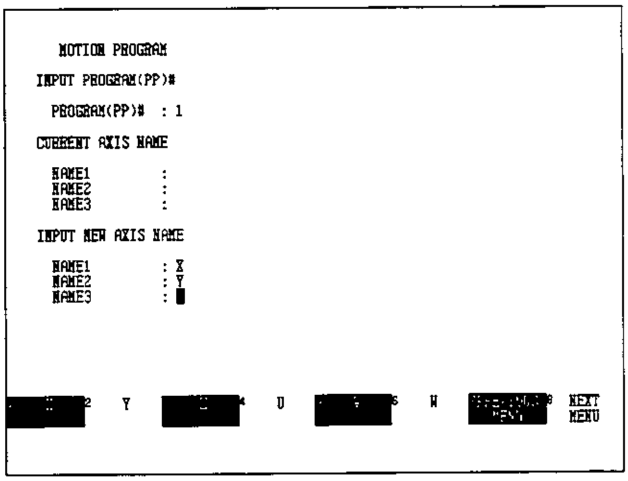
2) Select Program Create/Change and press the Enter Key.



```
  MOTION PROGRAM
INPUT PROGRAM(PP)#
  PROGRAM(PP)#  : █
```

Figure 6.291

3) Enter a program number (from 1 to 8) and press the Enter Key.

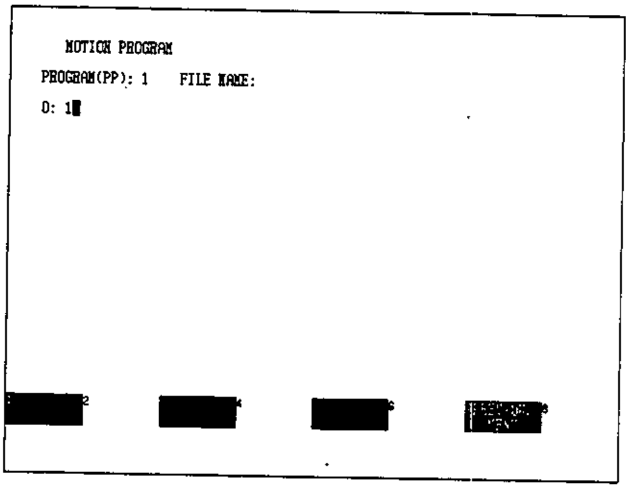


```
  MOTION PROGRAM
INPUT PROGRAM(PP)#
  PROGRAM(PP)#  : 1
CURRENT AXIS NAME
  NAME1         :
  NAME2         :
  NAME3         :
INPUT NEW AXIS NAME
  NAME1         : X
  NAME2         : Y
  NAME3         : █
```

Figure 6.292

4) Enter the axis names and press the Enter Key. (See Note (2))

5) Enter the O number (from 1 to 20).



```
   MOTION PROGRAM
PROGRAM(PP): 1    FILE NAME:
O: 1█
```

Figure 6.293

The Program Screen will be displayed.

Note (1) Terminology

- The program number is a buffer number specifying an area in the P120's working memory to be used as temporary memory for motion programs. A program of up to 2 kilobytes can be created in one buffer.
- The current axis name is the axis name specified by that buffer (motion program).

(2) The axis name uses the Servopack axis names and corresponds to the X,Y, Z, and so on of the motion program notation. Up to 3 axis names can be specified.

(3) The composition of the axis names used in the motion program is fixed. They are chosen from the name groups of (X, Y, Z) (U, V, W) and (A, B, C).

(4) Default axis names are display. Press the Enter Key to continue without changing them

- **Clearing a Program Buffer**

Use the following procedure to clear a program buffer.

1) Display the menu shown in *Figure 6.290.*

2) Select Program Create/Change and press the Enter Key.

3) Input the program number (from 1 to 8) and press the Enter Key.

4) Input the axis name and press the Enter Key.

5) Input the O number (from 1 to 20).

The Program Screen will be displayed.

Note (1) Pressing the Shift + Delete Keys after 2) will clear all the programs stored under all the program numbers (from 1 to 8).

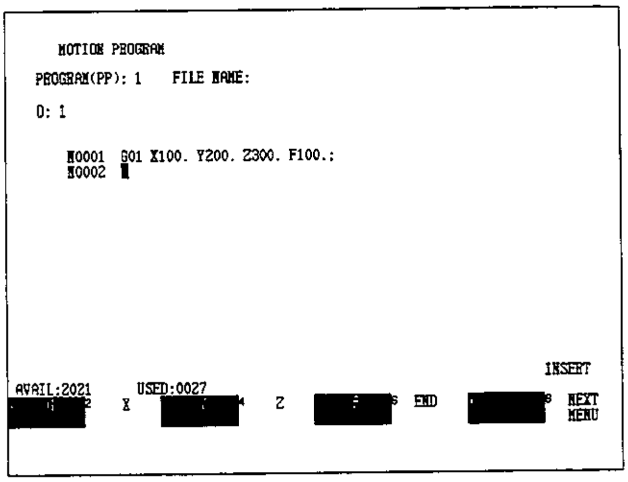
(2) Pressing the Shift + Delete Keys after 3) will clear all the programs stored under the specified program number.

3. Basic Key Operations

Use the following procedure to perform basic key operations.

1) Display the Program Screen.

2) Create the line N0001.



```
  MOTION PROGRAM
PROGRAM(PP): 1    FILE NAME:
O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  
```

Figure 6.294

3) Change the line. (See Note (1))

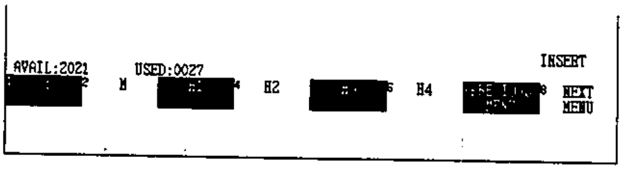

AVAIL:2021
USED:0027
INSERT
M
H2
H4
NEXT MENU

Figure 6.295

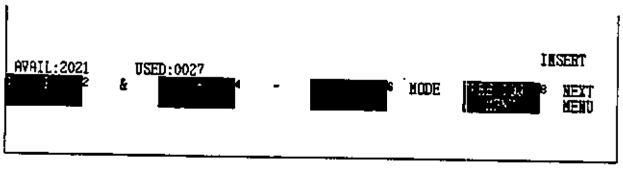

AVAIL:2021
USED:0027
INSERT
&
-
MODE
NEXT MENU

Figure 6.296

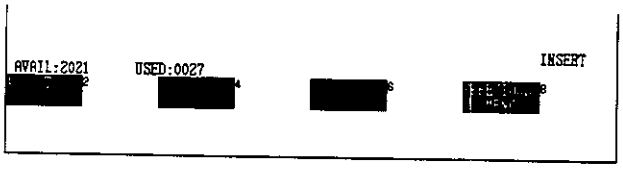
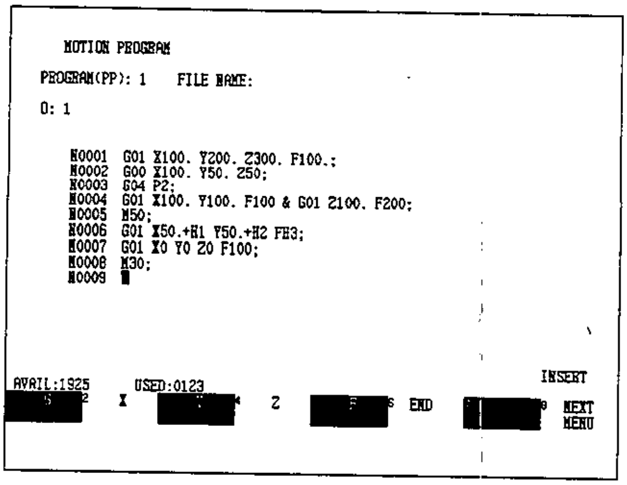

AVAIL:2021
USED:0027
INSERT

Figure 6.297

4) Create the remaining lines.



```
MOTION PROGRAM

PROGRAM(PP): 1    FILE NAME:

O: 1

N0001  G01 X100. Y200. Z300. F100.;
N0002  G00 X100. Y50. Z50;
N0003  G04 P2;
N0004  G01 X100. Y100. F100 & G01 Z100. F200;
N0005  M50;
N0006  G01 X50.+H1 Y50.+H2 FH3;
N0007  G01 X0 Y0 Z0 F100;
N0008  M30;
N0009  █
```

AVAIL:1925
USED:0123
INSERT
X
Z
END
NEXT MENU

Figure 6.298

Note (1) To change a line, press the Semicolon Key.

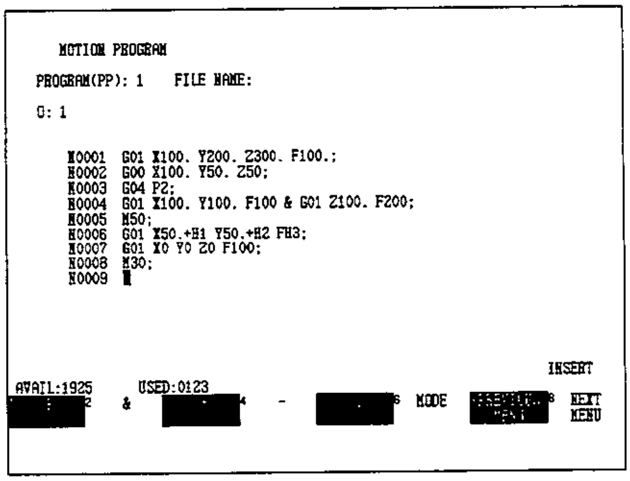
(2) The following shows how the keys are operated.

Input G:01 and press the SP Key
Input X: 100. and press the SP Key
Input Y: 200. and press the SP Key
Input Z: 300. and press the SP Key
Input F: 1000. and press the Semicolon Key

4. Replace (Overwrite) Mode

Normally, the screen operates in Insert Mode, but you can change it to Replace (overwrite) Mode by selecting Mode. In this mode, you can write over programs to change them.

1) Display the Program Screen shown in *Figure 6.298.*

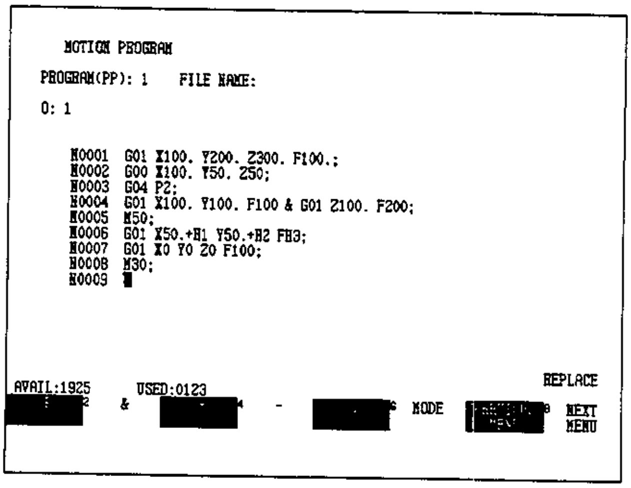


```
MOTION PROGRAM

PROGRAM(PP): 1    FILE NAME:

O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y100. F100 & G01 Z100. F200;
    N0005  M50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009  

                                                        INSERT
AVAIL:1925      USED:0123
```

Figure 6.299

2) Select Next Menu twice and change the function.

3) Select Mode. Replace Mode will be selected, and the Replace Screen will be displayed.



```
   MOTION PROGRAM
PROGRAM(PP): 1    FILE NAME:
0: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y100. F100 & G01 Z100. F200;
    N0005  M50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009  █

                                                    REPLACE
AVAIL:1925      USED:0123
```

Figure 6.300

4) Move the cursor to the location to be changed.

5) Input the program and select Mode. The screen will return to Insert Mode.

Note (1) Programs cannot be created with Replace Mode.

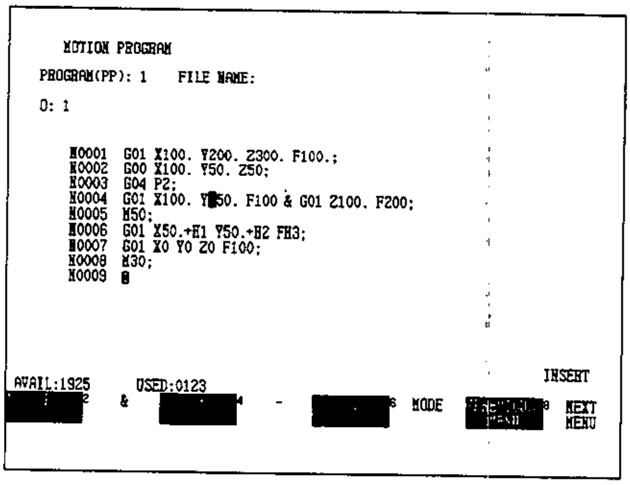
(2) The current mode is shown in the bottom right-hand corner of the screen.

5. Changing Programs in Insert Mode

This mode is used to insert programs. When new characters are input, the original characters move to the right. In this example, line N0004 is changed from Y100 to Y250.

1) Display the Program Screen shown in *Figure 6.298*.

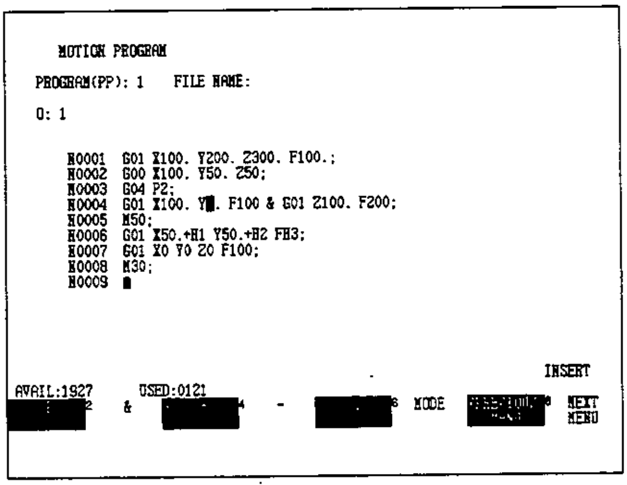
2) Move the cursor to the location to be changed.



```
   MOTION PROGRAM
PROGRAM(PP): 1    FILE NAME:
0: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y█50. F100 & G01 Z100. F200;
    N0005  M50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009  █

                                                    INSERT
AVAIL:1925      USED:0123
```

Figure 6.301

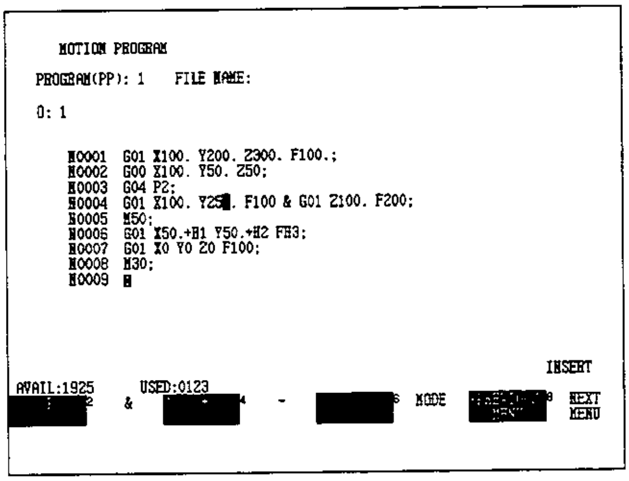
3) Press the Delete Key. (Note)



```
  MOTION PROGRAM
PROGRAM(PP): 1   FILE NAME:
0: 1

   N0001  G01 X100. Y200. Z300. F100.;
   N0002  G00 X100. Y50. Z50;
   N0003  G04 P2;
   N0004  G01 X100. Y. F100 & G01 Z100. F200;
   N0005  M50;
   N0006  G01 X50.+H1 Y50.+H2 FH3;
   N0007  G01 X0 Y0 Z0 F100;
   N0008  M30;
   N0009
```

Figure 6.302

4) Input the new data.



```
  MOTION PROGRAM
PROGRAM(PP): 1   FILE NAME:
0: 1

   N0001  G01 X100. Y200. Z300. F100.;
   N0002  G00 X100. Y50. Z50;
   N0003  G04 P2;
   N0004  G01 X100. Y25. F100 & G01 Z100. F200;
   N0005  M50;
   N0006  G01 X50.+H1 Y50.+H2 FH3;
   N0007  G01 X0 Y0 Z0 F100;
   N0008  M30;
   N0009
```

Figure 6.303

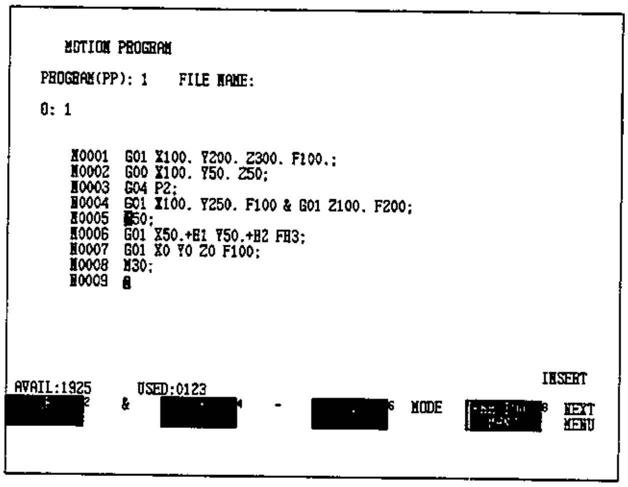
Note The Backspace Key can also be used for deletion.

6. Adding Programs

This operation adds programs in one line at a time. As an example, new line will be added at line N0005.

1) Display the Program Screen shown in *Figure 6.298.*

2) Move the cursor to the beginning of the line to be added to (N0005).

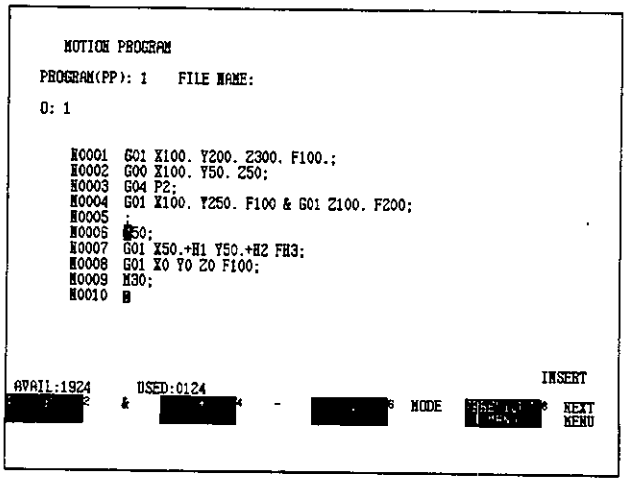


```
   MOTION PROGRAM

 PROGRAM(PP): 1    FILE NAME:

 0: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y250. F100 & G01 Z100. F200;
    N0005  █50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009  █

                                                          INSERT
AVAIL:1925     USED:0123
          2  &          4   -          6  MODE          8  NEXT
                                                           MENU
```

Figure 6.304

3) Press the Semicolon Key.

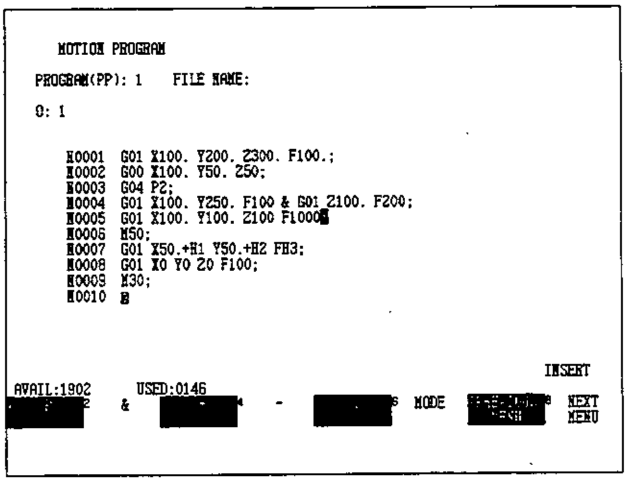
A space will be created at line N0005.



```
   MOTION PROGRAM

 PROGRAM(PP): 1    FILE NAME:

 0: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y250. F100 & G01 Z100. F200;
    N0005  ;
    N0006  █50;
    N0007  G01 X50.+H1 Y50.+H2 FH3;
    N0008  G01 X0 Y0 Z0 F100;
    N0009  M30;
    N0010  █

                                                          INSERT
AVAIL:1924     USED:0124
          2  &          4   -          6  MODE          8  NEXT
                                                           MENU
```

Figure 6.305

4) Enter the program to be added.



```
  MOTION PROGRAM

PROGRAM(PP): 1    FILE NAME:

O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y250. F100 & G01 Z100. F200;
    N0005  G01 X100. Y100. Z100 F1000
    N0006  M50;
    N0007  G01 X50.+H1 Y50.+H2 FH3;
    N0008  G01 X0 Y0 Z0 F100;
    N0009  M30;
    N0010

AVAIL:1902      USED:0146
```

Figure 6.306

Note The sequence numbers of the lines below that the new line will automatically increase by one.

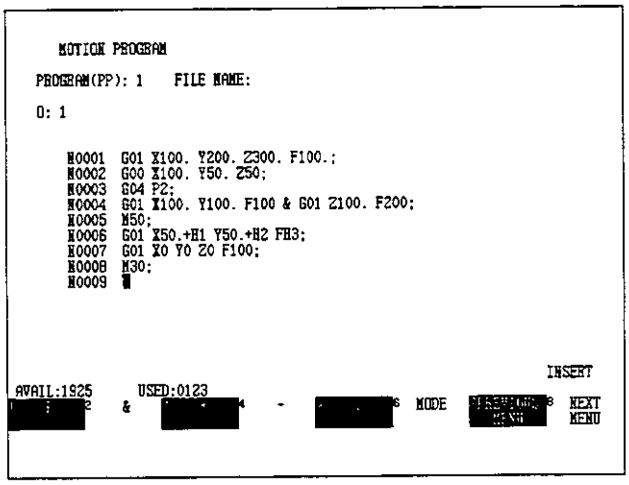
7. Program Edit Function

This function is used for copying, moving and deleting. Press the Shift + Edit/Change Node Keys. The Edit Screen will appear.

Press the Edit/Change Node Key or select Previous Menu to revert to the Program Screen. Editing is performed by blocks, and line numbers are added automatically.

1) Display the Program Screen shown in *Figure 6.298.*

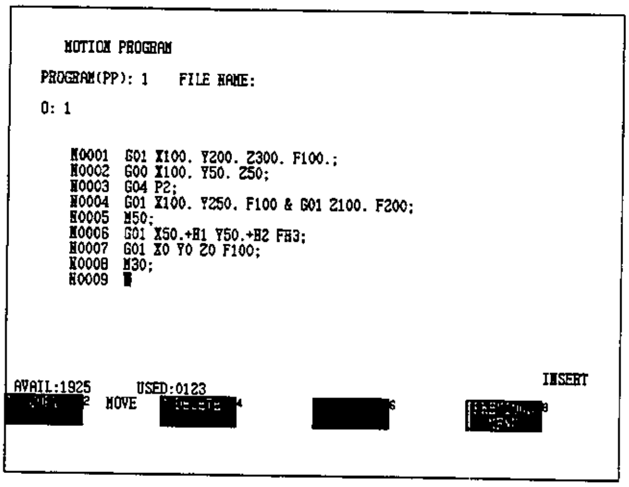
2) Press the Shift + Edit/Change Node Keys.



```
  MOTION PROGRAM

PROGRAM(PP): 1    FILE NAME:

O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y100. F100 & G01 Z100. F200;
    N0005  M50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009

AVAIL:1925      USED:0123
```

Figure 6.307

3) The Edit Screen will be displayed. Copying, moving, and deleting can be performed.



```
   MOTION PROGRAM

 PROGRAM(PP): 1    FILE NAME:

 O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  G01 X100. Y250. F100 & G01 Z100. F200;
    N0005  M50;
    N0006  G01 X50.+H1 Y50.+H2 FH3;
    N0007  G01 X0 Y0 Z0 F100;
    N0008  M30;
    N0009  █

                                                        INSERT
AVAIL:1925      USED:0123
```

Figure 6.308

4) Select Previous Menu.

The Program Screen will return.

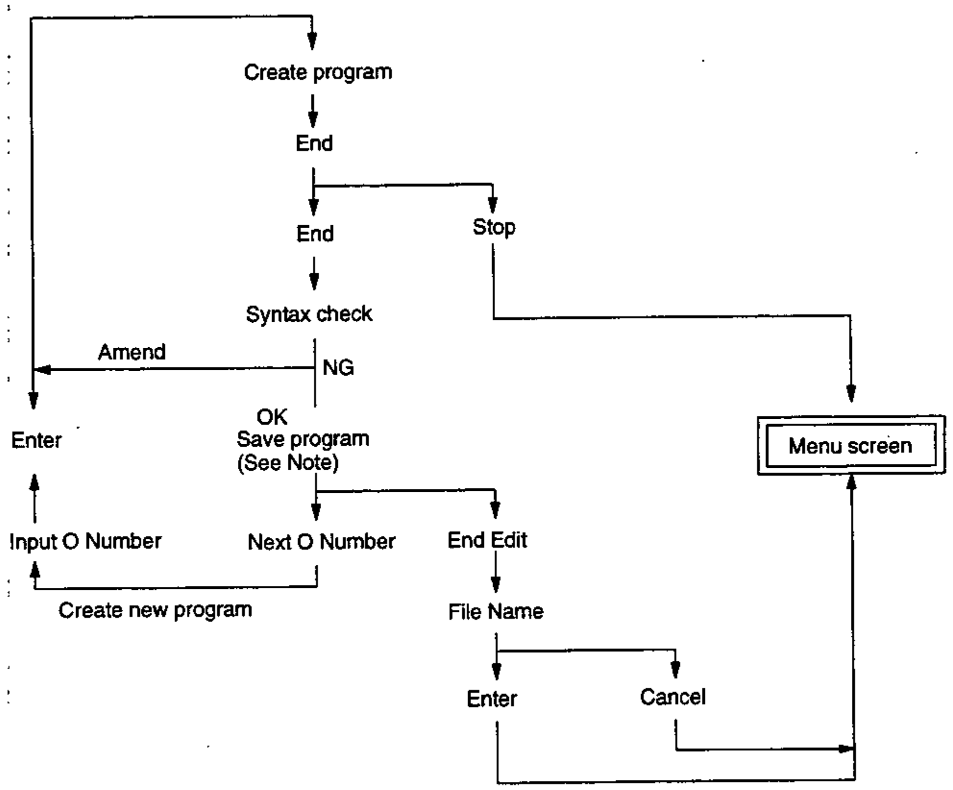
Note You can revert to the Program Screen from any screen by pressing the Edit/Change Node Key or by selecting Previous Menu.

8. Saving a Program

Select End after creating a program, and End and Stop will be displayed at the bottom of the screen.

Stop:	The screen will return to the Menu.
End:	The syntax will be checked. If there is an error in the program, the cursor will move to the line with the error. Once the error has been corrected, select End again. If there are no errors, the program will be saved, and Next O Number and End Edit will be displayed.
Next O Number:	A new program can be created by inputting an O Number.

End Edit: Input a file name. The name can be up to 8 characters long. Extensions cannot be used.


Create program
End
End
Stop
Syntax check
Amend
NG
OK
Enter
Save program (See Note)
Menu screen
Input O Number
Next O Number
End Edit
Create new program
File Name
Enter
Cancel

Note Means save in the P120 memory.

9. Editor Function

A. Copy

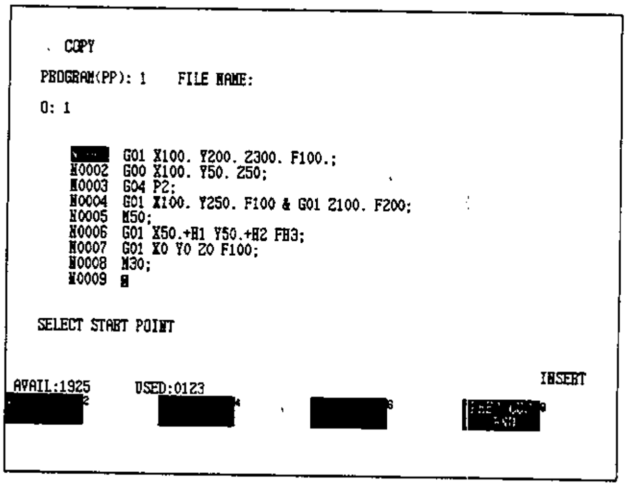
This operation can be used to create a program block with the same contents as another. Copying must be performed by block.

1) Display the Edit Screen shown in *Figure 6.308.*

2) Select Copy.

The Copy Screen will be displayed.

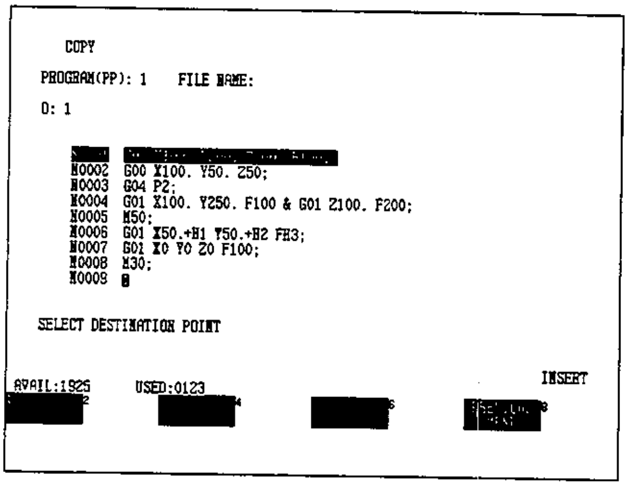
3) Move the cursor to the first block to be copied and press the Enter Key.



```
COPY

PROGRAM(PP): 1    FILE NAME:

O: 1

[illegible] G01 X100. Y200. Z300. F100.;
N0002 G00 X100. Y50. Z50;
N0003 G04 P2;
N0004 G01 X100. Y250. F100 & G01 Z100. F200;
N0005 M50;
N0006 G01 X50.+H1 Y50.+H2 FH3;
N0007 G01 X0 Y0 Z0 F100;
N0008 M30;
N0009 █

SELECT START POINT

                                              INSERT
AVAIL:1925      USED:0123
```

Figure 6.309

4) Move the cursor indicate the blocks to be copied and press the Enter Key. (See Note)

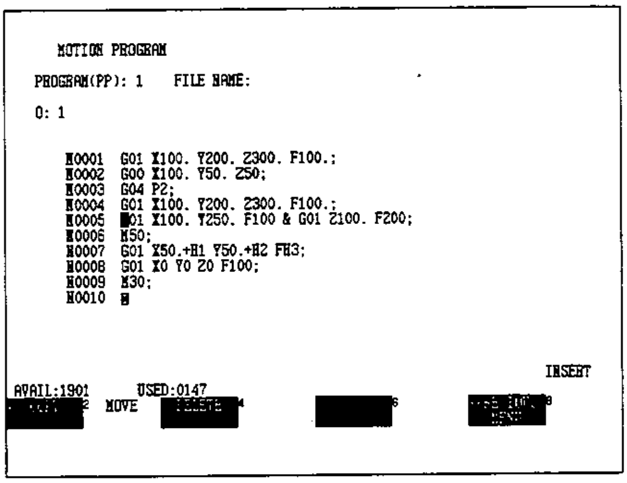


```
COPY

PROGRAM(PP): 1    FILE NAME:

O: 1

[illegible]
N0002 G00 X100. Y50. Z50;
N0003 G04 P2;
N0004 G01 X100. Y250. F100 & G01 Z100. F200;
N0005 M50;
N0006 G01 X50.+H1 Y50.+H2 FH3;
N0007 G01 X0 Y0 Z0 F100;
N0008 M30;
N0009 █

SELECT DESTINATION POINT

                                              INSERT
AVAIL:1925      USED:0123
```

Figure 6.310

5) Move the cursor to the destination block and press the Enter Key.

The copy is complete.



```
   MOTION PROGRAM

 PROGRAM(PP): 1    FILE NAME:

 O: 1

     N0001  G01 X100. Y200. Z300. F100.;
     N0002  G00 X100. Y50. Z50;
     N0003  G04 P2;
     N0004  G01 X100. Y200. Z300. F100.;
     N0005  G01 X100. Y250. F100 & G01 Z100. F200;
     N0006  M50;
     N0007  G01 X50.+H1 Y50.+H2 FH3;
     N0008  G01 X0 Y0 Z0 F100;
     N0009  M30;
     N0010  

                                                  INSERT
AVAIL:1901      USED:0147
```

Figure 6.311

Note Any number of blocks can be copied.

B. Move

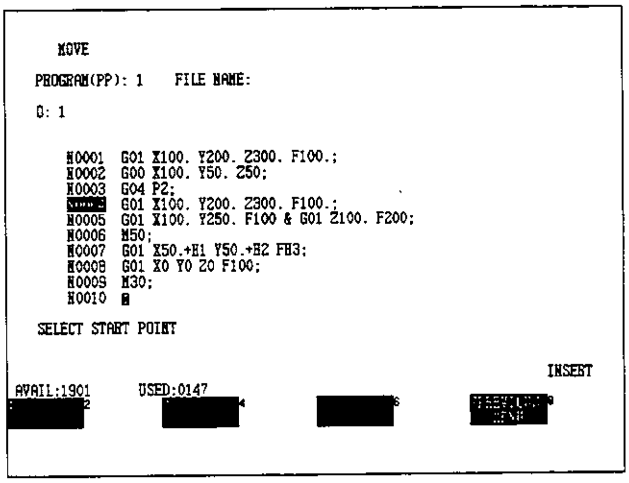
This operation can be used to move blocks to another location. Moving must be performed by block.

1) Display the Edit Screen shown in *Figure 6.308.*

2) Select Move.

The Move Screen will be displayed.

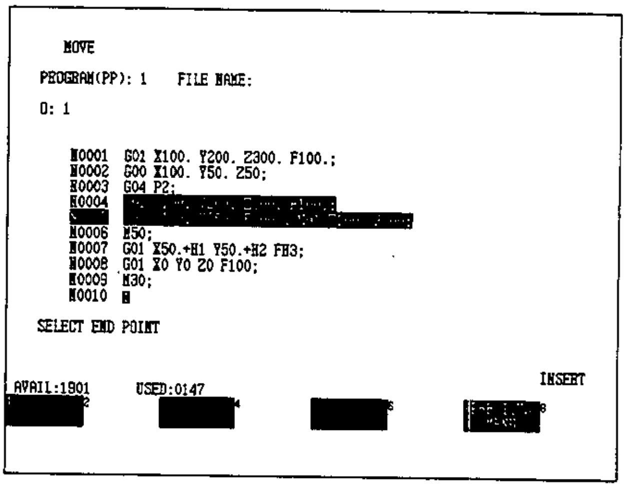
3) Move the cursor to the first block to be moved and press the Enter Key.



```
   MOVE

 PROGRAM(PP): 1    FILE NAME:

 O: 1

     N0001  G01 X100. Y200. Z300. F100.;
     N0002  G00 X100. Y50. Z50;
     N0003  G04 P2;
     N0004  G01 X100. Y200. Z300. F100.;
     N0005  G01 X100. Y250. F100 & G01 Z100. F200;
     N0006  M50;
     N0007  G01 X50.+H1 Y50.+H2 FH3;
     N0008  G01 X0 Y0 Z0 F100;
     N0009  M30;
     N0010  

 SELECT START POINT

                                                  INSERT
AVAIL:1901      USED:0147
```

Figure 6.312

4) Move the cursor to indicate the blocks to be moved and press the Enter Key. (See Note (1))

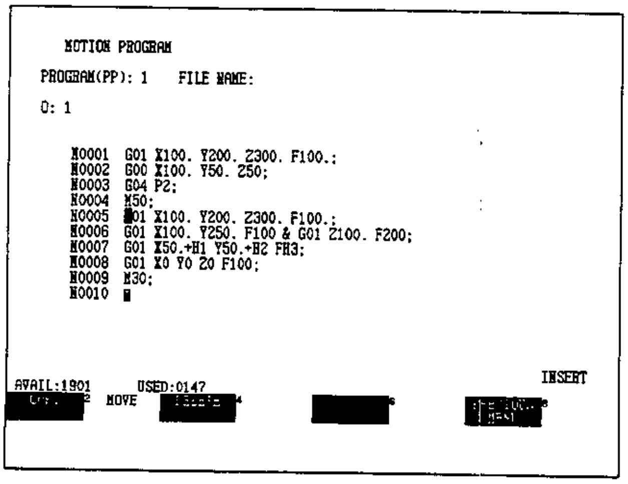


```
MOVE

PROGRAM(PP): 1    FILE NAME:

O: 1

   N0001  G01 X100. Y200. Z300. F100.;
   N0002  G00 X100. Y50. Z50;
   N0003  G04 P2;
   N0004  [illegible]
   [illegible]
   N0006  M50;
   N0007  G01 X50.+H1 Y50.+H2 FH3;
   N0008  G01 X0 Y0 Z0 F100;
   N0009  M30;
   N0010  █

SELECT END POINT

                                                    INSERT
AVAIL:1901      USED:0147
```

Figure 6.313

5) Move the cursor to the destination block and press the Enter Key. (See Note (2))

The move is complete.



```
MOTION PROGRAM

PROGRAM(PP): 1    FILE NAME:

O: 1

   N0001  G01 X100. Y200. Z300. F100.;
   N0002  G00 X100. Y50. Z50;
   N0003  G04 P2;
   N0004  M50;
   N0005  █01 X100. Y200. Z300. F100.;
   N0006  G01 X100. Y250. F100 & G01 Z100. F200;
   N0007  G01 X50.+H1 Y50.+H2 FH3;
   N0008  G01 X0 Y0 Z0 F100;
   N0009  M30;
   N0010  █

                                                    INSERT
AVAIL:1901      USED:0147
```

Figure 6.314

Note (1) If it is only one block, do not move the cursor, just press the Enter Key.

(2) Move the cursor to the next block after the block where it will be inserted.

C. Delete

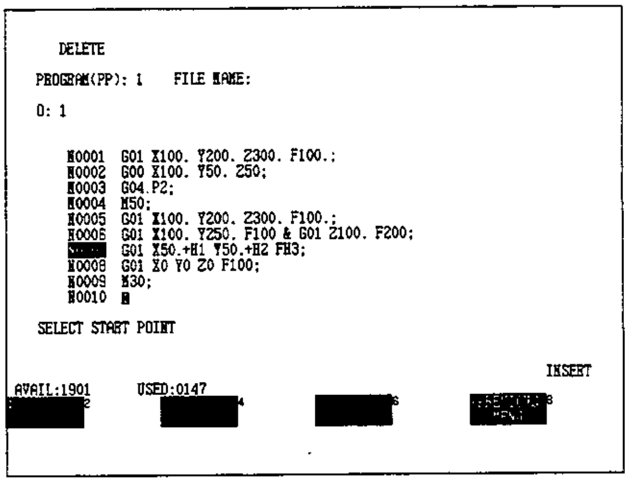
This operation can be used to delete blocks. Deletions must be performed by block.

1) Display the Edit Screen shown in *Figure 6.308.*

2) Select Delete.

   The Delete Screen will be displayed.

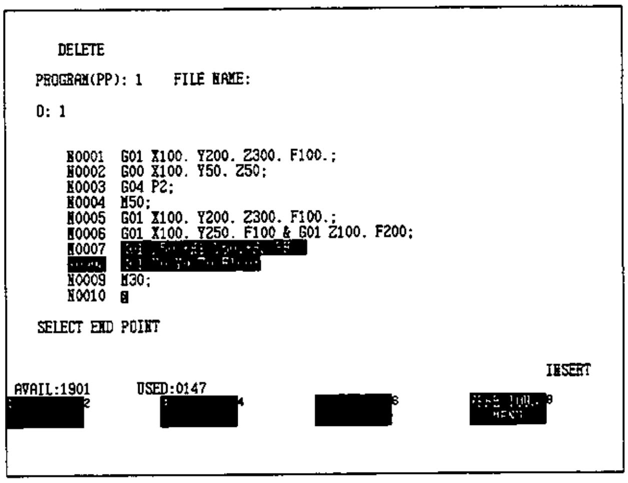
3) Move the cursor to the block to be deleted and press the Enter Key.



```
DELETE

PROGRAM(PP): 1    FILE NAME:

O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04.P2;
    N0004  M50;
    N0005  G01 X100. Y200. Z300. F100.;
    N0006  G01 X100. Y250. F100 & G01 Z100. F200;
           G01 X50.+H1 Y50.+H2 FH3;
    N0008  G01 X0 Y0 Z0 F100;
    N0009  M30;
    N0010

SELECT START POINT

                                                    INSERT
AVAIL:1901      USED:0147
```

Figure 6.315

4) Move the cursor to the part of the block to be moved and press the Enter Key.

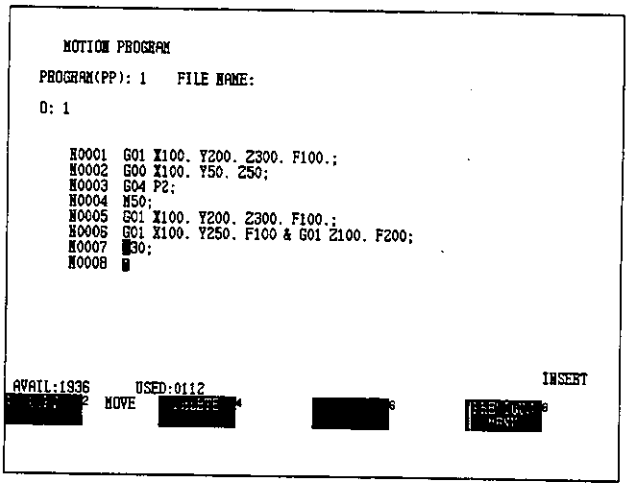


```
DELETE

PROGRAM(PP): 1    FILE NAME:

O: 1

    N0001  G01 X100. Y200. Z300. F100.;
    N0002  G00 X100. Y50. Z50;
    N0003  G04 P2;
    N0004  M50;
    N0005  G01 X100. Y200. Z300. F100.;
    N0006  G01 X100. Y250. F100 & G01 Z100. F200;
    N0007  [illegible]
           [illegible]
    N0009  M30;
    N0010

SELECT END POINT

                                                    INSERT
AVAIL:1901      USED:0147
```

Figure 6.316

5) Select Confirm.

The deletion is complete.



```
MOTION PROGRAM
PROGRAM(PP): 1    FILE NAME:
O: 1

N0001  G01 X100. Y200. Z300. F100.;
N0002  G00 X100. Y50. Z50;
N0003  G04 P2;
N0004  M50;
N0005  G01 X100. Y200. Z300. F100.;
N0006  G01 X100. Y250. F100 & G01 Z100. F200;
N0007  █30;
N0008  █

AVAIL:1936     USED:0112                                INSERT
```

2
MOVE
DELETE 4
6
8

Figure 6.317

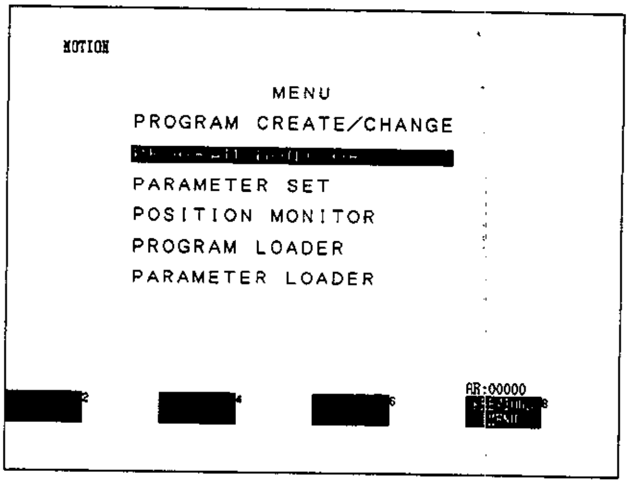
6.3.2 Program Monitor

Monitoring a Program

This operation can be used to see a block of a motion program while it is being executed (one axis).

1) Display the menu shown in *Figure 6.290.*

2) Select Program Monitor and press the Enter Key.



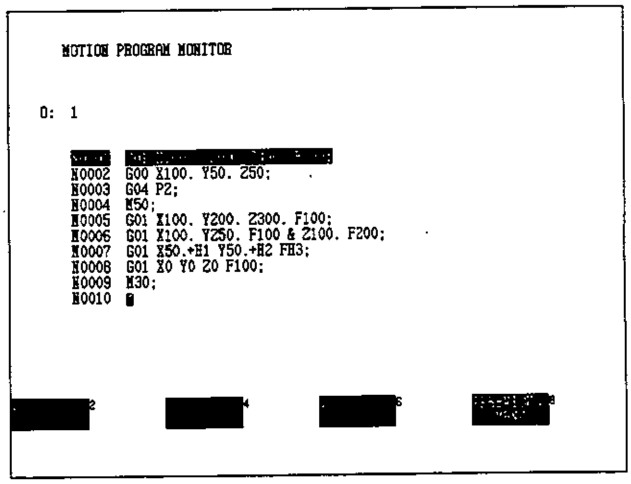
MOTION
MENU
PROGRAM CREATE/CHANGE
[illegible]
PARAMETER SET
POSITION MONITOR
PROGRAM LOADER
PARAMETER LOADER
AR:00000
2
4
6
8

Figure 6.318

3) Enter the module number, axis number, and program number, and press the Enter Key. (See Note (2))

Monitoring will begin.

The blocks being executed will be displayed in reverse video.



```
MOTION PROGRAM MONITOR

O: 1

[illegible]
N0002  G00 X100. Y50. Z50;
N0003  G04 P2;
N0004  M50;
N0005  G01 X100. Y200. Z300. F100;
N0006  G01 X100. Y250. F100 & Z100. F200;
N0007  G01 X50.+H1 Y50.+H2 FH3;
N0008  G01 X0 Y0 Z0 F100;
N0009  M30;
N0010
```

Figure 6.319

Note (1) When the contents of the P120 program and Servo program are not the same, the program cannot be monitored. When they differ, an error message "Miscompare In Program Area" will be displayed.

(2) Module number: Module number of the IF66
Axis number: Servopack axis number
Program number: The number of the buffer within the P120 (The program to be monitored is saved in the buffer.)

6.3.3 Setting Parameters

The following section describes editing and manipulating parameters.

1. Setting Parameters

This operation is used to make initial settings for the Servopack (the Main Menu).

1) Display the menu shown in *Figure 6.290*.

2) Select Parameter Set and press the Enter Key.

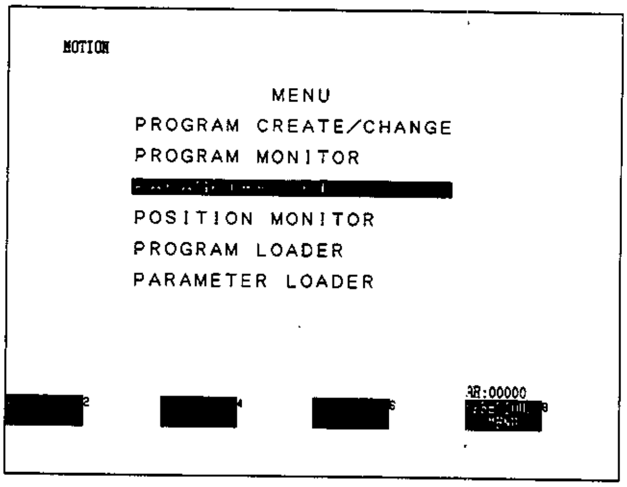
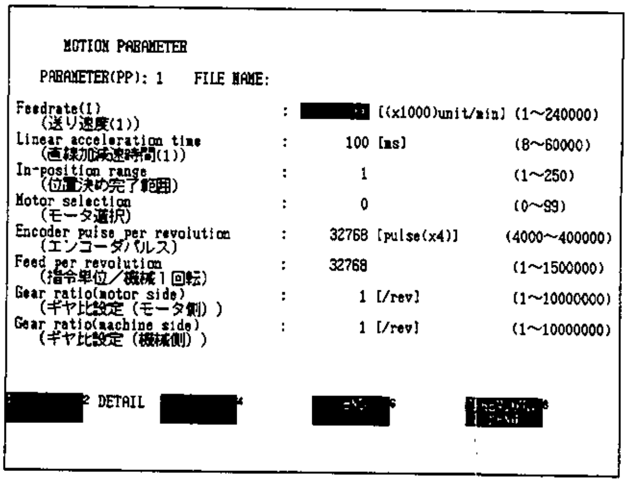

MOTION
MENU
PROGRAM CREATE/CHANGE
PROGRAM MONITOR
POSITION MONITOR
PROGRAM LOADER
PARAMETER LOADER
3R:00000

Figure 6.320

3) Input the parameter number (from 1 to 8).

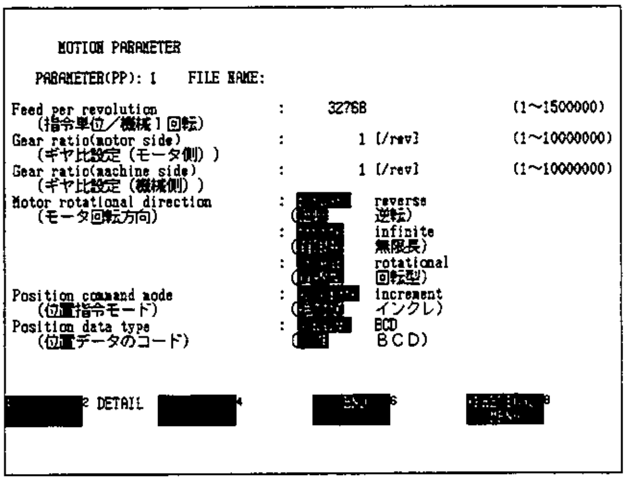
The Parameter Setting Screen will be displayed.



```
MOTION PARAMETER

PARAMETER(PP): 1    FILE NAME:
Feedrate(1)                    :          [(x1000)unit/min] (1～240000)
  (送り速度(1))
Linear acceleration time       :     100 [ms]              (8～60000)
  (直線加減速時間(1))
In-position range              :       1                   (1～250)
  (位置決め完了範囲)
Motor selection                :       0                   (0～99)
  (モータ選択)
Encoder pulse per revolution   :   32768 [pulse(x4)]      (4000～400000)
  (エンコーダパルス)
Feed per revolution            :   32768                   (1～1500000)
  (指令単位／機械１回転)
Gear ratio(motor side)         :       1 [/rev]            (1～10000000)
  (ギヤ比設定（モータ側）)
Gear ratio(machine side)       :       1 [/rev]            (1～10000000)
  (ギヤ比設定（機械側）)
```

Figure 6.321

4) The next parameter can be displayed with the Cursor Keys.



```
     MOTION PARAMETER

   PARAMETER(PP): 1    FILE NAME:

Feed per revolution                :     32768          (1~1500000)
   (指令単位/機械1回転)
Gear ratio(motor side)             :       1 [/rev]     (1~10000000)
   (ギヤ比設定(モータ側))
Gear ratio(machine side)           :       1 [/rev]     (1~10000000)
   (ギヤ比設定(機械側))
Motor rotational direction         :          reverse
   (モータ回転方向)                (          逆転)
                                   :          infinite
                                   (          無限長)
                                   :          rotational
                                   (          回転型)
Position command mode              :          increment
   (位置指令モード)                (          インクレ)
Position data type                 :          BCD
   (位置データのコード)            (          BCD)

          2 DETAIL          4                 6                 8
```

Figure 6.322

Note (1) Use the cursor keys to scroll the screen up and down.

(2) Do not change the value of the encoder pulse.

(3) The parameter number is a buffer number which specifies an area in the working memory to be used as a temporary memory for parameters.

(4) Editing parameters means saving parameter data from the Servo and editing it.

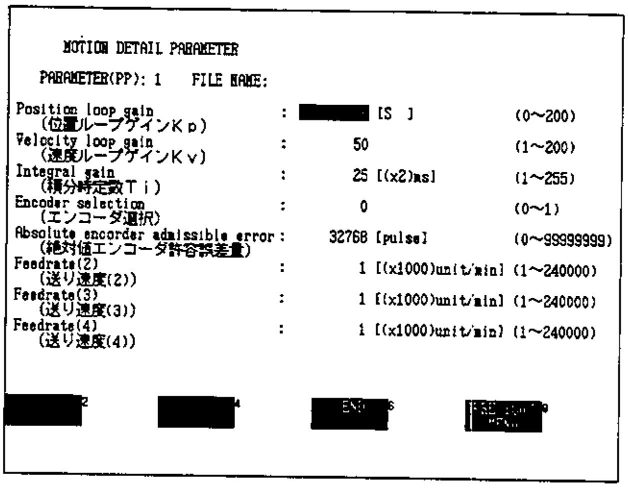
2. Setting Detailed Parameters

The menu used is for setting detailed parameters (the Submenu).

1) Display the Parameter Setting Screen shown in *Figure 6.321.*

2) Select Detail.

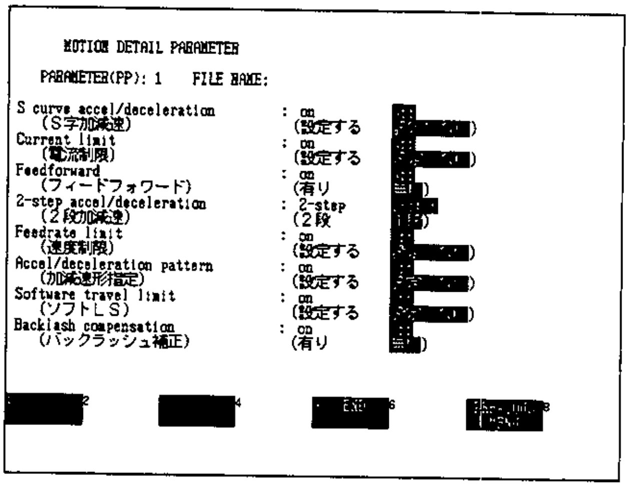
The Detailed Parameters Screen will be displayed.



```
MOTION DETAIL PARAMETER

PARAMETER(PP): 1    FILE NAME:

Position loop gain                      :          [S  ]                   (0~200)
   (位置ループゲインKp)
Velocity loop gain                      :      50                          (1~200)
   (速度ループゲインKv)
Integral gain                           :      25 [(x2)ms]                 (1~255)
   (積分時定数Ti)
Encoder selection                       :       0                          (0~1)
   (エンコーダ選択)
Absolute encorder admissible error      :   32768 [pulse]                  (0~99999999)
   (絶対値エンコーダ許容誤差量)
Feedrate(2)                             :       1 [(x1000)unit/min] (1~240000)
   (送り速度(2))
Feedrate(3)                             :       1 [(x1000)unit/min] (1~240000)
   (送り速度(3))
Feedrate(4)                             :       1 [(x1000)unit/min] (1~240000)
   (送り速度(4))
```

Figure 6.323

3) The next parameter can be displayed with the Cursor Keys.



```
MOTION DETAIL PARAMETER

PARAMETER(PP): 1    FILE NAME:

S curve accel/deceleration        : on
   (S字加減速)                      (設定する        )
Current limit                     : on
   (電流制限)                       (設定する        )
Feedforward                       : on
   (フィードフォワード)             (有り       )
2-step accel/deceleration         : 2-step
   (2段加減速)                      (2段        )
Feedrate limit                    : on
   (速度制限)                       (設定する        )
Accel/deceleration pattern        : on
   (加減速形指定)                   (設定する        )
Software travel limit             : on
   (ソフトLS)                       (設定する        )
Backlash compensation             : on
   (バックラッシュ補正)             (有り       )
```

Figure 6.324

Note (1) Use the cursor keys to scroll the screen up and down.

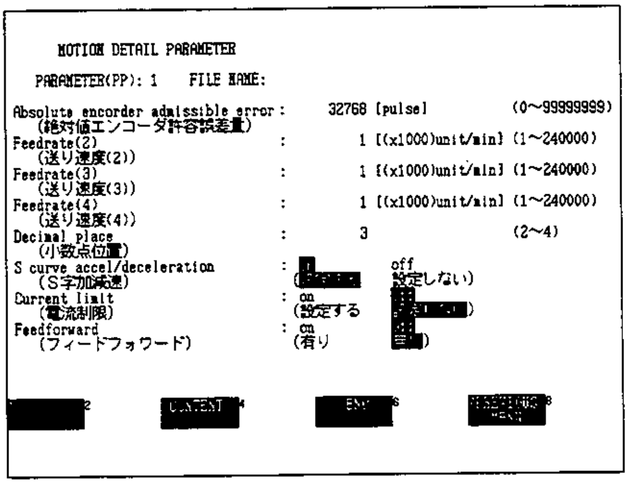
(2) Select Previous Menu to return to the screen displayed in *Figure 6.321* (the Main Menu).

3. Setting Detailed Parameters

As an example, the following example sets S-curve acceleration/deceleration.

1) Display the Detailed Parameters Screen shown in *Figure 6.323.*

2) Move the cursor to the location of the S-curve acceleration/deceleration.



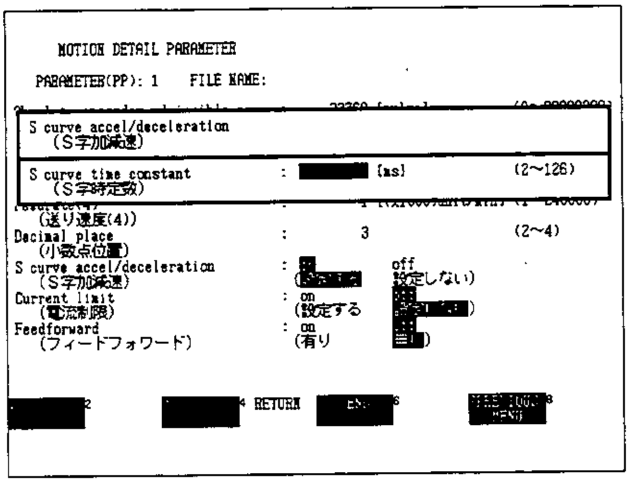
```
    MOTION DETAIL PARAMETER

  PARAMETER(PP): 1    FILE NAME:

Absolute encorder admissible error :     32768 [pulse]          (0~99999999)
   (絶対値エンコーダ許容誤差量)
Feedrate(2)                        :         1 [(x1000)unit/min] (1~240000)
   (送り速度(2))
Feedrate(3)                        :         1 [(x1000)unit/min] (1~240000)
   (送り速度(3))
Feedrate(4)                        :         1 [(x1000)unit/min] (1~240000)
   (送り速度(4))
Decimal place                      :         3                   (2~4)
   (小数点位置)
S curve accel/deceleration         :               off
   (S字加減速)                                     設定しない)
Current limit                      : on
   (電流制限)                        (設定する                  )
Feedforward                        : on
   (フィードフォワード)              (有り                      )
```

Figure 6.325

3) Use the cursor to switch this from OFF to ON.

4) Select Contents.

The screen for setting S-curve acceleration/deceleration will be displayed.



```
    MOTION DETAIL PARAMETER

  PARAMETER(PP): 1    FILE NAME:

 S curve accel/deceleration
   (S字加減速)

 S curve time constant             :          [ms]              (2~126)
   (S字時定数)

   (送り速度(4))
Decimal place                      :         3                   (2~4)
   (小数点位置)
S curve accel/deceleration         :               off
   (S字加減速)                                     設定しない)
Current limit                      : on
   (電流制限)                        (設定する                  )
Feedforward                        : on
   (フィードフォワード)              (有り                      )
```

Figure 6.326

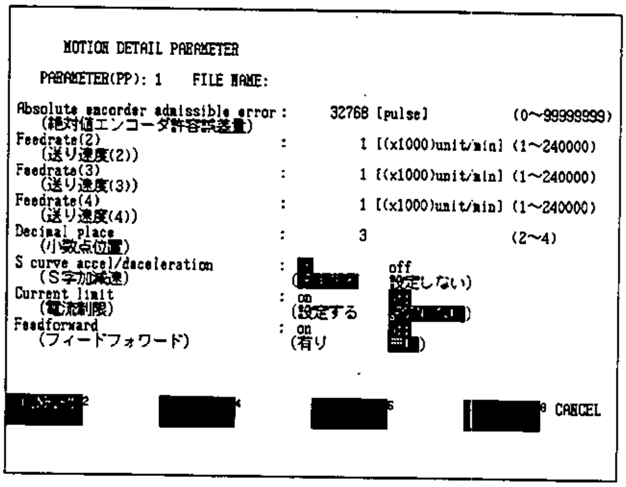
5) Input a value.

6) Select Return.

The operation is complete and the screen will return to the Detailed Parameters Screen.

When the Settings Have All Been Made

1) Select End. (Note (1))

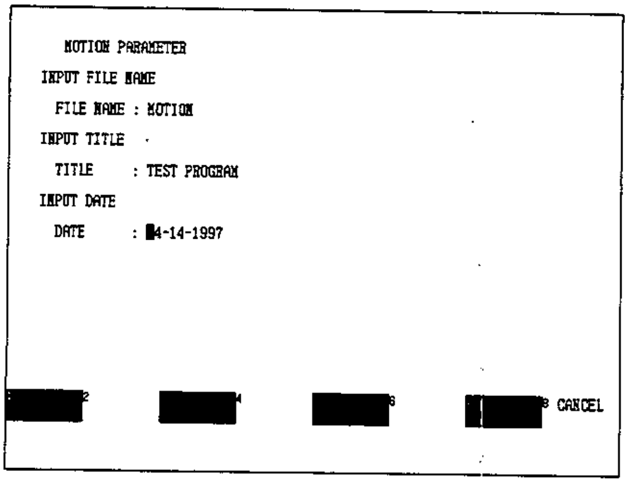


```
    MOTION DETAIL PARAMETER

   PARAMETER(PP): 1    FILE NAME:

Absolute encorder admissible error :      32768 [pulse]           (0~99999999)
   (絶対値エンコーダ許容誤差量)
Feedrate(2)                        :          1 [(x1000)unit/min] (1~240000)
   (送り速度(2))
Feedrate(3)                        :          1 [(x1000)unit/min] (1~240000)
   (送り速度(3))
Feedrate(4)                        :          1 [(x1000)unit/min] (1~240000)
   (送り速度(4))
Decimal place                      :          3                   (2~4)
   (小数点位置)
S curve accel/deceleration         :              off
   (S字加減速)                        (           設定しない)
Current limit                      : on
   (電流制限)                         (設定する            )
Feedforward                        : on
   (フィードフォワード)               (有り                )
```

Figure 6.327

2) Select Confirm.

3) Input the file name, title, and date. (Note (2))



```
   MOTION PARAMETER
 INPUT FILE NAME
   FILE NAME : MOTION
 INPUT TITLE
   TITLE     : TEST PROGRAM
 INPUT DATE
   DATE      : 04-14-1997
```

Figure 6.328

The screen will return to the Main Menu.

Note (1) End can be selected from either the Main Menu or the Submenu.

(2) File name: The parameter file name
Title: Any comment

6.3.4 Position Monitor

Monitoring Position

The current value for a motor axis can be viewed on screen.

1) Display the menu shown in *Figure 6.290.*

2) Select Position Monitor and press the Enter Key.

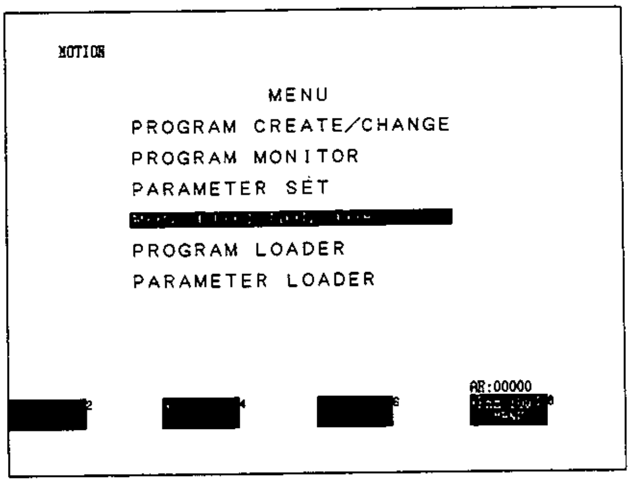
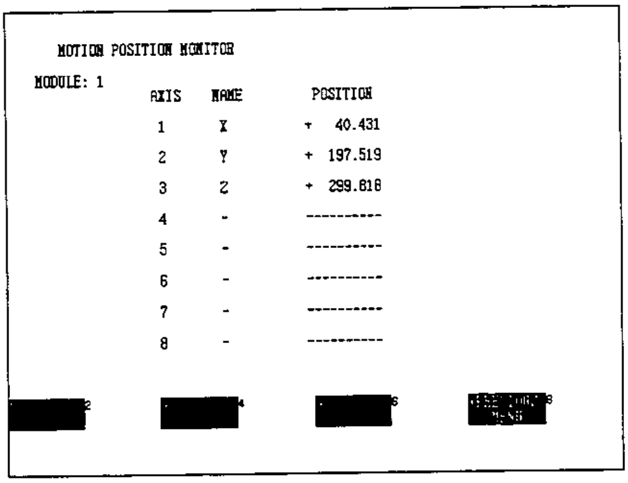

MOTION
MENU
PROGRAM CREATE/CHANGE
PROGRAM MONITOR
PARAMETER SET
PROGRAM LOADER
PARAMETER LOADER
AR:00000

Figure 6.329

3) Set the module number (from1 to 4), and press the Enter Key. (Note)

The current value will be displayed.



```
MOTION POSITION MONITOR
MODULE: 1
            AXIS   NAME      POSITION
             1      X       +   40.431
             2      Y       +  197.519
             3      Z       +  299.818
             4      -       ----------
             5      -       ----------
             6      -       ----------
             7      -       ----------
             8      -       ----------
```

Figure 6.330

Note This function monitors the axis connected to the specified IF66 module number. It is restricted to the axis stipulated on the DIP switch on the front panel of the IF66 Module.

6.3.5 Program Load

1. Program Loading Function

This operation loads and saves only the program.

1) Display the menu shown in *Figure 6.290.*

2) Select Program Loader and press the Enter Key.

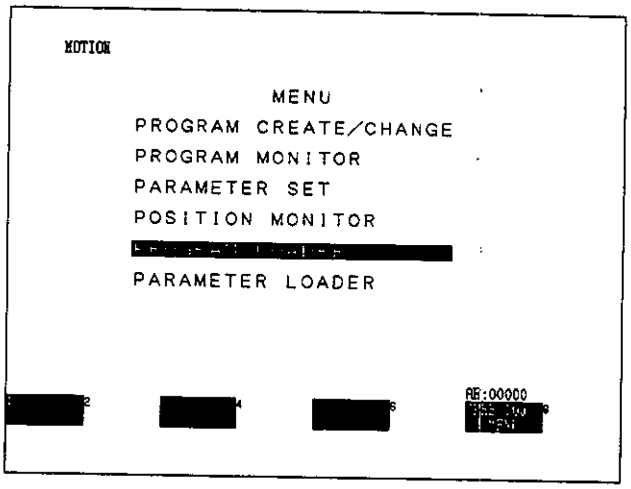
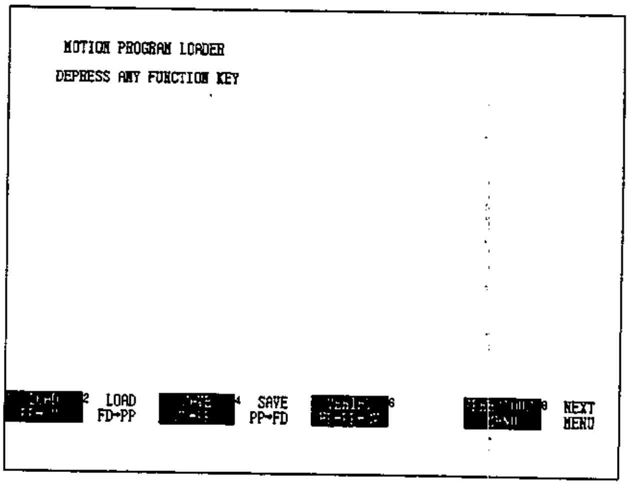

MOTION
MENU
PROGRAM CREATE/CHANGE
PROGRAM MONITOR
PARAMETER SET
POSITION MONITOR
PARAMETER LOADER
AB:00000
2
4
6
8

Figure 6.331

The Motion Program Loader Screen will be displayed.


MOTION PROGRAM LOADER

DEPRESS ANY FUNCTION KEY

2 LOAD
FD→PP
4 SAVE
PP→FD
6
8 NEXT
MENU

Figure 6.332

Function Key	Load/Save	Details
F1 PP→SV	Load	Writes from P120 to Servopack
F2 FD→PP	Load	Reads from floppy disk to P120
F3 SV→PP	Save	Reads from Servopack to P120
F4 PP→FD	Save	Writes from P120 to floppy disk
F5 FD→PP←SV	Verify	Compares floppy disk and P120

2. Writing (Loading) from P120 to Servopack

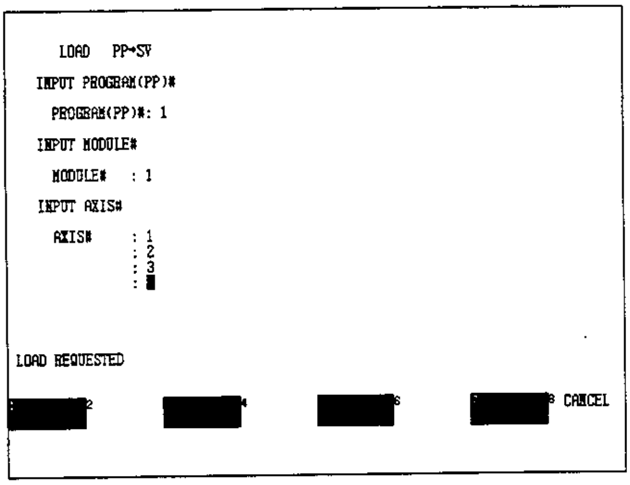
Use the following procedure to write from the P120 to the Servopack.

1) Display the Motion Program Loader Screen shown in *Figure 6.332.*

2) Select Load PP→SV.

3) Input the program number (from 1 to 8), and press the Enter Key.

4) Input the module number (from 1 to 4), and press the Enter Key. (See Note (1))



```
  LOAD   PP→SV
 INPUT PROGRAM(PP)#
  PROGRAM(PP)#: 1
 INPUT MODULE#
  MODULE#   : 1
 INPUT AXIS#
  AXIS#     : 1
            : 2
            : 3
            : █

LOAD REQUESTED
```

Figure 6.333

5) Input the axis number (from 1 to 8), and press the Enter Key.

6) Select Confirm.

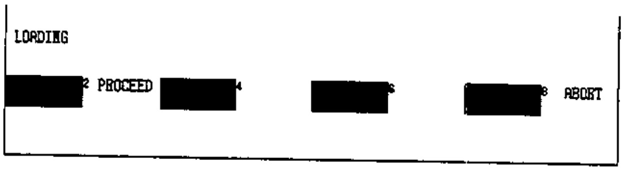
Load will be executed. (See Note (2))

7) Select End.

The loading is complete.

Note (1) Several access numbers can be specified.

(2) If Stop is selected while loading is in progress, the process will stop temporarily and the screen shown in *Figure 6.334* will be displayed.



```
LOADING
```

Figure 6.334

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader Screen.

3. Reading (Loading) from Floppy Disk to P120

Use the following procedure to read from a floppy disk to the P120.

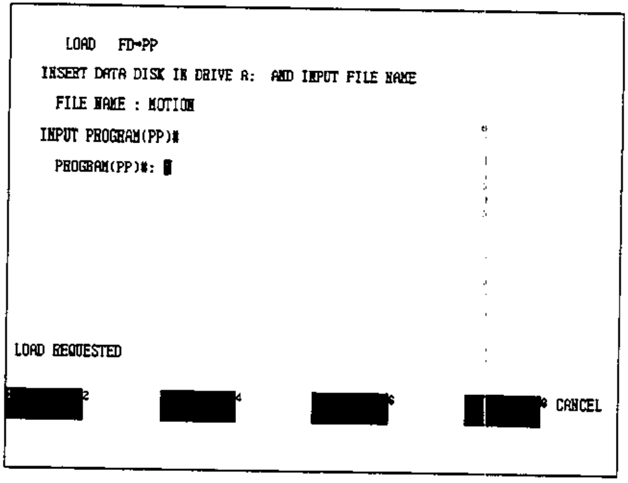
1) Display the Motion Program Loader Screen shown in *Figure 6.332*.

2) Select Load FD→PP.

3) Select File List.

4) Select the file name and press the Enter Key twice.

5) Input the program number (from 1 to 8), and press the Enter Key.



```
  LOAD   FD→PP
INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
  FILE NAME : MOTION
INPUT PROGRAM(PP)#
  PROGRAM(PP)#:

LOAD REQUESTED
```

Figure 6.335

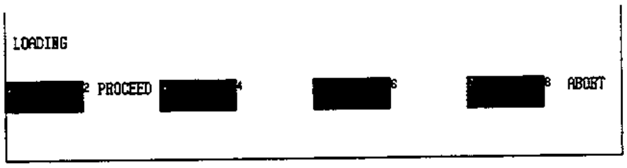
6) Select Confirm.

Load will be executed. (See Note)

7) Select End.

The loading is complete.

Note If Stop is selected while loading is in progress, the process will stop temporarily and the screen shown in *Figure 6.336* will be displayed.



```
LOADING
```

Figure 6.336

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader screen.

4. Reading (Saving) from Servopack to P120

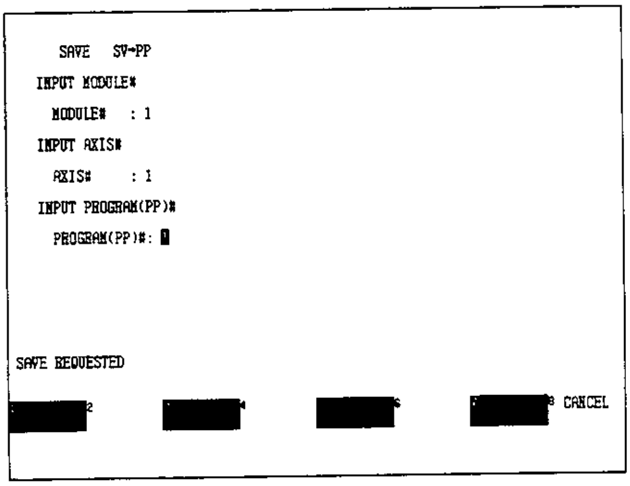
Use the following procedure to read from the Servopack to the P120.

1) Display the Motion Program Loader Screen shown in *Figure 6.332*.

2) Select Save SV→PP.

3) Input the module number (from 1 to 4), and press the Enter Key.

4) Input the axis number (from 1 to 8), and press the Enter Key.



```
  SAVE   SV→PP
 INPUT MODULE#
  MODULE#   : 1
 INPUT AXIS#
  AXIS#     : 1
 INPUT PROGRAM(PP)#
  PROGRAM(PP)#:

SAVE REQUESTED
```

Figure 6.337

5) Input the program number (from 1 to 8), and press the Enter Key.

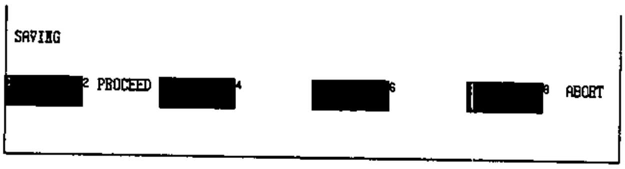
6) Save Requested will be displayed. Select Confirm.

   The save will be executed. (See Note)

7) Select End.

   The saving is complete.

Note If Stop is selected while saving is in progress, the process will stop temporarily and the screen shown in *Figure 6.338* will be displayed.



```
SAVING
```

Figure 6.338

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader Screen.

5. Writing (Saving) from P120 to Floppy Disk

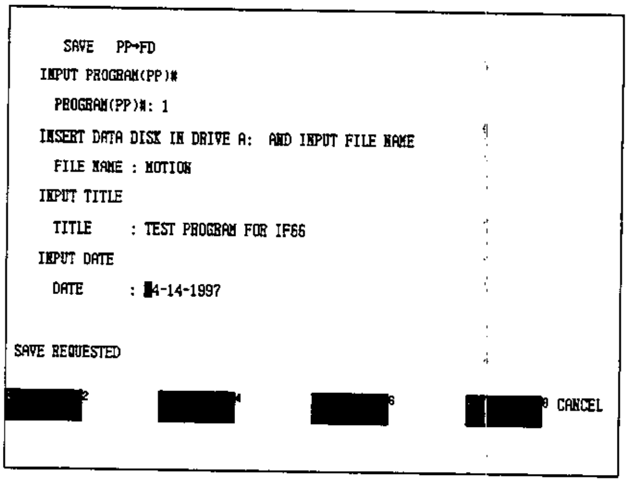
Use the following procedure to write from the P120 to a floppy disk.

1) Display the Motion Program Loader Screen shown in *Figure 6.332.*

2) Select Save PP→FD.

3) Input the program number (from 1 to 8), and press the Enter Key.

4) Input the file name, title, and date, and press the Enter Key.



```
   SAVE  PP→FD
 INPUT PROGRAM(PP)#
  PROGRAM(PP)#: 1
 INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
  FILE NAME : MOTION
 INPUT TITLE
  TITLE     : TEST PROGRAM FOR IF66
 INPUT DATE
  DATE      : █4-14-1997

SAVE REQUESTED
```

Figure 6.339

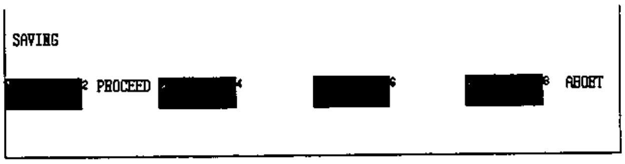
5) Select Confirm.

Save will be executed. (See Note)

6) Select End.

The saving is complete.

Note If Stop is selected while saving is in progress, the process will stop temporarily and the screen shown in *Figure 6.340* will be displayed.



```
SAVING
```

Figure 6.340

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader Screen.

6. Comparing the Floppy Disk with the Servopack (Verifying)

Use the following procedure to compare the data read from a floppy disk with the details of a motion program stored in the Servopack.

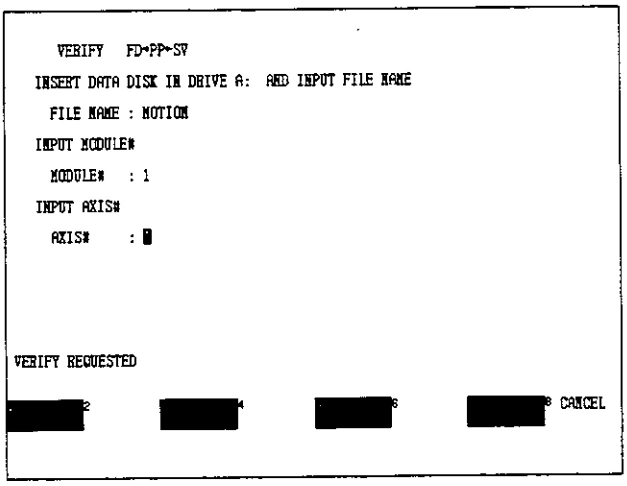
1) Display the Motion Program Loader Screen shown in *Figure 6.332*.

2) Select Verify FD→PP←SV.

3) Select File List.

4) Select the file name and press the Enter Key twice.

5) Input the module number (from 1 to 4), and press the Enter Key.



```
  VERIFY   FD→PP←SV
INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
 FILE NAME : MOTION
INPUT MODULE#
 MODULE#   : 1
INPUT AXIS#
 AXIS#     : █

VERIFY REQUESTED
```

Figure 6.341

6) Input the axis number (from 1 to 8), and press the Enter Key.

7) Select Confirm.

8) Verify is executed. (Note (1))

9) Verify ends.

Note (1) If Stop is selected while verifying is in progress, the process will stop temporarily and the screen shown in *Figure 6.342* will be displayed.

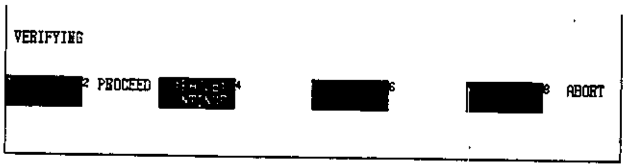

VERIFYING
2 PROCEED
4
6
8 ABORT

Figure 6.342

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader Screen.

(2) Make sure the Servopack motion program file name and the motion program file name on the floppy disk are the same.

6.3.6 Parameter Load

1. Parameter Loading Function

This operation loads and saves only parameters. Use the following procedure.

1) Display the Menu Screen.

2) Select Parameter Loader and press the Enter Key.

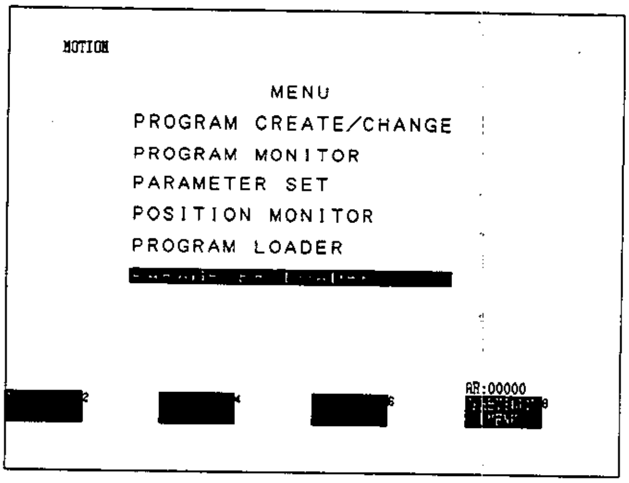
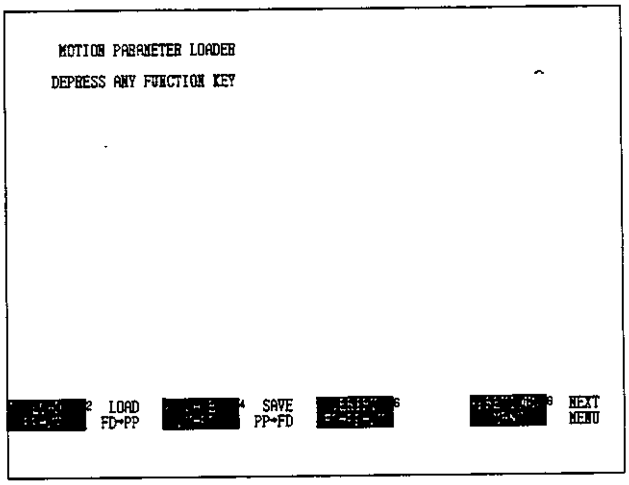

MOTION
MENU
PROGRAM CREATE/CHANGE
PROGRAM MONITOR
PARAMETER SET
POSITION MONITOR
PROGRAM LOADER
2
4
6
AR:00000
8

Figure 6.343

The Motion Parameter Loader Screen will be displayed.



MOTION PARAMETER LOADER

DEPRESS ANY FUNCTION KEY

Figure 6.344

Function Key	Load/Save	Details
F1 PP→SV	Load	Writes from P120 to Servopack
F2 FD→PP	Load	Reads from floppy disk to P120
F3 SV→PP	Save	Reads from Servopack to P120
F4 PP→FD	Save	Writes from P120 to floppy disk
F5 FD→PP←SV	Verify	Compares floppy disk and P120

Note If parameters are loaded with the Servopack in the Servo On condition, the status will change to Servo Off once loading is complete. Return to the Servo On condition by using the command SVON.

2. Writing (Loading) from P120 to Servopack

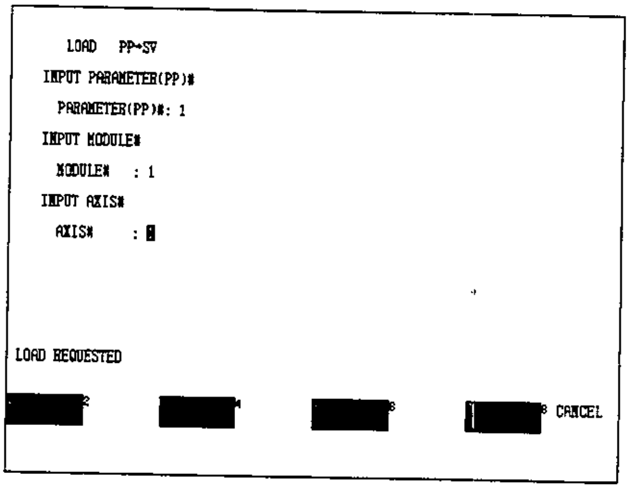
Use the following procedure to write from the P120 to the Servopack.

1) Display the Parameter Loader Screen shown in *Figure 6.344*.

2) Select Load PP→SV.

3) Input the parameter number (from 1 to 8), and press the Enter Key.

4) Input the module number (from 1 to 4), and press the Enter Key.



```
   LOAD   PP→SV
 INPUT PARAMETER(PP)#
   PARAMETER(PP)#: 1
 INPUT MODULE#
   MODULE#   : 1
 INPUT AXIS#
   AXIS#     : █



LOAD REQUESTED
          2         4         6         8 CANCEL
```

Figure 6.345

5) Input the axis number (from 1 to 8), and press the Enter Key. (Note (1))

Load Requested will be displayed.

6) Select Confirm.

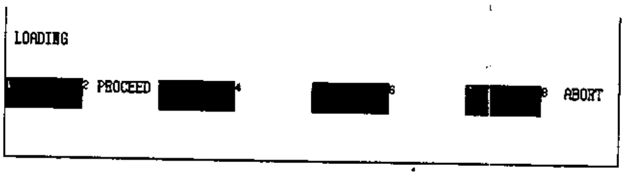
Load will be executed. (See Note (2))

7) Select End.

The loading is complete.

Note (1) Several axis numbers can be specified.

(2) If Stop is selected while loading is in progress, the process will stop temporarily and the screen shown in *Figure 6.346* will be displayed.



```
LOADING
          2 PROCEED         4         6         8 ABORT
```

Figure 6.346

Select Proceed to continue. Select Abort and the screen will return to the Parameter Loader Screen.

3. Reading (Loading) from Floppy Disk to P120

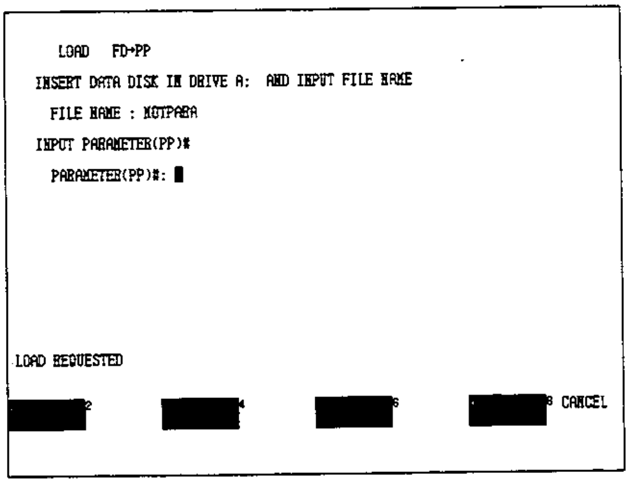
Use the following procedure to read from a floppy disk to the P120.

1) Display the Parameter Loader Screen shown in *Figure 6.344.*

2) Select Load FD→PP.

3) Select File List.

4) Select the file name and press the Enter Key twice.



```
  LOAD   FD→PP
INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
 FILE NAME : NOTPARA
INPUT PARAMETER(PP)#
 PARAMETER(PP)#: █

LOAD REQUESTED
```

Figure 6.347

5) Input the parameter number (from 1 to 8), and press the Enter Key.

   Load Requested will be displayed.

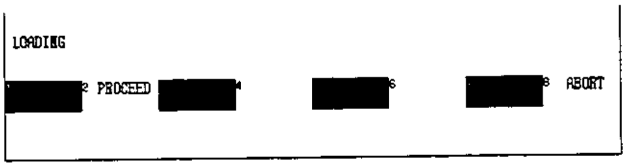
6) Select Confirm.

   Load will be executed. (See Note)

7) Select End.

   The loading is complete.

Note If Stop is selected while loading is in progress, the process will stop temporarily and the screen shown in *Figure 6.348* will be displayed.



```
LOADING
```

Figure 6.348

Select Proceed to continue. Select Abort and the screen will return to the Parameter Loader screen.

4. Reading (Saving) from Servopack to P120

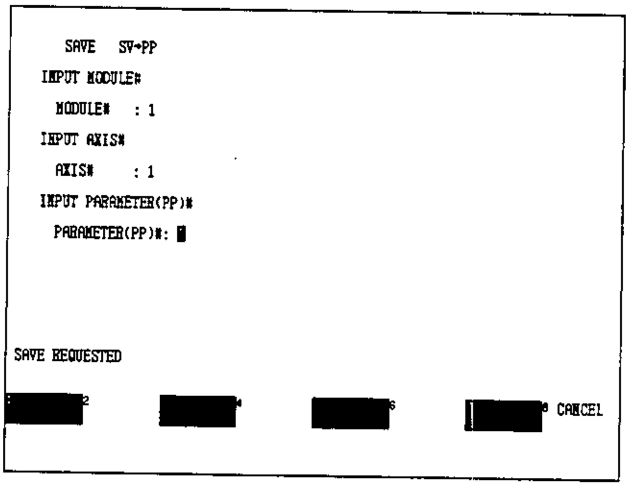
Use the following procedure to read from the Servopack to the P120.

1) Display the Parameter Loader Screen.

2) Select Save SV→PP.

3) Input the module number (from 1 to 4), and press the Enter Key.

4) Input the axis number (from 1 to 8), and press the Enter Key.



```
  SAVE   SV→PP
INPUT MODULE#
  MODULE#   : 1
INPUT AXIS#
  AXIS#     : 1
INPUT PARAMETER(PP)#
  PARAMETER(PP)#: █

SAVE REQUESTED
```

Figure 6.349

5) Input the parameter number (from 1 to 8), and press the Enter Key.

"Save Requested" will be displayed.

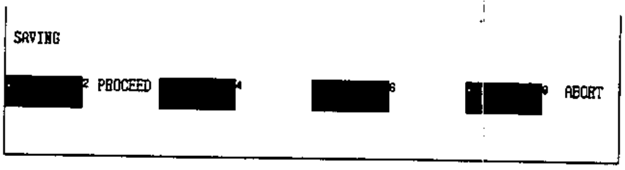
6) Select Confirm.

Save will be executed. (See Note)

7) Select End.

The saving is complete.

Note If Stop is selected while saving is in progress, the process will stop temporarily and the screen shown in *Figure 6.350* will be displayed.



```
SAVING
```

Figure 6.350

Select Proceed to continue. Select Abort and the screen will return to the Parameter Loader Screen.

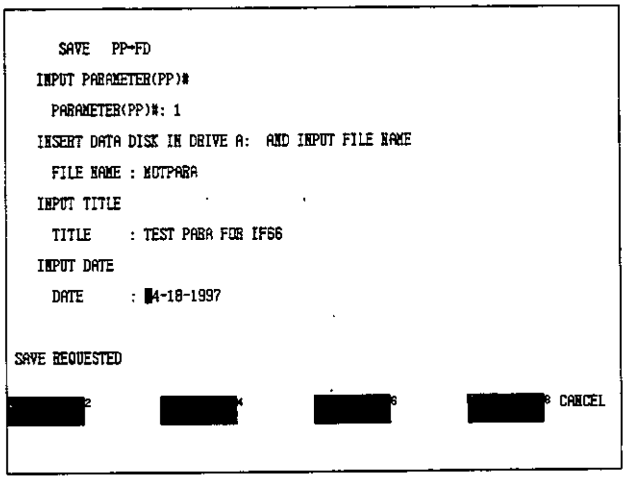
5. Reading (Saving) from P120 to floppy disk

Use the following procedure to read from the P120 to a floppy disk.

1) Display the Parameter Loader Screen shown in *Figure 6.344*.

2) Select Save PP→FD.

3) Input the parameter number (from 1 to 8), and press the Enter Key.



```
   SAVE   PP→FD
 INPUT PARAMETER(PP)#
   PARAMETER(PP)#: 1
 INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
   FILE NAME : MOTPARA
 INPUT TITLE
   TITLE     : TEST PARA FOR IF66
 INPUT DATE
   DATE      : █4-18-1997

SAVE REQUESTED
```

Figure 6.351

4) Input the file name, title, and date, and press the Enter Key.

   "Save Requested" will be displayed.

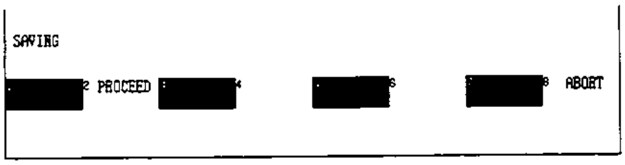
5) Select Confirm.

   Save will be executed. (See Note)

6) Select End.

   The saving is complete.

Note If Stop is selected while saving is in progress, the process will stop temporarily and the screen shown in *Figure 6.352* will be displayed.



```
SAVING
```

Figure 6.352

Select Proceed to continue. Select Abort and the screen will return to the Parameter Loader Screen.

6. Comparing the Floppy Disk with the Servopack (Verifying)

Use the following procedure to compare the information read from a floppy disk with the details of parameters stored in the Servopack.

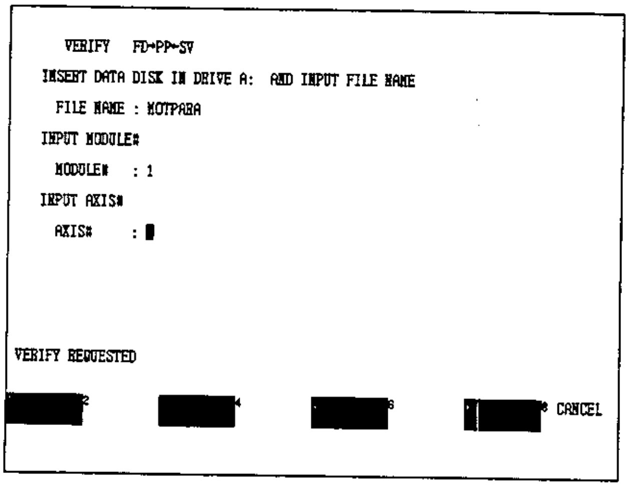
1) Display the Parameter Loader Screen shown in *Figure 6.344.*

2) Select Verify FD→PP←SV.

3) Select File List.

4) Select the file name and press the Enter Key twice.

5) Input the module number (from 1 to 4), and press the Enter Key.



```
   VERIFY   FD→PP←SV
 INSERT DATA DISK IN DRIVE A:  AND INPUT FILE NAME
  FILE NAME : MOTPARA
 INPUT MODULE#
  MODULE#   : 1
 INPUT AXIS#
  AXIS#     : █

VERIFY REQUESTED
```

Figure 6.353

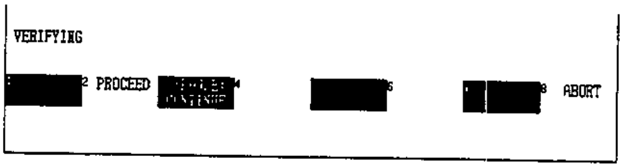
6) Input the axis number (from 1 to 8), and press the Enter Key.

7) Select Confirm.

Compare will be executed. (See Note (1))

The comparison is complete.

Note (1) If Stop is selected while the comparison is in progress, the process will stop temporarily and the screen shown in *Figure 6.354* will be displayed.



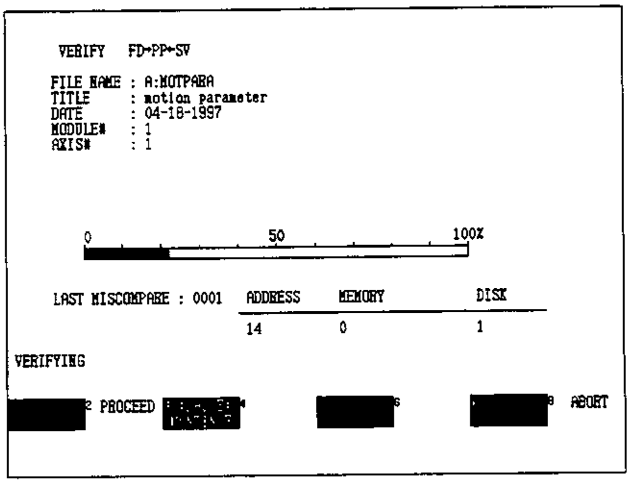
```
VERIFYING
```

Figure 6.354

Select Proceed to continue. Select Abort and the screen will return to the Motion Program Loader screen.

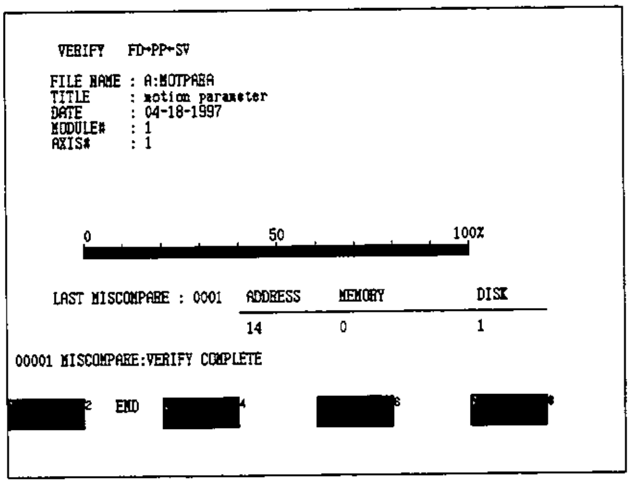
(2) If there is a discrepancy between the floppy disk and the Servopack, the screen will stop and a warning will be sounded. If ↑ Pause/Continue ↑ is set to Continue, the operation will continue to its completion. If it does stop, select Proceed to reactivate it.

(3) If the file names are the same but the contents are different, a verification error will occur. (See *Figures 6.355* and *6.356*)



```
VERIFY   FD→PP←SV

FILE NAME : A:MOTPARA
TITLE     : motion parameter
DATE      : 04-18-1997
MODULE#   : 1
AXIS#     : 1

LAST MISCOMPARE : 0001  ADDRESS   MEMORY        DISK
                        14        0             1
VERIFYING
```

Figure 6.355



```
VERIFY   FD→PP←SV

FILE NAME : A:MOTPARA
TITLE     : motion parameter
DATE      : 04-18-1997
MODULE#   : 1
AXIS#     : 1

LAST MISCOMPARE : 0001  ADDRESS   MEMORY        DISK
                        14        0             1
00001 MISCOMPARE:VERIFY COMPLETE
```

Figure 6.356

Table 6.4 When an Error Occurs as in *Figure 6.355*

Condition	Comments
Continue	The comparison will continue to the end, and the number of errors will be displayed. (See Note) *Figure 6.356*
Stop	1) Select Proceed until the end is reached and the number of errors will be displayed. (The comparison will stop each time selected.) 2) Select Stop and the comparison will be canceled.

Note The number of errors is displayed before the message "Miscompare" displayed at the bottom left-hand corner of the screen shown in *Figure 6.356.*

6.3.7 Error Messages

Table 6.5 shows the motion program and parameter error messages that can occur during P120 operation.

Table 6.5 Error Messages

Message	Cause
Invailed program #	A program area other than 1 to 8 has been chosen.
Invalid axis #	An axis number other than 1 to 8 has been chosen in the G-program Loader, Monitor, etc.
Duplicate axis #	An axis number has been duplicated in the program and parameter loader.
Invalid parameter	A parameter area other than 1 to 8 has been chosen.
Motion memory full	The G-program Edit has exceeded 2K.
Axis running	Load and/or save of a G-program or parameter data was confirmed while a motion command was being executed.
Invalid axis name	A configuration error for (X,Y,Z), (U,V,W), and (A,B,C) has occurred or a non-conforming name has been used.
Motion communication error	A communications error has occurred between the IF66 Module and the HR Servopack.
Motion program format error O _N _	A G-program formatting error has occurred in the Servopack when loading the program (Decimal point or similar)
No program in	There is no G-program in the Programming Panel or Servopack.
Mismatch program data	The contents of the P120 and Servopack programs are different in the G-program monitor.
Illegal axis number	The specified axis number was different when a G-program was loaded from the P120 to the Servopack.
Mismatch decimal place	The decimal point (parameter setting) is different between axes when loading the same program.
Invalid 0 #	A number outside 1 to 20 has been set as the O number.
Max block memory	There are more than 256 characters in one block.

6.4 File Management

6.4.1 File Management Procedures 6-236
6.4.2 P120 Transmission Parameters 6-237
6.4.3 Disk Operations 6-240
6.4.4 File Operations 6-244

File management includes operations involved with filing disks (user files), initializing disks, and setting P120 data transmission conditions, as listed below. These operations can be carried out with only the P120 in offline mode.

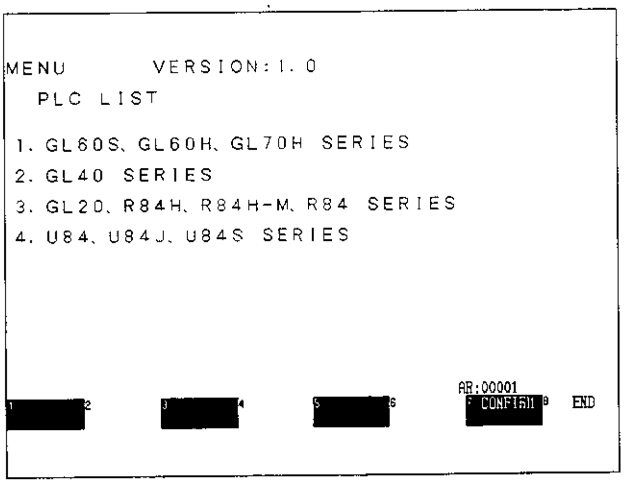
File Management

• Directory	Shows the names of files.
• Delete	Deletes unwanted files.
• Rename	Changes file names.
• Format	Formats (initializes) a new disk. Will delete all files on a hard disk.
• Check Disk	Checks usage status and checks records for errors.
• Copy	Copies files.
• Port Parameters	Sets data transmission conditions for communications ports.

6.4.1 File Management Procedures

Use the following procedures for managing files.

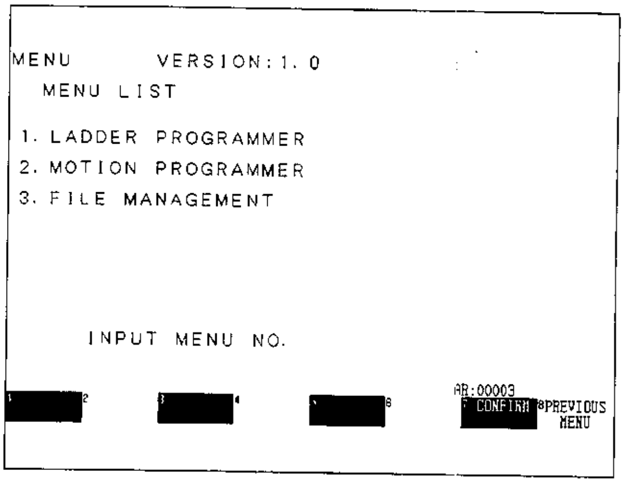
1) On the PLC List, select **1. GL60S, GL60H, GL70H Series.**



```
MENU        VERSION:1.0
  PLC LIST

1. GL60S、GL60H、GL70H SERIES
2. GL40 SERIES
3. GL20、R84H、R84H-M、R84 SERIES
4. U84、U84J、U84S SERIES

                                   AR:00001
```

Figure 6.357

2) Select Confirm and the Main List will be displayed.



```
MENU          VERSION:1.0
  MENU LIST

 1. LADDER PROGRAMMER
 2. MOTION PROGRAMMER
 3. FILE MANAGEMENT


      INPUT MENU NO.
```

Figure 6.358

3) Select **3. File Management** and then select Confirm.

Note (1) If the Attach Operation has already been completed, press the Supervisory Key and select Choose Model, or press the Shift + Supervisory Keys and return to the Menu List.

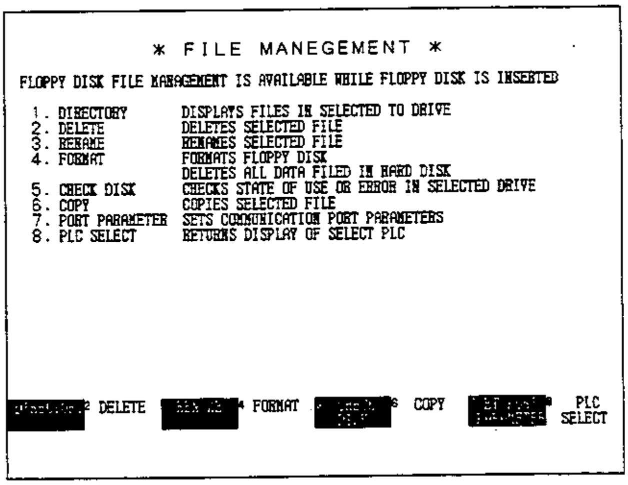
(2) Select Choose Model on the screen shown in *Figure 6.358* and the screen will change to the Menu List.

6.4.2 P120 Transmission Parameters

Setting Data Transmission Parameters

Use the following procedures to set the data transmission parameters for serial ports connecting the P120 with the GL60S, GL60H, or GL70H.

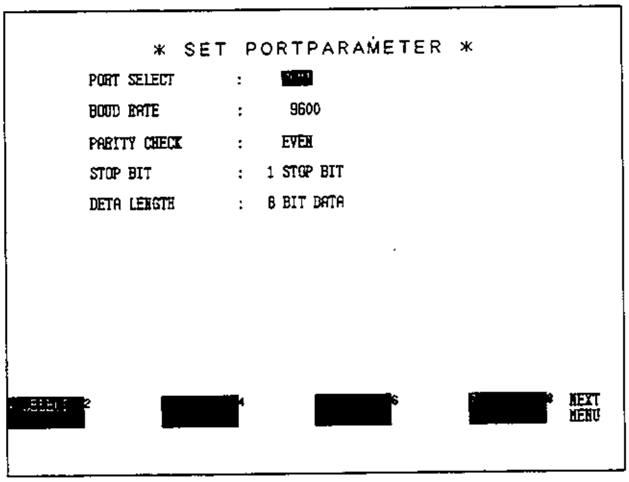
1) Display the File Management Screen.



```
                * FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED

 1. DIRECTORY       DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE          DELETES SELECTED FILE
 3. RENAME          RENAMES SELECTED FILE
 4. FORMAT          FORMATS FLOPPY DISK
                    DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK      CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY            COPIES SELECTED FILE
 7. PORT PARAMETER  SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT      RETURNS DISPLAY OF SELECT PLC
```

Figure 6.359

2) Select Set Port Parameters.



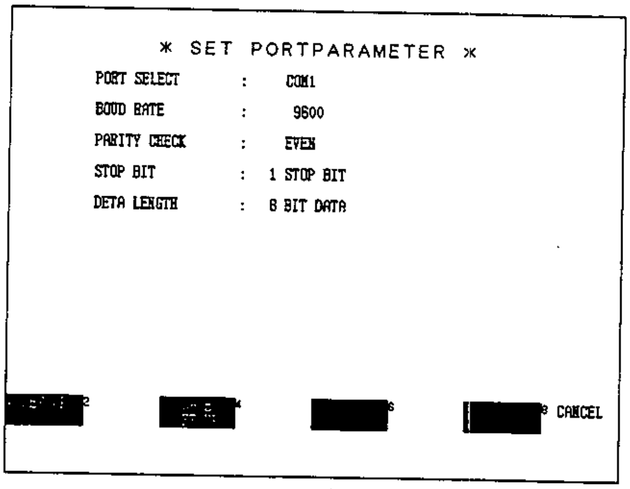
```
           * SET PORTPARAMETER *
   PORT SELECT     :
   BOUD RATE       :    9600
   PARITY CHECK    :   EVEN
   STOP BIT        :  1 STOP BIT
   DETA LENGTH     :  8 BIT DATA
```

Figure 6.360

3) Move the cursor to the item to be set.

4) Select Directory until desired setting is displayed.

5) When all the conditions have been chosen, select Next Menu.



```
* SET PORTPARAMETER *
PORT SELECT     :   COM1
BOUD RATE       :    9600
PARITY CHECK    :   EVEN
STOP BIT        : 1 STOP BIT
DETA LENGTH     : 8 BIT DATA
```

Figure 6.361

6) Choose Select.

The settings are complete.

Note (1) There is no need to perform this operation if the default GL60S, GL60H, or GL70H data transmission parameters are OK.

(2) The P120 has a data transmission parameters file on the hard disk. The default (initial) values are shown in *Figure 6.360*. To change these default parameters, set them on the hard disk. If the default parameters on the hard disk are changed to the required one, then there will be no need to change them every time the P120 is started. To change the parameters on the hard disk, choose Save Setup instead of Select on the screen shown in *Figure 6.361*.

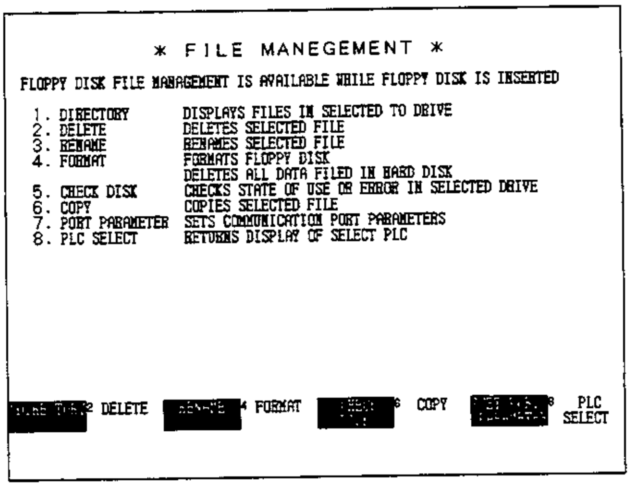
Item	Set Value
Baud rate	→ 75 → 110 → 150 → 300 → 600 → 19200 ← 9600 ← 4800 ← 2400 ← 1200 ←
Parity check	→ DISABLE → ODD → EVEN →
Stop bits	→ 1STOP BIT → 2STOP BIT →
Data length	→ 7BIT DATA → 8BIT DATA →

6.4.3 Disk Operations

1. Formatting Disks

Floppy disk:	Used to format a floppy disk to enable using it with the P120.
Hard disk:	Used to delete all the data on that disk.

1) Display the File Management Screen.



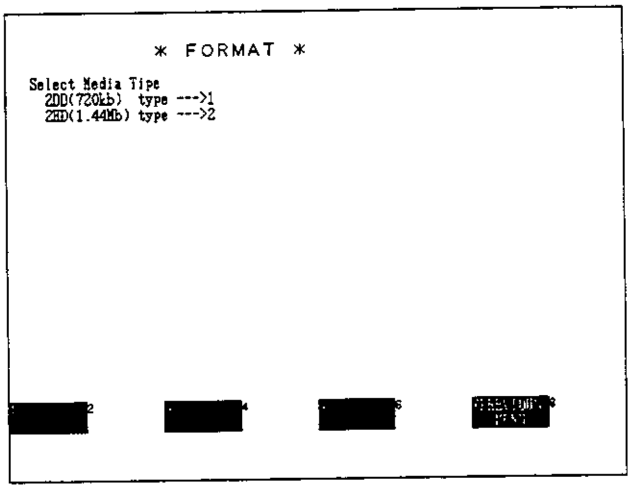
```
* FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED
 1. DIRECTORY        DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE           DELETES SELECTED FILE
 3. RENAME           RENAMES SELECTED FILE
 4. FORMAT           FORMATS FLOPPY DISK
                     DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK       CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY             COPIES SELECTED FILE
 7. PORT PARAMETER   SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT       RETURNS DISPLAY OF SELECT PLC
```

Figure 6.362

2) Select Format.

3) To format a floppy disk, select Floppy Disk. (See Note (2))

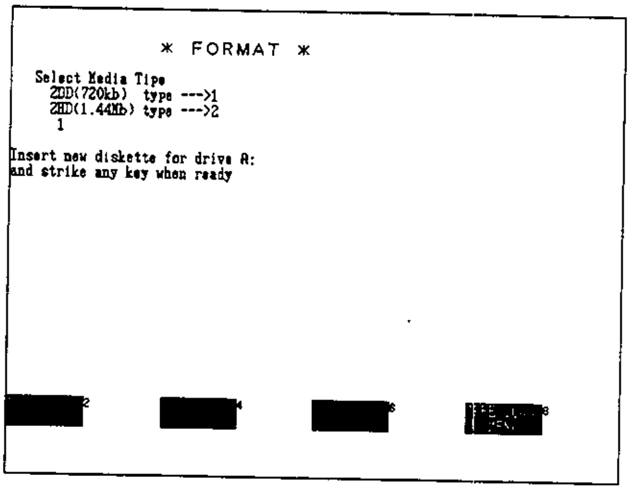
4) Insert the disk to be formatted into Drive A.



```
* FORMAT *
Select Media Tipe
  2DD(720kb)  type --->1
  2HD(1.44Mb) type --->2
```

Figure 6.363

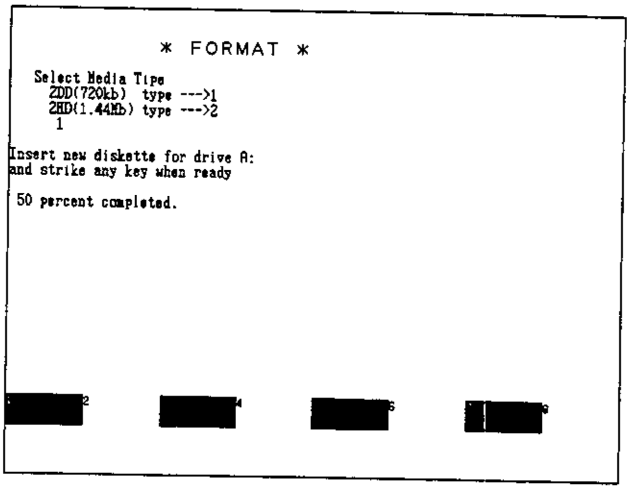
5) Select the media type.



```
* FORMAT *
Select Media Tipe
  2DD(720kb)  type --->1
  2HD(1.44Mb) type --->2
   1
Insert new diskette for drive A:
and strike any key when ready
```

Figure 6.364

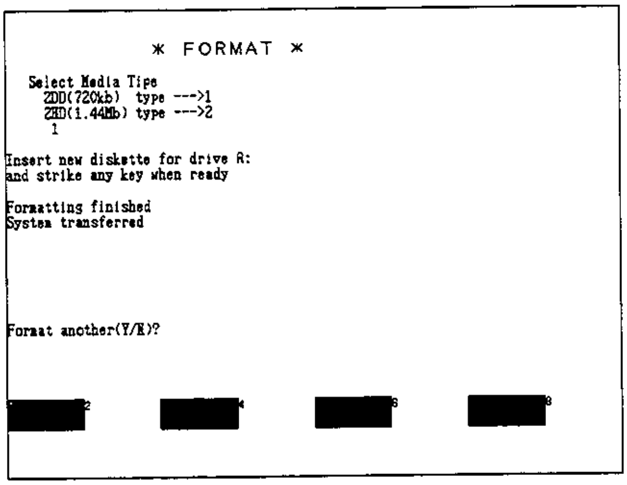
6) Press the Enter Key.



```
* FORMAT *
Select Media Tipe
  2DD(720kb)  type --->1
  2HD(1.44Mb) type --->2
   1
Insert new diskette for drive A:
and strike any key when ready
 50 percent completed.
```

Figure 6.365

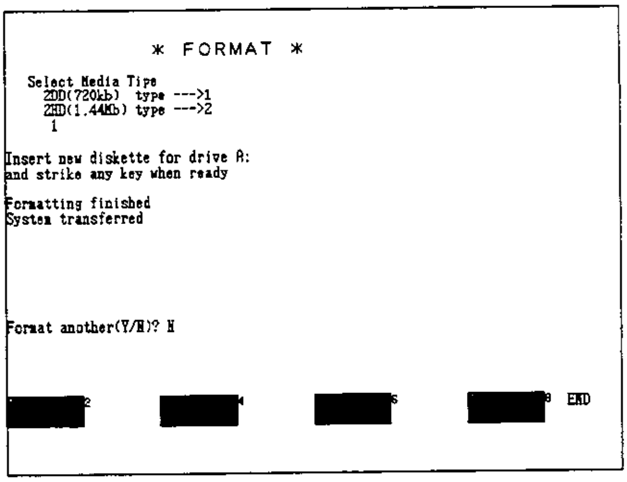
7) Press the Enter Key.



```
* FORMAT *

 Select Media Tipe
   2DD(720kb)  type --->1
   2HD(1.44Mb) type --->2
    1

Insert new diskette for drive A:
and strike any key when ready

Formatting finished
System transferred


Format another(Y/N)?
```

Figure 6.366

8) Enter "N."



```
* FORMAT *

 Select Media Tipe
   2DD(720kb)  type --->1
   2HD(1.44Mb) type --->2
    1

Insert new diskette for drive A:
and strike any key when ready

Formatting finished
System transferred


Format another(Y/N)? N
```

Figure 6.367

9) Select End.

Note (1) If you use a commercially available disk, make sure that it has the proper specifications and make sure you format it. When formatting it, make sure write protection is switched off.

(2) To format a hard disk, select Hard Disk.

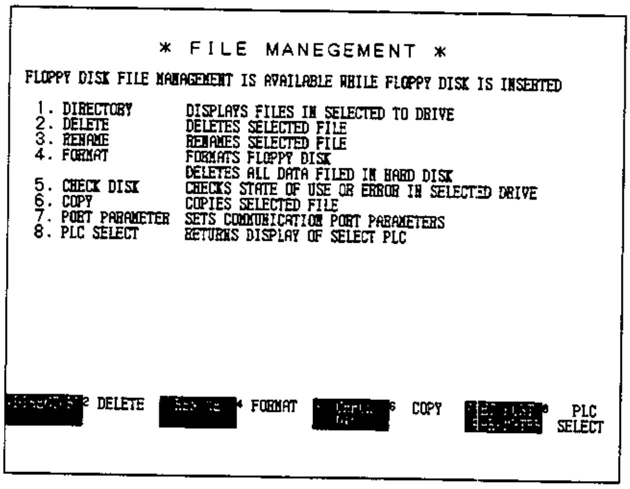
(3) When "N" is input at the screen shown in *Figure 6.365*, Previous Menu will be displayed. If Previous Menu is selected, the screen will return to the File Management Menu shown in *Figure 6.362*.

(4) Formatting completely destroys all the data on the disk. Use Delete to delete files from a disk that has already been formatted.

2. Checking a Disk

This procedure checks that there are no errors in a disk's status or its records. It is recommended to use Check Disk from time to time to make sure there are no errors in the directories and to see how much space is available on the disk. Use the following procedure to check a disk.

1) Display the File Management Screen.

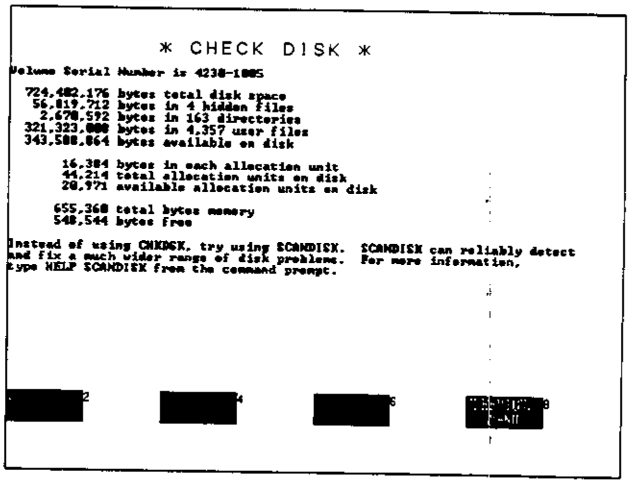


```
* FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED
 1. DIRECTORY       DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE          DELETES SELECTED FILE
 3. RENAME          RENAMES SELECTED FILE
 4. FORMAT          FORMATS FLOPPY DISK
                    DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK      CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY            COPIES SELECTED FILE
 7. PORT PARAMETER  SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT      RETURNS DISPLAY OF SELECT PLC
```

Figure 6.368

2) Select Check Disk.

3) To check a floppy disk, insert the disk into Drive A and select Floppy Disk. To check a hard disk, select Hard Disk.



```
* CHECK DISK *
Volume Serial Number is 4230-1005

  724,402,176 bytes total disk space
   56,819,712 bytes in 4 hidden files
    2,670,592 bytes in 163 directories
  321,323,008 bytes in 4,357 user files
  343,588,864 bytes available on disk

       16,384 bytes in each allocation unit
       44,214 total allocation units on disk
       20,971 available allocation units on disk

      655,360 total bytes memory
      548,544 bytes free

Instead of using CHKDSK, try using SCANDISK.  SCANDISK can reliably detect
and fix a much wider range of disk problems.  For more information,
type HELP SCANDISK from the command prompt.
```

Figure 6.369

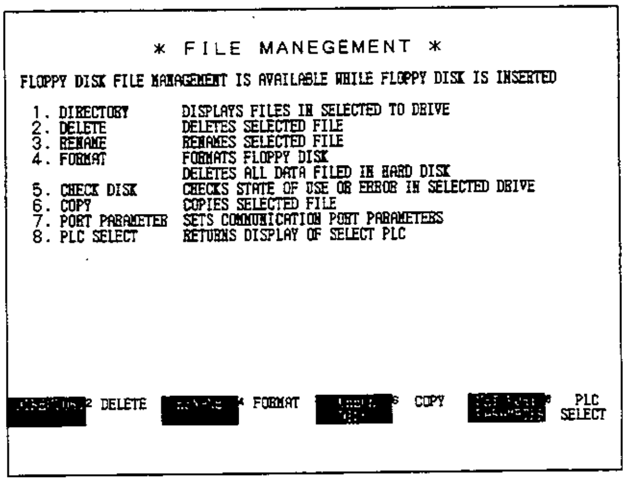
4) Select Previous Menu.

6.4.4 File Operations

1. Displaying a List of File Names

This procedure displays the directory information for a data disk. The directory contains the names of all the files as well as information on the size of the file, and when it was created or modified. Use the following procedure to display the directory list.

1) Display the File Management Screen.

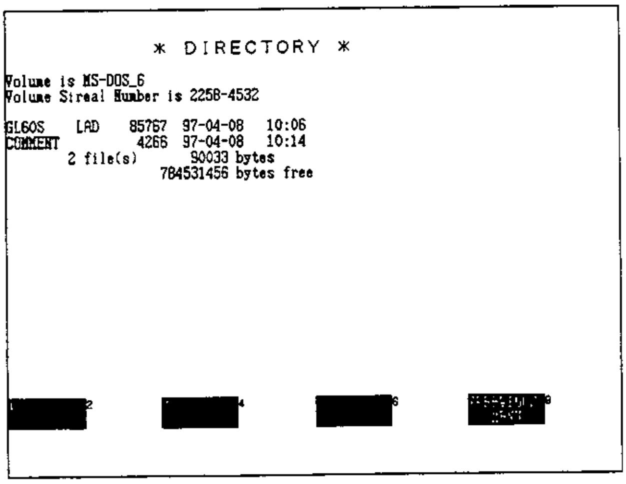


```
            * FILE  MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED

 1. DIRECTORY      DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE         DELETES SELECTED FILE
 3. RENAME         RENAMES SELECTED FILE
 4. FORMAT         FORMATS FLOPPY DISK
                   DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK     CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY           COPIES SELECTED FILE
 7. PORT PARAMETER SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT     RETURNS DISPLAY OF SELECT PLC
```

Figure 6.370

2) Select Directory.

3) To display the directory list of a floppy disk, insert the disk into Drive A and select Floppy Disk. To display the directory list of the hard disk, select Hard Disk.



```
            * DIRECTORY *
Volume is MS-DOS_6
Volume Streal Number is 2258-4532

GL60S    LAD    85767  97-04-08   10:06
COMMENT          4266  97-04-08   10:14
        2 file(s)       90033 bytes
                    784531456 bytes free
```

Figure 6.371

4) Select Previous Menu.

Note File names can be up to 8 characters long with extensions of up to 3 characters. Separate extensions with a period. The extensions may be omitted. The following characters may be used in file names and extensions.

A to Z 0 to 9 $ & # % / ( ) - @ _ ^{ } ~ !

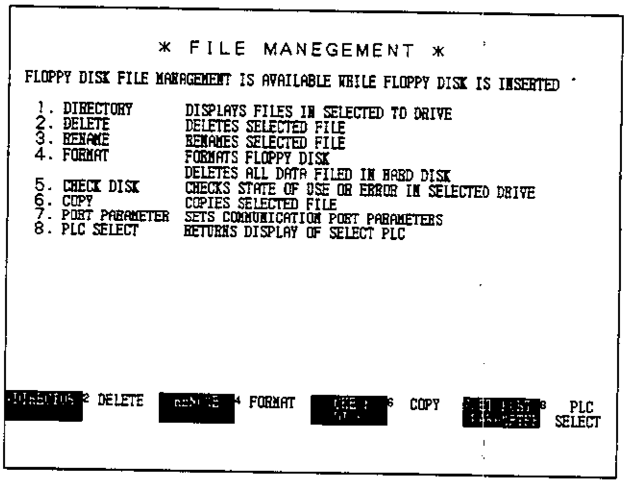
Both uppercase and lowercase characters can be used for file names. The P120 converts everything to uppercase characters. The following file names cannot be used because they are used by the system .

AUX CON LST PRN NUL
IO. SYS
MS DOS. SYS
COMMAND. COM

2. Changing File Names

The names of files on disks can be changed provided the new name is not the same as a file name already existing on the disk. Use the following procedures to change a file name.

1) Display the File Management Screen.

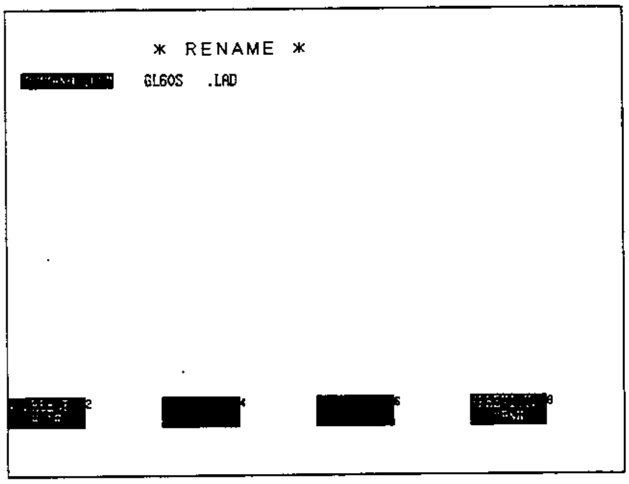


```
                  * FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED

 1. DIRECTORY       DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE          DELETES SELECTED FILE
 3. RENAME          RENAMES SELECTED FILE
 4. FORMAT          FORMATS FLOPPY DISK
                    DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK      CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY            COPIES SELECTED FILE
 7. PORT PARAMETER  SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT      RETURNS DISPLAY OF SELECT PLC
```

Figure 6.372

2) Select Rename.

3) To change the name of a file on a floppy disk, insert the disk into Drive A and select Floppy Disk. To change the name of a file on a hard disk, select Hard Disk.

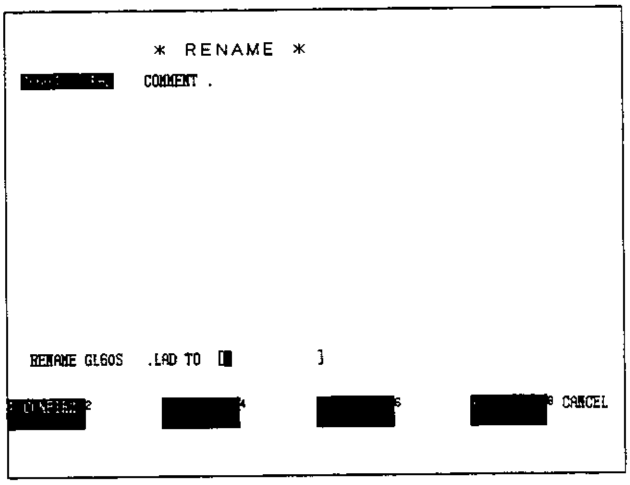


```
* RENAME *
GL60S   .LAD
```

Figure 6.373

4) Move the cursor to the location of the file name to be changed.

5) Choose Select File.

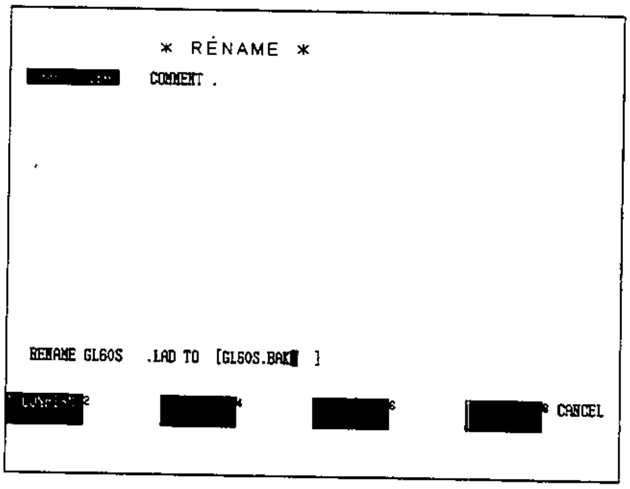


```
* RENAME *
COMMENT .

RENAME GL60S   .LAD TO [         ]
```

Figure 6.374

6) Input the name change (within 8 characters with ANK.)

7) Select Confirm. The change will be completed.



```
* RENAME *
        COMMENT .




RENAME GL60S  .LAD TO  [GL60S.BAK  ]
```

Figure 6.375

8) Select Previous Menu.

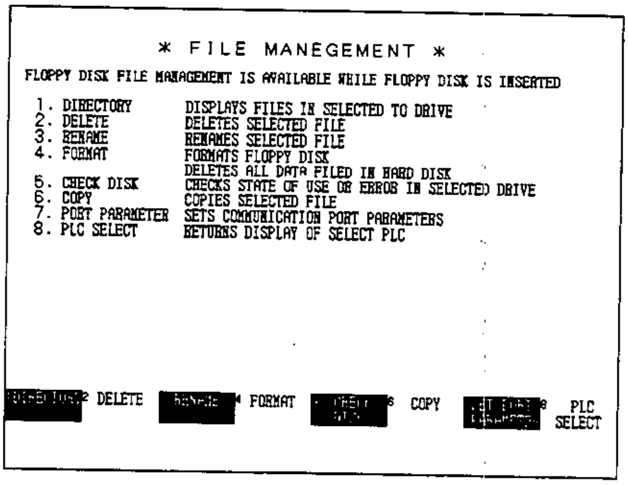
Note (1) Make sure the write-protect switch is turned off.

(2) Selecting Previous Menu in the screen shown in *Figure 6.375* will return the display to the screen shown in *Figure 6.373*.

3. Copying Files

Files can be copied in both directions between the hard disk and floppy disks. Use the following procedures.

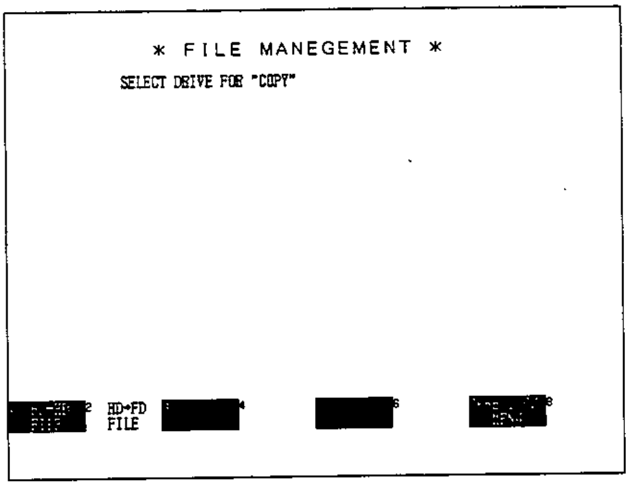
1) Display the File Management Screen.



```
* FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED
 1. DIRECTORY      DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE         DELETES SELECTED FILE
 3. RENAME         RENAMES SELECTED FILE
 4. FORMAT         FORMATS FLOPPY DISK
                   DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK     CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY           COPIES SELECTED FILE
 7. PORT PARAMETER SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT     RETURNS DISPLAY OF SELECT PLC
```

Figure 6.376

2) Select Copy.



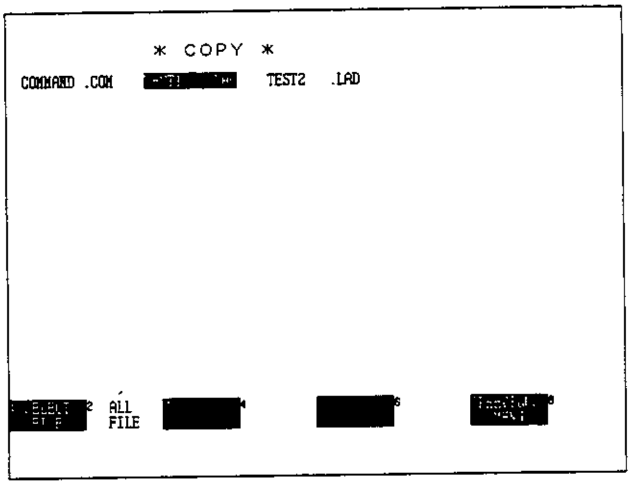
* FILE MANEGEMENT *

SELECT DRIVE FOR "COPY"

Figure 6.377

3) Insert the floppy disk into Drive A.

4) To copy from floppy disk to hard disk, select FD→HD File. To copy from hard disk to floppy disk, select HD→FD File.



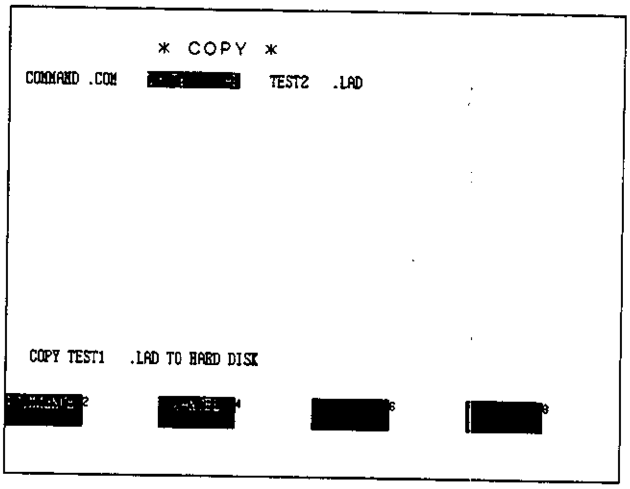
* COPY *

COMMAND .COM TEST2 .LAD

Figure 6.378

5) Move the cursor to the location of the file to be copied.

6) Choose Select File.



```
* COPY *
COMMAND .COM            TEST2   .LAD

COPY TEST1   .LAD TO HARD DISK
```

Figure 6.379

7) Select Commence and the change is completed.

8) Select Previous Menu.

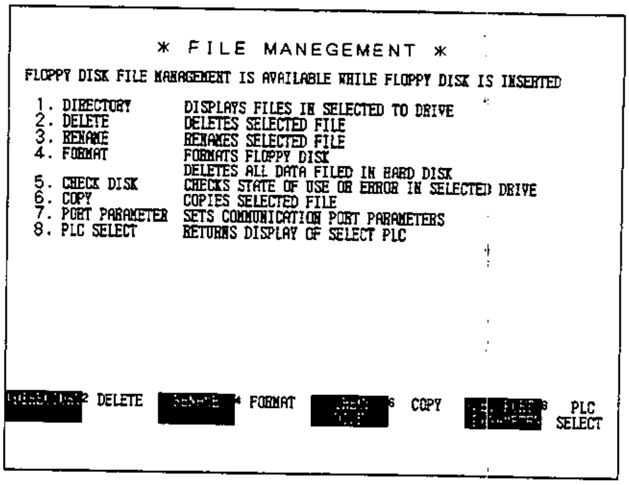
Note (1) Before trying to write to a floppy disk, make sure that it does not have the write-protect switch turned on.

(2) Select Previous Menu in the screen shown in *Figure 6.379* and the display returns to the screen shown in *Figure 6.377.*

4. Deleting Files

Use the following procedures to delete unwanted files.

1) Display the File Management Screen.

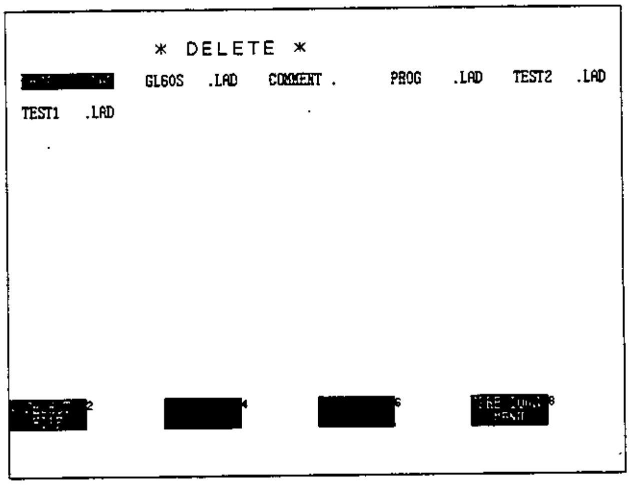


```
* FILE MANEGEMENT *
FLOPPY DISK FILE MANAGEMENT IS AVAILABLE WHILE FLOPPY DISK IS INSERTED
 1. DIRECTORY      DISPLAYS FILES IN SELECTED TO DRIVE
 2. DELETE         DELETES SELECTED FILE
 3. RENAME         RENAMES SELECTED FILE
 4. FORMAT         FORMATS FLOPPY DISK
                   DELETES ALL DATA FILED IN HARD DISK
 5. CHECK DISK     CHECKS STATE OF USE OR ERROR IN SELECTED DRIVE
 6. COPY           COPIES SELECTED FILE
 7. PORT PARAMETER SETS COMMUNICATION PORT PARAMETERS
 8. PLC SELECT     RETURNS DISPLAY OF SELECT PLC
```

Figure 6.380

2) Select Delete.

3) To delete a file on a floppy disk, insert the disk into Drive A and select Floppy Disk. To delete a file on a hard disk, select Hard Disk.

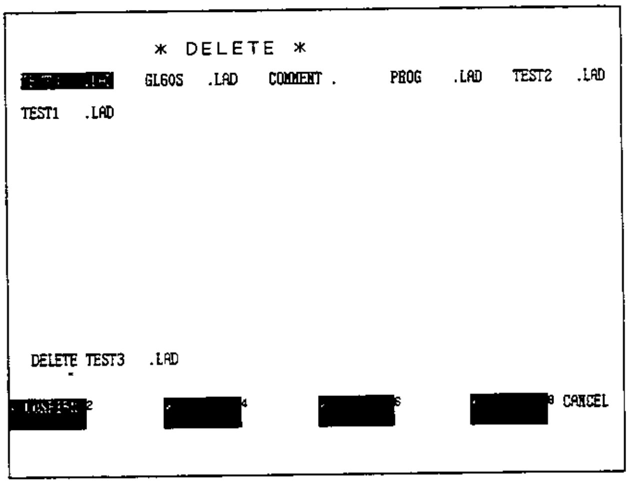


```
* DELETE *
          GL60S  .LAD  COMMENT .   PROG  .LAD  TEST2  .LAD
TEST1  .LAD
```

Figure 6.381

4) Move the cursor to the location of the file to be deleted.

5) Choose Select File.



```
* DELETE *
          GL60S  .LAD  COMMENT .   PROG  .LAD  TEST2  .LAD
TEST1  .LAD

DELETE TEST3  .LAD
```

Figure 6.382

6) Select Confirm and the deletion will be completed.

7) Select Previous Menu.

Note (1) Make sure that the disk does not have the write-protect switch turned ON.

(2) Make sure that the write-protect switch is turned ON for any disk that is important.

Online Operations: SFC Editing

7

This chapter describes the SFC Flow Screen, modes, conditions, status displays, and programming operations for SFC.

7.1 SFC Flow Screen **7-2**

7.2 Programming **7-4**

7.3 Mode **7-5**
- 7.3.1 The Mode Screen Display 7-5
- 7.3.2 Setting Conditions 7-7
- 7.3.3 Status Display 7-15

7.4 SFC Programming Operations **7-22**
- 7.4.1 SFC Flow Processing 7-24
- 7.4.2 SFC Action Circuits 7-83
- 7.4.3 SFC Transition Circuits 7-90

7.1 SFC Flow Screen

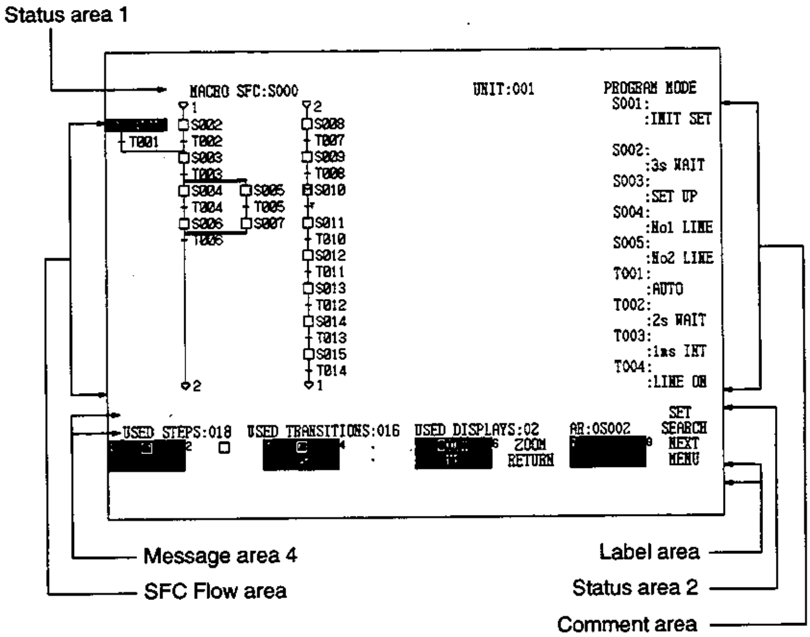

Status area 1
MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001:
:INIT SET
S002:
:3s WAIT
S003:
:SET UP
S004:
:No1 LINE
S005:
:No2 LINE
T001:
:AUTO
T002:
:2s WAIT
T003:
:1ms INT
T004:
:LINE ON
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:0S002
SET
SEARCH
NEXT
MENU
ZOOM
RETURN
Message area 4
SFC Flow area
Label area
Status area 2
Comment area

Figure 7.1 SFC Flow Screen

1) SFC Flow Area

This area displays the SFC flow and is stored in GL60S, GL60H, or GL70H. It displays one Macro SFC.

2) Comment Area

This area displays the comments input for steps. It consists of a cursor monitor area (the top row) and 8 reference setting areas below it.

3) Message Area

This area displays various messages giving guidance to the operator and showing the functional status of the P120, including displaying error messages.

4) Label Area

This area displays the functions of the Function Keys from F1 to F8 at the top of the keyboard.

5) Status Area

This area displays eight types of status data.

1) Macro SFC: S□□□
The number of the parent step on the macro-screen displayed on the screen.

2) Unit Number: □□□
The unit number of the GL60S, GL60H, or GL70H that is connected.

3) □□□□□□□□ Mode
The operating mode.

4) Number of Steps Used: □□□
The number of steps being used.

5) Number of Transitions Used: □□□
The number of transitions being used.

6) AR □□□□□
The contents of the assembly register, which holds the numerical values set from the keyboard.

7) Search Data
Search parameters.

8) Number of Displays Used: □□
Number of screens being used.

7.2 Programming

Use the following procedures for programming.

1) Connect the P120 and the GL60S, GL60H, or GL70H.

2) Turn ON the power to the P120.

3) From the PLC List, select 1. GL60S, GL60H, GL70H Series.

4) From the Main Menu, select 1. Ladder Programmer.

5) From the Main Menu, select Program Mode or Monitor Mode.

7.3 Mode

This operation sets the status for forced processing of steps. It also displays the status of steps with reference to the status of the reference numbers of relays and coils.

7.3.1 The Mode Screen Display 7-5
7.3.2 Setting Conditions 7-7
7.3.3 Status Display 7-15

7.3.1 The Mode Screen Display

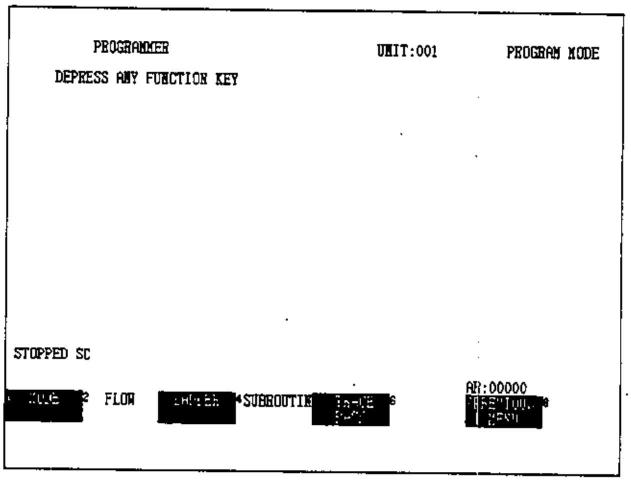
Use the following procedure to display the Mode Screen.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key. (See Note (1))

3) Stop the GL60S. (See Note (2))

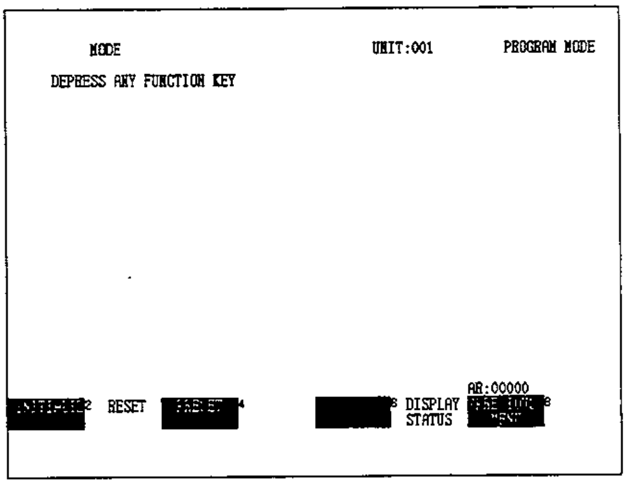
4) Select Programmer.



```
     PROGRAMMER                              UNIT:001        PROGRAM MODE
  DEPRESS ANY FUNCTION KEY



STOPPED SC
                                                     AR:00000
```

Figure 7.2

5) Select Mode.



MODE UNIT:001 PROGRAM MODE

DEPRESS ANY FUNCTION KEY

AR:00000

Figure 7.3

Note (1) The Attach Operation is not required if the PC is already online.

(2) The GL60S must be stopped only when setting conditions.

(3) The following three soft keys may be used to set conditions:

• Initialize Conditions:	Used to initialize.
• Reset Conditions:	Used to reset conditions.
• Preset Conditions:	Used to preset conditions.

(4) The following six soft keys may be used to display status after selecting Status Conditions:

• Display Hold Status:	Used to display the hold status of a step.
• Display Disable Status:	Used to display the disable status of a step.
• Display Active Status:	Used to display the active status of a step.
• Display Elapsed Time:	Used to display the active elapsed time of a step.
• Display Action Status:	Used to display the used status of an action program.
• Display Transition Status:	Used to display the used status of a transition program.

7.3.2 Setting Conditions

This operation enables setting conditions for forced step processing while referring to the status of the reference numbers of relays and coils.

1. Initialize

This operation is used to set the condition to change to active status after the conditions for the initial step have been met. It uses the reference number of coil or relay to make the setting. Use the following procedure for initialization.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Initialize.

3) Select Next Menu.

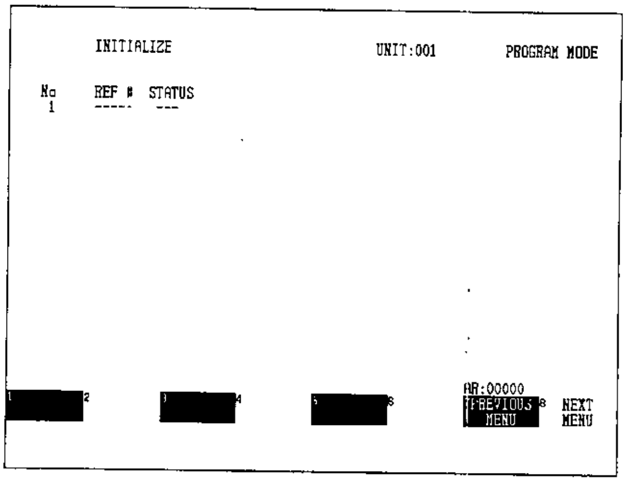

INITIALIZE
UNIT:001
PROGRAM MODE
No 1
REF # -----
STATUS ---
AR:00000
1
2
3
4
5
6
7 PREVIOUS MENU
8 NEXT MENU

Figure 7.4

4) Enter **10001** in the AR and select Set Reference Number.

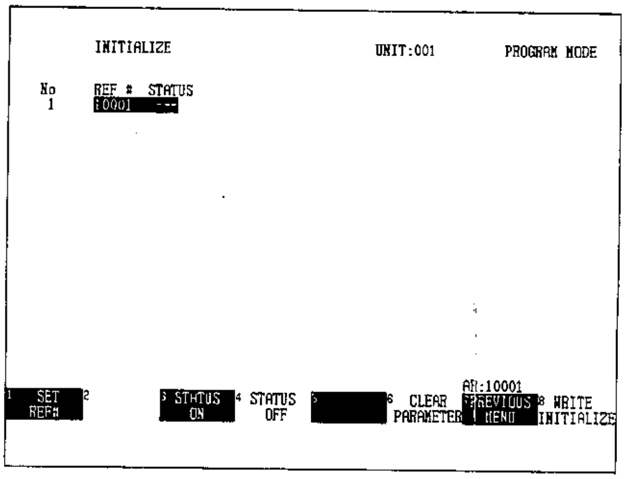
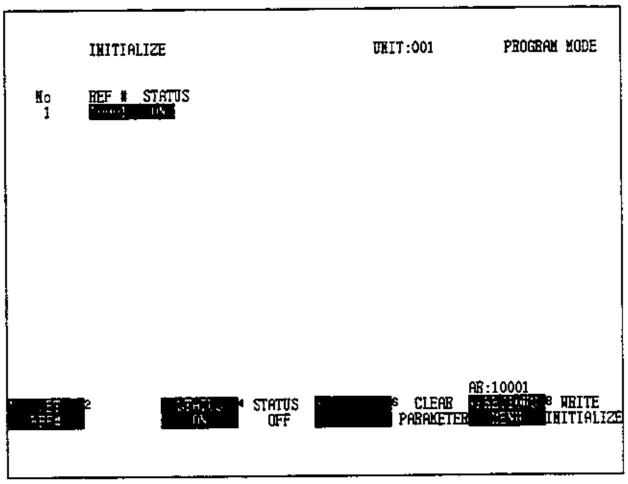

INITIALIZE
UNIT:001
PROGRAM MODE
No 1
REF # 10001
STATUS ---
AR:10001
1 SET REF#
2
3 STATUS ON
4 STATUS OFF
5
6 CLEAR PARAMETER
7 PREVIOUS MENU
8 WRITE INITIALIZE

Figure 7.5

5) Select Status On.



```
INITIALIZE                    UNIT:001          PROGRAM MODE

No    REF #  STATUS
 1    [illegible]   ON
```

Figure 7.6

6) Select Write Initialize. (See Note (2))

Note (1) Stop the GL60S, GL60H, or GL70H before performing the Initialize Operation.

(2) Settings will not be stored in the memory of the GL60S, GL60H, or GL70H unless Write Initialize is selected.

(3) To delete a setting after it has been entered, select Clear Parameter then Write Initialize. This will delete the contents of the memory of the GL60S, GL60H, or GL70H.

(4) Select Previous Menu to return to the previous screen.

(5) Only one condition can be set.

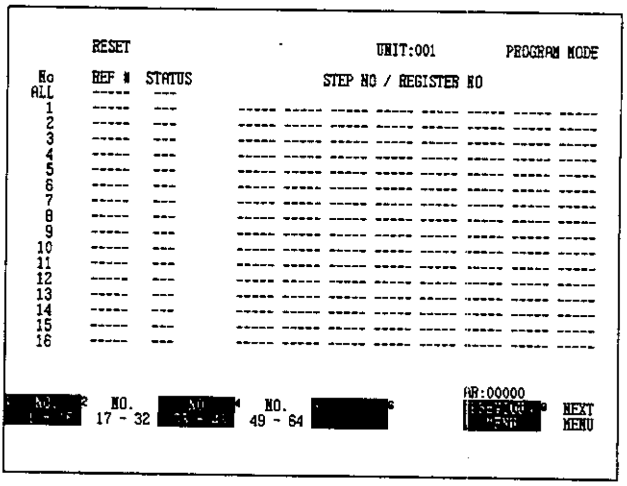
(6) Monitor Mode is for monitoring only. Settings cannot be made in Monitor Mode.

2. Reset

This operation changes any step to inactive status after the conditions have been met. The reference number of the relay or coil is used. To set a step, use the step number or input register number in the Step Number/Register Number area. Use the following procedures to set the conditions for Reset.

1) Display the Mode Screen shown in *Figure 7.3*.

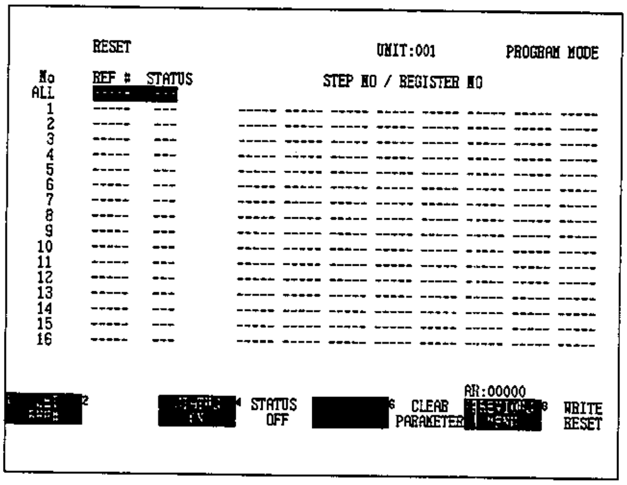
2) Select Reset.



```
         RESET                                  UNIT:001        PROGRAM MODE
 No      REF #   STATUS               STEP NO / REGISTER NO
ALL      -----    ---
  1      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  2      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  3      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  4      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  5      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  6      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  7      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  8      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  9      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 10      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 11      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 12      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 13      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 14      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 15      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 16      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----

                                                         AR:00000
   NO.    2   NO.       NO      4   NO.              6    [illegible]  8  NEXT
 1 - 16     17 - 32   33 - 48     49 - 64                  MENU           MENU
```

Figure 7.7

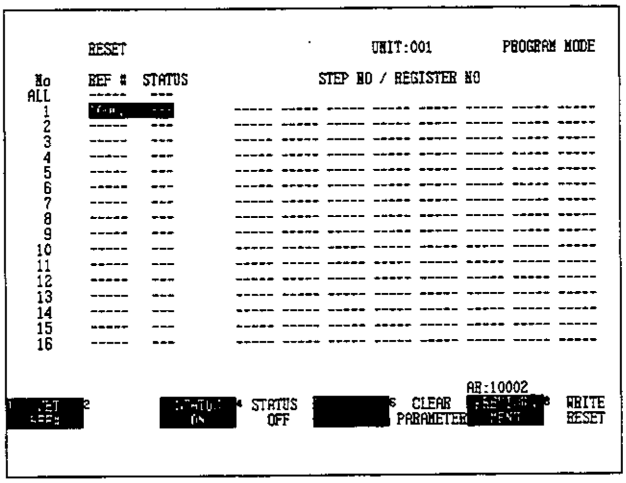
3) Select Next Menu.



```
         RESET                                  UNIT:001        PROGRAM MODE
 No      REF #   STATUS               STEP NO / REGISTER NO
ALL      -----    ---
  1      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  2      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  3      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  4      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  5      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  6      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  7      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  8      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
  9      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 10      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 11      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 12      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 13      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 14      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 15      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----
 16      -----    ---        ----- ----- ----- ----- ----- ----- ----- -----

                                                         AR:00000
 [illegible] 2              STATUS  4  STATUS               6  CLEAR      PREVIOUS  8  WRITE
                              ON        OFF                  PARAMETER    MENU        RESET
```

Figure 7.8

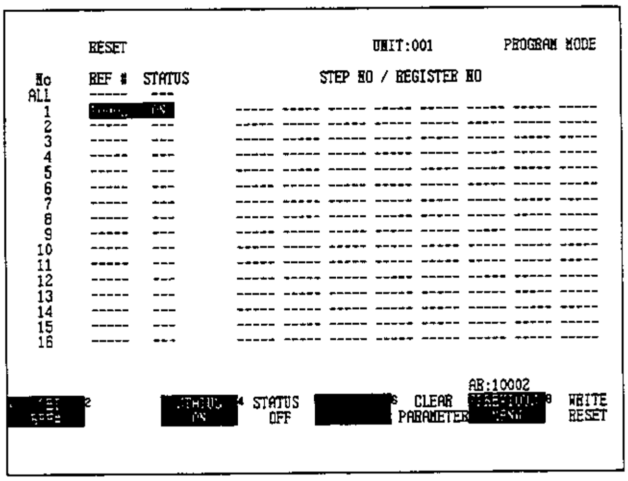
4) Move the cursor to the reference number input area, enter "10002" in the AR, and select Set Reference Number.



```
        RESET                                  UNIT:001        PROGRAM MODE

   No   REF #  STATUS                   STEP NO / REGISTER NO
  ALL   -----   ---
    1                     ----- ----- ----- ----- ----- ----- ----- -----
    2   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    3   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    4   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    5   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    6   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    7   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    8   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    9   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   10   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   11   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   12   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   13   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   14   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   15   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   16   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----

                                                     AR:10002
 1         2             4 STATUS           5  CLEAR            8 WRITE
                             OFF               PARAMETER          RESET
```

Figure 7.9

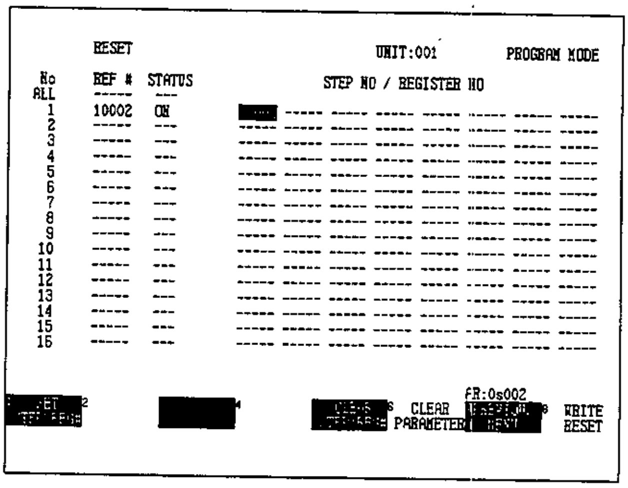
5) Select Status On.



```
        RESET                                  UNIT:001        PROGRAM MODE

   No   REF #  STATUS                   STEP NO / REGISTER NO
  ALL   -----   ---
    1           ON        ----- ----- ----- ----- ----- ----- ----- -----
    2   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    3   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    4   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    5   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    6   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    7   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    8   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
    9   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   10   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   11   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   12   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   13   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   14   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   15   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----
   16   -----   ---       ----- ----- ----- ----- ----- ----- ----- -----

                                                     AR:10002
           2             4 STATUS           5  CLEAR            8 WRITE
                             OFF               PARAMETER          RESET
```

Figure 7.10

6) Move the cursor to the Step Number/Register Number area, enter "S002" in the AR, and select Set Reference Number.



```
     RESET                                UNIT:001       PROGRAM MODE

No   REF #  STATUS              STEP NO / REGISTER NO
ALL  -----  ---
 1   10002  ON      ----- ----- ----- ----- ----- ----- ----- -----
 2   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 3   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 4   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 5   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 6   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 7   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 8   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
 9   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
10   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
11   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
12   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
13   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
14   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
15   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----
16   -----  ---     ----- ----- ----- ----- ----- ----- ----- -----

                                              AR:0s002
                                    CLEAR                 WRITE
                                    PARAMETER             RESET
```

Figure 7.11

7) If there are several conditional step numbers, move the cursor and set them in succession.

8) Repeat steps 4) to 7).

9) Select Write Reset. (See Note (2))

Note (1) Stop the GL60S, GL60H, or GL70H before performing the Reset Operation.

(2) The settings will not be stored in the memory of the GL60S, GL60H, or GL70H unless Write Reset is selected.

(3) To delete a setting after it has been entered, move the cursor to the location of the data to be deleted and select Clear Parameter or Clear Reference Number, and then select Write Reset. This will delete the contents of the memory of the GL60S, GL60H, or GL70H.

(4) To return to the previous screen, select Previous Menu.

(5) Up to 65 conditions (in the numbers section) can be set. To change the screen display of the numbers of conditions to be set, select from "Numbers 1 to 16" to "Numbers 49 to 64."

(6) Monitor Mode is for monitoring only. Settings cannot be made in Monitor Mode.

(7) Move the cursor in the numbers section with the Up Cursor, Down Cursor, Left Cursor and Right Cursor Keys.

3. Preset

This operation sets a step to active status after the conditions have been met. The reference number of the relay or coil is used. To set a step, use the step number or input register number in the Step Number/Register Number area. Use the following procedures to set the Preset Operation.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Preset.

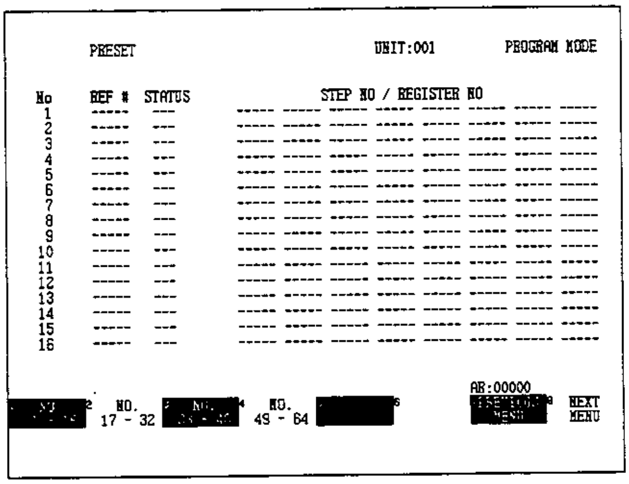

PRESET
UNIT:001
PROGRAM MODE
No
REF #
STATUS
STEP NO / REGISTER NO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
AR:00000
NO.
17 - 32
NO.
49 - 64
NEXT
MENU

Figure 7.12

3) Select Next Menu.

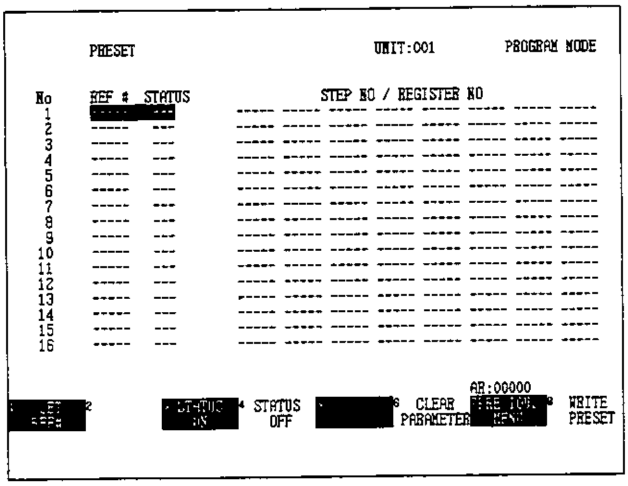
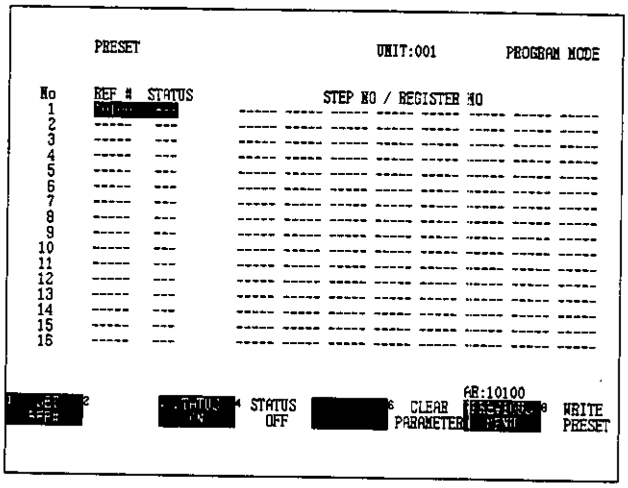

PRESET
UNIT:001
PROGRAM MODE
No
REF #
STATUS
STEP NO / REGISTER NO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
AR:00000
STATUS
ON
STATUS
OFF
CLEAR
PARAMETER
WRITE
PRESET

Figure 7.13

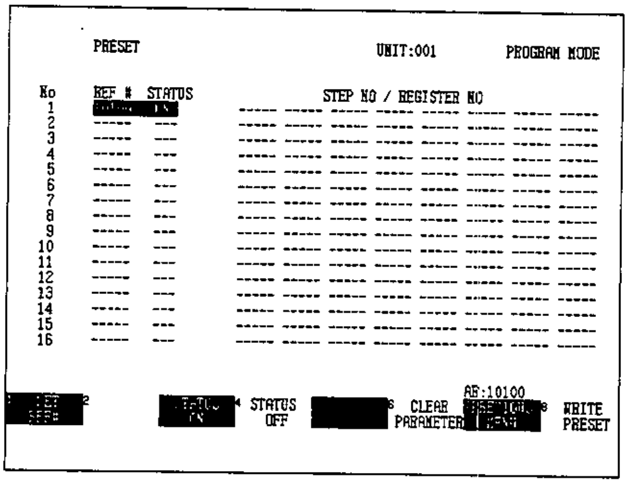
4) Move the cursor to the reference number input area, enter "10100" in the AR, and select Set Reference Number.



```
    PRESET                                  UNIT:001        PROGRAM MODE

No  REF #  STATUS               STEP NO / REGISTER NO
 1  [illegible]  ---   ----- ----- ----- ----- ----- ----- ----- -----
 2  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 3  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 4  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 5  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 6  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 7  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 8  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 9  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
10  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
11  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
12  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
13  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
14  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
15  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
16  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----

                                                      AR:10100
1 [illegible] 2   3 STATUS 4 STATUS   5        6 CLEAR     7 [illegible] 8 WRITE
                    ON       OFF                 PARAMETER     MENU         PRESET
```

Figure 7.14

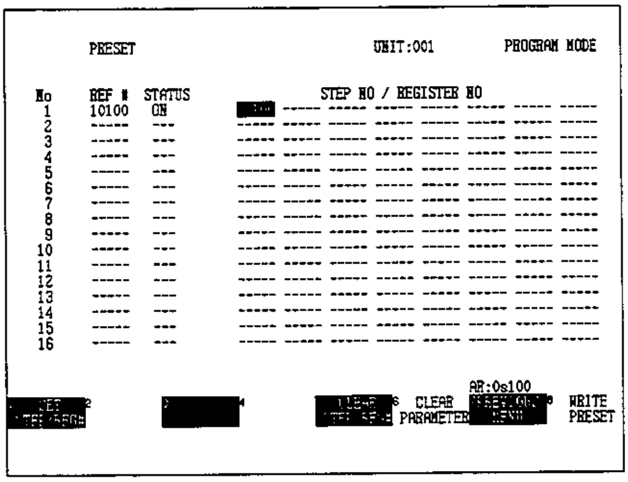
5) Select Status On.



```
    PRESET                                  UNIT:001        PROGRAM MODE

No  REF #  STATUS               STEP NO / REGISTER NO
 1  [illegible]  ON    ----- ----- ----- ----- ----- ----- ----- -----
 2  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 3  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 4  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 5  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 6  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 7  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 8  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
 9  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
10  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
11  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
12  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
13  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
14  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
15  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----
16  -----  ---   ----- ----- ----- ----- ----- ----- ----- -----

                                                      AR:10100
1 [illegible] 2   3 STATUS 4 STATUS   5        6 CLEAR     7 [illegible] 8 WRITE
                    ON       OFF                 PARAMETER     MENU         PRESET
```

Figure 7.15

6) Move the cursor to the Step Number/Register Number area, enter "S100" in the AR, and select Set Reference Number.



```
       PRESET                                UNIT:001        PROGRAM MODE

No     REF #   STATUS                 STEP NO / REGISTER NO
 1     10100    ON          ----- ----- ----- ----- ----- ----- -----
 2     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 3     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 4     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 5     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 6     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 7     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 8     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
 9     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
10     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
11     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
12     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
13     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
14     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
15     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----
16     -----    ---    ----- ----- ----- ----- ----- ----- ----- -----

                                                 AR:0s100
```

Figure 7.16

7) If there are several conditional step numbers, move the cursor and set them in succession.

8) Repeat steps 4) to 7). (See Note (2))

9) Select Write Preset.

Note (1) Stop the GL60S, GL60H, or GL70H before performing the Preset Operation.

(2) The settings will not be stored in the memory of the GL60S, GL60H, or GL70H unless Write Preset is selected.

(3) To delete a setting after it has been entered, move the cursor to the location of the data to be deleted and select Clear Parameter or Clear Reference Number, and then select Write Preset. This will delete the contents of the memory of the GL60S, GL60H, or GL70H.

(4) To return to the previous screen, select Previous Menu. Up to 64 set conditions (in the numbers section) can be set.

(5) To change the screen display of the numbers of conditions to be set, select from "Number 1 to 16" to "Numbers 49 to 64."

(6) Monitor Mode is for monitoring only. Settings cannot be made in Monitor Mode.

(7) Move the cursor in the numbers section with the Up Cursor, Down Cursor, Left Cursor and Right Cursor Keys.

7.3.3 Status Display

These operations display the status of a step (Hold, Disabled, Active), the elapsed time for an active step, and the usage status of action circuits and transition circuits.

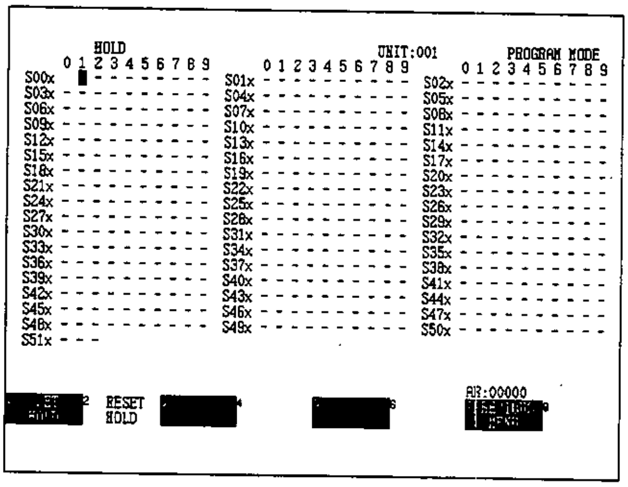
1. Displaying Hold Status

This operation displays the hold status of a step (which keeps the step active). The hold status for any step can be set or reset forcibly. Use the following procedure to display the hold status.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

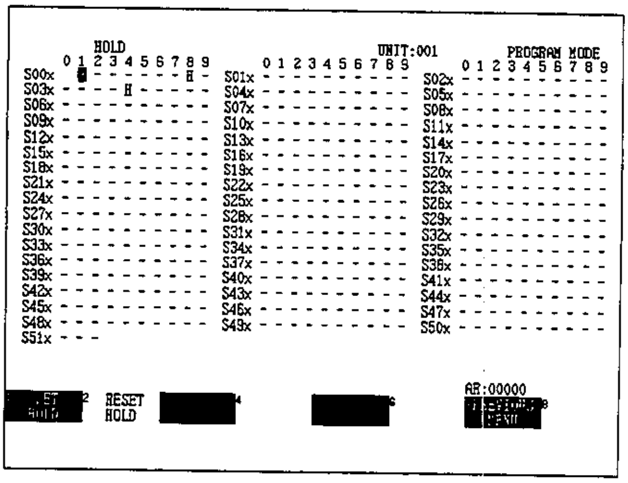
3) Select Display Hold Status.



```
        HOLD                                 UNIT:001        PROGRAM MODE
     0 1 2 3 4 5 6 7 8 9         0 1 2 3 4 5 6 7 8 9         0 1 2 3 4 5 6 7 8 9
S00x   █ - - - - - - - -   S01x - - - - - - - - - -   S02x - - - - - - - - - -
S03x - - - - - - - - - -   S04x - - - - - - - - - -   S05x - - - - - - - - - -
S06x - - - - - - - - - -   S07x - - - - - - - - - -   S08x - - - - - - - - - -
S09x - - - - - - - - - -   S10x - - - - - - - - - -   S11x - - - - - - - - - -
S12x - - - - - - - - - -   S13x - - - - - - - - - -   S14x - - - - - - - - - -
S15x - - - - - - - - - -   S16x - - - - - - - - - -   S17x - - - - - - - - - -
S18x - - - - - - - - - -   S19x - - - - - - - - - -   S20x - - - - - - - - - -
S21x - - - - - - - - - -   S22x - - - - - - - - - -   S23x - - - - - - - - - -
S24x - - - - - - - - - -   S25x - - - - - - - - - -   S26x - - - - - - - - - -
S27x - - - - - - - - - -   S28x - - - - - - - - - -   S29x - - - - - - - - - -
S30x - - - - - - - - - -   S31x - - - - - - - - - -   S32x - - - - - - - - - -
S33x - - - - - - - - - -   S34x - - - - - - - - - -   S35x - - - - - - - - - -
S36x - - - - - - - - - -   S37x - - - - - - - - - -   S38x - - - - - - - - - -
S39x - - - - - - - - - -   S40x - - - - - - - - - -   S41x - - - - - - - - - -
S42x - - - - - - - - - -   S43x - - - - - - - - - -   S44x - - - - - - - - - -
S45x - - - - - - - - - -   S46x - - - - - - - - - -   S47x - - - - - - - - - -
S48x - - - - - - - - - -   S49x - - - - - - - - - -   S50x - - - - - - - - - -
S51x - - -

                                                       AR:00000
 SET      RESET
 HOLD     HOLD
```

Figure 7.17

4) Move the cursor to the step number to be Set or Reset, and select Set Hold or Reset (clear) Hold. An "H" will appear if Set Hold is selected.



```
        HOLD                                 UNIT:001        PROGRAM MODE
     0 1 2 3 4 5 6 7 8 9         0 1 2 3 4 5 6 7 8 9         0 1 2 3 4 5 6 7 8 9
S00x   █ - - - - - - H -   S01x - - - - - - - - - -   S02x - - - - - - - - - -
S03x - - - - H - - - - -   S04x - - - - - - - - - -   S05x - - - - - - - - - -
S06x - - - - - - - - - -   S07x - - - - - - - - - -   S08x - - - - - - - - - -
S09x - - - - - - - - - -   S10x - - - - - - - - - -   S11x - - - - - - - - - -
S12x - - - - - - - - - -   S13x - - - - - - - - - -   S14x - - - - - - - - - -
S15x - - - - - - - - - -   S16x - - - - - - - - - -   S17x - - - - - - - - - -
S18x - - - - - - - - - -   S19x - - - - - - - - - -   S20x - - - - - - - - - -
S21x - - - - - - - - - -   S22x - - - - - - - - - -   S23x - - - - - - - - - -
S24x - - - - - - - - - -   S25x - - - - - - - - - -   S26x - - - - - - - - - -
S27x - - - - - - - - - -   S28x - - - - - - - - - -   S29x - - - - - - - - - -
S30x - - - - - - - - - -   S31x - - - - - - - - - -   S32x - - - - - - - - - -
S33x - - - - - - - - - -   S34x - - - - - - - - - -   S35x - - - - - - - - - -
S36x - - - - - - - - - -   S37x - - - - - - - - - -   S38x - - - - - - - - - -
S39x - - - - - - - - - -   S40x - - - - - - - - - -   S41x - - - - - - - - - -
S42x - - - - - - - - - -   S43x - - - - - - - - - -   S44x - - - - - - - - - -
S45x - - - - - - - - - -   S46x - - - - - - - - - -   S47x - - - - - - - - - -
S48x - - - - - - - - - -   S49x - - - - - - - - - -   S50x - - - - - - - - - -
S51x - - -

                                                       AR:00000
 SET      RESET
 HOLD     HOLD
```

Figure 7.18

Note (1) When setting or resetting hold status, make sure that the Memory Protect Switch of the GL60S, GL60H, or GL70H is in the OFF position.

(2) Be sure to reset (clear) a step which has been set to Hold when the hold status is no longer necessary.

(3) Set Hold and Reset Hold do not operate in Monitor Mode.

(4) Select Previous Menu to return to the previous screen.

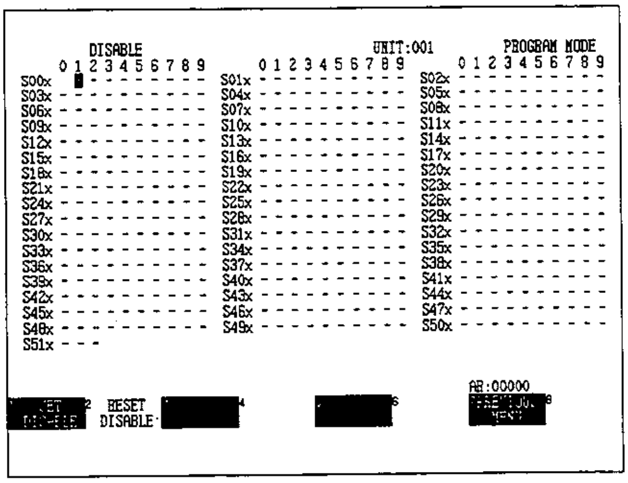
2. Displaying Disabled Status

This operation displays the disabled status of steps (placing advancement on hold). The disabled status can be set or reset forcibly for any step. Use the following procedure to display the disabled status.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

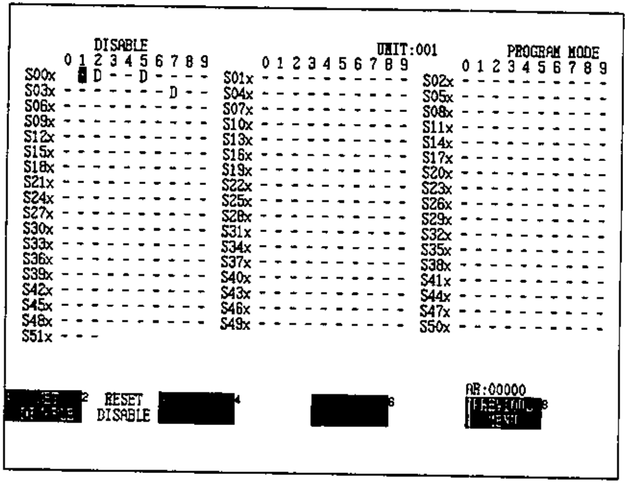
3) Select Display Disable Status.



```
         DISABLE                                   UNIT:001             PROGRAM MODE
      0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9          0 1 2 3 4 5 6 7 8 9
S00x    █ - - - - - - - -   S01x - - - - - - - - - -     S02x - - - - - - - - - -
S03x  - - - - - - - - - -   S04x - - - - - - - - - -     S05x - - - - - - - - - -
S06x  - - - - - - - - - -   S07x - - - - - - - - - -     S08x - - - - - - - - - -
S09x  - - - - - - - - - -   S10x - - - - - - - - - -     S11x - - - - - - - - - -
S12x  - - - - - - - - - -   S13x - - - - - - - - - -     S14x - - - - - - - - - -
S15x  - - - - - - - - - -   S16x - - - - - - - - - -     S17x - - - - - - - - - -
S18x  - - - - - - - - - -   S19x - - - - - - - - - -     S20x - - - - - - - - - -
S21x  - - - - - - - - - -   S22x - - - - - - - - - -     S23x - - - - - - - - - -
S24x  - - - - - - - - - -   S25x - - - - - - - - - -     S26x - - - - - - - - - -
S27x  - - - - - - - - - -   S28x - - - - - - - - - -     S29x - - - - - - - - - -
S30x  - - - - - - - - - -   S31x - - - - - - - - - -     S32x - - - - - - - - - -
S33x  - - - - - - - - - -   S34x - - - - - - - - - -     S35x - - - - - - - - - -
S36x  - - - - - - - - - -   S37x - - - - - - - - - -     S38x - - - - - - - - - -
S39x  - - - - - - - - - -   S40x - - - - - - - - - -     S41x - - - - - - - - - -
S42x  - - - - - - - - - -   S43x - - - - - - - - - -     S44x - - - - - - - - - -
S45x  - - - - - - - - - -   S46x - - - - - - - - - -     S47x - - - - - - - - - -
S48x  - - - - - - - - - -   S49x - - - - - - - - - -     S50x - - - - - - - - - -
S51x  - - -

                                                          AR:00000
```

Figure 7.19

4) Move the cursor to the step number to be set or reset, and select Set Disable or Reset (clear) Disable. A "D" will appear if Set Disable is selected.



```
        DISABLE                                UNIT:001               PROGRAM MODE
      0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9          0 1 2 3 4 5 6 7 8 9
S00x    █ D - - D - - - -  S01x - - - - - - - - - -  S02x - - - - - - - - - -
S03x  - - - - - - - D - -  S04x - - - - - - - - - -  S05x - - - - - - - - - -
S06x  - - - - - - - - - -  S07x - - - - - - - - - -  S08x - - - - - - - - - -
S09x  - - - - - - - - - -  S10x - - - - - - - - - -  S11x - - - - - - - - - -
S12x  - - - - - - - - - -  S13x - - - - - - - - - -  S14x - - - - - - - - - -
S15x  - - - - - - - - - -  S16x - - - - - - - - - -  S17x - - - - - - - - - -
S18x  - - - - - - - - - -  S19x - - - - - - - - - -  S20x - - - - - - - - - -
S21x  - - - - - - - - - -  S22x - - - - - - - - - -  S23x - - - - - - - - - -
S24x  - - - - - - - - - -  S25x - - - - - - - - - -  S26x - - - - - - - - - -
S27x  - - - - - - - - - -  S28x - - - - - - - - - -  S29x - - - - - - - - - -
S30x  - - - - - - - - - -  S31x - - - - - - - - - -  S32x - - - - - - - - - -
S33x  - - - - - - - - - -  S34x - - - - - - - - - -  S35x - - - - - - - - - -
S36x  - - - - - - - - - -  S37x - - - - - - - - - -  S38x - - - - - - - - - -
S39x  - - - - - - - - - -  S40x - - - - - - - - - -  S41x - - - - - - - - - -
S42x  - - - - - - - - - -  S43x - - - - - - - - - -  S44x - - - - - - - - - -
S45x  - - - - - - - - - -  S46x - - - - - - - - - -  S47x - - - - - - - - - -
S48x  - - - - - - - - - -  S49x - - - - - - - - - -  S50x - - - - - - - - - -
S51x  - - -

                                                             AR:00000
```

Figure 7.20

Note (1) When setting or resetting the disabled status, make sure that the Memory Protect Switch of the GL60S, GL60H, or GL70H is in the OFF position.

(2) Always reset (clear) the disabled status for a step when it is no longer required.

(3) Set Disable and Reset Disable do not operate in Monitor Mode.

(4) Select Previous Menu to return to the previous screen.

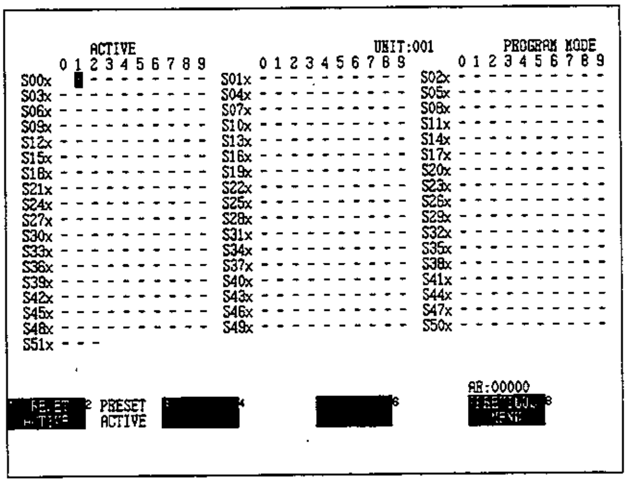
3. Displaying Active Status

This operation displays the active status of a step. Any step can be reset (cleared) or preset forcibly to active status. Use the following procedure to display the active status.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

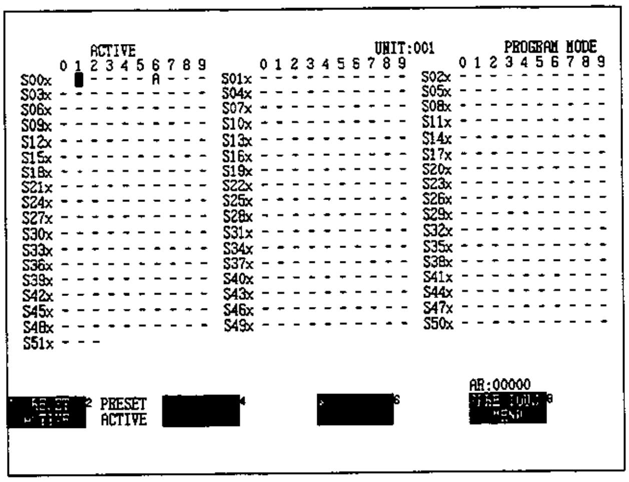
3) Select Display Active Status.



```
          ACTIVE                                    UNIT:001        PROGRAM MODE
      0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9
S00x  █ - - - - - - - - -  S01x  - - - - - - - - - -  S02x  - - - - - - - - - -
S03x  - - - - - - - - - -  S04x  - - - - - - - - - -  S05x  - - - - - - - - - -
S06x  - - - - - - - - - -  S07x  - - - - - - - - - -  S08x  - - - - - - - - - -
S09x  - - - - - - - - - -  S10x  - - - - - - - - - -  S11x  - - - - - - - - - -
S12x  - - - - - - - - - -  S13x  - - - - - - - - - -  S14x  - - - - - - - - - -
S15x  - - - - - - - - - -  S16x  - - - - - - - - - -  S17x  - - - - - - - - - -
S18x  - - - - - - - - - -  S19x  - - - - - - - - - -  S20x  - - - - - - - - - -
S21x  - - - - - - - - - -  S22x  - - - - - - - - - -  S23x  - - - - - - - - - -
S24x  - - - - - - - - - -  S25x  - - - - - - - - - -  S26x  - - - - - - - - - -
S27x  - - - - - - - - - -  S28x  - - - - - - - - - -  S29x  - - - - - - - - - -
S30x  - - - - - - - - - -  S31x  - - - - - - - - - -  S32x  - - - - - - - - - -
S33x  - - - - - - - - - -  S34x  - - - - - - - - - -  S35x  - - - - - - - - - -
S36x  - - - - - - - - - -  S37x  - - - - - - - - - -  S38x  - - - - - - - - - -
S39x  - - - - - - - - - -  S40x  - - - - - - - - - -  S41x  - - - - - - - - - -
S42x  - - - - - - - - - -  S43x  - - - - - - - - - -  S44x  - - - - - - - - - -
S45x  - - - - - - - - - -  S46x  - - - - - - - - - -  S47x  - - - - - - - - - -
S48x  - - - - - - - - - -  S49x  - - - - - - - - - -  S50x  - - - - - - - - - -
S51x  - - -
```

Figure 7.21

4) Move the cursor to the number of the step to be reset or preset, and select Reset (clear) Active or Preset Active. An “A” will appear if Preset Active is selected.



```
          ACTIVE                                    UNIT:001        PROGRAM MODE
      0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9
S00x  █ - - - - - A - - -  S01x  - - - - - - - - - -  S02x  - - - - - - - - - -
S03x  - - - - - - - - - -  S04x  - - - - - - - - - -  S05x  - - - - - - - - - -
S06x  - - - - - - - - - -  S07x  - - - - - - - - - -  S08x  - - - - - - - - - -
S09x  - - - - - - - - - -  S10x  - - - - - - - - - -  S11x  - - - - - - - - - -
S12x  - - - - - - - - - -  S13x  - - - - - - - - - -  S14x  - - - - - - - - - -
S15x  - - - - - - - - - -  S16x  - - - - - - - - - -  S17x  - - - - - - - - - -
S18x  - - - - - - - - - -  S19x  - - - - - - - - - -  S20x  - - - - - - - - - -
S21x  - - - - - - - - - -  S22x  - - - - - - - - - -  S23x  - - - - - - - - - -
S24x  - - - - - - - - - -  S25x  - - - - - - - - - -  S26x  - - - - - - - - - -
S27x  - - - - - - - - - -  S28x  - - - - - - - - - -  S29x  - - - - - - - - - -
S30x  - - - - - - - - - -  S31x  - - - - - - - - - -  S32x  - - - - - - - - - -
S33x  - - - - - - - - - -  S34x  - - - - - - - - - -  S35x  - - - - - - - - - -
S36x  - - - - - - - - - -  S37x  - - - - - - - - - -  S38x  - - - - - - - - - -
S39x  - - - - - - - - - -  S40x  - - - - - - - - - -  S41x  - - - - - - - - - -
S42x  - - - - - - - - - -  S43x  - - - - - - - - - -  S44x  - - - - - - - - - -
S45x  - - - - - - - - - -  S46x  - - - - - - - - - -  S47x  - - - - - - - - - -
S48x  - - - - - - - - - -  S49x  - - - - - - - - - -  S50x  - - - - - - - - - -
S51x  - - -
```

Figure 7.22

5) Select Confirm.

Note (1) When setting or resetting active status, make sure that the Memory Protect Switch of the GL60S, GL60H, or GL70H is in the OFF position.

(2) Active Reset and Active Preset cannot be selected in Monitor Mode.

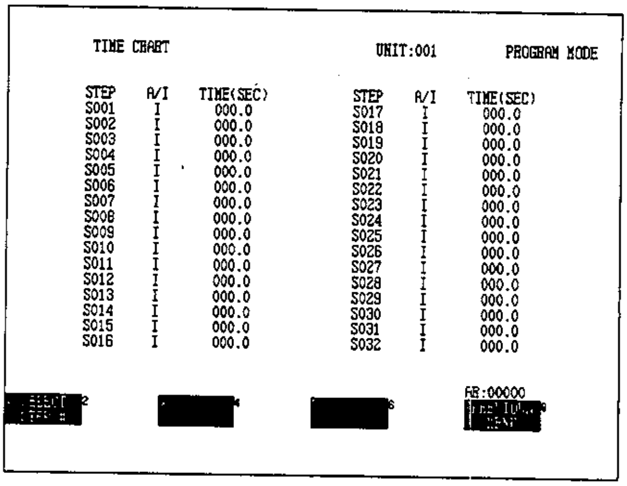
4. Displaying Active Elapsed Time

The time interval between when a step becomes active and when it becomes inactive can be displayed. Use the following procedure to display the active elapsed time.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

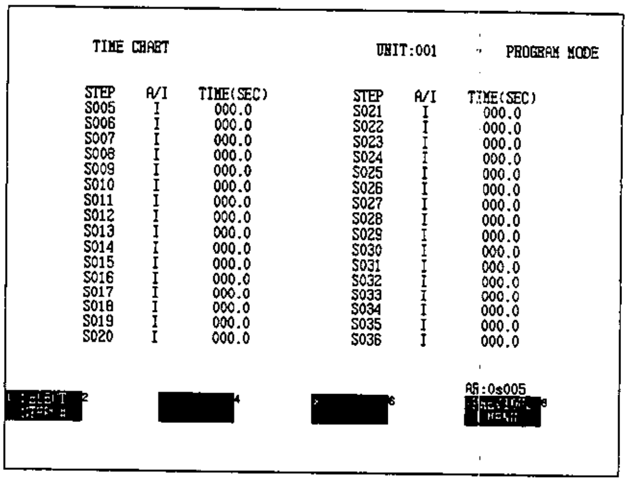
3) Select Display Elapsed Time.



```
TIME CHART                              UNIT:001        PROGRAM MODE

STEP   A/I    TIME(SEC)                 STEP   A/I    TIME(SEC)
S001    I       000.0                   S017    I       000.0
S002    I       000.0                   S018    I       000.0
S003    I       000.0                   S019    I       000.0
S004    I       000.0                   S020    I       000.0
S005    I       000.0                   S021    I       000.0
S006    I       000.0                   S022    I       000.0
S007    I       000.0                   S023    I       000.0
S008    I       000.0                   S024    I       000.0
S009    I       000.0                   S025    I       000.0
S010    I       000.0                   S026    I       000.0
S011    I       000.0                   S027    I       000.0
S012    I       000.0                   S028    I       000.0
S013    I       000.0                   S029    I       000.0
S014    I       000.0                   S030    I       000.0
S015    I       000.0                   S031    I       000.0
S016    I       000.0                   S032    I       000.0

                                                        AR:00000
```

Figure 7.23

4) Enter the relevant step number (S005) in the AR and choose Select Step Number. (See Note (2))



```
TIME CHART                              UNIT:001        PROGRAM MODE

STEP   A/I    TIME(SEC)                 STEP   A/I    TIME(SEC)
S005    I       000.0                   S021    I       000.0
S006    I       000.0                   S022    I       000.0
S007    I       000.0                   S023    I       000.0
S008    I       000.0                   S024    I       000.0
S009    I       000.0                   S025    I       000.0
S010    I       000.0                   S026    I       000.0
S011    I       000.0                   S027    I       000.0
S012    I       000.0                   S028    I       000.0
S013    I       000.0                   S029    I       000.0
S014    I       000.0                   S030    I       000.0
S015    I       000.0                   S031    I       000.0
S016    I       000.0                   S032    I       000.0
S017    I       000.0                   S033    I       000.0
S018    I       000.0                   S034    I       000.0
S019    I       000.0                   S035    I       000.0
S020    I       000.0                   S036    I       000.0

                                                        AR:0s005
```

Figure 7.24

Note (1) Enter the number of the step to be displayed. A continuous series of 32 step numbers beginning with the one entered can be displayed.

(2) "A" is displayed on the screen for active steps and "I" is displayed for inactive steps.

(3) The time cannot be set or deleted.

(4) Select Previous Menu to return to the previous screen.

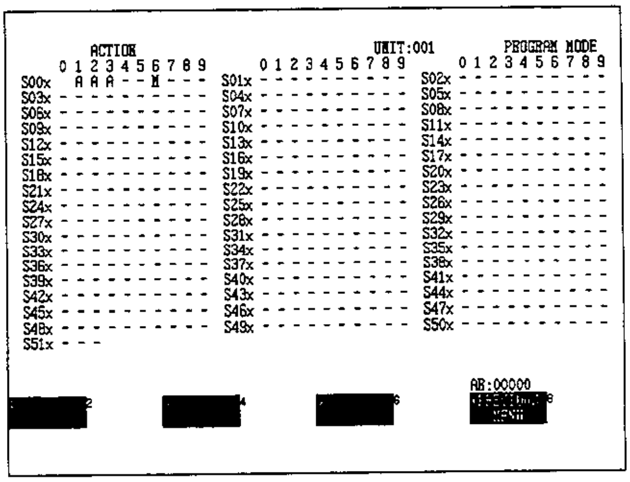
5. Displaying Action Circuit Used Status

This procedure displays the used status of the ladder circuit for each step.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

3) Select Display Action Status. (See Note (1))



```
      ACTION                                  UNIT:001          PROGRAM MODE
    0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9        0 1 2 3 4 5 6 7 8 9
S00x  A A A - - M - - -   S01x - - - - - - - - - -   S02x - - - - - - - - - -
S03x - - - - - - - - - -  S04x - - - - - - - - - -   S05x - - - - - - - - - -
S06x - - - - - - - - - -  S07x - - - - - - - - - -   S08x - - - - - - - - - -
S09x - - - - - - - - - -  S10x - - - - - - - - - -   S11x - - - - - - - - - -
S12x - - - - - - - - - -  S13x - - - - - - - - - -   S14x - - - - - - - - - -
S15x - - - - - - - - - -  S16x - - - - - - - - - -   S17x - - - - - - - - - -
S18x - - - - - - - - - -  S19x - - - - - - - - - -   S20x - - - - - - - - - -
S21x - - - - - - - - - -  S22x - - - - - - - - - -   S23x - - - - - - - - - -
S24x - - - - - - - - - -  S25x - - - - - - - - - -   S26x - - - - - - - - - -
S27x - - - - - - - - - -  S28x - - - - - - - - - -   S29x - - - - - - - - - -
S30x - - - - - - - - - -  S31x - - - - - - - - - -   S32x - - - - - - - - - -
S33x - - - - - - - - - -  S34x - - - - - - - - - -   S35x - - - - - - - - - -
S36x - - - - - - - - - -  S37x - - - - - - - - - -   S38x - - - - - - - - - -
S39x - - - - - - - - - -  S40x - - - - - - - - - -   S41x - - - - - - - - - -
S42x - - - - - - - - - -  S43x - - - - - - - - - -   S44x - - - - - - - - - -
S45x - - - - - - - - - -  S46x - - - - - - - - - -   S47x - - - - - - - - - -
S48x - - - - - - - - - -  S49x - - - - - - - - - -   S50x - - - - - - - - - -
S51x - - -

                                                          AB:00000
```

Figure 7.25

Note (1) The screen displays "A" when the ladder diagram is being used as the action circuit for a normal step, and "M" when it is being used as the action circuit for a step which has been expanded by a macro-step.

(2) Select Previous Menu to return to the previous screen.

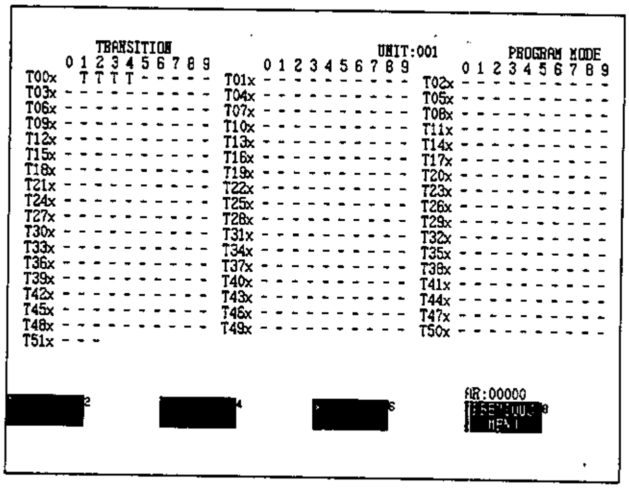
6. Displaying Transition Circuit Used Status

This procedure displays the used status of the ladder circuit for each transition.

1) Display the Mode Screen shown in *Figure 7.3.*

2) Select Display Status.

3) Select Display Transition Status. (See Note (1))



```
         TRANSITION                                 UNIT:001          PROGRAM MODE
     0 1 2 3 4 5 6 7 8 9       0 1 2 3 4 5 6 7 8 9       0 1 2 3 4 5 6 7 8 9
T00x   T T T T - - - - -  T01x - - - - - - - - - -  T02x - - - - - - - - - -
T03x - - - - - - - - - -  T04x - - - - - - - - - -  T05x - - - - - - - - - -
T06x - - - - - - - - - -  T07x - - - - - - - - - -  T08x - - - - - - - - - -
T09x - - - - - - - - - -  T10x - - - - - - - - - -  T11x - - - - - - - - - -
T12x - - - - - - - - - -  T13x - - - - - - - - - -  T14x - - - - - - - - - -
T15x - - - - - - - - - -  T16x - - - - - - - - - -  T17x - - - - - - - - - -
T18x - - - - - - - - - -  T19x - - - - - - - - - -  T20x - - - - - - - - - -
T21x - - - - - - - - - -  T22x - - - - - - - - - -  T23x - - - - - - - - - -
T24x - - - - - - - - - -  T25x - - - - - - - - - -  T26x - - - - - - - - - -
T27x - - - - - - - - - -  T28x - - - - - - - - - -  T29x - - - - - - - - - -
T30x - - - - - - - - - -  T31x - - - - - - - - - -  T32x - - - - - - - - - -
T33x - - - - - - - - - -  T34x - - - - - - - - - -  T35x - - - - - - - - - -
T36x - - - - - - - - - -  T37x - - - - - - - - - -  T38x - - - - - - - - - -
T39x - - - - - - - - - -  T40x - - - - - - - - - -  T41x - - - - - - - - - -
T42x - - - - - - - - - -  T43x - - - - - - - - - -  T44x - - - - - - - - - -
T45x - - - - - - - - - -  T46x - - - - - - - - - -  T47x - - - - - - - - - -
T48x - - - - - - - - - -  T49x - - - - - - - - - -  T50x - - - - - - - - - -
T51x - - -

                                                    AR:00000
```

Figure 7.26

Note (1) The screen displays "T" when the ladder diagram is being used as a transition circuit for a transition.

(2) Select Previous Menu to return to the previous screen.

7.4 SFC Programming Operations

7.4.1 SFC Flow Processing 7-24
7.4.2 SFC Action Circuits 7-83
7.4.3 SFC Transition Circuits 7-90

SFC flow processing is performed with the elements shown in *Table 7.1 SFC Element List.*

Table 7.1 SFC Element List

Type	Symbol	Name	Input Examples and Remarks	
Step	▣ SXXX	Initial step	▣ S001	Numbers S001 to S512
	□ SXXX	Step	□ S002	Numbers S001 to S512
	Ⓜ SXXX	Macro step	Ⓜ S003 +ᵀ (dummy transition)	Numbers S001 to S512 Processed with Ⓜ SXXX No number
Transition	+ TXXX	Transition	+ T001	Numbers T001 to T512
	ǂ TXXX	Counter transition	ǂ T002	Numbers T001 to T512
Connections	▽ X	FROM	▽ 1	Any number 1 to 8 Can be used only on the main screen.
	⇩ X	TO	⇩ 1	Any number f1 to 8 Can be used only on the main screen.
	▼	Macro entry	▼	Automatically displayed on the macro-screen with the Start Next Key. Only one can be displayed on the expanded-screen.
	♥	Macro return	♥	Up to 8 only can be displayed on the subscreen.
	└─┘	Convergence	+ T006 + T007	Convergence at the lower part of a transition. Can also converge from the left (from a left transition).
	┌─┐	Divergence	+ T001 + T002	Divergence from the upper part of a transition. Can also diverge from the left (from a left transition).
	╘═╛	Simultaneous convergence	+ T007	Convergence at the upper part of a transition. Can also converge from the left (from a left transition).
	╒═╕	Simultaneous divergence	+ T004	Divergence from the lower part of a transition. Can also diverge to the left (from a left transition).
	┌→	Loop to right	┌→+ T003	Entering above a transition. Use on the enter side of a ←┘

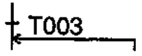
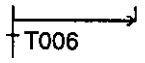
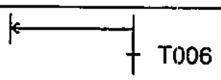
Type	Symbol	Name	Input Examples and Remarks	
Connec-tions, contd.	←┐	Loop to left	 T003	Entering below a transition. Use on the enter side of a └→
	└→	Loop from right	 T006	Leaving from above a transition. Use on the exit side of a ←┐
	←┘	Loop from left	 T006	Leaving from above a transition. Use on the exit side of a ┌→
	|	Short	|	Use as the extension of a downward transition or step.
	↑	Counter short	↑	Use as the vertical extension of a loop.

Table 7.2 SFC Delete Function Label Keys

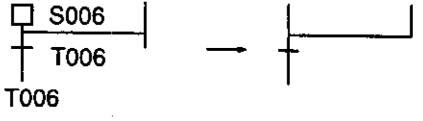
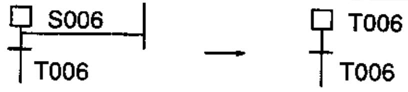
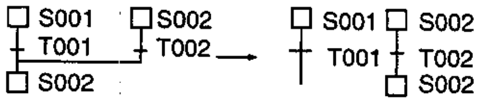
Type	Symbol	Use	Examples
Element Delete	:	Use for the deletion of elements other than divergences, convergences, loops, and macro-entries.	 S006 T006 T006
	†	Use for the deletion of divergences, convergences, and loops used above a transition.	 S006 T006 T006 T006
	⊥	Use for the deletion of divergences, convergences, and loops used below a transition.	 S001 S002 T001 T002 S002 S001 S002 T001 T002 S002

Table 7.3 Changes in Function Label Keys

Changes in Function Label Keys with the Cursor at FROM

1 ▽	2 ▼	3	4 :	5	6 Zoom Return	7	8 Next Menu

1	2	3	4 ═╗	5 ┼₊	6	7 Previous Menu	8 Next Menu

1	2	3 ┌→	4 ←┐	5 ┼₊	6	7 Previous Menu	8

Changes in Function Label Keys with the Cursor at a Step

1 ⊡	2 ☐	3 ⊡ †T	4 :	5 Zoom Up	6 Zoom Return	7	8 Next Menu

1 |	2 ↑	3	4 :	5	6	7 Previous Menu	8 Next Menu

1 ▽	2 ▼	3	4 :	5	6	7 Previous Menu	8

Changes in Function Label Keys with the Cursor at a Transition

1 ┼	2 ↟	3	4 :	5 Zoom Up	6 Zoom Return	7	8 Next Menu
1 │	2	3	4 :	5	6	7 Previous Menu	8 Next Menu
1 ┌─┐	2 ╘═╛	3 └─┘	4 ╒═╕	5 ┼T	6 ┼T	7 Previous Menu	8 Next Menu
1 └→	2 ←┘	3 ←┐	4 ┌→	5 ┼T	6 ┼T	7 Previous Menu	8 Next Menu
1 ▽	2 ▼	3	4 :	5	6	7 Previous Menu	8

7.4.1 SFC Flow Processing

The following describes the sequence control system.

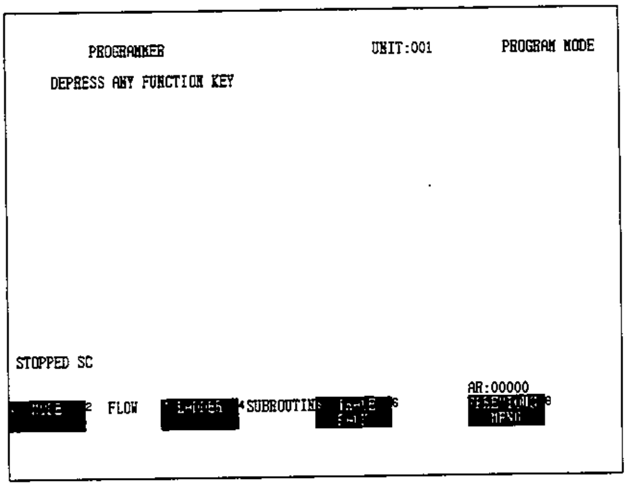
1. SFC Screen Display

Use the following procedure to display the SFC Screen.

1) Perform the Attach Operation. (See Note (1))

2) Press the Supervisory Key.

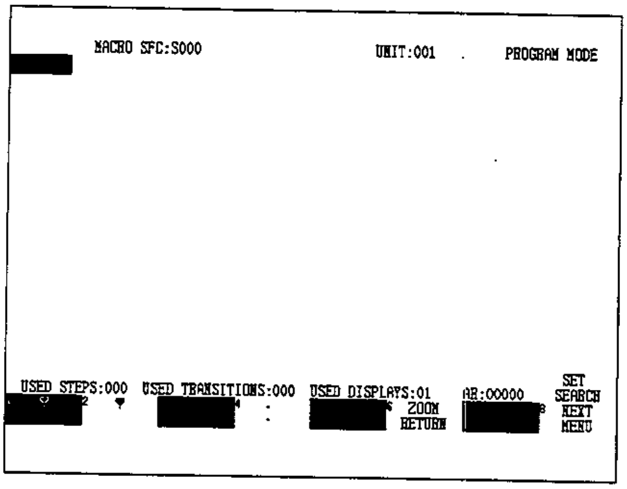
3) Select Programmer.



```
    PROGRAMMER                     UNIT:001          PROGRAM MODE
DEPRESS ANY FUNCTION KEY

STOPPED SC
                                                 AR:00000
                2 FLOW          4SUBROUTINE
```

Figure 7.27

4) Select Flow.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:000 USED TRANSITIONS:000 USED DISPLAYS:01 AR:00000

ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.28

Note (1) The Attach Operation is not required if the PC is already online.

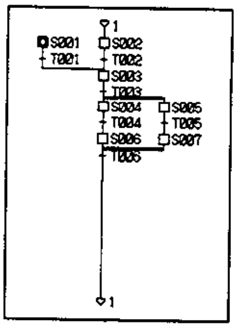
(2) You must operate in Program Mode in order to store an SFC.

(3) Set the GL60S, GL60H, or GL70H Memory Protect Switch to OFF. In Monitor Mode, it can be set to ON.

2. SFC Storage

A. Storing SFCs: Part 1

Example



1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
1

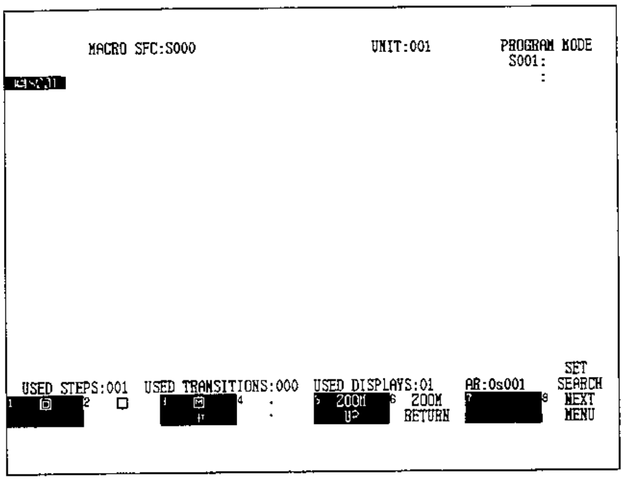
Use the following procedure to store SFCs.

1) Display the SFC Screen shown in *Figure 7.28.*

2) Move the cursor to the step line.

3) Enter **S001** in the AR.

4) Select ⊡.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

S001:

USED STEPS:001 USED TRANSITIONS:000 USED DISPLAYS:01 AR:0s001

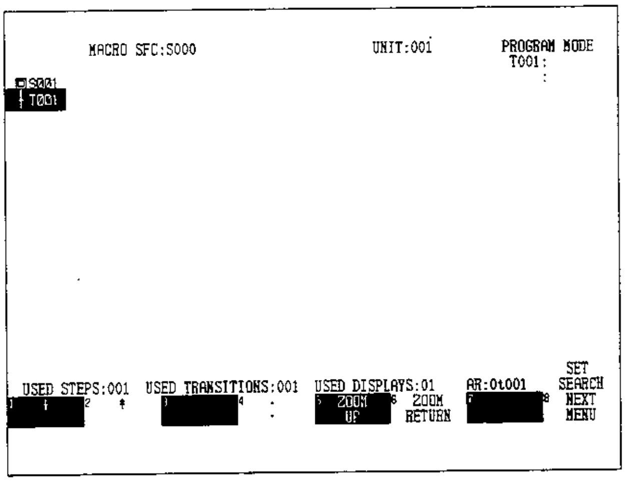
1 ⊡
2 ☐
3
4
5 ZOOM UP
6 ZOOM RETURN
7
8 SET SEARCH NEXT MENU

Figure 7.29

5) Move the cursor to the transition line.

6) Enter **T001** in the the AR.

7) Select +.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

T001:

USED STEPS:001 USED TRANSITIONS:001 USED DISPLAYS:01 AR:0t001

S001
T001
1 +
2
3
4
5 ZOOM UP
6 ZOOM RETURN
7
8 SET SEARCH NEXT MENU

Figure 7.30

8) Select Next Menu, then select └─┘.

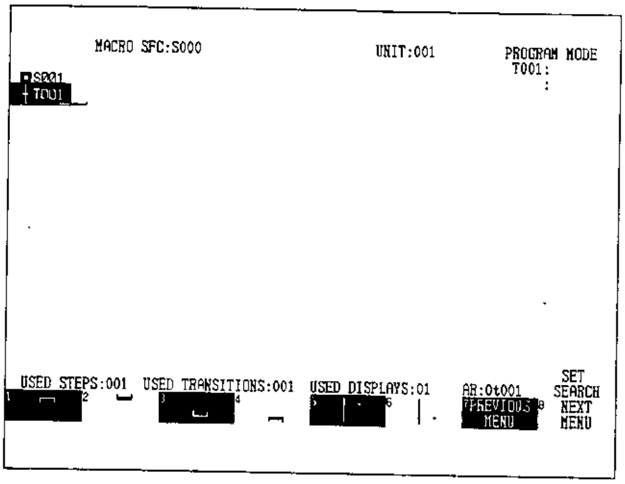

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T001:
S001
T001
USED STEPS:001
USED TRANSITIONS:001
USED DISPLAYS:01
AR:0t001
PREVIOUS MENU
SET SEARCH
NEXT MENU

Figure 7.31

9) Move the cursor to the FROM line.

10) Enter **1** in AR.

11) Select ▽.

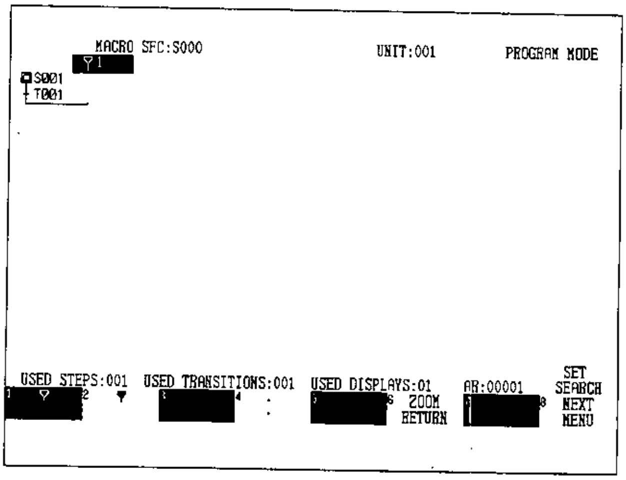

MACRO SFC:S000
▽1
UNIT:001
PROGRAM MODE
S001
T001
USED STEPS:001
USED TRANSITIONS:001
USED DISPLAYS:01
ZOOM RETURN
AR:00001
SET SEARCH
NEXT MENU

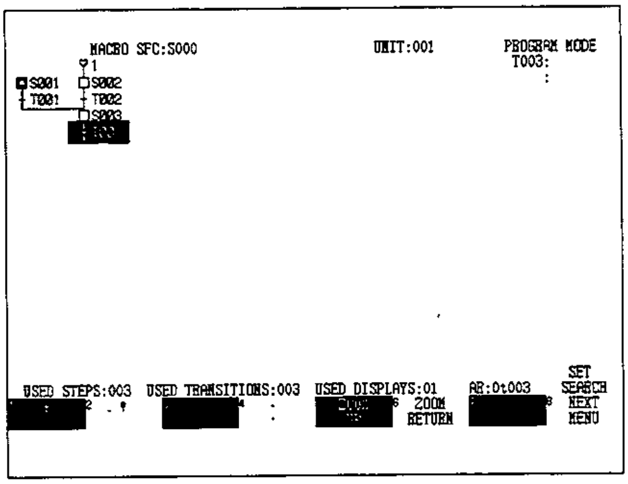
Figure 7.32

12) Store step S002.

13) Store transition T002.

14) Store step S003.

15) Store transition T003.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

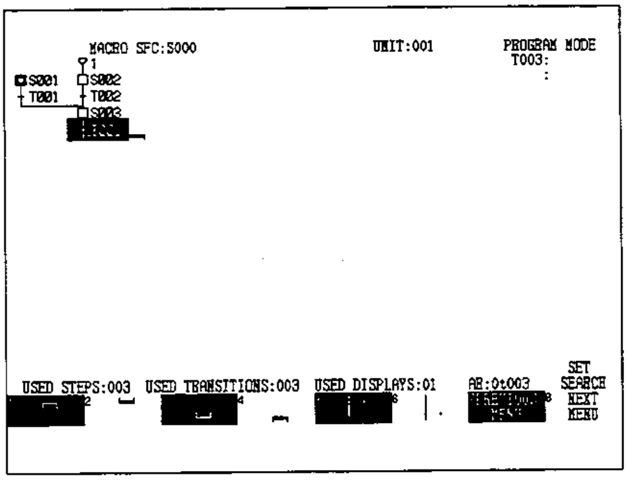
T003:

USED STEPS:003 USED TRANSITIONS:003 USED DISPLAYS:01 AR:0t003

1
S001
T001
S002
T002
S003
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.33

16). Select Next Menu, then select ⟹.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

T003:

USED STEPS:003 USED TRANSITIONS:003 USED DISPLAYS:01 AR:0t003

1
S001
T001
S002
T002
S003
SET
SEARCH
NEXT
MENU

Figure 7.34

17) Store step S004.

18) Store step S005.

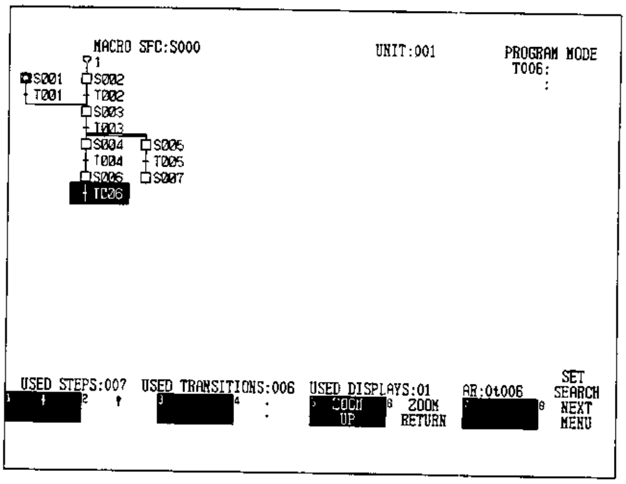
19) Store transition T004.

20) Store transition T005.

21) Store step S006.

22) Store step S007.

23) Store transition T006.



MACRO SFC:S000

UNIT:001

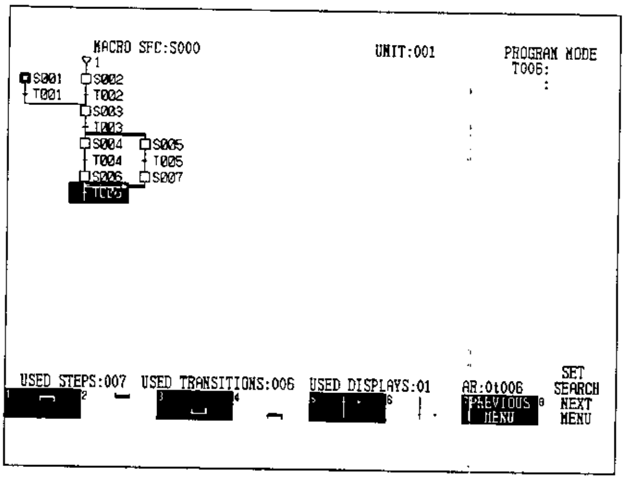
PROGRAM MODE
T006:

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:0↑006

1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
ZOOM UP
ZOOM RETURN
SET
SEARCH
NEXT
MENU

Figure 7.35

24) Select Next Menu, then select ⌴.



MACRO SFC:S000

UNIT:001

PROGRAM MODE
T006:

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:0↑006

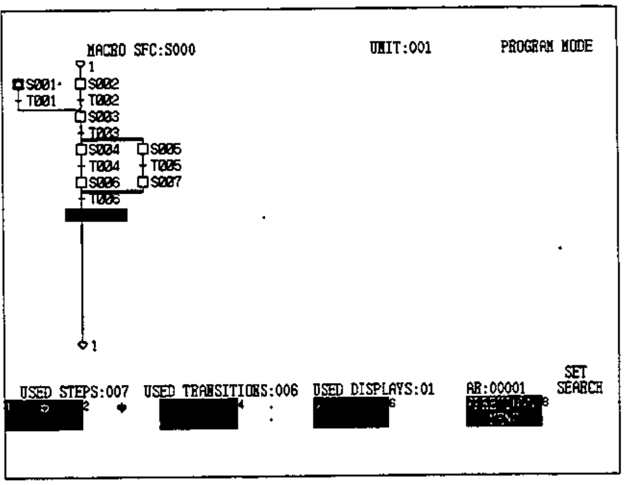
1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
PREVIOUS MENU
SET
SEARCH
NEXT
MENU

Figure 7.36

25) Move the cursor to the step line.

26) Enter **T001** in the AR.

27) Select Next Menu, then select ⇩.


MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00001

1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
1
SET
SEARCH

Figure 7.37

Note (1) Position the cursor in the SFC area.

(2) The same step numbers or transition number cannot be used twice.

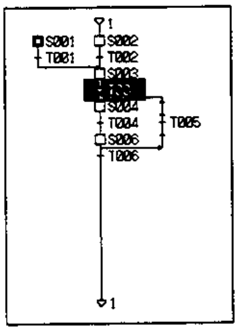
(3) Input divergences and convergences with the cursor located at the transition.

(4) See *Table 7.3* for the transitions of Function Label Keys in inputting elements.

(5) Input macro step 🄼 using the ⍖ Key. Only dummy transitions ┼T cannot be input.

B. Storing SFCs: Part 2

Example: Loops


1
S001
T001
S002
T002
S003
S004
T004
T005
S006
T006
1

Use the following procedure to store an SFC containing a loop.

1) Input the basic SFC elements.

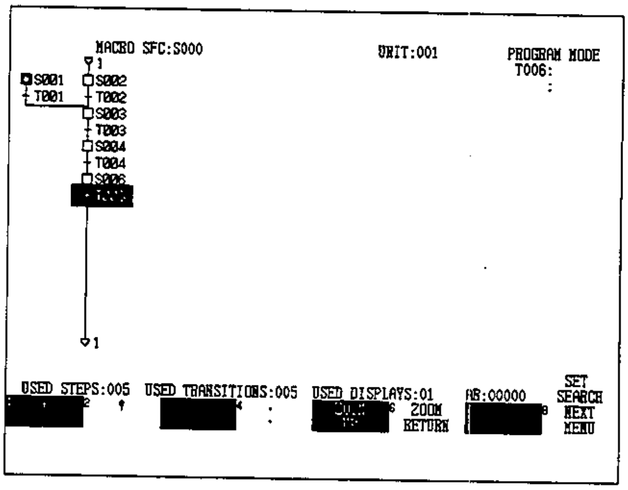

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T006:
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.38

2) Move the cursor to T006.

3) Select Next Menu, then select →.

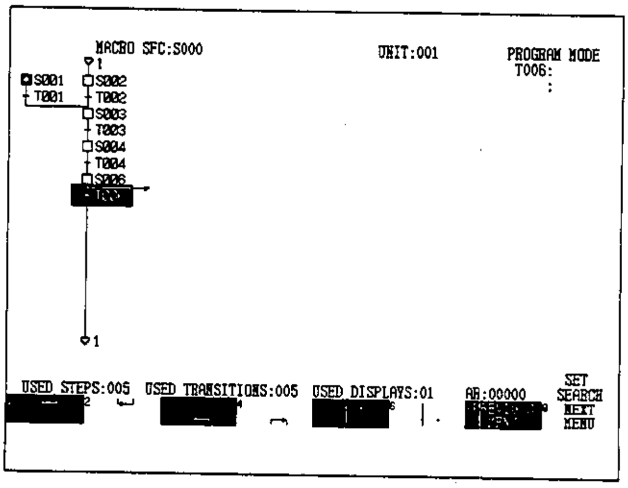

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T006:
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET
SEARCH
NEXT
MENU

Figure 7.39

4) Move the cursor to the step line.

5) Select Next Menu, then select ↑.

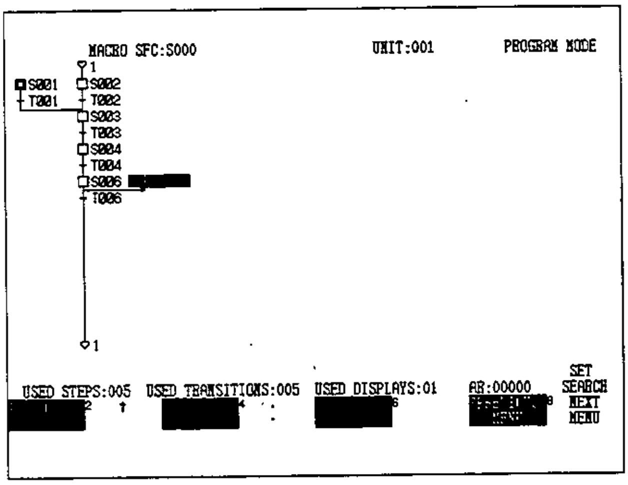

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET
SEARCH
NEXT
MENU

Figure 7.40

6) Move the cursor to the transition line.

7) Enter T005 in the AR.

8) Select Next Menu, then select ⇞.

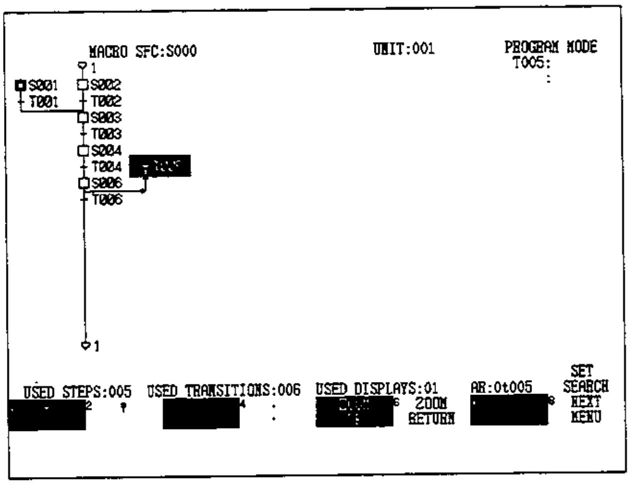

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T005:
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
1
USED STEPS:005
USED TRANSITIONS:006
USED DISPLAYS:01
ZOOM
RETURN
AR:0t005
SET
SEARCH
NEXT
MENU

Figure 7.41

9) Move the cursor to the step line.

10) Select Next Menu, then select ↑.

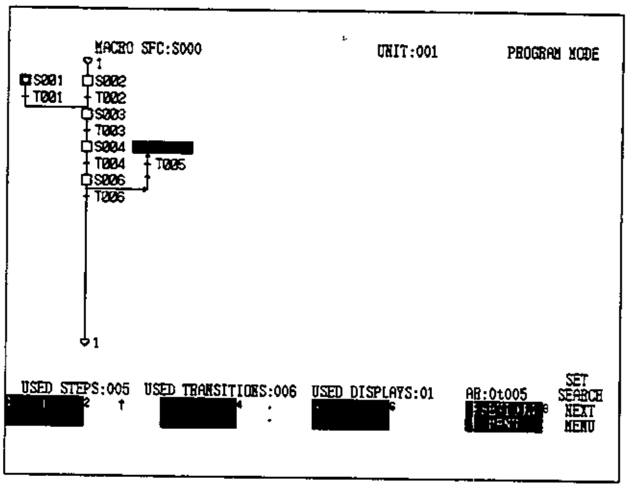

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:006
USED DISPLAYS:01
AR:0t005
SET
SEARCH
NEXT
MENU

Figure 7.42

11) Move the cursor to T003.

12) Select Next Menu, then select ↰.

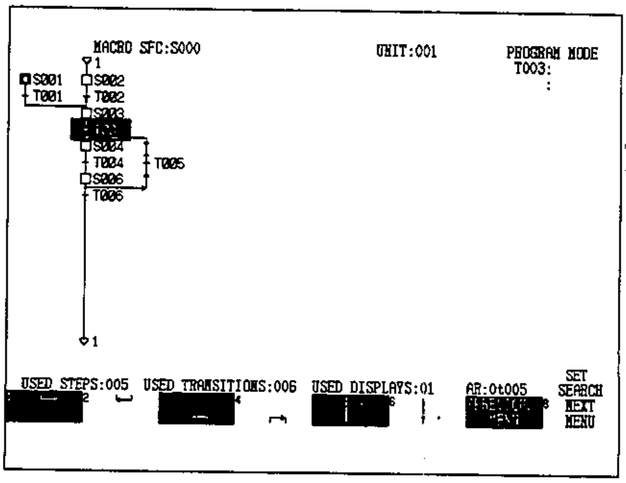

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T003:
1
S001
T001
S002
T002
S003
S004
T004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:006
USED DISPLAYS:01
AR:0t005
SET
SEARCH
NEXT
MENU

Figure 7.43

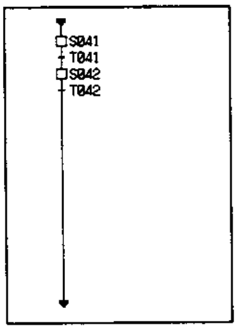
Note (1) Position the cursor in the SFC area.

(2) The same step number or transition number cannot be used twice.

(3) Input loop exit and loop enter elements with the cursor located at the transition.

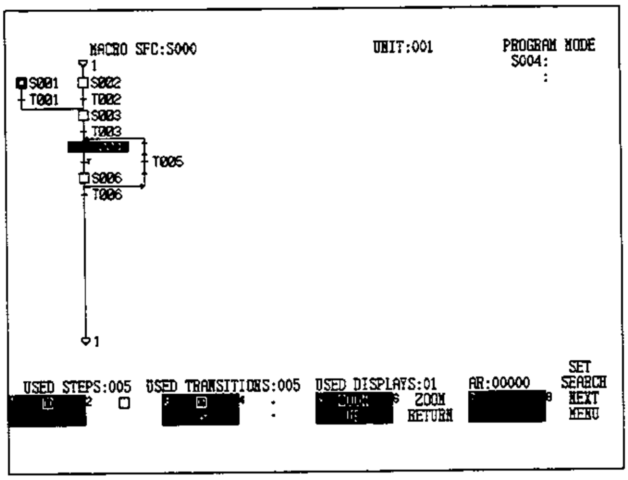
C. Storing SFCs: Part 3

Example: Expanded-screens


S041
T041
S042
T042

Use the following procedure to store expanded-screens.

1) Display the SFC Screen, including macro steps.


S001
T001
S002
T002
S003
T003
T005
S006
T006
1
1
ZOOM RETURN
SET SEARCH
NEXT MENU

MACRO SFC:S000 UNIT:001 PROGRAM MODE

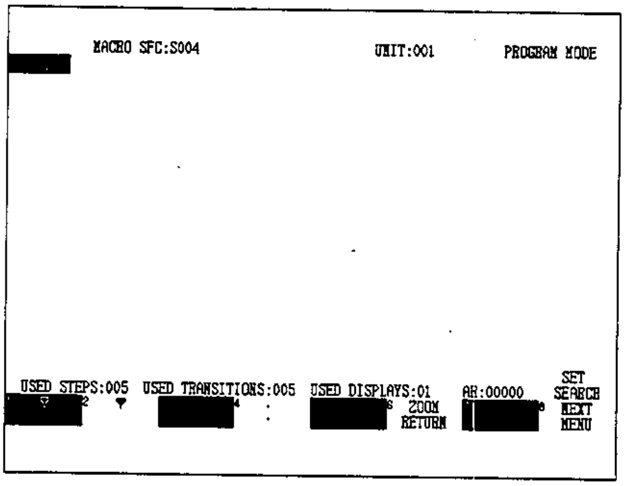
S004:

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

Figure 7.44

2) Move the cursor to macro step S004.

3) Select Zoom Up.

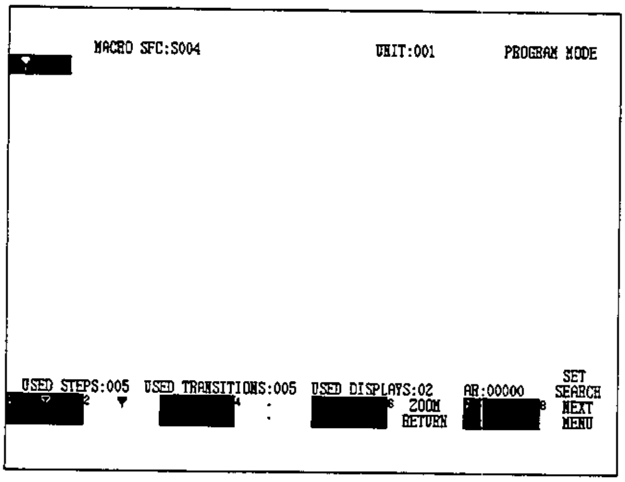

MACRO SFC:S004 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.45

4) Press the Start Next Key.


MACRO SFC:S004 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:02 AR:00000

ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.46

5) Store step S041.

6) Store transition T041.

7) Store step S042.

8) Store transition T042.

9) Move the cursor to the location of the step, and select ▼.

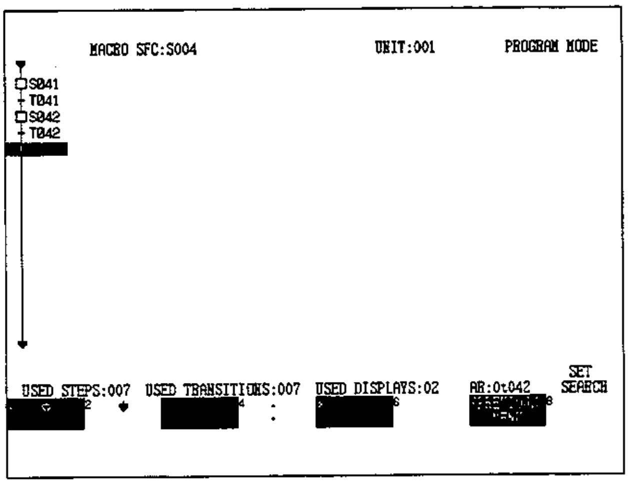

MACRO SFC:S004
UNIT:001
PROGRAM MODE
S041
T041
S042
T042
USED STEPS:007
USED TRANSITIONS:007
USED DISPLAYS:02
AR:0t042
SET
SEARCH

Figure 7.47

10) Select Previous Menu, then select Zoom Return.

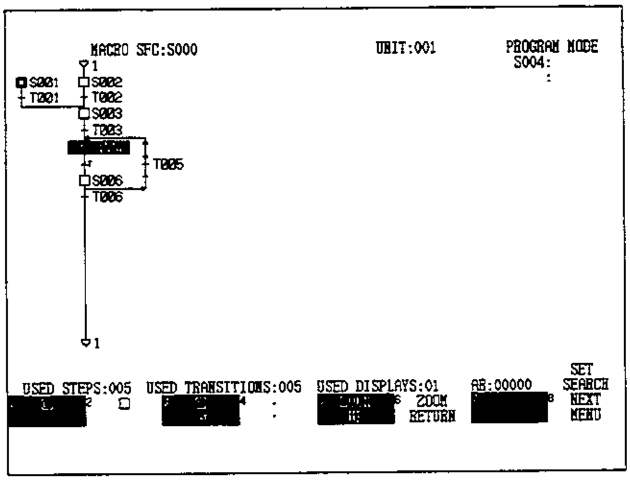

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S004:
1
S001
T001
S002
T002
S003
T003
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.48

Note (1) Position the cursor in the SFC area.

(2) The same step number or transition number cannot be used twice.

(3) A macro step is needed for this operation.
Macro step→⊞

(4) See *Table 7.3* for the changes in Function Label Keys when inputting elements.

(5) Input macro step ▣ using the ⊞ Key. Dummy transition {L} cannot be input.

3. Modifying SFCs

A. Making Additions to SFC Screens

This operation creates an SFC expanded-screen.

1) Display the SFC main screen, including macro steps.

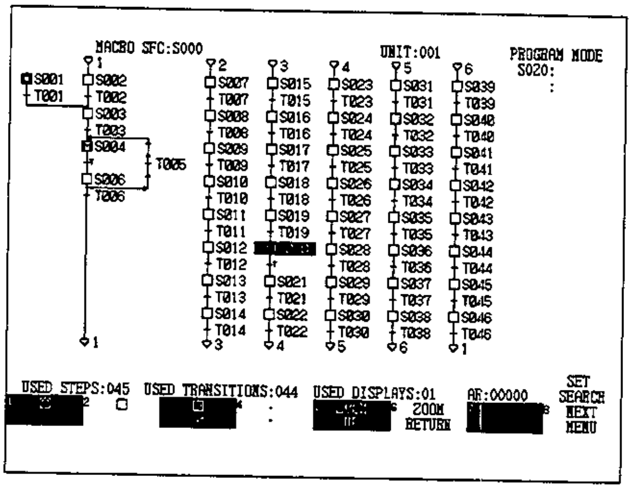

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S020:
S001 T001 S002 T002 S003 T003 S004 T005 S006 T006
S007 T007 S008 T008 S009 T009 S010 T010 S011 T011 S012 T012 S013 T013 S014 T014
S015 T015 S016 T016 S017 T017 S018 T018 S019 T019 S021 T021 S022 T022
S023 T023 S024 T024 S025 T025 S026 T026 S027 T027 S028 T028 S029 T029 S030 T030
S031 T031 S032 T032 S033 T033 S034 T034 S035 T035 S036 T036 S037 T037 S038 T038
S039 T039 S040 T040 S041 T041 S042 T042 S043 T043 S044 T044 S045 T045 S046 T046
USED STEPS:045
USED TRANSITIONS:044
USED DISPLAYS:01
AR:00000
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.49

2) Move the cursor to macro step S020 and select Zoom Up.

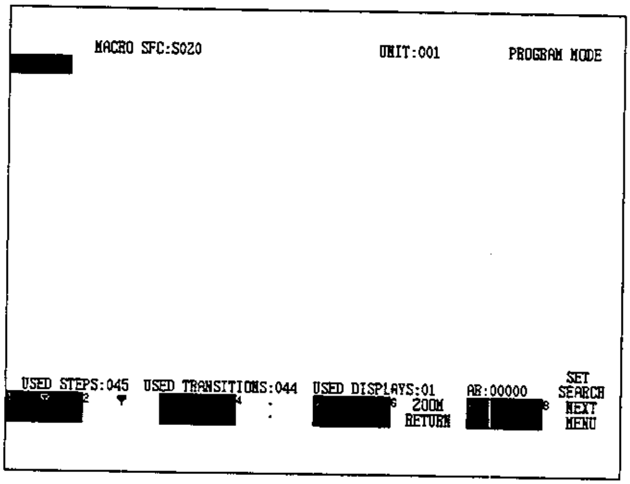
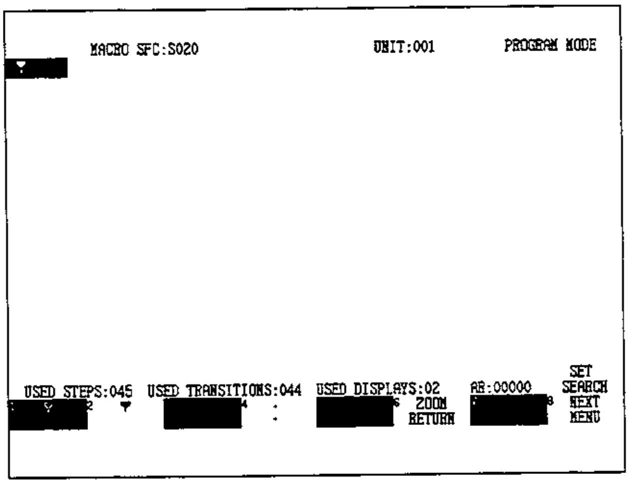

MACRO SFC:S020
UNIT:001
PROGRAM MODE
USED STEPS:045
USED TRANSITIONS:044
USED DISPLAYS:01
AR:00000
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.50

3) Press the Start Next Key. (See Note (4))



MACRO SFC:S020 UNIT:001 PROGRAM MODE

USED STEPS:045 USED TRANSITIONS:044 USED DISPLAYS:02 AR:00000

ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.51

Note (1) Position the cursor in the SFC area.

(2) A macro step Ⓜ is needed for the main screen and for expanded-screens.

(3) Up to 63 expanded-screens can be created.

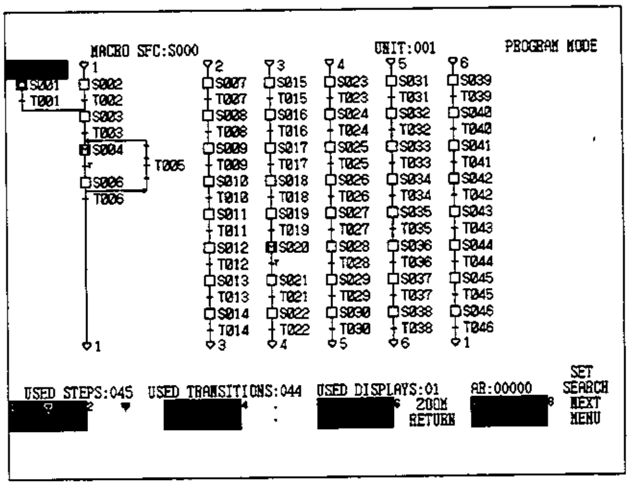
(4) Complete the storage of SFC elements using the same procedure as *C. Storing SFCs: Part 3* on page *7-34.*

(5) An expanded-screen can be added in the same way when zooming up from an expanded-screen (using a macro step at the expanded-screen).

B. Deleting SFC Screens

This operation deletes SFC main screens and expanded-screens.

1) Display the SFC main screen. (See Note (2))



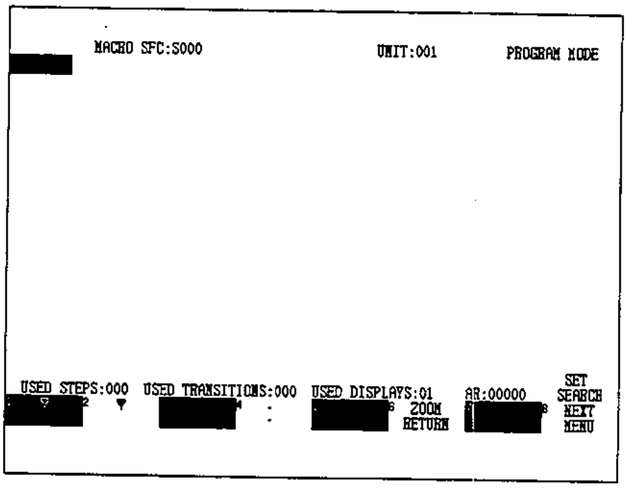
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:045 USED TRANSITIONS:044 USED DISPLAYS:01 AR:00000

S001
T001
1
S002
T002
S003
T003
S004
T005
S006
T006
1
2
S007
T007
S008
T008
S009
T009
S010
T010
S011
T011
S012
T012
S013
T013
S014
T014
3
3
S015
T015
S016
T016
S017
T017
S018
T018
S019
T019
S020
S021
T021
S022
T022
4
4
S023
T023
S024
T024
S025
T025
S026
T026
S027
T027
S028
T028
S029
T029
S030
T030
5
5
S031
T031
S032
T032
S033
T033
S034
T034
S035
T035
S036
T036
S037
T037
S038
T038
6
6
S039
T039
S040
T040
S041
T041
S042
T042
S043
T043
S044
T044
S045
T045
S046
T046
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.52

2) Press the Shift + Delete Keys. (See Note (3))



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:000 USED TRANSITIONS:000 USED DISPLAYS:01 AR:00000

Figure 7.53

Note (1) Position the cursor in the SFC area.

(2) In deleting an expanded-screen, display the expanded-screen by zooming up from the main screen using a macro step zoom up operation.

(3) An expanded-screen can be deleted in the same way.

(4) The expanded-screen macro entry element ▼ cannot be deleted by any other procedure.

(5) With a macro step, if the macro step has a an expanded-screen, you must begin by deleting that expanded-screen first.

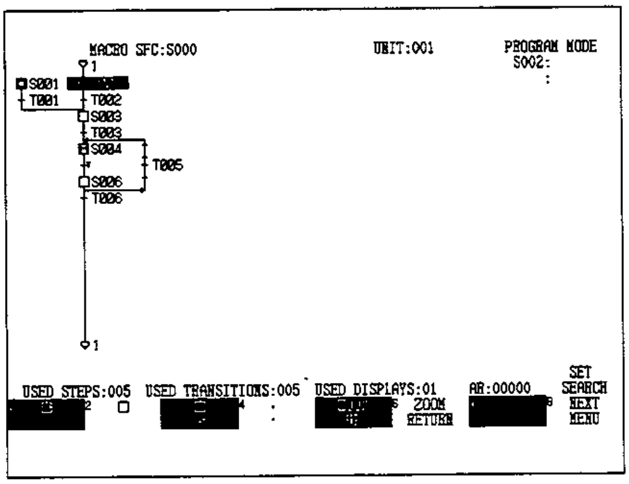
(6) The action circuit and transition circuit of each step is deleted by this operation.

C. Modifying Reference Numbers

This operation modifies step numbers and transition numbers.

1) Display the SFC main screen.

2) Move the cursor to the step number (S002) to be modified. (See Note (4))

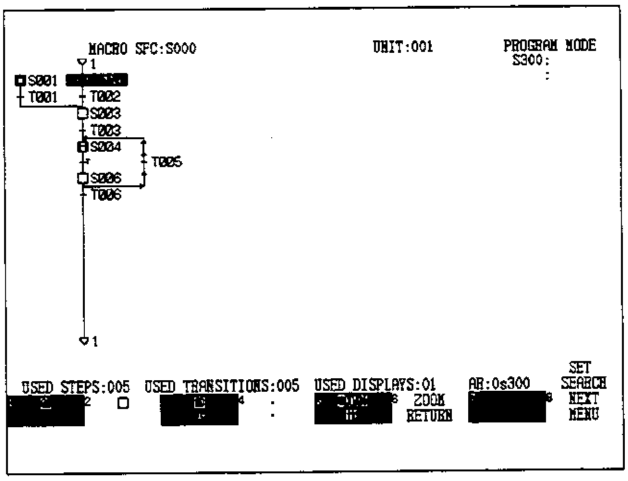

1
S001
T001
T002
S003
T003
S004
T005
S006
T006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

MACRO SFC:S000 UNIT:001 PROGRAM MODE
S002:

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

Figure 7.54

3) Enter the step number (S300) in the AR and and press the Enter Key. (See Note (5))


1
S001
T001
T002
S003
T003
S004
T005
S006
T006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

MACRO SFC:S000 UNIT:001 PROGRAM MODE
S300:

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:0s300

Figure 7.55

Note (1) Position the cursor in the SFC area.

(2) This operation cannot be used to modify elements.

(3) The same step number ot transition number cannot be used a second time.

(4) The same operation can be performed on a an expanded-screen.

(5) The same operation can be performed for the reference number of a transition.

(6) If changing the number of macro step ⍌, this operation cannot be performed if an action circuit already exists at the new number.

D. Modifying Elements

This operation modifies elements only. To modify reference numbers as well, refer to *C. Modifying Reference Numbers* on page *7-39.*

1) Display the SFC Screen.

2) Move the cursor to the step element (S001) to be modified.

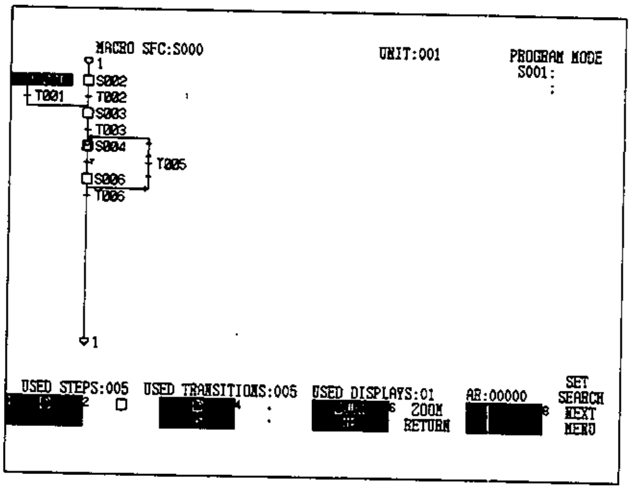

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001 :
1
S002
T001
T002
S003
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.56

3) Select step element ☐.

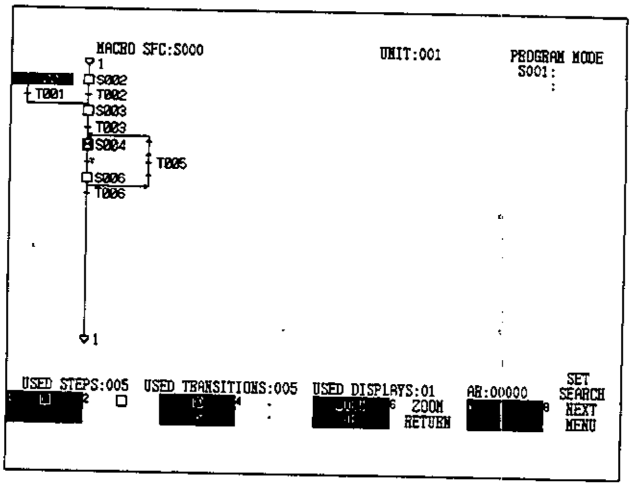
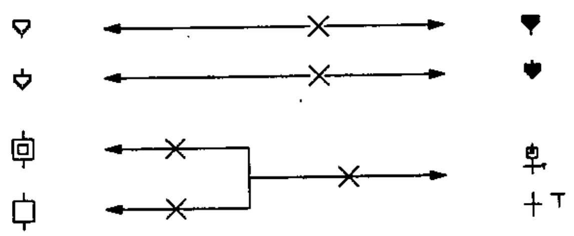

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001 :
1
S002
T001
T002
S003
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.57

Note (1) Position the cursor in the SFC area.

(2) It is not possible to change between an element which needs a reference number and an element that does not need a reference number.



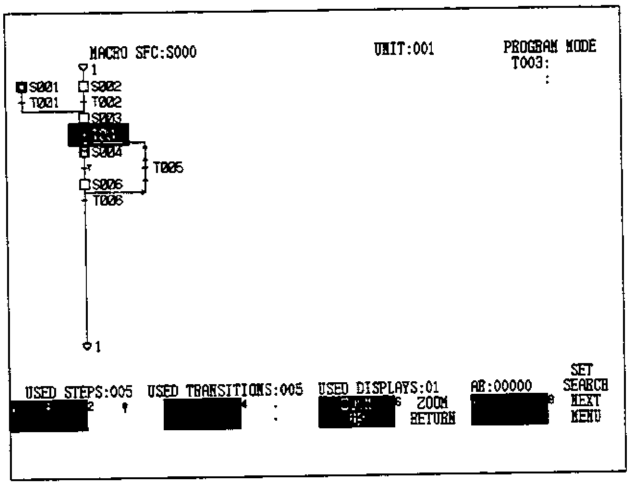
(3) Modify convergences, divergences and loops by moving the cursor to the transition element.

E. Deleting Elements: Part 1

This operation deletes individual elements as well as groups of divergences, convergences, and loops input from transition elements.

1) Display the SFC Screen.

2) Move the cursor to the transition element (T003) to be modified.

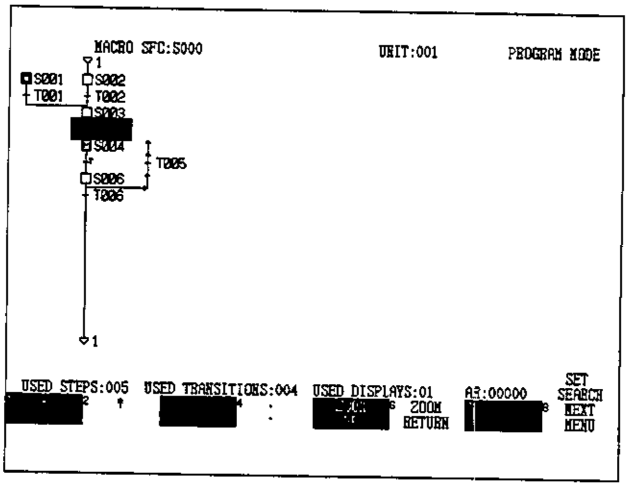


```
MACRO SFC:S000                UNIT:001        PROGRAM MODE
                                               T003:
USED STEPS:005  USED TRANSITIONS:005  USED DISPLAYS:01  AR:00000
```

1
S001
T001
S002
T002
S003
S004
T005
S006
T006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.58

3) Press the Delete Key.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:004 USED DISPLAYS:01 AR:00000

Figure 7.59

Note (1) Position the cursor in the SFC area.

(2) A macro step Ⓜ and the dummy transition ┼ᵀ with it cannot operate independently. They will be processed together no matter which of them the cursor is moved to.

(3) If the macro step has an expanded-screen, you must begin by deleting that expanded-screen first.

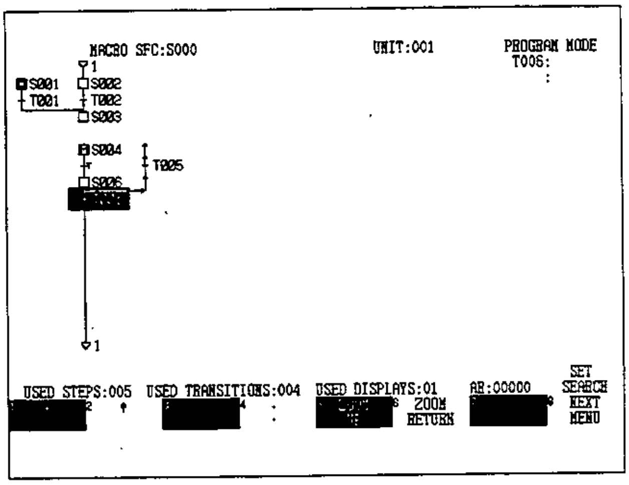
(4) The action circuit of a step and transition circuit of each transition is not deleted by this operation.

F. Deleting Elements: Part 2

This operation only deletes individual elements. Divergences, convergences, and loops input from transition elements are not deleted by this operation.

1) Display the SFC Screen.

2) Move the cursor to the transition element (T006) to be modified.



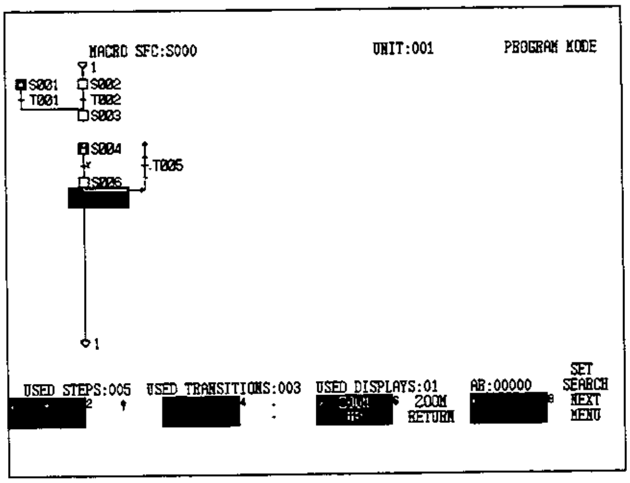
MACRO SFC:S000 UNIT:001 PROGRAM MODE T006:

USED STEPS:005 USED TRANSITIONS:004 USED DISPLAYS:01 AB:00000

1
S001
T001
S002
T002
S003
S004
T005
S006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.60

3) Select : .



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:003 USED DISPLAYS:01 AB:00000

1
S001
T001
S002
T002
S003
S004
T005
S006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.61

Note (1) Position the cursor in the SFC area.

(2) A macro step Ⓜ and the dummy transition ┼ accompanying it cannot operate independently. They will be processed together no matter which of them the cursor is moved to.

(3) If the macro step has an expanded-screen, you must begin by deleting that expanded-screen first.

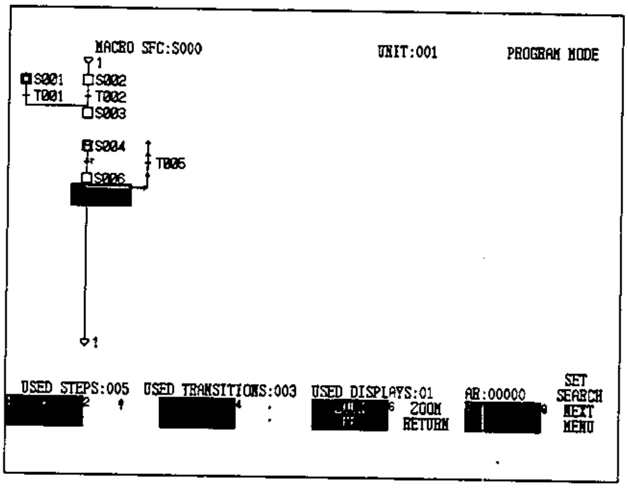
(4) The action circuit of a step and transition circuit of each transition is not deleted by this operation.

G. Deleting Elements: Part 3

This operation only deletes divergences, convergences, and loop elements input from transition elements. This operation cannot delete any other elements.

1) Display the SFC Screen.

2) Move the cursor beneath the transition element (S006) to be modified.



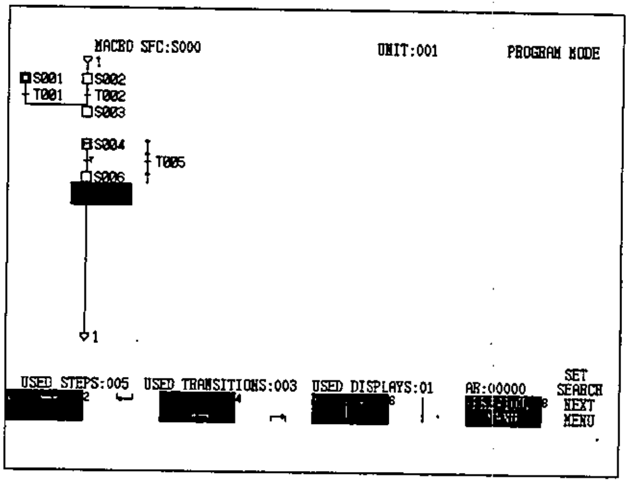
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:003 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
S004
T005
S006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.62

3) Select ┼┬. (See Note (2))



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:003 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
S004
T005
S006
1
SET
SEARCH
NEXT
MENU

Figure 7.63

Note (1) Position the cursor in the SFC area.

(2) Use ┼┬ to delete divergences, convergences, and loops input under transition elements.

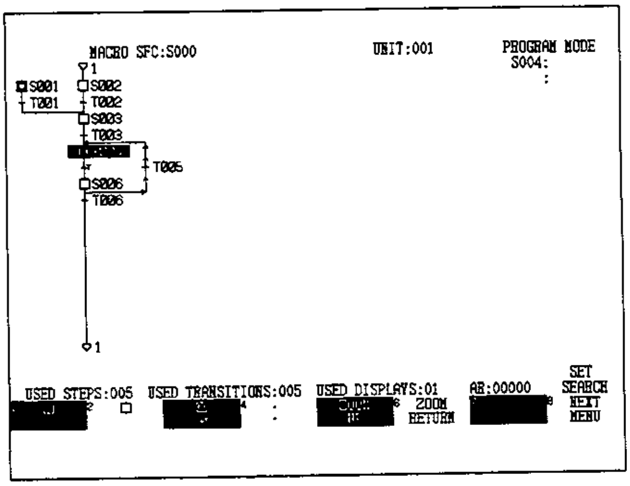
4. Displaying SFCs

This operation displays stored SFCs. The operation up to displaying the main screen is the same as *1. SFC Screen Display* on page *7-24*.

A. Zoom

This operation covers from displaying a macro step on an SFC main screen or expanded-screen to displaying a macro step expanded-screen. Use the Zoom Up and Zoom Return label keys.

1) Display the SFC main screen including macro steps.

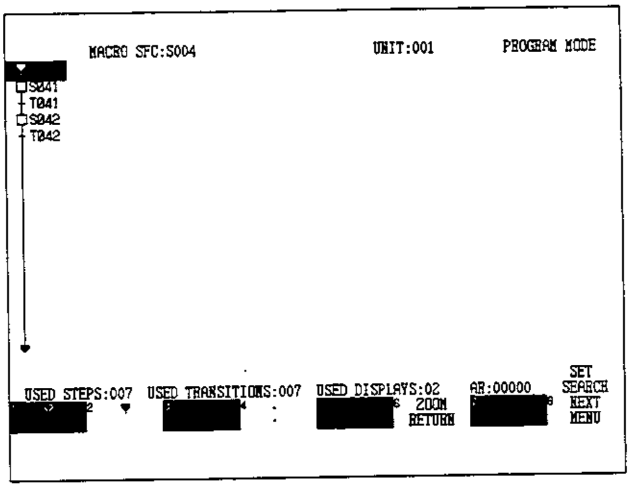


```
MACRO SFC:S000                    UNIT:001          PROGRAM MODE
                                                     S004:
USED STEPS:005  USED TRANSITIONS:005  USED DISPLAYS:01  AR:00000
```

1
S001
T001
S002
T002
S003
T003
T005
S006
T006
1
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.64

2) Move the cursor to macro step S004 and select Zoom Up. (See Note (3))



```
MACRO SFC:S004                    UNIT:001          PROGRAM MODE
USED STEPS:007  USED TRANSITIONS:007  USED DISPLAYS:02  AR:00000
```

S041
T041
S042
T042
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.65

3) To return to the screen before Zoom Up, select Zoom Return.

Note (1) Position the cursor in the SFC area.

(2) A macro step Ⓜ is essential for the main screen as well as the expanded-screen.

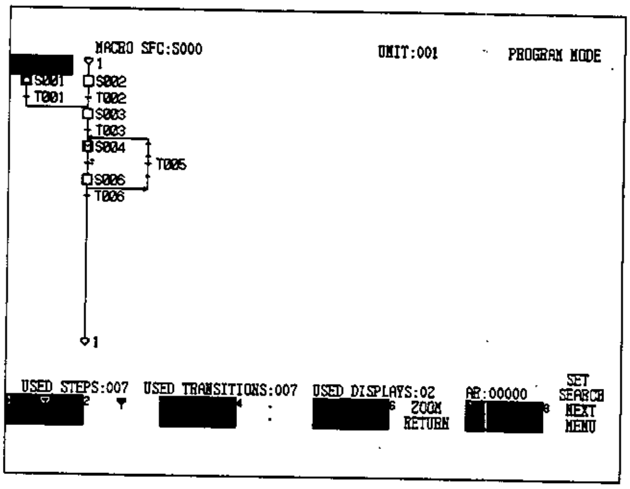
(3) If there is no expanded-screen, a new expanded-screen will be displayed, and the SFC storage operation can be performed.

(4) The Zoom Up operation can be used if the macro step is used in *Figure 7.65.*

B. Display Screen

This operation displays the SFC Screen for any step number that is input. It uses the Erase/Get Key.

1) Display the main SFC Screen.



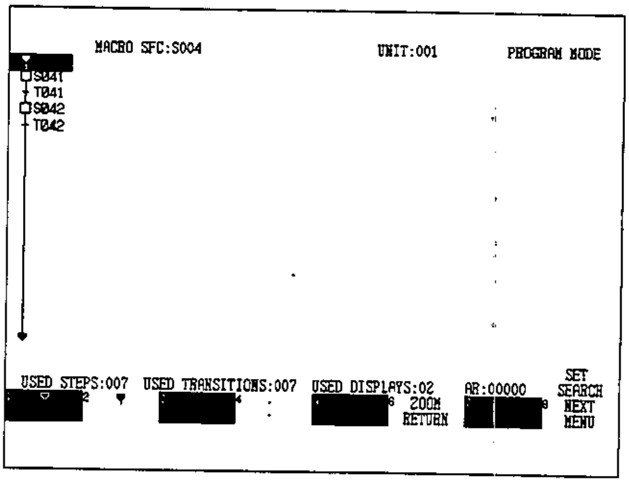
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:007 USED DISPLAYS:02 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
T005
S006
T006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.66

2) Enter macro step S004 in the AR and press the Erase/Get Key. (See Note (3))



MACRO SFC:S004 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:007 USED DISPLAYS:02 AR:00000

S041
T041
S042
T042
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.67

3) To read out the main screen, enter S000 in the AR and press the Erase/Get Key.

Note (1) Position the cursor in the SFC area.

(2) The step number of the main screen is fixed at "S000."

(3) If there is no expanded-screen, a new expanded-screen will be displayed, and the SFC storage operation can be performed.

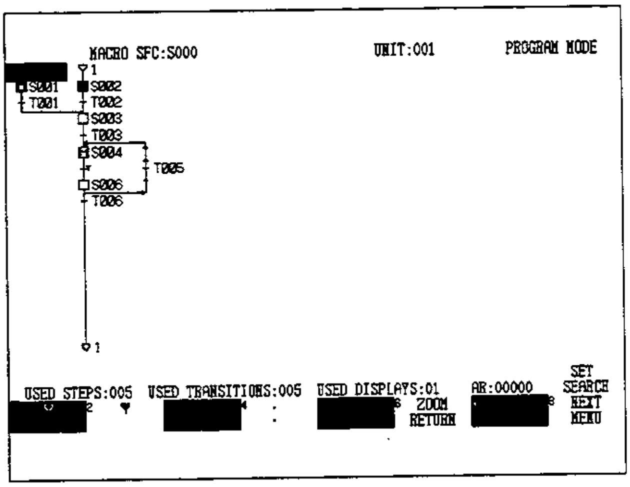
(4) An expanded-screen will be displayed if the step number is used as a macro step, or if the previous macro step screen remains when the reference number of the macro step is changed.

C. Display Active

This operation provides a transition display of the active status of each SFC step.

1) Display the main SFC Screen.

2) The display of steps that have become active (e.g., S002 in the following example) will change from ☐ to ■.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

Figure 7.68

3) S002→T002 is executed and S003 becomes active in the following example.

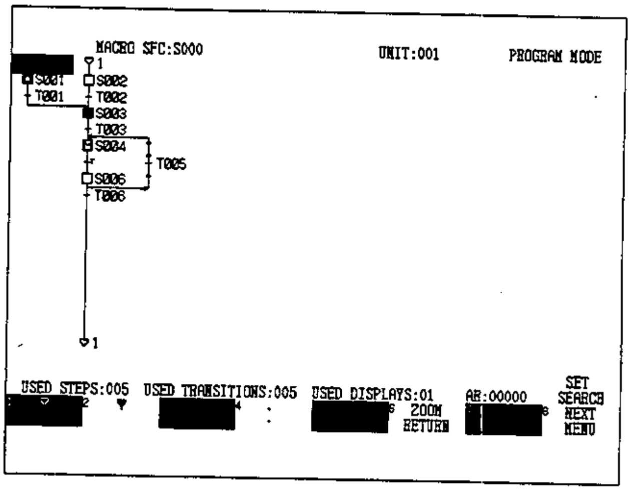

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
2
4
6
ZOOM
RETURN
8
SET
SEARCH
NEXT
MENU

Figure 7.69

Note (1) Start the GL60S before performing this operation.

(2) The element display changes from □ to ■ to indicate an active step.

(3) If the GL60S is stopped, the active step will remain displayed as ■ and execution will not proceed to the next step.

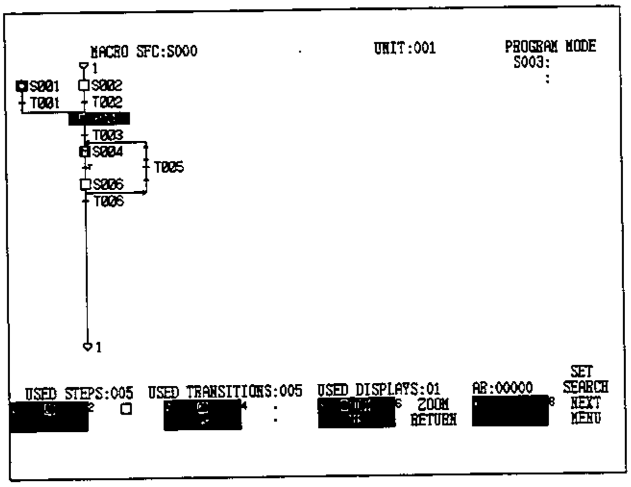
5. SFC Simulation

This operation allows the status of steps to be forcibly set and cancelled. The function is the same as the function for forcibly changing status shown in *7.3.3 Status Display* except that this operation uses the Edit Key.

A. Displaying the SFC Simulation Screen

Use the following procedure to display the SFC Disabling Simulation Screen.

1) Display the SFC Screen for which simulation is to be performed.



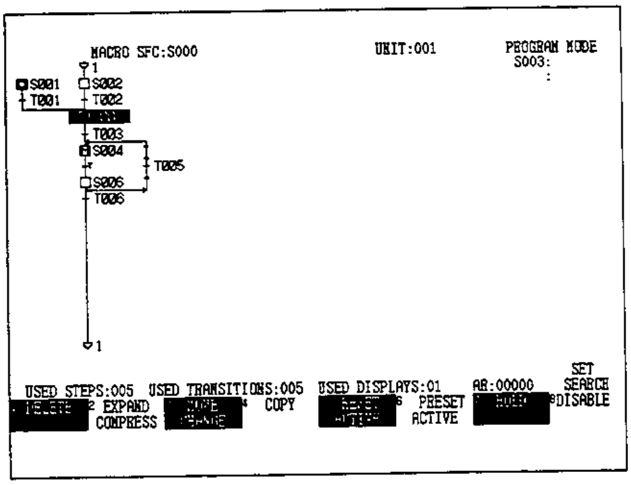
MACRO SFC:S000 UNIT:001 PROGRAM MODE S003:

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.70

2) Press the Shift + Edit/Change Node Keys.



MACRO SFC:S000 UNIT:001 PROGRAM MODE S003:

USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
DELETE
EXPAND
COMPRESS
COPY
PRESET
ACTIVE
HOLD
SET
SEARCH
DISABLE

Figure 7.71

Note (1) This operation can be performed only in Program Mode.

(2) Make sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OF

(3) To return to normal SFC operation after the completion of this operation, cancel hold o disabled status if set.

(4) If a step has been forcibly reset or preset, perform the procedure in item (3) above an then continue from the initial step to return to normal SFC actions.

(5) Press the Edit/Change Node Key to return to the original labels.

B. Hold

This operation forcibly holds a step (keeps it active).

1) Display the SFC Screen shown in *Figure 7.70*.

2) Select Set Hold from the Screen shown in *Figure 7.71*.

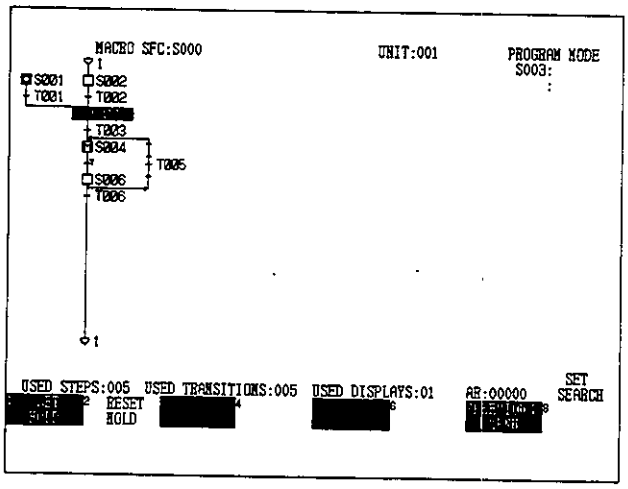

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
:
I
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET SEARCH
RESET HOLD
2
4
6
8

Figure 7.72

3) Move the cursor to S003 and select Set Hold.

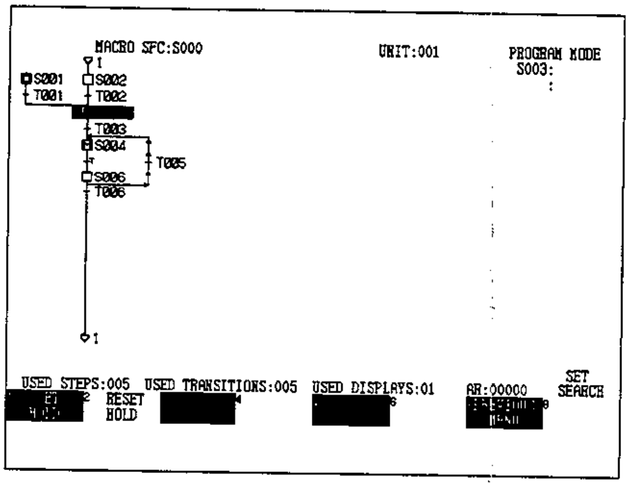

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
:
I
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET SEARCH
RESET HOLD
2
4
6
8

Figure 7.73

4) To revert to the original setting, select Reset Hold.

Note (1) Position the cursor at the step to be modified.

(2) The active status will not move from step placed on hold to the next step.

(3) Set Hold is only valid for an inactive step.

(4) Reset Hold is only valid for the active step.

(5) Cancel the hold status with Reset Hold once the hold status is no longer required.

C. Disable

This operation forcibly disables a step (i.e., prevents active status from moving to it).

1) Display the SFC Screen shown in *Figure 7.70.*

2) Select Disable from the screen shown in *Figure 7.71*, .

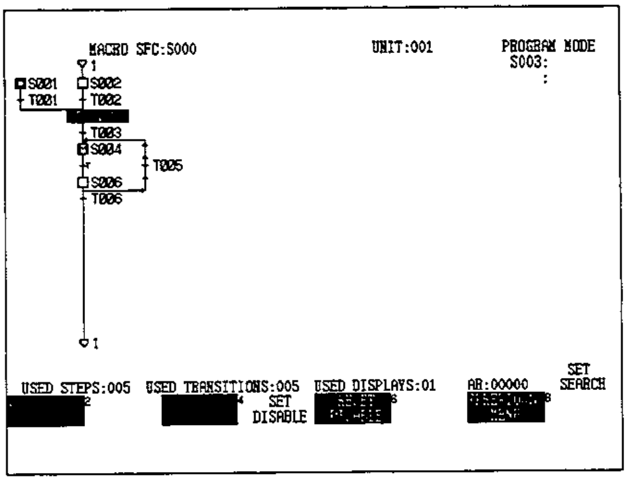

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET SEARCH
2
4
SET DISABLE
6
8

Figure 7.74

3) Move the cursor to S003 and select Set Disable.

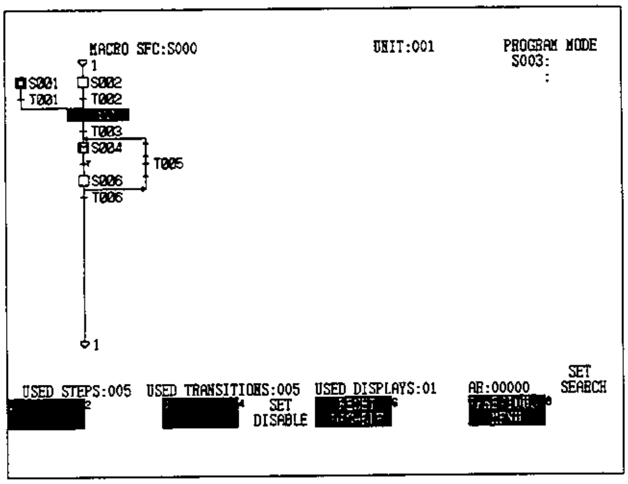

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET SEARCH
2
4
SET DISABLE
6
8

Figure 7.75

4) To revert to the original setting, select Reset Disable.

Note (1) Position the cursor at the step to be modified.

(2) Active status will not move from a step put on Hold to the next step.

(3) Set Disable cannot be used on the active step or a step put on hold.

(4) Reset Disable cannot be used on a step put on hold.

(5) Cancel the disabled status with Reset Disable once the disabled status is no longer required.

D. Preset and Reset

The Preset/Reset operation forcibly sets a step to active or inactive.

1) Display the SFC Screen shown in *Figure 7.70.*

2) On the screen shown in *Figure 7.71*, move the cursor to S003, and select Preset Active.

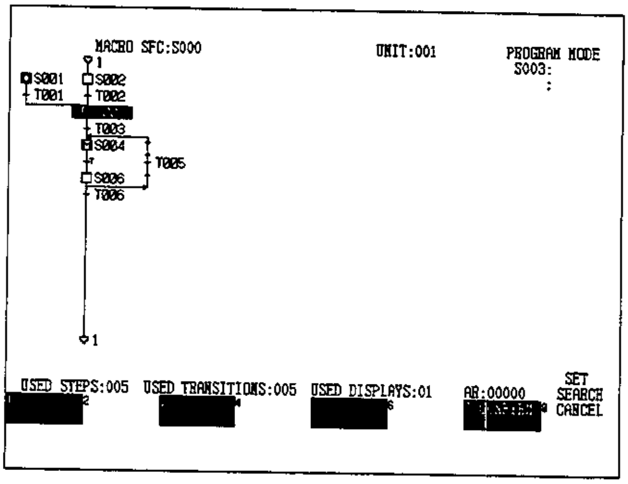

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005
USED TRANSITIONS:005
USED DISPLAYS:01
AR:00000
SET
SEARCH
CANCEL

Figure 7.76

3) Select Confirm.

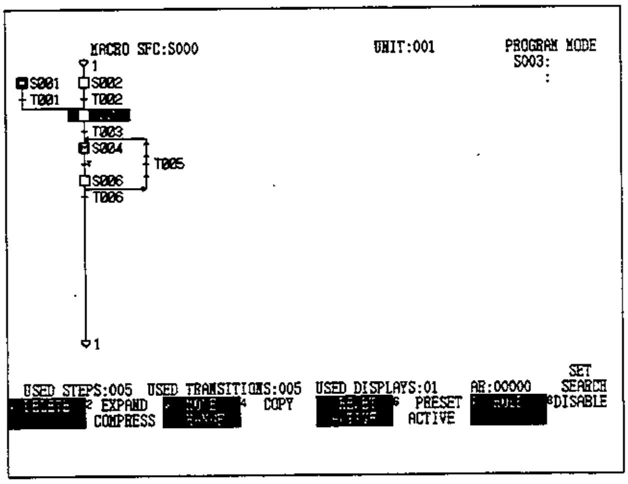

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
1
S001
T001
S002
T002
T003
S004
T005
S006
T006
1
USED STEPS:005 USED TRANSITIONS:005 USED DISPLAYS:01 AR:00000
2 EXPAND COMPRESS
4 COPY
6 PRESET ACTIVE
SET SEARCH
8DISABLE

Figure 7.77

4) To revert to the original setting, select Reset Active.

5) Select Confirm.

Note (1) Position the cursor at the step to be modified.

(2) Preset Active cannot be used on a step that is active.

(3) Reset Active cannot be used on a step that is inactive.

6. SFC Edit Operations

These operations edit the flow of the SFC. They use the Shift + Edit/Change Node Keys. They include the following:

• Delete	Deletes SFC elements and action circuits (transition circuits).
• Expand/Compress	Expands and compresses SFC columns and rows.
• Move/Change	Moves elements and exchanges action circuits steps.
• Copy	Copies SFC flow rows and column units.

A. Displaying the Edit Operation Screen

Use the following procedure to display the Edit Operation Screen.

1) Display the SFC Screen used for editing operations.

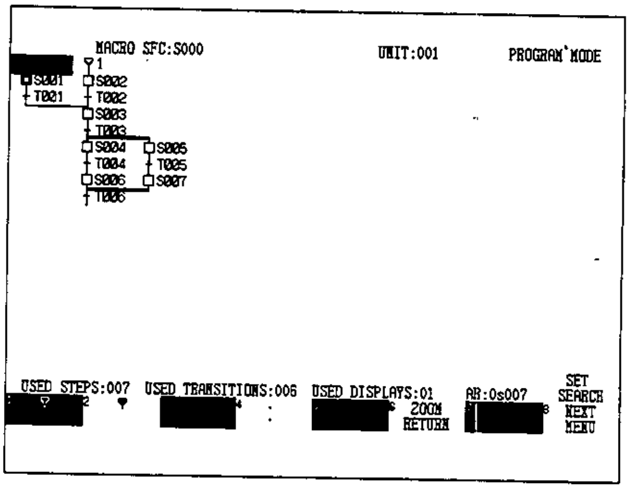

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:0s007
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.78

2) Press the Shift + Edit/Change Node Keys.

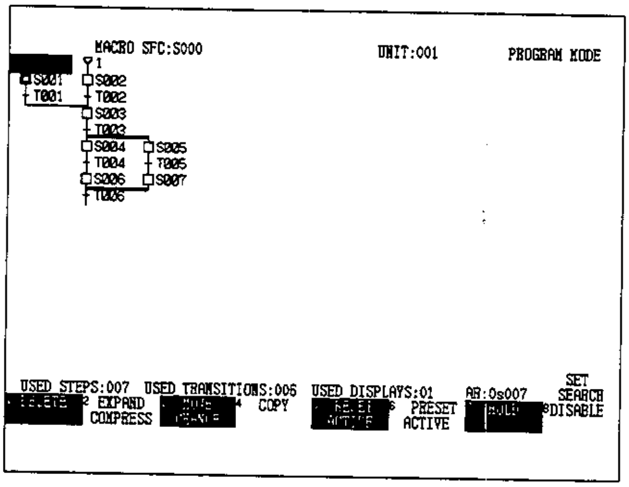

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:0s007
DELETE
EXPAND
COMPRESS
MOVE
CHANGE
COPY
RESET
ACTIVE
PRESET
ACTIVE
SET
SEARCH
DISABLE

Figure 7.79

Note (1) This operation can only be performed in Program Mode.

(2) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF. Press the Edit/Change Node Key to return to the original label.

B. Delete

This operation simultaneously deletes SFC step elements and action circuits as well as transition elements and transition circuits.

1) Display the SFC Screen shown in *Figure 7.79.*

2) Move the cursor to S002 and select Delete.

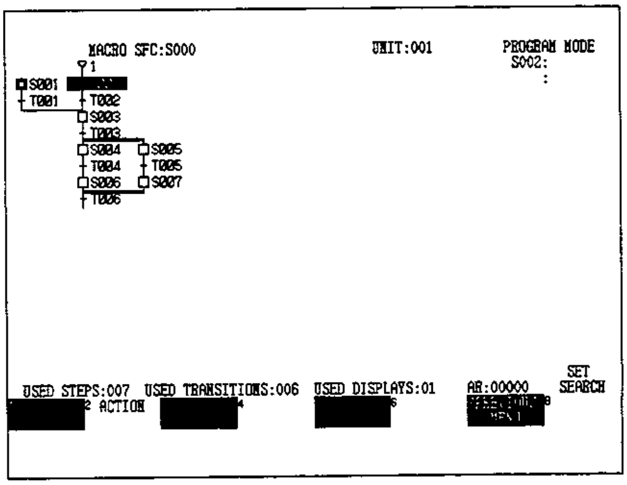

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S002:
:
1
S001
T001
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:00000
2 ACTION
4
6
8
SET
SEARCH

Figure 7.80

3) Select Action. (See Note (2))

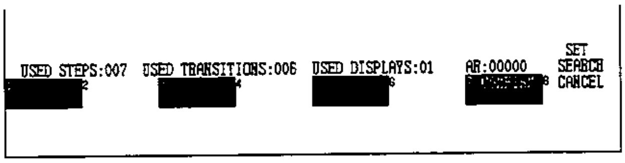

USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:00000
2
4
6
8
SET
SEARCH
CANCEL

Figure 7.81

4) Select Confirm. (See Note (3))

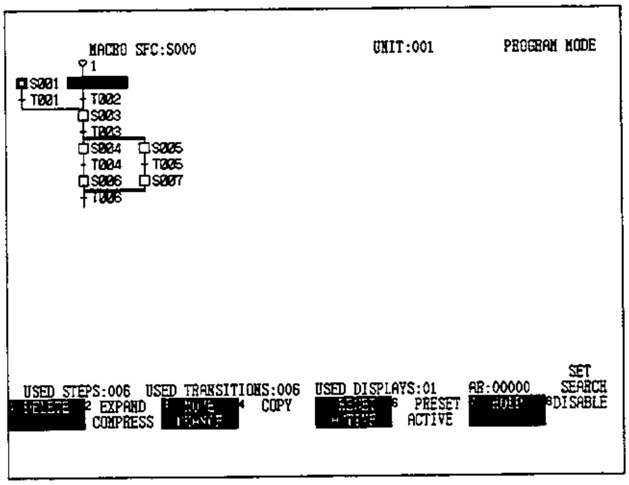

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
USED STEPS:006
USED TRANSITIONS:006
USED DISPLAYS:01
AR:00000
DELETE
2 EXPAND
COMPRESS
4 COPY
6 PRESET
ACTIVE
SET
SEARCH
8DISABLE

Figure 7.82

Note
(1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) If the cursor is at a transition element, select Delete Transition.

(3) If Cancel is selected instead of Confirm, the screen will return to the one shown in *Figure 7.80.*

(4) This operation cannot be used on an active step.

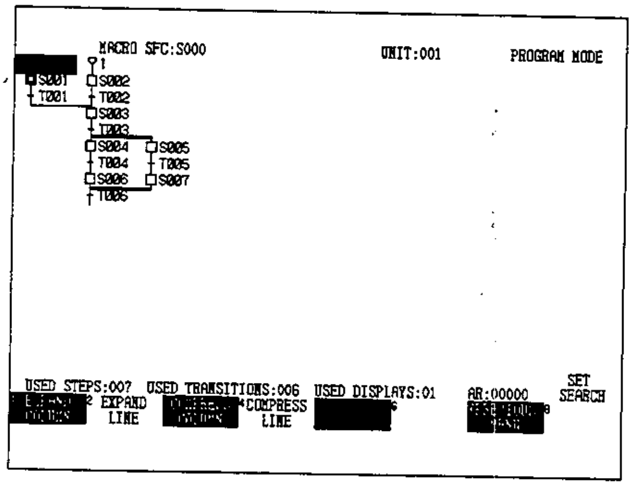
(5) If a macro step is to be deleted, it must be deleted from its subscreen.

C. Expand/Compress: Part 1

This operation expands the SFC columns to the right. It simultaneously moves all elements in the column where the cursor is positioned and all elements in columns to the right of the cursor.

1) Display the SFC Screen shown in *Figure 7.79.*

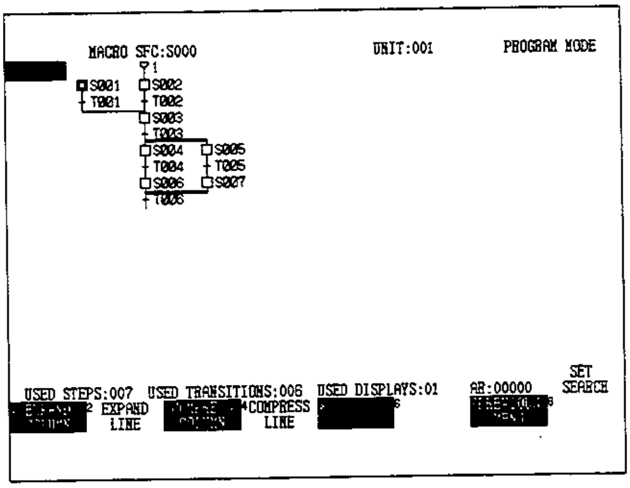
2) Move the cursor to S001 and select Expand/Compress.


S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
EXPAND
LINE
COMPRESS
LINE
SET
SEARCH

```
MACRO SFC:S000                UNIT:001          PROGRAM MODE
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01    AR:00000
```

Figure 7.83

3) Select Expand Column.



```
MACRO SFC:S000                    UNIT:001        PROGRAM MODE
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01   AR:00000
```

1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
6
8
SET SEARCH

Figure 7.84

Note

(1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) Make sure there are no elements in the eighth column.

(3) Make sure there are no divergences, convergences or loops in the seventh column.

(4) This operation cannot be performed if there is an active step in the column with the cursor or a column to the right of the cursor.

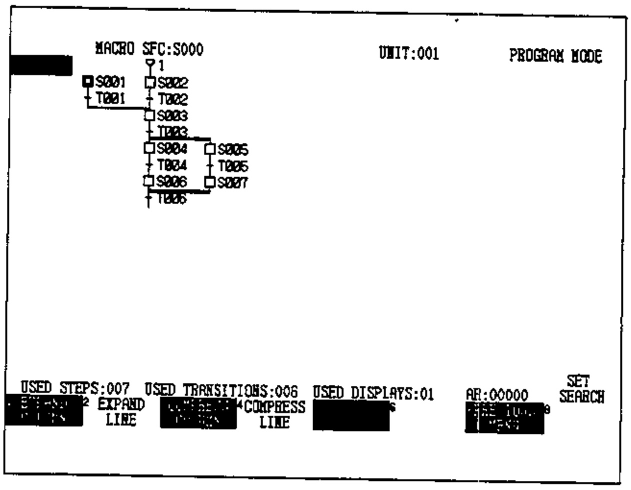
(5) To return to the labels shown in *Figure 7.79*, either press the Shift + Edit/Change Node Keys, or select Previous Menu.

D. Expand/Compress: Part 2

This operation compresses the SFC columns to the left. It simultaneously moves all elements in columns to the right of the cursor.

1) Display the SFC Screen from in *Figure 7.79*. (See Note (2))

2) Move the cursor to a vacant space on the left and select Expand/Compress.



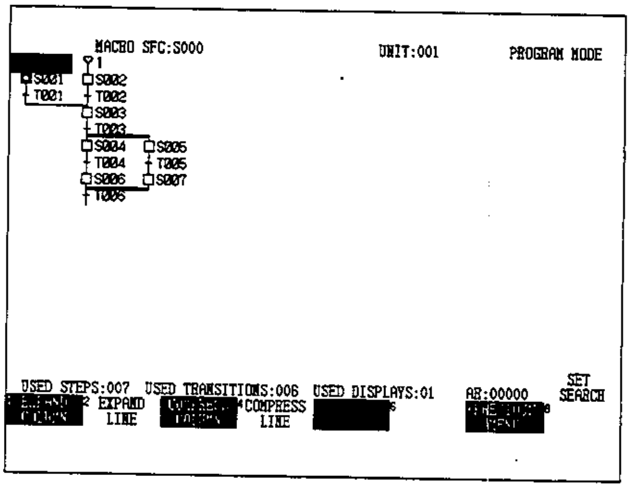
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
6
9
SET SEARCH

Figure 7.85

3) Select Compress Column.



MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
6
9
SET SEARCH

Figure 7.86

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) Perform this step if the labels shown in *Figure 7.79* are being displayed.

(3) Make sure there is no element at the cursor location.

(4) This operation cannot be performed if there is an active step in a column to the right of the one in which the cursor is located.

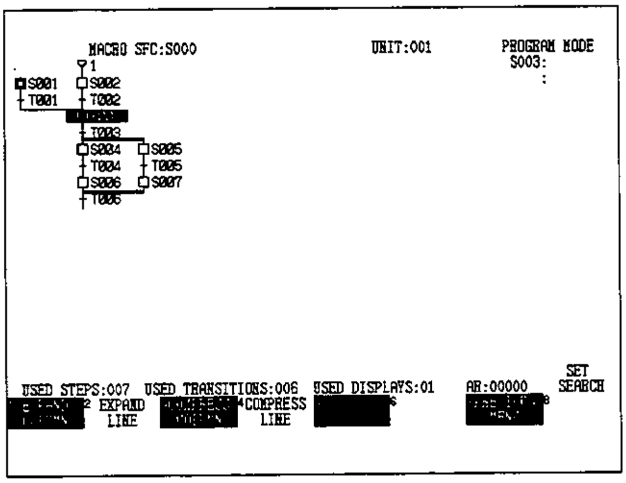
(5) To return to the labels shown in *Figure 7.79*, either press the Shift + Edit/Change Node Keys, or select Previous Menu.

E. Expand/Compress: Part 3

This operation expands the SFC rows downwards. It simultaneously moves all elements in the row where the cursor is positioned and all elements in rows below the cursor.

1) Display the SFC Screen shown in *Figure 7.79.*

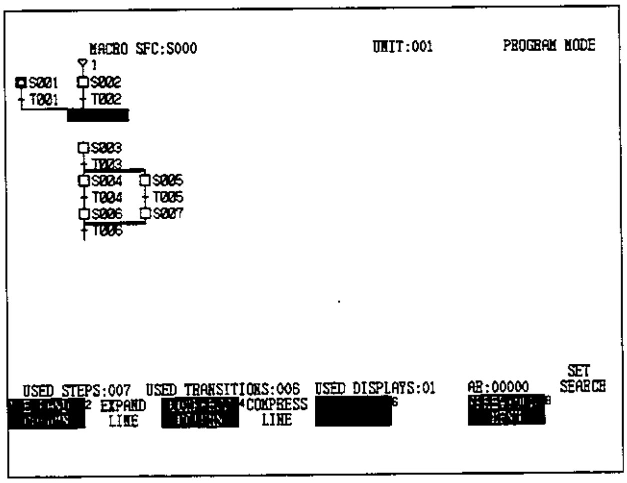
2) Move the cursor to S003 and select Expand/Compress.


MACRO SFC:S000
UNIT:001
PROGRAM MODE
S003:
1
S001
T001
S002
T002
T003
S004
S005
T004
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
SET SEARCH

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

Figure 7.87

3) Select Expand Line.


MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
SET SEARCH

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

Figure 7.88

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) Make sure that an 8-step row and an 8-transition row is vacant and that there is no TO ▽ or macro-return ♦.

(3) This operation cannot be performed if there is an active step in a row below the cursor.

(4) To return to the labels shown in *Figure 7.79*, either press the Shift + Edit/Change Node Keys, or select Previous Menu.

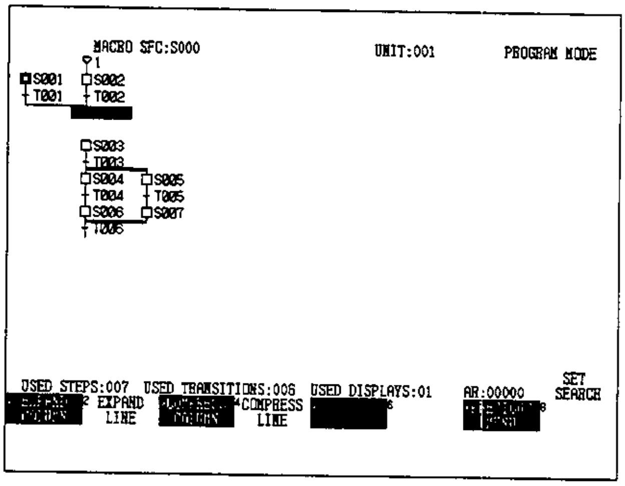
(5) This operation cannot be performed if the cursor is in a FROM or TO row.

F. Expand/Compress: Part 4

This operation compresses the SFC rows upwards. It simultaneously moves all elements below the position of the cursor.

1) Display the SFC Screen shown in *Figure 7.79.* (See Note (2))

2) Move the cursor to the vacant space on top and select Expand/Compress.



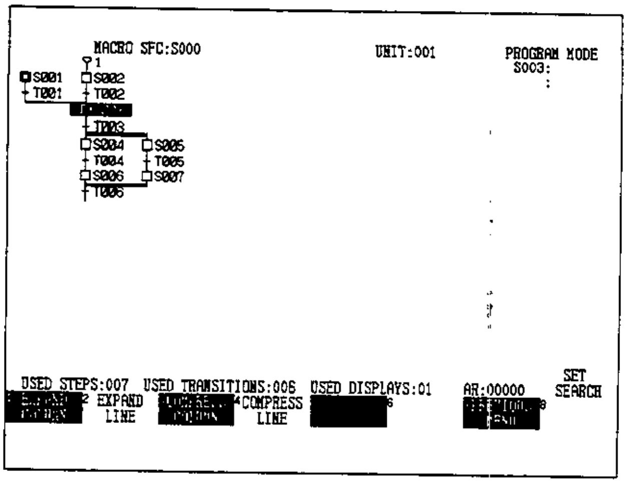
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
6
8
SET SEARCH

Figure 7.89

3) Select Compress Line.



MACRO SFC:S000 UNIT:001 PROGRAM MODE
S003:

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
T003
S004
S005
T004
T005
S006
S007
T006
2 EXPAND LINE
4 COMPRESS LINE
6
8
SET SEARCH

Figure 7.90

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) Do this if the labels shown in *Figure 7.79* are displayed.

(3) Make sure there are no elements at the cursor location.

(4) This operation cannot be performed if there is an active step below the location of the cursor.

(5) To return to the labels shown in *Figure 7.79*, either press the Shift + Edit/Change Node Keys, or select Previous Menu.

G. Exchanging Action Circuits

This operation automatically exchanges action circuits between any steps. The GL60S, GL60H, or GL70H will execute the action circuits immediately after the exchange.

1) Display the SFC Screen shown in *Figure 7.79*.

2) Select Move/Change and then select Change.

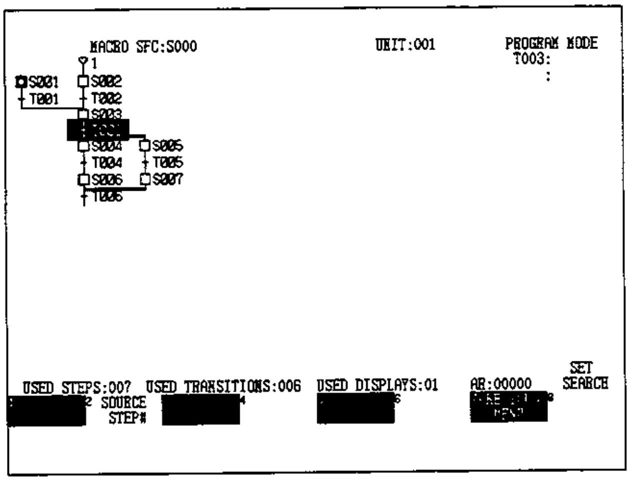
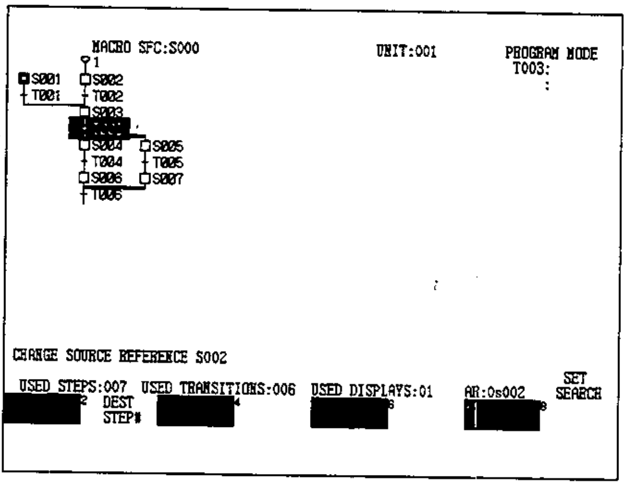

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T003:
:
1
S001
T001
S002
T002
S003
S004
S005
T004
T005
S006
S007
T006
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:00000
SET
SEARCH
SOURCE
STEP#

Figure 7.91

3) Enter the step number of one of the action circuits to be exchanged (S002) in the AR and select Source Step Number.

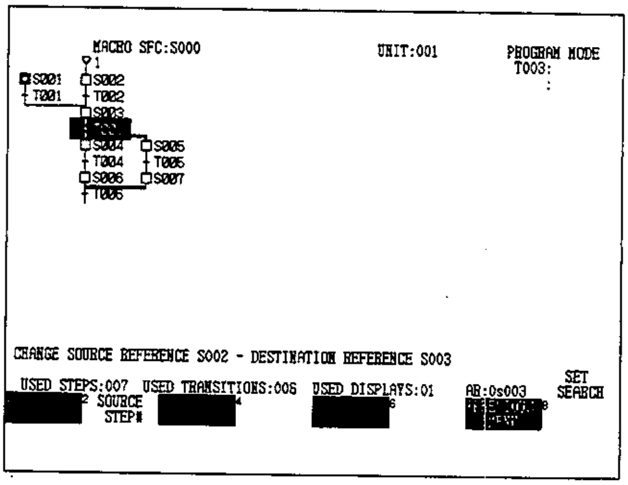

MACRO SFC:S000
1
S001
T001
S002
T002
S003
S004
S005
T004
T005
S006
S007
T006

```
UNIT:001
PROGRAM MODE
T003:
CHANGE SOURCE REFERENCE S002
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01  AR:0s002
```

DEST
STEP#
SET
SEARCH

Figure 7.92

4) Enter the step number of the other action circuit to be exchanged (S003) in the AR and select Destination step Number.


MACRO SFC:S000
1
S001
T001
S002
T002
S003
S004
S005
T004
T005
S006
S007
T006

```
UNIT:001
PROGRAM MODE
T003:
CHANGE SOURCE REFERENCE S002 - DESTINATION REFERENCE S003
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01  AR:0s003
```

SOURCE
STEP#
SET
SEARCH

Figure 7.93

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) Perform this operation carefully; the results will directly affect overall SFC operation.

(3) This operation cannot be used on an active step.

H. Move

This operation moves any SFC element within the same SFC Screen. Movements are made in units of single elements, although convergences, divergences, and loops with transitions can be moved at the same time as transitions.

1) Display the SFC Screen shown in *Figure 7.79.*

2) Select Move/Change and then select Move.

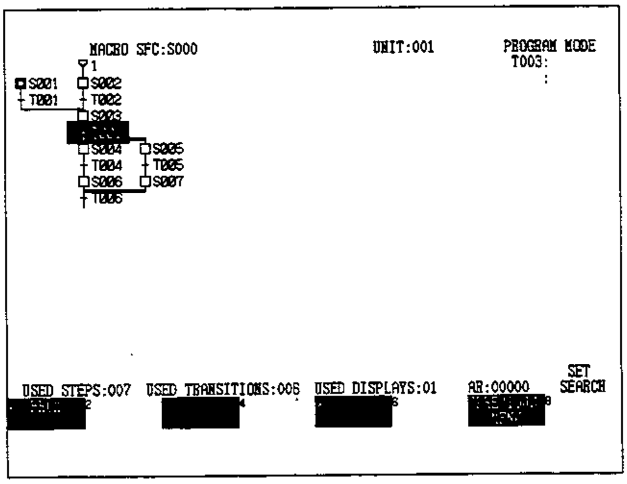

MACRO SFC:S000
UNIT:001
PROGRAM MODE
T003:
1
S001
T001
S002
T002
S003
S004
S005
T004
T005
S006
S007
T006
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:00000
SET
SEARCH

Figure 7.94

3) Position the cursor on the element to be moved (S003) and select From.

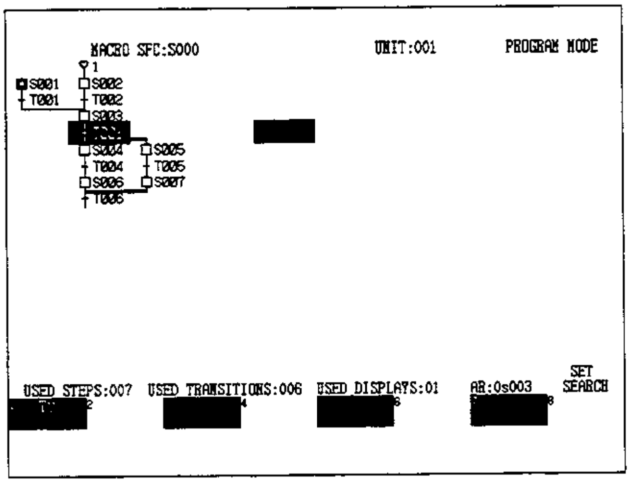
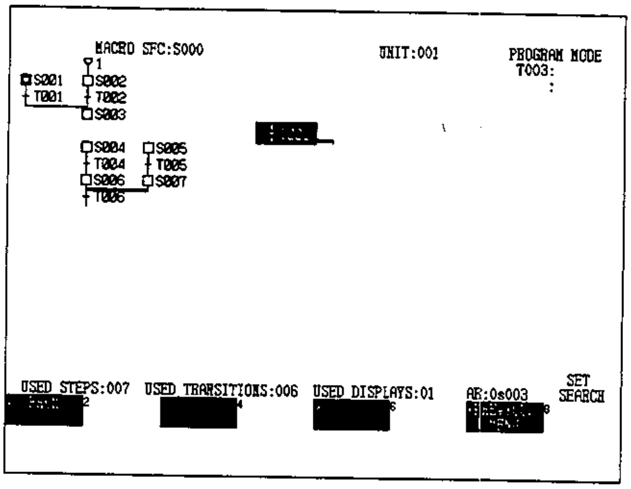

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
S004
S005
T004
T005
S006
S007
T006
USED STEPS:007
USED TRANSITIONS:006
USED DISPLAYS:01
AR:0s003
SET
SEARCH

Figure 7.95

4) Move the cursor to the destination and select To.


MACRO SFC:S000
1
S001
T001
S002
T002
S003
S004
T004
S006
T006
S005
T005
S007

UNIT:001

PROGRAM MODE
T003:

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:0s003

SET SEARCH

Figure 7.96

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) This operation cannot be perform if there is an element at the destination.

(3) The destination must be in the same line as the element.

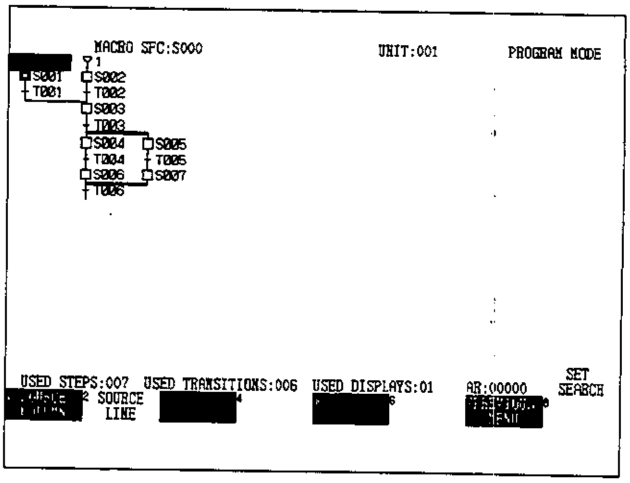
(4) This processing cannot be used on an active step.

I. Copy: Part 1

This operation copies a number of elements from any column to another column.

1) Display the SFC Screen shown in *Figure 7.79.*

2) Select Copy.


MACRO SFC:S000
1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
SOURCE
LINE

UNIT:001

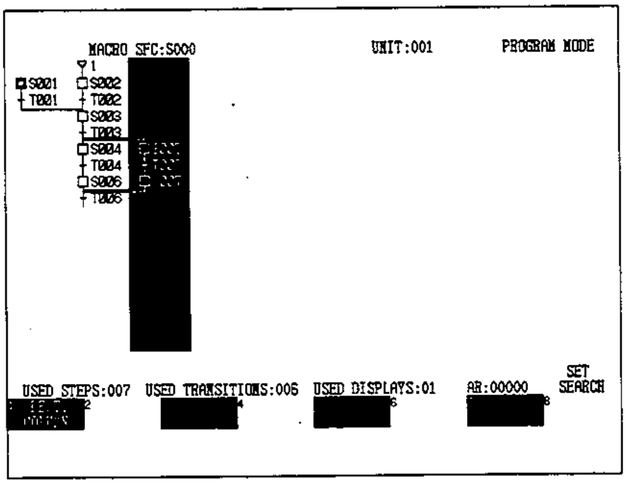
PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

SET SEARCH

Figure 7.97

3) Move the cursor to the column to be copied and select Source Column.

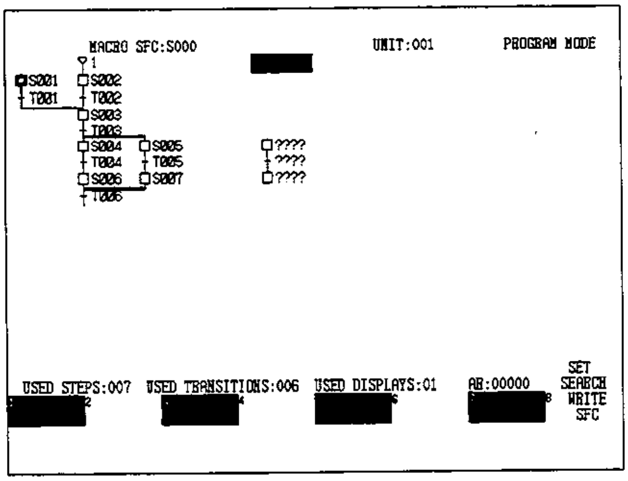

MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
SET
SEARCH
2
4
6
8

Figure 7.98

4) Move the cursor to the destination column and select Destination Column. The reference number will change to ????.

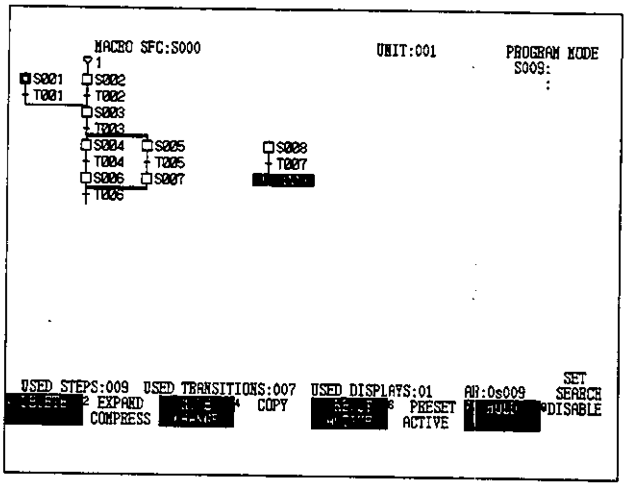

MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:007 USED TRANSITIONS:006 USED DISPLAYS:01 AR:00000

1
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
????
????
????
SET
SEARCH
WRITE
SFC
2
4
6
8

Figure 7.99

5) Input all the ???? reference numbers in the AR, press the Enter Key, and select Write SFC for each.



MACRO SFC:S000
1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
EXPAND
COMPRESS
COPY
PRESET
ACTIVE
SET
SEARCH
DISABLE

UNIT:001

PROGRAM MODE
S009:

USED STEPS:009 USED TRANSITIONS:007 USED DISPLAYS:01 AR:0s009

Figure 7.100

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) The destination columns must be empty.

(3) If there is a macro-entry ▼ in the copy source FROM line, the macro-entry ▼ will not be copied to the copy destination.

(4) The initial step ⧈ will also not be copied.

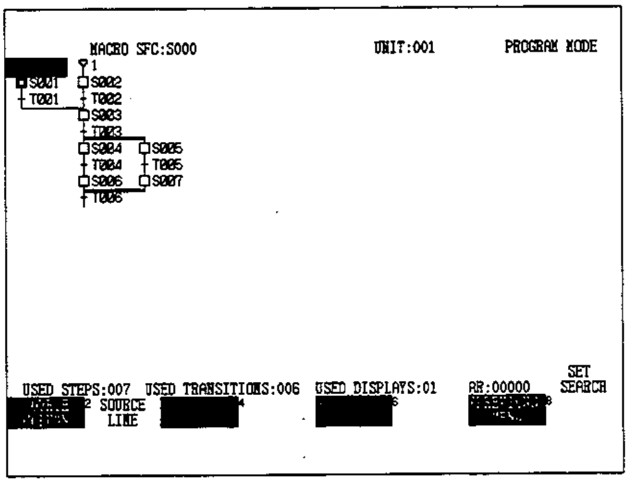
(5) The row(s) in the destination column will be the same as the original SFC rows.

J. Copy: Part 2

This operation copies a number of elements from any row to another row.

1) Display the SFC Screen shown in *Figure 7.79.*

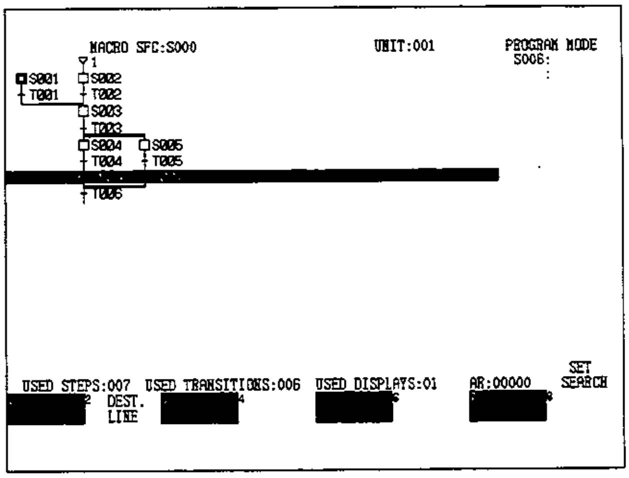
2) Select Copy.


MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
2 SOURCE LINE
4
6
8
SET SEARCH

```
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01  AR:00000
```

Figure 7.101

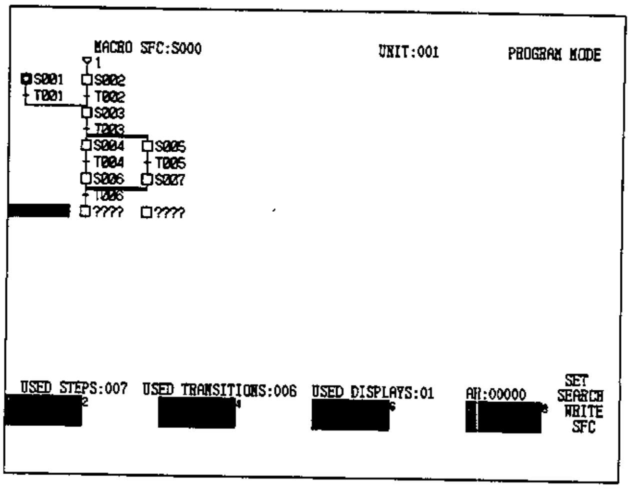
3) Move the cursor to the row to be copied and select Source Line.


MACRO SFC:S000
UNIT:001
PROGRAM MODE
S006:
:
1
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
T006
2 DEST. LINE
4
6
8
SET SEARCH

```
USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01  AR:00000
```

Figure 7.102

4) Move the cursor to the destination row and select Destination Line. The reference number will change to ????.

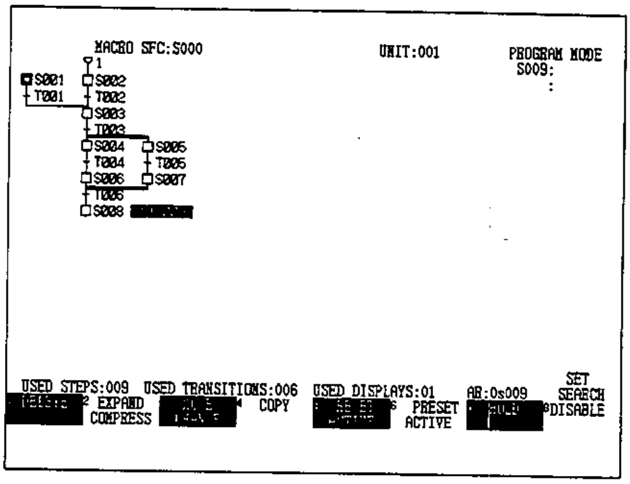


```
MACRO SFC:S000                              UNIT:001          PROGRAM MODE

USED STEPS:007  USED TRANSITIONS:006  USED DISPLAYS:01   AR:00000
```

1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
????
????
SET
SEARCH
WRITE
SFC

Figure 7.103

5) Input all the ???? reference numbers in the AR, press the Enter Key, and select Write SFC for each.



```
MACRO SFC:S000                              UNIT:001          PROGRAM MODE
                                                               S009:
                                                                   :

USED STEPS:009  USED TRANSITIONS:006  USED DISPLAYS:01   AR:0s009
```

1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
EXPAND
COMPRESS
COPY
PRESET
ACTIVE
SET
SEARCH
DISABLE

Figure 7.104

Note (1) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(2) The destination rows must all be empty.

(3) The macro-entry ▼ cannot be copied.

(4) The initial step ⧈ will also not be copied.

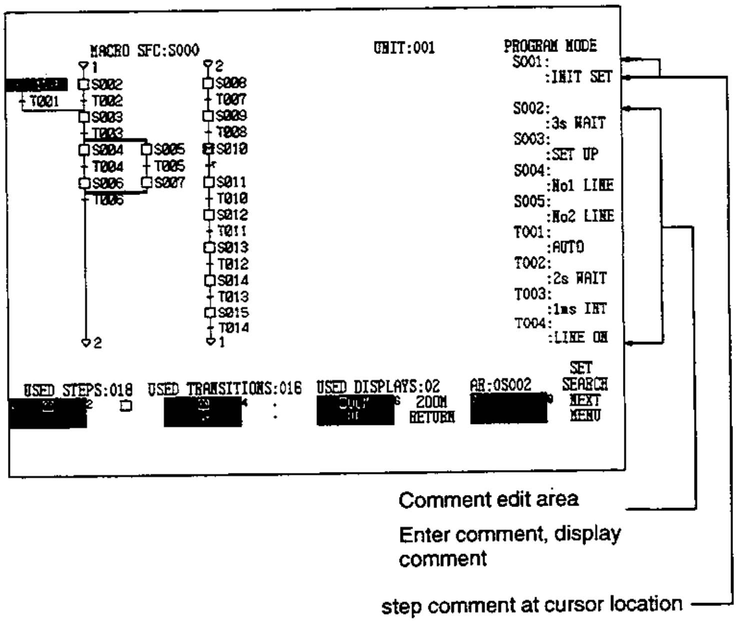
(5) Steps are copied to step rows and transitions are copied to transition rows.

7. SFC Comment Editing

This operation is used to input and display comments at each step of the SFC flow. A maximum of 8 characters can be input as a comment.

A. SFC Flow and Comment Edit Area

The step comment at the cursor location can be displayed only when the cursor is located at the SFC flow step number. To delete a comment from the screen in the comment edit area, move the cursor to the number of the step to be deleted and press the Shift + Erase/Get Keys.



```
MACRO SFC:S000                 UNIT:001        PROGRAM MODE
                                                S001:
                                                    :INIT SET
                                                S002:
                                                    :3s WAIT
                                                S003:
                                                    :SET UP
                                                S004:
                                                    :No1 LINE
                                                S005:
                                                    :No2 LINE
                                                T001:
                                                    :AUTO
                                                T002:
                                                    :2s WAIT
                                                T003:
                                                    :1ms INT
                                                T004:
                                                    :LINE ON
                                                               SET
USED STEPS:018  USED TRANSITIONS:016  USED DISPLAYS:02  AR:0S002  SEARCH
                                                 ZOOM           NEXT
                                                 RETURN         MENU
```

1
S002
T001
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
2
2
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
Comment edit area
Enter comment, display comment
step comment at cursor location

Figure 7.105

B. Displaying Comments: Part 1

This operation displays comments by positioning the cursor at the SFC flow step number.

1) Display the SFC Screen.

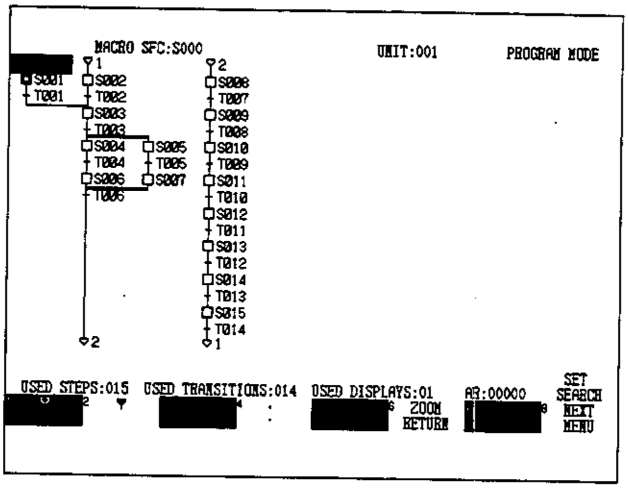

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
USED STEPS:015
USED TRANSITIONS:014
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.106

2) Move the cursor to step number S0001.

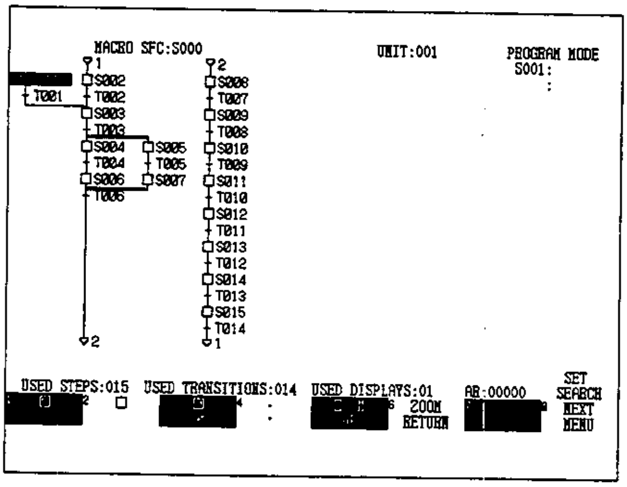

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001:
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
USED STEPS:015
USED TRANSITIONS:014
USED DISPLAYS:01
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.107

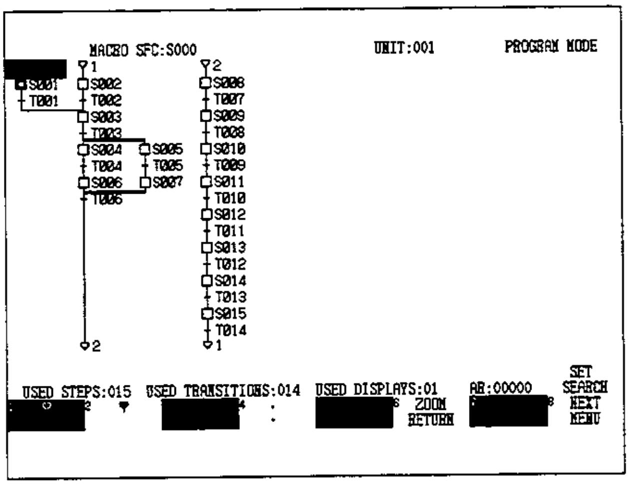
Note (1) Locate the cursor at the step number.

(2) Comment editing (write or delete) cannot be performed in the comment area displayed by this operation.

C. Displaying Comments: Part 2

This operation enables comments to be displayed in the comment edit area by positioning the cursor at the SFC flow step number and pressing the Retrace/Trace Key.

1) Display the SFC Screen.



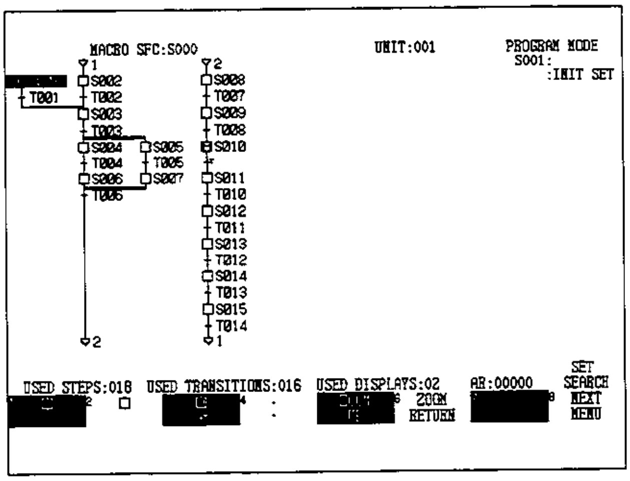
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:015 USED TRANSITIONS:014 USED DISPLAYS:01 AR:00000

1
2
S001
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.108

2) Move the cursor to step number S001.



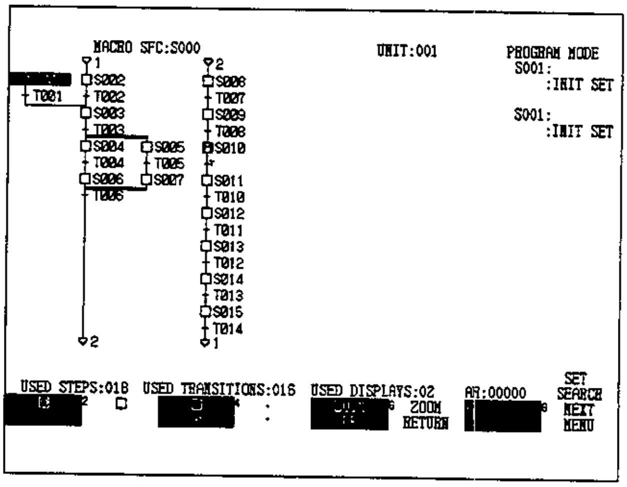
MACRO SFC:S000 UNIT:001 PROGRAM MODE
S001:
:INIT SET

USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:00000

1
2
T001
S002
T002
S003
T003
S004
T004
S006
T006
S005
T005
S007
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.109

3) Press the Retrace/Trace Key.


1
2
S002
T001
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
2
4
6 ZOOM RETURN
8
SET SEARCH
NEXT MENU

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001:
:INIT SET
S001:
:INIT SET
USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:00000

Figure 7.110

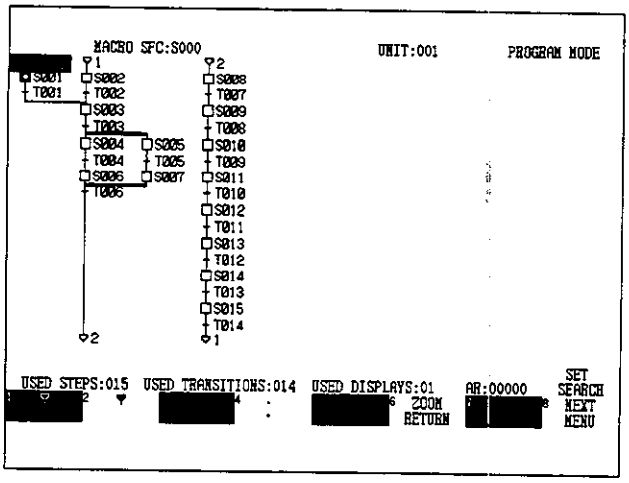
Note (1) Position the cursor at the step number.

(2) Comment editing (write or delete) can be performed at the comment area displayed by this operation.

D. Displaying Comments: Part 3

This operation enables comments to be displayed in the comment edit area by positioning the cursor at the SFC comment edit area, inputting the step number and pressing the Erase/Get Key.

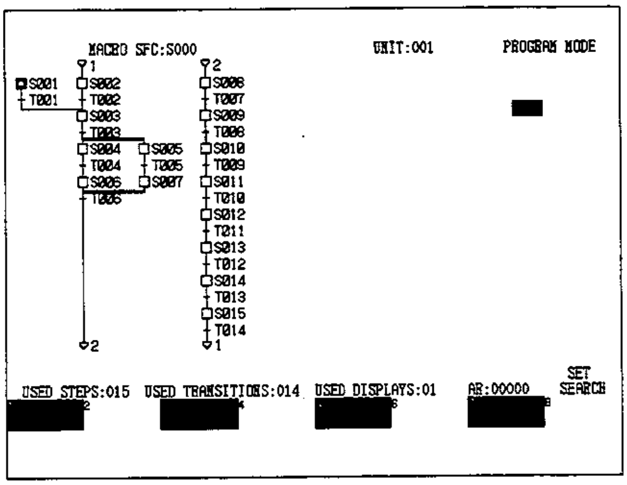
1) Display the SFC Screen.


1
2
S001
S002
T001
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
2
4
6 ZOOM RETURN
8
SET SEARCH
NEXT MENU

MACRO SFC:S000
UNIT:001
PROGRAM MODE
USED STEPS:015 USED TRANSITIONS:014 USED DISPLAYS:01 AR:00000

Figure 7.111

2) Position the cursor in the comment edit area.


MACRO SFC:S000 UNIT:001 PROGRAM MODE

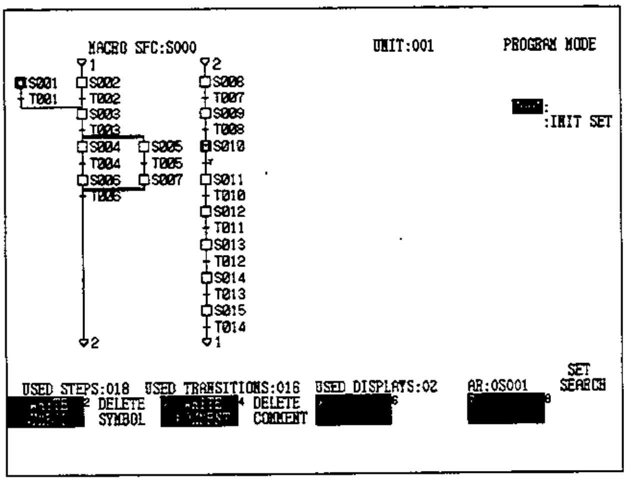
USED STEPS:015 USED TRANSITIONS:014 USED DISPLAYS:01 AR:00000

S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
2
SET
SEARCH

Figure 7.112

3) Enter the step number S001 in the AR.

4) Press the Erase/Get Key.


MACRO SFC:S000 UNIT:001 PROGRAM MODE

:INIT SET

USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:0S001

S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
2
DELETE
SYMBOL
DELETE
COMMENT
SET
SEARCH

Figure 7.113

Note (1) Move the cursor to the comment edit area in the SFC Screen.

(2) Comment editing (write or delete) can be performed at the comment area displayed by this operation.

E. Displaying Comments: Part 4

This operation displays successive comments in the comment edit area of the SFC Screen using the Page Up or Page Down Keys.

1) Display the SFC Screen shown in *Figure 7.113.*

2) Move the cursor to step number S001 in the comments in the comment edit area.

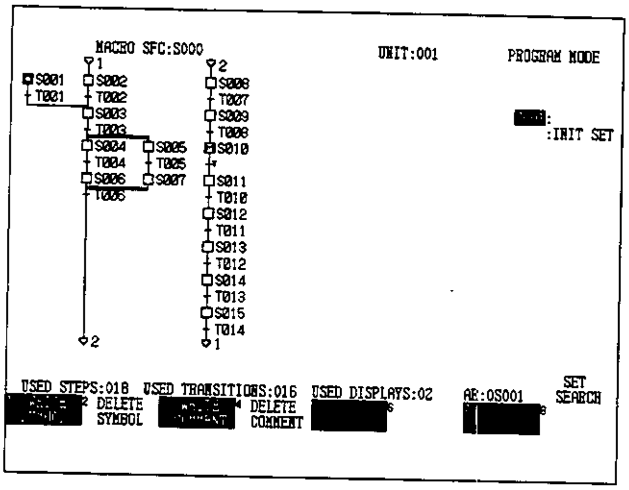

MACRO SFC:S000
1
2
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
UNIT:001
PROGRAM MODE
:INIT SET
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:0S001
WRITE SYMBOL
DELETE SYMBOL
WRITE COMMENT
DELETE COMMENT
SET SEARCH

Figure 7.114

3) Press the Page Down Key. (See Note (3))

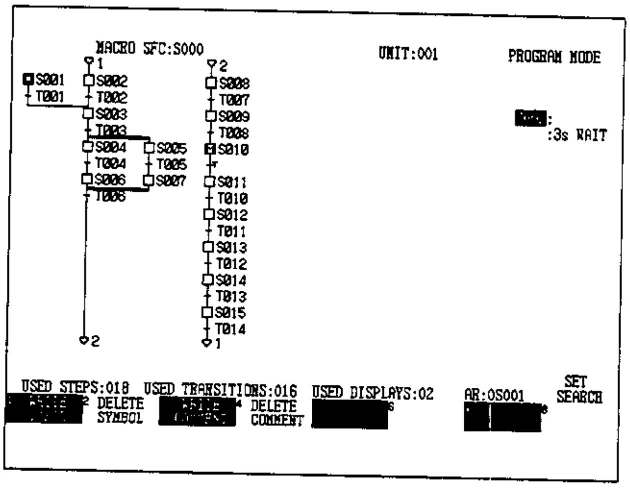

MACRO SFC:S000
1
2
S001
T001
S002
T002
S003
T003
S004
S005
T004
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
UNIT:001
PROGRAM MODE
:3s WAIT
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:0S001
WRITE SYMBOL
DELETE SYMBOL
WRITE COMMENT
DELETE COMMENT
SET SEARCH

Figure 7.115

4) Press the Page Up Key. (See Note (4))

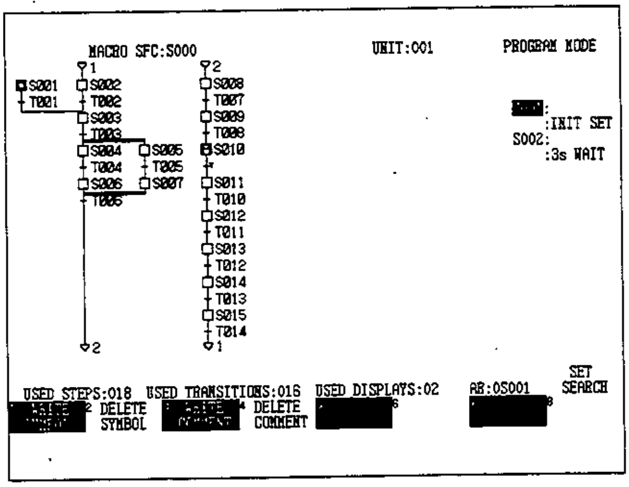

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
T006
S007
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
:INIT SET
S002:
:3s WAIT
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AB:0S001
SET
SEARCH
DELETE
SYMBOL
DELETE
COMMENT

Figure 7.116

Note (1) Move the cursor to the comment edit area in the SFC Screen.

(2) Comment editing (write or delete) can be performed at the comment area displayed by this operation.

(3) The Page Down Key will display the next step number. Only the location of the cursor will change.

(4) The Page Up Key displays the previous step number. It moves the step number at the cursor location one row lower and the previous step number is displayed at the cursor location.

F. Writing Comments

This operation inputs a comment for a step.

1) Display the SFC Screen shown in *Figure 7.113*.

2) Display the comment for a step in the comment edit area using the comment display operation.

3) Move the cursor to the step to be changed or input, and select Write Comment. (See Note (4))

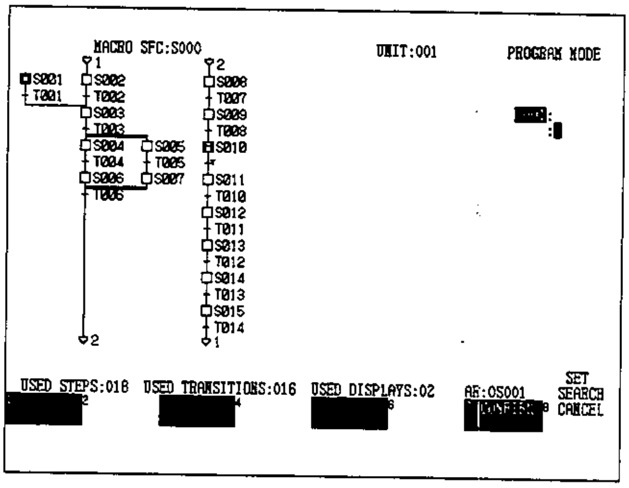

MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001 T001 S002 T002 S003 T003 S004 T004 S005 T005 S006 S007 T006
S008 T007 S009 T008 S010 S011 T010 S012 T011 S013 T012 S014 T013 S015 T014
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:OS001
SET
SEARCH
CANCEL

Figure 7.117

4) Enter the comment and select Confirm. (See Note (5))

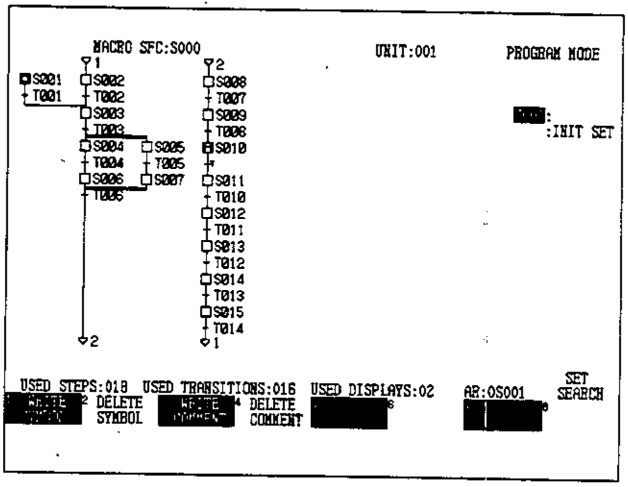

MACRO SFC:S000
UNIT:001
PROGRAM MODE
:INIT SET
S001 T001 S002 T002 S003 T003 S004 T004 S005 T005 S006 S007 T006
S008 T007 S009 T008 S010 S011 T010 S012 T011 S013 T012 S014 T013 S015 T014
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:OS001
DELETE SYMBOL
DELETE COMMENT
SET
SEARCH

Figure 7.118

Note (1) A maximum of 8 characters can be used to input a comment.

(2) Position the cursor in the comment edit area.

(3) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(4) Move the cursor with the Up, Down, Left and Right Cursor Keys.

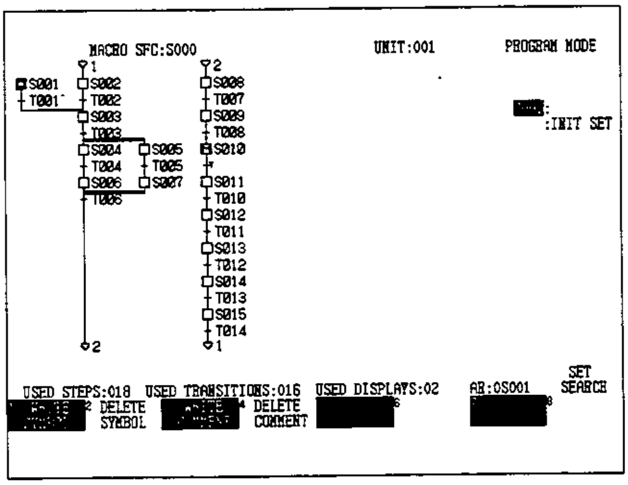
(5) If Cancel is selected at this point, the screen will revert to the comment before the input was made. To modify a comment, move the small cursor using the Up, Down, Left and Right Cursor Keys, make the required changes to any characters, and select Confirm. Only the characters altered at the location of the small cursor will change.

G. Deleting Comments

This operation deletes comments for a step.

1) Display the SFC Screen shown in *Figure 7.113*.

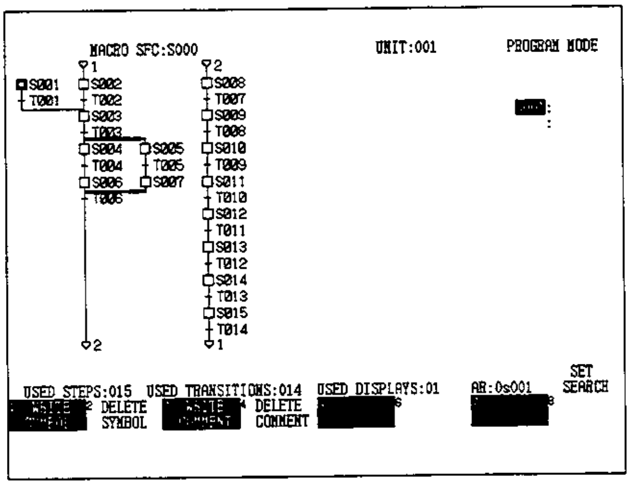
2) Display the comment for a step in the comment edit area using the comment display method.


MACRO SFC:S000
UNIT:001
PROGRAM MODE
:INIT SET
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
2
DELETE SYMBOL
DELETE COMMENT
SET SEARCH

USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:0S001

Figure 7.119

3) Move the cursor to the step number to be deleted and select Delete Comment. (See Note (3))


MACRO SFC:S000
UNIT:001
PROGRAM MODE
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
T009
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
2
DELETE SYMBOL
DELETE COMMENT
SET SEARCH

USED STEPS:015 USED TRANSITIONS:014 USED DISPLAYS:01 AR:0s001

Figure 7.120

Note (1) Position the cursor in the comment edit area.

(2) Be sure the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(3) Move the cursor using the Up, Down, Left and Right Cursor Keys.

(4) Use this operation when deleting an entire comment.

8. Checking the SFC

This operation searches the stored SFC elements (the steps and transitions).

The following five search operations can be performed.

- Search for an element only.
- Search for a reference number only.
- Search for a combination of element and reference number.
- Search for a step on hold.
- Search for a disabled step.

A. Cursor Movement

The following shows the cursor movement necessary for specifying search data.

1) Display the SFC Screen shown in *Figure 7.113*.

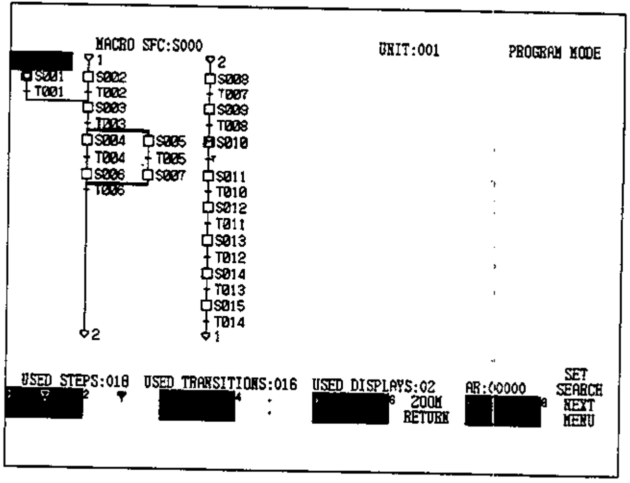
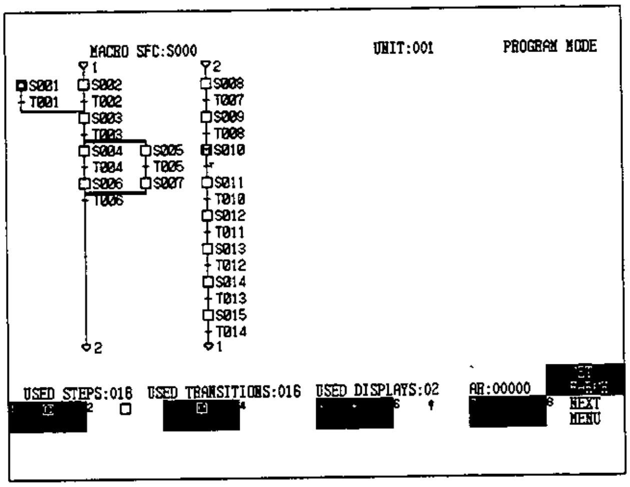

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:00000
ZOOM
RETURN
SET
SEARCH
NEXT
MENU

Figure 7.121

2) Press the Cont/Search Key. (See Note (1))


MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:016 USED TRANSITIONS:016 USED DISPLAYS:02 AR:00000

1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
NEXT MENU

Figure 7.122

Note (1) The cursor movements to the data setting location can only be made with this operation.

(2) To return the cursor to the SFC flow area, press the Tab Key.

B. Searching: Part 1

This operation sets the following three kinds of data search, locates the SFC flow screen where that element is used, and displays the screen.

- Search for an element only.
- Search for a reference number only.
- Search for a combination of element and reference number.

1) Display the SFC Screen shown in *Figure 7.122.*

2) Enter step number S040 in the AR and press the Enter Key. (See Note (3))

3) Select the Find Element label □. (See Note (4))

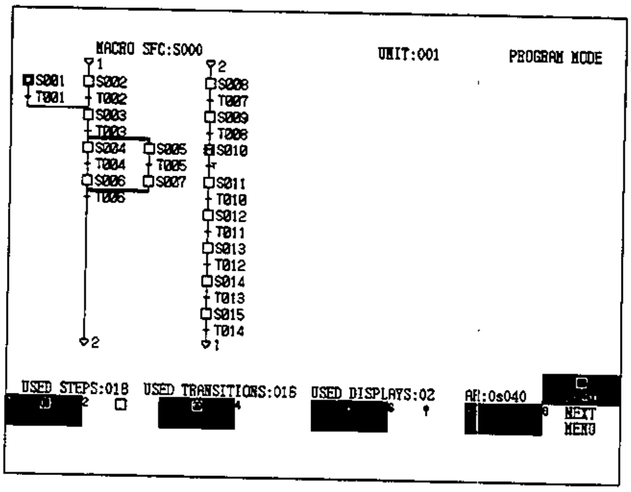

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:0s040
NEXT
MENU

Figure 7.123

4) Press the Cont/Search Key.

If nothing is found, the message "Not found" will be displayed. (See Note (5))

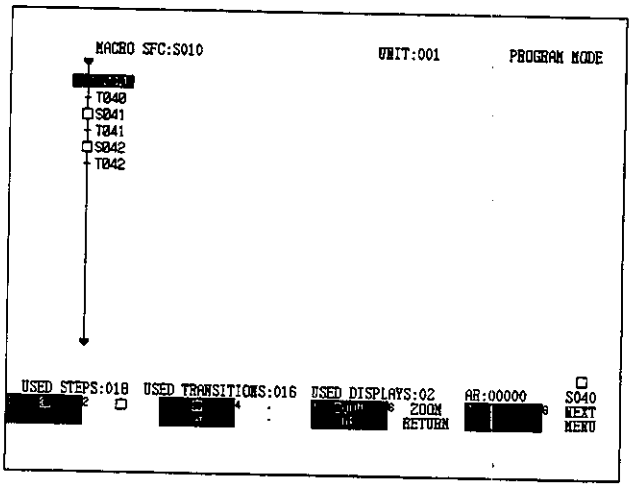

MACRO SFC:S010
UNIT:001
PROGRAM MODE
T040
S041
T041
S042
T042
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:00000
ZOOM
RETURN
S040
NEXT
MENU

Figure 7.124

Note (1) Position the cursor in the Set Search area and enter the search data.

(2) The following five elements can be searched for: [C], □, [M], +, ‡.

(3) The step number does not need to be input when searching for elements only.

(4) The element does need to be specified when searching for reference numbers only.

(5) When searching for elements only, press the Shift + Cont/Search Keys to continue the search.

(6) If the reference number is set before the element to searching for elements only, "ALL" will be displayed in the reference number area.

C. Searching: Part 2

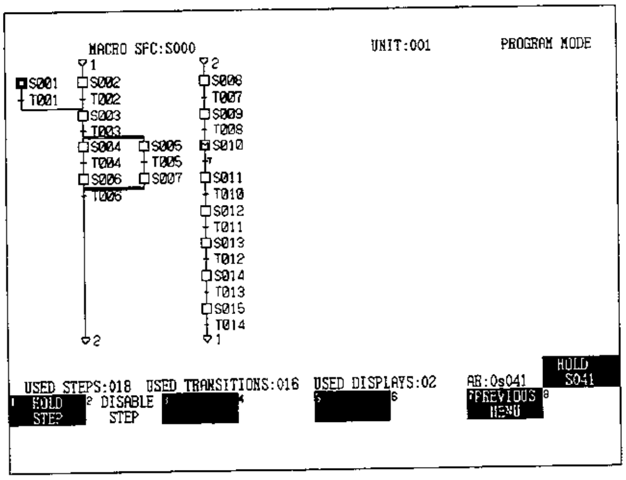
This operation searches for steps with hold or disabled status, and displays whether or not those steps are used in the SFC flow. Searches can be made for status only or for a combination of status and a reference number. The results are shown in the message area.

1) Display the SFC Screen shown in *Figure 7.123.*

2) Enter step number **S041** in the AR and press the Enter Key. (See Note (2))

3) Select Next Menu, and then select Hold Step.

For disabled status, select Disable Step. (See Note (3))


MACRO SFC:S000
1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
HOLD STEP
DISABLE STEP
PREVIOUS MENU

UNIT:001 PROGRAM MODE

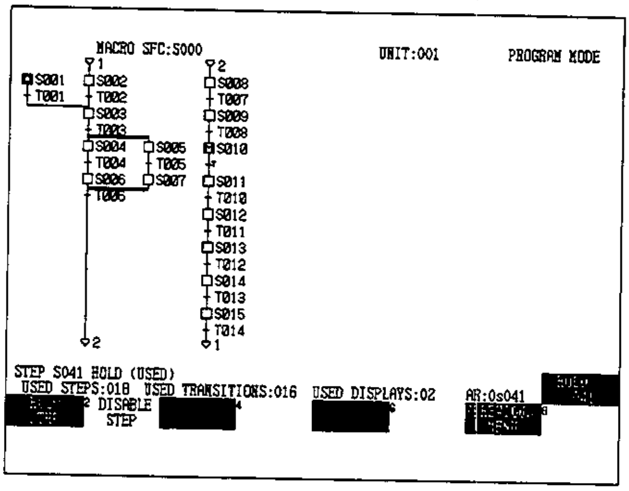
USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:0s041

HOLD S041

Figure 7.125

4) Press the Cont/Search Key.

If nothing is found, the message "Not found" is displayed. (See Note (4))


MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
DISABLE STEP

STEP S041 HOLD (USED)
USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:0s041

Figure 7.126

Note (1) Position the cursor in the Set Search area and enter the search data.

(2) The reference number does not need to be input when searching for a condition only.

(3) In a condition search, it is not possible to search for a reference number only.

(4) Press the Shift + Cont/Search Keys to continue the search.

(5) If the reference number is set before the condition to search for a condition only, "ALL" will be displayed in the reference number area.

(6) In a search where a reference number has been specified, the search is made from the reference number onwards.

(7) If the status is Hold in a step which is not used in the SFC flow in *Figure 7.126*, the display will show step S041 Hold (Not Used).

Table 7.4 Changes in Function Label Keys When Searching

1 ⊡	2 □	3 [M]	4	5 +	6 ↑	7	8 Next Menu

↕

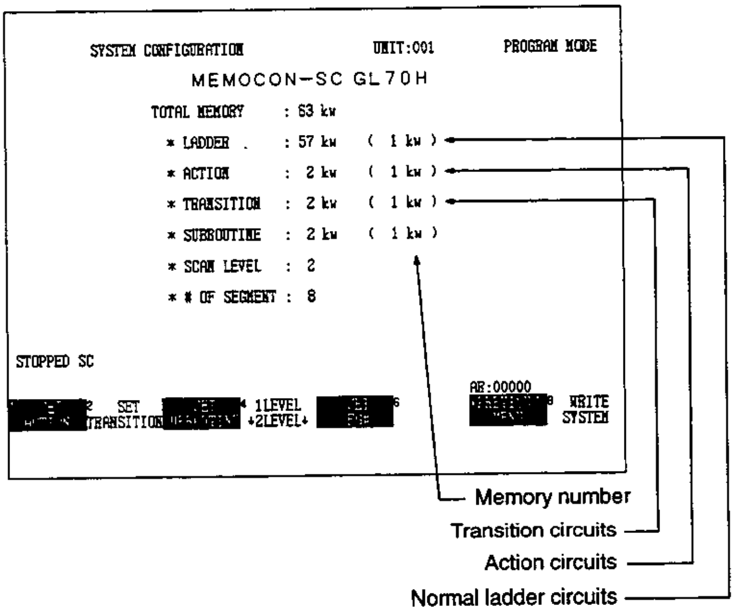
1 Hold Space	2 Disable step	3	4	5	6	7 Previous Menu	8

7.4.2 SFC Action Circuits

It is the action circuit that controls each step in the SFC flow. An action circuit is recorded using a ladder circuit.

The details of operations are the same as network processing in *6 Online Operation: Basic Editing.* To store action circuits, however, it is necessary first to acquire the memory in the GL60S, GL60H, or GL70H that the action circuit will use. This memory is acquired in 1 Kword units.

An action circuit can store as many networks as necessary for the step. To acquire the necessary memory, use the system configuration storage operations described in *6 Online Operation: Basic Editing. Figure 7.127* shows the screen after memory acquisition.



```
SYSTEM CONFIGURATION              UNIT:001          PROGRAM MODE
                   MEMOCON-SC GL70H
            TOTAL MEMORY    : 63 kw
             * LADDER .     : 57 kw   (  1 kw )
             * ACTION       :  2 kw   (  1 kw )
             * TRANSITION   :  2 kw   (  1 kw )
             * SUBROUTINE   :  2 kw   (  1 kw )
             * SCAN LEVEL   :  2
             * # OF SEGMENT :  8

STOPPED SC
                                                      AR:00000
        2   SET           4 1LEVEL            6                 8  WRITE
          TRANSITION        ↓2LEVEL↓                               SYSTEM
```

Figure 7.127

This section describes only the action circuit display and network circuit storage. For the basic operations, see *6.2 Ladder Programs.*

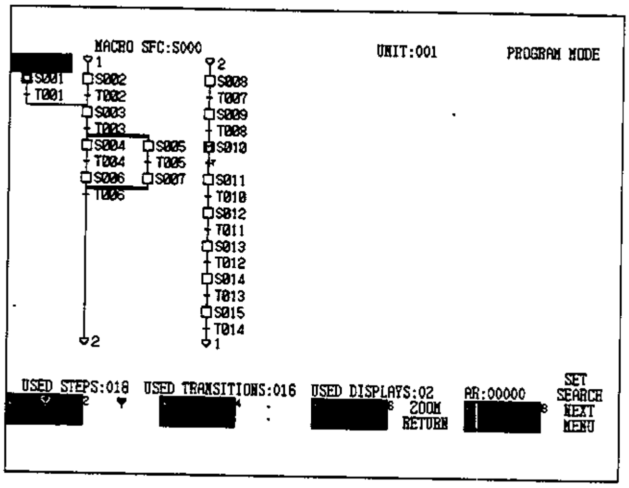
1. Displaying Action Circuits

Action circuits can be displayed using this operation by positioning the cursor at any step in the SFC flow and using the Zoom Up function, or by inputting any step number and using the Erase/Get Function.

A. Zoom

This operation displays the action circuit by positioning the cursor at any SFC step and selecting Zoom Up.

1) Display the SFC Screen.



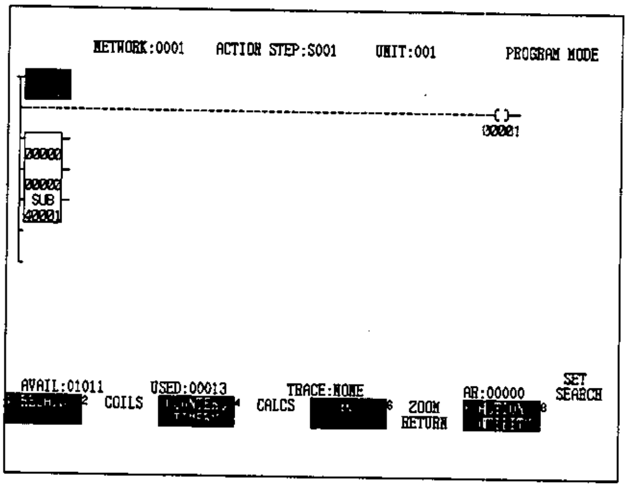
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:00000

1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.128

2) Move the cursor to any step and select Zoom Up. (See Note (2))



NETWORK:0001 ACTION STEP:S001 UNIT:001 PROGRAM MODE

AVAIL:01011 USED:00013 TRACE:NONE AR:00000

00001
00000
00000
SUB
00001
COILS
CALCS
ZOOM RETURN
SET SEARCH

Figure 7.129

3) Press the Page Down Key to display the next network. (See Note (3))

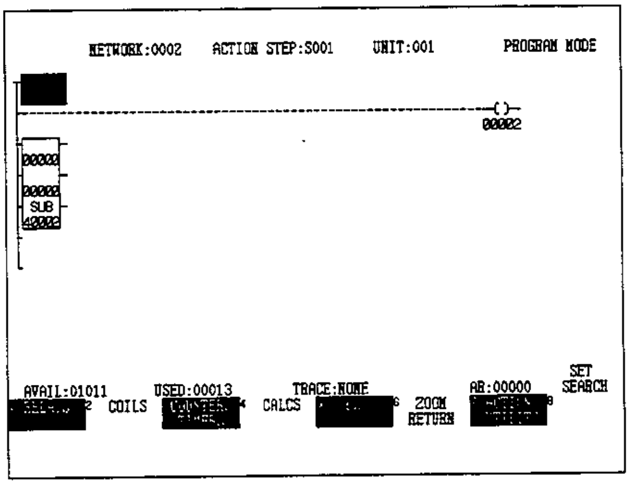

NETWORK:0002
ACTION STEP:S001
UNIT:001
PROGRAM MODE
00002
00000
00000
SUB
40002
AVAIL:01011
USED:00013
TRACE:NONE
AR:00000
SET SEARCH
COILS
CALCS
ZOOM RETURN

Figure 7.130

Note (1) Position the cursor at any step.

(2) If the circuit has not been stored, the screen will show the network as “00000.”

(3) To display the previous network, press the Page Up Key.

(4) It is possible to display the network in the action circuit only by using the procedure in step 2).

(5) The normal ladder circuit network can be displayed if only the Page Down operation with the network number is performed.

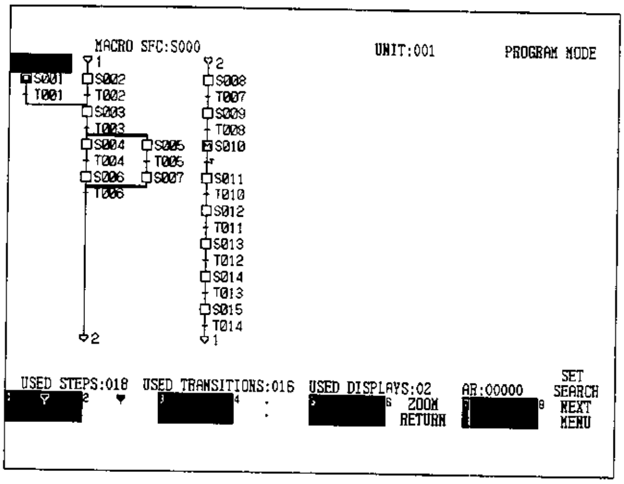
(6) To revert to the main SFC Screen from the screens shown in *Figures 7.129* and *7.130*, select Zoom Return.

(7) If the Zoom Up operation is performed from the macro step, the SFC Screen of the macro step will be displayed because there is no action circuit in the macro step M

B. Display

This operation displays an action circuit by inputting the number of any SFC step and pressing the Erase/Get Key.

1) Display the SFC Screen. (See Note (2))



MACRO SFC:S000

UNIT:001

PROGRAM MODE

USED STEPS:018

USED TRANSITIONS:016

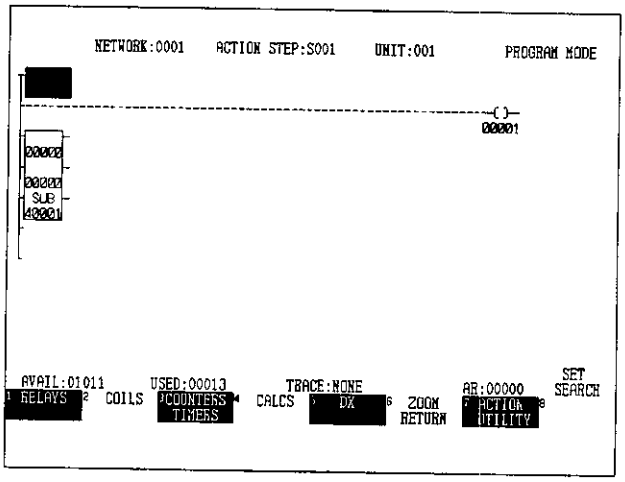
USED DISPLAYS:02

AR:00000

1
2
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
T006
S007
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
2
1
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.131

2) Enter step number **S001** in the AR and press the Erase/Get Key. (See Note (3))



NETWORK:0001

ACTION STEP:S001

UNIT:001

PROGRAM MODE

AVAIL:01011

USED:00013

TRACE:NONE

AR:00000

00001
00000
00000
SUB
40001
1 RELAYS
2 COILS
3 COUNTERS TIMERS
4 CALCS
5 DX
6 ZOOM RETURN
7 ACTION UTILITY
8
SET SEARCH

Figure 7.132

3) Press the Page Down Key to display the next network. (See Note (4))

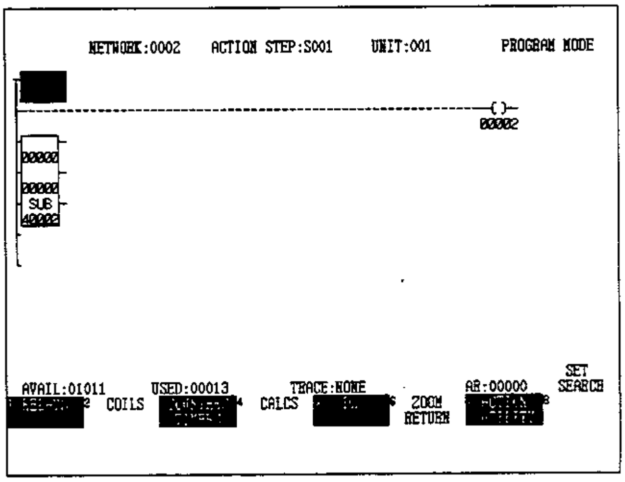

NETWORK:0002
ACTION STEP:S001
UNIT:001
PROGRAM MODE
00002
00000
00000
SUB
40002
AVAIL:01011
USED:00013
TRACE:NONE
AR:00000
SET SEARCH
COILS
CALCS
ZOOM RETURN

Figure 7.133

Note (1) Position the cursor in the SFC area.

(2) The normal ladder circuit network screen can also be used.

(3) If the circuit has not been stored, the screen will show the network as "00000."

(4) To display the previous network, press the Page Up Key.

(5) It is possible to display the network in the action circuit only by using the procedure in step 2). The normal ladder circuit network can be displayed only if the Page Down operation with the network number is performed.

(6) To revert to the SFC flow screen from the screens shown in *Figures 7.132* and *7.133*, enter S000 in the AR at the main screen and press the Erase/Get Key. To return to the expanded-screen, enter the step number of the expanded-screen in the AR and press the Erase Get Key. You can also revert with the zoom function by selecting Zoom Return.

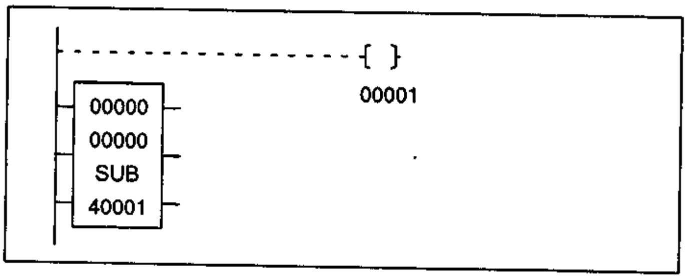
(7) If the step number input is the macro step number, the SFC Screen of that macro step will be displayed because there is no action circuit in macro step M.

2. Storing Networks

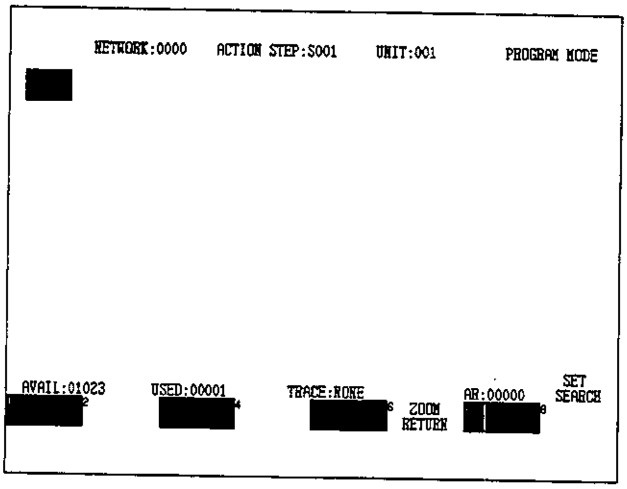
The same operation as for storing normal ladder circuit networks is performed. Only the zoom function for displaying action circuits is different.

Network Storage

Example


{ }
00001
00000
00000
SUB
40001

1) By displaying the action circuit in *1. Displaying Action Circuits* on page *7-84*, the action circuit input screen will be displayed.



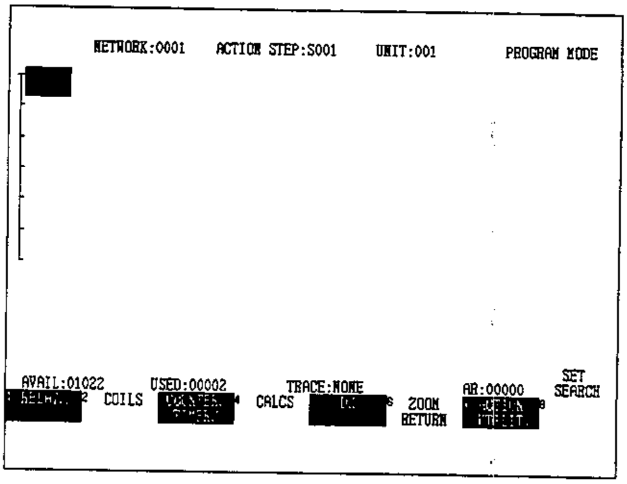
NETWORK:0000 ACTION STEP:S001 UNIT:001 PROGRAM MODE

AVAIL:01023 USED:00001 TRACE:NONE AR:00000

ZOOM
RETURN
SET
SEARCH

Figure 7.134

2) Press the Start Next Key.



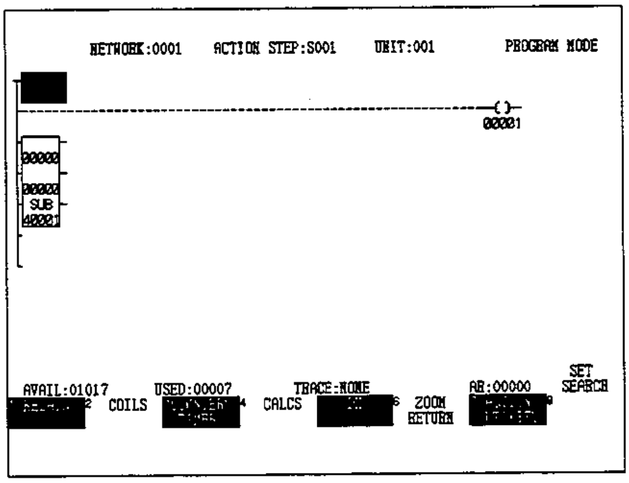
NETWORK:0001 ACTION STEP:S001 UNIT:001 PROGRAM MODE

AVAIL:01022 USED:00002 TRACE:NONE AR:00000

COILS
CALCS
ZOOM
RETURN
SET
SEARCH

Figure 7.135

3) Input the element. (See Note (3))



NETWORK:0001 ACTION STEP:S001 UNIT:001 PROGRAM MODE

AVAIL:01017 USED:00007 TRACE:NONE AR:00000

Figure 7.136

Note (1) Position the cursor in the logic area.

(2) Be sure that the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(3) To store the next network, press the Start Next Key and a new network is displayed. Use this screen for the network storage operations.

(4) The step number of a contact of any action circuit can be used in another ladder circuit. For example,

┤├ S001, ┤/├ S001, ┤↑├ S001, ┤↓├ S001

(5) It is not essential to input the action circuit.

(6) The search in Network Check is not limited to action circuits, but includes transition circuits and normal ladder circuits as well.

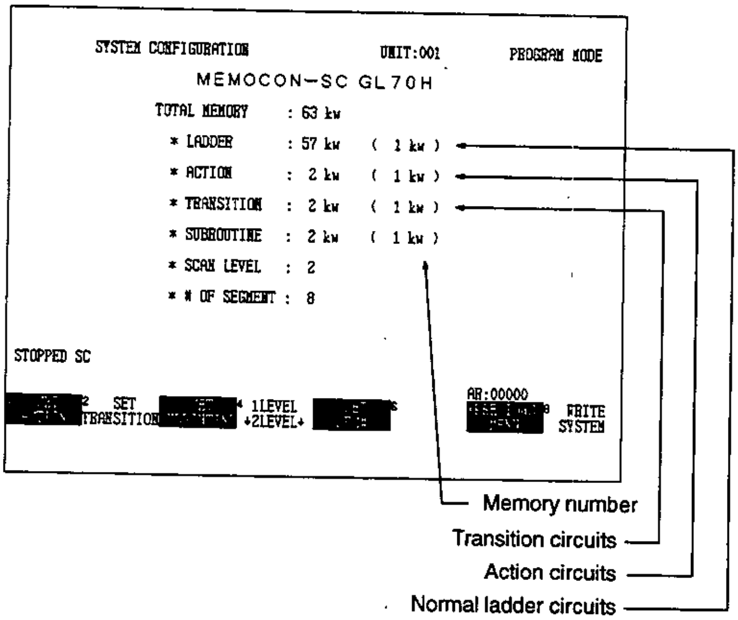
7.4.3 SFC Transition Circuits

In each SFC flow transition circuit, a circuit is recorded using a ladder circuit to make the program move from any one step to the next step.

The details of operations are the same as those given in the section on network processing in *6 Online Operation (Basic Editing)*. To store transition circuits, however, it is necessary first to acquire the memory in the GL60S, GL60H, or GL70H for use by the action circuits. This memory is acquired in 1 Kword units.

Transition circuits comprise one network for each transition. Transition circuits have to be stored for each transition.

To acquire the necessary memory, use the system configuration storage operations described in *6 Online Operation (Basic Editing)*. *Figure 7.137* shows the screen after memory acquisition.



```
SYSTEM CONFIGURATION                UNIT:001         PROGRAM MODE
                    MEMOCON-SC GL70H
              TOTAL MEMORY    : 63 kw
                * LADDER      : 57 kw    ( 1 kw )
                * ACTION      :  2 kw    ( 1 kw )
                * TRANSITION  :  2 kw    ( 1 kw )
                * SUBROUTINE  :  2 kw    ( 1 kw )
                * SCAN LEVEL  :  2
                * # OF SEGMENT :  8

STOPPED SC

        2  SET            4  1LEVEL                  AR:00000
          TRANSITION        ↓2LEVEL↓                          8  WRITE
                                                                SYSTEM
```

Figure 7.137

This section covers only transition circuit displays and network circuit storage. For the basic operations, see *6.2 Ladder Programs.*

1. Displaying Transition Circuits

Transition circuits can be displayed using this operation by positioning the cursor at any transition from the SFC flow and using the Zoom Up function, or by inputting any transition number and using the Erase/Get function.

A. Zoom

This operation displays the transition circuit by positioning the cursor at any SFC transition and selecting Zoom Up.

1) Display the SFC Screen.

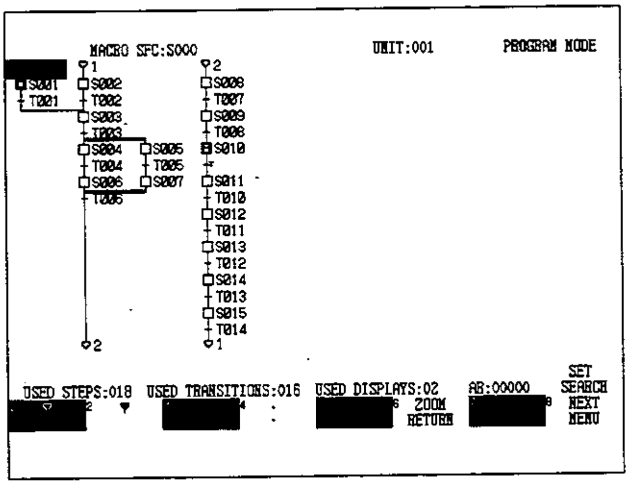

MACRO SFC:S000
UNIT:001
PROGRAM MODE
1
S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
2
2
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
USED STEPS:018
USED TRANSITIONS:016
USED DISPLAYS:02
AR:00000
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.138

2) Move the cursor to any transition and select Zoom Up. (See Note (2))

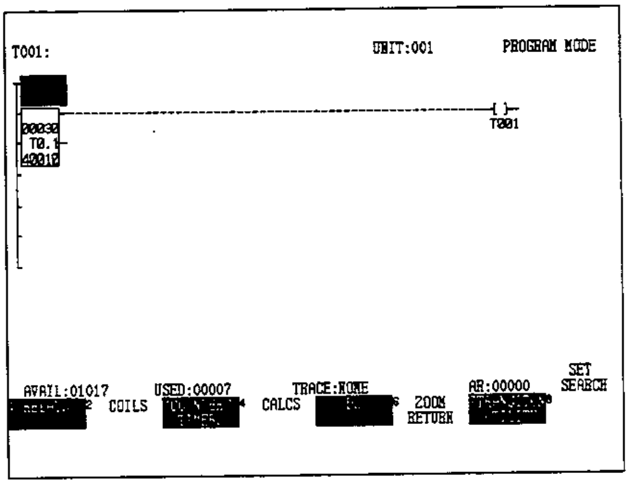

T001:
UNIT:001
PROGRAM MODE
00030
T0.1
40010
T001
AVAIL:01017
USED:00007
TRACE:NONE
AR:00000
COILS
CALCS
ZOOM RETURN
SET SEARCH

Figure 7.139

Note (1) Position the cursor at any transition.

(2) If the circuit has not been stored, the transition circuit storage screen will be displayed.

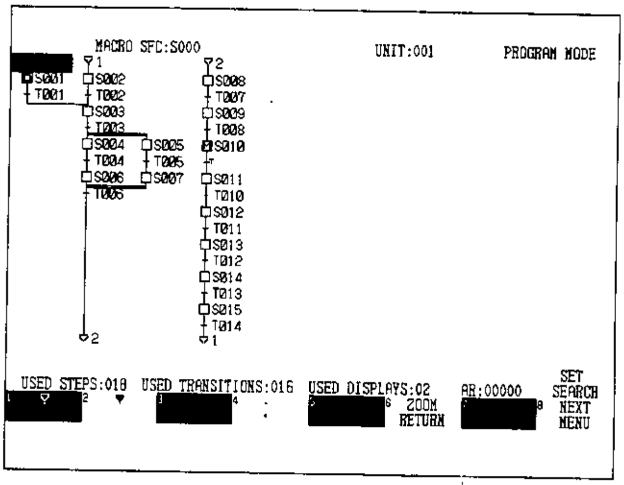
(3) To return from the screen shown in *Figure 7.139* to the original SFC Screen, select Zoom Return.

(4) There is no transition circuit for macro-transition +.

B. Display

This procedure displays a transition circuit by inputting the number of any SFC transition and pressing the Erase/Get Key.

1) Display the SFC Screen. (See Note (2))



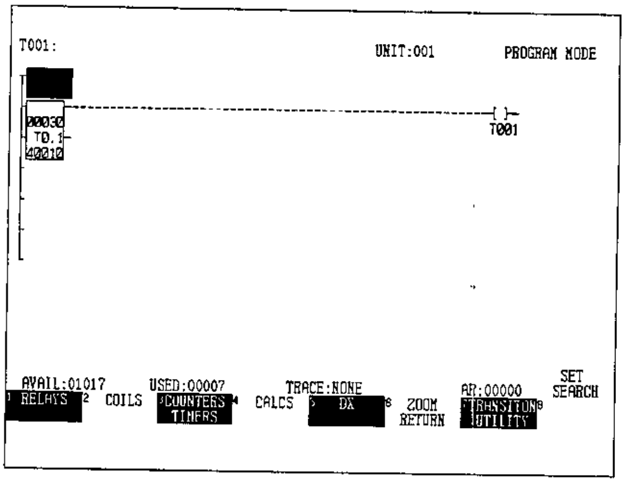
MACRO SFC:S000 UNIT:001 PROGRAM MODE

USED STEPS:018 USED TRANSITIONS:016 USED DISPLAYS:02 AR:00000

S001
T001
S002
T002
S003
T003
S004
T004
S005
T005
S006
S007
T006
S008
T007
S009
T008
S010
S011
T010
S012
T011
S013
T012
S014
T013
S015
T014
1
2
ZOOM RETURN
SET SEARCH
NEXT MENU

Figure 7.140

2) Enter transition number **T001** in the AR and press the Erase/Get Key. (See Note (3))



T001: UNIT:001 PROGRAM MODE

AVAIL:01017 USED:00007 TRACE:NONE AR:00000

00030
TD.1
40010
T001
RELAYS
COILS
COUNTERS TIMERS
CALCS
DX
ZOOM RETURN
TRANSITION UTILITY
SET SEARCH

Figure 7.141

Note

(1) Position the cursor in the SFC area.

(2) The normal ladder circuit network screen can also be used.

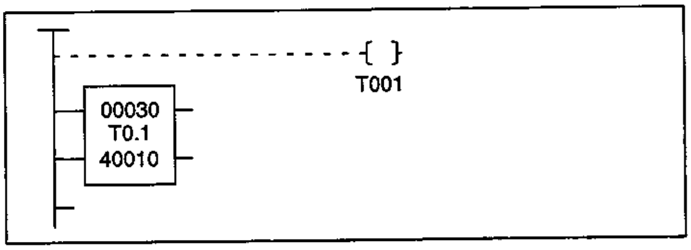
(3) If the circuit has not been stored, the transition circuit storage screen will be displayed.

(4) To return from the screen shown in *Figure 7.141* to the SFC flow screen, enter S000 in the AR at the main screen and press the Erase/Get Key. To return to an expanded-screen, enter the step number of that screen in the AR and press the Erase/Get Key. You can also return to the expanded-screen by selecting Zoom Return from the zoom functions.

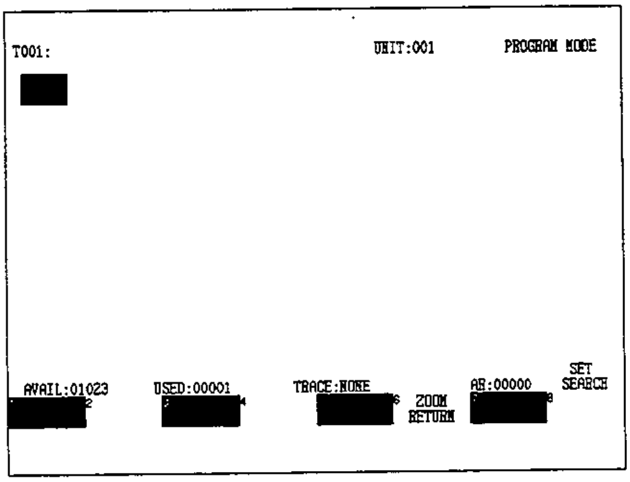
2. Storing Networks

The same operation is performed as for storing normal ladder circuit networks. Only the zoom function for displaying transition circuits is different.

Example



1) By displaying the transition circuit in *1. Displaying Transition Circuits* on page *7-91*, the transition circuit input screen is displayed.



```
T001:                                   UNIT:001        PROGRAM MODE

AVAIL:01023    USED:00001    TRACE:NONE           AR:00000
```

Figure 7.142

2) Select the Start Next Key.

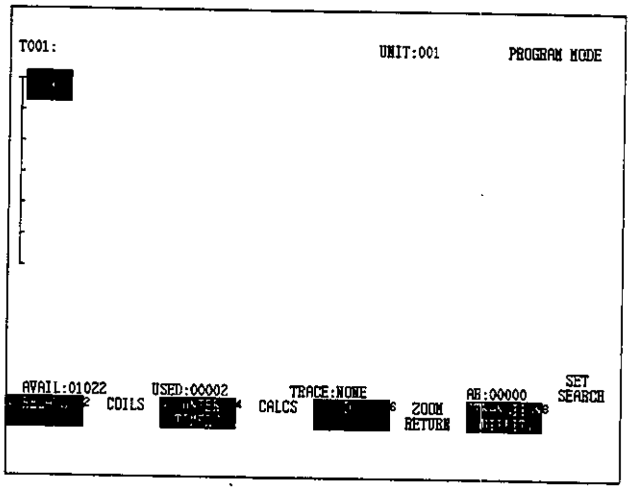

T001:
UNIT:001
PROGRAM MODE
AVAIL:01022
USED:00002
TRACE:NONE
AB:00000
SET SEARCH
COILS
CALCS
ZOOM RETURN

Figure 7.143

3) Input the timer element.

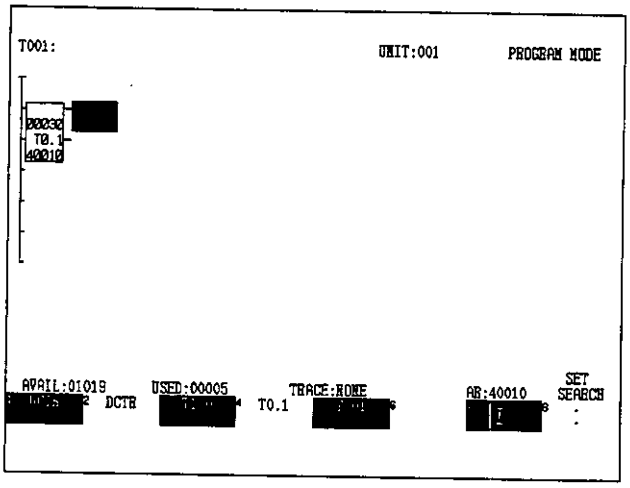
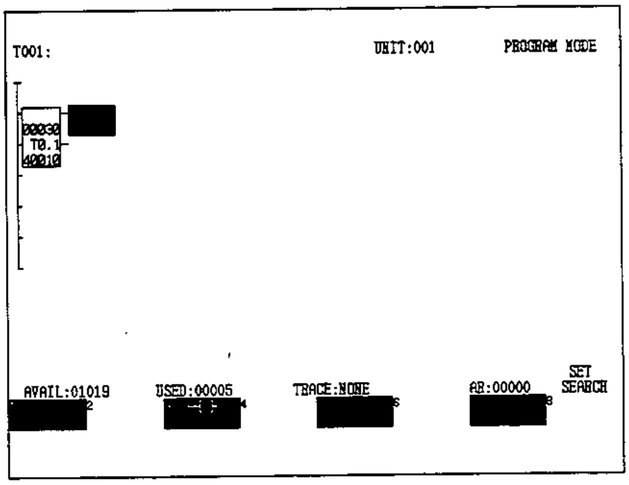

T001:
UNIT:001
PROGRAM MODE
00030
T0.1
40010
AVAIL:01019
USED:00005
TRACE:NONE
AB:40010
SET SEARCH
DCTR
T0.1

Figure 7.144

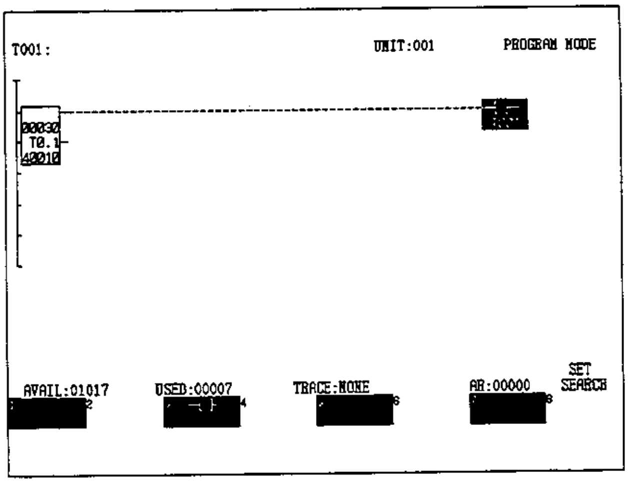
4) Select Coil. The { } label key will be displayed.



T001:
UNIT:001
PROGRAM MODE
00030
T0.1
40010
AVAIL:01019
USED:00005
TRACE:NONE
AB:00000
SET SEARCH

Figure 7.145

5) Move the cursor to the coil input location and select a transition coil { }. You do not need to enter the reference number.



T001:
UNIT:001
PROGRAM MODE
00030
T0.1
40010
AVAIL:01017
USED:00007
TRACE:NONE
AB:00000
SET SEARCH

Figure 7.146

Note
(1) Position the cursor in the logic area.

(2) Be sure that the Memory Protect Switch of the GL60S, GL60H, or GL70H is turned OFF.

(3) When inputting a transition coil, there is no need to input a reference number. It will be set for each transition.

(4) Normal coils { }, {L} cannot be input.

(5) Transition circuits are needed for transitions used in the SFC flow. While ladder circuits are not required, a transition coil must be input when a ladder circuit is not created.

(6) Searches in Network Check are not limited to transition circuits, but includes action circuits and normal ladder circuits as well.

(7) When a transition coil is solved in a transition circuit, elements in the columns to the right of the transition coil and the elements in rows below it will not be solved. See *Figure 7.147.*

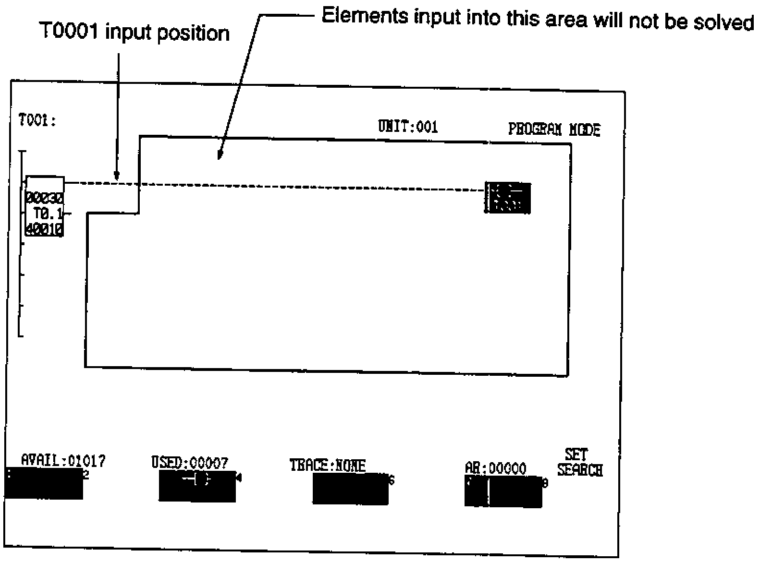

T0001 input position
Elements input into this area will not be solved
T001:
UNIT:001
PROGRAM MODE
00030
T0.1
40010
AVAIL:01017
USED:00007
TRACE:NONE
AR:00000
SET
SEARCH

Figure 7.147

Appendix A

List of Messages

A.1 Operating Error Messages

Error Message	Meaning	Action
# OF COIL MUST BE MULTIPLES OF 8	The leading number or number of points in discrete I/O in I/O allocation is not correct.	Make the reference number a multiple of 8 + 1 and the number of points a multiple of 8.
CAUTION: REFERENCE MULTIPLY IN TRAFFIC COP	The same reference number has been allocated more than once.	If that is acceptable, select Proceed. If not, change the allocation.
ADDRESS LIMIT	The number of allocated reference numbers or points is outside the acceptable range.	Change the allocations.
ANOTHER SC SAVED FILE	You tried to specify a file saved by another SC during loading or verification.	Press the Escape Key.
AR NOT DECIMAL	Data has been entered in another format in a location where only decimal values can be used.	Use a decimal value.
CAN NOT CREATE FILE	A file creation error when saving.	Execute Check Disk. Replace disk.
CAN NOT LOGIN – UNIT HAS PROGRAMMER ATTACHED	An attempt was made to use two Programming Panels on a GL60S, GL60H, or GL70H in Program Mode.	Use one of the Programming Panels in Monitor Mode.
CAN NOT READ DISK	A data read error occurred during loading or verification.	Press the Escape Key.
CAN NOT USED THE DISK	You inserted an unformatted disk into the drive and tried to perform a disk or file operation other than formatting.	Insert an appropriate disk.
CAN NOT WRITE TO DISK	A data write error occurred at time of saving.	Press Escape Key.
COIL NOT ALLOWED HERE	You tried to store a coil on the left of another element.	Store the coil in an appropriate location.
COIL NOT DISABLED	Force On or Force Off has been selected even though the element has not been disabled.	Disable the element.
COIL NOT IN A NETWORK	No corresponding coil has been found during a trace.	Press the Escape Key.
COIL USED	You tried to store a coil that is already being used.	Change the coil's reference number.
COMPRESS NOT ALLOWED DUE TO LINE #8	You selected Compress Line when the cursor is in the 8th row (the 8S, 8T row) in the SFC.	Press the Escape Key.
COMPRESS NOT ALLOWED DUE TO COLUMN #8	You selected Compress String in the SFC when the cursor is in the 8th column.	Press the Escape Key.
COMPRESS NOT ALLOWED DUE TO ROW #7	You selected Compress Horizontally when cursor is in 7th row of a network.	Press the Escape Key.

Error Message	Meaning	Action
CONTROLLER RUNNING LOAD NOT ALLOWED	You tried to load Save Data when GL60S, GL60H, or GL70H was operating.	Stop first, then execute.
CONTROLLER RUNNING	You attempted an operation that can only be performed while the device is stopped.	Stop the device.
DISK NOT INSERTED OR DISK ERROR	Either no disk has been inserted, or the disk is damaged.	Either insert a disk, or insert another one.
DISK WRITE PROTECTED	You attempted a file operation or a save while the disk was write-protected.	Enable writing to disk.
DUMMY TRANSITION NOT ALLOWED TO COPY	You tried to copy a row in the SFC where the cursor is when there is nothing in the row but a dummy transition condition (+T).	Press the Escape Key.
DUMMY TRANSITION NOT ALLOWED TO MOVE	You positioned the cursor at a location in the SFC where there is a dummy transition (+T) and tried to move it.	Press the Escape Key.
END OF LOGIC MEMORY	You pressed the Page Up Key when there is no network after the one being displayed.	Press the Escape Key.
EXIST ACTION LADDER	You tried to store a macro step when there is an action circuit at the relevant step number.	Change the step number.
EXIST MACRO SFC	You tried to store a step or an initial step when there is an expanded-screen at the relevant number.	Change the step number.
EXPAND NOT ALLOWED DUE TO COLUMN #8	You selected Expand String when the cursor is in the 8th column in the SFC.	Press the Escape Key.
EXPAND NOT ALLOWED DUE TO LINE #8	You selected Expand Line when the cursor is in the 8th row (Line 8S, 8T) in the SFC.	Press the Escape Key.
FILE ALREADY EXIST. OVERWRITE OK?	When saving, you entered the name of a file that already exists on the disk and tried to overwrite it.	Select either Confirm or Stop.
FILE NOT FOUND	When verifying or loading, you input the name of a file that does not exist.	Input the correct file name.
FROM USED	You tried to store a connector number already stored in the SFC for the same screen.	Change the connector number.
FUNCTION NOT ALLOWED	You pressed an unrelated Function Key.	Press the correct key.
GOSUB NOT USED	You tried to make a zoom return from a subroutine circuit when GOSUB has not been stored.	Press the Escape Key.
I/O ALLOCATION FULL	The sum of discrete inputs and outputs in the I/O allocation has exceeded 4,096 or the register inputs plus outputs has exceeded 512 groups.	Redo the allocations.

Error Message	Meaning	Action
I/O SLOT FULL	The number of slot for the Discrete Inputs and Output Modules, and Register Inputs and Output Modules in the I/O allocation have exceeded 256.	Redo the allocation.
ILLEGAL CHANNEL NUMBER	In the I/O allocation display, you input a number outside 1 to 3 in the AR and chose Select Channel.	Enter the correct channel number.
ILLEGAL PORT PARAMETER	In inputting a port parameter (baud rate, device, address delay) an incorrect setting has been made.	Change the setting.
ILLEGAL POINTS	In I/O allocation, you tried to input a value above 129 for one slot or, in high-speed ST allocation, a value above 4,097 for one station.	Change the setting.
ILLEGAL RACK NUMBER	On the I/O allocation display, you entered a number that is not permissible and chose Select Rack.	Input the correct rack number.
ILLEGAL SEGMENT NUMBER	In inputting the segment number or in the segment limits display, you input a number outside 1 to 8 and chose Set Segment Number or Select Segment.	Input the correct segment number.
ILLEGAL SIZE	In setting memory size, the set ladder size has become smaller than actually used ladder size.	Press the Escape Key.
ILLEGAL STATION NUMBER	In I/O allocation display, you input an unacceptable station number and selected Station Number.	Input the correct station number.
ILLEGAL STEP NUMBER	You entered a value outside S001 to S512 at the mode step elapsed time display and chose Select Step Number.	Input the correct step number.
ILLEGAL STEP OR REGISTER NUMBER	You specified a register number or step number not permitted by mode reset or preset and selected Step/Register Number.	Input the correct step or register number.
INITIAL STEP NOT ALLOWED EXCEPT S000	You tried to store the initial step in an expanded-screen.	Press the Escape Key.
INITIAL STEP USED	You tried to input a second initial step.	Press the Escape Key.
INVALID DATA	You tried to store a decimal value that exceeds 9999 or a hexadecimal value that exceeds FFFF.	Change the set value.
INVALID DATE	You tried to input a date in a format outside that established by the loader.	Input the correct date.
INVALID FILE NAME	You input a file name that is not on the disk or that must not be used.	Change the file name.

Error Message	Meaning	Action
INVALID MENU No.	You input a menu number at the menu screen which is outside 1 to 3.	Correct the menu number input.
INVALID NETWORK NUMBER	A non-existent network number has been input for moving a segment.	Press the Escape Key.
INVALID REFERENCE NUMBER	You tried to use a reference number outside the acceptable range.	Change the set value.
INVALID REPLACEMENT	You tried to change something into an element with a different number of rows such as timer→ADD.	Press the Escape Key.
INVALID UNIT NUMBER	You entered a numerical value outside 1 to 247 and performed the an Attach Operation.	Change the set value.
LAST NETWORK IN SEGMENT X	You tried to make the segment number smaller than "m" even though a network exists at segment "m."	Press the Escape Key.
MEMORY PROTECT ON	You tried to conduct an operation which would change the contents of the memory even though the IOP or COMM Memory Protect Switch is ON.	Turn the Memory Protect Switch off.
MISCOMPARE IN PROGRAM AREA	A verification error has been found in data in a program area during verification.	Redo the operation from the beginning.
MISCOMPARE IN SYSTEM AREA	A verification error has been found in data in the system area during verification.	Redo the operation from the beginning.
MISCOMPARE IN TRAFFIC COP AREA	A verification error has been found in data in the traffic cop area during verification.	Redo the operation from the beginning.
MISCOMPARE PROGRAM SIZE	At time of verification, a mismatch with the SC program memory size has occurred.	Press the Escape Key.
MISCOMPARE SAVE DATA SIZE	At time of verification, a mismatch has occurred between the size being saved and the SC memory size.	Press the Escape Key.
NETWORK NOT FOUND HIGHEST #: XXXXX	You set a non-existent network number and tried to read it.	Enter the correct network number.
NO AVAIL MEMORY	You tried to store an element even though there is no more memory available.	Press the Escape Key.
NO CONDITION DATA	You tried to execute a traceback when the conditions have not been set.	Set the conditions.
NO ELEMENT AT CURSOR COLUMN	In copying an SFC, you tried to copy a column when there is no element in the cursor column.	Press the Escape Key.
NO ELEMENT AT CURSOR LINE	In copying an SFC, you tried to copy a row when there is no element in the cursor row.	Press the Escape Key.

Error Message	Meaning	Action
NO ELEMENT AT CURSOR	You attempted a delete or perform similar operation when there is no element at the cursor.	Press the Escape Key.
NO ELEMENT TO COMPRESS	In editing SFC or network, you tried to compress data when there are no elements in rows or columns from cursor onwards.	Press the Escape Key.
NO ELEMENT TO EXPAND	In editing SFC, you tried to expand data when there were no elements in rows or columns from cursor onwards.	Press Escape Key.
NO EMPTY SPACE	You moved the cursor to a register location and tried to execute a trace when there was no vacant space in the reference area, or you moved the cursor to a step location in the SFC and tried to execute a trace when there was no vacant space in the comment area.	Press Escape Key.
NO NETWORK IN THE CONTROLLER	You pressed the Page Up or Page Down Keys when there were no networks in the GL60S, GL60H, or GL70H.	Press Escape Key.
NO NETWORK ON SCREEN	You attempted to delete a network when there were none displayed.	Press Escape Key.
NO SEARCH PARAMETERS	You attempted a search without setting search parameters.	Set search parameters.
NOT ALLOWED DUE TO COIL	You tried to store elements or vertical short circuits above the broken line of a coil.	Press Escape Key.
NOT ATTACHED TO THE CONTROLLER	You tried to carry out an operation that must be performed online before you completed the an Attach Operation Operation.	Carry out the an Attach Operation.
NOT DATA IN THE DISK (ACTION)	In loading or verifying, no data exists in (ACTION) in the file on the disk.	Redo the operation.
NOT ENOUGH MEMORY	You tried to save or copy when there was insufficient memory available on the disk.	Exchange it for a fresh disk.
NOT ENOUGH ROOM TO COMPRESS	You attempted a compression operation when there was not enough space for it.	Press Escape Key.
NOT ENOUGH ROOM TO COPY	You tried to copy when there was no space for copying on the SFC.	Press Escape Key.
NOT ENOUGH ROOM TO EXPAND	You attempted an expand operation when there was no space available for it.	Press Escape Key.
NOT ENOUGH ROOM TO MOVE	You attempted a move when there was no space available in the SFC.	Press Escape Key.

Error Message	Meaning	Action
NOT SAVED FILE	The file specified for loading was not the file saved by Load.	Press Escape Key.
ONLY DECIMAL OF HEXADECIMAL CHARACTERS ALLOWED IN AR	You used Keys other than 0 to 9, A to F, S, T or R to input into AR.	Press Escape Key.
PROGRAMMING GOING ON	The program has been modified by another Programming Panel when the network was being displayed in Monitor mode.	The operation must be re-done from the beginning.
REF # NOT SET UP	In setting the conditions for traceback, you tried to set ON or OFF when the reference was not set.	Set the reference number.
REFERENCE ON ALTERNATE SCREEN	You attempted a trace when the status of an input relay or register was being displayed at the location of the cursor in the expanded reference area.	Display the expanded reference area.
SC NOT CONNECTED OR POWER OFF	You attempted an Attach Operation while not connected to the GL60S, GL60H, or GL70H, or while the GL60S, GL60H, or GL70H power supply was turned OFF.	Connect up the GL60S, GL60H, or GL70H, or connect the power supply to the GL60S, GL60H, or GL70H.
SC SAMPLING BUSY	You attempted to display a waveform while conditions were not set up in traceback.	Press the Escape Key.
SEARCH FAILED	A search was made but those parameters are not being used.	Press the Escape Key.
SFC FLOW ERROR	You attempted a connection not permitted for SFC.	Correct the connection.
SFC MEMORY FULL	You tried to create a new expanded-screen even though 64 screens are already used for the SFC.	Press the Escape Key.
SPECIFY CH # OR ST #	You selected Previous Screen when no channel number or station number has been set in the high-speed ST allocation.	Set a channel number or station number.
SPECIFY POINTS OF SIZE PARAMETER	In allocation, you selected Previous Screen when the number of points or registers have not been set.	Set the points and/or size.
SPECIFY REF # PARAMETER	In allocation, you tried to set the number of points or registers before setting a reference.	Set the reference number.
SPECIFY STATUS OR STEP/REGISTER NO. PARAMETER	In Mode Reset or Preset, you selected Previous Screen without setting a step number or register number.	Set a step number or register number.
SPECIFY TIME IN MULTIPLES OF 10	In setting the time for a constant sweep, you tried to use a number that is not a multiple of 10.	Make the value set a multiple of 10.

Error Message	Meaning	Action
START OF LOGIC MEMORY	You pressed the Page Up Key when there are no networks before the one being displayed.	Press the Escape Key.
STEP ACTIVE	In the SFC, you tried to delete or move a step that is active.	Press the Escape Key.
STEP HOLD	You tried to disable a step that is on hold.	Cancel the hold status.
STEP DISABLED	You tried to put a disabled step on hold.	Cancel the disabled status.
STEP NOT USED	You attempted a Zoom Return from an action circuit when the step has not been stored.	Press the Escape Key.
STEP USED	You attempted to use the same step number twice.	Change the step number.
TIMEOUT ERROR--PRINTER	A communications time-out has occurred when outputting to the printer.	Press the Escape Key.
TRACE STACK EMPTY	You attempted a retrace even though the trace status display shows "Nil."	Press the Escape Key.
TRANSITION NOT USED	You attempted a Zoom Return from a transition circuit when the transition conditions have not been stored.	Press the Escape Key.
TRANSITION USED	You attempted to use the same transition number twice.	Change the transition number.
VERTICAL NOT ALLOWED IN THIS ROW	You tried to store a vertical short in the 7th row of a network.	Press the Escape Key.

A.2 Operating Messages

Message	Message	Message
ATTACHING	SC START REQUESTED	STEP SXXX DISABLED (NOT USED)
CONSTANT SWEEP CANCEL	SC STOP REQUESTED	STEP SXXX DISABLED (USED)
CONSTANT SWEEP INVOKED	SC ACTION MEMORY CLEAR REQUESTED	STOPPED SC
CONSTANT TIME: XXXXX	SC ALL COMMENT MEMORY CLEAR REQUESTED	SYSTEM CONFIGURATION WRITTEN
DISCRETE XXXXX DISABLED (NOT USED)	SC ALL DATA MEMORY CLEAR REQUESTED	TRACEBACK COMPLETE
DISCRETE XXXXX DISABLED (USED)	SC ALL SFC MEMORY CLEAR REQUESTED	VERIFY COMPLETE
DISCRETE XXXXX DISABLED	SC ALL TRAFFIC COP MEMORY CLEAR REQUESTED	VERIFY REQUESTED
LOAD COMPLETE	SC CONSTANT REGISTER DATA MEMORY CLEAR REQUESTED	XXXXX MISCOMPARE: VERIFY COMPLETE
LOAD REQUESTED	SC HOLD REGISTER DATA MEMORY CLEAR REQUESTED	DELETE XXX-XX
POWER DISPLAY INVALID–NETWORK SKIPPED	SC I/O TRAFFIC COP MEMORY CLEAR REQUESTED	RENAME XXX-XX TO [ ]
READING HOLD	SC LADDER MEMORY CLEAR REQUESTED	COPY XXX-XX TO DRIVE A
READING DISABLED	SC MODE MEMORY CLEAR REQUESTED	NO OTHER COIL DISABLED
READING ACTIVE	SC SFC COMMENT MEMORY CLEAR REQUESTED	
READING TIME CHART	SC SFC GRAPH MEMORY CLEAR REQUESTED	
READING ACTION	SC H SPEED ST TRAFFIC COP MEMORY CLEAR REQUESTED	
READING TRANSITION	SC SUBROUTINE MEMORY CLEAR REQUESTED	
READING TRAFFIC COP	SC TRANSITION MEMORY CLEAR REQUESTED	
RUNNING SC	SEARCHING	
SAVE COMPLETE	SEGMENT BOUNDARY CROSSED	
SAVE REQUESTED	SINGLE SWEEP TRIGGERED	

A.3 System Error Messages

Error Message	Meaning	Action
CRC FAILURE	There was an error in the data received from the GL60S, GL60H, or GL70H (a CRC check error).	Redo the operation from the beginning.
INVALID ADDRESS	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID COMMAND	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID NODE	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID PAGE	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID PARAMETER	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID RANGE	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
INVALID TYPE	There was an error in the data received from the GL60S, GL60H, or GL70H. A floppy disk has been used that is not a GL60S, GL60H, or GL70H floppy disk.	Redo the operation from the beginning. Use a floppy disk for use with the GL60S, GL60H, or GL70H.
P120 UART STATUS ERROR	There has been an error in the P120 reception data (possibly caused by external noise).	Redo the operation from the beginning, keeping away from sources of noise.

Error Message	Meaning	Action
SC CRC FAILURE	There was an error in the data received from the GL60S, GL60H, or GL70H (possibly caused by external noise).	Redo the operation from the beginning.
SC UART STATUS ERROR	There was an error in the data received from the GL60S, GL60H, or GL70H (possibly caused by external noise).	Redo the operation from the beginning.
TIMEOUT ERROR– COMMUNICATIONS DOWN	A signal was sent to the GL60S, GL60H, or GL70H but there has been no reply.	• Review the data transmission parameters (for the P120, GL60S, GL60H, or GL70H). • Check the cables. • Turn the power to the GL60S, GL60H, or GL70H OFF and ON again.
FATAL I/O ERROR MUST INITIALIZE RESET SEQUENCE	You attempted another operation after there was an error in data transmission with the GL60S, GL60H, or GL70H.	Redo the operation from the beginning.

A.4 Fatal Error Messages

Message	Submessage	Meaning	Action
WATCHDOG TIMER ERROR	—	One scan is taking more than 500 ms.	Review the program (reduce the scan time).
BIT ALU ERROR	—	ALU bit operating error (hardware)	Replace the CPU.
INVALID MEMORY ALLOCATION	—	Application memory allocation error	Clear all programs.
USER STATUS TABLE TOTAL SUM ERROR	—	Status table total sum error	Restart the CPU.
LADDER CIRCUIT ERROR	TOTAL SUM ERROR	Ladder circuit total sum error	Clear the ladder circuit.
	EOL ERROR	EOL (end of logic) error	Clear the ladder circuit.
	EOS ERROR	EOS (end of segment) error	Clear the ladder circuit.
	SON ERROR	SON (start of next) error	Clear the ladder circuit.
ACTION CIRCUIT ERROR	TOTAL SUM ERROR	Action circuit total sum error	Clear the action circuit.
	ENTRY TABLE TOTAL SUM ERROR	Action circuit entry table total sum error	Clear the action circuit.
	EOL ERROR	EOL (end of logic) error	Clear the action circuit.
	SOA ERROR	SOA (start of action) error	Clear the action circuit.
TRANSITION CIRCUIT ERROR	TOTAL SUM ERROR	Transition circuit total sum error	Clear the transition circuit.
	ENTRY TABLE TOTAL SUM ERROR	Transition circuit entry table total sum error	Clear the transition circuit.
	EOL ERROR	EOL (end of logic) error	Clear the transition circuit.
	SOT ERROR	SOT (end of transition) error	Clear the transition circuit.
SUBROUTINE CIRCUIT ERROR	TOTAL SUM ERROR	Subroutine circuit total sum error	Clear subroutine circuit
	ENTRY TABLE TOTAL SUM ERROR	Subroutine circuit entry table total sum error	Clear subroutine circuit
	EOL ERROR	EOL (end of logic) error	Clear subroutine circuit
	SOS ERROR	SOS (start of subroutine) error	Clear subroutine circuit
SFC PROGRAM ERROR	FLOW TABLE TOTAL SUM ERROR	SFC screen table total sum error	Clear the SFC screen.
	MODE TABLE TOTAL SUM ERROR	SFC mode table total sum error	Clear the SFC mode.
	STEP DATA ERROR	Action circuit data error	Clear the action circuit.
	TRANSITION DATA ERROR	Transition circuit data error	Clear the transition circuit.

Message	Submessage	Meaning	Action
traffic cop TABLE ERROR	TOTAL SUM ERROR	Traffic cop table total sum error	Clear the traffic cop table.
	ENTRY TABLE TOTAL SUM ERROR	Traffic cop entry table total sum error	Clear the traffic cop table.
ALLOCATION TABLE ERROR	ASCII ALLOCATION TABLE	ASCII allocation table error	Clear the ASCII allocation table.
	USER MEMORY ALLOCATION TABLE	Application program memory allocation table error	Clear all.
	PORT PARAMETER ALLOCATION TABLE	Data transmission parameter allocation table error	Clear all.
	H-SPEED ST. ALLOCATION TABLE	High-speed station allocation table error	Clear the high-speed station allocation table.
	PC-LINK ALLOCATION TABLE	PC link allocation table error	Clear the PC link allocation table.

A.5 Subsystem Troubles

Message	Submessage	Meaning	Action
IOP (IF60) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
COMM (IF61) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
RIOD☐ (IF62) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
LINK (IF64) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
NSB (IF65) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
SVIF☐ (IF66) MODULE TROUBLE	ROM ERROR	ROM ERROR	
	RAM ERROR	RAM ERROR	Replace the Module.
	COMMON MEMORY ERROR	COMMON MEMORY ERROR	
	WATCHDOG ERROR	WATCHDOG ERROR	
EXPAND MEMORY (MM60) MODULE TROUBLE	SYMBOL MEMORY TOTAL SUM ERROR	SYMBOL MEMORY TOTAL SUM ERROR	Clear symbols.
	COMMENT MEMORY TOTAL SUM ERROR	COMMENT MEMORY TOTAL SUM ERROR	Clear comments.
	EXPAND DATA MEMORY TOTAL SUM ERROR	EXPAND DATA MEMORY TOTAL SUM ERROR	Clear expansion memory.

P120 PROGRAMMING PANEL
USER'S MANUAL

TOKYO OFFICE
New Pier Takeshiba South Tower, 1-16-1, Kaigan, Minatoku, Tokyo 105-0022 Japan
Phone 81-3-5402-4511 Fax 81-3-5402-4580

YASKAWA ELECTRIC AMERICA, INC.
Chicago-Corporate Headquarters
2942 MacArthur Blvd Northbrook, IL 60062-2028, U.S.A.
Phone 1-847-291-2340 Fax 1-847-498-2430
Chicago-Technical Center
3160 MacArthur Blvd. Northbrook, IL 60062-1917, U.S.A.
Phone 1-847-291-0411 Fax 1-847-291-1018

MOTOMAN INC. HEADQUARTERS
805 Liberty Lane West Carrollton, OH 45449, U.S.A.
Phone 1-937-847-6200 Fax 1-937-847-6277

YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTDA.
Avenida Fagundes Filho, 620 Bairro Saude-Sao Pãulo-SP, Brazil CEP: 04304-000
Phone 55-11-5071-2552 Fax 55-11-5581-8795

YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-888-301

Motoman Robotics AB
Box 504 S38525 Torsås, Sweden
Phone 46-486-48800 Fax 46-486-41410

Motoman Robotec GmbH
Kammerfeldstraße 1, 85391 Allershausen, Germany
Phone 49-8166-900 Fax 49-8166-9039

YASKAWA ELECTRIC UK LTD.
1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, United Kingdom
Phone 44-1236-735000 Fax 44-1236-458182

YASKAWA ELECTRIC KOREA CORPORATION
Kfpa Bldg #1201, 35-4 Youido-dong, Yeongdungpo-Ku, Seoul 150-010, Korea
Phone 82-2-784-7844 Fax 82-2-784-8495

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park Singapore 556741, Singapore
Phone 65-282-3003 Fax 65-289-3003

YATEC ENGINEERING CORPORATION
Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-2563-0010 Fax 886-2-2567-4677

BEIJING OFFICE
Room No. 301 Office Building of Beijing International Club, 21
Jianguomenwai Avenue, Beijing 100020, China
Phone 86-10-6532-1850 Fax 86-10-6532-1851

SHANGHAI OFFICE
27 Hui He Road Shanghai 200437 China
Phone 86-21-6553-6600 Fax 86-21-6531-4242

YASKAWA JASON (HK) COMPANY LIMITED
Rm. 2909-10, Hong Kong Plaza, 186-191 Connaught Road West, Hong Kong
Phone 852-2803-2385 Fax 852-2547-5773

TAIPEI OFFICE
Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-2563-0010 Fax 886-2-2567-4677

SHANGHAI YASKAWA-TONGJI M & E CO., LTD.
27 Hui He Road Shanghai China 200437
Phone 86-21-6531-4242 Fax 86-21-6553-6060

BEIJING YASKAWA BEIKE AUTOMATION ENGINEERING CO., LTD.
30 Xue Yuan Road, Haidian, Beijing P.R. China Post Code: 100083
Phone 86-10-6233-2782 Fax 86-10-6232-1536

SHOUGANG MOTOMAN ROBOT CO., LTD.
7, Yongchang-North Street, Beijing Economic Technological Investment & Development Area,
Beijing 100076, P.R. China
Phone 86-10-6788-0551 Fax 86-10-6788-2878

YASKAWA ELECTRIC CORPORATION

YASKAWA

Specifications are subject to change without notice
for ongoing product modifications and improvements.

MANUAL NO. SIE-C825-60.14
© Printed in Japan August 1998 97-5
98-5①
97-82079, 588-33