

Product Application Note

Configuring EZ Ware on a Maple HMI to Communicate with an MPiec controller over MODBUS TCP

Applicable Product: MPiec, MotionWorksIEC



MODBUS TCP

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Doc#: AN.MP2000iec.06

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| YASKAWA | | | | |
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Application Overview

This document explains the steps required to configure a Maple HMI using EZ Ware to communicate to an MPiec series controller over MODBUS TCP. The HMI is the client and the MPiec controller is the server in this protocol.

Products Used:

| Component | Product and Model Number | |
|----------------------|------------------------------|--|
| Controller | MPiec | |
| Software | MotionWorks IEC Professional | |
| НМІ | HMI Maple Silver series HMI | |
| HMI software EZ Ware | | |

Implementation Method of Core Operation

Configuration of the MPiec controller

Step 1: Configuring MODBUS server:

Under Hardware configuration, enable the MPiec controller to be a MODBUS slave (server)





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This creates MODBUS groups that support Function codes 5 (MODBUS registers 00001 onwards), 6/16 (MODBUS registers 400001 onwards), 2 (MODBUS registers 10001 onwards) and 4 (MODBUS registers 30001 onwards) in the global variables list.

Save the Hardware configuration.

Power cycle the controller.

Step 2: Create MODBUS variables in the global variable list.

Create variables under the appropriate groups and assign local addresses to these variables (based on the group address range) as shown in the figure below.

| Name | Туре | Usage | Description | Address | |
|--|----------------------|---------------------------------|-----------------|------------|--|
| 🖃 Modbus FC#05 Qty: 128 🤇 | Coils, Address Rang | e: <mark>%</mark> IB24560 - %IB | 24575 Group Add | ress Range | |
| BitMaple_2_Siec | BOOL | VAR_GLOBAL | | %IX24560.0 | |
| 🖃 Modbus FC#06,16 Qty: 10 |)24 Registers, Addre | ess Range: %IB28 | 672 - %IB30719 | | |
| WordMaple_2_Siec | WORD | VAR_GLOBAL | | %MV28672 | |
| 🖃 Modbus FC#02 Qty: 128 Inputs, Address Range: %QB24560 - %QB24575 | | | | | |
| Bit_Siec_2_Maple | BOOL | VAR_GLOBAL | | %QX24560.0 | |
| 🖂 Modbus FC#04 Qty: 1024 Input Registers, Address Range: %QB28672 - %QB30719 | | | | | |
| Word_Siec_2_Maple | WORD | VAR_GLOBAL | | %QW/28672 | |

Figure 2: MODBUS Variables in the global variable page

Compile the project. Download to controller Run the project on the PLC

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Configuring EZWare

Step 1: Device configuration:

Under device settings, the local HMI is already listed. Add a new device.

| γ | stem Para | intecer s | secunys | | | | | | 2 |
|---|---------------|------------|----------|-----------|-----------|-----------|---------------|---------|-----------|
| | For | nt | 1 | Extend | ed Memory | T | Print | er/Back | up Server |
| | Device | | Model | - I | General | S | /stem Setting | | Security |
| | Device list : | : | | | | | | | |
| | No. | Name | Location | Device ty | уре | Interface | I/F Protocol | Statio | n no. |
| | Local HMI | Local HM | I Local | HMI5070 | NH(TH) / | Disable | N/A | N/A | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | New | | Dele | ete | Setting | js | | | |
| | Project des | cription : | | | | | | | |
| | | | | | | | | | |
| | 1 | | | | | | | | |

Figure 3: System settings in EZware

Set up new device with the following settings.

| Device Properties | | |
|-------------------|---------------------------------------|--|
| Name : | MP2300Siec | |
| | | |
| | | a a a a a a a a a a a a a a a a a |
| Location : | Local Settings | a second a second second second second |
| | | IP Address Settings |
| PLC type : | Modbus TCP/IP Master | IP address of IEC controller |
| | V.1.50, MODBUS_TCPIP.so | IP address : 192 . 168 . 1 . 1 |
| PLC I/F : | Ethernet PLC default station no. : 1 | Port no. : 502 |
| | Use UDP (User Datagram Protocol) | Timeout (sec) : 1.0 Turn around delay (ms) : 0 |
| IP : | 192.168.1.1, Port=502 Settings | |
| | | Send ACK delay (ms) : 0 Parameter 1 : 0 |
| | | Parameter 2 : 0 Parameter 3 : 0 |
| Inter | val of block pack (words) : 5 | OK Canc |
| Max. re | ad-command size (words) : 120 🖃 | |
| Max. wri | te-command size (words) : 120 💌 | |
| | OK Cancel | 1 |

Figure 4: IP address settings for the server

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Step 2: Variable declaration and MODBUS mapping:

To start variable creation, Go to library > Tags



Figure 5: Variable creation

Start a new tag as shown in figure 6

| Address | Tag Library | | | | | | 2 |
|---------|--------------------------|-------------------|-------------------------|-------------------|------------|---------|------------|
| Cus | stomized 🔿 System | | | | | | |
| No. | Address tag name | | | PLC name | Address ty | Address | Read/Write |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | ddress Tag | | | | × | |
| | | | | | | | |
| | | Tag name : | Tag_0 | | | | |
| | | PLC name : | Local HM | 11 | | | |
| | | PEC hame . | - | _ | | | |
| | | Address type : | Bit | C Word | | | |
| * User | can import HMI500 tag to | Device type : | LB | - | | | |
| | | Address · | 0 | | | | |
| | New | Address faurest : | | | | | |
| | bave Tag File Load | Address format : | טטטטט (r | ange : 0 ~ 11999] | | | Exit |
| | | | Г | OK | Cance | | |
| | | | | | | | |

Figure 6: New tag creation

To create a coil (bit to transfer BOOL data type from the Maple HMI to the IEC controller), use the fields as shown in figure 7.

| 1 YASKAWA | | | | |
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| ddress Tag | | |
|------------------|--------------------------|----------------------|
| Tag name : | Bit_Maple_To_IEC | |
| PLC name : | MP2300Siec | _ |
| Address type : | ● Bit | |
| Device type : | Ox C | orresponds to MODBUS |
| Address : | 1 | aress 0000 i |
| Address format : | DDDDD [range : 1 ~ 65535 | 3 |
| | ОК | Cancel |

Figure 7: New tag properties

To create a tag to transfer a bit from the IEC controller to the Maple HMI, use the fields as shown in figure 8.

| A | ddress Tag | | × |
|---|------------------|--------------------------|--|
| | Tag name : | Bit_IEC_To_Maple | |
| | PLC name : | MP2300Siec | • |
| | Address type : | ● Bit | |
| | Device type : | 1x 💌 | Corresponds to MODBUS address 10001 |
| | Address : | 1 | |
| | Address format : | DDDDD [range : 1 ~ 65535 | 5] |
| | | ОК | Cancel |

Figure 8: Discrete input tag

The properties to create a tag to send a word from Maple HMI to IEC Controller are as shown in figure 9.

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| A | ddress Tag | | | <u> </u> |
|---|------------------|---------------------------|----------|------------------|
| | Tag name : | Word_Maple_To_IEC | | |
| | PLC name : | MP2300Siec | | • |
| | Address type : | C Bit 💿 Word | d Corres | sponds to |
| | Device type : | 4x 💌 | MODB | US address 40001 |
| | Address : | 1 | | |
| | Address format : | DDDDD [range : $1 \sim 6$ | 5535] | |
| Ľ | | 0 | < | Cancel |

Figure 9: Multiple registers

The properties to create a tag to send a word from the IEC Controller to the Maple HMI are as shown in figure 10.

| Address Tag | | <u>×</u> |
|------------------|---------------------------|--------------|
| Tag name : | Word_IEC_To_Maple | |
| PLC name : | MP2300Siec | • |
| Address type : | O Bit • Word | nds to |
| Device type : | 3x MODBUs | memory 30001 |
| Address : | 1 | |
| Address format : | DDDDD [range : 1 ~ 65535] | |
| | ОК | Cancel |

Figure 10: Input registers

The address tag list looks as shown in figure 11.

| ag Library | | | | |
|-------------------|---|--|--|--|
| tomized 🔿 System | | | | |
| Address tag name | PLC name | Address ty | Address | Read/Write |
| Bit_Maple_To_IEC | MP2300Siec | Bit | 0x-1 | Read/Write |
| Bit_IEC_To_Maple | MP2300Siec | Bit | 1x-1 | Read/Write |
| Word_Maple_To_IEC | MP2300Siec | Word | 4x-1 | Read/Write |
| Word IEC To Maple | MP2300Siec | Word | 3x-1 | Read/Write |
| | ag Library omized C System Address tag name Bit_Maple_To_IEC Bit_IEC_To_Maple Word_Maple_To_IEC Word LEC To Maple | ag Library omized C System Address tag name PLC name Bit_Maple_To_IEC MP2300Siec Bit_IEC_To_Maple MP2300Siec Word_Maple_To_IEC MP2300Siec Word_Maple_To_IEC MP2300Siec | Address tag name PLC name Address ty Bit_Maple_To_IEC MP2300Siec Bit Word_Maple_To_IEC MP2300Siec Word Word LEC To Maple MP2300Siec Word | Address tag name PLC name Address ty Address Bit_Maple_To_IEC MP2300Siec Bit 0x-1 Bit_IEC_To_Maple MP2300Siec Bit 1x-1 Word_Maple_To_IEC MP2300Siec Word 4x-1 Word_TeC_To_Maple MP2300Siec Word 4x-1 |

Figure 11: Tag list

| 🖅 YASKAWA | | | |
|---|----------------|-----------------------|--|
| | | | |
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Step 3: Screen creation and variable mapping to screen objects:

Insert new object. New lamp object is used in this example. Click on 'setting' to associate this object with a defined tag.

| Nev | v Bit Lamp Object 🛛 |
|-----|---|
| G | ieneral Security Shape Label |
| | Description : |
| | Read address PLC name : Local HMI Setting |
| | Address : LB 0 |
| | |

Figure 12: New object properties

Checking the user defined tag check box will allow the user to select the variable from the user defined tags.

| ddress | | | × |
|--------------------------------------|--|------|----------------------------|
| PLC name Device type Address : | MP2300Siec Bit_IEC_To_Maple 1x-1 | (| ▼ ▼ User-defined tag |
| Address format : | DDDDD [range : 1 ~ 655 | 335] | |
| | | ОК | Cancel |

Figure 13: Mapping object to MODBUS variable

The shape, label and other properties can be chosen as desired. The object can then be placed on the display screen.

Configurations of Bit_Maple_To_IEC, Word_IEC_To_Maple and Word_Maple_To_IEC are given below.

| YASKAWA | | | |
|---|----------------|-----------------------|--|
| | | | |
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| Toggle Switch Object's Properties | x |
|--------------------------------------|-------------|
| General Security Shape Label Profile | |
| Description : | |
| Read address | |
| PLC name : Local HMI | Setting |
| Address : LB 🔽 0 | |
| Invert signal | |
| | |
| | |
| PLC name : MP2300Siec | Setting |
| Address : Bit Maple To IEC | Joccarigini |
| | |
| Vrite when button is released | |
| Attribute | |
| Switch style : Toggle | |
| | |

Figure 14: Configuration of Bit_Maple_To_IEC

| New Numeric Display Object | X |
|--|---|
| General Numeric Format Security Shape Font | |
| Description : | |
| Read address | |
| PLC name : MP2300Siec Setting | |
| Address : Word_IEC_To_Maple 💌 3x-1 | |
| | |
| | |

Figure 15: Configuration of Word_IEC_To_Maple

| YASKAWA | | | |
|---|----------------|-----------------------|--|
| | | | |
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| New Numeric Input Object | × |
|---|---|
| General Data Entry Numeric Format Security Shape Font | |
| Description : | |
| Read address | |
| Address : Word_Maple_To_IEC | |
| Notification | |

Figure 16: Configuration of Word_Maple_To_IEC:

The display screen looks as in figure 17.



Figure 17: Display screen

| YASKAWA | | |
|--|---------------------------------|----------------------------|
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Step 4: Simulation

Save the project

| C 112 | | | | |
|---|--|-------------------------------|--|--|
| compiling | | | | |
| Projec | :t name : C:\ Doi | Document cuments\n | s and Settings\nishant\My ishant\SIEC_Testing\Phoenix_V | isu\Maple_Test\Maple_Prog_2010_1216\MTP2.mtp |
| XOB fi | le name : C:\ Doi | Document cuments\n | s and Settings\nishant\My ishant\SIEC_Testing\Phoenix_V | isu\Maple_Test\Maple_Prog_2010_1216\MTP2.xob |
| XOB p | assword : | Set | (used in decompiler) | Decompilation is prohibited |
| Select the la | nguages usec | l on the H | MI | |
| Л | 🛛 Language 1 | | | |
| | | | | |
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| | | | | |
| U error(s), U | warning(s) | | | |
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| Picture size | : U Dytes | vtoc | | |
| | , 101/J9D | ytes | | |
| Shape size | : 396 bytes | 5 | | |
| Shape size Macro size | : 396 byte: : 14 bytes | 5 | | |
| Shape size Macro size | : 396 byte: : 14 bytes : 204275 b | ; vtes (0.19 | M) | |
| Shape size Macro size Total size | : 396 byte: : 14 bytes : 204275 b | ; ytes (0.19 | M) | |
| Shape size Macro size Total size | : 396 byte: : 14 bytes : 204275 b | ; ytes (0.19 | M) | |
| Shape size Macro size Total size | : 396 byte: : 14 bytes : 204275 b | ; ytes (0.19 | M) | |
| Shape size Macro size Total size succeeded | : 396 byte: : 14 bytes : 204275 b | ; ytes (0.19 | M) | |
| Shape size Macro size Total size succeeded | : 396 byte: : 14 bytes : 204275 b error message | ; ytes (0.19 es to modi | M) fy the attributes of relative obj | ects ! |
| Shape size Macro size Total size succeeded Double click | : 396 byte: : 14 bytes : 204275 b error message | ; ytes (0.19 rs to mod | M) fy the attributes of relative obj | ects ! |

Figure 18: Compile

Tools> Online Simulation will get the simulation running and the user can test real time communication between the two devices. On successful communication data exchange can be confirmed.





Figure 19: Testing communication