

## Product Application Note

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# **MP2000iec – Address Mapping between a Phoenix MII BK unit and an MP2000iec controller**

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Applicable Product: MP2000iec

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### Application Overview

This document provides detailed steps on how map addresses from a Phoenix MII BK unit with add on slices to a Yaskawa MP2000iec controller.

### Application Highlights

- Industry: Machine builders using MECHATROLINK II and Phoenix BK units
- Major Features: MECHATROLINK IO
- Results: Easy configuration, Extra I/O using the Phoenix bus coupler

### Products Used:

Component	Product and Model Number
Controller	MP2300Siec controller, Firmware version 2.0
Software	MotionWorks IEC Pro, Ver 2.0
Third Party Devices	Phoenix MODBUS bus coupler: IL ETH BK D18 DO4 2TX-PAC, IB IL PWM/2, IB IL 24 DI 2, IB IL 24 DO 2, MII BK IO mapper

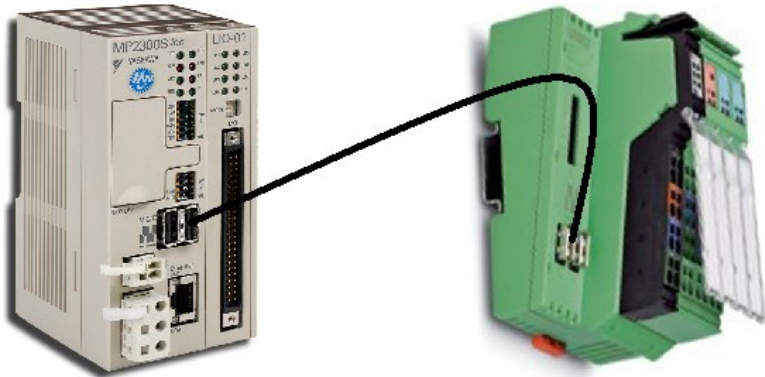


Figure 0: Communication configuration

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### Implementation Method of Core Operation

From the new project template in MotionWorks IEC, open the hardware configuration tool. Enter the IP address of the MP2000iec controller with the Phoenix BK unit connected and click connect.



Figure 1: Go online with the BK module

Choose the auto-discovered configuration. The BK bus coupler will be discovered automatically.

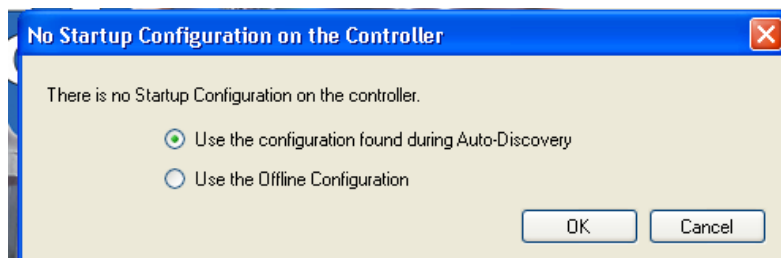


Figure 2: Choosing auto-discovered configuration

Make sure that the BK unit with the correct node number shows up in the project tree under MECHATROLINK II.

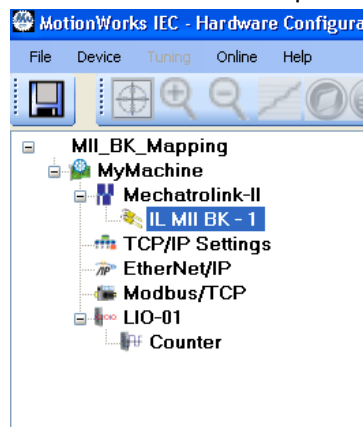


Figure 3: Discovered BK unit

Save and power cycle the controller.

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In the global variable worksheet of MotionWorks IEC, the variable group for the BK unit is created. This group contains 8 inputs and 4 outputs by default. These are the default IO on the BK unit. MECHATROLINK-II packets are made up of 32 bytes (32 bytes for Inputs and 32 bytes for Outputs). 4 bytes are used up for administrative functions like status, response etc. The remaining 28 can be used for data transfer.

In the example shown in this write up, the add on blocks to the basic BK unit in order are:

IB IL PWM/2, IB IL 24 DI 2, IB IL 24 DO 2.

These inline blocks correspond to 2, 40 and 63 in the Phoenix IO mapper utility.

In order to obtain the PLC input and output address to enter in the appropriate fields in the IO mapper utility, go to the 'IO configuration' set up in MotionWorks IEC to see the starting address of the BK variables. Click on 'Properties' as shown in figure 4.

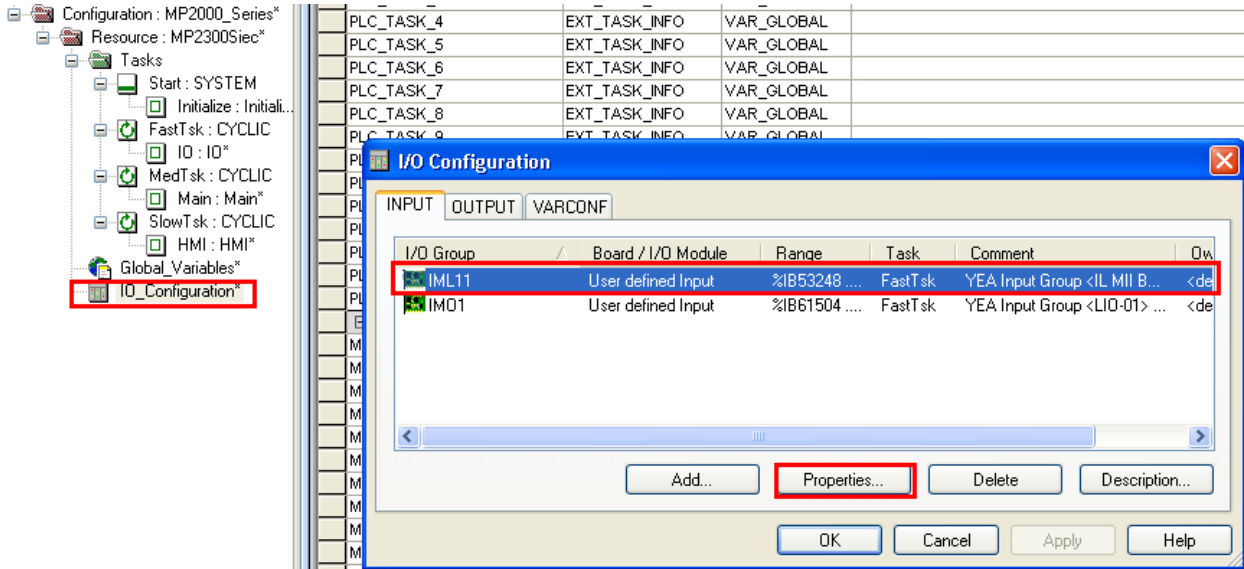


Figure 4: IO configuration in MotionWorks IEC

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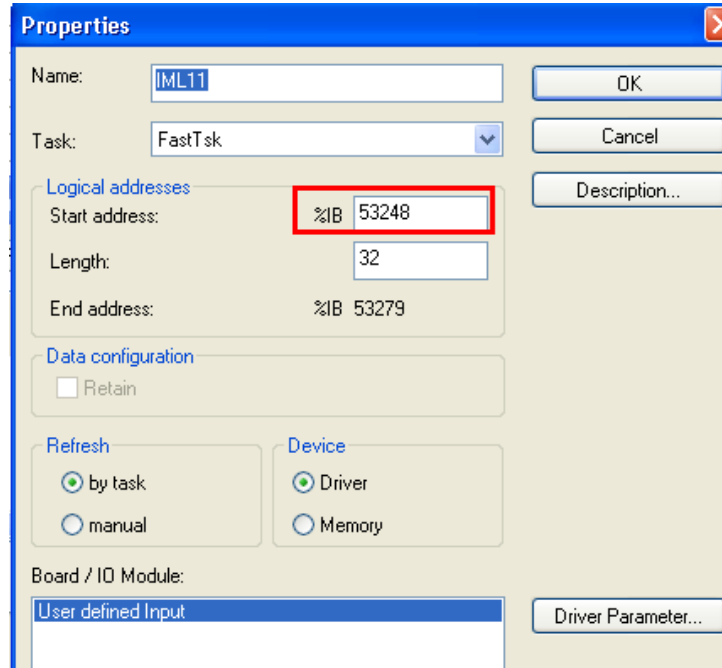


Figure 5: Starting address in MotionWorks IEC (PLC)

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A Phoenix IO mapping utility is available on [Yaskawa.com](http://Yaskawa.com). An explanation on how to use this utility is given below.

Enter the 'start address' from the properties page (Figure 5) in the 'IEC input address' field in the Phoenix IO mapping utility. Repeat the procedure for the outputs as well.

## MIIBK IO Mapper for Yaskawa IEC

This utility maps IEC Motion addresses to MIIBK frame data for a given Inline config (example: "36, 40, 65, 72, 18, 24"). In the *Address* fields enter the IEC Decimal add

Inline Configuration:

IEC Input Address:

IEC Output Address:

Figure 6: PLC addresses entered in the IO mapper utility

Click on 'map'. The mapping will be displayed as follows (figure 7). Note that the addresses on the IO mapping utility are word based (16 bits to a word). The addresses in MotionWorks IEC are byte based. For example: Word 53248 = Bytes 53248 and 53249

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## Address Maps

In the following maps the number in parentheses is the module's index in the Inline Modules table below. Because b where its bits occur.

The following configuration has been mapped.

EN2/2 (2), DI2 (40), DO2 (63)

### Input Map

IEC (Bytes)	MIIBK
%IB53248	not used
%IB53249	not used
%IB53250	IL_RESPONSE
%IB53251	IL_STATUS
%IB53252	Onboard DI8
%IB53253	IB IL 24 DI 2 (40)
%IB53254	IB IL PWM/2 (2)
%IB53255	high byte of %IW53254
%IB53256	IB IL PWM/2 (2)
%IB53257	high byte of %IW53256

### Output Map

IEC (Bytes)	MIIBK
%QB53248	not used
%QB53249	not used
%QB53250	IL_CTRL
%QB53251	not used
%QB53252	Onboard DO4 starting at bit 4
%QB53253	IB IL 24 DO 2 (63)
%QB53254	IB IL PWM/2 (2)
%QB53255	high byte of %QW53254
%QB53256	IB IL PWM/2 (2)
%QB53257	high byte of %QW53256

Figure 7: Mapping

The next step is to add variables to the global variables table in MotionWorks IEC.

Right click on the tab to the left of the last variable name after which you wish to add a new variable, and choose

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'append variable'.

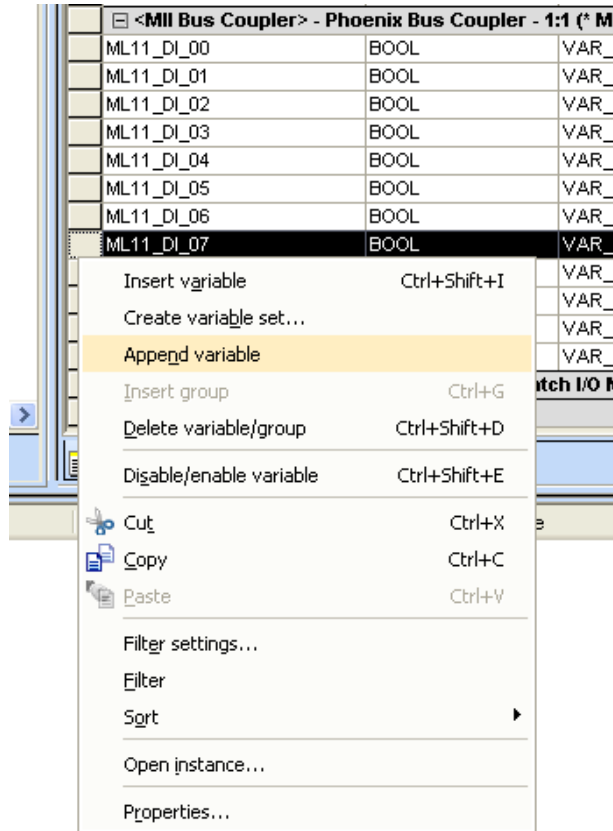


Figure 8: Adding variables with addresses in MotionWorks IEC

Add the new variables as shown below. Note the addresses were obtained (indirectly) from the mapping utility.



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☐ <MII Bus Coupler> - Phoenix Bus Coupler - 1:1 (* Modify Variable Names, Not Group Name. *)					
ML11_DI_00	BOOL	VAR_GLOBAL	Digital Input #0	%IX53252.0	
ML11_DI_01	BOOL	VAR_GLOBAL	Digital Input #1	%IX53252.1	
ML11_DI_02	BOOL	VAR_GLOBAL	Digital Input #2	%IX53252.2	
ML11_DI_03	BOOL	VAR_GLOBAL	Digital Input #3	%IX53252.3	
ML11_DI_04	BOOL	VAR_GLOBAL	Digital Input #4	%IX53252.4	
ML11_DI_05	BOOL	VAR_GLOBAL	Digital Input #5	%IX53252.5	
ML11_DI_06	BOOL	VAR_GLOBAL	Digital Input #6	%IX53252.6	
ML11_DI_07	BOOL	VAR_GLOBAL	Digital Input #7	%IX53252.7	
Extra_DI_1	BOOL	VAR_GLOBAL	Added DI_1	%IX53253.0	
Extra_DI_2	BOOL	VAR_GLOBAL	Added DI_2	%IX53253.1	
PWM_I_Word_1	WORD	VAR_GLOBAL	PWM InWord 1	%IW53254	
PWM_I_Word_2	WORD	VAR_GLOBAL	PWM InWord 2	%IW53256	
ML11_DO_00	BOOL	VAR_GLOBAL	Digital Output #0	%QX53252.4	
ML11_DO_01	BOOL	VAR_GLOBAL	Digital Output #1	%QX53252.5	
ML11_DO_02	BOOL	VAR_GLOBAL	Digital Output #2	%QX53252.6	
ML11_DO_03	BOOL	VAR_GLOBAL	Digital Output #3	%QX53252.7	
Extra_DO_1	BOOL	VAR_GLOBAL	Added DO_1	%QX53253.0	
Extra_DO_2	BOOL	VAR_GLOBAL	Added DO_2	%QX53253.1	
PWM_O_Word_1	WORD	VAR_GLOBAL	PWM OutWord 1	%QW53254	
PWM_O_Word_2	WORD	VAR_GLOBAL	PWM OutWord 2	%QW53256	

Figure 9: Global variable table in MotionWorks IEC

If a large array of variables with similar properties need to be created in sequence, 'create variable set' can be chosen in place of append variable. This will help in creating an array of variables in sequence with similar properties.

For example if an array of 32 input bits need to be created starting at address IB 53258, click on 'create variable set', and enter the fields appropriately. Clicking OK will generate an array of variables in the global variable work sheet.

Figure 10: Creating a variable set

The created set will look as follows

User Variables						
AddOn1	BOOL	VAR_GLOBAL		%IX53258.0		
AddOn2	BOOL	VAR_GLOBAL		%IX53258.1		
AddOn3	BOOL	VAR_GLOBAL		%IX53258.2		
AddOn4	BOOL	VAR_GLOBAL		%IX53258.3		
AddOn5	BOOL	VAR_GLOBAL		%IX53258.4		
AddOn6	BOOL	VAR_GLOBAL		%IX53258.5		
AddOn7	BOOL	VAR_GLOBAL		%IX53258.6		
AddOn8	BOOL	VAR_GLOBAL		%IX53258.7		
AddOn9	BOOL	VAR_GLOBAL		%IX53259.0		
AddOn10	BOOL	VAR_GLOBAL		%IX53259.1		
AddOn11	BOOL	VAR_GLOBAL		%IX53259.2		
AddOn12	BOOL	VAR_GLOBAL		%IX53259.3		
AddOn13	BOOL	VAR_GLOBAL		%IX53259.4		
AddOn14	BOOL	VAR_GLOBAL		%IX53259.5		
AddOn15	BOOL	VAR_GLOBAL		%IX53259.6		
AddOn16	BOOL	VAR_GLOBAL		%IX53259.7		
AddOn17	BOOL	VAR_GLOBAL		%IX53260.0		
AddOn18	BOOL	VAR_GLOBAL		%IX53260.1		
AddOn19	BOOL	VAR_GLOBAL		%IX53260.2		
AddOn20	BOOL	VAR_GLOBAL		%IX53260.3		
AddOn21	BOOL	VAR_GLOBAL		%IX53260.4		
AddOn22	BOOL	VAR_GLOBAL		%IX53260.5		
AddOn23	BOOL	VAR_GLOBAL		%IX53260.6		
AddOn24	BOOL	VAR_GLOBAL		%IX53260.7		
AddOn25	BOOL	VAR_GLOBAL		%IX53261.0		
AddOn26	BOOL	VAR_GLOBAL		%IX53261.1		
AddOn27	BOOL	VAR_GLOBAL		%IX53261.2		
AddOn28	BOOL	VAR_GLOBAL		%IX53261.3		
AddOn29	BOOL	VAR_GLOBAL		%IX53261.4		
AddOn30	BOOL	VAR_GLOBAL		%IX53261.5		
AddOn31	BOOL	VAR_GLOBAL		%IX53261.6		
AddOn32	BOOL	VAR_GLOBAL		%IX53261.7		

Figure 11: Created variable set in global variables work sheet