

Quick Reference Guide

MPiec Series Controllers

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STARTUP PROCEDURES

MP2000iec Series Controllers

"How Do I..."

1.0 Set the Front Panel Switches

KEY INFORMATION

CNFG normally ON, all others OFF

Switches only have an effect during power-on

STOP: Immediately stops the program from executing

Required for test run from Hardware Configuration or Web Interface

SUP: Boots the controller in "Supervisor mode" before a firmware update.

Supervisor mode can also be forced on through the web interface

INIT: Factory use only. Must remain OFF

Forces the controller to boot with "Default" hardware configuration

CNFG: Discovers all local and M-Link devices at power-up. May remain ON

*The discovered configuration is NOT used automatically, only if saved in MotionWorks IEC and after reboot
Ethernet devices are connected manually*

MON and TEST: Factory use only. Must remain OFF

E-INIT: Temporarily override the IP addresss with 192.168.1.1

E-TEST: Factory use only. Must remain OFF

Tools Required:
PC with ethernet port
MotionWorks IEC installed
Ethernet crossover cable
-or-
2 ethernet cables and ethernet hub/switch

1.1 Start MotionWorks IEC

During installation, a shortcut is placed on the desktop

If the shortcut is not visible, find it under Start -> Programs -> Yaskawa



1.2 Open a saved project

Start MotionWorks IEC (see procedure 1.1)

File -> Open Project. Navigate to the project and open.

If it is a Zipped project (ZWE or ZWT)

Open zwe or zwt file

Click "No". Navigate to the desired directory.

Type name for "unzip project as"

"Skip All" extracting firmware libraries

"Yes to All" for Page Layout overwrite

NOTE: Be sure there is no "dot" in the file path

1.3 Start a new project

Start MotionWorks IEC (see procedure 1.1)

File -> New Project.

Choose template according to controller type, OK

File -> Save As

NOTE: Be sure there is no "dot" in the file path

1.4 Prepare Controller for new project

As Required: Reset Controller to factory default (see procedure 1.7)

Turn OFF controller and servopacks

Turn ON the CNFG dipswitch

Turn ON power to the controller and servopacks

Wait ~30 sec for LEDs to stop flashing on controller

1.5 Establish ethernet communication with controller (web interface)

KEY INFORMATION:

MP2000iec IP address = 192.168.1.1 when powered up with E-INIT dipswitch ON

This switch setting does not affect the controller program or the address saved in FLASH.

The IP address will revert to the value saved in FLASH when the E-INIT dipswitch is OFF at power-up

Open Internet Explorer and type controller's IP address (192.168.1.1 if E-INIT is on) into address bar.

If MP2000iec web page appears, then you have communication. If not, check steps below.

Set TCP/IP properties of PC to an acceptable address. (control panel - network connections)

If E-INIT dipswitch = ON (use local network or crossover cable)

Set PC's IP address to 192.168.1.xxx (xxx= 002 or higher)

Disconnect controller from any existing ethernet network.

Connect crossover cable or regular ethernet cables to ethernet switch

If E-INIT dipswitch = OFF(Leave controller on factory network)

Determine the controller's IP address (see procedure)

Set a compatible IP address on PC (talk to network administrator)

Connect computer to factory network or crossover cable

1.6.1 Import Hardware Configuration from Controller to Project

KEY INFORMATION:

Servopack parameters "Drive Pn" are imported to the project

The Auto-Discovery, or "Disco" configuration may be imported after a factory reset (see procedure 1.7)

Open a saved project, or start a new project (see procedure 1.3)

Establish Ethernet communication with controller (see procedure 1.5)

Start Hardware Configuration by clicking on the icon



Confirm Connection Address in upper right corner

Click CONNECT in the upper right corner

Choose "Select Configuration on Controller" or "Use ... Auto-Discovery"

File-> **Save**, then **Disconnect**

Cycle Power on controller and amplifiers.

1.6.2 Send Hardware Configuration from Project to Controller

KEY INFORMATION:

It is NOT necessary to use the Connect button or go online unless sending servopack parameters

Offline and Online configuration can be compared by using the Connect button

Open a saved project that contains the desired hardware configuration (see procedure 1.3)

Establish Ethernet communication with controller (see procedure 1.5)

Start Hardware Configuration by clicking on the icon



Confirm Connection Address in upper right corner

File -> **Save** (if any additional changes were made to the Hardware Configuration)

To send Controller Configuration only, and NOT Servopack "Drive Pn" parameters

Online (menu) - Controller Configuration Utilities..., Send offline configuration..., Execute, "Yes" to restart

Advantages: Much faster transfer, automatic reboot, physical devices can be disconnected

To send both Controller Configuration AND Servopack "Drive Pn" parameters

Click CONNECT in the upper right corner

Choose "Use Offline Configuration"

File-> **Save**, then **Disconnect**

Cycle Power on controller and amplifiers.


Advantages: Checks to be sure the configuration is valid for connected devices

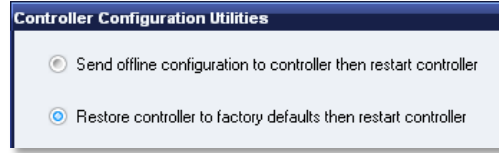
1.7 Reset an MP2300Siec system back to factory settings

KEY INFORMATION:

The controller, amplifier, and absolute encoder are reset individually in MotionWorks IEC

Reset the controller with all axes connected so that they may also be reset

- A. Establish Ethernet communication with controller (see procedure 1.5)
- B. Start MotionWorks IEC (see procedure 1.1)
- C. Start a new project (see procedure 1.3)
- D. Start **Hardware Configuration** by clicking on the icon 
- E. Set the **IP address** to the right of the "Connect" button
- F. Select the menu "**Online**"-**Controller Configuration Utilities**
- G. Execute "**Restore Controller to Factory Defaults...**"
- H. After reboot, click CONNECT in the upper right corner.
- I. Choose "**Use ... Auto-Discovery**". **Online is indicated**
- J. Under **Mechatrolink-II**, click on an axis that requires factory reset of amplifier or motor
- K. For each axis, click **Reset Default Pn Values** and/or **Reset Absolute Encoder** as required
- L. Check TCP/IP Settings and adjust the IP address as required
- M. File-> **Save**, then **Disconnect**
- N. Cycle Power on controller and amplifiers.



NOTES:

At this point the controller has a "startup" configuration saved, and so technically it is no longer at factory default. Execute "Restore ... Defaults" again to leave the controller at factory default, or simply continue to configure the hardware for your new project.

If the alarm A.CC0 is encountered, see [procedure 2.7](#) to clear.

1.8 Configure Axes / Servopacks

KEY INFORMATION:

Servopack configuration depends on the servopack model.

Common settings are shown below.

Set Programming Units

Click the configuration tab

Set the Load Type. Set the mechanical gear ratio.

Select measurement unit, then set Feed Constant (units moved per gearbox output shaft revolution)

Machine Cycle only applies to Load Type = Rotary. Set to 360 for rotary tables with units of degrees.

Disable Overtravel Inputs

Click the I/O tab

Set over-travel parameters to "Set Signal Off"

Disable Absolute Encoder

Click the Absolute Encoder tab

Set Absolute Encoder Usage to "use absolute encoder as incremental encoder"

Set 3-phase SGDv servopack to run single phase

Click the Function tab

Set Power Selection to "Apply Single Phase Power"

Absolute Encoder Battery Alarm/Warining

Pn008

Regeneration Power

Pn600

Absolute Encoder Multi-Turn Limit

Pn205

File-> Save

If OFFLINE, use the menu Online - Controller Configuration Utilities, **Send Offline Configuration**

Cycle Power on controller and amplifiers.

Clear any alarms under the "alarms" tab

1.9 Download project to controller

Go online with a project ([see procedure 1.6](#))

Click the "MAKE" button

A successful "Make" with zero errors is required before download. Correct all errors as required.

Option#2: Full Download (stop and restart)

Project Control -> Stop-> Download -> Download

Click the "cold" or "warm" button.

Close the project control box.

Option#1: Quick Download

Project Control -> Download -> Download Changes

Close the project control box.

1.A Set program to auto-start

KEY INFORMATION:

The controller always starts the "boot project" saved in flash memory at power-up.

Project Control -> Stop-> Download ->

Check "include bootproject"

Download

Close the project control box.

1.B Save a copy of the project on the controller for future upload

KEY INFORMATION:

A separate file must be downloaded, called "Project Source"

Project Control -> Stop-> Download ->

Check "Include Sources" to save a copy of the project for future upload

Check "user libraries", "Page Layouts", and "Backend Code"

Download

Close the project control box.

1.C Confirm motion is possible on each axis

Use Config tool "test move" tab under Mechatrolink

set test move parameters to appropriate value for machine

Default units are Motor Revolutions and Seconds. Change units if desired.

1.D Tune the motors

Follow standard manual tuning procedures for accurate tuning

Use "test move" and "tuning" to graph performance

For Sigma-5 motors, please use Advanced Autotuning within SigmaWin+

Disconnection from Mechatrolink may be required during tuning.

After tuning, click on each axis within the configuration tree

So that Pn settings are read and saved to the project/controller

Use the function block "Y_WriteDrivePn" for each axis

Writes parameters from controller to drive

restore undesired tuning adjustmetn

simplify servopack replacement

simplify new machine commissioning

Best practice is to use this as a manual operation

no built-in auto-detection of changed servopack Pn

Constant use may degrade servopack flash

MAINTENANCE PROCEDURES

MP2000iec Series Controllers

"How Do I..."

Tools Required:
 PC with ethernet port
 MotionWorks IEC installed
 Ethernet crossover cable
 -or-
 2 ethernet cables and ethernet hub/switch

2.1 Determine/Set unknown IP address in controller

Establish ethernet communication with controller with E-INIT=ON (see procedure 1.5)
 Use the [Login...](#) link and enter the following information (case sensitive)
 Login: **Admin** Password: **MP2300S or MP2310 or MP2600**
 In the controller's web page, choose "Ethernet Config"
 View / change the ethernet settings as required.
 Cycle Power on the controller

2.2 Extract/Open the project stored in the controller

KEY INFORMATION:

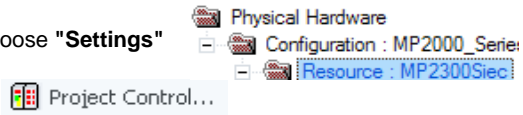
The project "source" must have been previously saved to the controller
 The "upload" button will appear in the Resource dialog if the source exists

Go online with a new project (See procedure 1.3)

Project Tree Window - Hardware Tab, R-Click "**Resource**" -> choose "**Settings**"

Set the IP address "**Parameter**" to the address of the controller

Open the Resource dialog by clicking "**Project Control**" button



A **green bar** at the bottom indicates connection to the controller

Click Upload - Project Source

The new project closes, click "**No**" to save changes to Untitled

The Project Source now opens, unzipping to the desired directory (See procedure 1.2)

Verify and set the IP address for the uploaded project as before

Project Tree Window - Hardware Tab, R-Click "**Resource**" -> choose "**Settings**"

Set the IP address "**Parameter**" to the address of the controller

2.3 Back Up the Controller Project (including servopack parameters)

KEY INFORMATION

The project archive contains the critical data for the controller and servopacks.
 Save this archive at time of machine commissioning and after any change is made.

Establish communication to the controller using the web interface (see procedure 1.5)

Use the [Login...](#) link and enter the following information (case sensitive)

Login: **Admin** Password: **MP2300S or MP2310 or MP2600**

In the controller's web page, choose "Project Archive"

Use "Receive from Controller" to save the current controller File Listing as a zipped file to the PC

Use "Send to Controller" to send an archive file from the PC to the controller

This procedure is also designed for OEM use when building multiple copies of a machine.

2.4 Replace the Controller (Install Project Archive)

KEY INFORMATION

MotionWorks IEC software is NOT required for controller replacement

The new controller must match the old in the following areas:

1. IP address, 2. Project Archive, 3. SRAM, 4. Firmware

- 1 Set the IP address using the default IP (see procedure 2.1)
- 2 Install the program backup archive to the controller and cycle power (see procedure 2.3)
- 3 Set Date/Time
- 3 Home all axes - this stores absolute encoder home offsets in the new controller
- The firmware level of the new controller must be greater than or equal to that of the old controller.
- 4 Consult your Yaskawa representative before attempting to change the firmware level.

See Procedure 2.5

2.5 Update the firmware

Acquire a firmware upgrade file named "firmware.zip"

Stop all motion

Establish communication with controller (see procedure 1.5)

Use the [Login...](#) link and enter the following information (case sensitive)

Login: **Admin** Password: **MP2300S or MP2310 or MP2600**

In the controller's web page, choose "update firmware"

Supervisor mode required. Re-apply power with SUP = ON, or enable via software

Follow directions to update the firmware

2.6 Replace a servopack

KEY INFORMATION:

The new Servopack requires the appropriate parameter set, which can be obtained:

1. From the controller, automatically, according to the controller program
2. From MotionWorks IEC project file, by sending the offline configuration and online save
3. From a previously saved SigmaWin+ parameter file

Remove the existing Servopack, and note the Mechatrolink rotary address switch setting.

Set the Mechatrolink rotary address switch on the new Servopack

Power ON, (expect Controller Alarm 3301 000b "Pn002 not correctly initialized")

Send Parameter Set*: Execute "Y_WriteParameters" according to application program.

Cycle power

*Send Parameter Set from MotionWorks IEC to all Servopacks.

Open the appropriate project file.

Start MotionWorks IEC Configuration.

Enter the controller IP address and click "Connect".

Choose "send offline configuration".

File-Save. Cycle Power.



2.7 Replace ServoMotor

KEY INFORMATION:

Absolute encoder requires special consideration:

Power OFF

Install replacement motor (mount, couple, wire) and Power ON

Clear Alarm A.810 (*Absolute Encoder Only*)

Clear Alarm A.CC0 (*Only with Absolute Encoder and multi-turn limit Pn205 set*)

Cycle Power to finish clearing alarm A.810 / A.CC0

Re-Calibrate axis position to mechanical zero

Stores absolute encoder offset in controller SRAM. Updates incremental encoder offsets

Available methods to clear A.810 & A.CC0

- 1 Project: Integrate the Y_ResetAbsoluteEncoder function block into your code
- 2 WebServer: Machine Operations, DrivePn tab - select axis number, click "**Abs Encoder Init**" / "**Multiturn Reset**"
- 3 MWIEC Hardware Configuration: Online, Under Mechatrolink-II click on axis, click "**Reset Absolute Encoder**"
- 4 SigmaWin+ : Setup - Absolute Encoder
- 5 Digital Operator: Fn008-> PgCl5 (and Fn013 (multi-turn reset)

2.8 Use Origin Search

Use Origin Search to align encoder C-pulse to machine position

May be useful if the following situations apply

* *Compression-type coupling is used (no keyway)*

* *Homing routine utilizes C-channel (ex: MC_StepRefPulse)*

* *Over-travel limits are close to home sensor (< 1motor rev)*

- 1 Align machine to known position (manually or with Servo Jog function)
- 2 Remove/loosen motor coupling so that it slips freely on the motor shaft.
- 3 Origin Search to position motor at C-pulse
- 4 Tighten coupling

2.9 Update the program (configuration or code)

KEY INFORMATION:

Configuration changes require an 1)online save followed by 2)Make and 3)Download.

Code changes require Make and Download

In the Download dialog, check Bootproject to retain changes after power cycle

In the Download dialog, check Include Sources to apply changes to zipfile.zwt in project archive

2.10 Replace Battery

KEY INFORMATION:

There is one battery in the controller, and also a battery in the cable of an absolute encoder motor

Replace absolute encoder battery while power is on - no further action required

Replace absolute encoder battery while power is off - See procedure 2.7 "replace servomotor"

Replace controller battery with power ON or OFF.

Do not leave controller power off without battery for more than 1 hour, to avoid corruption of SRAM data.

2.11 Apply Password Protection to program.

MotionWorks IEC- Express: There is no password protection at this time.

MotionWorks IEC- Pro:

File - Password, enter and activate password

R-Click on an item in project tree,

ANALYSIS & TROUBLESHOOTING PROCEDURES

MP2000iec Series Controllers

"How Do I..."

3.0 Monitor Program

Use "Debug Mode" button
Be sure the program is running

3.1 Watch Variables in a List (Monitor window)

View menu - Monitor
Right-click on a variable in program or variable list, add to Watch

3.2 Use Logic Analyzer (AKA: graph, trace, scope)

View menu - Logic Analyzer
Right-click on a variable in program or variable list, add to Logic Analyzer

3.3 Diagnose Alarm Status

View the Configuration Tool or the Web Page

Tools Required:

PC with ethernet port
MotionWorks IEC installed
Ethernet crossover cable
-or-
2 ethernet cables and ethernet hub/switch

MODBUS

Overview

Data is sent over ethernet using two possible protocols; ModBus/TCP and Ethernet/IP. Modbus uses "Function Codes" and EIP uses "Instances" as channels of communication between the controller and another device. All configuration is accomplished using MotionWorks IEC Configuration Tool.

| Step | Description | Detail |
|------|--|---|
| 1 | Add slave device to controller (master) | Go Online. Under Modbus TCP, "Add Slave Device". Enter Name, IP Address of device. Name the global status variable that will display the connection status of the device. Set update interval at or higher than the task scan time. |
| 2 | Add input and output data blocks to the device | Click on the device under ModBus TCP. Click "Add Data Block" Enter the I/O Group name that will appear as a header in the global variable list for that data block. Choose the desired function code. FC#4 is Read Input Registers. FC#16 is Write Multiple Registers Starting address already includes any modbus offset, so use address 1 for the first modbus data in the device. # of Items is number of modbus words (16 bit word). |
| 3 | Enable Slave Device | Some slave devices are enabled when powered on. When another MP2300Siec is used as a modbus slave, it must be enabled by checking "enable controller as a modbus slave" |
| 4 | Activate changes to controller* | (A) Save, (B) Make, (C) Download, (D) Cycle Power. Be sure controller is in RUN mode. If the slave device is another MP2300Siec, do the same to activate changes on the slave controller. |
| 5 | Verify communication to device | Monitor the staus variable that was named in Step 1. Expect value of 16#1000 or 16#1400 indicating connected status. |
| 6 | Create variables in controller (master) | In global variable list, note the address range for each data block as given in the gray Group heading. (%IB for inputs, and %QB for outputs) Create variables with addresses in the range listed. R-click "create variable set" to create several variables quickly. |
| 7 | Create variables in controller (slave) | If the slave device is another MP2300Siec, also go to its global variable list. Note the address range for each data block given in the gray Group heading. (%IB for inputs, and %QB for outputs) Create variables with addresses in the range listed. R-click "create variable set" to create several variables quickly. |
| 8 | Activate changes to controller | Make and run the program with the new variabls. Monitor the communication of variables and test operation of slave device. If the data type is chosen as "word" or "byte", individual bits can be selected in the variable declaration window. For example "Var.X0" for bit zero of Variable "Var". |

Common Mistakes

1. The controller is not in RUN mode (see resource tab)
2. Variables have the wrong address, or wrong type (I or Q)
3. I/O Driver Error - Repeat step 4 (Save, Make, Download, Cycle Power)

*It is important to Save, Make, Download, Cycle Power in this order. **Save** creates controller configuration files, * and also creates I/O drivers in for the program. **Make** is required before cycling power, or else the controller will run the old bootproject, which does not have the drivers to run the new hardware configuration (I/O driver Error).*

User Libraries

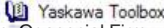

Overview

User Libraries are just normal project files imported into another project file as a library.
 "Application Code Toolboxes" from Yaskawa are simply User Libraries created at Yaskawa

Create a Library

| Step | Description | Detail |
|------|---|--|
| 1 | Rename the project and save in the Libraries folder (Optional, Best Practice) | File -> Save As.File -> Save Project As / Zip Project As... Navigate to Libraries folder Edit the file name to reflect the intended usage as a user library and revision control. For example, "TrainingLibrary_V001" |
| 2 | Delete unnecessary POUs and datatypes (Optional, Best Practice) | In project tree leave one LD program POU with an instance of each user FU/FB. Leave one ST program POU with data initialization. Leave 1-2 tasks to run both programs (for compile). I/O assigned to unused tasks must be reassigned. |
| 3 | Prefix all POUs and Datatypes (Optional, Best Practice) | Example Prefix: "YTTS_". Typical to leave LD programs YTTS_Palette and YTTS_Init running in YTTS_Tsk, using YTTS_CustomDatatypes. |
| 4 | MAKE the library project | Click "MAKE" and resolve all errors. A project that has only been renamed requires a new "MAKE" |
| 5 | Save the library project as ZIP (Optional, Best Practice) | File -> Save Project As / Zip Project As... Navigate to the Libraries folder (for organization purposes) Choose ZIP as the file type Best Practice: Do NOT change the name when zipping. Change the name in Step1 and re-MAKE first. Under "Zip Options" check boxes for "User Libraries" and "Front-end Code". Click the Zip button. <i>Single portable library file with revision name is produced</i> |

Use a Library

| Step | Description | Detail |
|------|--|---|
| 1 | Acquire a ZWE (Express) or ZWT (Pro) file | Use your own, or download from Yaskawa.com Product Page Follow links to save the file In Windows Explorer, copy the file to C:\Documents and Settings\All Users\Documents\MotionWorks IEC xxx\Libraries (For organization purposes) |
| 2 | Unzip the library project to the library directory | In MotionWorks IEC... File-> Open Project / Unzip Project Click "Yes" to unzip to the Library directory (File was copied here in previous step) or click "No" if opening directly from CD or Download folder "Skip All" to Extracting Firmware Libraries dialog "Yes to All" to Overwrite Page Layout |
| 3 | Check for Dependent Libraries | Project Tree -> Project Tab, Expand Libraries folder  Take note of any User Libraries, indicated by the "blue book" icon. Or special Firmware libraries such as "Ymotion", indicated by the "red book" icon  |
| 4 | Start new / open existing project | File -> New, or File -> Open |
| 5 | Insert the Library and any dependent libraries | In Project Tree, "Project" tab, R-Click "Libraries" -> Insert -> User Libraries Navigate to find the Library (if you unzipped it to the "libraries" folder, you will see it right away) Also insert any dependent libraries noted in Step 3 |
| 6 | Delete duplicate project data types | In Project Tree, "Project" tab, expand "Data Types" folder for both the user library and the project library. Delete any duplicates of "PLCTaskInfoTypes" or "MotionBlockTypes" from the project library. R-click -> delete (or open, delete text) <i>These data types are already defined within the imported library. Repeating the definition here causes compile errors since the same data types would be defined two times, even though the definitions are identical.</i> |
| 7 | Use FB from new group in edit wizard | Click on programming worksheet whitespace. Open Edit Wizard and the group dropdown list will have the library name. User Library blocks appear as Blue by default Help for Yaskawa "Application Code Toolbox" user libraries is available on the website, but is not integrated with the Right-Click menu as it is for the pink colored Firmware Library function blocks. |

* If you wish to use a Yaskawa "Application Code Toolbox" user library in a project along with your own custom library project, you must insert the Yaskawa library directly in your custom library project. You may NOT insert both libraries individually into a new project. A project with two libraries that both have the same datatype definitions will not compile, and so both libraries must be combined into a single library.

Specifically, your library project will have the MotionBlockTypes and PLCTaskInfoTypes defined, which are also defined in a Yaskawa library, such as PLCopenPlus Toolbox or Cam Toolbox. Insert one library into another and delete the duplicate datatypes for a successful MAKE.

OPC Server

Overview

The OPC Server is a Yaskawa software package that communicates variables between the controller and the Windows environment according to the OPC standard. This allows a "client" software package to have easy access to the controller data.







| Step | Description | Detail |
|------|--|---|
| 1 | Install the OPC Server software | Obtain software PDE-U-OPCPA and install. A serial number is required. With no serial number it functions as a 30-day demo. |
| 2 | Confirm ethernet communication between | Connect simultaneously to each controller via the web interface. Note the IP address of each controller. |
| 3 | Disable firewall | Open windows network connections and set to off |
| 4 | Configure OPC Server | Run OPC Configurator: R-click OpcProject, select resource type = MP2000, click settings, set IP address of controller, rename "new resource" as desired by clicking 2x slowly. Repeat above for additional controllers. |
| 5 | Run Server | Start-Program Files - Yaskawa - MWIEC OPC Server - OPC Server 2.1 |
| 6 | Monitor Server | R-click green OPC icon in system tray, select "Info - Statistics". This tells you connection status of "resources" (controllers) and "clients" (windows software). Repeat above to refresh |

Logic Analyzer

Overview

Logic analyzer graphs any controller variable at a cyclic task rate



| Step | Description | Detail |
|------|---|--|
| 1 | Add Variables   | Toggle Debug Mode = ON. Right-click a variable and select "Add to Logic Analyzer". The variable may be selected from the code, watch page, or variable list. |
| 2 | Adjust Window size  | menu "View" - Logic Analyzer. By default the window is docked and very small. Right-click on the window title bar and uncheck "allow docking". Resize the window by click & drag on corners. |
| 3 | Open Trigger Configuration  | Right-click the tab in the logic analyzer window "Configuration:Resource" and select Trigger Configuration. |
| 4 | Sampling | Time [in ms] between cycles is the task "interval", or scan time. (To view the task interval, toggle Debug Mode = OFF, Right-click a task, and choose Settings). "Pre-recording cycles" buffers a number of samples before the trigger condition is true. Post-recording cycles is the number of samples after the trigger is true. |
| 5 | Trigger conditions | The controller will start to capture the value of the added variables when the Pre-recording cycles buffer is full and the Trigger conditions are met. Select one of the variables from the dropdown list, an Operator, and a variable. A literal such as LREAL#0.0 or TRUE may also be entered directly. |
| 6 | Data collection | In MWIEC-Pro, the data can be collected synchronous with any of the cyclic tasks. The interval of the selected task x the total Pre/Post recording cycles gives the total time of the logic analyzer. |
| 7 | Capture Data  | Right-click the tab in the logic analyzer window "Configuration:Resource" and select Start Recording. Pro also has a handy button with the red "record" dot on it. |
| 8 | Zoom  | Click and drag on the horizontal axis or vertical axis. Left click & drag zooms one half, Right click & drag zooms the other half. |
| 9 | Cursors | Move the mouse pointer near the horizontal or vertical axis. The mouse pointer icon changes. Click and drag a single cursor onto the display area. |