



MT6070IE Serial HMI

## 1. Introduction

The MT6070IE is a serial based 7" touch screen with a 800x480 resolution TFT display that is designed into a NEMA4/IP65 rated bezel. It can connect to any of the 'Super' PLCs supplied by Triangle Research International (TRi) via RS232 or RS485 and communicates via the native Hostlink protocol as well as Modbus RTU if interfacing to 3rd party controllers.

This guide offers a walkthrough on how to get the MT6070IE HMI connected to a PC in order to transfer a HMI demo program to the unit, and also connect the HMI to a PLC in order to run the program and demonstrate some basic control of a PLC from the HMI.

If at any time more information is required on HMI safety and protection ratings, HMI Power, and HMI communication, please refer to the MT6070IE Installation Manual, Data Sheet, or the EBPro User Manual provided at the following links:

[http://www.triplc.com/documents/MT6070iE\\_Installation\\_Manual.pdf](http://www.triplc.com/documents/MT6070iE_Installation_Manual.pdf)

<http://www.triplc.com/documents/MT6070IE-Install-Instructions.pdf>

[http://www.triplc.com/documents/EasyBuilder\\_Pro\\_UserManual.pdf](http://www.triplc.com/documents/EasyBuilder_Pro_UserManual.pdf)

The following is only the minimum basic information required to get the MT6070IE set up with TRI PLCs in most situations.


### Getting Connected at a Glance:

1. Connect the HMI to a PC by plugging the mini-USB end of the USB cable into the MT6070iE and the standard USB end of the cable into one of your PCs USB ports.
2. Connect the HMI to the PLC by
  - a. Plugging the female end of a standard RS232 serial cable into the male DB9 connector on the MT6070iE (COM1).
  - b. Plugging the female end of a standard RS232 serial cable into the male DB9 connector on the PLC (COM1).
3. Install the Easy Builder Pro software from the included CD.
4. Connect 24V DC power to both the PLC and HMI.
5. Install the MT6070iE drivers. If not done automatically upon connection to your PC, [view the manual driver installation instructions](#).
6. Open the “MT6070iE\_TRI\_PLC.emtp” file (downloaded with this guide) from EBPro using **File -> Open** and select the file from the folder it was extracted to.
7. Compile the demo program by selecting **Tools -> Compile**
8. Transfer the demo program to the HMI using **Tools -> Download**
9. Use TRiLOGI to open the MT6070iE.PC6, which is also included in the “MT6070iE Demos and Guides.zip” file, and transfer it to the PLC

For more detailed instructions, proceed to the subsequent sections of this guide.

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## 2. Connect the HMI to a PC

Your MT6070iE comes with a USB Mini cable (standard PC USB to Mini-B ) to connect the HMI to your PC. It should be connected per the below diagram:

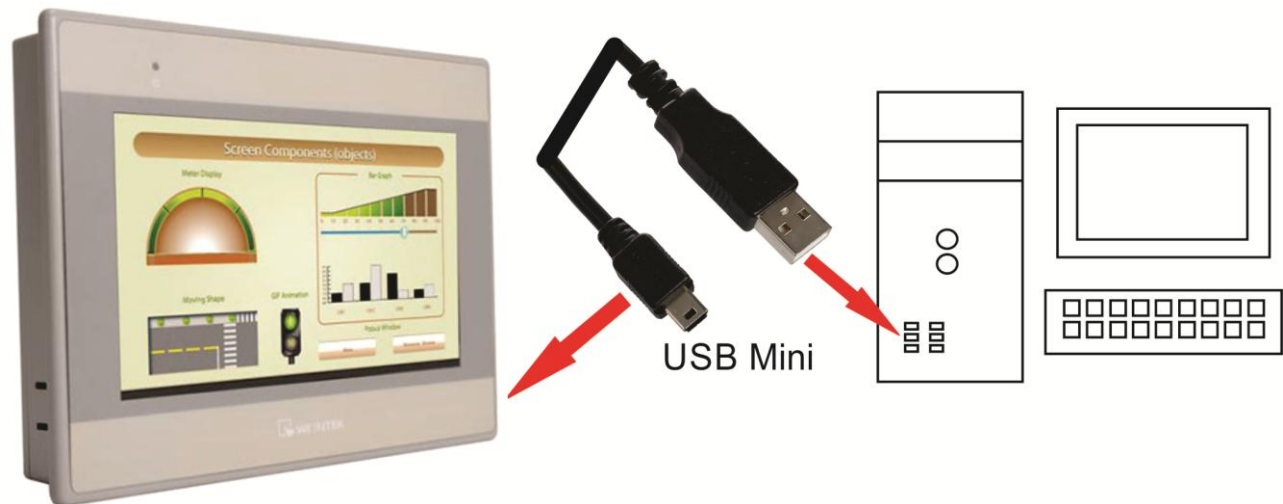


Figure 1: USB connection between MT6070iE and PC

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## 3. Connect MT6070iE to PLC

### A. RS232 Connection

Your MT6070iE comes with a standard DB9 serial cable for RS232 connection to your TRi PLC (If the HMI is purchased as a bundle with the PLC, otherwise the DB9 cable can be purchased separately).

Connect the female end of the standard 9-pin RS232 serial cable to the male DB9 connector on the MT6070iE.

Connect the male end of the DB9 cable to the female connector on the PLC.

## RS232 Connection Between MT6070iE and TRi Super PLC (excluding Nano-10)

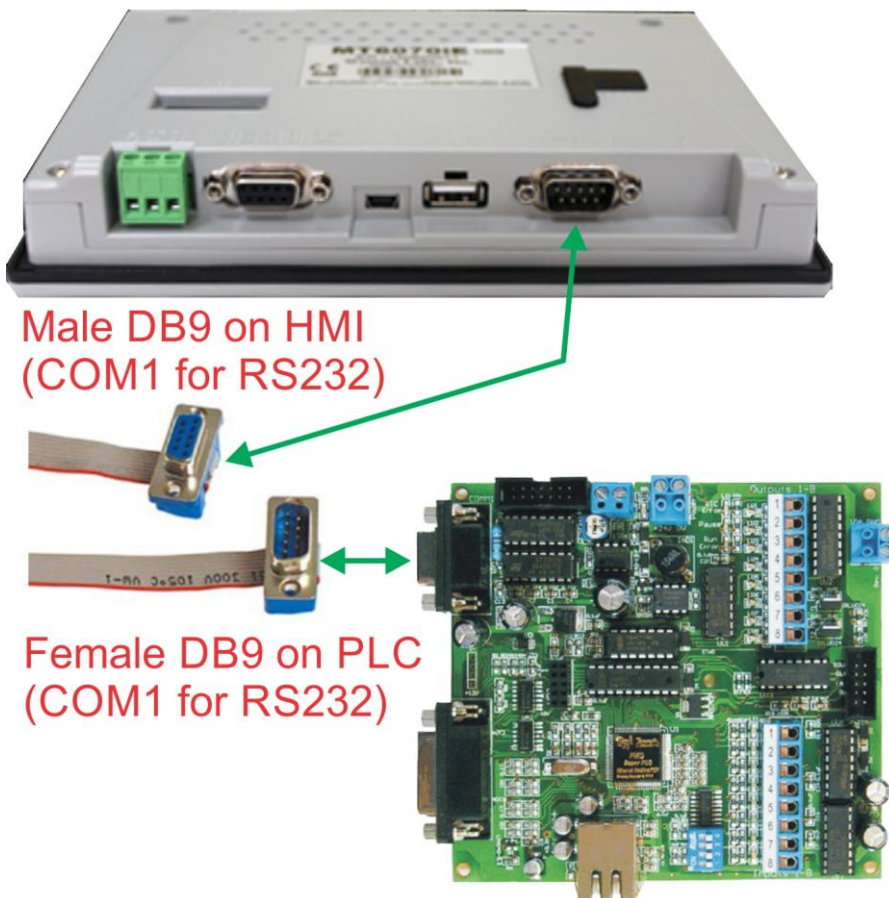


Figure 2: RS232 connection between MT6070iE and TRi PLC

### B. RS485 Connection

An RS485 connection cable is not provided, but it is possible to make a 2-wire RS485 connection between the PLC and HMI by modifying the standard DB9 cable, or by building a custom cable.

Connect the male end of the standard 9-pin RS232 serial cable to the female DB9 connector on the MT6070iE.

The Nano-10 does not have an RS232 port, so the DB9 cable supplied with the MT6070iE must be modified or a custom cable must be built in order to interface the Nano-10 (or any TRi PLC RS485 port) to the HMI. Refer to Figure 3 below when creating/modifying the cable.

## RS485 Connection Between MT6070iE and TRi Super PLCs (Required for Nano-10)

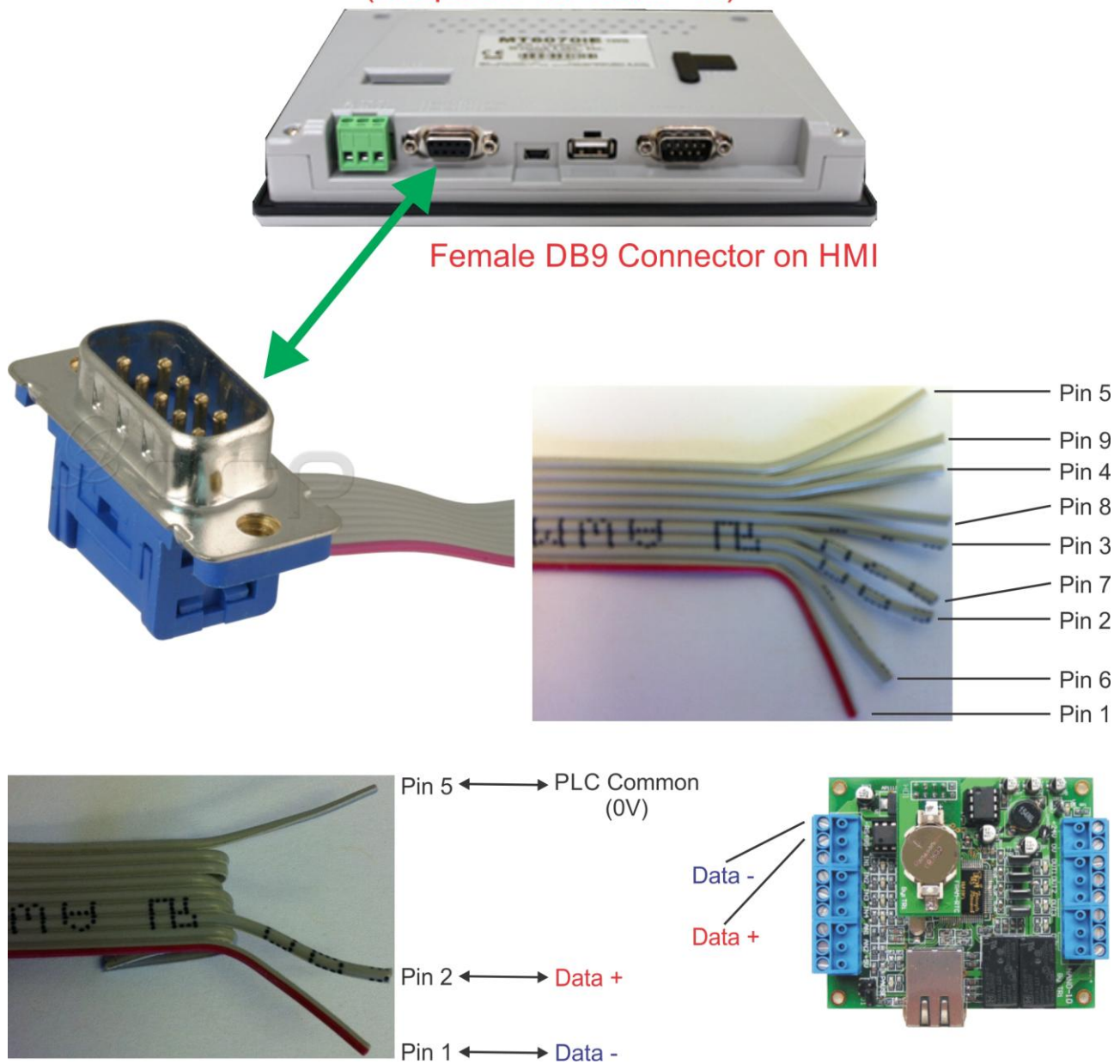


Figure 3: RS485 connection between MT6070iE and TRi PLC

1. Follow the pinout for the Female HMI connector table below to connect two wires (data + and data -) between the PLC and HMI.
2. The male end of the DB9 cable connects to the HMI and the female end is to be removed (cut the ribbon cable at the base of the connector) so that the ribbon cable can be stripped and the two signal wires can be connected to the RS485 terminal on the PLC.
3. We recommend terminating wires with ferrules for better connection to the RS485 screw terminal.
4. Alternatively, you can create a custom cable that is DB9 male terminated on one end and twisted pair (two wires) with terminal plugs on the other end.

Here are tables showing the RS232 and RS485 pin connections between the MT6070iE and all TRI PLCs (excluding the H-series and E-series PLCs) in case a custom cable is being built:

HMI to PLC Connection RS232				
Pin #	Symbol	HMI COM 1 Male Connector [RS232]	Pin #	PLC Female DB9 Connector [RS232]
2	RxD	Received Data	3	Received Data
3	TxD	Transmitted Data	2	Transmitted Data
5	GND	Signal Ground	5	Signal Ground

*Note: If you are using the Nano-10, there is no RS232 port and the RS485 port is actually considered COM1 in the PLC. See step 4 in Getting Connected for connection instructions.*

HMI to PLC Connection RS485				
Pin #	Symbol	HMI COM 1 Female Connector [RS485]	Pin	PLC 2-Wire Screw Terminal [RS485]
1	Rx-	Data-	-	Data-
2	Rx+	Data+	+	Data+
5	GND	Signal Ground	0V	Signal Ground

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## 4. Install EBPro for TRi PLCs HMI Software

You will have received a small CD labelled: Easy Builder Pro Resource CD.

You should install the EBPro software from the CD on your PC, which will include the necessary drivers for compatible TRI PLCs. If the software does not install right away, you can execute the "EBPro\_Vx.xx.xxmsi" file that is located in the main folder of the CD. Then follow the steps to install the software.

**IMPORTANT: WAIT FOR THE INSTALLATION TO FULLY COMPLETE BEFORE STARTING THE EBPRO APPLICATION FOR THE FIRST TIME. IF THE INSTALLATION DOES NOT COMPLETE, THE TRIANGLE RESEARCH DRIVER(S) MAY NOT BE**



**VISIBLE IN COMMUNICATION DRIVER LIST. IF THIS HAPPENS, PLEASE UNINSTALL, THEN REINSTALL AND WAIT FOR THE COMPLETION MESSAGE.**

Once the software has installed you can start EBPro from the start menu or desktop icon on your PC. You should then see something similar to the following picture:

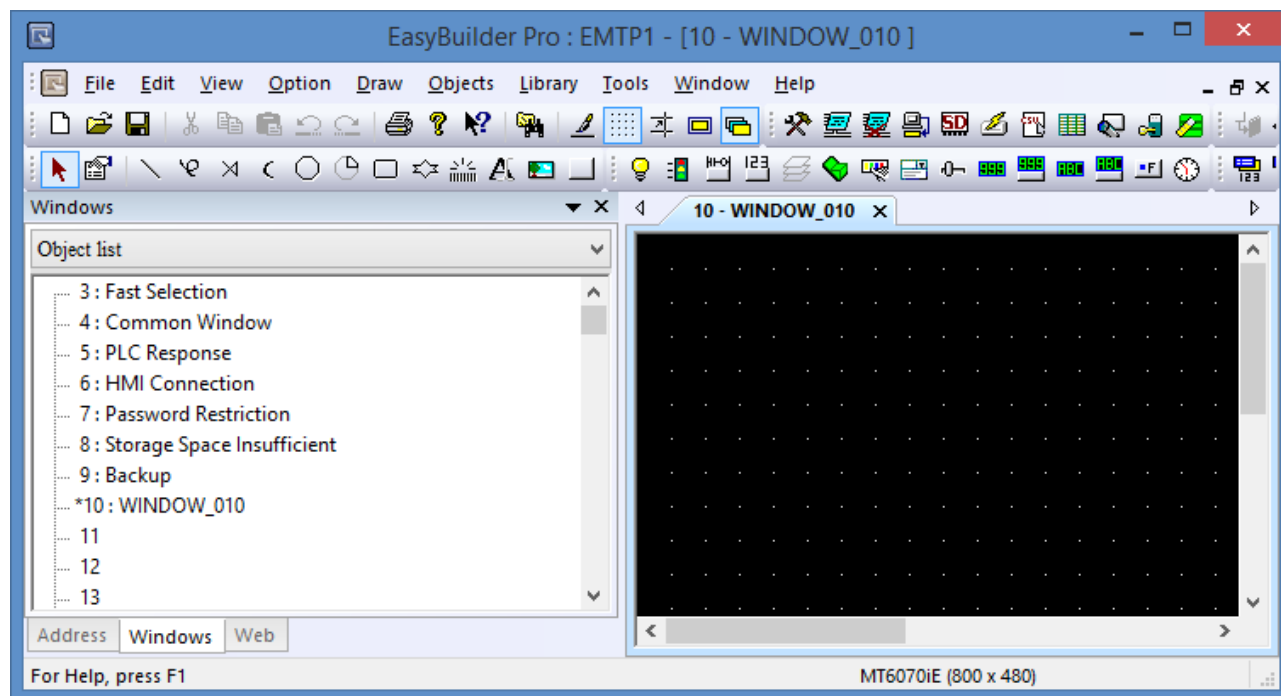


Figure 4: EBPro Startup Screen

## 5. Connect Power to HMI and PLC

The MT6070iE has 3 connections for power: +, -, and  $\frac{1}{2}$ . A 24VDC power supply should be used, which can be the same supply used for the PLC.

Power should be connected to the MT6070iE as follows :

1. Connect the +24VDC terminal from the power supply to the + terminal on the HMI.
2. Connect the 0VDC (-) terminal from the power supply to the - terminal on the HMI.
3. The  $\frac{1}{2}$  can generally be left unused, but the MT6070iE installation manual should be referenced if you are unsure.

Power should be connected to the PLC as follows :

1. Connect the +24VDC terminal from the power supply to the +24V terminal on the PLC.
2. Connect the 0VDC (-) terminal from the power supply to the 0V terminal on the PLC.
3. Reference the PLC documentation for more information on this.

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## 6. Install the MT6070iE Device Drivers on the PC

The drivers may install automatically upon connection to your PC, but if not, then you can [install the device drivers manually here](#).

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## 7. Load and Transfer HMI Sample Program

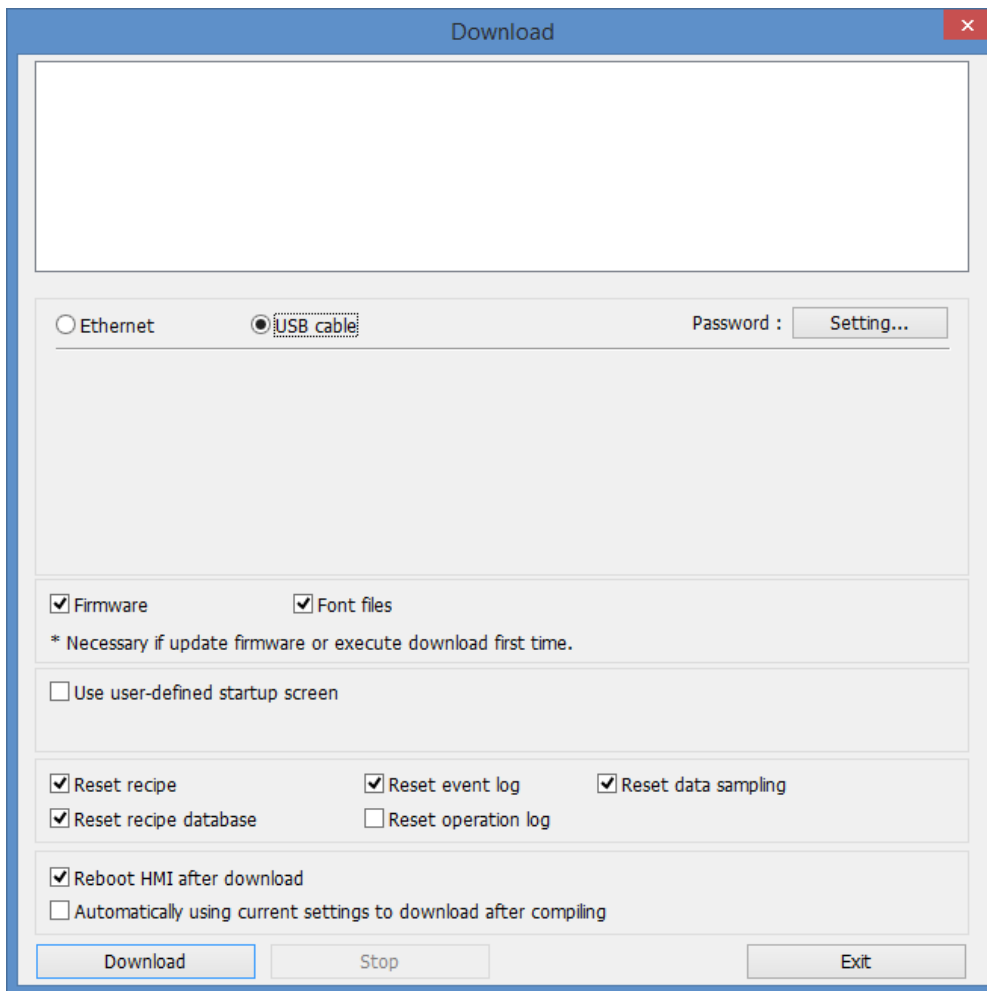
The sample program included with this quick start guide is called "MT6070iE\_TRI\_PLC.emtp". You can open this file from Easy Builder 8000 using File – Open and selecting the location that MT6070iE\_TRI\_PLC.emtp is saved to.

This sample program is already pre-configured for communication with a TRI PLC via RS485, since all of the compatible TRI PLCs have one or more RS485 ports.

Once you have opened the sample program, you can transfer it to the HMI as follows :

1. Go to the "Tools" menu and select "Compile".
2. A new window should appear, click on Compile.
3. You should see "Succeeded" highlighted if it worked. You can close the window.
4. Go to the "Tools" menu and select "Download". A new window should appear.
5. Make sure that "USB Cable", "Firmware", and "Reboot HMI after Download" are all selected as shown in Figure 5.
6. Click download and wait for the message that the download has finished.





**NOTE:**  
The “Firmware” box typically only needs to be checked the first time a program is being transferred to the HMI or if any COM settings have changed or if there is a firmware update being installed to the HMI.

Figure 5: Download Window

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## 8. Load and Transfer PLC Sample Program

A Trilogi PLC sample program, called MT6070iE.PC6, is also included in the “MT6070iE Demos and Guides.zip” file. This should be opened with Trilogi and transferred as normally done with Trilogi (and TLServer for serial connections). You can find more information on communicating with a PLC using Trilogi from the TL6 Programmers Reference Manual, and a quick start communication guide is available in appendix 1.

[TL6 Programmers Reference Manual.](#)

The MT6070iE.PC6 sample program is only required for the LCD and PWM functions included in the “MT6070iE\_TRI\_PLC.emtp” sample program. It could be modified to do more such as update the LCD periodically instead of only once.

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## 9. Using the MT6070iE Sample Program

Now that the MT6070iE\_TRI\_PLC.emtp sample program has been loaded in the HMI, you should see the Home screen for this program :

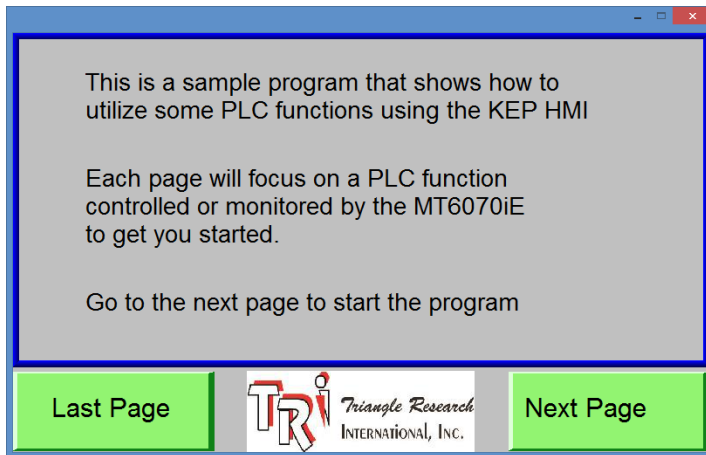


Figure 6: Home Screen

You can traverse through the different screens in the sample program by clicking on “Next Page” to go forward one page or “Last Page” to go backward one page. You can also access Help for each page by clicking on the “?” button, which will open up a new screen with some information and tips. There are 4 screens total as shown in Figures 7-10 below.

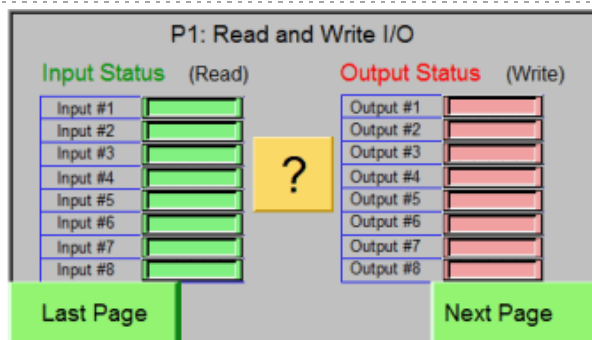


Figure 7: I/O Screen

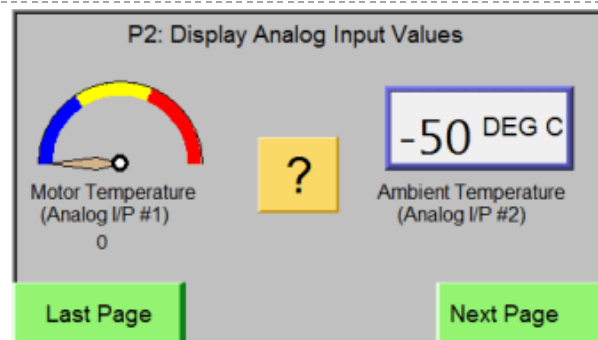


Figure 8: Analog Screen

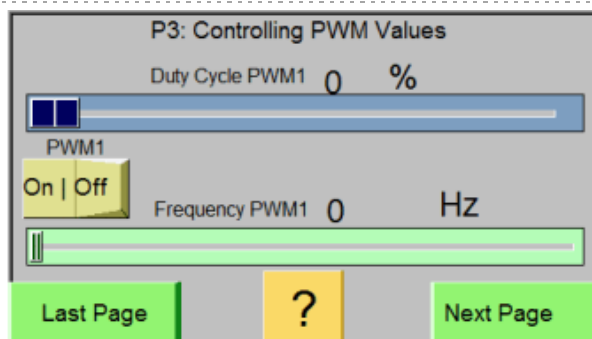


Figure 9: PWM Screen

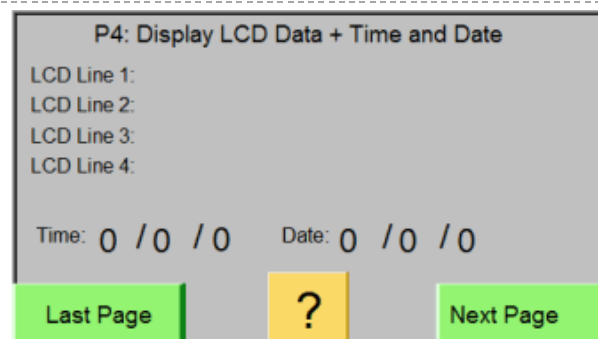


Figure 10: LCD Screen

## 10. Start a New Program and Configure for a TRI PLC

When you start a new program you will be asked to select your HMI model and screen orientation. You should select the MT6070iE (800 x 480) model and Landscape as per the following screenshot :

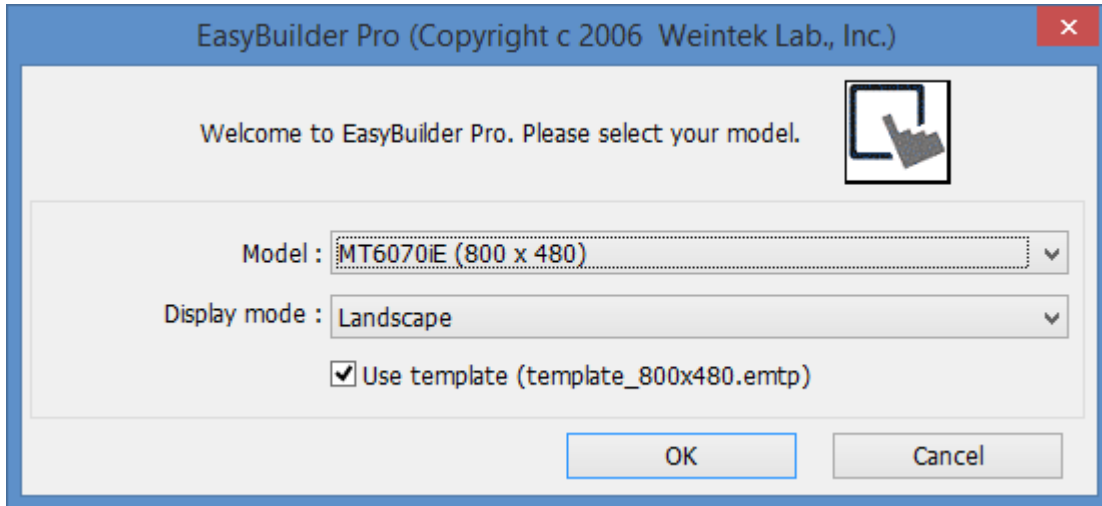


Figure 11: Select Model

Once you select OK, you will see a screen like Figure 12 below that allows you to configure the MMI settings for your current project. As shown below, the MT6070iE should be in the device list.

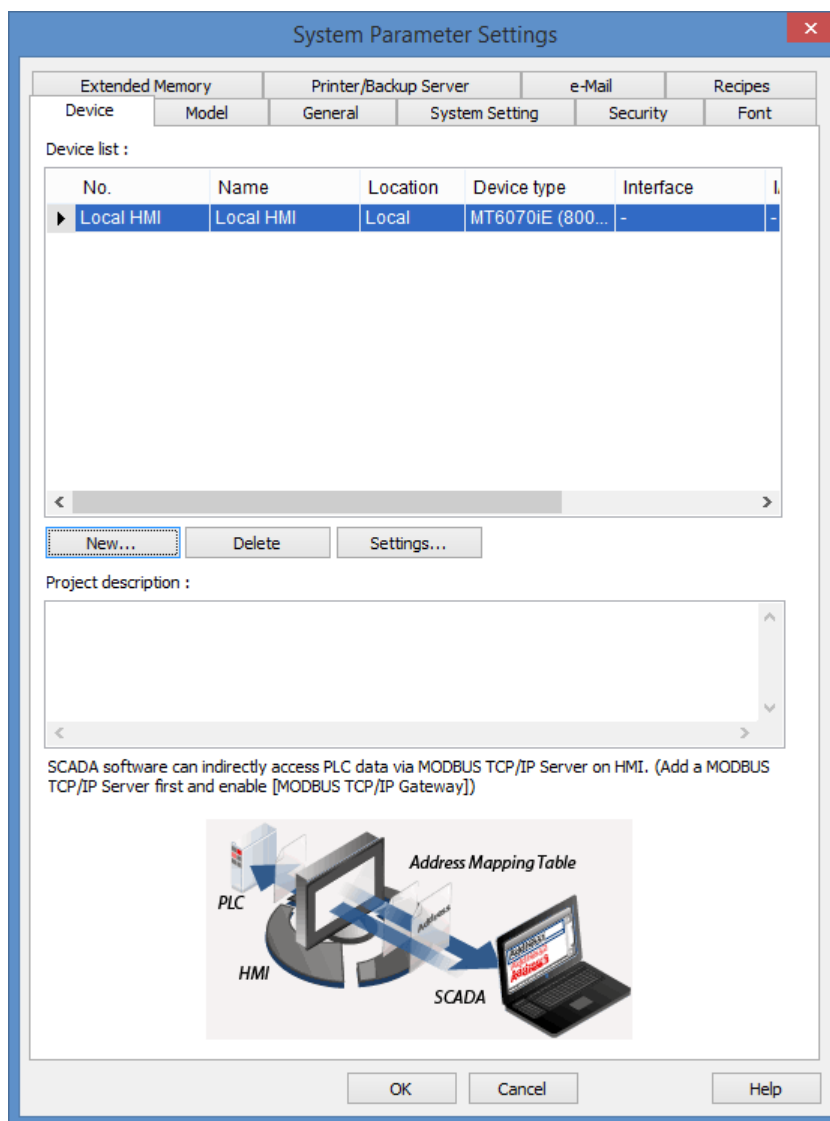


Figure 12: Configure HMI

Next you will need to add a PLC to the device list by selecting “New”, which will open up a new window called “Device Properties” as shown in Figure 13. The following settings should be selected, as shown in Figure 12:

1. **Name:** Anything (TRI\_PLC was assigned automatically after selecting PLC type)
2. **PLC** should be selected, not HMI
3. **Location:** Local – because it is a serial connection
4. **PLC type:** TRI\_FX – this is the communication driver for TRI PLCs. Select this from the drop down menu if another driver is shown.
5. **PLC I/F:** RS-232 or RS-485 depending on how you want to connect to the PLC.
6. **PLC default station no.:** 1 – this is the default PLC ID
7. **COM:** COM1 (38400, N, 8, 1) – these are the default com settings in the PLC
8. **Everything else** can be left as the default.

Device Properties

Name : TRI PLC

☐ HMI ☒ PLC

Location : Local Settings ...

PLC type : Triangle Research Inc. TRI\_FX  
V.1.00, TRI\_FX.e30

PLC I/F : RS-232

COM : COM1 (38400,N,8,1) Settings...

PLC default station no. : 1

☐ Default station no. use station no. variable

☐ Use broadcast command

[How to designate the station no. in object's address ?...](#)

Interval of block pack (words) : 0

Max. read-command size (words) : 32

Max. write-command size (words) : 32

OK Cancel

Figure 13: Add/Configure PLC

*Note1: If the Triangle Research Inc. TRI\_FX driver does not appear in the list, then the EBPRO software did not complete its installation. Please save and close your file, uninstall, and reinstall the EBPRO software. Wait until the completion message appears before starting the EBPRO software so that the installation is properly completed.*

*Note2: Other settings such as Response Time Out and Retry Count can be modified to handle com connection issues differently.*

Once you click OK, you should see the PLC in the device list below the MT6070iE. There are other tabs you can select to modify additional parameters in the HMI for this project,

but nothing that is required. The “General” and “System Setting” tabs contain settings that are most likely to be useful.

Then you can click OK on the Device Properties window and you should see a starting screen similar to Figure 14.

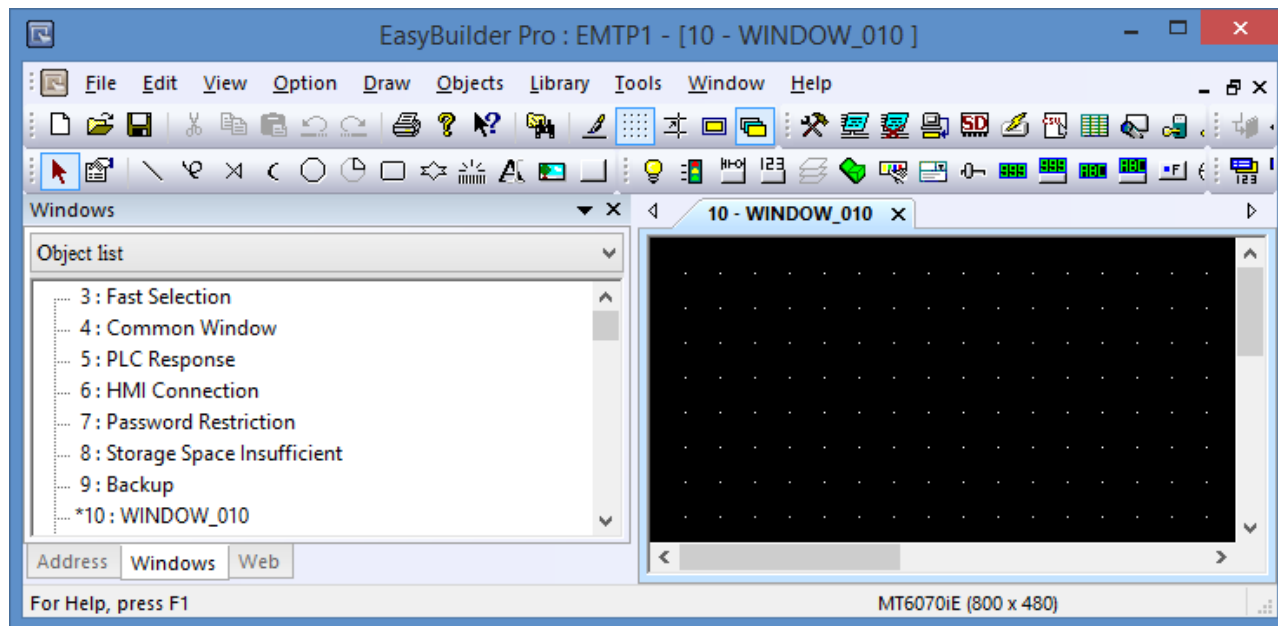


Figure 14: New Program Window

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Now you can add windows and fill them with data input and display objects as well as general text and pictures.

You can find more information on configuring the program for an MT6070iE with a TRI PLC as well as information on PLC data mapping between the PLC and HMI in the MT6070iE\_Mapping pdf document included in the “MT6070iE Demos and Guides.zip” package. The Help menu in EB8000 also has a lot of information on the available components that will help to design your touch screen program.