

Figure 1: EasyBuilder Pro New Project Screen

1. Introduction

The PLC I/O, registers, and data are all mapped to the HMI via the TRI_FX protocol and the tag names are preconfigured based on the TRi PLC variable names, which means there is no need to define tags.

When an object is placed on the screen, the user selects the PLC Name (TRI_FX) and Device Type, which is the preconfigured data tag. Depending on whether the object is for bit or word control/monitoring, the applicable Device Types will be available.

Read the EBPro help topic **Read Address** for further information on device types and addressing formats.

This data mapping document will show the following:

1. A reference table with the available I/O points, registers, and memory data associated with TRi PLCs.
2. How to add a data word object specifically for the TRi PLC. This is a data value that could be a DM[] variable in the PLC or an A\$ string variable.
3. How to add a coil/bit object specifically for the TRi PLC. This is a bit or coil that could be a physical input/output or a bit of a DM[] variable in the PLC.

NEW: Floating point is now supported on the TRI_FX protocol that is included with EBPro version 5 and later. Floating point variables can only be used with PLCs that support it, such as Fx PLCs.

2. EasyBuilder Pro Reference Table for TRi PLC Data & I/O

The below table shows all the available Data Words and I/O Bits for the TRI_FX protocol in EasyBuilder Pro.

Type : Describes the data type such that a Bit is a contact or coil, a Word is a 16-bit variable or register, and a DWord is a 32-bit variable or register.

Device Type : Contains the built in tag names available with the TRI_FX protocol that can be selected in a compatible EBPro object to link to PLC data.

Format : Range : The number of Bits for a device type or the index range for Words and DWords.

PLC Register : References the data names used in the TRiLOGI programming software. Bit types would be accessed from the I/O Table in the PLC program. Word and DWord types would be accessed using the associated variable/register name or using built in commands per the Notes column where applicable.

Notes for TRi PLCs : Additional info for each Device Type/PLC Register.

Type	Device Type	Format : Range	PLC Register	Notes for TRi PLCs
Bit	INPUT	bbb : 1~256	INPUT	Inputs as bits. Up to 128 physical on a PLC, remaining are soft bits
Bit	OUTPUT	bbb : 1~256	OUTPUT	Outputs as bits. Up to 128 physical on a PLC, remaining are soft bits
Bit	RELAY	bbb : 1~512	RELAY	Internal relays as bits. 512 available in a PLC
Bit	TMR_BIT	bb : 1~64	TIMER	Timer coil completion status
Bit	CTR_BIT	bb : 1~64	COUNTER	Counter coil completion status
Word	DM	dddd : 1~4000	DM[dddd]	DM[] 16 bit words. 1-4000 corresponds to DM[1] to DM[4000]
Word	TMR_PV	dd : 1~64	TIMERPV[dd]	Timer Present Value (Accumulator)
Word	CTR_PV	dd : 1~64	CTRPV[dd]	Counter Present Value (Accumulator)
Word	TMR_SV	dd : 1~64	-	**Timer Set Value (Preset). SETTIMERSV
Word	CTR_SV	dd : 1~64	-	**Counter Set Value (Preset). SETCTRSV
DWord	INTEGER	dd : 1~26	A, B, C, ..., Z	A-Z 32 bit Integers. 1~26 corresponds to A~Z
Word	STRING	dd : 1~26	A\$, B\$, ..., Z\$	A\$-Z\$ Strings. 1~26 corresponds to A\$~Z\$
DWord	HSCPV	d : 1~3	HSCPV[d]	High Speed Counter Present Values (Accumulator)
Word	ADC	dd : 1~16	-	**Analog Input Values. ADC(dd)
Word	DAC	dd : 1~16	-	**Analog Output Values. SETDAC
Word	TIME	d : 1~3	TIME[d]	Internal RTC Time Values. TIME[1] to TIME[3]
Word	DATE	d : 1~4	DATE[d]	Internal RTC Date Values. DATE[1] to DATE[4]
Word	EE_INT	dddd : 1~11000	-	**EEPROM Data Words. SAVE_EEP , LOAD_EEP
Word	EE_STR	ddd : 1~550	-	**EEPROM String Values. SAVE_EEP\$, LOAD_EEP\$
Word	LCD	d : 1~4	-	**LCD Display Strings. Read only. SETLCD
Word	IN_W	dd : 1~96	INPUT[dd]	INPUT[] registers as 16 bit words
Word	OUTW	dd : 1~96	OUTPUT[dd]	OUTPUT[] registers as 16 bit words
Word	RELW	dd : 1~96	RELAY[dd]	RELAY[] registers as 16 bit words
Float	FP	dddd : 1~1000	FP[dddd]	FP[] 32 bit floating point. 1-1000 corresponds to FP[1] to FP[1000]
Float	FLT_PT	dd : 1~26	A#, B#, ..., Z#	A#-Z# 32 bit floating point. 1-26 corresponds to A#-Z#

Table 1: HMI to TRi PLC Data Mapping

Notes:

1. * The Internal Registers are used to access PLC data via Omron registers. See Table 14.1 from section 14.6.1 of the Nano-10, FMD, or F-Series User Manual for the PLC data that registers 0-519 correspond to.
2. ** This data is accessible via built in commands as specified in the notes column.
3. String variables support the first 32 variables only.

Note: Internal Word LW8998 is used to return communication error codes. Display LW8998 with an ASCII Display object to see these codes:

ASCII	Decimal	Hex	Description
OK	19279	4B4F	No communication errors at this time
ER	21061	5245	Communication command error
EF	17989	4645	PLC Communication Checksum does not match received data
EC	17221	4345	Bad communication end code
RD	17490	4452	HMI waiting for full response from PLC
CK	19267	4B43	HMI Communication Checksum does not match received data

Table 2: HMI Communication Codes

3. Create a Data Word Object

The EBPro software should be open at this point with an existing or new project open and configured with the TRI_PLC protocol (refer to the quick start guide for more details on this).

There are many objects available in EBPro and only a couple will be used as an example. Here is a snapshot of part of the object list that is available from the EBPro help menu:

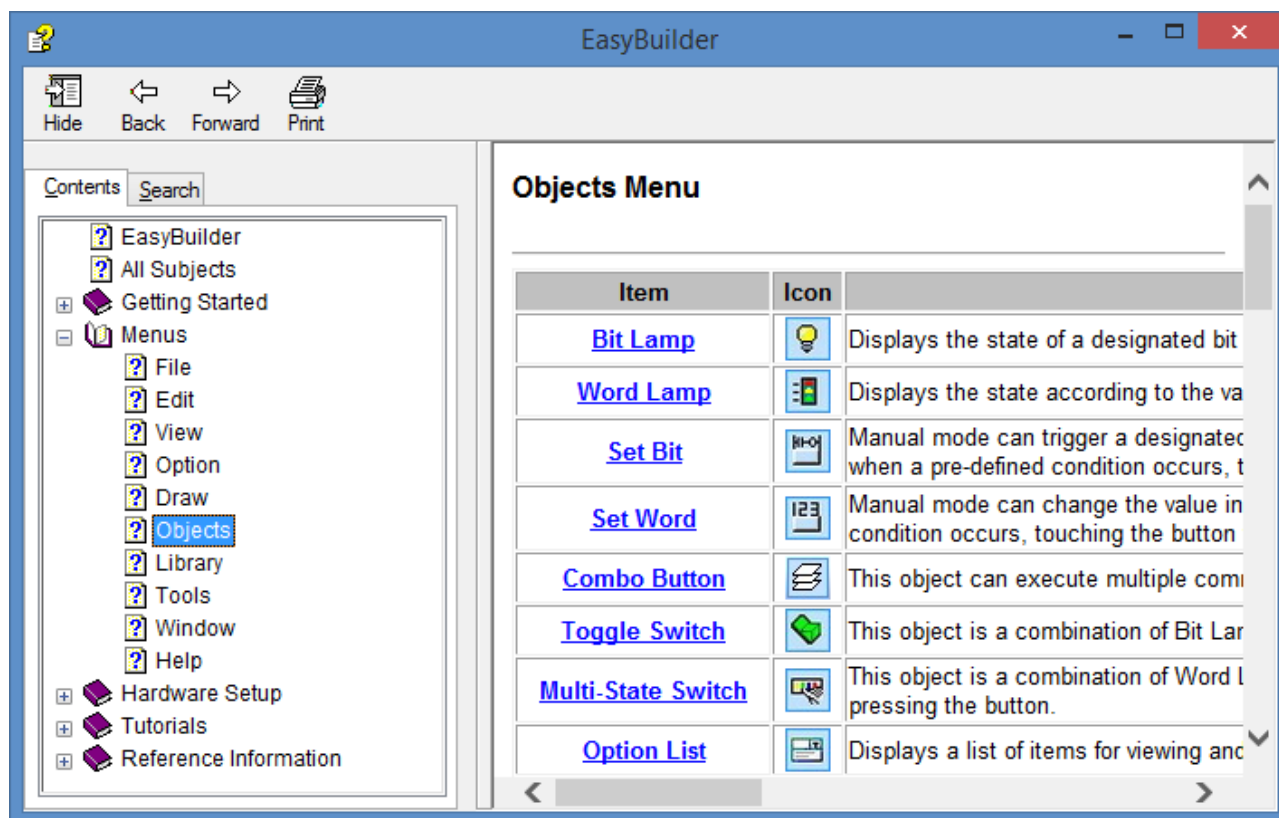


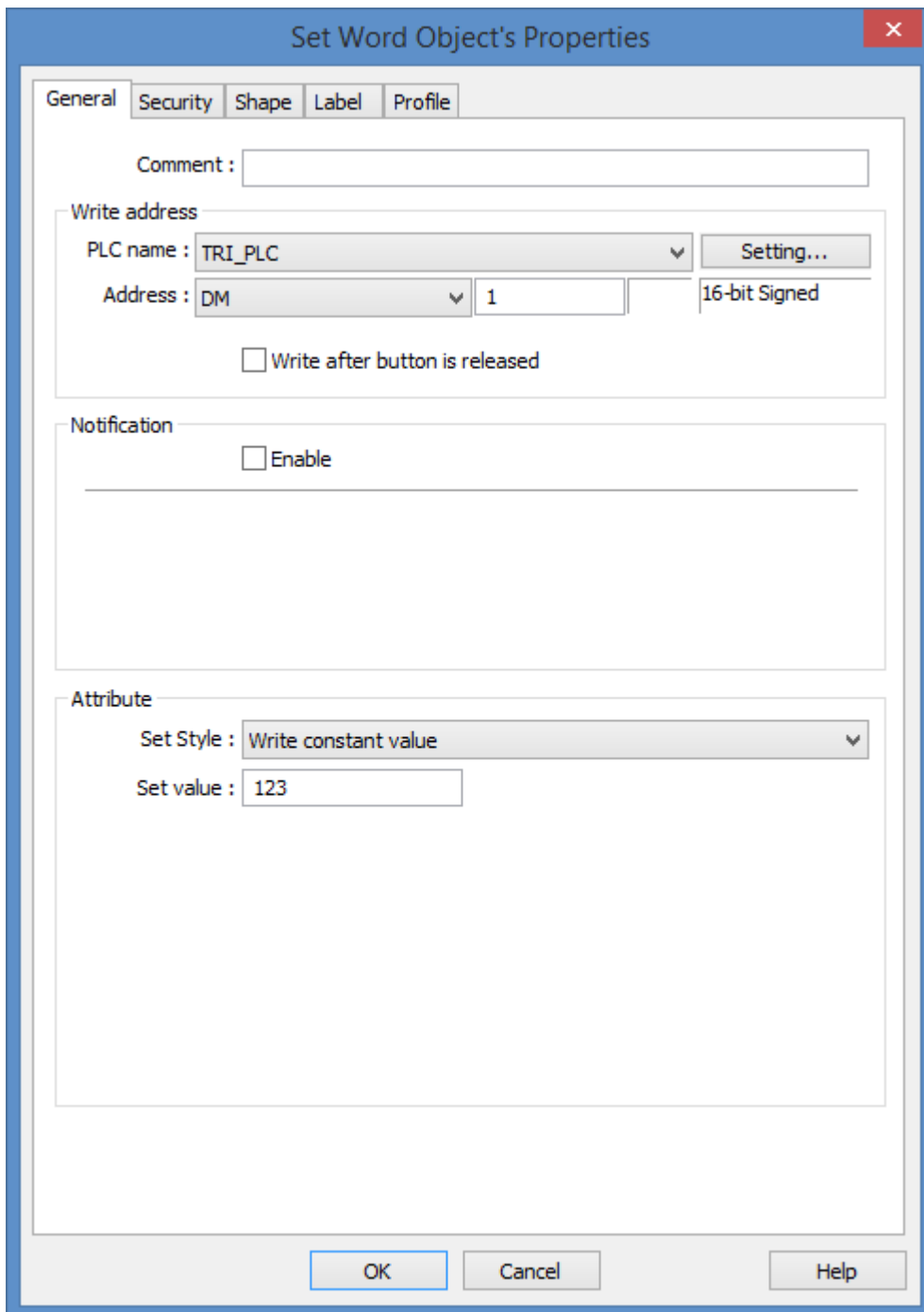
Figure 2: HMI Help - Objects Menu

The Set Word object will be used in this example to show how to map a Set Word button to DM[1].

This object allows you to map an integer to a PLC register, integer variable (such as a DM[]), or string variable (such as A\$-Z\$).

1. Select the "Set Word" symbol from the EBPro toolbar or from the **Objects --> Button** drop down menu. As shown in Figure 3, DM is chosen for this example.
2. Select **TRI_PLC** from the PLC name: drop down menu.
3. The field to the right of the **Address** drop-down selector is the variable index. Choose 1 for the first DM[] index, which is default.

4. Click the Setting... button and choose **16-bit Signed** to match the PLC variable format.
5. Choose "**Write Constant Value**" from the **Set Style** drop down selector in the Attribute section. Different object functions are available, but this is a simple set value function.
6. Enter a number in the **Set value** field (123 used here), which will be transferred to DM[1] in this case.
7. Click OK to accept the Set Word object properties and place the object on the screen by clicking in the window area.



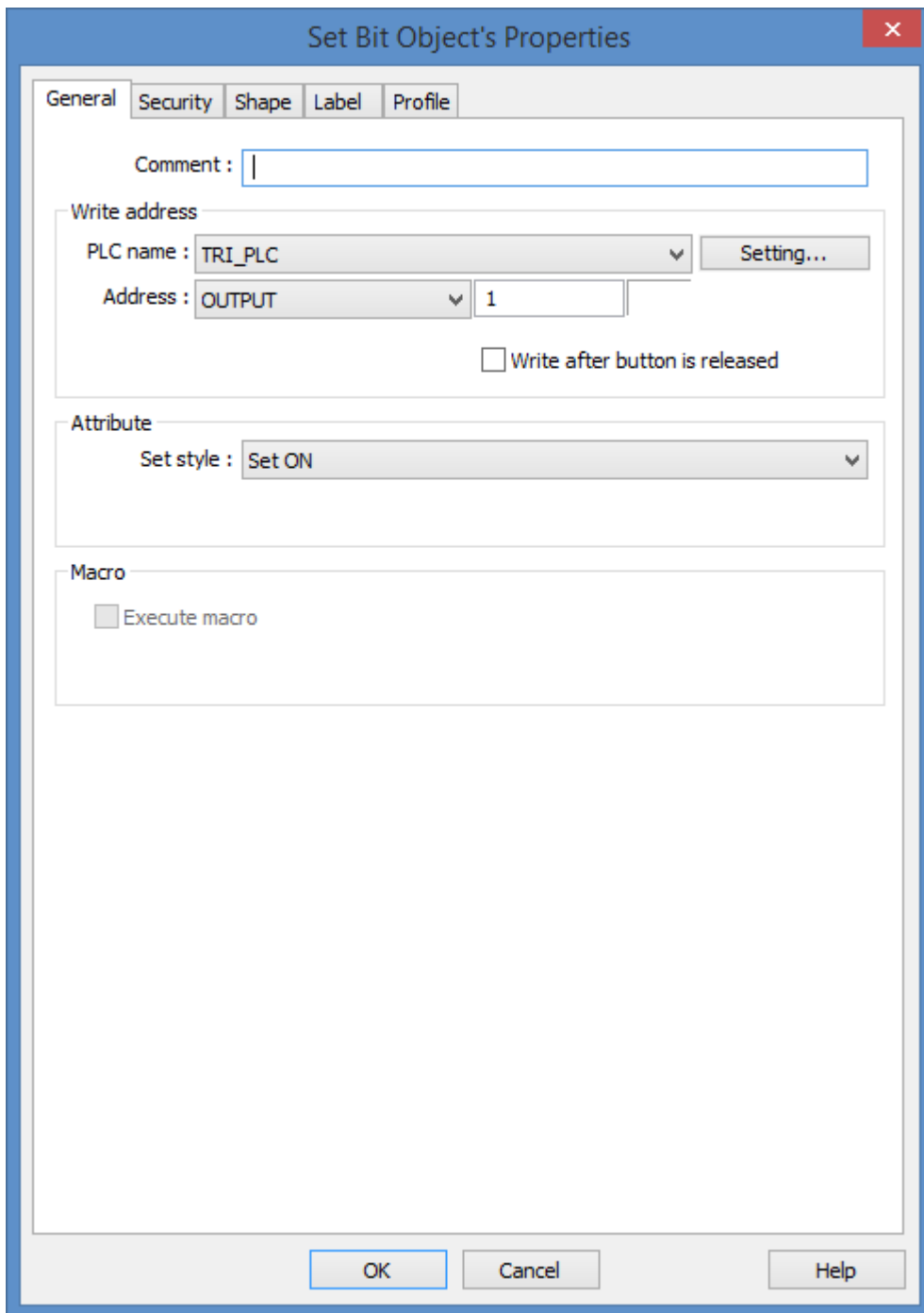
The image shows a software dialog box titled "Set Word Object's Properties" with a blue title bar and a red close button. It contains several tabs: "General", "Security", "Shape", "Label", and "Profile". The "General" tab is active. Inside the dialog, there is a "Comment" text field. Below it is a "Write address" section containing a "PLC name" dropdown menu set to "TRI_PLC", a "Setting..." button, an "Address" dropdown menu set to "DM", a numeric input field set to "1", and a "16-bit Signed" checkbox. There is also an unchecked checkbox labeled "Write after button is released". Below this is a "Notification" section with an unchecked "Enable" checkbox. At the bottom is an "Attribute" section with a "Set Style" dropdown menu set to "Write constant value" and a "Set value" input field set to "123". At the very bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

Figure 3: Tag Configuration Window- Create DM[1] Variable

4. Create a Set Bit Object

This allows you to map a single bit to a PLC input or output, internal relay register, DM[] variable, etc.

1. Select the "Set Bit" symbol from the EBPro toolbar or from the **Objects --> Button** drop down menu. As shown in Figure 4, Output is chosen for this example.
2. Select **TRI_PLC** from the PLC name: drop down menu.
3. The field to the right of the **Address** drop-down selector is the variable index. Choose 1 for the first Output, which is default.
4. Choose "**Set ON**" from the **Set Style** drop down selector in the Attribute section. Different object functions are available, but this is a simple set bit function.
5. Click OK to accept the Set Bit object properties and place the object on the screen by clicking in the window area.



The image shows a software dialog box titled "Set Bit Object's Properties". It has a blue title bar with a close button (X) in the top right corner. Below the title bar are five tabs: "General", "Security", "Shape", "Label", and "Profile". The "General" tab is selected. Inside the dialog, there is a "Comment:" label followed by an empty text input field. Below this is a section titled "Write address" which contains a "PLC name:" dropdown menu set to "TRI_PLC" with a "Setting..." button to its right, and an "Address:" dropdown menu set to "OUTPUT" followed by a text input field containing the number "1". Below the address field is a checkbox labeled "Write after button is released" which is currently unchecked. The next section is titled "Attribute" and contains a "Set style:" dropdown menu set to "Set ON". The final section is titled "Macro" and contains a checkbox labeled "Execute macro" which is currently unchecked. At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

Figure 4: Tag Configuration Window- Create Output 1 Bit

5. Additional Reference Sources

The following documents can be downloaded from the MT6070iE HMI product page on the TRi website at the following link: <http://triplc.com/mt6070ie.htm>

- MT6070iE Quick Start Guide
- EasyBuilder Pro User Manual
- MT6070iE_Installation_Manual

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- MT8050iE_Quick_Start_Guide
- EasyBuilder Pro User Manual
- MT8050iE_Installation_Manual