



DeviceNet Products - Communications

Technical Manual

MOD-EIP-LMD

Rev: 1.1
25/01/2007

Document #: 722-0131-101
EtherNet/IP Large Message Display

technology | concepts | solutions

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PLEASE READ!

This manual is intended to guide qualified personnel in the installation and operation of this product.

The user of and those responsible for applying this equipment must satisfy themselves as to the acceptability of each application and use of the equipment. In no event will TCS (NZ) Ltd be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

It is the responsibility of the user to thoroughly inspect the equipment before accepting the shipment from the freight company. Check the item(s) received against the purchase order. If any items are obviously damaged, it is the responsibility of the user not to accept delivery until the freight agent has noted the damage on the freight bill. Should any concealed damage be found during unpacking, it is again the responsibility of the user to notify the freight agent. The shipping container must be left intact and the freight agent should be requested to make a visual inspection of the equipment.

The unit should remain in its shipping container prior to installation. If the equipment is not to be used for a period of time, it must be stored according to the following instructions in order to maintain warranty coverage:

- Store in a clean, dry location.
- Store within an ambient temperature range of -40° to $+70^{\circ}$ C.
- Store within a relative humidity range of 0% to 95%, non-condensing.
- Do not store equipment where it could be exposed to a corrosive atmosphere.
- Do not store equipment in a construction area.

Before installation and start-up a general inspection of the mechanical integrity (i.e. loose parts, wires, connections, etc) should be made.

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Overview

The TCS EtherNet/IP Large Message Display can be controlled with a PLC via EtherNet/IP.

Setup Procedure

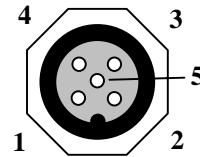
This is the procedure you should follow, with reference to the following sections of this manual:

- Connect Power and Ethernet cable from network switch to interface.
- Set and verify Message Display parameters using the provided configuration software.
- Map the Message Display tags into the PLC.
- Set up the messaging from the PLC to the Message Display.
- Test your PLC code.

Power Connector

The interface is connected to a 24V DC Power with the 5-way M12 connector provided. The pinout for this socket are as follows:

Pin	Signal
1	Unused
2	+24v DC
3	0v DC
4	Unused
5	Unused



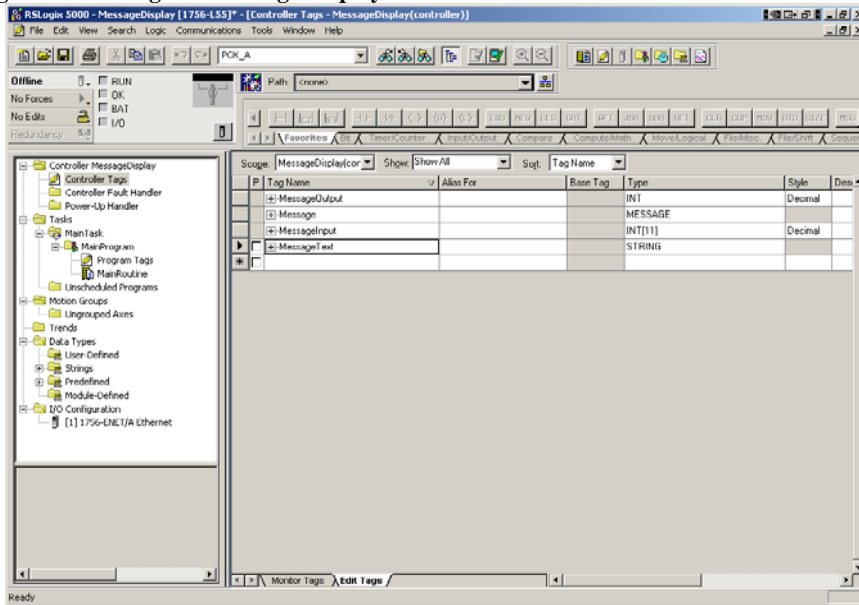
PLC

Once the Message display is configured you need to configure several things in the PLC.

Tags

After configuring the message display you will have noted the name of the output tag that it will send to the PLC. This tag must be added into the **Controller Tags** section of your PLC project. Once this is done the message display will be able to update the tag without any further PLC code. For example, say the message displays output tag is named “MessageOutput”. The controller tag for this would be entered as shown in Figure 1.

Figure 1 PLC Tags for Message Display



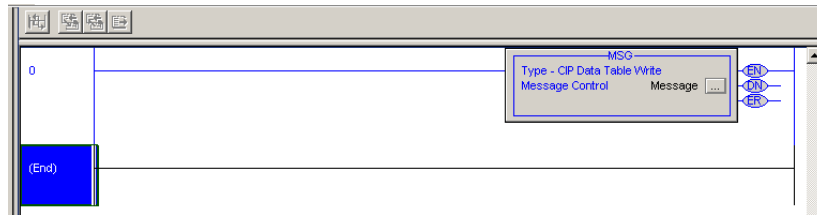
NOTE: The name of the “MessageOutput” tag will change depending on the name of the output tag that the Message Display was configured to send. Also the “Message” and “MessageInput” tags can be changed to suit your application.

There are three other tags in Figure 1; these are “Message”, “MessageInput”, and “MessageText”. The “Message” tag is used to send the “MessageInput” tag to the Message Display; these tags will be explained in the Messaging section below. The “MessageText” tag is not really required but makes writing a string to the Message Display a lot easier; this tag will be explained in the Input Data Format section.

Messaging

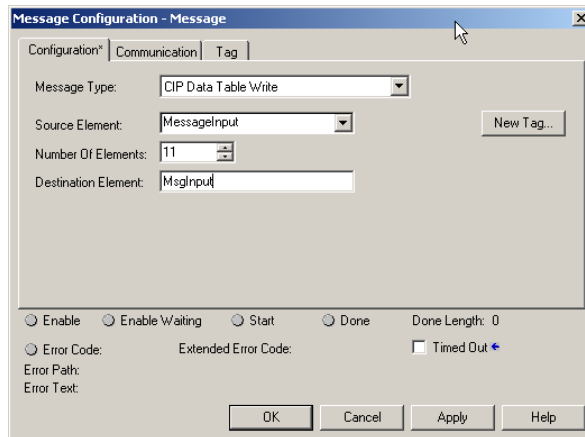
The input data for the Message Display is sent using a MSG instruction as shown in Figure 2.

Figure 2 MSG Instruction for Sending Input Data



The type of message being sent is a “CIP Data Table Write” as shown in Figure 3.

Figure 3 Message Instruction Configuration



NOTE: You can get to this screen by clicking on the ellipsis to the right of the “Message” tag in the MSG instruction shown in Figure 2

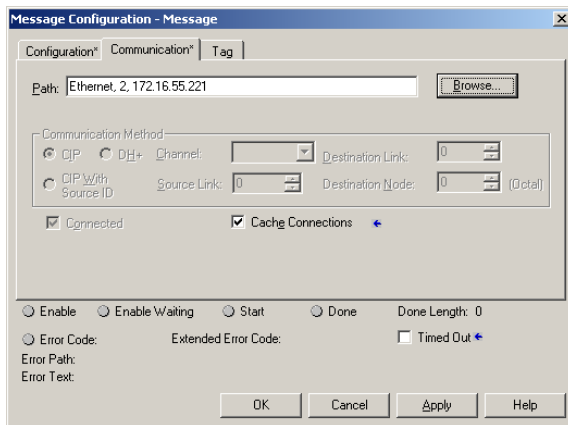
The **Source Element** is the name of the tag you have chosen to use for your input data to be stored in. It has to be an array of 11 integers (INTs); the use of this array will be described later. In the example above, the input data tag has been called “MessageInput”, however this can be changed if you have multiple message displays and want to display different messages.

The **Number of Elements** must be 11 because this is the size of your input data array and also the size of the input data array in the Message Display.

The **Destination Element** is the name of the tag that is used to store the input data in the Message Display. This will be the same (“MsgInput”) in every message display.

Once the “Configuration” tab is set up you need to go to the “Communications” tab, as shown in Figure 4.

Figure 4 Message Instruction Communications Path



The path is made up of three different parts separated by commas:

- The first part is the name of the Ethernet card (in your PLC rack) that will handle the communications. In This example the Ethernet card is named “Ethernet”, but this will probably be different in your case.
- The second part is the port to use; this will always be 2 because this denotes the Ethernet port on the Ethernet card.
- The third and final part is the IP address of the Message Display you want to send the input data to.

Input Data Format

The Input Data is made up of two fields as shown in Table 1.

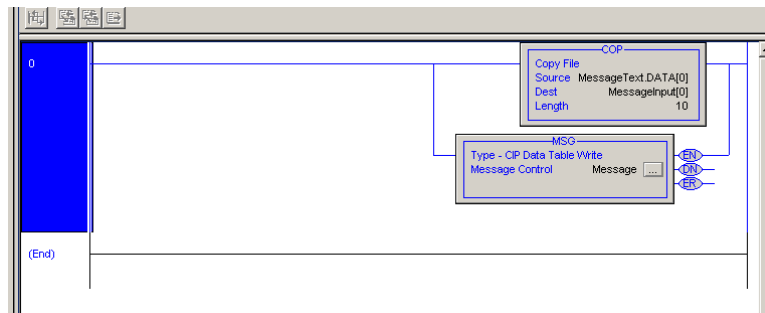
Table 1 Input Data Format

Word	Description
0-9	ASCII String (stored in little-endian)
10	Transmission ID

ASCII String

The ASCII String is the message that will be displayed on the 20-character message display. It is an array of 10 words (2-byte integers), so each word contains 2 characters. The characters in each word are read in little-endian, which means that the first byte in the word contains the second character and the second byte contains the first character. This means that you can use the “Copy File” instruction (COP) to directly copy the contents of a STRING tag into the input data tag, and it will be displayed in the order it is in the STRING tag. Figure 5 shows how you can copy an ASCII text string into the input data tag being sent the message display.

Figure 5 Copying Text to the Input Data



Output Data Format

There is only one word of output data that the Message Display will send to the PLC.

Table 2 Output Data Format

Word	Description
1	Response ID

Response ID

The Response ID is a 2-byte integer that is updated every time a message is displayed. The value of the Transmission ID sent to the Message Display will be copied into the Response ID and sent to the PLC after the message has been displayed.

The Response ID can be used to confirm that the message has been displayed. If you display one message and try to display another message before the Response ID is updated from the first message, you could overwrite some of the first message with the second message. So it is important to wait until the Response ID has changed to the same value as the Transmission ID that you sent the Message Display. Figure 7 shows how you can use the Response ID to make sure that no messages are sent while the Message Display is updating the message.

Figure 7 Using the Response ID

