EtherNet/IP™ Interface

880 Interface Option Card

Installation and Programming Manual

Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
C	February 29, 2024	Established revision history; added first and second generation option card details

Table i.   Revision Letter History

Contents

*Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at **www.ricelake.com/training** or obtained by calling 715-234-9171 and asking for the training department.*

1.0 Introduction

The EtherNet/IP Interface can be used to read and write data between a scale indicator and a PLC or another primary controller. This manual provides information for installation and use of this product.

The EtherNet/IP Interface is installed inside the indicator enclosure and installation in NEMA Type 4X stainless steel enclosures permits use in washdown environments.

See the indicator technical manual for additional installation information and detailed descriptions of indicator functions.

⚠️ *WARNING: Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.*

Manuals and additional resources are available on the Rice Lake Weighing Systems website at **www.ricelake.com**

Warranty information can be found on the website at **www.ricelake.com/warranties**

ⓘ *IMPORTANT: If card no longer communicates correct data, change SWAP parameter to BYTE in the indicator.*

1.1 Overview

EtherNet/IP Interface (Ethernet Industrial Protocol) is an open industrial networking standard allows control applications to make use of Ethernet communications components and physical media.

EtherNet/IP Interface is based on the IEEE 802.3 Ethernet standard, the TCP/IP protocol suite, and CIP (Common Industrial Protocol), the real-time I/O and information protocol used by both DeviceNet and ControlNet networks.

The EtherNet/IP Interface returns weight and status information from an indicator to the network and provides limited control of indicator functions to the programmer. Indicator configuration and calibration cannot be performed through the OLDSTD or AOPSTD format, but can be performed with the AOPEXT format.

The following sections of this manual cover three different ways to configure the 880 indicator. How it is configured depends on the format setting in the 880 FLDBUS/FORMAT parameter.

Format Parameter	Section	Applicable Indicator Firmware Version
AOPEXT	Section 4.0 on page 16	4.00 or Higher
OLDSTD	Section 5.0 on page 28	Version 1.00 to 4.00
AOPSTD	Section 6.0 on page 31	4.00 or Higher

Table 1-1. Format Parameters

📝 *NOTE: See Section 3.1 on page 15 showing the Fieldbus (FLDBUS) menu structure.*

1.2 FCC Compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

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2.0   Installation

EtherNet/IP Interface specific functions are provided by an EtherNet/IP module.

The module plugs into an open slot on the CPU board and provides power and access from the indicator bus to the module.

The interface option cards of the 880 universal and panel mount indicators share the same carrier board (PN 164756). The carrier board plugs into an open slot on the CPU board and provides power and access from the indicator bus to the module. The assembly steps of the carrier board and modules vary between the 880 universal mount and the 880 panel mount.

880 interface option card kits are shipped with the module and the carrier board separated.

- 880 universal mount module can be assembled to the carrier board before installing
- 880 panel mount carrier board must be installed before assembling the module to the carrier board

Carrier Board   **Carrier Board with Module**

Figure 2-1. Interface Option Card Kit
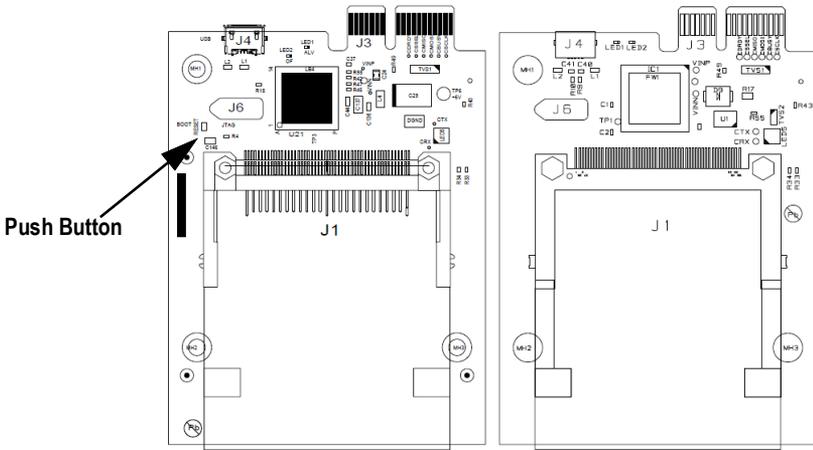
Figure 2-2. Second Generation (left) and First Generation (right) Boards

Card Generation	Identifying Characteristics
First Generation	green board
Second Generation	blue board, push button switch

Table 1-1. Option Card Identification Information

NOTE: Only second generation cards (blue boards) can have the firmware updated. See the 880 Technical Manual (PN 158387) for further instructions.

The indicator automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify an installed card to the system.

WARNING: Always disconnect the power before opening an enclosure.
Interface option cards are not hot swappable.

CAUTION: A grounding wrist strap must be worn to protect components from electrostatic discharge (ESD) when working inside an enclosure or controller assembly.

880 Universal Installation Instructions

1. Disconnect power to the indicator.
2. Remove the backplate of the universal enclosure to access the CPU board.
3. Carefully slide the module into the J1 connector on the carrier board, ensuring that the pins of J1 are not bent.
4. Ensure that the module is fully seated in the carrier board with the board hooks on the bottom of the module aligned with the carrier board.
5. Tighten module screws on the front of the module to clamp the board hooks of the module to the carrier board.
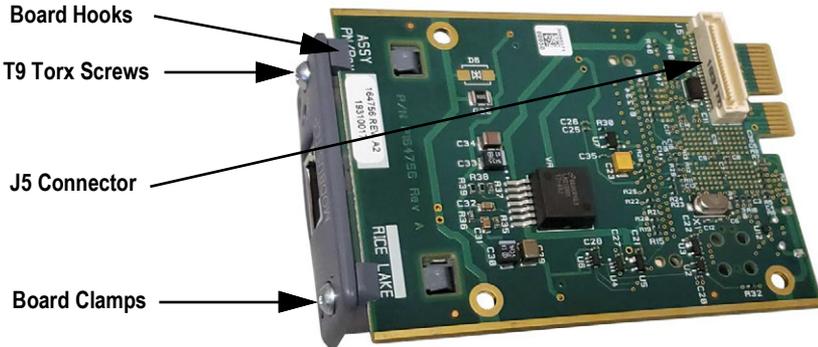
Figure 2-3. Bottom of Carrier Card with Module Installed

NOTE: Screws are tightened with a T9 Torx bit.
If the module is not fully seated on the carrier board, the hooks will push the module away from the board rather than securing the board to the module. This can potentially cause damage to the connector.

6. Carefully align the J5 connector on the bottom of the carrier board with the J8 option card slot on the CPU board.
7. Press down on the carrier board with module until it is seated on the CPU board connector.
8. Use the screws provided in the option kit to secure the carrier board to the threaded standoffs on the CPU board (faceplate not used).
9. Connect and properly run necessary cable.
10. Crimp on RJ45 after the cable is run through a cord grip (unless an optional backplate, PN 180835 with an RJ-45 receptacle has been installed).
11. Reinstall the enclosure backplate.

880 Panel Mount Installation Instructions

1. Disconnect power to the indicator and then disconnect the display cable from the controller assembly.

2. Remove the backplate of the panel mount from the extrusion, which allows the boards to slide out of the enclosure extrusion.

3. Remove the option slot faceplate from the backplate by removing the two screws that secure it to the CPU board.

4. Carefully align the J5 connector on the bottom of the carrier board (module currently not attached) with the J8 option card slot on the CPU board.

5. Press down on the carrier board until it is seated on the CPU board connector.

6. Use the screws provided in the option kit to secure the carrier board and faceplate to the threaded standoffs on the CPU board.

7. Carefully slide the EtherNet/IP module through the faceplate to the J1 connector on the carrier board, ensuring that the pins of J1 are not bent.

8. Ensure that the module is fully seated in the carrier board with the board hooks on the bottom of the module aligned with the carrier board.

9. Tighten the T9 Torx screws on the front of the module to clamp the board hooks of the module to the carrier board.

NOTE: Screws are tightened with a T9 Torx bit.

If the module is not fully seated on the carrier board, the hooks will push the module away from the board rather than securing the board to the module.
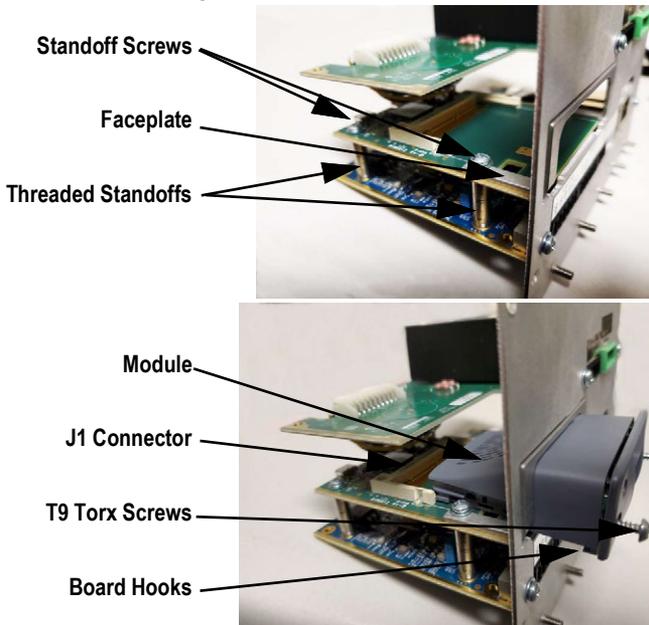
Figure 2-4. 880 Panel Mount Interface Option Card Installation

10. Reinstall the enclosure backplate and then reconnect the display cable.

2.1   LED Status Indicators

An LED array on the EtherNet/IP module provides status information for troubleshooting.

Figure 2-5. EtherNet/IP Module

📝 **NOTE: A test sequence is performed on LED (item 1, 2 and 3 below) during startup.**

Network Status LED (Item 1)

LED State	Description
Off	No power or no IP address
Green	Module is in Process Active or Idle state
Green, Flashing	Waiting for connections
Red	Duplicate IP address, FATAL event
Red, Flashing	Process Active Timeout

Table 2-2. Network Status LED

Module Status LED (Item 2)

LED State	Description
Off	No power
Green	Normal operation
Green, Flashing	Not configured or Scanner in idle status
Red	Major fault; Module is in state EXCEPTION (or FATAL event)
Red, Flashing	Minor fault in diagnostic object; IP conflict

Table 2-3. Module Status LED

Link/Activity LED (Item 3)

LED State	Description
Off	No link, no activity
Green	Link established
Green, Flickering	Activity

Table 2-4. Link/Activity LED

RJ45 Port (Item 4)

The EtherNet/IP interface supports 10/100Mbps, full or half duplex operation.

3.0   Configuration Settings

Configuring the network setting is done using a web browser or the Anybus® IP configuration utility.

> **NOTE: The card comes configured with the DHCP set to on, so it does not have a default IP address.**

Set network settings using the Anybus IP configuration utility.

1. Download and install the HMS IPconfig program from the Anybus website at https://www.anybus.com/technical-support/file-doc-downloads/anybus-support-tools?orderCode=tools

2. Open the installed configuration program (IPconfig.exe).

Type	IP	DIICP	Version	MAC	Comment	
Ethernet/IP Product by RLWS	10.2.53.122	Disabled	1.00	00-30-11-27-94-A3		

Figure 3-1. IP Configuration Utility - Startup

3. Select the displayed device. If the device does not appear, go to Step 4 and select the correct connection.

4. Press Settings icon in the upper right corner.

5. Use the Scan Settings dropdown menu to select the connection and press ⟳ .

Figure 3-2. IP Configuration Utility - Scan Setting Selection

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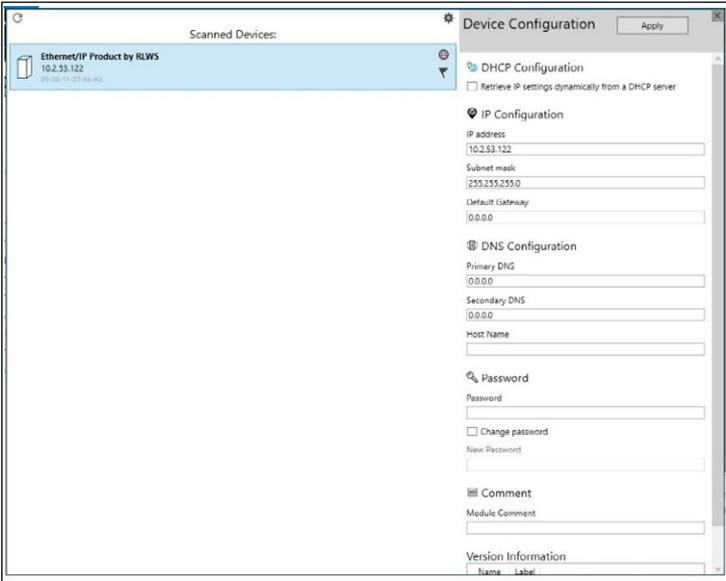
Figure 3-3. IP Configuration Utility - Enter Network Settings

6. Double click on the scanned device or right click to view or change current network settings.

7. Press **Apply** to configure the device.

Set network settings using a web browser.

The following figures are examples only, actual displays vary.

1. Open a web browser and type the IP address of the card into the address bar.

Figure 3-4. EtherNet/IP Main Display in a Web Browser

2. Click **Network interface**.
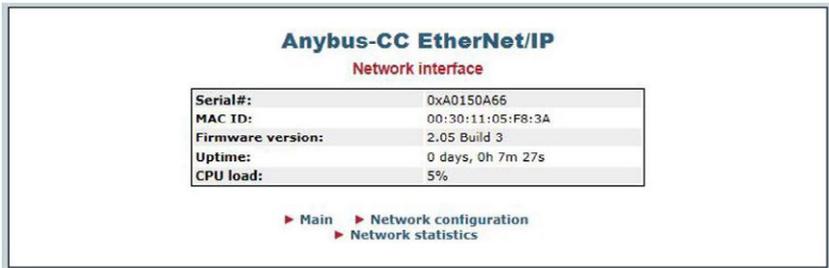
Figure 3-5. EtherNet/IP Network Interface Display in a Web Browser

3. Click **Network configuration**.
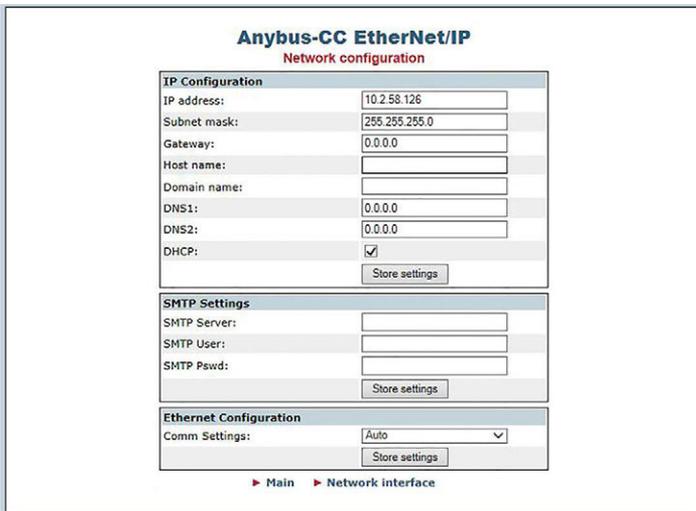
Figure 3-6. EtherNet/IP Network Configuration Display in a Web Browser

4. Change necessary settings.
5. Click **Store settings** to save any changes.

3.1   Fieldbus Menu

Navigate to the Fieldbus menu in the 880. The Fieldbus menu can be used when the interface option is installed in the 880 indicator.
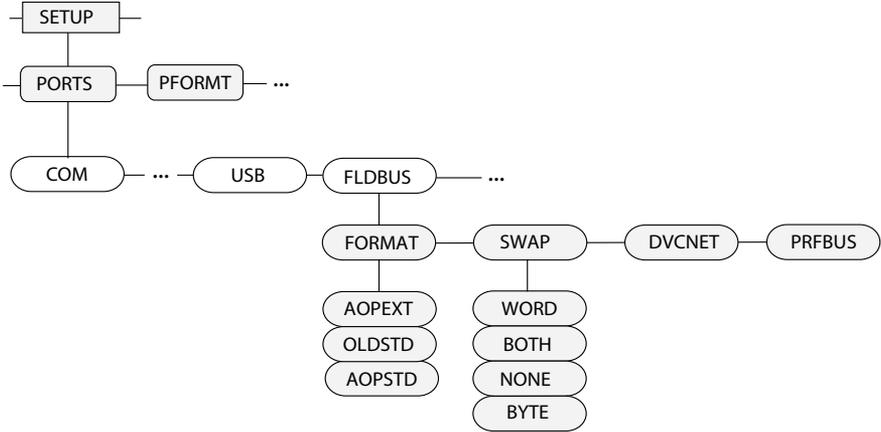
Figure 3-7. Fieldbus Menu Parameters

Parameter	Choices	Description
FORMAT	AOPEXT	36 BYTE input and 56 BYTE output is used to exchange data between the 880 and a PLC or DCS system
	OLDSTD	8 BYTE input and output is used to exchange data between the 880 firmware version 2.18 or later
	AOPSTD	8 BYTE input and output is used to exchange data between the 880 and a PLC or DCS system **NOTE:** *Use the dumpversions edp command to access the Anybus Host version of the card*
SWAP	**NONE** WORD BOTH BYTE	Specifies byte-swapping used for the field bus card; for DeviceNet cards, this parameter defaults to BYTE; for all other cards the default value is NONE
DVCNET	**63** 1–64	DeviceNet option address - Not applicable to EtherNet/IP
PRFBUS	**126** 1–126	PROFIBUS DP option address - Not applicable to EtherNet/IP

Table 3-1. Fieldbus Menu Parameters

4.0 AOPEXT Configuration

> **NOTE: The 880 must be configured for AOPEXT format found in the Fieldbus/Format parameter settings to use these commands. Use RXLogix to import EDS files.**

See Figure 4-1 to configure an EtherNet/IP module in CompactLogix or ControlLogix PLC with AOPEXT set for the 880 Fieldbus (FLDBUS) parameter

1. Select the Module Type Vendor Filter.
2. Select Rice Lake Weighing Systems. The AOP EDS is named 880 product by Rice Lake Weighing Systems.
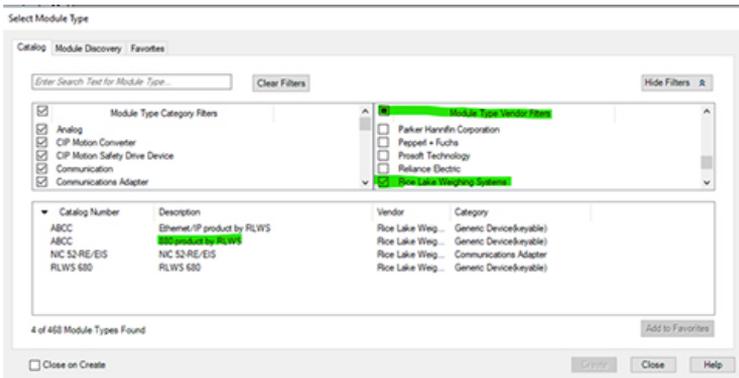
Figure 4-1. RSLogix Module Type

3. Press **Change** once the AOP EDS is added to the IO configuration.
4. Click on Standard Protocol and then select *Extended Protocol* from the drop down list.

Figure 4-2. Protocol Type

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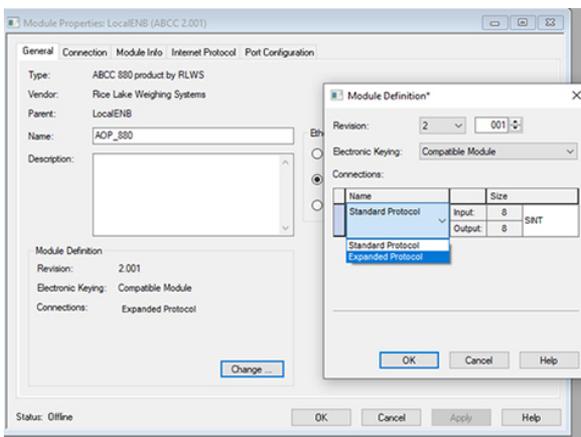
The new AOP EDS will produce the following tag names in the Program Tags directory for the input and output data.

Figure 4-3. AOP EDS Tag Names

If the AOP EDS is not available to set up, a generic module can be set up.
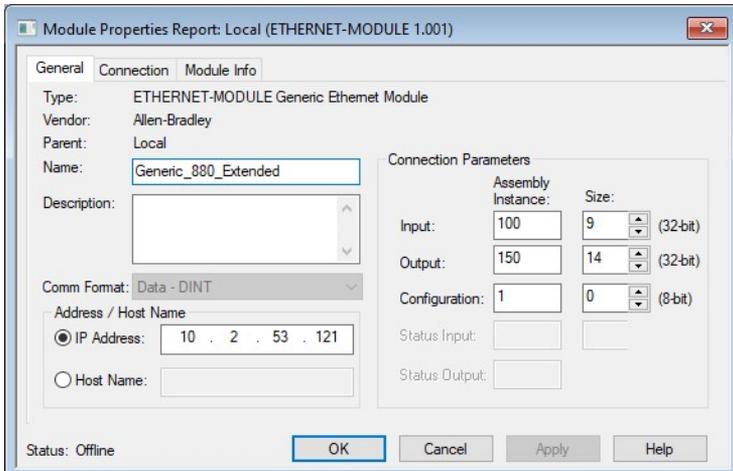
Figure 4-4. Generic EtherNet/IP Module

📝 **NOTE: If using a generic module, named tags will not be available.**

4.1   Data From the PLC to Indicator

Use in the 880 in AOPEXT Format.

Register No.	Output Registers	Byte Order	Byte No
0	Command Register	3	0
		2	1
1		1	2
		0	3
2	Parameter 1	3	4
		2	5
3		1	6
		0	7
4	Parameter 2	3	8
		2	9
5		1	10
		0	11
6	Parameter 3	3	12
		2	13
7		1	14
		0	15
8	Grads	3	16
		2	17
9		1	18
		0	19
10	Units	3	20
		2	21
11		1	22
		0	23
12	Decimal	3	24
		2	25
13		1	26
		0	27
14	Display Divisions	3	28
		2	29
15		1	30
		0	31

Table 4-1. Output Register Values

Register No.	Output Registers	Byte Order	Byte No
16	Calibration Point	3	32
		2	33
17		1	34
		0	35
18	Span Calibration Weight	3	36
		2	37
19		1	38
		0	39
20	Point #1 Calibration Weight	3	40
		2	41
21		1	42
		0	43
22	Point #2 Calibration Weight	3	44
		2	45
23		1	46
		0	47
24	Point #3 Calibration Weight	3	48
		2	49
25		1	50
		0	51
26	Point #4 Calibration Weight	3	52
		2	53
27		1	54
		0	55

Table 4-1. Output Register Values (Continued)

4.1.1 Commands

Command	Decimal	Description
No Command	0	No action
Zero Scale	1	Zero the scale
Tare Scale	2	Tare the current weight if parameter 1=0, otherwise tare the value that is in parameter 1
Clear Tare	3	Clear a tare if one exists
Display Net Mode	4	Switch the scale from gross mode to net mode
Display Gross Mode	5	Switch the scale from net mode to gross mode
Write Setpoint	10	Parameter 1 = setpoint # parameter 2 = value
Read Setpoint	11	Parameter 1 = setpoint #
Read IO Points	12	Parameter 1 = IO slot number
Set Output On	24	Parameter 1 = slot parameter 2 = bit
Set Output Off	25	Parameter 1 = slot parameter 2 = bi
Write Setup	27	Write calibration setting
Restart Instrument	34	Restarts the indicator
Perform Zero Calibration	35	Performs a zero calibration
Perform Span Calibration	36	Performs a span calibration
Point Calibration	37	Point value found in parameter 1 (1-3)
Save Calibration	38	Save the calibration and exit calibration mode
Abort Calibration	39	Aborts a calibration and clears any errors
Keyboard Enable/Disable	40	Disable keys (parameter 1 = 0) Enable keys (parameter 1 = 1)
Read Accumulator	41	Multi-value 1 = returned accumulator value

Table 4-2. Command Values

4.2   Data From the Indicator to the PLC

Register No.	Output Registers	Byte Order	Byte No
0	Gross Weight	3	0
		2	1
1		1	2
		0	3
2	Net Weight	3	4
		2	5
3		1	6
		0	7
4	Scale Status	3	8
		2	9
5		1	10
		0	11
6	On board IO Status	3	12
		2	13
7		1	14
		0	15
8	Last Command Processed	3	16
		2	17
9		1	18
		0	19
10	Command Status	3	20
		2	21
11		1	22
		0	23
12	Calibration Status	3	24
		2	25
13		1	26
		0	27
14	Multi Use Value 1	3	28
		2	29
15		1	30
		0	31

Table 4-3. Indicator to PC Data

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Register No.	Output Registers	Byte Order	Byte No
16	Multi Use Value 2	3	32
		2	33
17		1	34
		0	35

Table 4-3. Indicator to PC Data (Continued)

4.2.1 Onboard IO Status

Bit	Description	Bit Status	
0	IO Bit	0 = Off	1 = On
1			
2			
3			
4-31	Future Use		

Table 4-4.   Onboard IO Status

4.2.2 Calibration Status

Value	Description
0	Calibration not started
1	Calibration Acquisition in process
2	Calibration Acquisition OK
3	Calibration error

Table 4-5. Calibration Status

4.2.3   Command Status

Bytes	Description
0-3	Current command status result

Table 4-6.   Command Status

The following 880 values named **Result of last command received**, needs updating after the **last command processed** value is updated.

Value	Description
0	Command successfully performed
1	Not a valid command
2	General error; Trying to tare or zero while scale is in motion
3	Setpoint number does not exist; When trying to read or write to a setpoint but the setpoint value does not exist
4	Setpoint kind of OFF; When trying to read or write to a setpoint, but that setpoint is not configured
5	Setpoint not enabled; When trying to read or write to a setpoint but the setpoint is not enabled
6	Invalid IO; When trying to set any output on or off and that output is not configured
7	Not in setup mode; When trying to use write setup, zero calibration, span calibration, point calibration, save calibration, or abort calibration commands
8	Wrong command; Non calibration command used during calibration
9	Invalid units selection
10	Invalid decimal selection
11	Invalid display division selection
12	Calibration point out of range (1-4)
13	Invalid grads value
14	Calibration not allowed for MRMI or serial scale
15	Calibration weight out of range
16	Accumulator is not enabled
17	Audit trail is not enabled; Check the jumper to see that it is in the correct position

Table 4-7. Command Descriptions

Unit Values

Value	Units
0	Lb
1	Kg
2	Oz
3	Tn
4	T
5	G
6	None

Table 4-8. Values and Units

Decimal Point Values

Value	Decimal Point
0	888888
1	88888.8
2	888.88
3	888.888
4	88.8888
5	8.88888
6	NA
7	888880
8	NA

Table 4-9. Decimal Point Values

Display Divisions

Value	Display Divisions
0	1
1	2
2	5

Table 4-10. Display Division Values

4.2.4   Scale Status

Bit	Description	Bit Status	
0	Net Weight Polarity	0 = Positive	1 = Negative
1	Gross Weight Polarity		
2	Weight Stability	0 = Stable	1 = Motion
3	Underload Condition	0 = OK	1 = Under
4	Overload Condition	0 = OK	1 = Under
5	Push Button Tare Condition	0 = No	1 = Yes
6	Keyed Tare Condition	0 = No	1 = Yes
7	Gross Center of Zero	0 = COZ**	1 = COZ**
8	Display Mode	0 = Net	1 = Gross
9	Current Units	0 = Primary	1 = Other
10	Heartbeat - delay of 500 ms between on and off	0 = Off	1 = On
11	Scale Error	0 = Error	1 = OK
12	Accumulator Weight Polarity	0 = Positive	1 = Negative
12-31	Future Use		
** Center of Zero			

Table 4-11.   Status Descriptions

4.2.5   Scale Error

NOTE: The scale error bit is always set to 1 unless one of the following errors occurs in the 880. At that time, the error bit is set to 0 until the error is cleared.

Error Condition
Configuration signature error
General configuration checksum error
Load cell data checksum error
Backup battery voltage low
Battery backed memory corrupt
Load cell A/D error
Tare data checksum error
Accumulator overflow error
Unable to write to non-volatile memory

Table 4-12. Error Conditions

4.3   Standard Calibration

NOTE: The indicator will be put in calibration mode by the use of command 27 without pressing the setup switch.

Set the values (optional) that are wanted using the following parameters.

- Grads
- Units
- Decimal
- Display Divisions
- Calibration Weight

Use command 27 to write these parameters. If all values are within the allowable value, then the indicator is put in calibration mode. The unit displays **CALPAR**.

Clear the scale and send command 35 to perform a zero calibration. Ensure the unit is in calibration mode. The calibration status is displayed to show the process, an error or OK. **CALZRO** is displayed.

To perform a span calibration, set the span calibration weight value then place the weight on the scale and send command 36. The calibration status is displayed to show the process, an error or OK. **CALSPN** is displayed.

Use command 38 to save and exit the calibration mode.

Command 39 can be sent at any time to exit calibration and not save the calibration and settings.

4.4   Multi-Point Calibration

Set the values (optional) in the following parameters.

- Grads
- Units
- Decimal
- Display Divisions
- 1st Calibration Weight
- 2nd Calibration Weight
- 3rd Calibration Weight
- 4th Calibration Weight

Use command 27 to write these parameters. If all values are within the allowable value, then the indicator is put in calibration mode. **CALPAR** displays.

To perform a zero calibration, clear the scale and send command 35. Monitor the calibration status to check the calibration process.

To perform a multi-point calibration use the following steps.

1. Set the calibration point to 1.
2. Add the 1st weight to the scale.
3. Send command 37 to capture this calibration point. **CALPT1-4** displays.
4. Calibration status is displayed to show in process, an error or OK.

Repeat steps 1 - 4 changing the calibration point number to correspond to the current point.

Use command 38 to send to save and exit the calibration mode.

5.0 OLDSTD Configuration

See Figure 5-1 to configure an EtherNet/IP module in CompactLogix or ControlLogix PLC with OLDSTD set for the 880 Fieldbus (FLDBUS) parameter.
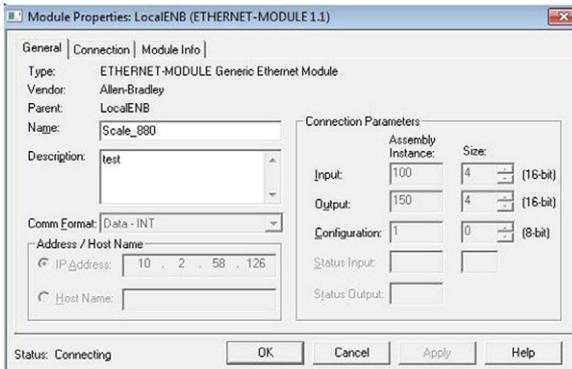
Figure 5-1. OLDSTD EtherNet/IP Module Screen

> **NOTE: Refer to Section 7.0 on page 32 for setting input and output communication and commands. Use RXLogix to import EDS files.**

5.1 Byte Swapping

Byte swapping assumes that a word is just two bytes in length. The following table lists the bytes and their respective description.

Byte	Description
None	No swapping
Byte	AB CD = BA DC swap just the bytes
Both	AB CD = DC BA swap both the bytes and the words
Word	AB CD = CD AB swap just the words

Table 5-1. Byte Swapping

5.2   Sample for BYTE Swapping in a PLC

📝 **NOTE: This is used when the 880 is set up to use OLDSTD format found in the 880 Fieldbus/Format setting to use these commands.**

See Figure 5-2 for an example of BYTE Swapping in a PLC when setting or reading a floating point value.

Use the following rungs when sending or reading floating point data:

EthernetIP - Ladder Diagram	Page 1
test_copy_command:MainTask:MainProgram	8/17/2007 2:33:14 PM
Total number of rungs in routine: 10	C:\RSLogix 5000\Projects\test_copy_command.ACD

Special swapping for EtherNet IP is needed.

Rungs 1 - 3 take the inputs from the EtherNet card and swap them in to an array on integers.

NOTE: An array needs to be used in order for the copy command to be use.

Reading the weight in integer format is as simple as putting a zero value in EthIP_output[0] since zero is the default you will see
the scale weight in EthIP_input[2].

0
SWPB
Swap Byte
Source   RLWS:I.Data[0]
                      8193
Order Mode   HIGH/LOW
Dest   EthIP_input[0]
                      288

1
SWPB
Swap Byte
Source   RLWS:I.Data[1]
                      2305
Order Mode   HIGH/LOW
Dest   EthIP_input[1]
                      265

This one needs to be swapped with 3 in order to make float commands work.

2
SWPB
Swap Byte
Source   RLWS:I.Data[2]
                      12611
Order Mode   HIGH/LOW
Dest   EthIP_input[3]
                      17201

This one needs to be swapped with 2 in order to make float commands work.

3
SWPB
Swap Byte
Source   RLWS:I.Data[3]
                      0
Order Mode   HIGH/LOW
Dest   EthIP_input[2]
                      0

Rungs 4 - 7 swap the user tags before they are sent back to the EtherNet IP card.

NOTE: Arrays need to be used so that the copy command can be used.

4
SWPB
Swap Byte
Source   EthIP_output[0]
                      288
Order Mode   HIGH/LOW
Dest   RLWS:O.Data[0]
                      8193

Figure 5-2. Ladder Logic for EtherNet/IP - Page 1 Example

5.3 Sample BYTE Swapping

See Figure 5-3 for an example of BYTE Swapping for all other commands.

EthernetIP - Ladder Diagram   **Page 2**
test_copy_command:MainTask:MainProgram   8/17/2007 2:33:15 PM
Total number of rungs in routine: 10   C:\RSLogix 5000\Projects\test_copy_command.ACD

5
```
                                    SWPB
                            Swap Byte
                            Source    EthIP_output[1]
                                              1
                            Order Mode  HIGH/LOW
                            Dest      RLWS:O.Data[1]
                                            256
```
This one needs to be swapped with 2 in order to make float commands work. So the correct value is sent.

6
```
                                    SWPB
                            Swap Byte
                            Source    EthIP_output[2]
                                              0
                            Order Mode  HIGH/LOW
                            Dest      RLWS:O.Data[3]
                                              0
```
This one needs to be swapped with 2 in order to make float commands work. So the correct value is sent.

7
```
                                    SWPB
                            Swap Byte
                            Source    EthIP_output[3]
                                              0
                            Order Mode  HIGH/LOW
                            Dest      RLWS:O.Data[2]
                                              0
```
Use the copy command to convert the two integers from the array to a float. This is used to read the scale weight if a float command is used like command # 288

8
```
                                    COP
                            Copy File
                            Source    EthIP_input[2]
                            Dest          Real[3]
                            Length            1
```
When you need to send a value to the indicator use the copy command to convert a float value to the two integers that are sent.

9
```
                                    COP
                            Copy File
                            Source        Real[4]
                            Dest    EthIP_output[2]
                            Length            2
```

(End)

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Figure 5-3. Ladder Logic for EtherNet/IP - Page 2 Example

6.0   AOPSTD Configuration

> **NOTE: The 880 must be configured for AOPSTD format found in the Fieldbus/Format parameter settings to use these settings. Use RXLogix to import EDS files.**

See Figure 6-1 to configure an EtherNet/IP module in CompactLogix or ControlLogix PLC with AOPSTD set for the 880 Fieldbus (FLDBUS) parameter.

1. Select the Module Type Vendor Filter.
2. Select Rice Lake Weighing Systems. The AOP EDS is named 880 product by Rice Lake Weighing Systems.
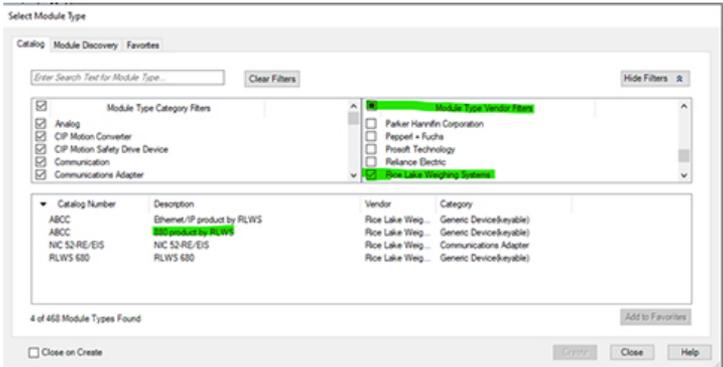
Figure 6-1. AOPSTD Module Type

Press **Change** once the AOP EDS is added to the IO configuration.
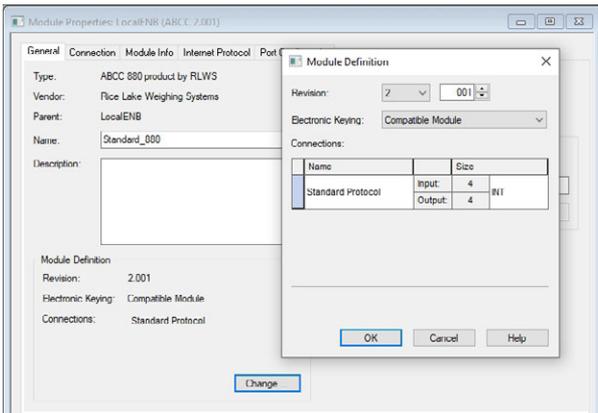
Figure 6-2. AOP EDS Addition

> **NOTE: Refer to Section 4.0 on page 16 for setting input and output communication and commands.**

7.0   Commands

> NOTE: The 880 must be configured for OLDSTD or AOPSTD format found in the Fieldbus/ Format parameter settings to use these commands.

Commands are used by the primary device to send and receive data from the interface as integer or floating-point data. The primary sends eight bytes in the output format to write commands to the indicator and reads eight bytes in the input format to read data from the indicator.

Decimal Point Handling

Integer commands return no decimal point information to the primary PLC.

For example, a value of 750.1 displayed on the indicator is returned to the primary as 7501.

Floating point commands support decimal point information with no special handling.

7.1   Output Data Format

To perform a command, the primary uses the output command format to send four 16-bit words to the interface. These four words contain the command and the necessary parameters to execute it. The output command format is shown in Table 7-1.

Word	Description
Word 1	Command Number
Word 2	Parameter
Word 3	Value (MSW)
Word 4	Value (LSW)

Table 7-1. 880 Output Data Format

> NOTE: See Section 7.2 on page 35 for BYTE swapping parameters.
> A lockout feature, incorporated into the indicator receive mechanism, looks for change in the output format data to prevent inundation by the same command.
> See affected commands noted in Table 7-2 on page 33 with an (*).
> Repeated commands must be separated by any other valid command/parameter/value combination.

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Parameter Value

In communication with the indicator, the scale number is sent in the second word of the output command format. Zero (0) represents the current scale. Certain commands require a parameter other than a scale number, such as a slot number, setpoint number, or other selection parameter. See the command descriptions for specific command requirements.

Value

The third and fourth words of the output format are used to pass value data on certain commands. Values entered in these words are treated as unsigned long integers or floating-point values, depending on the command.

Command Number

The number representing the indicator command is sent in the first word. Table 7-2 lists the commands that can be specified for indicators.

Some commands may not be available on all indicators.

Decimal	Hex	Command
0	0x000	Return Status and Weight (integer)
1	0x001	Display Channel
2	0x002	Display Gross Weight
3	0x003	Display Net Weight
9	0x009	Gross/Net key press (toggle)
10	0x00A	Zero*
11	0x00B	Display Tare*
12	0x00C	Keyed Tare*
13	0x00D	Push Button Tare*
14	0x00E	Clear Tare*
16	0x010	Primary Units
17	0x011	Secondary Units
18	0x012	Tertiary Units
19	0x013	Units key press (toggle units)
20	0x014	Print Request
21	0x015	Display Accumulator
22	0x016	Clear Accumulator
23	0x017	Push Weight to Accumulator
32	0x020	Return Gross (integer)
33	0x021	Return Net (integer)
34	0x022	Return Tare (integer)
37	0x025	Return Current Display (integer)

Table 7-2. Remote Commands

Decimal	Hex	Command
38	0x026	Return Accumulator (integer)
95	0x05F	Set Batching State
96	0x060	Batch Start
97	0x061	Batch Pause
98	0x062	Batch Reset
99	0x063	Batch Status
112	0x070	Lock Indicator Front Panel
113	0x071	Unlock Indicator Front Panel
114	0x072	Set Digital Output ON
115	0x073	Set Digital Output OFF
116	0x074	Read Digital I/O Status
253	0x0FD	No Operation
254	0x0FE	Reset Indicator
256	0x100	Return Status and Weight (float)
268	0x10C	Enter Tare (float)
288	0x120	Read Gross (float)
289	0x121	Read Net (float)
290	0x122	Read Tare (float)
293	0x125	Read Current Display (float)
294	0x126	Read Accumulator (float)
304	0x130	Set Setpoint Value (float)
305	0x131	Set Setpoint Hysteresis (float)
306	0x132	Set Setpoint Bandwidth (float)
307	0x133	Set Setpoint Preact (float)
320	0x140	Read Setpoint Value (float)
321	0x141	Read Setpoint Hysteresis (float)
322	0x142	Read Setpoint Bandwidth (float)
323	0x143	Read Setpoint Preact (float)

Table 7-2. Remote Commands (Continued)

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7.2   Command Descriptions

When using the OLDSTD or the AOPSTD format.

Return Status and Current Weight as Integer

NOTE: Since the 880 is only a single scale indicator, the output parameter value should be either a value of 0 or 1.

Command: 0, 0x000

Parameter: Scale number

Command 0 returns the status and gross or net scale weight (per scale configuration) of the specified scale in integer format, without changing the display. This command also causes the format-independent commands to return a value in the integer format.

Display Channel

Command: 1, 0x001

Parameter: Scale number

Command 1 causes the weight of the specified scale to be displayed and returned in its current mode and format.

Display Gross Weight

Command: 2, 0x002

Parameter: Scale number

Command 2 causes the gross weight of the specified scale to be displayed and returned.

Display Net Weight

Command: 3, 0x003

Parameter: Scale number

Command 3 causes the net weight of the specified scale to be displayed and returned.

Gross/Net Key Press (Toggle Mode)

Command: 9, 0x009

Parameter: Scale number

Command 9 toggles between gross and net mode (and count mode, if enabled).
If a scale number other than 0 is specified, the action will not be seen until the specified scale is displayed.

Zero

Command: 10, 0x00A

Command 10 performs a **ZERO** operation on the current scale.

Display Tare

Command: 11, 0x00B
Parameter: Scale number
Command 11 causes the tare weight on the specified scale to be displayed.
If a scale number other than 0 is specified, the indicator first causes the specified scale to be displayed. Display returns to the prior mode after checking the indicator.

Enter Tare (Integer)

Command: 12, 0x00C
Parameter: Scale number
Value: Tare weight
Command 12 enters a tare for the scale selected. Tare data must be in integer format. The indicator continues to return weight data in the current mode for the specified scale.

Acquire Tare (Simulate TARE Key Press)

Command: 13, 0x00D
Parameter: Scale number
Command 13 acquires a tare based on the weight currently on the specified scale. The indicator continues to return weight data in the current mode for the specified scale.

Clear Tare

Command: 14, 0x00E
Parameter: Scale number
Command 14 clears the tare for the specified scale. The indicator continues to return weight data in the current mode for the specified scale.

Primary Units

Command: 16, 0x010
Parameter: Scale number
Command 16 switches the current format of the specified scale to the primary units configured for that scale.

Secondary Units

Command: 17, 0x011
Parameter: Scale number
Command 17 switches the current format of the specified scale to the secondary units configured for that scale.

Tertiary Units

Command: 18, 0x012
Parameter: Scale number
Command 18 switches the current format of the specified scale to the tertiary units configured for that scale, if available.

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Units Key Press (Toggle Units)

Command: 19, 0x013
Parameter: Scale number
Command 19 toggles between primary and secondary units of the specified scale.

Print Request

Command: 20, 0x014
Parameter: Scale number
Command 20 causes the indicator to execute a print command for the current scale.

Display Accumulator

Command: 21, 0x015
Parameter: Scale number
Command 21 causes the value of the accumulator for the specified scale to be displayed and returned. This command is valid only when the accumulator for the specified scale is enabled.

Clear Accumulator

Command: 22, 0x016
Parameter: Scale number
Command 22 clears the value of the accumulator for the specified scale.
This command is valid only when the accumulator for the specified scale is enabled.

Push Weight to Accumulator

Command: 23, 0x017
Parameter: Scale number
Command 23 adds the net weight on the specified scale to the value of the accumulator for the specified scale. The scale must return to net zero between accumulations. The indicator returns the accumulated weight data for the specified scale. This command is valid only when the accumulator for the specified scale is enabled.

Return Gross as Integer

Command: 32, 0x020
Parameter: Scale number
Command 32 returns the gross weight value for the specified scale as an integer.

Return Net as Integer

Command: 33, 0x021
Parameter: Scale number
Command 33 returns the net weight value for the specified scale as an integer.

Return Tare as Integer

Command: 34, 0x022
Parameter: Scale number
Command 34 returns the tare weight value for the specified scale as an integer.

Return Current Display as Integer

Command: 37, 0x025
Parameter: Scale number
Command 37 returns the weight value for the specified scale as currently displayed. This may include gross, net, tare, or accumulator values, as enabled.

Return Accumulator as Integer

Command: 38, 0x026
Parameter: Scale number
Command 38 returns the accumulator value for the specified scale.
This command is valid only when the accumulator for the specified scale is enabled.

Set Batching State

Command: 95, 0x05F
Parameter: State (0 = off; 1 = auto; 2 = manual)
Command 95 sets the batching (BATCHNG) parameter.
Indicator status is returned with the current weight for the last scale specified.

Batch Start

Command: 96, 0x060
Parameter: Scale number
Command 96 starts a batch program from the current step after a stop, pause, or reset. Batch status is returned with the current weight for the specified scale.

Batch Pause

Command: 97, 0x061
Parameter: Scale number
Command 97 pauses a batch program at the current step.
Batch status is returned with the current weight for the specified scale.

Batch Reset

Command: 98, 0x062
Parameter: Scale number
Command 98 stops a batch program and resets it to the first batch step.
Batch status is returned with the current weight for the specified scale.

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Batch Status

Command: 99, 0x063

Parameter: Scale number

Command 99 returns the status of a batch. Batch status is returned with the current weight for the specified scale.

Lock Front Panel of Indicator

Command: 112, 0x070

Parameter: Scale number

Command 112 disables all the keys on the front panel of the indicator.
Indicator status is returned with the current weight for the specified scale.

Unlock Front Panel of Indicator

Command: 113, 0x071

Parameter: Scale number

Command 113 re-enables all the keys on the front panel of the indicator.
Indicator status is returned with the current weight for the specified scale.

Set Digital Output ON

Command: 114, 0x072

Parameter: Slot number

Value: Bit number

Command 114 sets the specified digital output ON (active). Use slot number 0 for onboard digital outputs. Indicator status is returned with the current weight for the last scale specified.

Set Digital Output OFF

Command: 115, 0x073

Parameter: Slot number

Value: Bit number

Command 115 sets the specified digital output OFF (inactive). Use slot number 0 for onboard digital outputs. Indicator status is returned with the current weight for the last scale specified.

Read Digital I/O

Command: 116, 0x074

Parameter: Slot number

Command 116 returns the status for all digital I/O in the specified slot in words 3 and 4. Use slot number 0 for onboard digital I/O. Indicator status is returned in the status area for the last scale specified.

No Operation

Command: 253, 0x0FD

Parameter: Scale number

Command 253 provides a command to use between operations, as necessary, without causing the indicator to perform any action. Indicator status and weight for the specified scale is returned.

Reset Indicator

Command: 254, 0x0FE

Parameter: None

Command 254 provides a command to remotely reset the indicator.
No data is returned.

Return Status and Current Weight as Float

Command: 256, 0x100

Parameter: Scale number

Command 256 returns the status and weight of the specified scale in floating-point format, without changing the display. This command also causes the format-independent commands to return a value in the floating-point format.
Returns current weight at a floating-point format.

Enter Tare as Float

Command: 268, 0x10C

Parameter: Scale number

Value: Tare weight

Command 268 enters a tare for the scale selected in floating-point format.
The indicator returns the tare weight as taken, or 0 for no tare.

Read Gross Weight as Float

Command: 288, 0x120

Parameter: Scale number

Command 288 returns the gross weight value for the specified scale in floating-point format.

Read Net Weight as Float

Command: 289, 0x121

Parameter: Scale number

Command 289 returns the net weight value for the specified scale in floating-point format.

Read Tare as Float

Command: 290, 0x122

Parameter: Scale number

Command 290 returns the tare weight value for the specified scale in floating-point format.

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Read Current Display as Float

Command: 293, 0x125

Parameter: Scale number

Command 293 returns the weight value for the specified scale as currently displayed in floating-point format. This may include gross, net, tare, or accumulator values, as enabled. The weight value is returned in the mode used to display a scale widget.

Read Accumulator as Float

Command: 294, 0x126

Parameter: Scale number

Command 294 returns the accumulator value for the specified scale in floating-point format. Batch status is returned in place of the indicator status.

Set Setpoint Value as Float

Command: 304, 0x130

Parameter: Setpoint number

Value: Setpoint value

Command 304 sets the setpoint value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a setpoint value. Batch status is returned in place of the indicator status.

Set Setpoint Hysteresis as Float

Command: 305, 0x131

Parameter: Setpoint number

Value: Hysteresis value

Command 305 sets the hysteresis value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a hysteresis value. Batch status is returned in place of the indicator status.

Set Setpoint Bandwidth as Float

Command: 306, 0x132

Parameter: Setpoint number

Value: Bandwidth value

Command 306 sets the bandwidth value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a bandwidth value. Batch status is returned in place of the indicator status.

Set Setpoint Preact as Float

Command: 307, 0x133

Parameter: Setpoint number

Value: Preact value

Command 307 sets the preact value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a preact value. Batch status is returned in place of the indicator status.

Read Setpoint Value as Float

Command: 320, 0x140

Parameter: Setpoint number

Command 320 returns the target value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a target value. Batch status is returned in place of the indicator status.

Read Setpoint Hysteresis as Float

Command: 321, 0x141

Parameter: Setpoint number

Command 321 returns the hysteresis value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a hysteresis value. Batch status is returned in place of the indicator status.

Read Setpoint Bandwidth as Float

Command: 322, 0x142

Parameter: Setpoint number

Command 322 returns the bandwidth value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a bandwidth value. Batch status is returned in place of the indicator status.

Read Setpoint Preact as Float

Command: 323, 0x143

Parameter: Setpoint number

Command 323 returns the preact value for the specified setpoint in floating-point format. This command is valid only when the setpoint is configured and requires a preact value. Batch status is returned in place of the indicator status

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7.2.1 BYTE Swapping

📝 *NOTE: See the Ports Menu in the indicator manual.*

The indicator sends and receives data in integer format.

The standard format is as follows for all input and output values:

High BYTE – Low BYTE

If the indicator FLDBUS/SWAP parameter is set to BYTE, then the BYTE order changes to:

Low BYTE – High BYTE

> *Example: If the weight on the scale reads 10 lb and a value of 2560 is displayed in the PLC, either swap the BYTES in the PLC or change the SWAP parameter to YES.*

7.3 Input Data Format

In response to a command, the interface returns data and status information to the primary as four 16-bit words. This information is returned in the input command format shown in Table 7-3 .

The value type can be set for those commands that do not specify integer or floating point data by sending a command 0x000 to specify integer data or command 0x100 for floating-point data. The value type is returned in the status word (bit 14) of the input format.

Word	Description
Word 1	Command Number
Word 2	Status
Word 3	Value (MSW)
Word 4	Value (LSW)

Table 7-3. 880 Input Data Format

📝 *NOTE: See Section 7.2 on page 35 for BYTE swapping parameters.*

7.3.1 Command number

The first word echoes the command number. If the command fails or is not recognized, the negative of the command number is returned to signal the error.

7.3.2 Status Data

Indicator status data is returned in the second word (Table 7-4). Batch commands return batch status in place of the low byte (Table 7-5 on page 45). Setpoint commands return batch status in the low byte of the status word and the setpoint number in the high byte.

	Indicator Status Data	
Word 2 Bit	**Value=0**	**Value=1**
00	Error ** (Bit-0 Errors on page 45)	No error
01	Keyed tare not present	Keyed tare present
02	Not center of zero	Center of zero
03	Weight invalid	Weight OK
04	Standstill	In motion
05	Primary units	Other units
06	Tare not present	Tare present
07	Gross weight	Net weight
08	Channel number *NOTE: Least significant bit first*	
09		
10		
11		
12		
13	Not used	
14	Integer data	Floating point data
15	Positive weight	Negative weight
This error condition does not necessarily mean the weight being reported is invalid. Refer to the "Weight invalid" bit.		

Table 7-4. Indicator Status Data Format

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Bit-0 Errors

• PLC command failed to execute
• No configuration has taken place
• Scale parameter is out of range
• Print error has occurred
• Load error has occurred
• Memory error has occurred
• Analog to digital converter error
• Tare error
• Scale over range error
• Scale under range error
• Non-recoverable configuration store error
• Indicator in configuration mode

Word 2 Bit	Batch Function Status Data	
	Value=0	Value=1
00	Digital input 4 OFF	Digital input 4 ON
01	Digital input 3 OFF	Digital input 3 ON
02	Digital input 2 OFF	Digital input 2 ON
03	Digital input 1 OFF	Digital input 1 ON
04	Batch not paused	Batch paused
05	Batch not running	Batch running
06	Batch not stopped	Batch stopped
07	Alarm OFF	Alarm ON
08	Setpoint number	
09		
10		
11		
12		
13	Not used	
14	Integer data	Floating point data
15	Positive weight	Negative weight

Table 7-5. Batch Function Status Data Format

7.3.3 Value

Weight data is returned to the primary in the third and fourth words of the input command format, depending on the command and the value type. The weight data returned is the displayed weight after the command is executed, unless the command specifies otherwise. A negative value is returned in the two's compliment format.

7.3.4 Setting a Float Value

Setting a float value in a setpoint requires the value to be sent in two separate integer values. Most PLCs have a mechanism to take a float value and separate it into to integer values.

> *Example: The following must be sent in the output words to set the value of Setpoint #1 to 10000.*

Command word = 304
Parameter word = 1
MSW = 17948
LSW = 16384

7.3.5 Reading a Float Value

When a float value is read it will be returned in two integers representing the float value. The PLC must combine MSW and LSW integer values back into a float value.

> *Example: The following is returned in the input words if the weight on the scale is 800.5.*

Command Word = 288
Status word = Scale status
MSW= 17480
LSW = 8192

7.3.6 Reading a Setpoint Value

When a setpoint value is read it will send a command 11 and set parameter 1 to 1-20 and returns a multi use value of 1 to the PLC. The setpoint value is updated while command 11 is being sent.

> *Example: Reading setpoint #2*

Command Word = 11
Parameter 1 = 2
The following is returned to the PLC
Multi use value 1 = 1120416563. This value is an iEEE floating point value.

7.3.7 Setting a Setpoint Value

Set the setpoint number in Parameter 1 and then set the setpoint value in Parameter 2. Send command 10 to write the setpoint value.

> *Example: Setting setpoint #2 to 100.1*

Command Word = 10
Parameter 1 = 2
Parameter 2 = 1120416563. This value is an iEEE floating point value.

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8.0　Specifications

Dimensions:

2.0 x 1.9 x 0.75 in (52 x 49 x 19 mm)

Power Requirements:

3.3 VDC, 250 mA

Connector Type:

RJ-45
10/100 Mbps, full or half duplex operation

Diagnostic LEDs:

Network status, Module status, Link status

IP Address Range:

Full IP address range

Environmental Specifications:

Temperature　　　　　　-40° to 158° F (-40° to 70° C)

Compliance:

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