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About This Manual

This manual provides information needed to install and use the Rice Lake Weighing Systems EtherNet/IP™ Interface. The EtherNet/IP Interface allows 520, 720i®, 820i®, and 920i® indicators to communicate with an EtherNet/IP network.

See the 520, 720i, 820i, or 920i Installation Manual for additional installation information and detailed descriptions of indicator functions.

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

Warning

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

The Ethernet card should NOT be used to communicate between buildings. The Ethernet port is not suitable for connection to circuits used outside the building and is subject to lightning or power faults.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.ricelake.com.

1. EtherNet/IP™ is a trademark of ControlNet International, Ltd. under license by Open DeviceNet Vendor Association, Inc.

1.0 Introduction

EtherNet/IP (“Ethernet Industrial Protocol”) is an open industrial networking standard that allows control applications to make use of widely-available Ethernet communications components and physical media. EtherNet/IP 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 a 520, 720i, 820i or 920i indicator to the network and provides limited control of indicator functions to the programmer. Indicator configuration and calibration cannot be performed through the EtherNet/IP Interface.

2. CIP™ and DeviceNet™ are trademarks of the Open DeviceNet Vendor Association.
3. ControlNet™ is a trademark of ControlNet International, Ltd.
2.0 Installation

The EtherNet/IP Interface hardware consists of a dual-board option card. EtherNet/IP-specific functions are provided by an EtherNet/IP module, which is factory-installed onto a bus adapter card. The bus adapter card plugs into an open option card slot on the 520, 720i, 820i, or 920i CPU board (or expansion board) and provides power and access from the indicator bus to the EtherNet/IP module.

This section describes the procedures used to install the EtherNet/IP Interface into the 520, 720i, 820i and 920i indicators.

2.1 Installing the EtherNet/IP Interface

Use the following procedure to install the EtherNet/IP Interface into 520, 820i, and 920i indicators.

2.1.1 Installing EtherNet/IP Option in the 720i/820i/920i

Use the following procedure to install the EtherNet/IP Interface in the 720i, 820i or 920i indicator:

1. Disconnect indicator from power source.

   Disconnect power before removing indicator backplate.

   Warning The 720i, 820i and 920i have no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.

2. Open indicator enclosure. For indicator models with backplates, place indicator face-down on an antistatic work mat. Remove screws that hold the backplate to the enclosure body.

   Caution Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.

3. Carefully align the large connector (J1) on the bus adapter card with connector J6 on the 820i, J12 on the 720i, J5 or J6 on the 920i CPU board. Press down to seat the bus adapter card in the CPU board connector.

4. Use the screws and lockwashers provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board.

5. Wire the card to the network as described in Section 2.2 on page 4.

6. Use cable ties to secure loose cables inside the enclosure.

7. For indicator models that include a backplate, position the backplate over the enclosure and reinstall the backplate screws. For the 820i and 920i desktop and universal models, use the torque pattern shown in Figure 2-3 to prevent distorting the backplate gasket. Torque screws to 15 in-lb (1.7 N-m)
2.1.2 Installing EtherNet/IP Option in the 520

Use the following procedure to install the EtherNet/IP Interface in the 520 indicator:

1. Disconnect indicator from power source.

   **Warning** Disconnect power before removing indicator enclosure cover.

2. Place indicator on an antistatic work mat. Remove screws that hold the enclosure cover to the enclosure body.

   **Caution** Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.

3. Carefully align the large option card connector with connector J2 on the CPU board (see Figure 2-5). Press down to seat the option card in the CPU board connector.

4. Use screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board.

5. Install terminal block end of cable assembly to EtherNet/IP option card.

6. Remove existing cover plate.

7. Re-use kep nuts to secure EtherNet/IP cover plate to standoffs located on inside of enclosure backplate (see Figure 2-6).

8. Once cabling is complete, position the cover over the enclosure and reinstall the screws.

9. Reconnect power to the indicator.
10. The indicator automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify the newly-installed EtherNet/IP interface to the system.

**DIP Switch Function**

Setting any one of the DIP switches to the ON position will set a static IP address when the indicator is powered up. This IP address will be 192.168.0.XXX where the XXX = DIP switch setting. Example: If switch #8 is ON, and the rest are OFF, the static IP address will be 192.168.0.1. If switch #7 is ON and the rest are OFF, the IP address will be 192.168.0.2.

**2.2 EtherNet/IP Network Connections**

Feed the EtherNet/IP network cable through the indicator cord grip. Allow enough cable for routing along inside of enclosure to connector on the EtherNet/IP module. Connect network cables to connector on the EtherNet/IP module (see Figure 2-4), then use cable ties to secure network cables to the cable tie mounts.

*Note To configure an IP Address, refer to Section 3.1 on page 6.*

**2.3 LED Status Indicators**

An LED array on the EtherNet/IP module provides status information for troubleshooting (see Figure 2-7):

- LED 1 provides status about the link
- LED 2 provides status information about the EtherNet/IP module
- LED 3 provides network status
- LED 4 flashes whenever a packet is sent or received

### LED 1: Link Status

<table>
<thead>
<tr>
<th>LED 1 Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>On</td>
<td>Module has a link</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Link not sensed</td>
</tr>
</tbody>
</table>

### LED 2 Status

<table>
<thead>
<tr>
<th>LED 2 Color/State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady off</td>
<td>No power to module</td>
</tr>
<tr>
<td>Steady green</td>
<td>Module operating correctly</td>
</tr>
<tr>
<td>Flashing green</td>
<td>Module not configured</td>
</tr>
<tr>
<td>Flashing red</td>
<td>Recoverable fault detected</td>
</tr>
<tr>
<td>Steady red</td>
<td>Internal error detected</td>
</tr>
<tr>
<td>Flashing red/green</td>
<td>Performing power-on self-test</td>
</tr>
</tbody>
</table>

*Figure 2-6. EtherNet/IP 520 Backplate Cable Assembly*

*Figure 2-7. EtherNet/IP Status LED Module*
**LED 3: Network Status.**

<table>
<thead>
<tr>
<th>LED 3 Color/State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady off</td>
<td>No power to module or no IP address assigned</td>
</tr>
<tr>
<td>Steady green</td>
<td>At least one EtherNet/IP connection established</td>
</tr>
<tr>
<td>Flashing green</td>
<td>No EtherNet/IP connections</td>
</tr>
<tr>
<td>Flashing red</td>
<td>Connection time-out</td>
</tr>
<tr>
<td>Steady red</td>
<td>Duplicate IP address detected</td>
</tr>
<tr>
<td>Flashing red/green</td>
<td>Performing power-on self-test</td>
</tr>
</tbody>
</table>

*Table 2-3. LED 3 Status*

**LED 4: Activity**

LED 4 flashes green each time a packet is transmitted or received.

**Watchdog LED**

A single bi-color LED on the surface of the EtherNet/IP module provides diagnostic information for debugging the module itself. Table 2-4 lists the indications provided by the debugging LED.

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No power</td>
</tr>
<tr>
<td>Red, 4Hz</td>
<td>DPRAM check fault</td>
</tr>
<tr>
<td>Red, 2Hz</td>
<td>ASIC and FLASH ROM check fault</td>
</tr>
<tr>
<td>Red, 1Hz</td>
<td>RAM check fault</td>
</tr>
<tr>
<td>Green, 2Hz</td>
<td>Module not initialized</td>
</tr>
<tr>
<td>Green, 1Hz</td>
<td>Module initialized and running</td>
</tr>
</tbody>
</table>

*Table 2-4. Debugging LED Indications*
3.0 Configuration Procedure

3.1 Configuration Procedure for 520, 720i, 820i, 920i and PLC

The following steps describe a typical procedure used to configure EtherNet/IP for an 820i or 920i indicator and a PLC. EtherNet/IP can be configured using either your web browser or the CompactLogix L32D controller with RSLogix 500 software. Figure 3-1 shows the configuration screen using your web browser.

1. Use iRev (920i) or Revolution III (520, 720i, or 820i) to configure the scales and scale capacities for the indicator.
2. Calibrate each scale and load any custom program required.
3. Power down the indicator. Install the EtherNet/IP option card (PN 87 803). Write down the MAC address shown on the back of the card.
4. Connect the EtherNet/IP option card to the network.
5. Use the MAC address on the back of the card and IPCONFIG Ethernet Configurator software to assign an IP Address to the Ethernet I/P card. Note that the IPCONFIG needs to be loaded on a PC that is on the same network as the Ethernet I/P card.
6. Load RSLogix 5000 onto the same PC running iRev or Revolution III.
7. Load RSLinx and configure and Comm Driver driver.
8. Use the RS-232 connector to connect the PC to the PLC.
10. Use the Generic Ethernet Module to add the indicator with EtherNet/IP to the I/O configuration; assign a name as shown in Figure 3-2 on page 7.
11. The module connection parameters are:
   - Input assembly inst. = 100  Size = 4
   - Output assembly inst. = 150  Size = 4
   - Configuration assembly inst. = 1  Size = 0
   - Data type is int.
12. Using RSLinx®, configure an Ethernet driver.

13. Attempt a connection to the PLC using RSLogix 5000. (See the manual, ENET-UM001D-EN-P, available on the Rockwell Automation website, for instructions.)

14. Without a program loaded on the PLC, turn the key to run. Click on the RLWS EtherNet/IP module in the I/O Config window. Another window will open that shows module properties.

15. Click on Module Info and verify that Anybus-S EtherNet/IP is shown as the Product Name. If so, the PLC is communicating with the EtherNet/IP card.

16. Close the Module Info window, then open Controller Tags and verify the three tags assigned for this module. For example, if the name assigned to the module was RLWS_EthernetIP, listed tags should include RLWS_EthernetIP:I (input buffer), RLWS_EthernetIP:O (output buffer), and RLWS_EthernetIP:C (control buffer).

17. Data should begin filling the input buffer from the indicator. Initial data received will not make sense, but data in Word 4 should change with changes in the weight applied to the scale.

18. Write the ladder or structured language code for the PLC. When data is acquired from the indicator, a SWPB (swap bits) instruction is required to swap the upper and lower bytes for all four outbound words. Data received must also use the SWPB instruction to swap inbound words. By using the SWPB instruction, words can be MOVEd to a destination tag then treated as real values elsewhere in the PLC program. See Figure 3-3.

---

Figure 3-2. Ethernet Modules Display
Figure 3-3. Ladder Logic for Bit-swapping
Use the following rungs when using commands 256-323

```
<table>
<thead>
<tr>
<th>0</th>
<th>SWPB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swap Byte</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Order Mode</td>
</tr>
<tr>
<td></td>
<td>Dest EthIP_input[0]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>SWPB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swap Byte</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Order Mode</td>
</tr>
<tr>
<td></td>
<td>Dest EthIP_input[1]</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>2</th>
<th>SWPB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swap Byte</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Order Mode</td>
</tr>
<tr>
<td></td>
<td>Dest EthIP_input[3]</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>3</th>
<th>SWPB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swap Byte</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Order Mode</td>
</tr>
<tr>
<td></td>
<td>Dest EthIP_input[2]</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>4</th>
<th>SWPB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swap Byte</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Order Mode</td>
</tr>
<tr>
<td></td>
<td>Dest RLWS:O.Data[0]</td>
</tr>
</tbody>
</table>
```

*Figure 3-4. Ladder Logic for EtherNet/IP Page 1*
This one needs to be swapped with 2 in order to make float commands work. So the correct value is sent.

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

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.

(End)

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

Commands are used by the EtherNet/IP master device to send and receive data from the EtherNet/IP Interface as integer or floating-point data. The master sends eight bytes in the output format (used to write commands to the indicator) and reads eight bytes in the input format (used to read data from the indicator).

Decimal Point Handling

Integer commands return no decimal point information to the master. For example, a value of 750.1 displayed on the indicator is returned to the master as 7501. Floating point commands support decimal point information with no special handling.

4.1 Output Command Format

To perform a command, the master uses the output command format to send four 16-bit words to the EtherNet/IP Interface. These four words contain the command and any parameters necessary to execute it. The output command format is shown in Table 4-1.

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word 1</td>
<td>Command number</td>
</tr>
<tr>
<td>Word 2</td>
<td>Parameter</td>
</tr>
<tr>
<td>Word 3</td>
<td>Value (MSW)</td>
</tr>
<tr>
<td>Word 4</td>
<td>Value (LSW)</td>
</tr>
</tbody>
</table>

Table 4-1. Output Command Format

The contents of each output command format word are described below:

Command number

The number representing the indicator command is sent in the first word. Table 4-2 lists the commands that can be specified for 520, 820i, 720i and 920i indicators.

NOTE: A lockout feature that looks for any change in the output format data is incorporated into the indicator receive mechanism to prevent inundation by the same command. Repeated commands must be separated by any other valid command/parameter/value combination.

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Hex</th>
<th>Command Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0x000</td>
<td>Return Status and Weight (integer)</td>
</tr>
<tr>
<td>1</td>
<td>0x001</td>
<td>Display Channel</td>
</tr>
<tr>
<td>2</td>
<td>0x002</td>
<td>Display Gross Weight</td>
</tr>
<tr>
<td>3</td>
<td>0x003</td>
<td>Display Net Weight</td>
</tr>
<tr>
<td>4</td>
<td>0x004</td>
<td>Display Count</td>
</tr>
<tr>
<td>9</td>
<td>0x009</td>
<td>Gross/Net key press (toggle)</td>
</tr>
<tr>
<td>10</td>
<td>0x00A</td>
<td>Zero</td>
</tr>
</tbody>
</table>

Table 4-2. Remote Commands
Parameter value
To allow communication with a multi-scale 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 in Section 4.3 on page 13 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.

4.2 Input Command Format
In response to a command, the EtherNet/IP Interface returns data and status information to the master as four 16-bit words. This information is returned in the input command format shown in Table 4-3.

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.

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Command number</td>
</tr>
<tr>
<td>1</td>
<td>Status</td>
</tr>
<tr>
<td>3</td>
<td>Value (MSW)</td>
</tr>
<tr>
<td>4</td>
<td>Value (LSW)</td>
</tr>
</tbody>
</table>

Table 4-3. Input Command Format

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.

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

<table>
<thead>
<tr>
<th>Word 2</th>
<th>Indicator Status Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Error</td>
</tr>
<tr>
<td>01</td>
<td>Tare not entered</td>
</tr>
<tr>
<td>02</td>
<td>Not zero</td>
</tr>
<tr>
<td>03</td>
<td>Weight invalid</td>
</tr>
<tr>
<td>04</td>
<td>Standstill</td>
</tr>
<tr>
<td>05</td>
<td>Primary units</td>
</tr>
<tr>
<td>06</td>
<td>Tare not acquired</td>
</tr>
<tr>
<td>07</td>
<td>Gross weight</td>
</tr>
<tr>
<td>08</td>
<td>Channel number (NOTE: Value 0 represents scale #32)</td>
</tr>
<tr>
<td>09</td>
<td>Digital input 4 OFF</td>
</tr>
<tr>
<td>10</td>
<td>Digital input 3 OFF</td>
</tr>
<tr>
<td>11</td>
<td>Digital input 2 OFF</td>
</tr>
<tr>
<td>12</td>
<td>Digital input 1 OFF</td>
</tr>
<tr>
<td>13</td>
<td>Not used</td>
</tr>
<tr>
<td>14</td>
<td>Integer data</td>
</tr>
<tr>
<td>15</td>
<td>Positive weight</td>
</tr>
</tbody>
</table>

Table 4-4. Indicator Status Data Format

<table>
<thead>
<tr>
<th>Word 2</th>
<th>Batch Function Status Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Digital input 4 OFF (520) Error</td>
</tr>
<tr>
<td>01</td>
<td>Digital input 3 OFF</td>
</tr>
<tr>
<td>02</td>
<td>Digital input 2 OFF</td>
</tr>
<tr>
<td>03</td>
<td>Digital input 1 OFF</td>
</tr>
<tr>
<td>04</td>
<td>Batch not paused</td>
</tr>
<tr>
<td>05</td>
<td>Batch not running</td>
</tr>
<tr>
<td>06</td>
<td>Batch not stopped</td>
</tr>
<tr>
<td>07</td>
<td>Alarm OFF</td>
</tr>
</tbody>
</table>

Table 4-5. Batch Function Status Data Format
Value
Weight data is returned to the master 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.

4.3 Command Descriptions

NOTE: For all commands that require a scale number, a value of 0 indicates the current scale. Unless otherwise specified, the indicator returns weight and status data for the specified scale.

Return Status and Current Weight as Integer
Command: 0, 0x000
Parameter: Scale number
Command 0 returns the status and weight 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. This command is valid for the 920i only.

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.

Display Piece Count
Command: 4, 0x004
Parameter: Scale number
Command 4 causes the piece count on the specified scale to be displayed and returned. This command is valid only for the 520 indicator, and only if count mode is enabled.

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 may not be evident 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. The tare data continues being returned even if the display times out and returns to another mode.

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. This command is valid for the 920i only.

**Units Key Press (toggle units)**
Command: 19, 0x013
Parameter: Scale number
Command 19 toggles the current format of the specified scale to the next units configured for that scale, as available.

**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 only valid if 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 only valid if 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 only valid if the accumulator for the specified scale is enabled.

**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 Piece Count**
Command: 35, 0x023
Parameter: Scale number
Command 35 returns the piece count value for the specified scale. This command is valid only for the 520 indicator, and only if count mode is enabled.

**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, piece count, or accumulator values, as enabled. On the 920i, the weight value is returned in the mode used to display a scale widget.

**Return Accumulator as Integer**
Command: 38, 0x026
Parameter: Scale number
Command 38 returns the accumulator value for the specified scale. This command is only valid if the accumulator for the specified scale is enabled.

**Return Rate of Change as Integer**
Command: 39, 0x027
Parameter: Scale number
Command 39 returns the current rate of change value for the specified scale. This command is valid only for the 720i, 820i, 920i.

**Return Peak as Integer**
Command: 40, 0x028
Parameter: Scale number
Command 40 returns the net peak value for the specified scale. This command is valid only for the 520 indicator, and only if the peak hold function 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.

**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 (On the 520, status is returned only for the digital inputs.) Use slot number 0 for onboard digital I/O. Indicator status is returned in the status area for the last scale specified.

**Enable Bus Command Handler**  
Command: 128, 0x80  
Parameter: None  
Command 128 enables the bus command handler in a user program in a 920i indicator only. While this handler is enabled, all other PLC commands are disabled.

**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.

**Set 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.

Read Piece Count as Float
Command: 291, 0x123
Parameter: Scale number
Command 291 returns the piece count value for the specified scale in floating-point format. This command is only valid for the 520, and only if count mode is enabled.

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, piece count, rate-of-change, or accumulator values, as enabled. On the 820i/920i, 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. This command is only valid if the accumulator for the specified scale is enabled.

Read Rate of Change as Float
Command: 295, 0x127
Parameter: Scale number
Command 295 returns the current rate of change value for the specified scale in floating-point format. This command is only valid for the 820i and 920i.

Read Peak Value as Float
Command: 296, 0x128
Parameter: Scale number
Command 296 returns the net peak value for the specified scale in floating-point format. This command is only valid for the 520, and only if the peak hold function is enabled.

Set Setpoint Value as Float
Command: 304, 0x130
Parameter: Setpoint number
Value: Target value
Command 304 sets the target value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a target value.

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 only valid if the setpoint is enabled and requires a hysteresis value.

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 only valid if the setpoint is enabled and requires a bandwidth value.

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 only valid if the setpoint is enabled and requires a preact value.

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 only valid if the setpoint is enabled and requires a target value.

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 only valid if the setpoint is enabled and requires a hysteresis value.

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 only valid if the setpoint is enabled and requires a bandwidth value.

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 only valid if the setpoint is enabled and requires a preact value.
Set Register
Command: 368
Registers: 1 thru 256
Command 368 sets register value. 1 through 128 are integer and 129 through 256 are real. This command is only valid for the 720i PCE version.

Get Register
Command: 402
Registers: 1 thru 256
Command 402 returns register value. 1 through 128 are integer and 129 through 256 are real. This command is only valid for the 720i PCE version.
5.0 Appendix

5.1 EDS File

The EDS file for the EtherNet/IP adapter, shown below, is included on the CD that comes with the option. The EDS file must be installed in the host device to enable communication with the indicator.

[File]
DescText = "HMS AnyBus-Communicator EtherNet/IP";
CreateDate = 04-02-2003;
CreateTime = 14:40:00;
ModDate = 07-22-2003;
ModTime = 10:45:00;
Revision = 1.2;

[Device]
VendCode = 90;
VendName = "HMS Networks";
ProdType = 12;
ProdTypeStr = "Communication Adapter";
ProdCode = 1;
MajRev = 1;
MinRev = 17;
ProdName = "Anybus-C EtherNet/IP";
Catalog = "Anybus-C EtherNet/IP";

[Device Classification]
Class1 = EtherNetIP;

[Params]
Param1 =
  0,             $ first field shall equal 0
  ,,             $ path size,path
  0x0000,        $ descriptor
  0xC7,          $ data type : 16-bit Unsigned Integer
  2,             $ data size in bytes
  "Output Size",  $ name
  ",",           $ units
  ",",           $ help string
  0, 504, 16,    $ min, max, default data values
  0, 0, 0, 0,    $ mult, dev, base, offset scaling not used
  0, 0, 0, 0,    $ mult, dev, base, offset link not used
  0;             $ decimal places not used

Param2 =
  0,             $ first field shall equal 0
  ,,             $ path size,path
  0x0000,        $ descriptor
  0xC7,          $ data type : 16-bit Unsigned Integer
  2,             $ data size in bytes
  "Input Size",  $ name
  ",",           $ units
  ",",           $ help string
  0, 504, 16,    $ min, max, default data values
  0, 0, 0, 0,    $ mult, dev, base, offset scaling not used
  0, 0, 0, 0,    $ mult, dev, base, offset link not used
  0;             $ decimal places not used

[Connection Manager]
Connection1 =
0x04010002,  $ trigger & transport
$ 0-15 = supported transport classes (class 1)
$ 16 = cyclic (1 = supported)
$ 17 = change of state (0 = not supported)
$ 18 = on demand (0 = not supported)
$ 19-23 = reserved (must be zero)
$ 24-27 = exclusive owner
$ 28-30 = reserved (must be zero)
$ 31 = client 0 (don't care for classes 0 and 1)
0x44240405,  $ point/multicast & priority & realtime format
$ 0 = O=>T fixed (1 = supported)
$ 1 = O=>T variable (0 = not supported)
$ 2 = T=>O fixed (1 = supported)
$ 3 = T=>O variable (0 = not supported)
$ 4-7 = reserved (must be zero)
$ 8-10 = O=>T header (4 byte run/idle)
$ 11 = reserved (must be zero)
$ 12-14 = T=>O header
$ 15 = reserved (must be zero)
$ 16-19 = O=>T point-to-point
$ 20-23 = T=>O multicast
$ 24-27 = O=>T scheduled
$ 28-31 = T=>O scheduled
,Param1,,  $ O=>T RPI,Size,Format
,Param2,,  $ T=>O RPI,Size,Format
,,  $ config part 1 (dynamic assemblies)
,,  $ config part 2 (module configuration)
"ABC-EIP IO Connection",  $ connection name
"",  $ Help string
"20 04 24 01 2C 96 2C 64";  $ exclusive output path

5.2 EtherNet/IP Interface Specifications

Power Requirements

Bus Adapter Card with EtherNet/IP Module, DC Power:
Supply voltage: 6 VDC, supplied by 520/920i bus
Typical current draw: 270 mA
Power consumption: 1.62 W

Indicators, Typical AC Load:
520  Power (TRMS):3.51 W
     Current (TRMS):33.7 mA
820i Power (TRMS):2.18 W
     Current (TRMS):28.9 mA
920i Power (TRMS):2.18 W
     Current (TRMS):28.9 mA

Communications Specifications

EtherNet/IP Network Communications:
Twisted-pair cabling at 10 or 100Mbps

Environmental Specifications

Temperature: –10° to +40° C (14° to 104° F)

Conformance

The Anybus-S EtherNet/IP Interface has been tested by ODVA’s independent test lab and found to comply with the ODVA composite conformance test, revision 3.

The EtherNet/IP Interface has been found in accordance with EMC directive 89/336/EEC for European standards EN 50081-2 and EN 61000-6-2.
EtherNet/IP Interface Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, “Protecting Your Components From Static Damage in Shipment,” available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

These warranties exclude all other warranties, expressed or implied, including without limitation warranties of merchantability or fitness for a particular purpose. Neither RLWS nor Distributor will, in any event, be liable for incidental or consequential damages.

RLWS and Buyer agree that RLWS’ sole and exclusive liability hereunder is limited to repair or replacement of such goods. In accepting this warranty, the Buyer waives any and all other claims to warranty.

Should the seller be other than RLWS, the Buyer agrees to look only to the seller for warranty claims.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.
