System-10 BTU Meter
BACnet Network Interface Installation Guide

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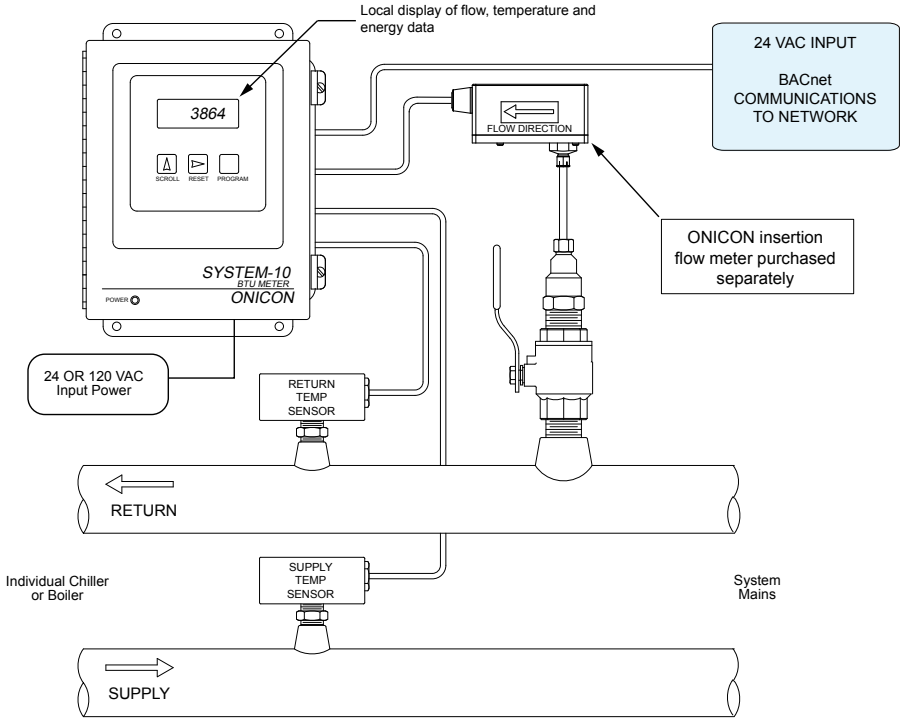
SECTION 1: INTRODUCTION

1.1 PURPOSE OF THIS GUIDE

The purpose of this guide is to provide installation and commissioning procedures and basic operating and servicing instructions for the ONICON System-10 BTU Meter.

1.2 TYPICAL SYSTEM-10 BTU METER

ONICON'S System-10 is a true heat (Btu) computer which accepts data from several sensors, performs a series of computations with that data, and displays and/or transmits the results as an indication of the amount of heat (Btu's) being transferred per unit time or as a totalized amount.



1.3 SPECIFICATIONS

BACnet NETWORK INTERFACE

MS/TP RS485

Transceiver: 2-wire, half-duplex
MAC address (device address) range: 1 - 254 (Default: 017)
Device Instance: 0 - 4,194,303 (Default: 57017)
Baud rate: 9600, 19200, 38400, 76800 or Auto-Baud (Default: Auto)
Termination: 120 ohms or none (Default: none)
Biasing: None
Flow control: None

UDP/IP

Transceiver: 10Base T, 10Mbps, Rj45 connection
Device Instance: 0 - 4,194,303 (Default: 57017)
Default IP address: 192.168.1.24 (Subnet Mask 255.255.255.0) (Port 47808)
Flow control: None

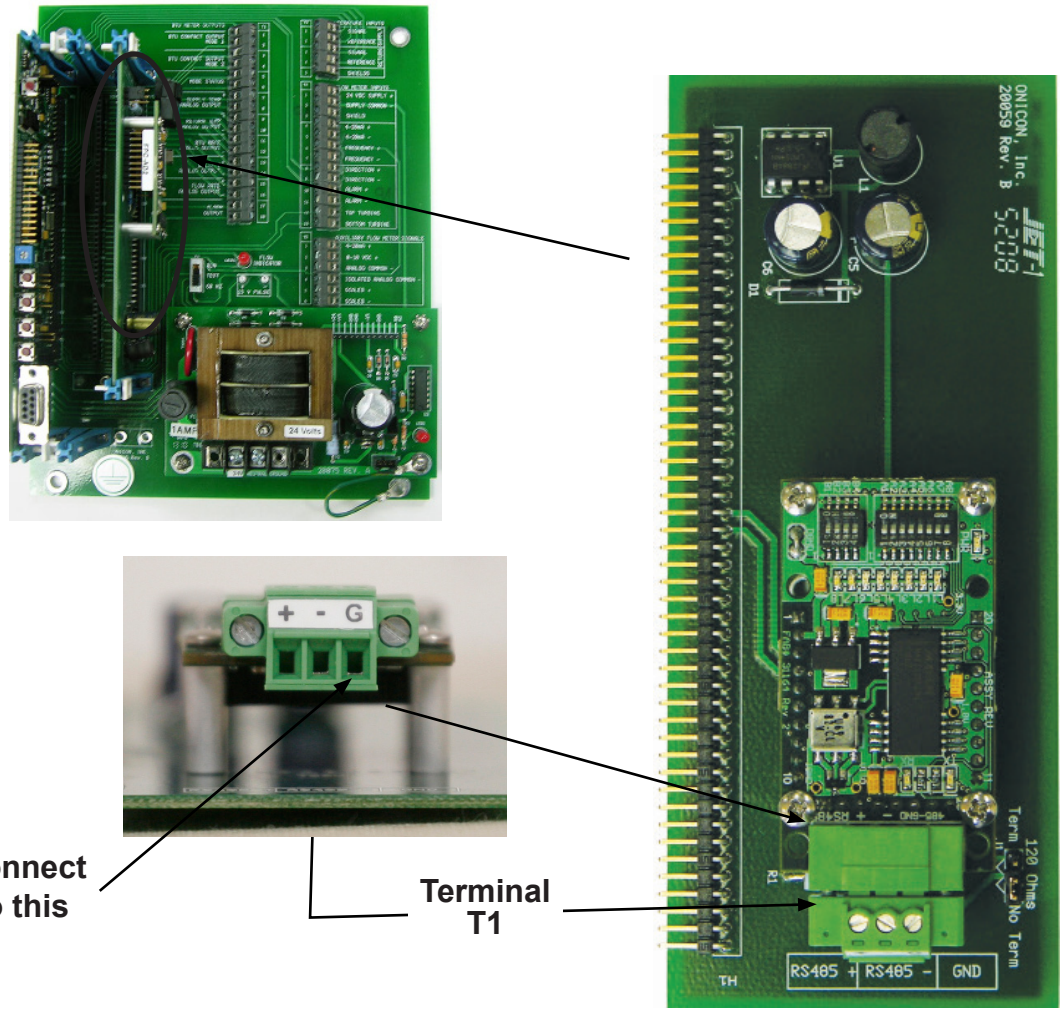
1.4 NETWORK SIGNAL CONNECTIONS

1.4.1 BACnet MS/TP

BACnet MS/TP, 2-wire (half-duplex) serial output connections are connected to terminal T1 as shown. Do not exceed 4.4 in-lb (0.5 Nm) of torque when tightening.

CAUTION

Only qualified service personnel should make connections between the System-10 BTU Meter and the user's external equipment. ONICON assumes no responsibility for damage caused to the external equipment as a result of an improper installation.



CAUTION

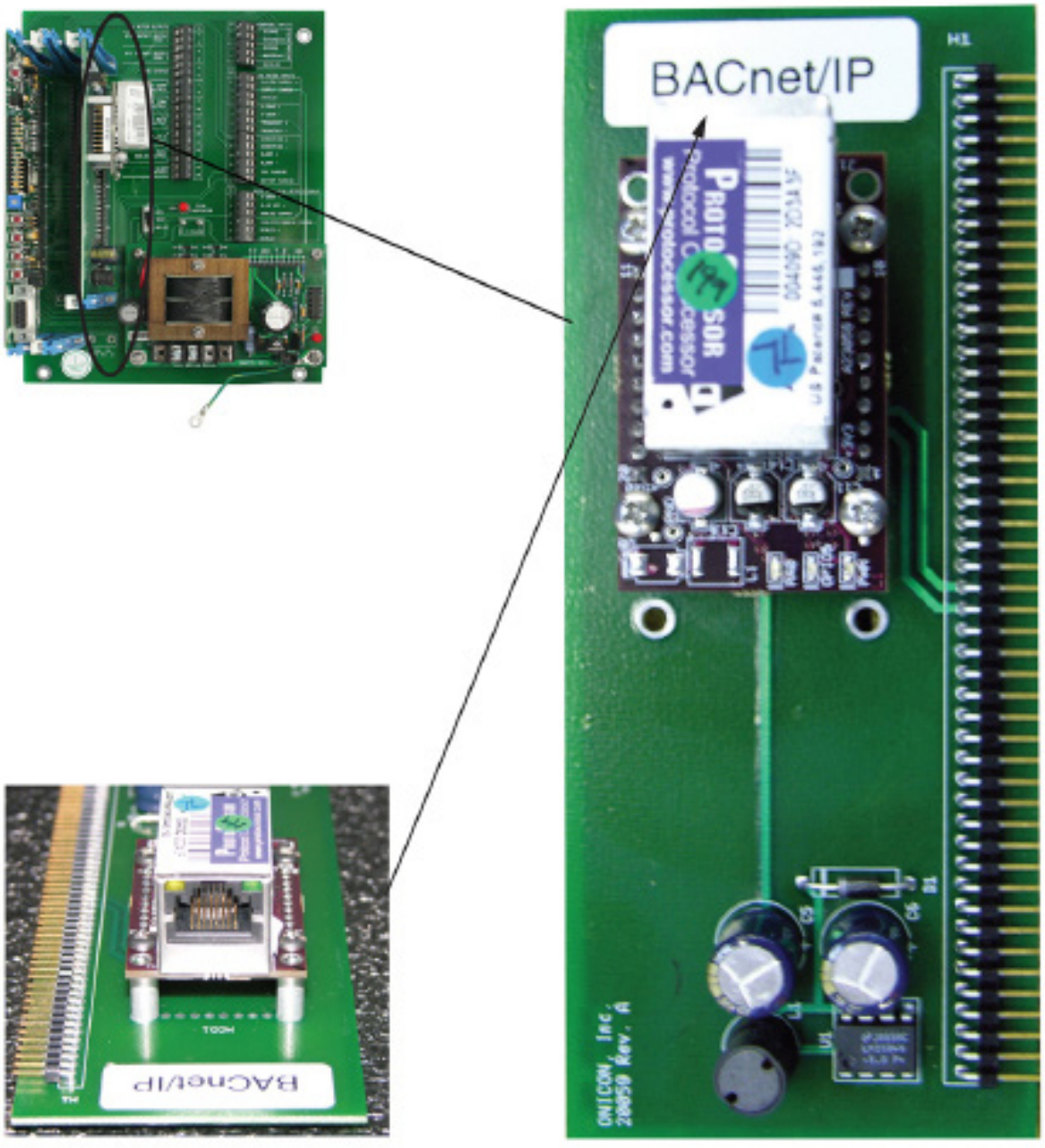
Incoming and outgoing RS485 cable shield wires should be connected together, but must not be connected to the Btu meter.

1.4.2 BACnet/IP

BACnet/IP, 10Base T output connections are made as shown. Requires 10Base T cable and Rj45 connector.

CAUTION

Only qualified service personnel should make connections between the System-10 BTU Meter and the user's external equipment. ONICON assumes no responsibility for damage caused to the external equipment as a result of an improper installation.



NOTE: RJ45 Connector

1.4.3 Optional Network Interface With Isolated Digital Pulse Input (Di3)

The System-10 BTU Meter can be provided with an auxiliary pulse input for totalizing pulse outputs from external devices such as water or gas meters. Pulses are accumulated in an internal register, and the totalized value is available on the network. This register can be zeroed via the network. The maximum register total is 9,999,999. The register will rollover to zero when this value is exceeded.

If the auxiliary pulse input option was ordered at the same time the BTU Meter was ordered, it will arrive fully configured and ready to use. If it was ordered after the BTU Meter was delivered and is being installed as a field upgrade, it may be necessary to configure the pulse input. The information required to configure the input is provided below and on the following pages:

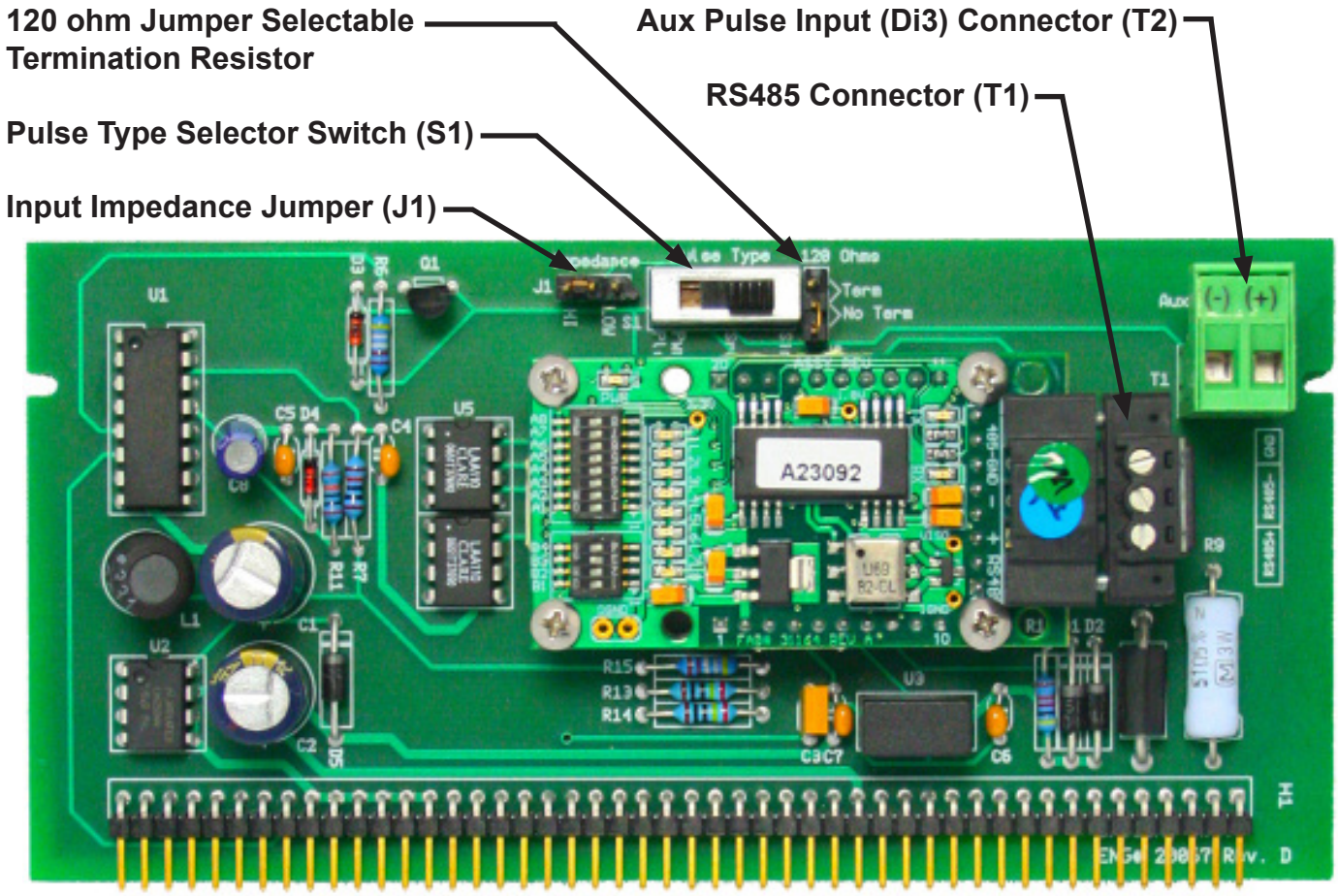
The input pulse must meet the following criteria:

1. Frequency input range, 50 Hz maximum
2. 10 millisecond minimum pulse duration

Input Pulse Definition:

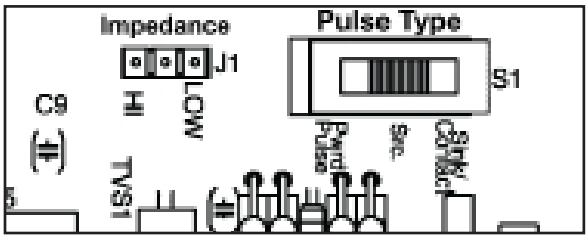
In order to configure the communications card auxiliary pulse input, you must first determine which type of pulse your meter produces. The allowable types of input pulses are described on the following pages. Based on the type of pulse, set the selector switch (S1) on the communications circuit board (Fig. 1) to the correct setting.

Fig. 1



NOTE: BACnet MS/TP shown above. See appendix A-4 for BACnet/IP auxiliary input board.

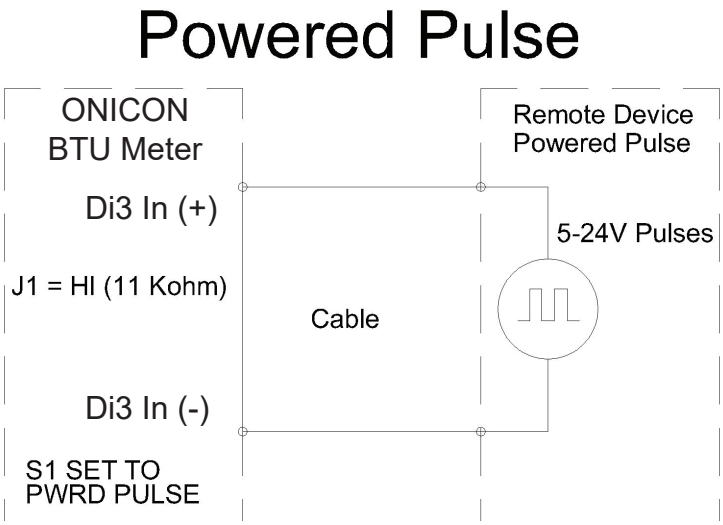
Pulse Switch and Jumper Location



Powered Pulse:

This type of output refers to a pulse which has an associated voltage with it (see Fig. 2). Set the selector switch, S1 to Pwrd Pulse. The allowable voltage range is 5-24 VDC. The input impedance is set at the factory to be 11 KOHM via the impedance selector jumper (J1, see Fig. 1). A lower impedance, 3 KOHM can be selected if required by the instrument providing the pulse output. Consult the instrument manufacturer or ONICON if you are uncertain as to the proper jumper selection.

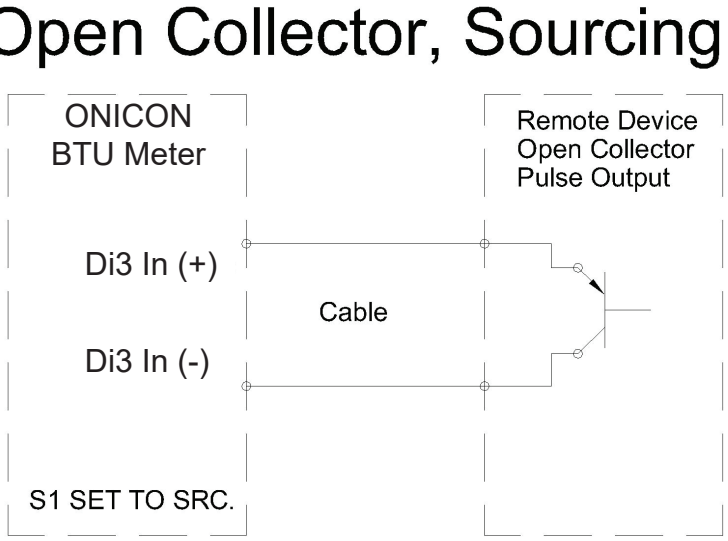
Fig. 2



Open Collector (Sourcing):

This type of output refers to an open Collector Switch configured for a sourcing function (see Fig. 3). Set the selector switch, S1 to SRC. The switch must be rated for at least 20 mA at 20 VDC.

Fig. 3



Open Collector Sinking or Dry Contact:

This type of output refers to an open collector switch configured in a current sinking arrangement or a dry contact switch (see Fig. 4 and 5). Set the selector switch, S1 to Sink. In either case, the switch must be rated for at least 20 mA at 20 VDC.

Fig. 4

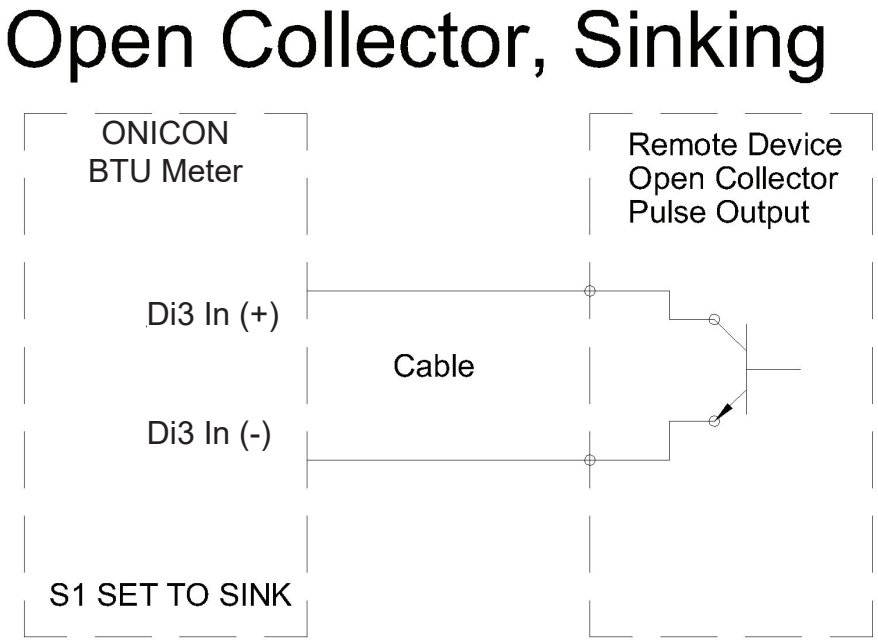
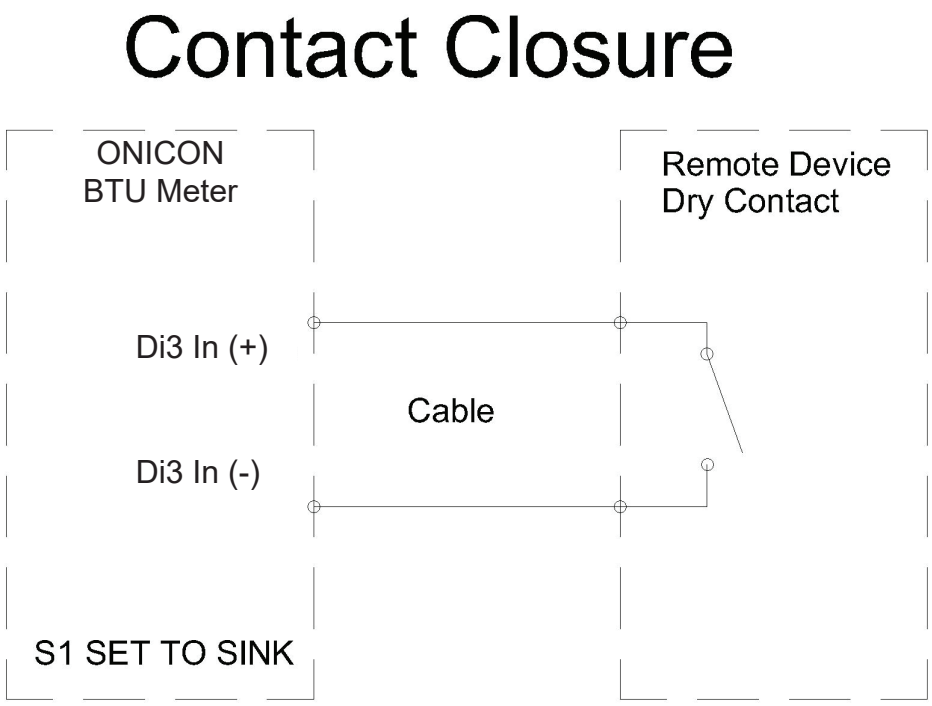


Fig. 5



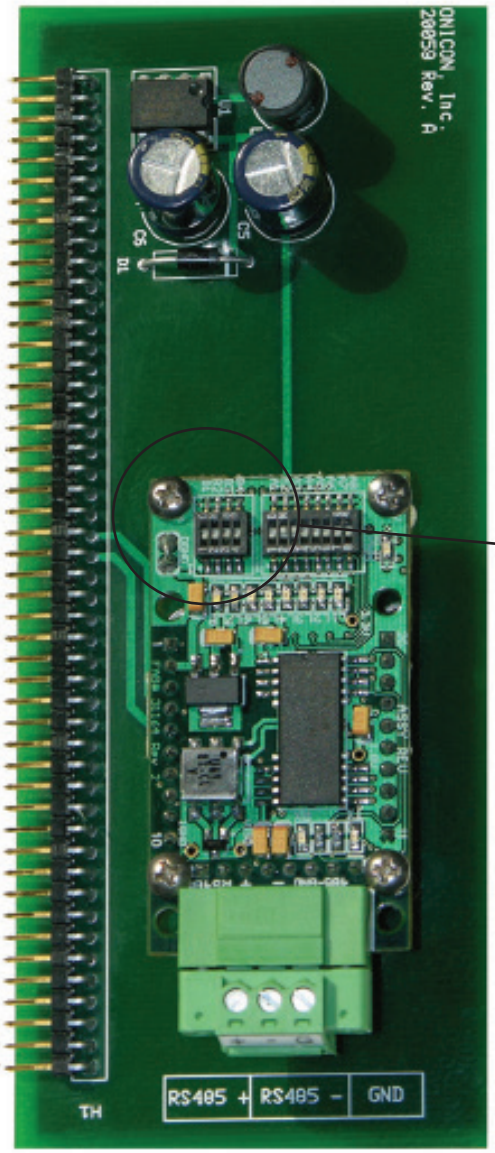
1.5 BACnet MS/TP BAUD RATE, BIASING & TERMINATION

1.5.1 Baud Rate

Every ONICON Btu meter is individually programmed at the factory with application specific data provided by the customer during the process of ordering the meter, and this normally includes the Baud rate setting. If the Baud rate was provided, the meter will be configured to operate at the specified rate. The standard Baud rate settings are 9600, 19200, 38400 and 76800 Baud.

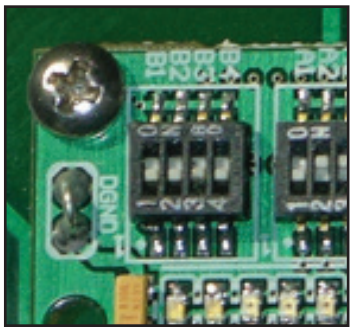
If the Baud rate setting was not provided to ONICON, the System-10 will be configured to "auto" detect the Baud rate of the network. In this configuration, the meter should detect and automatically adjust to the proper rate when it is connected to the network.

The Baud rate setting can be manually changed in the field. The photos and table below show the Baud rate dipswitch settings.



(Circuit board shown upside down for clarity.)

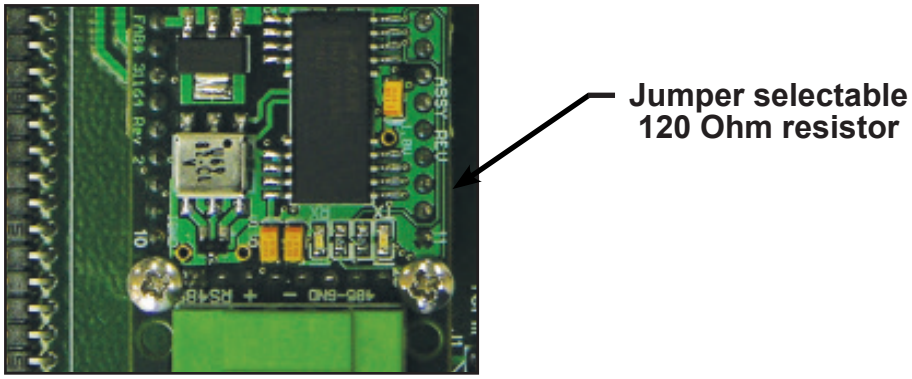
B1	B2	B3	B4	Rate
0	0	0	0	Autobaud
1	0	0	0	9600
0	1	0	0	19200
0	0	1	0	38400
0	0	0	1	76800



Baud Rate Dip Switches

1.5.2 Biasing and Termination

The ONICON System-10 does not provide biasing voltage to the RS485 network. A jumper selectable 120Ω termination resistor is provided as show below. The termination resistor should only be used when the display is installed at the end of the line.



NOTE: See Fig. 1 on page 8 to locate the termination resistor on network interface board with auxiliary input.

1.6 NETWORK ADDRESSING

Before the System-10 can communicate on the BACnet network, the appropriate addresses must be programmed into the Btu meter.

For MS/TP networks the required addresses are the MAC address and the device instance number. Both must be assigned to the display. Section 1.6.1 details the procedure for changing both the MAC address and the device instance number.

For IP networks, an IP address and a device instance number must be assigned to the meter. In addition, managed IP networks may require a gateway address. The procedure for assigning the device instance number is detailed in section 1.6.1. Procedures for entering the IP address and the gateway address are detailed in sections 1.6.2 and 1.6.3. Both require the use of the RUInet utility program and a PC with an Ethernet card and an available port.

1.6.1 Changing the MAC Address and Device Instance Number

To communicate with the network, the BACnet MS/TP interface requires a MAC address (Station I.D.) and a device instance number (Node I.D.). The BACnet/IP interface does not require a MAC address, only the device instance number. The MAC address can be any number from 001 – 254. The device instance number can be any number from 0 – 4,194,303. Both addresses are entered via the System-10 user interface on the front panel of the meter. The procedure for entering or changing either the MAC address or the device instance number is outlined in the table on the next page.

IMPORTANT NOTE

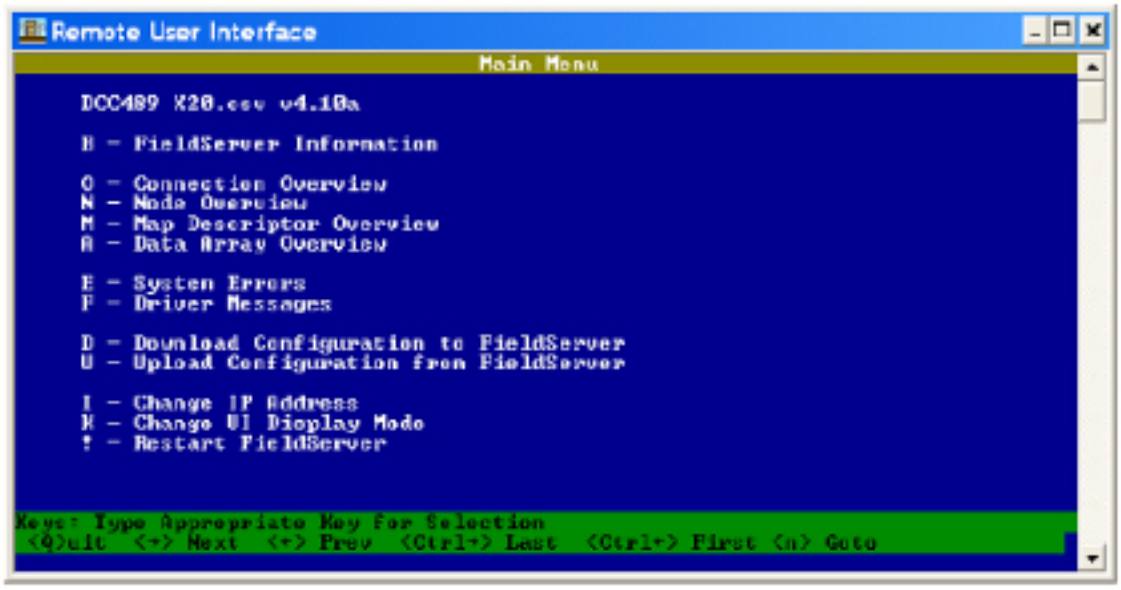
As per the BACnet standard, assigning a MAC address of 128 or higher will disable the "automatically discover new devices" feature in the host software. Displays with a MAC address of 128 or higher are slave devices and must be manually added to the network.

STEP	ACTION	REACTION	COMMENT
0	Obtain MAC address & device instance number from the network administrator.	None.	The MAC address is a three digit number from 001 – 254. The device instance number can be anything from 0 – 4,194,303.
1	With the meter running, open the front panel, locate and momentarily press the pushbutton switch DEV ADD / PROG ENAB.	None.	DEV ADD / PROG ENAB is located in the lower left corner of the System-10 processor board next to the DB9 connector (See appendix page A-1).
2	Momentarily press the PROGRAM pushbutton on the front panel of the display. If this is not done, the display will revert to the RUN mode after 5 minutes.	The System-10 will change to the PROGRAM mode. The top line of the LCD will indicate PPPPPPPP. The second line will read DEVICE ID and the first digit of the 3 digit MAC address will be blinking.	The PROGRAM pushbutton is on the front panel.
3	Successively press the SCROLL pushbutton to increment the number to the desired value from 0 – 9.	The blinking number increments by one each time you press the SCROLL pushbutton.	The SCROLL pushbutton is on the front panel.
4	Momentarily press the RESET pushbutton once.	The second digit will now be blinking.	The RESET pushbutton is on the front panel.
5	Successively press the SCROLL pushbutton to increment the number to the desired value from 0 – 9.	The blinking number increments by one each time you press the SCROLL pushbutton.	The SCROLL pushbutton is on the front panel.
6	Momentarily press the RESET pushbutton once.	The third digit will now be blinking.	The RESET pushbutton is on the front panel.
7	Successively press the SCROLL pushbutton to increment the number to the desired value from 0 – 9.	The blinking number increments by one each time you press the SCROLL pushbutton.	The SCROLL pushbutton is on the front panel.
8	Once the correct address is displayed, momentarily press the PROGRAM pushbutton.	The INSTNCE page is now displayed with the first digit of the device instance number blinking.	The PROGRAM pushbutton is on the front panel.
9	Use the SCROLL pushbutton and RESET pushbutton as described above to enter the new device instance number.	Each digit will increment and the RESET pushbutton will advance the blinking cursor to the next digit.	The SCROLL pushbutton and the RESET pushbutton are on the front panel.
10	Once the correct address is displayed, momentarily press the PROGRAM pushbutton.	The FM LOCN page appears with UNKNWN defaulted as the current location.	The PROGRAM button is on the front panel.
11	Press the SCROLL button.	The setting will toggle between UNKNOWN, SUPPLY, and RETURN.	Refer to Section 4.5 of the System-10 Installation and Operation Guide if you wish to change the settings.
12	Press the PROGRAM button.	The FRONT PANEL RESET page appears.	It is not necessary to change anything on this page.
13	Momentarily press the PROGRAM pushbutton.	The SAVE CHANGES page appears.	The new addresses must be saved to take effect.
14	Momentarily press the SCROLL pushbutton.	The “N” changes to “Y” on the SAVE CHANGES page.	The “Y” must be selected in order for the new addresses to take effect.
15	Momentarily press the PROGRAM pushbutton.	The new addresses are saved and the display will revert to the RUN mode.	

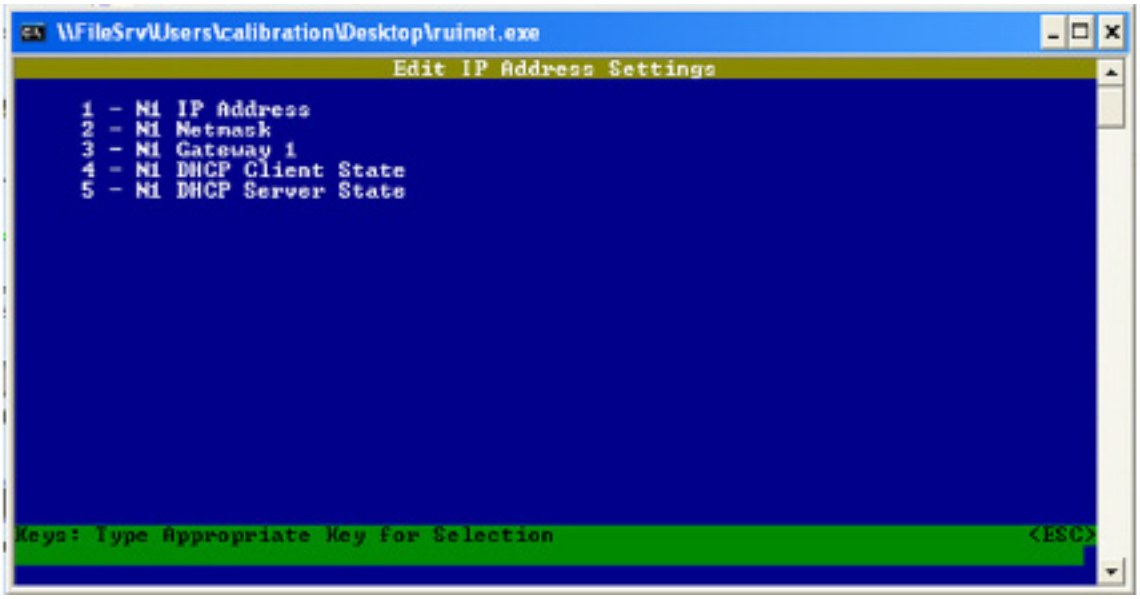
1.6.2 Changing the IP Address

Changing the IP address requires the use of RUInet utility software and a PC with an Ethernet card and an available port. Assuming the Btu meter is programmed with the default address (192.168.1.24) the host PC must be configured to operate with an IP address of 192.168.1.1 and a subnet mask of 255.255.255.0. RRUInet is available for download from the ONICON website, http://www.onicon.com/Networking_Information.html.

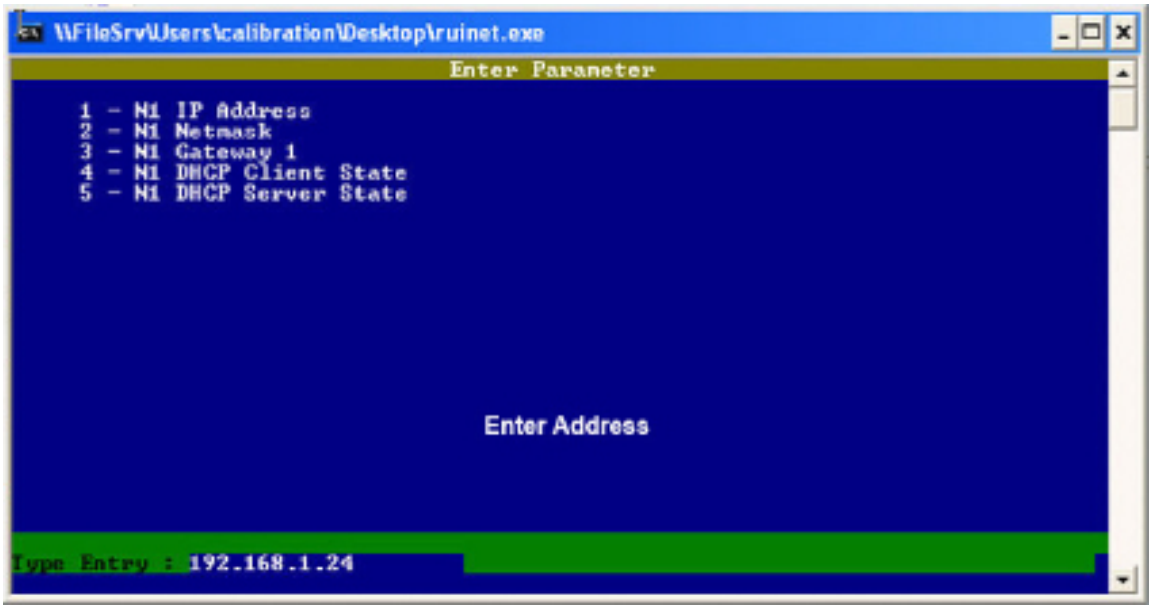
1. Load RUInet and configure the PC as necessary.
2. Connect an RJ45 Ethernet cable between the PC and the System-10 and power the meter. Allow 60 seconds for the System-10 firmware to cycle through start-up diagnostic routines.
3. Open RUInet.
4. From the Remote User Interface main menu (shown on the next page) select option "I", Change IP Address.



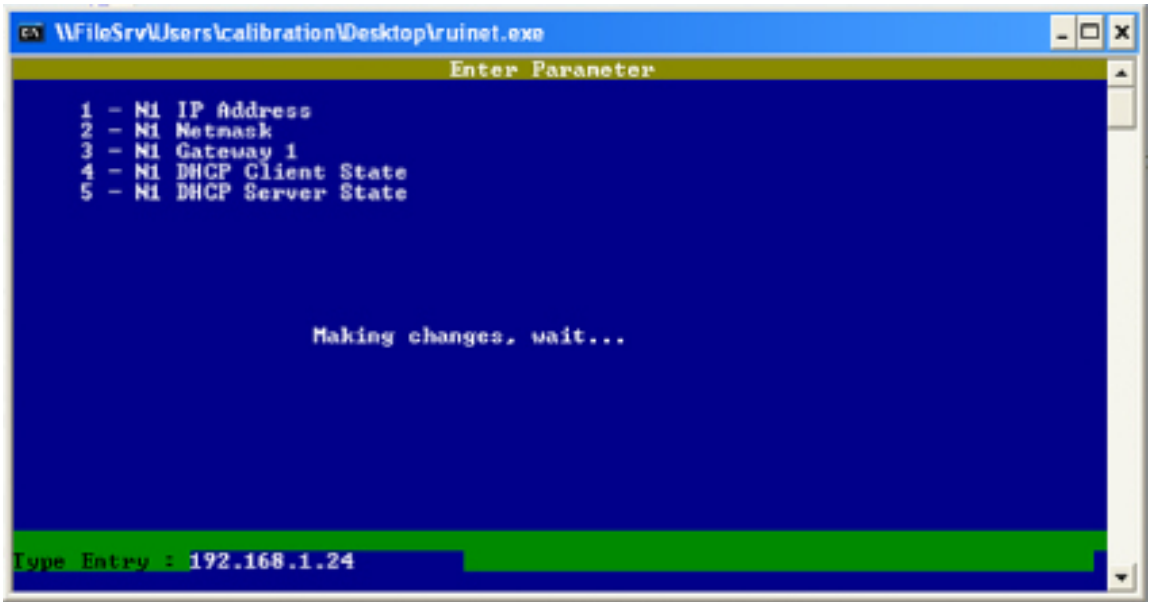
5. From the Edit IP Address Settings menu (shown below) select option 1. Please note that the default subnet mask is 255.255.255.0 and should not be changed unless necessary.



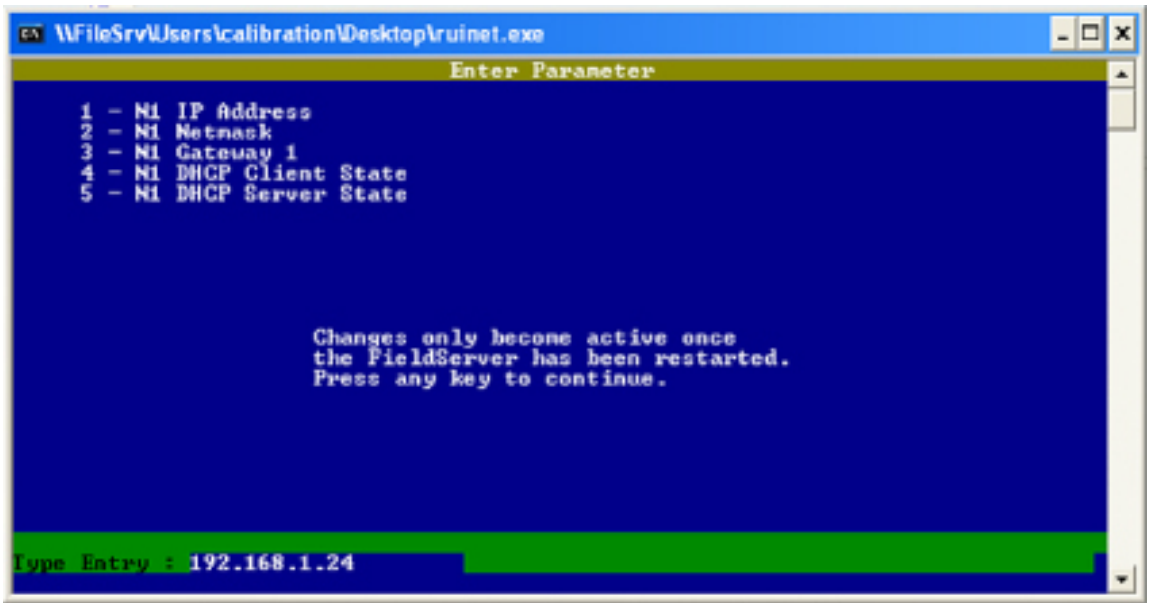
6. Enter the new IP address as shown below and press enter.



7. The following message will appear.



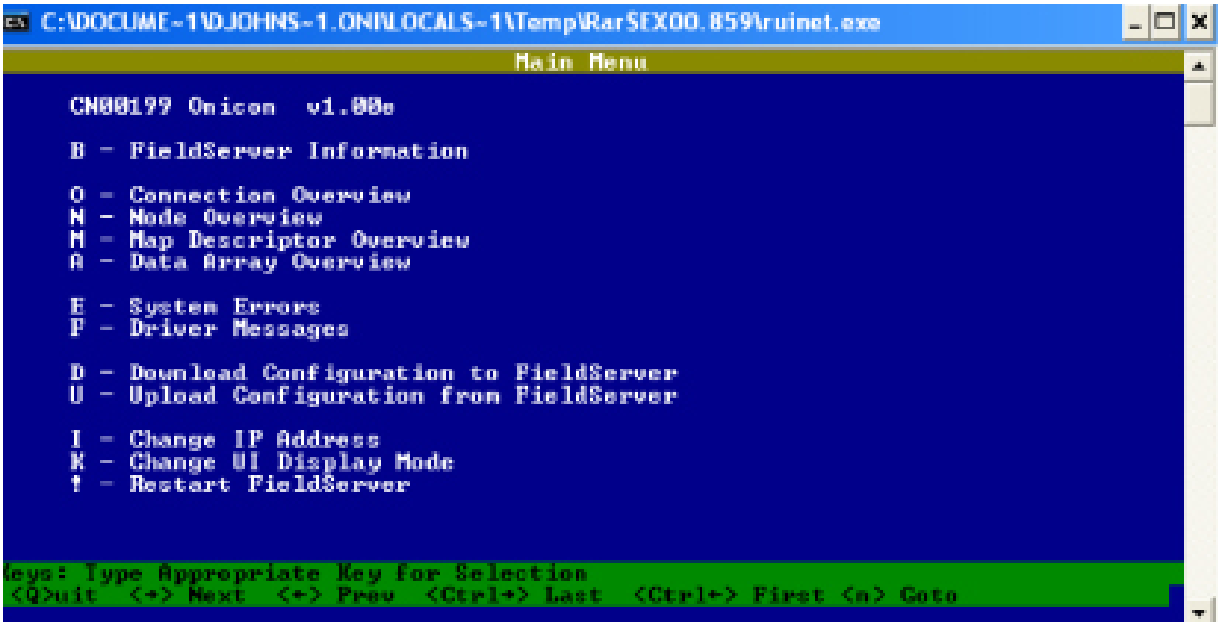
8. When the address change is complete, the following message will appear. You must cycle power to the System-10 for the change to take effect.



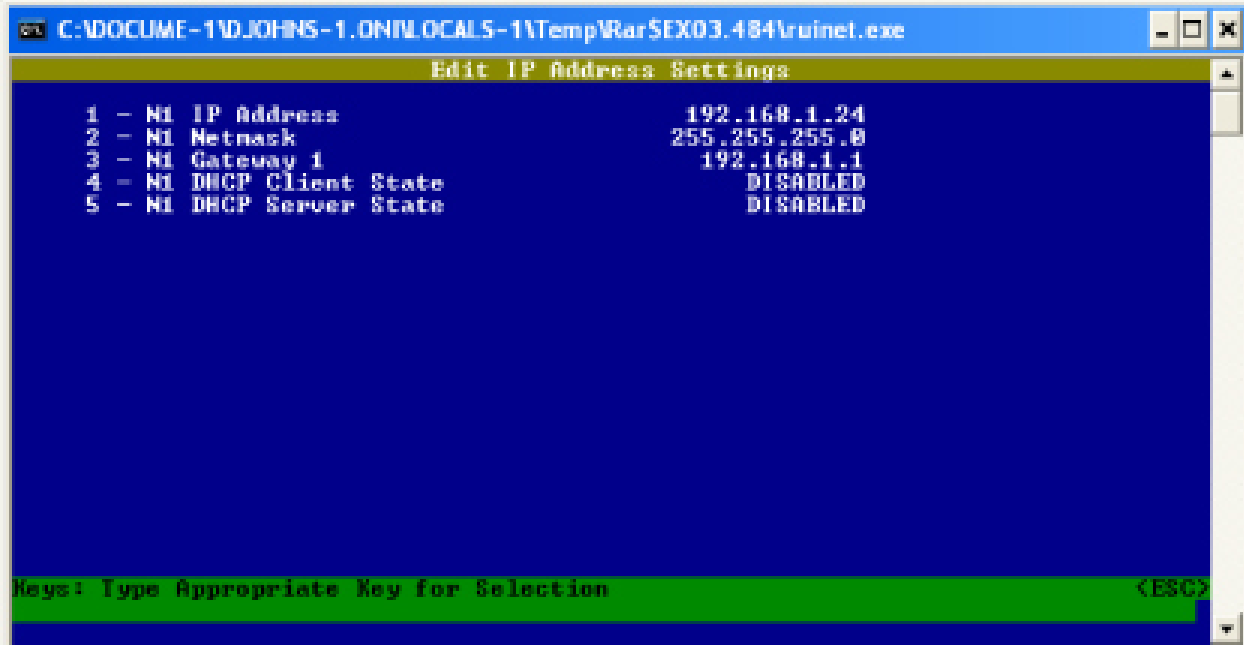
1.6.3 Changing the Gateway Address

Changing the gateway address requires the use of RUInet utility software and a PC with an Ethernet card and an available port. Assuming the display is programmed with the default address (192.168.1.24) the host PC must be configured to operate with an IP address of 192.168.1.1 and a subnet mask of 255.255.255.0. RUInet is available for download from the ONICON website, http://www.onicon.com/Networking_Information.html.

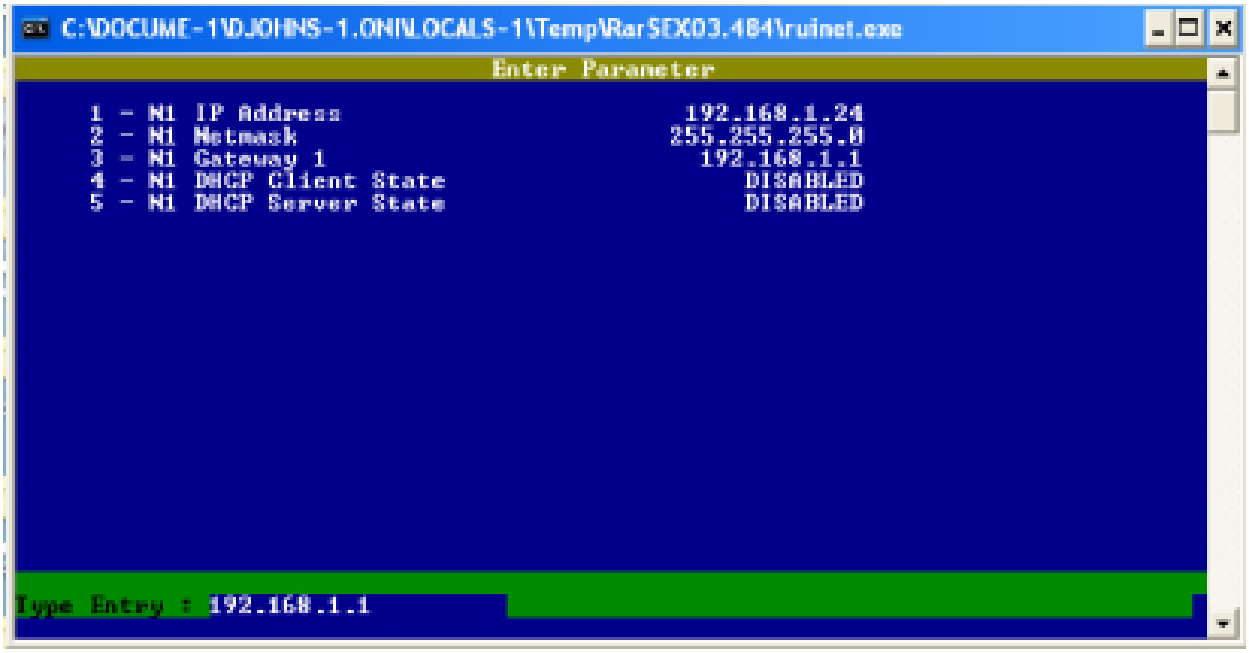
1. Load RUInet and configure the PC as necessary.
2. Connect an Rj45 Ethernet cable between the PC and the display and power the System-10. Allow 60 seconds for the display firmware to cycle through start-up diagnostic routines.
3. Open RUInet.
4. From the Remote User Interface main menu (shown below) select option “I”, Change IP Address.



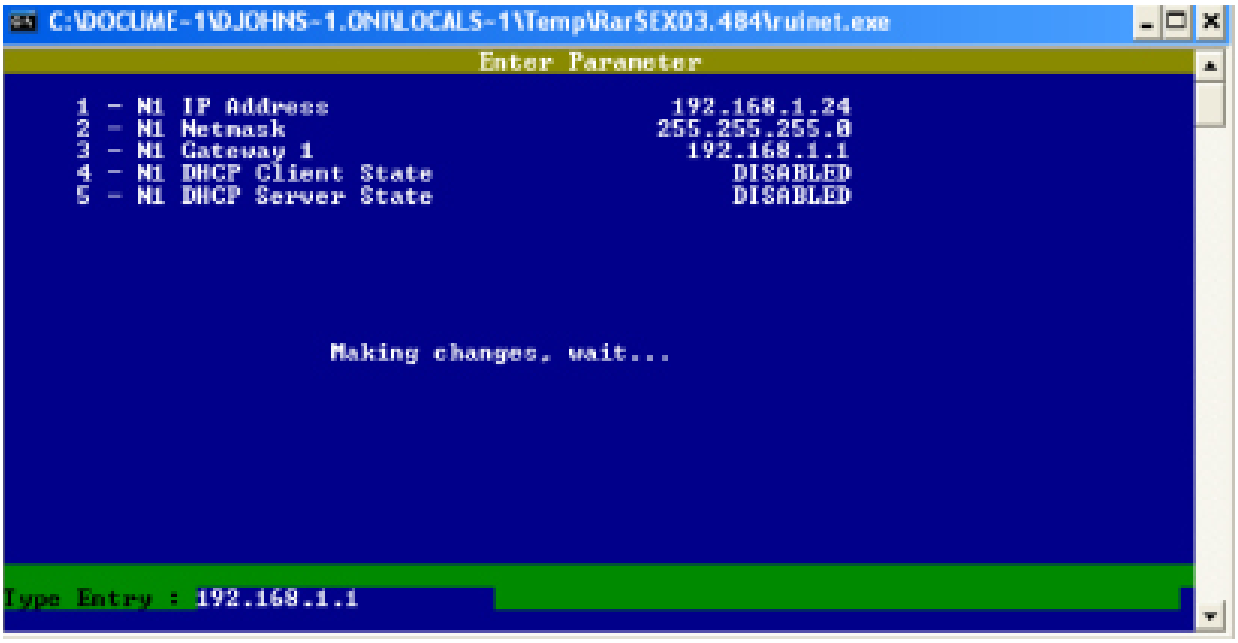
5. From the Edit IP Address Settings menu (shown below) select option 3.



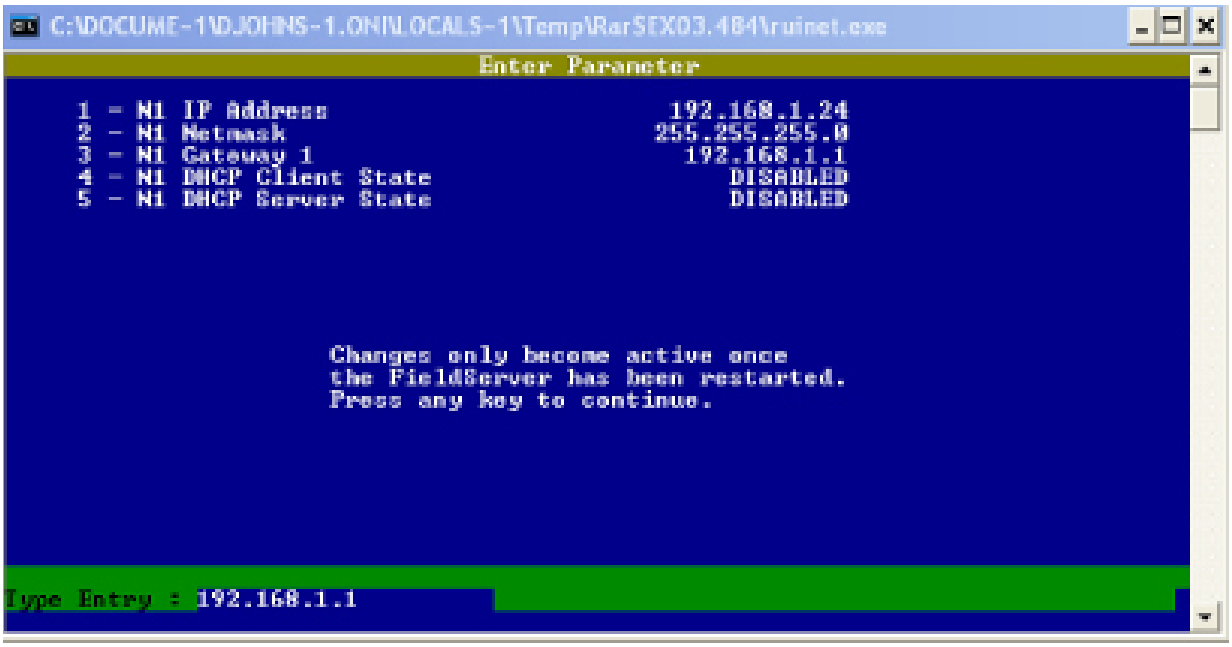
6. Enter the new gateway address as shown below and press enter.



7. The following message will appear.



8. When the address change is complete, the following message will appear. You must cycle power to the System-10 for the change to take effect.



SECTION 2.0: BACnet PICS AND OBJECTS

2.1 PIC STATEMENTS

BACnet Protocol

Date:	August 16, 2005
Vendor Name:	ONICON Incorporated
Product Name:	System-10 Btu Meter
Product Model:	SYSTEM-10-BAC

Product Description: The System-10 BTU Meter provides highly accurate thermal energy measurement in chilled water, hot water and condenser water systems based on signal inputs from two matched temperature sensors (included) and any of ONICON's insertion or inline flow meters (ordered separately). The System-10-BAC provides energy, flow and temperature data on a local alphanumeric display and to the network via the BACnet communications MS/TP driver. An optional auxiliary input is also available to totalize pulses from another device and communicate the total directly to the network.

BACnet Standardized Device Profile (Annex L):

▯ BACnet Smart Sensor (B-SS)
▯ BACnet Smart Actuator (B-SA)
▯ BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):

▯ K.1.2 BIBB – Data Sharing – ReadProperty-B (DS-RP-B)
▯ K.1.8 BIBB – Data Sharing – WriteProperty-B (DS-WP-B)
▯ K.5.2 BIBB – Device Management – Dynamic Device Binding-B (DM-DDB-B)

Segmentation Capability:
None

Standard Object Types Supported:

▯ Device Object
▯ Analog Input
▯ Analog Output
▯ Analog Value
▯ Binary Input
▯ Binary Output
▯ Binary Value
▯ Multi State Input Output
▯ Multi State Output
▯ Multi State Value

For all these properties the following apply:

1. Does not support BACnet CreateObject
2. Does not support BACnet DeleteObject
3. Does not support any optional properties
4. No additional writable properties exist
5. No proprietary properties exist
6. No range restrictions exist

Data Link Layer Options:

▯ MS/TP master (Clause 9), baud rate up to 76800 bps
▯ MS/TP slave (Clause 9), baud rate up to 76800 bps

Device Address Binding:
Not supported

Character Sets Supported:

▯ ANSI X3.4

BACnet Protocol

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Vendor Name:	ONICON Incorporated
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- ☐ K.5.2 BIBB – Device Management – Dynamic Device Binding-B (DM-DDB-B)

Segmentation Capability:
None

Standard Object Types Supported:

- ☐ Device Object
- ☐ Analog Input
- ☐ Analog Output
- ☐ Analog Value
- ☐ Binary Input
- ☐ Binary Output
- ☐ Binary Value
- ☐ Multi State Input Output
- ☐ Multi State Output
- ☐ Multi State Value

For all these properties the following apply:

1. Does not support BACnet CreateObject
2. Does not support BACnet DeleteObject
3. Does not support any optional properties
4. No additional writeable properties exist
5. No proprietary properties exist
6. No range restrictions exist

Data Link Layer Options:

- ☐ MS/TP master (Clause 9), baud rate up to 76800 bps
- ☐ MS/TP slave (Clause 9), baud rate up to 76800 bps

Device Address Binding:
Not supported

Character Sets Supported:

- ☐ ANSI X3.4

2.2 AVAILABLE BACnet® OBJECTS

The System-10 BTU Meter operates in one of three operating modes: single, dual or bi-directional. The table on the next page contains point information for each of the operating modes.

In single mode operation, only one register accumulates energy and one register accumulates volume. Thus, only two AV points and two BV reset points are necessary.

BACNET OBJECT	OBJECT DESCRIPTION	UNITS	NOTES
Analog Input 1	Energy Rate	Btu/Hr, kW or Tons	
Analog Input 2	Volume Rate	L/Sec, L/Min, L/Hr, M^3/Hr, GPM, CFS or CFM	
Analog Input 3	Supply Temperature	Degrees C or F	
Analog Input 4	Return Temperature	Degrees C or F	
Analog Value 1	Mode 1 Energy Total	Btu, TonHrs or kWHrs	
Analog Value 2	Mode 1 Volume Total	Liters, M^3, Gallons or Ft^3	
Analog Value 3	Mode 2 Energy Total	Btu, TonHrs or kWHrs	Only used in dual-mode applications.
Analog Value 4	Mode 2 Volume Total	Liters, M^3 or Gallons	Only used in dual-mode applications.
Analog Value 5	Auxiliary Input Total (Di3)	None	BACnet will not report engineering units for this object.
Analog Value 6	Operating Mode (Single, Dual or Bi-directional)	Not Applicable	None = 0 Single = 1 Dual = 2 BiDir = 3
Analog Value 12	Mode 1 Mode 2 Indication	Not Applicable	Mode 1 = 1 Mode 2 = 2
Binary Value 11	Zero Mode 1 Energy Total	Not Applicable	Changing this property from the (0) inactive state to the (1) active state will reset the total to zero. (Must be priority 8 manual operator).
Binary Value 12	Zero Mode 1 Volume Total	Not Applicable	
Binary Value 13	Zero Mode 2 Energy Total	Not Applicable	
Binary Value 14	Zero Mode 2 Volume Total	Not Applicable	
Binary Value 15	Zero Auxiliary Input Total	Not Applicable	

2.3 ADDITIONAL BACnet® OBJECT INFORMATION

BACnet® Object Type and Number of Objects Implemented
Device 1
Analog Input 4
Analog Value 7
Binary Value 5

Property	Default Value	Read-only or Writable	Comment
Object Identifier	Device - 57017	Writable	0-4,194,303
Object Name	BTU Meter - 57017	Writable	29 char. Max
Object Type	Device	Read-only	
System Status	Operational	Read-only	
Vendor Name	ONICON Incorporated	Read-only	
Model Name	BTU Meter	Read-only	
Firmware Rev.	v1.01fA	Read-only	
Protocol Version	1	Read-only	
Protocol Revision	1	Read-only	
Services Supported	Read property, Read property multiple, Write property, Who-has, I have, Who-is, I-am	Read-only	
Object Types Supported	Analog input, Analog value, Binary value	Read-only	
Object List	(Device, 57017), (analog input, 1 – 4), (analog value, 1 – 13), (binary value, 11 – 15)	Read-only	
Max ADPU Length	206	Read-only	
Segmentation Supported	NO_SEGMENTATION (3)	Read-only	
APDU Timeout	2000	Read-only	
# of APDU Retries	3	Read-only	
Max Master	127	Read-only	
Device Address Binding		Read-only	Active
Database Revision	1	Read-only	

2.4 ANALOG INPUT(S)

Property	Default Value	Read-only or Writable
Object Identifier	Analog input 1 to 4	Read-only
Object Name	Various	Read-only
Object Type	Analog-input	Read-only
Present Value	REAL	Writable
Status Flags	(F,F,F,F)	Read-only
Event State	normal	Read-only
Reliability	No-fault-detected	Read-only
Out-of-Service	FALSE	Writable
Units	Various	Read-only
Min-Present-Value	-1000000000	Read-only
Max-Present-Value	1000000000	Read-only
Resolution	0.000001	Read-only

Analog Input Objects	
Object Identifier	Function
Analog input 1	Energy rate
Analog input 2	Volume rate
Analog input 3	Supply temperature
Analog input 4	Return temperature

BACnet Engineering Units for Analog Inputs (Defaults)
Energy rate: **Btu/h**, tons, kW
Volume rate: l/s, l/m, l/hr, m3/h, **gpm**, ft3/s, ft3/m
Temperature: **°F** or °C

2.5 ANALOG VALUE(S)

Property	Default Value	Read-only or Writable
Object Identifier	Analog value 1 to 13	Read-only
Object Name	Various	Read-only
Object Type	Analog-value	Read-only
Present Value	REAL	Writable
Status Flags	(F,F,F,F)	Read-only
Event State	normal	Read-only
Reliability	No-fault-detected	Read-only
Out-of-Service	FALSE	Writable
Units	Various	Read-only
Priority Array	{NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL}	Read-only
Relinquish Default	0	Read-only

Analog Value Objects	
Object Identifier	**Function**
Analog value 1	Mode 1 Energy Total
Analog value 2	Mode 1 Volume Total
Analog value 3	Mode 2 Energy Total
Analog value 4	Mode 2 Volume Total
Analog value 5	Aux Input Total
Analog value 6	Operating Mode
Analog value 12	Mode 1 Mode 2 Indication
Analog value 13	BACnet Instance

Analog value 7-11 are used internally only.

BACnet Engineering Units for Analog Values **(Defaults)**

Energy: **Btu**, ton-hours, KW-hours
Volume: **gallons**, liters, ft3 or m3
Auxiliary pulse inputs: **No units** (counts)

2.6 BINARY VALUE(S)

Property	Default Value	Read-only or Writable
Object Identifier	Binary value 11 to binary value 15	Read-only
Object Name	Various	Read-only
Object Type	Binary-value	Read-only
Present Value	0	Writable
Description	Binary-value,# Name	Read-only
Status Flags	(F,F,F,F)	Read-only
Event State	normal	Read-only
Reliability	No-fault-detected	Read-only
Out-of-Service	FALSE	Writable
Active Text	Active	Read-only
Inactive Text	Inactive	Read-only
Priority Array	(NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL)	Read-only
Relinquish Default	0	Read-only

Binary Value Objects		
Object Identifier	**Description**	**Notes**
Binary value 11	Zero Mode 1 Energy Total	Changing this property from the (0) inactive state to the (1) active state will reset the total to zero. (Must be priority 8 manual operator).
Binary value 12	Zero Mode 1 Volume Total	
Binary value 13	Zero Mode 2 Energy Total	
Binary value 14	Zero Mode 2 VolumeTotal	
Binary value 15	Zero Mode Aux Input Total	

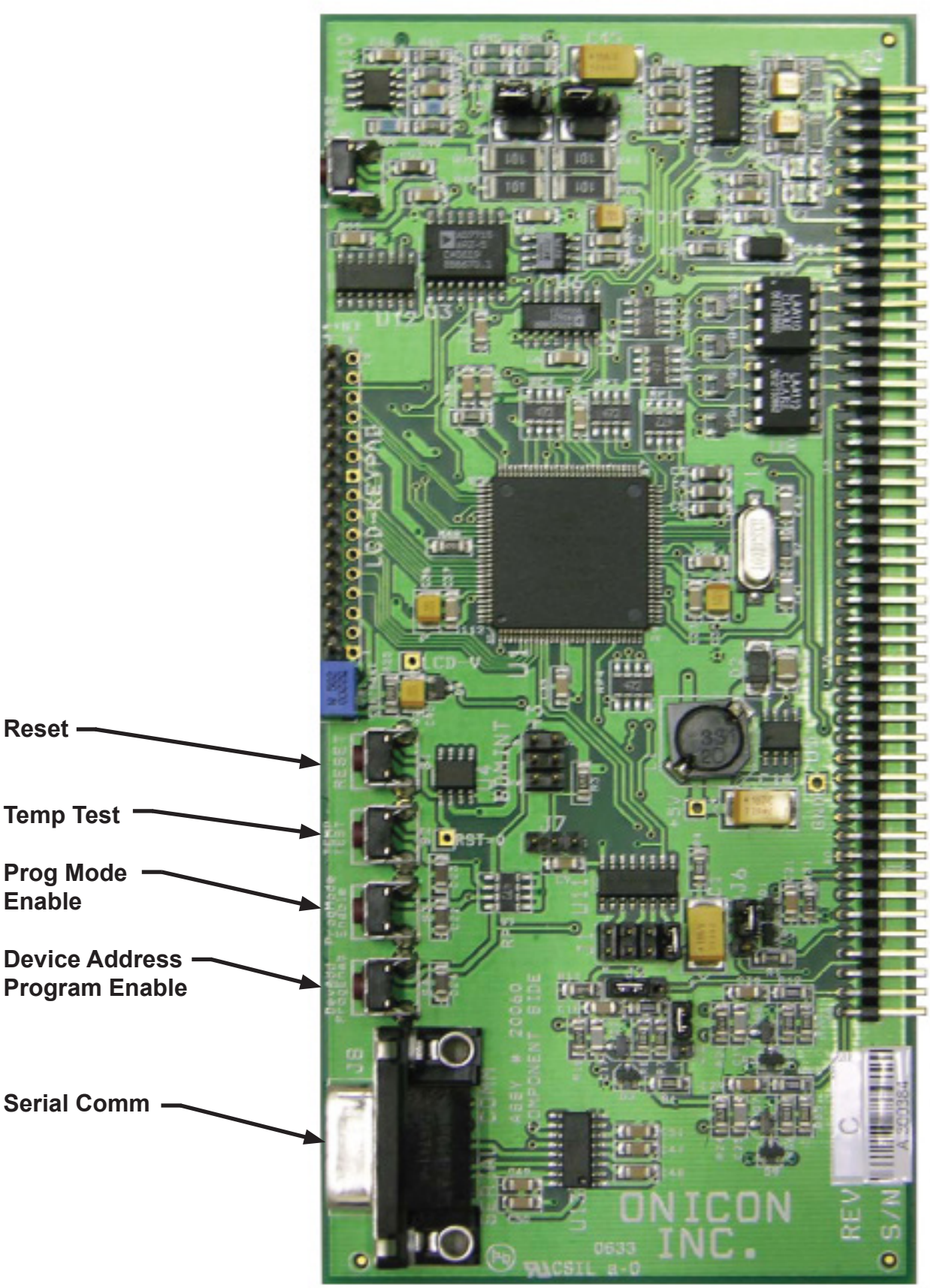
SECTION 3.0: NETWORK TROUBLESHOOTING TIPS

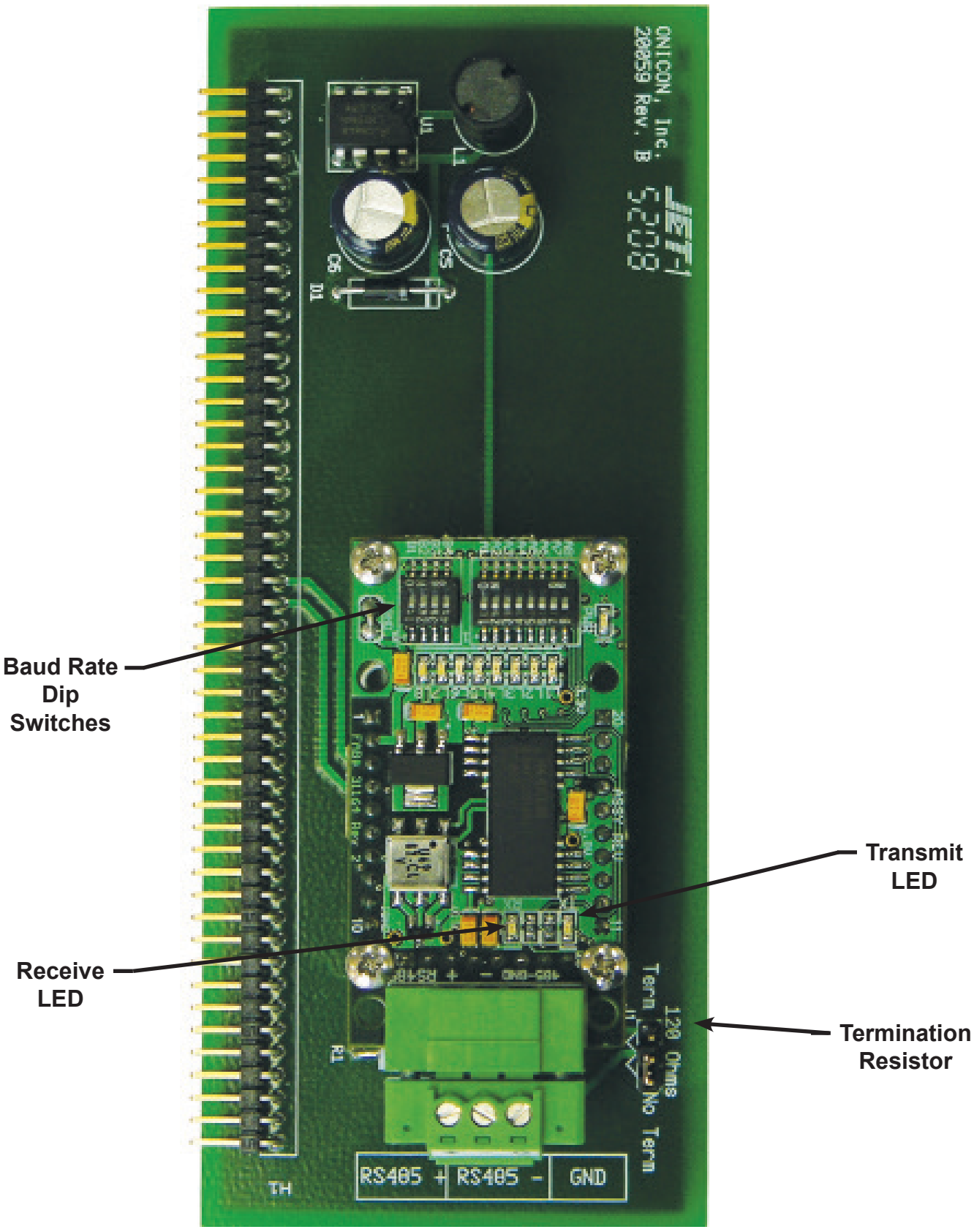
3.1 TROUBLESHOOTING

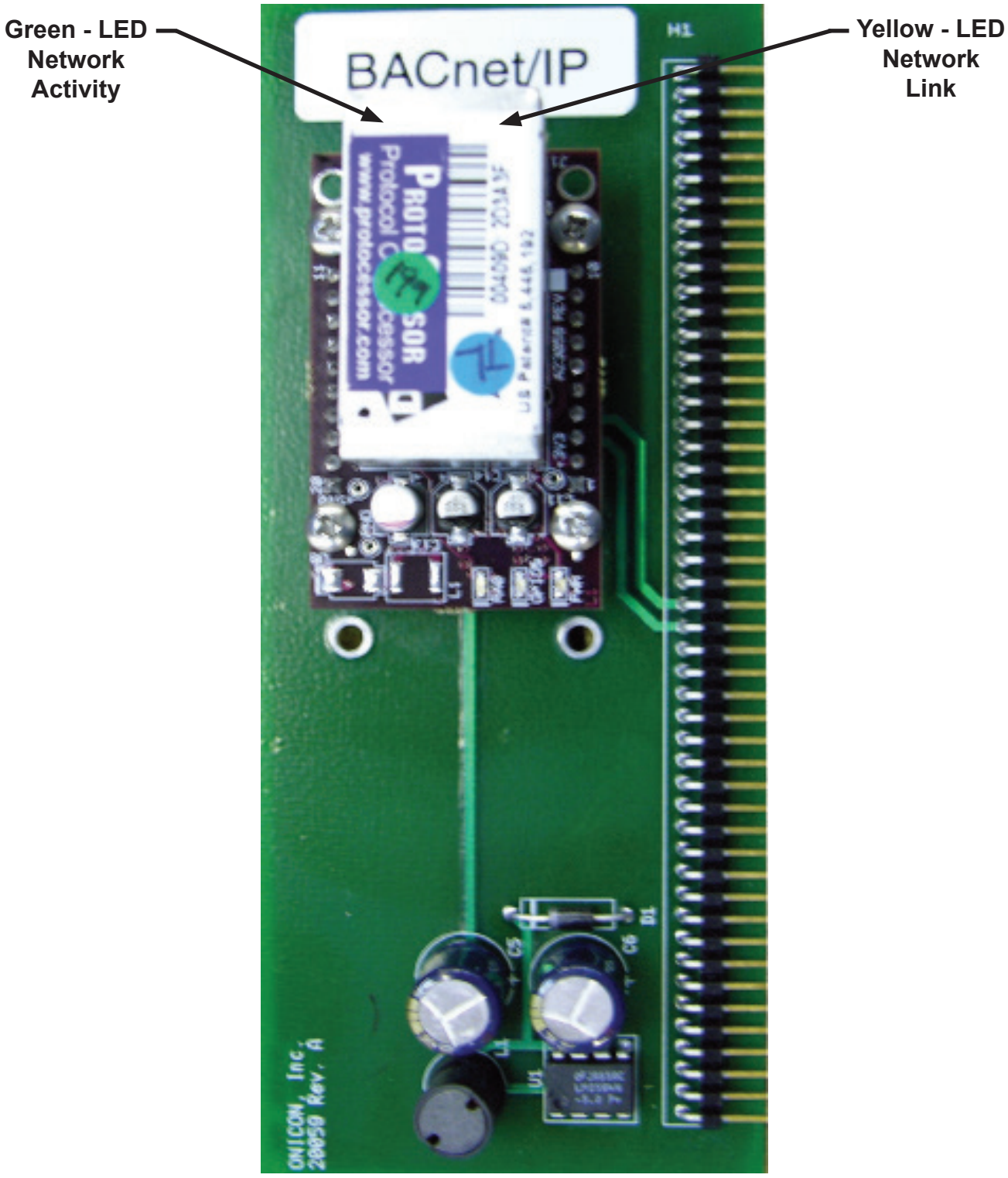
REPORTED PROBLEM	POSSIBLE SOLUTIONS
Device will not communicate with the network controller.	• Is the receive LED flashing on the network board? This LED will flash whenever there is traffic on the network. If the LED is not flashing, look for an open network cable. • Is the transmit LED flashing? The transmit LED will only flash when the device is responding to a poll. A unique address is required for each device on the network. Duplicate addresses will cause some or all of the devices on the network to quit working. (See section 1.6.1 of this manual for details.) • The RS485 network cable connections are polarity sensitive and must be connected the same way on every device (i.e. + to + and - to -). (See section 1.4.1 of this manual for details.) • The Baud rate setting must match the network Baud rate. (See section 1.5.1 of this manual for details.) • Shield drain connections should be daisy chained in the same manner as the signal cables for RS485. The shield drain wire should be left unterminated at the end of the cable and connected to earth only at the network master controller. Shield wires must not be connected to the RS485 connector on the System-10. • The maximum number of devices allowed on an RS485 network segment without a repeater is 32. Adding more than 32 devices to a single segment may reduce the transceiver output voltage to a level that is too low to be distinguished from background noise on the cable.

REPORTED PROBLEM	POSSIBLE SOLUTIONS
Device will not communicate with the network controller. (cont.)	• RS485 cable impedance should be matched to a termination resistor at the end of the cable. ONICON boards have a jumper selectable 120 ohm resistor for termination. This resistor should only be used if the display is the last device on the network cable. (See section 1.5.2 of this manual for details.) • A unique IP address is required for each device on TCP/IP networks. Duplicate addresses will cause multiple devices to respond to the same poll. This will cause some or all of the devices on the network to quit working. (See section 1.6.2 of this manual for details.) • Managed IP networks may require that a gateway IP address be programmed into the ONICON TCP/IP device. (See section 1.6.3 of this manual for details.)
Network communications are disrupted when the device is connected.	• The RS485 network cable connections are polarity sensitive and must be connected the same way on every device (i.e. + to + and - to -). (See section 1.4.1 of this manual for details.) • Is the transmit LED flashing? The transmit LED will only flash when the device is responding to a poll. A unique address is required for each device on the network. Duplicate addresses will cause some or all of the devices on the network to quit working. (See section 1.6.1 of this manual for details.) • A unique IP address is required for each device on TCP/IP networks. Duplicate addresses will cause multiple devices to respond to the same poll. This will cause some or all of the devices on the network to quit working. (See section 1.6.2 of this manual for details.) • Shield drain connections should be daisy chained in the same manner as the signal cables for RS485. The shield drain wire should be left unterminated at the end of the cable and connected to earth only at the network master controller. Shield wires must not be connected to the RS485 connector on the System-10.

SYSTEM-10 BTU METER COMPUTER BOARD




Baud Rate
Dip
Switches
Receive
LED
Transmit
LED
Termination
Resistor
RS485 +
RS485 -
GND
120 Ohms
Term
No Term
TH


Green - LED
Network
Activity
Yellow - LED
Network
Link
BACnet/IP
H1

System-10 BACnet/IP
Auxiliary Input Board