D-100

BACnet Network Interface Installation Guide

BACnet



ONICON

Flow and Energy Measurement

DOC-0003828 Rev.B

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APPENDIX

A-1 D-100 PROCESSOR BOARD

A-2 D-100 BACnet MS/TP BOARD

A-3 D-100 BACnet IP BOARD

A-4 D-100 BACnet/IP Auxiliary Input Board (Di3)

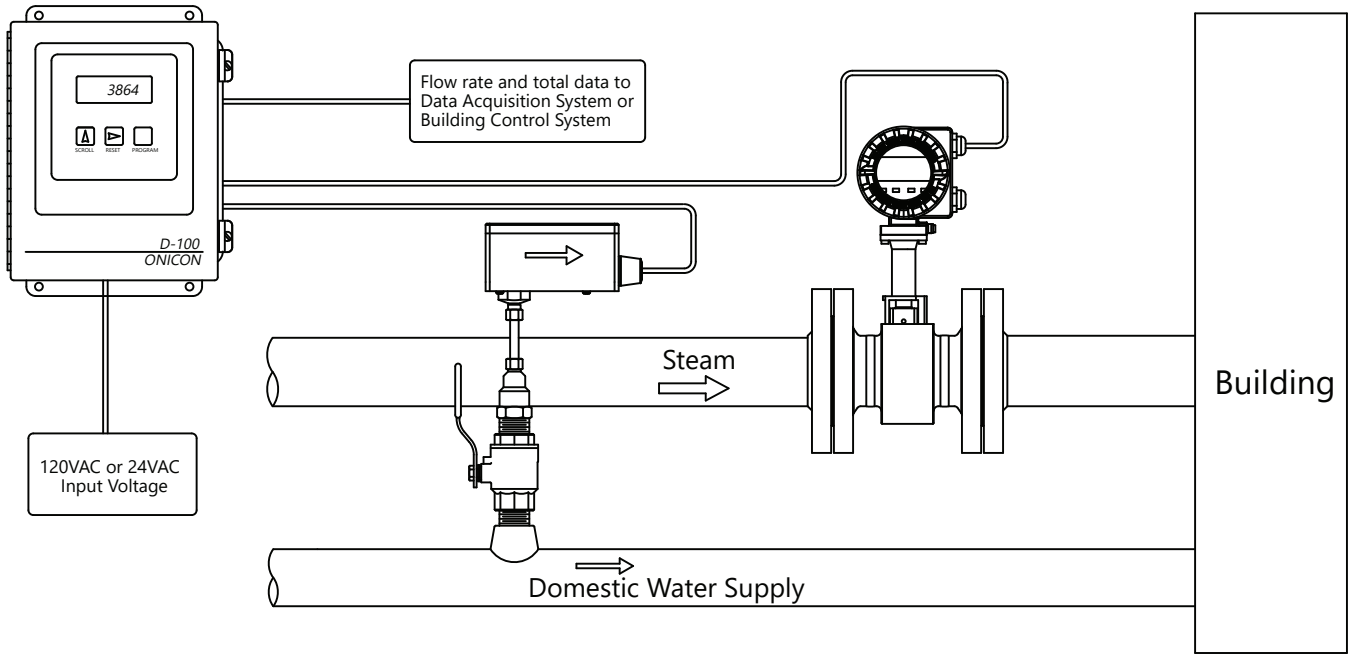
SECTION 1: INTRODUCTION

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 D-100 BACnet serial interface.

1.2 TYPICAL D-100 FLOW DISPLAY

The D-100 is a totalizing display module that provides a local indication of liquid, gas or steam flow rate and total data. It can also be provided with an optional BACnet MS/TP or BACnet/IP serial interface to communicate data to the building control network.



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: Base 10T, 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

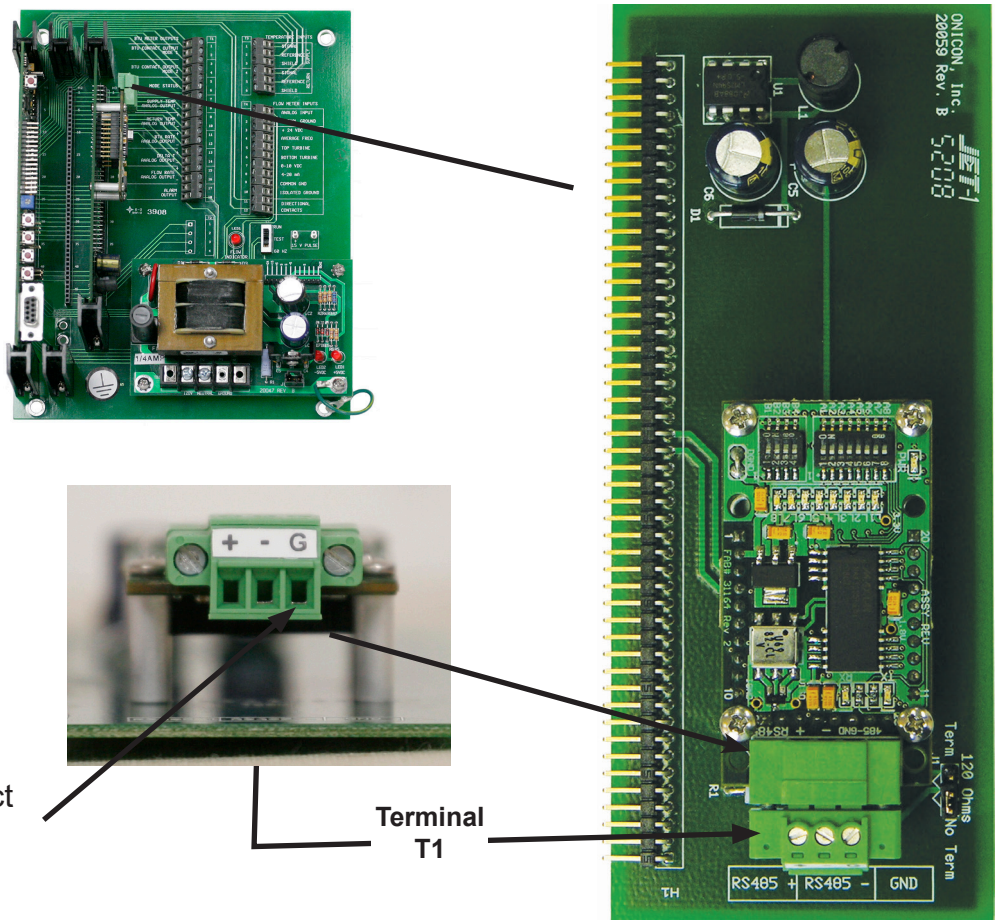
1.4 NETWORK SIGNAL CONNECTIONS

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 D-100 Flow Display 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

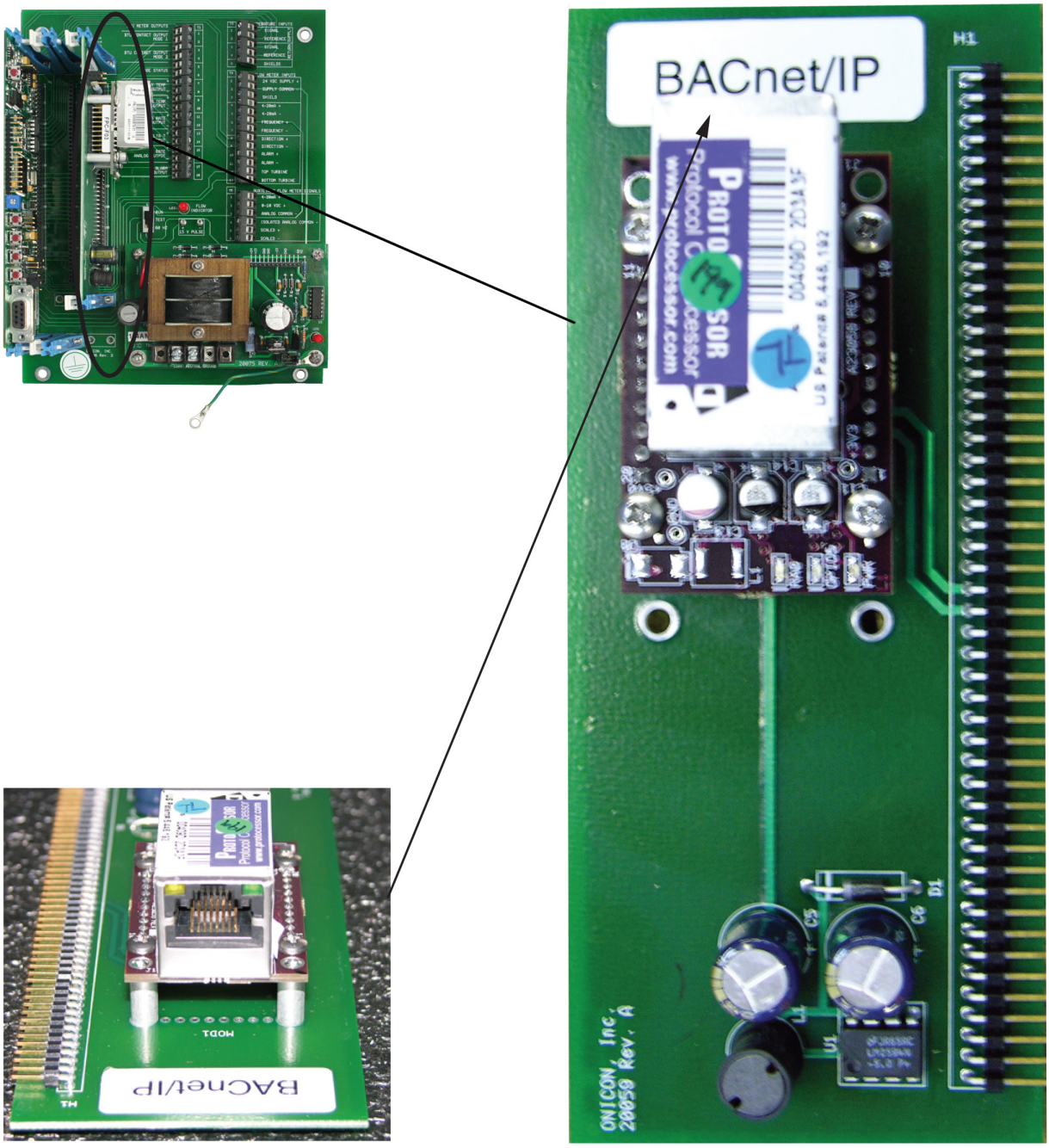
Incoming and outgoing RS485 cable shield wires should be connected together, but must not be connected to the display.

1.4.2 BACnet/IP

BACnet/IP, Base 10T output connections are made as shown. Requires Base 10T cable and RJ45 connector.

CAUTION

Only qualified service personnel should make connections between the D-100 Flow Display 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 D-100-BACnet Display can be provided with an digital input pulse 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 is 9,999,999. The register will rollover to zero when this value is exceeded.

If the digital pulse input option was ordered at the same time the display was ordered, it will arrive fully configured and ready to use. If it was ordered after the display 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 for an digital input pulse, 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.

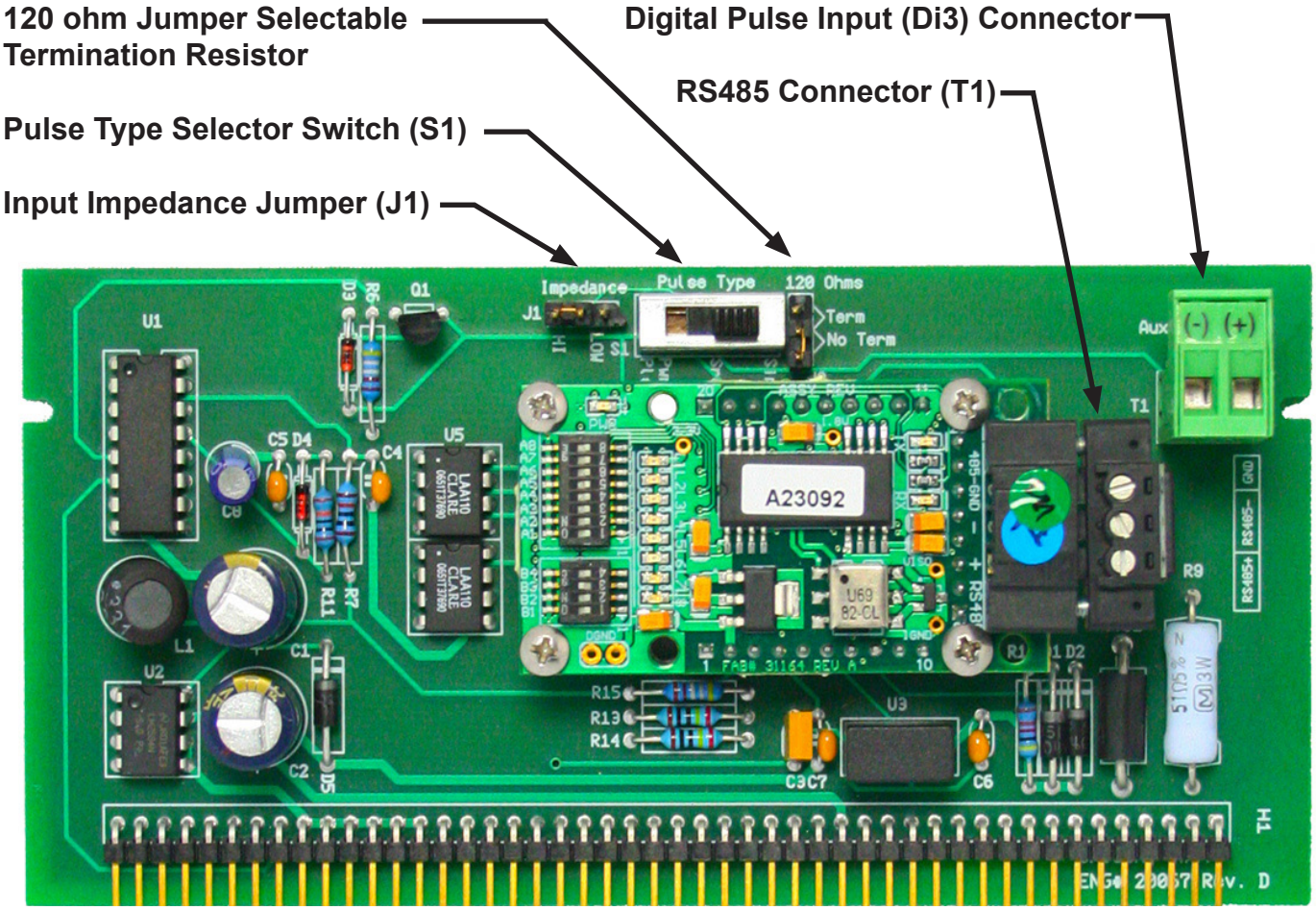
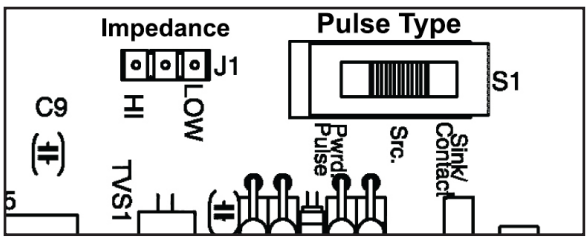


Fig. 1

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.

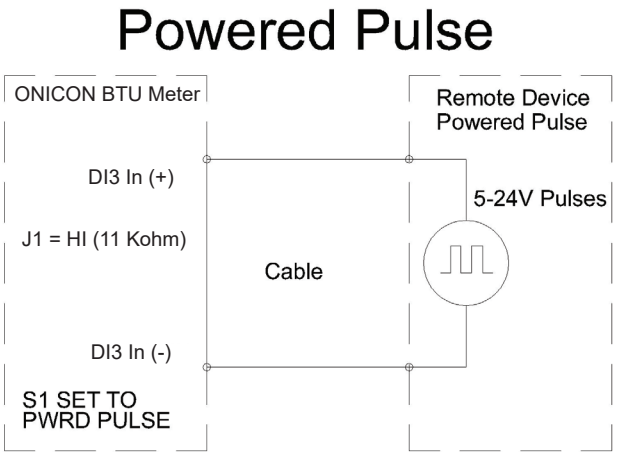


Fig. 2

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.

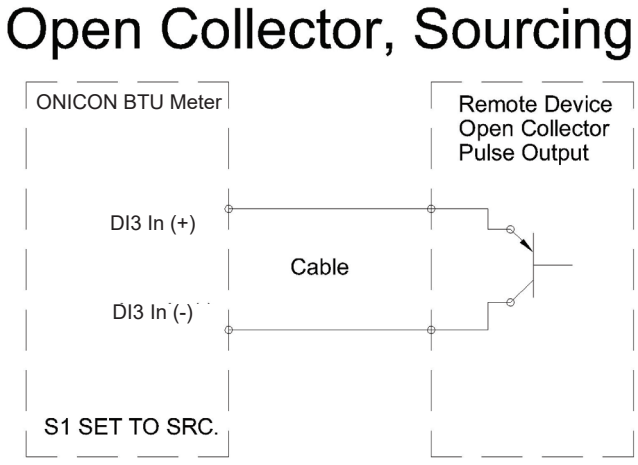


Fig. 3

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.

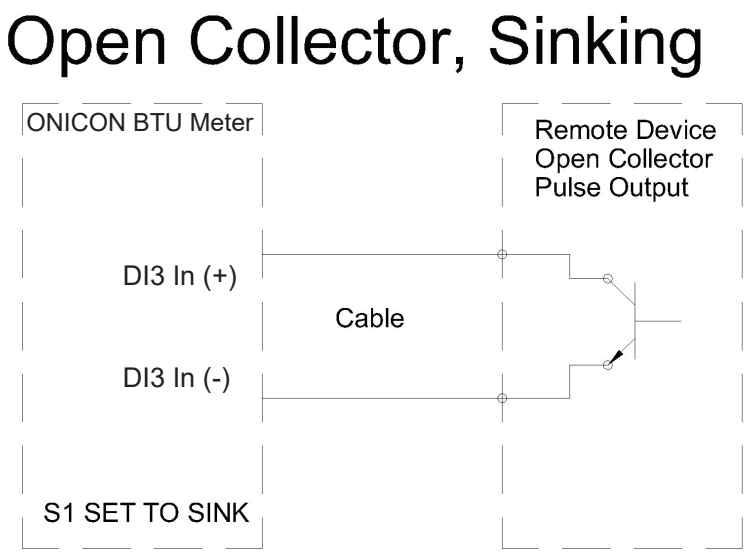


Fig. 4

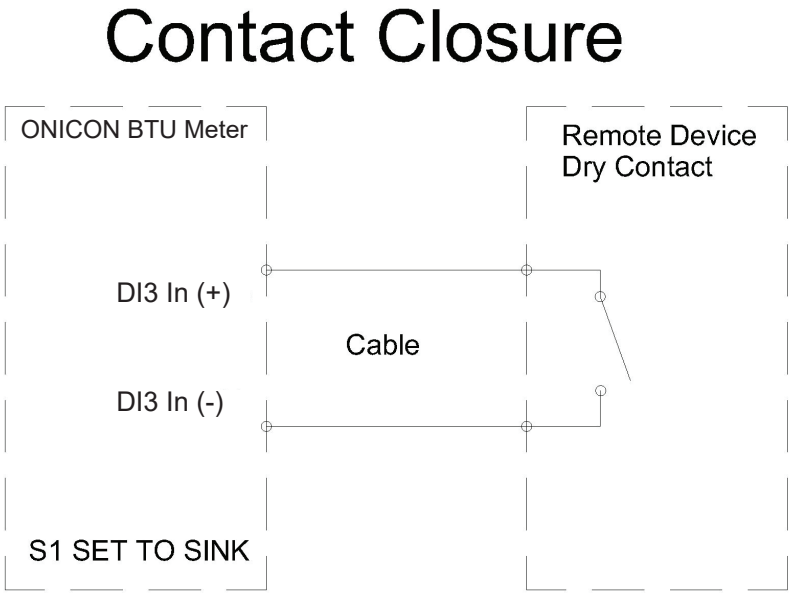


Fig. 5

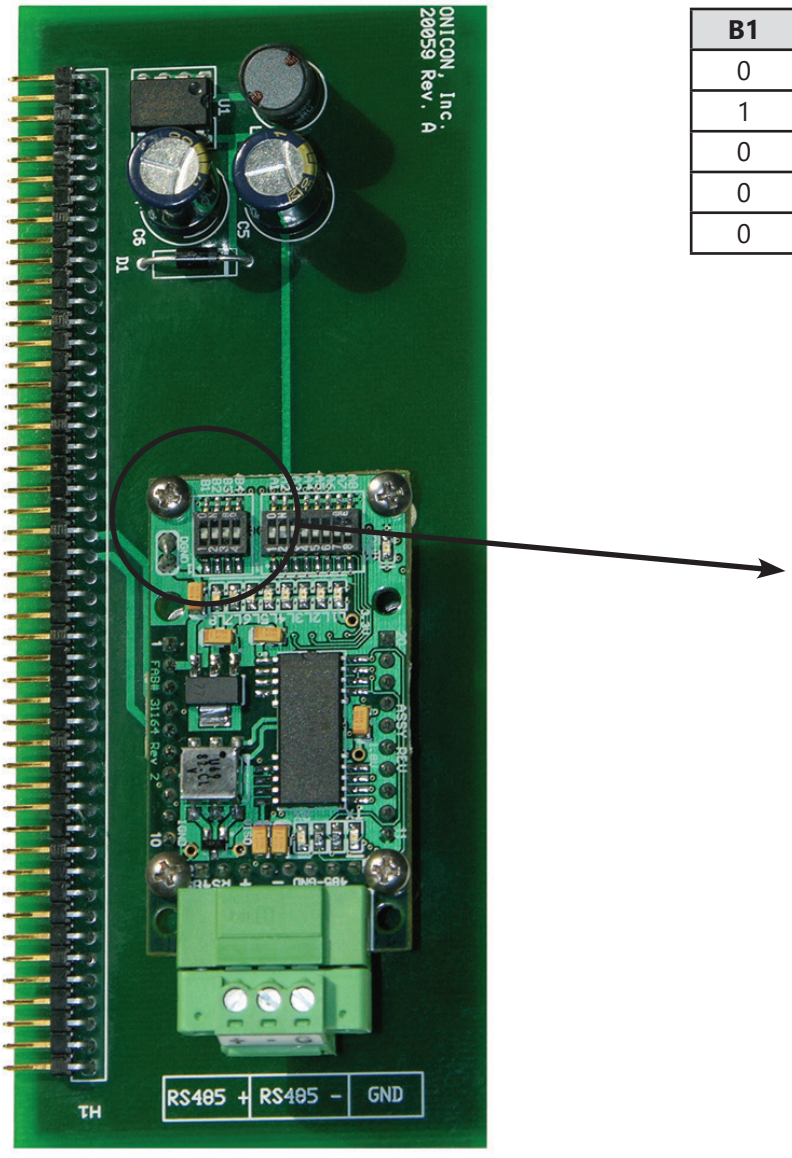
1.5 BACnet MS/TP BAUD RATE, BIASING & TERMINATION

1.5.1 Baud Rate

Every ONICON D-100 is individually programmed at the factory with application specific data provided by the customer during the process of ordering the display, and this normally includes the Baud rate setting. If the Baud rate was provided, the display will be configured to operate at the specified rate. The standard Baud rate settings are 9600, 19200, 38400 and 76800 Baud.

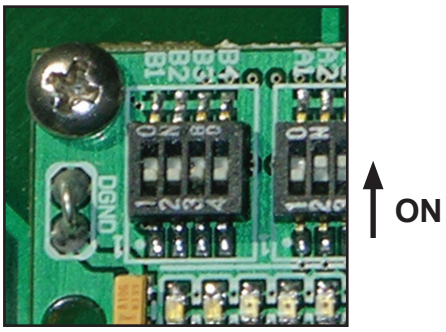
If the Baud rate setting was not provided to ONICON, the D-100 will be configured to "auto" detect the Baud rate of the network. In this configuration, the display should detect and automatically adjust to the proper rate when it is connected to the network.

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



(Circuit board shown upside down for clarity.)

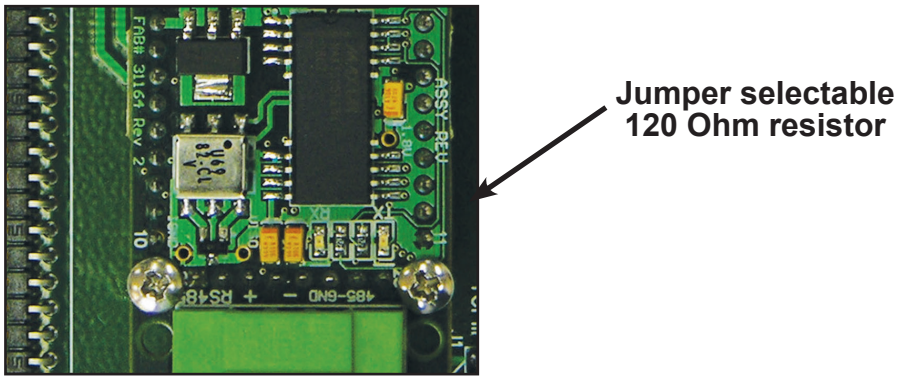
B1	B2	B3	B4	Rate
0	0	0	0	Autobaud
1	0	0	0	9600
0	1	0	0	19200
0	0	1	0	38400
0	0	0	1	76800



Baud Rate Dip Switches

1.5.2 Biasing and Termination

The ONICON D-100 does not provide biasing voltage to the RS485 network. A jumper selectable 120W 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 register on network interface board with auxiliary output.

1.6 NETWORK ADDRESSING

Before the D-100 can communicate on the BACnet network, the appropriate addresses must be programmed into the display.

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 display. 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 D-100 user interface on the front panel of the display. 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

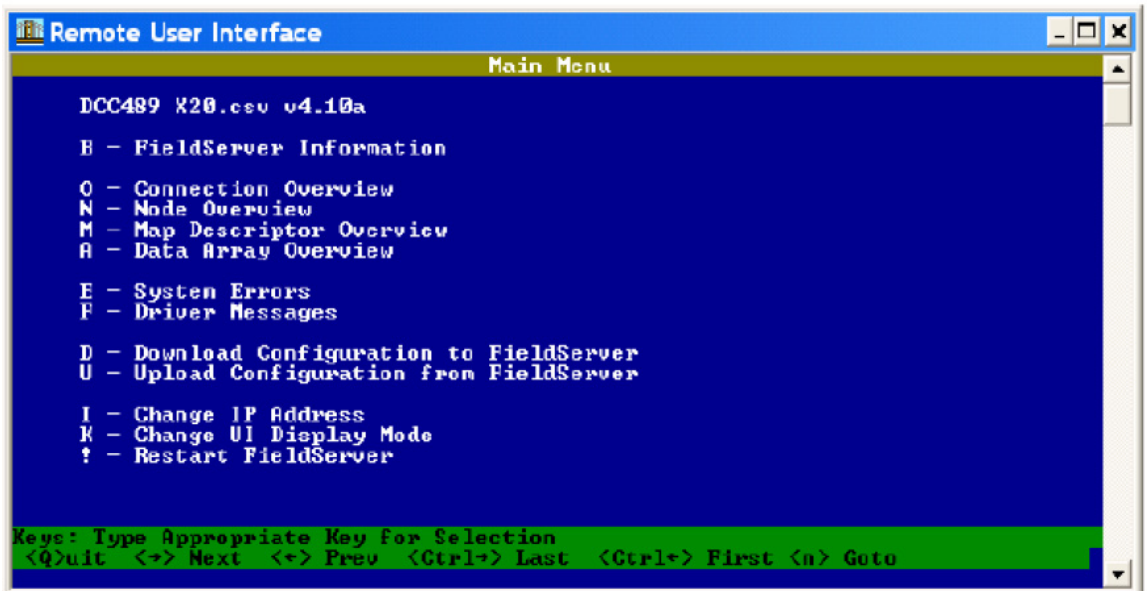
As per the BACnet standard, assigning a MAC address of 128 or higher will disable the "automatically discover new devices" feature in the host software. Displays with a MAC address of 128 or higher are slave devices and must be manually added to the network.

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 display 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 D-100 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 D-100 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 the right most pushbutton on the front panel user interface.
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 the left most pushbutton on the front panel user interface.
4	Momentarily press the RESET pushbutton once.	The second digit will now be blinking.	The RESET pushbutton is the center pushbutton on the front panel user interface.
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 the left most pushbutton on the front panel user interface.
6	Momentarily press the RESET pushbutton once.	The third digit will now be blinking.	The RESET pushbutton is the center pushbutton on the front panel user interface.
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 the left most pushbutton on the front panel user interface.
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 the right most pushbutton on the front panel user interface.
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 is the left most pushbutton on the front panel user interface. The RESET pushbutton is the center pushbutton on the front panel user interface.
10	Once the correct address is displayed, momentarily press the PROGRAM pushbutton.	The FRONT PANEL RESET page appears.	It is not necessary to change anything on this page.
11	Momentarily press the PROGRAM pushbutton.	The SAVE CHANGES page appears.	The new addresses must be saved to take effect.
12	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.
13	Momentarily press the PROGRAM pushbutton.	The new addresses are saved and the display will revert to the RUN mode.	

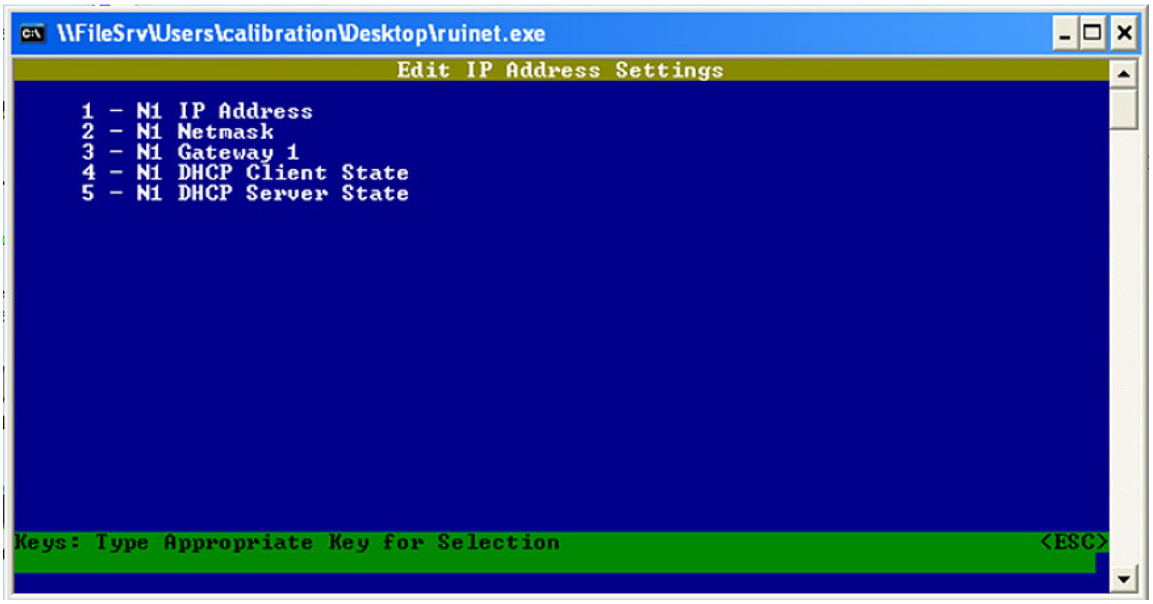
1.6.2 Changing the IP Address

Changing the IP address requires the use of RUInet utility software and a PC with an Ethernet card and an available port. Assuming the 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.

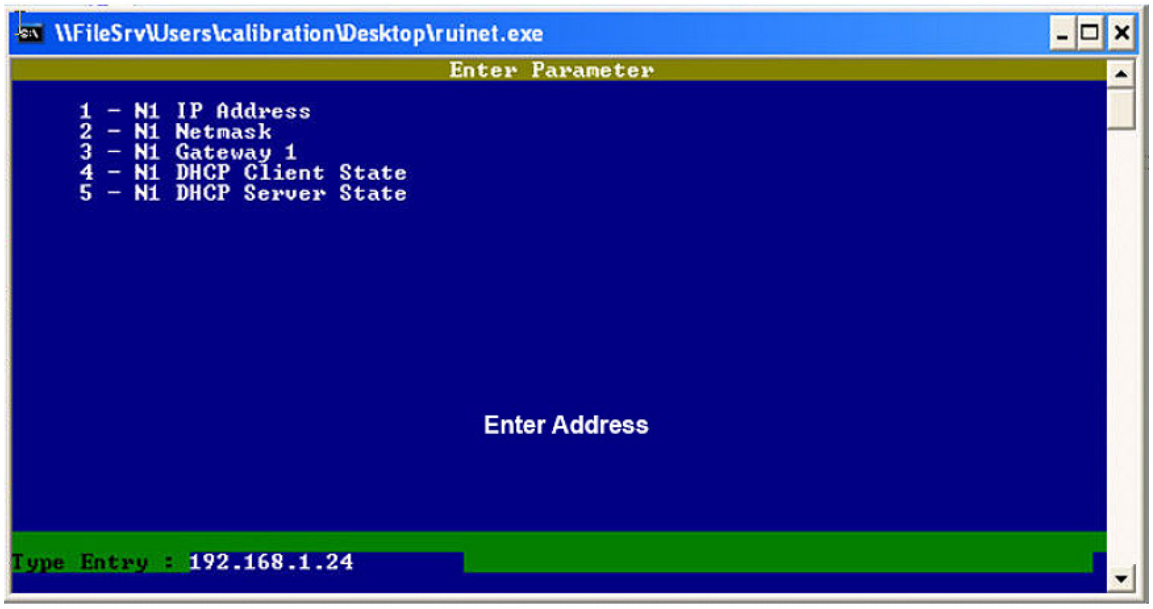
1. Load RUInet and configure the PC as necessary.
2. Connect an RJ45 Ethernet cable between the PC and the display and power the D-100. Allow 60 seconds for the display firmware to cycle through start-up diagnostic routines.
3. Open RUInet.
4. From the Remote User Interface main menu (shown on the next page) select option “I”, Change IP Address.



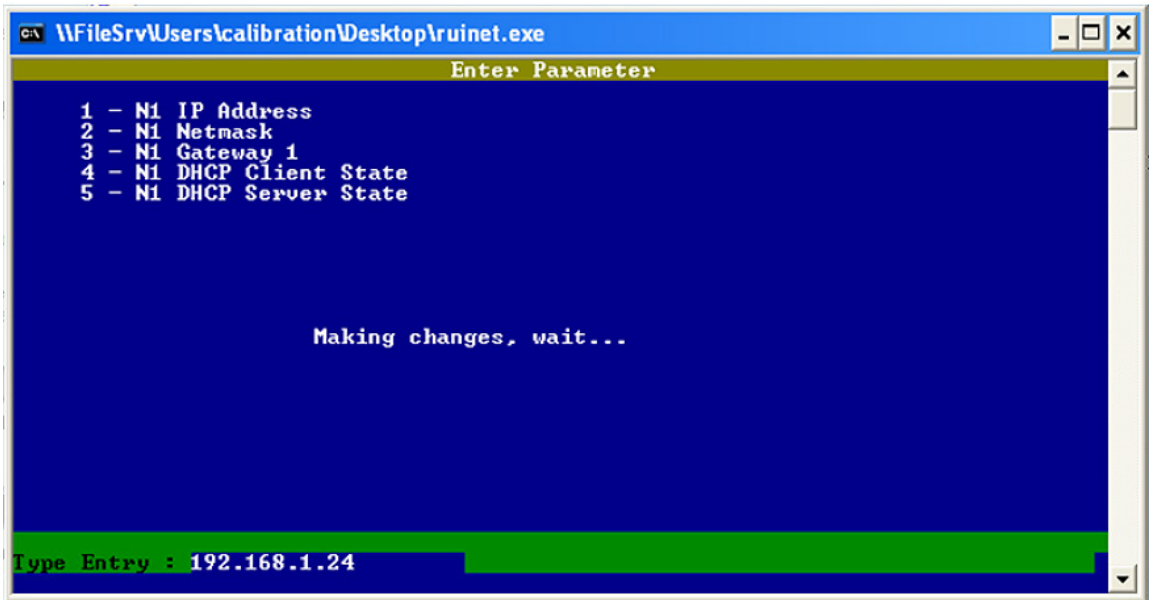
5. From the Edit IP Address Settings menu (shown below) select option 1. Please note that the default subnet mask is 255.255.255.0 and should not be changed unless necessary.



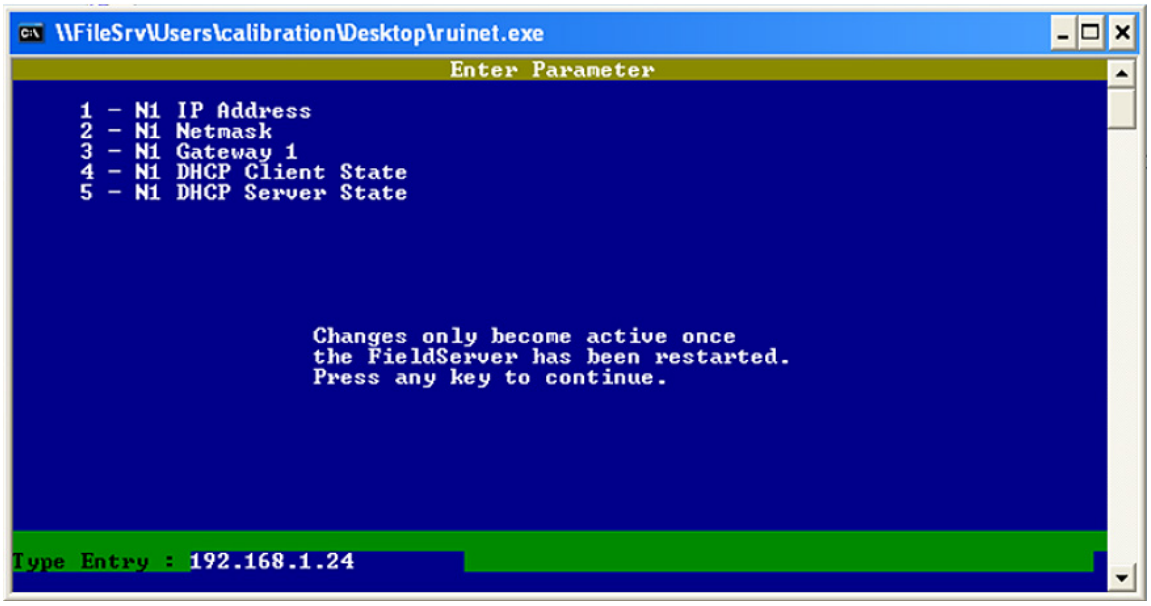
6. Enter the new IP address as shown below and press enter.



7. The following message will appear.



8. When the address change is complete, the following message will appear. You must cycle power to the D-100 for the change to take effect.



1.6.3 Changing the Gateway Address

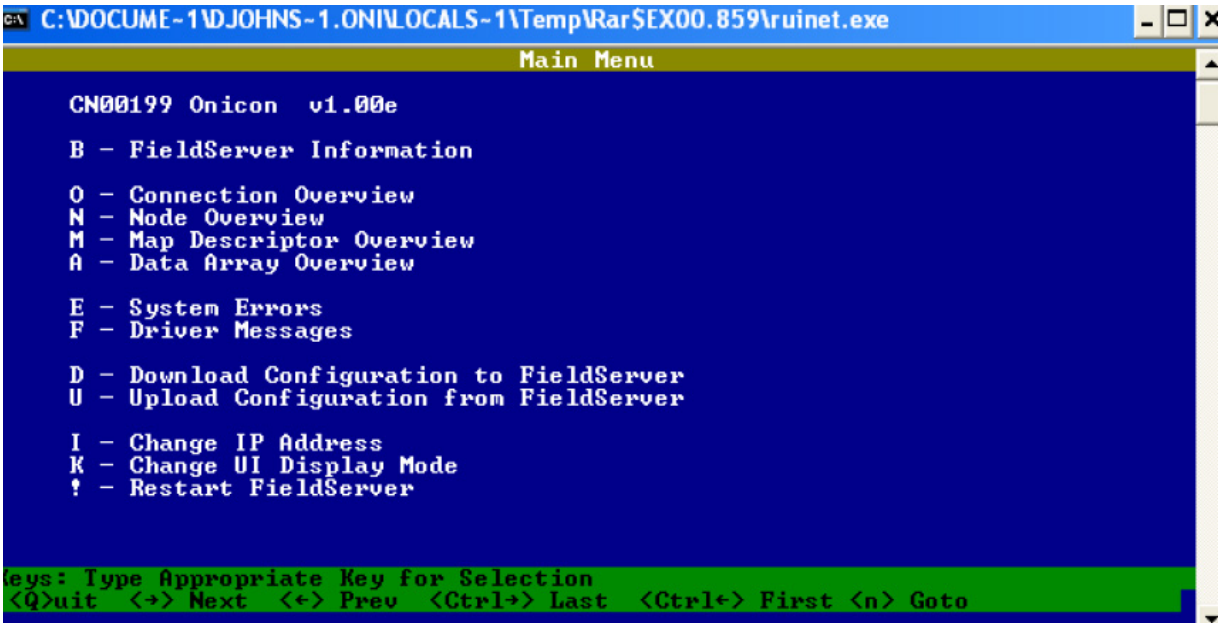
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1. Load RUInet and configure the PC as necessary.

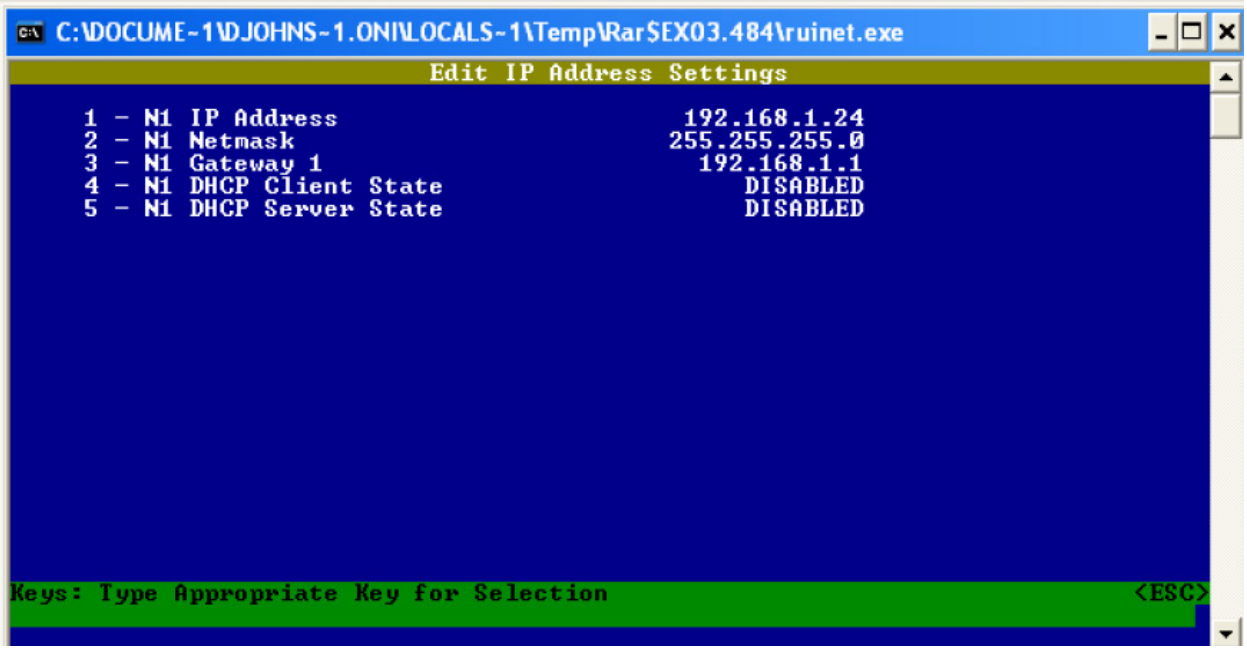
2. Connect an RJ45 Ethernet cable between the PC and the display and power the D-100. Allow 60 seconds for the display firmware to cycle through start-up diagnostic routines.

3. Open RUInet.

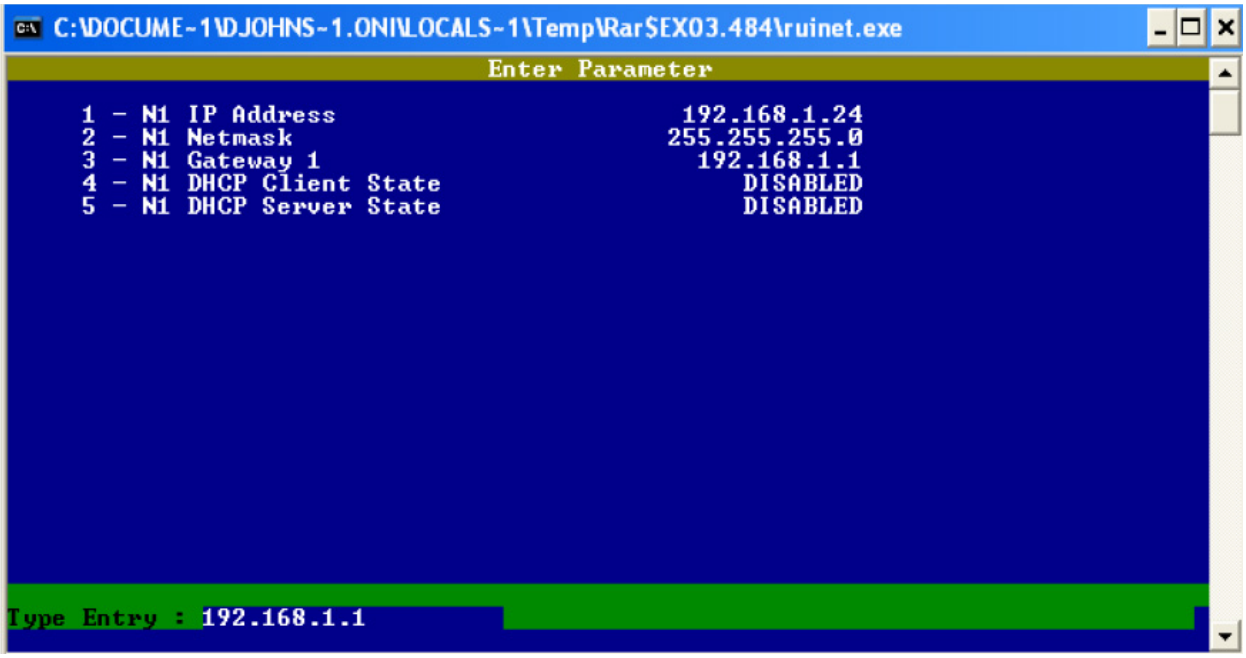
4. From the Remote User Interface main menu (shown below) select option "I", Change IP Address.



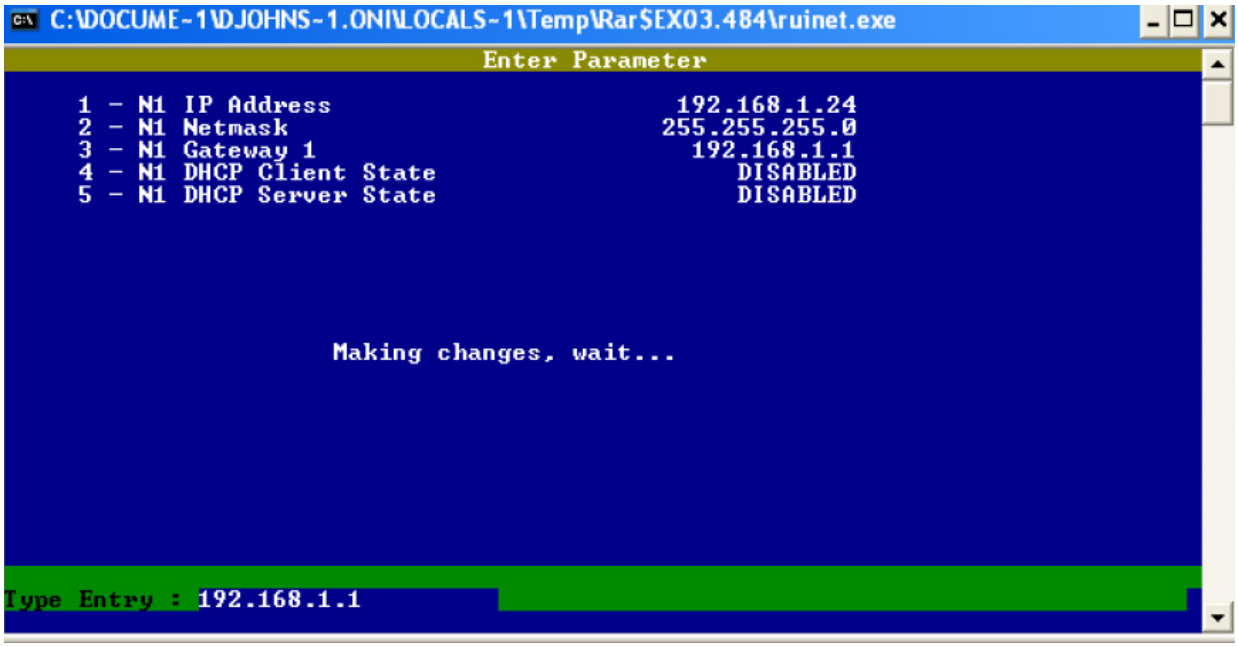
5. From the Edit IP Address Settings menu (shown below) select option 3.



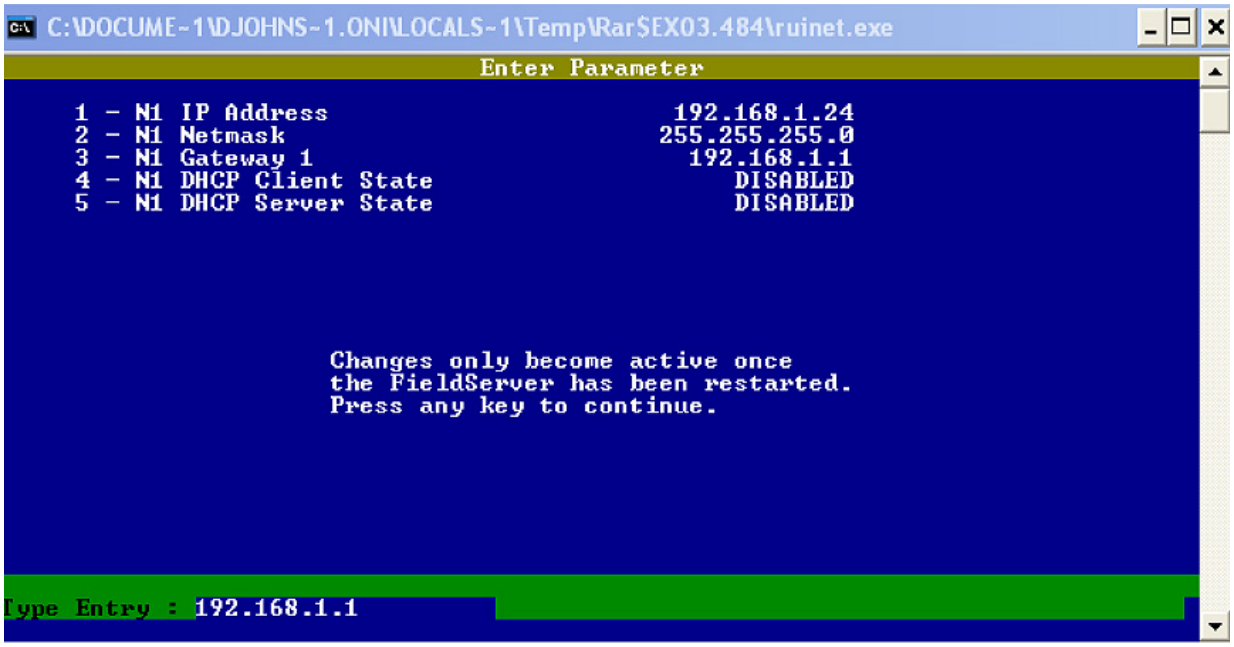
6. Enter the new gateway address as shown below and press enter.



7. The following message will appear.



8. When the address change is complete, the following message will appear. You must cycle power to the D-100 for the change to take effect.



D-100 Network Interface Module BACnet/IP Driver
Protocol Implementation Conformance Statement (PICS)

BACnet Protocol

Date: January 1, 2010
Vendor Name: ONICON Incorporated
Product Name: D-100-BAC Network Interface Module
Product Model: D-100-BAC/IP

Product Description: The D-100 Flow Display with Network Interface is a flexible platform designed to provide semi-custom solutions to difficult network interface problems. The standard module includes an internal power supply in a NEMA 13 wall mounted enclosure. A variety of optional interface modules allows for simultaneous connection to multiple networks from one device or provides network access for non-networked sensors.

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 CreatObject
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:

BACnet IP (Annex J)

Networking Options:

BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices? Yes

Device Address Binding:

Not supported

Character Sets Supported:

ANSI X3.4.

D-100 Network Interface Module with BACnet MS/TP Interface
Protocol Implementation Conformance Statement (PICS)

BACnet Protocol

Date: July 1, 2009
Vendor Name: ONICON Incorporated
Product Name: D-100-BAC Network Interface Module
Product Model: D-100-BAC

Product Description: The D-100 Flow Display with Network Interface is a flexible platform designed to provide semi-custom solutions to difficult network interface problems. The standard module includes an internal power supply in a NEMA 13 wall mounted enclosure. A variety of optional interface modules allows for simultaneous connection to multiple networks from one device or provides network access for non-networked sensors.

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 CreatObject
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 BAC OBJECTS

The table below contains information for each BACnet object. The D-100 operates in one of two operating modes, unidirectional or bidirectional flow. Please note that for unidirectional flow applications, Mode 2 objects are not used.

BACnet Object	Object Description	Units	Notes
Analog Input 1			Not Used
Analog Input 2	Volume or Mass Rate	GPM, GPH, MGD, L/S, L/M, L/Hr, M^3/Hr, Lb/Hr, Kg/Hr, CFS, CFM, No Units	
Analog Input 3	Generic Analog Input	PSI, BAR, KPA, GPM, L/S, M^3/Hr, CFS, CFM, KBtu/Hr, KW, TONS, %RH, Deg F, Deg C, No Units	
Analog Input 4	Generic Analog Input	PSI, BAR, KPA, GPM, L/S, M^3/Hr, CFS, CFM, KBtu/Hr, KW, TONS, %RH, Deg F, Deg C, No Units	
Analog Value 1			Not Used
Analog Value 2	Mode 1 Volume or Mass Total	Gallons, Liters, M^3, Lbs Mass, Kg Mass, Ft^3, No Units	
Analog Value 3			Not Used
Analog Value 4	Mode 2 Volume or Mass Total	Gallons, Liters, M^3, Lbs Mass, Kg Mass, Ft^3, No Units	
Analog Value 5	Auxiliary Input Total	None	BACnet will not report engineering units for this object
Analog Value 6	Operating Mode (Unidirectional or Bidirectional)	Not Applicable	1 = Unidirectional 3 = Bidirectional
Analog Value 12	Bidirectional Flow Indication	Not Applicable	1 = Mode 1 (forward direction) 2 = Mode 2 (reverse direction)
Binary Value 11	Not Used		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 or Mass Total	Not Applicable	
Binary Value 13	Not Used		
Binary Value 14	Zero Mode 2 Volume or Mass 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	Display Module	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 2	Volume / Mass rate
Analog input 3	Ai3 Rate
Analog input 4	Ai4 Rate

Analog Input 1 is not used.

BACnet Engineering Units for Analog Inputs (Defaults)

Volume / Mass Rate: **GPM**, GPH, MGD, L/S, L/M, L/Hr, M^3/Hr, Lb/Hr, Kg/Hr, CFS, CFM, No Units
Ai3 / Ai4 Rate: PSI, BAR, KPA, **GPM**, L/S, M^3/Hr, CFS, CFM, KBtu/Hr, KW, TONS, %RH, Deg F, Deg C, No Units

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 2	Mode 1 Volume / Mass Total
Analog value 4	Mode 2 Volume / Mass 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.

Analog value 1 & 2 are not used.

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

Volume / Mass: **Gallons,** Liters, M^3, Lbs Mass, Kg Mass, Ft^3, No Units
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 12	Zero Mode 1 Volume Total	
Binary value 14	Zero Mode 2 Volume Total	
Binary value 15	Zero Mode Aux Input Total	

Binary Value 11 & 13 are not used.

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 D-100. • 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.
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.)

Reported Problem	Possible Solutions
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.)
Network communications are disrupted when the device is connected (cont.).	• 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 D-100.

APPENDIX

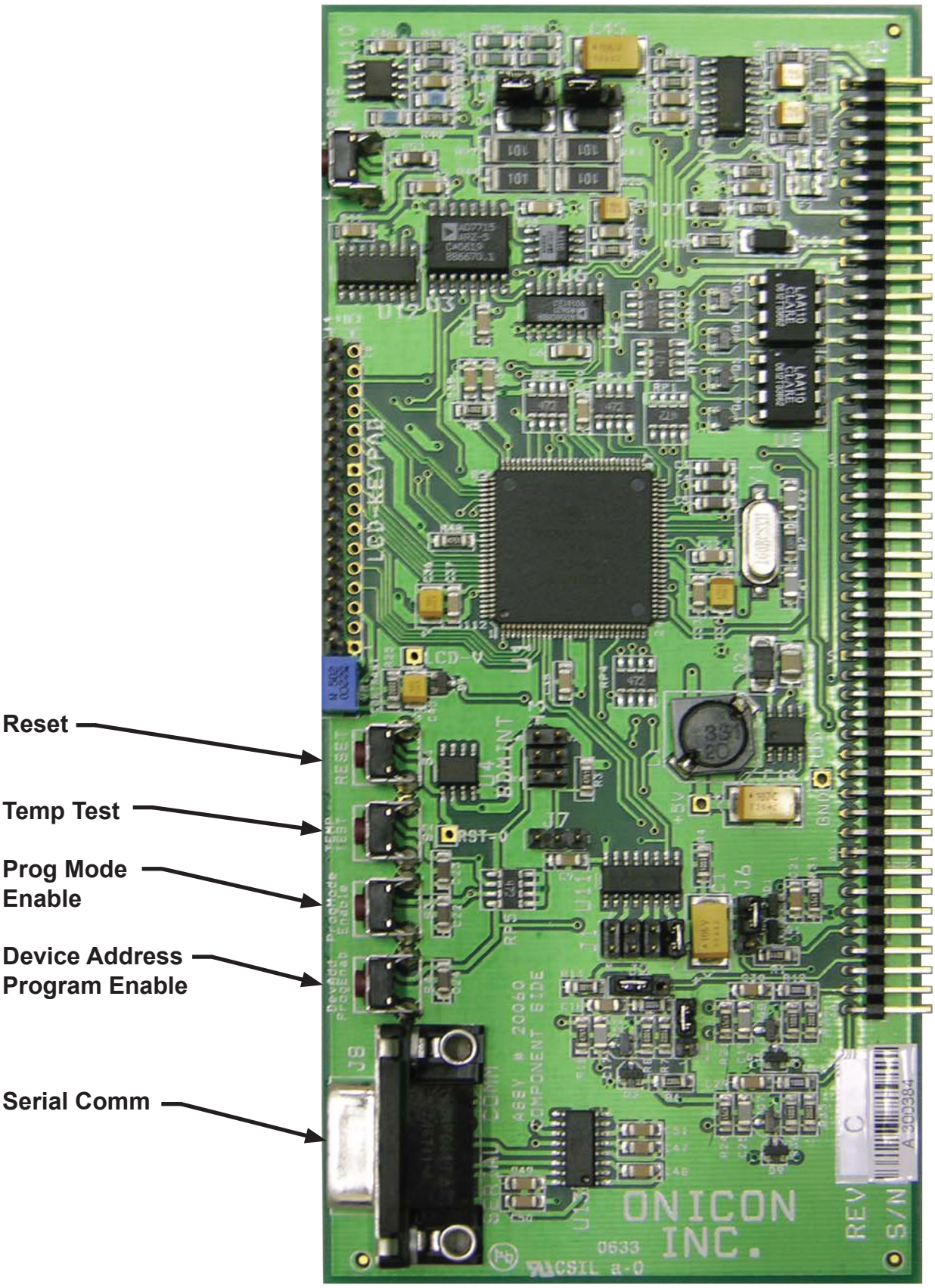
A-1 D-100 PROCESSOR BOARD

A-2 D-100 BACnet MS/TP BOARD

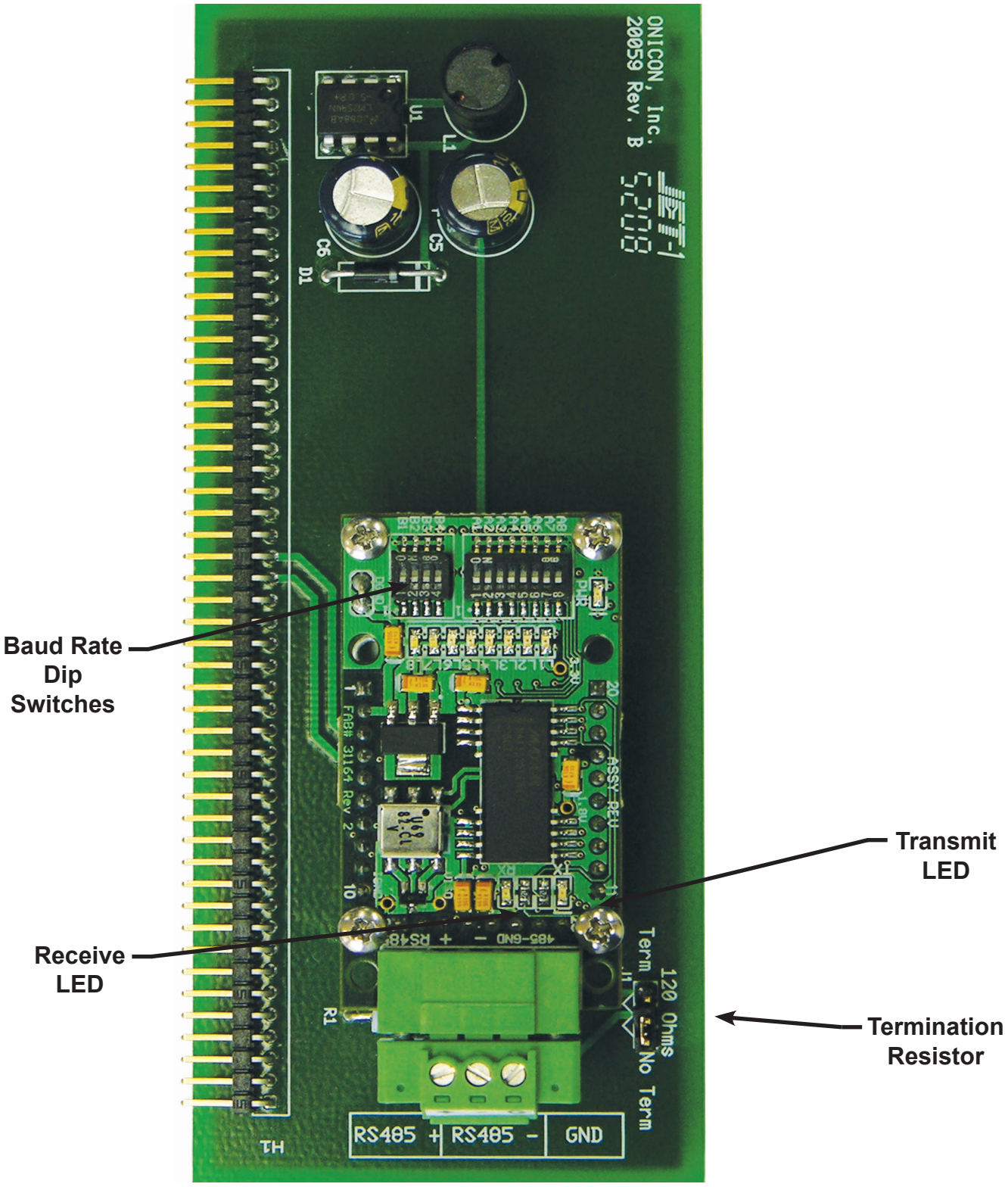
A-3 D-100 BACnet IP BOARD

A-4 D-100 BACnet/IP Auxiliary Input Board (Di3)

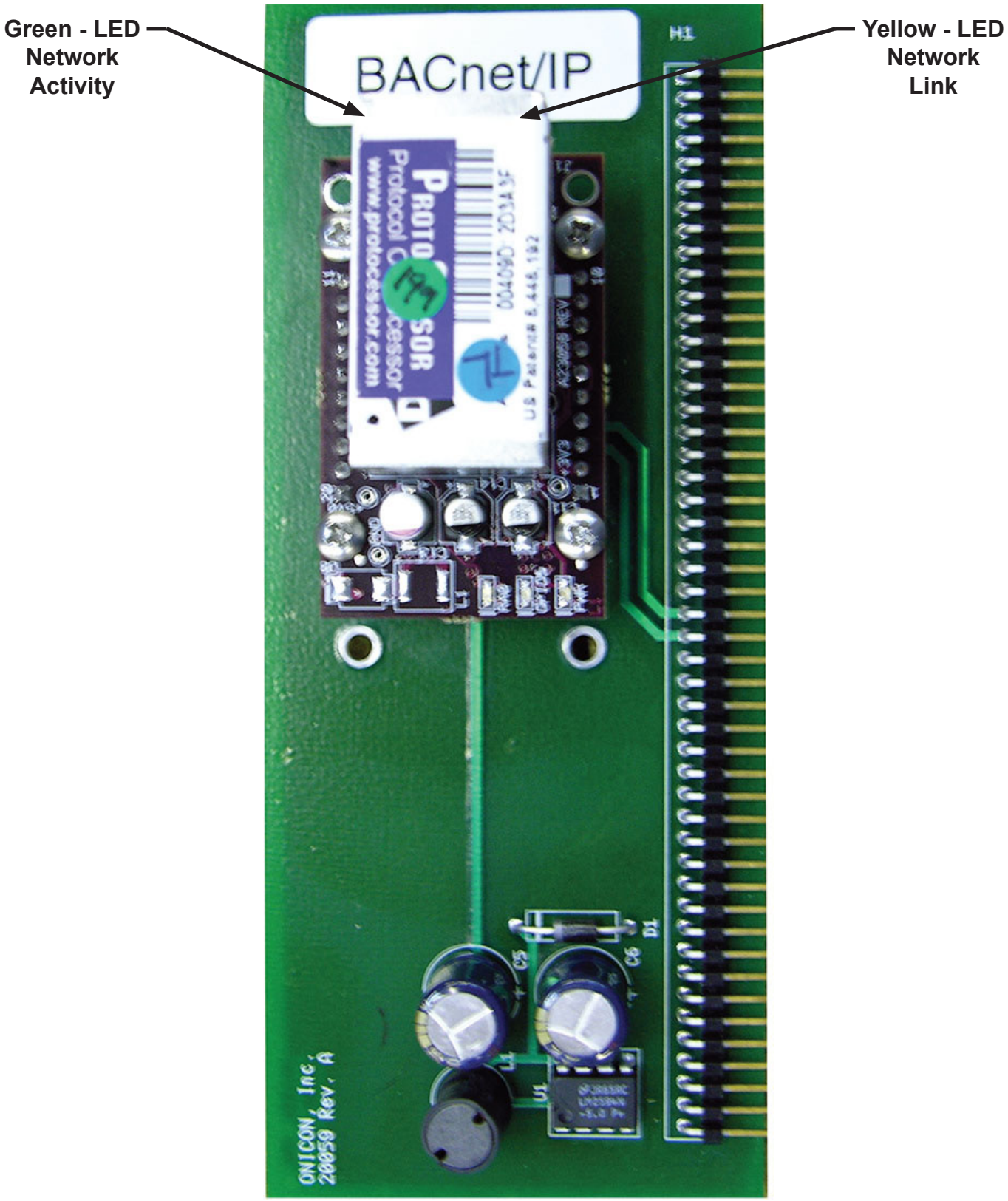
D-100 FLOW DISPLAY PROCESSOR BOARD



D-100 BACnet MS/TP BOARD



D-100 BACnet IP BOARD



D-100 BACnet/IP
Auxiliary Input Board

