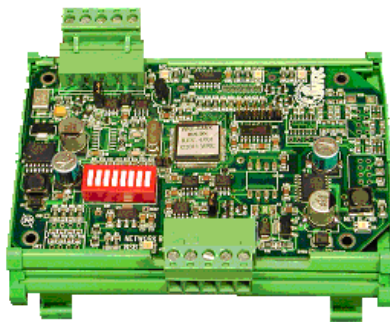


WRC-CANX Series IV CAN Bus Extender User's Manual Revision 4.06



Western Reserve Controls, Inc.

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4.01	Initial Release	April 2011
4.05	Added Product Picture, Removed FAQ section 10. Updated List of WRC Products Available in Section 7	March 2012
4.06	Added WRC-CANX-NEM-DN Pictures, Updated WRC Logo, Removed "Inc." from WRC, Added Table of Changes, Removed RM121DN reference from Section 4.5.2, Updated List of WRC Products Available in Section 7	October 2022

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All other trademarks are property of their respective companies.

Label Markings



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1. Overview

The WRC-CANX Extenders is a family of products that extend the communications cable lengths for DeviceNet, SDS (Smart Distributed System), J1939, CANopen and other CAN, V2.0, Part A or Part B serial bus systems. By allowing the user to extend the bus length for any given speed, they assist the user in cost-effectively implementing I/O or other nodes on these buses at remote locations that would be more difficult or more expensive to do otherwise.

A WRC-CANX Extender (the family members collectively referred to here as CANX or Extender) can be connected in a bus trunk line or drop line and is transparent to the other nodes on the bus. It receives and actively re-transmits (store-and-forward) each message from either side of the network without interpreting the message or acting upon it.

Each product has two network interfaces with an electrical isolation path between the two. Power is delivered to the unit through the network connectors. For DeviceNet and SDS systems power is provided through the 5-conductor bus cable.

A CANX can be used for quite a number of helpful purposes, including

- to extend the network beyond its absolute maximum length (e.g., 500 meters for DeviceNet) at the slowest speed
- to implement a longer network for a given baud rate (e.g., pushing a 500K baud network beyond 100 m for DeviceNet)
- to provide higher speed baud rates for a given network length
- to extend the length of the drop cable (e.g., longer drops than 6 m for DeviceNet)
- to provide 2500V electrical isolation between the 2 sub-nets
- to create a unique network topology instead of a conventional bus structure, such as a star configuration

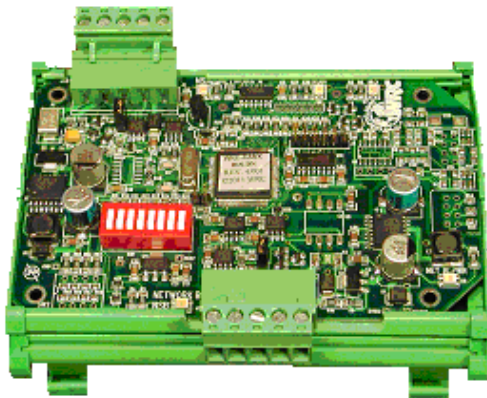


Figure 1-1 WRC-CANX-DIN-DN Series IV



Figure 1-2 WRC-CANX-NEM-DN Series IV

1.1. Series IV Specific Features

The Series IV CANX enhancements include:

- * Expanded DIP switch settings allow selection for CAN bus speeds up to 1 M Baud in addition to the standard DeviceNet baud rates
- * Made enhancements to allow for adding custom baud rates in the future.

1.2. Features

The WRC-CANX has the following features:

Extends CAN-Bus cable lengths - trunk line or drop lines
Allows operation at higher speeds for specific distances
Expands the usable applications for CAN-Bus systems
Operates at 9.6K, 10K, 20K, 40K, 50K, 100K 125K, 250K, 500K, 800K and 1M baud
Operates up to 1M baud for other CAN protocols
No configurable parameters
Automatic baud rate selection
No address selection required
Isolates the two sides of the bus - 2500 volts
Logically transparent to the Master and Slave devices on the bus
DeviceNet; SDS; CANopen, J1939, CAN, V2.0, Part A and Part B compatible
Powered from the 24Vdc supplied by bus network or the user

Two mechanical packages:

DIN rail mount:	WRC-CANX-DIN
Sealed NEMA-4X enclosure:	WRC-CANX-NEM

5-pin pluggable connection for the DIN mount unit
5-pin round mini-style connection for the NEMA mount unit
Standard CAN chips manage bus error detection
Standard CAN chips handle message bus contention
Less than 900 μ sec latency
4 bi-color (red/green) status LED's
CE Compliant

1.3. Basic Operation

There are two bus connections for each CANX, referred to as Network A and Network B. The CAN Bus is connected to each side of the CANX and each side receives its power and signals from the Bus on its respective side. See

Figure 1-33 for a typical application.

Whenever a message is transmitted on the Bus to which CANX is connected, CANX receives the message on the side where it was initiated and performs a store-and-forward of the message to the other side. It then transmits the message to the bus on the other side, following the defined bus arbitration rules. This action is performed for any valid CAN message independent of who generated it or to whom it is intended.

There is approximately a 900 μ sec propagation delay of the message through the CANX.

The CANX is not addressed as a specific device on the Bus and cannot be interrogated by other nodes. It is transparent to all other nodes on the bus.

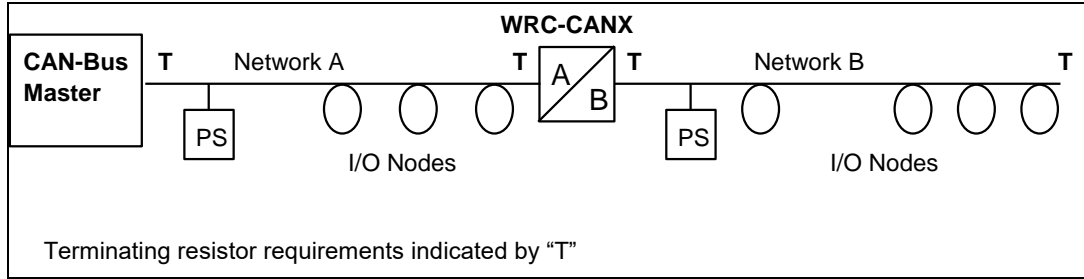


Figure 1-3 Typical CANX network configuration

1.4. Reference Documents

The following documents are referenced in this User's Manual:

- * ODVA DeviceNet Specification
- * Honeywell Micro Switch Specification GS 052 104, "SDS Smart Distributed System Physical Layer Specification", release date 12/8/1994

2. Quick Start

To quickly and easily install your CAN-Bus Extender in your DeviceNet system, follow the instructions below. For more details, see Section 4.

To Install and Establish Communications

1. Remove the CAN-Bus Extender from the box and connect your CAN-Bus cable to the 5-pin plugs (supplied with CANX-DIN) or the mini-style connectors (user-supplied) according to wiring specifications for the CAN Bus you are using and described later in this manual.
2. Leave the DIP switches in the factory setting position of FF or all OPEN positions. The DIP switches are set to autobaud both A and B sides from the first valid CAN message on either side.
3. Using on-board jumpers W1 and W3, terminate each side of the CAN-Bus network, as appropriate. (This is especially critical at the higher baud rates.)
4. The CANX does not differentiate between A side and B side from a functional perspective. The CANX can be oriented with either side toward the Master.
5. Make sure that there is power on both network sides. (The CANX isolated power and signal.)
6. Plug the CANX into your network.
7. The CAN-Bus Extender will undergo its initialization sequence, flashing the LED's. After approximately 5 seconds, the Module Status LED (labeled "MS") will go on solid green and network LED's (labeled "NSA" and "NSB") will flash green.
8. Both Network A and B Status LED's (NSA and NSB) will go on solid once a valid CAN message is received into either side of the Extender and the baudrate auto-detect has been successfully performed.
9. The CAN-Bus Extender is now operating on the network and is ready to repeat messages from either Network A or Network B.

3. General Specifications

Product:	WRC-CANX-DIN and WRC-CANX-NEM CAN-Bus Extender, Series IV	
Description:	Electrical extender to extend the permitted cable distances defined for CAN-based network products	
Device Type:	Communications Extender	
Product Revision:	4.xx	
DeviceNet Conformance:	Designed to conform to the ODVA DeviceNet Specification	
Baud rate:	9.6K, 10K, 20K, 40K, 50K, 100K 125K, 250K, 500K, 800K and 1M baud fixed or auto-detect baud rate on DeviceNet	
Address selection:	Not applicable	
Bus Connection:	<u>WRC-CANX-DIN</u> Extender: 5-pin pluggable header (male pins) Phoenix Contact MSTBA 2.5/5-G-5.08/AU CAN-Bus Cable: 5-contact plug (female contacts) Phoenix Contact MSTB 2.5/5-ST-5.08/AU (included) <u>WRC-CANX-NEM</u> Extender: Woodhead # 51354, female sockets, female threads Woodhead # 1R5006A17A120, male pins, male threads CAN-Bus Cable: See accessories list	
Status Indicators:	Module Status:	green/red bi-color LED
	Network A Status:	green/red bi-color LED
	Network B Status:	green/red bi-color LED
	Diagnostic Data:	green/red bi-color LED
Voltage Isolation:	2500 V	
Maximum power:	Voltage:	11 - 25 Vdc
	Current:	Network A: 110 mA @ 11 Vdc - 60 mA @ 25 Vdc Network B: 20 mA @ 11 Vdc - 10 mA @ 25 Vdc
	Power:	1.5 W
Mounting:	WRC-CANX-DIN:	DIN rail mount, EN 50022
	WRC-CANX-NEM:	Panel-mount, 4 screws
Size:	<u>WRC-CANX-DIN</u>	<u>WRC-CANX-NEM</u>
	Length:	4.32" (110 mm) 5.11" (130 mm)
	Depth:	1.79" (45,5 mm) 2.27" (57,7 mm)
	Height:	3.44" (87,4 mm) 3.70" (94,0 mm)
Operating Temp:	0-70 °C	
Humidity:	0-95% RH, non-condensing	
Agency Approvals and Certifications:	Agency: CE	

4. Hardware Installation and Configuration

4.1. Overview

A CAN-Bus Extender is a single device connecting to two parts (sub-network) of a single CAN-Bus network. The CANX-DIN is to be mounted on an EN50022 DIN rail (available from WRC and WRC's distributors as part number WRC 50022) in any orientation. The CANX-NEM is a NEMA-4X polycarbonate enclosure and is panel mounted.

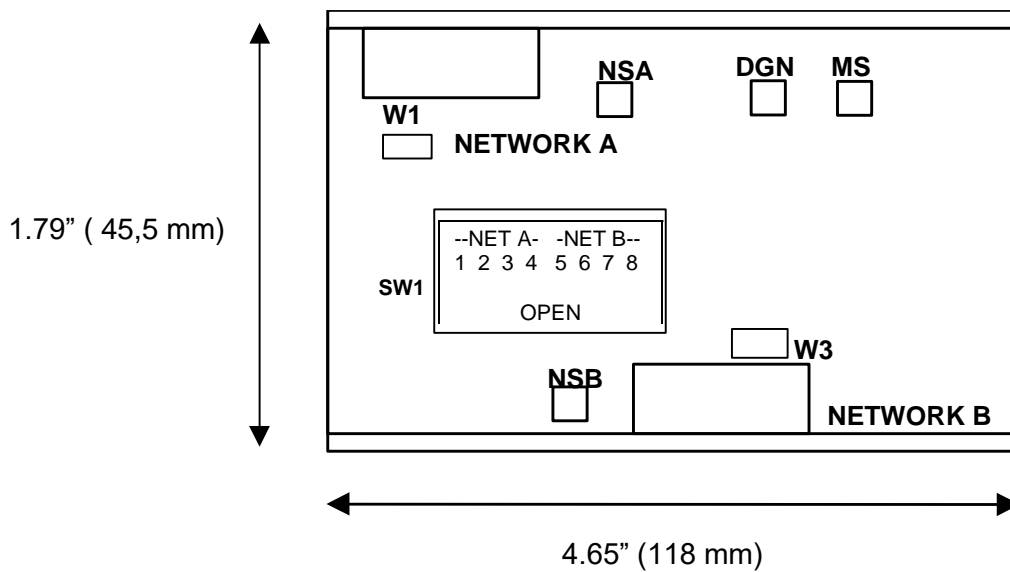


Figure 4-1 WRC-CANX-DIN Series IV Dimensional Drawing

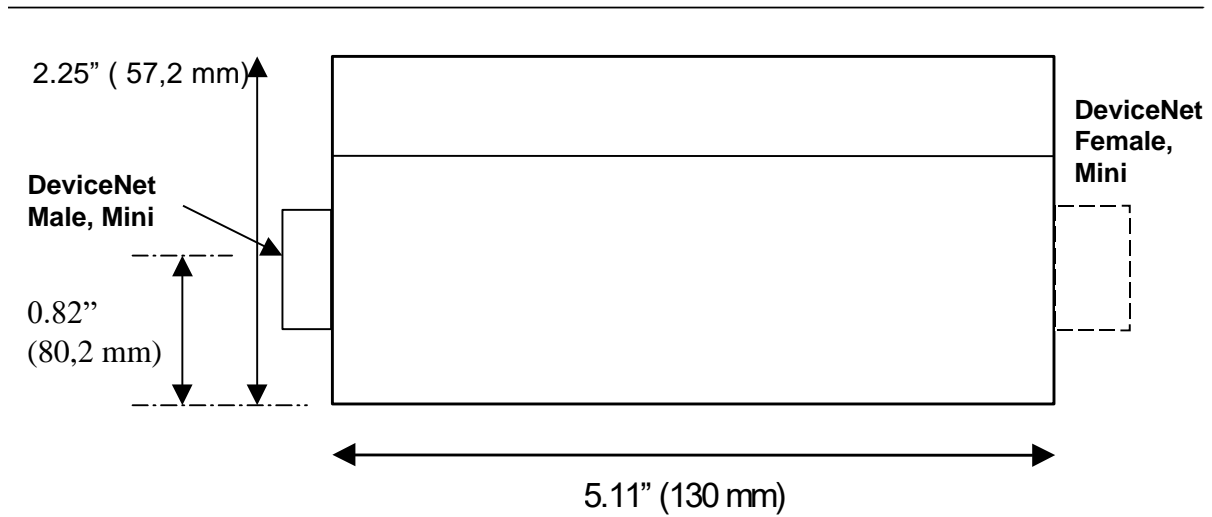
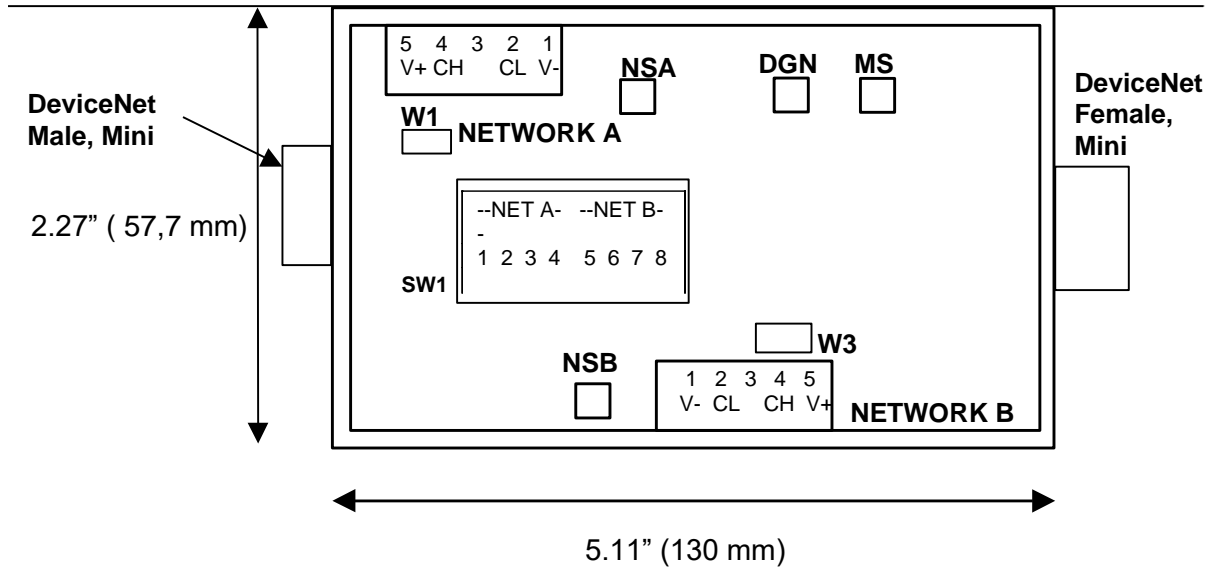


Figure 4-2 WRC-CANX-NEM Series IV Dimensional Drawing

4.2. DIP Switch Settings

The WRC-CANX-XX has an 8-pole DIP switch.

- Switch positions 1-4 are used to set the Network A baud rate.
- Switch positions 5-8 are used to set the Network B baud rate.

The baud rates can be set independently, or one side can take its baud rate from the other side (in the "Remote" setting).

The Autobaud detects from DeviceNet bauds.

For CANopen speeds, select the fix baudrate setting.

When both the CANX units are set to all open switch positions (remote-remote) it scans through DeviceNet baudrates.

Table 4-1 Baud Rate Settings for Switches

Baud rate	Local	Position 1	Position 2	Position 3	Position 4	Meaning
	Remote	Position 5	Position 6	Position 7	Position 8	
125K		CLOSED	CLOSED	CLOSED	CLOSED	Fixed
250K		CLOSED	CLOSED	CLOSED	OPEN	Fixed
500K		CLOSED	CLOSED	OPEN	CLOSED	Fixed
Autobaud		CLOSED	CLOSED	OPEN	OPEN	Autobaud for DeviceNet Bauds (125k,250k,500k)
9.6K		CLOSED	OPEN	CLOSED	CLOSED	Fixed
10K		CLOSED	OPEN	CLOSED	OPEN	Fixed
20K		CLOSED	OPEN	OPEN	CLOSED	Fixed
40K		CLOSED	OPEN	OPEN	OPEN	Fixed
50K		OPEN	CLOSED	CLOSED	CLOSED	Fixed
100K		OPEN	CLOSED	CLOSED	OPEN	Fixed
800K		OPEN	CLOSED	OPEN	CLOSED	Fixed
1M		OPEN	CLOSED	OPEN	OPEN	Fixed
Remote		OPEN	OPEN	OPEN	OPEN	Takes baud rate from the opposite end device. If both sides are remote, Autobaud from either side.
Autobaud		ALL OTHER SWITCH POSITIONS				Autobaud

4.3. LED Operation

The WRC-CANX-XX Multiplexer has four (4) LED's that provide visual status information to the user about the product and the DeviceNet network. See Figure 4-1, Table 4-2, Table 4-3 and Table 4-4.

Table 4-2 Module Status LED (labeled MS)

LED State	Module Status	Meaning
OFF	No Power	There is no power through DeviceNet.
Green	Device Operational	WRC-CANX is operating normally.
Flashing Red	Minor Fault	Advanced Memory Technology (AMT) buffers space exceeded.
Red	Unrecoverable Fault	WRC-CANX may be damaged.
Flashing Red/Green	Device Self-Testing	WRC-CANX is in self-test mode.

Table 4-3 Network Status LED's (labeled NSA and NSB)

LED State	Module Status	Meaning
OFF	No Power / Not on-line	WRC-CANX has no power or device is not operating.
Flashing Green	Idle	WRC-CANX has not received a valid message for 0.5 sec.
Fast Flashing Green	Auto baud selection	The WRC-CANX is waiting for a valid message to fix the baud rate.
Green	On-line	WRC-CANX is operating normally.
Flashing Red	CAN controller buffer overflow	There is more traffic on the network than the system can handle.
Red	Critical link failure (Bus Off)	WRC-CANX has detected an error that makes it incapable of communicating on the link.

Table 4-4 Diagnostic Status LED's (labeled DGN)

LED State	Module Status	Meaning
OFF	Normal operation	No Power, or Normal Operation with power applied.

4.4. Power Requirements

The WRC-CANX-XX CAN-Bus Extender subsystem is powered from the 11-25 Vdc provided by the DeviceNet network. The WRC-CANX consumes 60 mA of current at 25 Vdc, or 1.5 Watts, typical. See Section 3.

Power is typically taken from the bus on each side and each side (A and B) requires power. Power applied to the A Side powers the entire unit except the B Side isolated transceiver. If isolation is

not required for your application, then the power line may be jumpered from side A to side B. Care must be taken that the power supply is capable of handling the entire load on both sides of the CANX.

4.5. Network Cabling and Configuration

This section provides general guidelines for connecting DeviceNet and SDS systems. You can find detailed specifications in the appropriate ODVA DeviceNet and Honeywell SDS specifications.

4.5.1. Cable Lengths

The following provide cable length limits for DeviceNet and SDS systems.

Table 4-5 Network Maximum Lengths - DeviceNet

Baud Rate	Trunk Line Length		Drop Length			
	Maximum Distance		Maximum		Cumulative	
	Meters	Feet	Meters	Feet	Meters	Feet
125 Kbits/s	500 m	1640 ft	6 m	20 ft	156 m	512 ft.
250 Kbits/s	250 m	820 ft	6 m	20 ft	78 m	256 ft.
500 Kbits/s	100 m	328 ft	6 m	20 ft	39 m	128 ft.

DeviceNet has a limit of 64 nodes per network for any baud rate. The CANX does not count as an addressed device.

Table 4-6 Network Maximum Lengths - SDS

Baud Rate	Trunk Line Length (maximum)		Drop Length (maximum)		No. Nodes
	Meters	Feet	Meters	Feet	
125 Kbits/s	457.2	1500	3.6	12	64
250 Kbits/s	182.8	600	1.8	6	64
500 Kbits/s	91.4	300	0.9	3	64
1 Mbits/s	22.8	75	0.3	1	32

SDS has a limit of 32 nodes per network for any baud rate. The CANX does not count as an addressed device.

4.5.2. Network Termination

A CAN-Bus system **must be terminated at each end of the trunk line**. The host controller and the **last** device (CAN-Bus Extender or other DeviceNet node) on the network section must always be terminated to eliminate reflections, even if only two nodes are present. Follow the information below when using a CANX.

The CANX Series IV has built-in terminators, which can selectively included or omitted from the network. To include the on-board terminator on side A, install jumper W1; or remove the W1 jumper if the on-board terminator is not desired. For the side B sub-network, install or remove jumper W3. The CANX is shipped from the factory with the jumpers installed.

Trunk line use

For the purpose of network termination, the CANX is treated as the last node on the section of the trunk network to which it is connected. Therefore, when a CANX is used directly in a trunk line, it must be terminated on both the Network A and Network B sides. You must also place a terminating resistor on the other end device of Network A and on the last device on Network B side of the trunk line.

Drop line use

When CANX is used in a drop line (the Network A side is toward the main trunk), the Network A connection is **not** terminated. In this configuration the Network B section is considered as an independent bus line electrically. The CANX, as the first node in this new bus line and must be terminated, and the last device on the line must also be terminated.

Some specifications for the terminating resistor are:

Table 4-7 Terminating Resistors

DeviceNet	SDS
121 ohm	120 ohm
1% metal film	2%
1/4 watt	1/4 watt

Important: Per the DeviceNet and SDS specs -- do not terminate devices on drop lines.

Note: The WRC-CANX Series IV family is configured at the factory with 2 **internal terminating resistors** on each network – one for Network A and one for Network B – using jumpers W1 and W3. If these are used in a trunk line, no other terminators should be placed at the CANX that end of the network.

Note: If the CANX is used on a **drop line**, the internal terminating resistor should be removed on Network A – the drop line directly from the trunk line.

4.5.3. DeviceNet Connection Wiring

The supplied 5-pin CAN-Bus connection plug accepts cable sizes from 12 AWG - 24 AWG. The maximum wire size (12 AWG) has an area of 6530 circular mils and the smallest (24 AWG) has an area of 3265 circular mils.

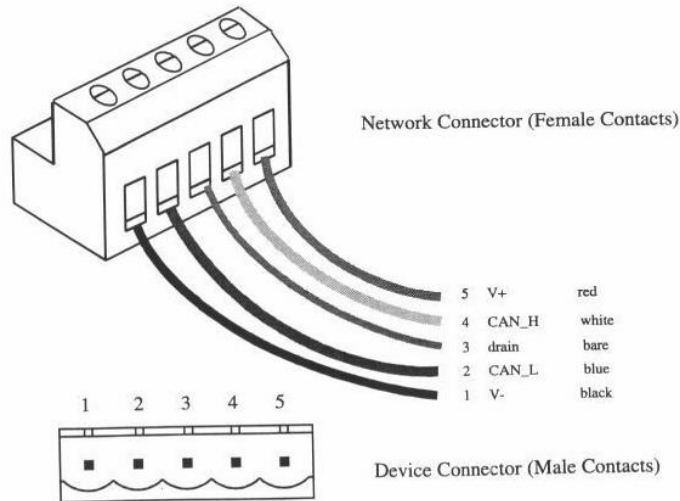


Figure 4-3 WRC-CANX-DIN-DN DeviceNet cable connector

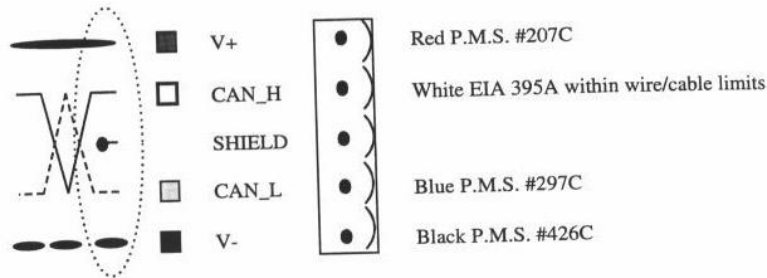


Figure 4-4 DeviceNet cable specifications

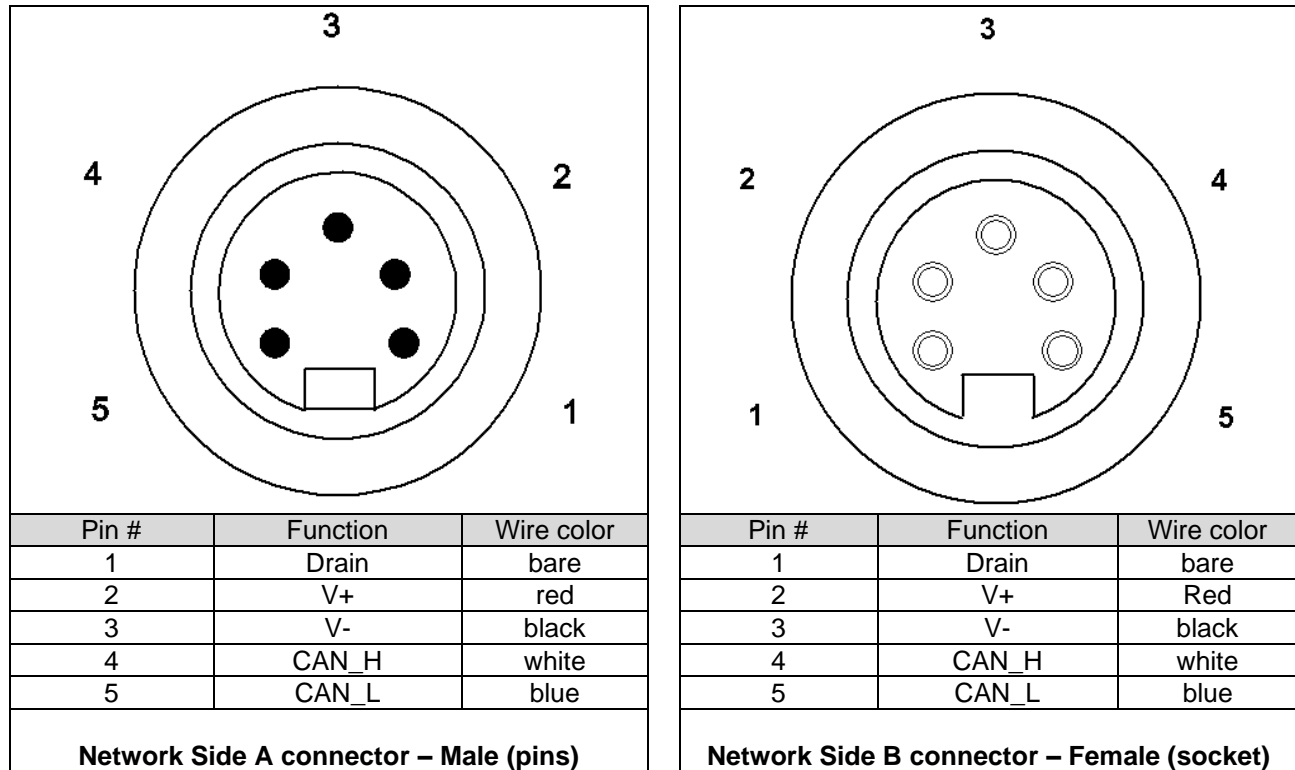


Figure 4-5 WRC-CANX-NEM DeviceNet Connectors

4.5.4. SDS Bus Connection Wiring

The supplied 5-pin CAN-Bus connection plug accepts cable sizes from 12 AWG - 24 AWG. The maximum wire size (12 AWG) has an area of 6530 circular mils and the smallest (24 AWG) has an area of 3265 circular mils.

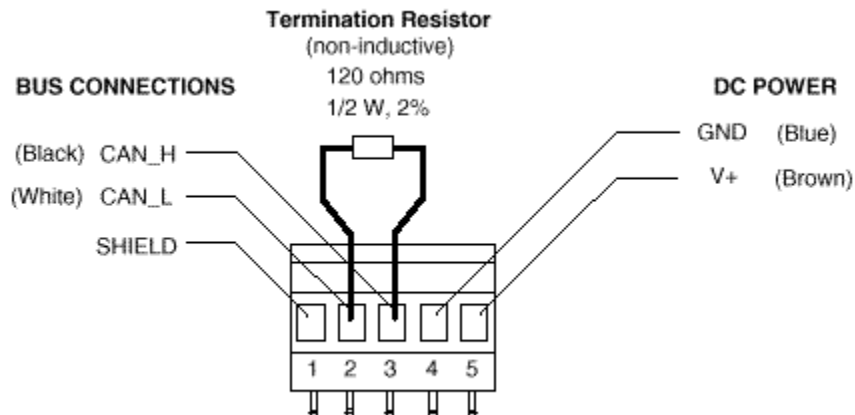


Figure 4-7 SDS Plug Connector

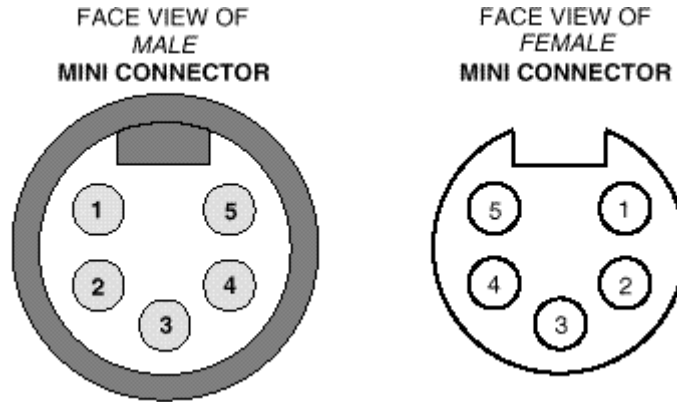


Figure 4-6 SDS Mini Connector

5. Operation

The CANX accepts and stores messages received at either network connection and actively re-transmits the messages to the other sub-net while providing 2500V isolation between the two sections of the network. The two bus connections for each CANX are referred to as Sub-Network A and Sub-Network B, and the two sub-nets are one logical network with isolation between them. The CANX may be used to extend the maximum distance that a network can operate at any given speed. That is a CANX may be used

- to extend the network beyond its absolute maximum length (e.g., 500 meters for DeviceNet) at the slowest speed
- to implement a longer network for a given baud rate (e.g., pushing a 500K baud network beyond 100 m for DeviceNet)
- to provide higher speed baud rates for a given network length
- to extend the length of the drop cable (e.g., longer drops than 6 m for DeviceNet)
- provide 2500V electrical isolation between the 2 sub-nets

The CAN Bus is connected to each side of the CANX and each side receives its power and signals from the Bus on its respective side.

Whenever a message is transmitted on the Bus to which CANX is connected, CANX receives the message on the side where it was initiated and performs a store-and-forward of the message to the other side. This action is performed for any valid CAN message independent of who generated it or to whom it is addressed.

The CANX is not addressed as a specific device on the Bus and cannot be interrogated by other nodes. It is transparent to all other nodes on the bus.

5.1. Application Notes

To help insure ease of installation and reliable operation of your system, the following guidelines should be followed CANX installation in your CAN network.

You may install the Network A side or B Side of CANX toward the Bus Master.

The CANX takes its logic power from the A Side, but you may power up the CANX from either side first.

There is a message propagation delay of less than 900 μ sec through the CANX.

In autobaud mode, each side can autobaud from the other side or from the first message on its own side.

CANX is not a grounded device and the Bus shield is not connected electrically to the device. Therefore, follow appropriate wiring practices to eliminate noise and other problems.

5.1.1. CANX Theory of Operation

As described the CANX performs a store-and-forward operation on each message received. The operation is described in this section.

The CANX will verify and accept (consume) on either network side any and all valid CAN messages. The message will be momentarily stored internally and the CANX will immediately attempt to re-send (produce) the message on the other side bus. Because the other side of the CANX is a different bus electrically and from a data link perspective, it will perform a negotiation session on that bus section to retransmit (produce) the message onto that section. This action has the effect of doubling the overall number of total attempts to get onto the bus of each message. This is the case because every message is reproduced independent of where the target node exists; that is, the CANX does not interrogate the message to determine the target node and does not know physically where the target node is connected.

As the bus negotiation is performed on the second side, the retransmitted message may or may not get on the next bus section immediately. That will depend solely upon the priority of the message the CANX is sending with respect to the messages being generated by nodes on that side of the bus and on the amount of overall bus traffic on that side. In the case where the CANX does not immediately win the negotiation it stores the messages and attempts to resend it in the same fashion as any other device on the network. To the extent that it cannot produce immediately the message will be stored in an internal buffer until it can be sent.

As other messages arrive at the CANX they also are put into an internal buffer and retransmitted as quickly as possible. The internal buffers (one for each side) are FIFO buffers so that the messages for each side will be retransmitted in the order that they are received with respect to the other messages received on the same side. Up to 100 messages can be held in the internal AMT buffers.

5.1.2. Network Throughput Design Considerations

The effect of the operations described above and the internal propagation delay inside the CANX (less than 900 μ sec) as it performs the store-and-forward is that it may be possible to design a network with more traffic that the CANX can be expected to handle. Care should be taken to design the network so that the amount of total traffic does not exceed the capabilities of the total system. Each application and installation has its own requirements and configurations so a definitive formula would be very difficult to define. However, a good rule of thumb would be to set up the scan time for a network that includes a CANX that is no faster than twice the fastest scan time possible to achieve the desired communications that may be obtained without the CANX.

In the event that the network operation prevents all messages on one side from getting out before the buffer on that side fills, subsequent messages will be lost. The CANX will continue to process transmitting all stored messages and will accept new messages once room clears in the buffer. The red LED labeled NSA or NSB will illuminate and will remain illuminated for 5 seconds after the "buffer full" condition clears.

5.1.3. Fixed Operation

Fixed baud rate operation has the specific advantage that it can be used in networks where all devices are auto baud only.

The baud rate is set by setting SW1 switch positions before powering up the A side of the CANX. See Table 4-1.

5.1.4. Autobaud Operation

Autobaud is the method by which a device automatically determines the baud rate on the DeviceNet network and sets its internal baud rate to match without the need for switches or software configuration. The CANX supports autobaud.

Autobaud operation has the advantage of allowing a system implementer or designer to ignore the operating baud rate when installing the CANX. The general practice is that when an I/O device is autobaud, it does not transmit a DupMacID request message immediately upon power up. It waits for another (fixed baud rate) device to send its DupMacID message in order use that message to determine to which baud rate the network has been set.

Since the CANX is not a logical node on DeviceNet, it does not initiate any DeviceNet communications. When both the A and B sides are set to autobaud, a valid message on either side will be used to set the baud rate on both sides. In addition, that message is transmitted out the other side of the network to the nodes from which they can establish their baud rates if in autobaud.

In the case where no device that initiates this DupMacID sequence, all the autobaud devices will just wait for some valid message to be generated.

The CANX baud rate is set by setting SW1 switch positions before powering up the A side of the CANX, as defined in Table 4-1.

6. Example Configurations

Examples of valid configurations are shown in the following figures.

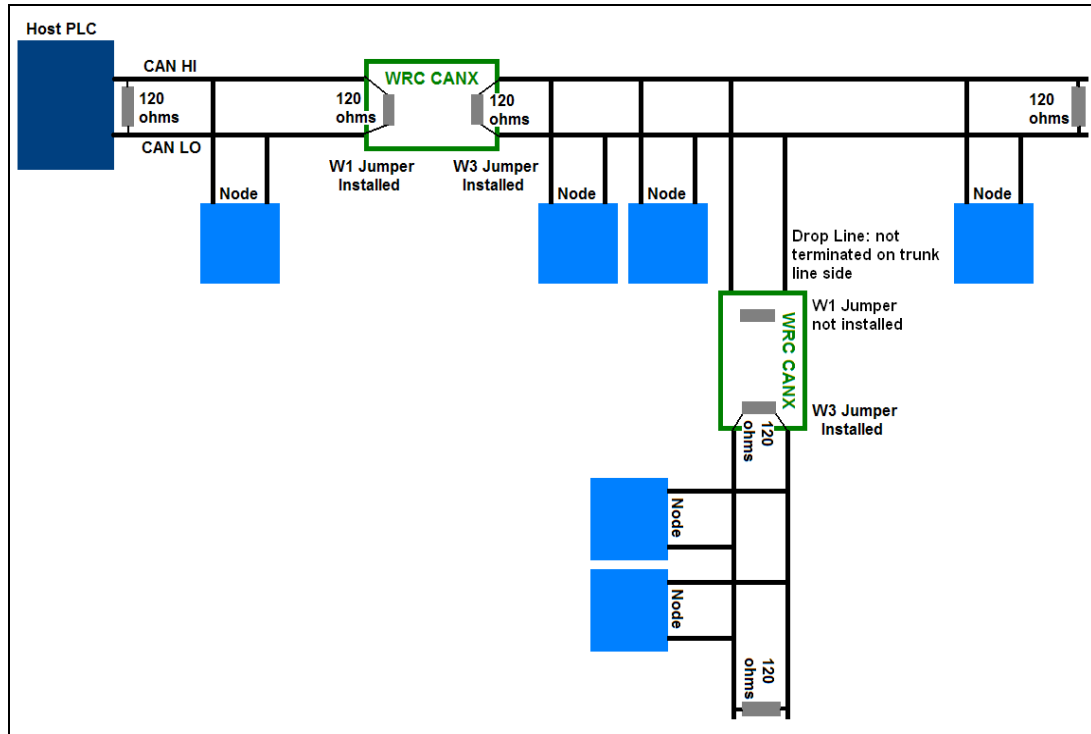


Figure 6-1 Sample WRC-CANX Setup

• Linear Bus Topology

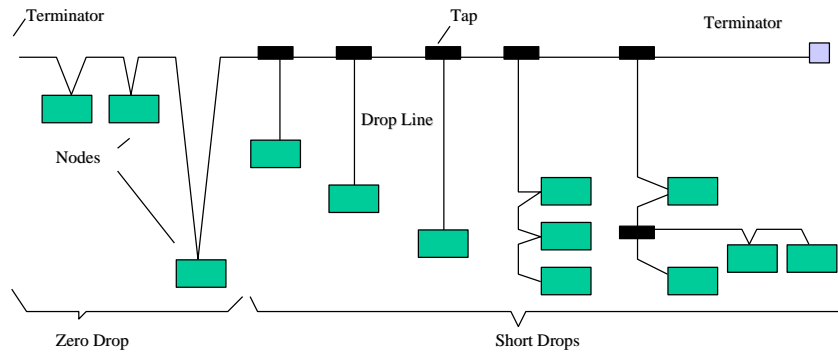


Figure 6-2 Linear Topology Example

• Linear Bus Topology - distance doubled

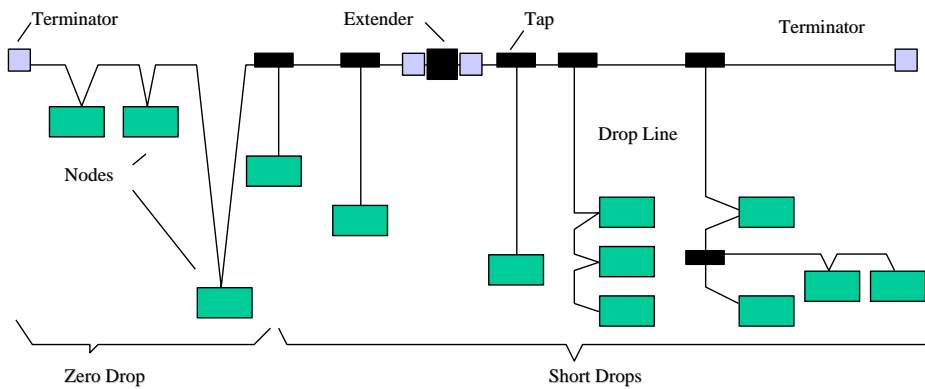


Figure 6-3 Linear Topology with Double Distance Example

- Linear Bus Topology - multiple Extenders

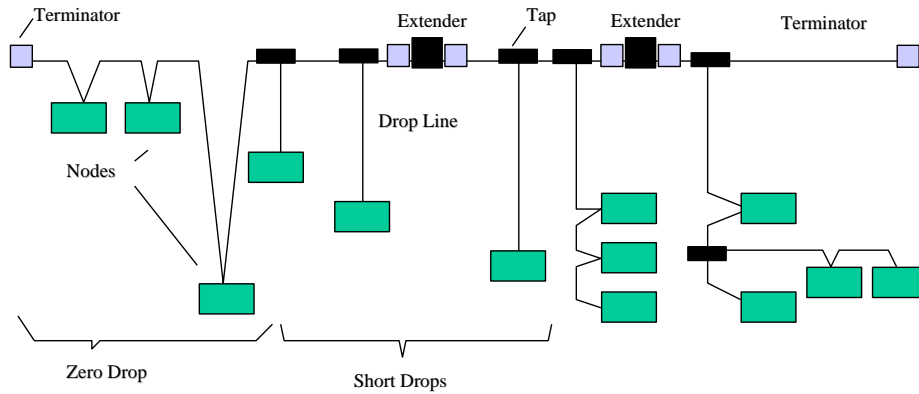


Figure 6-4 Linear Topology with Multiple Extenders Example

- Linear Bus Topology - multiple extended drop lines

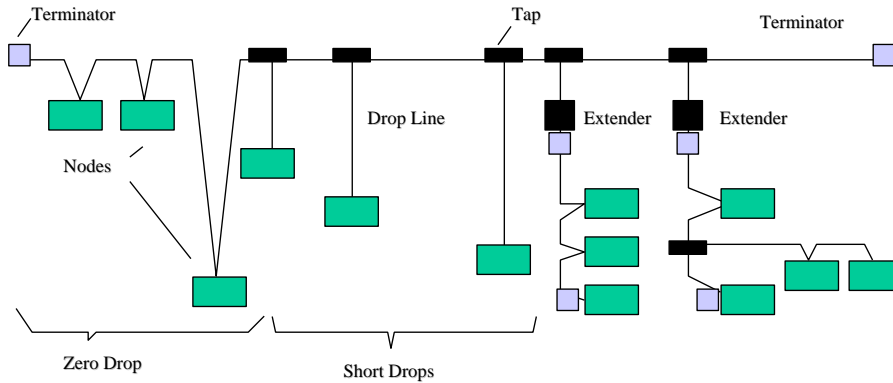


Figure 6-5 Linear Topology with Multiple Extended Drop Lines Example

- Modified Star Topology - multiple extended drop lines

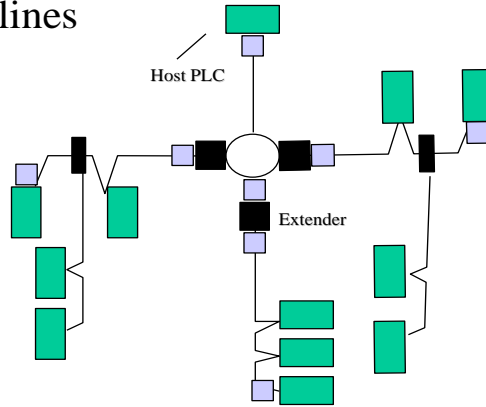


Figure 6-6 Star Topology with Multiple Drop Lines Example

7. Additional WRC Products

The following WRC products and components are also available.

Table 7-1 Additional WRC Products Available from ProSoft Technology

Part	WRC Part Number
DeviceNet, CANopen Extender, DIN mount	WRC-CANX-DIN-DN
DeviceNet, CANopen Extender, NEMA box	WRC-CANX-NEM-DN
DeviceNet, CANopen Extender, Fiber Optic, NEMA box, multi-mode fiber	WRC-CANR-DF-DN
DeviceNet, CANopen Extender, Fiber Optic, NEMA box, single-mode fiber	WRC-CANR-DF-SM

The following components can be used with a WRC-CANX CAN-Bus Extender for replacements or spare parts.

<u>Part</u>	<u>WRC P/N</u>	<u>Equivalent Mfr. Part Number</u>
• CANX-DIN Link Connector and Terminator Resistor	CANX-DN-CK	Phoenix Contact MSTB2.5/5-ST-5.08/AU
• CANX-NEM Cable	n/a	Various manufacturers' Mini-Style Connector Examples: Cable assy. w/ female threads, fem. sockets: Turck RKM 570-*M/630 ("trunk line") Turck RKM 571-*M/630 ("drop line") Cable assy. w/ male threads, male pins: Turck RSM 570-*M/630 ("trunk line") Turck RSM 571-*M/630 ("drop line")
• DIN rail (1 meter)	WRC 50022	Phoenix Contact NS 35/7,5 0801733 (2 m) Allen-Bradley 199-DR1 (1 m)

WRC also provides discrete and analog I/O signal conditioning and multiplexing on DeviceNet, as well as communication gateways.

8. Troubleshooting

This section identifies some of the common problem observed when commissioning or operating a CANX Extender.

Problem:

DeviceNet devices will not communicate on the network
Module Status LED is solid Green
Network Status LEDs are flashing Green at ½ second intervals

Meaning

No transmissions have been received by the CANX for 0.5 seconds.

Possible Solutions:

1. Network cables are broken or disconnected.
2. Network is not properly terminated.
3. All devices have stopped trying to communicate on the network.
4. Power has been lost on the B Side subnetwork.

Problem:

DeviceNet devices will not communicate on the network
Module Status LED is solid Green
Network Status LEDs are flashing Green quickly

Meaning

The CANX is in autobaud and is waiting for a valid message to fix its baud rate.

Possible Solutions:

1. Network cables are broken or disconnected.
2. Network is not properly terminated.
3. All devices have stopped trying to communicate on the network.

Problem:

Some messages are missed on network.
Module Status LED is solid Green
NSA and NSB LEDs are flashing Red

Meaning

Internal CAN buffers are full. Network has more traffic than it can handle.

Possible Solutions:

1. Reduce the scan rate from the Master.
2. Reduce the COS frequency on I/O devices.
3. Decrease the assembly sizes of I/O connections.
4. Recalculate the network traffic and bandwidth without the CANX.

Problem:

Some messages are missed on network.
Module Status LED is solid Green
NSA and NSB LEDs are flashing Red

Meaning

Internal AMT buffers are full. Network has more traffic than it can handle.

Possible Solutions:

1. Reduce the scan rate from the Master.
2. Reduce the COS frequency on I/O devices.
3. Decrease the assembly sizes of I/O connections.
4. Recalculate the network traffic and bandwidth without the CANX.

9. Summary of Changes to Series IV from Rev 2 and Series III

To facilitate implementation of the new Series III CANX products for customers that are currently users of the CANX Revision 2.xx products, this section summarizes the product changes from Rev 2 to Series III.

9.1. *DIP Switch Baud Rate Settings*

Several new options exist for setting the baud rate on the CANX Series III.

- Like the Series III, the Series IV has an 8-position DIP switch block. All 8 switches are defined and used.
- The Series IV unit is compatible with all CANopen baud rates. These baud rates are fixed by setting the 8 position dip switch to the appropriate configuration.
- Like Series III, a “remote mode” exists which allows either side to set its baud rate based on the other side’s BR – in either fixed baud or autobaud.
- See Section 4.2 above for details.

9.2. *Terminating Resistors*

The Series IV has an on-board terminating resistor on each CAN connection that can be selectively included or excluded from the network circuit. With jumpers W1 and/or W3 in place, the CANX puts a 121-ohm resistor across the CAN_H and CAN_L lines on sub-network sides A and/or B. See Figure 4-1 and Figure 4-2 for the location of these jumpers.

9.3. *Field Programmable Updates*

The CANX Series IV has its program held in flash memory, which can be updated in the field. Contact the factory for details.