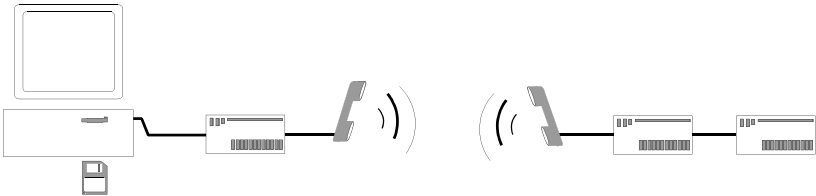
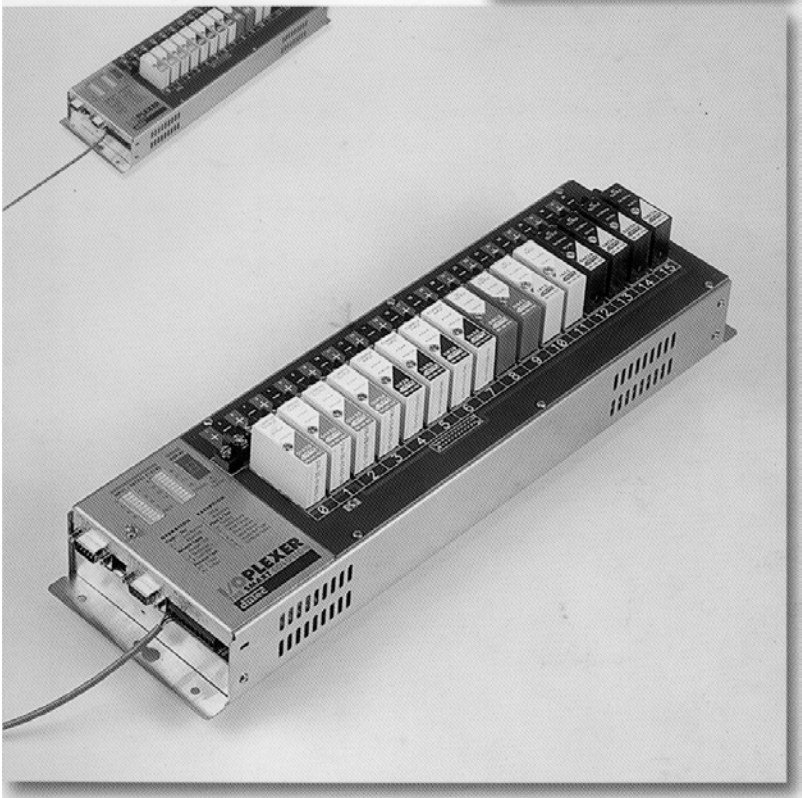


duTec
I/O Plexer
Repeater
MANUAL



Innovative I/O Since 1977

Jan 2005
Revision



I/O Plexer Repeater
Hardware
Users
Manual



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Overview:

In applications such as remote process monitoring, factory automation, and energy management, a variety of signals must be transmitted over long distances. Instead of requiring expensive, multi-conductor sensor wiring for each signal, cabling costs can be reduced significantly by using a pair of I/O Plexer Repeaters and a single communications circuit. Often called “wire savers” or “Cable concentrators” I/O Plexer Repeaters replace expensive and noise prone long distance wire runs.

One I/O Plexer repeater concentrates sensor signals into serial data. The other recreates the individual signals at a second location. Special firmware eliminates the need for a host computer. Data flow is bi-directional, meaning that signals can be passes in either direction. Data checksumming is automatically employed to ensure data integrity.

Capacity:

One pair of I/O Plexer Repeaters can interface 16 analog and digital signals in any combination. With optional digital expanders, up to 48 more digital signals can be added for a total of 64 I/O channels.

Compatibility:

I/O Plexer Repeaters use DuTec I/O modules to match signal requirements exactly. With a direct interface to sensors, no external signal conditioning is required. Furthermore, all DuTec modules feature total electrical isolation, both module to logic and module to module. Analog modules are available to measure:

- Millivolts DC to hundreds of volts AC
- Milliamps DC to amps AC
- Frequency to tens of kHz
- Temperature with all popular thermocouples and resistance temperature devices

A full range of industry standard digital modules is available for AC, DC, and dry contact inputs and outputs to hundreds of volts.

I/O Plexer Repeaters can be used to convert signals from one type to another. For example, a thermocouple at the remote site can be converted to a standard process current (4-20mA) signal at the local site.

Communications:

DuTec supports several standards for transmitting serialized I/O data between I/O Plexer repeaters. In addition to hard wiring, built in modem control lines allow the use of telephone, fiber optic, and radio modems at baud rates to 38,400.

Serial Link	Maximum Distance	
	Feet	Meters
RS-232	50	15
RS-422	5,000	1,524
RS-485	5,000	1,524
Modem	Unlimited	Unlimited

Response Time:

Under full load (sixteen analog and 48 digital signals), the average response time between an input event and resulting output is less than 250mS @9600 Baud.

Easy Setup:

The I/O Plexer Repeater has its own power supply, no need to purchase or reserve space for an external supply. A push-button and on board LED indicator configure the baud rate and Input/ Output separators. Removable terminal strips allow the attachment/ removal of multiple cable sets in one step. This modularity greatly reduces troubleshooting and upgrade delays.

Built in Diagnostics:

On power up, the unit self-tests for system faults and reports via a sequential display. Should hardware or firmware fail, an onboard hardware watchdog provides safe shutdown by turning off all outputs.

Communications Watchdogs:

The I/O Plexer Repeater can be instructed to implement alarm and failsafe states in the event of a communication failure.

Upgradable:

If the application evolves to a centralized or distributed control network, I/O Plexer Repeaters can be returned to the factory to be converted into standard I/O Plexers for a fraction of the cost of a new unit. This means that the I/O Plexer Repeater hardware can be “recycled” into a fully compatible I/O system for use with a standard MMI or SCADA package.

Available I/O Modules

Analog inputs, 12 Bit		Analog Outputs, 12 Bit	
Frequency		Voltage	
F10K-B	input 300Hz-10Khz	0V1	Output 0-1V, self sourcing
F2.5K-L	input 0-2.5Khz	0v5	Output 0-10V, self sourcing
F5K-L	input 0-5Khz	0v10	Output 0-10V, self sourcing
F10K-L	input 0-10 KHZ		
Voltage		Current	
V25M	input 0-25mV	01420	Output, 4-20mA Self-Sourcing
V50M	input 0-50mV		into 275 Ohm Load.
V100M	input, 0-100mV	Digital	Inputs
V1	input 0-1V		
V5	input 0-5 V	AC	
V5B	input bi-polar ±5V	AC5	input 90-140Vac
V10	input 0-10V	AC5A	input 180-280Vac
V10B	input Bi-polar ±10V	DC	
VAC	input 28-140 Vac	DC5D	input 3-32 VDC fast>500Hz
VAC-A	input 56-280 Vac	DC5NP	input 10-32 Vdc, 15-32
Current			Nonpolar
I420	input 4-20 mAac	Digital	Outputs
IAC5	input 0-5Aac	AC	
Thermocouple			
ITCE	Type E 0° to 435°C	OAC5	Output 12-140 Vac, 3.5A
ITCJ	Type J 0° to 700°C	OAC5A	Output 24-280Vac, 3.5A
ITCJ-1	Type J -80° to 750°C	OAC5A5	Output 24-280Vac 3.5A NC
ITCK	Type K -100° to 924°C		
ITCK-1	Type K -110° to 1250° C	OAC5J	Output 20-280Vac, 6.0A
ITCR	Type R 0° to 960° C	DC	
ITCR-1	Type R 0° to 1760° C	ODC5	Output 5-60 Vdc, 3.5A
ITCS	Type S 0° to 1034° C	ODC5A	Output 4-200Dc, 1.0A
ITCS-1	Type S 0° to 1760°C	ODC5R	Electro-Mechanical 0.5A Relay Form A NC
ITCT	Type T -200° to 224° C	Special	Purpose
ITCT-1	Type T -120° to 400° C	IDC5S*	Dry input contact sense, built in isolated source
ITCT-2	Type T 0° to 150° C		
RTD			
TR100	100 Ohm PT -50° to 350°C	IDC5Z*	input±200mV, 0-10Khz
TR100-1	100 Ohm PT 0° to 100°C		(digital)**
Type 590	Temperature Sensor	SPS-1*	Sensor power supply 18-24Vdc, 30mA
TP590	-188.4° to 150°C	TIO1	Digital Input/output Test Module with field switch and LED
TP590-1	50.0° to 150°C		
<p>* When Selecting A power supply for the system, assume 25mA for standard digital modules and 100mA for modules marked With an *</p> <p>** The IDC5Z Module is used for low-level signals and will pass signals at the rate of 10Khz The I/Oplexer however is limited by Communications baudrate.</p>		Support	Products
		Fuses	
		FMP-06	Fuse Assy 0.062A
		FMP-1	Fuse Assy, 1A
		FMP-3	Fuse Assy, 3A
FMP-5	Fuse Assy 5A		

Physical Characteristics:

Power	Standard	85-132 VAC @30W (47-440 Hz)
	Option /E, /E5	105-256 VAC @23W/39W (47-440Hz)
	Option /B	10-16 VDC @35W
	Option /C	18-36 VDC @35W
Environment	Temperature	0-60°C
	Humidity	95% non-condensing
Package	Type	Stainless Steel
	Length	17.25 in. (44 cm)
	Width	5.0 in. (12.7cm)
	Height	3.5 in. (8.9cm)
	Weight	4 lbs. (1.8kg)

Ordering Information:

Specify duTec products by model number e.g.,

IOP-RAD	I/O Plexer repeater for analog and digital signals
IOP-RD	I/O Plexer repeater for digital signals only

Options are specified by a series of suffixes to the model number, preceded by a slash. Power supply options are noted above. To expand signal capacity beyond 16, the following options allow the use of the I/O Plexer repeater with digital expanders. For example,

IOP-RAD/3+ Allows the use of one to three digital expanders on an analog capable I/O Plexer repeater.

IOP-RD/B Specifies a digital only I/O Plexer Repeater with a 12 VDC compatible power supply.

Installation:

In a wall mounted enclosure the I/O Plexer Repeater can be mounted horizontally or vertically. Horizontal installation is good practice as it makes the best use of natural convection.

Figure 2-1 below shows the outline of the I/O Plexer Repeater. Using the keyhole slots, the unit can be mounted with 2-#10 screws on 16.5" centers. Using the corner holes, the unit can be mounted with 4-#6 or #8 round head or pan head screws located on a 3.5" X 16.5" grid. Hole locations in relation to the overall dimensions are shown below. Both the I/O Plexer repeater and the digital expander have the same mounting dimensions.

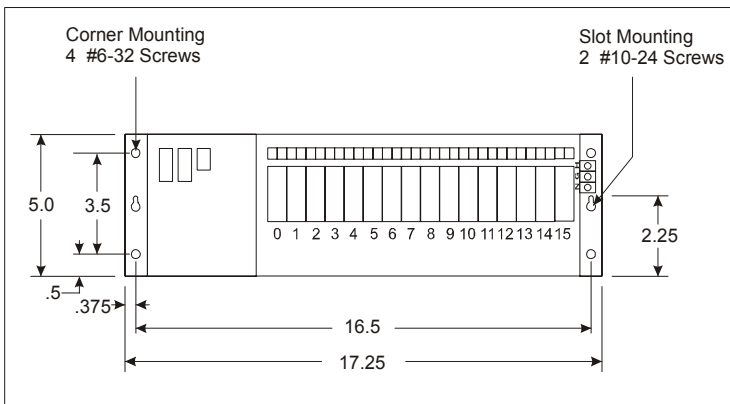


Figure 2-1 I/O Plexer footprint

Power Wiring:

Power connections are made at the 3 position terminal block located on the right end of the I/O Plexer Repeater. No. 8 captive wire clamps accept 10-16 AWG wire or spade lugs. The terminal block cover need not be removed to install wiring.

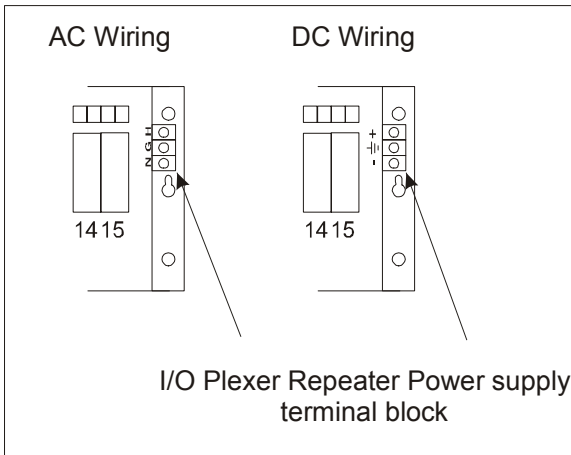


Figure 2-2 Power wiring

The center terminal block position, adjacent to the letter G on the end of the I/O module board, is chassis/ earth ground which is connected to the I/O Plexer Repeater case.

Standard 85-132 VAC, 47-440 Hz and option /E5 105-265 VAC 47-440Hz Operation.

Following power wiring conventions(AWG)

Black wire to terminal marked H (hot)

White wire to the terminal marked N (neutral)

Green wire to the terminal marked G (chassis/ earth ground)

Option /B or /C 10-30 VDC Operation

+ of the power source to the terminal marked H

- of the power source to the terminal marked N

Earth Ground, where available to the terminal marked G

Digital Expander

The I/O Plexer Repeater Digital Expander (IOP-DE) Receives its power and signals from the I/O Plexer Repeater via the included 24 pin keyed ribbon cable (duTec part #CE-24) No other power wiring is required.

Linking the two I/O Plexer Repeaters:

In order for two I/O Plexer Repeaters to share their data, they must be linked via a serial connection. This link can be hard-wired using either an RS-422 or RS-485 twisted pair connection where the wire run between devices is less than 5000 Feet. In situations where distances are greater than 5000 feet or circumstances do not allow additional wire to be installed; RS-232 Radio or telephone modems may be used. In any event, the appropriate transmitter of the I/O Plexer Repeater will be connected to a suitable receiver of the other I/O Plexer Repeater as shown in figure 2-3.

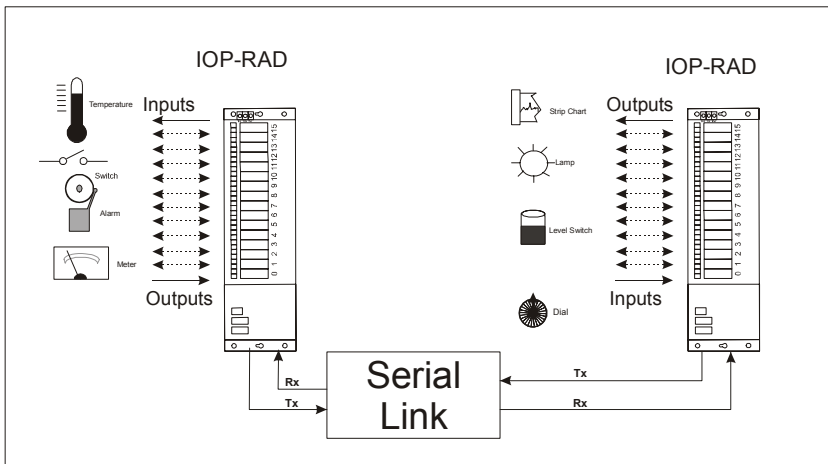


Figure 2-3 Communications link

Link via RS-485

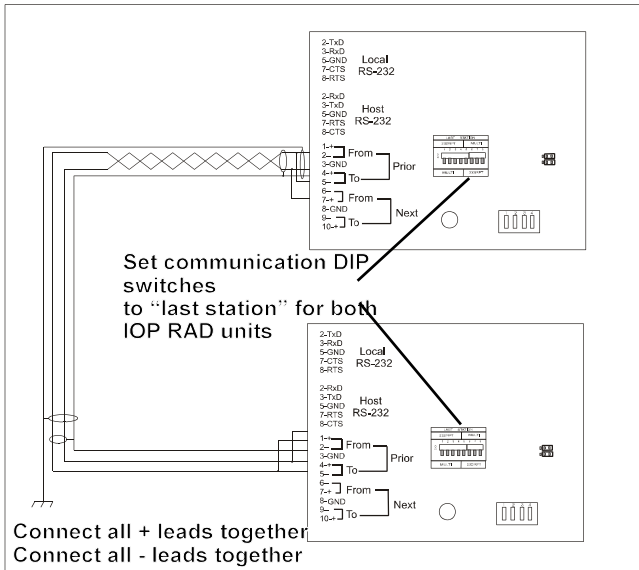


Figure 2-4 Link via RS-485

Figure 2-4 shows one individually shielded twisted pairs of AWG 24 (such as Belden 8162) with the shields connected between unit grounds. The overall isolated shield should be connected to ground in one place only. In a perfect world with no electrical noise and equal ground potentials everywhere the ground connection is not required. Not using the ground connection can lead to costly debugging.

These connections, which require the cover to be removed, are made by placing a 1/4 inch stripped wire into the openings of the wire clamp terminal block and tightening the screw. This block is socketed for easy removal.

An alternative means for network connection is to use the 10 pin male connector located behind the clamp terminal block. This connector mates with Molex shell, number 50-57-9005, and used pins, 16-02-0103

In addition to the Host to I/O Plexer Repeater wiring the installer should confirm that the 8 switches are set in the correct positions (all on or up). In all cases, the switches marked "pull-up" in the diagram in page 3-1 should be left in the "on" position.

Link via RS-422

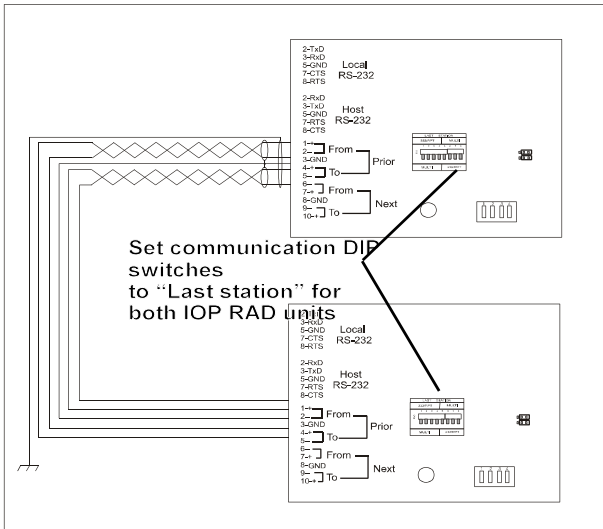


Figure 2-5 Link via RS-422

Figure 2-5 shows two individually shielded twisted pairs of AWG 24 with an overall isolated shield (such as Belded 8162) with the internal shield connected between unit grounds. The overall isolated shield should be connected to earth ground in one place only. In a perfect world with no electrical noise and equal ground potentials, the signal ground connection would not be required. Not connecting signal ground however, frequently leads to costly debugging.

These connections, which require the cover to be removed, are made by placing a 1/4 inch stripped wire into the openings of the wire clamp terminal block and tightening the screw. This block is socketed for easy removal.

An alternative means for network connection is to use the 10 pin male connector located behind the clamp terminal block. This connector mates with Molex shell, number 50-57-9005, and used pins, 16-02-0103

In addition to the serial link wiring the installer should confirm that the 8 switches are set in the correct positions (on or up). The switches marked "pull-up" in the diagram on page 3-1 should be left in the "on" position.

Link via modem:

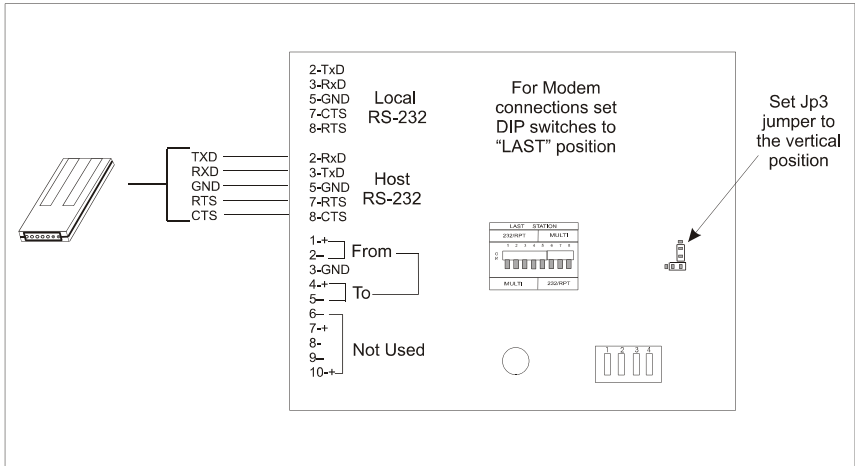


Figure 2-6 Link via Modem

Two handshake control lines are provided on the I/O Plexer Repeater for interfacing to modems. They are request to send (RTS) and Clear to send (CTS).

An active high RTS signal from the I/O Plexer Repeater advises the modem that data is available. When the modem is ready to accept data, it places its CTS line active high to the I/O Plexer Repeater thus initiating the data exchange.

In addition to the modem to I/O Plexer Repeater wiring the installer should confirm that JP3 (RTS/CTS Jumper) is positioned as shown in figure 2-10. Jumper JP5 (RTS/CTS for the local RS-232 port), should remain in the horizontal position unless the RTS/CTS pair is needed in the device connected to the local RS-232 port. A cable for most modem applications, the IOP-RT cable, is available from duTec.

The switches marked "Pull up" in figure 3-1 should be left in the "on" position.

Adding Digital Expanders:

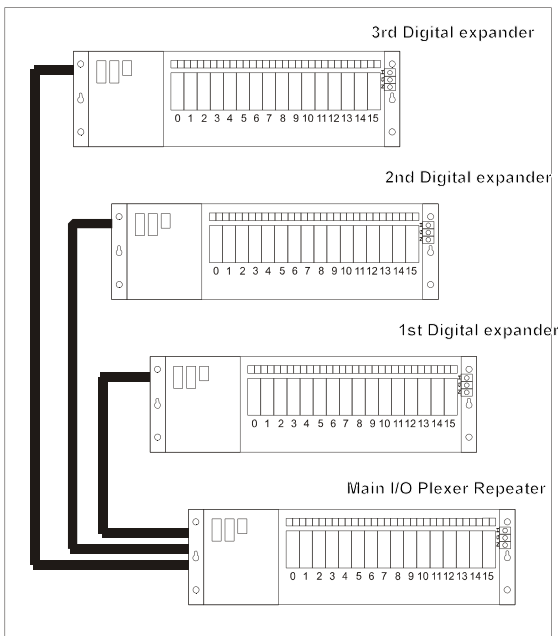


Figure 2-15 Digital Expanders

Up to three Digital expanders may be connected to each side of an I/O Plexer Repeater system. These chassis are attached to the main unit via a ribbon cable supplied with the Digital Expander. Normally, power is supplied through this cable. In some circumstances, however, the Digital Expander is purchased with an optional power supply. If so equipped, the installer must provide the necessary power connections as well (see page 2-2).

Digital expanders are configured during the main chassis' normal setup procedure.

Installing the I/O Modules:

The I/O Plexer Repeater system is made up of a communications link with an I/O system located at each end. At one end of this link is a main I/O chassis designated *UNIT 0* at the other end there is a similar I/O chassis designated *UNIT 1*. Installed on these chassis are individual I/O Modules designed to handle analog or digital, input or output signals. For every analog input located on *UNIT 0*, there is a corresponding analog output on *UNIT 1* and vice versa. Naturally this is true for digital modules as well.

In addition to the main I/O chassis, an I/O Plexer Repeater system may include additional I/O chassis called digital expanders. These chassis allow up to 48 additional digital only I/O signals to be transmitted over the serial link.

When installing the system, place the chassis designated *UNIT 0* in the location having the most output signals.

Certain guidelines must be followed when installing I/O modules on the I/O Plexer repeater chassis. In particular the inputs must be grouped separately from the outputs on each I/O chassis. Using the worksheets found in the next four pages, place the desired I/O modules in the indicated positions.

The following worksheets will be used when setting the necessary input/ output separator for *UNIT 0*.

UNIT 0			UNIT 1		
Mod #	Main	Chassis	Mod #	Main	Chassis
Mod #	Input/ Output	Module PN	Mod #	Output/ Input	Module PN
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

- 1) Install all analog input modules for *UNIT 0* beginning with module #0 then #1 and so on. If none were used, skip this step.
- 2) Install all digital input modules for *UNIT 0* beginning with the next available module position. If none are used, skip this step.
- 3) Repeat step 2 for the analog output and digital output modules.
- 4) Install the modules in *UNIT 1* which are to be matched with those in *UNIT 0*. Be sure that each input in *UNIT 0* is paired with a corresponding output in *UNIT 1*. Likewise for the outputs.

UNIT 0 1 st			UNIT 1 1 st		
Mod #	Expander Input/ Output	Chassis Module PN	Mod #	Expander Input /Output	Chassis Module PN
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

- 1) Install all digital input modules for *UNIT 0* beginning with module #0 then #1 and so on. If none were used, skip this step.
- 2) Install all digital output modules for *UNIT 0* beginning with the next available module position. If none are used, skip this step.
- 3) Install the modules in *UNIT 1* which are to be matched with those in *UNIT 0*. Be sure that each input in *UNIT 0* is paired with a corresponding output in *UNIT 1*. Likewise for the outputs.

UNIT 0			UNIT 1		
2nd Expander		Chassis	2nd Expander		Chassis
Mod #	Input/Output	Module PN	Mod #	Input/Output	Module PN
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

- 1) Install all digital input modules for *UNIT 0* beginning with module #0 then #1 and so on. If none were used, skip this step.
- 2) Install all digital output modules for *UNIT 0* beginning with the next available module position. If none are used, skip this step.
- 3) Install the modules in *UNIT 1* which are to be matched with those in *UNIT 0*. Be sure that each input in *UNIT 0* is paired with a corresponding output in *UNIT 1*. Likewise for the outputs.

UNIT 0			UNIT 1		
3rd Expander		Chassis	3rd Expander		Chassis
Mod #	Input/Output	Module PN	Mod #	Input /Output	Module PN
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

- 1) Install all digital input modules for *UNIT 0* beginning with module #0 then #1 and so on. If none were used, skip this step.
- 2) Install all digital output modules for *UNIT 0* beginning with the next available module position. If none are used, skip this step.
- 3) Install the modules in *UNIT 1* which are to be matched with those in *UNIT 0*. Be sure that each input in *UNIT 0* is paired with a corresponding output in *UNIT 1*. Likewise for the outputs.

Analog Inputs:

Modules should NEVER be installed or removed while power is applied to the I/O Plexer Repeater.

Note: Analog modules normally run hot to the touch

Correct polarity connections are essential to proper operation of all analog inputs. Connections to terminals marked with a “+” must be more positive than the terminals marked with a “-”. Thermocouples and RTD’s are connected directly to the I/O modules with special connectors which insure correct polarity.

Module status indicators are On dimly, when wired correctly, and monitoring a valid signal. The indicator light may be On brightly, off, or flicker otherwise.

Figure 2-7, figure 2-8 and figure 2-9 show the wiring for various types of analog inputs. With the exception of thermocouples and RTD’s, connections are made via the black terminal strip. In the case of thermocouple RTD’s, connections are made directly to the module, mating connectors are included. There must be nothing connected to the screw terminals corresponding to these module positions. The source of analog inputs is external to the I/O Plexer Repeater in most circumstances. Exceptions are those of RTD and Type 590 temperature input modules where source excitation is supplied within the module.

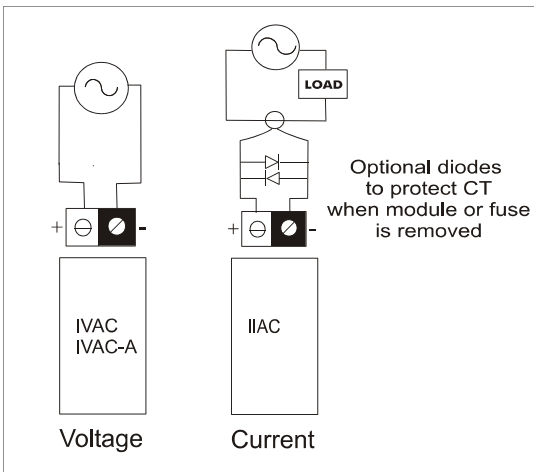


Figure 2-8 AC current and voltage wiring

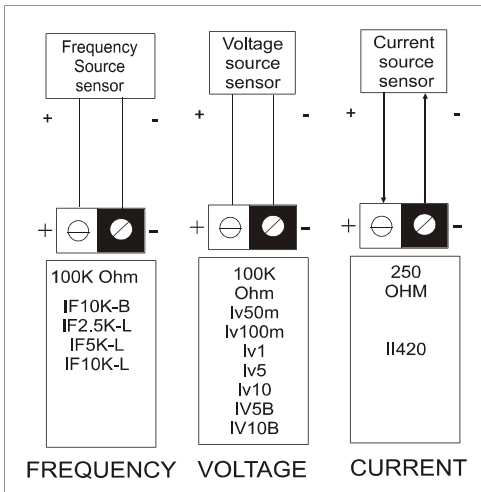


Figure 2-9 Analog Frequency, Voltage, and current input wiring

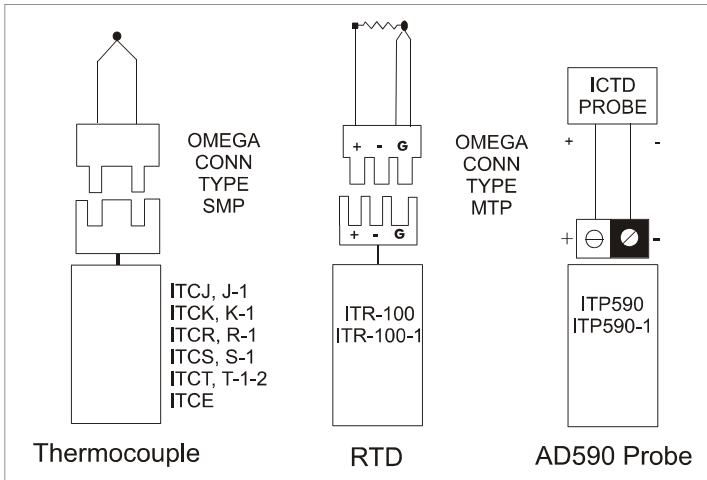


Figure 2-10 Temperature input wiring

Analog outputs:

Modules should NEVER be installed or removed while power is applied to the I/O Plexer Repeater.

Note: Analog modules normally run hot to the touch

Both voltage and current output modules provide their own isolated power output. This eliminates the need for external power supplies and insures electrical *isolation* between each output. This also makes it possible to wire voltage outputs in series to obtain larger voltage swings (consult application support).

Module status indicators blink briefly when outputs are updated. It should be noted that the status indicator only reflects the TTL data stream to the modules. This in of itself does not indicate the actual value of the output signal. Output can only truly be verified by monitoring the device to be controlled using a multimeter, oscilloscope, or employing an analog input module as a feedback tool.

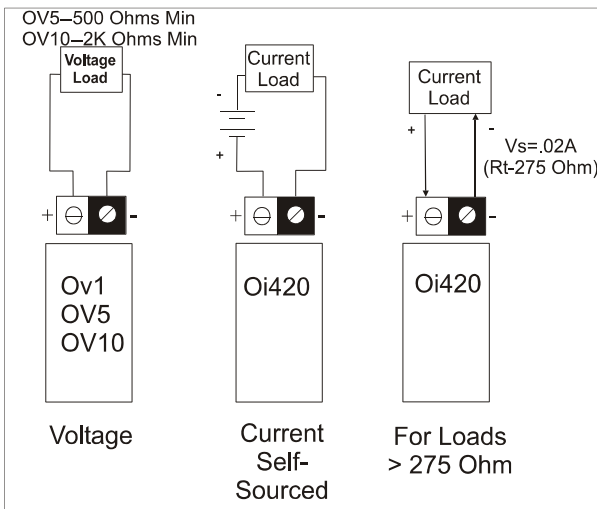


Figure 2-11 Analog Voltage and current output wiring

OI420 analog output modules will drive up to 275 ohms. If the loop resistance exceeds 275 ohms, and external power supply must be added as shown in figure 2-11. Correct polarity is essential.

Digital Inputs:

Modules should NEVER be installed or removed with power applied to the I/O Plexer Repeater.

The source of the discrete signal to be monitored is external to the I/O Plexer Repeater in most circumstances. The IDC5S digital input dry contact sense module is an exception. It provides its own current for sensing contact closure. Therefore, an external supply is not needed. In fact, they can be DESTROYED if an external source is connected.

The IDC5 and IDC5D input modules are polarity sensitive and operate only when the “+” terminal is more positive than the “-“ terminal, Polarity does not affect the performance of the IAC5, IAC5A, or the IDC5S input modules.

Because the field sides of input modules are totally isolated from each other, like polarities can be wired common to make use of a single power supply.

The wiring and operation of digital input modules can be verified by closing individual input sensing contacts and observing the change on the nodule status indicators. They are On when the module input circuit is energized.

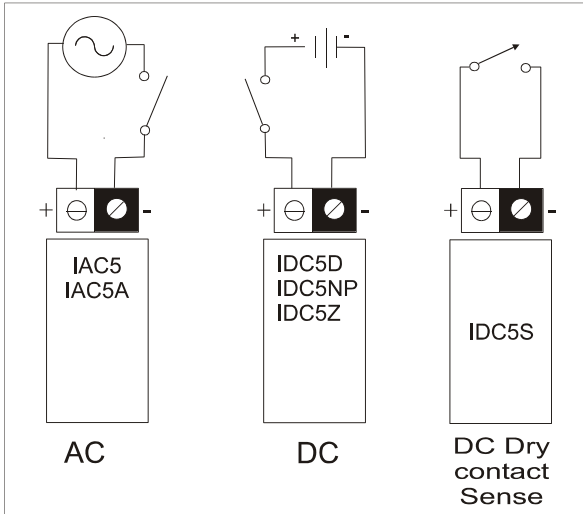


Figure 2-12 Digital Input Wiring

Digital outputs:

Modules should never be installed or removed while power is applied to the I/O Plexer Repeater.

ODC5, ODC5A, OAC5, and OAC5A digital output modules are used to switch external power supply loads on and off.

Because they contain a protective reverse diode, the ODC5 and ODC5A output modules are polarity sensitive and operate correctly only when the “=” terminal is more positive than the “-“ terminal. A DC digital output module connected backwards conducts current through its protective diode and appears to be uncontrollable, it is. Polarity does not affect the performance of OAC5 and OAC5A digital output modules.

Because the field sides of output modules are totally isolated from each other, like polarities can be wired common to make use of a single power supply.

It should be noted that the status indicator only follows the logic instruction to the modules and does not show that the module, its fuse, or external power is present. Outputs can only be truly verified by monitoring the output with a multimeter, oscilloscope, or by employing a digital input module as a feedback tool.

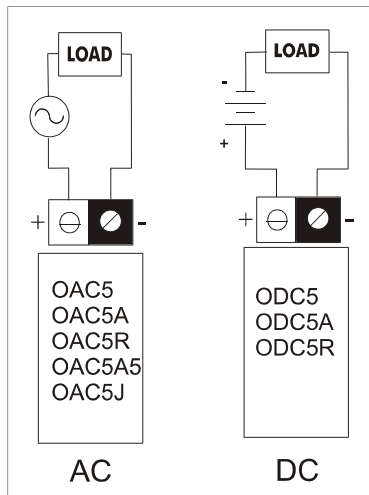


Figure 2-13 Digital output Wiring

Chassis Setup:

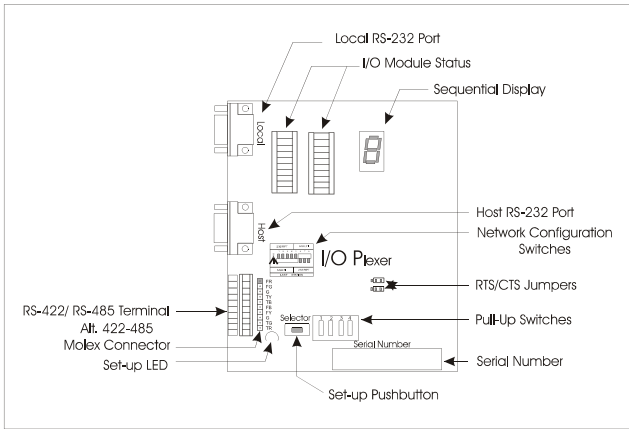


Figure 3-1 Connectors, Switches, and Indicators

During the setup phase of an I/O Plexer Repeater system, the main chassis are given specific values for unit identity, network baud rate, and in the case of *UNIT 0*, where the separation between input and output modules is. A momentary pushbutton and seven segment display provide access to these parameters. Figure 3-1 shows the location of these components labeled setup pushbutton and sequential display.

During normal operation, the sequential display shows the following characters one at a time.

Display cycle for *UNIT 0*:

E C H O = 0 0 X ⁰ X ¹ X ¹¹ X H Y Y Y L 3

Display cycle for *UNIT 1*:

E C H O = 1 H Y Y Y L 3

Unit Number:

Each I/O Plexer Repeater is set to either *UNIT 0* or *UNIT 1*. The sequential display indicates Echo = followed by the unit number. When shipped from the factory, I/O Plexer Repeaters are configured as *UNIT 1* (Echo = 1).

Input/ Output Separators:

Each *UNIT 0* will require up to four input/ output separators to be set. This identifies which modules are inputs and which are outputs for each chassis being used. For example, *UNIT 0* could consist of its main chassis as well as up to three digital expander chassis. Upon establishing communications, *UNIT 0* Will automatically configure the *UNIT 1* separator appropriately.

The first I/O separator, following the 0 in the sequential display, is the *UNIT 0* main chassis I/O separator. It should be set equal to the hex value of the lowest numbered module position containing an output module (analog or digital) on the *UNIT 0* main chassis. If *UNIT 0* is full (all 16 positions) of outputs, set the I/O separator to 0. Refer to the worksheet found on page 2-9.

The second I/O separator, following the 0 in the sequential display, is the first digital expander I/O separator. It should be set equal to the lowest numbered module position containing a digital output module on the first expander chassis. Refer to the worksheet on page 2-10. If the first digital expander is not being used, disregard this value.

The third separator, following the 1 in the sequential display, is the I/O separator for the second digital expander. It should be set equal to the lowest numbered module position containing a digital output module on the second expander chassis. Refer to the worksheet found on page 2-11. If the second digital expander is not being used, disregard this value.

The last I/O separator, following the 11 in the sequential display, is the third digital expander I/O separator. It should be set equal to the lowest numbered module position containing a digital output module on the third digital expander chassis. Refer to the worksheet on page 2-12. If the third expander is not being used, disregard this value.

Baud Rates:

Any one of the standard baud rates of 300, 600, 1200, 2400, 4800, 9600, 19200, or 38,400 can be used for the serial network communications. The sequential display indicates the letter H followed by a baud rate divided by 100. As shipped the I/O Plexer Repeater are set up for 9600 baud, the display will indicate H 096.

Network type switch:

The I/O Plexer Repeater network switch must be set to the last unit position (as in figure 3-1). The digit after the L in the sequential display represents how the network switch under the cover plate is set. This should always be set to “last unit” therefore the sequential display should always be L 3.

Note: The seven segment display will not reflect a switch position change until power to the unit has been cycled.

Modem Jumpers:

If modems are not being used, the jumpers should remain in place, as shipped, in a horizontal position (see page 2-6)

Changing setup parameters

During setup, the user may need to change the unit number, serial link baud rate, and the input/ output separator positions on *UNIT O*. The pushbutton located under the removable cover is used to change these parameters. The pushbutton causes the adjacent LED to flash each time it is pushed. Any changed values are automatically saved in non-volatile EEPROM.

During the diagnostic test period following the application of power, the sequential display shows: GoGoGo \equiv Flashing the push button LED once when the \equiv appears, places the unit in setup mode. The value of each setup<< Index will generate here >> character can be changed as they appear in sequence, by pressing the pushbutton. The display will continue to cycle through the setup sequence until there is a full cycle with no changes. The I/O Plexer Repeater then stores all values in EEPROM for automatic use following a power cycle. If desired changes were not implemented correctly, line power can be recycled and setup via pushbutton can be repeated as required.

Communication Verification:

Most startup problems are related to the communications link. The lowest bar of the left 10 bar display (marked recv) blinks when there is serial data traffic being sent to this I/O Plexer Repeater from the other unit. The LED merely indicates serial data. It does not indicate that this data is valid nor at the proper baud rate. The lower bar on the right 10 bar display (marked trans) blinks each time this I/O Plexer Repeater sends data to the other unit. When the network is first activated, *UNIT 0* polls *UNIT 1* periodically until it answers. When the link is established, the two units will communicate in a back and forth manner continuously. If either side experiences failure, such as power loss, *UNIT 0* will return to periodically polling *UNIT 1* until the link is re-established and/ or power is returned to the unit.

Hardware error codes:

When the I/O Plexer Repeater is initially turned on, it goes through internal self test. If anything is not correct, the appropriate error code will flash on the sequential display. Try recycling power, if that does not resolve the error condition please call duTec technical support at (800) 248-1632.

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