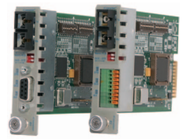
Omnitron Systems

iConverter® RS422/485 User Manual



DESCRIPTION

The iConverter RS422/485 is a serial RS-422 or RS-485 to fiber converter. The iConverter RS422/485 operates in a back-to-back configuration, with one module at each end of the fiber link.

The serial port interface is available with a DB-9 female connector or terminal block connector for field wiring.

When configured for Half-Duplex mode or in Multi-point Full-Duplex mode, the module automatically detects the signal baud rate of the connected device. The module can be configured to connect to a DCE or DTE device by accessing the DIP-Switch on the front-panel.

A built-in remote Fiber Loopback DIP-Switch provides easy validation of the fiber segment. The Loop-Back does not interrupt signal transmission over the fiber.

Built-in configurable terminators support Full-Duplex and Half-Duplex operations, allowing the unit to be deployed and terminated at any node in the serial line.

See data sheet for available models.

The RS422 modules can be used in an unmanaged or managed applications. To be managed, an Network Management Module (NMM2) or a module with integrated management must be installed in the same chassis.

For more information on management software and hardware options, see Comprehensive Network Management Solution product page.

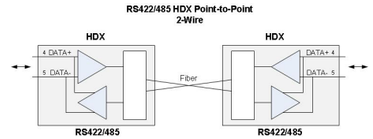
RS422/485 Definitions

RS-422 is specified as a simplex multidrop standard, which only one driver and up to 10 receivers can be connected to the same bus. If more than one driver needs to be connected on the same bus, then RS-485 is recommended.

RS-485 is specified as a multipoint standard, which means up to 32 transceivers can be connected on the same bus.

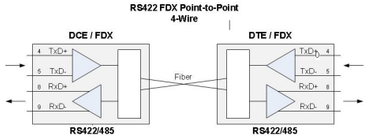
Half-Duplex Point-to-Point

The RS422/485 module can be configured to support an extension of a half-duplex 2-wire application. The example below shows the configuration of the RS422/485 modules. Terminations may be required. See Bank 2 DIP-switches.



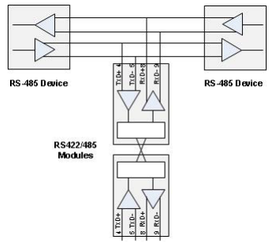
Full-Duplex Point-to-Point

The RS422/485 module can be configured to support an extension of a full-duplex 4-wire application. The example below shows the configuration of the RS422/485 modules. Terminations may be required. See Bank 2 DIP-switches.



RS-485 Multi-Point

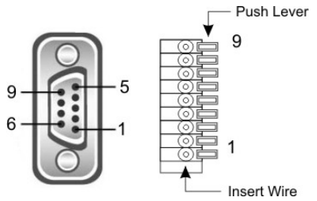
RS-485 can also link multiple drivers and receivers on the same signal path. Both a half-duplex and full-duplex configuration is supported. Terminations are required depending on the location of the modules. See Bank 2 DIP-Switches.



PORT STRUCTURE

Front-Panel Ports:

The front-panel of the module features one fiber port (P1) and one RS-422/485 capable serial port (P2). Depending on the model, the serial port is available either as a DB-9 female connector or as a terminal block for field wiring as shown below.



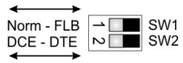
Pin Out Assignment					
Pin #	FDX			FDX	HDX
	Point-to-Point (Normal)			Multi-Point	
	Signal	DTE	DCE	-	-
1	GND	-	-	-	-
2	RTS+	OUT	IN	-	-
3	RTS-	OUT	IN	-	-
4	TXD+	OUT	IN	TXD+ (IN)	DATA+
5	TXD-	OUT	IN	TXD- (IN)	DATA-
6	CTS+	IN	OUT	-	-
7	CTS-	IN	OUT	-	-
8	RXD+	IN	OUT	RXD+ (OUT)	-
9	RXD-	IN	OUT	RXD- (OUT)	-

DIP-SWITCH SETTINGS

The default setting of the module is:

DCE, RS-422 Full Duplex Point-to-Point, speed up to 1,024kbps, Loopback Disabled

Front-Panel DIP-Switches



SW1: Fiber Loopback "Norm - FLB"

When this DIP-Switch is in the "Norm" position (factory default), the Fiber Loopback is disabled. Setting this DIP-Switch to the "FLB" position on the module at either end of the fiber segment will enable the Fiber Loopback test.

When Fiber Loopback is enabled, the local module with the DIP-Switch in "FLB" position is the master, and the remote module with the DIP-Switch in "Norm" position is the slave. If the fiber segment passes the Loopback test, the "Tst" LED on the master will blink rapidly (10 times per second) and the "Tst" LED on the slave will blink slowly (once per second). If the fiber segment fails the Loopback test, the "Tst" LED will remain solid on the master unit.

The Fiber Loopback test does not interfere with serial conversion and signal transmission.

If both modules are configured to the "FLB" position, then both modules would still display valid master mode results.

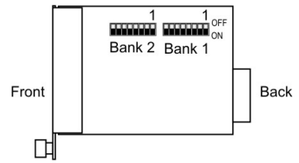
SW2: Serial "DCE - DTE"

When the "DCE - DTE" DIP-Switch is in the "DCE" position (factory default), the module is configured to connect to Data Communications Equipment such as a modem or printer.

Setting this DIP-Switch to the "DTE" position configures the module to connect to Data Terminal Equipment such as a computer or controller.

The "DCE - DTE" DIP-Switch is disabled if the module is in Half-Duplex (HDX) or in Multi-point (MP).

Board-Mounted DIP-Switches



Bank 1 DIP-Switches

SW1 - SW4: Baud Rate Selection for RS-485 "BAUD"

DIP-Switches 1 through 4 configure the baud rate when the module is operating in Half-Duplex mode or in Multi-point Full-Duplex mode. Please see the table on the next page.

These DIP-Switches are deactivated when the module is operating in point-to-point Full-Duplex RS-422 Mode.

Baud Rate DIP-Switch Configuration				
SW1	SW2	SW3	SW4	Baud Rate
OFF	OFF	OFF	OFF	110
ON	OFF	OFF	OFF	300
OFF	ON	OFF	OFF	1200
ON	ON	OFF	OFF	2400
OFF	OFF	ON	OFF	4800
ON	OFF	ON	OFF	9600
OFF	ON	ON	OFF	19.2K
ON	ON	ON	OFF	38.4K
OFF	OFF	OFF	ON	57.6K
ON	OFF	OFF	ON	115K
OFF	ON	OFF	ON	230K
ON	ON	OFF	ON	460K
OFF	OFF	ON	ON	921K
ON	OFF	ON	ON	
OFF	ON	ON	ON	
ON	ON	ON	ON	

SW5: Full/Half-Duplex "FDX/HDX"

When the Full/Half-Duplex selection DIP-Switch is in the OFF "FDX" position (factory default), the module operates in serial Full-Duplex mode.

Configuring the DIP-Switch to the ON "HDX" position enables serial Half-Duplex mode. **When the module is in Half-Duplex mode, SW8 point-to-point/Multi-point DIP-Switch has no effect.**

SW6 and SW7: "RSV"

Reserved for future use. Must be kept in the OFF position.

SW8: Full-Duplex Normal/Multi-Point "NORM/MP"

This DIP-Switch has no affect if the module is in Half-Duplex mode.

When this DIP-Switch is in the OFF "NORM" position (factory default), the module operates in a point-to-point Full-Duplex mode, commonly used 4-wire applications. **Baud rate selection is automatic in this mode, from 110 to 1024kbps.**

When this DIP-Switch is in the ON "MP" position, the module operates in a Multi-point Full-Duplex mode, often referred as Full-Duplex RS-485 or Multi-point RS-422. **In this mode, Baud rate must be manually configured using the "BAUD" DIP-Switches 1 through 4.**

Bank 2 DIP-Switches (not accessible via software):

SW1 - SW6: Termination Type

SW1 through SW6 configure the termination settings.

Valid Full-Duplex Termination DIP-Switches						
SW1	SW2	SW3	SW4	SW5	SW6	Termination Type
OFF	OFF	OFF	OFF	OFF	OFF	No Termination
ON	ON	OFF	OFF	OFF	OFF	TXD+ 768 ohm pull-up to +V TXD- 768 ohm pull-down to GND
OFF	OFF	ON	OFF	OFF	OFF	100 ohm between TXD+ and TXD-
OFF	OFF	OFF	ON	OFF	OFF	100 ohm between RXD+ and RXD-
OFF	OFF	OFF	OFF	ON	OFF	100 ohm between CTS+ and CTS-
OFF	OFF	OFF	OFF	OFF	ON	100 ohm between RTS+ and RTS-

Valid Half-Duplex Termination DIP-Switches						
SW1	SW2	SW3	SW4	SW5	SW6	Termination Type
OFF	OFF	OFF	OFF	OFF	OFF	No Termination
ON	ON	OFF	OFF	OFF	OFF	DATA+ 768 ohm pull-up to +V DATA- 768 ohm pull-down to GND
OFF	OFF	ON	OFF	OFF	OFF	100 ohm between DATA+ and DATA-

SW7 - SW8: "RSV"

Reserved for future use. Must be kept in the OFF position.

MOUNTING AND CABLE ATTACHMENT

The iConverter modules are hot-swappable and can be installed into any iConverter chassis.

1. Carefully slide the module into an open slot in the chassis. Align the module with the installation guides and ensure that the module is firmly seated against the backplane. Secure the module by fastening the front panel thumbscrew (push in and turn clockwise to tighten) to the front of the chassis.
2. When using the terminal block, the wire used to connect the module to the equipment must be 20AWG to 26AWG thickness. Cut the wires to the length required and strip approximately 11 mm of insulation from the each wire. Insert the stripped end into the terminal connector on the module by pushing the lever associated with the desired pin number.
3. When using the DB-9, attach the DB-9 serial cable to the DB-9 on the module and on a serial RS-422 or RS-485 device.
4. Attach the fiber port via an appropriate multimode or single-mode fiber cable to the other RS422/485 module.
5. When using single-fiber (SF) media converter models, the Tx wavelength on one end has to match the Rx wavelength on the other.

SOFTWARE CONTROLLED SETTINGS

Additional settings are available via software control when a RS422 is installed in an iConverter chassis with a Management Module.

The following software settings can be controlled via Serial Console/Telnet Console, NetOutlook Management Software or other third-party SNMP-based clients:

- Loopback Modes
- DTE/DCE and Full/Half Duplex Configuration
- Baud Rate

Software controlled settings can be selected to override DIP-Switch settings.

For more information on using and configuring the Advanced Features, register for access to the NetOutlook Management Software user manual.

LED INDICATORS

LED	Color	Description
Power "Pwr"	Amber	**OFF:** Module is not powered **ON:** Module has power
Fiber Loopback "Tst"	Green	**OFF:** Test not activated **ON:** Master - Tx pattern sent, but no pattern received. **Blinking (10Hz):** Master - Tx pattern sent, and pattern received. **Blinking (1Hz):** Slave - Rx pattern received
Fiber Activity "Act"	Green	**OFF:** No fiber link **Blinking:** Fiber data received
"DTE"	Green	**OFF:** DTE not selected **ON:** DTE selected
"DCE"	Green	**OFF:** DCE not selected **ON:** DCE selected
Serial Activity "Act"	Green	**OFF:** No serial data **Blinking:** Serial data received

SPECIFICATIONS

Data Rates	RS-422 Full Duplex Point to Point 110 bps to 1,024,000 bps RS-422 Half Duplex or RS-485 Multipoint Full Duplex 110 bps to 921,600 bps (DIP-switches)
Standard Compliances	EIA-422/485
Regulatory Compliances	Safety: UL, CE, UKCA EMI: FCC Class A ACT: TAA, BAA, NDAA
Environmental	RoHS, WEEE, REACH
DC Power Requirements	3.3VDC, 0.5A @ 3.3VDC
Dimensions W x D x H	0.85" x 4.5" x 2.8" (21.6 mm x 114.3 mm x 71.1 mm)
Weight	8 oz. (226.8 grams)
Temperature	Commercial: 0 to 50°C Wide: -40 to 60°C Storage: -40 to 80°C

Humidity	5 to 95% (non-condensing)
Altitude	-100m to 4,000m
MTBF (hrs)	850,000
Warranty	Lifetime warranty

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Warranty

This product is warranted to the original purchaser (Buyer) against defects in material and workmanship for a period of two (2) years from the date of shipment. A lifetime warranty may be obtained by the original purchaser by registering this product at www.omnitron-systems.com/support within ninety (90) days from the date of shipment. During the warranty period, Omnitron will, at its option, repair or replace a product which is proven to be defective with the same product or with a product with at least the same functionality.

For warranty service, the product must be sent to an Omnitron designated facility, at Buyer's expense. Omnitron will pay the shipping charge to return the product to Buyer's designated US address using Omnitron's standard shipping method.

Limitation of Warranty

The foregoing warranty shall not apply to product malfunctions resulting from improper or inadequate use and/or maintenance of the equipment by Buyer, Buyer-supplied equipment, Buyer-supplied interfacing, unauthorized modifications or tampering with equipment (including removal of equipment cover by personnel not specifically authorized and certified by Omnitron), or misuse, or operating outside the environmental specification of the product (including but not limited to voltage, ambient temperature, radiation, unusual dust, etc.), or improper site preparation or maintenance.

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The remedies provided herein are the Buyer's sole and exclusive remedies. Omnitron shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

Environmental Notices

The equipment covered by this manual must be disposed of or recycled in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE Directive) of the European Community directive 2012/19/EU on waste electrical and electronic equipment (WEEE) which, together with the RoHS Directive 2015/863/EU, for electrical and electronic equipment sold in the EU after July 2019. Such disposal must follow national legislation for IT and Telecommunication equipment in accordance with the WEEE directive: (a) Do not dispose waste equipment with unsorted municipal and household waste. (b) Collect equipment waste separately. (c) Return equipment using collection method agreed with Omnitron.

The equipment is marked with the WEEE symbol shown to indicate that it must be collected separately from other types of waste. In case of small items the symbol may be printed only on the packaging or in the user manual. If you have questions regarding the correct disposal of equipment go to www.omniton-systems.com/support or e-mail to Omnitron at intlinfo@omnitron-systems.com.

Safety Warnings and Cautions

ATTENTION: Observe precautions for handling electrostatic discharge sensitive devices.

WARNING: Potential damage to equipment and personal injury.

WARNING: Risk of electrical shock.

Customer Support Information

For help with this product, contact our Technical Support:

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