

RS-485/422 Serial-Port Fiber Extension

Media Converters

C/RS485-CF-01, C/RS485-CF-02

USER'S GUIDE

Designed to be installed in the TRANSITION Networks E-MCC-1600 Media Converter Chassis, the C/RS485-CF-0x series serial-port fiber extension Media Converters extend distances between RS-485 or RS-422 nodes for **up to two (2) kilometers over multimode fiber** or **up to twenty (20) kilometers over singlemode fiber**.

C/RS485-CF-0x series Media Converters allow RS-485 two-wire half-duplex operation, RS-485 four-wire full-duplex operation, and RS-422 four-wire operation, with switch-selectable termination and biasing resistors, at speeds from 1 Kb/s to 500 Kb/s.

C/RS485-CF-01

Provides one (1) terminal block RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) ST 100BASE-FX connectors to **multimode fiber @ 850 nM**.

C/RS485-CF-01(SM)

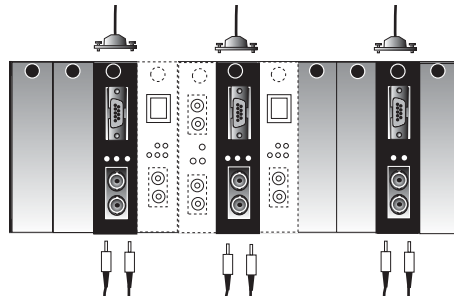
Provides one (1) terminal block RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) ST 100BASE-FX connectors to **singlemode fiber @ 1300 nM**.

C/RS485-CF-01(SC)

Provides one (1) terminal block RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) SC 100BASE-FX connectors to **multimode fiber @ 850 nM**.

C/RS485-CF-02

Provides one (1) DB-9 RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) ST 100BASE-FX connectors to **multimode fiber @ 850 nM**.



C/RS485-CF-02(SM)

Provides one (1) DB-9 RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) ST 100BASE-FX connectors to **singlemode fiber @ 1300 nM**.

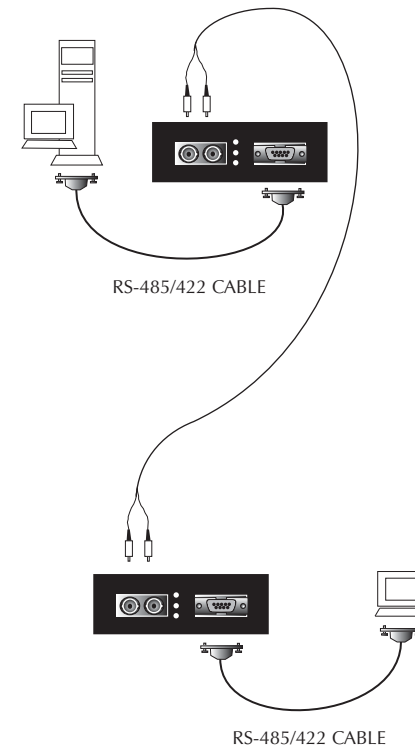
C/RS485-CF-02(SC)

Provides one (1) DB-9 RS-485/RS-422 copper connector and one (1) set of RX (receive) and TX (transmit) SC 100BASE-FX connectors to **multimode fiber @ 850 nM**.

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C/RS485-CF-0X in the NETWORK

The C/RS485-CF-0x can be used to install a fiber network extension between RS-485 or RS-422 network nodes.



One slide switch on the C/RS485-CF-0x series Media Converter allows site selection of RS-485 2-wire (half-duplex) operation, RS-485 4-wire (full-duplex) operation, or RS-422 4-wire (full-duplex) operation (see page 3).

A second slide switch on the C/RS485-CF-0x series Media Converter allows echo prevention in two-wire mode or transmission only on "transmit/receive - (B) RS-485 2wire, transmit - RS-422 and transmit/receive + (A) RS-485 2wire, transmit + RS-422" pair (see page 3).

A 4-position dip switch on the C/RS485-CF-0x series Media Converter allows site selection of 130 ohm terminator insertion on the "receive - C/RS485 4 wire, RS422 and receive + C/RS485 4 wire, RS422" pair or on the "transmit/receive - (B) C/RS485 2wire, transmit - RS422 and transmit/receive + (A) C/RS485 2wire, transmit + RS422" pair (see page 3).

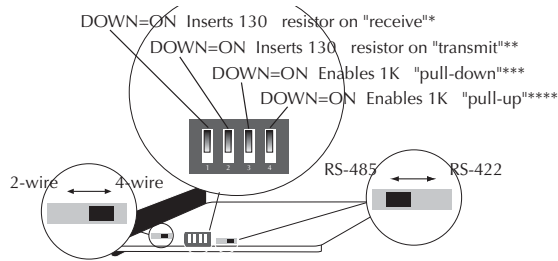
The dip switch also allows site selection of 1K ohm pull down on "transmit/receive - (B) C/RS485 2wire, transmit - RS422" or of 1K ohm pull up on "transmit/receive + (A) C/RS485 2wire, transmit + RS422" (see page 3).

INSTALLATION

Set Switches

Use a small flatblade screwdriver or a similar device to set the recessed switches according to the site installation.

1. Set the 2-wire /4-wire slide switch to the 4-wire setting to enable the "receive – RS-485 4 wire, RS422 and receive + RS-485 4 wire, RS-422" pair for RS-422 4 wire full duplex operation.
2. Set the RS-485/RS-422 slide switch to the RS-485 position to prevent echo in two-wire mode. Set the RS-485/RS-422 slide switch to the RS-422 to allow transmit only on "transmit/receive - (B) RS-485 2wire, transmit - RS-422 and transmit/receive + (A) RS-485 2wire, transmit + RS-422" pair.



Refer to the drawing and notes below for setting the 4-position dip switch.

- * Position 1 ON inserts 130 ohm terminator on the "receive – RS-485 4 wire, RS-422 and receive + RS-485 4 wire, RS-422" pair.
- ** Position 2 ON inserts 130 ohm terminator on the "transmit/receive - (B) RS-485 2wire, transmit - RS-422 and transmit/receive + (A) RS-485 2wire, transmit + RS-422" pair.
- *** Position 3 ON enables 1K ohm pull down on "transmit/receive - (B) RS-485 2wire, transmit - RS-422".
- **** Position 4 ON enables 1K ohm pull up on "transmit/receive + (A) RS-485 2wire, transmit + RS-422

Install Slide-In-Module in E-MCC-1600 Chassis

NOTE: Media Converter Slide-in-Modules can be installed in any installation slot, in any order.

1. Remove the Media Converter Slide-in-Module protective plate from the selected installation slot by removing the two (2) screws that secure the plate to the front of the E-MCC-1600.
2. Carefully slide the Media Converter Slide-in-Module into the installation slot, aligning the Media Converter Slide-in-Module with the installation guides.

NOTE: Ensure that the Media Converter Slide-in-Module is firmly seated against the backplane.

3. Secure the Slide-in-Module by securing the panel fastener screw attached to the Slide-in-Module to the E-MCC-1600 chassis.

INSTALLATION -- Continued

COPPER /DB-9 CONNECTOR

NOTE: Shielded cables are required on DB-9 for EMC compliance.

1. Locate or build TIA/EIA-574-DB-9 compliant cables configured as shown on page 7, with a male DB-9 connector at one end of the cable and with a straight-through cable.
2. Connect the male DB-9 connector at one end of the cable to the Media Converter female DB-9 connector.
3. Connect the other end of the cable to the node device.

COPPER /TERMINAL BLOCK CONNECTOR

1. Locate or build TIA/EIA-574-compliant terminal block cables configured as shown on page 7 and with straight-through cable.
2. Using a small flatblade screwdriver or a similar device, release each terminal block installation location as necessary. Refer to the diagram on page 7, connect the wires at one end of cable to the Media Converter terminal block connector.
3. Connect the other end of the cable to the node device.

FIBER

1. Locate or build TIA/EIA-574-compliant fiber cable with male two-stranded TX to RX connectors at both ends.

The diagram shows a fiber crossover cable. On the left end, there are two female connectors labeled TX (top) and RX (bottom). On the right end, there are two female connectors labeled TX (top) and RX (bottom). The cable is crossed, meaning the TX connector on the left is connected to the RX connector on the right, and the RX connector on the left is connected to the TX connector on the right.
2. Connect the male TX and RX cable connectors at one end of the cable to the TX and RX female connectors, respectively, on the Media Converter.
3. Connect the male TX and RX cable connectors at the other end of the cable to the RX and TX connectors of the IEEE 802.3™ compliant fiber device.

Connect to Power

The Media Converter is powered by the E-MCC-1600.

OPERATION

After installation, the Media Converter should function without operator intervention.

Status LEDs:

Use the status LEDs to monitor Media Converter operation in the network.

RXF Flashing LED indicates data reception on the fiber link.

RXC Flashing LED indicates data reception on the copper link.

P(o)W(e)R: Steady LED indicates connection to external power.



FAULT ISOLATION AND CORRECTION

If the Media Converter fails, isolate and correct the failure by determining the answers to the following questions and then taking the indicated action:

1. Is the P(o)w(e)r LED on the Media Converter illuminated?

NO

- Is the Media Converter inserted properly into the chassis?
- Is the power cord properly installed into the chassis and at the external power source?
- Does the external power source provide power?
- Contact Technical Support at (800) 260-1312.

YES

- Proceed to step 2.

2. Is the RXF LED illuminated?

NO

- Disconnect and reconnect the fiber cable to restart the initialization process.
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 3.

3. Is the RXC LED illuminated?

NO

- Disconnect and reconnect the copper cable to restart the initialization process.
- Restart the terminal device(s) to restart the initialization process.
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 4.

FAULT ISOLATION and CORRECTION

4. Does the data fail to move across the link, even though both LEDs are illuminated?

YES

- Check the RS-485/RS-422 cables for proper configuration and connection.
- Contact Technical Support at (800) 260-1312.

CABLE SPECIFICATIONS

Fiber Cable

Bit Error Rate: $< 10^{-9}$

MULTIMODE

Fiber Optic Cable Recommended: 62.5 / 125 μ m multimode fiber
Optional: 100/140, 85/125, 50/125 μ m mm fiber
Wavelength: 850 nanometers

C/RS485-CF-01, C/RS485-CF-01(SC), C/RS485-CF-02, C/RS485-CF-02(SC):

Fiber Optic Transmitter Power: min: -16.0 dBm max: -10.0 dBm
Fiber Optic Receiver Sensitivity: min: -32.0 dBm max: -7.2 dBm
Link Budget: 16.0 dB
Typical Maximum Cable Distance**: 2 kilometers

SINGLEMODE

Fiber Optic Cable Recommended: 9 μ m singlemode fiber
Wavelength: 1300 nanometers

C/RS485-CF-01(SM), C/RS485-CF-02(SM)

Fiber Optic Transmitter Power: min: -23.0 dBm max: -14.0 dBm
Fiber Optic Receiver Sensitivity: min: -34.0 dBm max: -14.0 dBm
Link Budget: 11.0 dB
Typical Maximum Cable Distance**: 20 kilometers

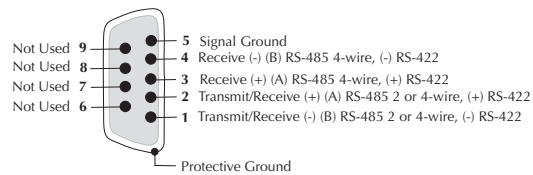
**Actual distance dependent upon physical characteristics of network installation.

RS-485/422 Copper Cable

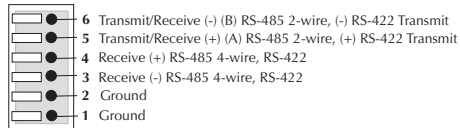
Gauge: 24 to 22 AWG
Attenuation: 20 dB/1000' @ 10 MHz
Differential Characteristic Impedance: 100 Ω \pm 10% @ 10 MHz
Maximum Cable Distance varies by baud rate: 4000ft[1220M] at <90kbaud
decreasing logarithmically to 300ft[92M] at 500kbaud.

CABLE SPECIFICATIONS -- Continued

RS-485/422 DB-9 SIGNALS





RS-485/422 TERMINAL BLOCK SIGNALS



TECHNICAL SPECIFICATIONS

Standards	ANSI/TIA/EIA-485-A, IEEE 802.3™	
Data Rate	1000 baud to 500,000 baud.	
	<i>(No rate setting is required. The Media Converter adjusts automatically to the baud rate.)</i>	
Case Dimensions	4.7" x 3.0" x 1.8"	(119mm x 76mm x 46mm)
Shipping Weight	3 pounds	(1.4 kilograms)
Environment	Temperature:	0-50°C (32° to 122° F)
	Storage Temperature:	-20 to 85°C
	Humidity	10-90%, non condensing
	Altitude	0-10,000 feet
Power Consumption	2.2 Watts	
Warranty	Lifetime	

 DECLARATION OF CONFORMITY	
Name of Mfg:	Transition Networks 6475 City West Parkway, Minneapolis MN 55344 USA
Model:	C/RS485-CF-0x Series Serial-Port Extension Media Converters
Part Number(s):	C/RS485-CF-01, C/RS485-CF-01(SM), C/RS485-CF-01(SC), C/RS485-CF-02, C/RS485-CF-02(SM), C/RS485-CF-02(SC)
Regulation:	EMC Directive 89/336/EEC
Purpose:	To declare that the C/RS485-CF-0x to which this declaration refers is in conformity with the following standards. EMC-CISPR 22: 1985 Class A; EN 55022: 1988 Class A; EN 50082-1:1992; EN 60950 A4:1997; IEC 801.2, IEC 801.3, and IEC 801.4; IEC 950
<i>I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).</i>	
 Stephen Anderson, Vice-President of Engineering	April 11, 2000 Date

COMPLIANCE INFORMATION

UL Listed
C-UL Listed (Canada)
CISPR22/EN55022 Class A + EN55204
CE Mark

FCC Regulations

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Canadian Regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Regulations

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in weichen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention !

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.



CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentliches Telekommunikationsnetz in den EG-Mitgliedstaaten verstößt gegen die jeweiligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

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