
B&B ELECTRONICS
10-30VDC
RS-232
www.bb-elec.com
RS-232 to RS-422/485 Converter
RS-422/485
GND
RD B (+)
RD A (-)
TD B (+)
TD A (-)
RS-232 Optical Isolator/Repeater
Model 485HES

SERIAL CONVERSION

THAT EXTENDS YOUR INDUSTRIAL NETWORK TO THE EDGE

CONNECT LEGACY SERIAL ASSETS TO NEW NETWORK TECHNOLOGIES

Process improvements continually bring new equipment and technologies to the market. But leveraging the benefits of new systems with costly legacy equipment relies on effective data communications. With the industry's widest selection of serial and fiber conversion devices, B&B Electronics has the tools and guidance you need to make the most of all your equipment investments - old or new.

People have been predicting the demise of serial communications for years. Yet, there are millions of serial ports still performing in the field today. B&B Electronics keeps perfectly good, even costly old equipment operating and data flowing with serial and fiber optic conversion and isolation products.

- *Industrial automation & process control*
- *Warehouse and building automation*
- *Petroleum, natural gas, mining*
- *Electric utilities, smart grids, submetering*
- *Water/wastewater*
- *Alternative energy sources*
- *Security*
- *Traffic control*
- *In-cabinet conversion*
- *Motors and drives*

SERIAL CONVERTERS & REPEATERS

Hardened Converter & Repeaters
- UL, Class 1/Division 2 listed
- NEMA TS1/TS2 requirements for transportation
- IEC 61850-3 rated for electrical substations
- Shock and vibration tested
- 3-way, 2 kV optical isolation - input/output/power
- Level 4 ESD protection, 15 kV air, 8 kV contact
- Wide operating temperature range
- Modbus compatible
- Removable terminal blocks
- Automatic Send Data Control

Isolated Converters
- UL, Class 1/Division 2 listed
- UL Recognised
- UL 508 certification, EMX rated
- Isolated and non-isolated versions
- ESD protection - 8 kV contact, 15 kV Air
- Built-in switchable bias & termination
- Wide operating temperature range
- Modbus compatible
- Automatic Send Data Control
- Up to 1,200 meter (4,000 ft.) range
- Address up to 32 nodes
- DIN rail, inline, or panel mount
- NEMA TS2 options

Fiber Optic Converters
- UL, Class 1/Division 2 listed
- UL Listed
- UL Recognised
- IEC 61850-3 rated for electrical substations
- Shock and vibration tested
- Optical isolation
- Single- and multi-mode, SC or ST
- High bandwidths
- Impervious to noise and ground differentials
- Modbus compatibility
- Wide operating temperature range

Fiber Optic Modems
- Optical isolation
- Connectors: multi-mode ST fiber; 9-pin serial
- Modbus compatible
- Up to 4 km (2.5 mi) range
- Port-powered

Port Powered Converters
- Port powered (battery or external options)
- Up to 1,200 meter (4,000 ft.) range
- Automatic Send Data Control
- Modbus compatibility

TTL Converters
- UL Listed
- 2-channel TTL to RS-232/422 bi-directional
- Isolated and non-isolated versions
- 3.3 or 5 V versions
- Port powered or external power supply

Current Loop Converters
- Optical isolation
- 20 mA current loop
- Transmit (T+, T-) and Receive (R+, R-) loop; active or passive
- UL Recognised
- Wide operating temperature range

CAN/Fiber Converter
- CAN (Controller Area Network)
- Optical isolation to 2 kV
- Terminal block connections
- Extend network node capacity
- DIN rail mount

REPEATERS

- UL, Class 1/Division 2 listed
- UL Recognised
- Shock and vibration tested
- Optical isolation
- Surge suppression
- Wide operating temperature range
- Modbus compatible
- Automatic Send Data Control
- Up to 1,200 meter (4,000 ft.) range
- DIN rail, panel, inline mounting
- NEMA TS2 options

SURGE PROTECTORS & ISOLATORS

Heavy-duty, 3-stage Surge Protectors

- IEEE 1000-4-5: 1995 and IEEE C62.41-1991 rated
- 3 stages: 1) gas discharge tube, 2) series resistor, 3) transient voltage suppressor
- Protected Signal Ground connection
- Dedicated chassis #10 grounding screw
- NEMA TS2 options

1-stage Surge Protectors

- 600W surge suppression
- Fast-acting 125 mA PCB fuses (disposable)

SERIAL CARDS

PCI Cards

- Add multiple serial ports to PCs
- RS-232, RS-422/485
- Optical isolation
- Data rates up to 2.5 Gbps
- 5 and 3.3 V PCI bus compatible
- Full height or low-profile options
- 16550 or 16750 UARTS, 16 or 64-byte or 1024FIFOs
- Hot swapping, plug-and-play

DATA TOOLS & ADAPTERS

Port Combiners, Splitters, Data Taps, Mini Tester

- Port combiners - monitor, control multiple serial devices via one PC port
- Port splitters - multiple PCs share peripheral serial devices
- Data taps - monitor and record RS-232 serial data lines transparently
- Mini tester - check RS-232 lines for data activity or device failures

Class 1/Division 2 Certified For Hazardous Locations

485DRCi-PH
232OPDRi-PH
485OPDRi-PH
FOSTCDRi-PH-xx series

For applications requiring Class 1/Division 2 certification, B&B Electronics has a range of connectivity and communication solutions designed to operate in hazardous environments.

- see page 470 for a complete listing of C1D2 products.

c UL us LISTED

SERIAL CONVERSION

WHICH IS RIGHT FOR YOU?

SERIAL CONVERTERS & REPEATERS

PRODUCT FAMILY	Hardened Converters & Repeaters	Isolated Converters	Fiber Optic Converters
Features:			
Serial to [protocol]	RS-232/422/485, Fiber Optic	RS-232, RS-422/485	Fiber Optic
Isolation?	✔	✔	✔
RS-232 Connector	DB9 female	DB9 female, DB25 female, terminal block	Terminal block
RS-422/485 Connector	Terminal block	Terminal block	
Fiber Connector	SC or ST, Single- or multi-mode		SC or ST, Single- or multi-mode
Fiber Range	4 or 15 km (2.5 or 9 mi)		4 or 15 km (2.5 or 9 mi)
TTL Connector			
Current Loop Connector			
CAN Connector			
Data Rate	Up to 115.2 kbps	Up to 460.8 kbps	Up to 115.2 kbps
Automatic Send Data Control?		✔	✔
Modbus?	✔	✔	✔
Wide Temperature?	✔	✔	✔
Power	10-48 VDC, external	10-30 VDC or 10-48 VDC, external	10-30 VDC or 10-48 VDC, external
Mounting	Panel (DIN rail option)	DIN rail, inline, panel	DIN rail (panel option)
Additional Features *(may vary by model)*	UL Listed C1/D2. IEC 61850-3/electrical substations. Shock, vibration tested. NEMA TS2/transportation (repeater models).	UL Recognized. UL Listed C1/D2. NEMA TS2 Built-in switchable bias & termination.	UL 508. UL Recognized. UL Listed C1/D2. IEC 61850-3/electrical substations. Shock, vibration tested.
Page	400 - 407	408 - 415	416 - 419

PRODUCT FAMILY	Fiber Optic Modems	Port Powered Converters	TTL Converters
Features:			
Serial to [protocol]	Fiber Optic	RS-422, RS-485, RS-422/485	RS-232/TTL (bidirectional)
Isolation?	✔		✔
RS-232 Connector	DB9 female	DB9 female	DB9 female, DB25 male, DB25 female
RS-422/485 Connector		DB9 female, RJ11, terminal block	
Fiber Connector	Multi-mode ST		
Fiber Range	4 km (2.5 mi)		
TTL Connector			DB9 male, DB25 female, DB25 male
Current Loop Connector			
CAN Connector			
Data Rate	Up to 115.2 kbps	Up to 115.2 kbps	38.4 up to 115.2 kbps
Automatic Send Data Control?		✔	✔
Modbus?			
Wide Temperature?			
Power	Port-powered	Port-powered (battery and external options)	Port-powered (external option)
Mounting	Inline	Inline	Inline
Additional Features *(may vary by model)*			
Page	420 - 427	428 - 439	436 - 431

SERIAL CONVERSION

WHICH IS RIGHT FOR YOU?

SERIAL CONVERTERS & REPEATERS

PRODUCT FAMILY	Current Loop Converters	CAN Converter	Optically Isolated Repeaters
Features:			
Serial to [protocol]	20 mA Current Loop	CAN (bidirectional)	RS-232, RS-422/485
Isolation?	✔	✔	✔
RS-232 Connector	DB9 female, Terminal block		DB9 male, DB9 female, Terminal block
RS-422/485 Connector			Terminal block
Fiber Connector		ST	
Fiber Range			
TTL Connector			
Current Loop Connector	Terminal block		
CAN Connector		Terminal block	
Data Rate	19.2 kbps	250 kbps	230.4 kbps
Automatic Send Data Control?			✔
Modbus?			✔
Wide Temperature?	✔		✔
Power	Port-powered or external	10-30 VDC, external	10-12-14 VDC, external
Mounting	DIN rail, inline	DIN rail	DIN rail, Inline, panel
Additional Features *(may vary by model)*			UL Recognized. UL Listed C1/D2. Shock, vibration tested. NEMA TS2
Page	442	445	446 - 452

SURGE PROTECTORS

PRODUCT FAMILY	Heavy Duty, 3-Stage	Single-stage
Features:		
Protection *(may vary by model)*	3 Stages for each line: 1 - gas discharge tube 2 - series resistor 3 - transient voltage suppressor Protected Signal Ground connection Dedicated chassis #10 grounding screw	500W surge suppression (500 W for 485FPP) Transient voltage suppressor Fast-acting 125 mA PCB fuses (disposable) #10 grounding screw
Connectors	Terminal blocks	Terminal blocks
Protocol	RS-232, or RS-422/485	RS-422/485
Lines Protected	5 lines - RS-232, or 3 lines - RS-422/485, or 5 lines - RS-422/485	4 lines - RS-422/485
Enclosure	Metal or molded platic	Open board
Mounting	DIN rail, panel	Inline
Additional Features *(may vary by model)*	IEEE1000-4-5:1995, IEEEC62.41-1991, NEMA TS2	
Page	456 - 458	459

Heavy Industrial RS-232 to RS-422/485 Isolated Converter

485DRCI-PH

PRODUCT FEATURES

- IEEE-61850-3, IEEE-1613
- NEMA TS2
- -40 to 85°C Operating Temperature
- Rugged IP30 Metal Panel Mount Case
- 50G Shock, 4G Vibration
- 2kV Triple Isolation
- 10 to 48 VDC Input Power

The ILinx™ 485DRCI-PH is our premium Heavy Industrial RS-232 to RS-422/485 Isolated Converter. Designed for rugged industrial environments, it has been put through some of the most exacting compliance tests in the industry. Meeting the requirements of IEC 61850-3 and IEEE 1613, it is suitable for installation in electrical substations. These specifications are more stringent than the NEMA TS1/TS2 requirements for transportation applications. Powerful isolation on both data ports protects your equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged IP30 metal case, it converts unbalanced, full or half-duplex RS-232 signals to balanced RS-422/485 signals. Featuring Automatic Send Data Control circuitry, it does not require special software control of handshake signals in RS-485 mode. Our bit-wise enabled circuitry automatically detects the data rate without setting a DIP switch.

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
485DRCI-PH	Heavy Industrial RS-232 to RS-422/485 Isolated Converter

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	TD, RD, GND
RS-422	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 4-Wire	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 2-Wire	Data A(-), Data B(+)
RS-232 Connector	DB9 Female (DCE)
RS-422/485 Connector	5 Position, Removable Terminal Block
Data Rate	1.2 to 115.2 Kbps
Isolation	2 KV RMS, 1 minute
Surge Protection	600 W Peak Power Dissipation Clamping time < 1 pico-second
Industrial Bus	MODBUS ASCII / RTU
Bias	Built-in, switchable 1.2KΩ XMT/RCV
Termination	Built-in, switchable 120Ω
POWER	
Source	External
Power Connector	2 Position Removable Terminal Block
Input Voltage	10 to 48 VDC (56 VDC Maximum)
Power Consumption	0.5 W typical (1.9 W with termination)
TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG, Copper wire only.
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
INDICATORS	
Power	Red LED
TD / RD (Each Port)	Green LED
MECHANICAL	
Dimensions	5.2 x 3.7 x 1.3 in 132.4 x 92.9 x 33.0 mm
Enclosure	IP30 Metal, Panel Mount
Weight	0.46 lbs (208.65 grams)
MTBF	163611 Hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 85°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 176°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, IEC 61850-3, IEEE 1613 UL C1 D2, File: E245458, NEMA TS2

Heavy Industrial RS-232 to RS-422/485 Isolated Converter

485DRCI-PH

IEC 61850-3 ELECTRO MAGNETIC INTERFERENCE SPECIFICATIONS

TEST	DESCRIPTION		TEST LEVEL	LEVEL
61000-4-2	ESD	Enclosure Contact	8 kV	4
		Enclosure Air	15 kV	4
61000-4-3	Radiated RFI	Enclosure Ports	10 V/m	3
61000-4-4	Burst (Fast Transient)	Signal Ports	4 kV @ 2.5 Khz	------
		DC Power Ports	4 kV	4
61000-4-5	Surge	Signal Ports	2 kV line to earth, 1 kV line to line	4
		DC Power Ports	2 kV line to earth, 1 kV line to line	3
61000-4-6	Induced (Conductive) RFI	Signal Ports	10 V RMS	3
		DC Power Ports	10 V RMS	3
61000-4-12	Damped Oscillatory	Signal Ports	2.5 kV common, 1 kV diff mode @ 1MHz	3
		DC Power Ports	2.5 kV common, 1 kV diff mode @ 1MHz	3
61000-4-16	Mains Frequency Voltage	Signal Ports	30 V Continuous, 300 V for 1 s	4
		DC Power Ports	30 V Continuous, 300 V for 1 s	4
61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3

IEEE 1613 C37.90 ELECTROMAGNETIC INTERFERENCE SPECIFICATIONS

TEST	DESCRIPTION		TEST LEVEL	LEVEL
C37.90.3	ESD	Enclosure Contact	8 kV	------
		Enclosure Air	15 kV	------
C37.90.2	Radiated RFI	Enclosure Ports	10 v/m	------
C37.90.1	Fast Transient	Signal Ports	4 kV @ 2.5 kHz	------
		DC Power Ports	4 kV	------

ENVIRONMENTAL SPECIFICATIONS

TEST	DESCRIPTION		TEST LEVEL	LEVEL
60068-2-1	Cold Temperature	Test Ad	(-)40 C, 16 Hours	------
60068-2-2	Dry Heat	Test Bd	(+)85 C, 16 Hours	------
60068-2-30	Humidity (damp heat cycle)	Test Dd	90% (non-condensing) (+)55C, 6 Cycles	------
IEC 60068-2-6	Vibration	Test Fc	4G	Class 2
IEC 60068-2-27	Shock	Test Ea	50G	Class 2
IEC 60068-2-32	Drop	------	6 faces, 3 edges, 1 corner total 10 drops at 1 m	------

Heavy Industrial RS-232/422/485 to Fiber Optic Converters

FOSTCDRI-PH-MC, FOSTCDRI-PH-MT, FOSTCDRI-PH-SC

PRODUCT FEATURES

- IEEE-61850-3, IEEE-1613
- NEMA TS2 (FOSTCDRI-PH-MT)
- Multi or Single Mode, ST or SC Versions
- -40 to 85°C Operating Temperature
- Rugged, IP30 Metal Panel Mount Case
- 50G Shock, 4G Vibration
- 2kV Triple Isolation

The FOSTCDRI-PH-xx series are premium heavy industrial serial to fiber optic converters. Designed for rugged industrial environments, they have been put through most exacting compliance testing in the industry. Meeting IEC 61850-3 and IEEE 1613 requirements, they are suitable for installation in electrical substations. These specifications are more stringent than the NEMA TS1/TS2 requirements for transportation applications. Powerful isolation protects equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged IP30 metal case, these converters convert serial signals to multi-mode or single-mode fiber optic. Bit-wise enabled circuitry automatically detects the data rate without setting a DIP switch.

In addition to direct point-to-point connectivity, operation in multi-drop mode is possible. This enables serial devices to communicate with up to 31 others in a fiber ring. Supporting mixed standards, you can replace other converters and add the EMI / RFI protection inherent to fiber optic communications.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
FOSTCDRI-PH-MC	Serial to Multi-mode SC Converter
FOSTCDRI-PH-MT	Serial to Multi-mode ST Converter
FOSTCDRI-PH-SC	Serial to Single-mode SC Converter

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

DRAD35 - DIN Rail Mounting Kit 35mm

Heavy Industrial RS-232/422/485 to Fiber Optic Converters

FOSTCDRI-PH-MC, FOSTCDRI-PH-MT, FOSTCDRI-PH-SC

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	TD, RD, GND
RS-422	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 4-Wire	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 2-Wire	Data A(-), Data B(+)
Serial Connector	5-position, removable terminal block
Data Rate	9.6 to 115.2 Kbps
Isolation	2 KV RMS, 1 minute
Surge Protection	600 W peak power dissipation Clamping time < 1 pico-second
Industrial Bus	Modbus ASCII / RTU
Bias	Built-in, switchable 1.2KΩ XMT/RCV
Termination	Built-in, switchable 120Ω
FIBER OPTIC TECHNOLOGY	
Type / Wavelength	Multi-mode or Single-mode 1310 nM
Output Power (MM)	-19 (min), -14 (max) dBm
Output Power (SM)	-15 (min), -8 (max) dBm
RCV Sensitivity	≤ -32 dBm
Cable	62.5 / 125 µM (MM), 9 / 125µM (SM)
Data Rate	9.6 to 115.2 kbps
Distance	2 kM (MM), 15 kM (SM)
Fiber Light	Modulated
POWER	
Source	External
Power Connector	2-position, removable terminal block
Input Voltage	10 to 48 VDC (56 VDC maximum)
Power Consumption	0.9 W typical (2.6W with termination)

TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG, copper wire only
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
INDICATORS	
Power	Red LED
TD / RD (Each Port)	Green LED
MECHANICAL	
Dimensions	13.24 x 9.29 x 3.0 cm (5.2 x 3.7 x 1.3 in)
Enclosure	IP30 metal, panel mount
Weight	0.46 lbs (208.65 grams)
MTBF	127,103 hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 85°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 176°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, IEC 61850-3, IEEE 1613 UL C1 D2, File: E245458, • NEMA TS2 (FOSTCDRI-PH-MT)

IEC 61850-3 ELECTRO MAGNETIC INTERFERENCE SPECIFICATIONS				
Test	**Description**		**Test Level**	**Level**
61000-4-2	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	4 4
61000-4-3	Radiated RFI	Enclosure Ports	10 V/m	3
61000-4-4	Burst (Fast Transient)	Signal Ports DC Power Ports	4 kV @ 2.5 Khz 4 kV	- 4
61000-4-5	Surge	Signal Ports DC Power Ports	2 kV line to earth, 1 kV line to line 2 kV line to earth, 1 kV line to line	4 3
61000-4-6	Induced (Conductive) RFI	Signal Ports DC Power Ports	10 V RMS 10 V RMS	3 3
61000-4-12	Damped Oscillatory	Signal Ports DC Power Ports	2.5 kV common, 1 kV diff mode @ 1MHz 2.5 kV common, 1 kV diff mode @ 1MHz	3 3
61000-4-16	Mains Frequency Voltage	Signal Ports DC Power Ports	30 V Continuous, 300 V for 1 s 30 V Continuous, 300 V for 1 s	4 4
61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3
IEEE 1613 C37.90 ELECTROMAGNETIC INTERFERENCE SPECIFICATIONS				
C37.90.3	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	-
C37.90.2	Radiated RFI	Enclosure Ports	10 v/m	-
C37.90.1	Fast Transient	Signal Ports DC Power Ports	4 kV @ 2.5 kHz 4 kV	-
ENVIRONMENTAL SPECIFICATIONS				
60068-2-1	Cold Temperature	Test Ad	(-)40 C, 16 Hours	-
60068-2-2	Dry Heat	Test Bd	(+)85 C, 16 Hours	-
60068-2-30	Humidity (damp heat cycle)	Test Dd	90% (non-condensing) (+)55C, 6 Cycles	-
IEC 600068-2-6	Vibration	Test Fc	4g	Class 2
IEC 600068-2-27	Shock	Test Ea	50g	Class 2
IEC 60068-2-32	Drop	-	6 faces, 3 edges, 1 corner, total 10 drops at 1 m	-

Heavy Industrial RS-422/485 Isolated Repeater

485OPDRI-PH

PRODUCT FEATURES

- IEEE-61850-3, IEEE-1613
- NEMA TS2
- -40 to 85°C Operating Temperature
- Rugged IP30 Metal Panel Mount Case
- 50G Shock, 4G Vibration
- 2kV Triple Isolation
- 10 to 48 VDC Input Power

The ILinx™485OPDRI-PH is our premium Heavy Industrial RS-422/485 Isolated Repeater. Designed for rugged industrial environments, it has been put through some of the most exacting compliance tests in the industry. Meeting the requirements of IEC 61850-3 and IEEE 1613, it is suitable for installation in electrical substations. These specifications are more stringent than the NEMA TS1/TS2 requirements for transportation applications. Powerful isolation on both data ports protects your equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged IP30 metal case, it extends full or half-duplex RS-422/485 signals an additional 4000 feet and allows you to add another 32 nodes to your network. Our bit-wise enabled circuitry automatically detects the data rate without setting a DIP switch.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
485OPDRI-PH	Heavy Industrial RS-232 to RS-422/485 Isolated Repeater

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

DRAD35 - DIN Rail Mounting Kit 35mm

TBKT1 - Replacement Term Block, 2

Heavy Industrial RS-422/485 Isolated Repeater

485OPDRI-PH

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-422	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 4-Wire	TDA(-), TDB(+), RDA(-), RDB(+)
RS-485 2-Wire	Data A(-), Data B(+)
RS-422/485 CON.	5 Position, Removable Terminal Block
Data Rate	1.2 to 115.2 Kbps
Isolation	2 KV RMS, 1 minute
Surge Protection	600 W Peak Power Dissipation Clamping time < 1 pico-second
Industrial Bus	MODBUS ASCII / RTU
Bias	Built-in, switchable 1.2KΩ XMT/RCV
Termination	Built-in, switchable 120Ω
POWER	
Source	External
Power Connector	2 Position Removable Terminal Block
Input Voltage	10 to 48 VDC (56 VDC Maximum)
Power Consumption	0.5 W typical (2.3 W with termination)
TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG, Copper wire only.
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
Temperature rating of field installed conductors 105°C minimum.	

INDICATORS	
Power	Red LED
TD / RD (Each Port)	Green LED
MECHANICAL	
Dimensions	13.24 x 9.29 x 3.30 cm 5.2 x 3.7 x 1.3 in
Enclosure	IP30 Metal, Panel Mount
Weight	0.46 lbs (208.65 grams)
MTBF	122832 Hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 85°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 176°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, IEC 61850-3, IEEE 1613, UL C1 D2, File: E245458, NEMA TS2

IEC 61850-3 ELECTRO MAGNETIC INTERFERENCE SPECIFICATIONS				
Test	**Description**		**Test Level**	**Level**
61000-4-2	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	4 4
61000-4-3	Radiated RFI	Enclosure Ports	10 V/m	3
61000-4-4	Burst (Fast Transient)	Signal Ports DC Power Ports	4 kV @ 2.5 Khz 4 kV	- 4
61000-4-5	Surge	Signal Ports DC Power Ports	2 kV line to earth, 1 kV line to line 2 kV line to earth, 1 kV line to line	4 3
61000-4-6	Induced (Conductive) RFI	Signal Ports DC Power Ports	10 V RMS 10 V RMS	3 3
61000-4-12	Damped Oscillatory	Signal Ports DC Power Ports	2.5 kV common, 1 kV diff mode @ 1MHz 2.5 kV common, 1 kV diff mode @ 1MHz	3 3
61000-4-16	Mains Frequency Voltage	Signal Ports DC Power Ports	30 V Continuous, 300 V for 1 s 30 V Continuous, 300 V for 1 s	4 4
61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3
IEEE 1613 C37.90 ELECTROMAGNETIC INTERFERENCE SPECIFICATIONS				
C37.90.3	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	-
C37.90.2	Radiated RFI	Enclosure Ports	10 v/m	-
C37.90.1	Fast Transient	Signal Ports DC Power Ports	4 kV @ 2.5 kHz 4 kV	-
ENVIRONMENTAL SPECIFICATIONS				
60068-2-1	Cold Temperature	Test Ad	(-)40 C, 16 Hours	-
60068-2-2	Dry Heat	Test Bd	(+)85 C, 16 Hours	-
60068-2-30	Humidity (damp heat cycle)	Test Dd	90% (non-condensing) (+)55C, 6 Cycles	-
IEC 600068-2-6	Vibration	Test Fc	4g	Class 2
IEC 600068-2-27	Shock	Test Ea	50g	Class 2
IEC 60068-2-32	Drop	-	6 faces, 1 corner, 3 edges, total 10 drops at 1 m	-

Heavy Industrial RS-232 Isolated Repeater

2320PDRI-PH

PRODUCT FEATURES

- IEEE-61850-3, IEEE-1613
- NEMA TS2
- -40 to 85°C Operating Temperature
- Rugged IP30 Metal Panel Mount Case
- 50G Shock, 4G Vibration
- 2kV Triple Isolation
- 10 to 48 VDC Input Power

The 2320PDRI-PH is our premium Heavy Industrial RS-232 Isolated Repeater. Designed for rugged industrial environments, it has been put through some of the most exacting compliance tests in the industry. Meeting the requirements of IEC 61850-3 and IEEE 1613, it is suitable for installation in electrical substations. These specifications are more stringent than the NEMA TS1/TS2 requirements for transportation applications. Powerful isolation on both data ports protects your equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged IP30 metal case, this repeater operates in wide temperature extremes. The panel mount form factor with DIN Rail mount option makes it easy to integrate into your control panel or other industrial equipment.

Installation and configuration is easy. Data is connected with a DB9 female connector (DCE) and a DB9 male connector (DTE). Power is connected through terminal block that accepts 10 to 48 VDC from any external source.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
2320PDRI-PH	Heavy Industrial RS-232 Isolated Repeater

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

DRAD35 - DIN Rail Mounting Kit 35mm

TBKT1 - Replacement Term Block, 2

Heavy Industrial RS-232 Isolated Repeater

2320PDRI-PH

SPECIFICATIONS

SERIAL TECHNOLOGY	
Serial Connector	DB9 F (DCE), DB9 M (DTE)
Data Rate	Up to 115.2 Kbps
Isolation	2 KV RMS, 1 minute
POWER	
Source	External (Not Included)
Power Connector	2 Position Removable Terminal Block
Input Voltage	10 to 48 VDC (56 VDC Maximum)
Power Consumption	0.55 W (typical), 1.5 W (maximum)
TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
INDICATORS	
Power	Red LED
Data	Green LED TD, RD, CTS, RTS

MECHANICAL	
Dimensions	13.24 x 9.29 x 3.30 cm 5.2 x 3.7 x 1.3 in
Enclosure	IP30 Metal, Panel Mount
Weight	0.46 lbs (208.65 grams)
MTBF	194712 Hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 85°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 176°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, IEC 61850-3, IEEE 1613 UL C1 D2, File: E245458, NEMA TS2

IEC 61850-3 ELECTRO MAGNETIC INTERFERENCE SPECIFICATIONS				
Test	**Description**		**Test Level**	**Level**
61000-4-2	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	4 4
61000-4-3	Radiated RFI	Enclosure Ports	10 V/m	3
61000-4-4	Burst (Fast Transient)	Signal Ports DC Power Ports	4 kV @ 2.5 Khz 4 kV	- 4
61000-4-5	Surge	Signal Ports DC Power Ports	2 kV line to earth, 1 kV line to line 2 kV line to earth, 1 kV line to line	4 3
61000-4-6	Induced (Conductive) RFI	Signal Ports DC Power Ports	10 V RMS 10 V RMS	3 3
61000-4-12	Damped Oscillatory	Signal Ports DC Power Ports	2.5 kV common, 1 kV diff mode @ 1MHz 2.5 kV common, 1 kV diff mode @ 1MHz	3 3
61000-4-16	Mains Frequency Voltage	Signal Ports DC Power Ports	30 V Continuous, 300 V for 1 s 30 V Continuous, 300 V for 1 s	4 4
61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3
IEEE 1613 C37.90 ELECTROMAGNETIC INTERFERENCE SPECIFICATIONS				
C37.90.3	ESD	Enclosure Contact Enclosure Air	8 kV 15 kV	-
C37.90.2	Radiated RFI	Enclosure Ports	10 v/m	-
C37.90.1	Fast Transient	Signal Ports DC Power Ports	4 kV @ 2.5 kHz 4 kV	-
ENVIRONMENTAL SPECIFICATIONS				
60068-2-1	Cold Temperature	Test Ad	(-)40 C, 16 Hours	-
60068-2-2	Dry Heat	Test Bd	(+)85 C, 16 Hours	-
60068-2-30	Humidity (damp heat cycle)	Test Dd	90% (non-condensing) (+)55C, 6 Cycles	-
IEC 600068-2-6	Vibration	Test Fc	4g	Class 2
IEC 600068-2-27	Shock	Test Ea	50g	Class 2
IEC 60068-2-32	Drop	-	6 faces, 1 corner, 3 edges, total 10 drops at 1 m	-

Industrial Isolated Converter

485LDRC9

PRODUCT FEATURES

- Extend data up to 1.2 km (4,000 ft.)
- 2 kV optical isolation on input/output
- Wide operating temperature (-40 to +80 °C)
- Modbus compatible
- UL Recognized, NEMA TS2
- Automatic Send Data Control

The 485LDRC9 is an optically isolated RS-232 to RS-422/485 converter. RS-232 signals interface through a DB9 female connector or a terminal block. RS-422/485 signals and power inputs connect to the terminal block. Terminal blocks are arranged to allow easy wiring inside a control panel.

Built-in Automatic Send Data Control circuitry allows quick set-up and eliminates the need for external software drivers to control handshake signals. The converter operates on externally sourced 10-30 VDC power.

Optically isolated data lines (2,000 V on input/output) with 500W surge suppression ensure that connected equipment is protected even in the harshest environments. DIN rail mount design snaps on standard 35mm rail and a small form factor fits neatly into tight cabinets.

The 485LDRC9 is ideal for critical industrial communications, factory automation, in-cabinet conversion, warehouse automation, security, and many other applications.

Learn More!

READ ON!

RS-485 Problem Solver

www.bb-elec.com/485ProblemSolver

*Carrier data charges may apply.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-422/485 CONNECTOR
485LDRC9	DB9 Female or Terminal Block	Terminal Blocks

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232 - 2 options	
Option 1: Connector	DB9 Female (DCE)
Option 1: Signals	TD, RD, GND
Option 2: Connector	Terminal block
Option 2: Signals	TD, RD, GND
RS-422	
Connector	Terminal block
Signals	TDA(-), TDB(+), RDA(-), RDB(+), GND
Termination	120 (switchable)
RS-485	
Connector	Terminal Block
Signals	TDA(-), TDB(+), RDA(-), RDB(+), GND
Modes	2-wire and 4-wire
Termination	120 (switchable)
ISOLATION	
Lines Protected	Data lines
Method	Optical
Rating	2,000 V
SURGE SUPPRESSION	
Lines Protected	Data lines
Method	TVS
Rating	7.5V bi-directional avalache breakdown device 500W peak power dissipation
Response Time	< 1 pico-second
INDUSTRIAL BUS	
Modbus	ASCII/RTU

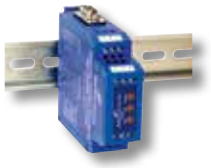
ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

9PAMF6 - 6 ft. (1.8 m) 232 DB9 male to DB9 female serial cable

Industrial Isolated Converter

485LDRC9



SPECIFICATIONS

POWER	
Connector	Terminal block
Voltage	10-30 VDC
Consumption	0.5 W
Source	External powering required
TERMINAL BLOCKS	
Wire Size	24 to 14 AWG
Torque	4 kfg-cm
LED INDICATORS	
Power (RED)	On when power applied
TD (RED)	Flashes when RS-422/485 data is transmitted
RD (RED)	Flashes when RS-422/485 data is received
ENCLOSURE	
Material	Plastic
IP Rating	20
Dimensions	2.5 x 7.9 x 9.5 cm (1.0 x 3.1 x 3.7 in)
Mounting	35 mm DIN rail (panel mount adapter available)

ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF, 485LDRC9	257448 hours
MTBF Calculation Method	Parts Count Reliability Prediction

APPROVALS / CERTIFICATIONS - 485LDRC9

cULus Recognized, File Number: E222870, NEMA TS2

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions

CE

EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments

EN 61000-4-2: 2009 Electro-Static Discharge (ESD)

EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)

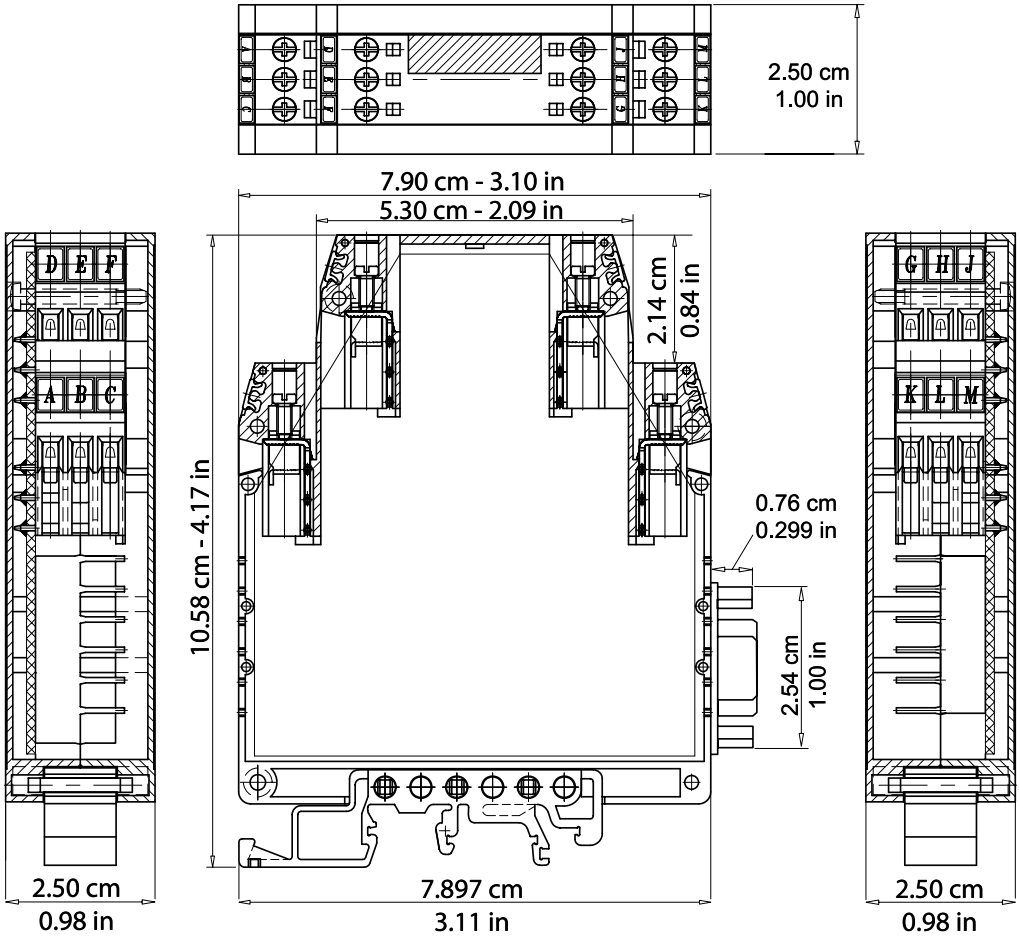
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)

EN 61000-4-6: 2009 Conducted Immunity

Download complete Declaration of Conformity at www.bb.elec.com

MECHANICAL DIAGRAM

Dimensional Diagram of 485LDRC9



Isolated Serial Converter

485OI9TB

PRODUCT FEATURES

- 1,500 Volts optical isolation
- Converts RS-232 to RS-422/485
- 4-wire, full-duplex RS-485
- 2-wire, half-duplex RS-485

Model 485OI9TB is a basic, isolated converter. It converts unbalanced, full duplex RS-232 signals to balanced full-duplex (4-wire) RS-422/485 or half-duplex (2-wire) RS-485 signals.

The converter provides 1,500 Volts RMS optical isolation of the data lines and ground (and connected devices) between the RS-232 and RS-422/485 signals. RS-232 port has a female DB9 connector. RS-422/485 port has a 6-position terminal block.

The RS-232 side of the converter draws power from the handshake lines (DTR, RTS). At least one handshake line must be asserted (raised high) to power the RS-232 side.The RS-422/485 side must be powered by an external 12 VDC power supply (sold separately).

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-422/485 CONNECTOR
485OI9TB	DB9 Female	Terminal Block

ACCESSORIES

485PS2 - 12VDC@100mA wall transformer power supply, tinned stripped leads

9PAMF6 - 6 ft. (1.8 m) RS-232 Serial Cable

E1250BL-BB3 - 12VDC @ 500MA European wall transformer power supply, tinned stripped leads

MMNM9 - DB9 male to DB9 male Null Modem Adapter

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	9600 bps
RS-232	
Connector	DB9 Female (DCE)
Signals	TD, RD, GND
RS-422/485	
Connector	Terminal block
RS-485, 2-Wire	Data A (-), Data B (+), GND
RS-422/485, 4-Wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
ISOLATION	
Lines Protected	Data lines
Method	Optical
Rating	1,500 V
POWER	
Note: Requires 2 Power Sources	
RS-232	
Source	Port-powered from DTR and RTS handshake lines
RS-422/485	
Connector	Terminal block
Voltage	10-14 VDC
Consumption	0.9 W
Source	External

TERMINAL BLOCK	
Wire Size	26 to 16 AWG
Torque	2.0 lb fin
ENCLOSURE	
Material	Plastic
Dimensions	5.5 x 8.3 x 1.7 cm (2.2 x 3.3 x 0.7 in)
Mounting	Inline
ENVIRONMENTAL	
Operating Temperature	0 to +50 °C (+32 to +122 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	272581 hours
MTBF Calculation Method	MIL 217F Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - 485OI9TB	
cULus, File Number: E222870	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	
Download complete Declaration of Conformity at www.bb.elec.com	

Isolated In-line Serial Converters

4WSD90TB, 4WSD250TB

PRODUCT FEATURES

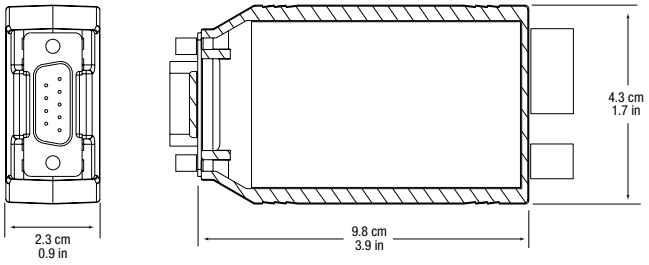
- Modbus compatible serial conversion
- Removable terminal blocks for RS-422/485
- 2,000V two-way optical isolation
- Automatic Send Data Control - no software drivers necessary
- Accepts external power from 10-48 VDC

Isolated Models 4WSD90TB and 4WSD250TB convert RS-232 to RS-422 or RS-485 (2 or 4-wire). 2,000V two-way optical isolation protects devices from power surges, spikes and ground loops in harsh electrical environments.

These in-line converters support distances up to 1,200 m (4000 ft.) and data rates up to 115.2 kbps. Switchable modes support 2-wire RS-485, 4-wire RS-485, and full duplex RS-422. Available with female DB9 or DB25 RS-232 inputs.

Removable terminal blocks for RS-422/485 and external power make wiring easy. Accepts external power from 10-48 VDC.

MECHANICAL DIAGRAM



ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR
4WSD90TB	DB9 Female	Removable Terminal Blocks
4WSD250TB	DB25 Female	Removable Terminal Blocks

ACCESSORIES

485PS2 - 12VDC@100mA wall transformer power supply, tinned stripped leads

7175 - 2 position 3.5MM Replacement Terminal Block (power, included)

7372 - 5 position 3.5MM Replacement Terminal Block (data, included)

TBKT4 - 5 position 3.5MM Replacement Terminal Block

9PAMF6 - 6 ft. (1.8 m) RS-232 Serial Cable

E1250BL-BB3 - 12VDC @ 500MA European wall transformer power supply, tinned stripped leads

MMNM9 - DB9 male to DB9 male Null Modem Adapter

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
LED Indicators	TD and RD
RS-232	
Connectors	4WSD90TB: DB9 female 4WSD250TB: DB25 female
Signals	TD, RD, GND
RS-422/485	
Connector	4WSD90TB: Terminal block, removable 4WSD250TB: Terminal block, removable
RS-485, 2-wire	Data A(-), Data B (+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA (-), RDB(+), GND
POWER	
Input Required	10-48 VDC
Current Draw	28 mA at 12 VDC (typical)

MECHANICAL	
Dimensions, 4WSD90TB	9.8 x 4.3 x 2.3 cm (3.9 x 1.7 x 0.9 in)
Dimensions, 4WSD250TB	9.8 x 5.5 x 2.3 cm (3.9 x 2.2 x 0.9 in)
MTBF	179604
MTBF Calculation Method	MIL 217F Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
APPROVALS / CERTIFICATIONS - 4WSD90TB, 4WSD250TB	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	

Industrial RS-232 to RS-422/485 Converter

485DRCi

PRODUCT FEATURES

- Data rates up to 115.2 kbps
- Three-way 2,000V optical isolation (input, output, power)
- Wide operating temperature
- UL Class 1/Division 2
- Modbus ASCII/RTU compatible
- 10–48 VDC input power range

Model 485DRCi industrial-grade isolated serial converter changes RS-232 signals to RS-422 for increased range, or to RS-485 for increased range plus multi-drop capability.

Designed for rugged industrial use, the 485DRCi is UL approved and certified for operation in Class 1/Division 2 environments and also offers 2,000V 3-way optical isolation on input, output, and power lines. In addition to optical isolation, the unit has surge suppression on the RS-422/485 lines. This DIN rail mountable converter optically isolates and converts unbalanced, full or half-duplex, RS-232 signals to balanced RS-422/485 signals at baud rates up to 115.2 kbps. Configuration is made via a 12-position DIP switch on the bottom of the converter.

Featuring Automatic Send Data Control circuitry, the converter does not require special software control of handshake signals in RS-485 mode. Removable terminal blocks for power and RS-422/485 signals make wiring easy. It is powered by a supply voltage of 10 to 48 VDC which is isolated from all data and signal ground lines.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-422/485 CONNECTOR	ISOLATION
485DRCi	DB9 Female (DCE)	Removable Terminal Block	2,000 V

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

EK-CLIP-MPC - Replacement DIN Rail Clip

TBKT1 - Replacement Term Block, 2 position 5.08mm

TBKT2 - Replacement Term Block, 5 position 5.08mm

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

IN THE FIELD

Resolving Electrical Substation Data Glitches

Industry: Energy & Natural Resources Utilities

Product: Optically Isolated Converter

www.bb-elec.com/Substation

485DRCi

Carrier data charges may apply.

Industrial RS-232/422/485 Converter

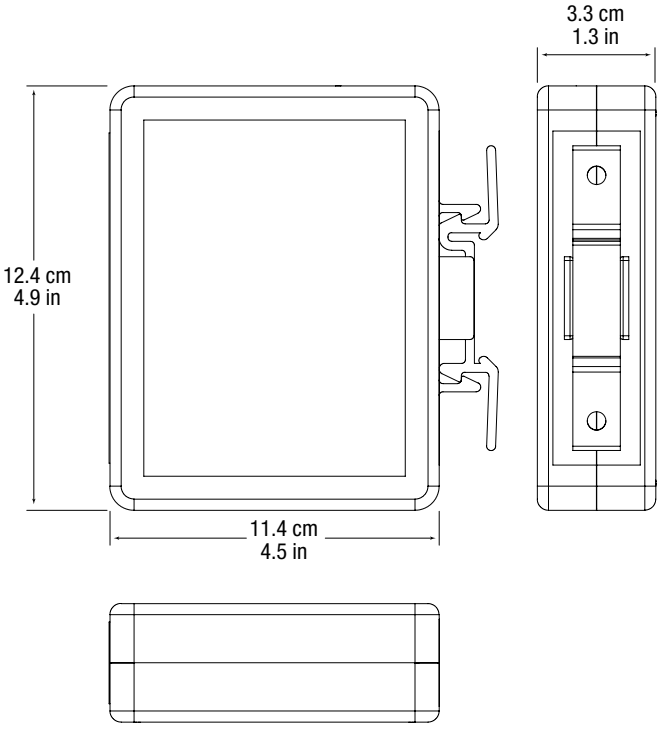
485DRCi

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	1.2 to 115.2 kbps
RS-232	
Connector	DB9 female (DCE)
Signals	TD, RD, GND
RS-422/485	
Connector	Removable terminal block, 28 to 14 AWG
RS-485, 2-wire	Data A(-), Data B (+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA (-), RDB(+), GND
ISOLATION	
Rating	2,000 V
Lines Protected	3-way (input, output, power lines)
Method	Optical
SURGE SUPPRESSION	
Lines Protected	Data lines
Rating	600W peak power dissipation
Clamping/Response Time	< 1 pico-second
INDUSTRIAL BUS	
Modbus	ASCII/RTU
POWER	
Connector	Removable terminal block, 28 to 14 AWG
Voltage	10-48 VDC
Consumption	960 mW
Source	External
MECHANICAL	
LED Indicators	Transmit, Receive, and Power
Dimensions	11.4 x 3.3 x 12.4 cm (4.5 x 1.3 x 4.9 in)
Enclosure	35mm DIN mount, plastic, IP30
Weight	204.12 g (0.45 lbs)

ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	254617 hours
MTBF Calculation Method	Parts Count Reliability Prediction
CLASS 1/DIVISION 2 WIRING	
Type	Solid copper only
Size	28 to 14 AWG
Temperature	105 °C (221 °F) minimum
Terminal Torque	0.5 Nm (Newton-meters)
APPROVALS / CERTIFICATIONS - 485DRCI	
cUL 508, File Number: E222870 (C1 D2 E245458)	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

MECHANICAL DIAGRAM



RS-232 to RS-422/485 Converters

SCP211 & SCP311

PRODUCT FEATURES

- Isolated and Non-Isolated Models
- ESD Protection - 8 kV Contact, 15 kV Air
- Rugged Metal Case
- Wide Operating Temperature Models
- Panel Mount with Available DIN Rail Adapters
- Built in Switchable Bias & Termination

The SCP series RS-232 to RS-422/485 serial converters are compact and tough. Each model is designed and tested to meet heavy industrial EMC standards. The RS-232 signal is connected through a female DB9 connector. The RS-422/485 (2-Wire and 4-Wire) signal is connected through a removable terminal block, making wiring easy. Power is connected through a two position removable terminal block. Bit-wise enabled circuitry automatically detects the character time-out eliminating the need to set DIP switches for the baud rate.

Basic model SCP211-DFTB3 is non-isolated and made for less demanding temperature extremes. If you need a wider operating temperature but do not require isolation, model SCP211T-DFTB3 is available. These models should be used when isolation is not required, such as applications in which the data line does not exit the control cabinet.

Model SCP311T-DFTB3 offers 2 kV Isolation and will stand up to -40 to 80° C temperature variations. This is our most rugged model in this series. The SCP311 is an excellent investment for protecting your expensive control equipment.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
SCP211-DFTB3	RS-232 to 422/485 Converter
SCP211T-DFTB3	Wide-Temp, RS-232 to RS-422/485 Converter
SCP311T-DFTB3	Wide-Temp, Isolated, RS-232 to 422/485 Converter

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

DRAD35 - DIN Rail Mounting Clips 35mm

TBKT1 - Replacement Term Block, 2 position 5.08mm

TBKT2 - Replacement Term Block, 5 position 5.08mm

TBKT4 - (2) Replacement Term Block, 5 position 5.08mm

9PAMF6 - RS-232 serial cable DB9 Male To DB9 Female, 6 ft. (1.8 m)

232AMF500 - RS-232 serial cable DB25 Male To DB25 Female, 6 ft. (1.8 m)

RS-232 to RS-422/485 Converters

SCP211 & SCP311

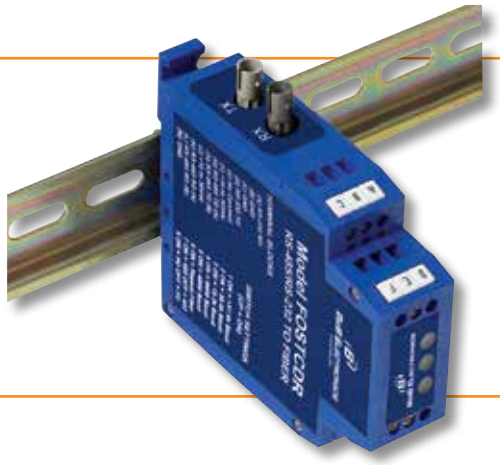
SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	TD, RD, GND
RS-422/485 4W	TDA(-), RDA(-), TDB(+), RDB(+), GND
RS-485 2W	DATA A(-), DATA B(+), GND
Data Rate	460.8 Kbps
Isolation	2 kV (SCP311T-DFTB3)
Surge Protection	+/- 0.5 kV DC Ports, +/- 1 kV Signal Ports
Industrial Bus	Modbus ASCII/RTU
Bias	1 KΩ Switchable
Termination	120 Ω Switchable
Connectors	RS-232 – DB9F (DCE) RS-422/485 – Removable Terminal Block
POWER	
Source	External
Power Connector	Terminal Block
Input Voltage	10 to 30 VDC
Power Consumption	1.0 Watt Maximum
INDICATORS	
TD / RD	Green LED (Also used to indicate power)
MECHANICAL	
Dimensions	99x22.9x73.7 mm (3.9x0.9 x2.9 in)
Enclosure	IP 30, Metal
Weight	0.33 lbs, 0.15 kg
MTBF SCP211 Series	313926 Hours
MTBF SCP311-DFTB3	217576 Hours
MTBF Calc. Method	MIL 217F Parts Count Reliability

ENVIRONMENTAL	
Operating Temperature	
SCP211-DFTB3	0 to 70°C
SCP211T-DFTB3	-40 to 80°C
SCP311T-DFTB3	-40 to 80°C
Storage Temperature	-40 to 85°C
Operating Humidity	0 to 95% Non-condensing
APPROVALS / CERTIFICATIONS	
Regulatory	UL Listed, UL File Number: E222870
Emissions	FCC Class B, CISPR Class B (EN55022)
CE	EN61000-6-2:2005 (Heavy Industrial) EN61000-4-2:2008 (ESD) 8kV contact, 15kV air EN61000-4-3:2006 (RI) 10 V/m EN61000-4-4:2004 (EFT Burst) 1kV signal, 2kV power EN61000-4-5:2005 (Surge) 1kV signal, 500V DC, 1kV AC EN61000-4-6:2005 (CI) 10 Vrms

Standard Serial to Fiber Optic Converters

FOSTCDR, FOSTCDRKT, FOSTCDR-INV



PRODUCT FEATURES

- Data rates up to 115.2 kbps
- 4 km (2.5 mi) range
- 10 to 30 VDC input voltage
- Wide operating temperature
- 2000V, 2-way isolation
- Modbus ASCII/RTU compatible
- EMI/RFI protection
- TD, RD and Power LED's

The FOSTCDRx line of fiber optic converters are suitable for standard industrial installations. These converters extend data communications up to 4 km (2.5 mi) and provide two-way optical isolation on the input and output lines.

Model FOSTCDR industrial serial to multimode fiber optic converter, provides the most versatile connection possible between any asynchronous full or half-duplex serial equipment. In addition to direct point-to-point connectivity, it is capable operating in a multi-drop mode. This allows one serial device to communicate with up to 31 other devices around a fiber optic ring. Since the FOSTCDR supports mixed serial standards, you can replace other converters and isolators and add the EMI/RFI immunity inherent to fiber optic communications.

An Automatic Send Data Control circuit controls the RS-422/485 driver chip, eliminating the requirement for special software. Easy to install and configure, it has an 8-position DIP switch to set up the RS-422/485 parameters and terminal blocks to connect serial signals and power. In RS-232 mode, it supports Transmit and Receive data. Handshaking signals are not passed through.

A kit option, Model FOSTCDRKT, conveniently bundles two FOSTCDR converters with two matched power supplies.

Model FOSTCDR-INV features an “inverted fiber state” and is suitable for applications requiring the fiber optic light to be Off in the idle state.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	FIBER CONNECTOR	ISOLATION
FOSTCDR	Terminal Block	Multi-mode ST	2,000 V
FOSTCDR-INV	Terminal Block	Multi-mode ST	2,000 V
FOSTCDRKT	Bundled Kit Version, includes: (2) FOSTCDR Converters, (2) MDR-20-24 Power Supplies, (1) DFMM-STST-1M Fiber Optic 1-Meter Cable		

ACCESSORIES

MDR-40-24 - DIN Rail Mount Power Supply 24VDC, 1.7 A output power

DFMM-STST-1M - Multimode fiber patch cable ST-ST connectors

What is the difference between Model FOSTCDR and Model FOSTCDR-INV?

The FOSTCDR keeps the light in the fiber turned On when no data is transmitted and the input signal is in the MARK state (idle). If light is lost or too low, the electrical signals go to the SPACE state. The input signal turns the light Off/On in step with the data. This model has an indicator for Transmit and Receive, if no light is received, the RD LED will come on, the RD output will be positive relative to GND (normally negative), and in RS-422 or RS-485 mode, no light will set the TD(A)- line high relative to TD(B)+. The usual voltage with light in the fiber and no signal sets the B line high relative to A (about 4.4 Volts DC no termination).

The FOSTCDR-INV is the opposite. The fiber is Off in the idle state.

Standard Serial/Fiber Optic Converters

FOSTCDR, FOSTCDRKT, FOSTCDR-INV

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	RS-232: 115.2 Kbps maximum RS-422/485: 460.8 Kbps maximum
RS-232	
Connector	Terminal block (24 to 14 AWG)
RS-232	TD, RD, GND
RS-422/485	
Connector	Terminal block (24 to 14 AWG)
RS-485, 2-wire	Data A(-), Data B(+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
ISOLATION	
Rating	2KV RMS, 1 minute
Lines Protected	2-way (input, output lines)
Method	Optical
FIBER OPTIC TECHNOLOGY	
Type / Wavelength	Multi-mode / 820 nm
Output Power	(-) 17 to (-) 10 dBm
Receive Sensitivity	(-) 25.4 dBm to (-) 24 dBm
Cable	62.5/125 micro-meter
Connector	ST
Data Rate	9.6 to 115.2 kbps
Maximum Distance	4 km (2.5 mi)
Idle State	Transmitter light ON
POWER	
Source	External
Input Voltage	10 to 30 VDC
Consumption	1.7 Watts
Connector	Terminal block, (24 to 14 AWG)

INDUSTRIAL BUS	
Modbus	ASCII/RTU
MECHANICAL	
LED Indicators	Serial TD, RD, and Power
Dimensions	10.6 x 7.9 x 2.5 cm (4.3 x 2.3 x 0.95 in)
Enclosure	35mm DIN mount, plastic
Weight	182 g (0.4 lbs)
ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing

APPROVALS / CERTIFICATIONS - FOSTCDR

cULus Recognized, File Number: E222870

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions

CE

EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments

EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity

Download complete Declaration of Conformity at www.bb.elec.com

APPROVALS / CERTIFICATIONS - FOSTCDR -INV

UL 508, File Number: E222870

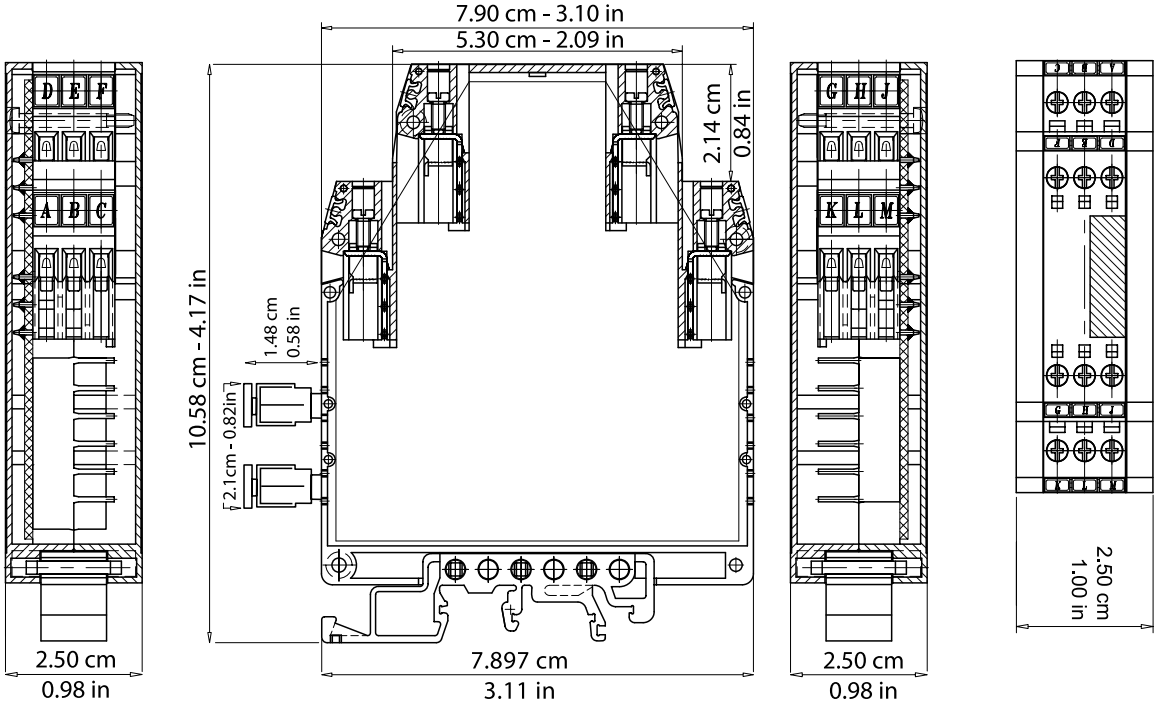
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions

CE

MTBF	
FOSTCDR	460854 hours
FOSTCDR-INV	138904 hours
Calculation Method	MIL 217F Parts Count Reliability Prediction

MECHANICAL DIAGRAM

Dimensional Diagram of FOSTCDR



Industrial Serial to Fiber Optic Converters

FOSTCDRI, FOSTCDRI-INV

PRODUCT FEATURES

- Data rates up to 115.2 kbps
- 10 – 48 VDC input power range
- Wide operating temperature
- 2,000V, 3-way optical isolation
- Modbus ASCII/RTU compatible
- EMI / RFI protection
- UL Class 1/Division 2
- Inverted fiber state option (Model FOSTCDRI-INV)
- TD, RD and Power LED's

Model FOSTCDRI is B&B Electronics' premium industrial serial to multi-mode fiber optic converter. Its rugged design is UL approved and certified for Class 1/Division 2 industrial environments. It extends data communications up to 4km (2.5 miles) . It provides three-way optical isolation on the input, output and power lines.

In addition to direct point-to-point connectivity, it is capable of operating in a multi-drop mode. This allows one serial device to communicate with up to 31 other devices around a fiber ring. Since it supports mixed standards, you can replace other converters and isolators and add the EMI / RFI protection inherent to fiber optic communications.

In RS-232 mode, the converter supports Transmit and Receive data. Handshaking signals are not passed through. An Automatic Send Data Control circuit controls the RS-422/485 driver chip, eliminating the requirement for external software.

Easy to install and configure, it has a 12-position DIP switch on the bottom to configure RS-422/485 parameters. Serial data and power cables connect to removable terminal blocks. ST connectors are used for the fiber.

Model FOSTCDRI-INV features an "inverted fiber state" and is suitable for applications requiring the fiber optic transmit light to be Off in the idle state.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	FIBER CONNECTOR	ISOLATION
FOSTCDRI	Terminal Block	Multi-mode ST	2,000 V
FOSTCDRI-INV	Terminal Block	Multi-mode ST	2,000 V

ACCESSORIES

MDR-40-24 - 24 VDC, 1A, slim-line DIN rail power supply

DFMM-STST-1M - Multi-mode fiber optic cable with ST/ST connectors (62.5/125 micro-meter), 1 meter

TBKT1 - Replacement 2-position terminal block, 5.08 mm

TBKT2 - Replacement 5-position terminal block, 5.08 mm

What is the difference between Model FOSTCDRI and Model FOSTCDRI-INV?

The FOSTCDRI keeps the light in the fiber turned On when no data is transmitted and the input signal is in the MARK state (idle). If light is lost or too low, the electrical signals go to the SPACE state. The input signal turns the light Off/On in step with the data. This model has an indicator for Transmit and Receive, if no light is received, the RD LED will come on, the RD output will be positive relative to GND (normally negative), and in RS-422 or RS-485 mode, no light will set the TD(A)- line high relative to TD(B)+. The usual voltage with light in the fiber and no signal sets the B line high relative to A (about 4.4 Volts DC no termination).

The FOSTCDRI-INV is the opposite. The fiber is Off in the idle state.

Industrial Serial/Fiber Optic Converters

FOSTCDRI, FOSTCDRI-INV

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	9.6 to 115.2 kbps
RS-232	
Connector	Removable terminal block
Signals	TD, RD, GND
RS-422/485	
Connector	5-position, removable terminal block
RS-485, 2-wire	Data A(-), Data B(+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
Bias	Built-in, switchable, 1.2KΩ
Termination	Built-in, switchable, 120Ω

ISOLATION	
Rating	2KV RMS, 1 minute
Surge Protection	600 W peak power dissipation
Clamping Time	< 1 pico-second
Lines Protected	2-way (input, output lines)
Method	Optical

FIBER OPTIC TECHNOLOGY	
Type / Wavelength	Multi-mode / 820 nm
Output Power	-16dBm min, -12dBm typical, -9dBm maximum
Receive Sensitivity	-24dBm min, -25.4dBm maximum
Cable	62.5/125 micro-meter
Connector	ST
Data Rate	9.6 to 115.2 kbps
Maximum Distance	4 km (2.5 mi)
Idle State, FOSTCDRI	Transmitter light ON
Idle State, FOSTCDRI-INV	Transmitter light OFF

INDUSTRIAL BUS	
Modbus	ASCII/RTU

POWER	
Source	External
Input Voltage	10 to 48 VDC (56 VDC maximum)
Consumption	0.5 W (typical), 1.3W (with termination)
Connector	2-position, removable terminal block, 24 to 14 AWG

TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG
Pitch	5.08 mm
Insulation Resistance	≥ 500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm

LED INDICATORS	
Power	Red LED
FO Receive	Red LED
FO Transmit	Red LED

MECHANICAL	
Dimensions	12.3 x 11.3 x 3.2 cm (4.9 x 4.5 x 1.3 in)
Enclosure	IP 20 plastic, 35 mm DIN mount
Weight	199.6 g (0.44 lbs)

ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	138904 hours
MTBF Calculation Method	Parts Count Reliability Prediction

APPROVALS / CERTIFICATIONS - FOSTCDRI

UL Class 1 Division 2, Groups A, B, C, D
File Number: E222870 (HAZLOC E245458)

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions

CE

EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity

Download complete Declaration of Conformity at www.bb.elec.com

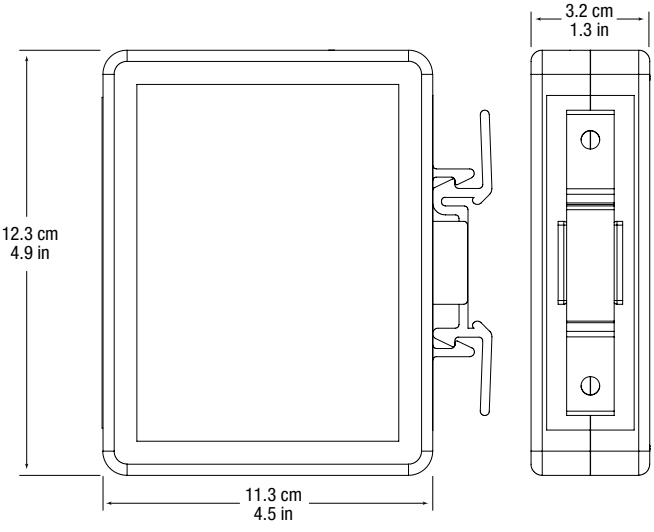
APPROVALS / CERTIFICATIONS - FOSTCDRI-INV

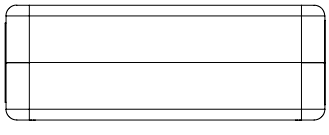
UL 508, File Number: E222870

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions

CE

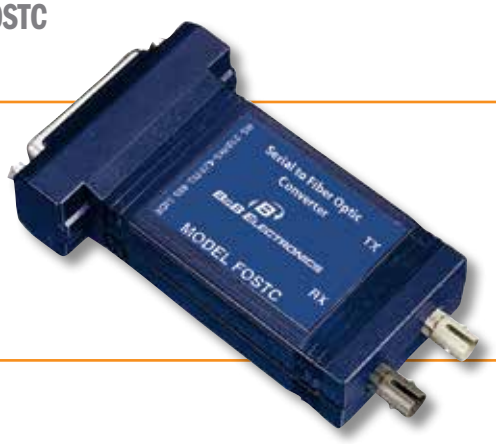
MECHANICAL DIAGRAM





In-line Fiber Optic Modem

FOSTC



PRODUCT FEATURES

- Inherent EMI/RFI immunity from surges, spikes, ground loops
- Extend serial signals up to 4 km (2.5 mi) with Multimode Fiber
- Point-to-point or multi-drop ring configuration
- Converts RS-232 to RS-422/485
- RS-232 data rates up to 115.2 kbps; RS-422/485, 500 kbps
- RS-485 Automatic Send Data Control

Fiber optic cabling has inherent resistance to EMI/RFI and transient immunity, making it ideal for industrial and utility data communication applications.

Model FOSTC provides the most versatile connection possible between asynchronous serial equipment using fiber optic cable. Any two pieces of asynchronous serial equipment can communicate full or half-duplex over two fibers at distances up to 4 km (2.5 mi). The converter can be used for point-to-point communications between serial devices. It can also be used to create a multi-drop master/slave configuration, allowing one serial device to talk to multiple slave devices around a fiber ring.

RS-232, RS-422, or RS-485 data signals are supported. Different standards can be mixed and matched to allow RS-232 devices to connect to RS-422 or RS-485 systems. This means the FOSTC can replace converters and isolators when connecting remote devices, while providing the EMI/RFI and transient immunity of optical fiber.

Supports both the Transmit Data and Receive Data lines, and provides full hardware control of the RS-485 driver with B&B Electronics' Automatic Send Data Control circuit. All serial connections are provided on the same DB25 female connector, while the multi-mode fiber is connected via two ST connectors. Powered by 12 VDC at 140 mA max. An external power supply is available.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	FIBER CONNECTOR	MODBUS?
FOSTC	DB25 female	Multi-mode ST	✔

ACCESSORIES

232PS3 - 12 VDC DIN rail mount power supply, USA

PS1EU-1000 - 220-240 VAC to 12 VDC wall power supply, jack, Euro CEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

232CAM - PC-AT serial computer to modem cable, 6 ft. (1.8 m)

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

In-line Fiber Optic Modem

FOSTC

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	RS-232: 115.2 kbps maximum RS-422/485: 500 kbps maximum
RS-232	
Connector	DB25 female (DCE)
Signals	TD, RD, GND
RS-422/485	
Connector	DB25 female (DCE)
RS-485, 2-wire	Data A(-), Data B(+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
FIBER OPTIC TECHNOLOGY	
Transmission Line	Dual, multi-mode glass optical cable
Connector	ST
Wavelength	820 nm
Size Options	50/125, 62.5/125, 100/140, 200 µm
Output Power	(-) 17 to (-) 10 dBm
Receive Sensitivity	(-) 25.4 dBm to (-) 24 dBm
Cable	62.5/125 micro-meter
Data Rate	9.6 to 115.2 kbps
Maximum Distance	4 km (2.5 mi)
FIBER COMMUNICATION MODES	
Point-to-Point Transmission	Asynchronous, half or full-duplex
Multi-Drop Transmission	Asynchronous, half duplex fiber ring
POWER	
Source	External
Input Voltage	12 VDC
Range DC	10- 14 VDC
Connections	2.5mm phone jack (Tip Positive) or DB25 pins 25(+) & 12(-)
Power Consumption	1.7 W max 1 W typical

MECHANICAL	
Dimensions	11 x 5.9 x 2.5 cm (4.3 x 2.3 x 0.95 in)
Enclosure	Plastic, Inline
ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
MTBF	570522
MTBF Calculation Method	Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - FOSTC	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

FIBER OPTIC CABLES

MULTI-MODE DUPLEX FIBER		LENGTH							
MODEL NUMBER	**CONNECTOR TYPE**	**1M**	**2M**	**3M**	**5M**	**10M**	**15M**	**20M**	**30M**
DFMM-LCLC-XX	LC TO LC	✔	✔	✔	✔				
DFMM-SCLC-XX	SC TO LC	✔	✔	✔	✔	✔			
DFMM-SCSC-XX	SC TO SC	✔	✔	✔	✔	✔			
DFMM-STLC-XX	ST TO LC	✔	✔	✔	✔	✔			
DFMM-STSC-XX	ST TO SC	✔	✔	✔	✔	✔			
DFMM-STST-XX	ST TO ST	✔	✔	✔	✔	✔	✔	✔	
SINGLE-MODE DUPLEX FIBER		**LENGTH**							
MODEL NUMBER	**CONNECTOR TYPE**	**1M**	**2M**	**3M**	**5M**	**10M**	**15M**	**20M**	**30M**
DFSM-LCLC-XX	LC TO LC	✔	✔	✔	✔	✔			
DFSM-SCLC-XX	SC TO LC	✔	✔	✔	✔	✔			
DFSM-SCSC-XX	SC TO SC	✔	✔	✔	✔	✔			
DFSM-STLC-XX	ST TO LC	✔	✔	✔	✔	✔			
DFSM-STSC-XX	ST TO SC	✔	✔	✔	✔	✔			
DFSM-STST-XX	ST TO ST	✔	✔	✔	✔	✔	✔		✔

Note: Model Number change the xx to its fiber length number for the actual Model Number.
Example: If ou want a 1M Multi-Mode LC to LC Fiber the part number would be DFMM-LCLC-1M.

Heavy Industrial RS-232/422/485 to Fiber Optic Converters

FOSTCDRI-PH-MC, FOSTCDRI-PH-MT, FOSTCDRI-PH-SC

PRODUCT FEATURES

- IEEE-61850-3
- IEEE 1613
- Multi or Single Mode, ST or SC Versions
- -40 to 85°C Operating Temperature
- Rugged, IP30 Metal Panel Mount Case
- 50G Shock, 4G Vibration
- 2kV Triple Isolation

The FOSTCDRI-PH-xx series are premium heavy industrial serial to fiber optic converters. Designed for rugged industrial environments, they have been put through most exacting compliance testing in the industry. Meeting IEC 61850-3 and IEEE 1613 requirements, they are suitable for installation in electrical substations. These specifications are more stringent than the NEMA TS1/TS2 requirements for transportation applications. Powerful isolation protects equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged IP30 metal case, these converters convert serial signals to multi-mode or single-mode fiber optic. Bit-wise enabled circuitry automatically detects the data rate without setting a DIP switch.

In addition to direct point-to-point connectivity, operation in multi-drop mode is possible. This enables serial devices to communicate with up to 31 others in a fiber ring. Supporting mixed standards, you can replace other converters and add the EMI / RFI protection inherent to fiber optic communications.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
FOSTCDRI-PH-MC	Serial to Multi-mode SC Converter
FOSTCDRI-PH-MT	Serial to Multi-mode ST Converter
FOSTCDRI-PH-SC	Serial to Single-mode SC Converter

ACCESSORIES

MDR-20-24 - DIN Rail Mount Power Supply 24VDC, 1.0 A output power

Heavy Industrial RS-232/422/485 to Fiber Optic Converters

FOSTCDRI-PH-MC, FOSTCDRI-PH-MT, FOSTCDRI-PH-SC

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	9.6 to 115.2 kbps
RS-232	
Connector	Removable terminal block
Signals	TD, RD, GND
RS-422/485	
Connector	5-position, removable terminal block
RS-485, 2-wire	Data A(-), Data B(+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
Bias	Built-in, switchable, 1.2KΩ
Termination	Built-in, switchable, 120Ω

ISOLATION	
Rating	2KV RMS, 1 minute
Surge Protection	600 W peak power dissipation
Clamping Time	< 1 pico-second
Lines Protected	2-way (input, output lines)
Method	Optical

FIBER OPTIC TECHNOLOGY	
Type / Wavelength	Multi-mode / 820 nm
Output Power	-16dBm min, -12dBm typical, -9dBm maximum
Receive Sensitivity	-24dBm min, -25.4dBm maximum
Cable	62.5/125 micro-meter
Connector	ST
Data Rate	9.6 to 115.2 kbps
Maximum Distance	4 km (2.5 mi)
Idle State, FOSTCDRI	Transmitter light ON
Idle State, FOSTCDRI-INV	Transmitter light OFF

INDUSTRIAL BUS	
Modbus	ASCII/RTU

POWER	
Source	External
Input Voltage	10 to 48 VDC (56 VDC maximum)
Consumption	0.5 W (typical), 1.3W (with termination)
Connector	2-position, removable terminal block, 24 to 14 AWG

TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG
Pitch	5.08 mm
Insulation Resistance	≥ 500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm

LED INDICATORS	
Power	Red LED
FO Receive	Red LED
FO Transmit	Red LED

MECHANICAL	
Dimensions	12.3 x 11.3 x 3.2 cm (4.9 x 4.5 x 1.3 in)
Enclosure	IP 20 plastic, 35 mm DIN mount
Weight	199.6 g (0.44 lbs)

ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	138904 hours
MTBF Calculation Method	Parts Count Reliability Prediction

APPROVALS / CERTIFICATIONS - FOSTCDRI

UL Class 1 Division 2, Groups A, B, C, D
File Number: E222870 (HAZLOC E245458)

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions

CE

EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments

EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity

Download complete Declaration of Conformity at www.bb.elec.com

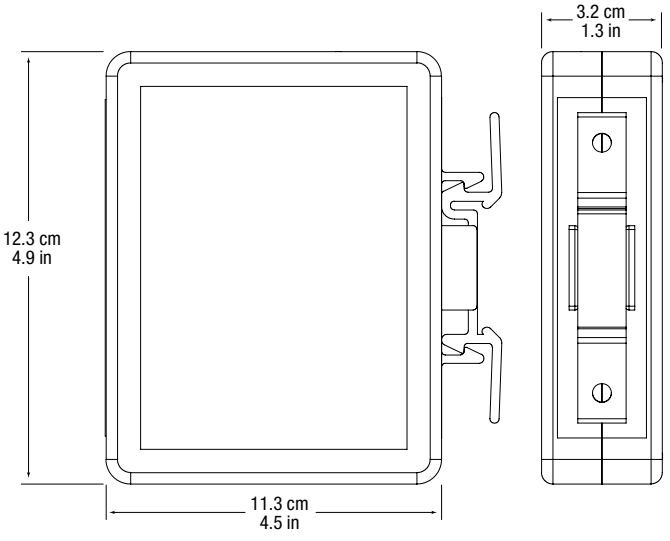
APPROVALS / CERTIFICATIONS - FOSTCDRI-INV

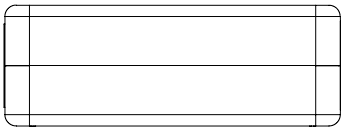
UL 508, File Number: E222870

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions

CE

MECHANICAL DIAGRAM





Serial to Single-mode Fiber Converter

FOSTCDRi-ST, FOSTCDRi-SC

PRODUCT FEATURES

- Data rates up to 115.2 kbps
- 15 km (9 mi) range
- 10 to 48 VDC power input
- Wide operating temperature
- 2000V isolation
- Modbus ASCII/RTU compatible
- EMI/RFI protection

B&B Electronics' ILinx™ fiber converters designed with functionality required for heavier industrial environments. Model FOSTCDRi-Sx industrial-grade isolated converter changes RS-232, RS-422, or RS-485 to single-mode fiber optics.

Designed for industry, FOSTCDRi-Sx extends serial data ranges up to 15 km (9 mi) and provides the most versatile connection possible between asynchronous full or half-duplex serial equipment. In addition to direct point-to-point connectivity, it is capable operating in a multi-drop mode. This allows one serial device to communicate with up to 31 others around a fiber optic ring. Since it supports mixed serial standards, it can replace other converters and isolators and add the EMI/RFI immunity inherent to fiber optic communications. Fiber optic connectors are SC or ST.

B&B Electronics' Automatic Send Data Control circuit controls the RS-422/485 driver chip, eliminating the requirement for special software. Easy to install and configure, it has a 12-position DIP switch to set up the RS-422/485 parameters and removable terminal blocks to connect serial signals and power. In RS-232 mode, the FOSTCDRI-SC supports Transmit Data and Receive Data. Handshaking signals are not passed through.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	FIBER CONNECTOR	MODBUS?
FOSTCDRi-SC	Terminal Blocks, removable	Single-mode SC	✔
FOSTCDRi-ST	Terminal Blocks, removable	Single-mode ST	✔

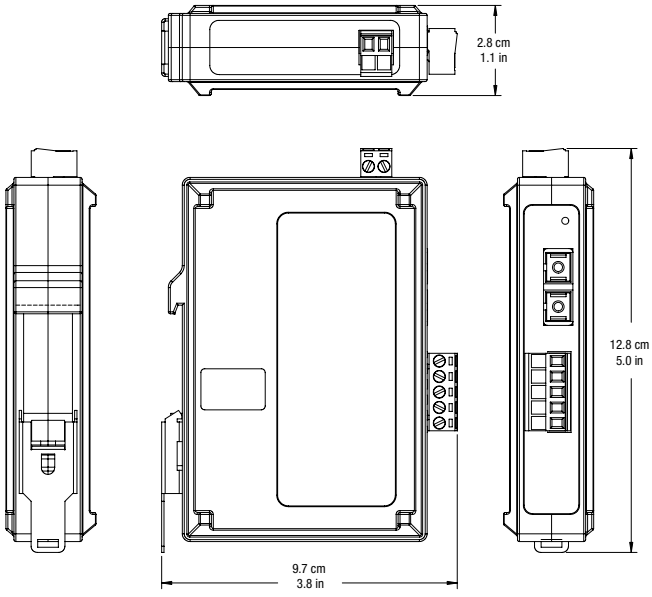
ACCESSORIES

MDR-20-24 - 24 VDC @ 1.0 A DIN rail mount power supply, slim-line

TBKT1 - Replacement Terminal Block, 2-position, 5.08mm

TBKT2 - Replacement Terminal Block, 5-position, 5.08mm

MECHANICAL DIAGRAM - FOSTCDRI-SC



Fiber Optic Benefits

Fiber optic cable carries serial data up to 15 kilometers (9 miles), much farther and reliably than conventional copper lines.

Power surges, spikes and groupd loops are created by electrical equipment, by nearby lightning strikes, and from other sources. They are easily picked up by copper data lines and transmitted to connected devices, garbling data communications and damaging equipment.

However, fiber optic data transmission uses light in glass fiber cable as a communication medium. Being inherently non-electric, fiber optic cable will not pick up noise and provides the most reliable system possible – ideal for spanning areas with severe interference, such as near heavy electrical equipment, welding or radio transmissions. It does not transmit power spikes or surges and prevents ground loops by not providing a conductive path for the ground.

Serial/Single-mode Fiber Converter

FOSTCDRi-ST, FOSTCDRi-SC

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	9.6 to 115.2 kbps
RS-232	
Connector	Removable Terminal Block (12 to 28 AWG)
Signals	TD, RD, GND
RS-422/485	
Connector	Removable Terminal Block (12 to 28 AWG)
RS-485, 2-wire	Data A(-), Data B(+), GND
RS-422/485, 4-wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
ISOLATION	
Isolation	2KV RMS, 1 minute
Surge Protection	600 W peak power dissipation
Clamping Time	< 1 pico-second
FIBER OPTIC TECHNOLOGY	
Connector	ST
Type / Wavelength	Single-mode / 1310 nm
Output Power	(-) 15 to (-) 8 dBm
Receive Sensitivity	Less than or equal to (-) 32 dBm
Cable	9/125 micro-meter
Data Rate	9.6 to 115.2 kbps
Maximum Distance	15 km (9 mi)
POWER	
Source	External
Input Voltage	10 to 48 VDC (Class 2)
Power Consumption	1.4 Watts
Connector	Removable terminal block (12 to 28 AWG)

INDUSTRIAL BUS	
Modbus	ASCII/RTU
MECHANICAL	
LED Indicators	FO Receive, FO Transmit, Power
Dimensions	12.8 x 9.7 x 2.8 cm (5.0 x 3.8 x 1.1 in)
Enclosure	35mm DIN Mount, Plastic, IP30
Weight	149.7 g (0.3 lbs)
ENVIRONMENTAL	
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	88423 hours
MTBF Calculation Method	Parts Count Reliability Prediction

APPROVALS / CERTIFICATIONS - FOSTCDRI-SC

UL 508, File Number: E222870

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions

CE

EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments

EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity

Download complete Declaration of Conformity at www.bb.elec.com

FIBER OPTIC CABLES

MULTI-MODE DUPLEX FIBER		LENGTH							
MODEL NUMBER	**CONNECTOR TYPE**	**1M**	**2M**	**3M**	**5M**	**10M**	**15M**	**20M**	**30M**
DFMM-LCLC-XX	LC TO LC	✔	✔	✔	✔				
DFMM-SCLC-XX	SC TO LC	✔	✔	✔	✔	✔			
DFMM-SCSC-XX	SC TO SC	✔	✔	✔	✔	✔			
DFMM-STLC-XX	ST TO LC	✔	✔	✔	✔	✔			
DFMM-STSC-XX	ST TO SC	✔	✔	✔	✔	✔			
DFMM-STST-XX	ST TO ST	✔	✔	✔	✔	✔	✔	✔	
SINGLE-MODE DUPLEX FIBER		**LENGTH**							
MODEL NUMBER	**CONNECTOR TYPE**	**1M**	**2M**	**3M**	**5M**	**10M**	**15M**	**20M**	**30M**
DFSM-LCLC-XX	LC TO LC	✔	✔	✔	✔	✔			
DFSM-SCLC-XX	SC TO LC	✔	✔	✔	✔	✔			
DFSM-SCSC-XX	SC TO SC	✔	✔	✔	✔	✔			
DFSM-STLC-XX	ST TO LC	✔	✔	✔	✔	✔			
DFSM-STSC-XX	ST TO SC	✔	✔	✔	✔	✔			
DFSM-STST-XX	ST TO ST	✔	✔	✔	✔	✔	✔		✔

Note: Model Number change the xx to its fiber length number for the actual Model Number.
Example: If you want a 1M Multi-Mode LC to LC Fiber the part number would be DFMM-LCLC-1M.

Fiber Optic Modem

9PFLST, 232FLST

PRODUCT FEATURES

- Transparent asynchronous RS-232 at 115.2 Kbps
- Full or half-duplex
- Range up to 4 km (2.5 mi)
- TD, RD, RTS and CTS supported
- EMI/RFI transient immunity to surges, spikes, ground loops
- Port powered, no external power required

These port-powered fiber optic modem allows two RS-232 serial devices to communicate transparently over longer distances and with greater reliability. The inherent immunity of fiber optic protects data from line surges, spikes and ground loops.

They transmit RS-232 data, full or half duplex, over two fibers at distances up to 4 km (2.5 mi) and data rates up to 115.2 kbps.They have a DCE female serial connector and multi-mode ST fiber connectors. TD, RD, and RTS/CTS handshake lines are supported.

The modem is powered from the RS-232 data and handshake lines. A power jack is provided for connecting an optional +12 VDC supply (not included) for use with low powered ports such as laptops and PCs.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	FIBER CONNECTOR	OUTPUT
9PFLST	DB9 Female	Multi-mode ST	RS-232
232FLST	DB25 Female	Multi-mode ST	RS-232

Note: Must be used in pairs

ACCESSORIES

232PS - 12VDC@1000ma, Wall Transformer Power Supply, 2.5 mm male plug

E1250BL-BB3 - 230 VAC to 12 VDC Wall Transformer Power Supply, 2.5 mm male plug

9PAMF6 - RS-232 serial cable DB9 Male To DB9 Female, 6 ft. (1.8 m)

232AMF5 - RS-232 serial cable DB25 Male To DB25 Female, 6 ft. (1.8 m)

DFMM-STST-3M - Multi-Mode Duplex Fiber Cable, ST To ST, 9.8 ft. (3 m)

Fiber Optic Benefits

Fiber optic cable carries serial data up to 4 kilometers (2.5 miles), much farther and reliably than conventional copper lines.

Power surges, spikes and groupd loops are created by electrical equipment, by nearby lightning strikes, and from other sources. They are easily picked up by copper data lines and transmitted to connected devices, garbling data communications and damaging equipment.

However, fiber optic data transmission uses light in glass fiber cable as a communication medium. Being inherently non-electric, fiber optic cable will not pick up noise and provides the most reliable system possible – ideal for spanning areas with severe interference, such as near heavy electrical equipment, welding or radio transmissions. It does not transmit power spikes or surges and prevents ground loops by not providing a conductive path for the ground.

Fiber Optic Modem

9PFLST, 232FLST

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	DB9 female
Signals	TD, RD, RTS, CTS, GND
FIBER OPTIC TECHNOLOGY	
Connector	Multi-mode ST
Typical Range	Up to 4 km (2.5 mi) on multi-mode glass fiber
Transmission Line	Dual multi-mode optical cable
Transmission Mode	Asynchronous, half or full-duplex, point-to-point
POWER	
Source	Port-powered from serial port TD, RTS, and DTR lines
Optional	External 10–16 VDC @ .5 Watt max
Coupled Power Budget	12.1 dB
Optic Wavelength	820 nm
MECHANICAL	
9PFLST Dimensions	10.9 x 4.3 x 2.4 cm (1.3 x 1.7 x 1.0 in)
232FLST Dimensions	10.9 x 5.8 x 2.4 cm (4.3 x 2.3 x 1.0 in)
Enclosure	Plastic, inline
MTBF	404846
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
APPROVALS / CERTIFICATIONS - 9PFLST	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)	
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)	
EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

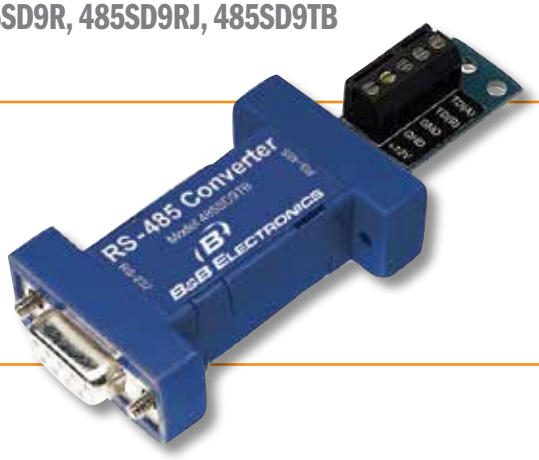
FIBER OPTIC CABLES

MULTI-MODE DUPLEX FIBER		LENGTH							
MODEL NUMBER	**CONNECTOR TYPE**	**1M**	**2M**	**3M**	**5M**	**10M**	**15M**	**20M**	**30M**
DFMM-LCLC-XX	LC TO LC	✔	✔	✔	✔				
DFMM-SCLC-XX	SC TO LC	✔	✔	✔	✔	✔			
DFMM-SCSC-XX	SC TO SC	✔	✔	✔	✔	✔			
DFMM-STLC-XX	ST TO LC	✔	✔	✔	✔	✔			
DFMM-STSC-XX	ST TO SC	✔	✔	✔	✔	✔			
DFMM-STST-XX	ST TO ST	✔	✔	✔	✔	✔	✔	✔	
SINGLE-MODE DUPLEX FIBER		**LENGTH**							
MODEL NUMBER	CONNECTOR TYPE	1M	2M	3M	5M	10M	15M	20M	30M
DFSM-LCLC-xx	LC to LC	✔	✔	✔	✔	✔			
DFSM-SCLC-xx	SC to LC	✔	✔	✔	✔	✔			
DFSM-SCSC-xx	SC to SC	✔	✔	✔	✔	✔			
DFSM-STLC-xx	ST to LC	✔	✔	✔	✔	✔			
DFSM-STSC-xx	ST to SC	✔	✔	✔	✔	✔			
DFSM-STST-xx	ST to ST	✔	✔	✔	✔	✔	✔		✔

Note: Model Number change the xx to its fiber length number for the actual Model Number.
Example: If you want a 1M Multi-Mode LC to LC Fiber the part number would be DFMM-LCLC-1M.

Port Powered RS-232/485 Converters

485SD9R, 485SD9RJ, 485SD9TB



PRODUCT FEATURES

- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Change RS-232 TD and RD to RS-485 signals
- Automatic Send Data Control - no software drivers necessary
- Baud rates up to 115.2 kbps
- Powered from RS-232 handshake lines - no power supply required

These port-powered, two channel converters allow your computer to communicate longer distances by converting TD and RD RS-232 lines to RS-485 signals. RS-485 also provides multi-drop capability.

All converters feature Automatic Send Data Control which enables the driver when data is present on the RS-232 side. Control of the driver is automatic at speeds up to 115.2 kbps.

Converters are powered by the RS-232 port DTR and RTS handshake lines, or by an optional external 12 VDC power supply. When port powered, at least one of these handshake lines must be asserted (high) to power the unit. By raising RTS, the RS-485 driver is enabled and the RS-485 receiver is disabled. By lowering RTS, the RS-485 driver is disabled and the RS-485 receiver is enabled.

These converters are suitable for field service, where a power supply would add clutter, or anywhere you need compact, easy-to-use, economically priced serial conversion.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR	OUTPUT	OPTIONAL POWER SUPPLY
485SD9R	DB9 Female	DB9 Female	RS-485 2-wire	
485SD9RJ	DB9 Female	RJ11	RS-485 2-wire	
485SD9TB	DB9 Female	Terminal Block	RS-485 2-wire	✔

ACCESSORIES

485PS2 - 120 VAC to 12 VDC power supply, 100 mA, tinned leads, USA

PS1EU-1000 - 220-240 VAC to 12 VDC power supply, 1A, tinned leads, Euro CEEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC power supply, 1A, tinned leads, UK BS-1353 plug

9PAMF6 - DB9 male to DB9 female adapter cable, 6 ft. (1.8 m)

Why use an "optional" power supply with a port-powered converter?

Simply put, all RS-232 ports are not created equal. Many laptop PC's, for example, deliberately reduce power to the RS-232 port to save the battery. And, if you are working at the distance limits of RS-422 or 485, you might need an extra boost. For the majority of applications though, the converter's port powering is sufficient to accomplish the task.

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

Learn More!

READ ON!

Port Powered Converter FAQ

www.bb-elec.com/PortPowerFAQ

*Carrier data charges may apply.

Port Powered RS-232/485 Converters

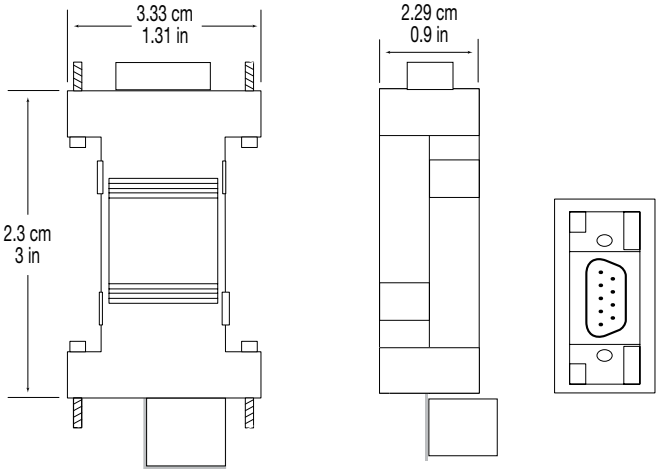
485SD9R, 485SD9RJ, 485SD9TB

SPECIFICATIONS

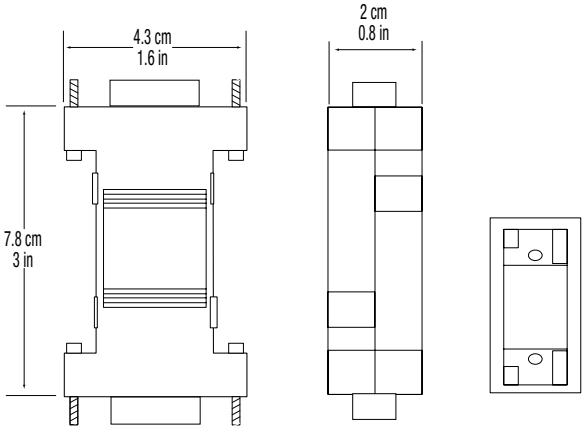
SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	485SD9R: DB9 female 485SD9RJ: DB9 female 485SD9TB: DB9 female
RS-485	
	485SD9R: DB9 female 485SD9RJ: RJ11 485SD9TB: Terminal block
Biasing Resistors	4.7k Ohms
POWER	
Source	Port-powering: from RS-232 handshake lines. External 12-16 VDC power supply, optional.
Power Connector	485SD9TB only (terminal block)
Input Voltage	485SD9TB only (12VDC)
Power Consumption	40mA max
MECHANICAL	
Dimensions	485SD9R: 7.8 x 4.3 x 2.0 cm (3.0 x 1.6 x 0.8 in) 485SD9RJ: 2.3 x 3.3 x 2.29 cm (3.0 x 1.3 x 0.9 in) 485SD9TB: 8.9 x 3.4 x 1.7 cm (3.50 x 1.34 x 0.67 in)
Enclosure	plastic
Weight	.18 lbs (81.6 g)
MTBF	485SD9R: 986473 485SD9RJ: 897656 485SD9TB: 968410
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% non condensing
APPROVALS / CERTIFICATIONS - 485SD9R, 485SD9RJ, 485SD9TB	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

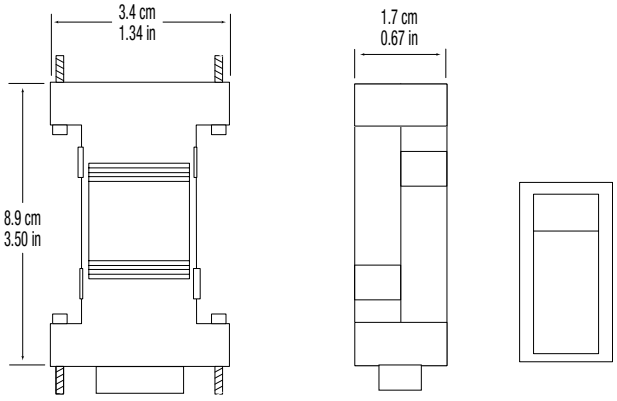
MECHANICAL DIAGRAM - 485SD9RJ



MECHANICAL DIAGRAM - 485SD9R MODEL



MECHANICAL DIAGRAM - 485SD9TB



Port Powered RS-232/485 Converters

4WSD9R, 4WSD9TB

PRODUCT FEATURES

- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Change RS-232 TD and RD to RS-485 signals
- Automatic Send Data Control
- Baud rates up to 115.2 kbps
- RS-232 Port Power or External 12 VDC Power Jack
- Dipswitch selectable RS-422 or RS-485

The 4WSD9TB and 4WSD9R Universal Converter provides RS-232 to RS-422/RS-485 conversion using either port-power or an external power supply. The 4WSD9TB has a Terminal Block RS-485 connector, and the 4WSD9R has a DB9 Female connector.

Data is converted in both directions, RS-232 Transmit data is converted to balance RS-422 or RS-485 Transmit, and Received RS-422/485 signals are converted to RS-232. Unlike converters which require programing hardware handshaking signals to control RS-485 or RS-422 operation, the 4WSD9TB and 4WSD9R provides automatic Send Data Control. In RS-485 mode, the RS-485 driver is enabled by circuitry which senses the RS-232 TD input. In half duplex RS-485 mode, the receiver is enabled when not transmitting. For full duplex operation, the receiver is set always enabled. In RS-422 mode, the transmitter and receiver are always enabled. The operating mode is set with 4 switches (Table 1). The converters are powered by the RS-232 signal lines whether they are set high or low. If not enough power is available from the port, or no handshaking lines are available, a DC Jack is provided to connect a 12VDC supply. The DB9 female connector for RS-232 is wired as DCE (like a modem).

No external power is required if two RS-232 output handshake lines are available and the cable run is short. If the handshake lines are raised and no termination is used, the power efficiency is greatly increased. Less than 3mA is required to operate the 4WSD9R plus the load current. For applications that do not have handshake lines or require a large load current, power may be externally supplied with a +12VDC power supply with a 2.5mm plug (tip positive).

The RS-232 port has a female DB9 connector with pins 2 (RD), 3 (TD), and 5 (Signal Ground) supported. Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (DCD), and 4 (DTR) are also tied together. Any incoming data lines in either the high or low state are used to port power the 4WSD9R. The more handshake lines available, the more likely the unit can be port powered. Table 2 shows the RS-232 pinout.

Although handshake lines can be used to power the converter, no handshaking is required to control the RS-422/RS-485 driver. With switch 1 set to RS-422, the driver is always enabled. When switch 1 is in the RS-485 position, the RS-485 driver is automatically enabled during each spacing state on the RS-232 side. During the marking or idle state, the RS-485 driver is disabled and the data lines are held in the marking state by the 4.7K Ohm pull-up and pull-down resistors. The value of these resistors may need to be changed to a different value when termination is used in order to maintain the proper DC bias during the idle state.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR	OUTPUT	OPTIONAL POWER SUPPLY
4WSD9R	DB9 Female	DB9 Female	RS-485 2 or 4-wire or RS-422	✔
4WSD9TB	DB9 Female	Terminal Block	RS-485 2 or 4-wire or RS-422	✔

ACCESSORIES

485PS - 12 VDC power supply, 100 mA, 2.5 mm plug, USA

E1250BL-BB3 - 220-240 VAC to 12 VDC wall power supply, 2.5 mm plug, Euro CEE7/7 plug

9PAMF6 - DB9 male to DB9 female adapter cable, 6 ft. (1.8 m)

Port Powered RS-232/485 Converters

4WSD9R, 4WSD9TB

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	4WSD9R: DB9 female 4WSD9TB: DB9 female
Signals	RD, TD, GND, DCD, DTR, DSR, RTS, CTS
Port Power **	Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (CD), and 4 (DTR) are also tied together.
RS-422/485	
Connector	4WSD9R: DB9 female 4WSD9TB: Terminal block
Biasing Resistors	4.7k Ohms
Signals	TDA (-), TDB (+), RDA (-), RDB (+), GND
Termination	None
Operation	Dipswitch selectable RS-422 or RS-485 4WSD9R: RS-485 2 or 4-wire or RS-422 4WSD9TB: RS-485 2 or 4-wire or RS-422

POWER	
Source	Port-powered: from RS-232 handshake lines. External 12-16 VDC power supply, optional.
**	Port-powered requires 7 to 12 VDC supplied on at least one handshake line.
Power Connector	2.5 mm plug (tip positive)
Input Voltage	12 VDC @ 100 mA

MECHANICAL	
Dimensions,	4WSD9R: 7.8 x 4.3 x 2.0 cm (3.0 x 1.6 x 0.8 in) 4WSD9TB: 9.0 x 4.3 x 2.3 cm (3.6 x 1.7 x 0.9 in)
Enclosure	Plastic, Inline
Weight	4WSD9R: 0.10 lbs. (49 g); 4WSD9TB: 0.11 lbs. (50 g)
MTBF	4WSD9R: 880179 4WSD9TB: 345242
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 - 95% Non-condensing

APPROVALS / CERTIFICATIONS - 4WSD9R, 4WSD9TB

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions (4WSD9R)
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions (4WSD9TB)
CE
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity
Download complete Declaration of Conformity at www.bb.elec.com

Battery Powered Serial Converter

485BAT3

PRODUCT FEATURES

- 3 Power Options: Battery (2-AAA), RS-232 handshake lines, or external power supply
- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Change RS-232 TD and RD to RS-485 signals
- Automatic Send Data Control - no software drivers necessary
- Baud rates up to 115.2 kbps

Three Versatile Powering Options

Model 485BAT3 features power versatility, making it perfect for field testing solutions. It can be powered in three ways: batteries, port powered, or external power supply.

Use the battery power option with a low power RS-232 port (found on many laptops) or no handshake lines or when it is inconvenient to use a power supply. The 485BAT3 will draw as much power as possible from the RS-232 port and get any additional current necessary from the batteries.

If you have a full power port and all your handshake lines, turn off the battery switch. This allows you to run full port powering and saves the batteries for emergencies. Note: The battery On-Off switch conserves battery life. It does not turn on and off all power to the unit.

Lastly, a stripped and tinned +12VDC external power supply may be used. Simply attach it to the terminal blocks and plug it in.

485BAT3 converts unbalanced RS-232 signals to balanced RS-422 or RS-485 signals. RS-485 is an enhanced version of the RS-422 standard, allowing multiple drivers and receivers on a 2-wire system.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR	OUTPUT	OPTIONAL POWER SUPPLY
485BAT3	DB9 Female	Terminal Block	RS-485 2 or 4-wire or RS-422	(2) AAA batteries or port powered or external source

ACCESSORIES

485PS2 - 12 VDC (wired) power supply, 100 mA, USA

PS1EU-1000 - 220-240 VAC to 12 VDC power supply, 1A, tinned leads, Euro CEEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

9PAMF6 - DB9 male to DB9 female adapter cable, 1.8 m (6 ft.)

9PMTT - RS-232 mini tester

Why use an "optional" power supply with a port-powered converter?

Simply put, all RS-232 ports are not created equal. Many laptop PC's, for example, deliberately reduce power to the RS-232 port to save the battery. And, if you are working at the distance limits of RS-422 or 485, you might need an extra boost. For the majority of applications though, the converter's port powering is sufficient to accomplish the task.

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

Battery Powered Serial Converter

485BAT3

SPECIFICATIONS

SERIAL TECHNOLOGY		
Data Rate		115.2 kbps maximum
RS-232		
	Connector	DB9 Female (DCE)
	Signals	RD, TD, GND, DCD, DTR, DSR, RTS, CTS
	Port Power **	Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (CD), and 4 (DTR) are also tied together.
RS-422/485		
	Connector	Terminal Block
	Signals	TDA (-), TDB (+), RDA (-), RDB (+), GND
Operation		Dipswitch selectable RS-422 or RS-485 RS-485, 2 or 4-wire RS-422, 4-wire
Biasing Resistors		4.7k Ohms
Termination		None
POWER		
Source, 3 options		(2) AAA batteries (not included). Port-powered from RS-232 handshake lines. External 12-16 VDC power supply, optional.
	**	Port-powered requires 7 to 12 VDC supplied on at least one handshake line.
Power Connector		Terminal Block
Input Voltage		12 VDC @ 100 mA
Battery Life		7 hours fully loaded wtih no port power available 100 to 250 hours, typical

MECHANICAL	
Dimensions	9.0 x 6.5 x 2.8 cm (3.6 x 2.6 x 1.1 in)
Enclosure	Plastic, ABS Inline
Weight	0.23 lbs. (104.3 g)
MTBF	241370
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	95% Non-Condensing
APPROVALS / CERTIFICATIONS - 485BAT3	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)	
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)	
EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

Port Powered RS-232/422 Converters

422PP9R, 422PP9TB

PRODUCT FEATURES

- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Change RS-232 TD and RD to balanced RS-422 signals
- Automatic Send Data Control - no software drivers necessary
- Baud rates up to 115.2 kbps
- Powered from RS-232 handshake lines - no power supply required

These port-powered, two-channel converters change TD and RD RS-232 lines to balanced RS-422 signals extending communication distances up to 1.2 km (4,000 ft.). Automatic Send Data Control feature enables the RS-422 driver when data is present on the RS-232 side. Control of the driver is automatic at rates up to 115.2 kbps. The RS-422 driver and receiver are always enabled.

With port-powering, no power supply is required. Power is derived from the DTR and RTS RS-232 handshake control lines. If port-powering the unit, at least one handshake line must be present, in either the positive or negative voltage state. This permits use in applications without worrying about software control of the handshake lines. Can also be powered externally.

Converters are configured to transmit both directions in an RS-232 and RS-422 system. RS-232 pinout connects directly to a computer's COM port or any other DTE device. Connections to the RS-422 side are made through the terminal blocks.

These converters are suitable for field service, where a power supply would add clutter, or anywhere you need compact, easy-to-use, economically priced serial conversion.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-422 CONNECTOR	OUTPUT	OPTIONAL POWER SUPPLY
422PP9R	DB9 Female	DB9 Female	RS-422	
422PP9TB	DB9 Female	Terminal Block	RS-422	✔

ACCESSORIES

422PS2 - 12 VDC (wired) power supply, 100 mA, USA

PS1EU-1000 - 220-240 VAC to 12 VDC power supply, 1A, tinned leads, Euro CEEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

9PAMF6 - DB9 male to DB9 female adapter cable, 1.8 m (6 ft.)

Why use an "optional" power supply with a port-powered converter?

Simply put, all RS-232 ports are not created equal. Many laptop PC's, for example, deliberately reduce power to the RS-232 port to save the battery. And, if you are working at the distance limits of RS-422 or 485, you might need an extra boost. For the majority of applications though, the converter's port powering is sufficient to accomplish the task.

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

Port Powered RS-232/422 Converters

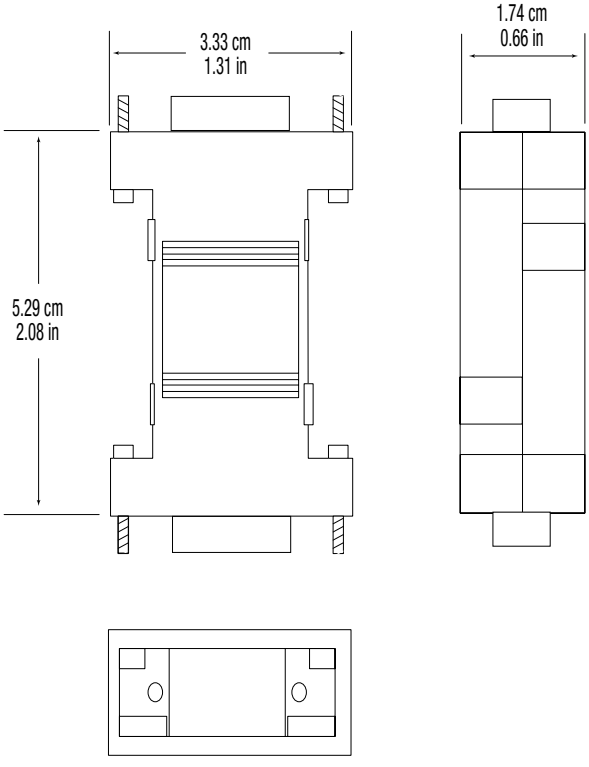
422PP9R, 422PP9TB

SPECIFICATIONS

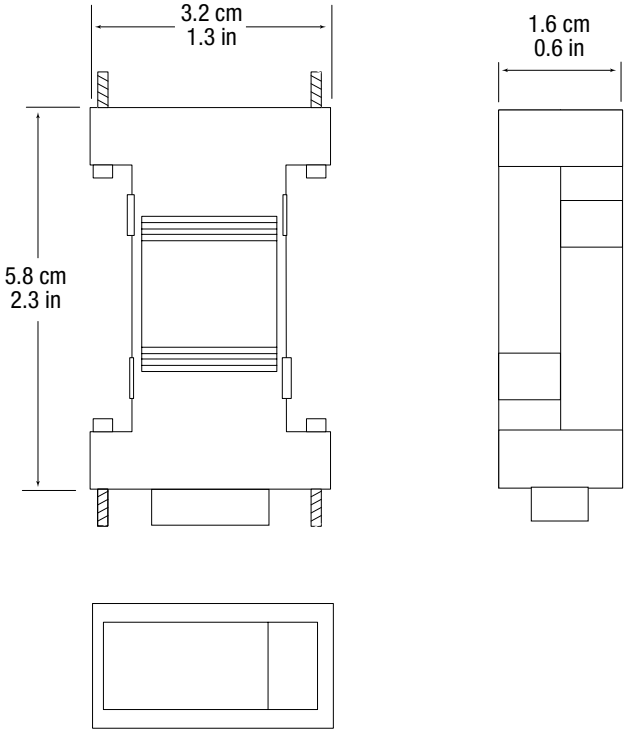
SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	422PP9R: DB9 female 422PP9TB: DB9 female
Signals	
RS-422	
Connector	422PP9R: DB9 female 422PP9TB: Terminal block
Signals	
Operation	RS-422, 4-wire
Biasing Resistors	4.7k Ohms
Termination	None
POWER	
Source	Port-powered from RS-232 handshake lines. (422PP9TB Only) Optional, external 12-16 VDC power supply.
Power Connector	Terminal Block
Input Voltage	12 VDC @ 100 mA

MECHANICAL	
Dimensions	422PP9R: 6.1 x 3.3 x 1.7 cm (2.4 x 1.3 x 0.66 in)
Dimensions	422PP9TB: 8.9 x 3.3 x 1.7 cm (3.5 x 1.3 x 0.7 in)
Enclosure	Plastic, In-line
Weight	0.10 lbs (45.3 g)
MTBF	422PP9R: 2094328 422PP9TB: 849670
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0-95% Non-Condensing
APPROVALS / CERTIFICATIONS - 422PP9R, 422PP9TB	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)	
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)	
EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

MECHANICAL DIAGRAM - 422PP9R

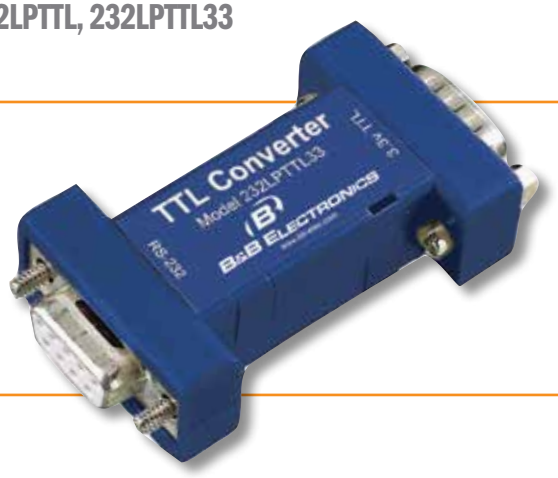


MECHANICAL DIAGRAM - 422PP9TB



Port Powered TTL/RS-232 Converters

232LPTTL, 232LPTTL33



PRODUCT FEATURES

- Convert 2 channels in each direction from TTL ("Transistor Transistor Logic)" to RS-232
- Automatic Send Data Control - no software drivers necessary
- 5V and 3.3V TTL options
- Baud rates up to 115.2 kbps
- Powered from RS-232 data/handshake lines - no power supply required

These non-isolated, four channel TTL/CMOS converters make easy connections between TTL equipment and RS-232 ports and run at a maximum baud rate speed of 115.2 kbps. All models convert two channels (TX and RX) in each direction (bi-directional) from TTL to RS-232. Use these converters with almost any micro controller or programmable logic controller that supports TTL.

Model 232LPTTL converts RS-232 to 5VDC TTL/CMOS competitive levels. Model 232LPTTL33 converts RS-232 to 3.3VDC TTL/CMOS compatible levels. Two channels are used to convert from RS-232 to TTL/CMOS signals and two channels are used to convert from TTL/CMOS signals to RS-232. These converters support TD, RD, RTS, and CTS. DB9S female connector on the RS-232 side. DB9P male connector on the TTL/CMOS side. This unit is powered from the
RS-232 data and handshake lines, whether the lines are high or low.

Pins used are:

RS-232 DB9S Female Pin	Function	TTL/CMOS DB9P Male Pin
3 (input)	TD	3 (output)
2 (output)	RD	2 (input)
7 (input)	RTS	7 (output)
8 (output)	CTS	8 (input)
5 (signal gnd)	GND	5 (signal gnd)

Pin 5 is signal ground for both connectors. Both models are powered by the signals on pins 7(RTS), 4 (DTR), and 3(TD). These handshake lines can be in either the high or low condition, but must be present to power the converter. The unit can work at baud rates up to 115.2 kbps.

It is important that TTL/CMOS logic, and only TTL/CMOS logic (0 to +5 VDC for the 232LPTTL, and 0 to +3.3 VDC for the 232LPTTL33) is used for the TTL/CMOS side of the converter. The maximum sinking current for one TTL/CMOS output is 3.2 mA. The maximum source current for one TTL/CMOS is 1 mA. Signal levels are inverted by the converters. Please refer to the table under Specifications.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	TTL CONNECTOR	TTL VDC
232LPTTL	DB9 Female	DB9 Male	5V
232LPTTL33	DB9 Female	DB9 Male	3.3V

ACCESSORIES

9PAMF6 - DB9 Male to DB9 Female, 1.8 m (6 ft.)

MMNM9 - Null Modem Adapter - DB9 Male / DB9 Male

Automatic Send Data Control Explained

As operating systems become more complex, it is increasingly difficult to control an RS-485 driver with standard software and the RTS line. This is especially true in Windows and multi-tasking operating systems. With B&B Electronics' Automatic Send Data Control circuit, driver control is in the converter hardware, so you do not have to work with software at all.

The circuit monitors data flow and enables the driver during transmission and automatically disables it when no data is being sent. There is no need to rework software or install new drivers. Most B&B Electronics RS-232 to RS-485 converters and RS-485 serial cards include Automatic Send Data Control.

Port Powered TTL/RS-232 Converters

232LPTTL, 232LPTTL33

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	DB9 female
Signals	TD, RD, RTS, CTS
TTL	
Connector	DB9 male
Signals	2 Input/2 Output Channels, GND
Logic	CMOS
VDC Level	232LPTTL: 5V 232LPTTL33: 3.3V
POWER	
Source	Port-powered: from RS-232 handshake lines
MECHANICAL	
Dimensions	5.29 x 3.33 x 1.74 cm (2.08 x 1.31 x 0.66 in)
Enclosure	Plastic, In-line
Weight	0.08 lbs (36.2 g)
MTBF, 232LPTTL33	1674682
MTBF Calc. Method, 232LPTTL33	Parts Count Reliability Prediction

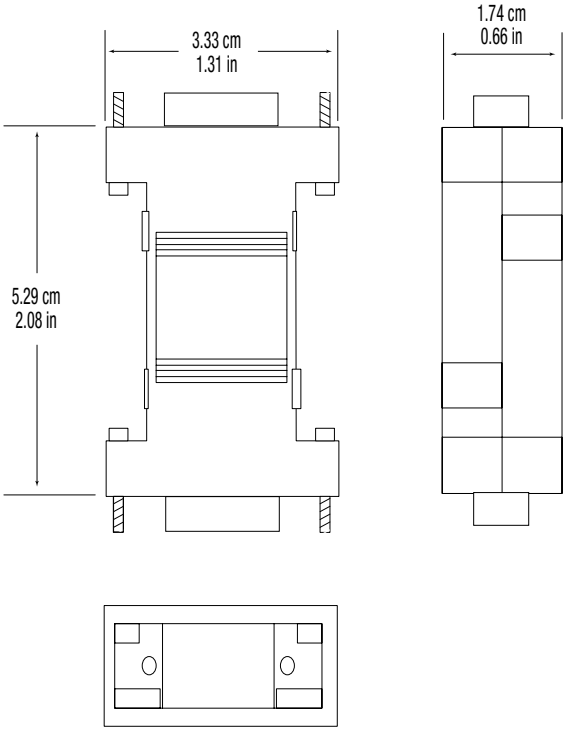
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing

APPROVALS / CERTIFICATIONS - 232LPTTL
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions
CE
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity
Download complete Declaration of Conformity at www.bb.elec.com

POLARITY

5VDC TTL/CMOS Input	3.3VDC TTL/CMOS Input	RS-232 Output
Low (< .8V)	Low (< .8V)	+5V minimum, +9V typical
High (> 2V)	High (> 2V)	-5V minimum, -+9V typical
5VDC TTL/CMOS Output	**3.3VDC TTL/CMOS Output**	**RS-232 Input**
+3.45V minimum, +4.6V typical	+2.4V minimum, +3.0V typical	Low (< .2V)
+.55V maximum, +.1V typical	+.55V maximum, +.1V typical	High (> 2.4V)

MECHANICAL DIAGRAM – 232LPTTL, 232LPTTL33



Port Powered TTL/RS-232 Converters

232TTL, 2320TTL

PRODUCT FEATURES

- Convert 2 channels in each direction from TTL to RS-232
- Baud rates up to 115.2 kbps (38.4 kbps on isolated model)
- Powered from RS-232 data/handshake lines - no power supply required
- Optically isolated version (Model 2320TTL)

Models 232TTL and 2320TTL convert RS-232 signals to 0-5 VDC TTL levels. The 2320TTL provides 1500V optical isolation. Two channels are used to convert from RS-232 to TTL signals and two channels are used to convert fomr TTL signals to RS-232.

These converters support RD, TD, RTS, and CTS. The DB25P male connector (DCE) is for the RS-232 side. The DB25S female connector is for the TTL side. The 232TTL supports baud rates up to 115K baud, the 2320TTL supports up to 38.4K baud.

It is important that only TTL logic (0 to +5V) is used for the TTL side of the converter. The maximum sinking current for one TTL output is 8 mA. The maximum source current for one TTL is 0.8 mA. Signal levels are inverted by the converter in its standard configuration as shown in Table 1.

Table 1: Standard inverted Outputs

TTL Input	RS-232 Output
high (>2.0V)	-5 V maximum, -9V typical
low (<0.8V)	+5 V minimum, +9V typical

TTL Output	RS-232 Input
high (>2.0V)	-5 V maximum, -9V typical
low (<0.8V)	+5 V minimum, +9V typical

The 2320TTL has the option for non-inverted outputs. See table 2, "Operations Requiring Modification" if non-inverted outputs are desired.

Power

The 232TTL requires an external +12VDC power supply connected either through 2.5mm jack or pins 12(GND) and 25 (+12VDC) on the TTL side.

The 2320TTL requires both Port Power on the RS-232 side, and external +12VDC power supply connected either through 2.5mm jack or pins 12(GND) and 25 (+12VDC) on the TTL side.

Port power is derived from the outputs of the host RS-232 port. TD, RTS, and DTR lines may be used to port power the RS-232 side. A minimum of two of these lines in either high or low states is required for proper operation. To externally power the RS-232 side, connect the positive lead of the +12VDC power supply to pin 25 and the GND lead to pin 12 of the DB25 female connector.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	TTL CONNECTOR	TTL VDC	ISOLATION
232TTL	DB25 Male	DB25 Female	5V	
2320TTL	DB25 Female	DB25 Male	5V	1500V

ACCESSORIES

232PS - 12VDC@100mA wall transformer power supply, 2.5mm plug

E1250BL-BB3 - 220-240 VAC to 12 VDC wall power supply, 2.5mm plug Euro CEE7/7 plug

232CAMS - DB25 male to DB9 female adapter cable, 15.24 cm/6 in

232SGF - 25-pin gender reverser - changes male port to female

Options Requiring Modification

The 2320TTL may be modified to non-inverted signals as shown in Table 2 by placing a jumper wire across JP1:A labeled "NI"

Table 2: Modified to Non-Inverted Outputs

TTL Input	RS-232 Output
high (>2.0V)	-5 V maximum, -9V typical
low (<0.8V)	+5 V minimum, +9V typical

TTL Output	RS-232 Input
high (>2.0V)	-5 V maximum, -9V typical
low (<0.8V)	+5 V minimum, +9V typical

The 2320TTL may also be modified to accept a +5V supply on the TTL side. Remove the 0 ohm surface mount resister labeled R13 and place a jumper wire across JP1:B labeled +5V. A +4.75 to +5.25V at a maximum of 25mA is necessary to power the TTL side of the converter when this modification is made.

Port Powered TTL/RS-232 Converters

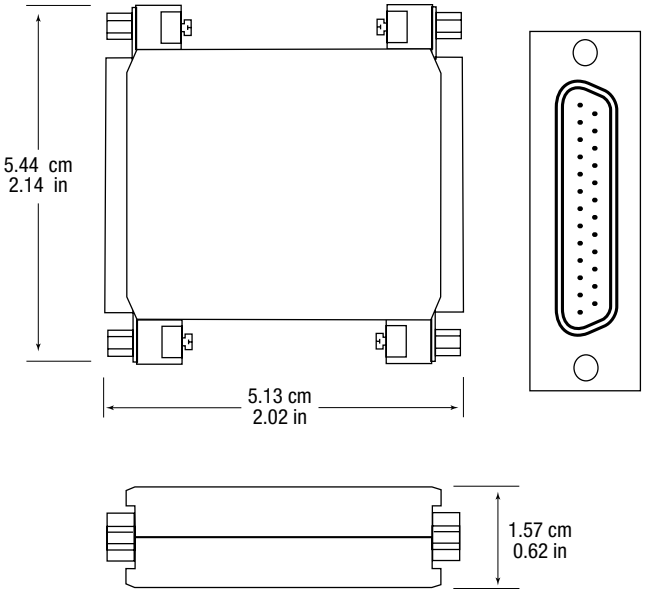
232TTL, 2320TTL

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	232TTL: 115.2 kbps maximum 2320TTL: 38.4 kbps maximum
RS-232	
Connector	232TTL: DB25 male (DCE) 2320TTL: DB25 female (DCE)
Signals	TD, RD, RTS, CTS, GND
TTL	
Connector	232TTL: DB25 female 2320TTL: DB25 male
Signals	2 Input/2 Output Channels, GND
Logic	CMOS
VDC Level	5V
ISOLATION	
Isolation	2,000 V optical
POWER	
232TTL Source	232TTL: External +12VDC power supply on 2.5mm jack for pins 25 (+) and 12 (-) on TTL DB25
2320TTL Source	RS-232: port-powered from RS-232 handshake lines TTL: requires +12 VDC external power supply
Input Voltage	12 VDC (<100 mA)

MECHANICAL	
Dimensions,	232TTL: 5.4 x 5.6 x 1.7 cm (2.1 x 2.2 x 0.7 in) 2320TTL: 7.8 x 5.4 x 2.1 cm (3.1 x 2.1 x 0.8 in)
Enclosure	232TTL: GE LEXAN POLYCARBONATE GRADE 920 2320TTL: Plastic, ABS - Inline
Weight	.011 lbs (49.9 g)
MTBF	232TTL: 1367614 2320TTL: 517206
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMEN TAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
APPROVALS / CERTIFICATIONS - 232TTL	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	
APPROVALS / CERTIFICATIONS - 2320TTL	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
Download complete Declaration of Conformity at www.bb.elec.com	

MECHANICAL DIAGRAM



TTL to RS-422 Converters

422TTL, 422TTL33

PRODUCT FEATURES

- Convert 2 channels in each direction from TTL (“Transistor Transistor Logic)” to RS-422
- Baud rates up to 115.2 kbps
- 5V and 3.3V TTL options
- Open pads to change pin conf iguration

Models 422TTL and 422TTL33 convert RS-422 or EIA-530 signals to TTL at data rates up to 115.2 Kbps. Two channels are used to convert RS-422 to TTL and two channels are used to convert TTL to RS-422.

Select Model 422TTL for 5 VDC TTL or select Model 422TTL33 for 3.3 VDC TTL. A DB25 male connector is used on the TTL side and a DB25 female connector is used on the RS-422 / EIA-530 side. The converters support RD, TD, RTS, and CTS. Pin 7 is signal ground for both connectors.

These units can work at baud rates up to 115.2 Kbps. Open pads are provided for each line. Therefore, if you choose to, you can change the pin connectors for any of the 4 channels.

When converting a second RS-422 channel, use the corresponding RTS A and RTS B pins (refer to the Quick Start Guide).

These converters invert the TTL signal. Refer to the specifications table to determine polarity. An external +12 VDC power supply is required (not included).

ORDERING INFORMATION

MODEL NUMBER	RS-422 CONNECTOR	TTL CONNECTOR	TTL VDC	POWER SUPPLY REQUIRED
422TTL	DB25 Female	DB25 Male	5V	✔
422TTL33	DB25 Female	DB25 Male	3.3V	✔

ACCESSORIES

422PS - 12VDC@100mA wall transformer power supply, 2.5mm plug

E1250BL-BB3 - 220-240 VAC to 12 VDC wall power supply, 2.5mm plug Euro CEE7/7 plug

232CAMS - DB25 male to DB9 female adapter cable, 15.24 cm/6 in

PS1EU-1000 - 220-240 VAC to 12 VDC Power Supply, jack, Euro CEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

TTL to RS-422 Converters

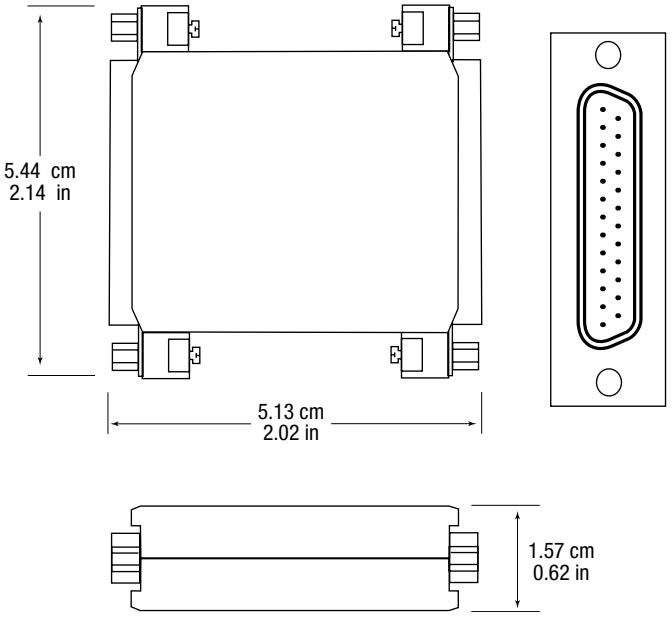
422TTL, 422TTL33

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-422	
Connector	DB25 female
Signals (EIA-530 pinout)	TDA(-), TDB(+), RDA (-), RDB (+), RTS A(-), RTS B (+), CTS A (-), CTS B (+)
TTL	
Connector	DB25 male
Signals	TD, RD, RTS, CTS
VDC Level	422TTL: 5V 422TTL33: 3.3V
POLARITY (VOLTS)	
TTL Input	**RS-422 / EIA-530 Output – V(A)-V(B)**
High	Negative
Low	Positive
TTL Output	**RS-422 / EIA-530 Input – V(A)-V(B)**
High	Negative
Low	Positive
POWER	
Source	External (2.5 mm positive tip)
Input Voltage	12 VDC (<100 mA)

MECHANICAL	
Dimensions	5.4 x 5.6 x 1.7 cm (2.1 x 2.2 x 0.7 in)
MTBF, 422TTL	1539882
MTBF Calc. Method, 422TTL	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
APPROVALS / CERTIFICATIONS - 422TTL	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

MECHANICAL DIAGRAM - 422TTL33



UL Rated Current Loop Converter

232CLDR

PRODUCT FEATURES

- Converts RS-232 to 20mA current loop
- 2000V optical isolation protection from transients
- One Transmit current loop & Receive current loop
- Current loops can be set to Active or Passive
- -40 to 80°C operating temperature

The 232CLDR is a DIN rail mountable RS-232 to current loop converter. It is wide temperature rated and UL Recognized for industrial applications. It has one optically isolated 20 mA transmit loop and one optically isolated receive loop. Each loop can be set to either "Active" or "Passive." When set to "Active" an isolated 20 mA current is supplied for each loop (Transmit and Receive). One 10 to 30 VDC power supply (not included) provides power to the converter and both current loops.

The 232CLDR communicates at baud rates up to 19.2 kbps and can extend communications up to 600 meters (2,000 ft.). 2,000V optical isolation protects equipment from damaging ground loops and surges. Two LED's indicate data flow. Connections are made on terminal blocks.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	CURRENT LOOP CONNECTOR	POWER SOURCE FOR SERIAL SIDE
232CLDR	Terminal Block	Terminal Block	External power supply

ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-20-12 - DIN rail mount power supply 12VDC, 1.7 A output power

DRPM25 - 35mm DIN Rail to Panel Mount Bracket, 25mm wide

Current Loop Explained

Current loop devices use Current On or Current Off to transmit binary digits. Current loop signals can often transmit over circuits that serial signals can't traverse reliably, due to distance, marginal conductors and electrical noise.

Current loop converters from B&B Electronics interface RS-232 or RS-422/485 to the most common current loop ports – 20mA with open circuit voltages up to 30 V – at a maximum baud rate of 19.2 kbps. High speed optical isolators couple and isolate Transmit and Receive data. All B&B Electronics' current loop converters have a transmit (T+ and T-) loop and a Receive (R+ and R-) loop. Each loop may be operated as an active or passive loop. When the converter needs to provide the loop current, a 12 VDC power supply is required for the current loop side.

Contact B&B Electronics' Technical Support for information on modifications for higher loop currents and voltages.

Additional Reading

Current Loop Application Note

www.bb-elec.com/CurrentLoop

UL Rated Current Loop Converter

232CLDR

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	19.2 kbps maximum
RS-232	
Connector	Terminal block
Signals	TD, RD, GND
Current Loop	
Connector	Terminal block
Signals	T+, T-, R+, R-, GND

ISOLATION	
Method	Optical
Rating	2,000 V

POWER	
Connector	Terminal block
Input Voltage	10-30 VDC
Power Consumption	2.5 W
Source	External

TERMINAL BLOCKS	
Wire Size	24 to 14 AWG
Torque	4 kfg-cm

LED INDICATORS	
Data LEDs	RS-232 & Current Loop flash red when data is transmitted

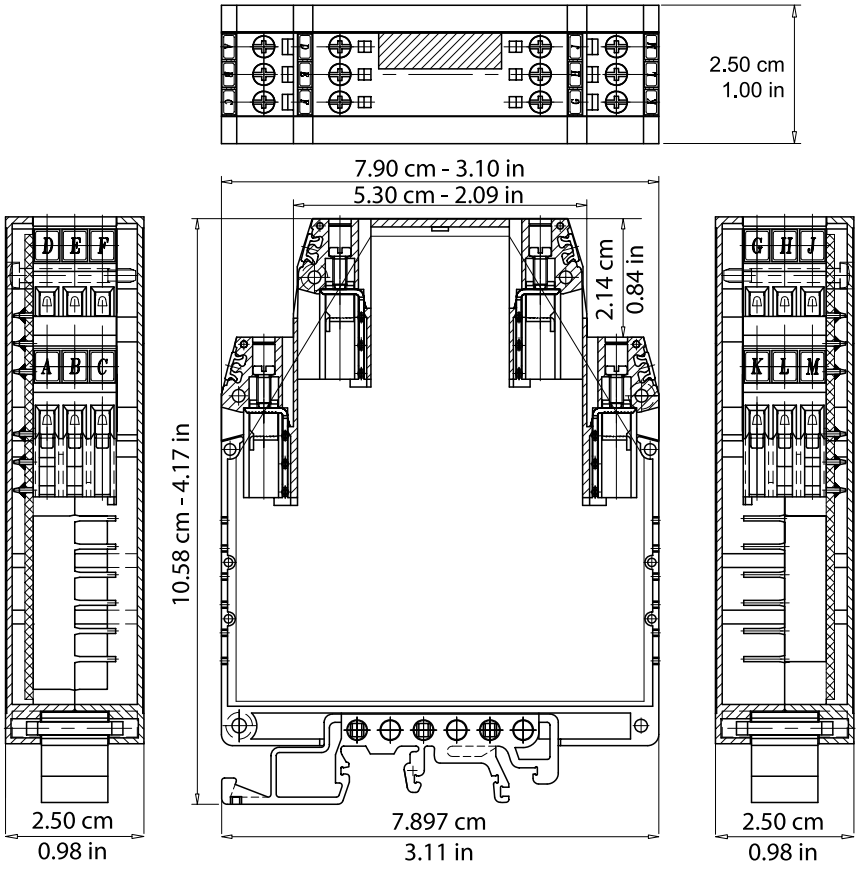
ENCLOSURE	
Material	Plastic
IP Rating	20
Dimensions	2.5 x 7.9 x 9.5 cm (1.0 x 3.1 x 3.7 in)
Mounting	35 mm DIN (panel mount adapter option)
MTBF	401834
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	-40 to +80°C (-40 to +176 °F)
Storage Temperature	-40 to +85°C (-40 to +185 °F)
Operating Humidity	0 to 95% non-condensing

APPROVALS / CERTIFICATIONS - 232CLDR
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions
CE
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity
Download complete Declaration of Conformity at www.bb.elec.com

MECHANICAL DIAGRAM

Dimensional Diagram of 232CLDR



Current Loop to Serial Converter

232CL9R

PRODUCT FEATURES

- Optically isolated digital current loop to serial conversion
- Baud rates up to 19.2 kbps
- Transmit (T+ and T-) loop and Receive (R- and R-) loop
- Each current loop may be operated active or passive
- Designed for 20mA digital current loop (other values available)

Model 232CL9R is a port-powered RS-232 to current loop converter. No external power required for passive loop installations, but a power supply is required to generate an active loop.

Current Loop Explained

Current loop devices use Current On or Current Off to transmit binary digits. Current loop signals can often transmit over circuits that serial signals can't traverse reliably, due to distance, marginal conductors and electrical noise.

Current loop converters from B&B Electronics interface RS-232 or RS-422/485 to the most common current loop ports – 20mA with open circuit voltages up to 30 V – at a maximum baud rate of 19.2 kbps. High speed optical isolators couple and isolate Transmit and Receive data. All B&B Electronics' current loop converters have a transmit (T+ and T-) loop and a Receive (R+ and R-) loop. Each loop may be operated as an active or passive loop. When the converter needs to provide the loop current, a 12 VDC power supply is required for the current loop side.

Contact B&B Electronics for information on modifications for higher loop currents and voltages.

ORDERING INFORMATION

MODEL NUMBER	SERIAL CONNECTOR	CURRENT LOOP CONNECTOR	POWER SOURCE FOR SERIAL SIDE
232CL9R	DB9 Female	Terminal Block	Port-powered or external power supply

ACCESSORIES

232PS2 - 12VDC @ 100 mA wall transformer power supply, tinned stripped leads

MDR-20-12 - DIN rail mount power supply 12VDC, 1.7 A output power

PS1UK-1000 - 220-240 VAC to 12 VDC Power Supply, jack, UK BS-1363 plug

PS1EU-1000 - 220-240 VAC to 12 VDC Power Supply, jack, Euro CEE7/7 plug

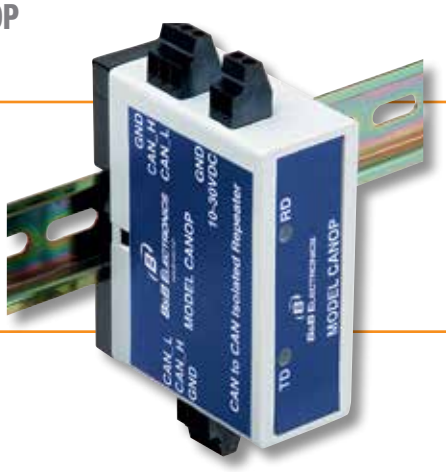
SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	19.2 kbps maximum
RS-232	
Connector	DB9 female
Signals	TD, RD, GND
Current Loop	
Connector	Terminal block
Signals	T+, T-, R+, R-, GND
POWER	
Source	Terminal Block
Input Voltage	12VDC @ 100 mA
MECHANICAL	
MTBF	714354
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
APPROVALS / CERTIFICATIONS - 232CL9R	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

Serial to CAN to Fiber Isolated Repeater

CANOP



PRODUCT FEATURES

- Convert CAN signals to fiber, and fiber to CAN
- Boosts signals to increase number of nodes
- Extend the node capacity of your CAN network
- 2,000 V optical isolation protection from surges and spikes
- Terminal Block & ST Fiber Optic Connectors

Model CANOP copper to fiber converter extends the node capacity of CAN (Control Area Network) systems while protecting CAN networks from component killing surges and transients. This optically isolated CAN repeater provides 2,000 VDC of optical isolation, allowing you to separate and protect critical segments of the system from the rest of the CAN network.

Connections are made by terminal blocks or ST fiber. Fiber optic cable offers natural resistance to EMI/RFI noise and surges that commonly interfere with electrical networks on factory floors and in industrial environments.

Model CANOP is housed in a rugged DIN rail mountable enclosure, making it easy to install in an industrial cabinet. A power supply of 10-30 VDC is required.

ORDERING INFORMATION

MODEL NUMBER	FIBER OPTIC CONNECTOR	CAN (COPPER)
CANOP	ST	Terminal Blocks

ACCESSORIES

MDR-40-12 - DIN rail mount power supply 12VDC, 3.4 A output power

DR-30-12 - DIN rail mount power supply 12VDC, 2 A output power

FOP3MST - 3m Ready-To-Use Duplex (ST) Fiber Optic Cable Assembly

CAN in Industrial Automation

The multi-layer structure of Controller Area Network (CAN) allows any station on a serial bus to communicate with any other station. There are also benefits in central control and selfdiagnosis and correction of transmission errors. A number of CAN-based higher level protocols have been developed for use in industrial automation applications. CAN Application Layer (CAL), CAN Kingdom, CAN-open, DeviceNet and Smart Distributed System are just a few of these variations.

SPECIFICATIONS

SERIAL TECHNOLOGY		
Baud Rate		250 kbps maximum
CAN		
	Connector	Terminal blocks
Fiber Optic		
	Connector	ST
	Signals	MultiMode
Turnaround		< 2 µ seconds
LEDs		TD, RD (may be difficult to see at high baud rates)
ISOLATION		
		2,000 VDC
POWER		
Power		150 mA @ 12V, fully loaded
Source		External, 10-30 VDC

MECHANICAL	
Dimensions	9.3 x 8.6 x 3.6 cm (4.0 x 3.4 x 1.4 in)
Enclosure	35mm DIN mount
MTBF	269297
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)

High-Speed, Isolated, RS-422/485 Repeater

485OPDR-HS

PRODUCT FEATURES

- 2 kV Isolation
- IEC Level 2, ± 4 kV contact ESD protection, IEC Level 3, ± 8 kV air ESD Protection
- 1.5 Mbps Data Rate
- -40 to 80°C Operating Temperature
- USB 2.0 – High Speed (480 Mbps)
- NEMA TS2

485OPDR-HS
The 485OPDR-HS is a high speed, optically isolated RS-422/485 repeater that supports data rates up to 1.5 Mbps, making it suitable for use in fieldbus systems such as Profibus.

Isolation
The 485OPDR-HS provides 2 kV digital Isolation with 8 kV air ESD protection and 600 W transient voltage suppression on the data lines.

Range Extension
The 485OPDR-HS can be used to extend the range of a network up to 4000 ft. (1.2 km), depending on data rates, and to add additional nodes. 2-Wire RS-485, 4-Wire RS-485 and RS-422 are supported. Data signals and the power inputs connect to built-in terminal blocks.

Enclosure
The repeater operates on externally sourced 10 to 30 VDC power. The enclosure has a DIN rail mount that is designed to fit easily on a standard 35mm rail.

ORDERING INFORMATION

MODEL NUMBER	
485OPDR-HS	High Speed Isolated RS-422/485 Repeater

ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-40-24 - DIN rail mount power supply 24VDC, 1.7 A output power

Profibus Overview

PROFIBUS "Process Field Bus" is communication standard for automation technologies and applications.

PROFIBUS DP ("Decentralized Peripherals") is the most common version of Profibus. It is used for deterministic communication between Profibus masters and their remote I/O slaves and supports numerous standard diagnostic options. Applications include production automation processes and operating sensors/actuators via centralized controllers.

PROFIBUS PA ("Process Automation") is less prevalent and tends to be application specific. It is often used to monitor measurement equipment via process control systems. PA and DP can be used together to help bridge application networks. PA uses the same protocol as DP so it can be linked to a faster DP backbone network to better transmit process signals from equipment to controllers. PA can also be used in hazardous areas. The IEC 61158-2 rated physical layer can bus-power instruments and limit current flow to prevent explosive conditions.

PROFIBUS FMS ("Field Bus Message Specification") is a complex communication protocol for more sophisticated communication needs. It supports non-deterministic data communication between Profibus masters.

High-Speed, Isolated, RS-422/485 Repeater

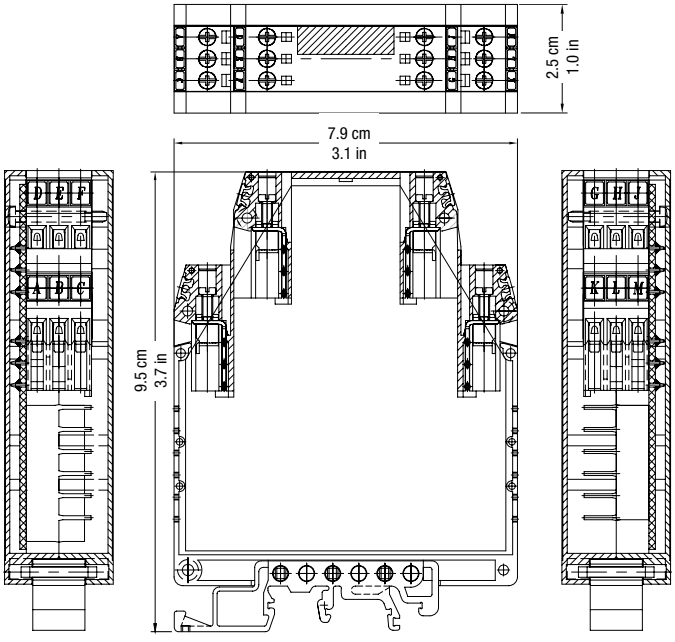
4850PDR-HS

SPECIFICATIONS

RS-422/485	
Connector	Terminal Block
SIGNALS	
	TDA(-), TDB(+), RDA(-), RDB(+), GND
	RS-422
	RS-485 2-Wire and 4-Wire
	Protected GND on Isolated Side
DATA RATE	
Bit-Wise Enabled	Up to 1.5 Mbps
ISOLATION	
Method	Optical
Rating	2000 V
SURGE SUPRESSION	
Method	TVS
Rating	12 V bi-directional avalanche breakdown device 600 W peak power dissipation
Response Time	< 1 pico-second
POWER	
Connector	Terminal Block
Voltage	10 to 30 VDC
Power Consumption	0.7 W
Source	External
TERMINAL BLOCKS	
Wire Size	24 to 14 AWG
Torque	4 kgf-cm

LED INDICATORS	
2 DATA LEDs (Green)	Data LED for each side of isolator Flashes when data transmitted
ENCLOSURE	
Material	Plastic
IP Rating	20
Dimensions	1.0 x 3.1 x 3.7 in (2.5 x 7.9 x 9.5 cm)
Mounting	35 mm DIN (Panel Mount Adapter is available)
ENVIRONMENTAL	
Operating Temperature	-40 to 80 C (-40 to 176 F)
Storage Temperature	-40 to 85 C (-40 to 185 F)
Operating Humidity	0 to 95% Non-condensing
MTBF	117316
MTBF Calculation Method	MIL217F Parts Count Reliability
APPROVALS AND CERTIFICATIONS	
Agency Approvals	CE, FCC, NEMA TS2
	EN61000-6-2 (Heavy Industrial)
	EN61000-4-2 (ESD) ± 4 kV contact, ± 8 kV air
	EN61000-4-3 (RI) 10 V/m, 80-1000 MHz; 3 V/m 1.3 to 2.7 GHz
	EN61000-4-4 (EFT Burst) ± 2 kV DC ports; ± 1 kV signal ports
	EN61000-4-5 (Surge) ± 2 kV common; ± 1 kV differential
	EN61000-4-6 (CI) 10 Vrms, 0.15 to 80 MHz
	EN61000-4-8 (Magnetic) 10 A/m, 50 Hz & 60 Hz
Other	IEC60068-2-27 (Shock) 50 G Peak, 11 ms, 3 axes
	IEC60068-2-6 (Vibration) 140-500 Hz, 4G, 3 axes
	IEC60068-2-32 (Drop) 10 total drops from sides, corner, edges
	Emissions FCC Class B, CISPR Class B (EN55022)

MECHANICAL DIAGRAM



RS-422/485 Isolated Repeater

4850PDR

PRODUCT FEATURES

- Extend data up to 1.2 km (4000 ft.)
- 2000V optically isolated data lines
- -40 to 80°C operating temperature
- Modbus ASCII/RTU

The 4850PDR is an optically isolated RS-422/485 isolated line repeater that can be used to isolate a piece of equipment from the rest of the network. As a repeater, it extends the distance of an existing network an additional 1.2 km (4000 ft.) and expands it beyond the typical 32-node limitation. Data signals and the power inputs connect to the terminal block. 600W surge suppression ensures that the connected equipment is protected even in the harshest of environments. 2-wire RS-485, 4-wire RS-485 and RS-422 are supported.

The repeater operates on externally sourced 10 to 30 VDC power. The enclosure has a DIN rail mount that is designed to fit easily on a standard 35mm rail.

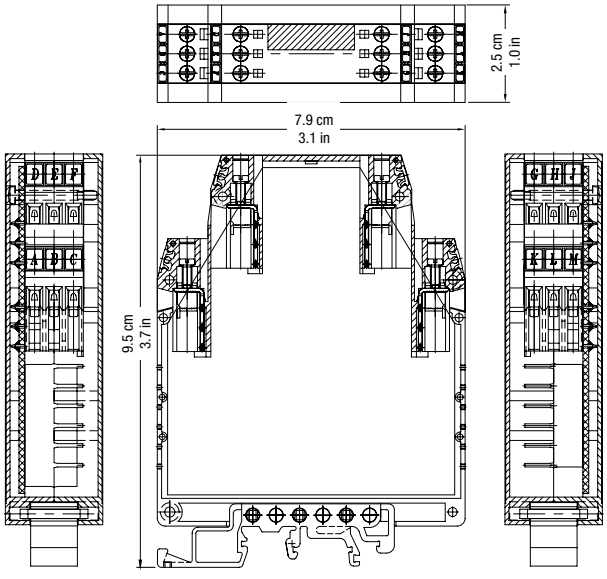
ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-40-24 - DIN rail mount power supply 24VDC, 1.7 A output power

DRPM25 - 35mm DIN Rail to Panel Mount Bracket, 25mm wide

EK-CLIP-MPC - DIN rail clip for enclosure



ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
4850PDR	RS-422/485 Isolated Repeater

SPECIFICATIONS

RS-422/485	
Connector	Terminal Block
Signals	TDA(-), TDB(+), RDA(-), RDB(+), GND RS-422 4-wire, RS-485 2- and 4-wire Protected GND on Isolated Side
ISOLATION	
Method	Optical
Rating	2000 V
SURGE SUPPRESSION	
Method	TVS
Rating	6.5V bi-directional avalanche breakdown device 500W peak power dissipation
Response Time	< 1 pico-second
INDUSTRIAL BUS	
	Modbus ASCII/RTU
POWER	
Connector	Terminal block
Voltage	10 to 30 VDC
Power Consumption	0.7 W
Source	External source required
TERMINAL BLOCKS	
Wire Size	24 to 14 AWG
Torque	4 kgf-cm
LED INDICATORS	
2 DATA LEDs (RED)	Data LED for each side of isolator Flashes when data transmitted
ENCLOSURE	
Material	Plastic
IP Rating	20
Dimensions	2.5 x 7.9 x 9.5 cm (1.0 x 3.1 x 3.7 in)
Mounting	35 mm DIN (Panel Mount Adapter is available)
ENVIRONMENTAL	
Operating Temperature	-40 to 80 C (-40 to 176 F)
Storage Temperature	-40 to 85 C (-40 to 185 F)
Operating Humidity	0 to 95% Non-condensing
MTBF	225299 hours
MTBF Calculation Method	MIL217F Parts Count Reliability
Agency Approvals	CE, FCC cULus Recognized, File E222870

Industrial RS-422/485 Isolated Repeater

485OPDRI

PRODUCT FEATURES

- Supports data rates up to 115.2 Kbps
- Extends signal 1,200 m (4,000 feet)
- Wide -40 to +80°C temperature range
- 10 to 48 VDC input power range
- 2000 V, 3-way optical isolation
- UL Class 1/Division 2 Listed
- Built-in, switchable termination & bias

The 485OPDRI isolated RS-422/485 repeater is designed for rugged industrial environments. It is UL listed and certified for use in Class 1/ Division 2 locations. Powerful optical isolation on both data ports protects your equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits add a third degree of protection.

Packaged in a rugged ABS plastic case, this repeater operates in wide temperature extremes. With a 35mm DIN rail mounting bracket, it easily integrates into control panels or other industrial equipment.

Installation and configuration is easy with DIP switches to set up baud rate and serial communications mode. Removable terminal blocks make wiring a snap. Power is connected through separate terminal block that accepts 10 to 48 VDC from any external source.

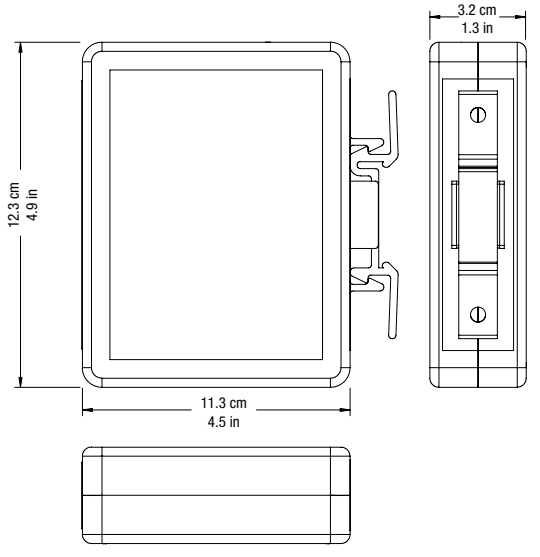
ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-40-24 - DIN rail mount power supply 24VDC, 1.7 A output power

DRPM25 - 35mm DIN Rail to Panel Mount Bracket, 25mm wide

EK-CLIP-MPC - DIN rail clip for enclosure



ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
485OPDRI	Industrial RS-422/485 Isolated Repeater

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-422	TDA(-), TD(B+), RDA(-), RDB(+)
RS-485 4-Wire	TDA(-), TD(B+), RDA(-), RDB(+)
RS-485 2-Wire	Data A(-), Data B(+)
Serial Connector	5 Position, Removable Terminal Block
Data Rate	2.4 to 115.2 Kbps
Isolation	2KV RMS, 1 Minute
Surge Protection	600 W Peak Power Dissipation Clamping time < 1 pico-second
Industrial Bus	Modbus ASCII / RTU
Bias	Built-in, Switchable, 1.2KΩ XMT/RCV
Termination	Built-in, Switchable, 120Ω
POWER	
Source	External power required
Power Connector	2 Position, Removable Terminal Block
Input Voltage	10 to 48 VDC (56 VDC Maximum)
Power Consumption	0.5 W (typical), 1.3 W (termination on both sides)
TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
INDICATORS	
Power	Red LED
Data	Red LED for Each Data Port
MECHANICAL	
Dimensions	12.3 x 11.3 x 3.2 cm (4.9 x 4.5 x 1.3 in)
Enclosure	IP 20 Plastic, 35 mm DIN Mount
Weight	222 g (0.49 lbs)
MTBF	114696 Hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 80°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, UL, UL Class 1 DIV 2, Groups A, B, C, D
UL File	E222870 (HAZLOC E245458)

RS-232 2kV Isolated Repeater

232OPDR

PRODUCT FEATURES

- Extend RS-232 data another 15.2 m (50 ft.)
- 2,000V optically isolated data lines
- -40 to +80°C operating temperature
- Terminal block connections
- UL Recognized
- NEMA TS2

The 232OPDR is a DIN rail mountable RS-232 optical isolator and repeater. It provides 2,000 V isolation for four RS-232 signal lines (two in each direction). The isolator has four LED's to show data flow and one LED to indicate power. Connections are made to a terminal block. The isolation provides protection for computer equipment from ground loops and induced currents caused by lightning or heavy electrical loads. It also functions as a repeater to extend RS-232 signals another 15.2 meters (50 ft.). The 232OPDR can support two data pairs or one data pair plus control signals in both directions.

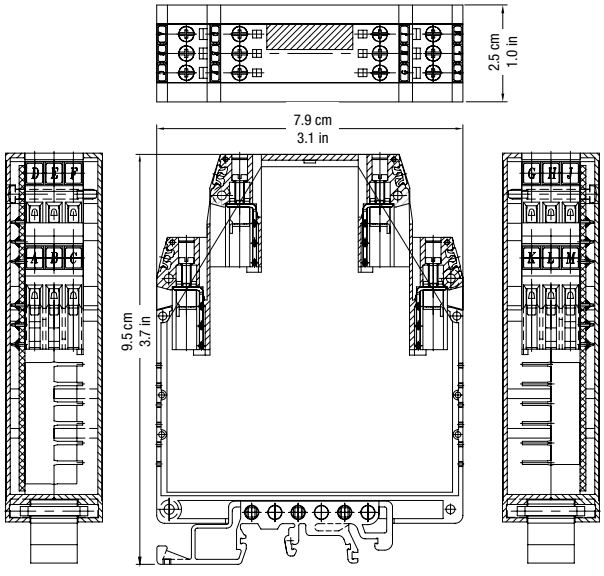
ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-40-24 - DIN rail mount power supply 24VDC, 1.7 A output power

DRPM25 - 35mm DIN rail to Panel Mount Bracket, 25mm wide

EK-CLIP-MPC - DIN rail clip for enclosure



ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
232OPDR	RS-232 2kV Isolated Repeater

SPECIFICATIONS

RS-232	
Connector	Terminal Block
Signals	4 signal lines in each direction. Protected ground on isolated side.
ISOLATION	
Method	Optical
Rating	2,000 V
POWER	
Connector	Terminal block
Voltage	10 to 30 VDC
Power Consumption	1.2 W
Source	External
TERMINAL BLOCKS	
Wire Size	24 to 14 AWG
Torque	4 kgf-cm
LED INDICATORS	
DATA LEDs (RED)	Data LED for each side of isolator Flashes when data transmitted
Power LED (RED)	ON when power applied
ENCLOSURE	
Material	Plastic
IP Rating	30
Dimensions	2.5 x 7.9 x 9.5 cm (1.0 x 3.1 x 3.7 in)
Mounting	35 mm DIN (panel mount adapter available)
ENVIRONMENTAL	
Operating Temperature	-40 to 80 °C (-40 to 176 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Humidity	0 to 95% Non-condensing
MTBF	244689 hours
MTBF Calculation Method	MIL217F Parts Count Reliability
REGULATORY	
Approvals	CE, FCC, NEMA TS2 cULus Recognized, File E222870

Industrial RS-232 Isolated Repeater

2320PDRI

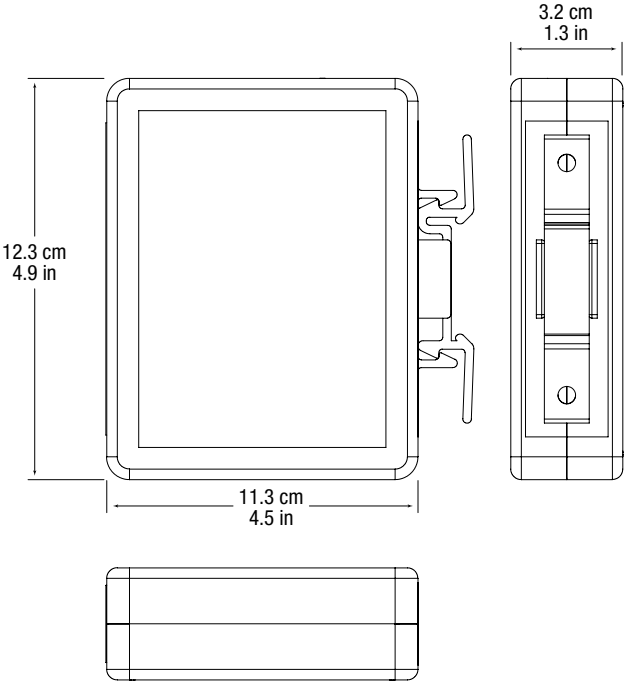
PRODUCT FEATURES

- Supports Data Rates up to 115.2 Kbps
- Wide -40 to 80°C Temperature Range
- 10 to 48 VDC Input Power Range
- 2000 V 3-Way Optical Isolation
- UL Class 1 Division 2 Listed

The 2320PDRI is our premium Industrial RS-232 Isolated Repeater. Designed for rugged industrial environments, it is UL listed and certified for use in Class 1 Division 2 locations. Powerful Optical Isolation on both data ports protects your equipment and data from damaging ground loops and surges. Additional isolation on the power supply circuits adds a third degree of protection.

Packaged in a rugged plastic case, the 2320PDRI operates in wide temperature extremes. With a 35mm DIN rail mounting bracket, it is easy to integrate into a control panel or other industrial equipment.

Installation and configuration is easy. Data is connected with a DB9 female connector (DCE) and a DB9 male connector (DTE). Power is connected through terminal block that accepts 10 to 48 VDC from any external source.



ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
2320PDRI	Industrial RS-232 Isolated Repeater

ACCESSORIES

MDR-20-24 - DIN rail mount power supply 24VDC, 1.0 A output power

MDR-40-24 - DIN rail mount power supply 24VDC, 1.7 A output power

DRPM25 - 35mm DIN Rail to Panel Mount Bracket, 25mm wide

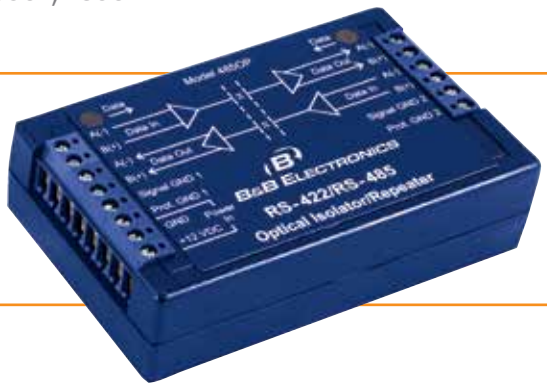
EK-CLIP-MPC - DIN rail clip for enclosure

SPECIFICATIONS

SERIAL TECHNOLOGY	
Serial Connector	DB9 F (DCE), DB9 M (DTE)
Data Rate	Up to 115.2 Kbps
Isolation	2 KV RMS, 1 minute
POWER	
Source	External
Power Connector	2 Position Removable Terminal Block
Input Voltage	10 to 48 VDC (56 VDC Maximum)
Power Consumption	0.6 W typical
TERMINAL BLOCKS	
Wire Size Accepted	28 to 12 AWG, Copper wire only.
Pitch	5.08 mm
Insulation Resistance	≥500 MΩ @ 500 VDC
Maximum Torque	5 Kg / cm
INDICATORS	
Power	Red LED
TD / RD	Red LED TD, RD, CTS, RTS
MECHANICAL	
Dimensions	12.3 x 11.3 x 3.2 cm (4.9 x 4.5 x 1.3 in)
Enclosure	IP 30 Plastic, 35 mm DIN Mount
Weight	0.43 lbs (195 g)
MTBF	177250 Hours
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	-40 to 80°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Humidity	0 to 95% Non-condensing
REGULATORY	
Approvals	FCC, CE, IEC 61850-3, IEEE 1613 UL C1 D2, File: E245458

Optically Isolated RS-422/485 Repeaters

485OP, 485OPB



PRODUCT FEATURES

- 2 KV isolation
- Add up to 32 nodes to RS-485 network
- RS-422 2-wire, RS-485 2 or 4-wire
- Modbus
- UL Recognized

Model 485OP is an optically isolated RS-422/485 signal repeater. In addition to 2KV isolation on the data lines, it can be used to extend RS-422/485 circuits an additional 1.2 km (4,000 ft.), thereby doubling the range. An added benefit is the ability to add another 32 nodes to an RS-485 network and join 2 and 4 wire systems.

The compact design fits almost anywhere. Terminal blocks allow easy installation. Wiring schematic on the label eliminates guesswork. A 12 VDC power supply is required.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION	POWER SUPPLY
485OP	RS-422/485 Fiber Optic Isolated Repeater	USA (included)
485OPB	RS-422/485 Fiber Optic Isolated Repeater	EU or UK (sold separately)

ACCESSORIES

PS1EU-1000 - 220-240 VAC to 12 VDC power supply, jack, Euro CEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC power supply, jack, UK BS-1363 plug

485HESP - RS-485 surge protector

485PS4 - 12VDC @ 500 mA, wall power supply, tinned stripped leads

SPECIFICATIONS

SERIAL PROTOCOLS	
	RS-422 4-wire
	RS-485 2-wire
	RS-485 4-wire
ISOLATION	
Lines Protected	Data lines
Method	Optical
Rating	2000 V
SURGE SUPPRESSION	
Lines Protected	Data lines
Method	TVS
Rating	6.5V bi-directional 600W peak power dissipation
INDUSTRIAL BUS	
	Modbus ASCII/RTU
POWER	
Connector	Terminal block
Voltage	10 to 14 VDC
Power Consumption	1.0 W
Source	Included wall transformer or other 10 to 14 VDC source
POWER SUPPLY	
Input Voltage	120 VAC (USA); 220-240 VAC (EU, UK)
Output Voltage	12 VDC
Output Connection	USA: Stripped and tinned leads EU: UK BS-1363 plug, jack UK: Euro CEE7/7 plug, jack
TERMINAL BLOCKS	
Wire Size	22 to 14 AWG
Torque	0.5 Nm
LED INDICATORS	
2 x DATA (RED)	Flashes when data received
ENCLOSURE	
Material	Plastic
IP Rating	30
Dimensions	9.7 x 6.1 x 2.5 cm (3.8 x 2.4 x 1.0 in)
Mounting	In line
ENVIRONMENTAL	
Operating Temperature	0 to 55 °C (32 to 131 °F)
Operating Humidity	0 to 95% non-condensing
MTBF	453103 hours
MTBF Calculation Method	Parts Count Reliability Prediction
AGENCY APPROVALS	
	CE, FCC
	cULus Recognized, File E222870
	Declaration of Conformity available for download at www.bb.elec.com

RS-232 Optical Isolator

9POP4

PRODUCT FEATURES

- 2.5 kV isolation
- ESD protection - 15 kV
- Protects up to 4 channels
- 230.4 kbps
- Ideal for laptops, lower power serial ports

The 9POP4 isolates and protects RS-232 equipment from lightning surges, accidental high voltage shorts, and ground loops. RS-232 data signals TD, RD, RTS, and CTS are supported at up to 230.4 kbps. Isolation circuits are 2.5 kV rated and protects valuable equipment while maintaining maximum uptime.

Each side of the isolator receives power from a single 12 VDC power supply to maintain the isolation. This powering configuration allows the device to be used in a system with only one power supply, regardless of the power provided by the RS-232 ports.

The isolator uses DB9 male and DB9 female connectors. The female connector is wired as a DCE and should be connected to a DTE port. The male connector is a DTE and should be connected to a DCE port. If you are connecting a DTE to a DTE or a DCE to a DCE, you will need a null modem adapter.

Power supplies recommended and available from B&B Electronics have been tested and certified. Using any other power supply may bypass or degrade the isolation barrier.

ACCESSORIES

232PS2 - 12VDC@100mA wall transformer power supply, tinned stripped leads

MMNM9 - Null Modem Adapter – DB9 Male / DB9 Male

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
9POP4	RS-232 4-Channel Optical Isolator

SPECIFICATIONS

SERIAL TECHNOLOGY			
RS-232	TD, RD, RTS, CTS, GND		
Data Rate	230.4 kbps		
Isolation	2.5 kV		
ESD	15 kV Air Discharge, 8 kV Contact		
Connectors	DB9 female (DCE) DB9 male (DTE)		
POWER			
Source	External required		
Power Connector	2.5 mm jack		
Input Voltage	12 VDC		
Power Consumption	731 mW		
MECHANICAL			
Dimensions	10.4 x 4.3 x 2.0 cm (4.1 x 1.7 x 0.86 in)		
Enclosure	IP 30, plastic		
Weight	54.4 g (0.12 lbs)		
MTBF	262084 hours		
MTBF Calc. Method	MIL 217F Parts Count Reliability		
ENVIRONMENTAL			
Operating Temperature	0 to 70°C		
Storage Temperature	-40 to 85°C		
Operating Humidity	0 to 95% Non-condensing		
APPROVALS / CERTIFICATIONS			
Emissions	FCC Class B, CISPR Class B (EN55022)		
CE	EN61000-6-1:2007	(Light Industrial)	
	EN61000-4-2:2008	(ESD)	ESD, ±8kV/±15kV (contact/air)
	EN61000-4-3:2006	(RFI)	RFI, 80-1000MHz 3V/m, 1.3 - 2.7 GHz, 3V/m
	EN61000-4-4:2004	(EFT Burst)	EFT, ±1kV Power, ±500V Data Lines
	EN61000-4-5: Ed2, 2005	(Surge)	Surge, ±2kV Power (AC), N/A on Data Lines
	EN61000-4-6:2005	(CI)	CI, 3Vrms all ports

2.5 kV RS-232 Optical Isolator

9SPOP2

PRODUCT FEATURES

- 2,500V, 2-way optical isolation
- RS-232 on DB9 male and female connectors
- Port-powered on both sides, no external power supply required

Model 9SPOP2 is a port powered two-channel isolator with a 2,500 Volt protection level. It optically isolates both the RS-232 Transmit and Receive data lines and RS-232 equipment from lightning surges, accidental high voltage shorts, and ground loops. RS-232 data signals TD and RD are supported at up to 115.2 kbps.

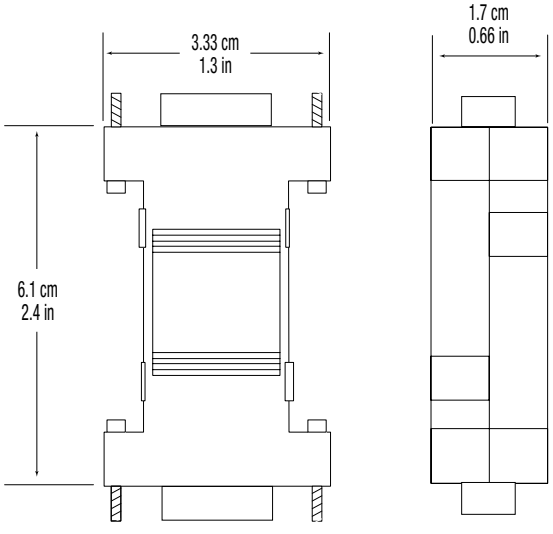
Surge Protection Standards

IEC 1000-4-5: 1995 “Surge Immunity Test” and IEEE C62.41-1991 “IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits” are the recognized standards for surge protection. B&B Electronics’ heavy duty surge protectors have been tested at 6 kV to meet these two specifications.

Learn more about surge suppression & isolation
www.bb-elec.com/TechLibrary

- “Isolation: Your Best Investment for Reliability”
- “Dataline Isolation Theory”
- “Dataline Surge Protection”

MECHANICAL DIAGRAM



ORDERING INFORMATION

MODEL NUMBER	CHANNELS PROTECTED	DTE CONNECTOR	DCE CONNECTOR	ISOLATION
9SPOP2	2	DB9 Female	DB9 Male	2,500 V

ACCESSORIES

9PAMF6 - DB9 Male To DB9 Female, 1.8 m (6 ft.)

MMNM9 - Null Modem Adapter – DB9 Male / DB9 Male

232HESP - RS-232 Surge Protector

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	9600 baud rate
RS-232	
Connector	DB9 female (DTE)
Connector	DB9 male (DCE)
Signals	TD, RD
Transmission Mode	Asynchronous, half or full duplex, point-to-point
POWER	
Source	Port Powered from both sides. DTE side - DTR & RTS lines. DCE side - DCD, DSR & CTS lines.
Weight	0.08 lb (36.3 g)
ISOLATION	
Volts/Duration	2,500 Volts RMS isolation for 1 minute
MECHANICAL	
Dimensions	6.1 x 3.3 x 1.7 cm (2.4 x 1.3 x 0.66 in)
MTBF	674717
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C
Storage Temperature	-55° to 125°C
Operating Humidity	0 to 95% Non-Condensing
MTBF	674717.4
MTBF Calc. Method	Parts Count Reliability Protection
APPROVALS / CERTIFICATIONS - 9SPOP2	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

4kV RS-232 Optical Isolator

232SPHI4

PRODUCT FEATURES

- 4,000V, 2-way optical isolation
- DB25 male and DB25 female connectors
- Can be used in 60601-1 applications
- Port-powered OR use optional external power supply

The 232SPHI4 isolates and protects RS-232 equipment from lightning surges, accidental high voltage shorts, and ground loops. RS-232 data signals at up to 115.2K bps as well as the RTS and CTS handshake lines are supported. The 232SPHI4 provides 4000 Volts of isolation between sides, and maintains creepage and air clearances required for double or reinforced insulation by IEC 60601-1.

Model 232SPHI4 has 4000 Volts of isolation — twice the rating of most isolators — to protect RS-232 equipment from lightning strikes, accidental high voltage shorts and ground loops.

DTE device connections are made through a DB-25 female. DCE device connections are made through a DB-25 male. The two sides of the isolator are powered independently to maintain isolation. Both sides can draw power from the RS-232 data and handshake lines, eliminating external powering requirements in nearly all systems.

If the isolator is to be used with low power ports or when no handshake lines are available, external power can be supplied to either side. This versatile powering configuration minimizes the number of supplies required by the overall system.

ACCESSORIES

232PS2 - 12VDC@100mA wall transformer power supply, tinned stripped leads

PS1EU-1000 - 220-240 VAC to 12 VDC Power Supply, jack, Euro CEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

232CAMR - DB9 Male to DB25 Female, 6 in (15.2 cm)

232CAMS - DB9 Female to DB25 Male, 6 in (15.2 cm)

ORDERING INFORMATION

MODEL NUMBER	CHANNELS PROTECTED	DTE CONNECTOR	DCE CONNECTOR	ISOLATION
232SPHI4	4	DB25 Female	DB25 Male	4,000 V

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	DB25 female (DTE)
Connector	DB25 male (DCE)
Signals	TD, RD, RTS, CTS
Transmission Mode	Asynchronous, half or full duplex, point-to-point
POWER	
Source	Port-powered from RS-232 data and handshake lines
Optional External Source	+10 to +16 VDC @ 40 mA max
External Connections	2.5mm power jacks (tip positive) or DB25 connectors pins 11 (+) and 12 (-)
ISOLATION	
Volts/Duration	4,000 Volts RMS isolation for 1 minute (may be limited by external supply)
MECHANICAL	
Dimensions	10.4 x 5.8 x 2.4 cm (4.1 x 2.3 x 0.95 in)
Minimum Air Clearance between DTE & DCE Sides:	5 mm (0.197 in)
Minimum Creepage Distance between DTE & DCE Sides:	8 mm (0.315 in)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C
Storage Temperature	-55° to 125°C
Operating Humidity	10 to 90% Non-Condensing
MTBF	351896
MTBF Calc. Method	Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - 232SPHI4	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
IEC 60601-1-2:2007 Medical Electrical Equipment, Electromagnetic Compatibility	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)	
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)	
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)	
Download complete Declaration of Conformity at www.bb.elec.com	

Three-stage DIN Rail Surge Protector

HESP4DR

PRODUCT FEATURES

- Three stages of protection on every data line
  1) Gas discharge tube
  2) Series resistor
  3) Transient voltage suppressor
- Protected signal ground connection
- Rugged terminal block connections
- Dedicated chassis ground lug
- Wide operating Temperature
- NEMA TS2

Model HESP4DR meets IEEE 1000-4-5: 1995 and IEEE C62.41-1991 recognized standards for premium surge protectors. It protects against lightning strikes, power surges, and other types of voltage disturbances with three stages of protection for each supported line: a gas discharge tube followed by a series resistor and finally a Transient Voltage Suppresser (TVS). Five RS-232 signals on terminal blocks are supported with a clamping voltage of 6.8 Volts.

The HESP4DR is housed in a sturdy DIN rail mount case with a #10 grounding screw. In order to work properly, it is important to have a good connection between the #10 screw and a solid earth ground.

ORDERING INFORMATION

MODEL NUMBER	INTERFACE	LINES PROTECTED	MOUNTING
HESP4DR	RS-422/485	(5) RS-422/485	DIN Rail Mount

ACCESSORIES

CU15B - Copper Grounding Strap

IN THE FIELD

Parking Lot Security

Industry: Transportation – Intelligent Parking
Product: High Energy Surge Protector

www.bb-elec.com/Parking

HESP4DR

Carrier data charges may apply.

Surge Protection Standards

IEC 1000-4-5: 1995 “Surge Immunity Test” and IEEE C62.41-1991 “IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits” are the recognized standards for surge protection. B&B Electronics’ heavy duty surge protectors have been tested at 6 kV to meet these two specifications.

Learn more about surge suppression & isolation
www.bb-elec.com/TechLibrary

- “Isolation: Your Best Investment for Reliability”
- “Dataline Isolation Theory”
- “Dataline Surge Protection”

Three-stage Surge Protector

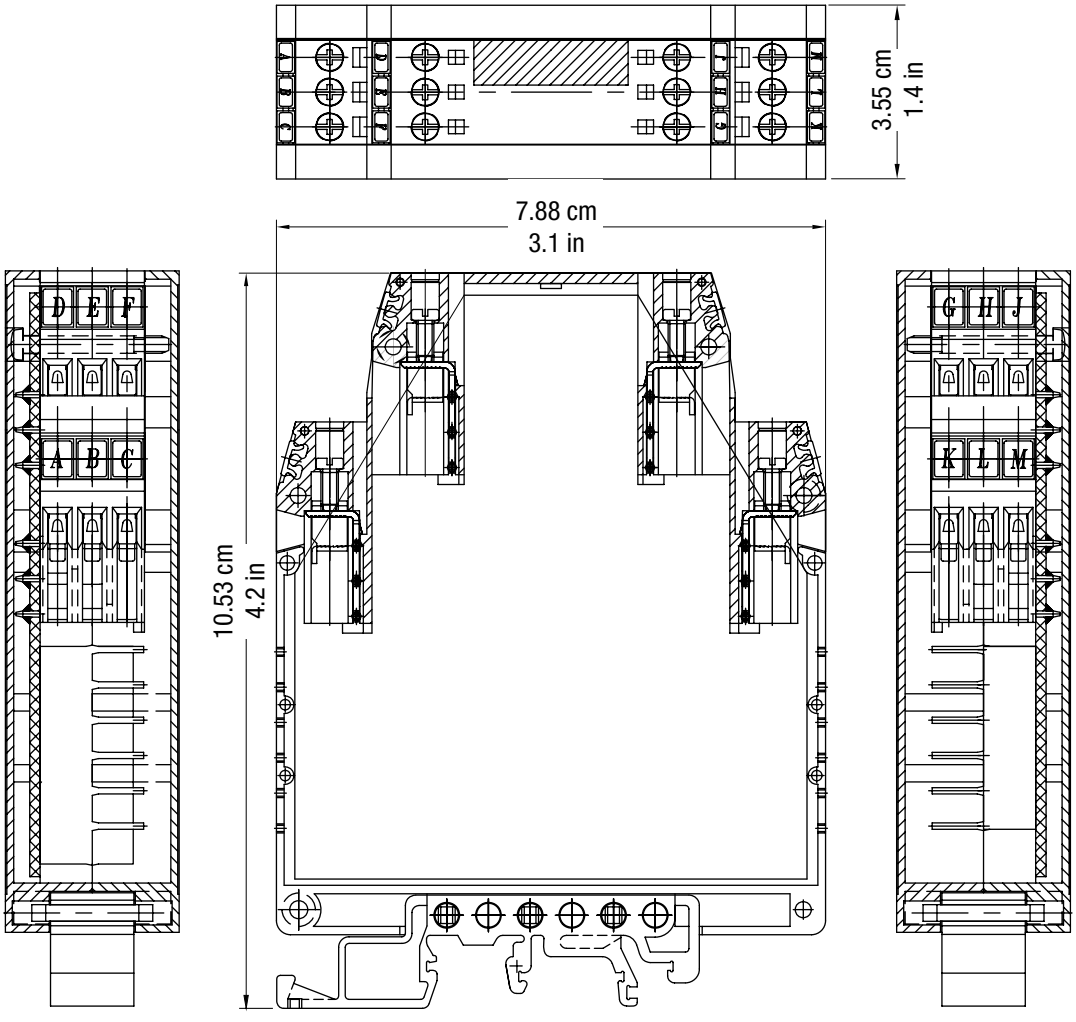
HESP4DR

SPECIFICATIONS

SERIAL TECHNOLOGY	
Connectors, line	5 position terminal blocks
Connectors, equipment	5 position terminal blocks
SURGE SUPPRESSION	
Clamping Voltage - stage 1	72 VDC, minimum 108 VDC, maximum
Series Resistance - stage 2	2.7 Ohms
Clamping Voltage - stage 3	6.45 VDC, minimum 7.14 VDC, maximum
Clamping Time	Less than 5 $x10^{-9}$ seconds
Dimensions	3.55 x 7.88 x 10.53 cm (1.4 x 3.1 x 4.2 in)
Installation	DIN rail mount
Weight	0.114 kg (4.02 oz)

ENVIRONMENTAL	
Operating Temperature	-40 to 80°C (-40 to 176°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Humidity	0 to 95% Non-condensing
APPROVALS / CERTIFICATIONS - HESP4DR	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE, NEMA TS2	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-5: 2006 Electrical Surges	
Download complete Declaration of Conformity at www.bb.elec.com	

MECHANICAL DIAGRAM



Three-stage RS-422/485 Surge Protectors

485HESP, 422HESP, 232HESP

PRODUCT FEATURES

- Three stages of protection on every data line
  1) Gas discharge tube
  2) Series resistor
  3) Transient voltage suppressor
- Protected signal ground connection
- Rugged terminal block connections
- Dedicated chassis ground lug

These three-stage surge protectors meet IEEE 1000-4-5: 1995 and IEEE C62.41-1991 recognized standards for premium surge protectors. It protects against lightning strikes, power surges, and other types of voltage disturbances with three stages of protection for each supported line: a gas discharge tube followed by a series resistor and finally a Transient Voltage Suppresser (TVS). Three RS-422/485 signals on terminal blocks are supported with a clamping voltage of approximately 6.8 Volts.

These surge protectors housed in a tough metal, panel mount case with a protected signal ground connection and dedicated chassis ground lug.In order to work properly, it is important to have a good connection between the #10 screws and a solid earth ground. The 485HESP provides two terminal posts and two metal mounting brackets to provide a good ground connection.

Surge Protection Standards

IEC 1000-4-5: 1995 “Surge Immunity Test” and IEEE C62.41-1991 “IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits” are the recognized standards for surge protection. B&B Electronics’ heavy duty surge protectors have been tested at 6 kV to meet these two specifications.

Learn more about surge suppression & isolation
www.bb-elec.com/TechLibrary

- “Isolation: Your Best Investment for Reliability”
- “Dataline Isolation Theory”
- “Dataline Surge Protection”

ORDERING INFORMATION

MODEL NUMBER	INTERFACE	LINES PROTECTED	MOUNTING
485HESP	RS-422/485	(3) RS-422/485	Panel Mount
422HESP	RS-422/485	(5) RS-422/485	Panel Mount
232HESP	RS-232	(5) RS-232	Panel Mount

ACCESSORIES

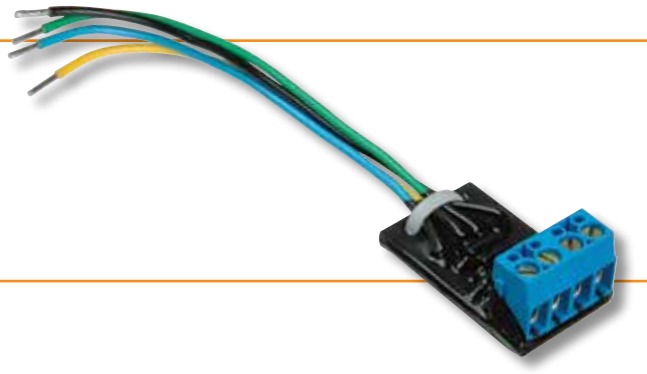
CU15B - Copper Grounding Strap

SPECIFICATIONS

SERIAL TECHNOLOGY	
485HESP	
Connectors, line	3 position terminal blocks
Connectors, equipment	3 position terminal blocks
422HESP/232HESP	
Connectors, line	5 position terminal blocks
Connectors, equipment	5 position terminal blocks
SURGE SUPPRESSION	
Clamping Voltage - stage 1	72 VDC, minimum 108 VDC, maximum
Series Resistance - stage 2	2.7 Ohms
Clamping Voltage - stage 3	6.45 VDC, minimum 7.14 VDC, maximum
Clamping Time	Less than 5 $x10^{-9}$ seconds
Dimensions	11.4 x 8.4 x 4.6 cm (4.5 X 3.3 x 1.8 in)
Installation	In-line
Weight	0.19 kg (6.7 oz)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
APPROVALS / CERTIFICATIONS - 485HESP	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
EN 61000-4-5: 2006 Electrical Surges	
Download complete Declaration of Conformity at www.bb.elec.com	

Fused RS-422/485 Surge Protector

485FPP



PRODUCT FEATURES

- Protects RS-422 or RS-485 ports
- 600W serial circuit surge suppression
- 125 mA fast-acting PCB fuses
- Simple in-line installation
- One time use, disposable unit

Single stage surge protectors offer a high degree of protection with Transient Voltage Suppressors (TVS) for each protected line.

Model 485FPP has 600W Transient Voltage Suppressors to clamp voltages without adversely affecting normal RS-422/485 data. Fast-acting 125 mA PCB fuses to protect RS-422 and RS-485 circuits against transient voltages that are too long or too large for normal suppression.

The 485FPP has 4 wires and terminal blocks for easy installation inline between the data cables – as close as possible to the serial port. Once a fuse is blown, the unit should be disposed and replaced.

ORDERING INFORMATION

MODEL NUMBER	PROTECTION	CONNECTORS	LINES PROTECTED
485FPP	RS-422/485 (disposable, fused)	Terminal Blocks (4) wire leads	(4) RS-422/485 data lines

ACCESSORIES

485HESP - RS-485 Surge Protector

485OP - RS-485 Optical Isolator

SPECIFICATIONS

SERIAL TECHNOLOGY	
Connectors	Terminal blocks RS-422/485: (4) wire leads
SURGE SUPPRESSION	
Surge Suppressors	7.5 Volts, bi-directional avalanche breakdown device
Clamping Voltage	< 1 x 10 -12 seconds, theoretical
Fuses	125 mA fast-acting type
Peak Power	500 Watts dissipation
Series Resistance	7.2 Ohms, maximum
Capacitance	6,000 picofarads, maximum
Installation	In-line
Weight	0.05 lbs (22.7 g)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
APPROVALS / CERTIFICATIONS - 485FPP	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
Download complete Declaration of Conformity at www.bb.elec.com	

Serial Modem Data Splitters

9PMDS, 232MDS

PRODUCT FEATURES

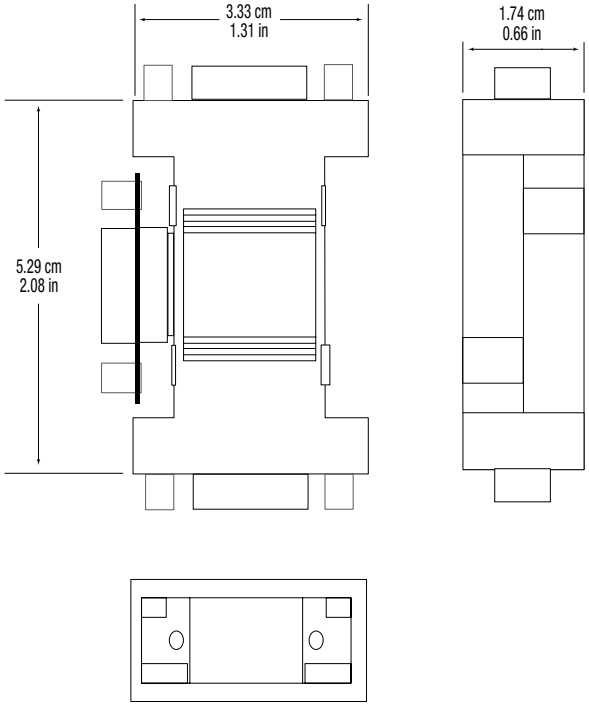
- Computers & terminals use one modem without switching
- Connect two or three PCs to one peripheral
- Use with modems, scanners, scales, other serial devices
- Quick plug-and-play installation – no configuration required
- Port powered – no external power required
- May be left permanently installed

With B&B Electronics' serial port splitters you gain reliability by capturing data from one peripheral on redundant PCs. These serial RS-232 splitters can improve a system's economy by sharing multiple PCs on a single peripheral,

Model **9PMDS** connects two computers or terminals to one modem without switching. The modem data splitter can combine two 9-pin DTE ports to one 9-pin DCE port.

Model **232MDS** can be connected so two computers or terminals can use one modem without switching. This modem data splitter can combine two 25-pin DTE ports and connect them to a 25-pin DCE port.

MECHANICAL DIAGRAM - 9PMDS



ORDERING INFORMATION

MODEL NUMBER	PC PORTS	PERIPHERAL PORTS
9PMDS	(2) DB9 Female	(1) DB9 Male
232MDS	(2) DB25 Female	(1) DB25 Male

ACCESSORIES

9PAMF6 - DB9 Male To DB9 Female, 6 ft. (1.8 m)

232CAM - DB9 Female to DB25 Male, 6 ft. (1.8 m)

232CAMS - DB9 Female to DB25 Male, 6 in (15.2 cm)

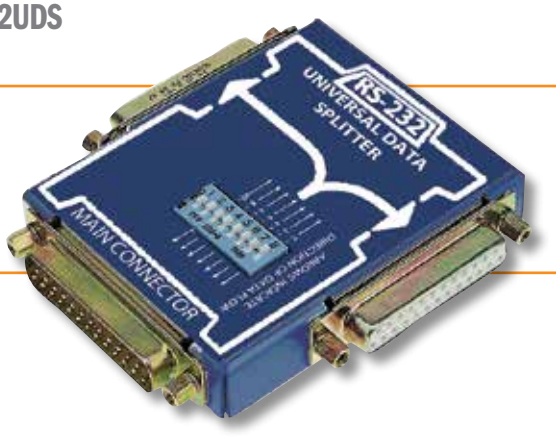
232AMF5 - DB25 Male to DB25 Female, 6 ft. (1.8 m)

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	
9PMDS - Connectors	Straight Through Ports: (2) DB9 Female Monitoring Port: (1) DB9 Male
232MDS - Connectors	Straight Through Ports: (2) DB25 Female Monitoring Port: (1) DB25 Male
Installation	In-line
MECHANICAL	
Weight	9PMDS: 81.7 grams (0.18 lbs) 232MDS: 176.9 grams (0.39 lbs)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
MTBF	9PMDS: 2595488 232MDS: 1133093
MTBF Calc. Method	Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - 9PMDS, 232MDS	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
Download complete Declaration of Conformity at www.bb.elec.com	

RS-232 Universal Data Splitter

232UDS



PRODUCT FEATURES

- Share your printer or modems
- Use as either a modem or printer data splitter
- Program data flow via DIP switch

Model **232UDS** universal serial data splitter,can be connected so that any two RS-232 devices can connect to any one RS-232 device. For example, two computers can share the same modem or serial printer at the same time and each can remain connected at all times.

The 232UDS can function as either an modem data splitter or a printer data splitter. It allows you to switch select which lines are OR'd together and which lines are passed straight through. This unit is self-powered from the RS-232 line and can be left permanently installed.

ORDERING INFORMATION

MODEL NUMBER	CONNECTOR	MAIN CONNECTOR	CONNECTOR
232UDS	DB25 Female	DB25 Male	DB25 Female

ACCESSORIES

232SGM - DB25 Gender Reverser – Changes Female Port to Male (M to M)

232SGF - DB25 Gender Reverser – Changes Male Port to Female (F to F)

232AMF5 - DB25 Male to DB25 Female, 6 ft. (1.8 m)

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	
Connectors	DB25 female DB25 male DB25 female
Pins Supported	Pins 1 through 8, 20. (Pins 1 and 7 connected between all 3 connectors.) (Other pins programmable for data flow direction.)
Installation	In-line
ISOLATION	
	2,000 VDC
POWER	
Power	Port-powered
Source	RS-232 handshake lines
MECHANICAL	
Weight	176.9 grams (0.39 lbs)
MTBF	400449
MTBF Calc. Method	Parts Count Reliability Prediction
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing

RS-232 Two Port Combiner

232PTC9

PRODUCT FEATURES

- Two or more serial devices can share a PC serial port
- Cascade combiners to connect many devices
- Automatic or software PC access control
- Quick, easy installation – may be left in place

Monitor and control multiple scales, scanners, terminals or other serial devices with a single PC. Economizes systems by connecting a PC port to several data sources – ideal for devices requiring only intermittent access. The first device to send captures the data path, locking out other lines.

Data flow may also be software controlled using the RTS line. Data from the host PC is sent to all attached devices. Port combiners can be cascaded by connecting the master port of each successive unit to one of the slave ports of the preceding unit. Each additional port combiner adds one slave port to the system. Model 232PTC9 requires external 12 VDC @ 100 mA power (included).

ORDERING INFORMATION

MODEL NUMBER	HOST PC PORT	PERIPHERAL PORTS
232PTC9	(1) DB25 Female	(2) DB9 Female

ACCESSORIES

232PS - 12VDC@100mA wall transformer power supply, 2.5mm plug

PS1EU-1000 - 220-240 VAC to 12 VDC Power Supply, jack, Euro CEE7/7 plug

PS1UK-1000 - 220-240 VAC to 12 VDC wall power supply, jack, UK BS-1363 plug

9PAMF6 - DB9 Male To DB9 Female, 6 ft. (1.8 m)

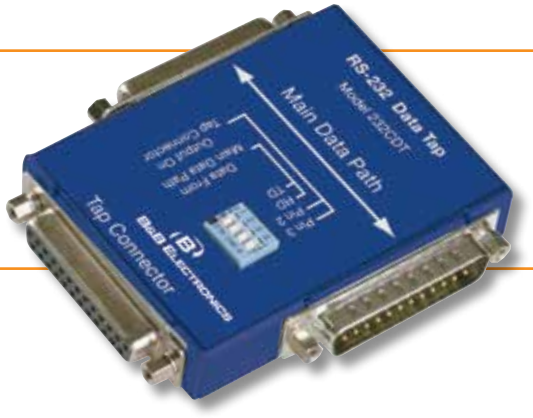
9SGM - DB9 Gender Reverser – Changes Female Port to Male (M to M)

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	
Connectors	Host PC Port: (1) DB9 Female Peripheral Ports: (2) DB9 Female
Signals	TD, RD, RTS (slave to master only) CTS indicates open channel (slave only)
Configuration	DCE
Installation	In-line
MECHANICAL	
Dimensions	10.19 x 5.08 x 2.29 cm (4.01 x 2.00 x 0.9 in)
Weight	0.26 lbs (117.9 g)
POWER	
Input Required	12-17 VDC
Current Draw	95 mA
ENVIRONMENTAL	
Operating Temperature	0 to +50 °C (+32 to +122 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
MTBF	938745
MTBF Calc. Method	Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - 232PTC9	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments EN 61000-4-2: 2009 Electro-Static Discharge (ESD) EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI) EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT) EN 61000-4-6: 2009 Conducted Immunity	
Download complete Declaration of Conformity at www.bb.elec.com	

RS-232 Data Taps

9PCDT, 232CDT



PRODUCT FEATURES

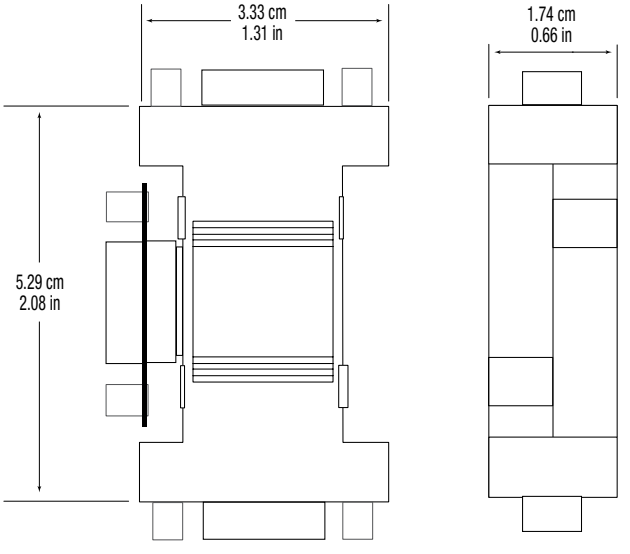
- Monitor and record serial data streams
- Easy to install, may be left in place
- Transparent connections
- No external power required

Tap in on a serial data stream and transparently feed another monitor, printer or other device.

Model **9PCDT** allows an RS-232 port to tap into and check data being transmitted between two other RS-232 ports. DIP switches set programming to monitor the main Transmit and Receive lines individually or together. Choose between monitoring the DCE or DTE port. Also allows the monitoring port to be either DTE or DCE. The DTE connector is male, and DCE and TAP connectors are female.

Model **232CDT** has DIP switches that allow programming to monitor the main Transmit and Receive lines individually or together. The male RS-232 connector on the top and the female RS-232 connector on the bottom are connected straight through, pin for pin. These connectors are used to connect the device – in series – with the RS-232 line to be tapped.

MECHANICAL DIAGRAM - 9PCDT



ORDERING INFORMATION

MODEL NUMBER	STRAIGHT THROUGH CONNECTORS	MONITORING PORT
9PCDT	(1) DB9 Male, (1) DB9 Female	DB9 Female
232CDT	(1) DB25 Male, (2) DB25 Female	DB25 Female

ACCESSORIES

9PAMF6 - DB9 Male To DB9 Female, 6 ft.

232CAMS - DB9 Female to DB25 Male, 6 in

232AMF5 - DB25 Male to DB25 Female, 6 ft.

232SGM - DB25 Gender Reverser – Changes Female Port to Male (M to M)

232SGF - DB25 Gender Reverser – Changes Male Port to Female (F to F)

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	
9PCDT	Straight Through Ports: (1) DB9 Male, (1) DB9 Female Monitoring Port: DB9 Female
232CDT	Straight Through Ports: (1) DB25 Male, (2) DB25 Female Monitoring Port: (1) DB25 Female
Installation	In-line
MECHANICAL	
Weight	9PCDT: 63.5 grams (0.14 lbs) 232CDT: 90.7 grams (0.2 lbs)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing
MTBF, 232CDT	1637197
MTBF Calc. Method	Parts Count Reliability Prediction
APPROVALS / CERTIFICATIONS - 9PCDT	
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions	
CE	
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments	
Download complete Declaration of Conformity at www.bb.elec.com	

RS-232 Mini Tester

9PMTT

PRODUCT FEATURES

- Test for RS-232 data line or equipment failures
- Convenient LEDs for line status
- Can be permanently installed in-line

Which RS-232 data lines are active? Find out with this RS-232 mini tester. It makes troubleshooting easy by helping to check interface connections, equipment, cable problems or failures.

Model **9PMTT** RS-232 mini tester is designed to connect with any RS-232 interface. The tester may be left in the line permanently. It is transparent to data transfer. Bright red or green LED signals clearly show which lines are active. The LEDs' color indicates Negative or Positive voltage (red meaning Negative; green meaning Positive).

ORDERING INFORMATION

MODEL NUMBER	RS-232	RS-232
9PMTT	DB9 Male	DB9 Female

ACCESSORIES

9SGF - DB9 Gender Reverser – Changes Male Port to Female (F to F)

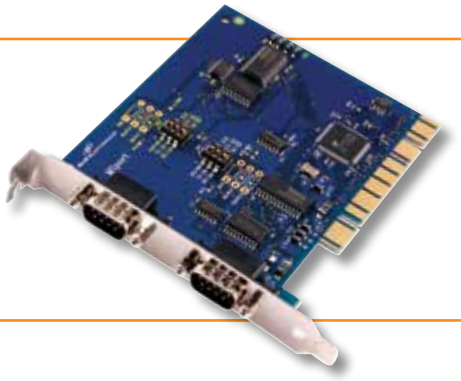
9SGM - DB9 Gender Reverser – Changes Female Port to Male (M to M)

SPECIFICATIONS

SERIAL TECHNOLOGY	
RS-232	
Connectors	DB9 male DB9 female
Signals	TD, RD, RTS, CTS, DSR, CD, DTR
Installation	In-line
LEDS	
Line Status	TD, RD, RTS, CTS, DSR, CD, DTR RED = negative voltage (mark) GREEN = positive voltage (space)
POWER	
Power	Port-powered from RS-232 handshake lines
Source	DTR & RTS
MECHANICAL	
Dimensions	5.0 x 5.4 x 1.6 cm (2.0 x 2.14 x .63 in)
Enclosure	Plastic
Weight	63.5 grams (0.14 lbs)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +185 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 to 95% Non-Condensing

MIPort™ Universal PCI Cards

One to Four Port RS-232/422/485 Cards



PRODUCT FEATURES

- Add 1, 2, or 4 Serial Ports to your PC
- Optical Isolation Available
- RS-232/422/485 Selectable on Each Port
- 5 and 3.3 V PCI Bus Compatible
- PCI-X Compatible
- Data Rates up to 460.8 Kbps

MIPort ™ Universal PCI Cards suit most any application. Outputs are independently configurable for RS-232, RS-422, or RS-485. Optically isolated cards offer 2000 VDC port-to-port isolation. Compare B&B's cards to others – B&B's premium Isolation Zone along with optical couplers and our unique isolated DC-DC converter design protect your PC from voltage surges and ground loops. DB9M connectors offer positive thumbscrew locking, more robust than phone jack connectors. Four port models include fan-out cables. Four port isolated model 3PCIOU4 has two RS-232/422/485 ports and two RS-422/485 ports. All models support data rates up to 460.8 kbps. MIPort™ cards are plug-and-play compatible and have adjustable FIFO trigger thresholds for input and output. RS-485 operation supports both 2-Wire and 4-Wire (full and half-duplex), and Automatic Send Data Control. All models include a comprehensive technical manual and CD ROM with drivers .

Whether you're application is Industrial Monitoring and control, SCADA, Point of Sale, Medical, or Security, MIPort™ Universal PCI Cards are your number one choice.

ACCESSORIES

9PAMF6 - DB9 Male To DB9 Female, 6 ft. (1.8 m)
9SGF - DB9 Gender Reverser – Changes Male Port to Female (F to F)
9SGM - DB9 Gender Reverser – Changes Female Port to Male (M to M)

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION	
Isolated		
3PCIOU1	1 RS-232/422/485	1 DB9 M
3PCIOU2	2 RS-232/422/485	2 DB9 M
3PCIOU4	2 RS-232/422/485 2 RS-422/485	2 DB9 M on card, 2 DB9 M on second exp slot (cable and bracket included)
Standard		
3PCIU2	2 RS-232/422/485	DB9 M
3PCIU4	4 RS-232/422/485	DB37 F (DB37 to 4 x DB9 M cable included)

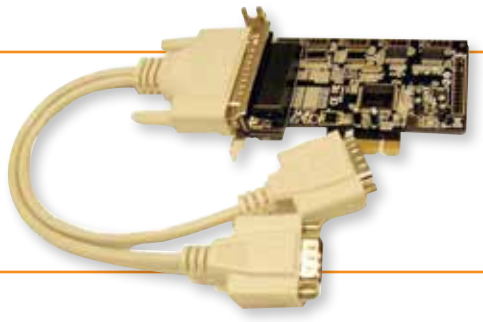
SPECIFICATIONS

Operating Systems	Windows XP, Windows 2008 Server (32/64 bit), Windows Vista (32/64 Bit), Windows 7 (32/64 Bit), Linux Kernel 2.6.x in the following distributions: Ubuntu 10.04 Desktop Edition (32/64 Bit) and Ubuntu 10.04 Server Edition (32/64 Bit).
BUS	PCI (33 MHz/32-bit)
Data Rate	Up to 460.8 kbps (RS-232/422/485)
UARTs	XR17D15X (16C550 Compatible)
Buffer	64 byte FIFO Buffer
Character Length	5, 6, 7, or 8 bits
Parity	Even, Odd, None, Space or Mark
Stop Bits	1, 1.5, or 2
*Isolation	2K V Optical. Ports are isolated From PC Power, Ground, and other ports on the same card
**RS-232 Signals	TD, RD, and all handshake signals
RS-422 Signals	TDA(-), TDB(+), and GND
RS-485 Signals	Data A(-), Data B(+), and GND
Operating Temperature	32 to 122 F (0 to 50 C)
Operating Humidity	0 to 95% Non-condensing
Dimensions	12.2 x 9.6 cm (4.8 x 3.8 in) Card Edge
Mounting Bracket	1.2 x 12.1 x 0.9 cm(0.5 x 4.8 x 0.4 in)
Approvals	FCC, CE

***Note: Isolated Models Only**
****Note: Model 3PCIOU4 supports RS-232 TD, RD, RTS, CTS, and Ground only**

PCI Express Low Profile Serial Card

DSLP-PCIE-100



PRODUCT FEATURES

- Supports serial data transfer rates to 230.4 kbps
- Advanced architecture utilises point-to-point technologies
- Data bus transfer rate of up to 2.5 Gbps under one-lane operation
- Compliant with PCI Express Base Specification 1.0a

PCI Express low profile serial cards offer a high-speed, serial I/O bus that maintains backwards capability with PCI applications and drivers. The layered architecture supports existing PCI applications and drivers by maintaining compatibility with the existing PCI model. Defined by high performance, scalable, serial bus, PCI Express Cards are dedicated to the device while multiple PCI Express devices can be active without interfering with each other.

The DSLP-PCIE-100 is configured to fit into low profile systems using one PC slot. It has a fanout cable to connect two serial devices, supports hot swapping, plug-n-play connections.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
DSLP-PCIE-100	2-port Serial RS-232 to DB9, Low Profile, PCI Express Board

SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Transfer Rate	Up to 230.4 kbps
Interface	RS-232
Bus	PCI-Express X1
Ports/Connectors	(2) DB-9 serial fan out cable, requires 1 PC bracket slot
Machine Compatibility	Low profile systems, standard height configuration with low profile orb installed
O/S Support	Windows 2000/XP/Server 2003/Vista/Win7 32/64 bit
ENVIRONMENTAL	
Operating Temperature	-30 to 75°C (-30 to 167°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% Non-condensing
APPROVALS / CERTIFICATIONS	
Certifications	CE, FCC, Compliant with PCI Express Base Specifications 1.0a

About PCI Express Card Technology

B&B Electronics' Quatech brand PCI Express Serial Cards are the breaking edge standard in serial card PCI technology and the successor for server- and client system I/O interconnects. In addition to bus technology upgrades, such as faster speeds and deeper FIFO rates, PCI Express cards have many advantages over traditional PCI cards including point-to-point link dedicated to each device (instead of PCI shared bus); lower latency in server architectures due to a more direct connection to the chip set; small connectors with easier implementation for system designers and advanced features via isochronous channels for guaranteed bandwidth delivery, advanced power management and hot swap support.

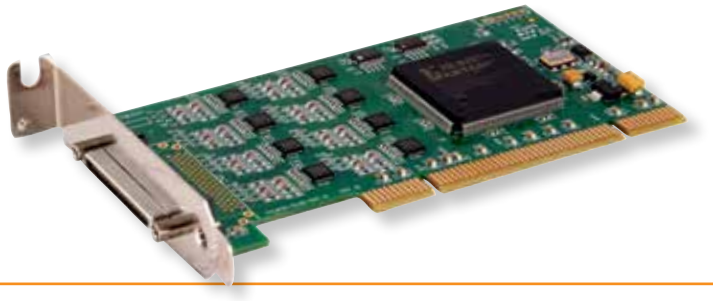
Advanced Features - As client system boards migrate from the PCI connector to the PCI Express connector, Quatech PCI Express cards maximise advanced features such as:

- Advanced power management
- Support for real-time data traffic
- Hot plug and hot swappability
- Data integrity and error handling

PCI Express vs. Universal PCI - Although PCI and UPCI Cards can be used in a variety of platforms, PCI Express reflects an industry trend to replace legacy shared parallel buses with high-speed serial buses. They both have the same dimensions and are equipped with rear brackets. But, the difference lies in the I/O connectors. PCI Express has 36 pins versus the 120 pins on a standard PCI connector.

Low Profile Universal PCI Serial Cards

DSCLP-100, ESCLP-100, QSCLP-100, SSCLP-100/-200/300



PRODUCT FEATURES

- 1, 2, 4 or 8 independent RS-232 ports
- RS-232 speeds up to 921.6 kbps (100 series)
- RS-422 or 485 configurable, full or half duplex (excludes ESCLP-100)
- RS-422/485 speeds up to 460.8 kbps (200/300 series)
- Auto enable/disable of RS-422/485 transmitter
- 16550 UARTs with 16-byte FIFOs (1, 2, 4 port boards)
- 16750 UARTs with 64-byte FIFOs (8 port boards)

These Low Profile Universal PCI Serial Cards utilise a single PCI slot to provide two independent asynchronous serial ports sharing a single interrupt. Multi-port versions require only one slot to connect. The cards include a fan out cable with independent DB-9 male connectors. All PCI registers are properly implemented, so you can be assured that these boards will be good citizens on the PCI bus. These models use a universal PCI connector compatible with both the 3.3V connector key required by PCI 2.3 and later specifications and the 5V connection used by older systems. Full modem control and hardware and software flow control

Serial port connections are made via DB-9 male connectors with 16550 UARTs containing 16-byte FIFOs. To maintain maximum signal integrity, the four-layer board design ensures maximum protection versus noise propagation throughout the communication lines.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
SSCLP-100	1 Port, RS-232, DB9, Low Profile, Universal PCI
SSCLP-200/300	1 Port, RS-422/485, DB9, Low Profile, Universal PCI
DSCLP-100	2 Port, RS-232, DB9, Low Profile, Universal PCI
QSCLP-100	4 Port, RS-232, DB9, Low Profile, Universal PCI
ESCLP-100	8 Port, RS-232, DB9, Low Profile, Universal PCI

About Low Profile Universal Cards

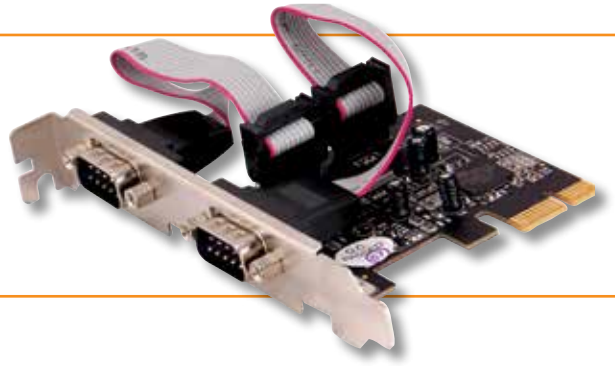
Low Profile Universal PCI cards add serial connectivity to a variety of desktop, thin client, embedded systems, and server environments. These boards provide true universal connectivity, enabling a single product to be used to implement systems with dramatically different resource requirements. This makes Quatech boards the most robust, flexible, and economical choice for any application requiring multiple serial ports. These cards are mechanically similar to standard PCI cards, but use a shorter board and a different mounting bracket. With greater flexibility, they are designed on the smallest MD1 low profile footprint, but come with both a full size ORB for standard systems, and a smaller ORB for use in low profile backplanes to fit even 2U racks without riser cards. A wide range of OS options facilitates system upgrades and multiplatform installations.

SPECIFICATIONS

SERIAL TECHNOLOGY	
Bus Interface	32-bit, 33 MHz PCI Bus specification 2.3 compliant
O/S Support	Windows 95/98/Me/2000/XP/Vista/7, Linux, DOS
Data Rate	Up to 460.8 kbps (200/300 series) Up to 921.6 kbps (100 series)
RS-232 Connectors/Ports	SSCLP: 1 DB-9 male DSCLP: DB-25 male to cable with 2 DB-9 male QSCLP: HD-44 female to cable with 4 DB-9 male ESCLP: VHDCI-68 male to cable with 8 DB-9 male
RS-422/485 Connectors/Ports	SSCLP: 1 DB-9 female DSCLP: DB-25 female to cable with 2 DB-9 female QSCLP: HD-44 female to cable with 4 DB-9 female Each RS-422 or RS-485 configurable, full or half duplex
RS-232 UARTs	S/ D/ QSCLP: 16550 UARTs; 16-byte FIFOs (1 per port) ESCLP: 16750 UARTs; 64-byte FIFOs (1 per port)
RS-422/485 UARTs	S/ DSCLP: 16550 UARTs; 64-byte FIFOs (1 per port) QSCLP: 16750 UARTs; 64-byte FIFOs (1 per port)
RS-232 Transceiver	ICL3245CA or compatible
RS-422/485 Transceiver	MAX3076E or compatible
RS-232 Drivers	High Level Output: +5V (min), +5.4V (typical) Low Level Output: -5V (min), -5.4V (typical) Transition Time (THL-TLH): 25ns (typical)
RS-422/485 Drivers	Differential Voltage: ±3.3V Transition Time (TLH): 52ns (typical) Transition Time (THL): 60ns (typical)
RS-232 Receive Buffers	Voltage Range: -25V (max), -25V(minimum) Transition Time (THL-TLH): 50ns (typical)
RS-422/485 Receive Buffers	Differential Input Threshold: ±0.2V Voltage Range: -7V to +12V Common Mode Input Transition Time (THL-TLH): 65ns (typical)
Dimensions	MD1 board, fits 2U racks: 6.36 x 11.99 cm (2.5 x 4.72 in) Low profile PCI bracket: 7.92H cm (3.12 in) (Standard PCI bracket also included)
POWER	
Requirements	+5V, 260mA (typical)
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C
Storage Temperature	-50 to +80 °C
Operating Humidity	10 to 80%
APPROVALS / CERTIFICATIONS	
Certifications	CE, FCC Class B RoHS and WEEE compliant

PCI Express Serial/Parallel Cards

DS-PCIE-100, QS-PCIE-100, HS-PCIE-100



PRODUCT FEATURES

- Supports serial data transfer rates to 115.2 kbps
- Data bus transfer rate of up to 2.5 Gbps under one-lane operation
- Configuration options: serial, parallel with serial
- Advanced architecture making use of point-to-point technologies
- Compliant with PCI Express Base Specification 1.0a

These boards support serial data transfer rates up to 115.2 kbps plus hot swapping, plug-n-play connection availability. PCIe Express serial/ parallel boards has many advantages over traditional PCI cards, including a point-to-point link dedicated to each device instead of the PCI's shared bus; lower latency in server architectures due to a more direct connection to the chip set; small connectors with easier implementation for system designers and advanced features via isochronous channels for guaranteed bandwidth delivery, advanced power management and hot swap support.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
DS-PCIE-100	2-port Serial RS-232 to DB-9 (requires 1 PC bracket slot)
QS-PCIE-100	4-port Serial RS-232 to DB-9 (requires 1 PC bracket slot)
HS-PCIE-100	6-port Serial RS-232 to DB-9 (requires 3 PC bracket slots)

About PCI Express Card Technology

These PCI Express Serial Cards are the breaking edge standard in PCI card technology for server and client system I/O interconnects. In addition to bus technology upgrades, such as faster speeds and deeper FIFO rates, PCI Express card advantages include a point-to-point link to each device (instead of PCI's shared bus); lower latency in server architectures due to a more direct connection to the chip set; and small connectors with easier implementation for system designers.

Advanced Features - As client system boards migrate from PCI connectors to PCI Express connectors, Quatech PCI Express cards maximise advanced features such as advanced power management, support for real-time data traffic, hot plug and hot swappability, and data integrity and error handling.

PCI Express vs. Universal PCI - Although PCI and UPCI Cards can be used in a variety of platforms, PCI Express reflects an industry trend to replace legacy shared parallel buses with high-speed serial buses. They both have the same dimensions and rear brackets. But, the difference is in the I/O connectors: PCI Express has 36 pins versus the 120 pins on a standard PCI connector.

SPECIFICATIONS

SERIAL TECHNOLOGY	
Compliance	Compliant with PCI Express Base Specification 1.0a
UART/FIFO	Built-in 16C550 compatible UART with 16 byte transmit-receive FIFO
Serial Data Rate	Up to 115.2 kbps
Interface	RS-232
Machine Compatibility	Full height systems
Bus	PCI-Express X1
O/S Support	Windows 2000/XP/Server 2003/Vista/Win7
DS-PCIE-100 Ports/Connectors	2 DB-9 serial on orb bracket, requires 1 PC bracket slot
QS-PCIE-100 Ports/Connectors	4 DB-9 serial, requires 1 PC bracket slot, fan out cable
HS-PCIE-100 Ports/Connectors	6 DB-9 serial, requires 3 PC bracket slots
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C
Storage Temperature	-50° to +80°C
Operating Humidity	10 to 90% Non-Condensing
APPROVALS / CERTIFICATIONS	
Agency Approvals	FCC, CE Compliant with PCI Express Base Specification 1.0a

Serial Express Cards

DSPXP-100

PRODUCT FEATURES

- I/O notebook expansion - adds PCIe serial ports
- Built-in 1024-byte FIFOs buffers boost data transmit/receive speed
- Baud rates up to 921.6 Kbps
- Hot plug & play, hot swapping capabilities
- Installs in any 34mm and 54mm Expresscard slots
- Supports PCI Express Base Specification Revision 1.1a

PCI ExpressCard technology is emerging with faster speeds and better efficiency than typical PC cards, connecting high-bandwidth peripherals to notebooks and other portables. The serial ExpressCard's credit-card form factor provides a smaller, faster and more desktop-friendly format.

Since laptops often do not provide the number and variety of built-in serial I/O ports available on a desktop PC, these one, two and four port cards can support I/O expansion and connectivity to serial devices in mobile laptop applications.

This 34mm PCI ExpressCard can be used in either 34 or 54mm slots. An included 54mm adapter improves the fit and durability of 34mm cards in larger 54mm slots and helps the card withstand normal or accidental stress and dislodging from the slot.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
DSPXP-100	2-port RS-232 Express Card

SPECIFICATIONS

SERIAL TECHNOLOGY	
Bus Interface	ExpressCard Standard, PCI Express-based Designs Specification, Revision 1.1 compliant interface
Baud Rate	921.6 kbps per port
UART	16450/550/750-compatible register set
Data FIFO	1024-bytes
Data Bits	Supports 5, 6, 7, 8. Supports even, odd, mark, space & no parity. Supports 1, 1.5 & 2 stop bits
O/S Support	Windows XP/Vista/7, 32 & 64 bit
Ports/Connectors	DSPXP-100: 2, RS-232, DB9 Male
ENVIRONMENTAL	
Operating Temperature	0 to +70 °C
Storage Temperature	-50 to +80 °C
Operating Humidity	10 to 90%
APPROVALS / CERTIFICATIONS	
DSPXP -100	TIA-232-F (RS-232) compliant
Agency Approvals	FCC, CE, RoHS

About PCI ExpressCards

The PXP card series was designed with a PCI Express (PCIe) interface rather than using USB controller interfaces. The PXP series is a great solution to connect to existing peripherals and maintain compatibility and functionality with current application software.

Advantages of a PCIe-based ExpressCard design are in the interface to the laptop's motherboard. The PCIe bus interface is the successor to the PCI bus, which in turn was the successor to the ISA bus to which built-in ports were originally attached. As such, the ExpressCard adapter utilises a PCIe-based design and can still directly use I/O space addresses and interrupts, thus more closely emulating built-in ports than can be done via USB-based design.

Moreover, because there is no USB stack for the drivers to contend with, throughput can be higher and latency will be lower (significantly in many cases). Due to improved data transfer rate, the ExpressCard is more efficient for multi-tasking operations. The PXP series supports data rates of up to 921.6 Kbps, providing steady flow of data throughput.