S.I. TECH

RS-422 to Fiber Solutions

08/22/16

Stand Alone Bit-Driver®   Mini Bit-Driver®   Rack Mounted Bit-Driver®

USA & International Headquarters
1101 N. Raddant Road
Batavia, IL 60510
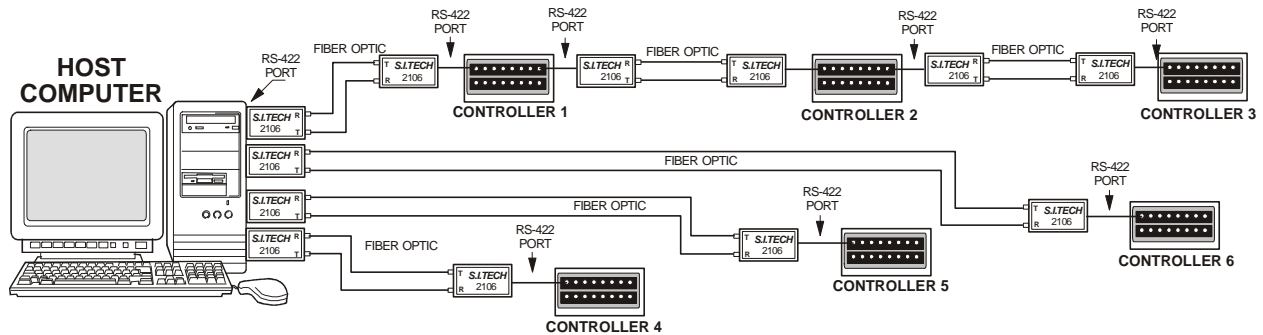Phone: (630) 761-3640 Fax: (630) 761-3644
Web Site: http://www.sitech-bitdriver.com

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RS-422 PRODUCTS

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RS-422 PRODUCTS

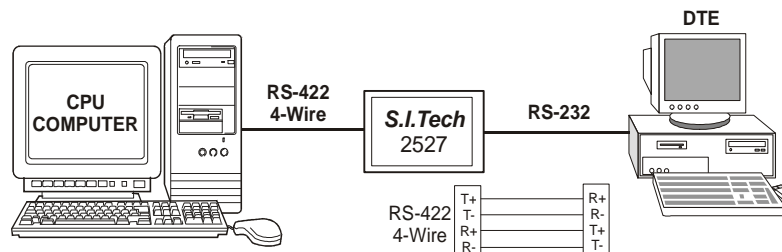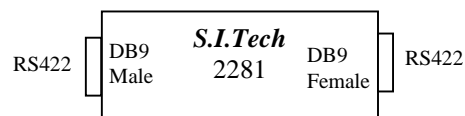### 1. Point to Point:

2. Multiplexer:
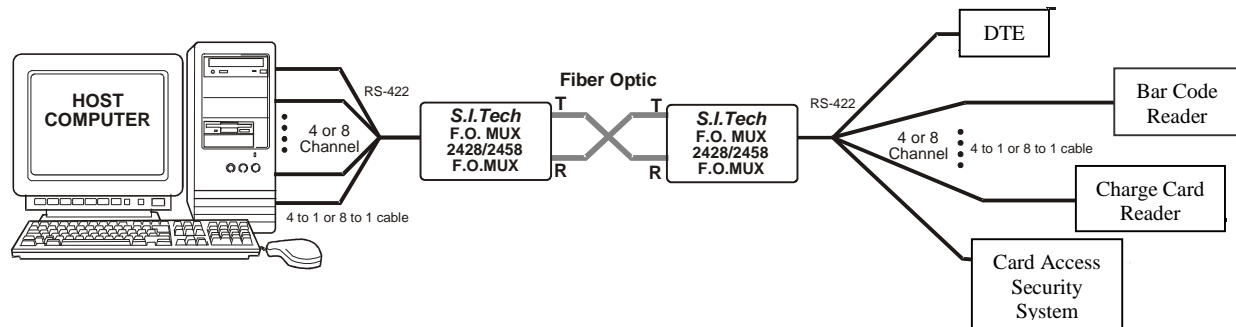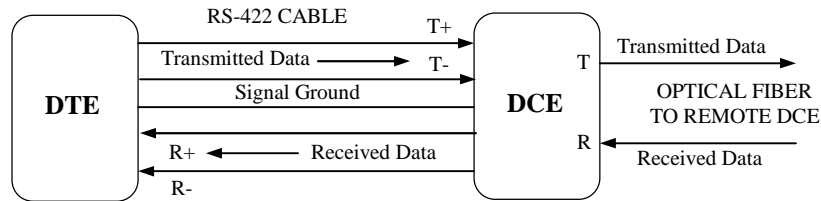

3. Protocol Conversion:

4. Opto Isolated:

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RS-422

EIA-RS-422 is a widely used specification for balanced 4-wire transmission (twisted or 2 twisted shielded pairs) where there is a signal transmit pair and a signal receive pair. Balanced transmission allows much longer distances and reduces the number of data errors.

Typical Setup

S.I.Tech supplies a broad array of products using RS-422 protocol for various applications such as process control, security systems, T-Net, etc..

EIA-422 Standard specifies the electrical characteristics of the balanced voltage digital interface circuit, normally implemented in integrated circuit technology that may be employed when specified for the interchange of serial binary signals between Data Terminal Equipment (DTE) and Data Circuit – Terminating Equipment (DCE) or in any point-to-point interconnection of serial binary signals between digital equipment.

The provisions of EIA-422 may be applied to the circuits employed at the interface between equipment where the information being conveyed is in the form of binary signals at the DC baseband level. This Standard shall be referenced by the specifications and specific interface standards applying these electrical characteristics.

EIA-422 is one of the series relating to the interconnection of DTE and DCE. Other EIA Standards in this series include RS-423-A and RS-449. RS-423 is applicable to unbalanced Interface Circuits and RS-449 is comprehensive Standard covering RS-422 plus flow control and timing circuits. EIA-422 is fully compatible with CCITT recommendations V.11 and X.27.

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RS-422 CONNECTOR

Unlike RS-232, which is a standard for the interface between data terminal equipment and data terminating equipment, including connector dimensions and pin number assignments, RS-422 and RS-485 are standards for the electrical characteristics of balanced digital systems. They specifically do not cover such details as pin assignments.

Over the years, individual manufacturers of equipment having electrical characteristics conforming to RS-422 or RS-485 have selected electrical connections ranging from twisted pig-tails through screw terminals, various type D connectors and modular RJ-XX telephone-type plugs and jacks.

S.I. Tech products made for use in RS-422 or RS-485 systems employ all of the above connection methods to comply with standards set by individual manufacturers. Some of these are shown in the sketches below.

Please check the appropriate tables or individual data sheets to determine which data connection methods are available on the product you are considering and to get pin-out information.

DTE Connector Face Contact Numbering
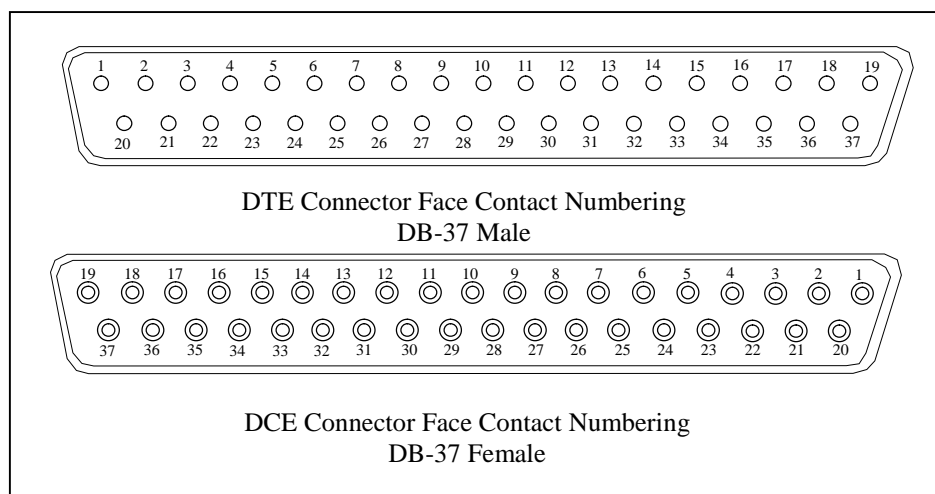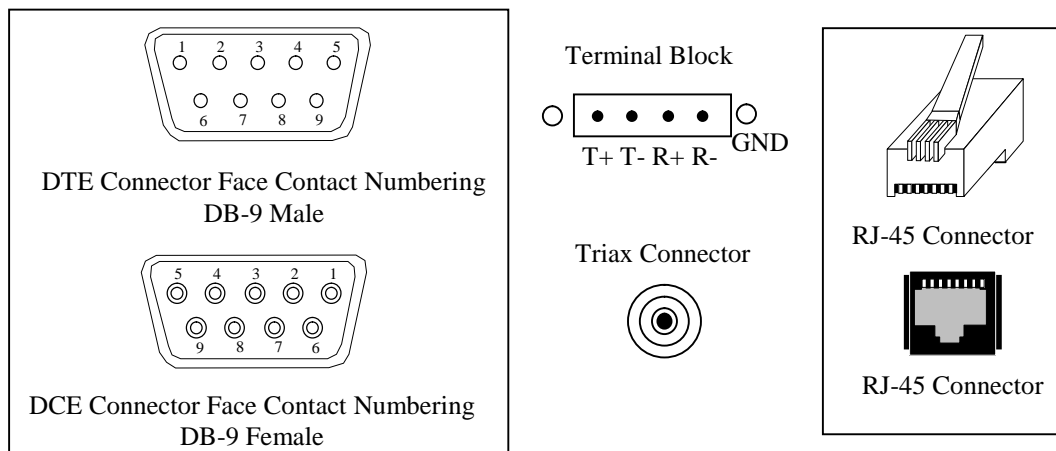DB-9 Male

DCE Connector Face Contact Numbering
DB-9 Female

Terminal Block

T+ T- R+ R-   GND

Triax Connector

RJ-45 Connector

RJ-45 Connector

DTE Connector Face Contact Numbering
DB-37 Male

DCE Connector Face Contact Numbering
DB-37 Female

TABLE D
RS-422 TO FIBER BIT-DRIVERS® (MODEMS)

Model No.	PCB Stand Alone	Mini	Rack Mount Card	Rugge-dized	Max. Data Rate Kbps	Async	Sync	Data Connector** (M or F)	Power Option*	4 Wire Data Connector**	Multimode Fiber Connector	Wavelength**** nm	Singlemode Fiber Connector***** 1300 nm	Point to Point	Multi-Drop	Dist 2 Km	Dist 5 Km	Dist 10 Km	Weight LB/KG	Remarks
2012	✓				56	✓			1,2	Terminal Block	ST/SMA	880	--	✓		✓			3/1.4	Wall Mount
2106		✓			56	✓			6	DB-9M/F	ST/SMA	880	--	✓		✓	✓		.25/.1	Mini, 4 Wire RS-422
2116		✓			38.4		✓		6	DB-9M/F	ST/SMA	880	--	✓		✓	✓		.25/.1	Variable Speed, 4 Wire
2140		✓			230	✓			6	Terminal Block	ST/SMA	820	ST/FC		✓	✓	✓	✓	-4/-2	Multidrop, ADD/Drop
2176		✓			256	✓			6	DB-9 F	ST/SMA	820	ST	✓		✓	✓	✓	.25/.1	High Speed, Mini
2281		✓			2.5M	✓			5	DB-9M/F	--	--	--	--	--	--	--	--	0.8/0.3	Opto Isolated RS-422
2322			✓		56	✓			1,2	RJ45	ST/SMA	880	--	✓		✓	✓		.5/.2	Card - 3000 Chassis
2376			✓		256	✓			1,2	RJ45	ST/SMA	820	ST	✓		✓	✓	✓	.5/.2	Card - 3000 Chassis
2561				✓	115	✓			1,2,3,10	DB-25	ST/SMA	820	ST/FC	✓		✓	✓		0.9/-4	Ruggedized RS-422
2563		✓			115	✓			6	DB-25	ST.SMA	820	ST.FC	✓		✓	✓	✓	0.4/0.2	Three in One RS232/422/485
2857	✓				10 M	✓			1,2	Terminal Block	ST/SMA	820	ST/FC/SC	✓		✓	✓	✓	3/1.4	High Speed RS-422
2859			✓		20M	✓			1,2	Triax Conn	ST/SMA	820	ST/FC	✓		✓	✓	✓	6/3	2 CH RS-422, 1U Rack
2860			✓		20M	✓			1,2	Triax BNC	ST/SMA	820	ST/FC	✓		✓	✓	✓	5/2.3	4 CH RS-422/TTL, 1U Rack
2861			✓		20M	✓			1,2	Coax	ST/SMA	820	ST/FC	✓		✓	✓	✓	5/2.3	5 Ch RS-422/TTL, 1U Rack
2866	✓				20M	✓			4,9	Terminal Block	ST/SMA	820	ST/FC	✓		✓	✓		0.1/0.06	3" X 3" PCB (7.6 X 7.6 cm)
2867		✓			20M	✓			1,2	BNC & Term Blk	ST/SMA	820	ST/FC	✓		✓	✓	✓	6/3	3 CH Switchable RS-422 & TTL
212106		✓			256	✓			--	DB-9F/USB	--	--	--	✓		--			0.25/0.1	RS-422 to USB
Kit #9		✓			256	✓			6	DB-9 F	ST/SMA	820	--	✓					-	POS Kit - Micros System

Data Connector: M or F (F is STD on most models)

* Power Options: See "Power Options and How to Order" sheet (p. 106) for options and ordering instructions.

** Pin outs are specified in data sheets.
Temperature range 0 - 50 degrees C unless shown otherwise.
Extended Temperature (ET) range available on some products.

*** Distance: 2 km - STD, 5 km - L, 10 km - XL, 20 km - UL

**** Use one wavelength throughout system except if WDM is used

***** Only Models having fiber connector entry in this column are available in single mode

HOW TO ORDER

Base Model					Fiber and Connector			
Number	Power*	Data Connector**	Distance***		Multimode (MM)-STD	Singlemode (SM) -Specify	Temperature	
XXXX	1. 110 VAC - STD	M or F (F is STD on most models)	2 Km - STD		ST-STD	ST-STD	0 - 50° C - STD	
	2. 230 VAC - V		Other - Specify		Other-Specify	Other-Specify	-40 to +80° C - ET	
	6. See Chart		L, XL, or UL				Other - Call S.I. Tech	

e.g. 2012 = RS 422 to Fiber Bit-Driver, 110 VAC, Terminal Block, 2 Km, Multimode, ST Connectors, 0 - 50°C
2106 = RS-422 to Fiber, Mini Bit-Driver, DB9F, 2 Km, Multimode, ST Connectors, 0 - 50° C, uses 2121 Power Supply

Specifications subject to change without notice.

S.i.TECH

RS422 TO FIBER OPTIC BIT-DRIVERS®

2012

- ❑ Wall mounted Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 56 Kbps
- ❑ Input/Output Interface is 4 wire (plus ground) Terminal Block for RS-422
- ❑ Power Supply Cord for 110VAC. Order S.I. Tech 2012V for 230VAC
- ❑ Particularly suitable for use with GE, SIEMENS, and other Programmable Controllers in environments such as cargo container cranes at Seaports
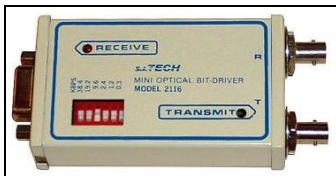
2106

- ❑ Mini Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 56 Kbps
- ❑ Input/Output Interface DB-9 Female (Male optional)
- ❑ Connects directly to Terminal or by RS-422 2 pair cable
- ❑ Uses External Power Supply, S.I. Tech Model 2121 (110VAC) or 2164 (230VAC)
- ❑ T-Net Approved

212106*

- ❑ RS-422 to USB
- ❑ Can be used to Connect Legacy RS-422 Interface to new PCs with only USB ports
- ❑ Supplied with virtual comport drivers
- ❑ Can be used with S.I.Tech #2106 RS-422 Fiber Bit-Driver®

2116

- ❑ Mini Synchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Switch Selectable Synchronous Data Rates from 0.3 through 38.4Kbps
- ❑ Input/Output Interface is DB-9 Male (Female optional)
- ❑ Connects directly to Terminal or by RS-422 2 pair cable
- ❑ Designed to work with United Telecom C, X, and L BUS System
- ❑ Uses External Power Supply, S.I. Tech Model 2121 (110VAC) or 2164 (230VAC)

2176

- ❑ Mini Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 256 Kbps
- ❑ Designed for use with Micros POS Systems
- ❑ Works with S. I. Tech Model 2376 Card Mounted Bit-Driver
- ❑ Use External Power Supply S.I.Tech 2121 (110VAC – USA) or 2164 (230VAC)

2322

- ❑ Card Cage Mounted Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 56 Kbps
- ❑ Input/Output Interface is 8 Pin RJ-45 Female Connector
- ❑ Available on Eurocard, fits S.I. Tech Model 3000A, 19 inch Rack
- ❑ Designed to work with S.I. Tech Model 2106 or 2012 Bit-Drivers®

2376

- ❑ Card Cage Mounted Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 256 Kbps
- ❑ Input/Output Interface is 8 Pin RJ-45 Female Connector
- ❑ Switchable Line Termination provided
- ❑ Designed for use with Micros System
- ❑ Designed to work with S.I. Tech Model 2176 Mini Bit-Driver®

2857

- ❑ High Speed Stand Alone Asynchronous Simplex or Full Duplex Optical Bit-Driver®
- ❑ Max Data Rate is 20 Mbps
- ❑ Input/Output Interface is 4 Wire (plus Ground) Terminal Block for RS-422
- ❑ Power Supply Cord for 110VAC. Order S.I. Tech Model 2857V for 230VAC
- ❑ Available as 1/2/4 Channel in 1U high rack

2140*

- ❑ RS422/RS485 (4 Wire) Multidrop Bit Driver
- ❑ Fiber in, Fiber out, RS422 Drop
- ❑ Up to 230 Kbps Data Rate
- ❑ Multimode or Single mode
- ❑ Repeater with RS422/RS485 (4 Wire) Add/Drop
- ❑ 12VDC Power

2281*

- ❑ Opto Isolated RS422 to RS422
- ❑ DB9 Male to DB9 Female
- ❑ Data Rate to 2.5 Mbps
- ❑ Input Power 10 to 15VDC nor VAC
- ❑ 1000 VAC Isolated

2561*

- ❑ Up to 115.2 Kbps Async Operation
- ❑ Extended Temp Range: -40 to +80°C
- ❑ Ruggedized Enclosure, Panel Mounting
- ❑ Complies with IEEE C37-90-1
- ❑ IEC 801 Surge Protection
- ❑ Conformal Coated – Environmental Protection
- ❑ Various AC/DC Power Options

S.I.TECH

2563*

- ❑ "Three in One" Design RS232/422/485 to Fiber Bit-Driver
- ❑ Max Data Rate is 115.2 Kbps
- ❑ Multimode or Single mode
- ❑ DIN Rail Option
- ❑ 12VDC Power

2859*

- ❑ 2 Channel RS422 Fiber Optic Bit Driver
- ❑ 1U High Case
- ❑ Up to 20 Mbps data rate
- ❑ Multimode or Single mode
- ❑ Uses Triax Connector for High Level Instrumentation, Security, Shielding. Used for Military Systems.

2860*

- ❑ 4 Channel RS422 and TTL to Fiber Optic Bit Driver
- ❑ 1U High Case
- ❑ Up to 20 Mbps Data rate
- ❑ Multimode or Single mode
- ❑ Uses Triax (RS-422 Input) and BNC (TTL Output) to Connect to High Speed Network
- ❑ Used in Military System for High Security

2861*

- ❑ 5 Channel RS422 and TTL to Fiber Optic Bit Driver
- ❑ 1U High Case
- ❑ Up to 20 Mbps Data rate
- ❑ Multimode or Single mode
- ❑ Uses Coax Connectors
- ❑ Unit has Isolated Filtered Power Supply and Isolated Grounds

2867*

- ❑ 3 Channel RS422 and TTL Switchable Input to Fiber Optic Bit Driver with Continuous RS-422 and TTL Outputs
- ❑ 1U High Case
- ❑ Up to 20 Mbps Data rate
- ❑ Multimode or Single mode
- ❑ Uses BNC and Terminal Blocks
- ❑ Used in Military System

Kit #9*
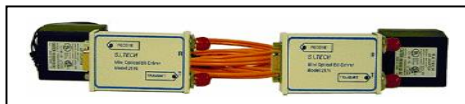
- ❑ POS Kit: 2 – 2176 Bit Driver (RS422), 2 – 2121 Power Supplies, 1 – 5202-010-8255 (10m) FO Cable Assembly, ST/ST. 1 – 7176 Cable Assembly, 1 – 7177 Cable Assembly
- ❑ Designed for Micros System Provides Electrical Isolation to Protect Computer, POS Terminals
- ❑ Long Distances are Possible

TABLE E
RS-422 TO FIBER MULTIPLEXERS

Package		Model No.	Max. Data Rate Kbps	Data Format			Power Option*	Data Connector**	Number of Channels	Point to Point		Distance *** Km				Weight LB/KG	Multimode (820 nm)/ Singelmode (1300 nm)	Trunk**** Fiber Connector	Remarks
Stand Alone	Rack Mount			Control Signals	Async	Sync				Point to Point	Multidrop	2	5	10	20		MM/SM		
√		2424	256		√		1,2	DB37 F	4	√		√	√	√	√	3/1.4	MM/SM	ST/SMA	uses 1 to 4 cable 7024
√		2428	76.8		√		1,2	DB37 F	8		√	√	√	√	√	3/1.4	MM/SM	ST/SMA	uses 1 to 8 cable 7028

* Power Options: See "Power Options and How to Order" sheet (p. 106) for options and ordering instructions.

** Pin outs are specified on data sheets

*** Distance: 2 km - STD, 5 km - L, 10 km - XL, 20 km - UL.

****Other connector options for singlemode is FC.

Temperature range 0 - 50 degrees C unless shown otherwise.

HOW TO ORDER

Base Model

Number	Power*	Data Connector**	Distance***	Fiber and Connector		Temperature
				Multimode (MM) - STD	Singelmode (SM)-Specify	
XXXX	110V - STD 230VAC - V	M or F (F is STD on most models.)	2 Km - STD Other - Specify L, XL, or UL	ST - STD Other - Specify	ST - STD Other - Specify	0 - 50° C - STD Other - Call S.I. Tech

e.g. 2424 = RS422 Async, 4 CH Fiber Multiplexer, 110VAC, DB37 F, 2Km, Multimode ST, 0-50 C

Specifications subject to change without notice.

S.i.TECH

RS-422 TO FIBER MULTIPLEXERS

2424

- ❑ Four Channel Asynchronous Simplex or Full Duplex Time Division Multiplexer Optical Bit-Driver®
- ❑ Max Data Rate is 256 Kbps on each channel
- ❑ Powered through 110 VAC line cord
- ❑ 230 VAC version available as S.I. Tech Model 2424V
- ❑ Each unit requires 4-to-1 RS-422 cable S.I. Tech #7024

2428

- ❑ Eight Channel Asynchronous Simplex or Full Duplex Time Division Multiplexer Optical Bit-Driver®
- ❑ Max Data Rate is 76.8 Kbps on each channel
- ❑ Powered through 110 VAC line cord
- ❑ 230 VAC version available as S.I. Tech Model 2428V
- ❑ Each unit requires 8-to-1 RS-422 cable S.I. Tech #7028

Model 2012

S.I.TECH

Asynchronous Fiber Optic Bit - Driver ®

Features:
- Designed to work with Siemens Optoflex fiber optic cable.
- Designed to work with GE and other programmable controllers with RS-422 interface.
- Particularly suitable for cargo container cranes at seaports.
- Wall/Panel mount case.

S.I.Tech Bit-Driver®
MODEL 2012
DCD TD RD
T+ T- R- R+ G

Specification	Value
Operation Mode:	Asynchronous, simplex or full duplex, 56 Kbps
Input/Output Interface:	RS-422, 4 Wire Terminal Block
Transmission Line Interface:	2 ST connector fiber optic receptacles (SMA option). Duplex fiber optic cable.
Transmission Distance:	6600 ft. (2km) (5 km option)
Transmitter Output Power:	0.5 Microwatts into 50 Micron fiber
System Wavelength:	880 nm (1300 nm Option)
Minimum Sensitivity:	15 nanowatt @ 880 nm at less than 10^{-9} bit error rate
Operating Temperature:	0 $^{\circ}$C to 50 $^{\circ}$C
Metal Enclosure:	6.25" X 8.5" X 2.5" wall mount (15.9 X 21.6 X 6.4 cm)
Weight:	3 lbs.
Input Power:	110 VAC 60 Hz
230 Volt Version:	2012V

UL listed. Meets FCC Requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/km	Distance* Meters	Distance Feet
50	3.0	2000	6600
100	5.0	2000	6600
62.5	4.0	2000	6600
10**	1.0	7000	23000

* 4 km option available
** Single Mode option

RS-422 CONFIGURATION

CUSTOMER EQUIPMENT	S.I.TECH 2012	SIGNAL
R+	T+	TRANSMIT DATA +
R-	T-	TRANSMIT DATA -
T+	R+	RECEIVE DATA +
T-	R-	RECEIVE DATA -
GND	G	GROUND

Model 2106

S.I.TECH

Optical Asynchronous Mini Bit-Driver® Point to Point

RECEIVE   **R**

s.i.TECH
MINI OPTICAL BIT-DRIVER®
MODEL 2106

TRANSMIT   **T**
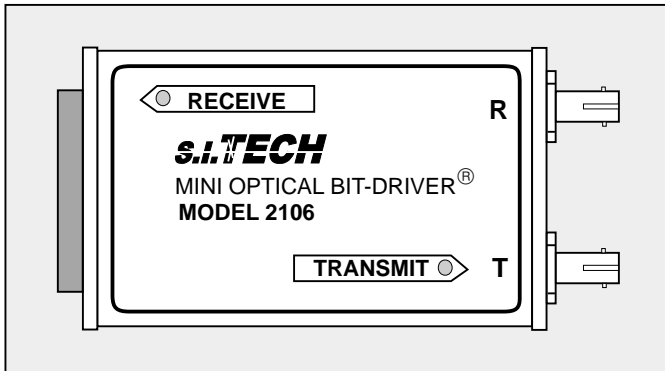
Features:
- 50 to 115.2 Kbps asynchronous, simplex or full duplex operation
- 6600 ft (2 Km) distance capability
- 0 ºC to 50 ºC operating range
- ST connector receptacles (SMA option)
- RS-422 or 4 Wire RS-485
- Can be used with T-Network

Operation Mode: Asynchronous, simplex or full duplex

Input/Output Interface: RS-422, 9 pin type D, (4 Wire RS-485) Asynchronous at 50 to 115.2 Kbps, connects directly to terminal (RS-422 cable not required)

Transmission Line Interface: ST connector is standard for interfacing with fiber optic duplex cable (SMA option)

Transmssion Distance: 6600 Ft (2 Km).

Optical Power into a 50 Micron Core Optical Fiber: 0.5 microwatt, 10 dB power budget* @ 880 nanometers

Receiver Sensitivity: 50 nanowatts at less than 10^{-9} bit error rate

Operating Temperature: 0 ºC to 50 ºC

Metal Enclosure: 1.75 x 3 x 0.625 in (4.5 x 7.5 x1.6 cm) Panel or DIN rail mounting option

Weight: 0.25 lb (100 grams)

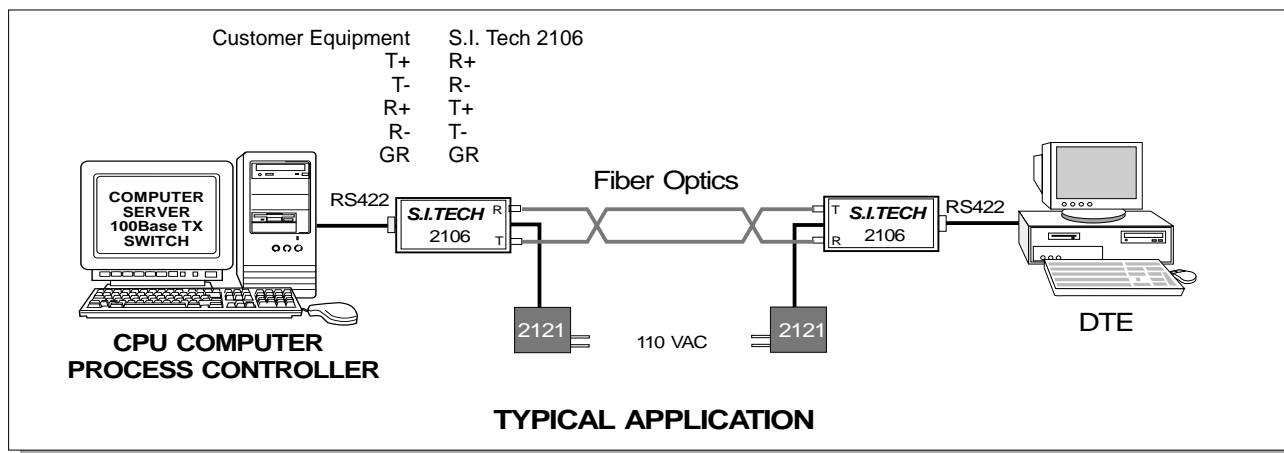**Input Power:** External with power supply (S.I. Tech #2121 - 110 VAC to 12 VDC)

230V Version: Use S.I.Tech #2122 power supply

RS - 422 PINS UTILIZED BY 2106 MINI BIT - DRIVER® 9 PIN CONNECTOR - FEMALE (MALE OPTION)

Pin No.	Description	Symbol
1	Ground	
3	Transmit Data (+)	T +
4	Receive Data (+)	R +
5	Ground	
6	Receive Data (-)	R -
9	Transmit Data (-)	T -

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/Km	Distance Meters*	Distance Feet*
1000	200	100	330
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600

* High power option available
1000 Micron is plastic fiber, 660nm, SMA connectors

Meets FCC Requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

UL CSA CE

Customer Equipment | S.I. Tech 2106
T+ | R+
T- | R-
R+ | T+
R- | T-
GR | GR

COMPUTER SERVER 100Base TX SWITCH

RS422 **S.I.TECH** R 2106 T

Fiber Optics

T **S.I.TECH** 2106 R RS422

CPU COMPUTER PROCESS CONTROLLER

2121   110 VAC   2121

DTE

TYPICAL APPLICATION

Model 2116

S.I.TECH

Optical Synchronous Mini Bit-Driver® Point to Point

RECEIVE R

S.I.TECH
MINI OPTICAL BIT-DRIVER®
MODEL 2116

KBPS 38.4 19.2 9.6 2.4 1.2 0.3

TRANSMIT T
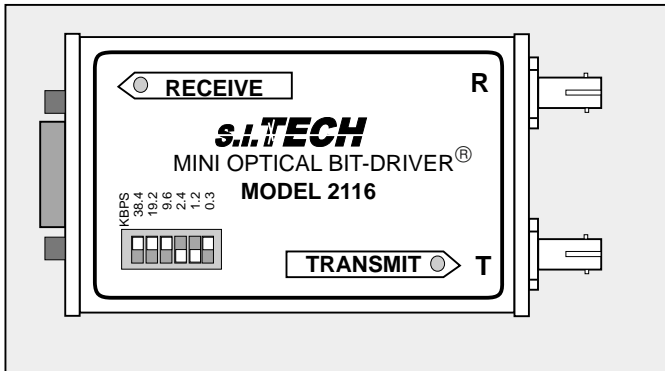
Features:
- 0 to 38.4 Kbps synchronous, simplex or full duplex operation
- 6600 ft. (2Km) distance capability
- 0 $^{\circ}$C to + 50 $^{\circ}$C operating range
- ST connector receptacle (SMA option)
- Designed to work with C, X, and L BUS system
- Switch is provided to set system speed

Operation Mode: Synchronous, simplex or full duplex

Input/Output Interface: RS-422, 9 pin type D, asynchronous at 0 to 38.4 Kbps, connect directly to terminal (RS 422 cable not required)

Transmission Line Interface: ST connector is standard for interfacing with fiber optic cable (SMA option)

Optical Power into a 50 Micron Core Optical Fiber: 0.5 microwatt, 10 dB power budget* @ 880 nanometers

Receiver Sensitivity: 50 nanowatts at less than

Bit Error rate: 10^{-9} bit error rate

Operating Temperature: 0 $^{\circ}$C to 50 $^{\circ}$C

Metal Enclosure: 1.75 x 3 x 0.625 in (4.5 x 7.5 x1.6 cm) Panel or DIN rail mounting option

Weight: 0.25 lb (100 grams)

Input Power: External with power supply (S.I. Tech #2121 - (110VAC to 12 Volt DC)

230V Version: Use S.I.Tech #2122 power supply

RS - 422 PINS UTILIZED BY 2116 MINI BIT - DRIVER®
9 PIN CONNECTOR - MALE (Female Option)

Pin No.	Description	Symbol
1	Signal Ground	SG
3	Transmit Data (+)	T + (SSD)
4	Receive Data (+)	R + (SRD)
5	Protective Ground	Chassis
6	Receive Data (-)	R - (RC) Receive Common
9	Transmit Data (-)	T - (SC) Send Common

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/km	Distance Meters*	Distance Feet*
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600

* High power option available

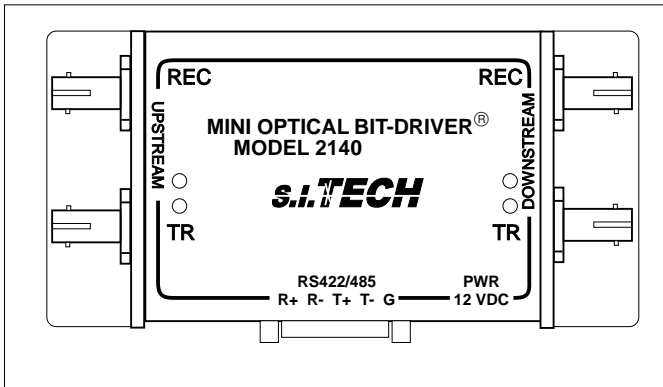*Meets FCC Requirements of Class A, Part 15 Computing Devices Standard.*
Specifications subject to change without notice.

(UL) (SP) CE

Computer Equipment   S.I. Tech 2116
T+   R+
T-   R-
R+   T+
R-   T-
GND   GND

COMPUTER SERVER 100Base TX SWITCH

RS422   S.I.TECH 2116   FIBER OPTICS   S.I.TECH 2116   RS422

2121   110 VAC   110 VAC   2121

CPU COMPUTER PROCESS CONTROLLER   **DTE**

TYPICAL APPLICATION
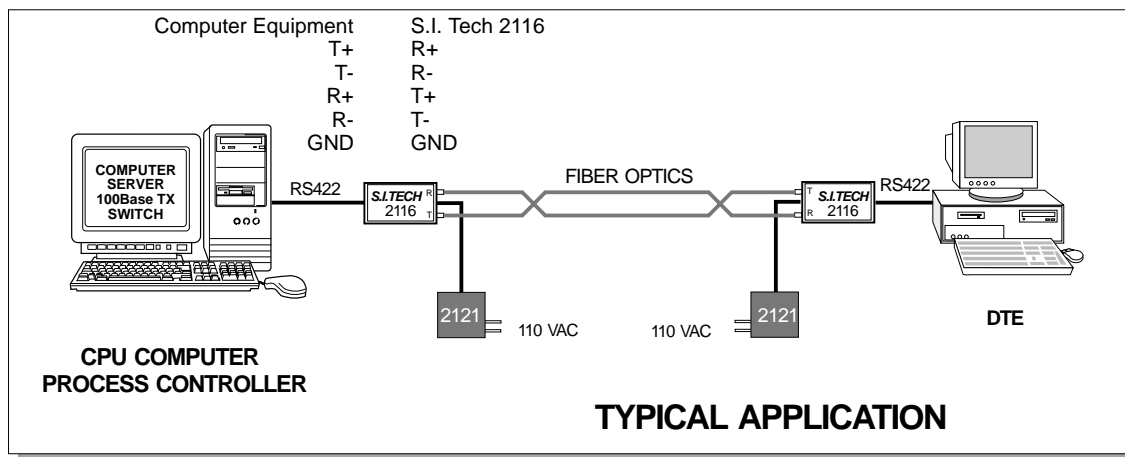
Model 2140

Optical Mini Bit-Driver ®

Features:
- RS-422/485 Multipoint operation with up to 32 nodes
- Various speeds - 110 bps to 230 Kbps, 4 Wire (Speed set at the factory)
- Flange Mounting
- Multimode or single mode options
- Repeater with 4-wire RS-422/485 Add/Drop

Fiber ports repeat data through the 2140 and drop/insert data on the RS-422/485 port. The RS-422/485 port inserts data onto both fiber ports and drops data from both fiber ports.

Operation Mode:	RS-422/485 Full duplex
Input/Output Interface:	RS-422/485, 4 wire port operating 110 bps to 230 Kbps (Factory set)
Transmission Line Interface:	ST connectors are standard for interfacing with fiber optic duplex cable (SMA option)
Optical Power into a 62.5 Micron Core Optical Fiber:	30 microwatts, 13 dB power budget @ 850 nanometers (1300 nm option)
Receiver Sensitivity:	1 microwatts at less than 10^{-9} bit error rate.
Operating Temperature:	0 °C to 50 °C (-40 to +70 °C option for Multimode)
Metal Enclosure:	5.5 x 2.3 x 1.0 in (with flange) (13.97 x 5.84 x 2.54 cm) Panel or DIN rail mounting option
Weight:	0.4 lbs (182 grams)
Input Power:	External with power supply (S.I. Tech #2121 - 110 VAC to 12 VDC)
230 Volt Version:	Use S.I.Tech 2122 power supply

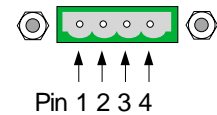*Meets FCC requirements of Class A, Part 15 Computing Devices Standard.*
Specifications subject to change without notice.

RS - 422/485 CONNECTOR

Pin No.	Description
1	R+ (Input)
2	R- (Input)
3	T+ (Output)
4	T- (Output)

RS - 422/485 CONNECTOR

Pin 1 2 3 4

OPERATING DISTANCE FOR FIBER OPTIC CABLE

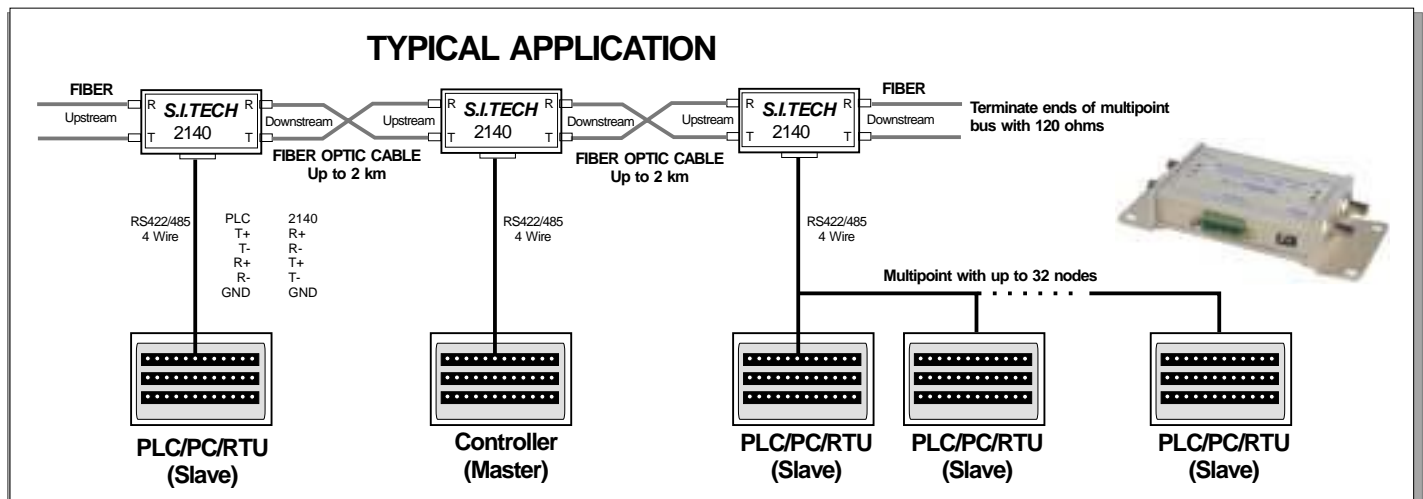| Fiber Size (Microns)	Attenuation dB/Km	Distance Meters*	Distance Feet*
50	3.0	2000	6600
62.5	4.0	2000	6600
10 SM	1.0	10000	33000

* High power option available
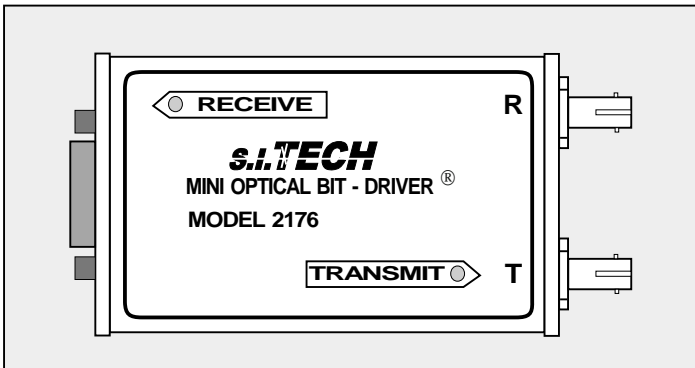SM - Single Mode (1300nm). Temp: SM -20° to +60° C

ORDERING INFORMATION

Model Number	Description
2140	Multimode to Multimode, ST Connectors
2140-MM-B	Multimode to One side blank, ST Connectors
2140-MM-SM	Multimode to Single Mode, ST Connectors
2140-SM-SM	Single Mode to Single Mode, ST Connectors

TYPICAL APPLICATION

Terminate ends of multipoint bus with 120 ohms

FIBER OPTIC CABLE Up to 2 km

FIBER OPTIC CABLE Up to 2 km

Multipoint with up to 32 nodes

PLC	2140
T+	R+
T-	R-
R+	T+
R-	T-
GND	GND

PLC/PC/RTU (Slave) — **Controller (Master)** — **PLC/PC/RTU (Slave)** — **PLC/PC/RTU (Slave)** — **PLC/PC/RTU (Slave)**

S.I.TECH

Optical Asynchronous Mini Bit - Driver ® Point to Point

RECEIVE R

s.i.TECH
MINI OPTICAL BIT - DRIVER ®
MODEL 2176

TRANSMIT T

FEATURES:

- 0 to 256 Kbps asynchronous, simplex or full duplex operation
- 6600 ft. (2 Km) distance capability
- 0 °C to 50 °C operating range
- ST connector receptacle (SMA Option)
- Designed to work with Micros Systems
- Cable assemblies 7176 & 7177

Operation Mode: Asynchronous, simplex or full duplex

Input/Output Interface: RS-422, 9 pin Type D, asynchronous at 0 to 256 Kbps, connects directly to terminal (RS422 cable not required)

Transmission Line Interface: ST connector is standard for interface with fiber optic duplex cable (SMA option)

Optical Power into a 50 Micron Core Optical Fiber: 5 microwatts, 13 dB power budget @820 nanometers (1300nm option)

Receiver Sensitivity: 250 nanowatts at less than 10^{-9} bit error rate

Operating Temperature: 0 °C to 50 °C

Input Power: External with Power Supply (S.I. Tech #2121 - 110 VAC to 12 VDC)

230 Volt Version: Use S.I. Tech #2122 power supply

Metal Enclosure: 1.75" x 3" x 0.625" (4.5 x 7.5 x 1.6 cm) Panel or DIN rail mounting option

Weight: 0.25 lb (100 grams)

Card Version: 2376 (3000 Rack)

RS - 422 PINS UTILIZED BY 2176 BIT-DRIVER ® 9 PIN CONNECTOR (FEMALE)

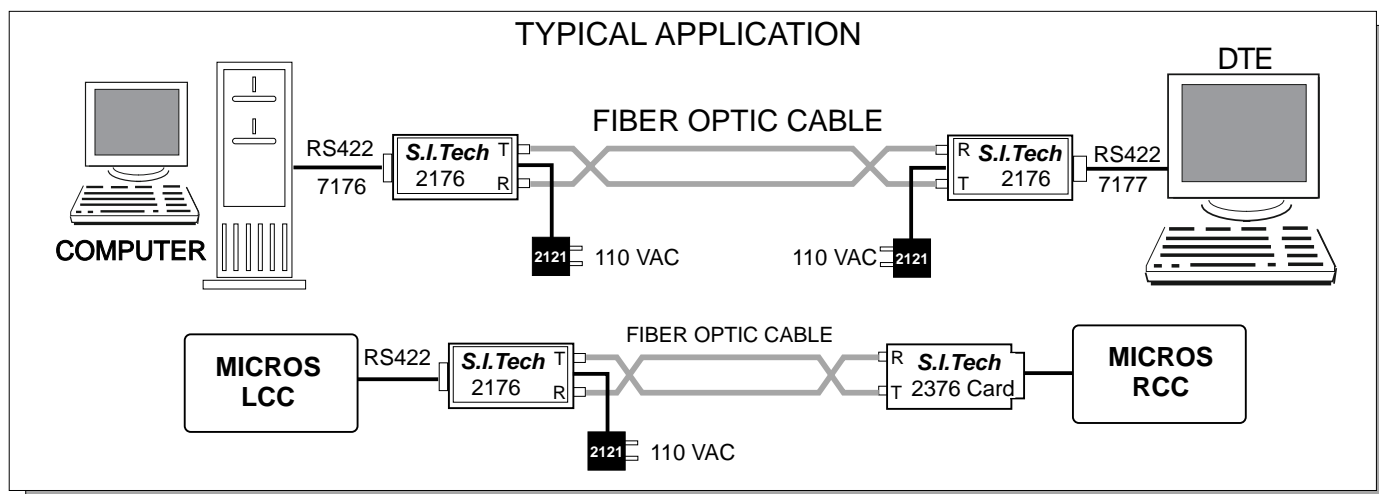| Pin No	Description	Symbol
1	Ground	SG
3	Transmit Data (+)	T + (SSD)
4	Receive Data (+)	R + (SRD)
5	Protective Ground	Chassis
6	Receive Data (-)	R - (RC) Receive Common
9	Transmit Data (-)	T - (SC) Send Common

Operating Distance for Fiber Optic Cable

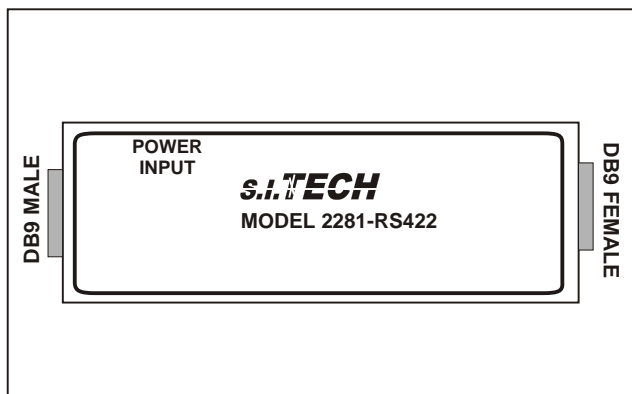| Fiber Size (Microns)	Attenuation dB/Km	Distance* Meters	Distance* Feet
50	3.0	2000	6600
62.5	4.0	2000	6600
10 SM	1.0	7000	23000

* High power option available / SM - Single Mode option (1300nm)

UL & CSA listed. Meets FCC Requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

(UL) (CSR) C E

TYPICAL APPLICATION

DTE

FIBER OPTIC CABLE

RS422
7176

S.I.Tech T
2176 R

R **S.I.Tech**
T 2176

RS422
7177

COMPUTER

2121 110 VAC

110 VAC 2121

MICROS LCC

RS422

S.I.Tech T
2176 R

FIBER OPTIC CABLE

R **S.I.Tech**
T 2376 Card

MICROS RCC

2121 110 VAC

Model 2281

S.I.TECH

Asynchronous Metallic Isolated Bit-Driver

POWER
INPUT

s.i.TECH

MODEL 2281-RS422

DB9 MALE

DB9 FEMALE

The S.I.Tech Model 2281 is an optically isolated RS422 to RS422 converter. It combines connector to connector compatibility with outstanding performance characteristics. It supports full duplex transmission between compatible EDP equipment at speeds up to 2.5 Mbps.

RS - 422 DB-9 CONNECTOR PINS UTILIZED BY 2281 BIT DRIVER

Pin No	Function	Male	Female
1	TD1+	Input	Output
6	TD1-		
2	TD2+	Input	Output
7	TD2-		
4	RD1+	Output	Input
8	RD1-		
5	RD2+	Output	Input
9	RD2-		
3	GND		

FEATURES and SPECIFICATIONS

Interface: Two pair bidirectional RS422 4-wire interface
Connectors: DCE DB9-P (male), DTE DB9-S (female)
Data Rate: 0 to 2.5 Mbps.
Cable: Shielded 100 - 200 twisted pairs. Using 24AWG with 52.5PF/m shunt capacitance cable length supported of 1200m at rates less than 90kbps and falling to 20m at rate of 2.5Mbps.
Isolation: 1000VAC between the DTE port and the DCE and power ports
Power: 10 to 15VDC or 8 to 13VAC, about 2 watts. (Use S.I.Tech #2121 external power supply)
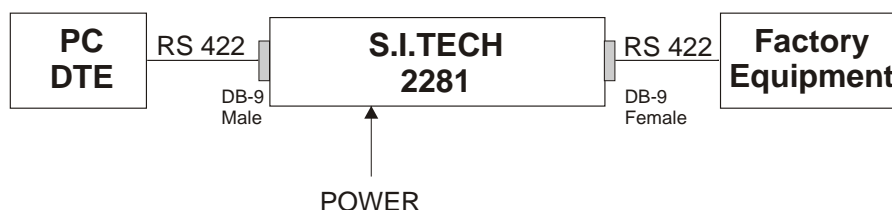Temperature: 0 to 50°C

Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

U_L CE

TYPICAL APPLICATION

PC
DTE

RS 422

DB-9
Male

S.I.TECH
2281

RS 422

DB-9
Female

Factory
Equipment

POWER

Model 2561

S.I.TECH

Optical Asynchronous Ruggedized Mini Bit-Driver

Features:

- Up to 115 Kbps asynchronous operation on fiber optic cable, simplex or full duplex operation
- $-40\ ^oC$ to $+80\ ^oC$ operating range**
- Metal ST connector receptacle (SMA option)
- LED indicators for power, transmit, and receive data
- Female DB25 connector
- Complies with IEEE C37.90.1
- IEC 801 Surge Protection
- Panel Mounting Brackets, two mounting locations
- Conformal coating
- See distance chart

Operation Mode:	Asynchronous, simplex or full duplex
Input/Output Interface:	RS-422, DB25F connector
Transmission Line Interface:	Metal ST connector is standard for interfacing with fiber optic duplex cable (SMA option, SC and FC option for SM)
Transmission Distance:	See Chart
Optical Power into a 62.5 Micron Core Optical Fiber:	30 microwatts, 10 dB power budget @ 820 nanometers (1300 nm Option)
Receiver Sensitivity:	3 microwatts at less than 10^{-9} bit error rate
Operating Temperature:	-40 ^oC to +80 ^oC for Multimode -20 ^oC to +60 ^oC for Single mode
Humidity:	0 to 90% Non Condensing
Metal Enclosure:	7.25 X 2.28 X 1.3 in (18.4 X 5.8 X 3.3 cm)
Weight:	0.9 lb. (400 grams)
Input Power:	85 V to 265 VAC or DC (+24 VDC and -48 VDC Option)
Card Version:	S.I.Tech #2361 with Series 3000 Rack

Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

RS - 422 CONNECTOR PINS UTILIZED BY 2561 MINI BIT - DRIVER (FEMALE)

Pin No.	Description	Symbol
1	Protective Ground	Chassis GND
7	Signal Ground	Sig. GND
14	Transmit Data +	T+ ⎫ Output
15	Transmit Data -	T- ⎭
21	Receive Data +	R+ ⎫ Input
22	Receive Data -	R- ⎭

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/Km	Distance* Meters	Distance* Feet
50	3.0	2000	6600
62.5	4.0	2000	6600
10 SM**	1.0	10000	33000

* High power option available. SM - Single mode (1300nm) option
Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.
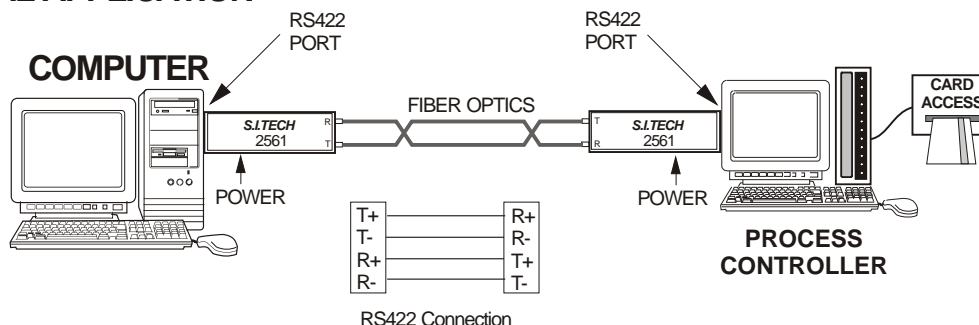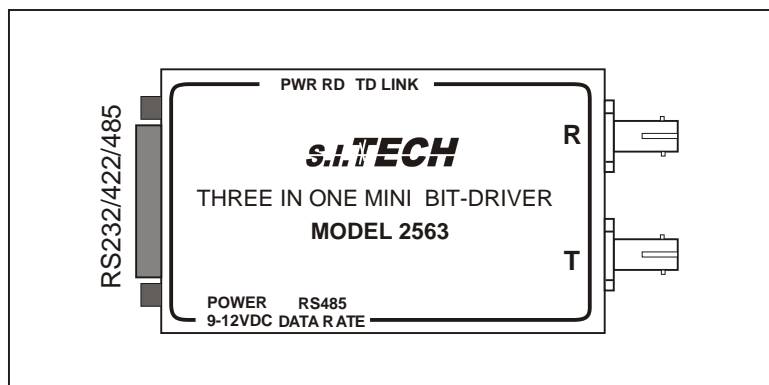** SM - Temperature Rating: -20 ^oC to +60 ^oC

TYPICAL APPLICATION

Model 2563

S.I.TECH

Optical Asynchronous (Three In One) Mini Bit-Driver

Operation Mode: Asynchronous, simplex or full duplex

Input/Output Interface: Fully independent RS232/RS422/RS485, asynchronous concurrent. DB25 connector

Transmission Line Interface: Metal ST connector is standard for interfacing with fiber optic duplex cable (SMA option, SC and FC option for SM)

Transmission Distance: See Distance Chart

Optical Power into a 62.5 Micron Core Optical Fiber: 20 microwatts, 10 dB power budget @ 820 nanometers (1300 nm Option)

Receiver Sensitivity: 2 microwatts at less than 10^{-9} bit error rate

Operating Temperature: 0 $^{\circ}$C to 50 $^{\circ}$C

Metal Enclosure: 3.6" X 2.3" X 1.2" (9.1 X 5.84 X 3.0 cm)

Weight: 0.4 lb. (185 grams)

Input Power: 9 to 12VDC, 200mA

Features:

- Concurrent, fully-independent RS232, RS422, and RS485 communication channel over a one duplex fiber optic cable (data is multiplexed over fiber link)
- Up to 115kbps asynchronous operation
- Full duplex RS232 and RS422
  - Optional tri-state control for bus RS422 systems
- Half duplex RS485
  - Rotary switch sets the RS485 bit rate
- Metal ST connector receptacle (SMA option)
- Female DB25 connector RS232 wired as DCE device
- LED indicators for power, optical link status, transmit and receive data
- Optical link status pin
- Multimode or single mode
- DIN rail mounting option

S.I.Tech 2563 is a unique Bit-Driver allowing simultaneous communication using RS232, RS422, and RS485. Each electrical interface is totally independent and share combined fiber link. This way equipment with different interfaces can be connected over the same fiber link i.e. in a manufacturing plant.

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/Km	Distance* Meters	Distance* Feet
50	3.0	2000	6600
62.5	4.0	2000	6600
10 SM	1.0	5000	16000

* High power option available. SM - Single Mode option
Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.

DB25 Female Connector Pinout

STD	Pin	Designation	Description	Direction
RS232	2	TD	Transmit Data	Input
	3	RD	Receive Data	Output
	4	RTS	Request to Send	Looped
	5	CTS	Clear to Send	Back
	6	DSR	Data Set Ready	Looped
	20	DTR	Data Terminal Ready	Back
	8	OSD	Optical Signal Detect	Output
	7	SG	Signal Ground	
	1	PG	Chassis Ground	
RS422	12	RS422 Tx+	Transmit Data	Input
	24	RS422 Tx-	Balanced Pair	
	13	RS422 Rx+	Receive Data	Output
	25	RS422 Rx-	Balanced Pair	
	11	SG	Signal Ground	
	23	PG	Chassis Ground	
RS485	10	RS485 D+	Bidirectional Data	Half
	22	RS485 D-	Balanced Pair	Duplex
	11	SG	Signal Ground	
	23	PG	Chassis Ground	

Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
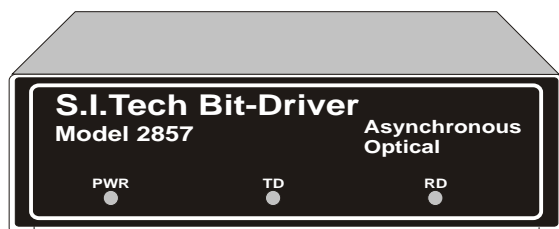*Specifications subject to change without notice.*

TYPICAL APPLICATION
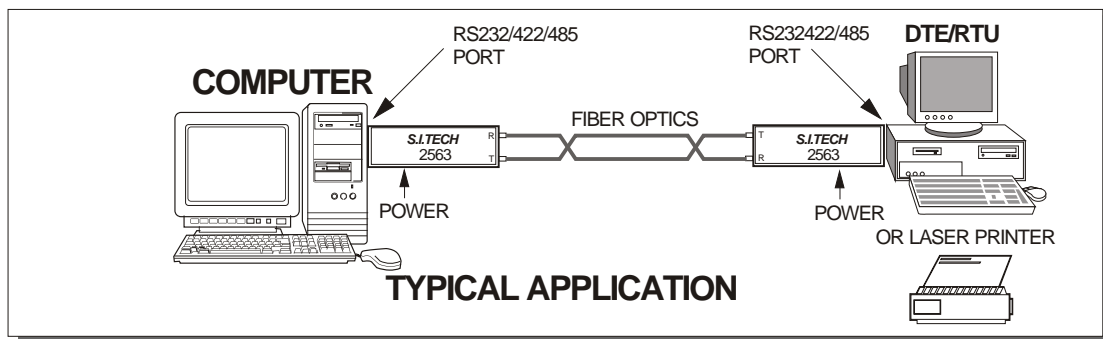
RS485 Data Rate

0	1200 bps
1	2400 bps
2	4800 bps
3	9600 bps
4	19.2 Kbps
5	38.4 Kbps
6	76.8 Kbps
7	115.2 Kbps

RS-422 to Fiber Optic Bit-Driver

S.I.Tech Bit-Driver
Model 2857   **Asynchronous Optical**

PWR   TD   RD

The S.I.Tech Model 2857 is designed for high speed RS-422 data communication using fiber. This system uses 4 wire RS-422.

Status Indicators:
PWR: Power On
TD: Optical Transmitter On
RD: Optical Port Receiving Data

T+
T- ⎯ Output

R+
R- ⎯ Input

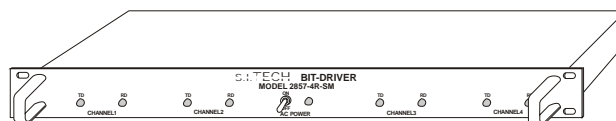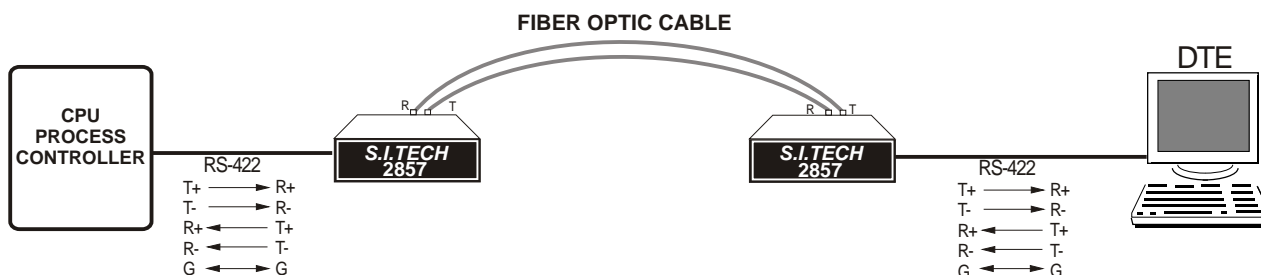| Operation Mode:	Asynchronous, simplex or full duplex, 20 Mbps
Input/Output Interface:	RS-422, 4 wire terminal block
Transmission Line Interface:	2 ST fiber optic receptacles (SMA option)
Transmission Distance:	See distance chart
Transmitter Output Power:	30 microwatts into 50 micron fiber
System Wavelength:	820 nanometers (1300 nm option)
Minimum Sensitivity:	3 microwatts @ 820 nanometers at less than 10^{-9} bit error rate
Operating Temperature:	$0\ ^{\circ}C$ to $50\ ^{\circ}C$
Input Power:	110 VAC 60 Hz
Metal Enclosure:	7.5" x 7" x 3" (19 x 17.8 x 7.6 cm)
1U 19" Rack:	17"W x 1.75"H x 7.5"D (43.2 x 4.3 x 19.0 cm)
Weight:	3 lbs. (1.36 kg)
230 Volt Version:	2857V

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation (dB/Km)			Distance (Meters)			Distance (Feet)		
	Wavelength (nm)			Wavelength (nm)			Wavelength (nm)		
	850	1300	1550	850	1300	1550	850	1300	1550
50	3.0	1.0	-	2000	6000	-	6600	20000	-
62.5	4.0	1.0	-	2000	6000	-	6600	20000	-
10 SM*	-	0.35	0.25	-	10000	12000	-	33000	40000

 * Single mode (1300nm) option
Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.

Related Products

Model Numbers

2857	RS422 to Fiber, Multimode, 110VAC, ST
2857-V	RS422 to Fiber, Multimode, 230VAC, ST
2857-SM	RS422 to Fiber, Single Mode, 110VAC, ST
2857-2R	RS422 to Fiber, 2 Ch Rack Mounted, 110VAC, ST
2857-4R	RS422 to Fiber, 4 Ch Rack Mounted, 110VAC, ST
2857-4R-SM	RS422 to Fiber, 4 Ch Rck Mnt, Single mode, 110VAC, ST

S.I.TECH BIT-DRIVER
MODEL 2857-4R-SM
TD RD CHANNEL1   TD RD CHANNEL2   AC POWER   TD RD CHANNEL3   TD RD CHANNEL4

Meets FCC Requirements of Class A, Part 15 Computing Device Standard. UL listed.
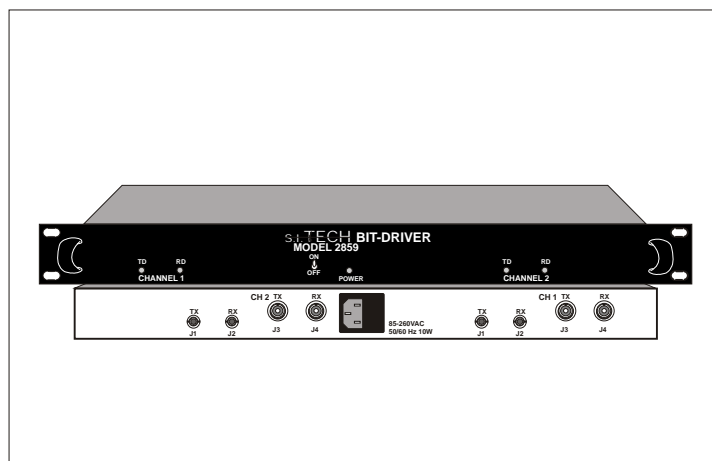*Specifications subject to change without notice.*

TYPICAL APPLICATION

FIBER OPTIC CABLE

DTE

CPU PROCESS CONTROLLER

RS-422
T+ → R+
T- → R-
R+ ← T+
R- ← T-
G ↔ G

R   T   S.I.TECH 2857

R   T   S.I.TECH 2857

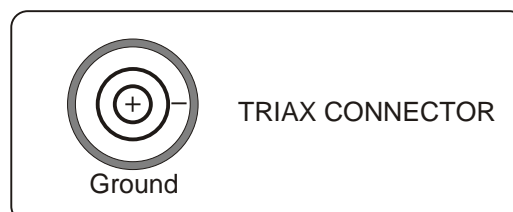RS-422
T+ → R+
T- → R-
R+ ← T+
R- ← T-
G ↔ G

Model 2859

S.I.TECH

RS-422 to Fiber Optic Bit-Driver

The S.I.Tech Model 2859 is designed for high speed RS-422 data communication using fiber. This system uses triax connectors for interfacing to high speed network. The model 2859 provides 2 independent channels for data, clock, etc.

TRIAX CONNECTOR

Ground

T+
T- ⎤— Input (J3)

R+
R- ⎤— Output (J4)

	Specification
Operation Mode:	Asynchronous, simplex or full duplex, 20 Mbps
Input/Output Interface:	RS-422, 2 channel system, 4 Triax connectors
Transmission Line Interface:	4 ST connector fiber optic receptacles (SMA option)
Transmission Distance:	2 Km - 6600 ft. (5 Km option)
Transmitter Output Power:	30 microwatts into 50 micron fiber
System Wavelength:	820 nanometers (1300 nm option)
Minimum Sensitivity:	3 microwatts @ 820 nanometers at less than 10^{-9} bit error rate
Operating Temperature:	$0\ ^{o}C$ to $50\ ^{o}C$
Input Power:	110 VAC 60 Hz
Metal Enclosure:	1U 19" rack 17"W X 1.75"H X 7.5"D (43.2 X 4.3 X 19.0 CM)
Weight:	5 lbs. (2.3 kg)
230 Volt Version:	2859V

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km	Distance Meters	Distance Feet
62.5	4.0	2000	6600
50	3.0	2000	6600
10SM**	1.0	10000	33000

** Single mode (1300nm) option (SC, ST, or FC)

Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.

Meets FCC Requirements of Class A, Part 15 Computing Device Standard. UL listed.
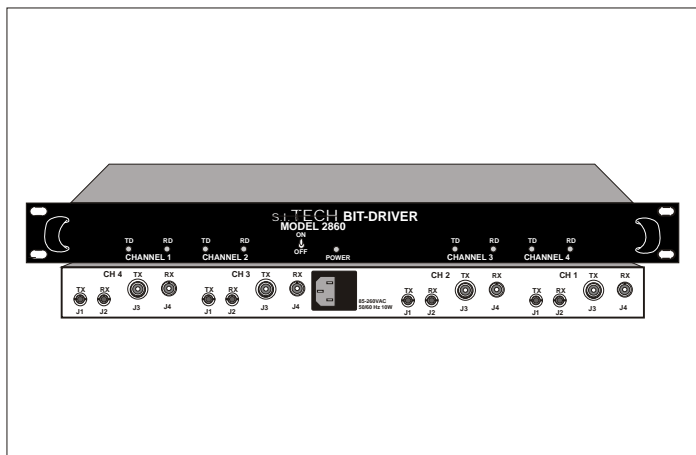*Specifications subject to change without notice.*

TYPICAL APPLICATION

FIBER OPTIC CABLE

DTE

CPU PROCESS CONTROLLER

S.I.TECH 2859

S.I.TECH 2859

Model 2860

S.I. TECH
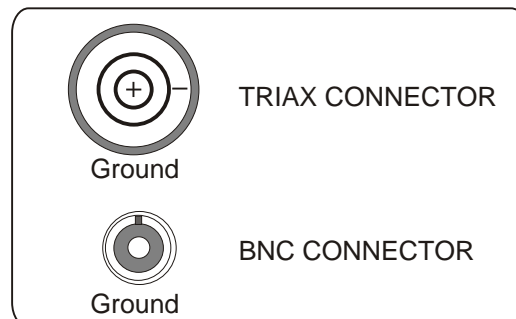
RS-422 and TTL to Fiber Optic Bit-Driver

The S.I.Tech Model 2860 is designed for high speed RS-422 and TTL data communication using fiber. This system uses TRIAX and BNC connectors for interfacing to high speed network. The model 2860 provides 4 independent channels for data, clock, etc.

- Ruggedized for Field Application (Option)
- Conformal Coated (Option)

Operation Mode:	Asynchronous, simplex or full duplex, 20 Mbps
Input/Output Interface:	RS-422/TTL, 4 channel system, 4 Triax & 4 BNC connectors
Transmission Line Interface:	8 ST connector fiber optic receptacles (SMA option)
Transmission Distance:	2 Km - 6600 ft. (5 Km option)
Transmitter Output Power:	30 microwatts into 50 micron fiber
System Wavelength:	820 nanometers (1300 nm option)
Minimum Sensitivity:	3 microwatts @ 820 nanometers at less than 10^{-9} bit error rate
Operating Temperature:	0 ^{o}C to 50 ^{o}C (-20 to +60°C for SM)
Input Power:	110 VAC 60 Hz (18 to 36VDC Option)
Metal Enclosure:	1U 19" rack 17"W X 1.75"H X 7.5"D (43.2 X 4.3 X 19.0 CM)
Weight:	5 lbs. (2.3 kg)
230 Volt Version:	2860V

TRIAX CONNECTOR

BNC CONNECTOR

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km	Distance Meters	Distance Feet
62.5	4.0	2000	6600
50	3.0	2000	6600
10SM*	1.0	10000	33000

* Single mode (1300nm) option (SC, ST, or FC)

Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.
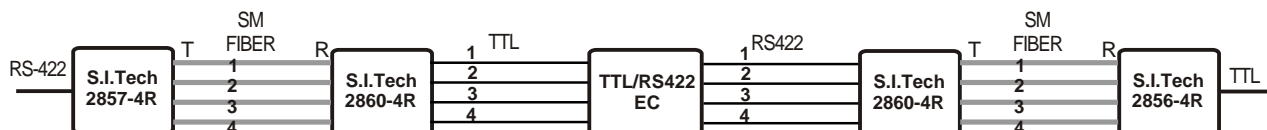
Note:
2860-4R-SM: 4 CH, Single Mode
J3: RS422 Input
J4: TTL Output

Meets FCC Requirements of Class A, Part 15 Computing Device Standard. UL listed.
Specifications subject to change without notice.

TYPICAL APPLICATION

Model 2861

S.I.TECH

RS-422 and TTL to Fiber Optic Bit-Driver

The S.I.Tech Model 2861 is designed for high speed RS-422 and TTL data communication using fiber. This system uses special 5 coax connectors for interfacing to high speed network. Model 2861 provides 5 independent channels for data, clock, etc.

- Ruggedized for Field Application (Option)
- Conformal Coated (Option)
- Unit has Isolated Filtered Power Supply and Isolated Grounds
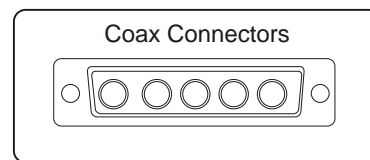
Coax Connectors

Operation Mode:	Asynchronous, simplex or full duplex, 20 Mbps	
Input/Output Interface:	RS-422/TTL, 5 channel system, 5 special coax connectors	
Transmission Line Interface:	10 ST connector fiber optic receptacles (SMA option)	
Transmission Distance:	2 Km - 6600 ft. (5 Km option)	
Transmitter Output Power:	30 microwatts into 50 micron fiber	
System Wavelength:	820 nanometers (1300 nm option)	
Minimum Sensitivity:	3 microwatts @ 820 nanometers at less than 10^{-9} bit error rate	
Operating Temperature:	$0\ ^{\circ}$C to $50\ ^{\circ}$C (-20 to $+60\ ^{\circ}$C for SM)	
Input Power:	110 VAC 60 Hz (18 to 36VDC Option)	
Metal Enclosure:	1U 19" rack 17"W X 1.75"H X 7.5"D (43.2 X 4.3 X 19.0 CM)	
Weight:	5 lbs. (2.3 kg)	
230 Volt Version:	2861V	

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km	Distance Meters	Distance Feet
62.5	4.0	2000	6600
50	3.0	2000	6600
10SM*	1.0	10000	33000

* Single mode (1300nm) option (SC, ST, or FC)

Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.
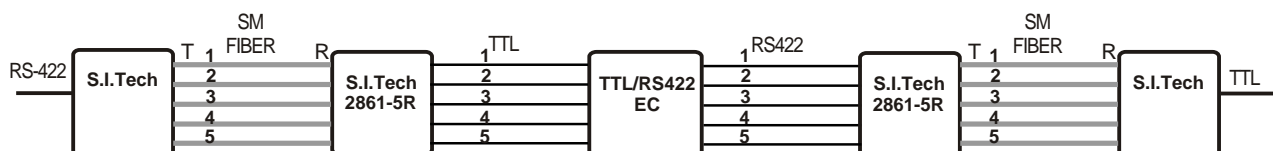
Note:
2861-5R-SM: 5 CH, Single Mode
J3: RS422 Input
J4: TTL Output

Meets FCC Requirements of Class A, Part 15 Computing Device Standard. UL listed.
Specifications subject to change without notice.

TYPICAL APPLICATION

RS-422 — S.I.Tech — T 1 2 3 4 5 SM FIBER R — S.I.Tech 2861-5R — 1 2 3 4 5 TTL — TTL/RS422 EC — 1 2 3 4 5 RS422 — S.I.Tech 2861-5R — T 1 2 3 4 5 SM FIBER R — S.I.Tech — TTL

Model 2866 TR/REC

S.I.TECH

Fiber Optic Transmitter/Receiver Pair

TRANSMISSION LINE INTERFACE

Operating distance is dependent upon optical fiber core diameter and the cable's optical attenuation. The table below indicates three cables that may be used at any data rate. These cables are available in connectorized assemblies to meet the exact configuration of your application.

S.I.Tech offers complete links including fiber optic cable, connectors, cable assemblies, and Bit-Drivers .

SYSTEM

Transmission: Up to 6500 ft. (2 Km) with suitable graded index fiber optic cable
Typical Bit Error Rate: Better than 10^{-9}

ELECTRICAL SIGNAL INPUT/OUTPUT
FOR TRANSMITTER AND RECEIVER

Format: RS422
Duty Cycle: 0 to 100%
Minimum Pulse Width: 50 nanoseconds
Data Rate: 2400 bps to 20 Mbps
Input impedance: Selectable 120 or Hi impedance
Output Impedance: Standard RS422

OPTICAL TRANSMITTER

Transmitter Output: 20 microwatts (-20 dBm) into 50 micron fiber
Wavelength: 820 nanometers (1300 nm option)
Emitter Type: LED (lensed)
Optical Connector: ST or SMA compatible metal receptacle

OPTICAL RECEIVER

Wavelength: 820 to 900 nanometers (1300 nm option)
Minimum Sensitivity: (BER 10^{-9}) 2 microwatts (-30 dBm) @ 820 nanometers
Maximum Sensitivity: 20 microwatts
Optical Connector: ST or SMA compatible metal receptacle
Operating Temperature: $0\ ^{\circ}C$ to $85\ ^{\circ}C$
PCB Size: 3.0 x 3.0 in. (7.6 x 7.6 cm)
Weight: 0.12 lbs (60 grams)
Stand Alone Version: 2857

Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
*Specifications subject to change without notice.*

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/Km	Distance Meters	Distance Feet
100	5.0	2000	6600
62.5	4.0	2000	6600
50	3.0	2000	6600
10 SM*	1.0	7000	23000

* Single mode, 1300 nm option
Optical unit connection: Connect the optical transmission line to the Tx and Rx receptacles. Note which cable channel goes to Tx or Rx by noting cable imprint. On the other end, reverse the connection.

TYPICAL APPLICATION

DTE: Data Terminal Equipment
DCE: Data Communication Equipment
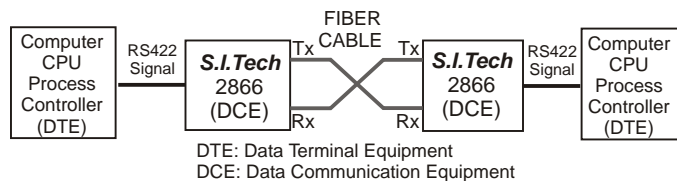
Pin Assignment - Transmitter/Receiver Board

Connector	Pin No. (Left to Right)	Description
5-Pin*	5	RS422 Input-
	4	RS422 Input+
	3	Ground
	2	RS422 Output-
	1	RS422 Output+
3-Pin**	3	Power Input
	2	No Connect
	1	Ground

* ITW PANCON CE56 F20-5-C or Equivalent
** ITW PANCON CE156 F20-3-C or Equivalent
Power Input: Optional +5VDC or +12VDC operation at 200mA maximum.

Model 2867

S.I.TECH

RS-422 and TTL to Fiber Optic Bit-Driver

The S.I.Tech Model 2867 is designed for high speed RS-422 and TTL data communication using fiber. This system uses Terminal block and BNC connectors for interfacing to high speed network. The model 2867 provides 3 independent channels for data, clock, etc.
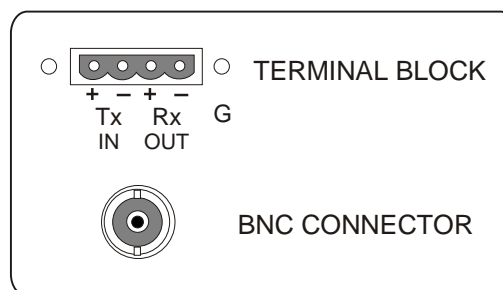
TERMINAL BLOCK

+ − + −
Tx Rx G
IN OUT

BNC CONNECTOR

Operation Mode: Asynchronous, simplex or full duplex, 20 Mbps

Input/Output Interface: RS-422/TTL, 3 channel system, 3 terminal blocks & 6 BNC connectors

Transmission Line Interface: 6 ST connector fiber optic receptacles (FC Option-SM)

Transmission Distance: See table

Transmitter Output Power: 30 microwatts into 50 micron fiber

System Wavelength: 820 nanometers (1300 nm option)

Minimum Sensitivity: 3 microwatts @ 820 nanometers at less than 10^{-9} bit error rate

Operating Temperature: $0\ ^{\circ}$C to $50\ ^{\circ}$C

Input Power: 85-260VAC, 50/60Hz, 10W

Metal Enclosure: 1U 19" rack 17"W X 1.75"H X 7.5"D (43.2 X 4.3 X 19.0 CM)

Weight: 5 lbs. (2.3 kg)

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km (1300nm)	Distance Meters	Distance Feet
62.5	1.0	5000	16000
50	1.0	5000	16000
10SM*	0.35	20000	65000

* Single mode (1300nm)

Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.
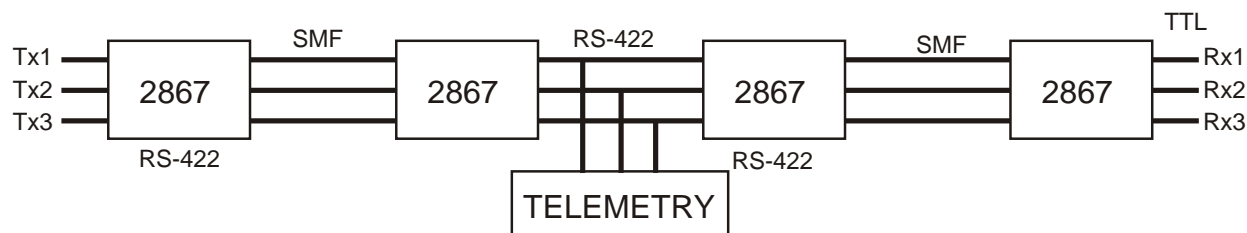
Note:
2867-3R-SM: 3 CH, Single Mode
2867 has built in switches for switching channel between TTL and RS-422 inputs.

Meets FCC Requirements of Class A, Part 15 Computing Device Standard. UL listed. RoHS compliance.
Specifications subject to change without notice.

TYPICAL APPLICATION

Model 2424/2454

S.I.TECH

Asynchronous Time Division Multiplexer

S.I.Tech Bit-Driver®

Model 2424   **Multiplexer**

PWR   TD   RD
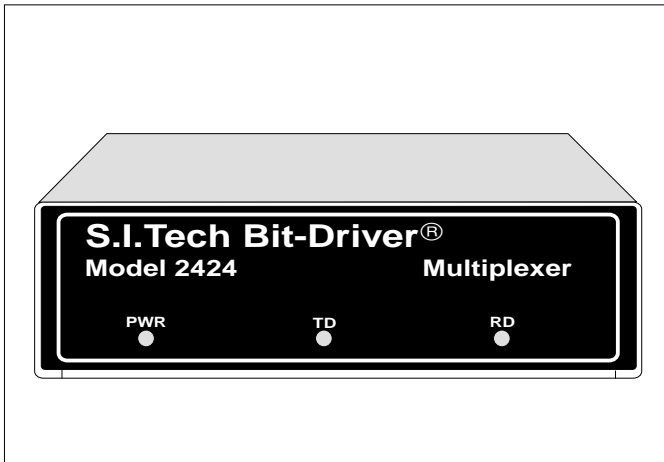
Model 2424/2454 is a 4 channel communication system providing 4 Bit-Driver links using one optical cable interface.

The 2424 provides 4 full duplex RS422 channels for any data rate on any channel(s) up to 76.8 Kbps.

The 2454 provides 4 half duplex RS485 channels. The data rate must be set at the factory for data rate up to 76.8 Kbps.

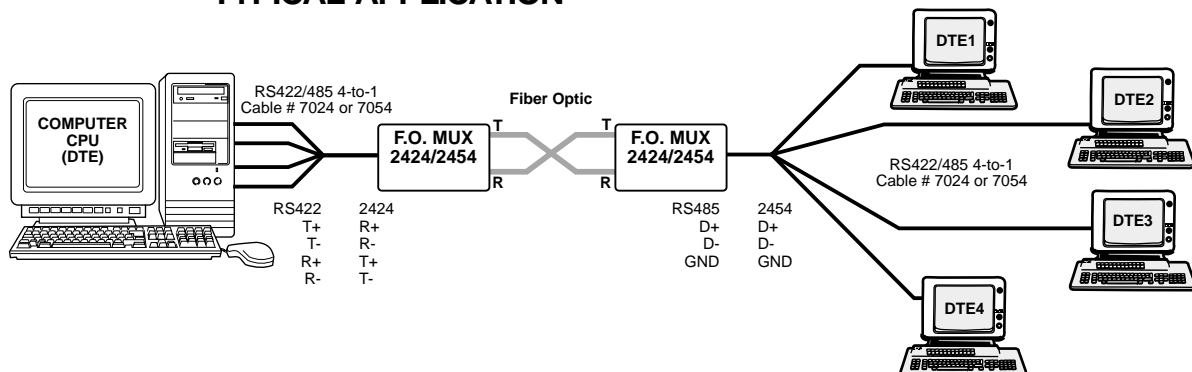| **Operation Mode:** | Asynchronous, RS422 simplex or full duplex. RS485 half duplex. |
Input/Output Interface:	RS422/RS485 up to 76.8 Kbps
Input/Output Connector:	37 pin female (DB37)
Phase Distortion:	Less than 10%
Optical Connector:	ST standard (SMA option)
Transmission Distance:	6600 ft. (2 Km, 5 Km option)
Optical Power into a 62.5/125 micron Fiber:	10 μW (50 μW option)
Receiver Sensitivity:	0.5 Microwatt @ 10^{-9} BER
System Wavelength:	850 nm (1300 nm option)
Bit Error Rate:	10^{-9}
Operating Temperature:	0 $^{\circ}$C to 50 $^{\circ}$C
Metal Enclosure:	7.5" X 7" X 3" (19 X 17.8 X 7.6 cm)
Weight:	3 lbs.(1.36 kg)/Rack 6 lbs.(2.72kg)
Input Power:	105 to 130 VAC 60 Hz
230 Volt Version:	2424V/2454V

UL & CSA listed. Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

PIN ASSIGNMENT FOR THE DB37 CONNECTOR

FUNCTION RS422	CHANNEL NUMBER			
	1	2	3	4
TX+	37	35	33	31
TX-	19	17	15	13
RX+	36	34	32	30
RX-	18	16	14	12
Signal Ground	1, 2, 3, 20, 21			
FUNCTION RS485	CHANNEL NUMBER			
	1	2	3	4
Data+	37	35	33	31
Data-	19	17	15	13
Signal Ground	1, 2, 3, 20, 21			

Note: Order 4-to-1 RS422/RS485 Cable #7024 or 7054

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km	Distance (Meters)	Distance (Feet)
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600
10 SM*	1.0	7000	23000

* Single mode (1300nm) option
(High power option available for longer distance)

TYPICAL APPLICATION

COMPUTER CPU (DTE)

RS422/485 4-to-1 Cable # 7024 or 7054

F.O. MUX 2424/2454   Fiber Optic   F.O. MUX 2424/2454

RS422	2424
T+	R+
T-	R-
R+	T+
R-	T-

RS485	2454
D+	D+
D-	D-
GND	GND

RS422/485 4-to-1 Cable # 7024 or 7054

DTE1 DTE2 DTE3 DTE4

Model 2428/2458

S.I.TECH

Asynchronous Time Division Multiplexer

Model 2428/2458 is an 8 channel communication system providing 8 Bit-Driver links using one optical cable interface.

The 2428 provides 8 full duplex RS422 channels for any data rate on any channel(s) up to 76.8 Kbps.

The 2458 provides 8 half duplex RS485 channels. The data rate must be set at the factory for data rate up to 76.8 Kbps.

S.I.Tech Bit-Driver®
Model 2428 **Multiplexer**

PWR   TD   RD

Operation Mode:	Asynchronous, RS422 simplex or full duplex. RS485 half duplex.
Input/Output Interface:	RS422/RS485 up to 76.8 Kbps
Input/Output Connector:	37 pin female (DB37)
Phase Distortion:	Less than 10%
Optical Connector:	ST standard (SMA option)
Transmission Distance:	6600 ft. (2 Km, 5 Km option)
Optical Power into a 62.5/125 micron Fiber:	10 μW (50 μW option)
Receiver Sensitivity:	0.5 Microwatt @ 10^{-9} BER
System Wavelength:	850 nm, (1300 nm option)
Bit Error Rate:	10^{-9}
Operating Temperature:	0 °C to 50 °C
Metal Enclosure:	7.5" X 7" X 3" (19 X 17.8 X 7.6 cm)
Weight:	3 lbs.(1.36 kg)/Rack 6 lbs.(2.72kg)
Input Power:	105 to 130 VAC 60 Hz
230 Volt Version:	2428V/2458V

UL & CSA listed. Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

PIN ASSIGNMENT FOR THE DB37 CONNECTOR

FUNCTION RS422	CHANNEL NUMBER							
	1	2	3	4	5	6	7	8
TX+	37	35	33	31	29	27	25	23
TX-	19	17	15	13	11	9	7	5
RX+	36	34	32	30	28	26	24	22
RX-	18	16	14	12	10	8	6	4
Signal Ground	1, 2, 3, 20, 21							
FUNCTION RS485	CHANNEL NUMBER							
	1	2	3	4	5	6	7	8
Data+	37	35	33	31	29	27	25	23
Data-	19	17	15	13	11	9	7	5
Signal Ground	1, 2, 3, 20, 21							

Note: Order 8-to-1 RS422/RS485 Cable #7028 or 7058

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation dB/Km	Distance (Meters)	Distance (Feet)
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600
10 SM*	1.0	7000	23000

* Single mode (1300nm) option
(High power option available for longer distance)

TYPICAL APPLICATION

COMPUTER CPU (DTE)

RS422/485 8-to-1 Cable # 7028 or 7058

1 to 8 Channel

Fiber Optic

F.O. MUX 2428/2458 — T R ... T R — F.O. MUX 2428/2458

RS422	2428
T+	R+
T-	R-
R+	T+
R-	T-

RS485	2458
D+	D+
D-	D-
GND	GND

1 to 8 Channel   RS422/485 8-to-1 Cable # 7028 or 7058

DTE1 DTE2 DTE7 DTE8

Model 2564

S.I.TECH

Optical Asynchronous Multiplexer
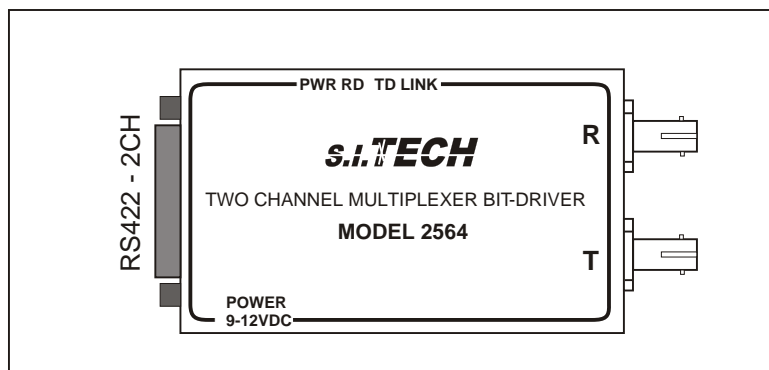
Features:
- 2 Channel RS422 Multiplexer
- Up to 180 Kbps asynchronous operation, each channel
- Full duplex RS422
- Metal ST connector receptacle (SMA option)
- LED indicators for power, optical link status, transmit and receive data
- Multimode or single mode
- DIN rail or panel mounting option

S.I.Tech 2564 is a unique Bit-Driver. The two channel RS422 electrical interfaces are totally independent and share combined fiber link.

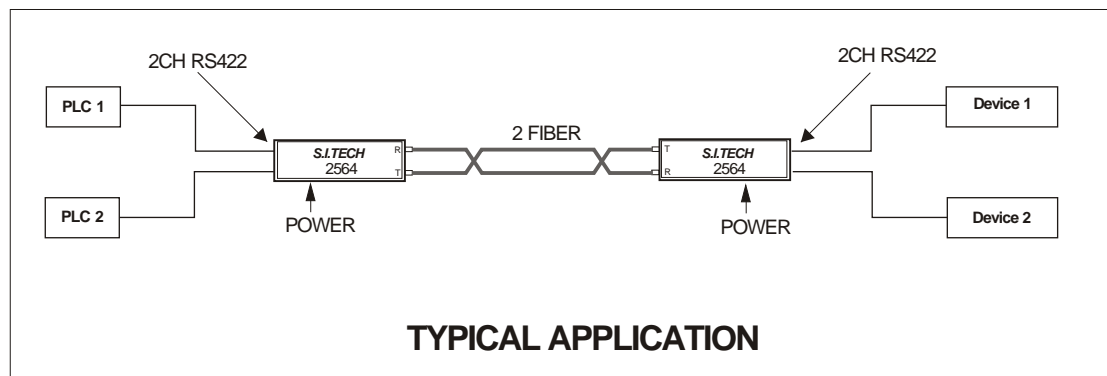|	
Operation Mode:	Asynchronous, simplex or full duplex
Input/Output Interface:	2 CH RS422 Multiplexer DB25 connector
Transmission Line Interface:	Metal ST connector is standard for interfacing with fiber optic duplex cable (SMA option, FC option for SM)
Transmission Distance:	See Distance Chart
Optical Power into a 62.5 Micron Core Optical Fiber:	20 microwatts, 10 dB power budget @ 820 nanometers (1300 nm Option)
Receiver Sensitivity:	2 microwatts at less than 10^{-9} bit error rate
Operating Temperature:	-40 ^{o}C to 85 ^{o}C (-20 ^{o}C to 60 ^{o}C Single Mode)
Metal Enclosure:	3.6" X 2.3" X 1.2" (9.1 X 5.84 X 3.0 cm)
Weight:	0.4 lb. (185 grams)
Input Power:	9 to 12VDC, 200mA

DB25 Female Connector Pinout

Pin No.	Description	
1,7	Signal Ground	
2	Rx1+	Ch1 Output
3	Rx1-	
4	Tx1+	Ch1 Input
5	Tx1-	
16	Term1+	Ch1 Termination
17	Term1-	
14	Rx2+	Ch2 Output
15	Rx2-	
21	Tx2+	Ch2 Intput
22	Tx2-	
6	Term2+	Ch2 Termination
20	Term2-	
Shell	Chassis	

OPERATING DISTANCE FOR FIBER OPTIC CABLE

Fiber Size (Microns)	Attenuation dB/Km	Distance* Meters	Distance* Feet
50	3.0	2000	6600
62.5	4.0	2000	6600
10 SM	1.0	5000	16000

* High power option available. SM - Single Mode option
Optical unit connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connection.

Meets FCC requirements of Class A, Part 15 Computing Devices Standard.
Specifications subject to change without notice.

TYPICAL APPLICATION