LAN – WAN to Fiber Optic Modems

01/06/26

Stand Alone Bit-Driver®

Mini Bit-Driver®

Rack Mounted Bit-Driver®

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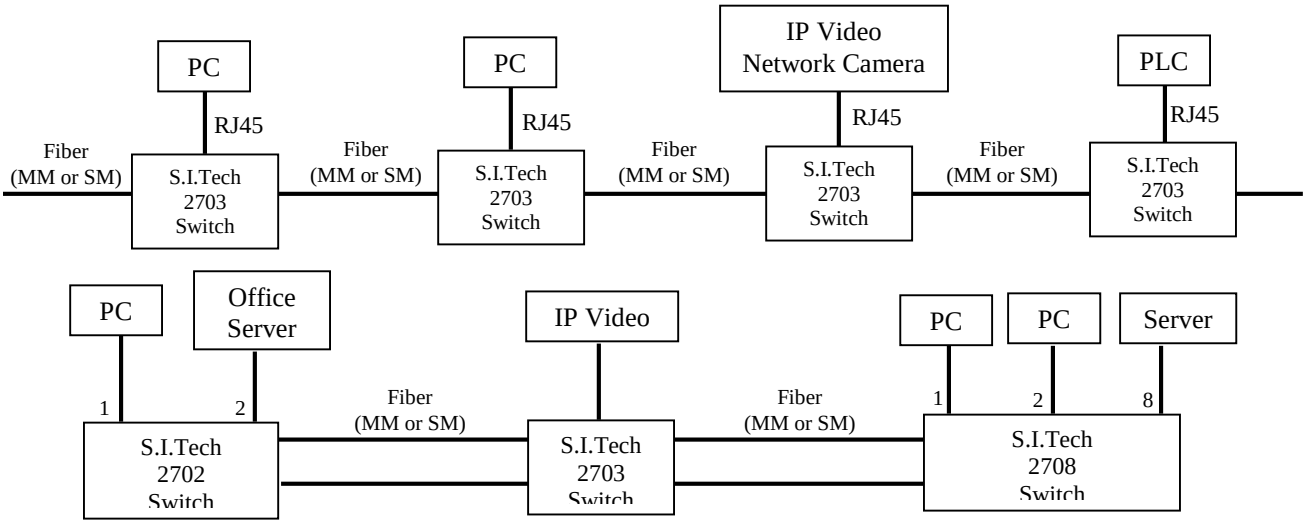
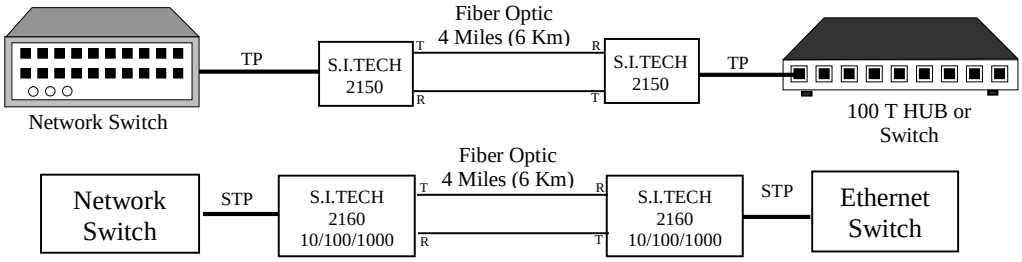
LAN/WAN PRODUCTS

LAN/WAN PRODUCTS
(Local Area and Wide Area Networks)

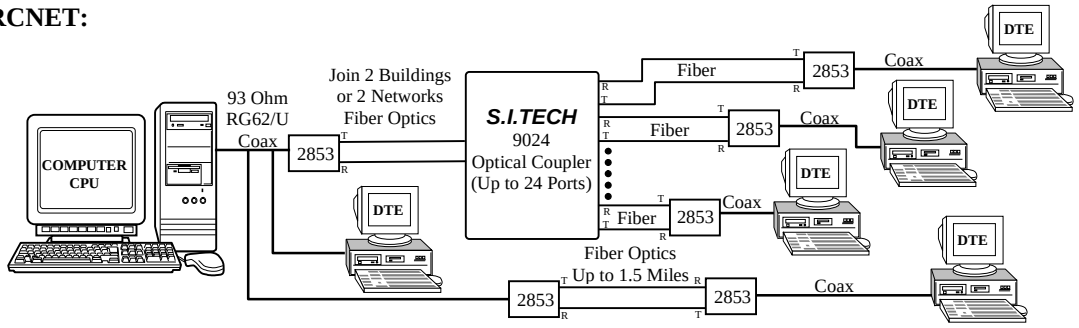
1. Ethernet:



2. 100/1000 Mbps Single mode Ethernet:



3. ARCNET:



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LAN/WAN

With a personal computer on each desk, so-called distributed data processing emerged with a need to connect all PC's in a given area and to share data files together. This is how the local area network (LAN) was born.

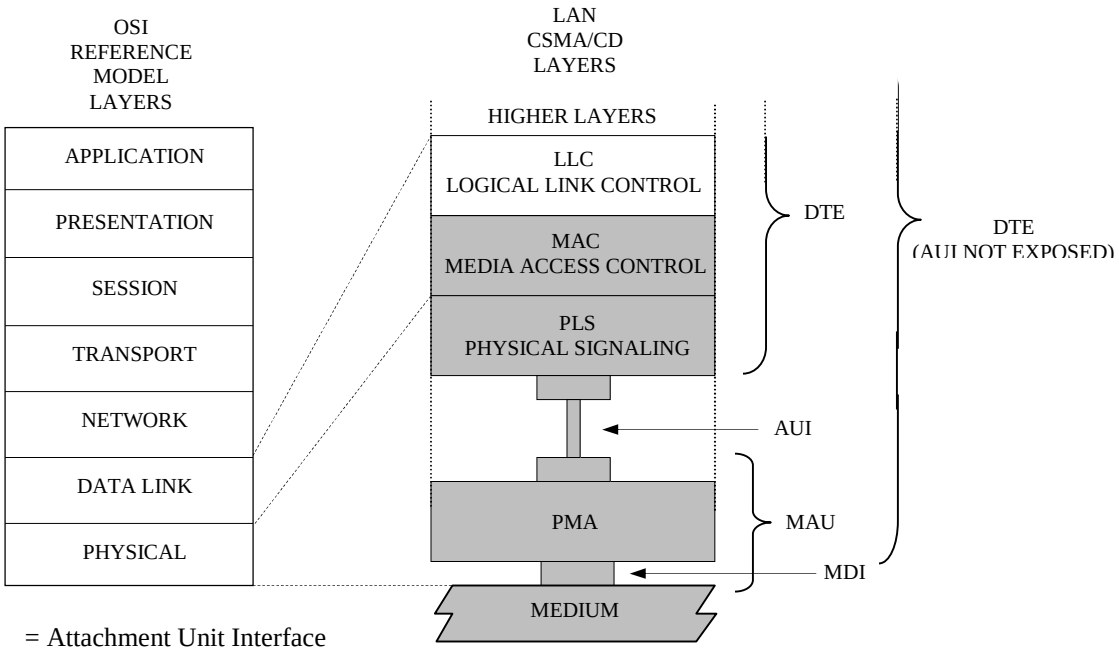
Today LAN's can have hundreds or even thousands of users (nodes) connected together. In large networks, segments are created so that problems can be easily isolated and eliminated. Over the years there have been many networking schemes, each with advantages and disadvantages. Today, Ethernet is the most prominent LAN in offices.

While LAN's are adequate for small companies with one office, larger companies with multiple offices need more complex networks.

So we have:

MAN – Metropolitan Area Network
WAN – Wide Area Network
Global Net – Global - Many countries
Internet – Global - Worldwide
Intranet - Within the same company-multiple networks, networked
Mobile Net - Cellular phone network
Telephone Network - Global
SAN - Storage Area Network

In discussing LOCAL AREA or WIDE AREA NETWORK, typically OSI (Open Systems Interconnection), a reference model, is used as shown below.



AUI = Attachment Unit Interface
MAU = Medium Attachment Unit
MDI = Medium Dependent Interface
PMA = Physical Medium Attachment

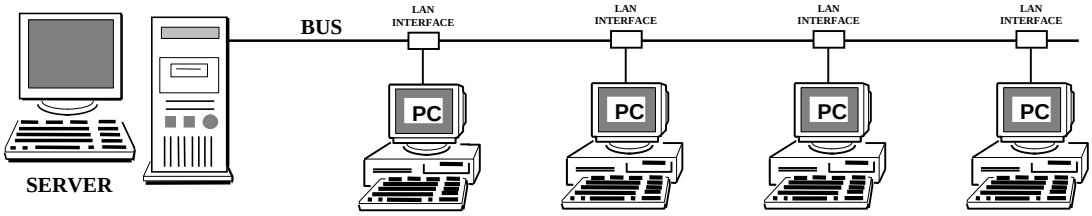
ISO/IEC 8802-3 (IEEE 802.3) relationship to the ISO/IEC Open System Interconnection (OSI) reference model.

S.I. Tech Fiber Optic products fall into physical and data link layers of the model.

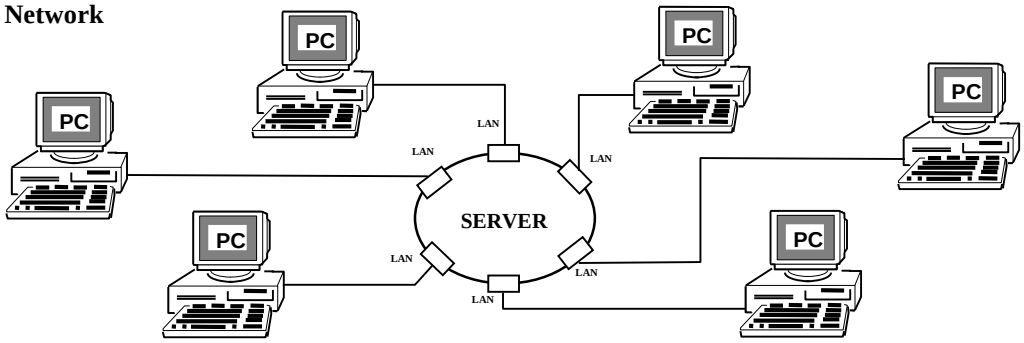
LOCAL AREA NETWORKS

As the term implies, computers located in a given area such as an office or factory can be networked (connected together) in a particular scheme. Today's Local Area Networks are comprised of many special inter connecting schemes, each with unique benefits and disadvantages. Basic configurations are:

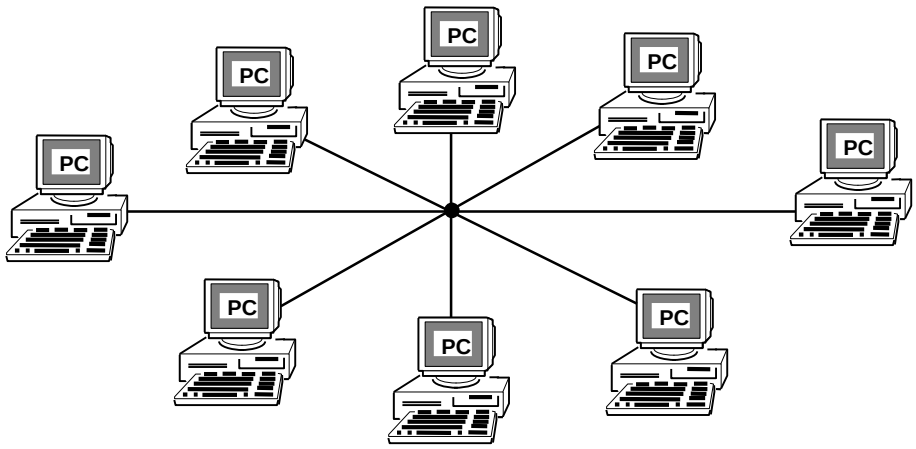
1. **Bus Network: all users are attached to a common BUS.**



2. **Ring Network**



3. **Star Network**



4. **Tree Network: Combining these concepts into various fashions, today's complex LAN's are set up.**

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IEEE – Institute of Electrical and Electronic Engineers have developed many LAN standards and new ones are continually created. Some of the present standards are:

IEEE 802.1 - Relationship between IEEE and ISO model
IEEE 802.2 - Network control protocol
IEEE 802.3 - Ethernet Local Area Network
IEEE 802.4 - Map/Top Local Area Network
IEEE 802.5 - Token Ring Local Area Network
IEEE 802.6 - MAN Network
IEEE 802.7 - Broad Band Local Area Network
IEEE 802.8 - Fiber Optic CSMA/CD
IEEE 802.9 - Integrated Voice and Data
IEEE 802.10 - Interoperable LAN/MAN security
IEEE 802.11 - Wireless LAN
IEEE 802.12 - Demand priority access method. Repeater spec.
IEEE 802.14 - Cable TV based Broad Band Network
IEEE 802.15 – Wireless Personal Area Network (WPAN)
IEEE 802.16 – Metropolitan Area Network - Wireless

A short description on the more common networks is given below:

ARCNET:	A token passing BUS network, developed by Datapoint. Runs at 2.5Mbps and uses 93 ohm coaxial cable as a medium.
Ethernet:	Is a BUS network using CSMA/CD scheme. Today's business world predominately uses Ethernet as a networking protocol. Ethernet is well developed with low cost devices for 10 and 100Mbps. 1 gigabit and 10 Gbps systems are available and higher speeds under development. (40 and 100 Gbps)
Token Ring:	The token access procedure used on a network with a sequential or ring topology. Popularized by IBM. Runs at 4 and 16Mbps. FDDI, which is token ring, runs at 100Mbps.
Map/Top:	The token passing BUS network for the Manufacturing Industry.
FDDI:	Fiber distributed data and token ring network running at 100Mbps has counter rotating rings for redundancy.
Internet:	Global computer network, where everyone has access to Worldwide Web. Wide ranging access speeds are available.
Telephone Network:	Global network of all telecommunications equipment, telephones.
SONET:	Synchronous optical network – used for high speed telecom connections. Speed ranges from OC-1 to OC-768. (51Mbps to 40Gbps.)
Fire wire	IEEE 1394 – 800 Mbps

Common features of all fiber optic networking products offered by S.I. Tech:

Industry refers to S.I. Tech products by various names such as line drivers, media converters, transceivers, etc. The basic concept is to use fiber optics wherever possible and required or specified. Fiber can be used in place of unshielded twisted pair (UTP), shielded twisted pair (STP), coax, twinax, radio, or satellite connection with appropriate interface and product design.

While fiber optics can exceed distance limitations of various networking specifications, network engineers should consider networking issues such as time out, software limitations, equipment compatibility, etc.

Typical operating distances for fiber optic cables

Fiber Size (Microns)	Nominal Attenuation dB/Km				Distance* Km				Distance* Feet				Bandwidth MHz/Km			
	660 nm	850 nm	1310 nm	1550 nm	660 nm	850 nm	1310 nm	1550 nm	660 nm	850 nm	1310 nm	1550 nm	660 nm	850 nm	1310 nm	1550 nm
1000	200	-	-	-	0.1	-	-	-	330	-	-	-	-	-	-	-
200	-	7.0	-	-	-	1.0	-	-	-	3300	-	-	-	20	-	-
50	-	3.0	1.0	-	-	2	5	5	-	6600	16000	-	-	600	600	-
62.5	-	3.5	1.0	-	-	2	5	5	-	6600	16000	-	-	200	600	-
10 SM	-	-	0.35	0.25	-	-	10	20	-	-	33000	66000	-	-	Unspecified	-

*Longer distances are possible and available with special designs. Various connector options are available, such as SMA/ST/FC/SC/MT-RJ/LC

S.I. Tech supplies indoor/outdoor Fiber Optic cables and cables with connectors. Fiber Optic Repeater/Mode (size) Converters: S.I. Tech model 2062 and 2082 are designed to convert multimode fiber any size to any other size or can also be used to convert any size multimode to single mode fiber. The 2062 has a maximum data speed of 20 Mbps and the 2082 has a maximum data speed of 1000 Mbps.

2062-MM/MM	2062-MM/SM	2062-SM/SM
2082-MM/MM	2082-MM/SM	2082-SM/SM

Additionally, these products can also be used to extend the distance of a fiber optic link or overcome excessive link loss (attenuation).

Power Cord: 3 Pin International Standard Cord

Status Indicators: All products come with status indicator LEDs to show network activity, fiber link activity, power, collision, and other indicators. Refer to chart or individual data sheet for specifics.

All S.I. Tech products are UL listed where applicable. Many are CE compliant. Meet ROHS and WEE regulations,

TRANSMISSION MEDIA:

Twisted Pair
Coaxial Cable
Fiber Optics
Satellite
Radio

TWISTED PAIR – is the lowest cost transmission medium available within buildings, as most of the time, telephone wiring exists in all buildings. Over the years, cable manufacturers have significantly improved transmission properties of unshielded twisted pair (UTP) or shielded twisted pair cables (STP). These are now classified by EIA/TIA (Electronic Industries Association/Telecommunication Industry Association) “category of performance” standards based on carrier frequency in Hz or MHz. This translates roughly into the following data rates in Mbps.

CAT	Cable Type	Max Data Rate
1	UTP	Below 1 Mbps
2	UTP	4 Mbps
3	UTP/STP	16 Mbps
4	UTP/STP	20 Mbps
5	UTP/STP	100 Mbps
5e	UTP/STP	200 Mbps
6	UTP/SFTP*/STP	1000 Mbps
7	SFTP	1/10 Gbps

*Foil Shield

COAXIAL CABLES: IBM SNA, ARCNET, and ETHERNET are coaxial cable based networks. Both IBM SNA and ARCNET use 93 ohm, low capacitance cable. Ethernet Trunk Cable is typically 50 ohm thick coax (yellow cable) and Ethernet Distribution Cable is thin coax, RG-58/U.

As we all know, attenuation (loss) in coaxial cable goes up with frequency and distance. The higher the data rate and the longer the distance, the higher the loss. This limits the distance that cable can be used effectively without amplification (Boosters, Repeaters). Cable television, which typically uses 75 ohm coaxial cable, uses repeaters on poles to boost the signal.

TABLE K
ETHERNET LAN

Network	Model #	Package: Stand Alone	Package: Mini	Package: Card	Data Rate up to Mbps	Status Indicators	Power* Option	Data** Connection	Fiber Connection Multimode 820 nm	Fiber Connection Singlemode 1300 nm	Distance Km ***: 2	Distance Km ***: 5	Distance Km ***: 10	Standard Network	Weight LB/KG	Remarks
Ethernet	2062		√		25	√	5	FIBER IN/OUT	ST/SMA	ST	√	√	√		.5/.2	Fiber Optic Repeater/Converter
	2082		√		1000	√	5	FIBER IN/OUT	ST	ST/FC/SC	√	√	√		.5/.2	Fiber Optic Repeater/Converter
	2150		√		100	√	8	RJ45	ST	ST	√	√	√	√	.5/.2	Fast Ethernet
	2160		√		10/100/1000	√	8	RJ45	SC	SC	√	√	√	√	.5/.2	Gigbit Ethernet
	2350			√	10	√	1,2	RJ45	ST	ST	√	√	√	√	.5/.2	10Mbps Ethernet
	2350-10/100A			√	10/100	√	1,2	RJ45	ST/SC	SC	√	√	√	√	.5/.2	10/100Mbps Ethernet
	2351			√	10	√	ISA BUS	ISA BUS	ST/SMA	ST	√	√		√	.5/.2	ISA BUS Card
	2361-10/100/1000			√	10/100/1000	√	1,2	RJ45	SC	SC	√	√	√	√	.5/.2	10/100/1000Mpbs Ethernet
	2550		√		10	√	6	RJ45	ST	ST	√	√		√	.5/.2	Ethernet 10 Base FL or FOIRL
	3150	√			10/100	–	8	RJ45S	ST	ST	√			√	1.0/0.5	Highly Shielded 2150
	3152	√			10/100	–	-	RJ45RJ45S						√	1.0/0.5	Ethernet Filter
	3160	√			10/100/1000	–	8	RJ45S	ST	ST	√			√	1.0/0.5	Highly Shielded 2160

ETHERNET SWITCH

2702		√		10/100	√	1,2	RJ45	ST/SC	SC	√	√	√	√	1/.4	2 Ports RJ45, 1 Fiber
2703		√		10/100	√	1,2	RJ45	ST/SC	SC	√	√	√	√	1/.4	1 Ports RJ45, 2 Fiber
2704		√		10/100	√	1,2	RJ45	ST/SC	SC	√	√	√	√	1.5/.7	4 Ports RJ45, 1 Fiber
2708		√		10/100	√	1,2	RJ45	ST/SC	SC	√	√	√	√	2/.9	8 Ports RJ45, 1 Fiber

* 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

*** While on Fiber side you can go long distances, check Network Timing & Distance limitations

HOW TO ORDER

Base Model: Number	Base Model: Power*	Data Connector**	Distance***	Fiber and Connector: Multimode (MM)-STD	Fiber and Connector: Singlemode (SM)-Specify	Temperature
XXXX	1. 110 VAC - STD 2. 230 VAC - V 5,6, & 8 - See Chart	M or F (F is STD on most models)	2 Km - STD Other - Specify L, XL, or UL	ST - STD Other-Specify	SC - STD Other-Specify	0 - 50° C - STD -40 to +80° C - ET Other - Call S.I. Tech

e.g. 2150 = Fast Ethernet to Fiber Bit-Driver, Needs S.I. Tech #2164 Power Supply, RJ-45, 2 Km, Multimode, ST Connectors, 0-50 Degrees C

Specifications subject to change without notice.

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TABLE L
LAN/WAN

Network	Model #	Package: Stand Alone	Package: Mini	Package: Rack	Card	Data Rate up to Mbps	Status Indicators	Power* Option	Data ** Connector	Fiber Connection Multimode 820 nm	Distance Km ***: Fiber Connector Singlemode 1300 nm	Distance Km ***: 2	Distance Km ***: 5	Distance Km ***: 10	Distance Km ***: 20	Standard Network	Weight LB/KG	Remarks
Arcnet																		
	2353			√		2.5	√	1, 2	BNC F	ST/SMA	ST/FC/SC	√	√	√		√	.5/.2	ARCNET Card, 3000 Rack
	2853	√		–		2.5	√	1, 2	BNC F	ST/SMA	ST/FC/SC	√	√	√		√	3/1.4	ARCNET
IBM - SEE IBM SECTION																		
Omninet (RS-485)																		
	2852	√				1	√	1, 2	Terminal Block	ST/SMA	ST/FC/SC	√	√			√	3/1.4	RS-485 Network
WAN/Internet/ Telecom																		
T-1	2390				√	1.54	√	1,2,3	RJ45	ST/SMA	ST/FC/SC	√	√	√	√	T-1	1/.4	T-1
	2890-2R-ASP-1			√		1.54	√		DB15	ST/SMA	ST/FC	√	√	√	√	T-1	6/2.7	2CH, T1
	2890-4R-ASP-1			√		1.54	√	1,2,3	RJ48	ST/SMA	ST/FC	√	√	√	√	T-1	6/2.7	4CH, T1
E-1	2391				√	2.04	√	1,2,3	BNC	ST/SMA	ST/FC/SC	√	√	√	√	E-1	1/.4	E-1
T-1/E-1																		
	2890	√		√		1.54	√	1,2,3	RJ45	ST/SMA	ST/FC/SC	√	√	√	√	T-1	3/1.4	T-1
	2891	√		√		2.04	√	1,2,3	2 BNC F	ST/SMA	ST/FC/SC	√	√	√	√	E-1	3/1.4	E-1
	2896			√		1.54/2.04	√	1,2,3	RJ45/BNC	ST/SMA	ST/FC/SC	√	√	√	√	T-1/E-1	6/2.7	2Ch, T-1 or E-1
T-3/E-3/STS-1																		
	2893			√		44	√	1,2,3	2 BNC F	ST	ST/FC/SC	√	√	√	√	T-3	5/2.2	T-3
	2894			√		34	√	1,2,3	2 BNC F	ST	ST/FC/SC	√	√	√	√	E-3	5/2.2	E-3
	2895			√		51.8	√	1,2,3	2 BNC F	ST	ST/FC/SC	√	√	√	√	STS1	5/2.2	STS-1 (OC-1)
LAN: Using RS-232/422/485		**See sections applicable to these standards**																

* 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

ARCNET is a trademark of Datapoint Corp

IBM is a registered trademark of International Business Machines Corp

Omninet is a trademark of Corvus Systems Inc.

HOW TO ORDER

Base Model Number	Power*	Data Connector**	Distance***	Fiber and Connector: Multimode (MM)-STD	Fiber and Connector: Singlemode (SM)-Specify	Temperature
XXXX	1. 110 VAC - STD 2. 230 VAC - V 3. See Chart	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 -40 to +80° C - ET Other - Call S.I. Tech

e.g. 2890V=2890T-1 to Fiber,230VAC, RJ45, 2 Km, Multimode, ST Connectors, 0-50 degrees C

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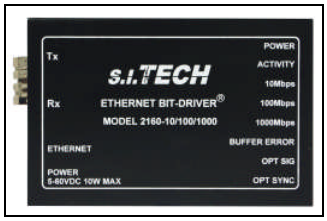
LAN/WAN
ETHERNET FIBER OPTIC BIT-DRIVERS®

2151

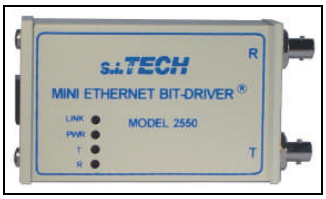
- Mini Optical Bit-Driver®
- Supports 10 Base-T/100 Base-TX (IEEE 802.3) MDI Using Auto Negotiation or Manual Settings (Rate, Duplicity, Flow Control)
- Power, Link Status, Activity, and Rate LED indicators
- ST, SC or MT-RJ for Multimode optical connections, SC or LC options for Single Mode
- Auto MDI-X Detection of Straight or Crossover Cables with Correction
- Plug & Play - No Setup Required
- Redundant Power Input
- Ruggedized Metal Enclosure (IP 40)

2160-10/100/1000



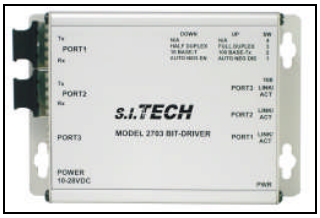
- Mini Optical Bit-Driver, 10/100/1000 Mbps Data Speed
- Link Status, optical and Ethernet LED Indicators
- Long Distances using Single mode Fiber
- Multimode or Single Mode

2550



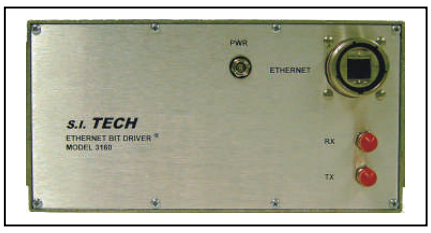
- Mini Optical Bit-Driver®
- Compatible with 10 Base-FL or FOIRL Standards
- Link Status, Receive Data, Transmit Data, and Power LED indicators
- Connects to RJ45 – Twisted Pair
- Multimode is standard (200, 50, 62.5), Single mode optional

2703*



- Layer 2 switch meets IEEE 802.3
- Unmanaged 3 port (2 optical and 1 electrical) 10/100 Mbps switch
- Optical ports 1 and 2 – Various combinations: MM/MM, MM/SM
- Wire port 3 – 10 or 100 Base – T(x) wire as MDI – X
- Optic connector options: ST/SC/LC/MR-RJ
- Status indicators: PWR, Link/Activity, 10/100
- Switch for port 3 configuration

3160



- Highly shielded version of S.I.Tech #2160 – 10/100/1000 Ethernet
- Designed for use in shield room, testing and instrumentation

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10/100/1000Mbps Ethernet Kit #12

- 2 - 2160-10/100/1000 Ethernet Bit-Drivers
- 2 - 2164 Power Supplies
- 1 - 5202-010-8264 33' (10M) 2 Fiber Indoor Multimode Cable - SC/SC
- 1 - 7250 Straight Ethernet Cable
- 1 - 7251 Crossed Ethernet Cable

FIBER SIZE CONVERSION

S.I.Tech 2062 and 2082 can be factory configured to change one fiber size or optical fiber such as 200 micron to 62.5, 50 to 62.5 micron, or multimode to single mode. See ordering information table below.

Table 1: 2062 Combinations

Model Number	Description
2062-00 ST	1000 Micron Plastic Fiber to 50/62.5 Glass Fiber
2062-O-ST	OMRON 200 to 62.5 Micron – ST**
2062-ST*	Multimode 50/62.5 to Multimode 50/62.5 Repeater - ST
2062-MM/SM-ST	Multimode 50/62.5 to Single Mode Converter – ST
2062-SM/SM-ST	Single Mode to Single Mode Repeater - ST

* If you need to go long distances 10km or more, use 1310nm TR/REC (designable as SM/SM)
** Use with S.I.Tech #9402-0008-5568 fiber cable assembly

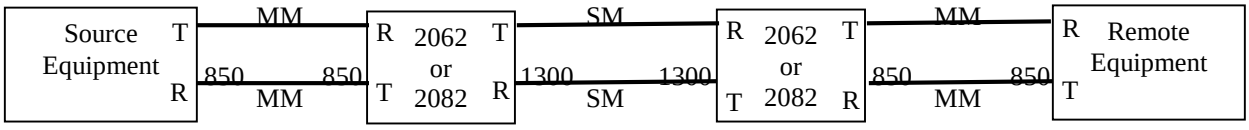
Table 2: Operating Distance for Fiber Optic Cable

Fiber Size Micron	Attenuation DB/km@				Distance							
					660nm		850nm		1300nm		1550nm	
	660nm	850nm	1310nm	1550nm	FT	Meters	FT	Meters	FT	Meters	FT	Meters
50	-	3.0	1.0	-	-	-	6600	2000	20000	6000	-	-
62.5	-	3.5	1.0	-	-	-	6600	2000	20000	6000	-	-
100	-	5.0	-	-	-	-	6600	2000	-	-	-	-
200	-	7.0	-	-	-	-	3300	1000	-	-	-	-
1000	200	-	-	-	330	100	-	-	-	-	-	-
10 SM*	-	-	0.35	0.25	-	-	-	-	33000	10000	66000	20000

* Single mode (observe network timing restriction)

The 2062 and 2082 needs to be properly configured in order to be compatible with your system. For instance, if you are using:

A. CISCO equipment with 850nm wavelength transmitter/receiver made for multimode fiber, then the S.I.Tech 2062 and 2082 port used with that CISCO equipment needs to be 850nm wavelength TR/REC. Similarly if remote end is 1300nm TR/REC then 2062 and 2082 port connecting to remote end should support 1300nm TR/REC.
B. Typical Application – Fiber Size Conversion



Note: Always Connect T to R and R to T as shown above.

S.I.Tech 2062 can be used up to 25Mbps as a repeater. If your data rate is higher such as 100 Mbps or Gigabit (1000 Mbps), use S.I.Tech #2082

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Web Site: http://www.sitech-bitdriver.com

Table 3: 2082 Combinations
Ordering Information

Model Number	Description
2082-MM/MM-100	Multimode 50/62.5 to Multimode 50/62.5 Repeater for up to 100Mbps. ST Standard, SC option
2082-MM/MM-1000	Multimode 50/62.5 to Multimode 50/62.5 Repeater for Gigabit. SC standard
2082-MM/SM-100	Multimode 50/62.5 to Single mode converter for up to 100 Mbps. ST or SC to SC
2082-MM/SM-1000	Multimode 50/62.5 to Single mode converter for up to Gigabit. SC to SC
2082-SM/SM-100	Single mode to Single mode Repeater for up to 100 Mbps. SC to SC
2082-SM/SM-1000	Single mode to Single mode Repeater for up to Gigabit. SC to SC

Notes:

1. Single mode (1300nm) is supplied with SC connecters as standard (FC optional).
2. **Check fiber bandwidth spec to determine length limitation.**
3. Check link loss (attenuation).
4. Single fiber option.
5. For proper operation 2082 fiber size converter should be matched to customer equipment e.g. If your Transmitter/Receiver is 850nm, S.I.Tech 2082 TR/REC should be 850nm. For 1300nm use 1300nm rated 2082.

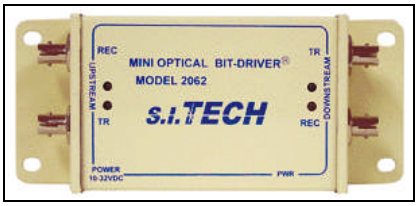
Table 4: Operating Distance for Fiber Optical Cable and 2082

Fiber Size (Micron)	Attenuation (db/Km)			Distance-100Mbps (Meters)			Distance-1000Mbps (Meters)			Distance – 100 Mbps (Feet)			Distance – 1000 Mbps (Feet)		
	Wavelength(nm)			Wavelength(nm)			Wavelength(nm)			Wavelength(nm)			Wavelength(nm)		
	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550
50	3.0	1.0	-	2000	6000	-	550	600	-	6600	20000	-	1600	2000	-
62.5	4.0	1.0	-	2000	6000	-	200	600	-	6600	20000	-	600	2000	-
10*	-	0.35	0.25	-	10000	12000	-	20000	25000	-	33000	40000	-	66000	82500

* Single mode option (for long distance, higher power, contact factory.)
At Gigabit data rate both attenuation and bandwidth of the fiber should be considered to determine distance.

LAN/WAN
FIBER OPTIC REPEATER BIT-DRIVERS® (FIBER SIZE CONVERTER)

2062



- Fiber Optic Repeater
- Can be configured to convert Multimode to Single mode
- Extends Distance of Multimode or Single mode Segment
- Max Data Rate is 25 Mbps
- ST connector is standard

2082

- Fiber Optic Repeater
- Can be configured to convert Multimode to Single mode
- Extends Distance of Multimode or Single mode Segment
- Max Data Rate is 1000 Mbps (Gigabit)
- ST connector is standard, SC/FC Optional, ST (100 Mbps)

2092

- Fiber Optic Repeater/Fiber Channel Repeater
- Data Rates from 100 Mbps to 10 Gbps
- Works with Ethernet or other LANs, WAN, Switches, and Routers
- Requires 2164 Power Supply
- Single mode to Single mode option as 2092-SM/SM
  Fiber Optic Repeater & Fiber Converter (multimode to single mode) as 2092-MM/SM

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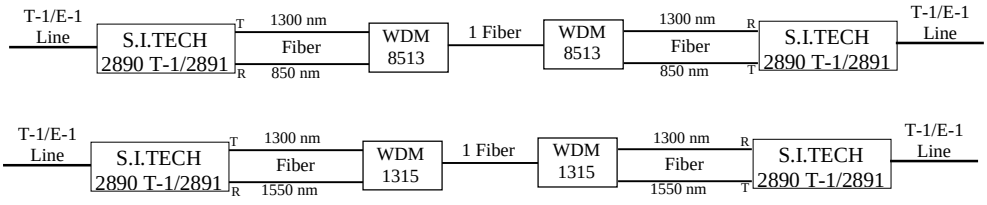
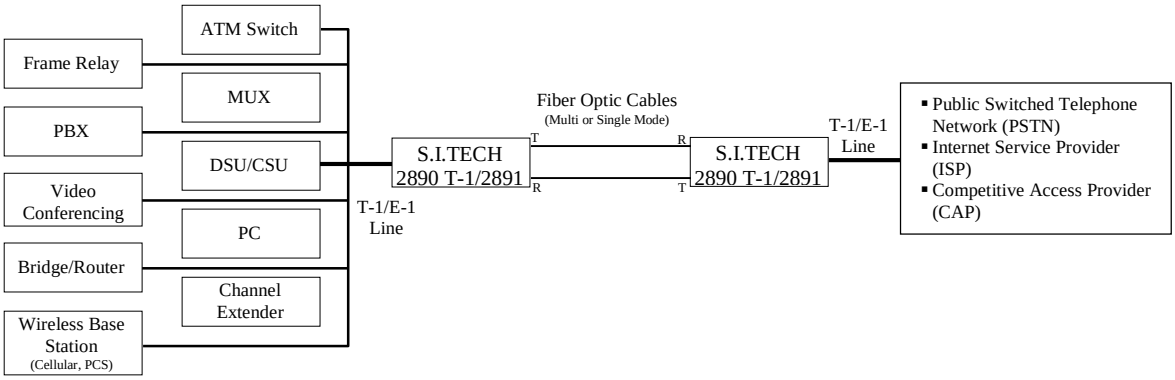
WIDE AREA NETWORKS (WAN)

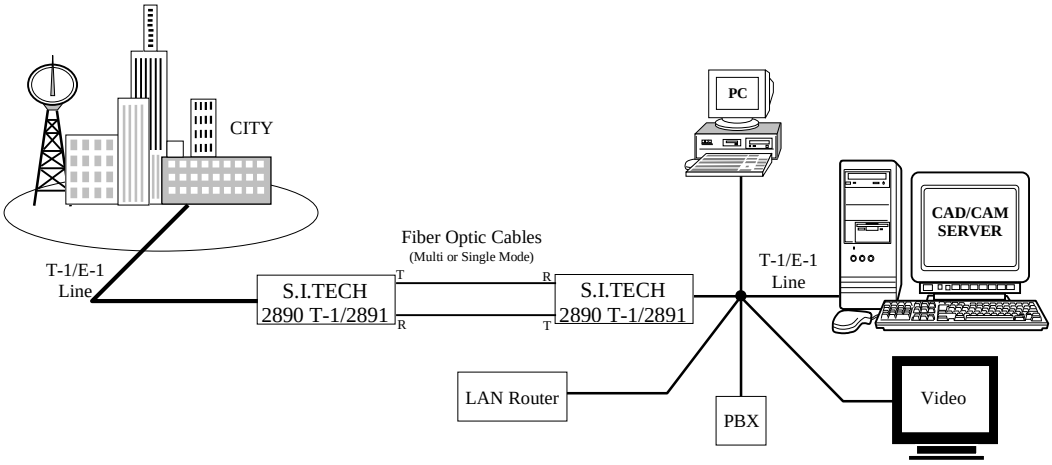
1. Special Application Using Wave Length Division Multiplexing (WDM):



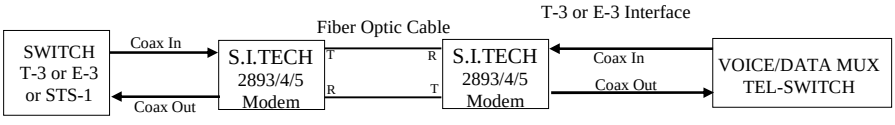
2. Dedicated T-1/E-1 Line with Phone Network:



3. Local Area (Wide Area) Network Using T-1/E-1 Fiber Line:



4. T-3/E-3 or STS-1 (OC-1) Applications:



WAN FIBER OPTIC BIT-DRIVERS®

2890

- Synchronous Half or Full Duplex Optical Bit-Driver®
- T1 – AMI or B8ZS Line Coding
- Clear Channel Capability
- Status indicators and alarms for ease of use and maintenance
- Max Data Rate is 1.544 Mbps
- Stand Alone or Rack Mount Options
- Multimode is standard, Single mode optional
- 110VAC/230VAC/48VDC Options
- Interfaces with either ST, SC, or FC connectors
- 2 Channel T-1 Model #2890-2R or 2896

2890-2R-ASP-1

- 2 T1 Independent Channels
- Status indicators
- Power
- Multimode is standard, Single mode optional
- ST
- Designed for Military systems
- Ruggedized Vibration Immunity
- Conformal Coated(s) for Environmental Protection

2890-4R-ASP-1

- 4 CH Independent T1, AMI or B8ZS
- Status indicators and Alarms
- Multimode and Single mode
- Up to 10 Km at low cost
- Channels pairs 1 or 2, 3 and 4 can be operated in redundant fiber mode

2896

- 2CH Independent T1 (DS1), AMI or B8ZS
- Provides Clear Channel Capability
- Status Indicators and Alarms for easy of Use
- Multimode is standard, Single mode optional
- Up to 10Km at Low Cost
- Optical Link Failure Alarm Build in
- Can be used as Redundant T1 CH with Automatic Switch over

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Model 2151

S.I.TECH

Industrial Ethernet to Fiber Optic Media Converter

Features:

- Supports 10 Base-T/100 Base-TX (IEEE 802.3) MDI Using Auto Negotiation or Manual Settings (Rate, Duplicity, Flow Control)
- Small size
- Mode Switches
- Power, Link Status, Activity, and Rate LED indicators
- ST, SC or MT-RJ for Multimode optical connections, SC or LC options for Single Mode
- Auto MDI-X Detection of Straight or Crossover Cables with Correction
- Plug & Play
- Redundant Power Input
- Conformal Coated
- Ruggedized Metal Enclosure (IP 40)

S.I.Tech 2151 Ethernet media converter is a compact adapter for connection of Ethernet 10 Base-T/100 Base-TX equipment over fiber optic cable at 100 Base-FX. It uses ST, SC or MT-RJ for Multimode fiber and SC or LC for Single mode fiber.

During auto negotiation, the 2151 pair choose the best common mode of operation (half/full duplex, 10/100 Mbps).

The unit contains LED indicators to provide visible verification of transmission status and media converter functions.

Operation Mode: Auto Negotiation and Manual Settings
Input/Output Interface: Shielded RJ45
Transmission Line Interface: ST optical connector is standard (SC, MT-RJ or LC optional)
Transmission Distance: See distance chart
Transmitter Output Power: 12 Microwatts into 62.5/125 micron fiber (-19dBm)
System Wavelength: 1300 nm Multimode (Single mode Option)
Data Rate: 10/100 Mbps
Bit Error Rate: 10^{-9}
Receiver Sensitivity: 1 Microwatts @ 1300 nanometers (-30dBm)
Operating Temperature: -40°C to 70°C
Humidity: 0 to 95% Non Condensing
Weight: 0.8 lb (365 grams)
Input Power: 10 to 32VDC, 3 Watts Redundant Power Input
Metal Enclosure: 4.15" X 3.65" X 1.21" (10.54 X 9.27 X 3.00 cm) DIN Rail Mounting

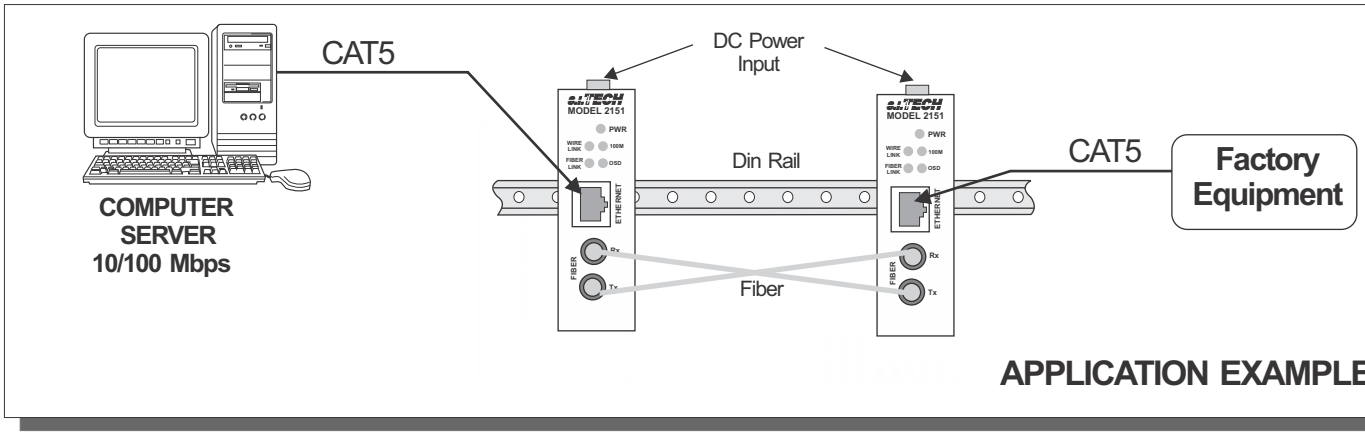
Operating Distance for Fiber Optic Cable

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	3.5	1.0	-	2000	6000	-	6600	20000	-
10**	1.0	0.35	0.25	-	20000	24000	-	66000	80000

** Single mode option - 1300nm (for longer distances, high power, contact factory)

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 connections.

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



APPLICATION EXAMPLE

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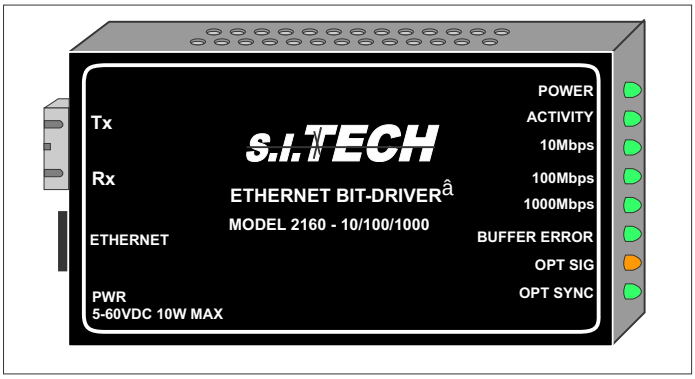
Model 2160-10/100/1000

S.I.TECH

Ethernet to Fiber Bit-Driverâ



Operation Mode: 10/100/1000Base-T to Fiber
Ethernet Interface: Shielded RJ-45
Fiber Interface: LC Connector Std.
Transmission Distance: See distance chart
System Wavelength: 850, 1310 nm or 1550 nm
Data Rate: 10/100/1000 Mbps
Bit Error Rate: 10^{-12}
Operating Temperature: 0 to 70 ^{o}C
Input Power: 5-60 VDC, 10W. External with power supply-S.I.Tech #2164-100/240VAC 50/60Hz to 12VDC UL, CSA, CE, & TUVGS Listed
Metal Enclosure: 5.75"L X 3.8'W X 1.0"H (14.60 X 9.60 X 2.54 cm)
Weight: 0.8 lb. (365 grams)

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

Features:

- Supports IEEE 802.3x 10/100/1000Base-T/1Gbps twisted pair link
- Meets IEEE 803.3x clock jitter and frequency variation specifications
- Automatic speed detection and adjustment 10/100/1000
- Full duplex operation
- Auto MDI/MDI-X (Automatic detection of straight or crossover twisted pair cables)
- Automatic master/slave determination
- LC optical connectors standard
- Wide range input power: 5 to 60 VDC, 10W
- LED Indicators:
  - Optical Power Detect
  - Optical Receiver Signal Lock
  - Ethernet Link Established
  - 10/100/1000 Operation
  - Activity and Collision
- Available with 850nm multimode or 1310nm or 1550nm single mode optics
- Multiple optical power configurations to support 5, 10, 20 to 80 Km fiber runs (single mode only)
- POE option

The S.I.Tech 2160 Bit-Driver is intended to extend the length of Ethernet links to up to 80Km for long haul backbone applications. Once installed the 2160's are completely transparent to the system. Units must be installed in pairs. Network timing limitations, fiber attenuation, and bandwidth may limit maximum transmission distance to less than maximum.

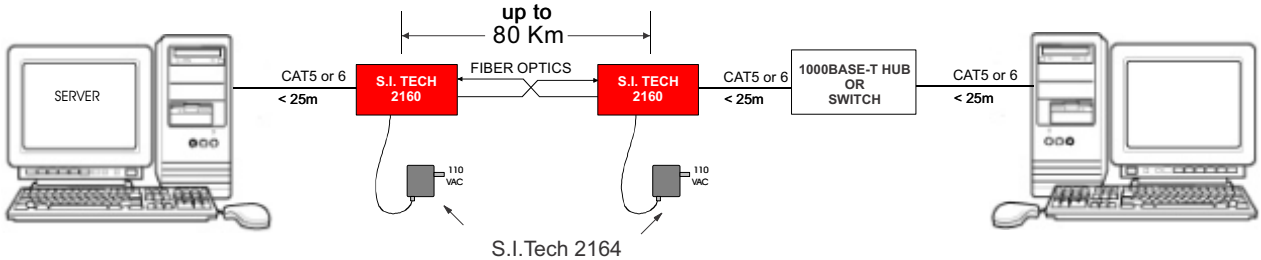
Optical Unit Connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connections.

OPERATING DISTANCE FOR OPTIC CABLE

FIBER SIZE (Microns)	ATTENUATION dB/Km		BANDWIDTH MHz/Km		DISTANCE Meters*		DISTANCE Feet*	
	850 nm	1310 nm	850 nm	1310 nm	850 nm	1310 nm	850 nm	1310 nm
50	3.0	1.0	600	600	500	600	1600	1800
62.5	3.5	1.0	200	600	200	600	660	1800
10 SM	Unspecified	0.4	Unspecified	Unspecified		20000		66000

SM - Single mode (High power - long distance option)
* At gigabit data rate, both attenuation and bandwidth of the fiber should be considered to determine distance limit.

TYPICAL APPLICATION



S.I.Tech 2164

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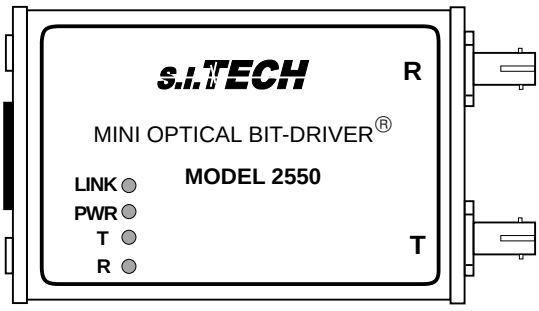
Model 2550

S.I.TECH

Ethernet to Fiber Optic Transceiver



Features:

- Supports 10 Base - FL or FOIRL Standards
- Small size
- Link Status, Receive Data, Transmit Data, and Power LED indicators
- ST or SMA optical connectors

S.I.Tech 2550 Ethernet Fiber Optic Transceiver is a compact adapter for connection of Ethernet based equipment to any fiber optic 10 Base FL/ FOIRL network. The transceiver connects to RJ45 and provides ST or SMA fiber optic connectors.

Four LED indicators provide a visible verification of transmission status and transceiver functions.

Operation Mode: 10 Base - FL/FOIRL
Input/Output Interface: ST optical connector standard (SMA option).
Transmission Distance: See distance chart
Transmitter Output Power: 30 μW, 62.5/125μ fiber
System Wavelength: 850 nm (1300 nm option)
Data Rate: 10 Mbps
Collision Frequency: 10 MHz.
Bit Error Rate: 10^{-9}
Receiver Sensitivity: 3 μW
Operating Temperature: 0 ^{o}C to 50 ^{o}C
Metal Enclosure: 2.0 x 3.5 x 1.0 in (5.0 x 8.90 x 2.54 cm)
Weight: 0.25 lb (100 grams)
Input Power: External with power supply (S.I.Tech #2121 - 110 VAC to 12 VDC)
230V Version: S.I.Tech #2122 power supply

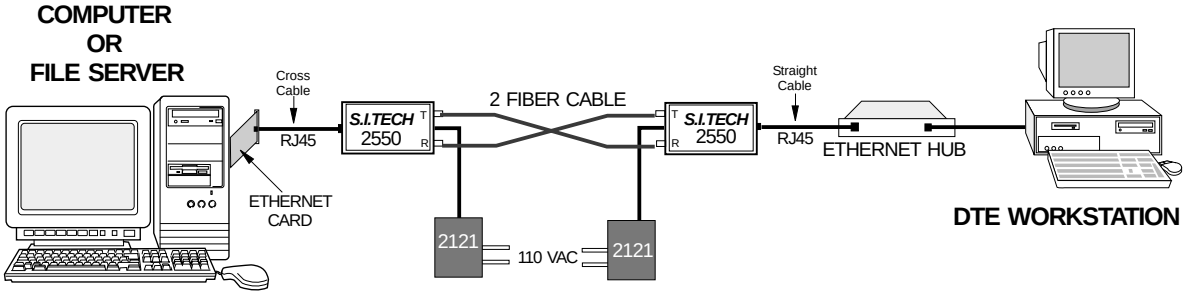
Operating Distance for Fiber Optic Cable

Model #	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
2550-O	200	7.0	-	-	1000	-	-	3300	-	-
2550	50	3.0	1.0	-	2000	6000	-	6600	20000	-
2550	62.5	4.0	1.0	-	2000	6000	-	6600	20000	-
2550-SM	10*	1.0	0.35	0.25	-	10000	12000	-	33000	40000

* Single mode (observe network timing restrictions) - 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.

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



TYPICAL APPLICATION

Note: One Ethernet connection must be set to 10 Mbps only.

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Model 3151

Ethernet to Fiber Optic Media Converter - Shielded

Features:

- Supports 10 Base-T/100 Base-TX and 10 Base-FL/100 Base-FX Standard
- Designed for use in harsh environment
- ST optical connectors
- Auto senses between 10 and 100 Mbps speeds
- Plug & Play - No Setup Required
- Improved EMI/RFI protection

S.I.Tech 3151 Ethernet media converter is designed for use in a harsh environment and connection of Ethernet based equipment over fiber optic cable at 10 Base-T/100 Base-TX and 10 Base-FL/100 Base-FX. It uses Multimode or Single mode fiber with ST connectors. Model 3151 auto senses and switches between 10 and 100 Mbps.

Operation Mode:	10 Base-T/100 Base-TX and 10 Base-FL/100 Base-FX, Auto 10/100 Sensing
Input/Output Interface:	Shielded RJFTV for harsh environment
Transmission Line Interface:	ST optical connector is standard
Transmission Distance:	See distance chart
Transmitter Output Power:	30 Microwatts into 62.5/125 micron fiber
System Wavelength:	1300 nm Multimode (Single mode Option)
Data Rate:	10/100 Mbps
Bit Error Rate:	10^{-9}
Receiver Sensitivity:	10 Microwatts @ 1300 nanometers
Operating Temperature:	0 ^{O}C to 50 ^{O}C
Weight:	2 lbs
Input Power:	External with power supply (S.I.Tech #2164 - 100 to 240 VAC, 50/60 Hz, to 12VDC, UL, CSA, CE, & TUVGS Listed)(216A-L Linear PS)
Metal Enclosure:	9.37"X4.25"X1.75" (23.8X10.8X4.4 cm) Totally shielded

Notes:

1. The 3151 and 2151 pair auto negotiates between 10 Base-T and 100 Base-Tx and chooses the best mode of operation (half/full duplex,10/100 Mbps). If one of the connecting ports also supports operation at 1000 Base-T - Gigabit (e.g.,10/100/1000Mbps NIC), the 3151 and 2151 pair will auto negotiate to the best mode of operation not exceeding 100 Mbps however, one of the connecting ports must be limited to 10 or 100 Mbps operation.
2. Use with metallic plug, using tri start thread coupling mechanism (Mil-DTL-38999 series III type) with anti-decoupling device for high vibration.
3. Applications: railways, radars, shelters, battle field communication systems, navy, shield rooms.

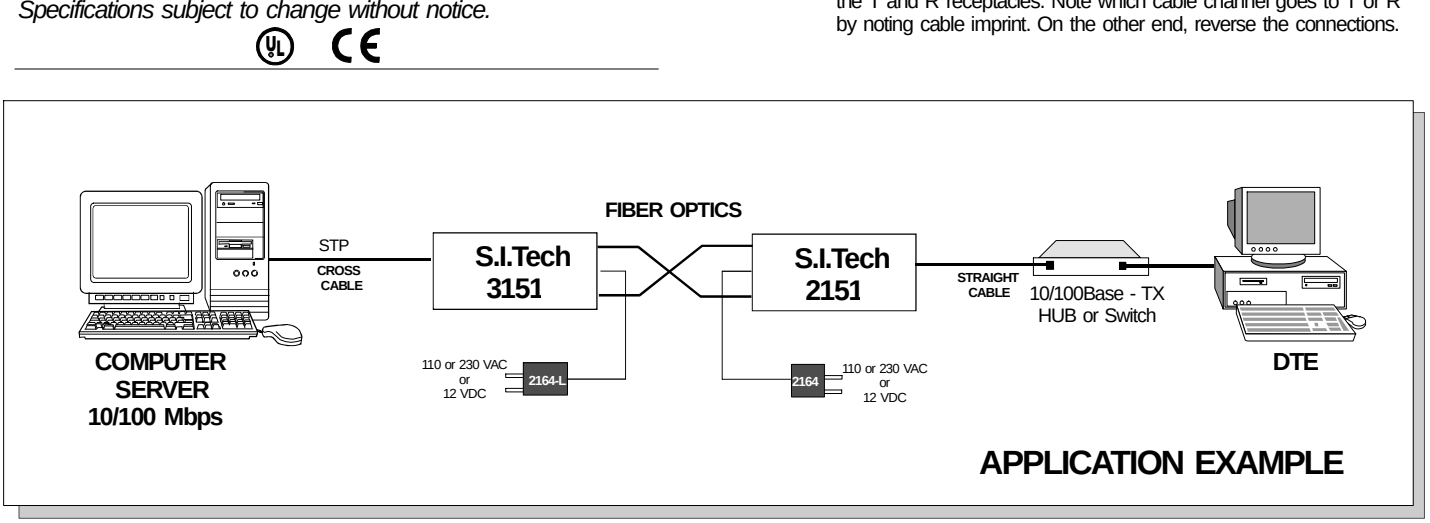
Operating Distance for Fiber Optic Cable

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	3.5	1.0	-	2000	6000	-	6600	20000	-
10**	1.0	0.35	0.25	-	10000	12000	-	33000	40000

** Single mode option - 1300nm (for longer distances, high power, contact factory)

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 connections.

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



APPLICATION EXAMPLE

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Model 3160 - Shielded

Ethernet to Fiber Bit-Driverâ

Operation Mode: 10/100/1000Base-T to Fiber
Ethernet Interface: Shielded RJ FTV for harsh environment
Fiber Interface: ST Connector Std.
Transmission Distance: See distance chart
System Wavelength: 850, 1310 nm or 1550 nm
Data Rate: 10/100/1000 Mbps
Bit Error Rate: 10^{-12}
Operating Temperature: 0 to 50 ^{o}C
Input Power: 5-60 VDC, 10W. External with power supply-S.I.Tech #2164-100/240VAC 50/60Hz to 12VDC UL, CSA, CE, & TUVGS Listed
Metal Enclosure: 9.37"L X 4.25'W X 1.75"H (23.8 X 10.8 X 4.4 cm)
Weight: 2 lb. (900 grams)

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

Features:

- Supports IEEE 802.3x 10/100/1000Base-T/1Gbps twisted pair link
- Meets IEEE 803.3x clock jitter and frequency variation specifications.
- Automatic speed detection and adjustment 10/100/1000
- Full duplex operation
- Auto MDI/MDI-X (Automatic detection of straight or crossover twisted pair cables)
- Automatic master/slave determination
- ST optical connectors standard
- Wide range input power: 5 to 60 VDC, 10W
- Designed for use in harsh environment
- Improved EMI/RFI protection
- Available with 850nm multimode or 1310nm or 1550nm single mode optics
- Multiple optical power configurations to support 5, 10, 20 to 80 Km fiber runs (single mode only)

The S.I.Tech 3160 Bit-Driver is intended to extend the length of Ethernet links to up to 80Km for long haul backbone applications. Once installed the 3160's are completely transparent to the system. Units must be installed in pairs.(3160 and 2160)
Network timing limitations and fiber attenuation and bandwidth may limit maximum transmission distance to less than maximum.

Notes:
1. The PC, Switch, or Hub to which S.I. Tech 3160 is attached must support “Auto Negotiation, i.e. Auto 1000, Auto 100 or Auto 10 Mbps.”
2. Use with metallic plug, using tri start thread coupling. Mechanism (Mil-DTL-38999 Series III type) with anti-decoupling device for high vibration.
3. Applications: Railways, radars, shelters, battle field, communication systems, navy, shield rooms.

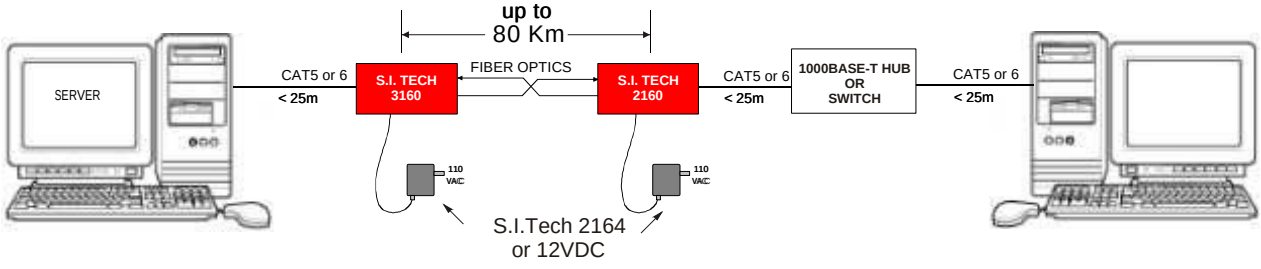
Optical Unit Connection: Connect the optical transmission line to the T and R receptacles. Note which cable channel goes to T or R by noting cable imprint. On the other end, reverse the connections.

OPERATING DISTANCE FOR OPTIC CABLE

FIBER SIZE (Microns)	ATTENUATION dB/Km		BANDWIDTH MHz/Km		DISTANCE Meters*		DISTANCE Feet*	
	850 nm	1310 nm	850 nm	1310 nm	850 nm	1310 nm	850 nm	1310 nm
50	3.0	1.0	600	600	500	600	1600	1800
62.5	3.5	1.0	200	600	200	600	660	1800
10 SM	Unspecified	0.4	Unspecified	Unspecified		20000		66000

SM - Single mode (High power - long distance option)
* At gigabit data rate, both attenuation and bandwidth of the fiber should be considered to determine distance limit.

TYPICAL APPLICATION



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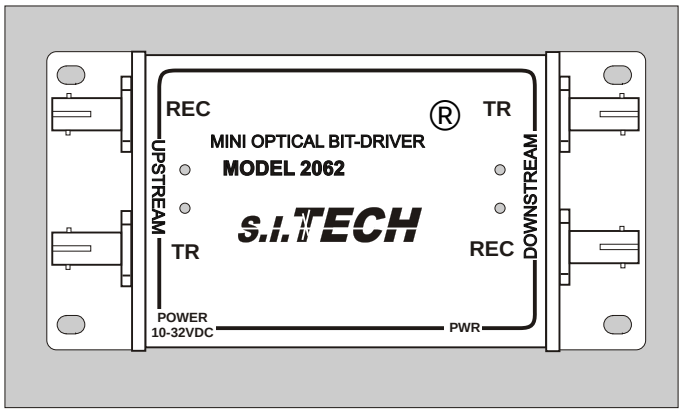
Model 2062

S.I.TECH

Optical Repeater Mini Bit-Driver ®



Features:

- Up to 20 Mbps full duplex
- Designed to work with Arcnet, Ethernet, & Token Ring fiber optic LANs
- Up to 2 Km of 50 or 62.5 micron fiber (10 dB budget)
- Powered by wall transformer 12 or 24 VDC supply (part # 2121)
- Multimode or single mode option
- Status indicators - TR and REC
- Can be used as fiber size converter e.g. 50 to 62.5 micron

S.I.Tech 2062 is designed to be used as a repeater on fiber optic networks. This repeater extends the distance of fiber optic Arcnet, Ethernet, Token Ring, TTL or T1/E1 links up to 10 Km. This repeater can be configured to convert from multimode to single mode fiber. The 2062 can also be used to convert from one size of fiber to another, e.g. 50/125 to 62.5/125 micron.

Operation Mode: Full duplex NRZ or encoded data
Input/Output Interface: ST connectors for all fiber sizes
Transmission Distance: 2 Km (50 or 62.5 micron fiber)
Transmitter Output Power: 10 dB power budget (10 Km single mode option)
Optical Coupled Power: 50 microwatts into 200 micron fiber, 30 microwatts into 62.5 micron fiber, -15 dBm into 9 micron fiber
Receiver Sensitivity: 3 microwatts @ 10^{-9} bit error rate
Metal Enclosure: 5.5" X 2.3" X 1.0" (14.0 X 5.84 X 2.54 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: S.I.Tech #2164 power supply

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

OPERATING DISTANCE FOR FIBER OPTIC CABLE

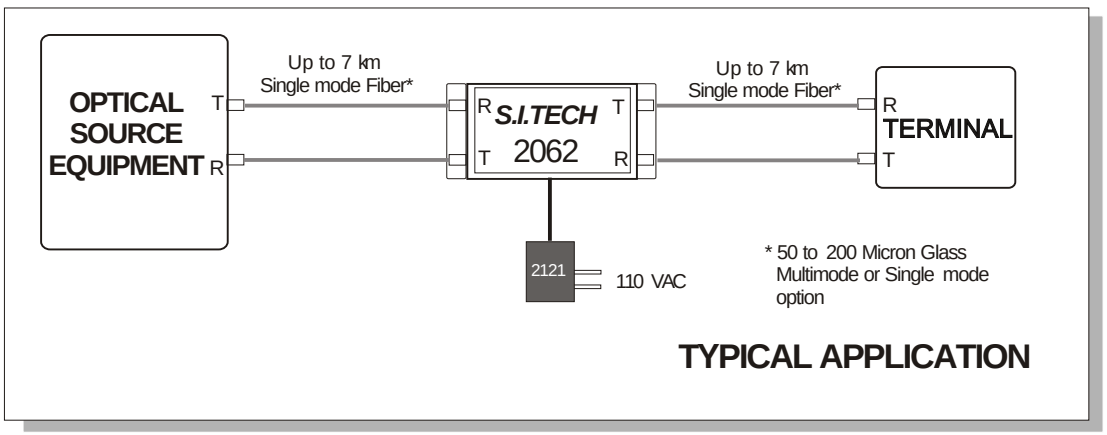
Fiber Size (Microns)	Attenuation dB/Km	Distance Meters	Distance Feet
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600
200	7.0	1000	3300
1000	200	100	330
10*	1.0	7000	23000

* Single mode (observe network timing restrictions) option - 1300nm

ORDERING INFORMATION

Model Number	Description
2062-00 ST	1000 Micron Plastic Fiber to 50/62.5 Glass Fiber
2062-O -ST	OMRON 200 to 62.5 Micron - ST**
2062 - ST	Multimode 50/62.5 to Multimode 50/62.5 Repeater - ST
2062-MM/SM - ST	Multimode 50/62.5 to Single mode Converter - ST
2062-SM/SM - ST	Single mode to Single mode Repeater - ST

** Use with S.I. Tech #9402-0008-5568 Fiber Optic Cable Assembly



TYPICAL APPLICATION

For application engineering assistance: 630-761-3640 FAX: 630-761-3644 S.I.Tech, P.O.Box 609, Geneva, Illinois 60134 U.S.A. Web site: http://www.sitech-bitdriver.com
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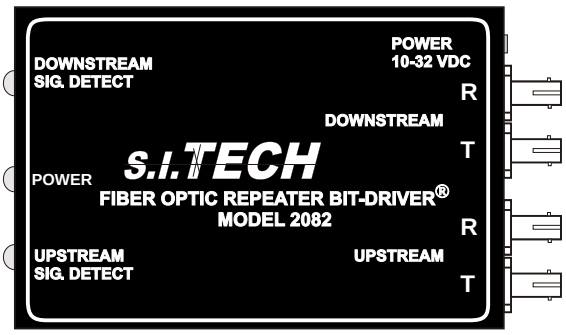
Model 2082

S.I.TECH

Optical Repeater Mini Bit-Driver ®



Features:

- Data Rates from 10 Mbps to 1000 Mbps full duplex
- Optical repeater compatible with **Ethernet** or other LANs, WAN, Switches, and Routers
- Powered by S.I.Tech #2164 Power Supply
- Multimode or single mode option
- Status indicators
- Single fiber option
- Convert multimode to single mode

S.I.Tech 2082 is designed to be used as a repeater on fiber optic links. It can be used to extend the distance of a network link up to 10 Km with single mode fiber or it can also be used to convert from multimode to single mode fiber.

Operation Mode: Full duplex NRZ or encoded data
Input/Output Interface: ST connectors (SC, FC option)
Transmission Distance: See distance chart
Transmitter Output Power: 10 dB power budget (10 Km single mode option)
Metal Enclosure: 5.75" X 3.8" X 1.0" (14.6 X 9.6 X 2.54 cm)
Weight: 1.0 lb (450 grams)
Input Power: External with power supply (S.I.Tech #2164 - 100 to 240VAC to 12VDC)

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

ORDERING INFORMATION

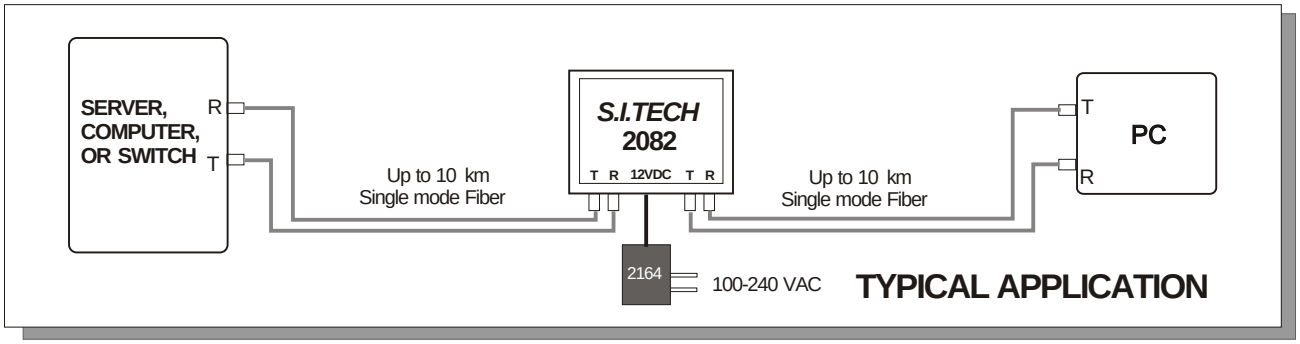
Model Number	Description
2082 - MM/MM - 100	Multimode 50/62.5 to Multimode 50/62.5 Repeater for up to 100 Mbps, ST standard. SC option
2082 - MM/MM - 1000	Multimode 50/62.5 to Multimode 50/62.5 Repeater for Gigabit. SC standard
2082 - MM/SM - 100	Multimode 50/62.5 to Single mode Converter for up to 100 Mbps. ST or SC to SC
2082 - MM/SM - 1000	Multimode 50/62.5 to Single mode Converter for Gigabit. SC to SC
2082 - SM/SM - 100	Single mode to Single mode Repeater for up to 100 Mbps. SC to SC
2082 - SM/SM - 1000	Single mode to Single mode Repeater for Gigabit. SC to SC

Notes:
1. Single mode (1300nm) is supplied with SC connectors as standard (FC optional).
2. **Check fiber bandwidth spec to determine length limitation.**
3. Check link loss (attenuation).
4. Single fiber option.
5. For proper operation 2082 optical repeater or fiber size converter should be matched to customer equipment e.g. If your Transmitter/ Receiver is 850nm, S.I.Tech 2082 TR/REC should be 850nm. For 1300nm use 1300nm rated 2082.

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation (dB/Km)			Distance-100Mbps (Meters)			Distance-1000Mbps (Meters)			Distance-100Mbps (Feet)			Distance-1000Mbps (Feet)		
	Wavelength (nm)			Wavelength (nm)			Wavelength (nm)			Wavelength (nm)			Wavelength (nm)		
	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550
50	3.0	1.0	-	2000	6000	-	500	600	-	6600	20000	-	1600	2000	-
62.5	4.0	1.0	-	2000	6000	-	200	600	-	6600	20000	-	600	2000	-
10*	-	0.35	0.25	-	10000	12000	-	20000	25000	-	33000	40000	-	66000	82500

* Single mode option (for longer distances, high power, contact factory)
At Gigabit data rate both attenuation and bandwidth of the fiber should be considered to determine distance.



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Model 2092

10 Gigabit Optical Repeater Bit-Driver Ò

Features:

- Data Rates from 100 Mbps to 10 Gbps specified on Purchase Order
- No Regeneration
- Powered by S.I.Tech #2164 Power Supply
- Multimode or single mode option
- Status indicators
- Single fiber option
- Convert multimode to single mode

S.I.Tech 2092 is designed to be used as a repeater on fiber optic links. It can be used to extend the distance of a network link up to 10 Km with single mode fiber or it can also be used to convert from multimode to single mode fiber.

Operation Mode: Full duplex NRZ or encoded data
Input/Output Interface: LC connectors
Transmission Distance: See distance chart
Metal Enclosure: 4.15" X 3.65" X 1.21" (10.54 X 9.27 X 3 cm)
Weight: 0.8 lb (365 grams)
Input Power: 10 to 32 VDC, 2.5 Watts Redundant Power

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

ORDERING INFORMATION

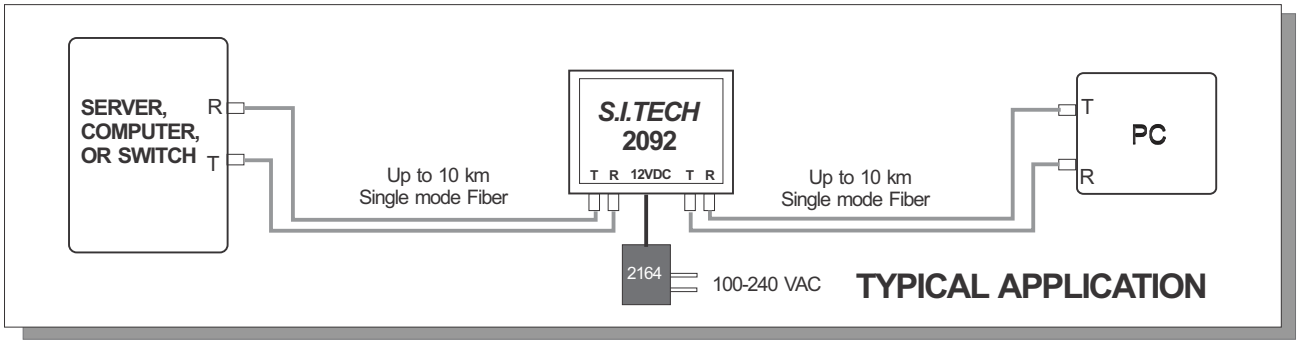
Model Number	Description
2092 - MM/MM - 1G	Multimode 50/62.5 to Multimode 50/62.5 Repeater for up to 1 Gbps, LC standard.
2092 - MM/MM - 10G	Multimode 50/62.5 to Multimode 50/62.5 Repeater for 10 Gigabit. LC standard
2092 - MM/SM - 1G	Multimode 50/62.5 to Single mode Converter for up to 1 Gbps. LC standard
2092 - MM/SM - 10G	Multimode 50/62.5 to Single mode Converter for 10 Gigabit. LC standard
2092 - SM/SM - 1G	Single mode to Single mode Repeater for up to 1 Gbps. LC standard
2092 - SM/SM - 10G	Single mode to Single mode Repeater for 10 Gigabit. LC standard

Notes:
1. **Check fiber bandwidth spec to determine length limitation.**
2. Check link loss (attenuation).
3. For proper operation 2092 optical repeater or fiber size converter should be matched to customer equipment e.g. If your Transmitter/ Receiver is 850nm, S.I.Tech 2092 TR/REC should be 850nm. For 1300nm use 1300nm rated 2092.

Operating Distance for Fiber Optic Cable

Fiber Size (Microns)	Attenuation (dB/Km)			Distance -100Mbps Feet (Meters)			Distance -1000Mbps Feet (Meters)			Distance -10000Mbps Feet (Meters)		
	Wavelength (nm)			Wavelength (nm)			Wavelength (nm)			Wavelength (nm)		
	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550
50	3.0	1.0	-	6600 (2000)	20000 (6000)	-	1600 (500)	2000 (600)	-	100 (30)	200 (60)	-
62.5	4.0	1.0	-	6600 (2000)	20000 (6000)	-	600 (200)	2000 (600)	-	50 (15)	200 (60)	-
10*	-	0.35	0.25	-	33000 (10000)	40000 (12000)	-	20000 (66000)	25000 (82500)	-	33000 (10 Km)	40000 (13 Km)

* Single mode option (for longer distances, high power, contact factory)
At 10 Gigabit data rate both attenuation and bandwidth of the fiber should be considered to determine distance.



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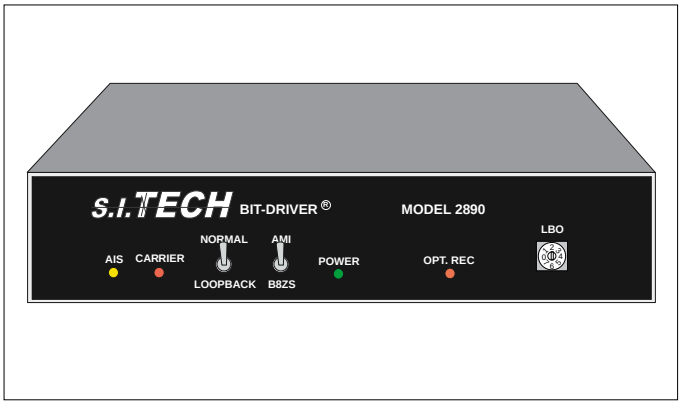
Model 2890 (T1) / 2891 (E1) - 1U

T1/E1 to Fiber Bit - Driver ®



Features:

- T1 AMI or B8ZS, E1 AMI or HDB3
- Provides clear channel capability
- Status indicators and alarms for ease of use and maintenance
- Multimode or single mode fiber interface options
- Up to 10 Km at low cost
- Optical link failure alarm build in

The S.I.Tech 2890/2891 Bit-Driver® is designed to work with T1 or E1 systems. Model 2890/2891 is a T1 or E1 to fiber optic transmitter/receiver full duplex product implementing T1 or E1 protocol. Normal operating data is 1.544 Mbps. (E1 - 2.048 Mbps)

This fiber optic Bit-Driver® product eliminates many disadvantages of metallic T1 and E1 signals, especially EMI/RFI, ground loops (electrical isolation with fiber), high attenuation (high signal loss), limiting distance between nodes of system, and potential lightning damage outdoors between buildings.

S.I.Tech Model 2890/2891 is a stand alone or rack mount product allowing easy change from T1 or E1 to fiber. Simply connect T1 or E1 cable to model 2890/2891 input/output port. Model 2890/2891 comes with power supply and status indicators.

Operation Mode: Synchronous, half/full duplex
T1 - 1.54 Mbps
E1 - 2.048 Mbps

Input/Output Interface: T1, RJ48C 100 Ω Twisted Pair
E1, BNC 75 Ω Coax or
E1, RJ48C 120 Ω Twisted Pair

Transmission Line Interface: 2 ST fiber optic receptacles

Connector Options: SC, FC, and SMA

Transmission Distance: 6600 ft. (2km)

Distance Options: 5km, 10km, or 20km

Transmitter Output Power: 30 Microwatts into 50 Micron fiber (820nm & 1300nm options)

Receiver Wavelength: 820nm or 1300nm

Minimum Sensitivity: 3 Microwatts @ 820 nanometers

Bit Error Rate: 10^{-9}

Operating Temperature: 0^{o} C to 50^{o} C

Metal Enclosure: 7.5" X 7" X 1.75" - 1U
(19 X 17.8 X 4.4 cm)

1U Rack Mounting Option: 17.0"W X 1.7"H X 7.5"D
(43.2 X 4.3 X 19.0 cm)

Weight: 2 lb.(1.0 kg) / Rack 5 lb.(2.30kg)

Input Power: 110 VAC, 50 Hz, 5W

Power Options: 2890/2891V (230 VAC)
2890-48/2891-48 (-48 VDC)

Card Version: 2390/2391 (Euro Card Size)

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

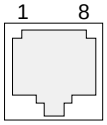
OPERATING DISTANCE FOR FIBER OPTIC CABLE

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

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

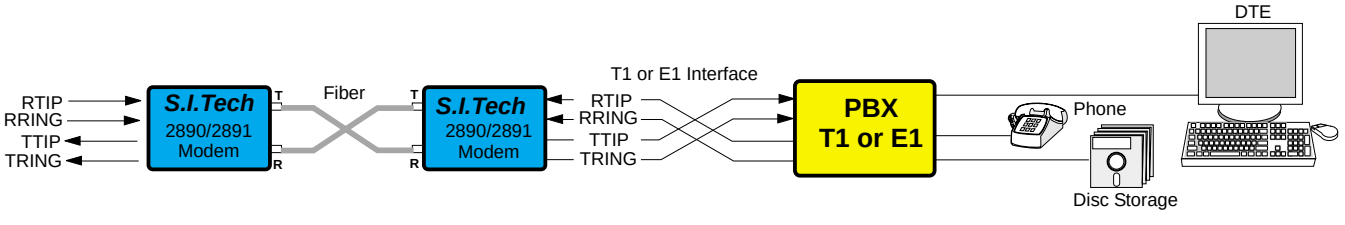
FEMALE RJ48C I/O CONNECTIONS

Pin #	Name	Function
1	R	T1/E1 receive ring
2	T	T1/E1 receive tip
4	R1	T1/E1 transmit ring
5	T1	T1/E1 transmit tip
7	Ground	Transmit drain wire
8	Ground	Receive drain wire



RJ48C

TYPICAL APPLICATION



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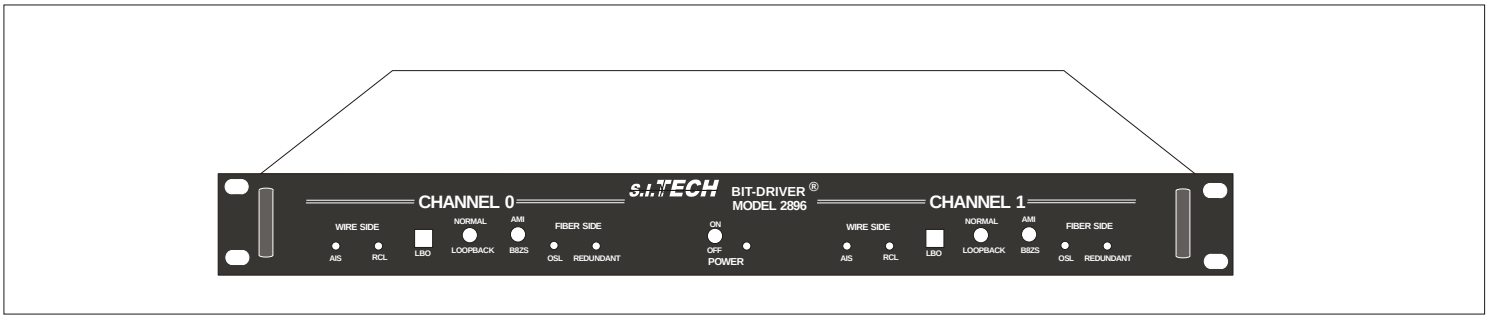
Model 2896

S.I.TECH

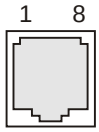
T1 to Fiber Bit - Driver® with Redundancy



Operation Mode: Synchronous, half/full duplex 1.544 Mbps (DS-1 protocol)
Input/Output Interface: RJ48 TP-100 Ω 2 CH
Transmission Line Interface: 4 ST fiber optic receptacles
Transmission Distance: See distance chart
Transmitter Output Power: 30 Microwatts into 50 Micron fiber (1300 nm Option)
Receiver Wavelength: 820 nm (1300 nm Option)
Minimum Sensitivity: 3 Microwatts @ 820 nanometers
Bit Error Rate: 10^{-9}
Line Bit Rate: 1.544 Mbps
Line Code: AMI or B8ZS
Dynamic Range: 10 dB
Frame Structure: T1
Operating Temperature: 0 ^{o}C to 50 ^{o}C
Relative Humidity: 95%
Mean Time Between Failure: MTBF @ 25 ^{o}C = 470,000 Hours
MTBF @ 50 ^{o}C = 190,000 Hours
[Bellcore test method used]
Metal Enclosure: 17.0"W X 1.7"H X 7.5"D (43.2 X 4.3 X 19.0 cm) Designed for 19" Rack, 1U High Rack
Weight: 6 lb.(2.72kg)
Input Power: 110VAC, 220VAC 50/60 Hz, or 48VDC, 10 Watts

FEMALE RJ48 I/O CONNECTIONS

Pin #	Name	Function
1	R	T1/E1 receive ring
2	T	T1/E1 receive tip
4	R1	T1/E1 transmit ring
5	T1	T1/E1 transmit tip
7		Transmit drain wire
8		Receive drain wire



RJ48C

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

Features:
- 2 channel T1 (DS-1) AMI or B8ZS over 4 fibers
- Provides clear channel capability
- Status indicators & alarms for ease of use and maintenance
- Multimode or single-mode fiber option
- Up to 10 km at low cost
- Optical link failure alarm built in
- Use as 2 independent channels or redundant operation with automatic switch over

S.I.Tech 2896 Bit-Driver is designed to work with T1 systems. Model 2896 is a T1 to fiber optic transmitter/ receiver full duplex product implementing T1 protocol, 2 CH rack mounted, power unit and built in redundancy. (110VAC, 220VAC, or 48VDC)

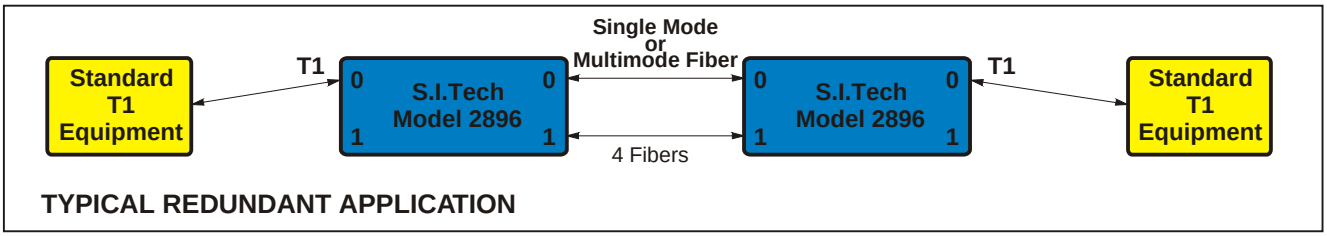
This fiber optic Bit-Driver product eliminates many disadvantages of metallic T1 signals, especially EMI/RFI, ground loops (electrical isolation with fiber), high attenuation (high signal loss), limiting distance between nodes of system, and potential lightning damage outdoors between buildings.

S.I.Tech Model 2896 Bit-Driver is a rack mount product allowing easy change from T1 to fiber. Simply connect T1 cable to Model 2896 input/output port. Model 2896 comes with power supply and status indicators. 2896 provides 2-T1 channels. Unit works with 110VAC, 220VAC, and 48VDC input power, 50/60 Hz, 20W. Power can be switched ON or OFF on each channel, as well as primary. Unit can be used as 2 channels or redundant with automatic switch over.

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 or 1550nm) option (for longer distances, contact factory)



TYPICAL REDUNDANT APPLICATION

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