

PX - 1100

T1/E1 FIBER OPTIC LINK

USER'S MANUAL



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Description

Series PX-1100 are T1/E1 fiber optic modems that operate with either one or two multimode or singlemode fibers. Units support full duplex operation at data rates 1.544/2.048 Mbps. Line code (AMI, B8ZS or HDB3) and length (0-655 feet) are switch-selectable. Built-in jitter attenuator reduces wander and jitter in received clock signal. Modems are based on FPGA (Field Programmable Gate Array) technology, featuring low current consumption and high reliability. Each unit include local (5 LED indicators) and optional remote PC-based diagnostic, extensive local and remote loop test capabilities and alarm port for control of external series BPX fiber optic bypass switch. Modems are available as stand alone modules with 12V DC/24 VAC power supplies and as cards for 18 cards subrack with 110/220 VAC power supply.

System Specifications

Electrical

T1 Data Rate.....	1.544 Mbps
E1 Data Rate.....	2.048 Mbps
Line Code.....	AMI, B8ZS, HDB3
Line length.....	0-655feet
T1 input impedance.....	100 Ω
E1 input impedance.....	75 Ω
T1 data connector.....	3 pin Terminal Block
E1 Data Connector.....	BNC
Bit error rate.....	10E-12

Optical

Transmitter.....	LED/Laser
Wavelength.....	850/1300nm
Connectors	ST/FC
Optical output, Laser.....	-8dBm
Optical output, LED, 62,5 μ m.....	-17 dBm
Receiver sensitivity.....	-40 dBm
Receiver optical dynamic range	45db

Power

Supply current @ 12VDC	250 mA
Supply current @ 24VAC	120 mA
Power consumption	3W

Temperature

Operating	-25°C to 75°C
Storage.....	-40°C to 90°C
Humidity.....	0-95% non-condensing

Physical (card)

Weight.....	450g (16oz)
Width.....	132mm (5.21")
Length.....	182mm (7.16")
Height.....	29mm (1.15")

Installation

Before unpacking equipment, inspect boxes for evidence of external damage during transportation. The equipment should also be inspected for damage after it is removed from container. Claims concerning shipping damage should be made to shipping agencies.

Equipment should be located in area with adequate ventilation and away from strong magnetic and electrical fields.

Series PX-1100 system is designed for quick and easy installation. Follow steps 1 through 6 below to install units.

1. Select application - Digital Signal Cross-connect (DSX-1), Channel Service Unit (CSU) network interface, Repeater or E1 link. Select length of electrical cable to the unit (0 - 655 feet) and line code (B8ZS, HDB3 or AMI).

Set switches LEN0, LEN1, LEN2, TCODE, RCODE according to selected application (table1). Code can be set separately for the input of the fiber modem (RCODE) and the output (TCODE).
2. Connect T1 or E1 signal to TIP and RING terminals (Fig. 1 or 2).
3. Connect optical cables, verify the optical cable loss and input optical power to the receiver. Cable loss should not exceed the loss budget of the system (see optical system specifications).

4. Connect the power. Check status of LEDs (Fig 1 or 2). The red “power” LED should be ON. Green “status” LEDs should be OFF. T1 or E1 link should operate normally.
5. Status LEDs indicate alarm conditions:
 - SYNC ON - Receiver does not receive valid signal from fiber, check fiber connection and loss;
 - LOSS ON - Transmitter does not detect valid T1/E1 signal. Check electrical connection to the fiber modem;
 - ALARM ON - Transmitter is detecting unframed all-ones condition (blue alarm) using criteria of less than 9 zeros out of 8192 bit periods. Check T1/E1 Source;
 - BPV ON-Transmitter is detecting bipolar violations in T1/E1 signal. Check T1/E1 source.
6. Alarm port is designed to connect external optical BPX series bypass switch to pins 2 and 3 or relay (5 VDC, 200 mA Max) between pins 1 and 2 (Fig. 1 or 2).
Alarm port is activated when alarm condition is generated on card:
 - One of internal voltages is absent on the card;
 - Laser / LED current is out of specified range;
 - Received optical signal is absent.

Automatic optical bypass can be enabled by setting SIP switch BYPASS to ON position (Table 2). Optical bypass switch can also be activated manually using OPT. BYPASS switch button on the front panel of the card or from remote PC using Spectra Smart software.

Troubleshooting

In case of problems system offers five levels of loopback operation. Follow steps 1 through 5 below until problem can be located.

1. Connect T1/E1 Bit Error Rate Tester (BERT) to the system (fig.3). Set RLOOP switch to ON position (Table 2). This will verify the electrical connection to the system, operation of line receiver, driver and jitter attenuator. If system operates properly, set RLOOP to OFF position.
2. Set LOOP switch to ON position. This will additionally test operation of line coder. If system operates properly set LOOP switch to OFF position.
3. Connect optical output of the card with optical input using short piece of fiber optic cable. This will test operation of LED / Laser and optical receiver. If system operates properly, connect cards using one or two optical cables.
4. Set LLOOP switch on remote card to ON position. This will verify optical cables, optical interface and line coder of the remote card. If system operates properly, set LLOOP switch to OFF position.
5. Connect electrical input of the remote card to output using short piece of electrical cable. This will verify operation of jitter attenuator, line driver and receiver of the remote card.

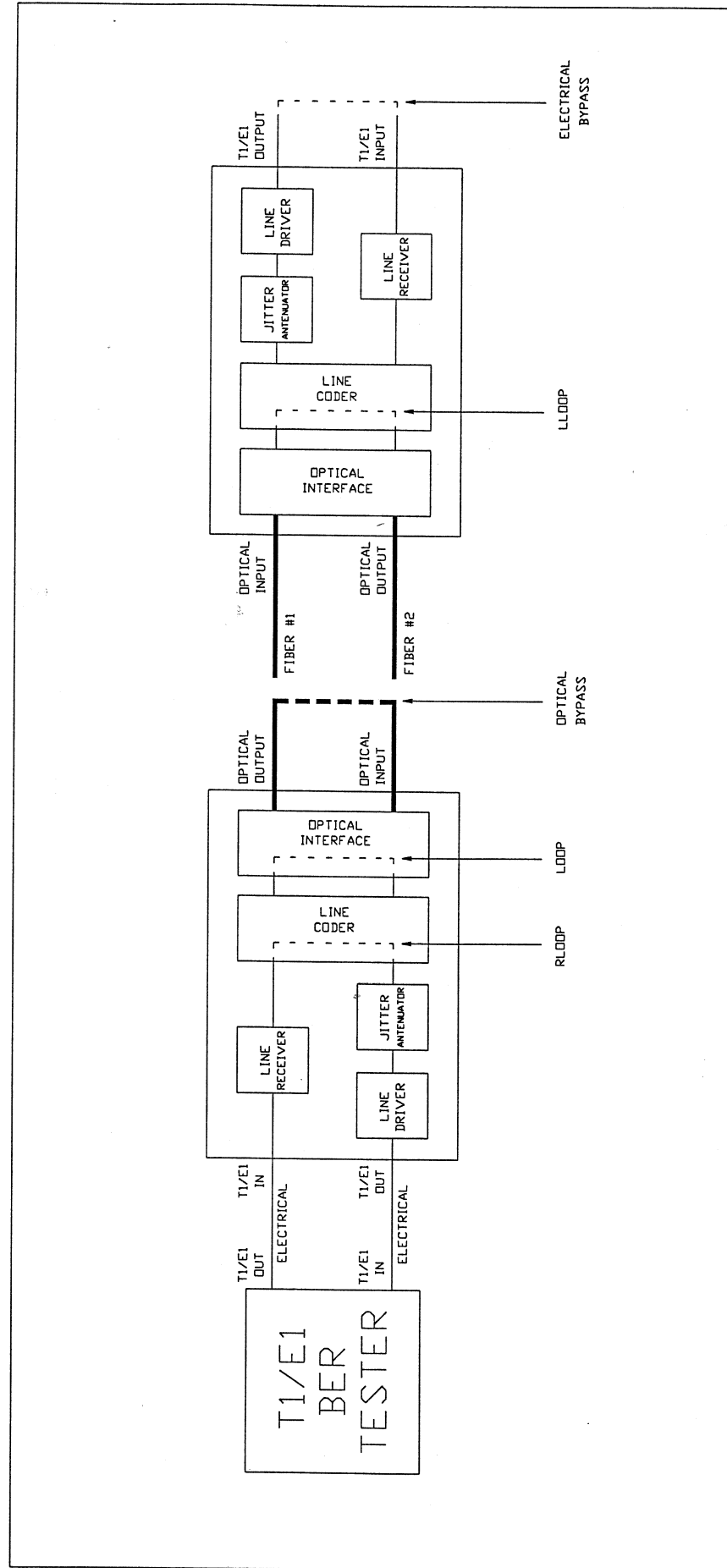


FIGURE 3. SYSTEM TROUBLESHOOTING

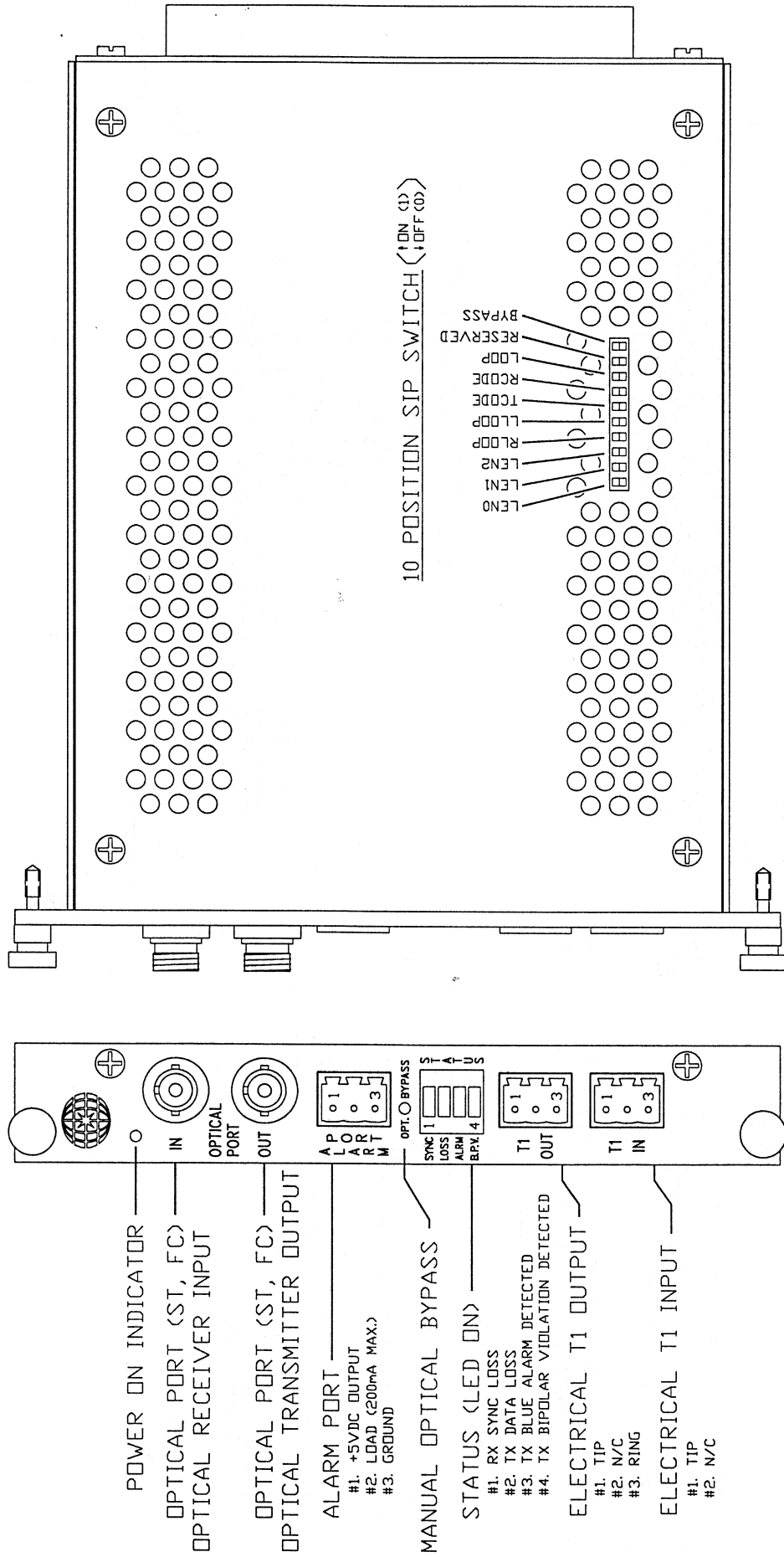


FIGURE 1. T1 PINOUT & SIP LOCATION

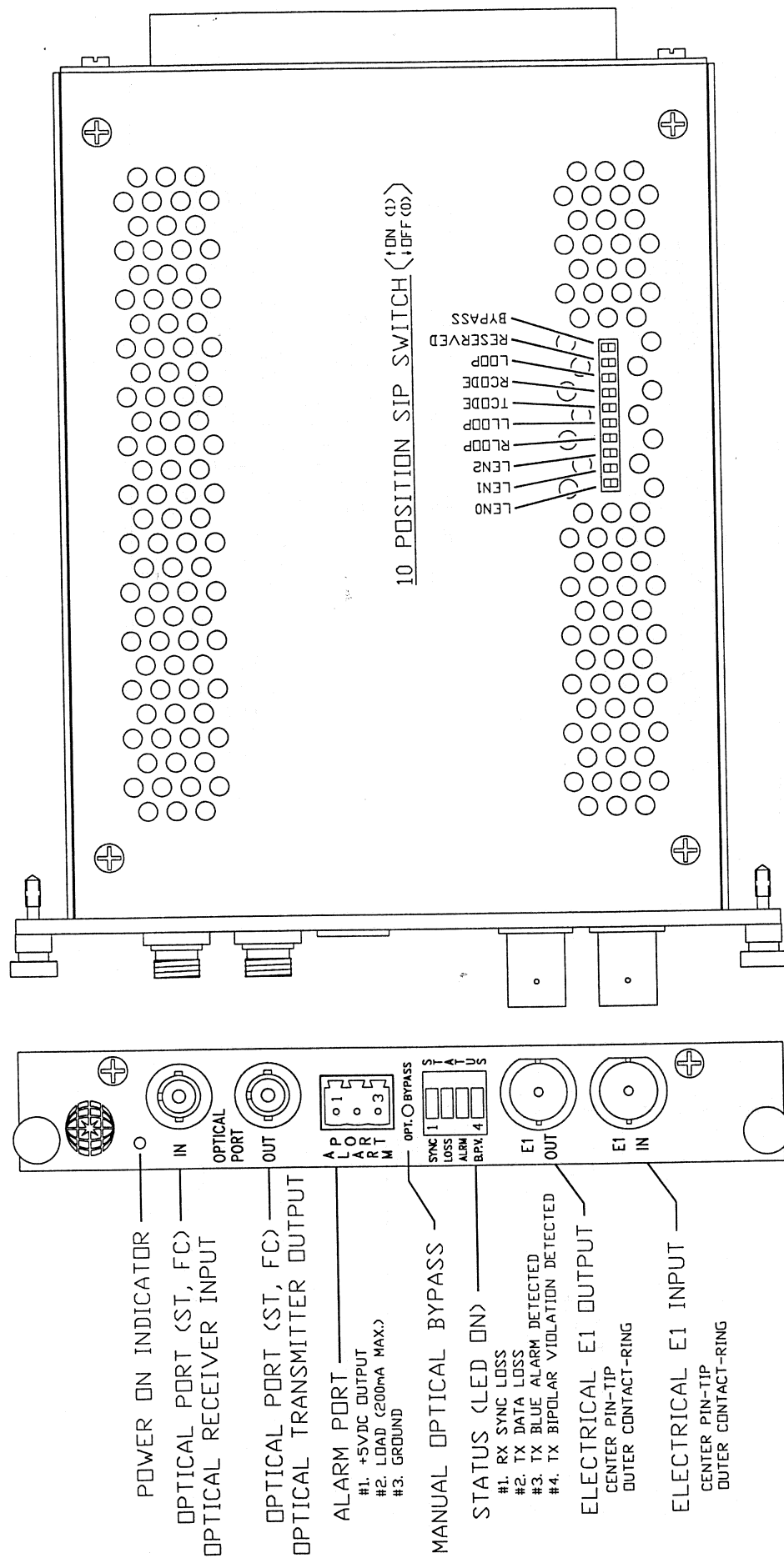


FIGURE 2. E1 PINOUT & SIP LOCATION

APPLICATION	OPTION SELECTED	CODE	SIP SETTINGS				
			LEN0	LEN1	LEN2	TCODE	RCODE
DSX-1, ABAM CABLE, AT&T 600B, AT&T 600C,	0-133 FEET	B8ZS	1	1	0	0	0
		AMI	1	1	0	1	1
	133-266 FEET	B8ZS	0	0	1	0	0
		AMI	0	0	1	1	1
	266-399 FEET	B8ZS	1	0	1	0	0
		AMI	1	0	1	1	1
	399-533 FEET	B8ZS	0	1	1	0	0
		AMI	0	1	1	1	1
	533-655 FEET	B8ZS	1	1	1	0	0
		AMI	1	1	1	1	1
CSU NETWORK INTERFACE	FCC part 68, Option A	B8ZS	0	1	0	0	0
		AMI	0	1	0	1	1
	ANSI T1.403	B8ZS	1	1	0	0	0
		AMI	1	1	0	1	1
REPEATER	AT&T CB113	B8ZS	1	0	0	0	0
		AMI	1	0	0	1	1
* E1 2.048 MHz	CCITT G.703	HDB3	0	0	0	0	0
		AMI	0	0	0	1	1

* This setting is ONLY valid on E1 links

TABLE 1. APPLICATION SELECTION

SIP SETTINGS	OPTION SELECTED
RLOOP	0 REMOTE LOOPBACK DISABLED
	1 REMOTE LOOPBACK ENABLED
LLOOP	0 LOCAL LOOPBACK DISABLED
	1 LOCAL LOOPBACK ENABLED
LOOP	0 INTERNAL LOOPBACK DISABLED
	1 INTERNAL LOOPBACK ENABLED
BYPASS	0 AUTOMATIC OPTICAL BYPASS DISABLED
	1 AUTOMATIC OPTICAL BYPASS ENABLED

TABLE 2. LOOPBACK & OPTICAL BYPASS SELECTION