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PRODUCTIVITY

SERIES

200 CSU

210 CSU

REFERENCE MANUAL

34-00196

1ST EDITION

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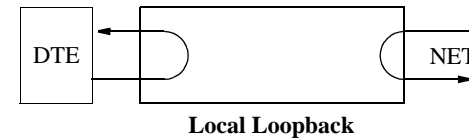
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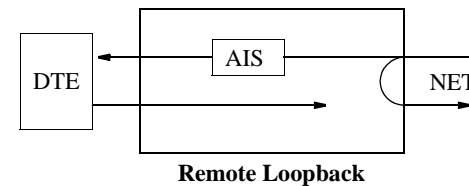
The controls, indicators and test features are identical for both units except for the front panel 'FAR' indicator, which is found only on the 200 CSU. Each unit uses LED indicators to convey major alarm conditions and looping status. Loops are initiated using the network test switch.

3.1 Testing

The front panel test switch is used for local testing. When placed in the local loop mode (LOOP), the unit loops the signal from the customer equipment (DTE IN) back to the customer equipment (DTE OUT). It also loops the received signal from the T1 facility (NET IN) back to the T1 facility (NET OUT). When moved back to 'NORM', the local loopback is removed.



The unit can also be looped remotely by generating towards it a standard CSU line loopback code (00001 repeating for 5 seconds, framed or unframed). Once looped, the received signal from the T1 facility (NET IN) is regenerated and transmitted back to the T1 facility (NET OUT). The unit can be unlooped remotely by generating towards it a standard CSU line unloop code (001 repeating for 5 seconds, framed or unframed).



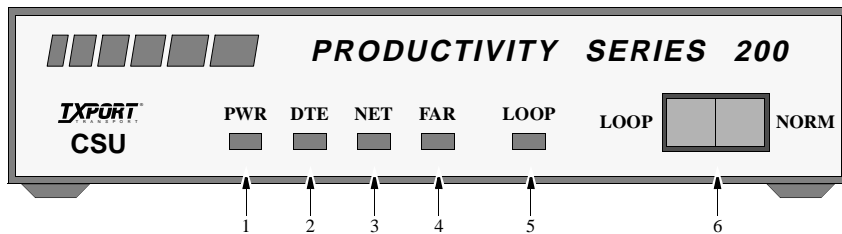
DIP switch S1-6 configures the unit to either generate an unframed all ones (AIS) signal to the DTE or to pass the received data from the network to the DTE. The 200 unit responds to the facility data link (FDL) loop (PLB, 0000111011111111) and unloop command messages (0011100011111111).

OPERATION

3.0 Introduction

This chapter describes the front panel operation and test features of the TxPORT 200 and 210 CSUs. Both units are controlled manually using a front panel test switch and rear panel DIP switches (the DIP switches are discussed in the ‘Installation’ chapter). The front panel switch and the LED indicators are described below.

200 CSU Front Panel



1	POWER: This green LED lights when power is applied to the unit.
2	DTE T1 Status: This red LED lights if the internal alarm circuitry detects a loss of signal condition for § 175 bit times from the DTE. The LED stays lit until the unit detects § 4 pulses in 32 bit times.
3	Network T1 Status: This red LED lights if the internal alarm circuitry detects a loss of signal condition for § 175 bit times from the network. The LED stays lit until the unit detects § 4 pulses in 32 bit times.
4	Far end T1 status (200 CSU only): This red LED lights if the internal alarm circuitry detects a yellow alarm signal from the far end terminal equipment. This condition occurs if the far end terminal is out of sync with the T1 signal from the network. The format for a yellow alarm is bit 2 set to 0 in each DS0 (D4 mode) or 8 ones/8 zeros in the facility data link (ESF mode).
5	Loop: This amber LED lights under the following conditions: the manual loop switch is placed in the ‘LOOP’ position or the unit receives an inband loop code for > 5 seconds, or (for the 200 only) the unit receives an FDL loop message (PLB or LLB). The LED does not light if the test switch is placed in the ‘NORM’ position or if an inband or FDL unloop code is received for >5 seconds.
6	Test Switch: This 2-position switch is used for local testing. When placed in the local loop mode (LOOP), the unit loops the signal from the customer equipment (DTE IN) back to the customer equipment (DTE OUT). It also loops the received signal from the T1 facility (NET IN) back to the T1 facility (NET OUT). When moved back to ‘NORM’, the local loopback is removed.

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GENERAL

1.0 Introduction

The TxPORT Productivity Series 200 ESF CSU and 210 CSU provide an economical solution for providing the T1 interface between customer premise equipment and T1 facilities (telco or private). Each unit is compatible with all T1 carrier transmission equipment and is designed to comply with all industry standard specifications. Both the transmitted and received 1.544 Mbps signals are conditioned.

The 200 unit is an industry standard, ESF T1 channel service unit which supports ESF performance monitoring, testing, and performance reporting per AT&T 54016 and ANSI T1.403.

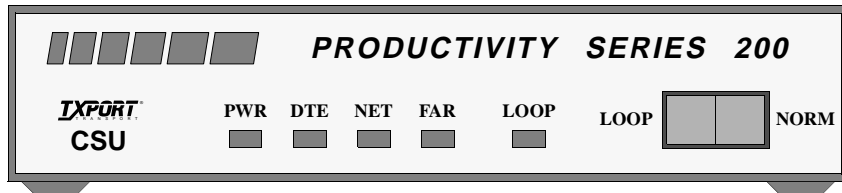
The 210 unit is an industry standard, frame transparent T1 channel service unit. It detects and activates network initiated loopbacks, monitors bipolar violations, and maintains pulse density of the transmitted signal. The unit works with any T1 line format and is transparent to framed (D4 or ESF) or unframed T1 signals. The 210 unit is transparent to line coding and may operate with either AMI or B8ZS.

Both units are constructed for stand-alone (tabletop) use but may be installed in an equipment rack or cabinet (requiring optional rack mount hardware). The front and rear panels of the two units are similar. Any differences will be noted in the appropriate places throughout this manual.

Each unit provides ALBO circuitry on the network receive path. The network ALBO supports a receive range of +1 dB to -30 dB. The DTE supports DSX1 signal ranges up to 655 feet. The units also provide LBO circuitry on both network and DTE. The network transmit LBO is user selectable (from 0 dB to -22.5 dB). The DTE transmit LBO is user selectable in five incremental ranges from 0 to 655 feet.

Both CSU units operate from an externally provided -24 or -48 VDC power source. Network and DTE connections are made through RJ48C type connectors. The units have primary and secondary surge protection on both the network and DTE side (meeting the UL 1459 requirements).

TxPORT 200 CSU



2.3 Connections

Both 200 and 210 CSU rear panels have RJ48C connections for the network and DTE interface and a terminal strip for the power connection. The following paragraphs describe these connections.

2.3.1 DTE and Network Connections

The equipment and network physical interfaces are standard RJ48C 8-pin modular jacks with the following pinout.

Pin	NET Interface	DTE Interface
1	Data In	Data Out
2	Data In	Data Out
3	Not Used	Not Used
4	Data Out	Data In
5	Data Out	Data In
6	Not Used	Not Used
7/8	Chassis Ground	Chassis Ground

2.3.2 Power Connection

The 200 and 210 CSU units operate from -48 Volts DC. Connections are made on the following power terminals using 20-gauge stranded (or similar) wire:

GND	Ground
PWR-	-48 VDC (± 6 V, 45 mA)
PWR+	Return

DTE Line Coding: Position S2-3 sets the DTE line coding, including conversion.

A - AMI B - B8ZS

Network Line Framing: Position S2-4 sets the CSU to the framing of the network line. In the ESF mode, the unit responds to all T1.403 or 54016 messages.

A - ESF B - D4

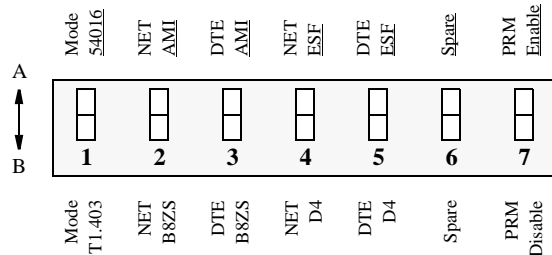
DTE Line Framing: Position S2-5 sets the CSU to the framing of the DTE line.

A - ESF B - D4

PRM: Position S2-7 enables/disables sending a PRM (performance report message) during AIS. If the unit detects a loss of sync from the DTE, an unframed all ones signal is generated to the T1 facility. If Switch S2-1 is set for T1.403 operation, the unit interrupts the AIS signal with a PRM once a second.

A - PRM enabled B - PRM disabled

Configuration Switch S2



Note: This switch is provided only on the 200 CSU

The differences between the 200 and 210 CSU units are summarized as follows:

- Configuration switch S2 is found only on the 200 CSU.
- Position S1-7 (switch S1, position 7) is a spare on the 200 CSU. On the 210 CSU, position S1-7 is used to enable the 'Transparent' mode.
- The front panel 'FAR' LED indicator is installed only on the 200 CSU.

1.1 Specifications

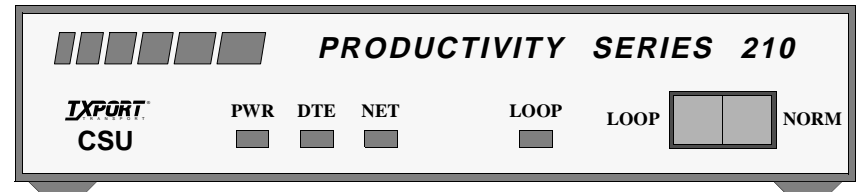
Network Interface

Line Rate: 1.544 Mb/s (± 50 bps)
 Line Framing: D4 or ESF
 Line Code: AMI or B8ZS
 Line Impedance: balanced 100 Ω (± 5%)
 Input Signal: DS1, +1 to -30 dB (ALBO)
 Output Signal: 3.0 V, ±15%, base-peak into 100 Ω
 Line Build Out: 0, -7.5, -15, and -22.5 dB attenuation
 Line Protection: 1000 V lightning, fused input/output
 Jitter Control: per TR62411 and T1.403
 Pulse Density: per TR62411

Equipment Interface

Line Rate: 1.544 Mb/s (± 50 bps)
 Line Framing: D4 or ESF
 Line Code: AMI or B8ZS
 Line Impedance: balanced 100 Ω (± 5%)
 Input Signal: DSX1 to 655 feet
 Output Signal: Selectable DSX1 signal level from 0 to 655 feet
 Line Protection: 1000 V lightning, input/output

TxPORT 210 CSU



Mechanical

Mounting: desktop or wall
Dimensions: 1.75" H, 6.8" W, 10.5" D
Weight: 2 lbs.

Industry Standards

FCC Compliance: Part 15 Subpart B, Class A
FCC Part 68 Reg: FXKUSA- 75742-DE-N
NRTL: UL 1459
CSA Certified: LR62298
DOC/CSO3: 1653 5663 A
TR54016: September 1989
TR62411
ANSI T1.403

Environmental

Operating Temp: 0° to 50° C (32° to 122°F)
Storage Temp: -20° to 85° C (-4° to 185°F)
Humidity: 95% max (non-condensing)

1.2 FCC Requirements



WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference.
- 2) This device must accept any interference received, including interference that may cause undesired operation.

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

Network LBO: Positions S1-1 and S1-2 set the network line build out signal level of data transmitted towards the T1 facility. The output level is factory set at 0 dB. It may be attenuated by -7.5 dB, -15 dB, or -22.5 dB if operating conditions require a change. The telco should provide the proper setting to the user. If unsure of the exact setting, then leave it at 0 dB.

DTE LBO: Positions S1-3, S1-4, and S1-5 set the DTE line build out transmit signal value towards the customer equipment. The value should match the cable length from the CSU DTE port to the attached equipment.

Loop Mode: Position S1-6 selects the operating mode during an active payload loop-back. The unit can be optioned to 'generate' unframed all ones (Alarm Indication Signal) to the DTE during a remote loop or to 'pass' the received network signal to the DTE on a remote loop.

A - Generate AIS B - Pass network data

AMI/B8ZS: Position S1-7 is used only on the 210 CSU as follows: In the 'Transparent' mode, the unit is transparent to line code information. In the 'Conversion' mode, AMI signals from the DTE are converted to B8ZS and B8ZS signals from the network to the DTE are converted to AMI. This mode provides clear channel capability across the network without violating ones density requirements.

A - Transparent B - Conversion

Density: Position S1-8 enables ones density insertion per AT&T 62411. The 'Enabled' mode allows insertion after 15 successive zeros from the DTE. The 'Disabled' mode ignores density control and allows up to 175 zeros to pass towards the network before a loss of signal is declared.

A - Enabled B - Disabled

2.2.2 Configuration Switch S2

Switch S2 is located only on the 200 CSU. This switch provides the following configuration parameters:

Operating Mode: Position S2-1 sets the operating mode of the unit. In the 54016 mode, the unit responds only to 54016 CSU messages. In the T1.403 mode, the unit responds to ANSI loop/unloop commands and generates a PRM every second, but will not respond to 54016 messages. The two modes are exclusive of each other.

A - 54016 B - T1.403

Network Line Coding: Position S2-2 sets the network line coding, including conversion.

A - AMI B - B8ZS

2.1 Supplied Materials

The TxPORT 200 and 210 CSUs are shipped from the factory with the 200/210 CSU reference manual. The user may require additional items for the installation and operation of the units. Refer to [Section 1.4](#) for complete ordering information.

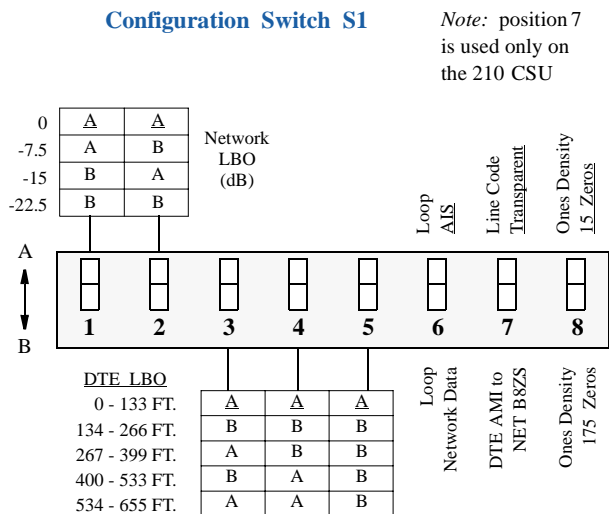
2.2 Unit Configuration

The following sections describe the configuration of the 200/210 CSU. These units were designed to be operated from manual DIP switch control. Refer to the diagrams in [this chapter](#) for switch locations. The 210 unit is transparent to framed (D4 or ESF) or unframed T1 signals. It is also transparent to line coding and may operate with either AMI or B8ZS.

On power up, each unit is configured to the hardware settings of the option switches. Subsequent changes to these settings will not take effect until the unit has been reset. This may be accomplished either by removing and then reapplying power or by pushing the test switch toward 'LOOP' and then quickly back to 'NORM'. The unit will then recycle through its LEDs and read the new configuration.

2.2.1 Configuration Switch S1

Switch S1 is located on the CSU rear panel. This switch provides the following configuration parameters:



Notice to Users of 1.544 Mb/s Service: The following instructions are provided to ensure compliance with FCC Rules, Part 68:

- 1) All direct connections to T1 lines must be made using standard plugs and jacks.
- 2) Before connecting your unit, you must inform the local telephone company of the following information:

Port ID: P/N/12 - 00492

REN/SOC (Service Order Code): 6.0 N

FIC (Facility Interface Code):

04DU9-BN	04DU9-DN	04DU9-1ZN
04DU9-1KN	04DU9-1SN	

USOC jack: RJ48C

- 3) If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn whether the source of trouble is your equipment or the telephone line. If your equipment needs repair, it should not be reconnected until it is repaired.
- 4) The unit has been designed to prevent harm to the T1 network. If the telephone company finds that the equipment is exceeding tolerable parameters, they can temporarily disconnect service. In this case, the telephone company will give you advance notice, if possible.
- 5) Under FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
- 6) If the telephone company alters their equipment in a manner that will affect the use of this device, they must give you advance warning so that you can have the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.
- 7) The attached affidavit must be completed by the installer.
- 8) In the event of equipment malfunction, all repairs should be performed by our company or an authorized agent. It is the responsibility of users requiring service to report the need for service to our company or to one of our authorized agents.

1.3 Warranty

TxPORT warrants each unit against defects in material and workmanship for a period of five years from the date the unit was shipped to the customer. If the unit malfunctions at any time during the warranty period, TxPORT will repair, or at TxPORT's option, replace the unit free of charge.

The remedies listed herein are the users sole and exclusive remedies. TxPORT shall not be liable for any indirect, direct, incidental or consequential damages. The owner must return the unit to the factory, shipping prepaid and packaged to the best commercial

standard for electronic equipment. TxPORT will pay shipping charges for delivery on return. The customer is responsible for mode and cost of shipment to TxPORT. This warranty does not apply if the unit has been damaged by accident, misuse or as a result of service or modification by other than TxPORT personnel.

When returning the unit for warranty work, a Return Material Authorization (RMA) number must be obtained from customer service (refer to [the last page of this manual](#) for phone numbers). When calling TxPORT to obtain a Return Material Authorization number or to arrange service, please have the following information available:

- Model number(s) and serial number(s) for the unit(s).
- Reason for return and symptoms of problem.
- Warranty status (if known).
- Purchase order number to cover charges for out-of-warranty items.
- Name and phone number of person we can contact if we have questions about the unit(s).
- Mode of shipment required (second day air is the normal mode of shipment for all returned material unless otherwise specified).

As soon as TxPORT has the above information, the RMA that must accompany the item(s) returned can be issued.

1.4 Ordering Numbers

Both the TxPORT 200 and 210 units are shipped from the factory with the 200/210 CSU reference manual. The user may require additional items for the installation and operation of each unit. Use the following numbers to order the basic unit or optional equipment.

Part Number	Description
F-200-001--111	200 ESF CSU unit
F-210-001--111	210 CSU unit
30-00087	200 mA, wall mount power transformer, 115 VAC to -48 VDC
9-2000-001-1	Single unit horizontal rack mount hardware for 19" equipment rack
9-2000-001-2	Dual unit horizontal rack mount hardware for 19" equipment rack
9-2000-002-1	Single unit horizontal rack mount hardware for 23" equipment rack
9-2000-002-2	Single unit horizontal rack mount hardware for 23" equipment rack

INSTALLATION

2.0 Introduction

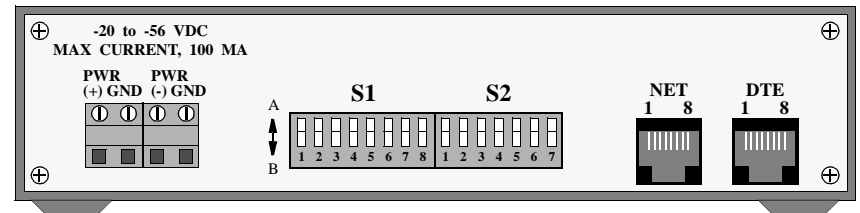
This chapter contains information and instructions required to prepare the TxPORT 200 and 210 CSUs for use. Included are initial inspection procedures, configuration guidelines, connection instructions, and powering information.

The differences between the 200 and 210 CSU units (which are covered in this chapter) are summarized below:

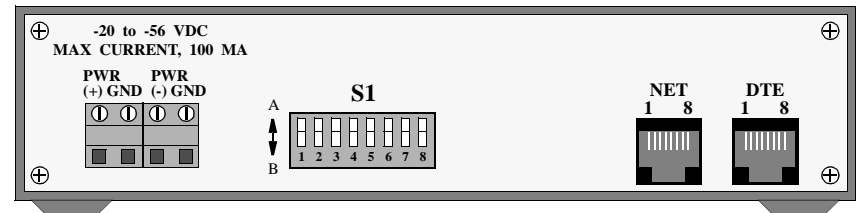
- DIP Switch S2 is found only on the 200 CSU.
- Position S1-7 (switch S1, position 7) is a spare on the 200 CSU. On the 210 CSU, position S1-7 is used to enable the 'Transparent' mode.

NOTE: Throughout this manual, all factory default settings are shown underlined (the 'A' position is the default setting for all switches).

TxPORT Model 200 Rear Panel



TxPORT Model 210 Rear Panel



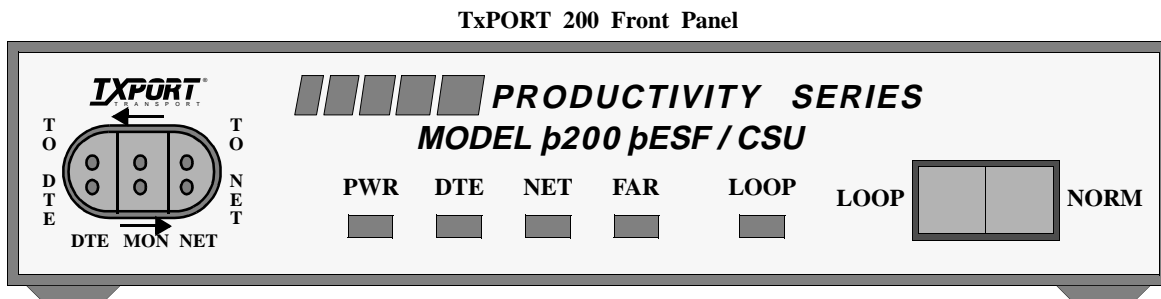
Subject: 200 ESF CSU Reference Manual, 1st Edition, March 1995

Date: March 4, 1996

Re: Test Jacks

This addendum provides additional information and/or corrections to the present manual. The information will be incorporated into the next printing of this manual.

Test Jacks



Test Access Jacks: These bantam jacks provide access to the T1 line on the DTE side as follows: the left 2 ports break connection to the unit and make connection to the DTE, the middle 2 ports are used for monitoring the signals passing through the unit (between the DTE and the network), and the right 2 ports break connection to the DTE and make connection to the unit in the direction of the network.