ExpreSpan® II Advanced T1 Delivery System HDSL Transmission Unit Multiple Mounting Assembly (HTU-C/220)

CLEI code: T1MFFG0B (81.2210A)*
CLEI code: T1MFFH0B (81.2210B)*

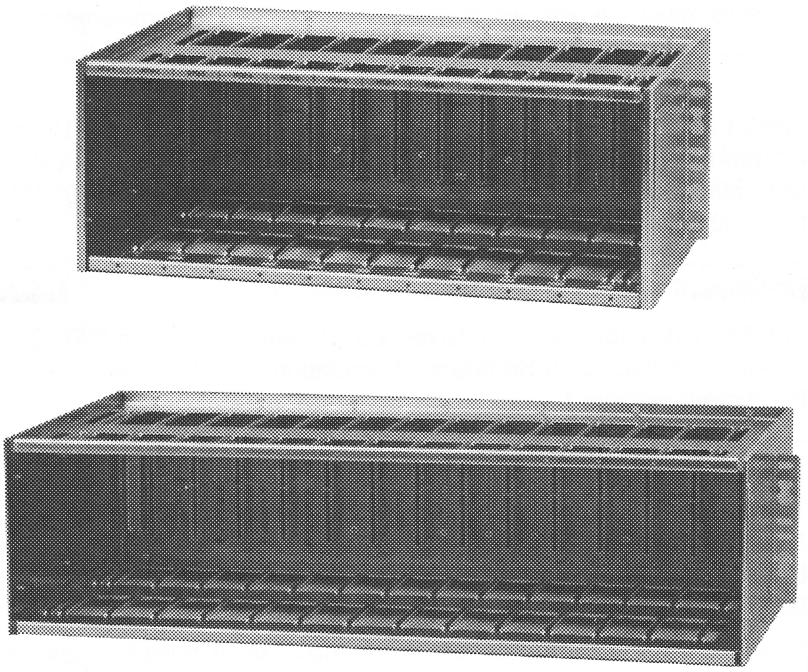


Figure 0-1 ***ExpreSpan® II Advanced T1 Delivery System HDSL Transmission Unit Multiple Mounting Assembly (HTU-C/220)***

Contents

1. Regulatory Statements

FCC Warning Statement

1.1 Federal Communications Commission (FCC) Rules require that you be notified of the following:

- This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15, Subpart B of the FCC Rules which are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment, when properly installed (refer to Section 3.) and equipped only with Tellabs 81.2201 HTU-C or Tellabs 81.2202 HTU-220 modules.
- 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, in which case the user will be required to correct the interference at his own expense.

UL Recognition

1.2 The 81.2210 ExpresSpan II Advanced T1 Delivery System HTU-C/220 Multiple Mounting Assembly is Underwriter Laboratories (UL) recognized to the 1459 Telephone Equipment Standard (Second Edition), when equipped with Tellabs 81.2201 HTU-C modules or Tellabs 81.2202 HTU-220 modules.

CSA Certification

1.3 The 81.2210 ExpresSpan II Advanced T1 Delivery System HTU-C/220 Multiple Mounting Assembly is Canadian Standards Association (CSA) Certified to the C22.2 225 Telephone Equipment Standard.

DOC Compliance

1.4 The 81.2210 ExpresSpan II Advanced T1 Delivery System HTU-C/220 Multiple Mounting Assembly is compliant with the Canadian Department of Communication (DOC) Advisory Bulletin EMCAB-1, Issue 2, Grade 2 - EMI Radiated Susceptibility Bell Canada Standard DS-8460.

1.5 This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian DOC.

(See paragraph 1.6 for the French translation of paragraph 1.5.)

1.6 Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

2. General

2.1 This practice describes features of the ExpresSpan II Advanced T1 Delivery System HDSL Transmission Unit's 2210 HTU-C/220 Multiple Mounting Assembly, and provides instructions for termination of alarm, power, and facility leads.

2.2 This practice section is being revised to correct Figures 2-1, 3-5, and 3-6, paragraph 3.3, 3.24, and 3.25, correct the relative humidity and change Power Consumption to Power Dissipation in Section 4., and update Sections 5. and 6.

2.3 The 2210 is available in a 19-inch relay rack mounting (81.2210A) and a 23-inch relay rack mounting (81.2210B). The 19-inch mounting houses up to 11 HTU-C/220s with an HTU Alarm and Access module. The 23-inch mounting houses up to 14 HTU-C/220s with an HTU Alarm and Access module.

2.4 One 81.2209 HTU Alarm and Access Module is required for each shelf that contains HTU-C or HTU-220 modules.

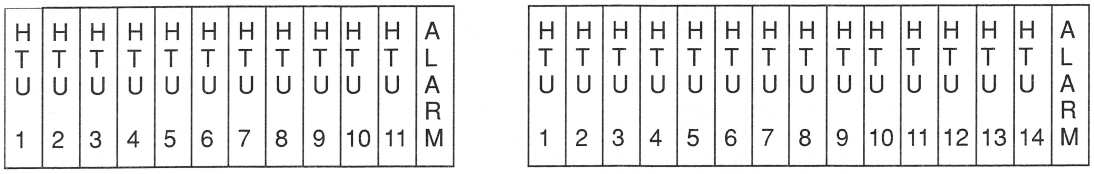
2.5 Figure 2-1 shows the address positions of HTU-C/220 modules in a shelf and the dedicated HTU Alarm and Access Module position.

2.6 The HTU-C is designed to be mounted in a Tellabs HTU-C/220 Multiple Mounting Assembly to gain the benefits of a connector-based backplane, common system control, and enhanced Operations: Administration, Maintenance, and Provisioning (OAM&P) functionality.

2.7 When mounted in a Tellabs HTU-C/220 Multiple Mounting Assembly, multiple HTU-C modules and multiple mounting assemblies interface common equipment to provide OAM& P functions for the system from a single point.

2.8 A per-shelf HTU Alarm and Access module provides alarm concentration and the interface to craft terminals for OAM&P support.

2.9 The Tellabs HTU-C/220 Multiple Mounting Assembly also accommodates the 220 AT&T T1 office repeaters and other vendors' 220-based HDSL units. However, common system control and enhanced OAM&P functions are available only with the Tellabs HTU-C and HTU-220 modules.

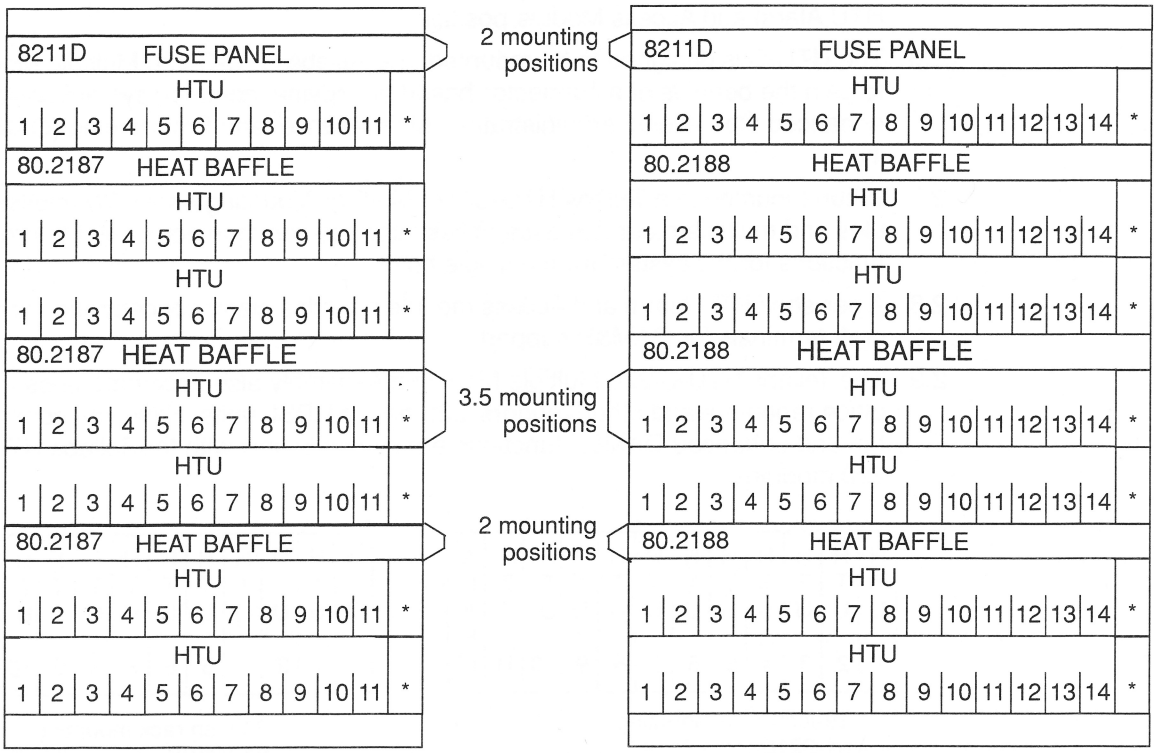


19-inch rack mounting
81-2210A

23-inch rack mounting
81.2210B

Figure 2-1 HTU-C/220 Multiple Mounting Assemblies

2.10 Up to seven Multiple Mounting Assemblies can be collocated in a 7-foot rack, as shown in Figure 2-2.



7-foot high, 19-inch rack configuration

7-foot high, 23-inch rack configuration

* This mounting position is dedicated for the 2209 which is required whenever a 2210 contains an HTU-C module, and is optional if there are only HTU-220 modules.

Figure 2-2 Possible HTU-C/220 7-Foot High Rack Configurations

Note: The equipment layout shown in Figure 2-2 is per Bellcore TR-EOP-000063, Issue 3, March, 1988, loading (<150 lb/ft^2). When installing multiple shelves in a bay, there must be a heat baffle (Tellabs part number 80.2187 (19") or 80.2188 (23")) installed between every two shelves in the bay.

Reference Documents

2.11 The following additional reference documents are available for the ExpreSpan II Advanced T1 Delivery System:

- HDSL Transmission Unit-Central Office (HTU-C) 76.812201
- HDSL Transmission Unit-Central Office (HTU-220) 76.812202
- HDSL Transmission Unit-Remote Distribution (HTU-R) 76.812203
- HTU Alarm and Access Module 76.812209
- HTU-R Single Position Mounting Assembly 76.812211
- HTU-R Multiple Mounting Assembly 76.812214

Note: This practice deals exclusively with the 2210.

3. Installation

Inspection

3.1 Each 2210 should be visually inspected upon arrival to find possible damage incurred during shipment. If damage is noted, a claim should be filed immediately with the carrier. If stored, both the mounting assembly and module(s) should be inspected again prior to installation.

Rack Mounting

3.2 When a 19-inch rack mounting is required, the following equipment can be ordered.

- Mounting assembly 81.2210A
- Fuse panel 82.8211D
- Heat baffle 80.2187
- Backplane cover 80.5933 is available (must be ordered)

3.3 When a 23-inch rack mounting is required, the following equipment can be ordered.

- Mounting assembly 81.2210B
- Fuse panel 82.8211D which requires adapter 80.0358
- Heat baffle 80.2188
- Backplane cover 80.5934 is available (must be ordered)

Wiring

3.4 Refer to Figure 3-1 for a diagram of the 2210A backplane.

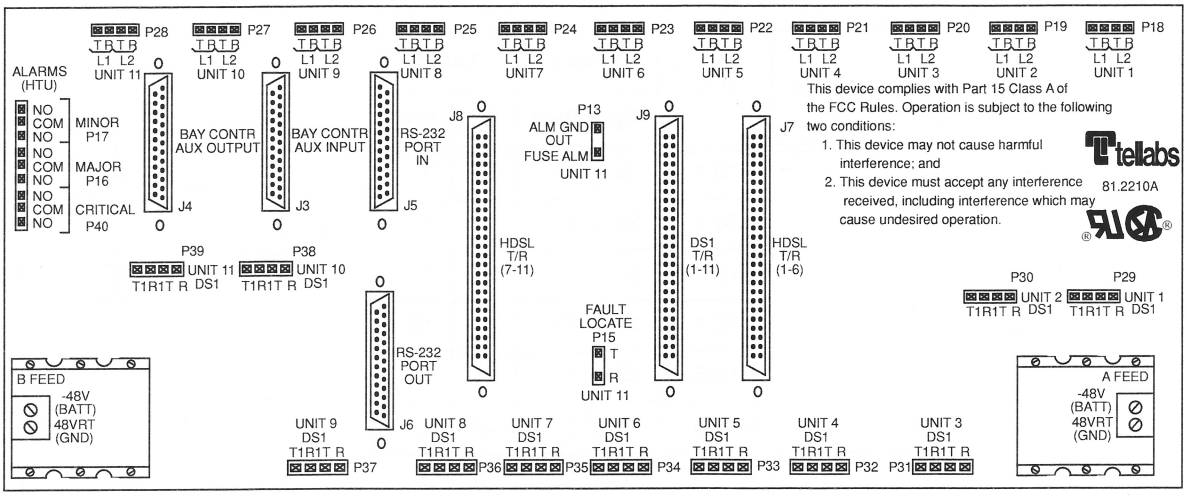


Figure 3-1 2210A Backplane

3.5 Refer to Figure 3-2 for a diagram of the 2210B backplane.

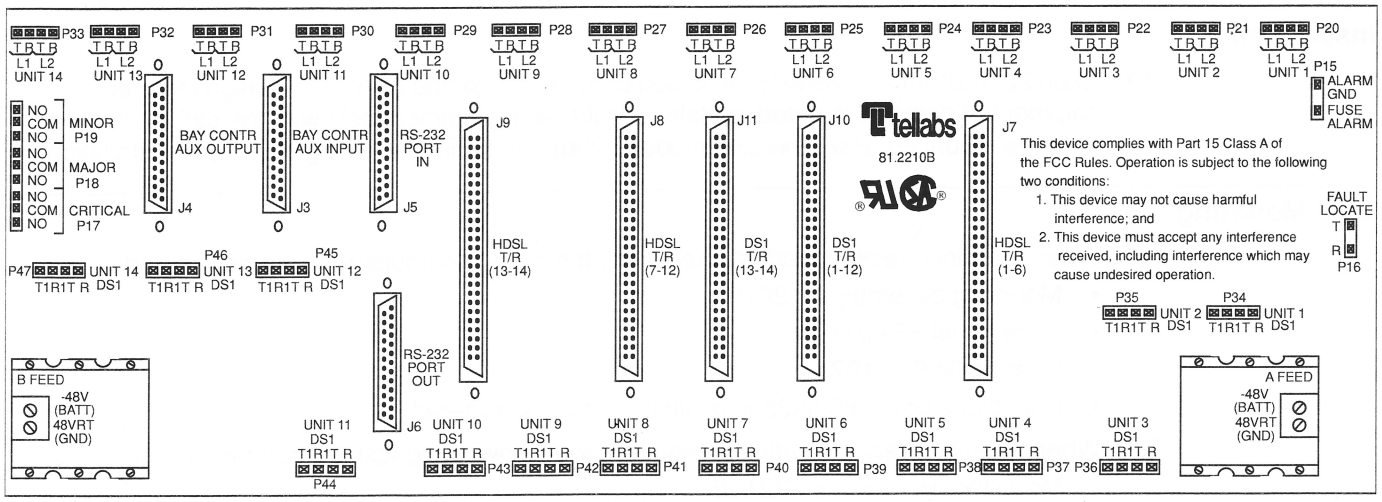


Figure 3-2 2210B Backplane

HDSL

3.6 All connections (Loop 1 Tip, Ring and Loop 2 Tip, Ring) for the HDSL line-side of the 2210 are made via either an amphenol connector (refer to Figures 3-3 and 3-4) or wire-wrap pins located on the backplane of the shelf (refer back to Figures 3-1 and 3-2). Cable strain relief is provided at the back of the shelf.

Connector	HTU	Loop 1		Loop 2	
		Tip	Ring	Tip	Ring
J7	HTU 1	26	1	28	3
	HTU 2	30	5	32	7
	HTU 3	34	9	36	11
	HTU 4	38	13	40	15
	HTU 5	42	17	44	19
	HTU 6	46	21	48	23
J8	HTU 7	26	1	28	3
	HTU 8	30	5	32	7
	HTU 9	34	9	36	11
	HTU 10	38	13	40	15
	HTU 11	42	17	44	19

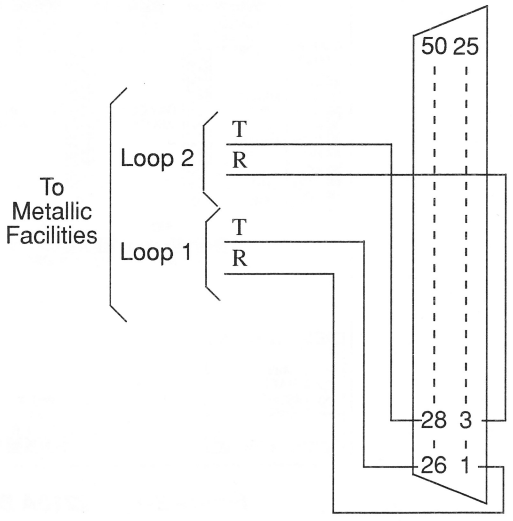


Figure 3-3 HDSL Connector Pin-Outs 2210A

Connector	HTU	Loop 1		Loop 2	
		Tip	Ring	Tip	Ring
J7	HTU 1	26	1	28	3
	HTU 2	30	5	32	7
	HTU 3	34	9	36	11
	HTU 4	38	13	40	15
	HTU 5	42	17	44	19
	HTU 6	46	21	48	23
J8	HTU 7	26	1	28	3
	HTU 8	30	5	32	7
	HTU 9	34	9	36	11
	HTU 10	38	13	40	15
	HTU 11	42	17	44	19
	HTU 12	46	21	48	23
J9	HTU 13	26	1	28	3
	HTU 14	30	5	32	7

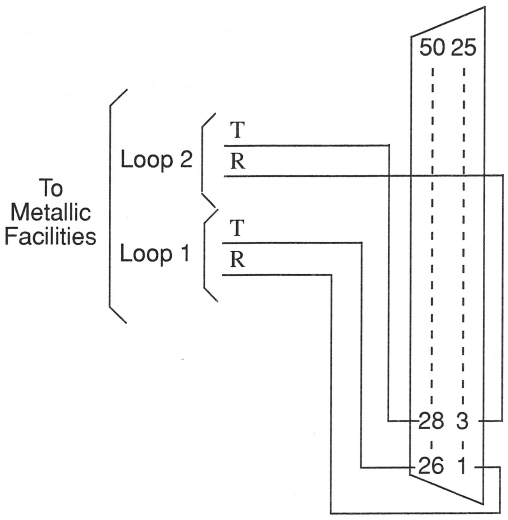


Figure 3-4 HDSL Connector Pin-Outs 2210B

DS1

3.7 All connections (T1,R1 and T,R) for the DS1 side of the 2210 are made via either an amphenol connector (refer to Figures 3-5 and 3-6) or wire-wrap pins located on the backplane of the shelf (refer back to Figures 3-1 and 3-2). Cable strain relief is provided at the back of the shelf.

Connector	CKT	XMT		RCV	
		Tip	Ring	Tip	Ring
J9	CKT 1	39	14	26	1
	CKT 2	40	15	27	2
	CKT 3	41	16	28	3
	CKT 4	42	17	29	4
	CKT 5	43	18	30	5
	CKT 6	44	19	31	6
	CKT 7	45	20	32	7
	CKT 8	46	21	33	8
	CKT 9	47	22	34	9
	CKT 10	48	23	35	10
	CKT 11	49	24	36	11

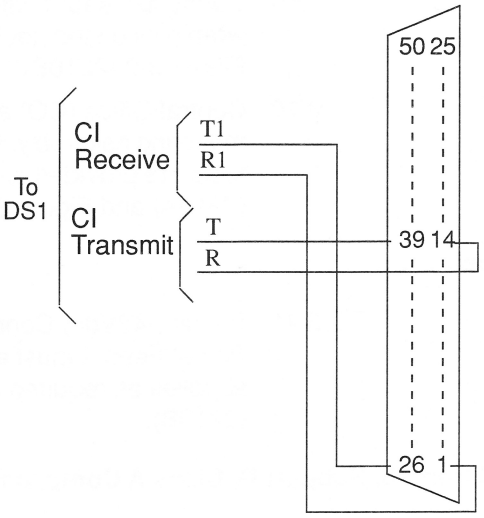


Figure 3-5 DSI-RJ48H Connector Pin-Outs 2210A

Connector	CKT	XMT		RCV	
		Tip	Ring	Tip	Ring
J10	CKT 1	39	14	26	1
	CKT 2	40	15	27	2
	CKT 3	41	16	28	3
	CKT 4	42	17	29	4
	CKT 5	43	18	30	5
	CKT 6	44	19	31	6
	CKT 7	45	20	32	7
	CKT 8	46	21	33	8
	CKT 9	47	22	34	9
	CKT 10	48	23	35	10
	CKT 11	49	24	36	11
	CKT 12	50	25	37	12
J11	CKT 13	39	14	26	1
	CKT 14	40	15	27	2

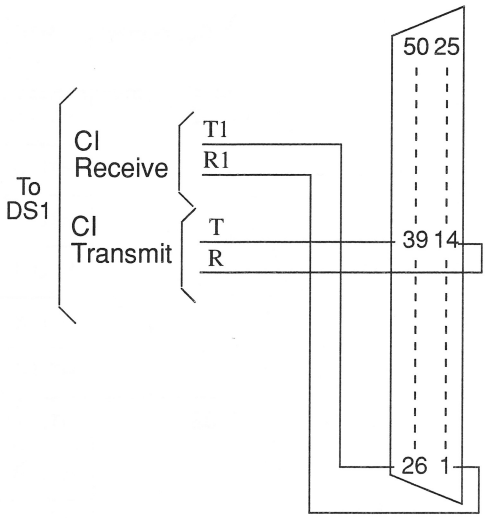


Figure 3-6 DSI-RJ48H Connector Pin-Outs 2210B

Alarms/Fault Locate

3.8 Connections for alarm ground and fuse alarm outputs for traditional 220 repeaters are made via wire-wrap pins on the backplane of the mounting assembly. Refer back to Figure 3-1 (2210A) and Figure 3-2 (2210B).

3.9 Connections for fault locate tip and ring pair for traditional 220 repeaters are made via wire-wrap pins on the backplane of the mounting assembly. Refer back to Figure 3-1 (2210A) and Figure 3-2 (2210B).

3.10 Central Office (CO) alarm connections are made via wire-wrap pins on the backplane of the mounting assembly. Normally Open (NO), Normally Closed (NC), and common (COM) contacts are provided for major, minor, and critical alarm connections. Refer back to Figure 3-1 (2210A) and Figure 3-2 (2210B).

Power

3.11 Power (-48Vdc) Connection A feeds all the HTU-C/220 modules in the mounting assembly. Power Feed A must always be connected. Power Feed B may be used for redundant power supplies as required (HTU-C only). Refer back to Figure 3-1 (2210A) and Figure 3-2 (2210B).

FCC Part 15, Subpart B, Class A Compliant DS1 and HDSL Shield Termination Method

3.12 Shielded wire connections for the HDSL and DS1 connections must be used for FCC Part 15 compliance.

3.13 Figure 3-7 is an example of a wire-wrap connection. Strip outer insulation back to expose braided and individual insulated wires. The exposed shield braid goes under the wire clamp, as shown in the shielded cable diagram (refer to Figure 3-7).

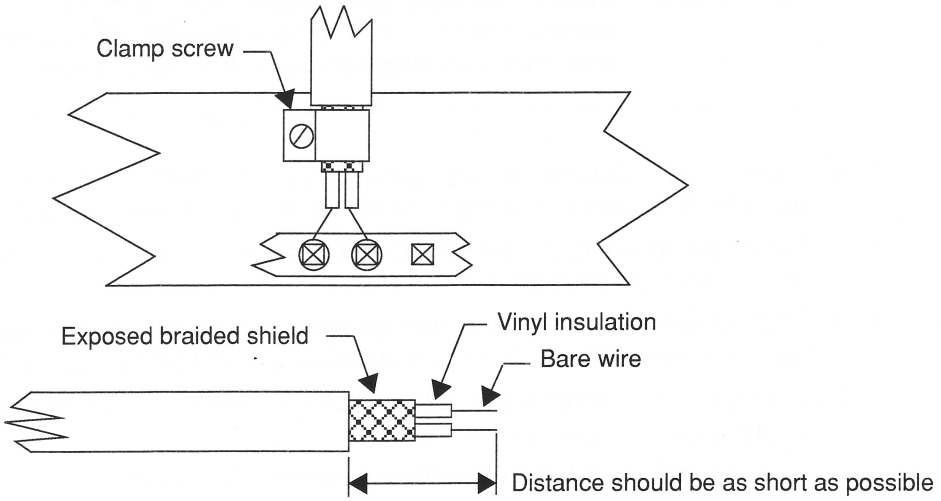


Figure 3-7 FCC Part 15, Subpart B, Class A Compliant D51 and HDSL Shield Termination Method

Note: All connections which do not use shielded telco-type connectors must employ this method of grounding if FCC Part 15, Subpart B, Class A compliance is required. When using the 2210 on customer premises, the wiring shield must be terminated as above, to provide FCC Part 15, Subpart B, Class A compliance. Two additional ground connections are provided with the mounting hardware, 1) crimp on spade tlp, 2) wire wrap spin-on pin. Both connections utilize the clamp screw for mounting shown in the above figure. These additional ground connections are only to be used in locations which are exempt from FCC Part 15, Subpart B, Class A compliance.

3.14 Shielded Connectors J3 through J9 (2210A) and J3 through J11 (2210B) provide shield connections when a shielded cable is inserted into the backplane connector. Shield clamps are not required on these connections (refer to Figure 3-8).

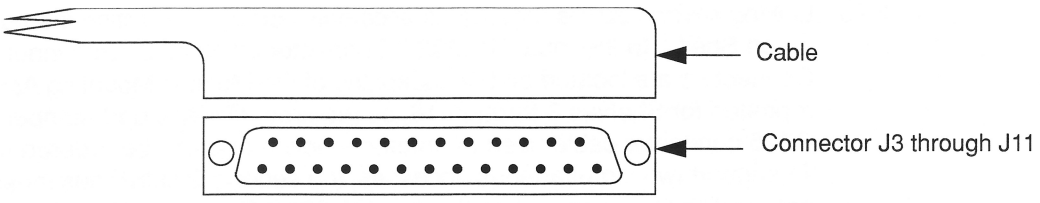


Figure 3-8 Shielded Connectors

Precautions

3.15 Installation personnel must observe the following precautions:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Module Installation

Caution: **Prior to handling any module or performing any maintenance functions, be sure to wear an electrostatic discharge strap that is connected via an alligator clip to the metal structure of the unit.**

3.16 Insert the modules into the appropriate slots in the front of the shelf. Ensure that each module is firmly seated in its edge connector and that the green 'power' LED is illuminated.

3.17 Refer back to Figure 2-1 for HTU-C/220 locations in the 2210. The order in which modules are placed does not matter.

3.18 Once a module is seated, a power-up, self-test diagnostic routine begins immediately. This power-up diagnostic routine starts automatically and typically takes 10 seconds.

3.19 During self-test, observe the HTU-C/220 front panels for the following:

- All LEDs flash once during the test.
- Self-test is completed when 'power' remains illuminated.

If Problems are Encountered

3.20 If the HTU-C/220's 'power' LED continues to flash, the module has failed power-up diagnostics; remove and reseat the module. If the power test fails a second time, the module should be returned to Tellabs for repair; please refer to the Repair and Return procedures in Section 6. of this Technical Manual for further instructions.

RS-232C Control Port

3.21 The HTU-220 module provides access to the OAM&P interface's RS-232C Control Port on its front panel. When used in the 2210 mounting with a 2209 HTU Alarm and Access module, OAM&P access is via the front panel DB-9 of the 2209.

3.22 The RS-232C Control Port provides an interface to any HTU-C/220 module in a 2210. Furthermore, the RS-232C Control Ports from as many as 16 Multiple Mounting Assemblies can be daisy chained together to allow access to any HTU-C/220 module in a bay (one at a time) from a single RS-232C terminal.

3.23 Linking several 2210s together is accomplished by connecting the output RS-232C connector on Shelf 1 to the input RS-232C Connector on Shelf 2. Both input and output RS-232C Connectors are located on the backplane of the Multiple Mounting Assembly. This process is repeated for Shelves 3 through 16, as required. (Tellabs part number 50.8003 is a 3-foot DB25 connector cable used for interconnection and can be ordered separately if required.) To support two simultaneous accesses, the second OAM&P bus must be connected. This is accomplished by connecting the Aux RS-232C Outport of Mounting #1 to the Aux RS-232C Inport of Mounting #2. This process is repeated for Shelves 3 through 16, as required.

Caution: **The RS-232C Connector on the front panel of the 2209 and the input RS-232C Connector on the backplane of the 2210 are parallel connections. The connector on the front panel of the 2209 HTU Alarm and Access Module, when in use, deactivates the backplane connector. When the terminal connection to the front panel RS-232C Connector Is removed, the backplane connector is automatically activated. Either one (but only one) of these connectors can be used per shelf. The Local Craft Interface (RS-232C terminal) must always be connected to Shelf 1.**

2209 HTU Alarm and Access Module Options

3.24 Shelf address is the only option which must be set on the 2209 module. Shelf address is the shelf in which the 2209 module is installed. A 2209 module can control up to a total of 16 2210A or 2210B Multiple Mounting Assemblies, a total of 224 individual HTU-C/220 modules. The shelf addressing is via a 5-position slide switch on the front of the 2209 module. The correspondence between the switch settings and the shelf address is shown in Table 3-1.

Shelf Number	SS1	SS2	SS4	SS8	SS16
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON

Table 3-1 Shelf Addressing Switch Settings

3.25 The baud rate for the RS-232C Port is set automatically by the 2209 module. The Control Port Auto Baud Rate optionsupports the following baud rates:

- 300 baud
- 1200 baud
- 2400 baud
- 4800 baud
- 9600 baud
- 19200 baud
- 38400 baud

Powering

3.26 The 2210 operates from a standard -48Vdc power supply/office battery.

4. Specifications

Physical

Dimensions	• 6.55 inches (16.64cm) high • 2210A: 19 inches (48.26cm) wide • 2210B: 23 inches (58.42cm) wide • 11.68 inches (29.67cm) deep
Weight	• 2210A: 13 pounds, 5.5 ounces (6.05kg) • 2210B: 15 pounds, 1.5 ounces (6.85kg)
Mounting	• 2210A: 19-inch rack • 2210B: 23-inch rack

Electrical

Input Voltage Range	• -42 to -56Vdc
Input Current	• 2210A: 5.5A maximum @ -42Vdc (includes 2209 module) • 2210B: 7A maximum @ -42Vdc (includes 2209 module)
Power Dissipation	• 2210A: 234 watts (fully loaded) 11 circuits at maximum lengths with span-powered HTU-Rs with NIU/smartjack/CSU power; 170 watts typical • 2210B: 297 watts (fully loaded) 14 circuits at maximum lengths with span-powered HTU-Rs with NIU/smartjack/CSU power; 216 watts typical

Environmental

Operating Temperature	• -40° to +149°F (-40° to +65°C) @ 5 to 95% relative humidity (no condensation)
Storage Temperature	• -58° to +175°F (-50° to +85°C) @ 5 to 95% relative humidity (no condensation)

5. Glossary

ACO	Alarm Cutoff
AIS	Alarm Indication Signal
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
B8ZS	Bipolar With Eight Zero Substitution
BER	Bit Error Rate
CI	Customer Interface/Installation
CLEI	Common Language Equipment Identification
CO	Central Office
COM	Common
CR	Carriage Return
CSA	Canadian Standards Association
CSA	Carrier Serving Area (TR-TSY-000057)
CSU	Channel Service Unit
DCE	Data Communication Equipment

DOC	Department of Communication
DS-1	Digital Signal - Level 1
DSR	Data Set Ready
DSX-1	Digital Signal Crossconnect - Level 1
DTE	Data Termination Equipment
DTR	Data Terminal Ready
EMI	Electromagnetic Interference
ESF	Extended Superframe
FCC	Federal Communications Commission
FDX	Full Duplex
FT1	Fractional T1
GND	Ground
HDSL	High Bit-rate Digital Subscriber Line
HOC	HDSL Overhead Channel
HTU	HDSL Transmission Unit
HTU-C	HDSL Transmission Unit-Central Office
HTU-R	HDSL Transmission Unit-Remote Distribution
HTU-220	HDSL Transmission Unit-Central Office (AT&T 220 mechanics compatible)
KTU	Key Telephone Unit
LPBK	Loopback
LED	Light Emitting Diode
LOS (DS1)	Loss of Signal
LOS (HDSL)	Loss of Synchronization
LOSW (HDSL)	Loss of Sync Word
MRA	Material Return Authorization
NC	Normally Closed
NI	Network Interface
NIU	Network Interface Unit
NO	Normally Open
OAM&P	Operations: Administration, Maintenance, and Provisioning
PSM	Power Supply Module
RJ	Registered Jack (FCC Part 68 compliant)
RXD	Receive Data
SF	Superframe
SNR	Signal to Noise Ratio
SYNC	Synchronization

TXD	Transmit Data
UL	Underwriter Laboratories
VDT	Video Display Terminal

6. Troubleshooting, Technical Assistance, Repair and Return

6.1 This section will assist in the installation, testing, or troubleshooting of the 2210 and will aid in the localization of trouble to this specific equipment. If the equipment seems to be defective, substitute new equipment (if possible) and conduct the test again. If the substitute operates correctly, the original should be considered defective and returned to Tellabs for repair or replacement (see paragraph 11.3). We strongly recommend that no internal (component-level) testing or repairs be attempted on the equipment; unauthorized testing or repairs may void its warranty.

Technical Assistance

6.2 Contact Tellabs Technical Assistance as follows:

Location	Telephone	FAX
Tellabs Pty Ltd., North Rocks, NSW, **Australia**	+61.2.890.1918	+61.2.890.1817
Tellabs SA, Brussels, **Belgium**	+32-2-646-5380	+32-2-646-6811
Tellabs **Canada** Ltd., Mississauga, Ontario	416 / 858-2058	416 / 858-0418
Tellabs International, Inc., **Dubai, U.A.E.**	+971-4-373250	+971-4-376526
Tellabs U.K. Ltd., Buckinghamshire, **England**	+44-628-660345	+44-628-667735
Tellabs H.K. Ltd., **Hong Kong**	+852-866-2983	+852-866-2965
Tellabs, Ltd., County Clare, **Ireland**	+353-61-471433	+353-61-471000 / 472004
Tellabs Ltd., Dublin, **Ireland**	+353-1-676-6333	+353-1-676-2646
Tellabs S.A. DE C. V., **Mexico**	525-282-1107, -1432, -1050, or -0981	525-282-0218
Tellabs, N.Z. Ltd., Wellington, **New Zealand**	+64-4-495-2130	+64-4-495-2133
Tellabs International, Inc. Seoul, **South Korea**	+82-2-589-0667 or -0668	+82-2-589-0669
Tellabs International, Inc., Stockholm, **Sweden**	+46-8-678-4040	+46-8-678-4041
Tellabs Turkey A.S., Ankara, **Turkiye**	+90-4-467-4330	+90-4-467-6664
USA and **Puerto Rico**	(800) 443-5555*	708 / 852-7346
*All other **Caribbean** and **South American** locations, or if the toll-free number is busy, telephone 708 / 969-8800		

Repair and Return

6.3 If equipment needs repair, contact Tellabs' Product Services Department with the equipment's model and issue numbers and warranty date code. You will be issued a Material Return Authorization (MRA) number and instructions on how and where to return the equipment.

Location	Telephone	FAX
Tellabs **Canada** Ltd., Mississauga, Ontario	416 / 858-2058	416 / 858-0418
Tellabs, Ltd., County Clare, **Ireland**	+353-61-471433	+353-61-471000 / 472004
Tellabs Operations, Inc., **Lisle, IL USA**	(800) 443-5555 (USA and Puerto Rico only) 708 / 969-8800 (other International)	708 / 852-7346 (both)

6.4 Repair service includes an attempt to remove any permanent markings made by customers on Tellabs equipment. If equipment must be marked, it should be done with nonpermanent materials and in a manner consistent with the correct handling of electrostatically sensitive devices.