

B18-04649-01

SMALL DST SHELF

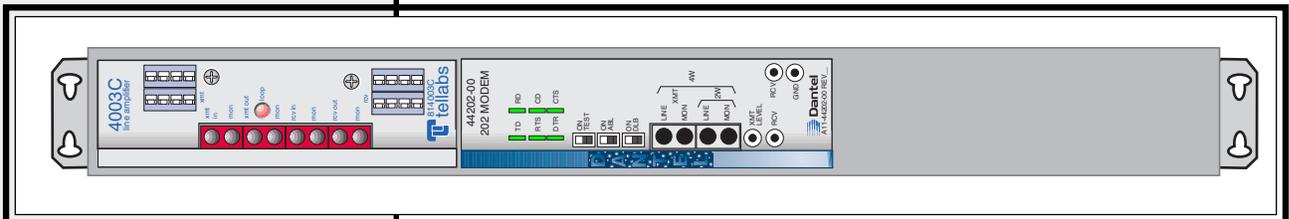


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About this Practice:

This is a new document.

Reissued Practices: Updated and new content can be identified by a banner in the right margin.

Issue date: October 1998

UPDATED

CAUTION

- Install or remove modules from the shelf only when the power is off. If you install a module in the shelf with the power on, the internal circuitry may suffer damage and the product warranty will be void.
- Remove and install circuit boards only in a static-safe environment (use antistatic wrist straps, smocks, footwear, etc.).
- Keep circuit boards in their antistatic bags when they are not in use.
- Do not ship or store circuit boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
- For more complete information on electrostatic discharge safety precautions, refer to Bellcore™ Technical Reference # TR-NWT-000870.

ORDERING INFORMATION

NOTE: This section lists the different options available for this product. To order any of the available options, contact Dantel Inside Sales through our toll-free number, 1-800-432-6835.

OPTION NUMBER	FEATURES
B18-04649-01	Wired shelf equipped with one (1) Tellabs 4003c and one (1) 44202 202-Type Modem

GENERAL DESCRIPTION

The B18-04649-02 shelf is a three-position shelf equipped with two modules.

Slot 1 - Tellabs 4003C Line Amplifier

The Tellabs 4003C Line Amplifier with Loopback provides switch-selectable level control, equalization, impedance matching in both the transmit and receive channels of a 4-wire voice-frequency transmission facility.

Additionally, the 4003C provides tone-activated or dc-activated equal-level loopback of the facility.

Slot 2 - Dantel 44202 Compatible Modem

The 44202 module provides Bell-type 202 (4-wire) data communications between distant digital equipment locations. It also provides on-board loop-back testing and multiple data interface inputs.

The 44202 is a plug-in P.C. board module that fits into any 400-type or similar equipment housing. The front panel has:

- ◆ Jacks.
- ◆ LEDs.
- ◆ Switches.
- ◆ Test points.
- ◆ Level setting potentiometers.

There are no options for the 44202 and it is not equipped to accept subassemblies.

INSTALLATION

This section consists of:

- ◆ Equipment mounting
- ◆ Wiring
- ◆ Switch and strap settings
 - 4003c Line Amplifier
 - 44202 202-Compatible Modem
- ◆ Alignment and Checkout Procedure

EQUIPMENT MOUNTING

Install the shelf in an equipment rack using the hardware provided. Refer to Fig. 1. Install the shelf as explained below.

Tools Required:

- ◆ Phillips screwdriver
- ◆ 3/8" hex nut driver

1. Check the mounting brackets.

The brackets are installed at the factory so the front of the shelf extends forward from the equipment rack. You can remove the brackets and reinstall them for flush mounting. To install the shelf in a 23-inch rack, remove the brackets and install the optional mounting brackets that are in a parts bag attached to the unit.

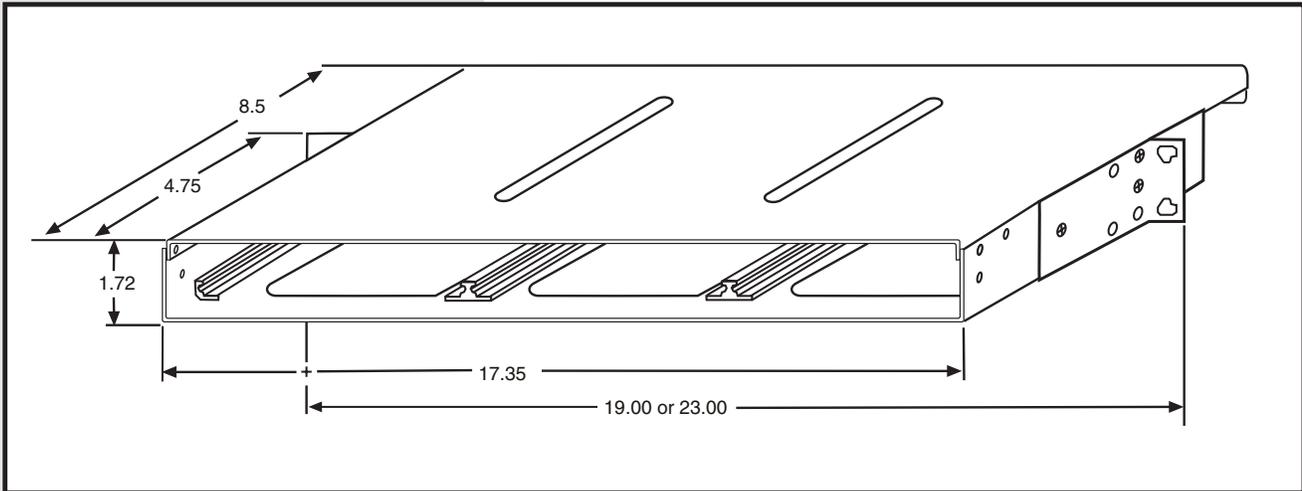
2. Install the shelf.

Install the shelf in the equipment rack, using the hardware supplied in the parts bag. Refer to Fig. 1 in conjunction with the following steps.

1. Facing the frame rail, place the shelf in the rack. Secure the shelf with three Phillips-head screws and lock washers - two on the right side at the top and bottom, and one on the lower left side.
2. Install one ESD stud with lock washer in the upper left location.
3. Secure all fasteners tightly, ensuring proper grounding between the ESD stud and the frame rail.
4. Place an ESD label next to the ESD stud.
5. From the rear of the bay, install the other ESD stud into the frame rail next to the shelf. Secure tightly, ensuring proper grounding between the ESD stud and the frame rail.
6. Place an ESD label next to the ESD stud.

INSTALLATION

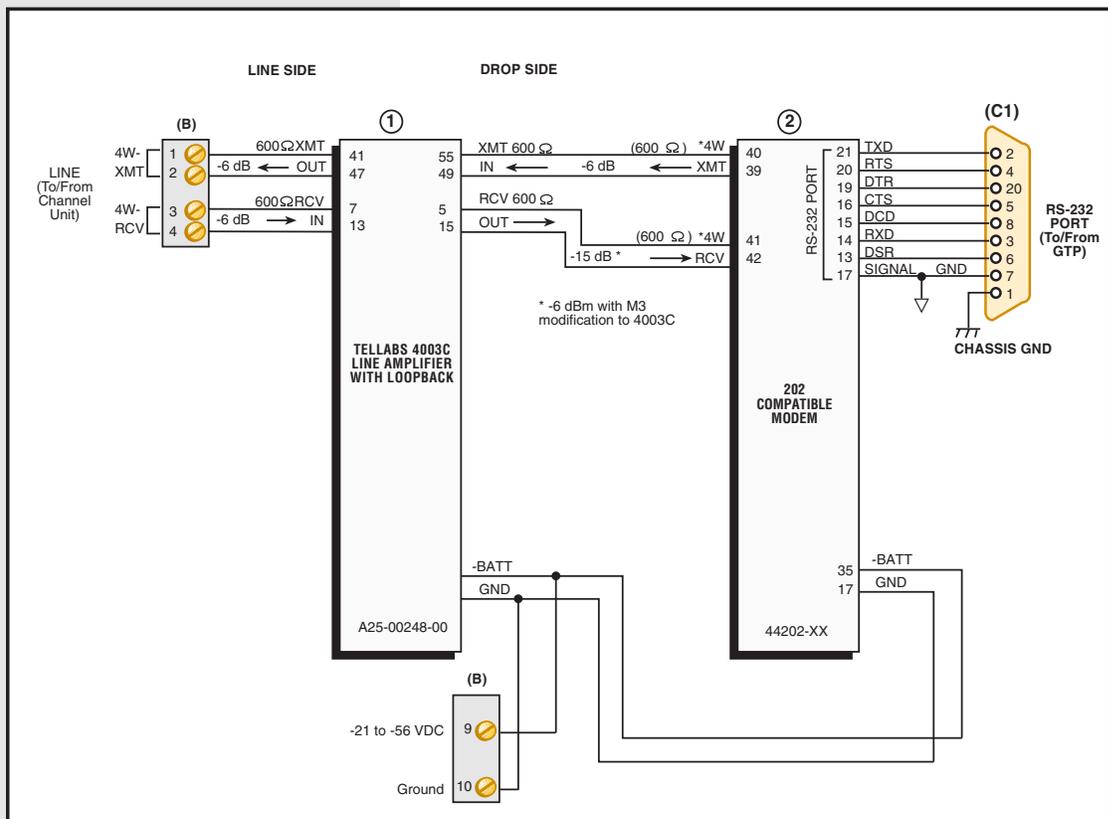
FIG. 1 - MOUNTING DIMENSIONS



WIRING

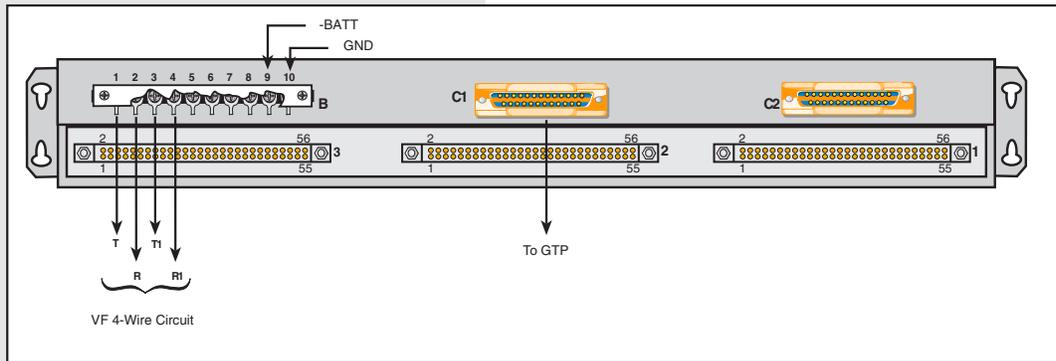
Connect the shelf as required. Refer to Fig. 2 for a functional schematic of the unit. Fig. 3 shows the connector locations on the rear of the unit.

FIG. 2 - FUNCTIONAL SCHEMATIC, 04649 SHELF



INSTALLATION

FIG. 3 - REAR VIEW, 4649 SHELF



SWITCH AND STRAP SETTINGS

4003C LINE AMPLIFIER

Refer to Tables A-C and Fig. 4 to set the options on the Line Amplifier in slot 1 of the shelf.

TABLE A - 4003C SWITCH OPTIONS

SWITCH	POSITION
S1-1	ON
S1-2	OFF
S2-1	ON
S2-2	OFF
S3	LOSS
S4	all OFF
S7-1	ON
S7-2	OFF
S8-1	ON
S8-2	OFF
S9	LOSS
S10	all OFF
S13-1	1 ON* (refer to Table B)
S14-1	OFF
S14-2	ON
FRONT PANEL LEVEL SWITCHES	
XMT	
No switches IN	
RCV	
No switches IN	
NOTE:	
OFF = away from the numbers	
ON = toward the numbers	

TABLE B - 4003C LOOPBACK FREQUENCY SELECTION (S13)

FREQUENCY	S13 SWITCH POSITION SET ON*
2813 Hz	all OFF
* 2713 Hz	1
2513 Hz	2
2413 Hz	3
1913 Hz	4
1813 Hz	5
1713 Hz	6
1613 Hz	7
1513 Hz	8
1413 Hz	9
1313 Hz	10
* NOTE: All other S13 switch positions must be set to the OFF position.	

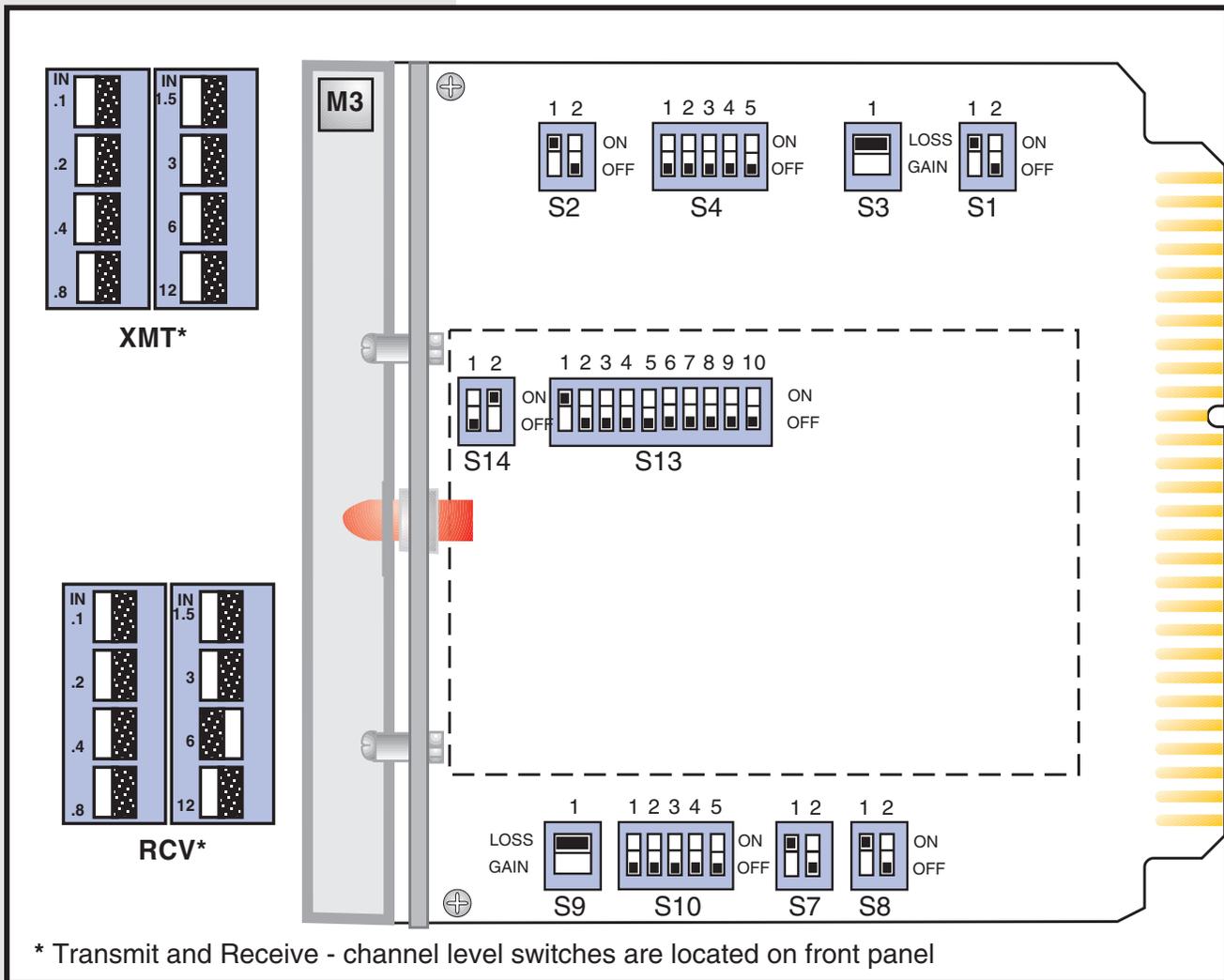
INSTALLATION

TABLE C - 4003C LOOPBACK LEVEL SELECTION (S14)

LOOPBACK LEVEL	S14 POSITION 1	S14 POSITION 2
+16 dB	OFF	OFF
0 dB *	OFF	ON
-16 dB	ON	OFF
-23 dB	ON	ON

* **NOTE:** This setting equals +9 dB on those units without an "M3" label on the handle.

FIG. 4 - 4003C SWITCH AND STRAP LOCATIONS



INSTALLATION

44202 MODEM

Refer to Tables D and E and Fig. 5 to set the switch and strap options on the 44202 Modem.

TABLE D - STRAP OPTIONS, 44202

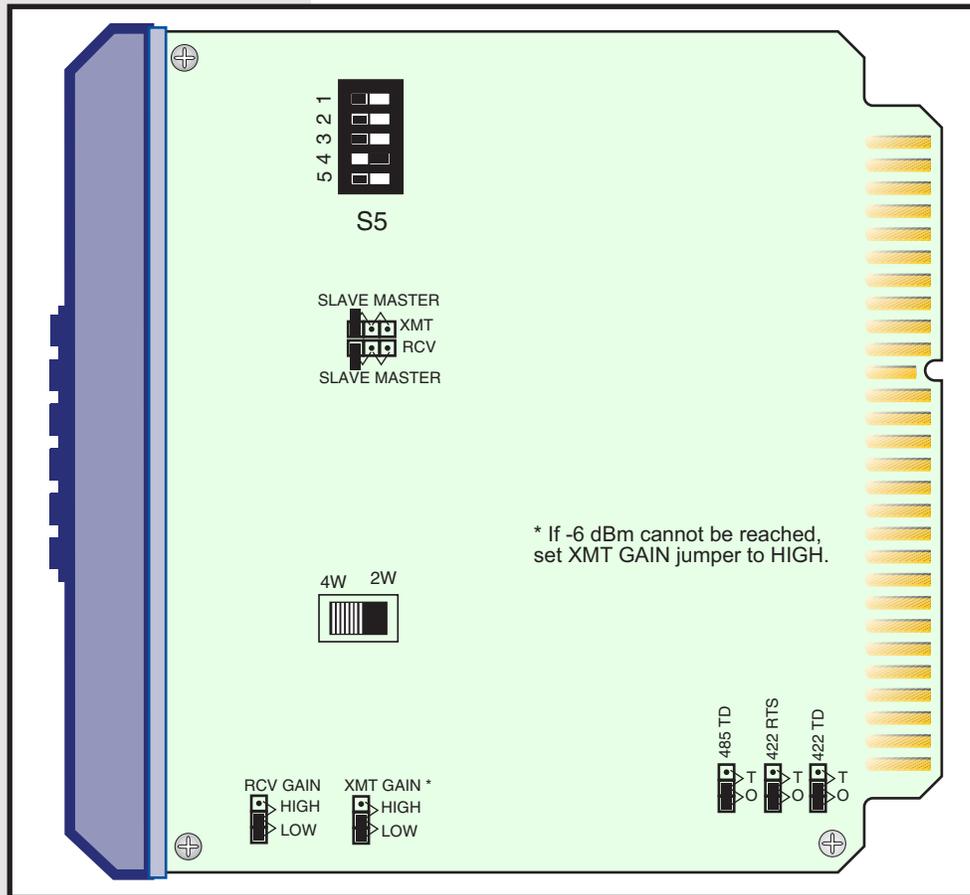
STRAP	POSITION	DESCRIPTION
TD422	O	No termination at 422 Transmit Data input.
RTS422	O	No termination at 422 Request To Send input.
TD485	O	No termination at 485 Transmit Data input.
XMT	n/a	Store in non-operative position.
RCV	n/a	Store in non-operative position.
RCV GAIN	LOW	Receive level gain to low.
XMT GAIN	LOW	Transmit level gain to low.
<i>NOTE: If a transmit level of -6 dBm cannot be reached, place the XMT GAIN jumper to HIGH.</i>		

TABLE E - SWITCH SETTINGS, 44202

SWITCH	POSITION	DESCRIPTION			
2W/4W	4W	Selects 4-wire operation			
RTS TEST	DOWN	Disables TEST functions.			
<i>NOTE: When RTS TEST switch is ON, RTS and DTR LEDs on front panel are ON.</i>					
SWITCH	POSITION	DESCRIPTION			
DLB	DOWN	Disables DLB functions.			
ALB	DOWN	Disables ALB functions.			
SWITCH S5 (5-POSITION MINI DIP)					
S5-1	S5-2	S5-3	S5-4	S5-5	DESCRIPTION
DOWN	UP	DOWN	DOWN	DOWN	Bell 202, Half Duplex (DOWN = rocker down on number side of switch. UP = rocker up on number side of switch.

INSTALLATION

FIG. 5 - SWITCH AND STRAP LOCATIONS, 44202



ALIGNMENT AND CHECKOUT PROCEDURE

All options and level settings are factory-set as shown in Fig. 2. Verify switch and strap options are set as shown in Tables A through E. The following procedure should be used for verification of level settings or if the Engineered Data levels require changes.

Level changes should only be required on the XMT or RCV pad on the front panel of the 4003C Line Amplifier. Level settings between the Line Amplifier and the 44202 Modem are factory-set for proper loopback.

Refer to Fig. 6.

1. **Action:** Configure the Tellabs 4003C and the Dantel 44202 modules as shown in Tables A through E.
2. **Action:** Ensure that power is removed from the equipment shelf. Terminate or open the transmit path to the existing data circuit. Install the modules in the proper slots.

CONTINUED . . .

INSTALLATION

3. **Action:** Apply power to the shelf.
4. **Action:** Connect a Transmit Measuring Set (TMS) to the **XMT LINE** jack of the 44202 modem. Configure the TMS for 600 ohm terminated measurement.
5. **Action:** Place the TEST switch, on the 44202 modem, in the ON (up) position.
Result: The **RTS** and **DTR** LEDs light. A 1200 Hz tone is transmitted to the test set.

NOTE: *Failure to achieve the desired result indicates lack of power or a defective module.*

6. **Action:** Adjust the **XMT LEVEL** potentiometer to obtain a reading of -6 dBm. (Turn clockwise to raise the level; counterclockwise to lower the level.)

NOTE: *If the transmit level cannot be reached, place the XMT GAIN jumper on the 44202 to HIGH. If the level still cannot be reached, the module is defective and should be replaced.*

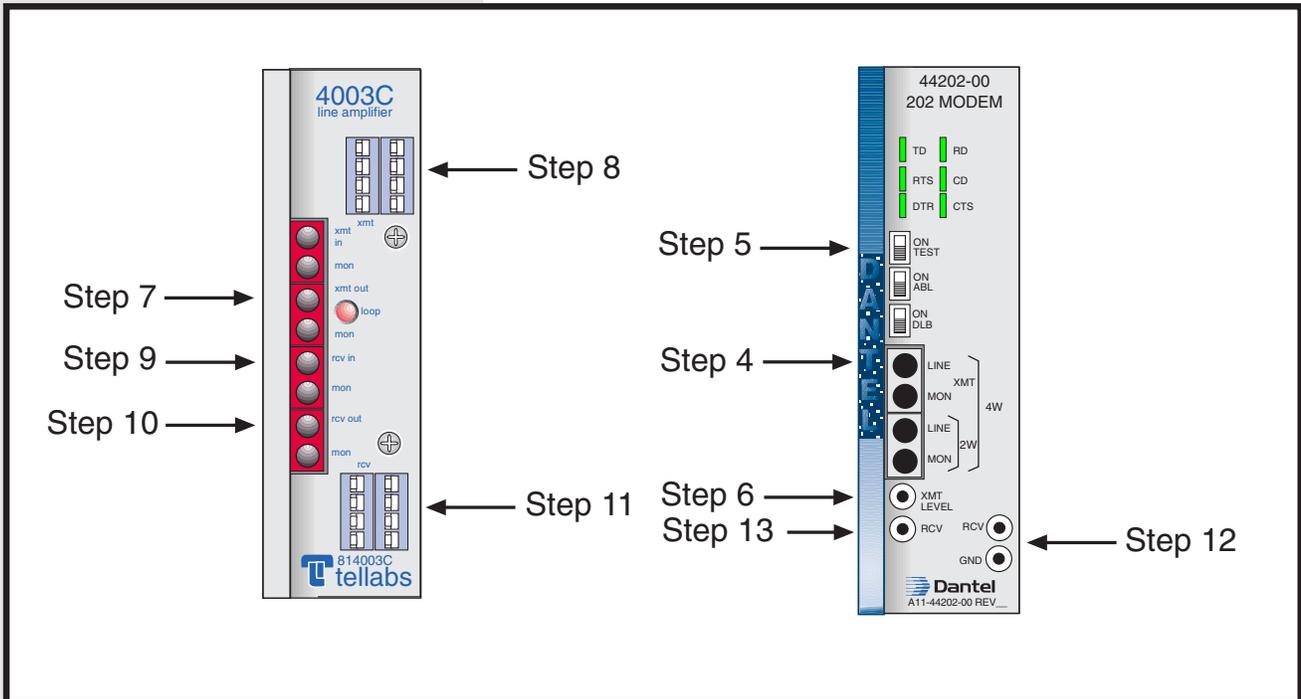
7. **Action:** Move the TMS cable to the 4003C **XMT OUT** jack.
8. **Action:** Adjust the 4003C **XMT** pad switches (located on the front panel) to obtain the engineered data level.
9. **Action:** Connect the TMS send jack to the 4003C **RCV IN** jack. Set the TMS to send the engineered data level (13 db below tone level).
10. **Action:** Connect the TMS rcv jack to the 4003C **RCV OUT** jack.
11. **Action:** Adjust the 4003C **RCV** pad switches (located on the front panel) to obtain a reading of -15 dBm on the TMS.
12. **Action:** Connect the TMS (set for bridging reading) or db meter to the test points labeled **RCV** and **GND**.
Result: The **CD** LED lights.
13. **Action:** Adjust the **RCV GAIN** pot to achieve a -20 dBm reading in the TMS.

NOTE: *If the receive gain cannot be adjusted, the module is defective and should be replaced.*

14. **Action:** Disconnect the TMS and place the TEST switch in the OFF (down) position.
15. This completes the DST alignment. Connect an RS-232 cable from the GTP to **C1** of the DST shelf and remove the termination or open plug in the transmit path to the existing circuit.

INSTALLATION

FIG. 6 - ALIGNMENT PROCEDURE POINTS



TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUE
B18-04649-02 SHELF (FULLY EQUIPPED)	
Input Voltage	-22 to -56 VDC
Input Current	160 mA (min.); 335 mA (max.)
Heat Dissipation	19.4 (+ 4003C min) (min); 30.6 (+ 4003C max) Btu/Hr (max)
Operating Temperature Range	0° to 55° C.
Physical Dimensions	
19" Configuration	19" x 8.5" x 1.73"
23" Configuration	23" x 8.5" x 1.73"
Mounting Holes	
19" Configuration	18.3" on center
23" Configuration	22.3" on center
Weight	7.0 lbs. (4.9 lbs. empty)
4003C LINE AMPLIFIER (PER MODULE)	
Terminating Impedance	1200, 600, or 150 ohms, balanced (switch selectable; all ports)
Flat Gain/Loss	-24 to +24dB in 0.1 dB increments (switch selectable)
Deviation from Gain Setting	±0.25dB max. @ 1KHz
Output Level	+15dBm max.
Harmonic Distortion	< 1% @ +15dBm
Equalized Gain	0 to 7.75dB in 0.25dB increments (switch selectable) (1K to 3KHz)
Frequency Response Deviation	±1.0dB @ 1KHz
Delay Distortion	< 125 uS @ 1KHz
Crosstalk	
Loss Between Channels	85dB min. @ 1KHz; 75dB min. @ 3KHz
Loss Between Adjacent Units	90dB min. @ 1KHz; 85dB min. @ 3KHz
Noise	15dBmC max. @ max. gain
Simplex Current	120mA max. w/ 5mA max. unbalance
Tone Loopback	
Threshold	-18dBm w/ no gain (varies w/ receive channel gain or loss)
Signal-to-Guard Ratio	3dB min.
Frequency	1 of 11; prescription set; center stabilities ±0.2%; 75Hz bandwidth
Operating Times	
Initiate	1.4 seconds max.; (loopback after removal of tone)
Release	0.7 seconds max.; (release during two-tone burst)
Local DC Loopback	Ground to operate; 25mA current
Levels	+16dB, +9dB, -16dB, or -23dB switch selectable
Input Voltage	-22 to -56 VDC
Input Current	25mA min. to 65mA max.
Operating Temperature Range	-7° to 54° C.
Weight	16 ounces
Physical Dimensions	1.4" x 6.0" x 5.6"

CONTINUED . . .

TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUES
44202 MODEM (PER MODULE)	
POWER REQUIREMENTS	
Input Voltage	-21 to -56 VDC
Input Current	
Idle	@ -21 VDC @ -24 VDC @ -48 VDC @ -56 VDC 120 mA 105 mA 75 mA 70 mA
Busy	135 mA 120 mA 85 mA 80 mA
Heat Dissipation (max)	@ -21 VDC @ -24 VDC @ -48 VDC @ -56 VDC 9.7 Btu/Hr 9.9 Btu/Hr 14.0 Btu/Hr 15.3 Btu/Hr
AUDIO PORT LEVELS (600 OHMS)	
XMT Carrier Level	-35 dBm min. to +7 dBm max.
RCV Carrier Level	-40 dBm min. to 0 dBm max.
RCV Path Gain	24 dB
RCV Path Attenuation	26 dB
DIGITAL INTERFACES	
TTL/CMOS	
Input Voltage	0 to 1 V = Low; 3.4 to 5 V = High
Output Current	16 mA Sink, Open Drain (high out)
RS-232 Receivers	
Input High Voltage	+3 to +25 V
Input Low Voltage	-3 to -25 V
RS-232 Drivers	
Output High Voltage	10.5 V typical; 9 V min. w/3K ohm load
Output Low Voltage	9.5 V typical w/ no load; 8 V min. w/ 3K ohm load
Short Circuit Current	±45 mA max.
Output Resistance	300 ohms min.
Max. Load Resistance	3K ohms
RS-422 and RS-485 Receivers	
Differential Input	±0.2 V threshold, voltage referenced to inverting input
Common Mode Input	±12 V max., voltage referenced to ground
RS-422 and RS-485 Drivers	
Differential Output Voltage	±4 V max., no load; ±1.5 V min., 54 ohm load, ref. @ inverting output
Short Circuit Current	+150 mA, $V_o = V_{cc}$; -150 mA, $V_o = 0$
Max. Load Resistance	54 ohms
ALB AND DLB INPUTS	
Operating Voltage	0 to 1 V
Disable Voltage	3.4 to 5 V or open
PHYSICAL FEATURES	
Weight	9 ounces
Dimensions	1.4" x 6.0" x 5.6"
Operating Temperature Range	0° to 55° C.

NOTES

WARRANTY

LIMITED WARRANTY

The Seller warrants that the standard hardware products sold will be free from defects in material and workmanship and perform to the Seller's applicable published specifications for a period of 18 months for hardware, and 3 months for software, from the date of the original invoice. The liability of the Seller hereunder shall be limited to replacing or repairing, at its option, any defective products which are returned F.O.B. to the Seller's plant, (or, at the Seller's option, refunding the purchase price of such products). In no case are products to be returned without first obtaining permission and a customer return authorization number from the Seller. In no event shall the Seller be liable for any consequential or incidental damages.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. The Seller shall make the final determination as to the existence and cause of any alleged defect. No warranty is made with respect to custom equipment or products produced to the Buyer's specifications except as specifically stated in writing by the Seller in the contract for such custom equipment.

This warranty is the only warranty made by the Seller with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer of the Seller and accepted by the Buyer.

Warranty and remedies on products not manufactured by the Seller are in accordance with warranty of the respective manufacturer. **THE SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED; AND ALL IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE AFORESAID OBLIGATIONS IS HEREBY DISCLAIMED BY THE SELLER.**

IN CASE OF DIFFICULTY

If you experience difficulty with this equipment, check the following, as appropriate:

- 1. Switch settings**
- 2. Signal levels**
- 3. Software configuration**
- 4. Connections between Dantel's equipment and your equipment.**

If there is still a problem, substitute equipment that is known to be good. For additional assistance, call Dantel's Technical Field Service Department weekdays, 6 A.M. to 5 P.M. pacific time:

1-800-4DANTEL (1-800-432-6835).

If a thorough checkout shows a piece of equipment has malfunctioned, you may return it to the factory. For repairs and emergency replacements, obtain a Return Material Authorization (RMA) number from the Customer Service Representative at **1-800-4DANTEL (1-800-432-6835)**.

To ensure expedient processing of your order, provide a purchase order number and shipping and billing information when requesting an RMA number. Also, when the units are returned to Dantel, include a description of the failure symptoms for each unit returned. Send defective equipment to:

Dantel, Inc. • 2991 North Argyle Avenue • Fresno, California 93727-1388



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