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Technical Bulletin 107686
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CLEI Codes:
List 1 D4C0RK14RENDING
List 2 D4C0RL04AA PENDING

4TO
4-WIRE TRANSMISSION ONLY
DFT® 4001 ISSUE 2, LISTS 1 & 2

CONTENTS PAGE

1. GENERAL

1.01 The Transcom DFT 4001 Issue 2 4TO channel unit provides an interface between a WECO* or equivalent D4 Channel Bank and a 4W analog transmission facility. List 1 models apply a momentarily high sealing current when the front-panel ZAP switch is depressed. List 2 models apply a momentarily high sealing current automatically when inserted in the channel bank. In all other respects, the units are identical. Lists 1 and 2 are functionally equivalent to the WECO J98726SH unit.

1.02 This paragraph is reserved to identify changes in subsequent issues of this Technical Bulletin.

1.03 The DFT 4001/2 operates as a 4W Transmission Only channel unit and provides:

- Easily programmed transmit and receive path attenuation (0 to 32.5 dB),
- Sealing current to optimize conduction,
- Front panel access to standard test points.

1.04 The Transcom 4TO unit mounts in all D4 PCM Channel Banks. Standard Bell System Practices (BSPs) may be used for most adjustment and alignment procedures.

2. APPLICATION INFORMATION

2.01 A diagram of a typical DFT 4001/2 application is given in Figure 2. Contact Transcom Marketing Technical Services for any additional application information required.

2.02 The DFT 4001/2 is designed for use on moderate-length 4W metallic extensions where no signaling is required or where end-to-end inband signaling is used. The unit can also be used in back-to-back carrier configurations. The dc loop-sealing current option is provided for extensions with hand-wrapped splices.

2.03 Refer to BSP 855-351-105 (Application Engineering) for prescription settings; the procedures for determining settings and making adjustments are covered in the Task Oriented Procedure (TOP), BSP 365-170-000.

3. CHANNEL UNIT DESCRIPTION

3.01 This description covers the transmission paths of the DFT 4001/2 (see Figure 8). For further information on elements common to all D4 channel units (options, gates, active filters, pulse amplitude modulators and demodulators), refer to the General Channel Unit Description, BSP Section 365-170-101.

3.02 The 4TO channel unit is coupled to the 4W facility via transformers T1 and T101. The sealing current option optimizes conduction when hand-wrapped splices are used in the T, R or T1, R1 cable pairs. The nominal sealing current is 20mA. List 2 models automatically apply a momentarily high (40mA) sealing current when inserted in the channel bank. List 1 models have a front panel switch for this function.

Transmit Path

3.03 The secondary of transformer T1 is connected to the transmit amplifier. The voice frequency (VF) signal is output from the transmit amplifier to a wide attenuation stage and then to the transmit filter. The signal at the input side of the transmit filter is available at the Test Jack. The TLP at the Test Jack is adjusted to −8.5 dB by means of the transmit attenuator.

3.04 The transmit filter is a 300-3000 Hz passband filter. The primary purpose of the filter is to reject frequencies above 4 kHz (one half the 8 kHz sample frequency) to prevent aliasing. The output of the filter is converted to Pulse Amplitude Modulation (PAM) by the transmit sample gate and then fed to the D4 common circuits.

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*WECO is a trademark of AT&T.

PHOTO PENDING

Figure 1—DFT 4001 Issue 2, List 1

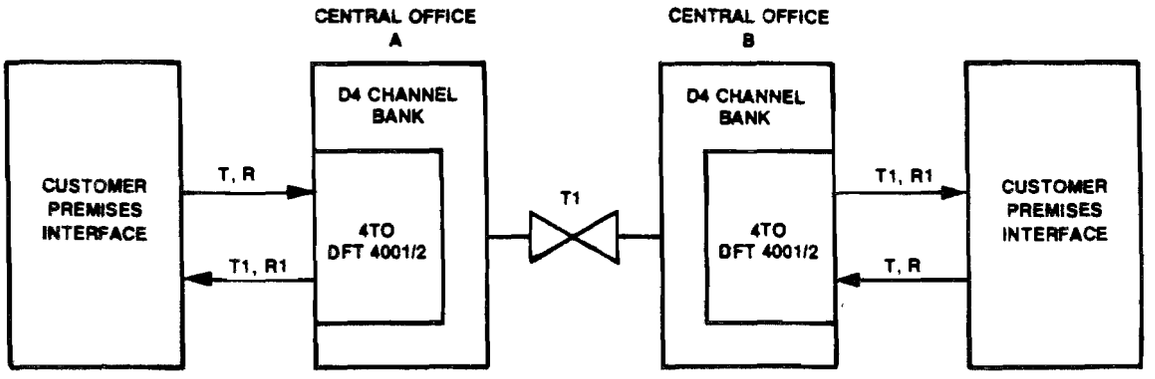

Figure 2—Typical DFT 4001/2 Application

Receive Path

3.05 The PAM pulses from the D4 common circuits are converted to VF in the active receive filter. The filter output at the Test Jack is +4.0 dB. The VF is amplified by the receive amplifier and output to the adjustable receive attenuator, which is used to adjust the VF output level.

4. SPECIFICATIONS

The DFT 4002/2 meets the requirements of Bell System PUB 43801.

Nominal Transmission Level at T, R: +7 to −16 dB

Nominal Transmission Level at T1, R1: +7 to −16 dB

Frequency Response: Equivalent to WECO J98726SH unit.

Return Loss (relative to 600Ω): ≥ 28 dB at 1 kHz
≥ 23 dB 300 to 3000 Hz

Longitudinal Balance (IEEE Method):
60 to 3000 Hz ≥ 75 dB with simplex lead open.
60 to 3000 Hz, ≥ 65 dB with sealing current enabled.

Sealing Current: 20 mA nominal; depends on loop resistance.

Power

Power Dissipation (typical):
0.144 W

Supply Current (typical):
+5 V: 2.0 mA
−12 V: 5.6 mA
+12 V: 5.6 mA
−48 V: 0.0 mA (Sealing Current off)

Environmental

Temperature Range (ambient*):
Operating - 40° to 100°F
Short Term - 35° to 120°F

Relative Humidity (ambient*):
Operating - 20% to 55%
Short Term - 20% to 80%

Physical

Weight: Standard package (20 units) - 20 lbs.

Size: depth - 10.3" (26.2 cm)
height - 4.4" (11.2 cm)
width - 1.4" (3.6 cm)

5. CIRCUIT PROGRAMMING

5.01 The locations of all the switches required to program the channel unit are identified in Figure 7; a brief description of each switch is given in Table D. Switches are marked as shown in Figure 7. General instructions on the operation of switches commonly used on Transcom modules are given in part 10, Switch Information. Switch markings and procedural information are designed to enhance the clarity of CLRC terminology and facilitate correct alignment of the unit by craft personnel.

Transmit and Receive Path Attenuation

5.02 Two 9-position rocker switches (Figure 7, callouts 1 and 6) are provided for these adjustments. The attenuators provide 0 to 32.5 dB attenuation in 0.1 dB steps.

Sealing Current (SC Switch)

5.03 This switch (callout 5) is used to select the sealing current option (SC). With the option selected (IN), approximately 20 mA of direct current flows in cable pairs T, R and T1, R1. This serves to break down the high resistance film which may develop at unsoldered, hand-twisted splices. In cases where unsoldered hand-twisted splices are not used, the option should not be selected.

Zap Switch (ZAP)

5.04 This switch (callout 3) is featured on List 1 models only and is used to momentarily increase the sealing current to approximately 40 mA. Note that the sealing current option (see para. 5.03) must be selected for the zap switch to perform its function. The zap current (40 mA), followed by a continuous current (20 mA) will usually correct and sustain the normal resistance of the cable pairs. This feature is automatic on List 2 models.

Sealing Current (LED Indicator)

5.05 This indicator (callout 2) is featured on List 2 models only. The LED is lit when sealing current is flowing.

Test Connector

5.06 The test connector (callout 4) provides splitting access to XMIT TLP, RCV TLP, and RNDIS. See Figure 3 for terminal assignments.

6. REFERENCES

6.01 The following BSP Sections may facilitate the programming and alignment of this unit:

SECTION	TITLE
179-100-311	D4 Channel Bank - Signaling Compatibility
365-170-000	D4 Channel Bank - TOP
365-170-100	D4 Channel Bank - Description
365-170-101	D4 Channel Bank - General Channel Unit Description
365-170-118	2-Wire and 4-Wire Transmission Only - Channel Unit Description
365-170-500	D4 Channel Bank - Maintenance Considerations
855-351-103	D1, D2, D3 and D4 Digital Channel Banks - Application Engineering
855-351-105	D4 Channel Banks - Channel Units -Application Engineering.

*as defined in Bell PUB 43801

7. INSTALLATION AND ALIGNMENT

7.01 ***Warning: This unit contains devices subject to damage by the discharge of static electricity. Antistatic measures (such as wearing grounding wrist straps or touching only the faceplate) should be taken when handling the unit.***

7.02 Alignment of the DFT 4001/2 is identical to alignment of the Western Electric J98726SH. Important information is given in the BSP Sections listed in part 6 of this Technical Bulletin. Most prescription settings are given in BSP 855-351-105. Attenuator settings should be provided on the Circuit Layout Record Card (CLRC) or may be determined manually by using the TOP, BSP 365-170-000.

7.03 Table D lists all the options and controls needed to align the unit. The numbers in the FIG. 7 CALL-OUT column in Table D are provided to identify the options and controls shown in Figure 7. General switch information is given in part 10 of this bulletin.

7.04 The DFT 4001/2 is equipped with a test connector (Figure 7, callout 4) on the front panel of the unit. The test connector terminal assignments are given in Figure 3.

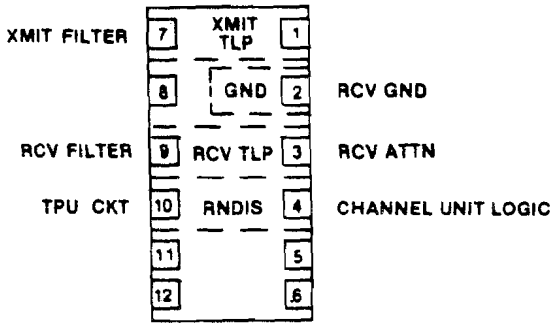

Figure 3—Test Connector

8. TESTING AND SERVICING

8.01 Use Transcom Maintenance Cards bearing the CLEI Code assigned to this unit (see para. 9.01) when testing the unit in a maintenance bank.

8.02 Transcom provides a limited five year warranty on this product. If this unit requires servicing:

a) Call the Transcom Repair Services Department at (401) 683-3000 ext. 220 and ask for a Return Authorization Number.

b) Pack the unit in a suitable carton (preferably the original shipping carton) and return it to:

Transcom Electronics, Inc.
1170 East Main Road
Portsmouth, RI 02871

Attention: Repair Services Department
Return Authorization Number: _____

9. ORDERING INFORMATION

9.01 The DFT 4001/2 has been assigned the following CLEI codes:

- List 1 Pending
- List 2 Pending.

9.02 When ordering, specify the number of units required for each List Number given in the Selection Guide.

Table A

DFT 4001/2 Selection Guide

List No.	Sealing Current	
	Manual	Automatic
1	X	
2		X

X = Option Provided

10. SWITCH INFORMATION

General

10.01 In order to follow the instructions given on the Circuit Layout Record Card (CLRC), you have to know how to correctly set the switches on your Transcom module. All the switches on your module are listed in Table D.

10.02 The three typical switches illustrated below may be slightly different from the switches on your Transcom module, but the same basic procedure is used for setting all of them. To ensure that you set the switches correctly, follow these simple guidelines:

1) Locate the switch specified in the CLRC (see Figure 7 and Table D).
2) **Standard option switches:** select IN or OUT as required (see Figure 4).
3) **Multi-position switches:** these switches may be used to select options and/or numerical values (see Figures 5 and 6). Select the specified value or option by actuating the appropriate switch position(s):
   - in the direction of the arrow (→ IN),
   - toward the value or option marking.

   Note: The overall numerical value of a multi-position switch is the sum of all the values selected. Therefore, if you select the values 1 and 4 (see Figure 6), the overall numerical value of the switch is 1 + 4 = 5. Table B shows how to set a typical numbered switch according to the settings specified on the CLRC. All switches with number values operate on the same basis: total switch value = sum of all numerical values selected.

Aligning Transcom Modules using WECO CLRCs

10.03 Options on a WECO unit may be selected by means of a jumper plug which is installed using an extractor tool. Transcom units utilize manually-operated slide switches (see Figure 4) for option selection. Transcom switches do not cover up letters or numbers when set OUT. If your CLRC is designed for WECO units, refer to Table D and make the equivalent setting on your Transcom unit.

Table B

SETTINGS FOR SWITCHES LABELED 1, 2, 4, 8

SETTING VALUES	SWITCH-POSITION SETTINGS			
	1	2	4	8
0	out	out	out	out
1	in	out	out	out
2	out	in	out	out
3	in	in	out	out
4	out	out	in	out
5	in	out	in	out
6	out	in	in	out
7	in	in	in	out
8	out	out	out	in
9	in	out	out	in
10	out	in	out	in
11	in	in	out	in
12	out	out	in	in
13	in	out	in	in
14	out	in	in	in
15	in	in	in	in

Table C

WECO/TRANSCOM EQUIVALENT SETTINGS *

	WECO UNIT	TRANSCOM UNIT
OPTION SWITCHES	white showing black showing	switch set IN switch set OUT
LETTER OR NUMBER SWITCHES	letter or number covered letter or number showing	switch set OUT switch set IN

* Except where otherwise stated.

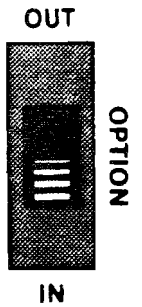

Figure 4 — Option Switch (Option Selected)

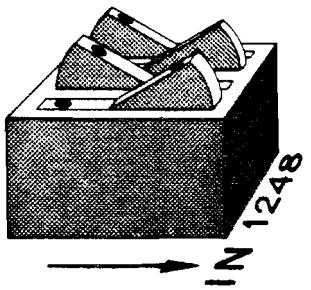

Figure 5 — 4-Position Rocker Switch (Setting Value: 10)

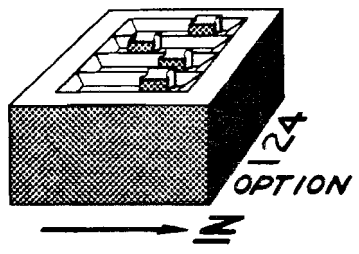

Figure 6 — 4-Position Slide Switch (Setting Value: 5 Option: Selected)

Table D
OPTION, CONTROL AND COMPONENT INFORMATION

MARKING	NAME	SETTING VALUES	OPERATION	FIG. 7 CALL-OUT
XMIT ATTN	Transmit Attenuator	0 to 32.5	• Set the nine positions (marked .1, .2, .4, .8, 1, 2, 4, 8, 16) to select required transmit attenuation value.	1
SEALING CURRENT	Sealing Current Indicator (List 2 only)		• The front panel LED is lit when sealing current is flowing.	2
ZAP	ZAP Switch (List 1 only)		• Depress switch to provide momentarily high sealing current (sealing current switch must be set to IN for ZAP switch to be effective).	3
	Test Connector		• Insert a test plug into this connector to obtain splitting access to: XMIT TLP - RCV TLP.	4
SC	Sealing Current	IN or OUT	• Set switch to IN to provide sealing current.	5
RCV ATTN	Receive Attenuator	0 to 32.5	• Set the nine positions (marked .1, .2, .4, .8, 1, 2, 4, 8, 16) to select required receive attenuation value.	6

Table E
CHANNEL UNIT ATTENUATION, GAIN AND LOSS PARAMETERS

TRANSMIT PATH (T, R TO TST JACK −8.5 dB TLP)				RECEIVE PATH (TST JACK +4.0 dB TLP TO T1, R1)			
GT INSERTION GAIN (dB)	ATTENUATOR RANGE (dB)	INPUT LEVEL AT T, R (dB)		GR INSERTION GAIN (dB)	ATTENUATOR RANGE (dB)	OUTPUT LEVEL AT T1, R1 (dB)	
		MIN*	MAX*			MIN*	MAX*
7.5	0 to 32.5	−16.0	~~0.5~~ 7.0	3.0	0 to 32.5	~~−8.5~~ −16.0	7.0

*Note: Input and output levels are given as recommended values. The attenuator(s) may allow for a wider range of values; however, to ensure optimum performance, keep levels within specified range.

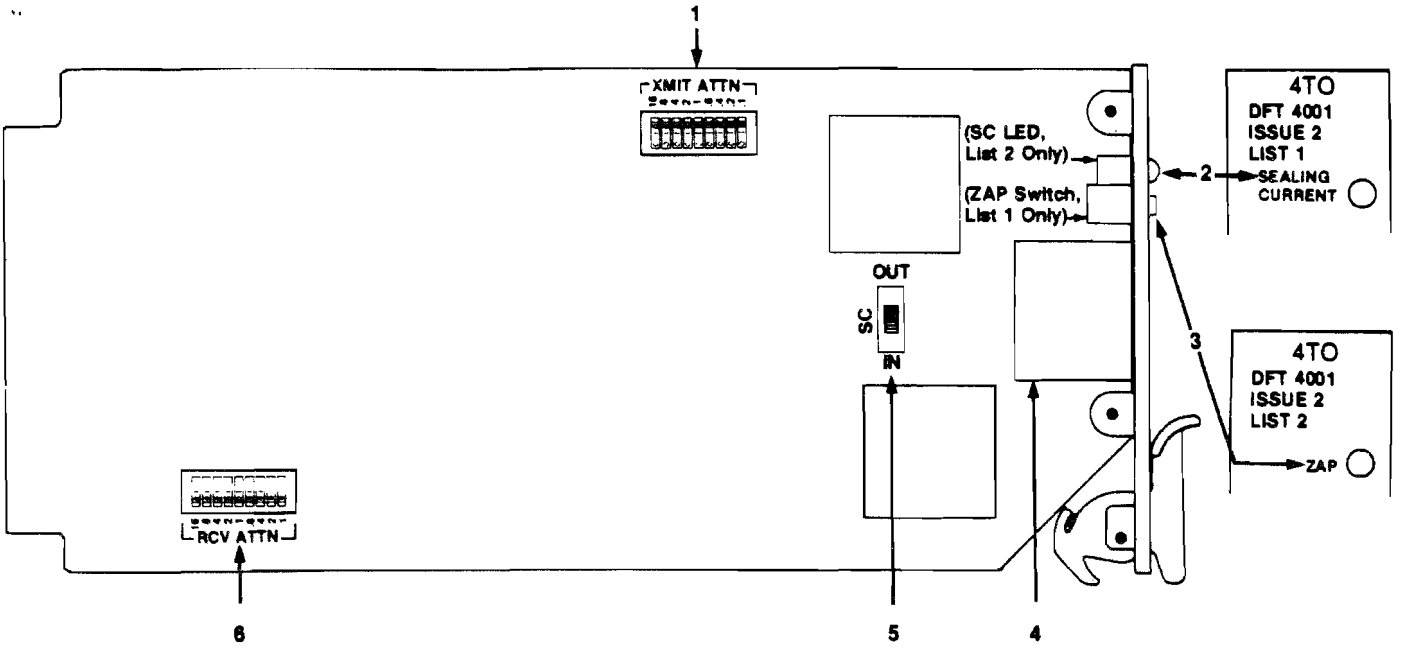

Figure 7—DFT 4001/2 Switch and Component Locations

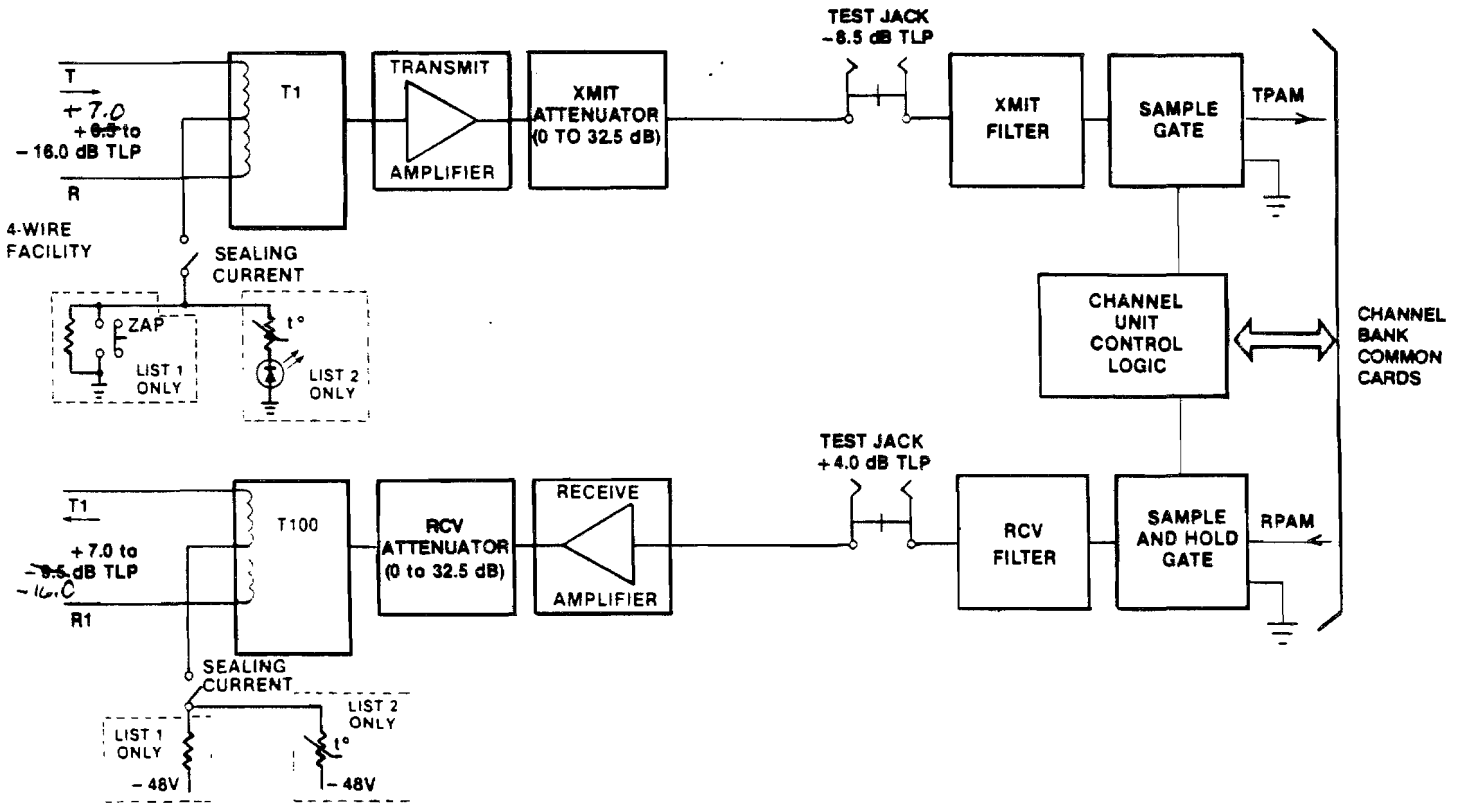

Figure 8—DFT 4001/2 Transmit and Receive Paths

NOTICE

The input and output levels for the DFT 4001 Issue 2, Lists 1 & 2, listed in Table E and Figure 8, are incorrect. The correct values are as follows:

	TRANSMIT PATH INPUT LEVEL AT T,R(dB)	RECEIVE PATH OUTPUT LEVEL AT T1,R1(dB)
Min.	– 16.0	– 16.0
Max.	7.0	7.0

Addendum 107854
(Attach to TB 107686)

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