BPT63 4-4 WIRE PASSIVE DATA INTERFACE UNIT
DESCRIPTION AND INSTALLATION
"OMNIPORT* " NETWORK CHANNEL TERMINATING EQUIPMENT

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1. GENERAL

1.01 This practice provides description, application, and installation information for the OMNIPORT NCTE (Network Channel Terminating Equipment) BPT63 4-4 Wire Passive DIU (data interface unit). A general description of OMNIPORT NCTE is given in AT&T Practice 332-620-100.

1.02 When this practice is reissued, the reason(s) for reissue will be listed in this paragraph.

1.03 The BPT63 DIU is part of the OMNIPORT NCTE family of customer premises equipment (both mountings and circuit packs) for voice-frequency special services, analog data, and maintenance applications.

2. UNIT DESCRIPTION

2.01 The BPT63 is a 4-4 wire passive terminal repeater with maintenance loopback for use on private line analog data circuits. It provides 1 to 16 dB of loss in 1-dB steps in both directions of transmission. The unit's maintenance feature can be remotely powered from the central office by using the

line power option, or local power can be provided by −48 or ±12 volts dc receptacle-mounted power supplies at the mounting. This unit can be mounted in any OMNIPORT NCTE mounting or 400-type equivalent.

A. Unit Specifications

2.02 The BPT63 unit specifications are summarized in Table A. Figure 1 is a block diagram of the unit and Fig. 2 shows the unit controls and faceplate. Table B is a listing of the unit leads and their functions.

B. Unit Impedance

2.03 This unit provides a 600-ohm impedance to the customer equipment and a switch selectable 600- or 1200-ohm impedance to the network facility. The 600- and 1200-ohm impedances are used to match nonloaded and loaded cable, respectively.

C. Line Power Option

2.04 The line power option allows the unit's maintenance loopback feature to be remotely powered from the central office. Power from the central office battery or a sealing current source is provided over the network facility to the unit's simplex leads (SXT and SXR). If the line power option is not used, the maintenance feature can be powered by either a −48 or ±12 volts dc power supply at the mounting.

2.05 For proper line powered operation, a simplex lead current between 10 and 30 mA is required. To ensure a simplex lead current within this range, the following loop resistance requirements must be observed:

(a) If a −48 volt central office battery is used, the loop resistance must be between 1000 and 2600 ohms. If the loop resistance is less than 1000 ohms, additonal resistance must be added to the loop to provide the required minimum resistance.

(b) If a sealing current source with a 1600-ohm output resistance is used, the minimum loop resistance is assured. The line power option can be used on loops with up to 1000 ohms of resistance.

D. Maintenance Feature

2.06 The maintenance feature is remotely activated by applying a 2713-Hz tone to the unit for at least 2 seconds. When the tone is removed, the maintenance feature disconnects the customer equipment from the circuit and provides a loopback connection to the network facility. A switch selectable gain of 8 or 16 dB is inserted in the loopback path to provide standard signal levels to the transmit (to the network) path. A BUSY indicator on the unit faceplate will light while the maintenance feature is activated. The maintenance feature can be remotely deactivated either by applying a 2713-Hz tone to the unit for at least 1 second or by allowing the feature to automatically time out after 20 minutes.

Note: To conserve power, the BUSY indicator is not powered by the line power option. However, the indicator will function if −48 or ±12 volts dc is provided at the mounting.

2.07 The maintenance feature can be locally activated by connecting the MLB (manual loopback) lead (pin 39) to the MLBG (manual loopback return) lead (pin 37). The unit will remain in the loopback condition as long as the MLB and MLBG leads are connected together.

2.08 A contact opening is provided between the SI and SIR leads (formerly designated TEK5 and TEK6, respectively) when the maintenance feature is activated as a "maintenance busy" indication to the customer equipment. The SIR lead has two output appearances, one on pin 19 and another on pin 21.

E. Sealing Current

2.09 A sealing current option is provided on this unit. This option connects the SXR and SXT leads together to provide a return path for sealing current applied at the far end of the circuit. When the maintenance feature is activated, a relay contact opens the simplex path and the associated loss of sealing current indicates that the unit is in the maintenance mode. This indication is not available when the line power option is selected because a simplex path is provided by the internal power supply circuit.

F. Monitor Jacks

2.10 Two 310-type monitor jacks, TRANS MON and REC MON, are located on the BPT63 face-

plate. These jacks provide test access to the customer side of the unit.

G. Identification Leads

2.11 This unit contains two identification leads (ID1 and ID2) for use by the telephone company. These leads are available for insertion of a component on the printed wiring board to allow positive identification of a particular unit.

H. Unit Controls

2.12 ***BUSY:*** This indicator on the unit faceplate will light when the maintenance loopback feature is in use and −48 or ±12 volt dc power is provided at the mounting.

2.13 ***48·12:*** When the unit is locally powered, this switch is set according to the power arrangement at the mounting. Set the switch in the 48 position if −48 volts dc is supplied or in the 12 position if ±12 volts dc is supplied.

2.14 ***LP:*** This switch selects the line power option when set in the LP position. Setting the switch in the LP position overrides the setting of the 48·12 and SC switches.

2.15 ***600·1200:*** This switch selects the network side output impedance. Set the switch in the 600 position to match nonloaded cable or in the 1200 position to match loaded cable.

2.16 ***SC:*** This option provides a sealing current return path when the switch is in the ON position.

2.17 ***8·16:*** This switch selects the amount of gain provided in the loopback path. Set the switch in the 8 or 16 position to provide 8 or 16 dB of loopback gain.

2.18 ***TRANS ATTN and REC ATTN:*** The TRANS ATTN and REC ATTN switches (1.0, 2.0, 4.0, and 8.0) control 1 to 16 dB of loss in 1-dB steps in the transmit and receive directions, respectively. Set the switches so the sum of the switches in the IN position equals 1 dB less than the desired loss (the unit includes a 1-dB loss to result in the desired circuit loss).

I. Attenuation Distortion

2.19 This unit provides a flat frequency response in both directions of transmission. Table C shows typical attenuation distortion values for BPT63.

3. APPLICATION

3.01 The BPT63 is a 4-4 wire passive terminal repeater for use on 4-wire voice-frequency private line data circuits. This unit can be used as a replacement for 829A data auxiliary sets and can also be used as a passive 4-4 wire terminal repeater for voice-frequency special services applications. A typical application of this unit is shown in Fig. 3.

4. INSTALLATION

4.01 The BPT63 can be installed in any OMNIPORT NCTE mounting, or 400-type equivalent. Installation involves providing power for the maintenance feature, setting the unit controls, and inserting the circuit pack in its mounting slot.

4.02 The line power option can be used to supply central office power to the unit, or power can be provided by −48 or ±12 volt dc power supplies located at the customer premises.

4.03 Set the unit controls as required for proper circuit operation as discussed in paragraphs 2.12 through 2.18. The following paragraphs provide information on setting the ATTN switches.

A. Attenuation

4.04 As shown in Fig. 2, the ATTN switches have two rows of rocker switches. These switches are mechanically tied together so that setting a switch in one row will automatically set the corresponding switch in the other row to the same position. For convenience, the sum of the switch markings (1.0, 2.0, 4.0, and 8.0) show the amount of attenuation supplied when the switches are placed in the IN position. Note that the attenuation provided by the ATTN switches is in addition to a 1-dB loss in both directions through the unit.

4.05 The attenuation to be provided can be determined by two methods. One method is used when the facility length and gauge are known. The other method is used when the facility length and

gauge are not known or if the circuit fails to meet transmission requirements using the known facility method.

Known Facility

4.06 When the length and gauge of the facility are known, the amount of attenuation to be provided can be obtained from the WORD (work order record and details) document, the CLR (circuit layout record) card, or by using the factors in Table D.

4.07 Table D contains attenuation factors that can be used to calculate the cable loss. For mixed gauge cables, the sum of the values calculated for each gauge will equal the overall cable loss. Subtract the overall cable loss from the design loss of the circuit to find the amount of additional loss required. Subtract 1 dB from the additional loss to obtain the ATTN switch setting.

Unknown Facility

4.08 The following procedure is for use when the length and gauge of the facility are not known or if transmission requirements are not met using the known facility procedure. Test equipment required for the following procedure includes a 43A test extender, or equivalent; a 600-ohm oscillator; and a 600-ohm detector. Equipment connections for this procedure are shown in Fig. 4.

> ***Note:*** This procedure can be performed without a test extender by using the TRANS MON and REC MON jacks on the unit faceplate if the customer equipment is not connected to the circuit.

4.09 Set the ATTN switches as follows:

(1) Insert unit into test extender and insert test extender into mounting shelf.

(2) Connect 600-ohm oscillator to customer-side T/R jack. Adjust oscillator to provide a 1004-Hz, 0-dBm signal.

(3) Connect detector at far end of facility to measure 1004-Hz signal.

(4) Adjust TRANS ATTN switches to provide desired signal level at far end.

(5) Connect oscillator at far end of facility. Adjust oscillator to provide a 1004-Hz, 0-dBm signal.

(6) Connect detector at customer side T1/R1 jack to measure 1004-Hz signal.

(7) Adjust REC ATTN switches to provide desired signal level at detector.

(8) Remove test equipment and remove unit from test extender.

(9) Insert unit into mounting shelf.

5. MAINTENANCE

5.01 This unit requires no routine maintenance. If a unit is faulty, replace it with a spare and send the defective unit to the nearest AT&T Service Center for repair.

TABLE A

BPT63 UNIT SPECIFICATIONS

FEATURE	PERFORMANCE
GENERAL	
CLEI CODE	NCDI040AXX
DIMENSIONS (H, W, D)	5.60 × 1.45 × 5.90 Inches
WEIGHT	10 Ounces
TEMPERATURE	
Operating	0° to 50° Celsius
Storage	−40° to 66° Celsius
HUMIDITY	5 to 95 Percent Relative
POWER REQUIREMENTS FOR MAINTENANCE LOOPBACK FEATURE	
REMOTE POWER (Line Power Option)	10 to 30 mA at SX Leads (maximum voltage drop across unit at 10 mA is 22 volts)
LOCAL POWER (Power Supply at Customer Premises)	
Nominal Voltage	±12 V dc or −48 V dc
Voltage Range	±12 V dc ±5 Percent, or −42.5 to −56.0 V dc
CURRENT DRAIN	
Typical	10 mA
Typical With Maintenance Feature Activated	20 mA
TRANSMISSION	
INTERFACE	4W-4W
IMPEDANCE	
Customer Side	600 Ohms
Network Side	600/1200 Ohms (for nonloaded and loaded cable)
LOSS	
Transmit	1 to 16 dB (switch selectable in 1-dB steps)
Receive	1 to 16 dB (switch selectable in 1-dB steps)
RETURN LOSS, TYPICAL	
Customer Side	
ERL	Greater Than 31 dB
SRL	Greater Than 31 dB (600 Ohms)
Network Side	
ERL	Greater Than 24 dB
SRL	Greater Than 25 dB (600 or 1200 Ohms)
LONGITUDINAL BALANCE (200 to 3000 Hz)	
Customer Side	Greater Than 40 dB
Network Side	Greater Than 60 dB

TABLE A (Contd)

BPT63 UNIT SPECIFICATIONS

FEATURE	PERFORMANCE
TRANSMISSION (Contd)	
IDLE CHANNEL NOISE	Less Than 5 dBrnC
ENVELOPE DELAY DISTORTION	Less than 100 μSec (200 to 4000 Hz referenced to 1 kHz)
PEAK-TO-AVERAGE RATIO (PAR)	98 or Greater
MAXIMUM SIGNAL LEVELS	
Input	+12 dBm
Output	+12 dBm
CROSSTALK	Greater Than 90 dB (between adjacent circuit packs)
MAINTENANCE	
TYPE	20-Minute Transmission Loopback With +8 or +16 dB of Gain
TONE DETECTOR	2713 ±7 Hz Tone, −30 dBm to 0 dBm (10 dB or greater signal-to-noise ratio)
REMOTE ACTIVATION	Activates After Removal of a 2-Second or Longer 2713 ±7 Hz Tone
REMOTE DEACTIVATION	Deactivates After Receiving 2713 ±7 Hz Tone for 1 Second or Will Time Out After 20 Minutes
LOCAL ACTIVATION	Activates When MLB and MLBG Leads (Pins 39 and 37) Are Connected Together. (Will Remain Activated Until Connection Is Removed.)
CUSTOMER BUSY	SI and SIR Leads (formerly designated TEK5 and TEK6) Are Open

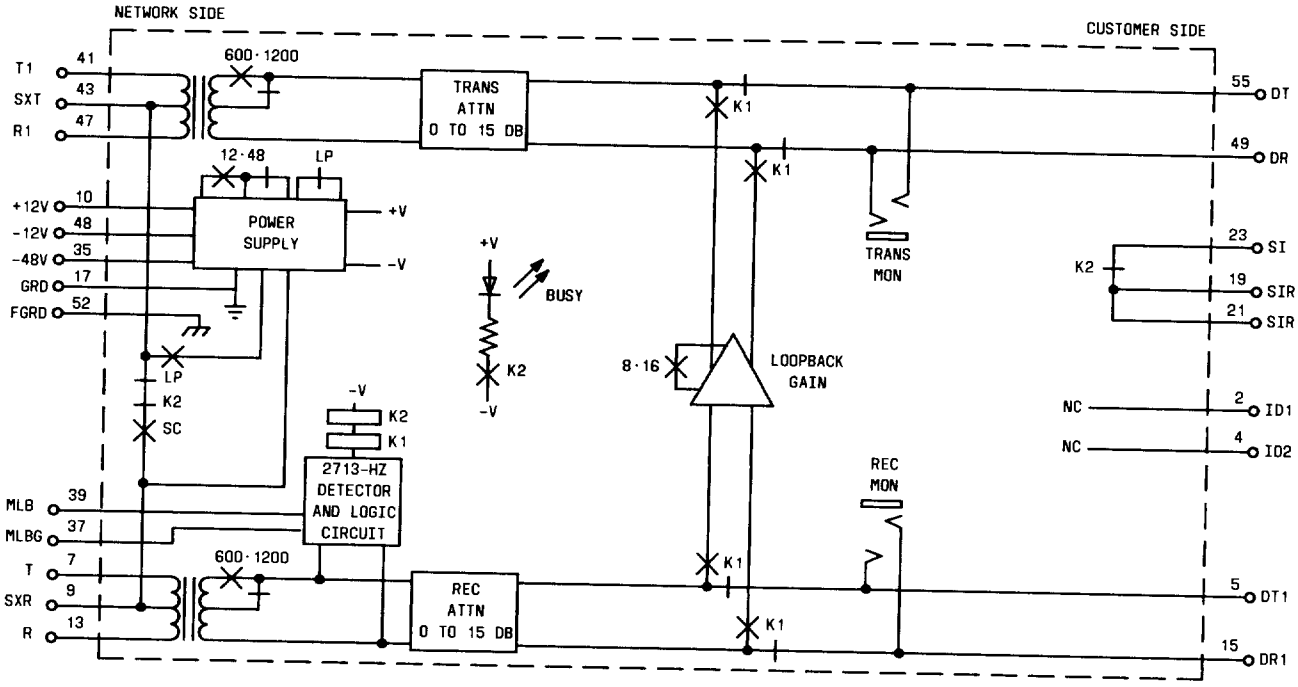


Fig. 1—Block Diagram of BPT63

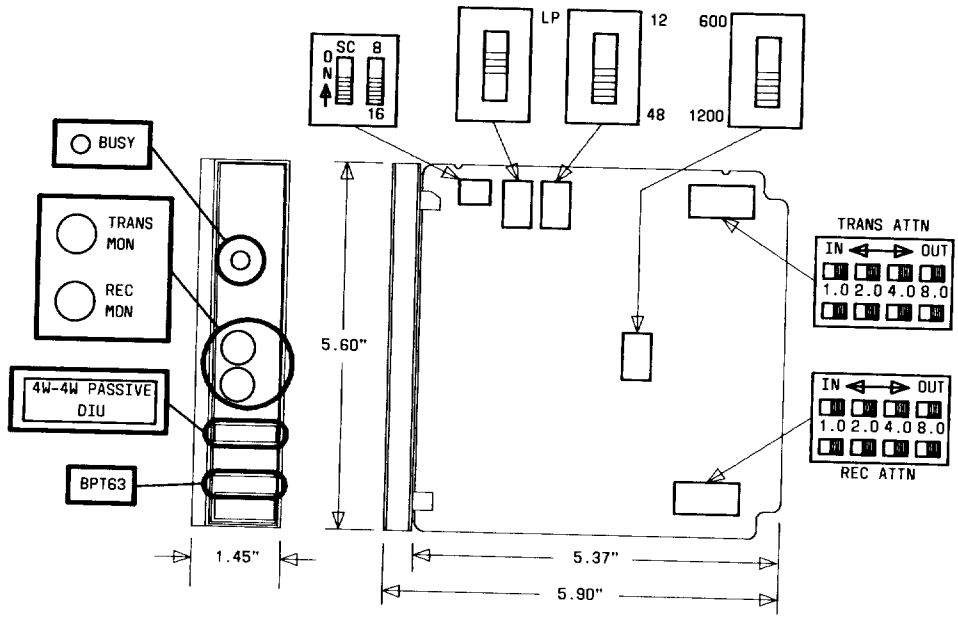


Fig. 2—BPT63 Unit Controls and Faceplate

TABLE B

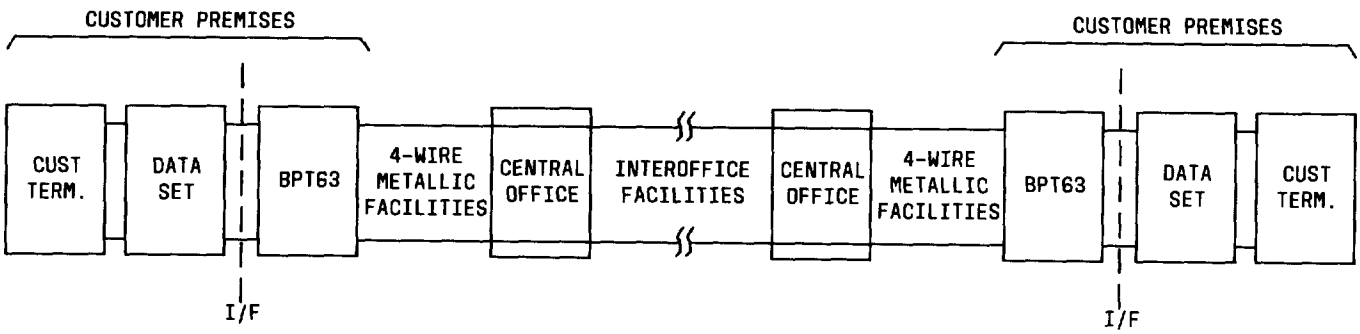
BPT63 LEAD DESIGNATIONS AND FUNCTIONS

LEAD NO.	LEAD DESIG	FUNCTION
NETWORK LEADS		
41	T1	(Tip 1) Transmit Output Toward Network
47	R1	(Ring 1) Transmit Output Toward Network
43	SXT	Transmit Simplex Lead (Network Side)
7	T	(Tip) Receive Input From Network
13	R	(Ring) Receive Input From Network
9	SXR	Receive Simplex Lead (Network Side)
CUSTOMER LEADS		
55	DT	(Data Tip) Transmitted Data Input From Customer
49	DR	(Data Ring) Transmitted Data Input From Customer
5	DT1	(Data Tip 1) Received Data Output Toward Customer
15	DR1	(Data Ring 1) Received Data Output Toward Customer
23	SI	Status Indicator Toward Customer (Formerly Designated TEK5)
19,21	SIR	Status Indicator Return Toward Customer (Formerly Designated TEK6)
POWER LEADS		
10	+12V	+12 V Battery Supply
48	−12V	−12 V Battery Supply
17	GRD	±12 V and −48 V Battery Supply Ground
35	−48V	−48 V Battery Supply
52	FGRD	Frame Ground
MISCELLANEOUS LEADS		
39	MLB	Manual Loopback
37	MLBG	Manual Loopback Return
2	ID1	Identification Lead 1
4	ID2	Identification Lead 2

TABLE C

TYPICAL BPT63 ATTENUATION DISTORTION (CHANNEL GAIN RELATIVE TO 0 dB AT 1000 Hz)

CHANNEL	FREQUENCY						
	200	300	400	1000	2000	2800	3400
Transmit	−0.2	−0.2	−0.1	0.0	0.0	0.0	0.0
Receive	−0.2	−0.1	−0.1	0.0	0.0	0.1	0.1



4-WIRE POINT-TO-POINT
PRIVATE LINE DATA CIRCUIT

Fig. 3—Typical Application of BPT63

TABLE D

ATTENUATION FACTORS

CABLE TYPE	1-KHZ LOSS PER KFT	1-KHZ LOSS PER MILE
H88 LOADED CABLE		
22 Gauge	0.15 dB	0.8 dB
24 Gauge	0.23 dB	1.2 dB
26 Gauge	0.34 dB	1.8 dB
D66 LOADED CABLE		
22 Gauge	0.15 dB	0.8 dB
24 Gauge	0.23 dB	1.2 dB
NONLOADED CABLE		
22 Gauge	0.34 dB	1.8 dB
24 Gauge	0.44 dB	2.3 dB
26 Gauge	0.54 dB	2.9 dB

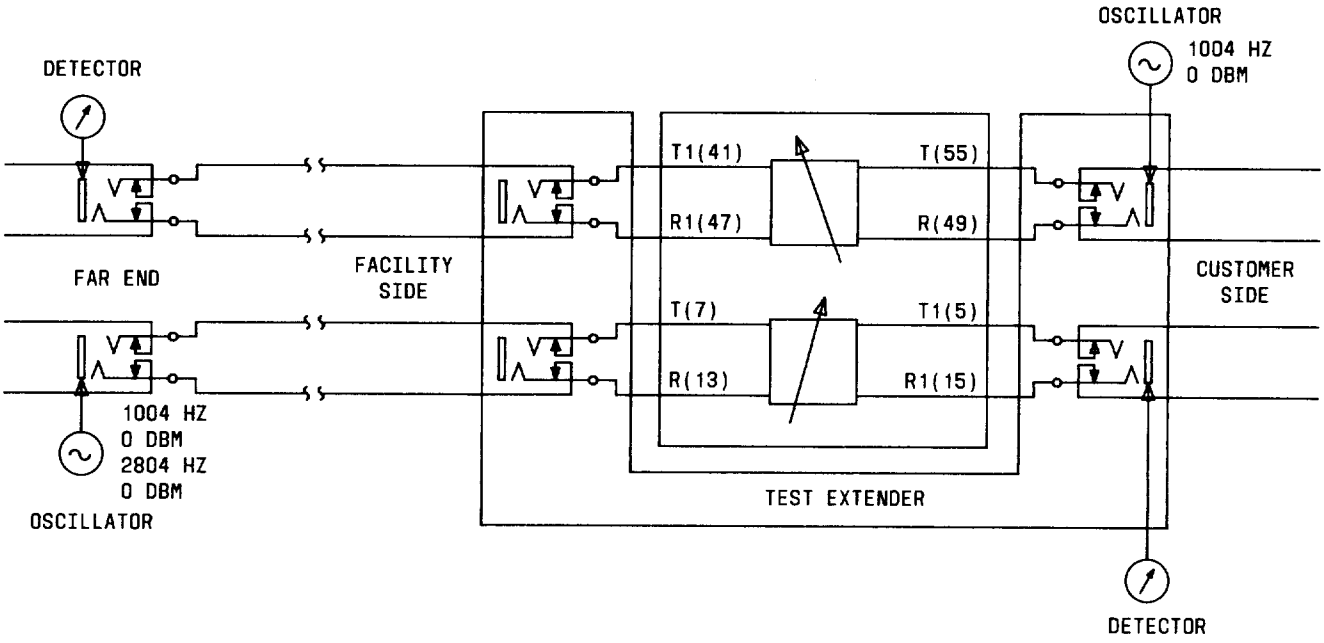


Fig. 4—Attenuator Adjusting Arrangement