P1 CARRIER TELEPHONE SYSTEM
ALTERNATE SYSTEM LINE-UP
NONREPEATERED SYSTEMS

1.00 INSTALL REMOTE TERMINALS

1.01 Proceed to nearest remote terminal location.

1.02 Install terminal (or terminals) as covered in Section 363-100-102 entitled P1 Carrier Telephone System, Installation and Connections, Remote Terminal, and connect the carrier line.

1.03 Proceed to other remote terminal locations of this system in order toward the one farthest from central office and repeat procedure of 1.02 at each location.

Transmitted Carrier Power at Remote Terminals

1.04 On 7F test set, turn DET SENS-db switch to +10 position.

1.05 Turn REC switch to DET HI-IMP position.

1.06 Connect receive cord from REC jack on test set to binding posts 15 (TRSG) and 22 (GRD) : red to 15, and black to 22.

1.07 Disconnect VF line from binding posts 7 and 8 on 386A terminal block and place a 600-ohm resistor across binding posts 7 and 8. Do not disconnect carrier line from binding posts 9 and 10.

1.08 Turn on 7F test set and check batteries.

1.09 DECIBEL meter should read between −2 and −4 (+6 to +8 dbm). If reading is not within these limits, perform transmitting tests and adjustments covered in section entitled P1 Carrier Telephone System, Adjustments and Maintenance, Remote Terminal Tests, Transmitting.

1.10 Leave 600-ohm resistor connected between binding posts 7 and 8.

1.11 For coterminus installations (more than one remote terminal at same location), disconnect VF lines from other terminals and connect a 600-ohm resistor to other 386A terminal block binding posts 7 and 8 in turn. Measure same value for each terminal as specified in 1.09.

1.12 Turn off 7F test set and remove receive cord from terminal. Leave a 600-ohm resistor across binding posts 7 and 8 of each terminal at this location. Close 386A apparatus case temporarily.

Received Carrier Power at Remote Terminals

1.13 On test set, turn REC switch to DET HI-IMP position.

1.14 Turn DET SENS-db switch to +10 position.

1.15 Connect receive cord from REC jack on test set to REC test point on 386A terminal block: red to 17 or 16 (REC), black to 22 (GRD).

Caution: On some earlier models of 386A terminal blocks, REC test point is binding post 16, but on later models it is 17. To find out which binding post is REC test point, measure resistance between binding post 2 and either 16 or 17. If resistance measured is about 650 ohms, that binding post is REC test point. If resistance is 19,000 ohms, that bind-

ing post is RING test point. Mark 386A terminal block binding posts 16 and 17 with proper designations.

1.16 Turn on 7F test set and check batteries. Turn DET SENS-db switch counterclockwise until a negative reading between 0 and —10 is obtained on DECIBEL meter.

1.17 Add reading of DECIBEL meter to setting of DET SENS-db switch. This is measured received carrier power.

1.18 Record this value and present air temperature under proper channel on Form E-4841B (Fig. 1). Repeat procedure of 1.04 through 1.18 for all other channels at this location.

1.19 Obtain correction factor from Table 3, Section 363-104-507, for appropriate line make-up and present temperature for each channel. Record this correction factor on Form E-4841B.

1.20 Estimate received carrier power for 50 F by adding correction factor to measured received carrier power. Record this value on Form E-4841B.

IN Pad Computation

1.21 Compute Desired IN Pad value by subtracting estimated received carrier power for 50 F from —27.5. Round off result to the nearest pad value and record this value as IN Pad. For example:

$$\begin{array}{r} -27.5 \\ -(-23.2) \\ \hline -4.3 \end{array}$$, use 4-db IN pad;

$$\begin{array}{r} -27.5 \\ -(-30.0) \\ \hline +2.5 \end{array}$$, use 0-db IN pad.

Note: If this value is positive, no pad is required.

1.22 Remove A board and install IN pad shown on Form E-4841B for each terminal at this location.

1.23 Estimate received carrier powers for temperatures shown on Terminal Information Card P-43B436, Fig. 2, by subtracting correction factors from Table 3, Section 363-104-507, for line make-up from the estimated received carrier power for 50 F. Record these estimated received carrier powers, IN pad value, and other necessary information on Terminal Information Card P-43B436. Do not record an OUT pad value. For example (Fig. 2):

ASSUMED LINE MAKE-UP 109HS, MEDIUM LOADING AREA

	Temperature, F				
	0	25	50	75	100
Estimated Rcvd Carr 50 F (Form E-4841B)	—23.2	—23.2	—23.2	—23.2	—23.2
Correction (Table 3)	— 1.6	— 0.8	0	+ 0.8	+ 1.6
Estimated Rcvd Carrier Power (Terminal Information Card)	—21.6	—22.4	—23.2	—24.0	—24.8

SYS — System number

CH — Channel number

TRANS__KC — Frequency transmitted from central office

REC__KC — Frequency transmitted from remote terminal

REC PWR:CARR

100°F
75°F
50°F
25°F
0°F

— Estimated received carrier power for each temperature shown

ED-97017-30 G- — Ordering code for the terminal

TERMINAL LINE-UP DATA

	REMOTE TERMINALS				CO TERMINALS				Pilot
	1	2	3	4	1	2	3	4	
Temp & Weather									
Measured Rcvd Carrier									
Correction to 50 F									
	-27.5	-27.5	-27.5	-27.5	-27.5	-27.5	-27.5	-27.5	
Estimated Rcvd Carrier 50 F									
Desired IN Pad									
IN Pad									
Trial OUT Pad	6	6	6	6					
Repeater Nearest Remote Terminals	12 kc	24 kc	36 kc	48 kc					
Present Temp									
Measured Output									
Correction to -40 F									
Output Estimated -40 F	5	5	5	5					
Output Desired -40 F									
Desired OUT Pad Change									
OUT Pad Change									
Present OUT Pad									
Corrected OUT Pad									

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Fig. 1 — Form E-4841B

SYS 1 CH 4
IN PAD 4
OUT PAD
TRANS 48 KC REC 96 KC

REC PWR:	CARR PILOT
100°F	—24.8
75°F	—24.0
50°F	—23.2
25°F	—22.4
0°F	—21.6

ED-97017-30

G-T2, H4, N2, W6

Fig. 2 — Terminal Information Card P-43B436

1.24 Check to see that a 600-ohm resistor is connected between binding posts 7 and 8 on 386A terminal block.

1.25 Close 386A apparatus case cover temporarily.

1.26 Repeat procedure covered in 1.23 through 1.25 for the other remote terminals at this location.

1.27 Proceed to other remote terminals, in order, to the one nearest central office, repeating procedure of 1.04 through 1.26.

2.00 END-TO-END MEASUREMENTS

2.01 At this point in the line-up, it is advisable to use two men, one located at central office and one at remote terminals. A vacuum tube voltmeter (VTVM) and a 1000-cycle source is used at central office; a P1 carrier test set is used at remote terminals.

2.02 Since remote terminal is transmitting carrier power toward the central office due to resistor on binding posts 7 and 8, received carrier power measurement may be made at central office.

2.03 Establish a talking circuit by removing resistor from binding posts 7 and 8 at remote terminal and connecting a 1011B hand set across these binding posts. At central office, remove 258C plug from DER VF jack of channel under test. See 2.14.

Received Carrier Power at Central Office

Note: If two or more systems follow same route for part of their length, refer to Section 363-104-504.

2.04 Remove termination (if any) from VTVM.

2.05 On VTVM, turn selector switch to 0-db position.

2.06 Connect a test cord from input jack on VTVM to REC test point on board A: red to REC, black (GRD) to yellow dot.

2.07 Turn selector switch counterclockwise until a negative reading between 0 and —10 is obtained on VTVM.

2.08 Add reading of VTVM to reading of selector switch. This is measured received carrier power.

2.09 Record this value on Form E-4841B under proper channel and repeat procedure of 2.06 through 2.09 for all terminals of system.

2.10 Obtain correction factor from Table 8, Section 363-104-512, for the appropriate line make-up (line section between central office and first repeater) and present outdoor temperature for each channel. Record this correction factor on Form E-4841B for each channel.

2.11 Estimate received carrier power for 50 F by adding the correction factor to measured received carrier power. Record this value on Form E-4841B as Estimated Rcvd Carr 50 F.

2.12 Compute Desired IN Pad value by subtracting estimated received carrier power for 50 F from —27.5. Round off result to nearest pad value and record this value as IN Pad. Install proper IN pad in appropriate terminal.

2.13 Estimate received carrier powers for temperatures shown on Terminal Information Card P-43B436, Fig. 3, by subtracting correction factor (Table 8, Section 363-104-512) for line make-up from estimated received carrier power for 50 F (see 1.23 for example). Record these values, IN Pad value, and other necessary information on Terminal Information Card P-43B436 (Fig. 3).

Note: If this value is positive, no pad is required.

SYS *1*	CH *4*	
IN PAD		
OUT PAD		
TRANS *96* KC	REC *48* KC	
REC PWR:	CARR	PILOT
100°F	*—22.0*	
75°F	*—21.7*	
50°F	*—21.3*	
25°F	*—19.9*	
0°F	*—19.6*	
ED-97017-30		
G-*T1, F4, N2, W2*		

Fig. 3 — Terminal Information Card P-43B436

Net Loss Measurements

2.14 If a parallel talking facility is not available to coordinate measurements at both carrier terminals, conversation must take place over channel being measured. Test sets are prepared for measurements; the talking sets are then disconnected from terminals. Test sets are connected and measurements made. Test sets are disconnected and talking circuit re-established to discuss measurement and coordinate next measurement. A separate talking battery must be connected in series with the telephone used in central office. The telephone set in series with battery may be connected across VF test point.

2.15 Prepare the test sets as follows:

7F Test Set (Remote Terminal)

1. SEND switch to AUDIO position.
2. AUDIO OSC FREQ switch to 1000-cycle position.
3. DET SENS-db switch to 0 position.
4. Turn on 7F test set and check batteries.
5. Operate CAL OSC key.
6. Turn AUDIO OSC OUTPUT knob to obtain reading of 0 on DECIBEL meter.
7. Release CAL OSC key.
8. ATTENUATOR switches to 0 positions.

1000-Cycle Source and VTVM (Central Office)

1. Set oscillator for 1000 cycles.
2. Connect test cord from oscillator to VTVM input terminals.
3. Connect 600-ohm resistor across input terminals of VTVM.
4. Set selector switch to 0-db position.
5. Adjust 1000-cycle output to obtain reading of 0 db on VTVM.

Note: If central office milliwatt supply is used, it should also be checked and, if necessary, adjusted in accordance with instructions for the milliwatt supply.

Central Office to Remote Terminal Direction

2.16 At central office, connect a test cord from 1000-cycle source output to VF test points on board A: red to left, black to right. Place a 258C plug in DER VF jack or disconnect wires from screw terminals 11 and 26 on board A.

2.17 The following steps are performed at remote terminal.

2.18 On test set, turn DET SENS-db switch to 0 position.

2.19 Turn REC switch to BAL 600Ω VF position.

2.20 Connect receive cord from REC jack on test set to binding posts 7 and 8 on 386A apparatus case terminal block.

2.21 On board D, turn REC potentiometer to obtain a reading of —5 on DECIBEL meter.

2.22 Remove test cords from terminals and re-establish talking circuit.

Remote Terminal to Central Office Direction

2.23 At remote terminal, connect send cord from SEND jack on test set to binding posts 7, 8, and 22 of 386A apparatus case terminal block: white to 7, black to 8, and sleeve to 22.

2.24 The following steps are performed at central office.

2.25 On VTVM, turn selector switch to 0-db position.

2.26 Connect 600-ohm resistor across input terminals of VTVM.

2.27 Connect test cord from VTVM input terminals to VF test points on board A: red to left, black (GRD) to right. Place a 258C plug in DER VF jack or disconnect wires from screw terminals 11 and 26 on board A.

2.28 On board D, turn REC potentiometer to obtain a reading of —5 on VTVM.

2.29 Turn off 7F test set and remove test cords from terminals. Re-establish talking circuit. Remove 258C plug in DER VF jack or reconnect wires to screw terminals 11 and 26 on board A.

Ringing Tests

2.30 After transmission tests have been performed, a signaling test must be made to ensure that remote terminals are applying ringing voltage to customer line.

2.31 Call local test desk and have party 1, 2, 3, and 4 ringing current applied, in turn, to line.

2.32 Connect a telephone set to power ground and to either 386A apparatus case terminal block binding post 7 (Ring) or 8 (Tip) for party 1, 2, 3, and 4, in turn, and observe that bell rings.

2.33 Disconnect telephone set and connect voice-frequency line to binding posts 7 (Ring) and 8 (Tip) of 386A apparatus case terminal block of remote terminal.

2.34 Replace cover of 803A connector and place desiccant in 386A apparatus case. Close and secure 386A apparatus case cover and terminal block cover.

Other Channels

2.35 Repeat 2.01 through 2.34 for remaining channels of system.

2.36 This completes system tests. Normal routines for placing customers in service now apply.