

**P1 CARRIER TELEPHONE SYSTEM**  
**SYSTEM LINE-UP AND MAINTENANCE**  
**NONREPEATERED SYSTEMS LINE-UP**

**1.00 INSTALL AND LINE UP REMOTE TERMINALS**

**1.01** After completing the preparation for system line-up, go to the nearest remote terminal location. Install the terminal in the 386A apparatus case.

**1.02** Adjust the terminal as outlined in Sections 363-101-100 to 363-101-509.

**2.00 TRANSMITTED CARRIER POWER AT REMOTE TERMINAL**

**2.01** Remove the carrier line from binding posts 9 and 10 on 386A terminal block.

**2.02** Check the 7F test set batteries.

**2.03** Turn DET SENS-db switch to +10 position.

**2.04** Turn REC switch to DET 600Ω position.

**2.05** Connect receive cord from REC jack on test set to 386A terminal block binding posts 9 and 10; red to 9, black to 10.

**Note:** If board A is strapped for 135 ohms (carrier line on screw terminals 4 and 5, and 1 strapped to 16), remove board A. Remove the strap between 1 and 16 and move carrier line to 20 and 21. This connects the line transformer for 600 ohms. Reinsert board A.

**2.06** Disconnect VF line from binding posts 7 and 8 on 386A terminal block of this terminal and place a 600-ohm resistor across the binding posts.

**2.07** The DECIBEL meter should read between -2 and -6 (+8 to +4 dbm) if no output pad is installed in the terminal. If an output pad is installed in the terminal, the DECIBEL meter should read -2 to -6 minus the output pad value. For example, if a 4-db output pad is installed in the terminal, the DECIBEL meter should read -6 to -10 (+4 to 0 dbm).

**2.08** For coterminus installations, disconnect VF lines from other terminals and move 600-ohm resistor to the other 386A terminal block binding posts 7 and 8 in turn. Measure same value for each terminal as specified in 2.07.

**2.09** Remove receive cord from the terminal. Place a 600-ohm resistor across binding posts 7 and 8 of each terminal at this location.

**2.10** Reconnect the carrier line to binding posts 9 and 10.

**Note:** If strap and connections on board A were changed in 2.05, remove board A and connect the line transformer for 135 ohms. See Note in 2.05.

**3.00 RECEIVED CARRIER POWER AT REMOTE TERMINAL**

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

**3.02** Turn DET SENS-db switch to 0 position.

**3.03** Connect receive cord from REC jack on test set to REC test point on the 386A apparatus case terminal block; red to 17 or 16 (REC), black to 22 (GRD).



*Caution: On some earlier models of 386A apparatus cases, the REC test point is binding post 16, but on later models it is 17. To find out which binding post is the REC test point, measure the resistance between binding post 2 and either 16 or 17. If the resistance measured is about 650 ohms, that binding post is the REC test point. If the resistance is 19,000 ohms, that binding post is the RING test point. Mark the 386A apparatus case terminal block binding posts 16 and 17 with the proper designations.*

**3.04** Turn DET SENS-db switch counterclockwise until a negative reading between 0 and -10 is obtained on DECIBEL meter.

Example:

Measured Value	Present Temperature	Engineer's Estimate		Write on Card
	°F	°F	Value	
-17	70	0 to 40	-11	-13
		40 to 80	-15	-17
		80 to 120	-19	-21

**TABLE I  
LINE-UP INSTRUCTIONS**

0-db Pad Specified			Other than 0-db Pad Specified	
<b>Measured REC Power</b>				
More		Less	More or Less	
<b>Than Estimated REC Power By:</b>				
<b>2 to 4 db</b>	<b>Over 4 db</b>	<b>Over 2 db</b>	<b>2 to 4 db</b>	<b>Over 4 db</b>
Install Proper 2- or 4-db Pad	Consult Engineer	Consult Engineer	Install Proper Pad	Consult Engineer

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

**3.06** From the P1 Carrier Record furnished by the engineer, select the estimated received carrier power for the present temperature. Compare the estimated received carrier power and the measured received carrier power and refer to Table I. Record measured received carrier power, pad values, and corrected estimated received carrier power for other temperature ranges on the Terminal Information Card (see Fig. 1). To correct the estimated received carrier power for other temperature ranges, change the engineer's estimated values by the difference between estimated and measured received carrier power for the present temperature. (See example.)

SYS	/	CH	/
IN. PAD			10
OUT. PAD			0
TRSG	12	kc	REC 24
REC	24	kc	
LINE CONN	800	A	
SIGNAL TONE	803	A	
REC PWR: CARR		PIL	
0-40	-13		
40-80	-17		
80-120	-21		
CARR PWR-LINE			
TERMINATED			
ED-97017-30,			
G-TA, E1, NI, W6			

Fig. 1 - Terminal Information Card

3.07 Remove receive cord from terminal.

3.08 Proceed to the other remote terminals in order from the one nearest the central office to the one farthest from the central office, repeating 1.00 through 3.08.

#### 4.00 END-TO-END MEASUREMENTS

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

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

4.03 Establish a talking circuit by removing the resistor from binding posts 7 and 8 at the remote terminal and connecting a 1011B handset

across these binding posts. At the central office, remove 258C plug from DER VF jack of channel under test.

#### 5.00 RECEIVED CARRIER POWER AT CENTRAL OFFICE

5.01 Remove the termination (if any) from VTVM.

5.02 On VTVM turn selector switch to 0-db position.

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

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

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

5.06 From the P1 Carrier Record furnished by the engineer, select the estimated received carrier power corresponding to the present outside temperature. Compare the estimated received carrier power and the measured received carrier power and refer to Table I (see 3.06).

5.07 Record received carrier power, pad values, and estimated received carrier power for other temperature ranges on the Terminal Information Card (see 3.06 and Fig. 1).

5.08 Remove test cord from REC test point.

#### 6.00 NET LOSS MEASUREMENTS

6.01 If a parallel talking facility is not available to co-ordinate measurements at both carrier terminals, conversation must take place over the channel being measured. The test sets are prepared for the measurements; the talking sets are then disconnected from the terminals. The test sets are connected and the measurements

made. The test sets are disconnected and the talking circuit re-established to discuss the measurement and co-ordinate the next measurement.

6.02 Prepare the test sets as follows:

7F Test Set (Remote Terminal)
<ol style="list-style-type: none"> <li>1. Send switch to AUDIO position.</li> <li>2. AUDIO OSC FREQ switch to 1000-cycle position.</li> <li>3. DET SENS-db switch to 0 position.</li> <li>4. Operate CAL OSC key.</li> <li>5. Turn AUDIO OSC OUTPUT knob to obtain reading of 0 on DECIBEL meter.</li> <li>6. Release CAL OSC key.</li> <li>7. ATTENUATOR switches to 0 positions.</li> </ol>

1000-Cycle Source and VTVM (CO)
<ol style="list-style-type: none"> <li>1. Set oscillator for 1000 cycles.</li> <li>2. Connect test cord from oscillator to VTVM input terminals.</li> <li>3. Connect 600-ohm resistor across input terminals of VTVM.</li> <li>4. Set selector switch to 0-db position.</li> <li>5. Adjust 1000-cycle output to obtain reading of 0 db on VTVM.</li> </ol>
<p><b>Note:</b> If the central office milliwatt supply is used, it should also be checked and, if necessary, adjusted in accordance with instructions for the milliwatt supply.</p>

**Central Office to Remote Terminal Direction**

6.03 At the central office, connect a test cord from the 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.

6.04 The following steps are performed at the remote terminal.

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

6.06 Turn REC switch to BAL 600Ω VF position.

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

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

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

**Remote Terminal to Central Office Direction**

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

6.11 The following steps are performed at the central office.

6.12 On VTVM, turn selector switch to 0 db position.

6.13 Connect 600-ohm resistor across the input terminals of the VTVM.

6.14 Connect test cord from VTVM input terminals 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.

6.15 On board D, turn REC potentiometer to obtain a reading of -5 on the VTVM.

6.16 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.

**7.00 RINGING TESTS**

**7.01** After transmission tests have been performed, a signaling test must be made to ensure that the remote terminals are applying ringing voltage to the subscriber's line.

**7.02** Call the local test desk and have Party 1, 2, 3, and 4 ringing current, in turn, applied to the line.

**7.03** Connect a telephone set to the 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 the bell rings.

**8.00 SUPERVISORY INTERFERENCE TESTS**

**8.01** At the central office, remove 600-ohm resistor from the VTVM.

**8.02** On the VTVM, turn selector switch to -10 db position.

**8.03** Connect test cord from VTVM input terminals to SUPV FLT test point on board H; red to SUPV FLT, black to yellow dot.

**8.04** Check that the telephone set at the remote terminal is on-hook.

**8.05** VTVM should read to left of 0.

**8.06** Turn the VTVM selector switch to +20 position.

**8.07** Check that the telephone set at the remote terminal is off-hook.

**8.08** The VTVM should read between -7 and -11. Record this value for use in 8.10.

**8.09** Remove test cord from board H and connect to SUPV test point on board D; red to SUPV, black to yellow dot.

**8.10** VTVM should read between -11 and -7. This reading should be within 1 db of the reading obtained in 8.08.

**8.11** Remove test cord from terminal.

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

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

**9.00 OTHER CHANNELS**

**9.01** Repeat 4.00 through 8.13 for remaining channels of system.

**9.02** Write all the required data on information cards and advise the engineer regarding any changes that were made on the system (see Fig. 1 and 2).

**9.03** Replace the covers of the 803A connectors of this system in the central office.

SYS	1	CH	1
IN. PAD			10
OUT. PAD			0
TRSG	2.4	kc	REC. 12
LINE CONN	800		A
SIGNAL TONE	803		D
REC PWR:	CARR		PIL
0-40	-16		
40-80	-17		
80-120	-18		
CARR PWR-LINE			
TERMINATED			
ED-97017-30,			
G	T1, A1, N1, W3		

**Fig. 2 — Terminal Information Card**

**9.04** This completes system tests. Normal routines for placing subscribers in service now apply.