

SINGLE-FREQUENCY SIGNALING SYSTEMS
OVERALL SIGNALING TESTS
E AND F TYPE
USING 2B SIGNALING TEST SET

1. GENERAL

1.01 This section describes procedures for making overall pulsing and supervisory tests on single-frequency (SF) signaling systems using the 2B signaling test set and its associated pulse-repeating adapter circuit.

1.02 The tests covered are:

A. Pulsing Using Originating 2B-1 Adapter:

This test checks pulsing of SF signaling systems when the SF signaling unit at the originating end requires loop pulsing.

B. Pulsing Not Using Originating 2B-1 Adapter:

This test checks pulsing of SF signaling systems when the SF signaling unit at the originating end requires M lead pulsing.

C. Supervision: This test checks the supervision during idle condition, seizure, answer, and pulsing.

1.03 The single-frequency signaling circuit is referred to in this section as an SF unit.

1.04 The 2B signaling test set modified for use with the pulse repeating adapter circuit is coded 2B-1.

1.05 Percent break adjustments of the 2B test set above 70 percent should be made slowly to prevent pulsing out incorrect values. Incorrect values will be indicated if the rate of vibration of the PERCENT BREAK meter pointer is not the same as that of the PULSES PER SECOND meter pointer. To restore correct percent break values, turn the ADJ % BK control counterclockwise until both pointers are vibrating at the same rate; then turn the control more slowly clockwise until the desired percent break value is obtained. It may

also be necessary to change the coarse ADJ % BK switch from S, M, or L setting to obtain desired range on the PERCENT BREAK meter.

1.06 Perform Test C without application of the 1000-Hz tone if -26 dBm 600Ω or -16 dBm 600Ω is not available.

1.07 Test C can be performed only on E and M signaling units.

1.08 Test C cannot be performed on E1A or E1B units unless these units are equipped with transmission path cut circuit SD-99778-01 or the 1000-Hz interfering tone is omitted.

1.09 The connections required at the originating and terminating ends of the signal system for each type SF unit is given in Fig. 1 through 15.

1.10 Lettered Steps: A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required depending upon local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 The apparatus required for each test is:

- (a) 2B or 2B-1 signaling test set (SD-56134-02)
- (b) 258D (dummy) plug.

SECTION 179-302-501

2.02 The apparatus which may be required is:

- (a) Pulse repeating adapter (SD-56134-02)
- (b) E-type extender (SD-99384-01)
- (c) F-type extender (SD-1C241-01)
- (d) Patching and testing cords as required per Fig. 1 through 15.

Note: The patching and testing cords shown in Fig. 1 through 15 assume that patching jacks will accept 310 plugs.

Test C

2.03 The apparatus required only for Test C is:

- (a) 52-type head telephone set and monitoring cord.

3. PREPARATION

STEP	ACTION	VERIFICATION
-------------	---------------	---------------------

All Tests

1	Make circuit associated with SF unit to be tested busy.	
---	---	--

Note: If testing E1R units normally arranged for A and B lead control, the loop must be open to assure proper testing over the M lead as provided in this section.

2	On 2B or 2B-1 test set— Set all keys to normal position.	
---	---	--

3	Set SCALE SEL switch to PPS position.	
---	---------------------------------------	--

4	Ascertain that power is connected if required.	
---	--	--

5	Operate CONT PLS key to DIAL PLS.	PERCENT BREAK meter reads 0 on black scale. See Step 6a.
---	-----------------------------------	--

6a	If requirement of Step 5 is not met— Adjust pointer adjustment screw of PERCENT BREAK meter to obtain 0 reading.	
----	---	--

7	Insert 258D plug into P jack.	PERCENT BREAK meter reads 100 on black scale. See Step 8b.
---	-------------------------------	--

8b	If requirement of Step 7 is not met— Unlock CAL % BK control, adjust to obtain reading of 100, and relock control taking care not to change 100 reading.	
----	---	--

Note: The proper performance of the tests covered in this section depends upon the correct pulse-per-second calibration and range of the 2B test set. See Section 100-263-501 for calibration if accuracy is not known.

STEP	ACTION	VERIFICATION
9	Remove 258D plug. <i>Note:</i> Repeat Steps 7, 8b, and 9 if test extends beyond 30 minutes.	
10	Restore CONT PLS key to normal.	

Tests A and B

11	Make originating and terminating test connections as shown on the appropriate figures of Fig. 1 through 9.	
12c	If 2B-1 adapter used at terminating end (Fig. 6 and 7)— On terminating adapter— Set FUNCTION switch to LP2 position; turn ADJ REC LOOP potentiometer fully counterclockwise to OUT position; set LEAK switch to OUT position; and operate all SEND LOOP keys to OUT position.	
13	On originating 2B or 2B-1 test set— Set ADJ % BK switch to M.	
14	Operate OG-BG key to BG.	
15	On terminating 2B or 2B-1 test set— Operate MEAS % BK key to LINE.	

4. METHOD

STEP	ACTION	VERIFICATION
A. Pulsing Using Originating 2B-1 Adapter		
16	On originating adapter— Operate FUNCTION switch to position P/C; turn ADJ REC LOOP potentiometer fully counterclockwise to OUT position; set LEAK switch to SF1 position; and operate all SEND LOOP keys to OUT position.	
17	On originating 2B-1 test set— Adjust ADJ PPS control to 12 pps on PULSES PER SECOND meter (0 to 20 scale).	
18	Operate PLS and MEAS % BK keys to DROP.	
19	Adjust ADJ % BK control fully counterclockwise.	

SECTION 179-302-501

STEP	ACTION	VERIFICATION
20	Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test a under heading of "Input Test Values". <i>Note:</i> It may be necessary to switch case ADJ % BK switch of 2B-1 test set to "S" or "L" to obtain desired % break values.	
21	On originating adapter— Set FUNCTION switch to LP1 position.	
22	On originating 2B-1 test set— Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A sub-test a under heading of "Output Test Limit".
23	On originating adapter— Set FUNCTION switch to P/C position; set LEAK switch to OUT position; and operate 100, 200, 400, and 800 SEND LOOP keys to IN position.	
24	On originating 2B-1 test set— Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test b under heading of "Input Test Values".	
25	On originating adapter— Set FUNCTION switch to LP1 position.	
26	On originating 2B-1 test set— Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A, sub-test b under heading of "Output Test Limit".
27	On originating adapter— Set FUNCTION switch to P/C position; set LEAK switch to SF1 position; and operate all SEND LOOP keys to OUT position.	
28	On originating 2B-1 test set— Adjust ADJ PPS control to 8 pps on PULSES PER SECOND meter.	
29	Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test c under heading of "Input Test Values".	

STEP	ACTION	VERIFICATION
30	On originating adapter— Set FUNCTION switch to LP1 position.	
31	On originating 2B-1 test set— Momentarily operate TWD D to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A, sub-test c under heading of "Output Test Limit".
32	On originating Adapter— Set FUNCTION switch to P/C position; set LEAK switch to OUT position; and operate 100, 200, 400, and 800 SEND LOOP key to IN position.	
33	On originating 2B-1 test set— Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test d under heading of "Input Test Values".	
34	On originating adapter— Set FUNCTION switch to LP1 position.	
35	On originating 2B-1 test set— Momentarily operate TWD D to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A, sub-test d under heading of "Output Test Limit".
36d	If not further tests are to be made— Remove all cords, restore all keys and return trunk to service.	

B. Pulsing Not Using Originating 2B-1 Adapter

- 16 On originating 2B or 2B-1 test set—
Adjust ADJ PPS to 12 pps on PULSES PER SECOND meter (0 to 20 scale).
- 17 Adjust ADJ % BK control fully counter-clockwise.
- 18 Adjust ADJ % BK control to obtain on *red* scale of PERCENT BREAK meter the % break value given in Table A, sub-test a under heading of "Input Test Values".

Note: It may be necessary to switch coarse ADJ % BK switch to "S" or "L" position to obtain desired % break values.

SECTION 179-302-501

STEP	ACTION	VERIFICATION
19	Operate PLS and MEAS % BK keys to DROP.	
20	Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK METER indication on <i>red</i> scale should be as given in Table A, sub-test a under heading of "Output Test Limit".
21	On originating 2B or 2B-1 test set— Restore all keys to normal.	
22	Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test b under heading of "Input Test Values".	
23	Operate PLS and MEAS % BK keys to DROP.	
24	Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A, sub-test b under heading of "Output Test Limit".
25	On originating 2B or 2B-1 test set— Restore all keys to normal.	
26	Adjust ADJ PPS control to 8 pps on PULSES PER SECOND meter.	
27	Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value given in Table A, sub-test c under heading of "Input Test Values".	
28	Operate PLS and MEAS % BK keys to DROP.	
29	Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>black</i> scale should be as given in Table A, sub-Test c under heading of "Output Test Limit".
30	On originating 2B or 2B-1 test set— Restore all keys to normal.	
31	Adjust ADJ % BK control to obtain on <i>red</i> scale of PERCENT BREAK meter the % break value as given in Table A, sub-Test d under heading of "Input Test Values".	
32	Operate PLS and MEAS % BK keys to DROP.	

STEP	ACTION	VERIFICATION
33	Momentarily operate TWD D key to ON HK and then to its normal position.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indication on <i>red</i> scale should be as given in Table A, sub-test d under heading of "Output Test Limit".
34d	If no further tests are to be made— Remove all cords, restore all keys, and return trunk to service.	

C. Supervision

- 11 At originating end—
Connect headset to monitoring jack associated with SF unit.
- 12 Make originating and terminating test connections as shown on the appropriate figures of Fig. 10 through 15.
- 13 At originating end—
Connect 1000-Hz tone to drop transmit port of SF unit.
- 14 On originating 2B or 2B-1 test set—
Set all key to normal and set ADJ % BK switch to M position.
- 15 Adjust ADJ PPS control to 5 pps on PULSES PER SECOND meter (0 to 20 scale).
- 16 Adjust ADJ % BK control fully counter clockwise.
- 17 Adjust ADJ % BK controls to 50 on *black* scale of PERCENT BREAK meter.

Busy Condition

- 18 On originating and terminating 2B or 2B-1 test sets—
Operate TWD L keys to OFF-HK.

At originating end—
1000-Hz heard at line transmit port.
No tone heard at line receive port of SF unit.
At both ends—
L lamp extinguished.

High Level, Terminating End Broadbanding

- 19 On originating 2B or 2B-1 test set—
Operate TWD L key to ON HK.

At originating end—
2600-Hz tone at high level heard for approximately 1/2 second at line transmit port of SF unit followed by 2600-Hz tone with 1000-Hz tone superimposed.
No tone heard at line receive port of SF unit.
On terminating 2B or 2B-1 test set—
L lamp lighted.

SECTION 179-302-501

STEP	ACTION	VERIFICATION
Cross Control Cut		
20	On terminating 2B or 2B-1 test set— Operate TWD L to ON HK.	At originating end— 2600-Hz tone heard at line transmit and line receive ports of SF unit. At both ends— L lamp lighted.
Flashing and Rering Tests		
21	On originating 2B or 2B-1 test set— Operate TWD L key to OFF HK and PLS key to LINE.	
22	On terminating 2B or 2B-1 test set— Operate MEAS % BK key to LINE.	On terminating 2B or 2B-1 test set— PERCENT BREAK meter indicates 40 to 60% break on <i>red</i> scale.
23	On terminating 2B or 2B-1 test set— Operate TWD L key to OFF HK.	Same as Step 22.
Idle Conditions		
24	On originating and terminating 2B or 2B-1 test sets— Operate TWD L keys to ON HK.	At originating end— 2600-Hz tone heard at both line transmit and line receive ports of SF unit. L lamps lighted.
25d	If no further tests are to be made— Remove all cords, restore all keys, and return trunk to service.	

TABLE A
PULSING TEST LIMITS ORIGINATING UNIT USING LOOP PULSING

ORIG	TYPE OF UNIT		INPUT TEST VALUES		OUTPUT TEST LIMIT
	TERM	TEST	PPS	% BREAK	% BREAK
				Note	
1. E2C	E1A	a	12	42 (2)	51 Min
E4C	E-B	b	12	70 (3)	71 Max
	(Note 1)	c	8	31 (2)	33 Min
		d	8	77 (3)	74 Max
2. E2C	FWA	a	12	42 (2)	52 Min
E4C		b	12	70 (3)	77 Max
E2S		c	8	31 (2)	34 Min
		d	8	77 (3)	87 Max
3. E2C	E2D	a	12	42 (2)	56 Min
E4C	E4D	b	12	70 (3)	82 Max
	E5D	c	8	31 (2)	36 Min
		d	8	77 (3)	82 Max
4. E2S	E2L	a	12	42 (2)	56 Min
		b	12	70 (3)	87 Max
		c	8	31 (2)	35 Min
		d	8	77 (3)	88 Max
5. E2S	E1P	a	12	42 (2)	44 (4) Min
		b	12	70 (3)	55 (4) Max
		c	8	31 (2)	45 (4) Min
		d	8	77 (3)	57 (4) Max

Note 1: E-B includes E1B, E2B, E3B, and E4B.

Note 2: Set leak to SF1.

Note 3: Set loop 1500 ohms.

Note 4: Measured on E lead.

TABLE B

PULSING TEST LIMITS ORIGINATING UNIT USING E & M LEAD PULSING

ORIG	TYPE OF UNIT		INPUT TEST VALUES		OUTPUT TEST LIMIT
	TERM	TEST	PPS	% BREAK	% BREAK
1. E1A E-B (Note 1)	E1A	a	12	58	51 Min
	E-B	b	12	67	71 Max
		c	8	40	33 Min
		d	8	74	74 Max
2. E1A E-B	E2D	a	12	54	56 Min
	E4D	b	12	73	82 Max
	E5D	c	8	41	38 Min
		d	8	83	82 Max
3. E1A E-B	E2L	a	12	57	56 Min
		b	12	73	87 Max
		c	8	41	35 Min
		d	8	83	88 Max
4. E1A E-B	FWA	a	12	53	52 Min
		b	12	73	84 Max
		c	8	36	34 Min
		d	8	81	92 Max
5. FWA	E1A	a	12	56	51 Min
	E-B	b	12	69	71 Max
		c	8	38	33 Min
		d	8	76	74 Max
6. FWA	E2D	a	12	52	56 Min
	E4D	b	12	71	80 Max
	E5D	c	8	39	38 Min
		d	8	79	80 Max
7. FWA	E2L	a	12	57	56 Min
		b	12	71	87 Max
		c	8	41	35 Min
		d	8	79	88 Max
8. FWA	FWA	a	12	53	52 Min
		b	12	71	80 Max
		c	8	36	34 Min
		d	8	79	88 Max

TABLE B (cont'd)

ORIG	TYPE OF UNIT		INPUT TEST VALUES		OUTPUT TEST LIMIT
	TERM	TEST	PPS	% BREAK	% BREAK
9. E1A E-B FWA with MPC	E1A	a	12	25	51 Min
	E-B	b	12	81	71 Max
	FWA	c	8	25	33 Min
	with MPC	d	8	86	74 Max
10. E1A E-B FWA with MPC	E2D	a	12	25	56 Min
	E4D	b	12	81	82 Max
	E5D	c	8	25	38 Min
	with MPC	d	8	86	84 Max
11. E1A E-B FWA with MPC	E2L	a	12	25	56 Min
		b	12	81	87 Max
		c	8	25	35 Min
	with MPC	d	8	86	88 Max
12. E1A E-B FWA with MPC	FWA	a	12	25	52 Min
		b	12	81	80 Max
		c	8	25	34 Min
	with MPC	d	8	86	88 Max
13. E1A E-B FWA with MPC	E1P	a	12	25	Note 44 (2) Min
		b	12	81	55 (2) Max
		c	8	25	45 (2) Min
	with MPC	d	8	86	57 (2) Max

TABLE B (cont'd)

ORIG	TYPE OF UNIT		INPUT TEST VALUES		OUTPUT TEST LIMIT
	TERM	TEST	PPS	% BREAK	% BREAK
14. E1R	E1P	a	12	Note 28 (3)	Note 44 (2) Min
		b	12	75 (3)	55 (2) Max
		c	8	28 (3)	45 (2) Min
		d	8	83 (3)	57 (2) Max
15. E1R	FWA	a	12	28 (3)	52 Min
		b	12	75 (3)	84 Max
		c	8	28 (3)	34 Min
		d	8	83 (3)	92 Max
16. E-B	E1P	a	12	53	44 (2) Min
		b	12	73	55 (2) Max
		c	8	36	45 (2) Min
		d	8	81	57 (2) Max
17. E1R	E2L	a	12	28 (3)	56 Min
		b	12	75 (3)	87 Max
		c	8	28 (3)	35 Min
		d	8	84 (3)	88 Max
18. FWA	E1P	a	12	53	44 (2) Min
		b	12	71	55 (2) Max
		c	8	36	45 (2) Min
		d	8	79	57 (2) Max
19. E1J FWB	E1J	a	5	50	42 Min, 58 Max
	FWB				

Note 1: E-B includes E1B, E2B, E3B, and E4B.

Note 2: Measured on E lead

Note 3: Input on M lead

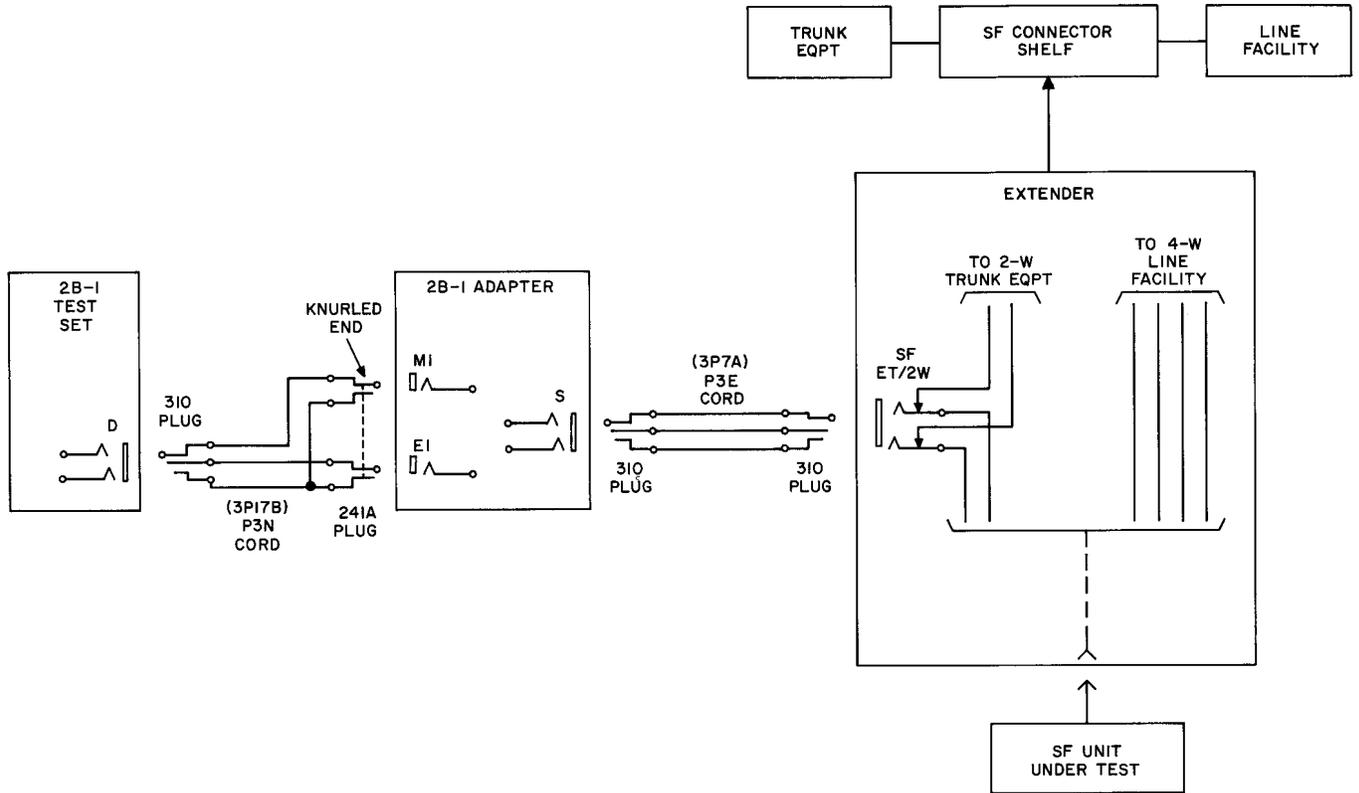


Fig. 1—Pulsing Tests—Originating End Connections for Testing E2C, E4C, and E2S SF Units Using an Extender

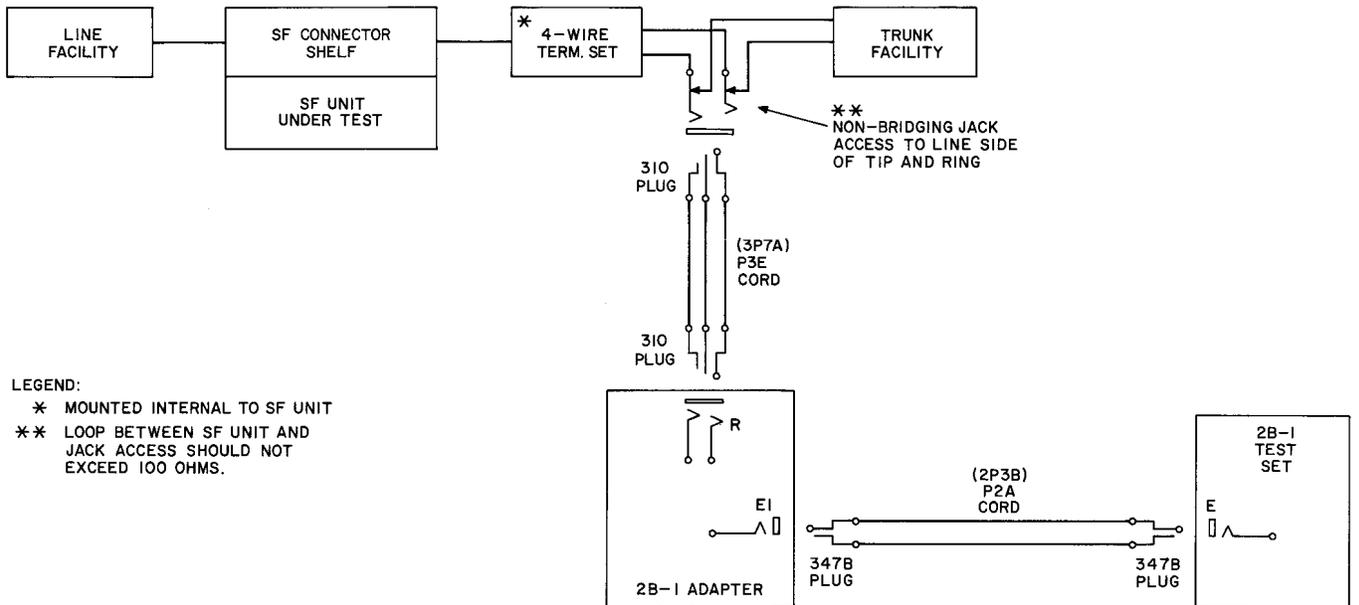


Fig. 2—Pulsing Tests—Originating End Connections for Testing E2C, E4C, and E2S SF Units

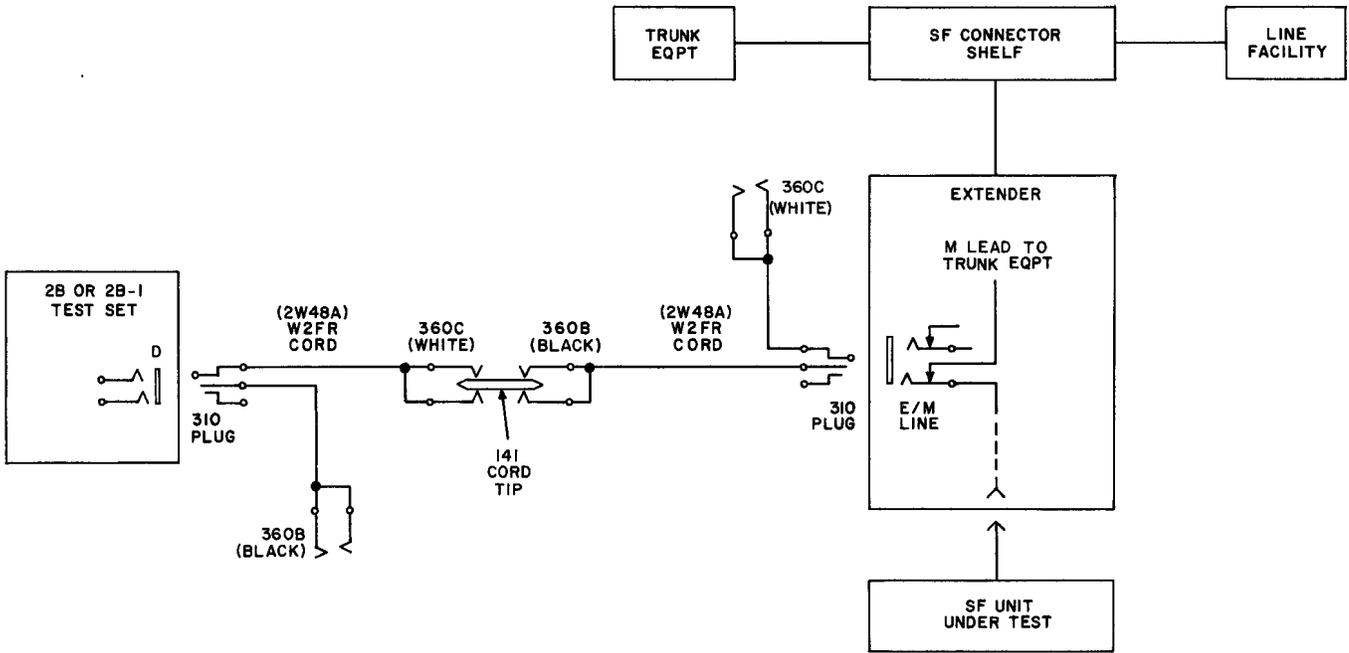


Fig. 3—Pulsing Tests—Originating End Connections for Testing E1A, E-B, E1J, FWA, FWB, and E1R SF Units Using an Extender

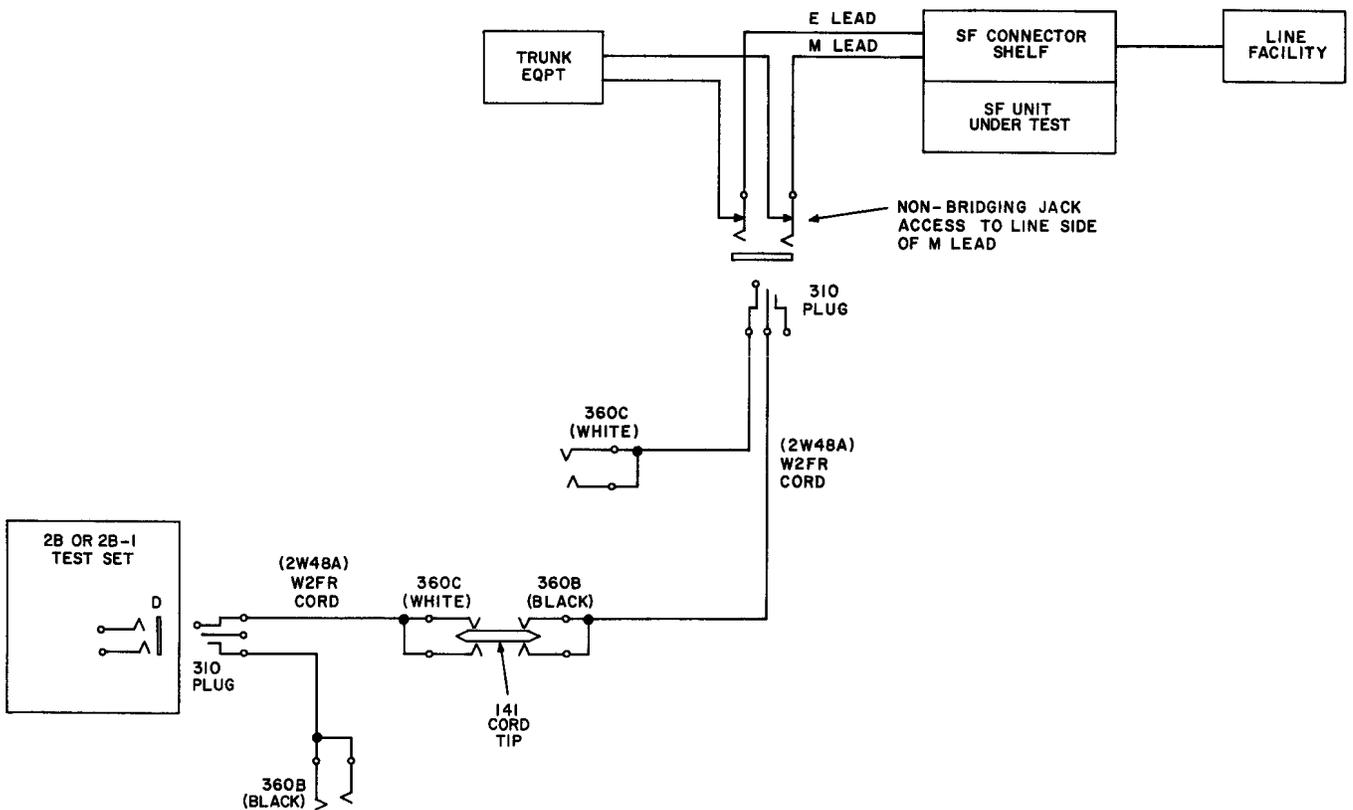


Fig. 4—Pulsing Tests—Originating End Connections for Testing E1A, E-B, E1J, FWA, FWB, and E1R SF Units

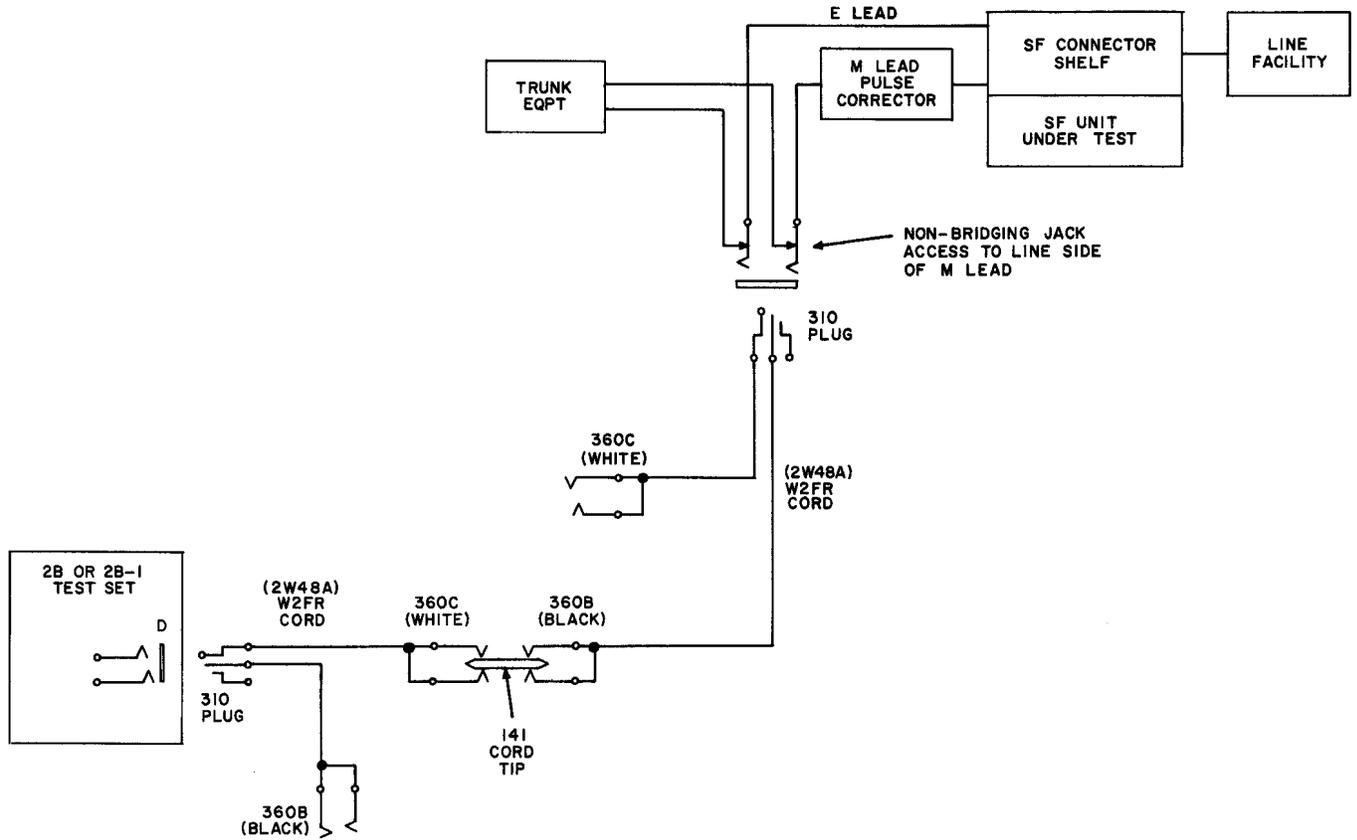


Fig. 5—Pulsing Tests—Originating End Connections for Testing E1A, E-B and FWA SF Units with M Lead Pulse Corrector

SECTION 179-302-501

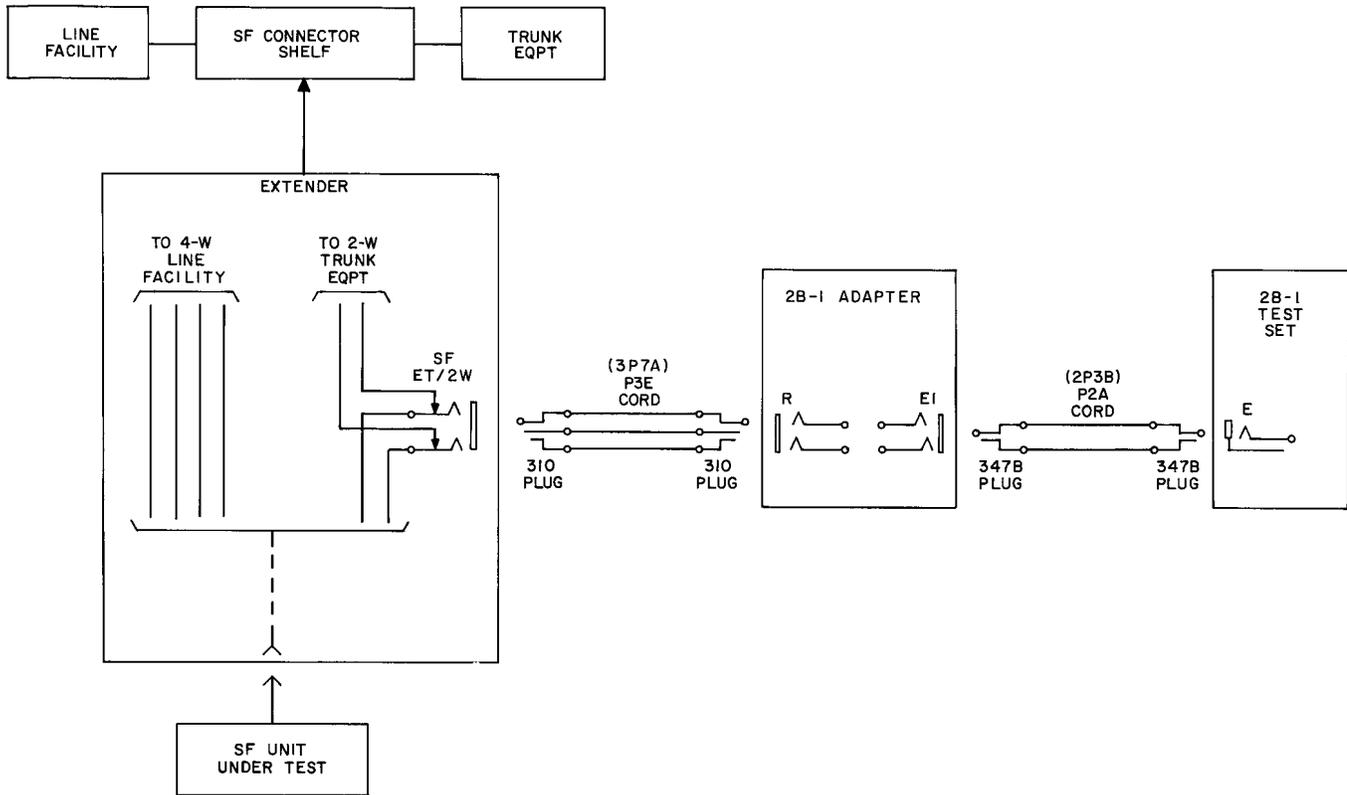


Fig. 6—Pulsing Tests—Terminating End Connections for Testing E2D, E4D, E5D, and E2L SF Units Using an Extender

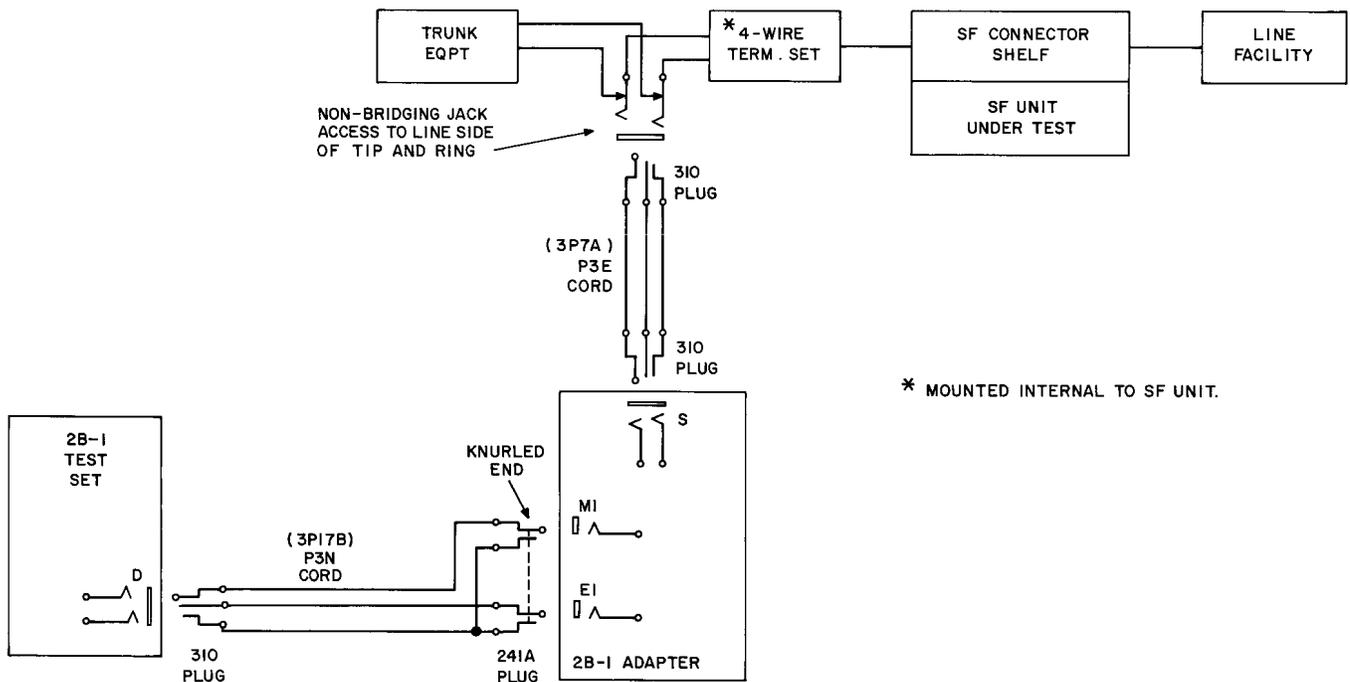


Fig. 7—Pulsing Tests—Terminating End Connections for Testing E2D, E4D, E5D and E2L SF Units

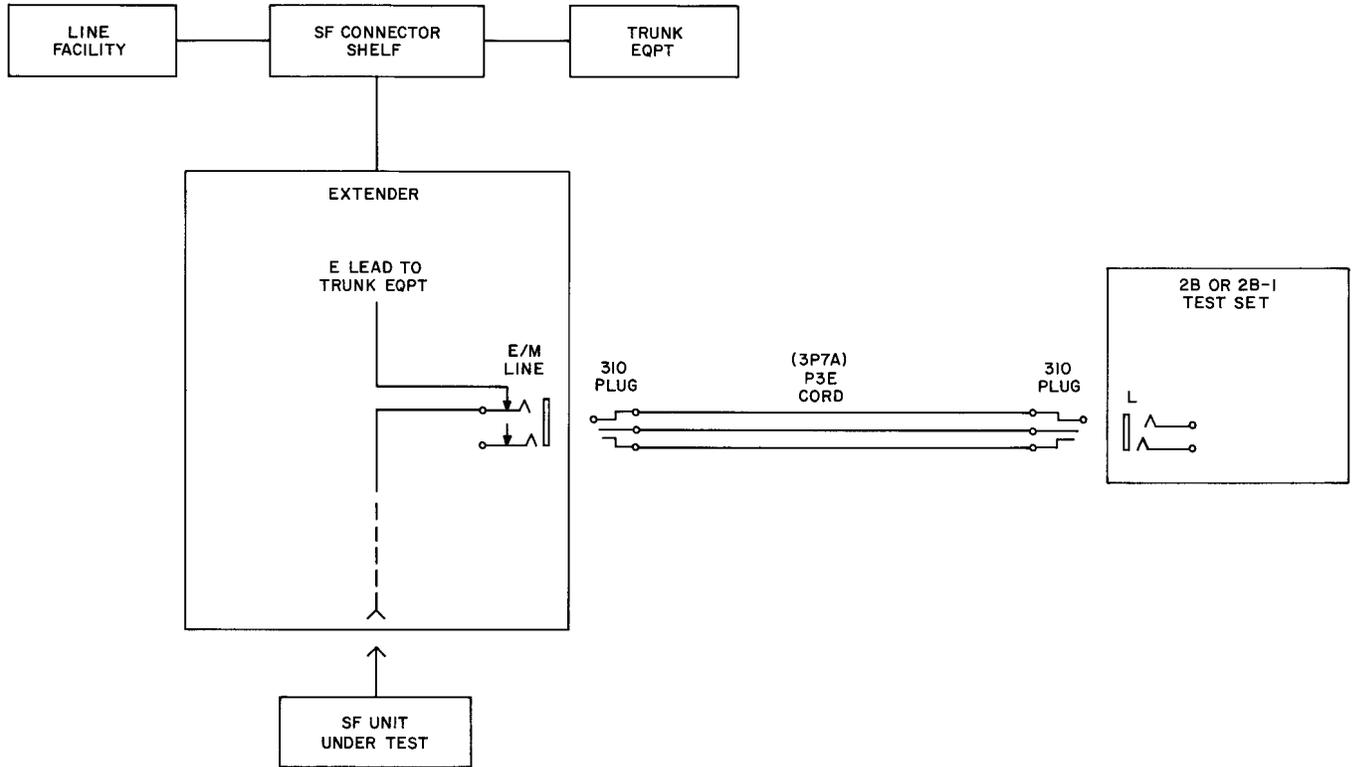


Fig. 8—Pulsing Tests—Terminating End Connections for Testing E1A, E-B, E1J, FWA, FWB, and E1P SF Units Using an Extender

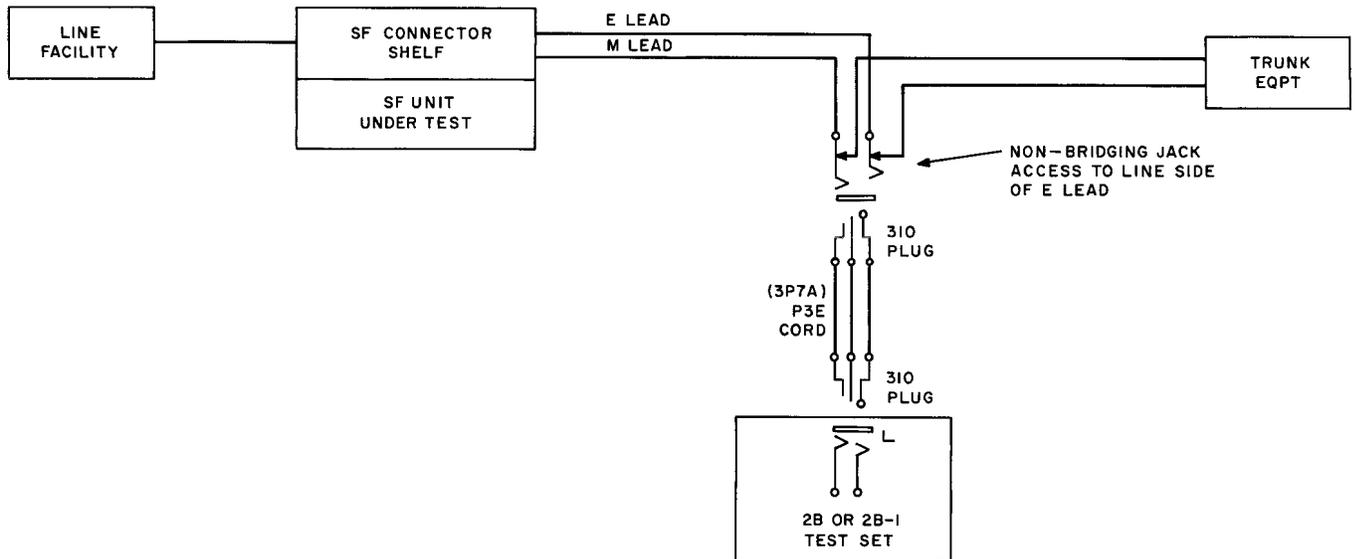
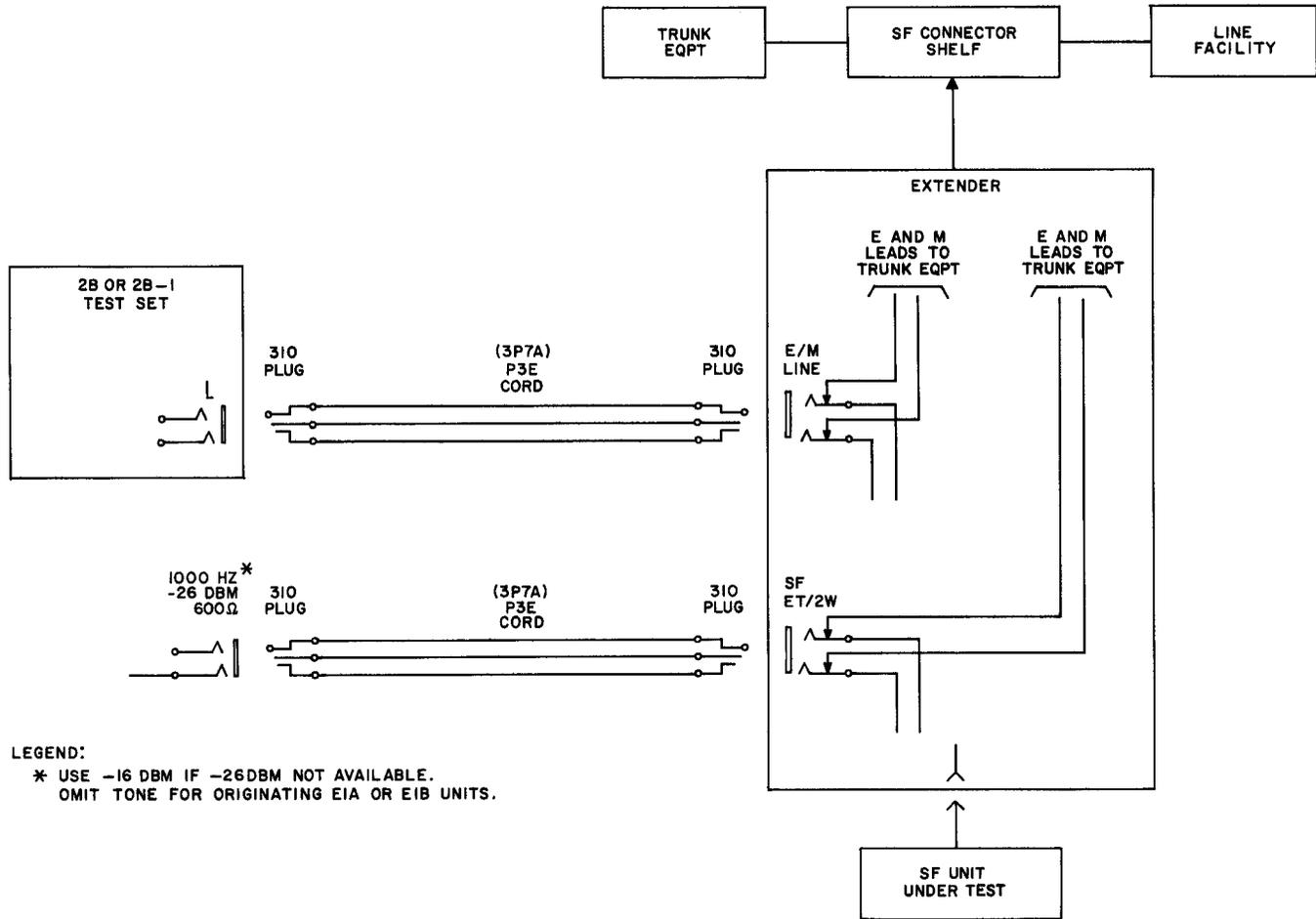


Fig. 9—Pulsing Tests—Terminating End Connections for Testing E1A, E-B, E1J, FWA, FWB, and E1P SF Units

SECTION 179-302-501



LEGEND:

* USE -16 DBM IF -26DBM NOT AVAILABLE.
 OMIT TONE FOR ORIGINATING EIA OR EIB UNITS.

Fig. 10—Supervision Test—Originating End Connections for Testing E & M Signaling Systems Using an Extender

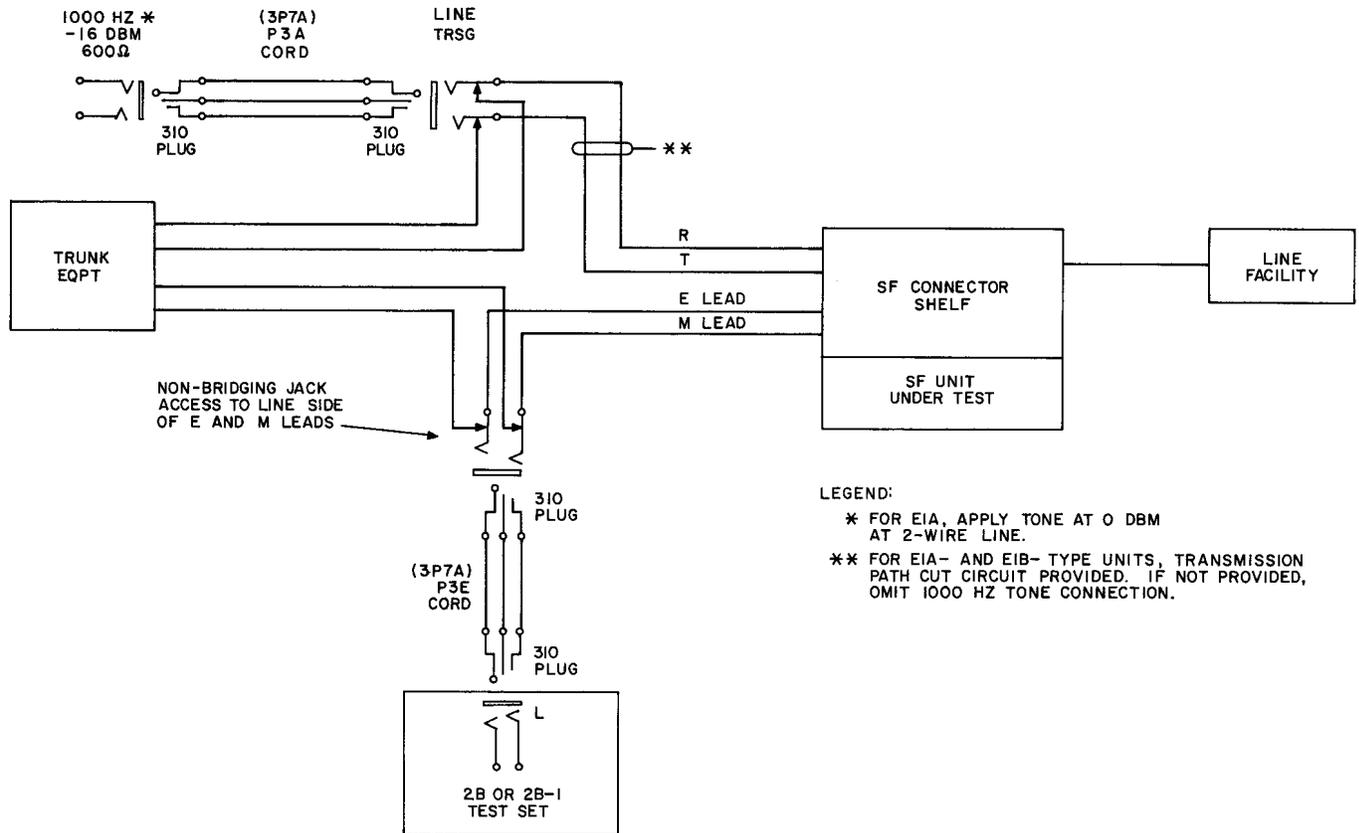


Fig. 11—Supervision Test—Originating End Connections for Testing E & M Signaling Systems at Circuit Patch Bay or Testboard

SECTION 179-302-501

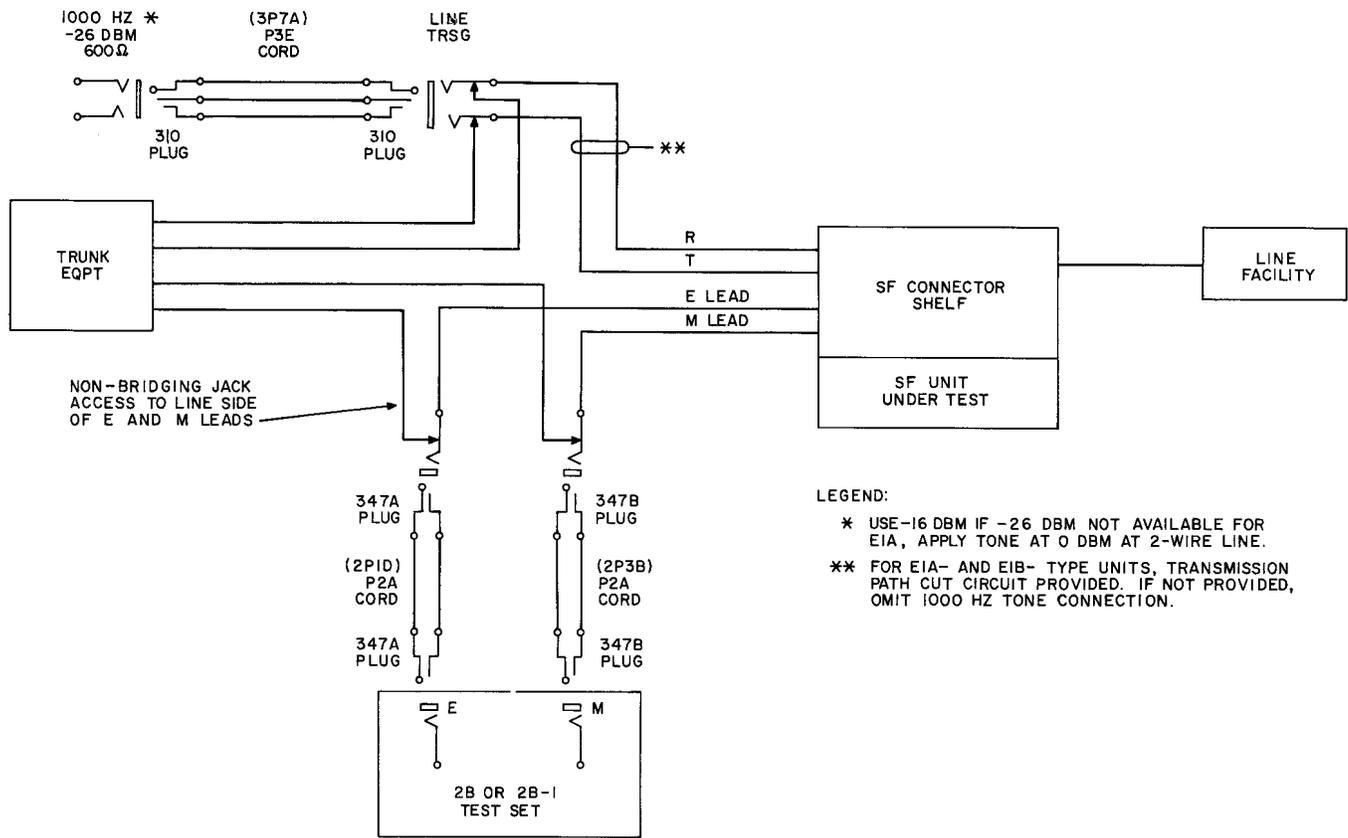


Fig. 12—Supervision Test—Originating End Connections for Testing E & M Signaling Systems at Signaling Bay

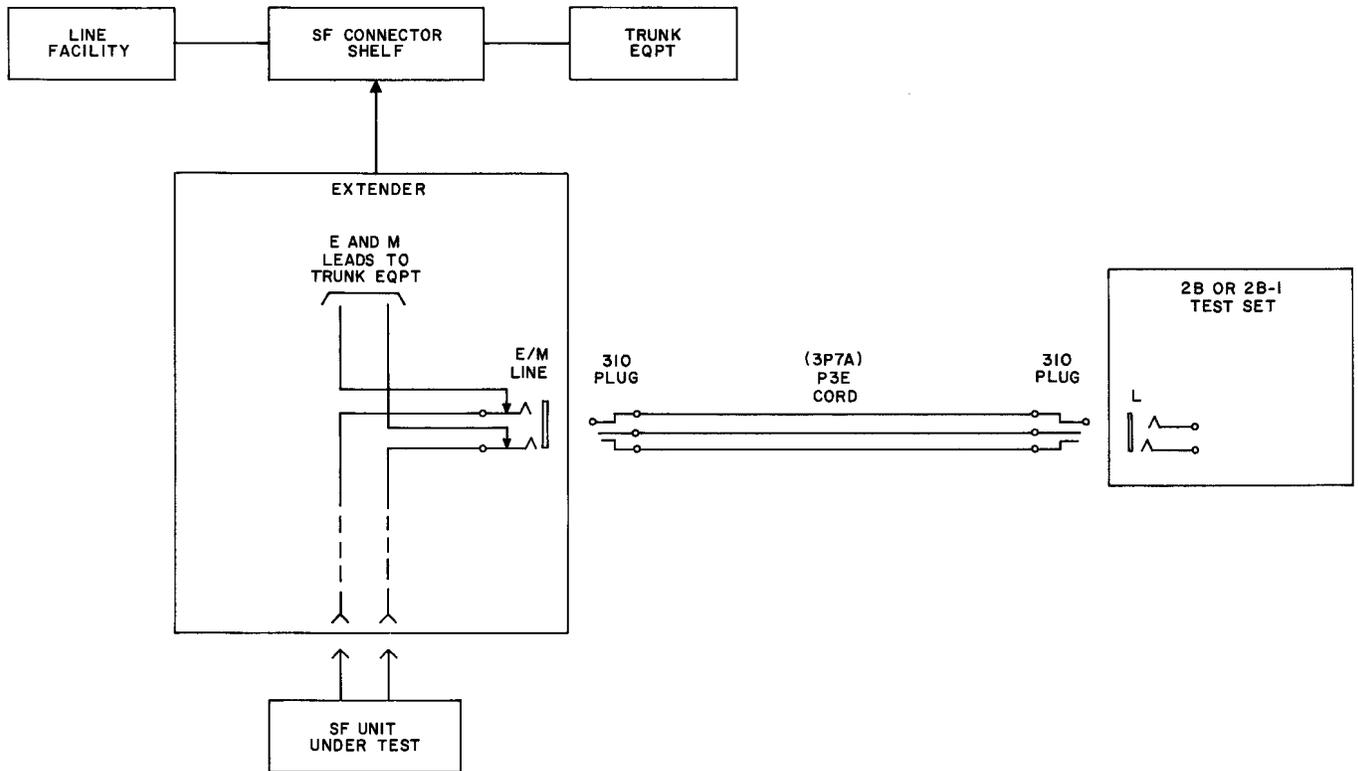


Fig. 13—Supervision Test—Terminating Connections for Testing E & M Signaling Systems Using an Extender

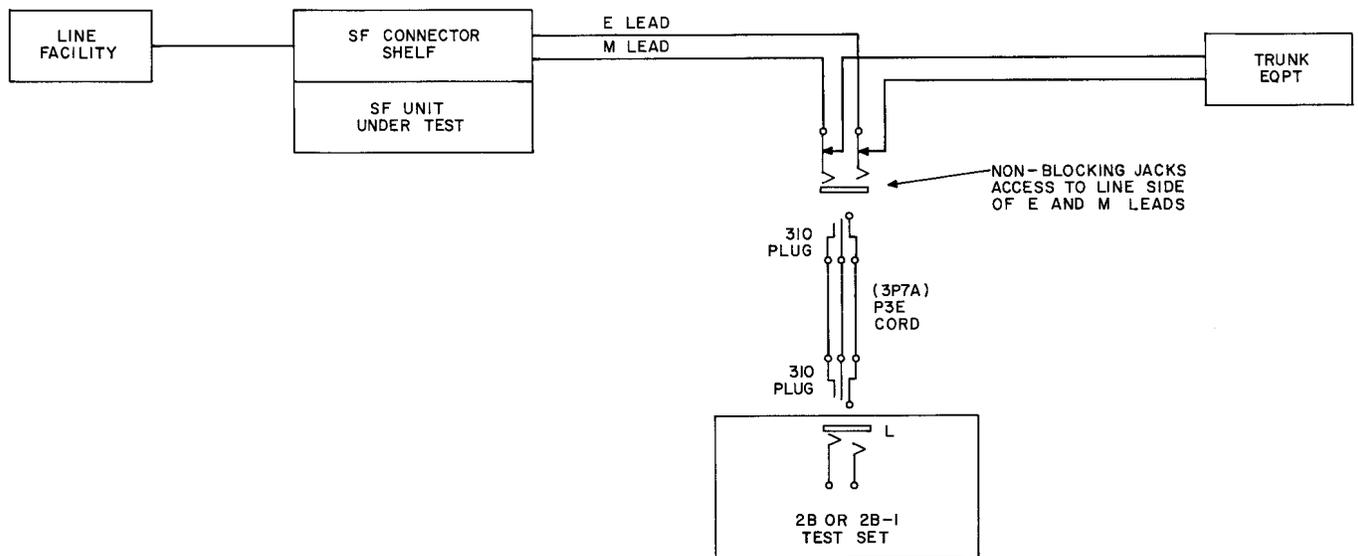


Fig. 14—Supervision Test—Terminating Connections for Testing E & M Signaling Systems at Circuit Patch Bay or Testboard

SECTION 179-302-501

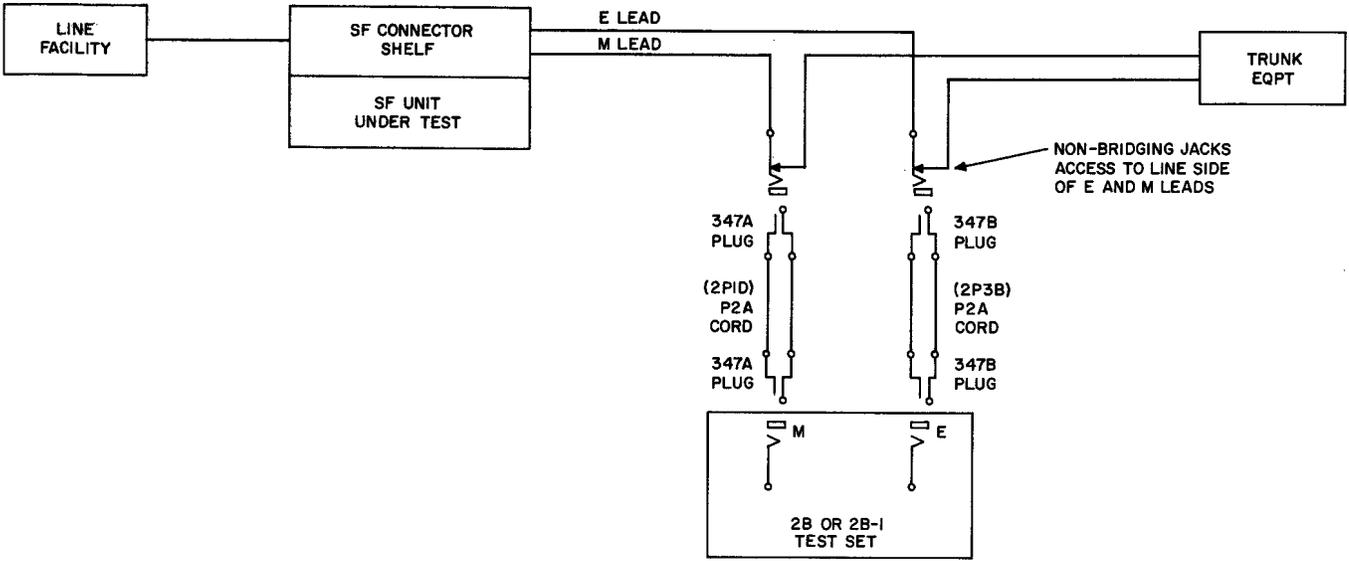


Fig. 15—Supervision Test—Terminating Connections for Testing E & M Signaling Systems at Signaling Bay