SIGNALING TEST EXTENDER
FOR USE WITH TYPE F SIGNALING UNITS
DESCRIPTION

1. GENERAL

1.01 This section describes the ▶FTA (SD-1C241-01) and FTB (SD-1C241-02)◀ test extenders which are provided to facilitate testing of Type F signaling units.

1.02 This section is reissued to include wiring options which allow certain test access without removing the FU( ) or FW( ) unit from the bay.

1.03 The FTA (SD-1C241-01) test extender accommodates only FWA, FWB, and ▶FWC◀ signaling units while the FTB (SD-1C241-02) test extender accommodates FWA, FWB, ▶FWC,◀ FUA, or an ▶FUD◀, plus any associated auxiliary signaling unit.

1.04 The test extender is used at the signaling unit bay. Its functions are to extend the signaling units to a workable position and to provide maintenance access for testing.

1.05 The test extender, as shown in Fig. 1 and Fig. 3, consists of a test stand with a number of jacks and keys, and a cable extender that connects from the test stand to the bay. The test stand used with the FTA test extender has a mounting that accommodates the FWA, FWB, or ▶FWC◀ signaling unit and an amplifier and pad circuit for changing transmission levels. The test stand for the FTB test extender has a mounting that accommodates either the FWA, FWB, ▶FWC,◀ FUA, or ▶FUD◀ unit plus the auxiliary unit. The FTB test extender can be used for accessing an FUA unit or a Type F auxiliary unit either individually or simultaneously. A block diagram of the test extender and the interconnections that are required for performing maintenance tests are shown in Fig. 2 and 4.

1.06 The 21A transmission measuring set (TMS), or its equivalent, is used with the test extender to make transmission tests, and the 2B, 2B1, or 4A signaling test set is utilized to make signaling tests.

2. APPLICATION

2.01 In preparation for performing transmission and signaling tests, the trunk associated with the signaling unit should be made busy. The signaling unit can then be removed from the bay and mounted in the test extender. When using the FTA test extender, connect the cable extender between the bay mounting J1 jack and the test extender P2 jack. When using the FTB test extender, the cable extender should be connected between the bay mounting J1 jack and the test extender P3 jack for testing FWA, FWB, ▶FWC,◀ FUA, or ▶FUD◀ unit. When testing auxiliary units, a cable extender is connected between the bay mounting JB jack and the extender P6 jack. The signaling unit under test will now have all of its leads extended to a workable position and access to all ports for testing is now available. Figure 5 shows the signaling unit in the test extender stand and the attached cable extender. Figure 6 shows the FTB extender with the cable extenders attached.

2.02 When using the FTA extender the input and output transmission leads of the FWA, FWB, or ▶FWC◀ signaling unit can be tested by means of a simple key operation rather than placing and replacing cord assemblies. However, when testing any of the signaling units with the FTB extender, only jacks are available for this purpose. Tables A, B, C, and D list the jacks and keys incorporated in the test extender, and give a brief description of their circuit function. Simplified schematic drawings of the test stand portion are shown in Fig. 7 and 8.

2.03 ▶When monitoring a signal at the AUX/EQPT TRMT OUT and AUX/EQPT RCV IN jacks, it is no longer necessary to plug the FU( ) or FW( ) unit into the FTB test extender with the auxiliary unit. The available wiring options allow the FU( ) or FW( ) unit to remain plugged into the bay when performing tests at these jacks.◀

3. TEST PROCEDURES EXAMPLE

3.01 The circuit associated with the signaling unit(s) to be tested must be turned down. Assume for example that the SF unit under test is an E&M lead signaling unit combination such as an FUA plus an FAA. The FTB extender must be used. Make the proper cord connections for preparing the test extender for testing. (See Fig. 4.) Connect the LINE E/M and DROP E/M jacks of the test extender to the TST2 L, D jacks of the 2B test set or to the LINE and DROP jacks of the 4A test set.

3.02 To test for SF tone out of the signaling unit, connect a TMS such as 21A test set to the SF TRMT OUT jack of the extender. Operate the TWD L key or TWD LINE key of the signaling test set from ON HOOK to OFF HOOK and back to ON HOOK. Low level tone (approximately -36 dBm) should be observed on the TMS, then be removed and finally come back on again at high level (approximately -24 dBm) followed by low level tone as the TWD L or TWD LINE key is switched back and forth.

3.03 To test for E lead response of the signaling unit the TMS should be adjusted for 2600 Hz at a level of -1 dBm. Connect this tone into SF RCV IN jack. The L lamp on the signaling test set should light. Remove the 2600-Hz tone and the L lamp is extinguished. All keys should be normal on the test set.

3.04 Conditions on the drop side of the E&M leads can also be determined by the patching arrangement given previously.

3.05 Transmission measurements can be made through the unit, from the distant office or from the local office. To check transmission through the unit adjust the TMS for 1000 Hz, 0 dBm and connect to AUX TRMT IN/2W jack or to SF RCV IN jack. Measure at SF TRMT OUT jack or AUX TRMT IN/2W jack, respectively. If testing 4-wire units such as FB_, FP_ or FR_ measure at AUX RCV OUT/NET jack. The loss is determined by the 4-wire terminating set (approximately 4 dB) plus the setting of the TRMT and RCV pads.

3.06 The transmission facility can be checked by sending 1000 Hz at a level of -16 dBm from the FAC TRMT IN jack and measuring at the FAC RCV OUT jack (+7 dBm). This is accomplished by working with the distant office.

3.07 Transmission tests between the patch bay jack circuit and the signaling unit can be made by measuring at EQPT TRMT OUT/2W [and EQPT RCV IN/NET (in 4-wire application)] jack.

3.08 The trunk processing features built into the auxiliary signaling unit can be checked with the use of the CGA keys on the FTB test extender. Operating the BSY key to the RLS-BSY position will apply ground to the ALM, ALO, and W( ) leads of the auxiliary signaling unit, simulating the response of the FYG CGA control circuit to a carrier failure. The DEL BSY key can then be used to release the switch train in a SXS office by momentarily operating the key to the RLS position; or it can be used to generate the delayed make-busy signal (battery on the ALB lead) by operating it to the BSY position. The response of the auxiliary signaling unit to these signals will vary with the signaling unit, the type of switching office, and the CGA options selected by operating screw switches on the face of the auxiliary signaling unit. A brief description of each of the major categories of signaling units for a typical application follows (3.09 through 3.11), but the individual BSP for the signaling unit should be consulted for more detailed information.

3.09 The following discussion assumes that the trunk processing features of an FAA auxiliary signaling unit, arranged for use on a 2-way trunk in an office equipped with a circuit patch bay, are to be checked (ALM or ALO, E, and ALB screws turned down). First, insert a dummy plug into the SF RCV IN jack or provide an off-hook incoming signal to assure no tone enters the FUA or FUD. The R relay of the FAA will be operated, grounding the E lead. Operating the BSY key to the RLS-BSY position will cause the R relay to release, opening the E lead and releasing the circuit. Operating the DEL-BSY key to the BSY position will generate a delayed make-busy signal which will operate the CGA relay in the FAA and reapply ground to the E lead. This makes the circuit busy to all outgoing

traffic. Restoring all keys to normal will release the circuit.

3.10 The following discussion assumes that the trunk processing features of an FCA auxiliary signaling unit, arranged for use in a SXS office where a sleeve lead is generated within the FCA, are to be checked. (This requires that the A, C, and H screws be tightened down.) First, insert a dummy plug into the SF RCV IN jack or provide an off-hook incoming signal to assure no tone enters the FUA or FUD. The R relay of the FCA will be operated, applying off-hook polarity to the loop. Operating the BSY key to the RLS-BSY position will cause the R relay to release, sending an on-hook polarity into the switching machine. This will also apply ground to the sleeve lead through the W( ) lead to keep the trunk in the busy state. Momentarily operating the DEL-BSY key to the RLS position will open this ground and allow the SXS switch train to release. Restoring all keys to normal will release the circuit.

3.11 Other classes of auxiliary signaling units (FD_, FL_, FPA, FS_, or FRA) are checked in a similar manner. With the dummy plug inserted in the SF RCV IN jack as before, operate the BSY key to the RLS-BSY position. This will release the R relay in an FD_, FL_, or FPA and thus open the loop and/or E lead. In the case of an FS_ or FRA, the CGA relay is operated which opens the loop (A&B leads) and grounds the E lead. Make-busy features are not provided in these units.

TABLE A

JACK FUNCTIONS FOR FTA TEST EXTENDER

JACK	FUNCTION
SF-LR	The SF Line Receive jack provides access to the input of the SF unit receiver for inserting 2600 Hz for signaling or tones for transmission tests.
SF-LT	The SF Line Transmit jack provides access to the output of the SF unit transmitter for measuring 2600 Hz signals or voice frequency transmission levels.
SF-ER	The SF Equipment Receive jack provides access to the output of the SF unit receiver for measuring voice frequency transmission levels.
SF-ET	The SF Equipment Transmit jack provides access to the input of the SF unit transmitter for inserting tones for transmission tests.
L-OUT	The Line Out jack provides access to the output of the line facility (receive direction) for measuring tone from the distant terminal.
L-IN	The Line In jack provides access to the input of the line facility (transmit direction) for sending tone to the distant terminal.
RCV-IN	The Receive In jack provides access to input of the drop facility going through the pads in the SF receive unit. It can be used in conjunction with PAD OUT jack for checking external equalizer or echo suppressor.
TRMT-OUT	The Transmit Out jack provides access to the output of the drop facility going through the pads in the SF transmitter. It can be used in conjunction with PAD IN jack for checking external equalizer or echo suppressor.
EQPT-IN	The Equipment In jack provides access to the input of the drop facility without going through the pads in the SF receive unit.
EQPT-OUT	The Equipment Out jack provides access to the output of the drop facility without going through the pads in the SF transmitting unit.
PAD-IN	The Pad In jack provides access to the SF transmitting unit through its associated pads.
PAD-OUT	The Pad Out jack provides access to the output of the SF receiver unit through its associated pads.
E/M-LINE	The E and M Line jack provides access to the E & M leads of the SF unit.
E/M-DROP	The E and M Drop jack provides access to the E & M leads of the drop facility.
EQPT-LP-E	The Equipment Loop E jack provides access to the E & EG leads of the drop facility.
2600 Hz	The 2600-Hz jack provides access to the 2600-Hz tone that is supplied to the SF unit. This tone level is approximately -16dBm.
AMP-IN**	The Amplifier In Jack provides access to input of 227D Amplifier in test extender.
AMP-OUT**	The Amplifier Out jack provides access to the output of the 227D amplifier in the test extender.
*TST-IN	The Test In jack provides access to the SF unit transmitting and receiving input and output leads.

TABLE A (Cont.)

JACK FUNCTIONS FOR FTA TEST EXTENDER

JACK	FUNCTION
*TST-OUT	The Test Out jack provides access to the SF unit transmitting and receiving units input and output leads (same circuit function as TST-IN jack). * The TST-IN and TST-OUT jacks of the test extender provide a means for testing the input and output leads of the SF transmitting and receiving units by key operations. Use of these jacks and the associated keys SF-ER, SF-LR, SF-LT, SF-ET enables connections to be made into the SF units transmission paths without removing cord assemblies. ** The amplifier can be useful in providing loop around testing of SF units or facilities by providing 23dB of gain or as required. (See AMPL ATT-12DB and AMPL ATT-5DB key functions — Table B)

TABLE B

KEY FUNCTIONS FOR FTA TEST EXTENDER

KEY	FUNCTION
SF-ER	The SF Equipment Receive Key switches the TST-IN and TST-OUT jacks to the output of the SF unit receiver.
SF-LR	The SF Line Receive Key switches the TST-IN and TST-OUT jacks to the input of the SF unit receiver.
SF-LT	The SF Line Transmit Key switches the TST-IN and TST-OUT jacks to the output of the SF unit transmitter.
SF-ET	The SF Equipment Transmit Key switches the TST-IN and TST-OUT jacks to the input of the SF unit transmitter.
*AMPL ATT-12DB	The Amplifier Attenuator-12dB Key inserts a 12dB loss in the output of the 227D test amplifier.
*AMPL ATT-5DB	The Amplifier Attenuator 5dB Key inserts a 5dB loss in the output of the 227D test amplifier. * With both AMPL ATT-12DB and AMPL ATT-5DB keys operated, a 17dB pad is inserted in the test extender amplifier circuit.

TABLE C

JACK FUNCTIONS FOR FTB TEST EXTENDER

JACK	FUNCTION
JACKS FOR EXTENDING FWA, FWB, FUA OR FUD UNITS	
SF RCV IN	The SF Receive Input jack provides access to the input of the SF unit receiver for inserting 2600 Hz for signaling or tones for transmission tests.
SF TRMT OUT	The SF Transmit Output jack provides access to the output of the SF unit transmitter for measuring 2600 Hz signals or voice frequency transmission levels.
SF RCV OUT	The SF Receive Output jack provides access to the output of the SF unit receiver for measuring voice frequency transmission levels.
SF TRMT IN	The SF Transmit Input jack provides access to the input of the SF unit transmitter for inserting tones for transmission tests.
FAC RCV OUT	The Facility Receiver provides access to the output of the line facility (receive direction) for measuring tone from the distant terminal.
FAC TRMT IN	The Facility Transmit Input jack provides access to the input of the line facility (transmit direction) for sending tone to the distant terminal.
RCV PAD IN	The Receive Pad Input jack provides access to input of the drop facility going through the pads in the SF receive unit. It can be used in conjunction with the RCV PAD OUT jack for checking external equalizer or echo suppressor.
TRMT PAD OUT	The Transmit Pad Output jack provides access to the output of the drop facility going through the pads in the SF transmitter. It can be used in conjunction with the TRMT PAD IN jack for checking external equalizer or echo suppressor.
AUX EQPT RCV IN	The Auxiliary or Equipment Receive Input jack provides access to the input of the drop facility without going through the pads in the SF receive unit for the FWA, FWB, or FWC or to the auxiliary unit for the FUA or FUD plus F-type auxiliary unit.
AUX EQPT TRMT OUT	The Auxiliary or Equipment Transmit Output jack provides access to the output of the drop facility without going through the pads in the SF transmitting unit for the FWA, FWB, or FWC or to the auxiliary unit for the FUA or FUD plus F-type auxiliary unit.
TRMT PAD IN	The Transmit Pad Input jack provides access to the SF transmitting unit through its associated pads.
RCV PAD OUT	The Receive Pad Output jack provides access to the output of the SF receiver unit through its associated pads.
2600 Hz	The 2600-Hz jack provides access to the 2600-Hz tone that is supplied to the SF unit. This tone level is approximately -16dBm.

TABLE C (Cont)

JACK	FUNCTION
JACKS COMMON TO FWA, FWB, FUA, FUD, AND TYPE F AUXILIARY UNITS	
LINE E/M	The E and M Line jack provides access to the E & M leads of the SF unit.
DROP E/M	The E and M Drop jack provides access to the E & M leads of the drop facility.
EQPT LP E	The Equipment Loop E jack provides access to the E & EG leads of the drop facility.
JACKS USED FOR TYPE F AUXILIARY UNIT EXTENSIONS	
AUX A/B	The Auxiliary A and B leads jack provides access to the A and B leads of the auxiliary units such as FA-, FP-, and FR- units.
AUX RCV OUT/NET	The Auxiliary Receive Out or Network jack provides access to the output of the auxiliary receiver in 4-wire units or terminating set network in 2-wire units.
AUX S-S2	The Auxiliary Sleeve jack provides access to the sleeve lead in the auxiliary unit with the S, MS, or M1 on tip as used in SXS, X-BAR Tandem, or No. 1 X-Bar. In same SXS applications S2 which appears on the ring may also be used, B1 and B2 leads appear on the tip and ring as required in No. 5 X-Bar applications.
AUX TRMT IN/2W	The Auxiliary Transmit Input or 2-Wire jack provides access to the transmit portion of the auxiliary unit in 4-wire units or the terminating set 2-wire in 2-wire units.
EQPT RCV IN/NET	The Equipment Receive Input or Network jack provides access to the receive portion of the switching equipment for 4-wire operation or the precision network for 2-wire operation.
EQPT A/B	The Equipment A and B leads jack provides access to the A and B leads of the equipment which is connected to such units as FA-, FP-, and FR-.
EQPT TRMT OUT/2W	The Equipment Transmit Output or 2-wire jack provides access to the output of the equipment for 4-wire operation or access to the tip and ring in 2-wire operation.
EQPT S-S2	The Equipment Sleeve jack provides access to the sleeve lead toward the equipment. (See AUX S-S2)
20 Hz	The 20-Hz jack provides access to the 20-Hz source for measuring the superimposed ringing power used by special service units (FR- or FS-)

TABLE D

KEY FUNCTIONS FOR FTB TEST EXTENDER

KEY	FUNCTION
SLV-BSY	The Sleeve Busy key inserts a sleeve make-busy condition for use in SXS outgoing applications using FC- units in place of outgoing trunk circuits. If outgoing trunk circuit is used, the SLV-BSY Key is not applicable.
TERM [600 / 900]	The Termination key allows selection of either a 600 or 900 ohm termination at the AUX TRMT IN/2W and EQPT TRMT OUT/2W.
DEL BSY [BSY (L) / RLS (NL)]	The DEL BSY key allows testing of the delay-busy feature of the trunk processing features in the auxiliary unit.
BSY [BSY RSL]	The Busy-Release Key allows testing of the busy functions of the trunk processing feature in the auxiliary unit.

Note: Items in [ ] refer to key positions

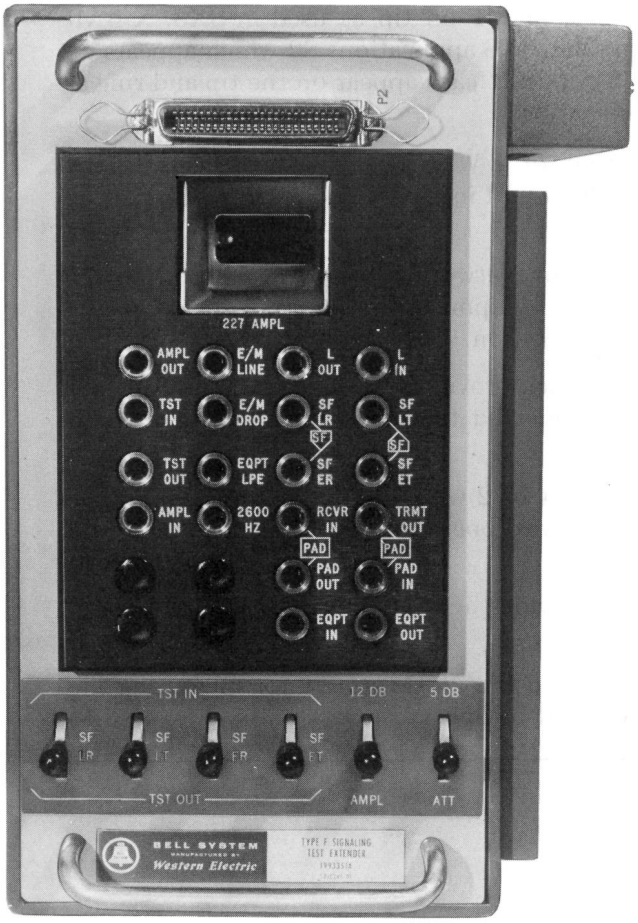

Fig. 1—FTA Test Extender (SD-1C241-01)—Jacks and Keys

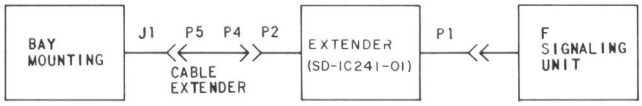

Fig. 2—FTA Test Extender in Use (SD-1C241-01)

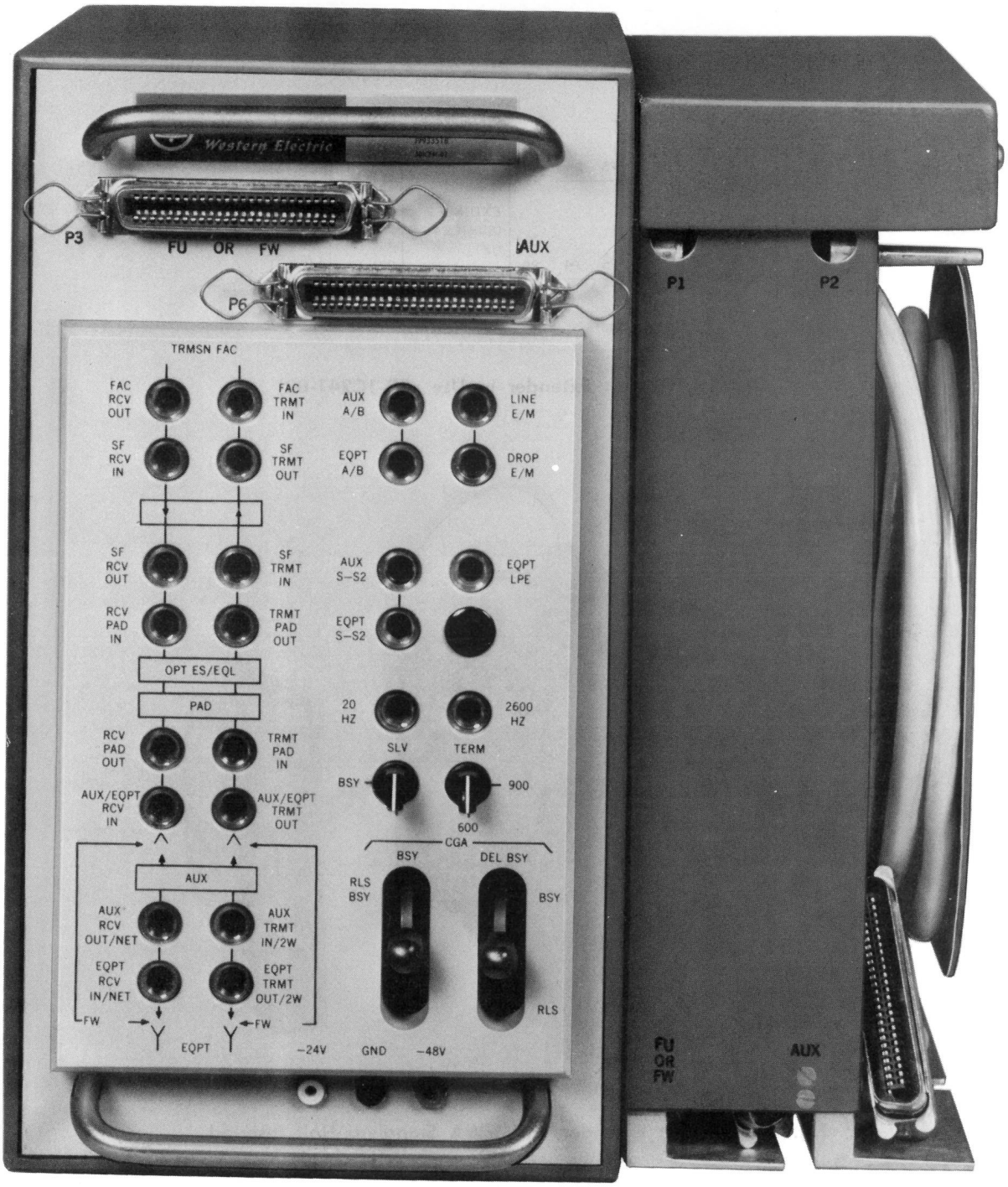

Fig. 3—FTB Test Extender (SD-1C241-02)—Jacks and Keys

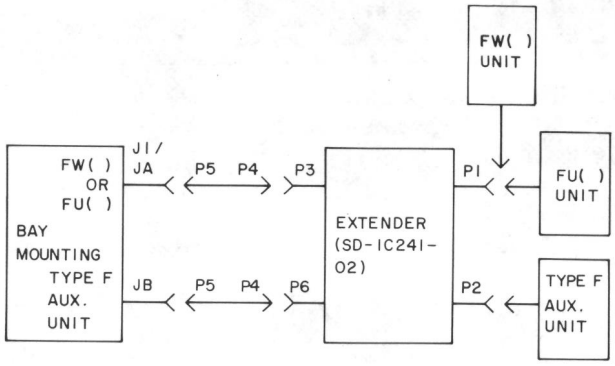

Fig. 4—FTB Test Extender in Use (SD-1C241-02)

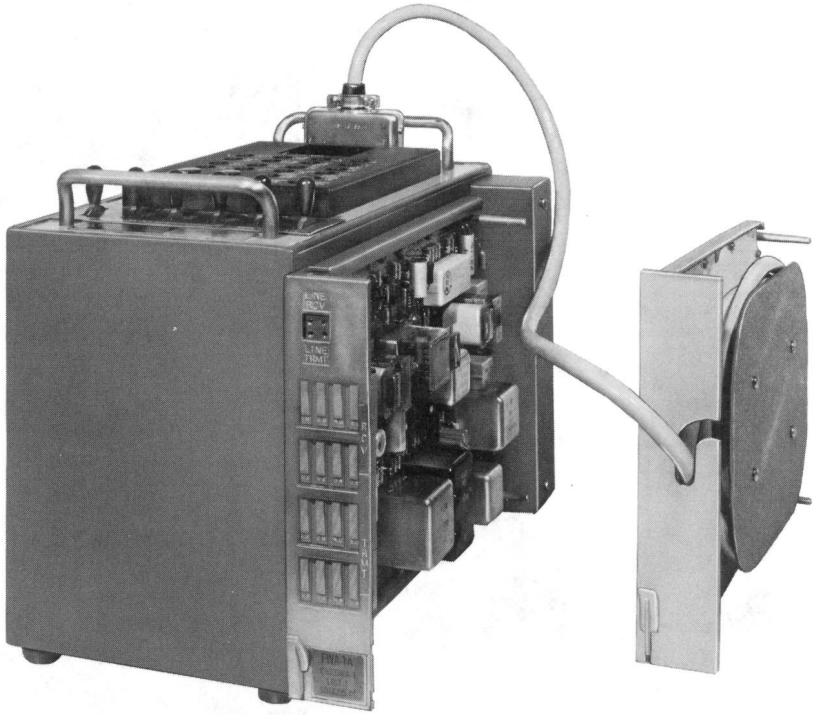

Fig. 5—FTA Test Extender with FWA Signaling Unit Inserted

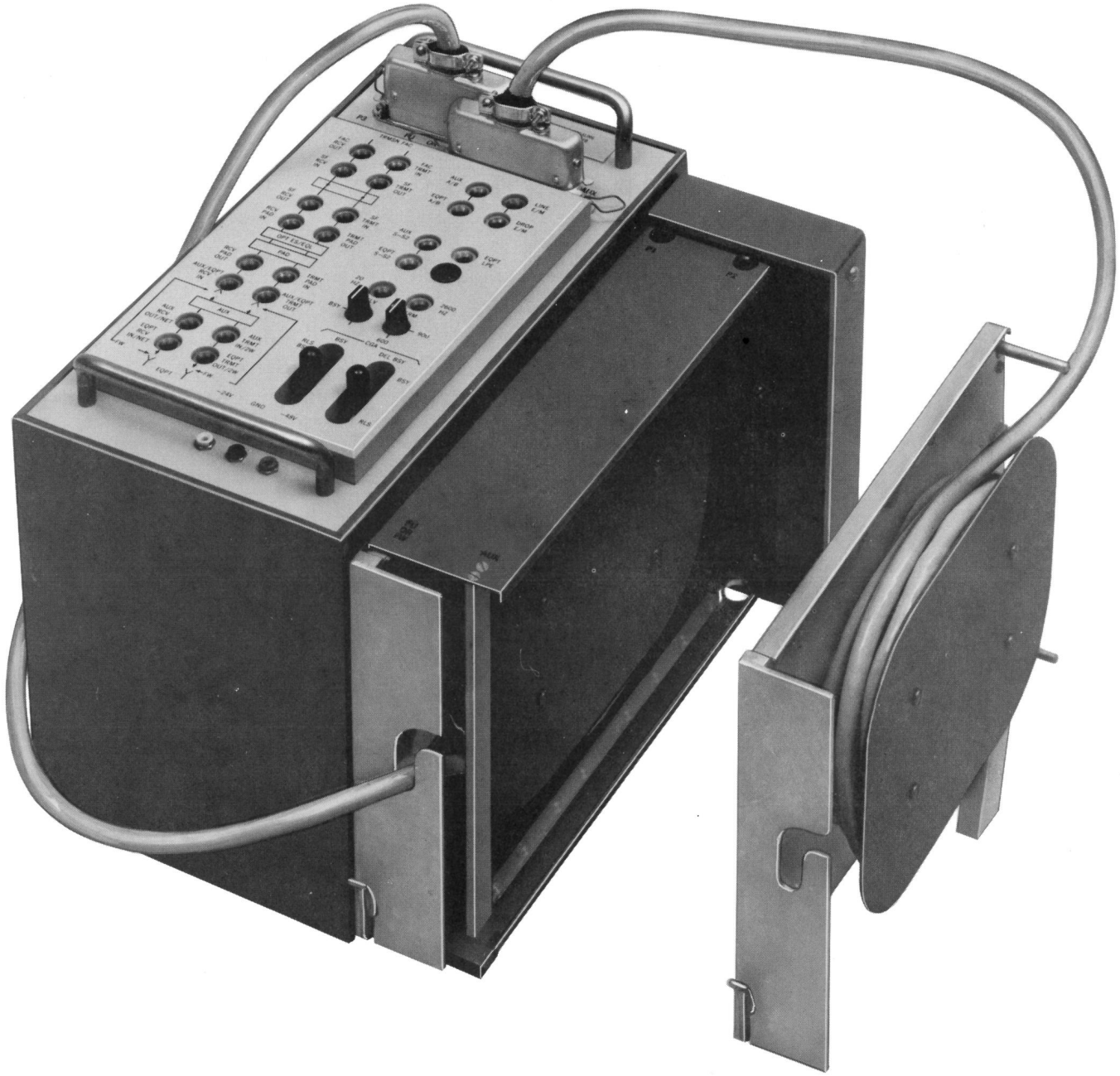

Fig. 6—FTB Test Extender with Cable Extenders Attached

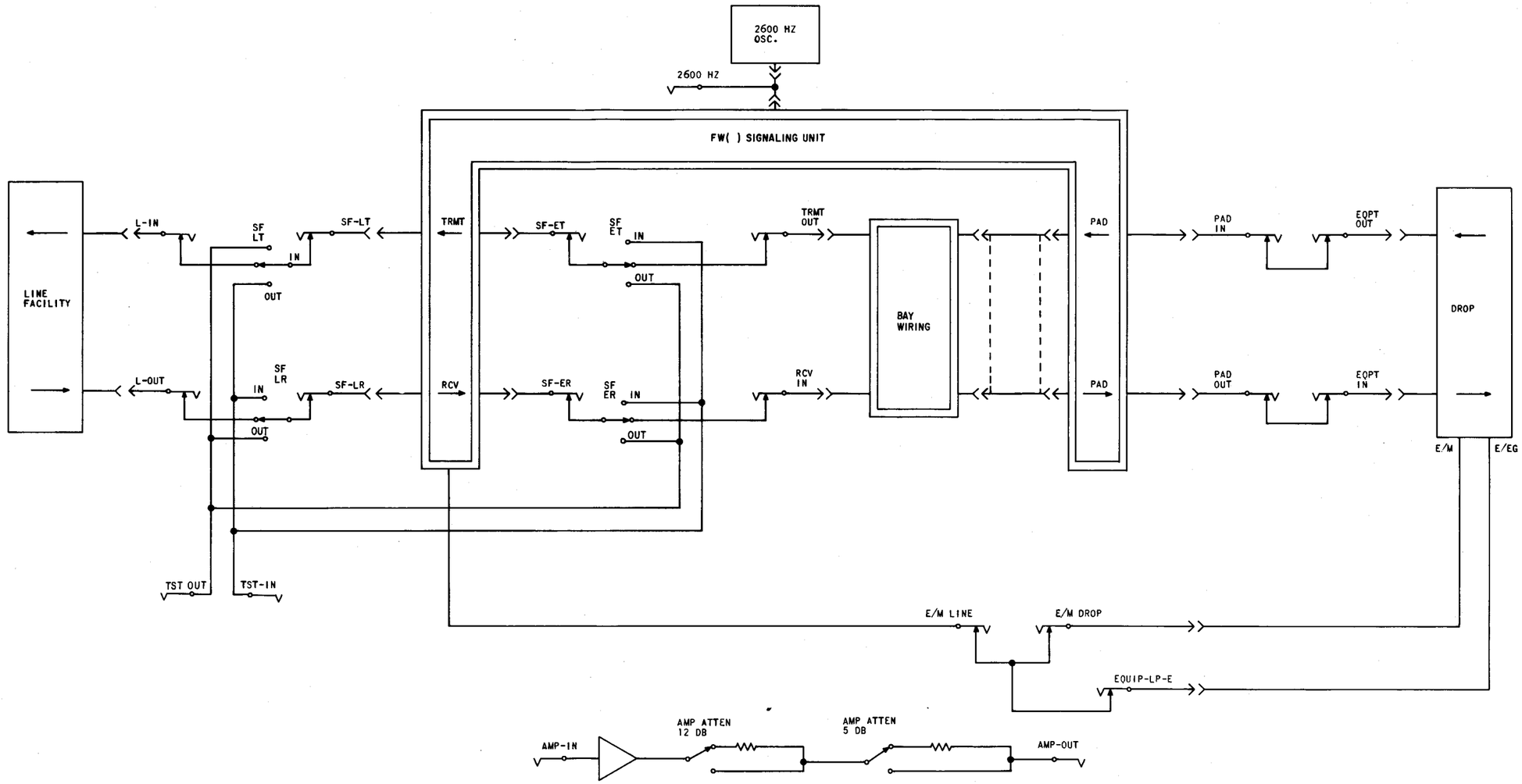

Fig. 8—Simplified Schematic of FTB Extender

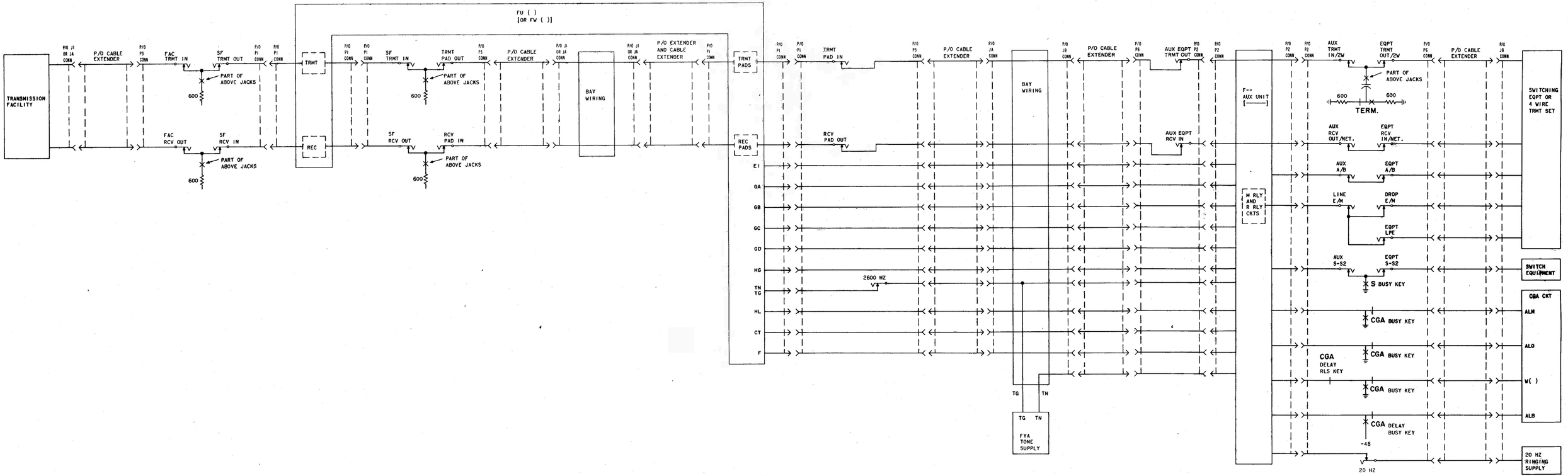

Fig. 7—Simplified Schematic of Test Extender (SD-1C241-01)