

TERMINATING SENDER TEST FRAME EQUIPMENT DESIGN REQUIREMENTS NO. 1 CROSSBAR SYSTEM

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein, covers the equipment design requirements for the framework, equipment, and circuits to be used in the engineering, manufacture, and installation of the terminating sender test frame and auxiliary terminating sender test connector unit in No. 1 crossbar offices.

1.02 This section is reissued to incorporate previous appendix changes.

Capacity

1.03 The terminating sender test frame is arranged to connect to 20 "B" positions and ten link subgroups of terminating senders. A link subgroup consists of a maximum of ten senders which may be all full selector, all B or central B (terminating part), or combinations containing full selector B senders, central B, multifrequency pulsing, or dial pulse terminating senders.

1.04 The capacity of the frame may be increased to 30 subgroups of senders by means of auxiliary terminating sender test connector units. One such unit is required for each additional ten or less subgroups of senders.

Description

1.05 The terminating sender test frame is a single-sided steel structure 11 feet 6 inches high and 2 feet 8-1/8 inches long, accommodating the equipment necessary to test 20 "B" positions and ten subgroups of terminating senders. Provision has been made so that, when required, the test frame may be associated with 10 or 20 additional subgroups of senders by means of one or two auxiliary terminating sender test connector units mounted on the sender test connector frame.

1.06 Access to the "B" positions is obtained by means of a 206-type selector, and to the senders by means of a connector circuit which consists of a 200-point crossbar switch and multicontact and U relays. One level on the crossbar switch is required for each subgroup of ten or less terminating senders. When the number of subgroups of senders to be associated with the test frame exceeds ten, an auxiliary terminating sender test connector unit is required for each additional ten or less subgroups. With the auxiliary terminating

sender test connector unit, the capacity of the test frame is increased to a maximum of 30 subgroups of senders.

1.07 After checking a sender, the test circuit is automatically connected to the next sender until all the senders are tested or a trouble is encountered which will cause the test circuit to stop and operate an alarm. When desired, particular senders may be selected for test. A sender may be tested repeatedly in an endeavor to locate a trouble or each sender may be tested twice automatically.

1.08 The terminating sender test circuit consists of the following components:

- (a) Connector Circuit: Controls the connection of the test circuit to the senders.
- (b) Group Test Circuit: Tests the group relays common to a subgroup of terminating senders.
- (c) Revertive Pulsing Circuit: Provides means of making tests on full selector senders.
- (d) DC Keypulsing Test Circuit: Provides means of making tests on call distributing B switchboard senders and position circuits.
- (e) Multifrequency Pulsing Test Circuit: Provides means of making tests on multifrequency pulsing terminating sender circuits.
- (f) MF-DC Keypulsing Test Circuit: Provides means of making tests on both multifrequency pulsing terminating senders and call distributing B switchboard senders and position circuits.
- (g) Dial Pulse Terminating Test Circuit: Provides means of making tests on dial pulse terminating senders.
- (h) Central B Switchboard Sender (Terminating Part) Test Circuit: Provides means of making tests on the terminating part of central B switchboard senders.
- (i) Register Check Circuit: Records and checks the information which the sender under test transmits to the terminating marker circuit.

1.09 As far as practical the various components of the circuit have been

segregated on the frame, the connector circuit being located near the top of the frame to facilitate cabling.

2. SUPPLEMENTARY INFORMATION

816-000-000 - No. 1 Crossbar System Index
 J21555 (816-303-150) - Sender Test Connector Frame
 J25551 (816-040-150) - End Guards, Aisle Pilot Lamp and DPTS Supports, Fuse Record Book and Holder, and Spare Fuse Mountings
 J25552 (816-017-150) - Frame Lighting (Incandescent Type) and Appliance Outlets
 J85505 - Central Office Lighting (Fluorescent Type)
 Floor Plan Data - Section 9.3, Sheet 4

3. DRAWINGS

WECO J drawings listed should be ordered by referring to the prefix and base number and requesting the highest suffix (-) number.

Key Sheet

SD-25000-01 - Crossbar System No. 1

Framework

ED-25020-01 - Miscellaneous Mounting Details and Cable Brackets
 ED-25023-01 - Frame Details
 ED-25025-01 - Fuse Assembly
 ED-25028-01 - Unit Assembly
 ED-25107-01 - Assembly Key and Lamp Panel
 ED-25108-11 - Test Frames, Miscellaneous Mounting Details
 ED-25146-50 - Magnetic Shield
 ED-25260-10 - Steel Panels
 ED-25283-50 - Frame Assembly
 ED-25506-70 - Pigeon Holes and Writing Shelf
 ED-90002-10 - Flush Panels
 ED-90382-10 - Key Mountings
 ED-90978-01 - Relay Casing Assembly

Equipment

ED-25212-01 - Designation Cards
 ED-25280-01 - Designation Charts
 J28051B-() - Auxiliary Terminating Sender Test Connector Unit
 J28051C-() - Terminating Sender Test Frame Equipment

Wiring and Cabling

ED-25285-10 - Switchboard Cabling Details
 ED-25286-10 - Frame Local Cable
 ED-25346-14 - Method of Running Power Feeders
 ED-25346-15 - Method of Running Power Feeders
 ED-25419-10 - Unit Local Cable

4. EQUIPMENT

J28051B (AT&TCo Std) - Auxiliary Terminating Sender Test Connector Unit

Equipment - J28051B-()
 Local Cable - ED-25419-10

List 1 - Framework, assembly, wiring, and equipment for an auxiliary terminating sender test connector unit.

	Wire	Equip	See Notes
Framework, ED-25028-51, G7		1	
Ter Sdr Test Conn. Ckt, SD-25159-01, Fig. 2	1	1	A,B,C

Notes

- The connector circuit is arranged for a maximum of ten subgroups of a maximum of ten senders each. The crossbar switch, the 0 to 9 relays, and the CO relay shall always be furnished. The SM and SMA relays 0 to 9, the A relays 0 to 9, B relays 0 to 9, and the associated contact protection shall be furnished as required.
- The auxiliary terminating sender test connector unit is mounted on the sender test connector frame, either on the same frame that is used to mount the auxiliary originating sender test connector unit, or on a second test connector frame.
- Battery and ground supply for the auxiliary terminating sender test connector unit is obtained from the terminating sender test frame over No. 24 gauge leads in the 261L cable between the test frame and the unit. Since only one sender at a time will be cut through the associated test frame, No. 24 gauge leads will, in general, be satisfactory for the battery and ground supply. If on a particular job the auxiliary terminating sender test connector unit is located more than 75 feet from the terminating sender test frame, the battery and ground leads shall be doubled up so that the resistance in each of these leads does not exceed 2 ohms.

J28051C (AT&TCo Std) - Terminating Sender Test Frame

Equipment - J28051C-()
 Local Cable - ED-25286-10

List 1 - Framework, assembly, wiring, and equipment for a terminating sender test frame arranged for testing full selector terminating sender. (See 5.21.)

	Wire	Equip	See Notes	
Framework, ED-25283-50, G1		1		<u>List 5</u> (A&M Only) - Wiring and equipment per SD-25159-01, Fig. G, J, K, L, and AN required for testing dial pulse terminating. (See notes A, B, 5.05, 5.12, and 5.20.)
Key and Lamp Panel ED-25107-01, G1		1		
Pigeon Holes and Wiring Shelf, ED-25506-70, G1		1		<u>List 6</u> - Wiring and equipment per SD-25159-01, Fig. H, J, and AE required for testing the terminating part of central B switchboard sender circuit. (See note B.)
Rel Casing, ED-90978-01: G3014, Front Only		1		
G3013, Front Only		1		<u>List 7</u> - Wiring and equipment per SD-25159-01, Fig. AZ required for testing full selector terminating senders arranged for interdigital timing.
Misc Frame Ckt, SD-25176-01: Fig. 2, 3, 6, 7, & 9	1	1		
Fig. 8	6	0		<u>List 8</u> - Wiring and equipment per SD-25159-01, Fig. J, K, L, AN, and AX required for testing dial pulse terminating senders. (See notes A, B, 5.05, 5.12, and 5.20.)
Fig. 10	4	0	5.25	
Ter Sdr Test Ckt, SD-25159-01: Conn. Ckt: Fig. 1, 1E, & N	1	1		<u>List 9</u> - Wiring and equipment per SD-25159-01, Fig. 9 required with list 7 when full selector senders are associated with two timing control circuits.
Fig. 1A, 1F, & 1G	1	0	5.06	
Fig. AV or AW	1	1	5.21	<u>List 10</u> - Wiring and equipment per SD-25159-01, Fig. 10 required with list 3 or 4 for testing senders equipped with the "stop-go" pulsing feature.
Fig. 2 & AM, Less "ZM" and "ZN" App	1	1	5.03, 5.05, 5.18	
Sdr Group Test Ckt, Fig. 3, Less "B," "E," "K," and "L" App, & Fig. R	1	1	5.07, 5.08, 5.09	<u>List 11</u> - Wiring and equipment per SD-25159-01, Fig. 9 and 11 required with list 7 when full selector senders are associated with three timing control circuits.
Revertive Pulse Test Ckt: Fig. 4, Less "B" App, "TF" App and "UX" wiring and App, and Fig. B, P, U, W, Y, AA, AT, AY, and BB	1	1	5.10	
Fig. F & I	1		5.14, 5.15	<u>List 12</u> - Wiring and equipment per SD-25159-01, Fig. 9, 11, and 12 required with list 7 when full selector senders are associated with four timing control circuits.
Fig. C, Less "D" App	1	1		
Reg. Check Ckt Fig. 6, Less "B" and "E" App	1	1	5.08, 5.11	<u>List 14</u> - Wiring and equipment per SD-25159-01, Fig. 4, "UX" and "TF" options only, required in addition to list 1 when full selector senders are arranged for balanced revertive pulsing.
Fig. AF	1		5.16	
<u>List 2</u> - Wiring and equipment per SD-25159-01, Fig. 5, AC, AD, AK, AP, and "D" apparatus, Fig. C required for testing call distributing B switchboard senders and position circuits (3-wire dc pulsing). (See 5.07 and 5.19.)				
<u>List 3</u> - Wiring and equipment per SD-25159-01, Fig. 8, E, K, L, AG, AI or AJ, and BC or BD required for testing multifrequency pulsing terminating senders. (See note A, 5.05, 5.13, 5.17, 5.22, 5.23, and 5.24.)				
<u>List 4</u> - Wiring and equipment per SD-25159-01, Fig. 7 and Fig. D, K, L, AD, and BC or ED, less "F," "G," "H," "L," "P," and "U" apparatus, required for testing both multifrequency pulsing terminating and call distributing B switchboard senders and position circuits (3-wire dc pulsing). (See note A, 5.07, 5.13, 5.22, and 5.23.)				
<u>Notes</u>				
A. When list 3 or 4 is furnished with list 5 or 8 on the same test frame, omit Fig. K and L in list 5 or 8 since only one of each of these figures is required with this combination.				
B. When list 5 or 8 and 6 are furnished on the same test frame, provide only one Fig. J for both lists.				

- C. List 10 should be furnished for all new work whenever list 3 or 4 is specified even though the senders covered by list 3 or 4 are not arranged for "stop-go" pulsing initially.

5. GENERAL NOTES

Equipment

- 5.01 One L4R cord 6 feet 0 inch long equipped with a No. 289A plug, a No. 396A transmitter, and a No. 716D receiver will be required for use with terminating sender test circuit SD-25159-01, Fig. 5 or J and shall be furnished when specified by the telephone company.
- 5.02 Grouping terminal strips designated SDT-GTS are provided near the terminating marker connector frames for connecting the "SDT" leads to the terminating marker connector equipment. The cables from the terminating sender test frame or auxiliary terminating sender test connector unit and the terminating marker connector frames are terminated on separate punchings and the punchings connected by strapping as required.
- 5.03 The senders in a subgroup shall be assigned to crosspoints in a horizontal row from 0 to 9 in the same order as they are assigned from bottom up on the crossbar switch on the link frame. Where both full selector and B senders are located in the same subgroup, the B senders shall be associated with the higher numbered crosspoints of the crossbar switch and the full selector senders with the lower numbered crosspoints. The order of selecting senders for test shall be the same as the order of selecting the senders by the link frame.
- 5.04 Facilities are provided at the PF and P terminal strips to permit connecting the PF punchings to P or PX punchings. These cross connections may be made in the shop or by the installer.
- 5.05 Since not less than three link subgroups of senders will be furnished in an office, the connector circuit shall be equipped in all cases for three subgroups. This equipment consists of the crossbar switch, the 0 to 9 relays, the CO relay, the SM and SMA relays 0 to 2, the A relays 0 to 2, the B relays 0 to 2, and the associated contact protection. The SM and SMA relays 3 to 9, the A relays 3 to 9, the B relays 3 to 9, and associated contacts protection shall be furnished for subsequent subgroups of senders as required. An auxiliary terminating sender test connector unit shall be provided for sender subgroups 11 to 20 and a second terminating sender test connector unit shall be provided for sender subgroups 21 to 30, which is the maximum capacity of the terminating sender test

frame. Provision for connection to these units shall be made at the test frame by providing optional wiring in the local cable and by wiring the common leads to the AUX terminal strip.

- 5.06 Equipment per SD-25159-01, Fig. 1A and 1F shall be provided when the test frame is to function with an auxiliary terminating sender test connector unit. Furnish Fig. 1G when a second auxiliary terminating sender test connector unit is required.

- 5.07 "E" apparatus of SD-25159-01, Fig. 3 and 5, less "F," "P," "G," "H," and "L" apparatus, and "D" apparatus, Fig. C shall be furnished if call distributing B switchboard senders are to be tested. "F" apparatus shall be furnished if any of the B senders to be tested are arranged to register an office designation from the "B" position circuit. "P" apparatus shall be furnished if "B" positions are to be tested. "H" apparatus shall be furnished if "B" positions are to be tested and any of these positions are arranged to transmit an office designation to the B senders. If "B" positions are to be tested and none of these positions are arranged to transmit an office designation to the B senders, "G" apparatus shall be furnished instead of "H" apparatus. "L" apparatus shall be furnished if any of the B senders to be tested are arranged to transmit a signal over the "K2" lead to the "B" position circuit as an indication that an office key must be operated.

- 5.08 "E" apparatus of SD-25159-01, Fig. 3 and 6 shall be provided if any or all of the senders to be tested are arranged to serve incoming frames numbered from 10 to 19, or are arranged to receive the office designation over the "F10" and "F00" leads from the link circuit.

- 5.09 "K" apparatus of SD-25159-01, Fig. 3 shall be furnished if any of the 3-wire dc pulsing senders to be tested receive an office indication over the "OA" and "OB" leads from the terminating sender link circuit. "L" apparatus of SD-25159-01, Fig. 3 shall be provided if any of these senders to be tested receive an office indication over the "OC" lead. "ZL" apparatus of SD-25159-01, Fig. 3 shall be furnished if any of the multifrequency pulsing senders to be tested receive an office indication over the "OA" and "OB" leads from the terminating sender link. "ZA" apparatus shall be furnished if any of these senders receive an indication over the "OC" lead.

- 5.10 Furnish "B" apparatus of SD-25159-01, Fig. 4 if any of the full selector terminating senders are arranged to receive over five incoming group selection pulses as an office indication.

- 5.11 Furnish "B" apparatus of SD-25159-01, Fig. 6 if any of the senders to be tested are arranged to pass the office indication to the terminating marker over the "OAB" lead.
- 5.12 Provide "ZZ" apparatus of SD-25159-01, Fig. G when trunk supervisory loop is not more than a maximum of 2450 ohms. Provide "YA" apparatus of this figure when trunk supervisory loop is not more than a maximum of 7200 ohms.
- 5.13 Provide "U" apparatus when ac frequencies are furnished over cable conductors from another office and the incoming trunk test set uses the same supply.
- 5.14 Wiring per Fig. F shall be connected when the feature for testing dial pulse terminating senders is not provided.
- 5.15 Wiring per Fig. I shall be connected when the feature for testing the terminating part of central B senders is not furnished.
- 5.16 Wiring per Fig. AF shall be connected when the multifrequency pulsing terminating sender test feature is not provided.
- 5.17 When Fig. E is furnished and Fig. AI is not furnished, wiring per SD-25159-01, Fig. AJ shall be connected when multifrequency pulsing senders are arranged for five digits only.
- 5.18 Furnish "ZM" apparatus of SD-25159-01, Fig. AM where it is desirable to block the test circuit, after all senders arranged for certain operating conditions have been tested, before allowing the test circuit to advance to senders having dissimilar operating conditions. Furnish "ZN" apparatus of SD-25159-01, Fig. AM and "ZY" wiring of Fig. 2 of SD-25159-01 when it is desirable to pass by part of any type of senders due to some dissimilar operating condition from the associated senders. Connections between terminal punchings associated with the EG or PG keys and the CO relay and crossbar switch shall be made in accordance with notes on the circuit.
- 5.19 Wiring per Fig. AK of SD-25159-01 shall be connected when the features for testing multifrequency pulsing or dial pulse terminating senders are not furnished.
- 5.20 Furnish Fig. AN of SD-25159-01 only when the feature for testing dial pulse terminating senders is furnished and neither the feature for testing 3-wire dc keypulsing or multifrequency pulsing is furnished.
- 5.21 Wiring per Fig. AW of SD-25159-01 shall be connected when it is desired to connect the test circuit to the audible and visual alarm circuit. Wiring per Fig. AV of SD-25159-01 shall be connected when it is desired to connect the test circuit to the floor alarm frame fuse and time alarm circuit.
- 5.22 Furnish "R" apparatus of SD-25159-01, Fig. L when multifrequency pulsing senders are to be tested and "S" apparatus if dial pulse senders are to be tested.
- 5.23 Furnish "ZA" apparatus of SD-25159-01, Fig. D, E, 7, and 8 when office indication over a common group of trunks is to be given by means of a fifth digit.
- 5.24 Furnish equipment per SD-25159-01, Fig. BD in offices having a 6-wire multifrequency current supply.
- 5.25 One Fig. 10 per SD-25176-01 shall be provided for each routine test frame whose TA lamp is multiplied to the terminating sender test frame.
- 5.26 Two designation charts per ED-25280-01, Fig. 3 filled out in accordance with the job equipment layout, shall be provided. One shall be mounted on 7-1/2-inch by 1-foot 3-inch fiber or masonite board and provided for use at the test frame, and the other one unmounted for the wire chiefs files.
- 5.27 The 89-type resistances that are required with the 1C pads shall be furnished as specified by the customer.

Wiring and Cabling

5.28 The frame local cable for a test frame per J28051C, List 1 shall be wired for all options with the added wiring for lists 2 to 13 included as required.

5.29 No. 24 gauge type "C" wire shall be used for all local cable wiring except in the case of battery and ground leads which shall be No. 22 gauge type "C".

5.30 No. 22 gauge type "AF" wire similar to P-319025 shall be used for all cross connections between the PF and P terminal strips and between the PF and AUX terminal strips.

5.31 The code numbers of the switchboard cables ordinarily used on the terminating sender test frame are shown on the switchboard cabling drawing. The circuits should be checked, however, to insure that the proper codes are specified to meet the latest circuit requirements.

List of "A&M Only" and "Mfr. Disc." Equipment

The following equipment has been replaced as indicated. Where "A&M Only" items appear, the issue numbers shown are those of the issue in which the rating was first applied.

<u>Equipment</u>	<u>Rating</u>	<u>Details</u>	
		<u>Last Shown in Issue</u>	<u>Replacing Equipment</u>
J28051A	Mfr.Disc.	6	J28051C
J28051C,L5	A&M Only	7	J28051C,L8
L13	Mfr.Disc.	10	J28051C,L14

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