

ORIGINATING SENDERS AND
 TEST FRAME TESTS

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1. GENERAL

1.1 Description of Test

1.11 This section describes the method of setting up calls for testing the originating sender circuits. The originating sender test circuit, SD-25221, is used for testing all features and wiring of the senders that are accessible to the sender test frame.

1.12 Lamps on the sender test frame are used to check the operation of the senders.

1.2 Manload: These are mostly one man tests.

1.3 Test Procedure

1.31 Before starting the checks of the test frame trouble detection features, make test of the fusing, contact protection, resistance measurements and "percent" break test on all senders and the sender test frame.

2. TESTING EQUIPMENT

2.1 Test Sets Required

<u>Amt</u>	<u>ITE</u>	<u>Description</u>
1	1883	Wheatstone Bridge
1	4015	Continuity Test Set
1	4029	Pulse Checking Set
1	8253	Contact Protection Circuit Test Set
1	4442	Ohmmeter

2.2 Cords Required

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9598	12'	2	110 Plug	110 Plug	4023
1	9528	6'	1	Spade Tip	Socket	2790
1	9601	12'	3	110 Plug	110 Plug	4023

2.3 Accessories Required

<u>Amt</u>	<u>Code</u>	<u>Description</u>	<u>With ITE</u>
As Req.	322A & 298A	Make Busy Plugs	4023
1	R-1824	Portable Pencil Lamp	4023
1	509A	Relay Connecting Tool	2790
1	419A	"	2790
1	KS-3008	Stop Watch	

∅ Furnished with ITE-4023 Accessory Set

3. GENERAL OPERATION OF THE TEST CIRCUIT

3.01 Access to the sender to be tested is obtained by means of crossbar switches, each switch providing access to a maximum of 10 subgroups of 10 subscriber senders or 5 key pulsing senders. The test terminals of each subgroup of senders appear on a separate horizontal row of the crossbar switch. Access to a particular sender is obtained by operating the G- key if there is more than one group of senders and by holding the PCR key operated until a point near the desired terminal is reached as indicated by the T (tens) and U (units), locating lamps. The test switch is then advanced to the desired terminal by operating and releasing the PCS key.

3.02 Start Cycle: To start the test circuit operate key ST. The test circuit will progress through all senders (dial or Touch-Tone) apply the particular test and light lamp EC when all senders have been tested. If key TT is operated only senders equipped for Touch-Tone are tested. Key PNS operated causes the test frame to pass over the new wire spring senders. The CT register records the number of circuits tested successfully.

3.03 Discontinue Test: To stop the test at any time release the ST key. The test in progress on some particular sender will be completed before the frame stops. The test may be resumed by operating the ST key.

3.04 Control Advance and Restore to Normal: To advance the test circuit for repeat tests on a sender in case of trouble, momentarily operate the CA key with the REP key operated. To advance the test circuit to the next sender, momentarily operate the CA key with REP key normal. To restore the test circuit to normal, release the ST key and momentarily operate the CA and RN key.

3.05 Repeat Tests: With the REP key operated before the completion of a test, the tests will be repeated indefinitely on one sender. With the REP-2 key operated two tests are made on each sender before the next sender is seized thus testing the ability of the sender to release. The number of repeat tests may be determined by the reading of the RST (repeat single test) register.

3.06 Automatic Pass Busy and Make Group Busy: If a particular sender or its link subgroup is busy either in service or because of a make busy plug, the BY (busy) or the GB (group busy) lamp will light when

the sender is seized. If the APB key is operated, all senders which busy longer than from 29 to 59 seconds will be passed by. The PB register records the number of senders passed by when this key is operated. In order to insure seizing a busy sender before it is seized for a new service call, operate the MGB key momentarily. The MGB key is operated to make busy the sender subgroup to service calls and give preference to the test circuit for this group of senders. Holding the subgroup busy in this manner for 5 to 12 seconds will operate the major alarm, which may be silenced by operating the TA (time alarm) key.

3.07 Individual Step Control: To control the dialing of each digit to the sender individually, operate the DSS (dial step-by-step) key. Then operate the AV (advance) key when that digit is to be dialed. To control the revertive pulse selections individually, operate the SS (selections step-by-step) key. Then operate the AV key momentarily when ready for each selection to be made. Both keys DSS and SS may be operated and dialing and selections controlled by the AV Key if desired.

3.08 Remote Control: To control tests of a particular sender while watching the sender, start the test with the REP key operated and plug a No. 32A test set into the B jack (C jack for a second test frame) remote control jack at the sender frame. Momentary operation of the test set red button, corresponds to the operation of the CA key of the test frame. The control advance feature can also be operated by momentarily inserting a 298A make busy plug into the remote control jack. If the DSS and the SS keys are operated on the test frame, the momentary operation of the test set white button corresponds to the momentary operation of the AV key of the test frame.

3.09 Time Alarms: Two time alarms are provided. These are: (1) The major alarm which is sounded if a subgroup of senders is held busy by the test circuit longer than 5 to 12 seconds, and (2) The minor alarm, which functions if a sender test is not satisfactorily completed within a predetermined interval after the test is started. This interval is 60 to 90 seconds on all tests except permanent signal time out and sender lamp tests where the interval is increased by 29 seconds.

3.10 To silence the minor test circuit alarm without interfering with aisle pilot and floor alarm lamp indications, operate the ACO key (alarm out off) key.

3.11 To prevent or restore both major and minor test circuit alarms - both audible and visible - operate the TA (time alarm) key. Testing will not advance from a particular sender while this key is operated.

4. SETTING UP TEST CALLS

4.01 The following paragraphs describe the key operations required to set up the test calls used for supplementary and routine tests.

4.02 Operate keys in the A, B, C, TH, H, T, U and STA rows corresponding to the office code and numerical digits and the

party letter or ten thousands digit to control dialing, Touch-Tone or PCI pulsing. Operate key 0 of row B when using a 2 digit code. Operate key NFD-0 (no fifth digit) of STA row when no fifth digit is required. Operate key XB-SY for crossbar codes.

4.03 In three-two digit areas, make sure that the BA key is normal when using a two digit code. Operate the BA (add B digit) key when using a three digit code.

4.04 If coin senders are to be tested with a prepayment coin class of service and the code dialed does not require a coin, operate the FC (free call) key.

4.05 The keys of the "frame" rows FA and F control the district frame number sent to the sender. Operate one key of the F row to indicate the units digit of the frame number and operate key 0 in the FA row for a frame number from 0 to 9 or key 1 for a frame number from 10 to 19. The settings of these keys should be changed for different tests to provide a check of all frame indications.

4.06 Class of Subscriber (Sub. Sender)

4.061 Operate one or more CS (class of service) keys as indicated in the Table A to indicate to the subscriber sender what class of subscriber is being simulated. In addition, operate a combination of "class checking" keys 1, 2, 4, and 8 corresponding to the combination of D (class of service) leads which the sender should ground to the marker, as indicated in the table. The settings of these keys should be changed for different tests to provide a check of all class of service indications.

4.062 In offices arranged to serve up to 25 classes of service, operate the SGR (second group) key if the sender under test grounds the SGR lead.

4.07 Class of Trunk (Key Pulse)

Operate one key of "class of service" row CS to tell a key pulsing sender what class of trunk is being simulated, and operate the No. 8 "class checking" key as indicated in the following chart.

Key Pulsing Senders

Class of Trunk Simulated	CS Keys Operated	Class (D) Checking Keys Opr.
District (See Note 1)	0-DIST	8
Distant Office Selector	1-TW	8
Incoming (See Note 2)	2-INC	8
	4-INC	8
	5-INC	8
District Tandem	3-TAN	8

NOTE 1: When the sender is arranged to complete calls over common multi-office trunk groups to multi-office terminating units from the office multiple (See Note 105 of SD-25015-015.) test calls should be selected to cover routings with SD-1 relay normal and operated. SD-1 relay when normal adds 5 to the incoming group selection and, therefore, for such calls the 1G-5 key must be operated.

NOTE 2: When the sender is arranged to complete calls over common multi-office trunk groups to multi-office terminating units direct from a switchboard (See Note 105 of SD-25015-015.) the 2-INC and 5-INC keys should be used on recurring cycles. Five pulses will be added to the incoming group selections when 4-INC or 5-INC keys are operated; therefore, the 1G-5 key must also be operated. The 1G-5 key must be normal when the 2-INC key is operated.

TABLE A

Subscriber Senders			
Number of Classes of Service Served by Group	Class of Service Simulated	CS Keys Operated	Class (D) Checking Keys Opr.
Only	-	None	None
	1	0-DIST	1
	2	1-TW	2
	3	2-INC	1,2
	4	3-TAN	4
	5	4-INC	1,4
	6	5-INC	2,4
	8	0-DIST	1,8
	9	1-TW	2,8
	10	2-INC	1,2,8
	11	3-TAN	4,8
	12	4-INC	1,4,8
	13	5-INC	2,4,8
Not more than 6	1	0-DIST	1
	2	1-TW	2
	3	2-INC	1,2
	4	3-TAN	4
	5	4-INC	1,4
	6	5-INC	2,4
	8	0-DIST	1,8
	9	1-TW	2,8
	10	2-INC	1,2,8
	11	3-TAN	4,8
	12	4-INC	1,4,8
	13	5-INC	2,4,8
	7 to 12	1	0-DIST.CS6
2		1-TW.CS6	2
3		2-INC.CS6	1,2
4		3-TAN.CS6	4
5		4-INC.CS6	1,4
6		5-INC.CS6	2,4
8		0-DIST.CS7	1,8
9		1-TW.CS7	2,8
10		2-INC.CS7	1,2,8
11		3-TAN.CS7	4,8
12		4-INC.CS7	1,4,8
13		5-INC.CS7	2,4,8
13 to 24		14	0-DIST.CS8
	15	1-TW.CS8	2,SGR
	16	2-INC.CS8	1,2,SGR
	17	3-TAN.CS8	4,SGR
	18	4-INC.CS8	1,4,SGR
	19	5-INC.CS8	2,4,SGR
	20	0-DIST.CS9	1,8,SGR
	21	1-TW.CS9	2,8,SGR
	22	2-INC.CS9	1,2,8,SGR
	23	3-TAN.CS9	4,8,SGR
	24	4-INC.CS9	1,4,8,SGR
	25	5-INC.CS9	2,4,8,SGR

4.08 Determine from the originating marker cross-connection chart the office brush and group for the route to be tested. Operate corresponding keys in the OB and OG rows. If the route uses no office selector operate the SO key.

4.09 Ascertain the compensating resistance used in the sender for the route being tested and operate one key in each of rows OFF-CR (office compensating resistance) and B-OFF-CR (beyond office compensating resistance). When office selections are skipped the associated OFF-CR keys are normal. Each button is designated with the amount of compensating resistance which it can insert into the fundamental circuit for the indicated selections. An amount should be selected to make a total of either 900 or 1600 ohms in conjunction with the resistance provided by the sender for that route unless otherwise specified for a particular test. Tests at both 900 and 1600 ohms are necessary and test revertive pulsing adequately.

4.10 Dial, Touch-Tone and Pulse Control Keys

4.101 Dialing Control Keys (Sub. Sender)
Operate one of the following keys:

PBX SURGE	ø15 PSS MIN BR
7 PPS MIN BR	15 PPS MAX BR
7 PPS MAX BR	ø26 PPS MAX BR
	26 PPS MIN BR

NOTE: 26 PPS MAX BR is used for all "Register Control" tests.

The two keys marked with (ø) perform the best general test of the dial register of subscriber sender and should be used for most routine testing. The remaining keys impose more severe tests on various parts of the dial register. They should be used occasionally during routines and may be applied to any sender whose dialing accuracy is suspected.

4.102 Touch-Tone Control Keys

Operation of key TT activates the Touch-Tone oscillators and sender select circuit for testing Touch-Tone senders. The TT key provides for nominal Touch-Tone levels and frequencies to be pulsed into the receiver. The keys in Table B apply conditions to check the receivers ability to guard against undesirable frequencies and noise. These keys should be operated occasionally during routines and during test of senders suspected of having receiver trouble.

TABLE B

Test	Key Operated	Result
High Level	HLV	Provides high level signal.
Low Level	LLV	Provides low level signal.
Long Pulse	LGP	Lengthens pulse and shortens interdigital timing.
Slow Pulse	SLP	Simulates extremely slow digit keying.
Controlled Pulse	PPS	Individual digit pulsed with each operation of Key AV.

	Switch Position		Relays Operated				Freq. Tested		
	FCA	FCB							
Single Freq. (High)	1	SFH	SF	HF	H1		1209		
	2	"	"	"	H2		1336		
	3	"	"	"	H3		1477		
	4★	"	"	"	H4		1633		
Single Freq. (Low)	1	SFL	SF	LF	L0		697		
	2	"	"	"	L3		770		
	3	"	"	"	L6		852		
	4	"	"	"	L9		941		
Special Freq.	1	3FS	SPF	TF	L0	H1	697	1209	2000
	2	"	"	"	L3	H2	770	1336	2000
	3	"	"	"	L6	H3	852	1477	2000
	4	"	"	"	L9	H2	941	1336	2000

★Tests involving the transmission of 1633 cycles shall be omitted when the Touch-Tone receiver circuit is not arranged to recognize this frequency.

4.11 Slow Revertive Pulsing: To test for false operation of counting relays caused by trouble in the counting relay circuit, operate "slow pulsing" key SP on any test which uses revertive pulsing - preferably on one which requires ten revertive pulses on some selection.

4.12 Preliminary Pulse: To test the preliminary pulse feature of subscribers' senders, have "preliminary pulse" key PP normal during full selector tests. Operating this key cancels the test.

4.13 To Check for Short Fundamental Closure From a PCI Trunk: Operate "fast assignment" key FAS on any regular PCI test which does not have stations delay, but not when testing late release PCI nor when making special coin tests. With key FAS normal, the ability of the sender TG- relays to hold over a short fundamental open is tested.

4.14 To Check for Absence of Ground Closure Between PCI Pulses: Operate "capacity" key CAP-PCI and set up a total beyond office compensating resistance in accordance with the following table:

Beyond Office Comp. Res. in Sender	Beyond Office Comp. Res. in Test Circuit
0	1300
300	900
600	600
900	600

4.141 This test is most likely to detect trouble when the beyond office compensating resistance in the sender is

either 300 or 600 ohms and the number sent contains heavy negative pulses followed by opens - for example, the number 5777.

4.15 To Check the "Regular" Test Leads
GT: Operate the LT key on alternate cycles of routine test. With the LT key normal only the "reserve" leads RT are tested.

4.16 Class of Test Keys: There are seventeen of these keys as follows:

SENDER KEY

- SUB&KP 1 Full Selector
- SUB 2 Reg: Control Test Full Selector
- SUB&KP 3 Late RIS., Full Selector
- " 4 P.C.I. Tdm.
- " 5 P.C.I. Non-Tandem (Direct)
- " 6 P.C.I. Tdm. to 3 Digit Opr.
- " 7 Late RIS.P.C.I. (TW) Rel. Normal
- " 8 Late RIS.P.C.I. (TW) Rel. Opd.
- SUB 9 Special Service Opr.
- SUB&KP 10 3 Digit Opr. Full Selector
- " 11 3 Digit Opr. FS with Distant Office Selector
- SUB 12 Permanent Sig.
- KP 12 Time Out
- SUB&KP 13 Office Overflow
- " 14 Incoming Overflow
- SUB 15 Dial Tone Test
- KP 15 Opr's Error District Junctor
- SUB 16 Trouble Release Test
- KP 16 Opr's Error - Inc. Trk.
- KP 16 Opr's. Error - Tdm. Dist. Trk.
- SUB 17 Direct Distance Dialing
- SUB 18 Restricted Code
- KP 18 Opr's Error Off. Sel. Trk.
- KP 18 Unassigned Code

4.161 When making tests using class key (1 to 9) the R2 key must be operated and when making tests using class keys (11 to 18) the R1 key must be operated before a test will start.

4.17 Numerical Digits on PCI Calls

4.171 Every code is cross-connected in the decoder to indicate whether the office called has five digit numbers and whether it has party letters. If the number called might have a station letter, the sender might have a station letter, the sender should delay closing the fundamental from 3 to 5 seconds after the fundamental digits are dialed. This information is recorded in subscribers' senders in the following four combinations:

- A. Numbers above 9999 and numbers with party letters.
- B. Numbers above 9999; no party letters.
- C. All numbers below 10,000 no party letters.
- D. All numbers below 10,000; numbers with party letters.

4.172 To test for false stations delay set up a code having stations delay B and a number whose first 3 digits are outside and range 100 to 104 (or 109) or else a code with delay C and any four digits. Also operate key O-NFD of row STA.

4.173 To test for proper stations delay without dialing a fifth digit, set up a code having stations delay B and four digits corresponding to the beginning of a possible 5 digit number, or else a code with delay A or D and any four digits. Also operate key O-NFD in row STA and "stations delay" key SD.

4.174 When key pulsing senders are arranged for operation without the use of a start key at the A position, no five digit numbers or station letters can be used. In this case operate key O-NFD in STA row on all PCI tests.

4.175 To test a 5 digit number, use a code having stations delay A or B and operate key 1 in the STA row. Set up digits as usual and operate key SD.

4.176 To test station letters, use a code having stations delay A and four digits which cannot be the beginning of a 5 digit number, or else delay D and any four digits. Also operate key W, R, J or M in the STA row and operate key SD.

5. LAMPS

5.1 Locating Lamps

5.11 The G- lamps indicate which cross-bar switch is being used to connect to a sender. When only one switch is equipped the G lamp lights after the ST key is released if all the test frame relays have not restored.

5.12 The TENS lamps indicate the number of the selecting magnet being used on the connector switch.

5.13 The Units lamps indicate the number of the pair of holding magnets being used on the connector switch.

5.2 Busy Lamps

5.21 The BY lamp indicates that the particular sender is busy. To pass the busy sender, restore the TA key and operate the CA key momentarily or if the APB key is operated, the test circuit will advance to the next sender automatically after a 29 to 59 second interval. If the busy condition is to be investigated, first determine if there is a make busy plug-in either the MB jack at the sender make-busy frame or the GB jack at the trouble indicator frame. If the stuck sender lamp at the "A" switchboard is lighted. If not, a false busy condition is indicated. When possible, investigate and clear such trouble at once.

5.22 The MGB lamp indicates that a sender subgroup is being held out of service during an attempt to seize a particular sender. Release the test circuit immediately by restoring the ST key and operating the CA key momentarily.

5.23 The GB lamp indicates that all the senders of the same type (dial or Touch-Tone) in the subgroup are busy. If it is desired to pass the busy group, restore the time out alarm and operate the CA key momentarily for each sender of the type being tested in the group. The group busy indication could be caused by one of the following conditions:

- (a) A make busy plug inserted in the GB jack of the sender make busy frame.
- (b) A make busy plug inserted in the connector GB jack at the trouble indicator frame.
- (c) The originating marker connector circuit has timed out.

If a false busy condition is found the subgroup is out of service.

4.103 Pulsing Control Keys (Key Pulsing Sender)

(a) Nonoperate Test of Marginal Relays TM and RM; Operate "Slow Key Pulsing" key SKP on a regular PCI or full selector test and set up numerical digits which will send a heavy positive pulse followed by a light positive over each of the tip and ring leads - for example. the number 1965.

(b) Speed Operate Test of TM, TP, TS RM, RP and RS Relays; Have key SKP normal and select digits on regular PCI of full selector tests which will apply to each of the tip and ring leads a heavy positive pulse followed by a light negative accompanied by an open on the other lead, a heavy positive pulse followed by a heavy negative, and a heavy negative followed by a heavy positive. For example, either of the following tests will meet these six conditions:

- (1) Set up a tandem PCI test with key 3-TAN in row CS operated and use 368-9624 for the code and numerical digits.

(2) Use numerical digits 6862 for testing the relays on the tip and 5984 for the relays on the ring.

(c) Release Test TS and RS Relays:
The check for the release of the TS or RS relays is only effective after a heavy negative pulse such as a 3 for the TS relay or a 9 for the RS relay.

(1) Operate TRT key and use numerical digits 3030 for tip release test.

(2) Operate RRT key and use numerical digits 9191 for ring release test.

5.3 Special Indication Lamps

5.301 The 0-9 pulse lamps may be lighted when a revertive selection failure is suspected by operating the PL-LP (pulse lamp) key. The number of these lamps lighted indicates the number of revertive pulses sent by the test circuit. With lamp 0 lighted, the indication is that the sender failed to open the fundamental circuit after receiving the correct number of pulses. With lamp 0 extinguished and other lamps lighted, the indication is that the sender opened the fundamental circuit too soon.

5.302 The 0-9 PCI check lamps indicate the actual number received from the sender. In the case of PCI pulsing, the digit in question is indicated by a lighted PCI progress lamp. If the failure occurred during the code check, the A, B or C digit which failed will be indicated by a PCI progress lamp, class of service by lamp D or the tens or units digit of the district frame number by lamp FA or F respectively.

5.303 The S lamp indicates that the sender either has closed the fundamental circuit too soon or has failed to close it at the proper time.

5.304 The X lamp indicates that either false battery or false ground has been detected on one of the F, CS, GS, SL, or ON leads tested by the X relay of the sender group test circuit or else that the sender subgroup advanced the preference lead prematurely.

5.305 The MTG-NO lamp indicates that the sender MTG relay operated falsely during its nonoperate test.

5.306 The MTG-O lamp indicates that the operate test is being applied to the sender MTG relay. This lamp is also lighted during the MTG relay nonoperate test unless the relay fails on its nonoperate test.

5.307 The CN lamp indicates that the sender has closed the fundamental circuit either without receiving a coin ground or in spite of a solid ground on the line, or that it has failed to close the fundamental circuit after receiving coin ground.

5.308 The SD lamp indicates failure of the stations delay test.

5.309 The FC lamp indicates a delayed opening of the fundamental circuit at the end of a selection.

5.310 The ORR lamp lights during the test of the official reroute feature.

5.311 The SGR lamp indicates failure of the sender to ground the SGR lead if the SGR key is operated. If the SGR key is normal it indicates a false ground on the SGR lead.

5.312 The DC lamp indicates that the DC lead of a key pulsing sender is not grounded at the proper time.

5.4 Progress Lamps

5.401 The SEL lamp lights after tests of the regular and reserve leads REG- and RES- of a sender subgroup and stays lighted until the subgroup S relay associated with the particular sender has operated.

5.402 The RL lamp lights while waiting for the sender to ground the RL lead.

5.403 The GH lamp lights while waiting for the GH lead to be grounded.

5.404 The CH and CH1 lamps light while the battery and ground chains respectively, through the subgroup are being tested to see that they open properly.

5.405 The SPF lamp lights during tests of the advance of the preference lead. It will stay lighted if the sender upon becoming busy, either fails to advance the preference lead to the next sender in the chain or fails to disconnect the subgroup S relay from its associated preference lead.

5.406 The DEC lamp lights while awaiting the release of the originating marker.

5.407 The CD lamp lights while the code is being dialed and checked.

5.408 The PP, ACA, ACB, ACC, A, B, C, TH, H, T, U, PDG-O&I and STA Dial Progress lamps indicate what digit is being dialed or keyed, or what digit is to be dialed or keyed next.

5.409 The D, F, FA, PTY, and AR1 lamps light while the code test circuit is checking the information sent from the sender to the marker regarding class of service, district frame, tip or ring party, and alternate route, respectively.

5.410 The CCO, CCL, CC2, CC4, and CC7 lamps light indicating two CC relays operated. Prefix 0 or 1 digit transmitted to marker from sender.

5.411 The LA, EA, and PD1 lamps light LA for local area code group, EA for extended area code group, and PD1 for recycle.

5.412 The LA and EA lamps indicate whether a local dial or an extended area indication, respectively is received from the originating marker.

5.413 The OB, OG, SB, SG, TG, MTG-O, IB, IG, FB, FT, FU, IA, and TC Selection Progress lamps indicate what selection is being checked or is to be checked next. Their designations indicate office and second office brush and group, operate test of sender TG or MTG relay, incoming and final selections, incoming advance, and trunk closure.

5.414 The RLS lamp lights while waiting for the sender to release.

5.415 The OF lamp lights during operate tests of the sender OF relay.

5.416 The IMP lamp lights while waiting for PCI pulsing to be completed.

5.417 The A, B, C, STA, TH, H, T, and U PCI Progress lamps indicate what PCI digit is being checked. A, B, and C also indicate what code digit is being checked in the marker during code check.

5.418 The TGT and RBT lamps light while the operator class control circuit for key pulsing senders is testing for trunk guard closure and reverse battery closure respectively.

5.419 The ODN lamp indicates that the test circuit is set to check the identification digit and directory number on ODN calls.

→ Arrowed lines indicate new or changed information.

5.420 The TT lamp indicates that this circuit is set to originate a TOUCH TONE call.

5.421 The NS lamp lighted indicates that this circuit is set to test a new sender (SD-27810-01).

5.5 Test Circuit Control Lamps

5.51 The TA (time alarm) lamp indicates that test has not been completed within the allowable interval. Operate the TA key to retire the alarm.

5.52 The EG (end of group) lamp indicates that the last sender of a group has been tested satisfactorily and that the key setup should be changed. An EG- key is supplied for each point requiring a new setup. With the keys normal, testing continues without interruption; but if any EG- key is operated, testing is stopped at this point. When the proper keys for the next group have been operated, releasing the EG- key will allow testing to be resumed. Any or all EG- keys may be operated at the start of a test.

5.53 The EC (end of cycle) lamp indicates that the last sender to which the test circuit has access has been tested satisfactorily. Operate the RN key momentarily to return the connector to normal.

Manager, Crossbar Product Engineering
Control Center

Reason for Reissue:
To add features for new sender
(SD-27810-01).

Replaces Section 161 dated 8-18-66.