

SUBSCRIBER DISTRICT JUNCTORS
TESTS USING DISTRICT JUNCTOR TEST CIRCUIT
NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers a method of testing subscriber district junctor circuits in No. 1 crossbar offices with the automatic district junctor test circuit.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 The tests covered are:

- ✓(A) Local Charge Test
- ✓(B) Free Call Test
- ✓(C) Operator Call Test
- ✓(D) Early Disconnect Test
- ✓(E) Condenser Test
- ✓(F) Automatic Release Test (Timed Disconnect Test)
- (G) False Automatic Release Test
- (H) Zone Call Test — Zone Registration District Junctors Only
- (I) Tip Party Charge Test — Two-Party District Junctors Only
- (J) Timing Test District Junctors Arranged for Overtime Charging
- (K) Called Subscriber Disconnect Before Second Charge — District Junctors Arranged for Overtime Charging

1.04 The test circuit obtains access to the district junctors by means of crossbar switches located on the sender link frames. Each switch provides access to a maximum of 100 district junctors associated with the sender link frame.

1.05 By operating certain of the test class keys, a series of tests corresponding to each of the operated keys is made on each district junctor. Most of the district junctor functions may be tested automatically in this manner.

1.06 Arrangements are provided for making tests of all district junctors starting with the lowest numbered circuit or, if desired, the tests may be started with any circuit. After a district junctor is tested, the test circuit advances automatically to the next district junctor and when the last district junctor is tested, the tests stop or if desired a test can be repeated indefinitely on one district junctor.

1.07 When desired, district junctors which test busy may be passed automatically.

1.08 The test circuit makes use of regular service circuits in addition to the district junctor under test. These include the subscriber sender link, subscriber sender, originating marker connector, marker, district link, office link and coin supervisory link circuits.

1.09 The district junctor test circuit is arranged to dial automatically into the subscriber sender any one of four office codes assigned for test purposes. These codes direct the marker to establish a connection through any idle district link, office junctor, and office link to a district test line which terminates on the office link frame. When making a charge test of AMA district junctors, four numerical digits also are dialed into the sender.

1.10 Registers are provided as follows: ST (single test) to record the number of single tests, CT (circuits tested) to record the number of circuits tested successfully, RST (repeat single test) to record the number of successful repeat tests and PB (pass busy) to record the number of busy district junctors passed without testing.

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1.11 When testing two-party district junctors for registration conditions, the tests should be made for both tip and ring parties.

2. APPARATUS

- 2.01 No. 32A test set.
- 2.02 No. 298A (make busy) plugs as required.
- 2.03 KS-3008 stop-watch or second-indicating watch.
- 2.04 District junctor test circuit per J27553 (SD-25158-0101).

3. PREPARATION

- 3.01 If some district junctor is already connected to the test circuit, release the ST (start) key and operate the CA (control advance) key momentarily.
- 3.02 Operate the RN (return to normal) key. When the N (normal) lamp lights, indicating that the test circuit is normal, release the RN key.

4. METHOD

(A) Local Charge Test

4.01 This test checks the operation and charging features, including the CH interrupter intervals and the duration and magnitude of the applications of register operate current and of coin collect current. During tests of two party circuits, the charging arrangement for the ring party only is checked. In the case of district junctors arranged for multiple or over-time message registration, a single registration only is checked. When testing AMA district junctors a check is made that the districts function with the call identity indexer for recording subscriber's answer and disconnect on charge calls.

- 4.02 Operate the LC (local charge) key.
- 4.03 If any other features are to be tested on the same cycle of tests, refer to the other tests covered in Part 4.

4.04 If any miscellaneous features are to be used, refer to Part 5.

4.05 Operate the ST (start) key. The test circuit will make a test, corresponding to each operated test class key, on the first district junctor of the first group. That is, if the respective test class keys are operated, successive tests will be made on the same district junctor in the following order: local charge, free call, operator, early disconnect, condenser, automatic release, zone and tip party charge. If all keys are operated including the Z and TPC keys and the particular type of district junctor under test does not require the zone or tip party charge test, or both tests, these tests will be automatically omitted.

4.06 If desired, the test can be made on any desired district junctor by first selecting the particular district junctor as covered in 5.01 to 5.04, inclusive. When the first circuit has been tested, the test circuit will advance to the next circuit and will continue this process until a test failure occurs or until tests have been made on all district junctors or until a busy district junctor is encountered.

4.07 When the last district junctor to which the test circuit has access is tested, the EC (end of cycle) lamp will light and after a time interval an alarm will be sounded.

4.08 If a test failure occurs, or if a circuit is busy longer than 4 to 4-1/2 minutes the TA (time alarm) lamp will light and the associated alarm will sound. In this event, refer to Part 6.

4.09 To cause the test circuit to discontinue tests, restore the ST key. All tests called for by the operated test class keys will be finished before discontinuing tests. To resume testing, reoperate the ST key.

(B) Free Call Test

4.10 This test checks that no charge is received when a free call code has been dialed. When testing AMA district junctors a check is made that no recorder is called in and that the recorder cancellation circuit functions.

4.11 Operate the FC (free call) key. Then proceed as outlined in 4.03 to 4.09, inclusive.

(C) Operator Call Test

- 4.12 This test checks the operation of the district junctor on an operator class of call.
- 4.13 Operate the OPR (operator) key. Then proceed as outlined in 4.03 to 4.09, inclusive.

(D) Early Disconnect Test

- 4.14 This test checks the operation of the district junctor when the call is abandoned after the office code has been dialed and the originating marker has completed its functions; but before the sender has made trunk test.
- 4.15 Operate the DSC (disconnect) key. Then proceed as outlined in 4.03 to 4.09, inclusive.

(E) Condenser Test

- 4.16 This test checks that the tip and ring condensers of the district junctor are neither short-circuited nor open.
- 4.17 Operate the CDR (condenser) key. Then proceed as outlined in 4.03 to 4.09, inclusive.

(F) Automatic Release Test (Timed Disconnect Test)

- 4.18 This test checks that the district junctor releases automatically when the called subscriber hangs up but the calling subscriber does not.
- 4.19 Operate the AR (automatic release) key. Then proceed as outlined in 4.03 to 4.09, inclusive. If desired, the automatic release time interval may be checked by noting the length of time the AR (automatic release) lamp is lighted. This interval should be approximately 1 to 2 minutes or 2 to 4 minutes, depending upon the intervals of the RB and RF interrupters. When testing AMA district junctors the interval should be 14 to 29 seconds.

(G) False Automatic Release Test

- 4.20 This test checks that the automatic release feature does not cause the district junctor to release falsely.

4.21 Operate the AR and FAR (false automatic release) keys. Then proceed as outlined in 4.03 to 4.05, inclusive. At the end of 5 minutes, if the district junctor is still engaged, this indicates a satisfactory condition.

4.22 Proceed as outlined in 4.06 to 4.09, inclusive.

(H) Zone Call Test — Zone Registration District Junctors Only

- 4.23 This test checks the operation of the district junctor in connection with the zone registration control circuit, and that a message registration pulse is sent out by the district junctor. This test does not check the number of message registration pulses sent out.
- 4.24 Operate the Z (zone) key and one of the other test class keys (LC, FC, OPR, DSC, CDR or AR key). When testing two-party district junctors, the TPC (tip party charge) key may also be operated to make test I on the same cycle of tests. Proceed as outlined in 4.03 to 4.09, inclusive.

(I) Tip Party Charge Test — Two-Party District Junctors Only

- 4.25 This test checks the operation and charging features of the tip party on district junctors arranged for two party service.
- 4.26 Operate the TPC key and one of the other test class keys (LC, FC, OPR, DSC, CDR or AR key). When testing zone registration district junctors, the Z key may also be operated to make test H on the same cycle of tests. Proceed as outlined in 4.03 to 4.09, inclusive.

(J) Timing Test — District Junctors Arranged for Overtime Charging

- 4.27 This test checks the initial charge, initial talking period and overtime charge features of district junctors arranged for overtime charging.
- 4.28 To make a timing test on all district junctors make a local charge call with the T key also operated.

Note: The overtime feature tests on zone districts for zone calls must be made with the zone registration test frame.

(K) Called Subscriber Disconnect Before Second Charge — District Junctors Arranged for Overtime Charging

- 4.29** This test checks that no overtime charge is made if the called subscriber disconnects before the end of the initial talking period.
- 4.30** On all district junctors other than zone district junctors, make a local charge test with the T and SUB-DISC (subscriber disconnect) keys also operated.
- 4.31** To check this feature on zone registration district junctors operate the Z, T and SUB-DISC keys. Proceed as outlined in 4.03 to 4.09, inclusive.

5. MISCELLANEOUS FEATURES

Selecting a Particular District Junctor

- 5.01** To select a particular district junctor for test, first make sure that the test circuit is normal as covered in 3.01 and 3.02.
- 5.02** Determine from the particular circuit chart the proper setting of the G (group), S (select) and H (hold) selectors to cause the test circuit to connect to the desired district junctor.
- 5.03** With the ST key normal, operate and release the G-PCS (group particular circuit step) key a sufficient number of times, or operate and hold the G PCR (group particular circuit run) key, until the proper G (group) lamp lights. In the same manner, manipulate the S-PCS (select particular circuit step) or S-PCR (select particular circuit run) key until the proper S (select) lamp lights, and the H-PCS (hold particular circuit step) or H-PCR (hold particular circuit run) key until the proper H (hold) lamp lights.
- 5.04** Operate the ST key. If the particular district junctor is busy either in service or because of a make-busy plug, the BD (busy district) lamp will light.

Repeat Tests

- 5.05** If the REP (repeat) key is normal, the test circuit will advance to the next district junctor after making as many tests as are

called for by the operated test class keys. The number of individual or single tests (local charge, free call, etc. tests considered cumulatively) may be determined by reading the ST register.

- 5.06** If it is desired to repeat the tests on a district junctor, operate the REP key before the completion of a test or series of tests. Restore the REP key to normal when the desired number of repeat tests have been completed. The number of times the tests are repeated may be determined by the reading of the RST register.

Control Advance

- 5.07** If it is desired to advance the test circuit to the next district junctor, momentarily operate the CA key with the REP key normal.
- 5.08** If a trouble is encountered and it is desired to advance the test circuit for repeat tests on the same district junctor, operate the REP key and momentarily operate the CA key.

Remote Control Advance

- 5.09** To control tests of a particular district junctor while watching that circuit, start the test with the REP key operated and plug a No. 32A test set into the C (remote control) jack at the sender link frame associated with the district junctor frame. Momentary operation of either one of the test set buttons will perform the functions of the CA key. (This function can also be performed by inserting a No. 298A plug into the remote control jack momentarily.)
- 5.10** Where C jacks appear on the zone registration district connector frames, the test circuit can be controlled as in 5.09 from this frame. The test frame may also be controlled on the RC (remote control) jack at the zone registration timing interrupter frame and the zone registration control frame. When testing AMA district junctors the test circuit can be controlled as in Paragraph 5.09 from the DJT jacks located on the recorder and call identity indexer frames. The DST jack at the transverter trouble indicator frame can be used to advance the test circuit or to repeat on the same district junctor depending on the position of the REP key.

Automatic Pass Busy

5.11 If it is desired to pass without testing those district junctors which test busy rather than wait for them to become idle, operate the APB (automatic pass busy) key. The PB register records the number of district junctors passed by when this key is operated. This feature cannot be used with the REP key operated.

Time Alarm

5.12 If the test circuit blocks due to a trouble condition or if, with the REP key normal, the test circuit is unable to test a district junctor because it has tested busy longer than 4 to 4-1/2 minutes, the intermittent minor alarm sounds, the test circuit TA lamp lights and the amber aisle pilot lamp lights.

5.13 In case the alarm is sounded because of a busy district junctor and that district junctor later becomes idle, the alarm indications retire automatically and the testing is resumed.

5.14 To silence the test circuit alarm without interfering with aisle pilot and test circuit lamp indications, operate the ACO (alarm cut off) key. With the ACO key operated, if a trouble or busy condition is encountered the TA and aisle pilot lamps light but the audible alarm does not sound.

5.15 To prevent or restore the test circuit alarm — both audible and visible — operate the TA (time alarm) key. Testing will not advance from a particular district junctor while this key is operated.

Interrupter Checking Circuit Alarm Release

5.16 If during the test of a district junctor a failure is indicated by the lighting of the PC lamp, note the district frame or frames also having PC lamps lighted and operate RL key at test frame or alarm cabinet to restore alarm.

Foreign Potential Check of "M" Leads

5.17 When it is desired to make a test for foreign potential on the M1 or M2 lead of message rate type district junctors or on the M1 lead of coin type district junctors the FV key, if provided, is operated. On message rate type junctors the test is applied when perform-

ing LC, FC, TPC, or Z tests. On coin type junctors the test is applied when performing the LC test.

Check for False Answer Entry

5.18 When testing AMA district junctors if it is desired to make a check for false answer entries, the FE key, if provided, is operated. The operation of this key provides a time interval after the answer entry indication before advancing the test switch.

Cancellation of Momentary Release Test of S Relay and Busyback Test of CS Relay

5.19 Where AMA district junctors arranged for AMA operation are tested and it is desired to use the test circuit for quickly locating troubles which cause one or more groups of 20 junctors to be made busy, the STC and LC keys should be operated and the individual district junctors in the made busy groups tested. The operation of the LC key will set up calls involving the perforation of the recorder tape. The operation of the STC key eliminates the time taken for making the momentary release test of the S relay and the busyback test of the CS relay.

Note: The STC key should not be operated at any time other than stated above or proper tests of the S and CS relays will not be made.

6. INTERPRETATION OF LAMP SIGNALS

6.01 When the test circuit alarm sounds, refer to the lighted lamps for the indications of the district junctor involved and the reason for the alarm. Some typical failure indications are given in Table 1 at the end of this section.

Locating Lamps

6.02 *The 0-19 (group) lamps* indicate the cross-bar connector switch in use and hence the group (maximum of 100) in which the district junctor under test is located.

6.03 *The 0-9 (select) lamps* indicate the selecting magnet operated on the connector switch and hence the horizontal level on which the district junctor under test is located.

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6.04 *The 0-9 (hold) lamps* indicate the number of the holding magnet operated on the connector switch. The lighted hold, select and group lamps indicate the district junctor under test.

6.05 *The 0-39 (coin locating) lamps* indicate, (if provided) the coin supervisory circuit under test.

6.06 *The SG (0-7) lamps* indicate, (if provided) the coin supervisory subgroup.

6.07 *The SC (0-4) lamps* indicate, (if provided) the coin supervisory circuit of the subgroup.

Special Indication Lamps

6.08 *The DIAL lamp* lights while dial pulses are being generated by the test circuit.

6.09 *The TCF (TC release failure) lamp*, (if provided) indicates release test failure of the TC relay.

Charge Lamps

6.10 *The MCH lamp* indicates the absence of ground on the M1 lead.

6.11 *The GM lamp* indicates the absence of ground on the M2 lead.

6.12 *The NCH lamp* indicates that no charge pulses were transmitted over the M1 or M2 lead.

6.13 *The OCH lamp* indicates that either an overcharge or a premature charge was made.

6.14 *The TMR lamp* indicates that the charge pulse was too short.

6.15 *The CNT and CNR lamps* indicate that coin current was transmitted over the tip and ring, respectively.

Supervisory Relay Lamps

6.16 *The S lamp* lights during operate tests of the S relay.

6.17 *The BB lamp* lights during operate and release tests of the CS relay.

6.18 *The 1 CHG lamp* lights during the initial charging interval.

6.19 *The BG lamp* lights while the tip and ring condensers are being checked for short circuits.

6.20 *The C lamp* lights while the leads to the tip and ring condensers are being checked for continuity and short circuits.

6.21 *The 2 CHG lamp* lights during the overtime charging interval except on an operator class call.

6.22 *The TR lamp* lights only on an operator class call and may indicate a cross or open on the tip or ring. On a coin district junctor the lamp may also indicate failure to cut through on reverse battery or failure to hold to the trunk S lead.

6.23 *The AR lamp* lights during tests of the automatic release feature.

6.24 *The DCH lamp* lights while awaiting coin collect or coin return (coin district junctors) or while awaiting release of district junctor (non-coin district junctors).

6.25 *The DN-LT lamp* lights while awaiting release of the district junctor.

6.26 *The RS lamp* lights during release test of S1 relay.

6.27 *The LC, FC, OPR, DSC, CDR, AR, Z, TPC, FVA, FEA, and RA lamps* indicate the class of tests being made as follows: LC (local charge), FC (free call), OPR (operator), DSC (early disconnect), CDR (condenser), AR (automatic release), Z (zone), TPC (tip party charge), FVA (false potential on M lead), FEA (false entry) and RA (recorder time out).

6.28 *The FR, O, Z, ZO, FZ, TFZ, TO, TZ, TZO, TMR, IMR, COT, C or CN, COT1, CNA and AMA lamps* indicate the type of district junctor under test as follows: FR (flat rate), O (overtime), Z (zone), ZO (zone and overtime), FZ (flat rate zone), TFZ (two party flat rate zone), TO (two party overtime), TZ (two party zone), TZO (two party zone and overtime),

TMR (two party message rate), IMR (individual message rate), COT (coin overtime), C or CN (coin) COT 1 (coin and overtime having both coin and non-coin adjustment for S relay), CNA (coin having both coin and non-coin adjustment for S relay) and AMA (automatic message accounting).

Connector Control Lamps

6.29 *The BD lamp* indicates a busy district junctor.

6.30 *The N lamp* indicates that the test circuit is normal.

6.31 *The EC lamp* indicates that the last district junctor of the last group to which the test circuit has access has been tested satisfactorily. Operate the RN key momentarily to return the test circuit to normal.

6.32 *The TA lamp* indicates that a test has not been completed within the allowable interval. Operate the TA key to retire the alarm.

TABLE 1 — TYPICAL FAILURE INDICATIONS

TST SEL. POSITION	SIGNIFICANT LAMPS LIGHTED	TEST	CLASS OF DISTRICT JUNCTOR	FAILURE INDICATED
2	MCH, GM	All	All	Trouble release from sender link.
3	MCH	A,B,F,G, H,I,J,K	All except AMA	Failure of ground on M1 lead.
3	GM	A,B,F,G, H,I,J,K	2 Pty.	Failure of ground on M2 lead.
3	DIAL	All	All	False battery on BT lead.
4		All	All	Cross on test line T or R, or FT or FR lead to sender.
4		A,B,C,E,F, G,H,I,J,K	All	Open test line T or R, or FT or FR lead to sender, or TRL lead.
4		A	AMA	Open M1 or M2 lead or both.
4		B	AMA	TC relay of district junctor falsely operated.
5,6	S	A,B,F,G, H,I,J,K	All	Failure of S relay to operate or failure of S1 relay to hold over opens.
5-14		C	Noncoin	Failure to hold to trunk S lead on cut-through condition.
8	MCH	A,B,F,G, H,I,J,K	All	False battery on BT lead.
9	MCH	A,B,F,G, H,I,J,K	All except AMA	Failure of CS relay to release.
13	NCH, 1CHG	A,H,I, J,K	Noncoin except AMA	No initial message registration.
13	NCH, 1CHG	B	Coin Overtime	No coin collect at end of initial period.
13	OCH, 1CHG	B	Noncoin except AMA	False message registration.

TABLE 1 — TYPICAL FAILURE INDICATIONS (Cont'd)

TST SEL. POSITION	SIGNIFICANT LAMPS LIGHTED	TEST	CLASS OF DISTRICT JUNCTOR	FAILURE INDICATED
13	OCH, 1CHG	A,I,J,K	Noncoin except AMA	Overcharge on initial registration.
13	TMR	A,B,F,G, H,I,J,K	All except AMA	Too short application of message registration, coin collect or coin return current.
13	TCF	A,F,G,H, I,J,K	All except AMA	TC relay failure.
13	OCH, 1CHG	J	Coin	Premature coin collection.
13	BG	E	All	Cross on condenser in talking path.
13	BB	A,B,F,G	AMA	Failure of CS relay to release.
13	BB	A,B	AMA	Failure of district junctor I relay to operate.
13	1CHG	A,B	AMA	Failure of recording functions of district junctor.
13	RA	A	AMA	Time out of recorder serving district junctor under test.
13	FEA, BB	A	AMA	False answer entry by district junctor under test.
15	C	E	All	Condenser open.
16	TR	C	All	Cross or open on tip or ring, on cut-through condition.
16	TR	C	Coin	Failure to cut-through on reverse battery or failure to hold to trunk S lead.
16	AR	F	All	Failure of automatic release feature.
16	OCH, 2CHG	J	Noncoin except AMA	Overcharge on second period registration.
16	OCH, 2CHG	K	Noncoin except AMA	Failure of timer to release when called subscriber disconnects during initial period.
18	RS	A,B,G,H, I,J		Failure of S and S1 relays to release.
19	DCH	A,B,D,J,K	Coin	Failure to apply coin collect or coin return current on disconnection.
19	DCH	D	Noncoin	Failure of district junctor to restore to normal on early disconnect.
20	DN-LT	A,B,C,E, H,I,J,K	Noncoin	Failure of district junctor to restore to normal.
20	DN-LT	A,B,C,D, E,J,K	Coin	Failure of district junctor to restore to normal.

7. REPORTS

7.01 The required record of these tests should be entered on the proper form.

7.02 A record of the readings of the registers operated during these tests should be made before and after the tests as required.