ROUTINE AND SUPPLEMENTARY TESTS OF KEY PULSING SENDERS

1. GENERAL INFORMATION

1.1 Description of Test

1.11 This section describes the following tests to be made on the key pulsing senders.

ROUTINE TESTS
SUPPLEMENTARY TESTS USING TEST FRAME

1.2 Manload: This is a one man test except for the tests described in Paragraph 3.6.

1.3 Test Procedure

1.31 Refer to Section 161 for general information and method of setting up test calls.

1.32 The performance requirements for key pulsing senders are covered in BSP AA634.001, a copy of which is incorporated in this handbook as Section 0.6.

1.4 Test Call Chart: Since the test frame applies certain tests to both key pulsing and subscriber senders, the same test call numbers may be used for routines 2721 A, B, D, E, G and H as are used for the corresponding tests on subscriber senders.

1.41 Using Figure 1 as a guide, prepare a test call chart. The chart should include calls to check all features specified in the performance requirement that are used in the Telephone Company assignment. Detailed information regarding the selection of test calls is covered in Paragraph 1.3 of Section 162 and Paragraph 4 of Section 161. Information pertaining to the selection of test calls for routine 2721C is covered in Paragraph 2.4 of this section.

2. ROUTINE TESTS

NOTE: Refer to Section 161 for method of setting up test calls and checking lamp information. The section and paragraph numbers listed at the end of the sub-paragraphs refer to the sender test frame CD-25221-01 circuit description sheet.

2.1 Perform the tests listed in the call chart prepared for the job (see Paragraph 1.4) at the frequencies specified in the performance requirements listed in Section 0.6 of this handbook. Where more than one test call is listed for a particular routine, change the test calls on recurring cycles. During the routine tests the test keys should be changed on recurring cycles to conform with the following requirements and to meet the class of service requirements outlined in Paragraph 4.07 of Section 161.

2.2 Full Selector (Rout. 2721-A) Class Key 1 (Sec. -0101 Par. 3)

2.201 Panel and crossbar codes and four numerical digits. Operate the XB-SY key for crossbar codes. (Sec. -0113 Par. 24)

2.202 Office and skip office selections. Keys OB and OG for office selections or SO for no office selections. (Sec. -0108 Par. 5)

2.203 Slow and fast revertive pulsing. SP key operated for slow pulsing. (Sec. -0108 Par. 10)

2.204 Test of MTG relay (marginal trunk guard). Operate the MTG key for routes using the sender MTG relay. (Sec. -0113 Par. 25)

2.205 Alternate route test. Operate the AR key to test the ability of a sender to ask for an alternate route and to function with the resulting translation. This key may be operated for the regular test of any code, except late release or overflow. (Sec. -0133 Par. 12)

2.206 On alternate cycles use 900 ohms and 1600 ohms compensating resistance (sender plus test circuit) by operating OFF-CR and B-OFF-CR keys as described in Paragraph 4.09 of Section 161.

2.207 TM and RM Relay Non-Operate Test: Operate the SKP key as described in Paragraph 4.102 of Section 161. (Sec. -0123 Par. 5 and 6)

2.208 TS and RS Relay Release Test (Sec. -0123 Par. 5)

(a) Operate TRT key and set up numerical digits 3030 for TS relay release test.

(b) Operate RRT key and set up numerical digits 9191 for ring release test.

2.209 AL and AC Relay Premature Operation Test (Sec. -0131 Par. 20)

Set up four numerical digits and operate (CLASS) 1, 2-INC and TCT keys.

2.210 To test "regular" GT testing leads operate LT key on alternate cycles. (Sec. -0131 Par. 8)

2.3 Panel Call Indicator (Rout. 2721-B) (Sec. -0101 Par. 3)

2.31 PCI Tandem Test, operate class key 4. Use any PCI tandem or sender tandem code and four numerical digits.

ROUTINE TESTS

ROUTINE NUMBER	CLASS OF TEST	CLASS KEY	TEST KEYS (SEE NOTE)	DIAL KEYS A B C	DIAL KEYS TH H T U STA	CS	CHECK	Ob OG	COMP.RES. OFF	COMP.RES. BOF	STA. DEL.
2721A	Full Selector	1	MTG, AR, SKP, XB-SY, IG5 (See Par. 2.1 and 2.2.)								
2721B	PCI Direct Tandem	5 4	CAP-PCI, FAS, SKP SD (See Par. 2.3)								
2721C	Operators Error	16 16 16 15 18	DSS (See Par. 2.4)			2-INC 3-TAN 0-DIS 0-DIS 1-TW					
2721D	Late Release - FS	3	See Par. 2.5								
2721E	Late Release - PCI Distant Office Without Distant O.	 8 7	 See Par. 2.62 See Par. 2.61								
2721G	Three Digit Operator Direct Routing Without Distant Off. Crossbar Tandem Off. PCI Routing	 10 11 6	 See Par. 2.71(a) See Par. 2.71(b) See Par. 2.72								
2721H	Off.Overflow - PCI Off.Overflow - FS INC Overflow	13 13 14	See Par. 2.81 See Par. 2.82 MTG L-10F See Par. 2.82								

SUPPLEMENTARY TESTS USING TEST FRAME AND "A" BOARD

	Unassigned Codes	18 18	RVT See Par. 3.1)								
	Automatic Priming	12	See Par. 3.21								
	Stuck Sender	12	See Par. 3.22								
	OF-2 Relay Holding Path	14	See Par. 3.3								
	F-Lead Cross Detecting Feature	1	See Par. 3.4								
	Reorder Feature	-	See Par. 3.5								
	Trouble Release	-	See Par. 3.5								
	Marker Conn. Paths	-	See Par. 3.6								
	Official Reroute	-	See Par. 3.7								
	Sender Block on No Class of Service	-	See Par. 3.8								
	Prefix 1 - 1 Feature	-	See Par. 3.9								

NOTE: Operate different test keys on recurring cycles so that all test conditions are covered over the last required number of cycles. Also use different class of service keys to meet all requirements of Para.4.07 Sec.161

FIG. 1 OUTLINE FOR TEST CALL CHART

(Sec. -0123 Par. 11) Operate the proper key in the STA row and the SD (station delay) key, if required as outlined in Paragraph 4.17 of Section 161.

2.32 PCI Direct, operate class key 5. Use any code for direct PCI and four numerical digits. Operate the proper key in the STA row and the SD key, if required as outlined in Paragraph 4.17 of Section 161. (Sec. -0123 Par. 9)

2.33 To test for short fundamental closure from a PCI trunk, operate the fast assignment key FAS as outlined in Paragraph 4.13 of Section 161. (Sec. -0117 Par. 8)

2.34 Capacity PCI Test. Operate the CAP-PCI key as outlined in Paragraph 4.14 of Section 161. (-0117 Par. 18)

2.35 All station delay features for which cross-connections are provided (Refer to Paragraph 4.17 of Section 161.)

2.4 Operator's Errors (Rout. 2721-C) (Sec. -0101 Par. 3)

2.41 Pull the control buttons of the CTR keys at the sender make busy frame outward. Operate the "skip office" key SO. (Sec. -0125 Par. 17)

2.42 On recurring cycles change the test calls to cover the following conditions:

(a) Trunk to incoming, stations digit keyed. Operate key 2-INC in row CS and class key 16. Set up four numerical Par. 15.1)

(b) Trunk to sender tandem, no code. Operate key 3-TAN in row CS and class key 16. Set up four numerical digits. (Sec. -0123 Par. 15.2)

(c) District junctor, no code. Operate key O-DIST in row CS, key DSS, and class key 16. Set up in rows A, B and C a code which would normally route to an operator, and set up the same three digits in rows TH, H, and T. Operate some key in the U row. On each test, momentarily operate key AV enough times to key three digits, or until the "units" lamp U lights; pause long enough to allow decoding, then operate key AV one more time to complete registration. (Sec. -0123 Par. 15.5)

(d) District junctor, wrong code. Operator key O-DIST in row CS and class key 15. Set up a code normally used with trunks to distant office selectors, and four numerical digits. (Sec. -0123 Par. 15.4)

(e) Trunk to distant office selector, wrong code. Operate key 1-TW in row CS and class key 18. Set up a code normally used with district junctors, and four numerical digits. (Sec. -0123 Par.15.3)

2.5 Late Release - Full Selector (Rout. 2721-D) (Sec. -0101 Par. 3)

(a) Use any crossbar or panel code and four numerical digits. Do not operate the XB-SY key. Operate class key 3. (Sec. -0123 Par. 8)

2.6 Late Release PCI Test (Rout. 2721-E) (Sec. -0101 Par. 3)

2.61 Late Release PCI Test with TW Relay Normal: Operate class key 7 and use any code for direct PCI not routed through a distant office selector, and four numerical digits. (-0117 Par. 17) Operate the proper key in the STA row and the SD key, if required as outlined in Paragraph 4.17 of Section 161.

2.62 Late Release PCI Test with TW Relay Operated: Operate class key 8 and use any code for direct PCI via distant office selector and four numerical digits. Operate the proper key in the STA row and the SD-key, if required, as outlined in Paragraph 4.17 of Section 161. FAS key should be normal for this test. (-0117 Par. 17)

2.7 Three Digit Operator Test (Rout. 2721-G) (Sec. -0101 Par. 3)

NOTE: Use tests per 2.71 and 2.72 on alternate cycles where features of 2.72 are provided. Divide the Direct tests between 2.71(a) and (b) when both routings are provided.

2.71 Direct Routing

(a) Without 2-Wire Office Selector: Operate class key No. 10 and operate a key in the B-OFF-CR row to bring the beyond office compensating resistance to 900 ohms. When the senders are wired for start key operation, set up only the code, otherwise also operate the O keys in rows TH, H, T and U. (Sec. -0129 Par. 12)

(b) Manual Straightforward Thru Crossbar Tandem: Use an operator code routed thru XB tandem (marker CL-6P cross-connection) operate class key 11 and make test in manner as Paragraph 2.71(a). (Sec. -0129 Par. 13)

2.72 PCI Tandem Routing (Class key 6): Use official 3-digit operator code routed thru PCI tandem (marker CL5 cross-connection). Operate the O keys in rows TH, H, T, U and STA. (-0115 Par. 21)

2.8 Office and Incoming Overflow (Rout. 2721-H) (Sec. -0101 Par. 3)

NOTE: This test checks the reaction of the sender when encountering a reversed fundamental loop beyond office trunk test. The test is, therefore, to be made regardless of whether the senders in the particular office under test will work through office selectors. It is not necessary to use codes requiring office selections, although such codes may be used when provided.

2.81 Operate class key 13 for the Office Overflow Test. The total compensating resistance between sender and test circuit should be 900 ohms for office selections and 900 ohms for beyond office. Office selections and compensating resistance should be set up in accordance with alternate route or second trial translation for the code used. Use full selector, PCI and operator codes for this test. (Sec. -0127 Par. 12)

2.82 Operate class key 14 for the Incoming Overflow Test. The total compensating resistance between sender and test circuit should be 900 ohms for all selections. Use any code which is routed full selector on its alternate route or second trial, setting up office selections in accordance with this route. Use any four numerical digits. Tests should be made using codes that require the MTG relay in the sender (MTG key operated) and codes that require the TG relay in the sender (MTG key normal) in order to apply the two speed test conditions to the sender OF and STP relays. On alternate cycles operate the L-IOF key to check that the sender waits for the distant circuit to open the fundamental loop. (Sec. -0127 Par. 15)

3. SUPPLEMENTARY TESTS USING TEST FRAME AND A BOARD

3.1 Unassigned Code: Operate key O-DIST and class key 18. Use an unassigned code and set up four numerical digits. Operate one key in each of the TH, H, T and U rows. Pull out the buttons of the CTR "cancel timed release" keys at the sender make busy frame. (Sec. -0127 Par. 18)

3.2 Check of Sender Lamps and Priming

3.21 Automatic Priming: Push in the control buttons of the CTR keys at the sender make busy frame. Operate keys O-DIST and SO and class key 12, and set up any code for a call from a district. To check the sender timing interval measure the time that "key release" lamp KR is lighted, which should be 20 to 40 seconds. The TA key may be kept operated except when advancing to a new sender in order to permit reading and resetting the stop-watch after each test. (Sec. -0127 Par. 16)

3.22 Stuck Sender: Pull the control buttons of the CTR keys at the sender make busy frame outward. Operate the TA key to prevent bringing in the test circuit alarm. Operate keys SS, REP, SO, class key 1 and O-DIST of row CS and set up any code for a call from a district that does not involve office selections. Operate the ST key and when the IB lamp lights operate the AV key. Observe that the stuck sender lamp at the make busy frame lights and audible alarm functions within 40 to 60 seconds after (IG) lamp lights. The stuck sender register (SS) for the sender group at the make busy frame should score once. Release the ST key and operate and release the CA key. If the senders are arranged to release with the CTR key out (AD wiring) the sender will release and the stuck sender lamp will go out. If the senders are not provided with AD wiring push in the control button of the associated CTR key and make sure that the stuck sender lamp goes out. Release the TA key. (Sec. -0108 Par. 12)

3.23 Repeat the test on the same sender using a code involving office selections. Operate the AV key a sufficient number of times to complete incoming brush selections and observe that the stuck sender lamp lights within 70 to 90 seconds after lamp (IG) lights. Restore the CTR key upon completion of the test.

3.3 Supplementary Holding Path of OF-2 Relay (AF Wiring)

3.31 Set up a full selector test with the Incoming Overflow Test Class Key No. 14 operated. Insulate contacts 8T and 9T of the FR relay of the OFL CONT KP part of the test circuit. Use 900 ohms compensating resistance. (Sec. -0127 Par. 15)

3.32 Operate the ST key. The test should progress through incoming group selection and should then block with the OF lamp lighted. After about 10 seconds, remove the insulation from the FR relay and observe that the test call is completed. Failure of the test frame to block in the OF position would indicate trouble in the supplementary holding path for the OF-2 relay.

3.33 Make this test on all KP senders arranged for AF wiring. Remove the insulation from 8 and 9T of relay FR when the test is completed. (-0127 Par. 15.5)

3.34 The test of the OF-2 relay holding path is identical for both KP and subscriber senders and, therefore, this test may be applied at the same time as the test per Paragraph 3.11 of Section 162.1 is applied to subscriber senders.

3.4 Test of F Lead Cross Detecting Features

3.41 Operate class key 1 and set up a full selector call. Depress the F-1 and F-3 frame indication keys. Operate the ST key and note that the test frame blocks with the RL lamp lighted. If the winding of the CK relay is open, the test frame will block with the CD and the D lamps lighted. Operate and release the CA key and test the next sender. This test is identical to the test on subscriber senders per Paragraph 3.12 of Section 162.1 and, therefore, may be applied at the same time that subscriber senders are tested.

3.5 Test of Reorder and Trouble Release Feature

3.51 Select a convenient 3-digit operator code that has no alternate route and make all trunks of this group

busy. Make all senders busy except the one to be tested. Select a second 3-digit code and have at least one trunk idle.

3.52 Select an A Board district junctor for use in making the following tests. Make busy all channels by making all secondary switches of the district link busy.

3.53 At the A board insert a special service calling cord into the district trunk and momentarily operate the KP key. Check that the KP and S lamps light. Key one digit and then remove the calling cord from the jack and note that the KP and S lamps are extinguished.

3.54 Plug a cord into the district trunk and originate a call to the busy trunk group. Note that a reorder signal is received.

3.55 Make a test call to the second trunk group. The marker finding all channels busy will give trouble release. A second trial will be made, followed by trouble release, which in turn causes the sender to return a reorder signal to the trunk.

3.56 Make the tests on each sender. Also make the markers busy as necessary and make a sufficient number of tests to use each marker at least once through every marker connector in which key pulsing senders appear.

3.57 Upon completion of the test, remove all make busy plugs.

3.6 Test of Paths Through the Marker Connectors

3.61 Apply the tests listed on the call chart to one sender in each marker connector using each marker.

3.62 These tests may be combined with the routine tests if they can be administered without causing interference with other tests.

→ Arrowed lines indicate new or changed information.

3.7 Official Reroute Test

NOTE: This test is made on senders which are arranged to reroute calls for OFF-9300. The sender is equipped with Figure J and AG wiring. (Sec. -0113 Par. 29)

3.71 Operate the ORR key. Set up a full selector test using test call OFF-9300. The XB-SY key should be normal. Operate the ST key. The test proceeds through all senders. If a test failure occurs, the ORR lamp will be lighted.

3.72 Leave the ORR key operated. Operate the AR key. Set up the proper route keys for the alternate route for OFF-9300. Operate ST key to start the test.

3.73 Release the AR and ORR keys. Operate XB-SY key and set up the regular route keys for OFF-9100. Operate the ST key to start the test.

3.74 Repeat the test of Paragraph 3.73 using code OFF-9200.

3.8 Sender Block on No Class of Service Indication

3.81 Set up a test call except that no CS key is to be operated and note that the call blocks. (-0131 Par. 9-11)

3.82 Set up a test call except that no frame indication key is to be operated and note that the call blocks.

3.83 Set up a test call except that the FA0 and FA1 keys are to be normal and note that the test call blocks.

3.9 Test of Prefix 1-1 Feature

3.91 Set up a full selector class of call (class key 1) or a PCI tandem call (class key 4) with an extended area code and operate the 1-1 (one-one) key. (Sec. -0105 Par. 8)

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