85A1 DATA SELECTIVE CALLING SERVICE STATIONS 100-WORD PER MINUTE HALF-DUPLEX OPERATION TEST PROCEDURES

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1. GENERAL

1.01 This section contains information on testing of the 85A1 Data Selective Calling Service Stations, 100-Word Per Minute Half-Duplex Operation, hereafter referred to in this practice as the station.

1.02 This section is reissued for the following reasons:

- To provide information on the data auxiliary set (DAS) 820J-type controller that is used for RO and ROTR service.
- To include test procedures for testing the DAS 820J-L1/2 controller equipped station.
- To include a sectionalizing trouble chart for the DAS 820J-L1/2 controller.
- To add identifying figures of each type controller.
- To incorporate minor changes throughout this section.

Since this reissue constitutes a general revision, marginal arrows ordinarily used to denote changes have been omitted.

1.03 Both installation testing and troubleshooting information are included in this section. Some of the tests are identical; therefore, each test is presented only once. Attended station testing with the STC should be performed when a station is installed to verify proper station operation. This test is also used to sectionalize trouble.

1.04 An installation test of the station will consist of the following tests:

- Local tests
- Loop-back test of 108-type or 109E data set
- Attended station testing with STC.

1.05 The troubleshooting sequence will be determined by the nature of trouble being investigated. In general, the station will have to be tested by the STC or CSTC (controlling serving test center) to determine the nature of trouble. Refer to the

practice entitled 85A1 Data Selective Calling Service Stations—100-Word Per Minute Half-Duplex Operation— Maintenance (581-131-300) for additional troubleshooting and trouble clearing procedures. Any or all of the following tests or procedures may be used in investigating a trouble condition:

- Local test
- Loop-back test of data set 108-type or 109E
- Alternate troubleshooting tests and substitution procedures
- Continuity test of data auxiliary set 804N-type or 804R7
- Attended station testing with STC.

1.06 Tools and materials required:

- KS-14510-L1 volt-ohm-milliammeter
- 1011-type handset
- KS-16785-L3 plug.

2. INSTALLATION TESTS

2.01 The installation tests are used to verify that the station has been installed properly and is operative as part of the 85A1 Data Selective Calling Service System.

2.02 After completing the installation of a station, perform the applicable test procedures contained in Part 4 or 5 of this practice. Refer to 1.04 for a list of the tests required to verify that a station is properly installed and operative.

> ***Note:*** When a station is equipped with a data set 109A, loop-back testing of the station is not possible due to the design of the data set.

3. TROUBLESHOOTING

3.01 The troubleshooting procedure should be performed in accordance with the maintenance philosophy given in the section entitled 85A1 Data Selective Calling Service Stations—100-Word Per Minute Half-Duplex Operation—Maintenance (581-131-300).

3.02 Maintenance procedures for the TTYs associated with the station should be performed in accordance with the applicable parts of the following sections.

- Model 33 Teletypewriter—Field Maintenance Practice (FMP) (579-200-350)
- Model 35 Teletypewriter—Field Maintenance Practice (FMP) (579-210-350).

Before testing a station, the type controller used at the station and the options used should be determined from the service order or station line card. The STC or CSTC must be informed of the type controller and the options provided so the options can be verified and the test "tailored" to the individual station (eg, the station stops on STX or the station does not stop on STX, etc). Unless this information is verified, an invalid test may result. Refer to Tables A, B, and C for information on the options that may exist at a station.

4. TEST PROCEDURES

PREPARING TEST TAPE (ASR TTY ONLY)

> ***Note:*** When preparing a message, insert approximately 3 inches of deletes (DEL) between one message and the next in order to aid in identifying each of the messages. A message begins with the start of heading (SOH) and ends with the end of text (ETX). A transmission begins with the start of heading (SOH) and ends with the end of transmission (EOT). A typical message format is shown in Fig. 1.

4.01 A test tape should be prepared before beginning the test procedure. To prepare the test tape, proceed as follows:

(1) Condition the TTY for off-line operation by operating the MODE switch to the OFF-LINE position. The OUT OF SVC lamp lights.

(2) Start with approximately 3 inches of deletes (DEL) and proceed to type the test tape message shown in Fig. 1, ending with sufficient deletes (DEL) to ensure that the EOT can be

detected by the reader.

LOCAL TEST

4.02 The following test should be performed to verify that the station functions properly. No attempts should be made to test the station with the STC or CSTC until it has been verified that the TTY, and associated components which are part of the station, are operative.

4.03 To perform a local test of the station, proceed as follows:

(1) Supply power to the station. This will initialize the circuits of the data auxiliary set 820G- or 820J-type.

Note: In the following steps, the alarms and associated indicator lamps are checked to verify that they are operative. The audible alarm can be optionally disabled.

(2) Verify that the AUD OFF lamp is extinguished. If the lamp is lighted, it can be extinguished by depressing and restoring the AUD OFF key.

(3) Use a nearby telephone, if available, to call the STC or CSTC and request a release. The STC will connect the loop to a test hub when the release is granted and will acknowledge release. This prevents interrupting service in the rest of the system.

Take proper steps to ensure that the customer is not billed for test calls. Refer to the section entitled Crediting Charges on Test Calls (010-250-001).

(4) When the station is equipped with an ASR TTY, condition the TTY for on-line operation.

(5) Remove the paper supply. The PAPER lamp should light and the alarm should sound.

Note: If the primary station is a 35 ROTR TTY, remove the tape. This is analogous to the removal of the paper supply and will cause a corresponding alarm indication.

(6) Operate the AUD OFF key. The AUD OFF lamp should light and the alarm should be silenced.

(7) Replace the paper (or tape) supply. The PAPER (TAPE) lamp will remain lighted.

(8) Operate the PAPER (TAPE) key. The PAPER (TAPE) lamp will be extinguished.

(9) Restore the AUD OFF key. The AUD OFF lamp will be extinguished.

Note: In the preceding steps, the alarm would have sounded each time an alarm condition was encountered unless the AUD OFF key had been operated.

(10) Operate the OUT OF SVC key. This key is operated to place the station in an out-of-service status. When the key is operated while the station is unselected, the OUT OF SVC lamp lights, the station will give a not-ready response to call in, the SEL lamp will flash once, and the alarm will momentarily sound. When the key is operated while a station is selected, the lamp will not light and the key operation will not take effect until the station becomes unselected. Operation of this key will not inhibit the station from making a response. Operation of the key will cause the TTY motor to turn off unless the station is selected. The OUT OF SVC lamp will also light when the station is in the loop-back or the off-line mode.

(11) Operate the OUT OF SVC key. The OUT OF SVC lamp will extinguish and the station is restored to service.

Note: When an ASR TTY is used at a station, the mechanical operation of the TTY can be checked by going off-line and using the keyboard to verify operation of the machine. When a RO TTY or ROTR TTY is provided, a similar mechanical check of the unit cannot be made.

ASR Stations Only

(12) Condition the station TTY for the off-line mode of operation.

(13) Check the mechanical operation of the TTY (by typing *U*U,..etc) to verify that

the TTY is operational. Refer to the previously referenced FMPs for information on the repair and adjustment of the TTY.

(14) Remove the TTY from the off-line mode.

(15) Perform the loop-back test of data set 108-type or 109E to verify operation of the data set and loop facilities.

RO and ROTR Stations Equipped With DAS 820J-L1/2

Note: In order to perform the following tests, it is necessary to gain access to the DAS 820J-L1/2 controller. Refer to the Section entitled 85A1 Data Selective Calling Service Stations—100-Word Per Minute Half Duplex Operation—Maintenance (581-131-300).

4.04 The DAS 820J-L1/2 controller provides a data bypass switch (designated T) on the controller. Operation of the T switch supplies data set signals, via the controller interface, to the TTY thereby bypassing the controller logic circuits. This allows additional testing of the TTY using signals from the STC.

LOOP-BACK TEST OF DATA SET 108-TYPE AND 109E

4.05 The remote test of the data set 108-type or 109E also necessitates gaining access to the DAS 820G-type or 820J-L1/2. Perform the following steps to check the operation of the data set and verify that the loop facilities are operative.

Note: This test is essentially the same as Action B in the attended test.

(1) Use a nearby telephone to call the STC or CSTC and request a test of the DS 108-type or 109E.

(2) The STC or CSTC will request that the NORM-MTCE switch be operated to the MTCE position to loop back the data set.

(3) The STC or CSTC can now perform a remote test of the DS 108-type or 109E to verify that the data set and loop facilities are operating properly.

(4) Verify that nothing is typed at the station.

(5) After completion of the test, return the NORM-MTCE switch to the NORM position.

4.06 The TTY range adjustments and/or adjustments to any auxiliary receiver should be made with a test signal that is transmitted from the STC. The station controller regenerates signals between the line and the TTY. Signals sent from the station reader in the OFF-LINE mode are not regenerated by the station controller. Range finder settings for ASR units (typing unit and punch, M35 only) can be made with the station in the OFF-LINE mode and then verified with signals from the STC. Range finder settings for the primary and auxiliary RO and ROTR must be made with STC signals.

ATTENDED STATION TESTING WITH STC—STATION EQUIPPED WITH DAS 820G-TYPE CONTROLLER

4.07 This is a concurrent test between an attended station and an STC or CSTC in which voice communication must be established and maintained throughout the test. The STC using Section 666-702-500 will ask the craft employee at the station to provide the alphanumeric characters for the SCC and SIC which will be required by the STC during the test.

4.08 The STC can test poll the station by sending the ENQ-EOT-DLE sequence followed by the SCC. The station will respond with ACK (or SIC), NAK, or CAN depending on the condition of the station and the options provided by the station. The test poll does not pick up traffic and it gives no visual indications to the station attendant that a poll is being made.

4.09 This station test procedure has some steps that require no action or verification by the Telco employee. A statement giving information on STC testing is often included in parentheses to aid the attendant in following the test progress at the STC.

4.10 When a step cannot be verified, refer to the same step number in Table D for a listing of components or items that may be the cause of the trouble condition or malfunction. Table D may be used for either DAS 820G-L1/4 or DAS 820G-L1/5, although only DAS 820G-L1/4 is shown. When L1/5 controller is provided, circuit pack AR268 is used in place of AR273. Therefore, by changing all AR273 references to AR268, Table D can be used for DAS 820G-L1/5.

4.11 When DAS 820G1 is used, refer to Table E. Table E provides a cross-reference between the cards used in the 820G-L1/4 (shown in Table D) and the cards used in the 820G1, 820G-L1/4, and 820G-L1/5 controllers. This cross-reference allows Table D to be used for troubleshooting all of the controllers in 85A1 service. For example, Table D lists the card or unit in the 820G-L1/4 that is the probable cause of trouble. If the circuit pack given in Table D is AR273, Table E shows the equivalent circuit packs as follows:

820G1	AR194
820G-L1/4	AR273
820G-L1/5	AR268

4.12 Several steps in Table D refer to Action A and Action B which are defined as follows:

Action A: Initialize station by having the STC send ENQ-DC2-ETX-EOT-DEL which returns the controller logic to the idle condition and then repeat the step.

Action B: Operate the NORM/MTCE switch to MTCE and have the STC perform a check of the line facilities and data set. After the check, operate the NORM/MTCE switch to NORM.

Note: Before starting this test, make sure the station leg is connected to a test hub and establish voice communication with the STC to aid in coordinating the test.

4.13 Perform the following Step-Action-Verification to check an attended DSCS station that uses a DAS 820G1 (Fig. 2) or DAS 820G-L1/- (Fig. 3) controller.

85A1 Service, Sectionalizing Trouble-Attended Station Testing (DAS 820G-Type Only)

STEP	ACTION	VERIFICATION
1	None (STC sends ENQ-DC2-ETX-EOT-DEL to initialize.)	SEL lamp OFF.
2	Check paper, form, or tape supply in TTY. Clear all alarms that may be on, check that OUT OF SVC and AUD OFF keys in attendant set are released. Check for no tape in tape reader. On ASR TTY, set the mode switch to the LINE position.	In attendant set: all lamps extinguished and audible alarm silent; all keys released. ASR TTY motor on (for 35 ASR). ON LINE lamp lights.
3	Operate MTCE/NORM switch on the controller to MTCE.	
4	None (STC sends to test for distortion of characters.)	None
5	Return MTCE/NORM switch on the controller to NORM.	
6	Operate OUT OF SVC key in attendant set.	OUT OF SVC lamp lights.
7	None (STC sends ENQ-SCC.)	SEL lamp flashes once and audible alarm sounds momentarily.
8	Release OUT OF SVC key in attendant set.	OUT OF SVC lamp extinguishes.

STEP	ACTION	VERIFICATION
9	Create paper alarm by real or simulated removal of paper, form, or tape from the machine.	PAPER lamp lights; audible alarm sounds.
10	None (STC sends ENQ-SCC.)	SEL lamp flashes once.
11	Replace paper, form, or tape in the machine. Momentarily operate PAPER key on attendant set.	PAPER lamp extinguishes; audible alarm becomes silent.
12	None (STC sends ENQ-SCC.)	SEL lamp lights. (33 ASR, 33 RO, 35 RO, 35 ROTR and 35 ASR in unattended mode, the motor(s) start.)
13	None (STC sends SOH-HEADINGS-DEL.)	TTY prints (or punches) HEADING.
14	None (STC sends ENQ and a character that is different from SCC.)	None
15	None (STC sends several characters.)	None
16	None (STC sends ENQ-DC2.)	None
17	None (STC sends TDM-STX-TEXT 1-DC2-TEXT 2-DC4-FF-DEL.)	Primary machine prints or punches TDM-STX (punched only)-TEXT 1-TEXT 2 (if no print suppression). Form feeds (if sprocket feed machine). Aux types or punches TEXT 2.
18	None (STC sends roll-call ETX-ENQ-SCC.)	If primary machine is an ROTR and has tape feed on roll call option, tape feeds out.
19	None (STC sends disconnect EOT-DEL.)	SEL lamp extinguishes. If primary machine is an ROTR and has the push out EOT option, an EOT should be punched in the tape. If disconnect feed out option is provided, the tape feeds out and the motor stops.
20	None (STC sends call-in ENQ-SCC-ENQ-DC2-TEXT.)	Motor(s) start, SEL lamp lights; TEXT received on primary machine.
21	None (STC sends character with parity error-TEXT-ETX-ENQ-SCC-EOT-DEL.)	MSG ERROR lamp lights; audible alarm sounds (if option is in). Underline is printed for character with parity error. SEL lamp extinguishes and motor stops.
22	Operate the MSG ERROR key on the attendant set. (STC will then send ENQ-SCC.)	SEL lamp lights. Motor(s) start.
23	None (STC sends ENQ-DC2-TEXT-BREAK-ENQ-EOT-EOT.)	Machine copies TEXT underlines for characters with parity error. MSG ERROR lamp lights,

STEP	ACTION	VERIFICATION
		audible alarms sounds, SEL lamp extinguishes and motor stops.
24	Operate the MSG ERROR key on the attendant set	MSG ERROR lamp extinguishes and audible alarm is silenced.
25	None (STC sends ENQ-SCC.)	None
26	None (STC sends ENQ-SCC.)	SEL lamp lights. Motor(s) start.
27	None (STC causes a carrier fail condition.)	MSG ERROR lamp lights; audible alarm sounds. An underline is printed for characters with parity error. SEL lamp extinguishes and motor stops.
28	Operate MSG ERROR key on attendant set.	Audible alarm becomes silent. MSG ERROR lamp extinguishes.
29	None (STC sends ETX-ENQ-SCC ***wait for station to respond*** EOT-DEL)	None
30	Check that ASR is in the ON-LINE mode with no tape in the gate of the tape reader. Operate the OUT OF SVC key on the attendant set.	OUT OF SVC lamp lights. 35 ASR motors stop.
31	None (STC sends DLE-SCC.)	None
32	Release OUT OF SVC key on attendant set.	OUT OF SVC lamp extinguishes.
33	None (STC sends a character other than SCC.)	None
34	If not previously prepared, prepare tape: DEL-... DEL-SOH-CR-LF-A-B-C-DEL-STX-TEXT-ETX-EOT-DEL-... DEL. Insert this tape into gate at initial DELs, operate bat handle to RUN.	BID lamp lights.

Note: The station transmission can optionally be arranged to stop upon receipt of control codes (SOH, STX, ETX, EOT) received from the tape. Stopping of the tape is indicated in the following test; however, due to equipment design the tape stops one or two characters (depending on the TTY used) after the control code is read. Due to differences in equipment, the exact character the tape stops on is not indicated.

35	None (STC sends DLE-SCC.)	(a) SEL lamp lights. ***or*** (b) SEL lamp lights and tape advances and stops after SOH, depending on controller option. ***or***

STEP	ACTION	VERIFICATION
		(c) SEL lamp lights and tape advances and stops after STX. Station may or may not copy A-B-C, depending on controller option. ***or*** (d) SEL lamp lights and tape advances and stops after ETX. ***or*** (e) SEL lamp lights and tape advances and stops after EOT. SEL lamp extinguishes.

Note: If the verification is 35(a), proceed to Step 36. If 35(b), proceed to Step 37. If 35(c), proceed to Step 38. If 35(d), proceed to Step 39. If 35(e), proceed to Step 40.

36	None (STC sends STX.)	(a) Tape advances and stops after SOH. ***or*** (b) Tape advances and stops after STX. Station may not copy A-B-C, depending on controller option. ***or*** (c) Tape advances and stops after EXT. ***or*** (d) Tape advances and stops after EOT. SEL lamp extinguishes.

Note: If the verification is 36(a), proceed to Step 37. If 36(b), proceed to Step 38. If 36(c), proceed to Step 39. If 36(d), proceed to Step 40.

37	None (STC sends STX.)	(a) Tape advances and stops after STX. Station may or may not copy A-B-C, depending on controller option. ***or*** (b) Tape advances and stops after ETX. (c) Tape advances and stops after EOT. SEL lamp extinguishes.

NOTE: If the verification is 37(a), proceed to Step 38. If 37(b), proceed to Step 39. If 37(c), proceed to Step 40.

38	None (STC sends ENQ-DC2-STX.)	(a) Tape advances and stops after ETX. Station copies test. ***or*** (b) Tape advances and stops after EOT. Station copies test. SEL lamp extinguishes.

Note: If the verification is 38(a), proceed to Step 39. If 38(b), proceed to Step 40.

STEP	ACTION	VERIFICATION
39	None (STC sends DLE-STX.)	Tape advances and stops after EOT. SEL lamp extinguishes.
40	None (STC sends DLE-SCC.)	(a) SEL lamp lights. ***or*** (b) SEL lamp lights and BID lamp extinguishes. TAPE lamp lights and audible alarm sounds. Depending on controller and option, audible alarm may not sound.

Note: If the verification is 40(a), proceed to Step 41. If 40(b), proceed to 42.

41	None (STC sends STX.)	SEL lamp remains lighted and BID lamp extinguishes. TAPE lamp lights and audible alarm sounds. Depending on controller and option, audible alarm may not sound.
42	Operate TAPE key on attendant set.	SEL lamp lighted, TAPE lamp extinguishes, and audible alarm is silenced if not already silent.
43	None (STC sends BREAK-PAUSE-ENQ-EOT-EOT.)	SEL lamp extinguishes. Emergency alarm sounds.
44	Insert test tape into the gate at initial DELS; operate the bat handle to RUN.	BID lamp on the attendant set lights.
45	None (The STC will repeat the applicable parts of Steps 35 through 40 to check operation of BID key.)	At the completion of Step 40, all lamps at the station attendant set should be off.
46	Remove tape and release the BID key.	None
47	Insert test tape into the gate at initial DELS; operate the bat handle to RUN.	BID lamp on the attendant set lights.
48	None (The STC will repeat the applicable parts of Steps 35 through 38 and perform an emergency stop during transmission of the TEXT.)	EMG STOP lamp lights and audible alarm sounds. Tape stops. SEL and BID lamps are off.
49	Operate EMG STOP key on attendant set.	EMG STOP lamp extinguishes, audible alarm silenced, and BID lamp lights.
50	Insert test tape into the gate at initial DELS; operate the bat handle to RUN.	BID lamp is lighted.
51	The STC will repeat the applicable parts of Steps 35 through 38. During TEXT transmission, cause a paper-out condition.	Friction Feed machine: PAPER lamp on the attendant set lights, audible alarm sounds, tape continues to run. Sprocket Feed machine:

STEP	ACTION	VERIFICATION
		PAPER lamp on the attendant set lights, audible alarm sounds, tape stops, and BID lamp extinguishes. Depress PAPER key to continue transmission if 820G-L1/- controller is used.
52	Remove tape from tape reader.	Tape lamp lights.
53	Replace the paper in the ASR.	None
54	Depress PAPER key on attendant set.	PAPER lamp extinguishes and audible alarm becomes silent.
55	Depress the TAPE key.	TAPE lamp extinguishes.
56	None (STC sends BREAK-PAUSE-ENQ-EOT-EOT.)	SEL lamp extinguishes.

Note: For Friction Feed machines perform Steps 57 through 59. For Sprocket Feed machines perform Steps 60 through 62.

57	None (STC sends ENQ-SCC.)	SEL lamps lights.
58	Cause a paper-out condition.	Audible alarm sounds when the paper-out condition occurs. PAPER lamp lights. The station remains selected (SEL lamp remains lighted).
59	Restore paper and operate the PAPER key.	Alarm condition canceled, PAPER lamp is extinguished.
60	None (STC sends ENQ-SCC.)	SEL lamp lights.
61	Cause a paper-out condition.	Audible alarm sounds when the paper-out condition occurs. ERROR lamp lights, PAPER lamp lights, and SEL lamp extinguishes (station unselects).
62	Restore paper and operate the PAPER key.	Alarm condition canceled, PAPER lamp is extinguished.
63	None (STC sends ENQ-DC2-ETX-EOT-DEL.)	Station returns to idle state.

END OF TEST

ATTENDED STATION TESTING WITH STC—STATION EQUIPPED WITH DAS 820J-L1/2 CONTROLLER

4.14 This is a concurrent test between an attended station and an STC or CSTC in which voice communication must be established and maintained throughout the test. The STC using Section 666-702-500 will ask the craft employee at the station to provide the alphanumeric characters for the SCC, SIC and station options which will be required by the STC during the test.

4.15 This station test procedure has some steps that require no action or verification by the Telco employee. A statement giving information on STC testing is often included in parentheses to aid the attendant in following the test progress at the STC.

4.16 When a step cannot be verified, refer to the same step number in Table F for a listing of components or items that may be the cause of the trouble condition or malfunction.

4.17 Several steps in Table F refer to Action A and Action B which are defined as follows:

Action A: Initialize station by having the STC send ENQ-DC2-ETX-EOT-DEL which returns the controller logic to the idle condition and then repeat the step.

Action B: Operate the NORM/MTCE switch to MTCE and have the STC perform a check of the line facilities and data set. After the check, operate the NORM/MTCE switch to NORM.

Note: Before starting this test, make sure the station leg is connected to a test hub and establish voice communication with the STC to aid in coordinating the test.

4.18 Perform the following Step-Action-Verification to check an attended DSCS station that uses a DAS 820J-L1/2 controller (Fig. 4).

85A1 Service, Sectionalizing Trouble-Attended Station Testing (DAS 820J-L1/2 Only)

STEP	ACTION	VERIFICATION
1	None (STC sends ENQ-DC2-ETX-EOT-DEL to initialize.)	SEL lamp off.
2	Check paper, form, or tape supply in TTY. Clear all alarms that may be on, check that OUT OF SVC and AUD OFF keys in attendant set are released.	In attendant set, all lamps extinguished and audible alarm silent; all keys released. TTY motor off.
3	Operate MTCE/NORM switch on the controller to MTCE.	OUT OF SVC lamp lights.
4	None (STC sends to test for distortion of characters.)	None
5	Return MTCE/NORM switch on the controller to NORM.	OUT OF SVC lamp extinguishes.

Note: At this time the RO and ROTR TTYs can be tested with unregenerated signals by performing steps 6 through 10. If this test is not required, these steps may be omitted.

6	Operate the DAS 820J-L1/2 T switch (Data Bypass switch) to ON.	OUT OF SVC lamp lights.
7	Gain access to the TTY MAINT ON-OFF-NORM ON switch and operate to the MAINT ON position.	TTY motor starts.
8	None (STC will transmit signals for testing.)	TTY will copy STC transmission.
9	Return MAINT ON-OFF-NORM ON switch to NORM ON position.	TTY motor stops.

STEP	ACTION	VERIFICATION
10	Return the T switch to the OFF position.	OUT OF SVC lamp extinguishes.
11	Operate OUT OF SVC key in attendant set.	OUT OF SVC lamp lights.
12	None (STC sends ENQ-SCC.)	SEL lamp flashes once and audible alarm sounds momentarily.
13	Release OUT OF SVC key in attendant set.	OUT OF SVC lamp extinguishes.
14	Create paper alarm by real or simulated removal of paper, form, or tape from the machine.	PAPER lamp lights; audible alarm sounds.
15	None (STC sends ENQ-SCC.)	SEL lamp flashes once. The motor is off.
16	Replace paper, form, or tape in the machine. Momentarily operate PAPER key on attendant set.	PAPER lamp extinguishes; audible alarm becomes silent.
17	None (STC sends ENQ-SCC.)	SEL lamp lights, motor starts.
18	None (STC sends SOH-HEADINGS-DEL.)	TTY prints (or punches) HEADING.
19	None (STC sends ENQ and a character that is different from SCC.)	None
20	None (STC sends several characters.)	None
21	None (STC sends ENQ-DC2.)	None
22	None (STC sends TDM-STX-TEXT 1-DC2-TEXT 2-DC4-FF-DEL.)	Primary machine prints or punches TDM-STX (punched only)-TEXT 1-TEXT 2 (if no print suppression). Form feeds (if sprocket feed machine). Aux types or punches TEXT 2.
23	None (STC sends roll-call ETX-ENQ-SCC.)	If primary machine is an ROTR and has tape feed on roll call option, tape feeds out.
24	None (STC sends disconnect EOT-DEL.)	SEL lamp extinguishes and motor stops. If primary machine is an ROTR and has the push out EOT option, an EOT should be punched in the tape. If diconnect feed out option is used, the tape feeds out and the motor stops.
25	None (STC sends call-in ENQ-SCC-ENQ-DC2-TEXT.)	SEL lamp lights; motor starts. TEXT received on primary machine.
26	None (STC sends character with parity error-TEXT-ETX-ENQ-SCC-EOT-DEL.)	MSG ERROR lamp lights; audible alarm sounds (if option is in); SEL lamp extinguishes.

STEP	ACTION	VERIFICATION
		Underline is printed for character with parity error.
27	Operate the MSG ERROR key on the attendant set. (STC will then send ENQ-SCC.)	SEL lamp lights. Motor starts.
28	None (STC sends ENQ-DC2-TEXT-BREAK-ENQ-EOT.)	Machine copies TEXT underlines for characters with parity error. MSG ERROR lamp lights, audible alarm sounds, SEL lamp extinguishes, and motor stops.
29	Operate the MSG ERROR key on the attendant set	MSG ERROR lamp extinguishes and audible alarm is silenced.
30	None (STC sends ENQ-SCC.)	None
31	None (STC sends ENQ-SCC.)	SEL lamp lights. Motor starts.
32	None (STC causes a carrier fail.)	MSG ERROR lamp lights; audible alarm sounds. An underline is printed for characters with parity error. SEL lamp extinguishes and the motor stops.
33	Operate MSG ERROR key on attendant set.	Audible alarm becomes silent. MSG ERROR lamp extinguishes.
34	None (STC sends ETX-ENQ-SCC.)	None
35	None (STC sends EOT-DEL.)	None

END OF TEST

5. ALTERNATE TROUBLESHOOTING TESTS AND SUBSTITUTION PROCEDURES FOR DAS 820G-TYPE CONTROLLERS

A. DAS 820G-Type

5.01 Maintenance of the data auxiliary set 820G-type station controller can be accomplished by subsitution of circuit packs and using the 1011-type handset to monitor the signals received and transmitted by the controller. Refer to Fig. 2 and 3 and Tables G, H, I and J for information on circuit pack substitution and tests using the 1011-type handset.

5.02 Tables G and H outline the more likely trouble conditions and give the suggested order of circuit pack substitution to isolate the circuit pack or packs that are in trouble. Tables I and J outline the test procedures using the 1011-type handset to locate the trouble condition.

The following tests and substitutions should not be performed until the line facilities and associated data set have been checked and verified to be operative as indicated in the practice entitled 85A1 Data Selective Calling Service Stations—100-Word Per Minute Half-Duplex Operation—Maintenance (581-131-300). When the circuit packs of the DAS 820G-type are to be replaced or substitutions made, refer to the previously referenced BSP for information on the replacement procedures for the CPs.

5.03 The STC or CSTC will attempt to place the DAS 820G-type in the loop-back mode. If

the DAS 820G-type can be placed in the loop-back mode, it can be assumed that AR190 CP is functioning properly. When the DAS 820G-type cannot be placed in the loop-back mode, the procedure outlined in Tables I and J and the associated text should be followed.

Disconnect all power from the station and visually inspect the wiring terminals for shorting, loose wires, etc, before proceeding with the following circuit pack substitutions.

5.04 Tables G and H show the relationship between groups of circuit packs and the controller functions. Tables G and H also list specific functional troubles and the circuit packs that may be suspected of causing this trouble. The columns are designated (from left to right) as follows:

(1) Trouble (probable troubles to be encountered)

(2) Tables G and H Test Number (the handset tests that will aid in the isolation of circuit packs in trouble)

(3) Possible Option (installer options)

(4) Circuit Packs to be Replaced (numbered in the suggested order of replacement).

5.05 The test outlined in Tables G and H may be used, if desired, to narrow down the list of possible circuit packs in trouble. The columns, under Circuit Packs to be Replaced, are numbered in the suggested order of replacement. All previously substituted CPs should be left in place until further substitutions eliminate the trouble condition. In order to determine the CPs which caused the trouble, return the removed CPs in the order they were removed until the trouble condition returns. Leave each old CP in place after determining that it is not in trouble. If the trouble condition persists after all of the suggested CPs have been replaced, then the entire controller should be replaced.

5.06 Tables I and J can be used to expedite the isolating of the CPs that are in trouble. This is accomplished by using the test points to monitor functions such as timing, data input, data output, and control signal detection. Tables I and J columns (from left to right) are as follows:

(1) Test Number

(2) Circuit Pack (circuit packs containing test points)

(3) Test Point (test point position numbers)

(4) Action To Be Taken (action required by STC or maintenance personnel)

(5) 1011-Type Handset Receiver Indications (test results or response).

5.07 The tests given in Table I and J are performed as follows:

(1) The 1011-type handset is conditioned for the TALK mode.

(2) Connect one of the handset leads to ground (TP 14 on AR190 CP).

(3) Connect the other handset lead to the test point indicated in Tables I and J.

The Handset Receiver Indications column includes the required receiver indication with an ordered list of CPs that should be replaced if the proper response is not obtained. When the response indicated by Tables I and J is obtained and the trouble condition still exists, the substitution procedure outlined in Tables G and H will have to be performed. When this is the case, previously substituted CPs will not have to be replaced.

5.08 The elimination of all trouble conditions by the substitution of CPs is not always possible since the source of trouble may be associated with nest wiring, connectors, power supply, etc. In such cases, replacement of the complete station controller DAS 820G-type will be required.

B. Continuity Test of DAS 804N-Type and 804R7

Continuity Test of DAS 804N3 or 804R7

5.09 This test checks the continuity of the keys and cabling associated with DAS 804N3 or 804R7 (refer to Table K).

Remove the power cord to the customer-provided ac receptacle before performing this test.

(1) Gain access to the DAS 820G-type or 820J-L1/2. Refer to the applicable section on the practice entitled 85A1 Data Selective Calling Service Stations—100-Word Per Minute Half-Duplex Operation—Maintenance (581-131-300).

(2) Disconnect the N plug from DAS 820G-type or 820J-L1/2.

(3) Connect a KS-16785-L3 plug (not part of station) to the N connector.

(4) Using a KS-14510-L1 volt-ohm-milliammeter, perform continuity test shown in Table K by using the pins of the KS-16785-L3 plug to make the connections.

Continuity Test of DAS 804N5

5.10 This test checks the continuity of the keys, lamps, and cabling associated with DAS 804N5.

Remove the power cord to the customer-provided ac receptacle before performing this test.

(1) Gain access to DAS 820G-type or 820J-L1/2. Refer to 5.09 (1).

(2) Disconnect the N plug from DAS 820G-type or 820J-L1/2.

(3) Connect a KS-16785-L3 plug (not part of station) to the N plug.

(4) Using a KS-14510-L1 volt-ohm-milliammeter, perform continuity test shown in Table L by using the pins of the KS-16785-L3 plug to make the connections.

6. STATION IN SERVICE VERIFICATION

6.01 When the preceding tests have been completed and the test requirements have been met, call the STC and request that the station be returned to service. Suggest that the customer verify that the service is satisfactory by sending a message through the system to the station. If possible, the customer should originate traffic and check that traffic is received satisfactorily at the station for which it was designated.

TABLE A

85A1 STATION OPTIONS AVAILABLE WITH DAS 820G1

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION
Blind or Unblind SOH Response	Unblind on SOH — station will type heading	AR362	SW1	OUT
	Blinded on SOH — station will not type heading	AR362	SW1	IN
Parity Error Response	Detection of parity error causes a CAN response	AR362	SW3	IN
	Detection of parity error does not cause a CAN response	AR362	SW3	OUT
Audible Alarm	Audible alarm is activated when the MSG ERROR lamp is lighted	AR364	SW4	IN
	Audible alarm is not activated when the MSG ERROR lamp is lighted	AR364	SW4	OUT
Paper Alarm	Alarm indication when paper is low (friction feed machine) or the tape is low (ROTR machine)	AR364	SW1 SW2	IN OUT
	Alarm indication when paper is out (sprocket feed machine)	AR364	SW1 SW2	OUT IN
Baud	110-baud operation	AR190	SW1 SW2 SW3 SW4	IN IN OUT OUT
Shift Out EOT	Station returned to idle mode upon receipt of EOT	AR362	SW2	OUT
	EOT shifted to terminal by pushing character out of transfluxor before station assumes idle mode	AR362	SW2	IN
Line Operation	Half-Duplex (HDX) operation	AR191 or AR530 AR193 AR193	SW2 SW1 SW2	IN IN OUT
Line Operation	Echoplex (EPX) operation (see Note 1)	AR191 or AR530 AR193 AR193	SW2 SW1 SW2	OUT OUT IN
Polling Response	Station starts transmitter when polled	AR362	SW4	OUT
	Station answers ACK when polled	AR362	SW4	IN
	Station answers SIC when polled	AR362	SW4 Note 2	IN

TABLE A (Cont)

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION
Stop On SOH	Station does not stop on SOH	AR191	SW3	OUT
	Station stops on SOH	AR191	SW3	IN
Stop On STX	Station stops on STX	AR191	SW4	OUT
	Station does not stop on STX	AR191	SW4	IN
Stop On ETX	Station does not stop on ETX	AR191	SW1	IN
	Station stops on ETX	AR191	SW1	OUT
Test Poll Response	Responds to test poll with a ready-to-send indication	AR364	SW3	IN
	Responds to test poll with a ready-to-receive indication	AR364	SW3	OUT

Note 1: Although the screw switches for echoplex operation are functional, the echoplex option is no longer offered.

Note 2: The ACK character in the transfluxor must be replaced by the SIC character and the strap between terminals E5 and E6 (AR188 CP) removed. The transfluxor is located on AR188 CP. Instructions on encoding the transfluxor are given in the section entitled 85A1 Data Selective Calling Service Stations — 100-Word Per Minute Half-Duplex Operation — Maintenance (581-131-300).

TABLE B

85A1 STATION OPTIONS AVAILABLE WITH DAS 820G-L1/4 AND DAS 820G-L1/5

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION
Parity Error Response	Detection of parity error causes a CAN response	AR485	SW3	IN
	Detection of parity error does not cause a CAN response	AR485	SW3	OUT
Audible Alarm	Audible alarm is activated when the MSG ERROR lamp is lighted	AR487	SW4	IN
	Audible alarm is not activated when the MSG ERROR lamp is lighted	AR487	SW4	OUT
Paper Alarm	Alarm indication when paper is low (friction feed machine) or the tape is low (ROTR machine)	AR487	SW1	IN
	Alarm indication when paper is out (sprocket feed machine)	AR487	SW1	OUT
Baud	110-baud operation	AR190	SW1 SW2 SW3 SW4	IN IN OUT OUT
Shift Out EOT	Station returned to idle mode upon receipt of EOT	AR485	SW2	OUT
	EOT shifted to terminal by pushing character out of transfluxor before stations assume idle mode	AR485	SW2	IN
Polling Response	Station starts transmitter when polled	AR485	SW4	OUT
	Station answers ACK when polled	AR485	SW4	IN
	Station answers SIC when polled	AR485	SW4 (see Note)	IN
Stop On SOH	Station does not stop on SOH	AR530	SW3	OUT
	Station stops on SOH	AR530	SW3	IN
Stop On STX	Station stops on STX	AR530	SW4	OUT
	Station does not stop on STX	AR530	SW4	IN
Stop On ETX	Station does not stop on ETX	AR530	SW1	IN
	Station stops on ETX	AR530	SW1 SW2	OUT IN
Copy Heading	Station will copy heading	AR486	SW1	OUT
	Station will not copy heading	AR486	SW1	IN
Delete Trailer	Alarm on delete trailer	AR487	SW2	OUT
	No alarm on delete trailer	AR487	SW2	IN

TABLE B (Cont)

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION
Response To Call While Tape Feeding	Responds NAK	AR268	SW3 SW4	OUT IN
	Responds ACK or SIC	AR268	SW3 SW4	IN OUT
Tape Feedout	Feedout in roll call or when station unselects	AR268	SW2	OUT
	Feedout only when station unselects	AR268	SW2	IN
Automatic Tape Feedout	Automatic tape feedout	AR268	SW1	OUT
	No automatic tape feedout	AR268	SW1	IN

Note: The ACK character in the transfluxor must be replaced by the SIC character and the strap between terminals E5 and E6 (AR188 CP) removed. The transfluxor is located on AR188 CP. Instructions on encoding the transfluxor are given in the section entitled 85A1 Data Selective Calling Service Stations — 100-Word Per Minute Half-Duplex Operation — Maintenance (581-131-300).

TABLE C

85A1 STATION OPTIONS AVAILABLE WITH DATA AUXILIARY SET 820J-L1/2

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION (NOTE 1)
Parity Error Response	Detection of a parity error causes a CAN response	AR683	S7	Closed
	Detection of a parity error does not cause a CAN response	AR683	S7	Open
Audible Alarm	Audible alarm is activated when a message error is detected and the MSG ERROR lamp is lighted	AR683	S3	Closed
	Audible alarm is not activated when a message error is detected and the MSG ERROR lamp is lighted	AR683	S3	Open
Paper Alarm	Paper alarm and indication is actuated when paper is low (friction feed machine) or tape is low (RO TTY)	AR683	S6	Closed
	Paper alarm and indication is actuated when paper is out (sprocket feed machine)	AR683	S6	Open
Shift Out EOT	Station returned to idle mode upon receipt of EOT	AR684	S8	Open
	EOT passed to terminal by pushing character before station assumes the idle mode	AR684	S8	Closed
Polling Response (Test Poll and Regular Poll)	Single CAN response to indicate the last message was improperly received (must be specified for DAS 820G1 operation)	AR684	S1 S2 S3 S4 S5 S6 S7	Open Closed Closed Open Closed Closed Open
	CAN response indicates no traffic — receiver ready (must be specified for DAS 820G-L1/- operation)	AR683	S8	Open
		AR684	S1 S2 S3 S4 S5 S6 S7	Closed Open Open Closed Open Open Closed
Response To Test Poll In DAS 820G1 Operation	ACK or SIC response indicating the receiver is ready	AR683	S8	Closed
	NAK response indicating there is no traffic	AR683	S8	Open
Response To Call-in While Form or Tape is Feeding	ACK or SIC response	AR683	S1 S2	Open Closed
	NAK response	AR683	S1 S2	Closed Open

TABLE C (Cont)

FUNCTION OR OPTION		CIRCUIT PACK	SWITCH	POSITION (NOTE 1)
Response To Call-in, Roll Call, and Test Poll	ACK response (see Note 2) SIC response (see Note 2)	AR686	Switch SC All Eight Sections	Switch positions are determined by the code character
Automatic Tape Feed Out	Automatic tape feed out on roll call or when the station unselects	AR683	S4	Closed
	Automatic tape feed out only when station unselects	AR683	S4	Open
Baud	110-baud operation	AR685	S1* S2* (Note 4)	Closed Closed
Carrier Squelch On Carrier Fail	Yes	AR683	S1*	Closed
	No (Note 3)	AR682	S1*	Open

Note 1: The "open" and "closed" designations referred to in this table are obtained by depressing one side of the rocker arm switch. When the side with the numbers (or dot) is depressed, the switch is closed. When the side opposite the numbers (or dot) is depressed, the switch is open.

Note 2: Encoding the ACK or SIC response requires the setting of the eight contacts of the SC switch (AR686 CP) to give the proper mark-space sequence. The setting of each contact is determined by the character being encoded. Refer to the BSP entitled 85A1 Data Selective Calling Service Stations — 100-Word Per Minute Half-Duplex Operation — Maintenance (581-131-300) for information on setting these switches.

Note 3: When the data set 109E is used, the no-carrier squelch option must be provided for both the data set and the DAS 820J-L/-.

Note 4: Switches marked thus (*) are screw switches and are "closed" when the screw is turned all the way in.

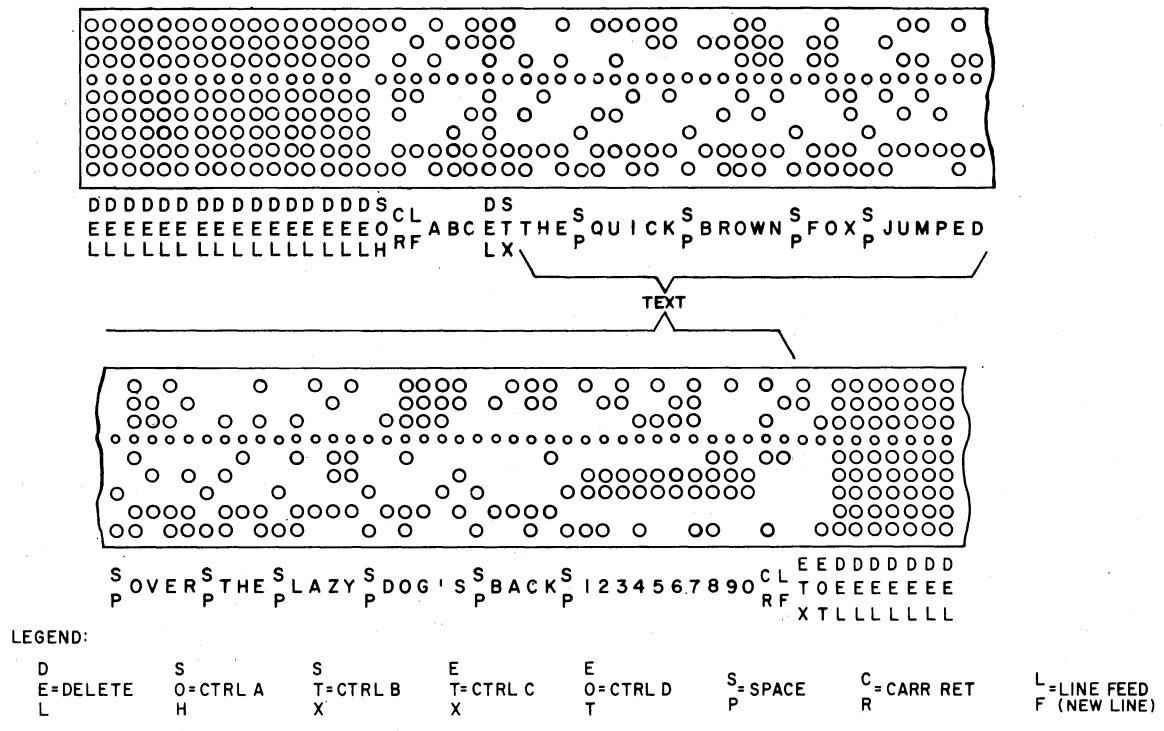


Fig. 1—Test Tape for Testing the 85A-Type DSCS Station

TABLE D

TROUBLE LOCATING CHART FOR DAS 820G-TYPE

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER SEE NOTE	DAS 804	LINE OR HUB FACILITY	OTHER
1	SEL lamp remains lighted.			AR188, 190, 193, 273, 498	Send-receive	Loop, 811, or hub	Remove AC power to initialize station.
2	Motor does not run.		Motor, TTY mode switch	AR273, 487	Send-receive		Check for voltage pin 24 M connector, TTY fuses, +48V, motor breaker.
	PAPER OUT lamp not extinguished.		PAPER OUT switch, ESU	AR273, 487 NST	Send-receive		Check voltage pins 6 and 50 of M connector.
	TAPE lamp not extinguished.			AR273, 487	Send-receive		Contacts in DAS 804 not opening.
3		No Tones		D/S, NST		Loop	No incoming carrier, turn carrier squelch "T" switch OFF.
		Low level		D/S		Loop	
		High level		D/S		Loop	
		Off frequency		D/S		Loop	
		Continuous space frequency		D/S			Incoming signal spacing.
4		High distortion or no response		D/S		Loop, 811, hub, or D/S	
5	Not applicable	Not applicable					
6	OUT OF SVC lamp does not light.			AR273, NST	Send-receive		Check lamp and contact on DAS 804, +12V on pin 2 and 4 of N connector.

ESU = Electrical Service Unit D/S = Data Set NST = Nest Wiring

Note: Refer to Table E for circuit pack cross reference when a controller other than DAS 820G-L1/4 is tested.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
7		No response or character other than NAK		AR188, 273, 498, D/S		Loop, D/S, 811, or hub	
	SEL lamp does not flash.			AR273, 498, NST	Send-receive		Check lamp.
	Audible alarm does not sound.			AR273, 487, 498, NST	Send-receive		
	SEL lamp lights.						Station selected as a receiver, not out of svc.
8	OUT OF SVC lamp does not extinguish.		ESU	AR273, NST	Send-receive		Action A, station may be in loop-back mode. TTY mode switch in OFF LINE position.
9	PAPER lamp does not light.		PAPER switch, ESU	NST	Send-receive		Check PAPER OUT lamp and for voltage pins 50 and 31 of M connector.
	Audible alarm does not sound.			AR273, 487, NST	Send-receive		Check speaker.
10		No response		AR188, 190, 193, 486, 487, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action B
		Response other than NAK	Contacts, ESU	AR188, 190			Station is not out of service.
	SEL lamp does not flash.			AR498	Send-receive		Station is not selected as a receiver.
	SEL lamp lights.		Contacts, ESU	AR273, 487, NST	Send-receive		

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
11	PAPER lamp does not extinguish.		Paper contacts, ESU	AR273, 487, NST	Send-receive		DAS 804 connections or key contacts. Check continuity between pins 6 and 8 of N plug for paper and 15 and 8 for alarm.
12		No response	—	AR188, 190, 193, 273, 486, 487, 498, 530, 542, D/S, NST		Loop. D/S, 811, or hub	Action B
		Response other than SIC or ACK	Form Feed	AR188, 273, 487, NST			Station is still out of service.
	SEL lamp does not light.			AR273, 498			Check lamp.
	SEL lamp flashes.		Contacts	AR273, 487			Station is not ready to receive.
13	TTY does not copy heading.		ESU or typing unit	AR273			Check for voltage on pin 43 of M connector.
	Motor not running.		Motor fuse or ESU	AR273			
		Receives copy					Station in loopback; send ETX-EOT and repeat step.
	TTY prints underline characters, ERROR lamp lights, copy is garbled.					Loop, D/S, 811, or hub	Action B

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
14		Hits or characters		D/S or NST		Loop, D/S, 811 at hub or noise pickup at hub	Station may be in loop-back; send ETX-EOT and repeat test.
	Station unselects.			AR188, D/S NST		Loop, D/S, 811, or hub	
	ERROR lamp lights.			D/S		Loop, D/S, 811, or hub	Parity error
	Prints underline characters.		Motor, lost character contact typing unit			Loop, D/S, 811, or hub	
15	Station prints characters.			AR188, 485, 542, NST			Failed to detect ENQ or failed to blind on detection of ENQ.
		Receives the transmitted characters		AR193, NST			Station in loop-back mode; send ETX-EOT.
16		Hits or characters				Loop, D/S, 811 at hub noise pickup	Action B
	ERROR lamp lights.			AR188, 485, 542, NST			
	Hit characters.						
	Underline characters.			AR188			
	Station unselects.						

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
17	TTY does not print TDM or TEXT.		ESU or typing unit	AR188, 485, 542		Loop, D/S, 811, or hub	Station failed to unblind; detect ENQ-DC2.
	TTY prints underline characters. ERROR lamp lights.		Lost character contact, typing unit			Loop, D/S, 811, or hub	Parity error
	No typing on ROTR.		ESU, contacts				
	No form feed.		Typing unit				
	Garbled copy.		Typing unit				
		Prints copy or hits and characters					Station may be in loop-back mode; send ETX-EOT and repeat test.
18		No response		AR188, D/S		Loop, D/S, 811, or hub	Failed to detect the roll call sequence. Repeat ETX-ENQ SCC.
		CAN response	Lost character contact typing unit				Parity error
		Response other than SIC or ACK		AR273, 487, 498, 542			
	Hit characters received.		Motor, ESU			Loop	
	Motor stops running.		Motor fuse				Station unselected because of carrier fail condition.
19	SEL lamp does not extinguish.			AR188, 273, 498, 542, NST		Loop, D/S, 811, or hub	Failed to detect EOT-EOT.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
19 (Cont)	Motor does not stop (M37 ASR).			AR188, 273, 498, 530, 542, NST		Loop, D/S, 811, or hub	Check for ground on pin 24 of M connector.
	EOT not punched in tape if ROTR.			AR485			Shift out EOT option not provided.
	False alarms on attendant set both audible and visual.		ESU, noise network				
		Hits received	Protective network				Check system grounding.
20		No response		AR188, 190, 193, 273, 486, 487, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action B
		Single character		AR188		Loop, D/S, 811, or hub	Noise at customer computer switcher.
		Response other than SIC or ACK	Lost character contacts or typing unit				
		CAN response	Contacts, ESU	AR273, 487			Last message not properly received.
		NAK response	Contacts				Station not ready to receive.
	SEL lamp does not light.		Contacts for form feed, vertical or horizontal tab, typing unit				

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
20 (Cont)	Motor does not start.		Fuse or breaker				
	False alarms.		Check protective networks				
	No TEXT received.		Typing unit	AR542, 485, D/S			Station failed to unblind upon generation of ACK or SIC.
21	MSG ERROR lamp does not light.			AR188, 273, 486			Action A. Check lamp and continuity between pin 12 and 8 on N connector.
	Underline characters not received.		Typing unit	AR188, 190, 486			
	Audible alarm does not sound.			AR273			Check speaker. Check for voltage between pin 8 and 22 of N connector.
	No copy	No response		D/S		Loop, D/S, 811, hub	
		Character other than ACK, SIC or CAN		AR188, 273, 487			Check for noise.
		False SIC character		AR188			
	SEL lamp does not extinguish.			AR273, 498			
	Motor does not stop.		ESU, contacts for form feed or horizontal tabs				Failed to detect EOT.

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
22		No response or false response		AR188, 190, 193, 273, 486, 487, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action B, also check for noise condition.
23	No copy			D/S			Action B
	Garbled copy		ESU typing unit	AR188, 190, 193, 273			
	MSG ERROR lamp does not light.			AR273, 487			Check lamp.
	Audible alarm does not sound.			AR273, 487			Check AUD OFF key on attendant set. Check for open between pins 15 and 8 of N plug.
	Station does not unselect.			AR188			Failed to detect EOT.
	Underline characters not received.		Typing unit	AR188, 190, 486			
24	MSG ERROR lamp does not extinguish.			AR273, 487, 498	MSG ERROR Contacts		Check for open between pins 13 and 8 on N plug.
	Audible alarm does not silence.			AR273, 487			
		Hits received				Noise	
25		No response		AR188, 190, 193, 273, 486, 487, 498, 530, 542		Loop, D/S, 811, or hub	Action B
		ACK or SIC response		AR485			Fail to set CAF flip-flop on AR485.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
25 (Cont)		Response other than ACK, SIC, NAK or CAN		AR188			Check for noise.
	Station SEL lamp lights.			AR485			
	SEL lamp flashes.		Form feed contacts				Station not ready to receive.
	Audible alarm sounds.		ESU	AR273, 487, 498, NST	Send-receive		
26		No response			Send-receive	Loop, D/S, 811, or hub	Action B
		Response other than ACK or SIC		AR485			Check for noise.
	SEL lamp does not light.		Form feed contacts	AR188, 273, 487, 498	Send-receive	Loop, D/S, 811, or hub	Check SEL lamp.
27	SEL lamp remains lighted.			AR273, 487, 498			
	Audible alarm does not sound.			AR193			
	MSG ERROR lamp does not light.			AR273, 487, 498, NST	Send-receive		Check lamp.
	Station does not unselect.			AR273, 487, 498			Check for noise.
	Underline characters not received.		Typing unit	AR188, 190, 486			
28	Alarm not silenced and lamp not extinguished.			AR485	Send-receive		Check continuity between pins 13 and 8 on N plug.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
29		Response other than CAN or no response		AR485, D/S	Send-receive	Loop, D/S, 811, or hub	Action B. Check for noise.
30	OUT OF SVC lamp does not light.			AR273, NST	Send-receive		Check lamp and key contacts.
31		Response other than CAN or NAK		AR188, 190			
		No response		AR188		Loop, D/S, 811, or hub	Check continuity between pins 4 and 8 on N plug.
32	OUT OF SVC lamp is not extinguished.		ESU		Send-receive		Action A. Check DAS 804 contacts.
		No response		AR188, 190, 193, 273, 485, 486, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	
		Response other than CAN or NAK		AR188, 190			Station may be in loop-back mode; send ETX-EOT and repeat step.
33		Transmitted characters					Action A
		Hit				Loop, D/S, 811, or hub	
		CAN or NAK		AR188, 190			
34	BID lamp does not light.		Reader contacts	AR273, 487	Send-receive		Check BID lamp and contacts.
	Motor does not start.		Motor fuse or breaker, ESU				

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
34 (Cont)		Hits	Noise protection network on motor start. Motor ESU			Loop, D/S, 811, or hub	EMG STOP lamp may be burned out and emg stop condition may exist. Operate EMG STOP key to clear condition.
35		(a) No response or response other than SIC or ACK		D/S AR188, 190, 530		Loop, D/S, 811, or hub	Noise at hub Action A Action B
		(b) No response SIC or ACK DEL...DEL SOH-CR-LF	Tape Reader and tape reader contacts, ESU	AR530			Check options on AR530.
		(c) No response. Hit characters STX followed by TEXT.	Tape Reader and tape reader contacts, ESU	AR273, 487, 530			Check options on AR530.
		(d) No response. TEXT-ETX followed by EOT.		AR273			
	(a) SEL lamp does not light.			AR273, NST	Send-receive		Check SEL lamp.
	(a) TD runs.		ESU, check fuse, tape reader	AR273, NST			Check between pins 49 and 8 DAS 820G-L1/2 for voltage L1/3 continuity.
	(b) TD is not stopped by SOH.		Tape Reader	AR193, 273, 530, 542			Check stop on SOH option installed.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
35 (Cont)	(c) TD is not stopped by STX.			AR530			Check stop on STX option installed.
	(d) TD is not stopped by ETX.			AR530			Check stop on ETX option installed.
	(e) TD stops before end of message pickup.		Tape Reader			Loop, D/S, 811, or hub	
36		(a) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B
		(a) DEL... DEL-SOH-STX		AR530			Check stop on SOH option.
		(a) DEL... DEL-SOH-STX-TEXT-ETX or DEL... EXT-EOT		AR188, 530, 542			
		(a) Garbled copy	ESU, tape reader			Loop, D/S, 811, or hub	
		(a) Parity errors received	ESU, motor noise	AR188, 190, 193, 486			Check for noise.
	(a) Tape does not start.			AR273, 487, 530			Action A
	(a) Tape is not stopped by SOH.		Contacts, ESU, tape reader				Check options provided.
	(a) Tape runs through complete message.		Contacts, tape reader	AR530			Check options provided.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
36 (Cont)	(a) Garbled copy.		Tape reader			Loop, D/S, 811, or hub	Action B
	(a) False alarm indications.		Motor noise or tape reader				
		(b) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action B Action A
		(b) Station is not stopped by STX					Check options provided.
	(b) Station fails to copy heading.			AR486			Check options provided.
		(c) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	
		(c) Station is not stopped by ETX		AR530			Check options provided.
		(c) Parity errors				Loop, D/S, 811, or hub	
	(c) Station fails to copy TEXT.			AR273, 485, 486			
	(c) Garbled copy.			D/S		Loop, D/S, 811, or hub	Action B
		(d) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action B

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
36 (Cont)		(d) Station fails to send EOT	Tape reader	AR273, NST			
	(d) SEL lamp does not extinguish.			NST			Check SEL lamp control, pin 16 on N connector.
		(a) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B.
		(a) No CR-LF-STX	Tape reader	AR530			Check options provided.
	(a) Tape does not start.			AR273, 487, 530			Action A
	(a) Tape is not stopped by STX.			AR530			Check options provided.
	(a) Garbled copy, no local copy.		Contacts, ESU tape reader	AR273, 487, 498, D/S			Check options provided.
37	(a) False alarms			AR530			Check options provided.
		(b) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B
		(b) STX- no TEXT		AR530			Check options provided.
		(b) Garbled or no copy	Tape reader	D/S		Loop, D/S, 811, or hub	Check options provided. Action B
	(b) Tape does not start.			AR273, 487, 530			Action A
	(b) Tape stopped by STX.			AR530			Check options provided.

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
37 (Cont)	(b) No local copy of heading or TEXT.		ESU, tape reader	AR273, 487, 498, D/S			Check options provided.
	(b) Garbled copy		ESU, tape reader	D/S			
		(c) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B
		(c) DEL... DEL-STX-TEXT-ETX		AR530			Check options provided.
	(c) Tape does not start.			AR273, 487, 530			Action A
	(c) Tape is stopped by ETX.			AR530			Check options provided.
	(c) No local copy of garbled copy.		ESU, tape reader	AR273, 487, 498, 530, D/S			Check options provided.
38		(a) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action A Action B
		(a) Garbled TEXT	ESU, tape reader	AR188, 530, 542, D/S		Loop, D/S, 811, or hub	
		(a) TEXT-ETX EOT		AR188, 273, 542			Check options provided.
	(a) No local copy		ESU, contacts tape reader	AR273, 487, 498, D/S			Check options provided.
	(a) Tape stopped by ETX.						Check options provided.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
38 (Cont)	(a) False alarms		Contacts tape reader	AR188, 193, 498, 542, NST			
		(b) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action A Action B
		(b) Garbled TEXT	Tape reader, ESU, contacts	AR188, 190			
		(b) TEXT-ETX	Tape reader, ESU				Check options provided.
	(b) No response, tape does not start.			AR273, 487, 530			
	(b) No local copy, heading or TEXT.		ESU, typing unit, tape reader contacts	AR188, D/S			Check options provided.
39		No response EOT not received		AR188, 190, 193, 485, 486, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action A Action B
	No response, SEL lamp does not extinguish.			AR273, 487, 530, D/S			EOT not received, station still selected. Action A
40		(a) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S, NST		Loop, D/S, 811, or hub	Action A Action B

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
40 (Cont)		(a) DEL... DEL, or improper SIC		AR188, 273, 487, NST			
	(a) No response. SEL lamp does not light.			AR273, 487, 530			Action A
		(b) No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B
		(b) ACK or SIC		AR188, 273			Check options provided.
		(b) Parity errors	ESU, tape reader	AR188, 530, 542, D/S		Loop, D/S, 811, or hub	
	(b) No response			AR273, 487, 530, D/S			Action A
	(b) Tape does not run.		ESU, contacts tape reader	AR273, 487, 498			
	(b) SEL lamp does not light.		Tape reader contacts				
	(b) Bid lamp does not extinguish.				Send -Receive		Check contacts.
	(b) TAPE lamp does not light.		ESU	AR273, 487			Check lamp.
	(b) Audible alarm does not sound.		ESU, contacts				Check options provided.
	(b) False alarms both audible and visual.		ESU	AR273, 487	Send-receive		

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
41		No response		AR188, 190, 193, 485, 486, 498, 530, 542, D/S		Loop, D/S, 811, or hub	Action A Action B
		Hit character or parity errors	ESU, tape reader	AR188, 530, 542, D/S	Send-receive		Check for noise.
	No response			AR273, 487, 530, D/S			Action A
	SEL lamp does not light.		Contacts tape	AR273, 487	Send-receive		
	BID lamp does not extinguish.				Send-receive		Check contacts.
	Audible alarm does not sound.			AR273	Send-receive		Check alarm circuits.
42	TAPE lamp does not extinguish.			AR273			Check continuity between pin 8 and 9 of N plug.
43		Hit characters	Contacts			Loop, D/S, 811, or hub	Check for noise on line.
	SEL lamp does not extinguish.			AR193, 487			Action A
44	BID lamp does not light.		ESU, tape contacts	AR273, 487			BID lamp key contacts. Check continuity between pin 18 and 8 on the N plug.
45							See repeated steps — NAK response indicates a no traffic or not ready condition.

TABLE D (Cont)

STEP FAIL-URE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
46							Not applicable.
47	BID lamp does not light.		Tape reader contacts	AR273, 487, 193	Send-receive		EMG STOP condition may exist and not be indicated.
		Hits					Check noise protection network.
48	BID lamp does not extinguish.			AR193, 273, 487			
	EMG STOP lamp does not light.			AR193, 273, 487			EMG STOP lamp is burned out.
	Audible alarm does not sound.						Audible alarm speaker.
49	EMG STOP lamp does not extinguish, audible alarm is not silenced.			AR273	Send-receive		Check DAS and connecting cables for ground troubles.
50	BID lamp does not light when tape is loaded.		Tape available contacts and tape reader	AR193, 273, 487			
51	Friction Feed: Paper lamp does not light.		Paper out contacts, ESU	AR193, 273, 487, D/S, NST			Also see applicable parts of the steps that are repeated.
	Audible alarm does not sound.						Check options provided on AR487.
	TD stops.			AR273, 487			
	Sprocket Feed: Paper lamp does not light.		ESU, contacts	AR273, 487			Also see applicable parts of the steps that are repeated.

TABLE D (Cont)

STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-L1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
51 (Cont)	Audible alarm does not sound.			AR273, 487			Check on the options provided on AR487.
	TD does not stop.			AR273, 487			
52	TAPE lamp does not light.		ESU, contacts	AR273, 487	Send-receive		Check tape out contacts.
53	PAPER lamp extinguishes.		ESU, contacts	AR273, 487	Send-receive		Check paper contacts.
54	PAPER lamp does not extinguish.		ESU, contacts	AR273	Send-receive		Check paper contacts and continuity between pin 6 and 8 on N plug.
55	TAPE lamp does not extinguish.			AR273	Send-receive		Check continuity between pins 8 and 9 on N plug.
56	SEL lamp does not extinguish.			AR193, 273, 487		Loop, D/S, or 811	
57		No response		AR190, 193, 486, 530, D/S, NST		Loop, D/S, or 811	Action A Action B
	SEL lamp does not light.			AR188, 193			
58		Station answers ACK or SIC	Check contacts				
		No response		AR190, 193, 486, 530, D/S, NST			Action A Action B
	Alarm does not sound and PAPER lamp does not light.		Check contacts		Check contacts		

TABLE D (Cont)

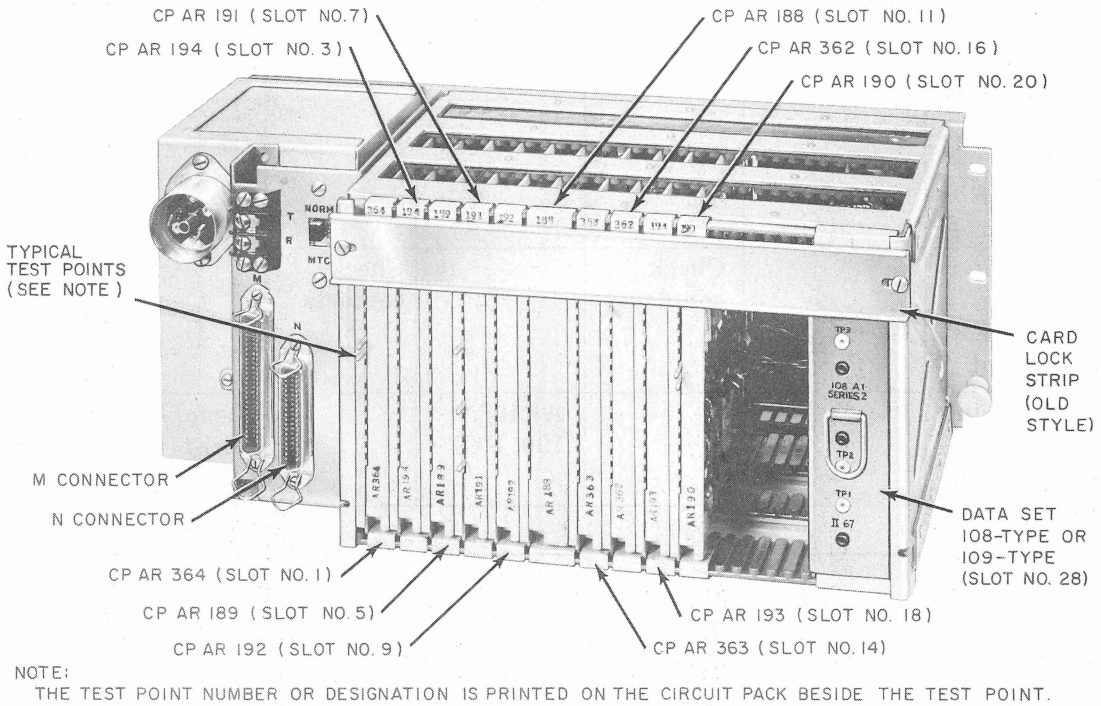
STEP FAILURE	TYPE OF TROUBLE		EQUIPMENT TO BE CHECKED				
	STATION	TEST CENTER	TTY	820G-1.1/4 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
59	Alarm condition not canceled. PAPER lamp lighted.		Check contacts		Check contacts		
60		No response		AR190, 193, 486, 530, D/S, NST			Action A Action B
	SEL lamp does not light.			AR188, 193			
61		Station answers ACK or SIC	Check contacts				
		No response		AR190, 193, 486, 530, D/S, NST			Action A Action B
	Alarm does not sound, PAPER and ERROR lamps do not light. Stations is selected (SEL lighted).		Check contacts		Check contacts		
62	Alarm condition not canceled. PAPER lamp lighted.		Check contacts		Check contacts		
63	Station not in unselected or idle condition.			AR188, 190, D/S		Loop, D/S, or 811	Station failed to detect EOT.
END OF TEST							

TABLE E

CONTROLLER CIRCUIT PACK CROSS-REFERENCE

DAS		820G1	820G-L1/4	820G-L1/5
SPEED		100	100	100
OPTION		U	Y	Z
CIRCUIT PACK LOCATIONS	A	AR364	AR487	AR487
	B	AR194	AR273	AR268
	C	AR189	AR498	AR498
	D	AR530*	AR530	AR530
	E	AR192	AR542	AR542
	F	AR188	AR188	AR188
	G	AR363	AR486	AR486
	H	AR362	AR485	AR485
	I	AR193	AR193	AR193
	J	AR190	AR190	AR190

* In equipment location D, AR191 CP may be used in 820G1 only.



NOTE:
THE TEST POINT NUMBER OR DESIGNATION IS PRINTED ON THE CIRCUIT PACK BESIDE THE TEST POINT.

Fig. 2—Data Auxiliary Set 820G1—Location and Designation of Circuit Packs

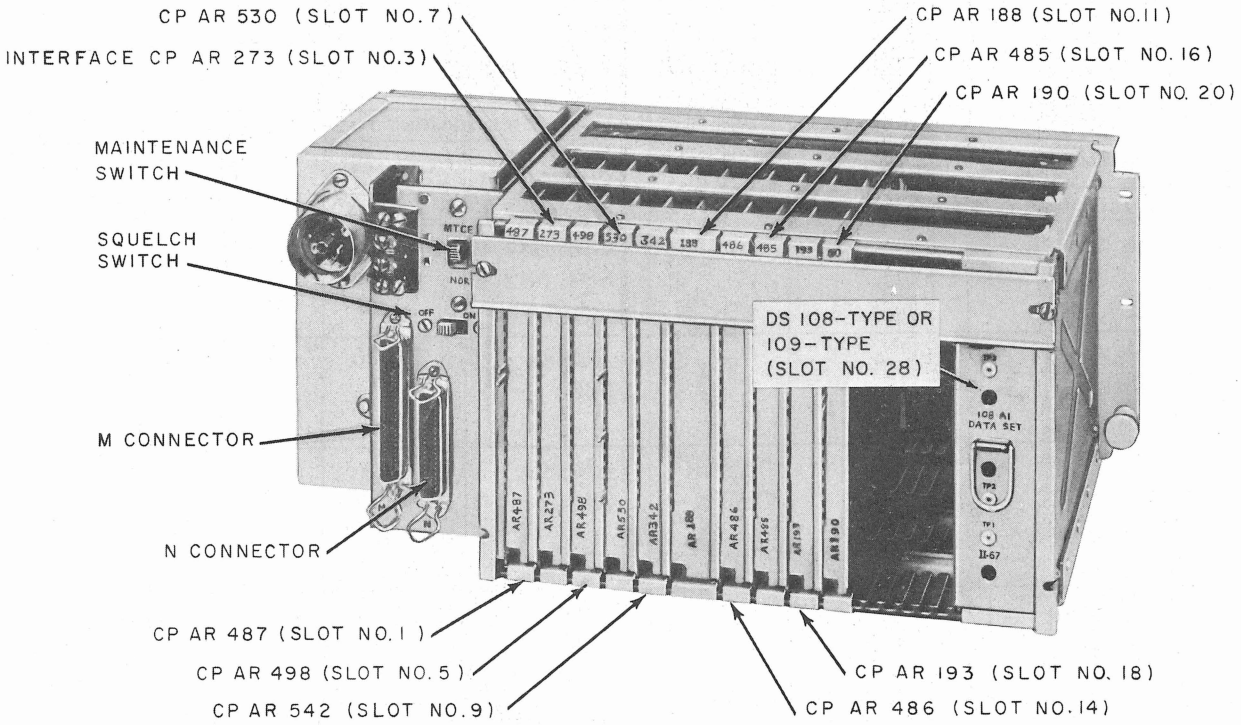


Fig. 3—Data Auxiliary Set 820G-L1/4—Location and Designation of Circuit Packs

TABLE F

TROUBLE LOCATING CHART FOR DAS 820J-L1/2

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
1	SEL lamp remains lighted.			AR686, 685, 684, 683, 682	Receive	Loop,811, or hub	Remove AC power to initialize station.
2	Alarm condition exists.			AR682, 683	Receive		
	PAPER OUT lamp not extinguished.		PAPER OUT switch, ESU	AR682, 683	Receive check for ground on lead		
	TAPE lamp not extinguished.			AR682, 683	Receive		Contacts in DAS 804 not opening.
3	OUT OF SVC lamp fails to light.	No Tones		AR682, D/S		Loop	No incoming carrier.
		Low level		D/S (108)		Loop	
		High level		D/S (108)		Loop	
		Off frequency		D/S (108)		Loop	
		Continuous space frequency		D/S (108)			Incoming signal spacing.
4		High distortion or no response		D/S (108)		Loop, 811, hub, or D/S	
5	OUT OF SVC lamp does not go out.	Not applicable		AR682, 684			Check (R) switch on DAS
6 to 10	OUT OF SVC lamp not lighted. No copy on TTY.		SMD ESU	AR682, D/S		Loop or hub	Check for AC power. Check controller wiring and operation of the T switch.
11	OUT OF SVC lamp fails to light.			AR682, 684	Receive		Check lamp and DAS 804.

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
12		No response or character other than NAK		AR686, 685,684, 683, 682	Receive OUT OF SVC key and lamp	Loop, D/S, 811, or hub	
	SEL lamp does not flash.			AR684, 683, 682	Receive		Check lamp.
	Audible Alarm does not sound.			AR684, 683, 682	Receive		Check speaker.
	SEL lamp lights.			AR684, 683, 682	OUT OF SVC key		Station selected as a receiver, not out of svc.
13	OUT OF SVC lamp does not extinguish.		ESU	AR684, 682	Receive check for ground		Action A, station may be in loop-back mode.
14	PAPER lamp does not light.		PAPER switch, ESU	AR683, 682	Receive check PAPER lamp		
	Audible Alarm does not sound.			AR683, 682	Receive		Check speaker.
15		No response	PAPER contacts	AR686, 685, 684, 683, 682		Loop, D/S, 811, or hub	Action B
		Response other than NAK	Contacts, ESU	AR683, 682			Station is not out of service.
	SEL lamp does not flash.			AR684, 683, 682	Receive		
	SEL lamp lights.		Contacts, ESU	AR684, 683, 682	Receive		Station is selected as a receiver.
16	PAPER lamp does not extinguish.		PAPER contacts, ESU	AR683, 682	Receive PAPER key contacts		

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
17		No response		AR686, 685, 684, 683, 682		Loop, D/S, 811, or hub	Action B
		Response other than SIC or ACK	Form Feed contacts	AR683, 682, 686			Station is still out of service.
	SEL lamp does not light.			AR684, 682	Receive		Check lamp.
	SEL lamp flashes.		Form Feed contacts	AR684, 683, 682	Receive		Station is not ready to receive.
18	TTY does not copy heading.		ESU or typing unit	AR684, 683, 682			
	Motor not running.		Motor fuse or ESU	AR682, 683, 684			
		Receives copy		AR684			Station in loop-back; send EXT-EOT and repeat step.
	TTY underline characters, ERROR lamp lights, copy is garbled.			AR685		Loop, D/S, 811, or hub	Action B
19		Hits or characters				Loop, D/S, 811 at hub or noise pickup at hub	Station may be in loop-back; send EXT-EOT and repeat test.
	ERROR lamp lights.			AR685, 683		Loop, D/S, 811, or hub	Parity error
	Prints under-line char-acters.		Motor, lost character contct typing unit	AR685		Loop, D/S, 811, or hub	

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
20	Station prints characters.			AR684, 683			Failed to detect ENQ or failed to blind on detection of ENQ.
		Receives the transmitted characters		AR684			Station in loop-back mode; send ETX-EOT.
21		Hits or characters				Loop, D/S, 811 or hub noise pickup	Action B
	ERROR lamp lights.			AR683, 685			
	Hit characters.					Loop, D/S, 811 or hub noise	
	Underline characters.					Loop, D/S, 811 or hub noise	
22	TTY does not print TDM or TEXT.		ESU or typing unit	AR684, 683, 682		Loop, D/S, 811, or hub	Station failed to unblind; detect ENQ-DC2.
	TTY prints underline characters. ERROR lamp lights.		Lost character contact, typing unit	AR685, 682		Loop, D/S, 811, or hub	Parity error
	No typing on ROTR.		ESU, stunt box contacts				
	No form feed.		Typing unit stunt box contacts	AR683, 682			
	Garbled copy.		Typing unit	AR683, 682			

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED		
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	LINE OR HUB FACILITY	OTHER
22 (cont)		Prints copy or hits and characters		AR684	Loop,D/S, 811, or hub	Station may be in loop-back mode; send ETX-EOT and repeat test.
23		No response		AR686, 685, 684, 683, 682	Loop, D/S, 811, or hub	Failed to detect the roll call sequence. Repeat ETX-ENQ SCC.
		CAN response	Lost character contact typing unit	AR684, 682, 683	Loop, D/S, 811, or hub	Parity error.
		Response other than SIC or ACK		AR684, 683	Loop, D/S, 811, or hub	Check SIC coding.
	Hit characters received.		Motor, ESU	D/S (108)	Loop	
24	SEL lamp does not extinguish.			AR685, 684, 682	Loop, D/S, 811, or hub	Failed to detect EOT-DEL.
	Motor does not stop.		ESU Form Feed contacts	AR683, 682		
	EOT not punched in tape if ROTR.			AR684		Shift out EOT option not provided.
	False alarms on attendant set both audible and visual		ESU, noise network			
		Hits received	Protective network			Check system grounding.

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER		LINE OR HUB FACILITY	OTHER
25		No response		AR686, 685, 684, 683, 682		Loop, D/S, 811, or hub	Action B
		Response other than SIC or ACK	Lost character contacts or typing unit	AR683, 684, 682			Check SIC coding.
		CAN response	Contacts, ESU	AR683			Last message not properly received.
		NAK response	Contact for PAPER Form Feed and horizontal tab	AR682	OUT OF SVC key contacts		Station not ready to receive.
	SEL lamp does not light.		Contacts for Form Feed, vertical or horizontal tab, typing unit	AR684, 682	Receive		
	Motor does not start.		Fuse or breaker	AR683, 682			Station not ready to receive.
	False alarms.		Check protective networks				Check for grounds.
	No TEXT received.		Typing unit print suppression solenoid	AR683, 684, 682			Station failed to unblind upon generation of ACK or SIC.
26	MSG ERROR lamp does not light.			AR685, 683, 682	Receive contacts and leads		Check lamp.
	Underline characters not received.		Typing unit	AR686, 685			

TABLE F (Cont)

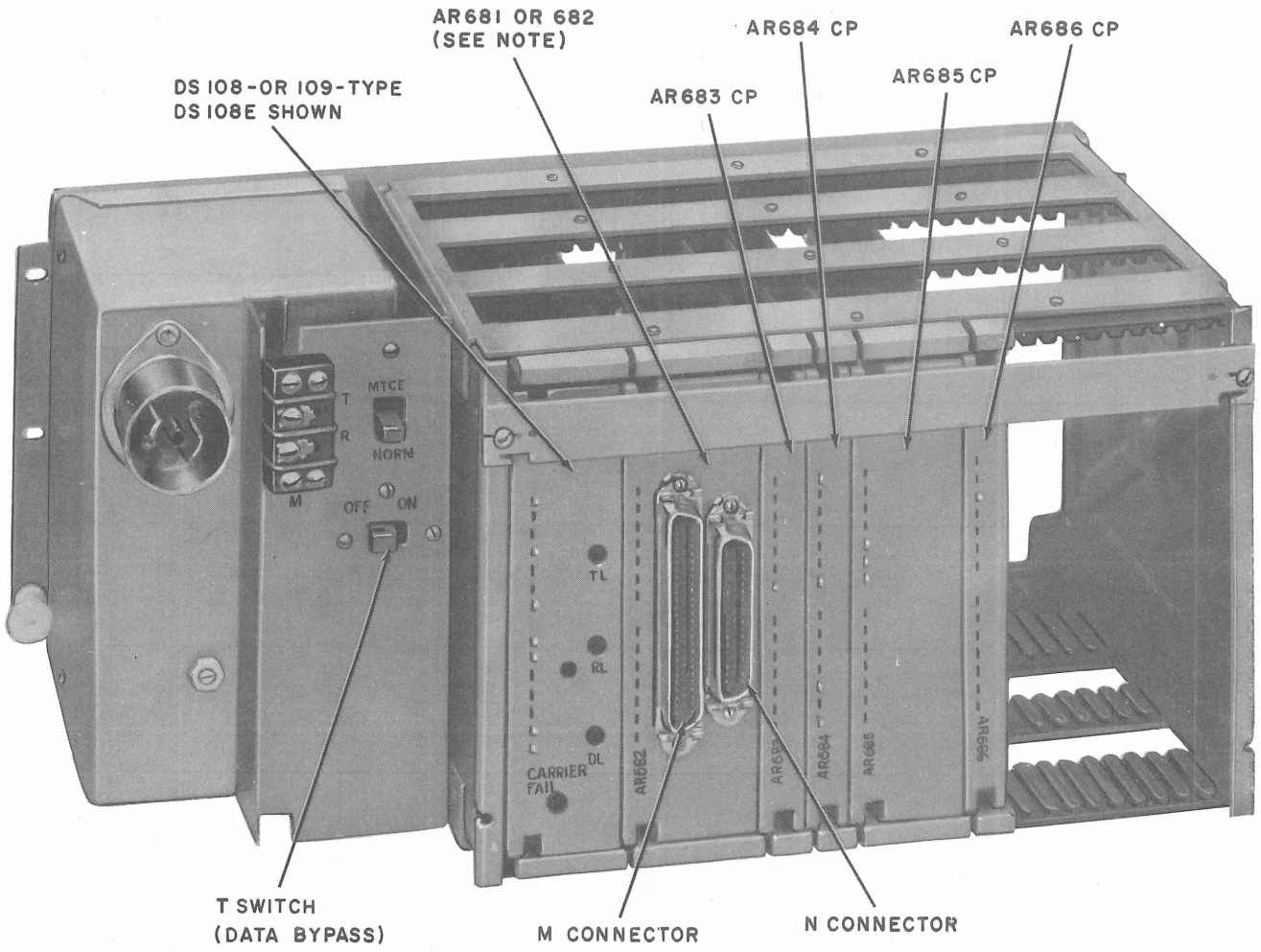
STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
26 (cont)	Audible alarm does not sound.			AR683, 682	Receive AUD OFF key and lamp		
	No copy	No response				Loop, D/S, 811, hub	Check for AC power.
		Character other than ACK, SIC or CAN		AR686		Loop, D/S, 811, or hub	Check for noise. Check SIC coding.
		False SIC character		AR686			Check SIC coding.
	SEL lamp does not extinguish.			AR685, 684, 682			Station did not unselect.
	Motor does not stop.		ESU, contacts for Form Feed or horizontal tabs	AR683, 682			Failed to detect EOT.
27		No response or false response		AR686, 685, 684, 683, 682		Loop, D/S, 811, or hub	Action B, also check for noise condition.
28	No copy.		Typing unit	AR683, 682			Action B
	Garbled copy.		ESU typing unit	AR683, 682			
	MSG ERROR lamp does not light.			AR683, 682	Receive		Check lamp.
	Audible alarm does not sound.			AR683, 682			Check AUD OFF key on attendant set. Check speaker.
	Station does not unselect.			AR685, 684, 682			Failed to detect EOT.

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER		LINE OR HUB FACILITY	OTHER
28 (cont)	Underline characters not received.		Typing unit	AR686, 685			
29	MSG ERROR lamp does not extinguish.			AR682, 683	MSG ERROR contacts		
	Audible alarm does not silence.			AR682, 683	Contacts		
		Hits received				Noise	
30		No response		AR686, 685, 684, 683, 682		Loop, D/S, 811, or hub	Action B
		ACK or SIC response		AR683			AC power interrupted.
		Response other than ACK, SIC, NAK or CAN		AR686			Check for noise. Check SIC coding.
31		Response other than ACK or SIC		AR686			Check for noise. Check SIC coding.
	SEL lamp does not light.		Form Feed contacts	AR683, 682	Receive	Loop, D/S, 811, or hub	Check SEL lamp.
32	SEL lamp remains lighted.			AR682, 683, D/S	SEL lamp and leads		
	Audible alarm does not sound.			AR683, 682			
	MSG ERROR lamp does not light.			AR683, 682	Receive		Check lamp.
	Station does not unselect.			AR684, 685, 682			Check for noise.

TABLE F (Cont)

STEP FAIL-URE	TYPE OF TROUBLE			EQUIPMENT TO BE CHECKED			
	STATION	TEST CENTER	TTY	820J-L1/2 CONTROLLER	DAS 804	LINE OR HUB FACILITY	OTHER
33	Alarm not silenced and lamp not extinguished.			AR683, 682	Receive contacts		
34		Response other than CAN or no response		AR683	Receive	Loop, D/S, 811, or hub	Action B, Check for noise.
35	Not applicable						
36	End of test.						



NOTE:
DAS 820J-LI/2 USES AR682 CP
DAS 820J-LI/3 USES AR681 CP

Fig. 4—Data Auxiliary Set 820J-Type—Location and Designation of Circuit Packs

TABLE G

TROUBLESHOOTING THE DAS 820G1

TROUBLE	TABLE E TEST NUMBER	POSSIBLE OPTION	CIRCUIT PACK TO BE REPLACED						
			1	2	3	4	5	6	7
1 No Response to Polling	1,2,3	Send Heading	AR188	AR192	AR189	AR191 or AR530	AR364	AR193	AR190
		Answer ACK	AR188	AR192	AR362	AR363	AR189	AR193	AR191 or AR530
2 BID Lamp Does Not Light	5		AR364	AR194					
3 Single Bid Does Not Work			AR364	AR194					
4 Tape Distributor Does Not Run	2,5	Answer ACK on Poll	AR188	AR192	AR191 or AR530	AR364	AR194		
5 Tape Distributor Does Not Stop on STX	2	Stop on STX	AR188	AR192	AR191 or AR530				
6 No Response to Emer Stop			AR188	AR192	AR362	AR193	AR189		
7 Paper Lamp Remains Lighted	1,2,3		AR194	AR364					
8 No Response to Call-In			AR188	AR190	AR192	AR362	AR193	AR191 or AR530	AR364
9 Tape Lamp Remains Lighted	2		AR194	AR364					
10 Permanent Loop-Back	2,4		AR362	AR189	AR191 or AR530				
11 Does Not Unblind on ENQ DC2			AR188	AR192	AR189	AR362	AR194		
12 Improper Response			AR188	AR192					
13 No Response	Perform all tests (1-6)								

TABLE H

TROUBLESHOOTING THE DAS 820G-L1/4 AND DAS 820G-L1/5

TROUBLE	TABLE F TEST NUMBER	POSSIBLE OPTION	CIRCUIT PACK TO BE REPLACED						
			1	2	3	4	5	6	7
1 No Response to Polling	1,2,3	Send Heading	AR188	AR542	AR498	AR530	AR487	AR193	AR190
		Answer ACK	AR188	AR542	AR485	AR486	AR498	AR193	AR530
2 BID Lamp Does Not Light	5		AR487	AR273 or AR268					
3 Single Bid Does Not Work			AR487						
4 Tape Distributor Does Not Run	2,5	Answer ACK on Poll	AR188	AR542	AR530	AR487	AR273 or AR268		
5 Tape Distributor Does Not Stop on STX		Stop on STX	AR188	AR542	AR530				
6 No Response to Emer Stop	2		AR188	AR542	AR485	AR193	AR498		
7 Paper Lamp Remains Lighted			AR273 or AR268	AR487					
8 No Response to Call-In	1,2,3		AR188	AR190	AR542	AR485	AR193	AR530	AR487
9 Tape Lamp Remains Lighted			AR273 or AR268	AR487					
10 Permanent Loop-Back	2		AR485	AR498	AR530				
11 Does Not Unblind on ENQ DC2	2,4		AR188	AR542	AR498	AR485	AR273 or AR268		
12 Improper Response			AR188	AR542					
13 No Response	Perform all tests (1-6)								

TABLE I

TESTING PROCEDURE WITH 1011-TYPE HANDSET FOR DAS 820G1

TEST NUMBER	CIRCUIT PACK	TEST POINT	ACTION TO BE TAKEN	1011-TYPE HANDSET RECEIVER INDICATIONS
1	AR190	9 12	STC sends single characters	— A click will sound for every character received. — If a click does not sound or if clicking is continuous, replace (1) AR530 or AR191... (2) AR190... (3) AR193.
2	AR191 or AR530	6	STC sends alternately DLE-EOT	— A click will sound for every control character received. — If a click does not sound, replace (1) AR530 or AR191... (2) AR192 ... (3) AR188.
		1	STC sends alternately ENQ-EOT	— A click will sound for every control character received. — If a click does not sound, replace (1) AR530 or AR191... (2) AR192... ... (3) AR188.
3	AR193	12	STC sends single characters	— A click will sound for every character received. — If a click does not sound, replace AR193.
		10	Station shall be placed in the traffic-available state. STC sends DLE-SCC	— If TD runs, a click will sound for every character sent to the line. — If the TD does not run, replace (1) AR194... (2) AR193... (3) AR364.
4	AR362	13	Station shall be placed in ready-to-receive state. STC sends ENQ-SCC	— A click will sound for every character printed by T.U. — If a click does not sound, replace (1) AR362... (2) AR194.
5	AR364	10	Move bat handle from STOP to RUN position	— Receiver emits barely audible hum (in STOP position) and then a click (in RUN position) coincident with the BID lamp lighting. — If the receiver does not sound a click, replace (1) AR364... (2) AR194.
6	AR364	9	Station shall be placed in the traffic-available state. STC sends DLE-SCC	— Receiver will emit barely audible hum until EOT is detected and coincident with EOT, a click will sound. — If receiver does not sound a click, replace (1) AR189... (2) AR364.

TABLE J

TESTING PROCEDURE WITH 1011-TYPE HANDSET FOR DAS 820G-L1/4 AND DAS 820G-L1/5

TEST NUMBER	CIRCUIT PACK	TEST POINT	ACTION TO BE TAKEN	1011-TYPE HANDSET RECEIVER INDICATIONS
1	AR190	9 12	STC sends single characters	— A click will sound for every character received. — If a click does not sound or if clicking is continuous, replace (1) AR530... (2) AR190... (3) AR193.
2	AR530	6	STC sends alternately DLE-EOT	— A click will sound for every control character received. — If a click does not sound, replace (1) AR530... (2) AR542... (3) AR188.
		1	STC sends alternately ENQ-EOT	—A click will sound for every control character received. — If a click does not sound, replace (1) AR530... (2) AR542... (3) AR188.
3	AR193	12	STC sends single characters	— A click will sound for every character received. — If a click does not sound, replace AR193.
		10	Station shall be placed in the traffic-available state. STC sends DLE-SCC	— If TD runs, a click shall sound for every character sent to the line. — If the TD does not run, replace (1) AR273 or AR268... (2) AR193... (3) AR487.
4	AR485	13	Station shall be placed in ready-to-receive state. STC sends ENQ-SCC	— A click will sound for every character printed by T.U. — If a click does not sound, replace (1) AR485... (2) AR273 or AR268.
5	AR487	10	Move bat handle from STOP to RUN position	— Receiver emits barely audible hum (in STOP position) and then a click (in RUN position) coincident with the BID lamp lighting. — If the receiver does not sound a click, replace (1) AR487... (2) AR273 or AR268.
6	AR487	9	Station shall be placed in the traffic-available state. STC sends DLE-SCC	— Receiver will emit barely audible hum until EOT is detected and coincident with EOT, a click will sound. — If receiver does not sound a click, replace (1) AR498... (2) AR487.

TABLE K

CONTINUITY TEST OF DAS 804N3 OR DAS 804R7

STEP	KEY	POSITION	SCALE	VOLT-OHM-MILLIAMMETER		
				CONNECT PROBE		READING OHMS
				+	−	
1	MSG ERROR	OPERATE	R X 10	13	8	∞
2		RELEASE		13	8	0 to 2
3	PAPER*	OPERATE		6	8	∞
4		RELEASE		6	8	0 to 2
5	AUD OFF	OPERATE		15	8	∞
6		RELEASE		15	8	0 to 2
7	OUT OF SVC	OPERATE		21	8	0 to 2
8		RELEASE		21	8	∞
9		OPERATE		4	8	∞
10		RELEASE		4	8	0 to 2
11				3	16	55 ±15
12				3	12	55 ±15
13				3	5	55 ±15
14				3	14	55 ±15
15				3	2	55 ±15
16				9	36	0 to 2

* TAPE LOW designation substituted for PAPER LOW when ROTR is provided.

TABLE L

CONTINUITY TEST OF DAS 804N5

STEP	KEY	POSITION	VOLT-OHM-MILLIAMMETER			
			SCALE	CONNECT PROBE		READING OHMS
				+	−	
1			R X 10	3	16	55 ±15
2				3	17	55 ±15
3				3	2	55 ±15
4				3	5	55 ±15
5				3	7	55 ±15
6				3	10	55 ±15
7				3	12	55 ±15
8				3	14	55 ±15
9				36	GRD	0 to 2
10	BID	OPERATE		19	8	∞
11		RELEASE		19	8	0 to 2
12		OPERATE		18	8	0 to 2
13		RELEASE		18	8	∞
14	OUT OF SVC	OPERATE		21	8	0 to 2
15		RELEASE		21	8	∞
16		OPERATE		4	8	∞
17		RELEASE		4	8	0 to 2
18	PAPER	OPERATE		6	8	∞
19		RELEASE		6	8	0 to 2
20	TAPE	OPERATE		9	8	∞
21		RELEASE		9	8	0 to 2
22	EMER STOP	OPERATE		11	8	∞
23		RELEASE		11	8	0 to 2
24	MSG ERROR	OPERATE		13	8	∞
25		RELEASE		13	8	0 to 2
26	AUD OFF	OPERATE		15	8	∞
27		RELEASE		15	8	0 to 2