SAGE DATA TRANSMISSION SYSTEMS — PRIVATE SERVICE SYSTEMS
AIR-GROUND VOICE COMMUNICATION SYSTEM
COMMON USER GROUP EQUIPMENT
TESTS OF AUTOMATIC TEST CIRCUIT

1. GENERAL

1.01 This section describes a method of testing the automatic test circuit (SD-1G030-01) for the common user group equipment of the air-ground voice communication system.

1.02 The tests covered are:

CHECK OF TIMING

A. Over-all Timing and Alarms: This test checks the ability of the circuit to time out and to sound an alarm if a test sequence is not completed within the required time limit.

B. Busy Distant End Timer: This test checks the circuit requirements of the BDE relay.

C. Failure Controller Start Timer: This test checks the circuit requirements of the FCS relay which causes the test circuit to bring in an alarm and release the controller if some trouble in the test circuit or in the controller prevents the controller from starting on a test call.

D. Release and Transfer Timer: This test checks the circuit requirements of the SP and LP relays which at the direction center check that the tone-off periods from the trunk do not exceed limits on release and transfer signals and which at the radio site determine the period for which tone will be removed to the trunk on release and transfer signals.

E. Channel Timer — Direction Center Only: This test checks the circuit requirements of the STM and LTM relays which check the channel circuit timers which permit the channel circuit to be released under certain conditions if no push-to-talk or codan signal has been present for a period of time.

F. Pulse Generator Test: This test checks the pulses per second and the per cent break of the PG relay which is used to generate pulses on incoming test calls.

G. Busy Channel and Trunk Tests: This test checks the operation of BTC and BTT relays which detect busy channels and trunks, respectively.

H. Trunk Made Busy Test: This test checks the operation of TPB relay which detects trunks that have been plugged busy.

OPERATIONAL TESTS

I. Suspend Testing Check: This test checks the ability of the test circuit to suspend testing when the channel or trunk under test is required for a service call.

J. Controller Preference Check Test: This test checks the ability of the test circuit to determine when its call has preference in the controller.

K. Manual Selection of Channels and Trunks: This test checks the ability of the test circuit to select any trunk and any channel under control of the setup switches and light the associated lamps.

L. Automatic Selection of Channels and Trunks: This test checks the ability of the test circuit to test over all channels and all trunks in an automatic progression.

M. Test Frame Operational Test: This test checks the circuit advance on normal tests, trunk originated tests, transfer tests, timing tests, and site selected tests. It also checks the operation with both A and B controllers.

1.03 All trouble indicator displays associated with test circuit operation are identified by an accompanying TCR lamp. RA lamp at the test circuit lights when the trouble indicator has been called on a test circuit operation.

1.04 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section, indicates an action which may or may not be required depending on local conditions. The

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condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

1.05 Local instructions should be followed for recording and reporting any register operations caused by performing these tests.

APPARATUS	NO. REQUIRED FOR TEST A	B	C	D	E	F	G	H	I	J	K	L	M
KS-3008 stop watch, or equivalent	1												
Test set (2.02)		1	1	1	1								
Test set (2.03)						1							
Test set for current flow tests (2.04)							1	1					
Test cord (2.05)									1	1			
No. 627A armature blocking tools, as required	1								3	18			
Relay contact connector holder (2.06)									1	1			

2. APPARATUS

2.01 The apparatus required for each test is shown in the following list. The details for each item are covered in the indicated paragraph.

2.02 Timing test set, J24753A (SD-25707-01). One P3K cord, 6 feet long, equipped with two No. 310 plugs (3P15B cord); and one W3M cord, 6 feet long, equipped with one No. 310 plug, one No. 360A tool, one No. 360B tool, one No. 360C tool (3W4A cord), one KS-6278 tool, and two No. 419A tools.

2.03 See Section 163-653-501 for apparatus required for Test F.

2.04 One 35-type test set. One W2W cord, 6 feet long, equipped with two No. 310 plugs and one W2W cord equipped with one No. 310 plug, one No. 360B tool, one No. 360C tool, and two No. 419A tools.

2.05 No. 893 cord, 6 feet long, equipped with two No. 360A tools (1W13B cord), one KS-6278 tool, and one No. 639A tool.

2.06 No. 651A tool (for use with relays which are equipped with wire clips for retaining the dust cover) or No. 651C tool (for use with relays which are not equipped with wire clips for retaining the cover).

3. PREPARATION

STEP	ACTION	
All Tests		
1	Restore all keys to normal	All lamps extinguished

4. METHOD

STEP	ACTION	VERIFICATION
	A. Over-all Timing and Alarms	
2	Block operated STT relay	After 4 to 5 seconds — TM lamp lights Audible alarm sounds Aisle pilot lights
3	Operate ACO key at trouble indicator momentarily	ACO lamp lights Audible alarm silenced Aisle pilot extinguished

STEP	ACTION	VERIFICATION
4	Remove blocking tool from STT relay	TM lamp extinguished ACO lamp extinguished
	B. Busy Distant End Timer	
2	Perform timing test of BDE relay using test set for timing tests and circuit requirements tables	Circuit requirements are met
	C. Failure Controller Start Timer	
2	Perform timing tests of FCS relay using test set for timing tests and circuit requirements tables	Circuit requirements are met CST, CSA lamps light
	D. Release and Transfer Timer	
2	Perform timing tests of SP relay using test set for timing tests and circuit requirements tables	Circuit requirements are met
3	Perform timing tests of LP relay using test set for timing tests and circuit requirements tables	Circuit requirements are met At direction center — TF lamp lights
	E. Channel Timer — Direction Center Only	
2	Perform timing tests of STM relay using test set for timing tests and circuit requirements tables	Circuit requirements are met
3	Perform timing tests of LTM relay using test set for timing tests and circuit requirements tables	Circuit requirements are met
	F. Pulse Generator Test	
2	Perform per cent break and pulse-per-second tests using Section 163-653-501 and circuit requirements table for PG relay	Circuit requirements are met
	G. Busy Channel and Trunk Tests	
2	Using 35-type test set and circuit requirements table — Make current flow tests of BTC, BTT relays	Circuit requirements are met
	H. Trunk Made Busy Test	
2	Using 35-type test set and circuit requirements table — Make current flow tests of TPB relay	Circuit requirements are met
	I. Suspend Testing Check	
2	Block CC relay operated	CH lamp lights
3	Connect ground to terminal 91 TST- terminal strip	SUP relay operates
4	Remove ground from terminal 91 of TST- terminal strip	

STEP	ACTION	VERIFICATION
5	Remove blocking tool from CC relay	SUP relay releases CH lamp extinguished
6a	If group switch is provided — Set at position 0	
7	Operate ON key	
8	Block CC relay operated	SR relay in associated controller operates CH lamp lights
9	Block SEQ2 relay nonoperated	
10	Apply ground 4F of SR relay in associated controller	SUP relay operates SUP lamp lights
11	Block operated TCC relay	SUP relay releases FCB lamp lights At radio site — SUP lamp extinguished
12	Remove ground 4F of SR relay Remove blocking tools from TCC, SEQ2 relays	
13	Restore ON key	SUP lamp extinguished
14	Remove blocking tool from CC relay	CH, FCB lamps extinguished
15a	If group switch is provided — Set at position 1 Repeat Steps 8 through 14	
16a	Repeat for all equipped positions of group switch	
17	Operate ON key	
18	Operate DTN relay	SUP, DTN lamps light
19	Restore DTN relay	DTN lamp extinguished At radio site — SUP lamp extinguished
20	Restore ON key	At direction centers — SUP lamp extinguished

J. Controller Preference Check Test

2	Block RL, SEQ1, TSA relays operated	CC lamp lights
3	Block CST, SEQ2, SEQ4 relays nonoperated	
4	Apply ground 5F of TO relay	
5	Operate ON key	
6	Operate CTA key	TCC, CAP relays normal
7	Block operated ST9 relay	CAP relay operates

STEP	ACTION	VERIFICATION
8	Block operated CU9 relay	CAP relay releases TCC relay operates
9	Block operated ST8 relay	TCC relay releases CAP relay operates
10	Remove blocking tool from CU9 relay Block CU8 relay operated	CAP relay releases TCC relay operates
11	Block operated ST7 relay	TCC relay releases CAP relay operates
12	Remove blocking tool from CU8 relay Block CU7 relay operated	CAP relay releases TCC relay operates
13	Block operated ST6 relay	TCC relay releases CAP relay operates
14	Remove blocking tool from CU7 relay Block operated CU6 relay	CAP relay releases TCC relay operates
15	Block operated ST5 relay	TCC relay releases CAP relay operates
16	Remove blocking tool from CU6 relay Block operated CU5 relay	CAP relay releases TCC relay operates
17	Block operated ST4 relay	TCC relay releases CAP relay operates
18	Remove blocking tool from CU5 relay Block operated CU4 relay	CAP relay releases TCC relay operates
19	Block operated ST3 relay	TCC relay releases CAP relay operates
20	Remove blocking tool from CU4 relay Block operated CU3 relay	CAP relay releases TCC relay operates
21	Block operated ST2 relay	TCC relay releases CAP relay operates
22	Remove blocking tool from CU3 relay Block operated CU2 relay	CAP relay releases TCC relay operates
23	Block operated ST1 relay	TCC relay releases CAP relay operates
24	Remove blocking tool from CU2 relay Block operated CU1 relay	CAP relay releases TCC relay operates
25	Block operated STO relay	TCC relay releases CAP relay operates
26	Remove blocking tool from CU1 relay Block operated CUO relay	CAP relay releases TCC relay operates
27	Block operated TSCA relay	TCC relay releases CAP relay operates

STEP	ACTION	VERIFICATION
28	Remove blocking tools from CUO, STO relays Operate CU1 relay momentarily	CAP relay remains operated
29	Remove blocking tool from ST1 relay Operate CU2 relay momentarily	CAP relay remains operated
30	Remove blocking tool from ST2 relay	CAP relay releases TCC relay operates
31	Remove blocking tools from TSCA, ST3 through ST9 relays	CAP, TCC relays release
32	Remove ground 5F of TO relay	
33	Operate TO key	TO, TOA relays operated
34	Apply ground 6F of TO relay	
35	Repeat Steps 7 through 26 blocking TU- relays where CU- relays are specified	
36	Remove blocking tools from TUO, STO through ST9 relays	CAP, TCC relays release
37	Remove ground 6F of TO relay	
38	Restore CTA, TO keys	TO, TOA relays release
39	Apply ground 5F of TO relay	
40	Operate CTB key	
41	Block operated STO relay	CAP relay operates
42	Block operated CUO relay	CAP relay releases TCC relay operates
43	Block operated ST1 relay	TCC relay releases CAP relay operates
44	Remove blocking tool from CUO relay Block CU1 relay operated	CAP relay releases TCC relay operates
45	Block operated ST2 relay	TCC relay releases CAP relay operates
46	Remove blocking tool from CU1 relay Block CU2 relay operated	CAP relay releases TCC relay operates
47	Block operated ST3 relay	TCC relay releases CAP relay operates
48	Operate TSCA relay	CAP relay releases TCC relay operates
49	Release TSCA relay	TCC relay releases CAP relay operates
50	Remove blocking tool from CU2 relay Block CU3 relay operated	CAP relay releases TCC relay operates
51	Block operated ST4 relay	TCC relay releases CAP relay operates

STEP	ACTION	VERIFICATION
52	Remove blocking tool from CU3 relay Block CU4 relay operated	CAP relay releases TCC relay operates
53	Block operated ST5 relay	TCC relay releases CAP relay operates
54	Remove blocking tool from CU4 relay Block CU5 relay operated	CAP relay releases TCC relay operates
55	Block operated ST6 relay	TCC relay releases CAP relay operates
56	Remove blocking tool from CU5 relay Block CU6 relay operated	CAP relay releases TCC relay operates
57	Block operated ST7 relay	TCC relay releases CAP relay operates
58	Remove blocking tool from CU6 relay Block CU7 relay operated	CAP relay releases TCC relay operates
59	Block operated ST8 relay	TCC relay releases CAP relay operates
60	Remove blocking tool from CU7 relay Block CU8 relay operated	CAP relay releases TCC relay operates
61	Block operated ST9 relay	TCC relay releases CAP relay operates
62	Remove blocking tool from CU8 relay Block CU9 relay operated	CAP relay releases TCC relay operates
63	Remove blocking tools from CU9, STO through ST9 relays	CAP, TCC relays release
64	Remove ground 5F of TO relay	
65	Operate TO key	TO, TOA relays operate
66	Apply ground 6F of TO relay	
67	Repeat Steps 41 through 47 and 50 through 63 blocking TU- relays where CU- relays are specified	
68	Remove ground 6F of TO relay	
69	Restore CTB, TO keys	TO, TOA relays release
70	Operate CTA key	
71	Block operated ST9, CU9 relays	
72	Apply ground 1F of TSCA relay	CAP relay operates
73	Block operated CTAO relay	CAP relay releases TCC relay operates
74	Operate TO relay	TCC relay releases CAP relay operates

STEP	ACTION	VERIFICATION
75	Release TO relay	CAP relay releases TCC relay operates
76-	Operate TSCA relay	TCC relay releases CAP relay operates
77	Release TSCA relay Remove blocking tool from CTAO relay Remove ground 1F of TSCA relay	CAP, TCC relays released
78	Apply ground 2F of TSCA relay	CAP relay operates
79	Block operated CTA1 relay	CAP relay releases TCC relay operates
80	Operate TSCA relay	TCC relay releases CAP relay operates
81	Restore TSCA relay Remove blocking tool from CTA1 relay Remove ground 2F of TSCA relay	CAP, TCC relays release
82	Apply ground 3F of TSCA relay	CAP relay operates
83	Operate CT2 relay	CAP relay releases TCC relay operates
84	Restore CT2 relay	TCC relay releases CAP relay operates
85	Operate TSCA relay	CAP relay releases TCC relay operates
86	Restore TSCA relay Remove ground 3F of TSCA relay Remove blocking tool from CU9 relay Block TU9 relay operated	CAP, TCC relays release
87	Apply ground 10F of TTAO relay	CAP relay operates
88	Block operated TTAO relay	CAP relay remains operated
89	Operate TO relay	CAP relay releases TCC relay operates
90	Restore TO relay Remove blocking tool from TTAO relay Remove ground 10F of TTAO relay	CAP, TCC relays release
91	Repeat Steps 87 through 90 for TTA1, TTA2, TTA3 relays	
92	Remove blocking tools from RL, SEQ1, SEQ2, SEQ4, CST, TSA, ST9, TU9 relays Restore ON, CTA keys	CC lamp extinguished

K. Manual Selection of Channels and Trunks

2	Set channel tens switch at position 0	

STEP	ACTION	VERIFICATION
3	Operate ON key	COO lamp lights
4	Restore ON key	COO lamp extinguished
5	Repeat Steps 2 through 4 setting channel tens switch at positions 1 and 2 on successive tests	C10, C20 lamps light on successive tests
6	Set channel units switch at position 0	
7	Operate ON key	CO lamp lights
8	Restore ON key	CO lamp extinguished
9	Repeat Steps 6 through 8 setting channel units switch at positions 1 through 9 on successive tests	C1 through C9 lamps light on successive tests
10	Set trunk tens switch at position 0	
11	Operate ON key	TOO lamp lights
12	Restore ON key	TOO lamp extinguished
13	Repeat Steps 10 through 12 setting trunk tens switch at positions 1, 2, 3 on successive tests	T10, T20, T30 lamps light on successive tests
14	Set trunk units switch at position 0	
15	Operate ON key	TO lamp lights
16	Restore ON key	TO lamp extinguished
17	Repeat Steps 14 through 16 setting trunk units switch at positions 1 through 9 on successive tests	T1 through T9 lamps light on successive tests

L. Automatic Selection of Channels and Trunks

2a	If group switch is provided — Set at position 0	
3	Operate CAT key	
4	Operate TAT key	
5	Operate CTA key	
6	Operate PBC key	
7	Operate PBT key	
8	Operate ON key	Channel 01, trunk 00 lamps light
9	Operate ST key momentarily	Observe that channel lamps, C-, light in sequence from 01 through 22 Observe that trunk lamps, T-, light in sequence from 00 to last equipped trunk for each channel tested GE lamp lights
10	Operate RL key momentarily	
11	Restore ON key	All lamps extinguished

STEP	ACTION	VERIFICATION
12a	If group switch is provided — Set group switch at successive equipped positions Repeat Steps 8 through 11	
13	Restore CAT key	
14	Restore TAT key	
15	Restore CTA key	
16	Restore PBC key	
17	Restore PBT key	
	M. Test Frame Operational Test	
2	Set channel tens and units switches at position 0	
3	Operate TAT key	
4	Operate PBT key	
5	Operate CTA key	
6	Operate ON key	Channel 00, trunk 00 lamps light
7	Operate ST key momentarily	Test frame picks idle trunk Observe progress lamps light for each trunk tested GE lamp lights
8	Operate RL key momentarily	GE lamp extinguished
9	Restore CTA key	
10	Operate CTB key	
11a	If testing at direction center — Operate TR key	
12a	Repeat Steps 7 and 8	
13a	Restore TR, ON keys	All lamps extinguished
14a	Operate CAT, PBC keys	
15a	Operate TM key	
16a	Operate ON key	Channel 00, trunk 00 lamps light
17a	Operate ST key momentarily	Test frame picks idle channel and idle trunk Observe progress lamps light for each channel and trunk tested GE lamp lights
18a	Restore TM, CAT, PBC keys	
19a	Operate RL key momentarily	GE lamp extinguished
20b	If testing at site — Operate SS key	

STEP	ACTION	VERIFICATION
21b	Repeat Steps 7 and 8	
22b	Restore SS key	
23	Operate TO key	
24	Repeat Steps 7 and 8	
25b	If testing at site — Operate TR key	
26b	Repeat Steps 7 and 8	
27b	Restore TR key	
28b	Restore CTB, ON, PBT, TAT, TO keys	All lamps extinguished