COMPANY PRIVATE

Installation Engineering Handbook 59
Western Electric Company, Incorporated
Hawthorne Works

Section
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Replaces: Section 314
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"BELLBOY"
PERSONAL SIGNALING SYSTEMS NO. 1A
J1 CONTROL TERMINAL

SUPPLEMENTARY TESTS

CONTENTS

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1. GENERAL INFORMATION

1.1 Description: This section describes a method for supplementary tests of various features of the J1 Control Terminal for use with Personal Signaling System 1A (Bellboy).

1.2 Application of Test: The tests of this section shall be performed after Section 313 is completed as outlined in Section 310 of this handbook. The tests of Section 410 and 411 of this handbook shall be performed as indicated in Paragraph 8 and 9.

2. TRANSMITTER TRUNK FEATURES (SD-96564-01)

2.1 Transmitter Cut-Off Key: Block nonoperated T2 relay. Block operated ST2 relay. Verify that W and Z relays are not operated.

2.11 Operate TCO key in First TTO. TG and MTG lamps light. T1 relay operates.

2.12 Release TCO key. TG and MTG lamps go out. T1 relay releases.

2.13 Repeat 2.11 and 2.12 with all other TCO keys of TTO.

2.14 Block operated C relay in first TTO (FS 2). TON lamp lights. T1 relay operates.

2.15 Remove block from ST2 relay. The ST2 and T1 relays remain operated.

2.16 Remove block from C relay. ST2 and T1 relays release. TON lamp goes out.

2.17 Block operated ST2 relay.

2.18 Repeat Paragraphs 2.14 through 2.17 for all other TTO.

2.19 Remove blocks from ST2 and T2 relays.

2.2 Tone Test Keys: Operate OMB key on the lamp panel. GL lamp lights.

2.21 Verify that TT key is in HT position on the lamp panel.

2.22 Operate TTS key to MOD CARR position on first TTO. TG and MTG lamps light. Verify that TT and S33 relays are operated.

2.23 Operate TTS key to CARR position. Verify that S33 relay is released.

2.24 Restore TTS key to NORM position. Verify that TT relay is released. TG and MTG lamps go out.

2.25 Repeat Paragraph 2.22 through 2.24 using TTS keys in all other TTO.

2.26 Operate TT key to LT position. Operate TTS key to MOD CARR position in first TTO. TG and MTG lamps light. Verify that TT and S1 relays operate.

2.27 Operate TT key to 3T position. Verify that TT, S1, S2, and S33 relays operate. (If No. 2 Oscillators are not provided, S32 relay will operate instead of S2 relay.)

2.28 Restore TTS key to NORM position in first TTO. TG and MTG lamps go out. TT and all S- relays are released.

2.29 Operate TT key to HT position, and OMB key to normal position. GL lamp goes out.

2.3 Transmitter Reset Keys: Use ITE-4442 Volt-Ohmmeter 300V DC scale to verify presence of voltages in following tests.

2.31 Operate and hold TRS key of first TTO. Verify that -130 volts appears at terminal 21 of "C" terminal strip on TTO.

2.32 Release TRS key. Verify that -130 volts appears at terminal 21 of "C" T.S. after allowing 10 seconds for capacitor to drain through voltmeter.

2.33 Repeat Paragraphs 2.31 and 2.32 with all other TTO.

3. REGISTER SECTION PREFERENCE CIRCUITS (FS3 SD-96504-01)

3.1 Regular Preference Chain:

3.11 Verify PT key is not operated on CCF lamp panel and that no tests are being performed in any ITR.

3.12 In highest numbered ITR (FS1-SD-96501-01), block the PC relay operated. Observe that the associated CA- and CB- relays operate in ITR, and associated RP relay operates in SD-96504-01 (RC-C).

3.13 Manually operate and release each PC relay of the other ITR. Observe that associated RP- relays do not operate.

3.14 Release PC relay in highest numbered ITR. Observe that associated RP-, CA-, and CB- relays are released in ITR.

3.15 Block PC relay operated in the next lower numbered ITR. Observe that associated CA- and CB- relays operate in ITR, and associated RP relay operates in RC-C.

3.151 Manually operate and release each PC relay of other lower numbered ITR and check that associated RP- relays do not operate.

3.152 Manually operate and release PC relay in higher numbered ITR. Observe that the associated RP- relay operates and releases, but that the associated CA- and CB- relays do not operate.

3.16 Release PC relay which was blocked operated. Observe that the associated RP-, CA-, and CB- relays are released.

3.17 Repeat Paragraphs 3.15 and 3.16 for other lower numbered ITR.

3.2 Emergency Preference Chain:

3.21 Operate PT key in CCF lamp panel. TPO and TP1 relays operate.

3.22 Repeat Paragraphs 3.12 through 3.17, observing that EP- relays operate and release instead of the RP- relays.

3.23 Restore PT key to normal.

3.3 Preference Continuity Check Circuit:

3.31 Connect ground to Contact 2 of the EP9 relay.

3.32 Block PC relay operated in any ITR. Observe TPO and TP1 relays are released in RC-C, the RCP lamp lights in CCF lamp panel, and the minor alarm sounds. Observe that the RP-, CA-, and CB-, relays associated with the operated PC relay are operated.

3.33 Remove ground from the EP9 relay. Release the operated PC relay. Observe the associated RP-, CA- and CB- relays are released.

3.34 Operate and release the AR key on CCF lamp panel. Observe that the RCP lamp goes out and the alarm is silenced. Observe that the TPO and TP1 relays operate. Operate and release PT key.

3.35 Connect ground to Contact 2 of the RP9 relay.

3.36 Block PC relay operated in any ITR. observe that TPO and TP1 relays in RC-C operate, RCP lamp lights and minor alarm sounds. Observe that the EP-, CA-, and CB- relays associated with the operated PC relay operate.

3.37 Remove ground from RP9 relay. Release operated PC relay. Observe that the associated EP-, CA-, and CB- relays are released.

3.38 Operate AR key. The RCP lamp goes out and alarm is silenced. The TPO and TP1 relays are released.

3.39 Remove ground from RPO relay.

4. TRAFFIC REGISTER FEATURES

4.1 Incoming Trunk Traffic Registers (FS1 SD-96501-01)

4.11 The traffic registers associated with the ITR are arranged on a Trunk Group basis from information provided by the Telephone Company.

4.12 All Trunks Busy Registers (ATB):

4.121 Block the SRA and TMA relays operated in each ITR of the first Trunk Group. Observe that the ATB register for the first Trunk Group operates once as the last SRA relay in the group is operated.

4.122 Repeat Paragraph 4.121 for each other Trunk Group. Observe that the proper assigned ATB register operates once.

4.13 Incoming Trunk Busy Registers (ITB):

4.131 Manually operate and release the GB- relay associated with the first ITR of the first Trunk Group. Observe that the ITB register for the first Trunk Group operates once and that ITB registers of other Trunk Groups do not operate.

4.132 Repeat Paragraph 4.131 for other CB- relays in same Trunk Group.

4.133 Repeat Paragraph 4.131 and 4.132 for other Trunk Groups.

4.14 Remove blocks from all SRA and TMA relays of ITR.

4.2 Storage Traffic Registers (FS2 SD-96504-01)

4.21 Calls Stored Register (CS):

4.211 Operate and release LCB relay in RC-A. Observe that the CS register operates once.

4.212 Repeat 4.211 in RC-B. Observe that the CS register operates once.

4.22 Storage Busy Register (SB):

4.221 Operate and release SB1 relay in RC-A. Observe that the SB register operates once.

4.222 Repeat Paragraph 4.221 in RC-B. Observe that the SB register operates once.

5. TRUNK SUPERVISION VERIFICATION - (FS1 SD-96501-01)

5.1 At Distributing Frame appearance of the ITR, verify with an R-9572 Test Receiver that there is ground on the Tip lead and battery on the Ring lead of each ITR. Both potentials are through the windings of the LA relays of ITR.

5.2 Insert a 258C Dummy Plug into the T jack of the first ITR. Verify that TST relay of ITR is operated.

5.21 (Without "S" option) Verify that there is no battery or ground on the Tip or Ring leads of the first ITR at the Distributing Frame.

5.22 (With "S" option) Verify that there is resistance battery on the Tip lead and resistance ground on the Ring lead of the first ITR at the Distributing Frame.

5.3 Remove Dummy Plug from T jack. TST relay of ITR is released.

5.4 Repeat Paragraphs 5.2 and 5.3 with all other ITR.

6. OPERATION TEST PREPARATION

6.1 Locate ITE-4608 Bellboy Test Set at front of Bay 0 of CCF.

6.2 Verify that all Test Set keys are in nonoperated position.

6.3 Use available wire or cable to make connections to Test Set as shown in Table A.

6.4 At Transmitter Control CKT of Transmitter Control and Tone Supply Bay:

6.41 Operate SMB key (GL lamp lights).

6.42 Insulate 8B of TCR relay and 9M of CKA relay.

6.5 Place the following temporary cross-connections until otherwise directed in Section 316:

6.51 In each ITR to be used with Step-by-Step office features, connect the ABS terminal (32) to the AS terminal (31) on DIS terminal strip.

6.52 In RC-C, place temporary connections between X-- and Y-- terminals to HG-- terminals as shown in Table B.

6.6 Place plug of an ITE-4647 Transmitter Trunk Simulator in OT OUT jack of each TTO.

TABLE A

Connect ITE-4608 T.S. "F" Pchg.	To TCF T.S. "B" Pchg.	Connect ITE-4608 T.S. "A" Pchg.	To Frame	To T.S.	To Pchg	To Note
01	16	T 0	CCF	"A"	001	CONNECT ONLY FOR EQUIPPED ITR
02	26	R 0			000	
03	36	T 1			003	
04	46	R 1			002	
05	56	T 2			005	
06	66	R 2			004	
07	76	T 3			007	
08	86	R 3			006	
09	96	T 4			009	
10	106	R 4			008	
11	116	T 5			011	
12	126	R 5			010	
13	136	T 6	ANF	"B"	001	
14	146	R 6			000	
15	156	T 7	ISF	"A"	001	
16	166	R 7			000	
(17 Not Used)	-	T 8			003	
18	176	R 8			002	
19	186	T 9			005	
20	196	R 9			004	
21	206	0 (T or R)	TCF	"B"	37	"TNC"
22	15	2 (T or R)			57	"ST"
23	25	4 (T or R)			67	"MB"
24	35	6 (T or R)	CCF	*		"CNC"
25	45					
26	55					
27	65					
28	75					
29	85					
30	95					
31	105					
32	115					
33	125					

* Connect to Contact 10 of BAO relay in RC-C.

TABLE B

Highest Numbered NCT Equipped:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Connect Terminal:	to HG-- terminals															
X00	10-26	10-17	10-14	10-13	10-12	10-12	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10-11	10
Y00	30-46	18-26	15-19	14-17	13-15	13-15	12-13	12-13	12-13	12-13	12-13	12-13	12-13	12-13	12-13	11
X01		30-37	21-25	18-22	16-18	16-18	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14-15	14	12
Y01		38-46	26-33	23-26	19-22	19-22	16-17	16-17	16-17	16-17	16-17	16-17	16-17	16-17	15	13
X02			34-38	30-33	23-25	23-25	18-19	18-19	18-19	18-19	18-19	18-19	18-19	18	16	14
Y02			39-46	34-37	26-31	26-31	21-22	21-22	21-22	21-22	21-22	21-22	21-22	19	17	15
X03				38-42	32-34	32-34	23-24	23-24	23-24	23-24	23-24	23-24	23	21	18	16
Y03				43-46	35-37	35-37	25-26	25-26	25-26	25-26	25-26	25-26	24	22	19	17
X04					38-42	38-41	30-31	30-31	30-31	30-31	30-31	30	25	23	21	18
Y04					43-46	42-44	32-33	32-33	32-33	32-33	32-33	31	26	24	22	19
X05						45	34-36	34-35	34-35	34-35	34	32	30	25	23	21
Y05						46	37-39	36-37	36-37	36-37	35	33	31	26	24	22
X06							41-43	38-39	38-39	38	36	34	32	30	25	23
Y06							44-46	41-42	41-42	39	37	35	33	31	26	24
X07								43-44	43	41	38	36	34	32	30	25
Y07								45-46	44	42	39	37	35	33	31	26
X08									45	43	41	38	36	34	32	30
Y08									46	44	42	39	37	35	33	31
X09										45	43	41	38	36	34	32
Y09										46	44	42	39	37	35	33
X10											45	43	41	38	36	34
Y10											46	44	42	39	37	35
X11												45	43	41	38	36
Y11												46	44	42	39	37
X12	Note: It is not necessary to connect "out-of-block" HG-- terminals 20, 27-29, 40 and 47-49.												45	43	41	38
Y12													46	44	42	39
X13														45	43	41
Y13														46	44	42
X14															45	43
Y14															46	44
X15																45
Y15																46

6.7 Connect ITE-4608 Test Set A jack to -48 volt supply jack with ITE-9600 cord or equivalent.

6.8 Operate volume control knob on test set speaker to "ON" position. Red pilot lamp lights on speaker.

7. TRANSMITTER INFORMATION SUPPLY CIRCUITS

7.1 Locate ITE-4089 (21A Transmission Measuring Set (TMS), at front of TCF.

7.11 Connect the power cord of TMS to a 115-volt 60 cycle supply and connect the attached test clip to a convenient ground.

7.12 Operate ON-OFF switch to ON and allow at least 10 minutes for warm-up before use.

7.13 Perform calibration procedure of TMO-4089 or BSP A702.614 if accuracy of oscillator or detector of TMS is in doubt.

7.14 Adjust DET INPUT switch to red +20 setting.

7.15 Connect DET IN jack of TMS to AMP out jack on TCF lamp panel with ITE-9361 cord equivalent.

7.2 F- Lead and Tone Slope Verification:

7.201 At front of TCF, set ATFR switch to TA1 position.

7.202 At rear of CCF lamp panel, place a temporary connection from ground to the tip of the spare jack located between the NCT1 and F1 jacks.

7.203 Connect this grounded spare jack to F33 jack on CCF lamp panel with 3P3D cord provided for CCF test jacks.

7.204 Verify that F33 lamp on ITE-4608 Bellboy Test Set is lit and that S33 relay in TC is operated.

7.205 Remove cover from TA1 KS-16754-L4 Amplifier on TCF. Adjust gain potentiometer of TA1 amplifier until 0 db is read on meter of TMS with DET INPUT switch set to red +20.

7.206 Operate ATFR switch to TA2 position. Repeat Paragraph 7.205 using TA2 amplifier.

NOTE: Do not change setting of TA1 and TA2 amplifier gain potentiometers after adjusting to meet 0 db level requirement for tone #33. If other tones aren't within ± 0.3 db of tone No. 33 recheck voltage at OSC OUT jack on 36A Oscillator and verify circuit of associated R1-33 resistors in TS-TG.

7.207 Remove plug from F33 jack and place in F32 jack on CCF lamp panel. Verify that associated S32 relay in TC is operated and that Test Set F32 lamp is lit.

7.208 Verify that tone indicated on TMS is within ± 0.3 db of tone No. 33 if No. 32 oscillators are equipped.

7.209 Operate AFTR switch to TA1 position and repeat Paragraph 7.208.

7.210 Repeat Paragraphs 7.207 through 7.209 with other F- jacks, S- relays and F- lamps in decreasing numerical sequence. Verify tone levels are within ± 0.3 db of tone No. 33 for equipped oscillators.

7.211 Remove cord from grounded spare jack and F1 jack on CCF lamp panel. Remove TMS cord from AMP OUT jack on TCF. Replace covers on TA1 and TA2 amplifiers.

8. ANNOUNCEMENT FEATURES

8.1 The four KS-16765-L2 Announcement Sets in the ANF and TCF shall be tested per Section 410 of this handbook.

8.2 The 401A Tone Generator (Tinkle-tone) is associated with AC-A, AC-B, and AC-SI through contacts of TR1, TR2 and TR3 relays, respectively, on Tinkle-tone unit of ANF.

8.21 The DICTATE lamp on AC-A, AC-B and AC-SI shall be disregarded as an indication of the start of the dictate interval.

8.22 The associated TR- relay operates at the end of the 2 second tinkle-tone interval prior to the announcement.

8.23 The TR-relay operation shall be used to indicate the start of dictation to prevent the tinkle-tone overlapping the announcement.

8.3 Announcement Transmission Levels

8.31 "Station Identification"

8.311 Adjust ITE-4089 21A Transmission Measuring Set, DET INPUT Switch to red + 20 setting.

8.312 Connect TMS DET IN jack to AMP OUT jack on TCF lamp panel. Remove cover from AC-SI.

8.313 Block nonoperated TR3 relay in Tinkle-tone unit on ANF, and STP relay in AC-SI. Block nonoperated ST1 and T5 relays in TC.

8.314 Insulate contact 4M of SI relay and block operated ATR and SI relays in TC. The recorder of AC-SI starts.

8.315 Adjust ANN LEV attenuator on TCF until ITE-4089 indicates +5 ±0.5 db with DET INPUT switch on red +20 setting.

NOTE: The needle of the ITE-4089 meter will waver due to modulation of the Tinkle-tone. The reading shall be taken at the mid-point of the needle movement.

8.316 Remove blocks from SI, ST1, ATR, T5 and TR3 relays. Remove insulator from 4M (SI). Replace cover on AC-SI.

8.317 Remove cord from AMP OUT jack in TCF.

8.32 "Completion A"

8.321 Adjust ITE-4089 switch DET INPUT to red +20 setting.

8.322 Connect ITE-4089 jack DET IN to jack TST on ITR-0 in CCF. Remove covers from AC-A, AC-B, AC-TBL, and associated KS-16754-L3 Amplifiers.

8.323 Block nonoperated WT and VA relays in RC-C, TR1 relay of Tinkle-tone unit on ANF, and STP relay of AC-A.

8.324 Block operated TAS and CKA relays in ITR-0. The recorder of AC-A starts.

8.325 Adjust gain potentiometer of KS-16754-L3 Amplifier associated with AC-A until ITE-4089 indicates -16 ± 0.5 db (meter reads -6 ± 0.5 db with DET INPUT switch at -10 setting). Record this level in the test record.

8.326 Remove blocks from TAS and CKA relays of ITR-0, TR1 relay of Tinkle-tone unit, STP relay of AC-A, and WT relay of RC-C.

8.33 "Completion B"

8.331 Block nonoperated TR2 relay of Tinkle-tone unit and STP relay of AC-B.

8.332 Block operated TAS and CKA relays in ITR-0 and WT relay in RC-C. The recorder of AC-B starts.

8.333 Repeat Paragraph 8.325 for amplifier of AC-B.

8.334 Remove blocks from TAS and CKA relays of ITR-0, TR2 relay of Tinkle-tone unit, STP relay of AC-B, and WT relay of RC-C.

8.34 "Trouble"

8.3401 Connect OSC OUT jack of ITE-4089 to J3 and J4 jacks on front of AC-TBL on ANF.

8.3402 Adjust ITE-4089 switches to the following positions:

FREQ MULT	X100
FREQ	10
OSC OUTPUT	-20

8.3403 Operate S4 switch of AC-TBL to DICTATE position. The AC-TBL recorder starts and D lamp lights.

8.3404 Release S4 switch when D lamp on AC-TBL goes out at end of 2 minute record interval.

8.3405 Remove cord from OSC OUT jacks of ITE-4089 and J3-J4 jacks of AC-TBL.

8.3406 Block operated TAS and RO relays in ITR-0 and TAM relay in RC-C. ITE-4089 will indicate level during 2 minute reproduce cycles.

8.3407 Adjust gain potentiometer of KS-16754-L3 Amplifier associated with AC-TBL until ITE-4089 indicates -10 ± 0.5 db (meter reads 0 ± 0.5 db with DET INPUT switch at -10 setting). Record this level in the test record.

8.3408 Remove blocks from TAS and RO relays and cord from TST jack of ITR-0.

8.3409 Connect DET IN jack of TMS to TST jack of ITR-1. Block operated TAS and RO relays in ITR-1. Verify that ITE-4089 indicates within ± 0.5 db of the level observed in Paragraph 8.3407.

NOTE: Do not change AC-TBL amplifier gain after adjustment of Paragraph 8.3407 for ITP-0. If requirement of Paragraph 8.3409 is not met in another ITP, verify circuit of TST jack and T1-T2 resistors and capacitors of that ITR.

8.3410 Repeat Paragraphs 8.3408 and 8.3409 with each other ITR.

8.3411 Remove blocks from TAS, RO, TAM, and VA relays. Remove connection from TST jack to ITE-4089.

8.3412 Replace cover on KS-16754-L3 Amplifiers.

8.4 Operation Test Preparation

8.41 Place 12 second announcement on each announcement set on ANF and TCF using the procedures of Section 410 of this handbook. Avoid long pauses in the announcement to provide a nearly full 12 seconds of speech. In order that the AC- may be identified as used during tests, the announcement should contain the following phases:

(a) AC-A - "Completion announcement A"

(b) AC-B - "Completion announcement B"

(c) AC-TBL- "Trouble announcement"

(d) AC-SI - "Station identification"

9. VOICE ALARM OPERATION

9.1 The two VA in ANF and TCF shall be tested per Section 411 of this handbook.

9.11 The VA relay in RC-C and AL3 relay in TC may be blocked nonoperated to avoid alarm indications during adjustments.

9.12 The delay interval for both VA shall be 6 seconds.

9.2 Operation Verification

9.21 VA in ANF: Verify that VA relay in RC-C is released.

9.211 Block operated TAS and CKA relays in ITR-0. Verify that after 30 seconds the ACA lamp does not light on CCF lamp panel.

9.212 Block operated TAM relay in RC-C. After 5-15 seconds, ACA lamp lights and minor alarm sounds.

9.213 Release TAM, TAS and CKA relays in RC-C.

9.214 Operate AR key on CCF lamp panel. ACA lamp goes out and minor alarm is silenced.

9.22 VA in TCF: Verify that AL3 relay in TC is released.

9.221 Block nonoperated ST1 and T5 relays in TC. Block operated ATR and SI relays in TC. Verify that after 30 seconds the VA lamp does not light on TCF lamp panel.

9.222 Block nonoperated TCR relay in TC. After 5-15 seconds, VA lamp lights and major alarm sounds.

9.223 Release TCR, ATR, SI, ST1, and T5 relays in TC.

9.224 Operate AR key on TCF lamp panel. VA lamp goes out and major alarm is silenced.

→ Arrowed lines indicate new or changed information

Manager, Panel and Step-by-Step
Switching Systems Engineering

Reason for Reissue:
To add Paragraph 3.23, delete paragraphs 3.305, 3.306, 3.312, 3.313, and remove Table C.