

CONTINUITY AND ELECTRONIC LEAD
 VERIFICATION SYSTEM
 CROSSBAR TANDEM

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1. GENERAL

1.1 Scope of Section

1.1.1 This section provides information and covers methods to be employed for verifying the continuity of switchboard cable leads on crossbar tandem installations. The verification procedures covered herein are applicable to both new and additions to crossbar tandem offices.

1.1.2 The methods of this section cover the use of tabular Cable Connecting Sheets (CCS) furnished by the Centralized Cable Analysis Organizations as the vehicle for performing lead verification operations.

1.2 Precautions Against Personal Injury, Equipment Damage and Service Interruptions

1.2.1 General precautions to be taken against personal injury, equipment damage, and service interruptions are covered in Handbook 0 and are to be observed at all times as they apply to the operations being performed.

1.3 Application

1.3.1 The performance of subsequent operational test methods per Crossbar Tandem Test Handbook 65 is based on the assumption that the continuity of all switchboard cable conductors, with the exception of those items shown in Handbook 9, Section 170, has been previously verified following the procedures of this section. Lead tests for the excepted items are covered in the operational test sections of Handbook 65.

1.4 Time Charging

1.4.1 Time charges for performing continuity verification of switchboard cable conductors, as described in this section, are applicable to work operations codes 322 and 332.

1.5 CCS Errors

1.5.1 If any discrepancies are uncovered in the CCS's themselves either during wiring, buzzing or subsequent test operations, the errors should be reported immediately per the routine of Handbook 1, Section 8A, Paragraph 7 to insure prompt correction and future accuracies.

2. TEST EQUIPMENT

2.1 Test Sets and Accessories (as provided in the Electronic Lead Verification System).

AMT.	ITE	DESCRIPTION
1	5421	Analyzer
1	5422	Encoder, Master, Test
1	5424	Encoder, 1000 Ckt.
1	5420	Test Accessory Set
		List 1

2.1.1 Cords

AMT.	ITE	DESCRIPTION
1	9214A	Cord, Test (30')
1	9214B	Cord, Test (60')
1	9214C	Cord, Test (100')
2	9215	Cord, Test, Relay
2	9216	Cord, Test, Multi-Cont.
2	9217	Cord, Test, Mkr. Mult.
2	9218	Cord, Test, X-Pt. Term.
5	9220	Cord, Test (100 Cond.)
1	9224	Cord, Test (200 Cond.)
1	9225	Cord, Test, Misc.
1	R-3790	Case, Shipping

3. METHOD OF VERIFICATION

3.1 Information Provided

- 3.11 Crossbar Tandem Offices are provided with Cable Connecting Sheets (CCS) by their local Centralized Cable Analysis Organization to perform sequential fanning and connecting wiring operations for all switchboard cables. Sheets are provided for all required cable runs whether they be bulk, formed, or P-wire.
- 3.12 The standard CCS sheets received will have been marked by the CCA Organization for specific job conditions (circuit numbers, terminal numbers, unit numbers, options for cable conductors, etc.) to cover all detailed originating and terminating information for each conductor end for each cable run furnished. Sheets are collated and bound with frame folder cover sheet AD-3-210 on a per frame or type of frame basis with a copy in both the "from" and "to" folder for each run.
- 3.13 These Cable Connecting Sheets are to be used for performing the required continuity verification of switchboard cable leads.
- #### 3.2 Procedure
- 3.21 Cables connected on a frame are referred to as "originating" (from) or "terminating" (to) depending on the frame control of a given cable run. The controlling end of a cable run is that frame from which the cable originates. Within a frame folder containing CCS's for cables to be verified, both originating and terminating cable runs will be collated. All cable runs within that folder which list the selected frame on the left hand side of the CCS (from end) should be verified at this time. This will result in all cable designations controlled by this frame being verified. Cables within the folder which show the frame on the "to" end will be verified from the respective controlling frames for these cables.
- 3.22 Each lead designation of every cable should be "buzzed" between the respective "to" and "from" terminations shown until all conductors have been verified. The left half of the CCS

depicts the terminations at the controlling frame and the right half depicts the terminations at the connecting frames. Repeat this procedure until all cables controlled by the frame under review have been verified in a similar manner. After each cable is verified, completion of that item should be recorded in the appropriate column on the SD-3-210 cover sheet.

- 3.23 Conductor colors should not be employed during verification operations. Continuity verification must be performed as a terminal-to-terminal check disregarding the associated lead color information also listed on the CCS. Terminal-to-terminal checking not only provides for continuity checking of the leads, but verified the integrity of functional lead assignments within a circuit. This type of checking, thereby, eliminates the chance of missing slipped terminals that can readily occur when checking by color code.
- 3.24 Continuity verification as described above is performed with the ITE-4137 or ITE-4137A AC Continuity Set. Cables listed in Table "A" may be verified using an "Electronic Lead Verification System". (See Table "A".)
- 3.3 AC Continuity Set ITE-4137 or ITE-4137A. (See Handbook 65, Vol. 1, Sect. 0.2, Para. 5)
- 3.31 Plug the ITE-4137 or ITE-4137A into a 105-125V AC outlet and verify the continuity of short leads as illustrated in Figure 1. Verify the continuity of long leads as shown in Figure 2 or 3.
- #### 3.4 Electronic Lead Verification System
- 3.41 For test set operation, refer to the TMD-5420, "Electronic Lead Verification System Operating Instructions".
- 3.42 Referring to Table A, set up the ITE-5421 Analyzer at the frame to be probed. At the frame to be cord interfaced, locate the ITE-5423 Encoder. Interconnect the test sets using cords provided. See Figure 4 for typical set up.

4. APPLICATIONS INFORMATION

4.1 Office Link Frame - Interconnect ITE-9218 Test Cords to banjo connection on rear of crossbar switch (Secondary Switch). Using a hand probe (Det. 7), verify wiring at the distributing frame for continuity, crosses and false ground. The terminal strip at the frame is stamped T, R, T1, R1, S1 and S. Hand probe the T1, R1, S1 and S leads. The T and R leads should indicate reversed.

4.2 Sender Links

4.21 Trunks - Interconnect ITE-9218 Test Cords to banjo connection on rear of the "PB" switch. Continuity verification will be through the local form. The "ST" leads may also be verified at the same time using ITE-9225 Test Cord connected to ITE-5424 Encoder, Zone 2, L1 connector. Because of double image of the "ST" leads, the impedance level on the ITE-5421 must be adjusted to indicate a single image.

4.22

Senders - Interconnect ITE-9218 Test Cords to banjo connection on rear of the "SA" and "SB" switch. Using the wiring list of the Sender Link Multiple, verify wiring at each sub-group appearance. The sub-group multiple per C()A and C()B terminal strip may be verified using the ITE-9221 Fixtures; however, these fixtures will fit 251 type terminal strips only. Refer to the TMO for the cord and fixture applications.

4.23

Marker Multiple - Interconnect ITE-9215 to the front of the multi-contact relays by inserting the fixture so as the metal makes contact with the movable or make contacts. Take care that the fixture is not forced in place. The multiple may be hand probed from the rear of the relays.

5. WIRING ERRORS

5.1

If a wiring error and/or reversal is located during verification, affected lead(s) should be reconnected to the proper termination(s) immediately according to handbook requirements. If not corrected immediately, leads should be clearly identified with R-3436 Flags and an accurate record kept on SD-4-1313 of future action to be taken.

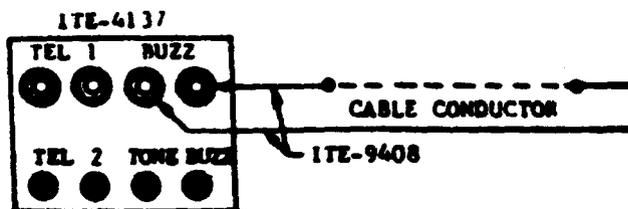
TABLE A

CORD INTER-FACING INFORMATION

ITEM	TEST SET LOCATION	LEADS TO BE HAND PROBED	CORD	JACK CONNECTION	LOCATION OF FIXTURES	SWITCH GRP.	SWITCH ZONE	IMAGE
Office Link Fr Trunk Level	ITE-5422 at OL ITE-5421 RIDF or MDF	TL () Ckts 0-59 T, R, S, S1	ITE-9218 Sec Switch	L to L1	SWO Level 0-4 1	A	1	00
				R to R2				39
				Cord 2				
				L to L3	SWO Level 5-9 1	A	1	100
				R to R4				139
				Repeat for SW 1-9 (See Note 1)				
						00-09	S Lead	
						10-19	R Lead	
						20-29	T Lead	
						30-39	S1 Lead	
SDR Link Fr Trunk	ITE-5422 at SDR Lks ITE-5421 at Inc Trk Fro.	Trks T,R,CO,D,PT FR, DC	ITE-9218	Cord 1	SW "PB" Vert 0 Levels 0-9	A	1	00
				L to L1				49
				R to R2				
				Cord 2	SW "PB" Vert 0 Levels 0-9	A	1	100
				L to L3				149
				R to R4				
SDR Link Fr SDR Mult.	ITE-5422 at Last appearance ITE-5421 at Each appearance	SDRS T,R,PT,FR CO, D, DC	ITE-9218 or ITE-9224	Cord 1	SW "SA" or "SB" Vert 0 Levels 0-9	A	1	00
				L to L1				49
				R to R2				
				Cord 2	SW "SA" or "SB" Vert 0 Levels 0-9	A	1	00
				L to L3				49
				R to R4	Check W.L. for actual Assignment			
Office Link Fr Mkr. Mult.	ITE-5422 Last appearance ITE-5421	At each appearance of mult. MCA, MCB	(2) ITE-9215	Cord 1	MCA Relay Contacts (SEE NOTE 2)	A	1	00
				L to L1				59
				R to R2				
Trunk Link Fr Mkr Mult.	Each appearance			Cord 2	MCB Relay Contacts	A	1	100
				L to L3				159
				R to R4				

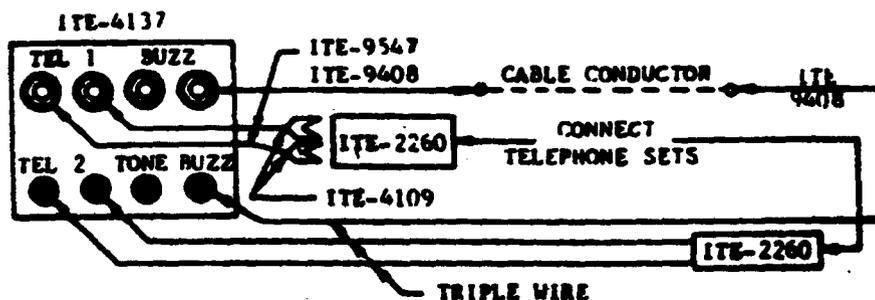
Note 1: Cord Fixtures designed for 6 point switch. To use on 4 point switch connect left four connectors to X-Bar switch S1, T, R, S of each level.

Note 2: Prior to inserting fixtures clean metal contact surface of fixtures with a KS + cleaner. Using care, insert fixture so as metal contact makes contact with the moving contacts of the relays. Inspect relays after removal of fixture for flipped or cross contact.
Cleaner, Spra 20406L1 - 232040600



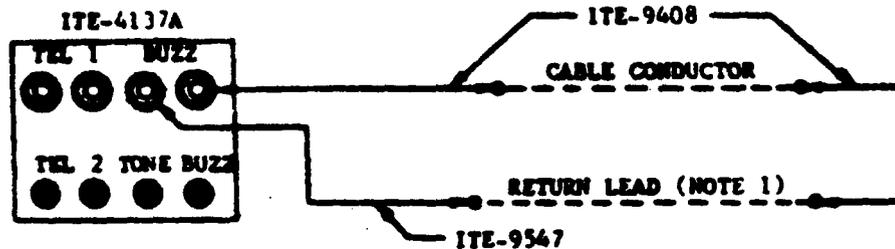
RP-0459

FIG. 1 SHORT LEAD (PAR. 3.31)



RP-0460

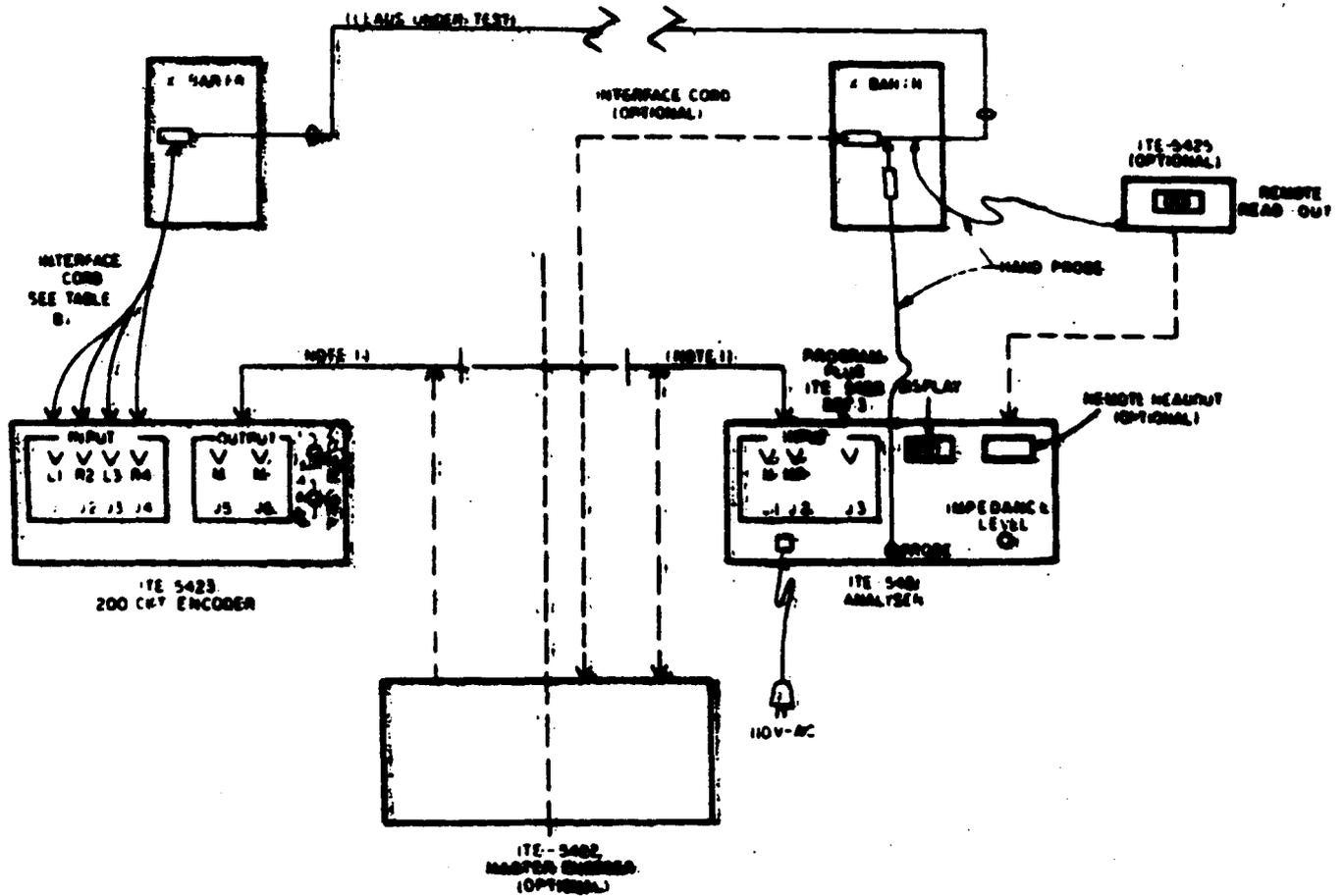
FIG. 2 LONG LEAD WITH TALKING CIRCUIT (PAR. 3.31)



NOTE 1: RETURN LEAD SHOULD BE FREE OF POTENTIAL AND GROUND

RP-0461

FIG. 3 LONG LEAD USING OFFICE TELEPHONE CIRCUIT (PAR. 3.31)



NOTE 1: USE AS REQUIRED
 ILS-9214, LIST 1 CORD 30'
 LIST 2 CORD 60'
 LIST 3 CORD 100'

RP-0456

FIG. 4. TYPICAL TEST SETUP
 (PAR. 3.42)

Assistant Manager
 Common Installation Engineering