LOCATING FA- AND FB- RELAY CONTACTS LIKELY TO CAUSE TRANSMISSION NOISE SIMILAR TO BANJO TONES TRUNK LINK AND CONNECTOR CIRCUIT NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers procedures for locating relay contacts likely to cause transmission noise similar to banjo tones. These procedures are limited in application to FA- and FB- relays in the trunk link and connector circuit of No. 5 crossbar offices.

1.02 The noise condition considered herein results from the effect of frame vibration on contacts having a contaminating film. The vibration causes changes in contact resistance resulting in transmission noise.

1.03 It is not necessary to make busy trunk or register circuits associated with the FA- and FB- relays to be tested. By listening for conversation when making the test connections for an FA- or FB- relay, a busy circuit can be identified and tests made on the relays in these circuits later. Where troubles are found, the circuits associated with the relays involved should be made busy in accordance with approved procedures before doing any work on the relays.

1.04 Two men are required for making the tests described below, one at the back of the frame for connecting to the circuits, the other at the front for tapping the relay cores and listening for the noise condition.

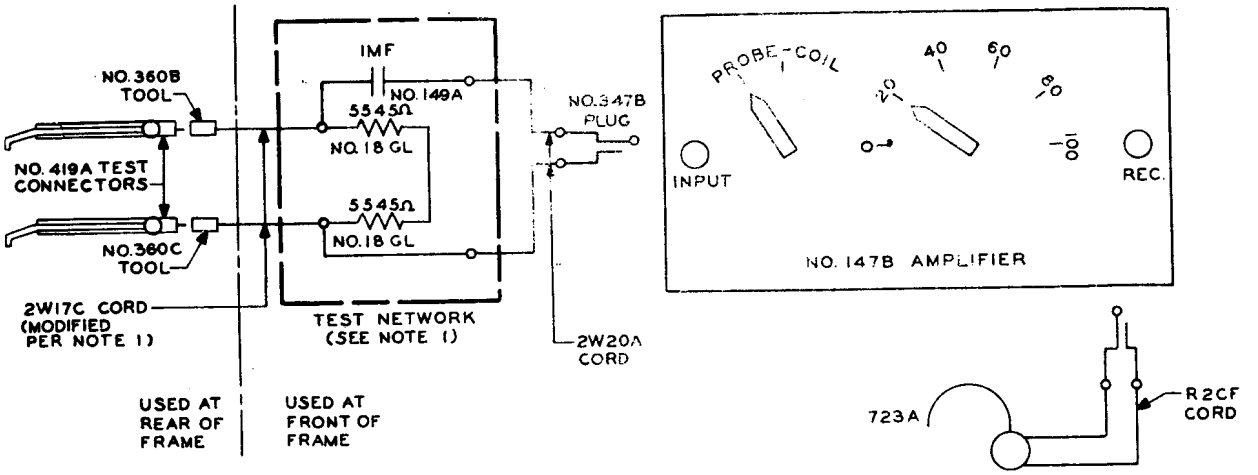
1.05 The tests described in this section should preferably be made during periods of light load.

1.06 The procedures for mounting shock absorbers on U-Type FA- and FB- relays used on trunk link and connector circuits in No. 5 Crossbar are covered in Section 040-518-802.

2. APPARATUS

2.01 List of Tools and Test Apparatus

Code or Spec No.	Description
Tools	
265C	Contact Burnisher Holder
419A (2 Reqd)	Test Connector
KS-2348	Cord Repair Screwdriver
	P-long-nose Pliers
Test Apparatus	
147B (or the replaced 147A)	Amplifier (part of No. 1A fault locator test set)
723A	Receiver with R2CF cord and No. 310 plug (part of No. 1A fault locator test set)
	Test network (made up locally per Fig. 1) consisting of:
	Two No. 18GL resistors (or equivalent resistance 11000 ohms ±4 per cent)
	One No. 149A capacitor (or equivalent 1MF capacitor)
	One 2W17C cord, consisting of a W2W cord, 10 feet long, with a No. 310 plug at one end and one No. 360B tool and one No. 360C tool at the other end (modified per Note 1, Fig. 1)
	One 2W20A cord, consisting of a W2AA cord, 5 feet long, equipped with a No. 347B plug.



NOTE 1: REMOVE THE SHELL FROM THE PLUG ON THE 2W17C CORD AND DISCONNECT THE CORD LEADS WITH THE KS-2348 CORD REPAIR SCREWDRIVER. UNSCREW THE PLUG FROM THE CORD. SOLDER THESE LEADS, AND THE NO.35 CORD TIPS OF THE 2W20A CORD TO THE TEST NETWORK AS SHOWN IN FIG.1. THEN TAPE THE RESISTORS AND CAPACITOR TOGETHER, TAKING CARE TO COVER THE SOLDERED CONNECTIONS.

RECEIVER, CORD AND NO.147B AMPLIFIER ARE PART OF NO. 1A FAULT LOCATOR TEST SET.

Fig. 1 - Test Network, No. 147B Amplifier, and Associated Equipment for Making Noise Tests on FA- and FB- Relays

3. PREPARATION

3.01 The man who will work at the front of the frame should clip the No. 147B amplifier to his belt and proceed as follows.

3.02 Connect the No. 347B plug of the 2W20A cord from the test network to the INPUT jack of the amplifier.

3.03 Plug the R2CF (receiver) cord into the REC jack of the amplifier.

3.04 Turn the PROBE-COIL switch on the amplifier to PROBE.

3.05 Turn the VOL switch on the amplifier to 20.

4. PROCEDURES FOR LOCATING CONTACT NOISE

4.01 Remove or drop, as required, the plastic covers on the junctor bay of the trunk link frame in front of the FA- and FB- relays to be tested.

4.02 Pass the end of the 2W17C cord, having the No. 360 tools, from the front to the rear of the trunk link frame at the right end of the third crossbar switch from the top in the junctor bay as follows. Swing aside the designation strip adjacent to the switch. From the front, pass the tools on the cord through the circular hole in the crossbar switch frame at the right of the end hold magnet. Then, from the rear, grasp the tools with the P-long-nose pliers and pull the cord through the hole so that the test network to which the cord is connected rests on the bottom of the switch frame adjacent to the circular hole. To secure the network in this position, tie a loop in the cord at the rear of the switch and position the loop against the edge of the circular hole.

4.03 Insert the No. 419A test connectors into the Nos. 360B and 360C tools of the 2W17C cord.

4.04 At the rear of the frame, connect the No. 419A test connectors to the terminals of the trunk switch associated with the talking circuit contacts on the first FA- or FB- relays to be checked, as shown in Fig. 2, starting at the FB99 relay. These talking circuit contacts are located on springs 7B-8B and 8T-9T on both the FA- and FB- relays. Terminals 1 and 2

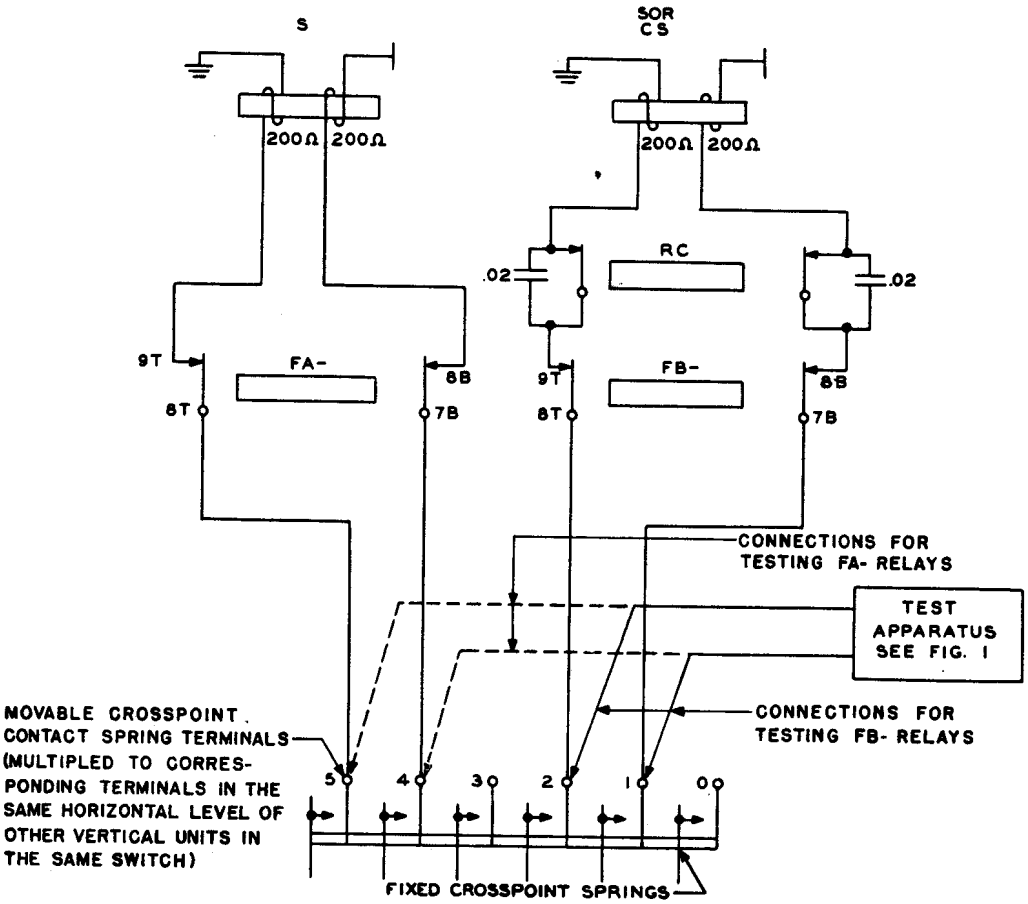


Fig. 2 - Connection for Making Banjo-noise Tests on FA- and FB- Relays

on each horizontal level 2 to 9, inclusive, of the crossbar switches are associated with springs 7B-8B and 8T-9T, respectively, of an FB- relay. Similarly, terminals 4 and 5 on each horizontal level 2 to 9, inclusive, on the switches are associated with springs 7B-8B and 8T-9T, respectively, of an FA- relay. The switch levels 2 to 9 are associated with FA- and FB- relays as shown below:

Switch	Level	Relay
0	2	FA02 and FB02
0	9	FA09 and FB09
9	2	FA92 and FB92
9	9	FA99 and FB99

Similarly, the intermediate levels of all switches are associated with correspondingly numbered FA- and FB- relays.

4.05 The man at the front of the frame taps the relay being checked and listens for contact noise in the receiver as covered in 4.06, while the man at the rear of the frame shifts connections as required.

4.06 With the proper connections made to the relay under test, lightly tap the end of the relay core with the end of the No. 265C tool. At the same time listen carefully in the receiver for a banjo-like tone. This tone indicates that the contacts are potential sources of such noise in the talking circuit. It will usually be necessary to test for only a few seconds to determine whether the relay contacts are causing noise.

Caution: To avoid damaging the relay do not tap the spoolhead of the relay.

Note: While making these tests, it may be necessary to adjust the amplifier level. However, keep this level as low as practicable in order to avoid introducing excessive amplifier noise in the test circuit.

4.07 In a similar manner, test the remaining FA- and FB- relays on the frame, progressing from the FB99 relay to the FA02 relay. Record the relays on which contact noise was heard. Clean the contacts on these relays as covered in Part 5.

5. CLEANING CONTACTS

5.01 Make busy in accordance with approved procedures the trunk circuits associated with the FA- and FB- relays having noisy contacts.

5.02 First, brush the contacts as covered in Section 069-306-801. Then burnish the contacts as covered in that section except use eight to ten instead of two or three strokes of the burnisher blade After burnishing, again brush the contacts.

5.03 After the contacts have been cleaned, repeat the test described in 4.05 and 4.06. If contact noise is still indicated, check the spring tension and contact follow requirements of the relay and readjust the relay if necessary. Again repeat the tests to make sure that the contact noise has been cleared.

5.04 When the tests have been completed, remount all covers which were removed, and restore to service all circuits which were made busy.