82B1 TELETYPEWRITER SWITCHING SYSTEM
MULTISTATION-LINE STATION PERFORMANCE TESTS

1. GENERAL

1.01 This appendix is issued to supplement Plant Series section 580-200-500. Its information applies to simplified test procedures at 82B1 multistation-line tributary stations. All information here applies to stations modified to function with customer equipment (cryptographic), option G, and station directors modified per option E. With the addition of option G at 82B1 tributary stations, simplified preliminary testing at the station is necessary to efficiently isolate station trouble. Functional tests formerly conducted by the STC to verify station trouble or check over-all station operations are no longer possible. Preliminary and final testing at each 82B1 tributary station with option G is now completely a field responsibility.

1.02 Simplified testing at tributary stations consists basically of telegraph transmission tests required to determine the transmission quality of the customer equipment (cryptographic equipment). These test procedures apply on routine maintenance or trouble visits to each tributary station. Make every effort to run through the appropriate tests upon each station visit to assure quality service. Follow up, if necessary, with functional station tests as outlined in the main section.

1.03 On line teletypewriter signal characteristics have changed slightly with the addition and inclusion of customer equipment (cryptographic) at each 82B1 tributary station. A thorough knowledge of them is necessary to intelligently operate the transmission test gear and efficiently analyze the resulting measurements. Three parts of the teletypewriter signal to consider closer are:

(a) Unit code (character length)

(b) Element length

(c) Baud rate

1.04 Following is a breakdown of the telegraph signals associated with modified 82B1 tributary stations.

UNIT CODE	ELEMENT LENGTH	BAUDS	WPM
7.00	13.33MS	75	107
7.42	13.47MS	74.2	100
8.00	13.33MS	75	(Sync)

1.05 Newly developed telegraph test equipment is needed to handle the station equipment and facility testing involving the customer equipment (cryptographic) at 82B1 tributary stations. This test equipment is designed to handle all teletypewriter codes and speeds (baud rate) commonly used in the 82B1 as well as other systems. The test equipment includes a test sentence generator in conjunction with a distortion generator and a start stop telegraph transmission measuring set. The test equipment is portable and represents a substantial improvement over existing test equipment. Test set coding is as follows:

- 911A Data Test Set (Combined Set)
- 911B Test Sentence and Distortion Generator
- 911C Transmission Measuring Set

Note: Use a modified 164C2, 3, or 4 if a 911C is not available.

2. INITIAL CONSIDERATIONS

2.01 Take all the customary precautions based on the continuity of service and subscriber convenience before proceding with any test operations. Refer to 580-200-901LL for outlying station routine maintenance procedures.

2.02 The functional tests of outlying station control equipment are performed by placing the SCU local test switch in the COMP STA or

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ASR positions as mentioned in the main section. Continue this procedure at modified stations but operate the TST1 key in the LCEC during the tests. This will prevent spurious signals generated by distributor "B" from appearing on the send line. Due to circuit modifications in the SCU, the answer back and beginning of the channel number sequence will not appear as copy during tests.

2.03 If receiver cut on tests (part of functional tests) are conducted with the KW7s' back to back (TST1 operated, SCU normal), operate the SOM-NBR switch to manual. This is necessary to prevent "ZCZC" signals generated by distributor "B" from appearing as garble at the RO and causing erroneous station operations. Note: If a failure is encountered, by-pass the customer equipment by putting the SCU local test switch in the COMP STA position.

3. TESTS (TABLE A)

3.01 Facility and station tests to prove the quality of all station components are outlined in Table "A".

3.02 Figures 1, 2, and 3 were developed for use with Table "A". They show exactly where the test equipment is placed in relation to the station components under test and where each is located in the over-all station package. Each figure has a notation of the type (unit code - baud rate) of telegraph signals found at that circuit location.

3.03 The test points referred to in Table "A" and shown on the figures are standard access points provided at all modified 82B1 tributary stations. Following is a list of the test points, their standard designation, and location.

(a) TP1 - LP Send CUR - LCEC

(b) TP2 - LP REC CUR - LCEC

(c) TP3 - SEND SCU

(d) TP4 - REC SCU

(e) TP5 - MON RL SCU

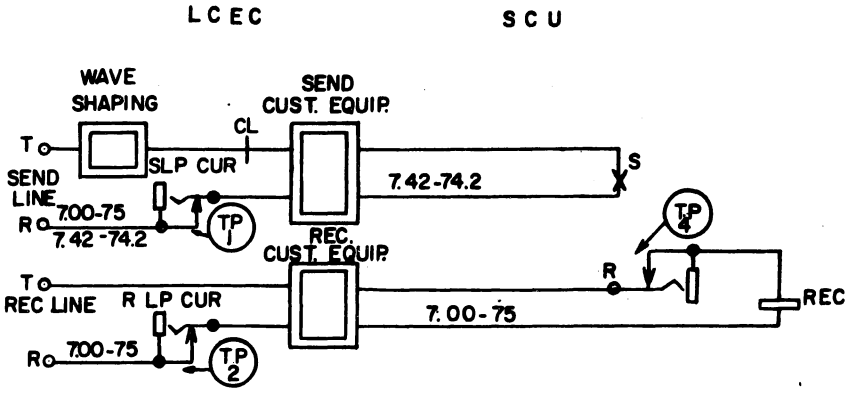

FIG. 1

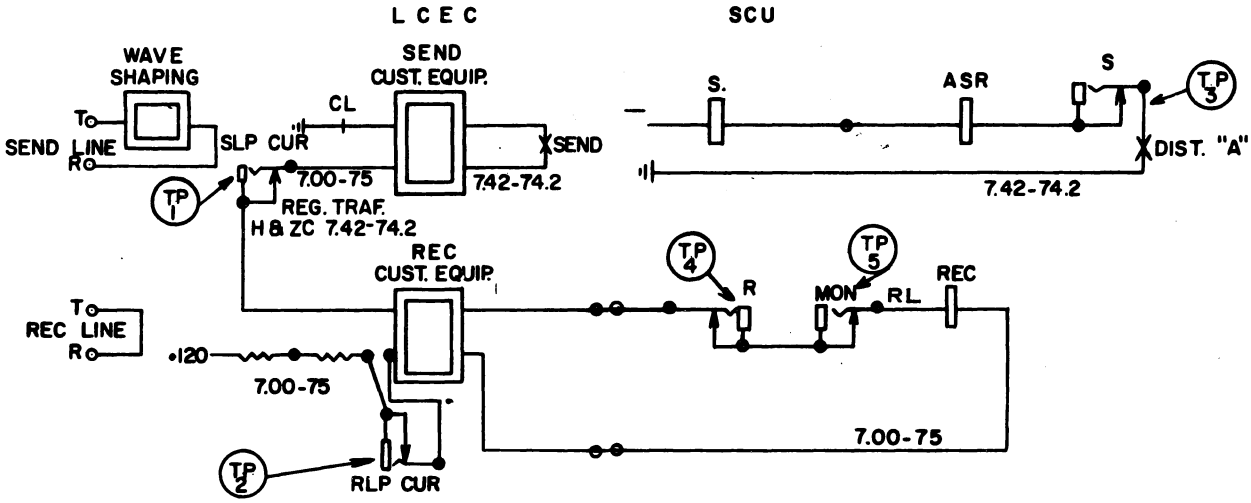

FIG. 2 (TSTI OPR)

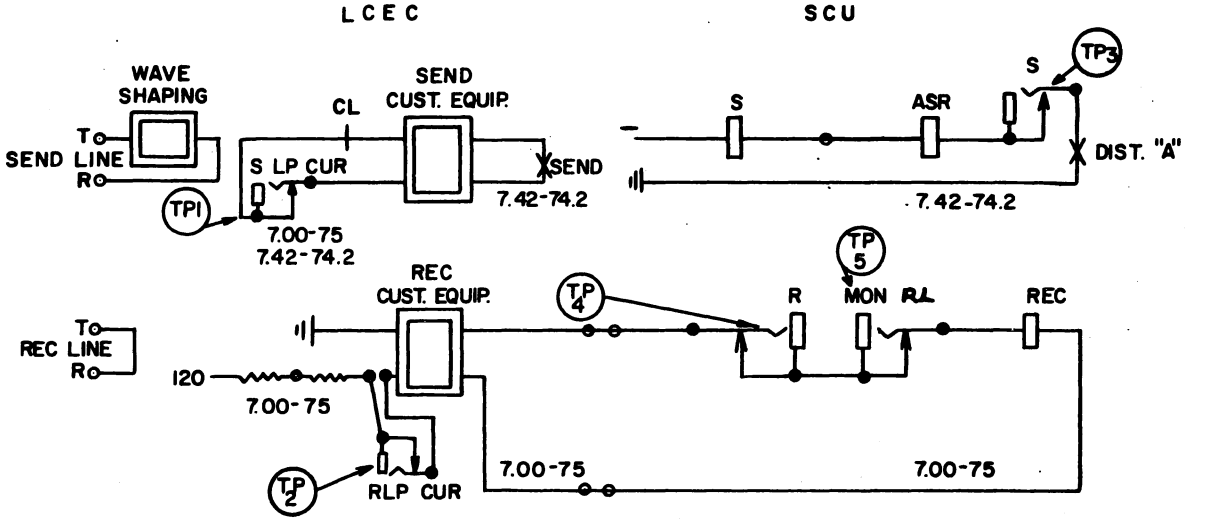

FIG. 3 (TST2 OPR)

FACILITY LINE UP AND STATION MAINTENANCE

TABLE A

- TESTS -	- TEST APPARATUS - TYPE	CONN.	FIG.	- STATION EQUIPMENT CONDITIONS - LCEC	SCU	CUST "S"	CUST "R"	ASR-RO	- PROCEDURES - REQUIREMENTS -
# -Facility-									
1. Send Loop - (Distortion)	911 A or 911 B, Test Sentence Generator	TP1	1	Normal	Normal	Normal	Normal	Normal	Send from station to toll office. Use standard test sentence at 7.00-75 and 7.42-74.2. Determine acceptable distortion from coefficient of circuit.
2. Receive Loop - (Distortion)	911 A (TMS) or 911 C	TP2	1	Normal	Normal	Normal	Normal	Normal	Measure the amount of distrotion in signals (7.00-75) received from the toll office. Should exceed source only by an amount as determined from circuit coefficient. Note: If toll office is not equipped for 7.00-75 sending, measure distortion on a 7.42-74.2 basis.
- Customer Equipment -									
3. Preparation (Steps 4 & 5 only)	911 A or B (TSG)	TP3	2	TST1 (OPR)	Normal	Normal	Normal	Normal	Send the standard test sentence at the 7.42-74.2 rate.
4. Send (KW7) (Distortion)	911 A or C (TMS)	TP1	2	TST1 (OPR)	Normal	Normal	Normal	Normal	Measure the amount of distortion in the signals. These are 7.00-75 signals and are regenerated by the KW7 with minimum distortion. This checks the send cust. equip.
5. Receive (KW7) (Distortion)	911 A or C (TMS)	TP4	2	TST1 (OPR)	Normal	Normal	Normal	Normal	Same as 4. This checks the rec. cust. equip.
- Tel. Co. Equipment -									
6. Distributor "A" (Distortion)	911 A or C (TMS)	TP3	2	TST1 (OPR)	SOM-NBR to MAN.- MAN. XMTR START ON-	Normal	Normal	Normal	Prepare a long tape containing the standard test sentence. Insert first in reg. XMTR and then in AUX. Adjust for minimum distortion.
7. Distributor "B" - CL Relay (Distortion)	911 A or C (TMS)	TP1	2	TST1 (OPR)	Normal	Normal	Normal	Normal	Block "HB" in SCU operated. Check distortion on the TMS. ("H" character only). Adjust for minimum distortion. Note: Signal is 7.42-74.2.
8. RO or ROTR PRINTING Note: This will prove the cryptographic capability of the KW7's.	None	None	2	TST1 (OPR)	SOM-NBR to MAN.- MAN. XMTR START ON-REC. SW to Emg. ALL Line Sigs.-	Normal	Normal	Normal	Use tape as in Step 6. Check copy on RO or ROTR for error free condition. Note: Test tape from Dist. "A" is needed to sync the KW7s'. If there is no copy, the KW7s' are not in sync. If there is any doubt about the KW7s' repeat step 4 for an extended period of time.
9. Orientation of RO. or ROTR - (Without KW7)	911 A or B (TSG)	TP4	3	TST2 (OPR)	REC. SW to Emg. All Line Sigs.-	Normal	Normal	Normal	Send the standard test sentence at the 7.00-75 rate. Follow standard orientation procedures by distorting the signals properly. ex. Mark & space.
10. Orientation of ASR	911 A or B (TSG)	TP3	3	TST2 (OPR)	Normal	Normal	Normal	Normal	Send the standard test sentence at the 7.42-74.2 rate. Follow standard orientation procedures. Note: Block STR in SCU operated.
11. Print "H" & ZCZC	None	*TP1 to MON SC	3	TST2 (OPR)	Normal	Normal	Normal	Normal	Block "HB" or "SN" operated as appropriate. Note: Operation of the SN relay will give one VZCZC. After Sync. the TRC will release and SNC operate. Release of the SNC will give another VZCZC.

* Use a 6' cord to patch from TP1 to MON SC in the SCU.