

2/19/79

Replaces: Section 115C
Dated: 5-2-77

AMARS
ANI-B IDENTIFIER
TOLL TESTS WITH
OUTPUTPULSER-IDENTIFIER TEST CKT

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| 1. <u>GENERAL INFORMATION</u> | | used to initiate calls to check most of the tests of this Section. However, this test procedure is inefficient and not recommended, since troubles may exist in the secondary network as well as the identifier causing more difficult trouble locating procedures. |
| 1.1 <u>Description</u> | | |
| 1.11 This section describes tests to be applied to the new solid state Identifier SD-1C593-01 using the Outputpulsar Identifier Test Circuit SD-95815-01. | | |
| 1.12 Precautions on circuit pack replacement including power down procedure are described in this section. | | |
| 1.2 <u>Prior Modifications</u> | 2. <u>RECORDS AND REQUIREMENTS</u> | |
| 1.21 Existing Identifier Circuits SD-95810-01 must be modified per DCS-1C593-01A to incorporate the solid state features and assume the SD-1C593-01 designation. | 2.1 <u>Records</u> | |
| 1.22 The Outputpulsar Identifier Test Circuit must be modified and tested according to DCS-95815-17 to enable it to test the new Identifier SD-1C593-01. | 2.11 Form SD-97-1313 and SD-97-1315 are required for trouble records of the tests of this section. | |
| | 2.2 <u>Requirements</u> | |
| | 2.21 The requirements for this section were obtained from the following: | |
| | | SD & CD-1C593-01 ANI-B Identifier
SD & CD-94846-01 ANI-B Identifier Test Set |
| 1.3 <u>Sequence of Tests</u> | | <u>Bell Laboratories Memorandum For File</u> |
| 1.31 The following section of Handbook 59 shall be performed prior to the tests of this section: | "Test Circuit To Monitor And Maintain the New ANI-B Identifier: by R.D. Palmieri | |
| Section 115B "Oscillator, Fuse and Alarm Tests" | "A Test Procedure For The Initial Turn-Up And Subsequent Maintenance Of The ANI-B Identifier For Use With AMARS And Toll: by R.F. Schillo | |
| 1.32 Where identifier tests are delayed due to incomplete OIT modification the Line Verification test Circuit (LVT) may be | | |

3. TEST EQUIPMENT

<u>AMT</u>	<u>ITE</u>	<u>DESCRIPTION</u>
1	5632	Digital Voltmeters
1	5221A	Storage Oscilloscope
1	5282	Logic Probe
1	*J1C081G	Identifier Test Set

* Telephone Company maintenance equipment

4. CIRCUIT PACK REPLACEMENT

4.1 Power Removal

4.1.1 Make busy the Identifier by inserting a plug in the identifier make busy jack IOB at the Miscellaneous Circuit for the Trouble Ticketer Frame.

4.1.2 J1C081A Unit

(a) The IC0- key must be operated to the 0 or 1 position before removing power from the "A" unit on Identifier 0 or 1 respectively. This key maintains off-normal logic inputs to circuit packs on FS1 and FS16 while power is removed.

NOTE: The IC0- keys will not be effective until both Identifiers have been wired. In the interium block the associated IC- (A,B,C) relays operated.

(b) The -48 volt fuses A1, B1, C1 should be removed before removing any circuit pack from the "A" unit. Other fuse removal is required for certain circuit packs as follows:

<u>CIRCUIT PACK</u>	<u>REMOVE FUSE</u>
JW125	-48v B
JW132	-48v C
JW133	-48v C
JW134	+130v
JW148	+130v
JW149	-48v C

(c) The -48 volt and +130 volt fuses are reinstalled after the circuit pack has been replaced.

4.1.3 J1C081B Unit and J1C081C Unit

(a) The "B" unit is mounted in Identifier 0 only and the "C" unit is remotely mounted usually with the CDA equipment.

(b) The "B" and "C" units serve both identifiers and therefore cannot be "powered down" for circuit pack removal. The types of circuit packs in these units are:

B Unit: JW93, JW137, JW140, JW142, JW150

C Unit: JW94, JW129, JW141

(c) The associated JW134 circuit pack in the identifier "A" unit must be removed prior to removal of a JW141 circuit pack. The JW141 circuit packs at positions A5 and A6 on the "C" unit serve identifiers 0 and 1 respectively.

NOTE: The above action is required to protect the JW134 circuit pack from damage by -48 volt cut-thru by a held TEST- mercury relay, or Sleeve relay board relay.

4.1.4 J1C081G Unit

(a) The "G" unit is the Identifier Test Set and mounts in the upper right hand corner of the "A" unit nest.

(b) The -48v F1 fuse should be removed prior to inserting or removing the test set.

4.2 Reseating

4.2.1 When failure occurs in a particular unit, a reseating operation should be performed, to check if there are connector problems.

4.2.2 While the circuit pack is removed for reseating, examine the terminals and connector for dirt and damage. Gold contacts should not be scratched or worn through.

4.2.3 Use a firm but not excessive pressure when seating the circuit pack. Do not force. If a resistance is felt, determine and eliminate the cause before inserting the pack.

4.3 Replacement Packs

4.3.1 When a fault is apparently cleared by a pack replacement, reinsert the original pack to verify that the fault returns. If the fault does not return, leave the original pack in place. The reseating requirement of the prior paragraph could be performed at this time.

4.3.2 If a replacement pack does not correct the trouble always replace the original pack.

5. TROUBLE LOCATING PRECAUTIONS AND PROCEDURES

5.1 When a trouble has been located in a circuit pack follow the procedure provided in the paragraph on "Circuit Pack Replacement".

5.2 Back Plane Wiring

5.21 When it is necessary to work on the back plane wiring of the circuit pack nests, use the following precautions.

(a) When working on the J1C081A unit remove the -48v B, C, A1, B1, C1 fuses and the +130 volt fuse.

(b) When working on the J1C081B unit remove the -48V D1, C1 fuses if the other new Identifier is not in service.

(c) When working on the J1C081C unit remove the -48v A2, B2 fuses if the other new Identifier is not in service.

(d) If the other Identifier is in service, in (b) and (c), it will be necessary to work on a unit containing voltages. Therefore, non-conducting tools should be used and metal tools such as pliers, etc., should be used sparingly and with extreme care.

5.3 Logic Probe

5.31 It would be needlessly repetitious to mention the ITE-5282 Logic Probe whenever logic measurements are made, therefore, whenever logical "0" or logical "1" measurements are required in this section the ITE-5282 Logic Probe should be used.

5.32 A logical "0" is a ground or low level (green lamp).

5.33 A logical "1" is a +5v or high level (yellow lamp).

5.34 OV overvoltage (red lamp) indicates voltage in excess of +32v or -18v.

5.35 A green or yellow lamp with a red lamp does not indicate a valid logical "0" or logical "1" indications unless the red lamp blinks out momentarily.

5.4 Test Point Notation

5.41 Each circuit pack location is described by the following notation:

Level-Nest-Position

Level - indicates a horizontal mounting on Identifier frame of one or two nests.

Nest - a nest is a unit which receives 16 circuit packs in a horizontal mount. If the level contains two nests, the left nest is designated A and the right nest is designated B.

Position- this is the position 1-16 of the circuit pack in the nest counting from left to right from the front.

5.42 The J1C081A unit contains 2 levels which are designated level 1 and 2 respectively as shown on sheet C1.

5.43 The J1C081B unit contains 1 level which will be designated level 3 as shown on sheet C2.

5.44 The J1C081C unit contains 1 level of one nest. No level indication will be used when referring to this unit.

5.45 Examples:

1B7 = JW148 circuit pack at level 1, nest B, position 7 of the J1C081A unit.

3B4 = JW150 circuit pack at level 3, nest B, position 4 of the J1C081B unit.

A11 = JW94 circuit pack at nest A, position 11 of J1C081C unit.

5.46 Each test point location used in this section will be described by the following notation:

circuit pack location - terminal (SD sheet)

5.47 Example:

2A10-103(B5) = terminal 103 of the JW127 circuit pack located at level 2, nest A, position 10 of the J1C081A unit as depicted on sheet B5 of SD-1C593-01.

5.5 Test Ground

5.51 In all testing operations of this section the test instruments shall always use the "quiet" ground provided under each respective circuit pack unit. The test ground provided on the front of the frame is only used for non-circuit pack functions.

5.6 Identifier Test Set

5.61 An explanation of the indications and switch functions of the Identifier Test Set J1C081G is given in Section 115A of this handbook.

5.7 Word Data

5.71 Tables on various words and their content at certain instants are provided in Section 115A of this handbook. These words have been given the following names for use in this section.

MASTER CLOCK
SECONDARY CLOCK
CDA ADDRESS
DATA CLOCK
OFF (ABC)
OFF (TST)
DATA
OK

5.72 A description of these words; their derivation and use is also provided in Section 115A.

5.8 Waveforms

5.81 Section 115A of the handbook provides typical waveforms which will be referred to during oscilloscope tests of this section.

5.82 The set-up and test points for these waveforms is also provided in Section 115A.

5.9 Trouble Locating Charts

5.91 Extensive trouble locating charts are attached to this section to locate defective circuit packs and incorrect wiring.

5.92 An attempt has been made to use all visual indications on the OIT, Identifier test set, and Identifier to direct the installer to the required trouble chart. Large trouble locating sequences have been broken into several trouble locating charts to reduce installer effort.

5.93 In using the trouble locating chart perform each verification in the "check" column in the order listed. When a verification does not occur as stated, refer to the action required in the "corrective action" column.

6. CIRCUIT PACK STRAPPING AND TOLL CALL PREPARATION

6.1 Observe the precautions in Paragraph 5 when performing any strapping operations.

6.2 Call Data Accumulator (CDA)

(a) A JW93 board is provided as an interface to each of 1 to 16 Call Data Accumulators provided in an ANI-B installation. These packs appear on the "B" unit in Identifier 0.

(b) All JW93 packs should be pulled back in their slots so they are disengaged from their connectors. This action is required to prevent any interference from local tests or troubles during the toll tests of this and later sections.

(c) Refer to sheet B1 of SD-1C593-01 and locate each CDA- terminal of the JW137 pack connector which is associated with an unequipped CDA. Using a VOM verify these terminals contain direct ground.

(d) Add temporary ground strapping to each CDA- terminal which is associated with an equipped CDA. This provides a termination of the JW137 pack while the JW93 packs are removed.

NOTE: If the straps of (c) or (d) are not in place the Identifier will receive a perpetual request by the CDA with the absent ground. This will cause the reed type relays to generate an audible buzzing sound.

(e) Refer to sheet B26 of SD-1C593-01 and locate each PE- and PO- terminals of the JW142 pack connector at location 3B6 which is associated with an unequipped CDA. Using a VOM verify these terminals contain direct ground.

(f) The temporary strapping and the disengaged JW93 packs shall remain in place until the local tests of Section 115F are performed.

6.3 Last Office

(a) Refer to sheet B8 of SD-1C593-01 and locate each OF- and OF- terminals of the JW138 connector which is associated with each office 0-6.

(b) Using a VOM verify only the OF- lead of the last office equipped is strapped to terminal 10 of the JW138 connector.

- (c) Using a VOM verify only the OF- lead of the last office equipped is connected to terminal 7 of the JW136 connector.
- 6.4 Offices Unequipped
- (a) Refer to sheet B15 of SD-1C593-01 and locate each OFF- terminal of the JW136 connector associated with an unequipped office 1 to 6.
- (b) Using a VOM verify each OFF- terminal associated with an unequipped office contains direct ground.
- 6.5 Power Removal Relays IC- (A,B,C)
- 6.51 Before testing Identifier 0 perform the following:
- (a) Block operated relays IC1 (A,B,C).
- (b) At the Trouble Ticketer Frame, make Identifier 0 busy by inserting a make-busy plug in jack IOB.
- 6.52 Remove the relay blocks and ground strap when Identifier 1 is wired and ready for testing.
7. IDLE STATE
- 7.1 Mount the J1C081G Identifier Test Set in the upper right hand corner of the "A" unit nest.
- 7.2 Install the F1 fuse for the Identifier Test Set and observe the following conditions:
- (a) The upper hexadecimal display for "OFF, CALLING NUMBER, COS" are all "F's".
- (b) The lower hexadecimal display for "CLK BITS, ADB CDA, MEM B A, OS" display "0070F0" respectively.
- (c) Of the LED indicators only the MCO should be lit.
- (d) On the JW148 circuit pack (1B7) the green and red LED's are extinguished.
- 7.3 If the proper hexadecimal displays of (a), (b) is not lit or any other LED is falsely lit refer to Section 115A to clear the trouble or replace the Identifier test set.
- 7.4 If the MCO indicator does not light proceed to Chart A, of the Trouble Locating Charts.
- 7.5 If the green or red LED's on JW148 light or flash proceed to Chart B of the Trouble Locating Charts.
8. OIT TEST SET-UP
- (a) A list of OIT keys which will be used in tests of this section are provided in Table A.
- (b) Identifier functions shall be tested as completely as possible using the test network (SVN key normal), and one out-pulsor on ring party calls. Both N and P leads will be tested on ring, multi-party and service observing calls.
- (c) Tests of tip party functions of the identifier will be made following ring party tests.
- (d) Tests of multiparty functions of the identifier will be made following tip party tests.
- (e) Tests of service observing functions of the identifier will be made following multiparty tests.
- (f) A list of OIT lamp indications in the sequence in which they are likely to occur is provided in Table B. Trouble lamps are also provided to aid in locating troubles.
9. RING PARTY TESTS
- 9.1 Operate keys OIT, IDK, IDO, OFFO and the appropriate keys IG (0-2) and OP (0-9) on the OIT Ckt.
- NOTE: If ZV option is provided operate keys STPP, ST2P and ST3P as shown in Note 2 on Sheet E2 of SD-95815-01 in order to generate the proper start pulse.
- 9.2 Set-up the Station digit keys TH00, H01, T02, U03 at the OIT. With key NP normal leads THN0, HN1, TN2, TN3 are used.
- 9.3 Set-up the Identifier Test Set in the Match mode to trap on toll calls (master count 34, see Table 1 Section 115A).
- NOTE: The test set may be set-up to trap on any master count 1-40. However the master count as read on the CLK BTS indicator displays only the Master Count trapped on the office A scan.

- 9.4 Initiate a call operating the ST key and verify each indication occurs in the sequence listed in Table C. Trouble Locating Charts for each indication are also listed in Table C.
- 9.5 Repeat the test call of 9.1 to 9.4 with the NP key operated. This will check the P lead (THPO, HP1, TP2, UP3) in the tone generation path of the OIT up to the tone detector JW122 on the Identifier.
- 9.6 Once a successful call identification has been obtained, run all possible digits for office 0 in order to determine a failure pattern which may aid in locating the trouble.
- (a) Repeat 9.1 to 9.5 using all "0's" for the station digits of office 0.
- (b) Similarly repeat (a) using all "1's", "2's", "3's", "4's", "5's", "6's", "7's", "8's", "9's" respectively.
- (c) Similarly repeat (a) for all other equipped offices.
- NOTE: The Trouble Locating Charts are written for Office 0 and station digits 0123. For other offices and station digits the charts are used as guides in performing similar trouble tests.

TABLE A
OIT KEY SET-UP

KEY	FUNCTION	NOTES
IG(0-2)	Identifier Group Selection (if provided)	Basic Set-Up
ID(0,1)	Identifier Selected	
OP(0-9)	Output Selected	
OIT	Output-Identifier Test	
ST	Starts Test	
STPP ST2P ST3P	Generates ST,STP,ST2P or ST3P Start pulses when option ZU is provided.	See Note 2 on Sheet E2 of SD-95815-01 to determine Set-Up.
IDK	Identification Check	Station Digits are not outputted, but read directly by OIT.
NP	Normal for N lead test Operated for P lead test	Selected Test Call
OFF(0-6)	Selected Office	
UO-,TO-,HO-,THO-	Selected Station Digits	
TP	Normal for Ring Party Operated for Tip Party	
PTY SO	Multiparty Call Service Observed Call	
TH2AT,H2AT, T2AT,U2AT, DXTH,DXH, DXT,DXU	Opens corresponding digit lead to cause Identification Failure Increases tone level to operate two tone detectors causing overregistration.	Trouble Test
CA CTT	Momentary operation repeats test Cancels Trouble Ticketer Bid	Auxiliary
NOTE: Release and reoperate the ST key to repeat the test.		

TABLE B
OIT LAMP SEQUENCE

LAMP	DATA	SEQUENCE
TP or RP	Tip or Ring Party	Initial Outpulser Functions
PK	Party Check	
IK	Trunk Info Checked	
OP(0-9)	Selected Outpulser	
OIT	Outpulser-Identifier Test	
IG(0-2)	Selected Identifier Grp	
L1	Identifier Seizure	Identifier Seized
ID(0,1)	Selected Identifier	
ITP	Identifier Tip Party	
TNC	Tone Path Cut-In	Identification Process
TNK	Tone Applied	
*OFA,OFB	Office Locating Scans	
*OFF,10F,20F,30F 40F,50F,60F	Office Identification Scans 0-6	
IRL	Identifier Releases	
OF(0-8)I	Identifier Office	Outpulser Registration
IDG(0,1,2)	Information Digit	
THK,HK,TK,UK	Station Digits Checked	
PTY	Multiparty Identified	
TGD	Trunk Guard Relay	Outpulser Outpulses
KP	Initial Pulse	
SP	Start Outpulsing	
I(0,1,2,4,7,10)	Information Digit	
A,B,C,(0,1,2,4,7,10)	Office Code	
TH,H,T,U(0,1,2,4,7,10)	Station Digits	
OEP	Outpulse Start Digit	
RL	Outpulser Released	
FTP	False Tip Party Indication Registered in Outpulser	
NPK	No Party Registered in Identifier	
OB	Outpulser Busy	
1TR	First Trial Failure	
2TR	Second Trial Failure	
TM2	Outpulser Abandoned Call or Party Test Timer - Timeout	
TM1	Outpulser Work Timer - Timeout	
TA	Overall timer - Timeout	
I(0,2)	ANI Failure	
I(0,4)	ANI Failure or Service Observed Call	
<p>* The scan lamps should light in the order OFA, OFB, OFF up to the last equipped office as the identifier executes each scan.</p>		

TABLE C
RING PARTY TESTS WITH OFFICE 0

SEQUENCE	IDENTIFIER AND TEST SET	MASTER COUNT	OIT	TROUBLE LOCATING
5 INITIAL OUTPULSER FUNCTIONS	MCO CLK BTS=00	0	RP,PK,IK, OP(0-9),OIT, IG(0-2),TNC, TNK,L1	
5 OFF-NORMAL	"ID-ON" 0 or 1 OND	0		C CC
OIT TEST RELAYS	TST1 relay TST(2-5) relays	0		D DA
IDENTIFIER SEIZED		0	1 ID(0,1)	E
5 RING PARTY CHECK	RPK	0		F FA
5 START	ST	0		G
MASTER CLOCK STARTED	MCO (momentarily extinguished)	1		H
CONN RELAYS (OFA)		1	OFA	I
MASTER COUNT 34 (OFA)	CLK BTS=22	2 TO 34		J
OFFICE IDENTIFIER	4 MEM B=1	34		K
CONN RELAYS (OFB)		1	2 OFB	L
CONN RELAYS (OFO)		1	4 OOF	M
OFFICE STORED & MATCHED	4 MEM A=1	34		N
NO OFFICE CROSS	OK=7	34		O
OFFICE LOADED	4 OFF=0	34		P
THOUSANDS LOADED	3 TH=0	34		PD
HUNDREDS LOADED	3 H=1	34		PE
TENS LOADED	3 T=2	34		PF
UNITS LOADED	3 U=3	34		PG
CLASS OF SERVICE LOADED	COS=0	34		PH
ALL CHECK	AK	34		Q
OFFICE TRANSMITTED		34	4 OFOI	R
THOUSAND TRANSMITTED		34	3 TH4,TH7,THK	RC
HUNDREDS TRANSMITTED		34	3 H0,H1,HK	RD
TENS TRANSMITTED		34	3 T0,T2,TK	RE
UNIT TRANSMITTED		34	3 U1,U2,UK	RF
IDENTIFIER RELEASED		-	IRL	-

NOTES FOR TABLE C ON NEXT PAGE.

TABLE C NOTES:

1. Also appears at Misc Ckt for Trouble Ticketer.
2. Optional, provided when more than 4 offices are in the Identifier Group.
3. Varies according to Station digits keys.
4. Varies according to Office Key (OFFO-6) operated at OIT.
5. Use Table D for tip party test.

TABLE D

SEQUENCE	IDENTIFIER AND TEST SET	MASTER COUNT	OIT	TROUBLE LOCATING CHART
Initial Outputpulser Functions	MCO CLK BTS=00	0	TP,PK,IK,OP(0-9) OIT,IG(0-2),TNC,TNK L1	
Off-Normal	"ID-ON" 0 or 1 OND	0		T
Tip Party Check	TPA,TPB,TPC relays TPK	0	ITP	TA TB TC
Start	ST	0		TD

10. TIP PARTY TESTS

- 10.1 Repeat the test call of 9.1 to 9.4 with the TP key operated at the OIT. Verify the indications of Table C are obtained except for the sequences INITIAL OUTPUTPULSER FUNCTIONS, OFF-NORMAL, RING PARTY CHECK, START. Substitute comparable indication and trouble locating charts as provided in Table D.
- 10.2 Release the TP key after test.

11. MULTIPARTY TESTS

- 11.1 Repeat the test call of 9.1 to 9.5 with the PTY key operated at the OIT. A successful identification will be indicated by obtaining lamps PTY and OFO the Information digit will be 1 (IO, I1 lamps) and the IDG1 lamp lights.
- 11.2 Check for the multiparty indications of charu U. Trouble locating tests are provided in charts UA, UB, UC, UD, UE.

- 11.3 Repeat 11.1 and 11.2 for offices 1, 2 and 3, respectively (as equipped). The charts are written for office 0 and should be used as a guide in performing similar trouble tests.

- 11.4 Release the PTY key after tests.

12. SERVICE OBSERVING TESTS

- 12.1 Repeat the test call of 9.1 to 9.5 with the S0 key operated at the OIT. A successful identification will be indicated by obtaining lamps RP, S0 and the display of Table C with the exception of the Information digit will be 3 (I1,I2 IDGO lamps).
- 12.2 Check for service observing indications of chart W when S0 lamp is not obtained at OIT.
- 12.3 Perform a multiparty call as described in 11.1 with the service observe (S0) key operated. A successful identification will be indicated by obtaining lamps PTY, S0 and the display of Table C with the exception of the Information digit will be 4 (IO,I4, IDG1 lamps).

- 12.4 Release the S0 key after tests.
13. TROUBLE INDICATION TESTS
- 13.1 Second Attempt Keys
- (a) Perform a ring party call of Para. 9 in office 0 with the H-2AT operated and verify the ES1 lamp lights at the OIT and all digits are displayed on the Identifier Test Set.
- (b) Similarly repeat (a) with the T-2AT key operated.
- (c) Similarly repeat (a) with the U-2AT key operated.
- (d) Similarly repeat (a) in office 1 with the TH-2AT key operated.
- (e) Release the TH-2AT key
- 13.2 DX Keys
- 13.21 Perform a ring party call of Para. 9 in office 0 with the DX-H key and two HO- keys operated and verify the following:
- (a) At the Identifier Test Set the AKF lamp is lit and the Hundreds digit displays an F.
- (b) Lamps 1TR and 2TR are lit at the OIT.
- (c) A trouble ticketer record is obtained with the Identifier number.
- 13.22 Similarly repeat 13.21 with the DX-T key and two TO- keys operated.
- 13.23 Similarly repeat 13.21 with the DX-U key and two UO- keys operated.
- 13.24 Similarly repeat 13.21 in office 1 with the DX-TH key and two THO- keys operated.
- 13.25 Release the DX-TH and THO- keys.
- 13.3 No Party Check
- 13.31 Perform a ring party call of Para. 9 with insulation in contacts 8B(TPA), 3B(TST3) in the identifier and verify the following:
- (a) Lamp NPK lights at the OIT.
- (b) No RPK lamp is obtained at the Identifier Test Set and the call fails.
- (c) A trouble ticketer record is obtained with an NPK indication.
- 13.32 Release all keys.

No changes indicated due to extensive revision.

ATTACHMENTS

Charts A,B,BA,BB,BC,C,CA,CB,CC,D,DA,E,F,FA,G,H,HA,I,J,JA,K,KA,KB,KC,KD,KE,KF,KG,KH,KI,KJ,L,M,N,NA,NB,NC,ND,O,P,PA,PB,PC,PD,PE,PF,PG,PH,Q,R,RA,RB,RC,RD,RE,RF,T,TA,TB,TC,TD,U,UA,UB,UC,UD,UE,W on pages 11 thru 39.

Manager, Product Engineering
Control Center

Reason for Reissue:

Miscellaneous corrections and to add charts for Class of Service (PH) multiparty (U,UA,UB,UC,UD,UE) and service observing (W).

CHART A

MCO indicator does not light.

CHECK	CORRECTIVE ACTION
Verify a logical "0" is present at 2A11-2(B6).	1. Replace JW148. 2. See Chart B.
Verify a logical "0" is present at 2A11-207,208,213,214,215,206(B6).	Replace JW124.
Verify a logical "0" is present at 2A10-22, 21, 24, 25, 216, 32, 31, 211, 215, 213, 212, 214(B5).	Correct wiring between JW124 and JW127.
Verify a logical "1" is present at MCO lead 2A10-103(B5).	Replace JW127.
Verify a logical "1" is present at 1B16-21,22(B28A,G13).	Correct wiring between JW127 and Identifier Test Set J1C081G.
Verify 1B16-103(G13) contains -48 volts and 1B16-106(G13) contains ground.	Remove F fuse and correct power wiring to test set.
Replace F fuse and the MCO indicator is lit.	1. Check Test Set is properly seated. 2. Replace Test Set.

CHART B

Green or Red LED's on JW148 light or flash

CHECK	CORRECTIVE ACTION
Verify a logical "1" is present at MCO lead 1B7-35(B24).	Correct wiring between JW148 and JW127.
Verify a logical "0" is present at: ON(-) lead 1B7-203(B24) ST(-) lead 1B7-202(B24) TP-CLR lead 1B7-204(B24) TWT(-) lead 1B7-205(B24)	ON(-) lead See Chart BA ST(-) lead See Chart BA TP-CLR lead See Chart BB TWT(-) lead See Chart BC
Green or Red LED's on JW148 are extinguished.	Replace JW148.

CHART BA

False ON(-) or ST(-) at JW148

CHECK	CORRECTIVE ACTION
A. Using a VOM verify ground is present at each of the 16 CDA- terminals shown on sheet B1 for 3B7 and sheet B2 for 3B14.	Re-check existing and temporary straps applied in "Circuit Pack Strapping and Toll Call Preparation" check multiple between 3B7 and 3B14.
B. Verify ground is not present at: 2B10-1,2,3(B3).	1. Remove false ground condition on Outputser leads 2. Replace JW132
C. Verify a logical "0" is present at: 1. 2B10-7,14,15(B3) 2. 1B7-8(B23). 3. 1B7-21(B24) 4. 3B7-203(,202B1) and 3B14-203(B2) for Identifier 0 2A3-12,36,11(B24) 3B7-204(B1), and 3B14-204,205(B2) for Identifier 1 5. 3B7-206,214(B1) and 3B14-206,214(B2) for Identifier 0 3B7-209,207(B1) and 3B14-209,207(B2) for Identifier 1 6. 3B4-6,7,8,9(B29) for ID 0 3A15-6,7,8,9(B29) for ID 1 7. 3B4-15,14(B29) for ID 0 3A15-15,14(B29) for ID 1 8. 1B7-19,33(B23) 9. 1B7-2,18 10. 1B7-202,203(B24)	1. Replace JW132. 2. Correct TR wiring. 3. Replace JW148. 4. Correct TSTX0,TRMO wiring for Identifier 0 Correct TSTX1,TRM1 wiring or replace JW140, for Identifier 1. 5. Replace JW137 at 3B7 or 3B14. 6. Correct ON-- or ST-- wiring. 7. Replace JW150 at 3B4 or 3A15. 8. Correct STA-, ONA- wiring. 9. Replace JW148 10. Correct ON(-) or ST(-) wiring.

CHART BB

False TP-CLR at JW148

CHECK	CORRECTIVE ACTION
Verify a logical "1" is present at 2A11-210(B6).	1. Replace JW124. 2. Correct TP-CLR wiring.

CHART BC

False TWT(-) at JW148

CHECK	CORRECTIVE ACTION
Verify a logical "0" is present at: 3B4-6,7,8,9(B29) for ID 0 3B15-6,7,8,9(B29) for ID 1	See Chart BA.
Verify MB1 relay is operated.	See Handbook Section 115E.

CHART BC (Cont'd.)

CHECK	CORRECTIVE ACTION
Using a VOM verify ground is present at 2A1-18(B22).	Correct wiring of make contact 12 of MB1.
Verify a logical "1" is present at: 1. 2A1-17(B22) 2. 3B4-3(B29) for ID 0 3A15-3(B29) for ID 1	1. Replace JW149. 2. Correct MBI- wiring.
Verify a logical "0" is present at: 3B4-17(B29) and 3A15-22(B29) for ID 0 3B4-22(B29) and 3A15-17(B29) and 1B8-40(B29) (on ID 0) and 1B8-9(B29) (on ID 1) for ID 1. 1B7-205(B24)	1. Correct TWTO wiring for ID 0. 2. Correct TWT1 wiring, or replace JW93-1(B8) or replace JW94-1B8 for ID 1.

CHART C

ID-ON indicator does not light

CHECK	CORRECTIVE ACTION
Verify a logical "1" is present at 2B10-201,202(B3)(during idle state).	See Chart CA.
Verify ground appears at 2B10-1, 3(B3) and 2A1-13,(B22).	Correct Outputpulser Seizure indications to Identifier.
Verify a logical "1" appears at 2B10-7,(B3).	Replace JW132.
Verify a logical "1" appears at 2A1-16(B22).	Replace JW149.
Verify a logical "1" appears at 1. 1B7-7(B23) 2. 1B7-8(B23)	1. Correct TST wiring between JW148 and JW149. 2. Correct TR wiring between JW148 and JW132.
Verify a logical "0" is present at: 3B7-215(B1) for Identifier 0 or 3B14-215(B2) for Identifier 1	1. See Chart BA (A, C3 to C9). 2. Replace JW137.
Verify a logical "0" is present at: 1B7-12(B23)	Correct ONC- wiring.
Verify a logical "0" is present at 1B7-102(B24)	See Chart CB.
Verify a logical "1" appears at 1B7-18(B23).	Replace JW148.

CHART C (Cont'd.)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1B16-19(B28B) for Identifier 0 or 1B16-20(B28B) for Identifier 1	Correct ON- wiring.
Verify the ID-ON 0 or 1 indicator is lit on the Identifier Test Set.	Replace the Identifier Test Set.

CHART CA

False off normal at JW132 ($\overline{ON}=1$)

CHECK (during idle state)	CORRECTIVE ACTION
Verify a logical "0" is present at 2B12-204(B4)	Correct ONC-1 wiring to JW148
Verify a logical "1" is at 2B12-205(B4)	Replace JW133.
Verify a logical "1" is present at 2B10-201,202(B3)	Correct \overline{ON} wiring.

CHART CB

False Master Clock Clear Indication at JW148(MCCLR=1)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A11-23(B6) when the JW148 reset key is operated.	<ol style="list-style-type: none"> 1. Check a logical "1" appears at 1B7-103(B24) when the JW148 reset key is operated. 2. Identifier 0: <ol style="list-style-type: none"> (a) Check RST wiring. Identifier 1: <ol style="list-style-type: none"> (a) Correct RST wiring. (b) Replace JW140.
Verify a logical "0" is present at 2A11-22(B6)	Replace JW124.
Verify a logical "0" is present at 1B7-102(B24)	Correct MCCLR wiring.

CHART CC

OND indicator does not light.

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1B7-34(B23).	Replace JW148.
Verify a logical "1" appears at 1B16-201(B28B) for Identifier 0 or 1B16-202(B28B) for Identifier 1	Correct OND- wiring.
Verify the OND indicator is lit on the Identification Test Set.	Replace the Identifier Test Set.

CHART D

Relay TST1 does not operate.

CHECK	CORRECTIVE ACTION
Verify a logical "1" is present at 1B7-31(B23)	Replace JW148
Verify a logical "1" is present at 2A1-15(B22)	Correct OT wiring.
Verify ground is present at 2A1-206(B22)	1. Verify a ground is present at 2A1-19(B22) 2. Replace JW149
Verify the TST1 relay is operated.	1. Verify a ground is present at U terminal of TST1. 2. Verify -48V is present at L terminal of TST1. 3. Replace relay TST1.

CHART DA

Relays TST(2-5) do not operate

CHECK	CORRECTIVE ACTION
Verify a ground is present at contact 5 make of relay TST1.	1. Check SVN key is normal in OIT. 2. Verify continuity of ground from OIT to Identifier. See B22.
Verify ground and battery are present at U and L winding terminals of each TST(2-5) relay.	1. Correct wiring. 2. Check fusing.
Verify relays TST(2-5) are operated.	Replace defective relays.

CHART E

ID- lamps not lit at OIT.

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B12-204(B4)	Correct ON(-) wiring.
Verify a logical "0" appears at 2B12-205(B4)	Replace JW133.
Verify a logical "0" appears at 2B1-36(B22)	Correct ON wiring.
Verify a ground appears at 2B1-202(B22)	Replace JW126.
Verify the ID- lamp lights at the OIT.	1. Verify a ground appears at terminal 14 of ON3 dry reed relay. 2. Verify -48V is present at terminal 1 of relay ON3. 3. Verify ground is present at terminal 3 of relay ON3, and appears during test at terminal 5, if not replace ON3 relay. 4. Check ID wiring to OIT or ID- Lamp at OIT.

CHART F

RPK indicator is not lit

CHECK	CORRECTIVE ACTION
Verify ground stays present at 2B12-17(B4)	Check ground via operated TST(2-5) relays and normal TPA, TPB, TPC, MB1 relays as shown on B4.
Verify a logical "0" is present at 2B12-12,14,15(B4)	See chart FA
Verify a logical "1" appears at 2B12-207(B4)	Replace JW133.
Verify a logical "1" appears at Identifier 0 1. 1B16-205(B28B)	1. Correct RPK0 wiring. 2. Correct RPK1 wiring.
Identifier 1 2. 1B16-206(B28B)	
RPK indicator is lit.	Replace Identifier Test Set.

CHART FA

False tip party indication

CHECK	CORRECTIVE ACTION
Verify ground does not appear at 2B10-2(B3)	Correct TP lead wiring to outputser
Verify a logical "0" is present at 2B10-14(B3)	Replace JW132
Verify a logical "0" is present at 2B14-106(B25)	Correct TP17 wiring
Verify a logical "0" is present at 2B14-11(B25)	Replace JW138
Verify a logical "0" is present at 2B12-12,14,15(B4)	Correct OTP wiring

CHART G

ST indicator is not lit.

CHECK	CORRECTIVE ACTION
Verify 2B12-206(B4) remains at a logical "0".	Replace JW133.
Verify 1B7-16(B23) remains at a logical "0".	Correct TPK(-) wiring.
Verify a logical "1" appears at 1B7-17(B23)	Correct RPK(-) wiring.
Verify a logical "1" appears at 1B7-2(B23)	Replace JW148.
Identifier 0: 1. Verify a logical "1" appears at 1B16-13(B28B)	1. Correct ST0 wiring.
Identifier 1: 2. Verify a logical "1" appears at 1B16-14(B28B)	2. Correct ST1 wiring.
ST indicator is lit.	Replace Identifier Test Set.

CHART H

MCO indicator not extinguished after ST indicator

CHECK	CORRECTIVE ACTION
Using oscilloscope verify a 6 volt peak to peak since wave of 5800 Hz is present at 2A11-5(B6).	See "Oscillator Check" in Section 115B.
Verify a logical "1" appears at 2A11-2(B6)	Correct ST wiring.
Verify a logical "1" is initially present at 2A11-204(B6)	Correct MCO wiring.
Verify a logical "1" is initially present at 2A11-3(B6)	See Chart HA.
Verify a logical "0" appears at 2A11-203(B6)	1. Correct MC38 wiring. 2. Replace JW127.
Verify a logical "1" appear at 2A11-206(B6)	Replace JW124.
Verify a logical "1" appears at 2A10-3(B5) and a logical "0" appears at 2A10-103(B5).	Replace JW127.

CHART HA

Secondary Clock Idle indication (SCO=1) is absent at Master Clock (JW124)

CHECK	CORRECTIVE ACTION
Verify logical "0" is initially present at 2A11-201,20,18,19(B6)	Replace JW124.
Verify logical "0" is initially present at 2A5-31,32,10,11(B7)	Correct SCGA, SCGB, SCGC, SCGD wiring.
Verify logical "1" is initially present at 2A5-3(B7)	Replace JW130.
Verify a logical "1" is initially present at 2A4-22(B7)	Correct SCO wiring.
Verify a logical "1" is initially present at 2A4-102(B7)	Replace JW143.
Verify a logical "1" is initially present at 2A11-3(B6)	Correct SCO wiring.

CHART I

OFA lamp does not light

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B14-102(B8)	Correct ST(-) wiring.
Verify a logical "1" appears at 2B14-6(B8)	Correct MC1 wiring.
Verify a logical "1" appears at 2B14-27(B8)	Replace JW138.
Verify a logical "1" appears at 2B8-203(B9)	Correct OFA wiring.
Verify -48V appears at 2B8-210,16,17,8(B9)	Replace JW125.
At OIT dry reed relays, verify -48V appears at terminal 1 of OTH, 1H, 2T, 3U relays as offices 0, 1, 2, 3 are provided respectively.	Correct OTH0, OH1, OT2, OU3 wiring from Identifier and make contacts of TST2, TST3, TST4 relays.
Verify OFA lamp lights.	See ECP 95815-19.

CHART J

Master Count 34 (2-2 on CLK BTS) fails to appear on test set on OFA scan.

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B14-22(B8)	Replace JW138.
Verify a logical "1" appears at 2A4-209(B10)	Correct OFAD wiring.
Verify a logical "1" appears at 2A4-17(B10)	Replace JW143.
Verify a logical "1" appears at 2A11-205(B6)	Correct ENABLE wiring.
Set the MC-MC-1 keys for master count 1 and verify the digits 1-0 are displayed on the CLK BTS display.	See Chart JA.
Similarly set the MC-, MC-1 keys for master counts 2-34 and verify the proper digits are displayed respectively on the CLK BTS displays. See Table 1 Section 115A.	<ol style="list-style-type: none"> 1. Check MCGA, MCGB, MCGC, MCGD, MCGB1, MCGA1 wiring to 1B9 connector. 2. Replace JW124. 3. Replace Test Set.

CHART JA

Master count 1 not displayed on CLK BTS display

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1B9-206(B13) See Table 1 Section 115A.	Correct MCGA, MCGB, MCGC, MCGD, MCGB1, MCGA1 wiring.
Verify the CLK BTS indicators display the digits 1-0 for master count 1. See Table 1 Section 115A.	Replace Test Set.

CHART K

MEM B does not display a 1 digit (office 0)

CHECK	CORRECTIVE ACTION
Using the oscilloscope obtain an Office A scan (see Section 115A) at 2A5-39(B5) and verify 17 pulses are present.	<ol style="list-style-type: none"> 1. Replace JW130. 2. Replace JW127. 3. Check even MC2 to MC34 wiring from JW130 to JW127. 4. Check MCGA, MCGB, MCGC, MCGD, MCGA1, MCGB1 wiring between JW124 and JW127.
Verify the Office A scan contains an extended 17th pulse (see Section 115A).	See Chart KA.
Verify a logical "1" appears at 1A1-201(B13)	<ol style="list-style-type: none"> 1. Repeat OIT test with NP key operated, if call succeeds THNO lead is open (NP key normal). 2. See Chart KE.
Verify a logical "1" appears at 2A5-206(B19)	See Chart KG.
Verify a logical "0" appears at 2A5-102(B19)	<ol style="list-style-type: none"> 1. Check OFAD wiring. 2. Replace JW138.
Verify a logical "1" appears at 2A5-1(B19) and logical "0"'s remain at 2A5-214,106,105(B19).	Replace JW130.
Verify a logical "1" appears at 1B9-7(G13) and logical "0"'s remain at 1B9-8,9,29(G13).	Correct A, B, C, OFX-1 wiring.
Verify a logical "1" appears at 2A13-103(B15)	Replace JW136.
Verify a logical "1" appears at 1B9-5(G13)	Correct MS wiring.
Verify a logical "1" appears at 1B9-6(G13)	Correct OFAD+OFBD wiring.
Verify hexadecimal display MEM B has a digit 1.	Replace Test Set.

CHART KA

Office A Scan does not contain an extended pulse

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A11-15(B6)	See Chart KB.
Using the oscilloscope verify the office A scan obtained earlier is also present at 2A11-14(B6)	Correct EVEN wiring.
Verify a logical "0" appears at 2A11-3(B6)	See Chart KD.
Using the oscilloscope verify the office A scan obtained above has an extended 17th pulse.	Replace JW124.

CHART KB

Secondary Clock Enable (ENC) is not received by Clock (JW124)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A9-38(B10)	Correct MC34 wiring.
Verify a logical "1" appears at 2A9-37(B10)	See Chart KC.
Verify a logical "1" appears at 2A11-26(B6)	See Chart KI.
Verify a logical "1" appears at 2A11-1(B6)	Replace JW124.
Verify a logical "1" appears at 2A9-36(B10)	Correct RPCY wiring.
Verify a logical "1" appears at 2A4-16(B10)	Replace JW143.
Verify a logical "1" appears at 2A9-5(B10)	Correct OFAD+OFBD wiring.
Verify a logical "1" appears at 2A9-11(B10)	Replace JW123.
Verify a logical "1" appears at 2A11-15(B6)	Correct ENC wiring.

CHART KC

Toll Request (REQ-17=1) absent at Secondary Clock Enable (JW123)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B14-105(B25)	Correct TR wiring.
Verify a logical "1" appears at 1B7-5(B23)	Replace JW148.
Verify a logical "1" appears at 2B14-26(B25)	Correct TRE wiring.
Verify a logical "1" appears at 2B14-20(B25)	Replace JW138.
Verify a logical "1" appears at 2A9-37(B10)	Correct REQ-17 wiring.

CHART KD

Master Clock Stop (SC0=0) is not received by Master Clock (JW124)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A11-201(B6)	Replace JW124.
Verify a logical "1" appears at 2A5-31(B7)	Correct SCGA wiring.
Verify a logical "0" appears at 2A5-3(B7)	Replace JW130.
Verify a logical "0" appears at 2A4-22(B7)	Correct SC0 wiring.
Verify a logical "0" appears at 2A4-102(B7)	Replace JW143.
Verify a logical "0" appears at 2A11-3(B6)	Correct SC0 wiring.

CHART KE

Thousand "0" digit (TH0=1) is not detected

CHECK	CORRECTIVE ACTION
Using an oscilloscope with the office A scan on channel 1, verify channel 2 has an over +20V signal at 2A1-11(B11) during the first 2/3 rds of extended pulse.	See Chart KF.
Using an oscilloscope at the OIT verify and trigger on over +20V. Check at contact 10 of ID relay for over +20V.	1. Verify ID relay operates. 2. Check OSC wiring to Identifier.

CHART KE (Cont'd.)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1A1-1,2,3,4,5,12,13,14,15,16,40(B13) and a logical "1" is initially present at 1A1-37,39,19-B13).	<ol style="list-style-type: none"> 1. Correct SC(1-10), SC(12-14), ENC wiring. 2. Replace JW143. 3. Replace JW130. 4. Check FNC wiring.
Verify a logical "1" appears at 1A1-201(B13)	<ol style="list-style-type: none"> 1. At OIT verify keys OFF0, TH00 are operated. 2. Replace JW122(1A1). 3. Correct THNO wiring to OIT. 4. See Chart KJ.

CHART KF

Oscillator enable pulse is absent or incorrect.

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A8-211(B11)	Correct SC1 wiring.
Using an oscilloscope with the office A scan on channel 1 verify channel 2 has a logical "1" at 2A8-16(B11) at the 2/3 mark of the extended pulse.	<ol style="list-style-type: none"> 1. Replace JW130. 2. Correct SCGA, SCGB, SCGC, SCGD wiring to JW124. 3. Replace JW124.
Verify a logical "1" appears at 2A8-17(B11)	Correct MC1 wiring.
Using a oscilloscope with the office A scan on channel 1 verify channel 2 has a logical "0" at 2A8-214(B11)	Replace JW139.
Verify the above also appears at 1B7-201(B11)	Correct OSC-EN wiring.
Verify a logical "1" appears at 1B7-1(B11)	Correct MC34 wiring.
Verify +44 volts is present at 1B7-206(B11)	<ol style="list-style-type: none"> 1. Check +130V is present at D42-1(B23). 2. Check grd in present at D42-6(B23). 3. Check +44V is present at D42-4(B23), if not replace D42. 4. Check +44 volt wiring.
Using an oscilloscope with the office A scan on channel 1 verify channel 2 has an over +20V signal at 1B7-207(B11) during the first 2/3 rds of the extended pulse.	Replace JW148.
Verify the above also appears at <ol style="list-style-type: none"> 1. 2A1-102(B11) 2. 2A1-11(B11) 	<ol style="list-style-type: none"> 1. Correct wiring. 2. (a) Verify a logical "0" is present at 2A1-12(B22). (b) Replace JW149.

CHART KG

THSK indication not generated by DATA CLOCK

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1A16-206(B16)	See Chart KH.
Verify a logical "0" appears at 2A13-24(B15)	1. Correct OFA wiring. 2. Replace JW138.
Verify a logical "1" appears at 2A13-1(B15)	Correct OITK wiring.
Verify a logical "1" appears at 2A13-32(B15)	1. Correct MATCH wiring. 2. Replace JW144.
Verify a logical "1" appears at 2A13-5(B15)	Replace JW136.

CHART KH

OITK indication not generated by Data Multiplexer

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A13-205(B15)	1. Correct SC12 wiring. 2. Replace JW130.
Verify a logical "1" appears at 2A13-29,6,9(B15) and a logical "0" appears at 2A13-212(B15).	Replace JW136.
Verify a logical "1" appears at 1A16-27,32,22(B15) and a logical "0" appears at 1A16-105(B16).	Correct MXA, MXB, MXC, MXS wiring.
Verify a logical "1" appears at 1A16-21(B16)	Correct THO wiring.
Verify a logical "1" appears at 1A16-206(B16)	Replace JW121.

CHART KI

DCK indication (logical "1") absent at Master Clock

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B14-7(B25)	Correcr RPK wiring.
Verify a logical "1" appears at 2B14-103(B25)	Correct OND wiring.
Verify a logical "1" appears at 2B14-211(B8)	Correct ON(-) wiring.

CHART KI (Cont'd.)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B10-15(B3)	Replace JW132.
Verify a logical "1" appears at 2B14-1(B25)	Correct RP wiring.
Verify a logical "1" appears at 2B14-9(B25)	Replace JW138.
Verify a logical "1" appears at 2A11-26(B6)	Correct DCK wiring.

CHART KJ

Tone is not transmitted by OIT

To verify the tone is properly generated by the OIT, set up the concerned office scan on channel 1 of the oscilloscope at the Identifier.

Run a wire between the OIT and Identifier for channel 2 and use this lead to trace the desired tone at the OIT.

The tones may be traced in the OIT up to the key which cuts that lead into the switchboard cable lead to the Identifier. This key must be normal during this test. The tones cannot be traced once they are loaded by cutting into the identifier.

The tones should appear during the first 2/3rds of the extended pulse which is 10 cycles of tone and should be 6 volts peak to peak.

CHART L

OFB lamp does not light (optional)

CHECK	CORRECTIVE ACTION
*Verify a logical "1" appears at 2B14-206(B8)	Correct MC39 wiring.
*Verify a logical "1" appears at 2A11-24(B6)	Correct MC40 wiring.
Verify a logical "1" appears at 2B14-28(B8)	1. Replace JW138. 2. Replace JW124.
Verify a logical "1" appears at 2B9-203(B9)	Correct OFB wiring.
Verify -48V appears at 2B9-210,16,17(B9)	Replace JW125.
At OIT dry reed relays, verify -48V appears at terminals 1 of 4TH, 5H, 6T relays as offices 4, 5, 6 are provided respectively.	Correct OTH4, OH5, OT6 wiring from Identifier and make contacts of TST4, TST5 relays.
Verify OFB lamp light.	See ECP 95815-19.

* MC39 and MC40 are very short and cannot be seen with the oscilloscope, the logic probe is required for these short pulses.

CHART M

OFF lamp does not light

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B14-29(B8)	Replace JW138.
Verify a logical "1" appears at 2B8-204(B9)	Correct OFO wiring.
Verify -48V appears at 2B8-210,40,201,20(B9)	Replace JW125.
At OIT dry reed relays, verify -48V appears at terminal 1 of OTHO, OH, 11 of OT, 21 of OU relays.	Correct OTHO, OHO, OTO OUO wiring from Identifier and make contacts of TST2 relays.
Verify OOF lamp lights.	See ECP 95815-19.

CHART N

MEM A does not display a 1 digit (Office 0)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B15-215(B18)	See Chart NA.
Verify a logical "1" appears at 1B9-24(G13)	Correct MC34 wiring.
Verify a logical "1" appears at 1B9-4(G13)	Correct SC10 wiring.
Using the oscilloscope obtain an office 0 scan (see Section 115A) at 2A5-39(B5) and verify 17 pulses are present.	See Chart NB.
Verify the office 0 scan contains an extended 17th pulse.	See Chart NC.
Verify a logical "1" appears at 2B15-8(B18) and logical "0"'s remain at 2B15-5,7,105(G13).	Replace JW128.
Verify a logical "1" appears at 1B9-16(G13) and logical "0"'s remain at 1B9-17,18,19(B18).	Correct TST1, TST2, TST3, TST4 wiring.
Using the oscilloscope with the office 0 scan on channel 1, verify channel 2 at 1B9-6(G13) is a logical "0" during the office 0 scan.	The OFAD+OFBD lead is held in a logical "1" state: 1. Replace JW143. 2. Correct OFAD+OFBD wiring.
Verify hexadecimal display MEM A has a digit 1.	Replace Test Set.

CHART NA

Memory of Office stored (OFOM=1) is not present

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B15-28(B18)	Correct ST(-) wiring.
Verify a logical "1" appears at 2B15-11(B18)	Correct MC34 wiring.
Verify a logical "1" appears at 2B15-18(B18)	Correct STROB wiring.
Verify a logical "1" appears at 2B15-1(B18) and logical "0"'s remain at 2B15-2,3,4(B18).	Correct A, B, C, OFX-1 wiring.
Verify a logical "1" appears at 2B15-208(B18).	Correct OFAD wiring.
Verify a logical "1" appears at 2B15-103(B18)	1. Correct OFBD wiring. 2. Replace JW138. 3. If OFB lamp is not provided, perform first 3 items of Chart L.
Verify a logical "1" appears at 2B15-215(B18)	Replace JW128.

CHART NB

Office 0 scan is not present

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2B14-23(B8)	Replace JW138.
Verify a logical "0" appears at 2A11-8(B6)	Correct OFOD wiring.
Verify the 17 pulses of office 0 are obtained.	Replace JW124.

CHART NC

Office 0 scan does not contain an extended 17th pulse

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B16-22(B18)	See Chart ND.
Verify a logical "1" appears at 2A9-201(B10)	Correct ENABLE-1 wiring.
Using the oscilloscope with the office 0 scan on channel 1, verify channel 2 at 2A9-11(B10) has a logical "1" pulse during the 17th pulse.	Replace JW123.

CHART ND

Secondary Clock Enable for Office 0 (ENABLE-1=1) is not present

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B16-2(B18)	Correct OFOM wiring.
Verify a logical "1" appears at 2B14-8(B8)	Replace JW138.
Verify a logical "1" appears at 2B16-102(B18)	Correct OFOD wiring.
Verify logical "1"'s remains at 2B15-23,212(B18) (ERROR-1,ERROR-2 indications)	1. Replace JW128. 2. The condition may be a valid office cross. To isolate office 0 for test, strap office 0 as the last office as described in Paragraph 6.3. Also strap all other offices as unequipped as described in Paragraph 6.4.
Verify logical "1"'s remain at 2B16-18,19(B18)	Correct ERROR-1, ERROR-2 wiring.
Verify a logical "1" appears at 2B16-22(B18)	Replace JW144.

CHART O

OS does not display a 7 digit

CHECK	CORRECTIVE ACTION
Verify a logical "0" remains at 2B16-30(B18)	Replace JW144.
Verify a logical "0" remains at 1B9-29(G13)	Correct OFX wiring.
Verify a logical "1" appears at 2B16-26(B18)	Replace JW144.
Verify a logical "1" appears at 1B9-3(G13)	Correct MATCH wiring.
Verify logical "1"'s remain at 1B9-1,2(G13)	1. Correct ERROR-1, ERROR-2 wiring. 2. See Item 4 of Chart ND.
Verify hexadecimal display OS has a digit 7.	Replace Test Set.

CHART P

OFF does not display a 0 digit (Office 0)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A12-10(B17)	See Chart PA.
Using the oscilloscope obtain traces A, B, C, D, one at a time using time base 50usec and trigger 2A12-10(B17). Draw each trace as received. A 2A12-20 B 2A12-204 C 2A12-201 D 2A12-210	See Chart PB.
Verify the A, B, C, D traces above are obtained at: A 2A12-1 B 2A12-7 C 2A12-23 D 2A12-22	See Chart PC.
Verify the A, B, C, D traces above are obtained at: A 1B16-7 B 1B16-8 C 1B16-9 D 1B16-10	Correct AD, BD, CD, DD wiring to test set.
Verify a logical "0" appears at 1B16-1(G13)	Correct LOF wiring.
Verify the OFF display has a digit 0.	Replace Test Set.

CHART PA

Load Office Pulse (LOF=1) is absent

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-10(B15) and a logical "1" occurs at 2A13-22(B15).	Replace JW136.
Verify a logical "0" appears at 2A12-27(B17)	Correct DCI wiring.
Verify a logical "1" appears at 2A12-202(B17)	Correct BS wiring.

CHART PA (Cont'd.)

CHECK	CORRECTIVE ACTION
Using an oscilloscope with the Office 0 scan on channel 1, verify channel 2 at 2A12-205,206(B17) have a logical 0 during the office 0 scan.	Correct OFA, OFB wiring.
Verify a logical "1" appears at 2A12-10(B17)	Replace JW135.

CHART PB

Proper Data Words not received by Data Mask (JW135)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1A16-2(B16)	Correct OF0 wiring.
Verify a logical "1" appears at 1A4-20(B13)	<ol style="list-style-type: none"> 1. At OIT verify key H01 is operated. 2. Replace JW122(1A4). 3. Correct HN1 wiring to OIT. 4. See Chart KJ.
Verify a logical "1" appears at 1A8-202(B13)	<ol style="list-style-type: none"> 1. At OIT verify key T02 is operated. 2. Replace JW122(1A8). 3. Correct TN2 wiring to OIT. 4. See Chart KJ.
Verify a logical "1" appears at 1A12-201(B13)	<ol style="list-style-type: none"> 1. At OIT verify key U03 is operated. 2. Replace JW122(1A12). 3. Correct UN3 wiring to OIT. 4. See Chart KJ.
Verify the A, B, C, D traces in Chart P are obtained at: A 1A16-208 B 1A16-207 C 1A16-215 D 1A16-214	<ol style="list-style-type: none"> 1. Replace JW121. 2. Check other data inputs for office, thousands, tens and units remain at logical "0".
Verify the A, B, C, D traces of Chart P are obtained at the points shown on Chart P.	Correct A, B, C, D wiring.

CHART PC

Proper Data Words not output from Data Mask (JW135)

CHECK	CORRECTIVE ACTION
Verify a logical "0" is present at 2A12-25(B17)	<u>Identifier 0</u> Connect temporary ground at this point. <u>Identifier 1 (See B28B)</u> <ol style="list-style-type: none"> 1. Correct ST0 wiring to Identifier 1. 2. Replace 1B8 on Identifier 1. 3. Replace 1B8 on Identifier 0. 4. Check ST0 wiring on Identifier 0.

CHART PC (Cont'd.)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A12-214(B17)	Correct OITK wiring.
Verify a logical "1" is present at 2A13-208(B15)	Correct MC34 wiring.
Verify a logical "1" is present at 2A13-39(B17)	Replace JW136.
Verify a logical "1" is present at 2A12-21(B17)	Correct DPE wiring.
Verify a logical "0" is not standing at 2A12-213(B17) during idle condition	1. Correct DC6 wiring. 2. Replace JW136.
Verify the A, B, C, D traces of Chart P are obtained.	Replace JW135.

CHART PD

TH does not display a 0 digit

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-16(B15)	Replace JW136.
Verify a logical "0" appears at 2A12-28(B17)	Correct DC2 wiring.
Verify a logical "1" appears at 2A12-9(B17)	Replace JW135.
Verify a logical "1" appears at 1B16-2(G13)	Correct LTH wiring.
Verify the TH display has a digit 0.	1. Perform Chart PB. 2. Perform Chart PC. 3. Replace Test Set.

CHART PE

H does not display a 1 digit

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-15(B15)	Replace JW136.
Verify a logical "0" appears at 2A12-11(B17)	Correct DC3 wiring.
Verify a logical "1" appears at 2A12-32(B17)	Replace JW135.
Verify a logical "1" appears at 1B16-3(G13)	Correct LH wiring.
Verify the H display has a digit 1.	1. Perform Chart PB. 2. Perform Chart PC. 3. Replace Test Set.

CHART PF

T does not display a 2 digit

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-14(B15)	Replace JW136.
Verify a logical "0" appears at 2A12-12(B17)	Correct $\overline{DC4}$ wiring.
Verify a logical "1" appears at 2A12-13(B17)	Replace JW135.
Verify a logical "1" appears at 1B16-4(G13)	Correct LT wiring.
Verify the T display has a digit 2.	1. Perform Chart PB. 2. Perform Chart PC. 3. Replace Test Set.

CHART PG

U does not display a 3 digit

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-33(B15)	Replace JW136.
Verify a logical "0" appears at 2A12-16(B17)	Correct $\overline{DC5}$ wiring.
Verify a logical "1" appears at 2A12-17(B17)	Replace JW135.
Verify a logical "1" appears at 1B16-5(G13)	Correct LU wiring.
Verify the U display has a digit 3.	1. Perform Chart PB. 2. Perform Chart PC. 3. Replace Test Set.

CHART PH

COS does not display a 0 digit

CHECK	CORRECTIVE ACTION
Verify logical "1"'s remain present at 2AG-30,37,38(B17)	Replace JW134.
Verify logical "1"'s remain present at 2A12-211,212,5,4(B17)	Correct NMR, MR, SPL, PTY-OUT wiring.
Verify logical "0" is present at 2A12-203(B7)	Correct PTY-OUT wiring
Verify a logical "0" appears at 2A13-34(B15)	Replace JW136.
Verify a logical "0" appears at 2A12-213(B17)	Correct DC6 wiring.

CHART PH (Cont'd)

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A12-15(B17)	Replace JW133.
Verify a logical "1" appears at 1B16-6(G13)	Correct LCOS wiring.
Verify the COS display has a digit 0.	Replace the test set.

CHART Q

AK indicator does not light

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2A13-21(B15)	Replace JW136.
<u>Identifier 0</u> 1. Verify a logical "0" appears at 1B16-23(G13) <u>Identifier 1</u> 2. Verify a logical "1" appears at 1B16-24(B15)	1. Correct $\overline{CK(0)}$ wiring. 2. Correct $\overline{CK(1)}$ wiring.
Verify a logical "0" appears at 2A13-11(B15)	Replace JW136
<u>Identifier 0</u> 1. Verify a logical "0" appears at 1B16-17(G13) <u>Identifier 1</u> 2. Verify a logical "1" appears at 1B16-18(G13)	1. Correct $\overline{DC8(0)}$ wiring. 2. Correct $\overline{DC8(1)}$ wiring.
Verify the AK Indicator is lit.	Replace Test Set.

CHART R

OFOI lamp at OIT is not lit

CHECK	CORRECTIVE ACTION
Verify a logical "0" appears at 2B7-4(B21)	See Chart RA.
Verify a logical "0" appears at 2B5-35(B21)	Correct 10(OFO) wiring.
Verify a logical "0" appears at 2B5-201(B21)	Replace JW126(2B5).
Verify a logical "0" appears at terminal 09 of C t.s.	Correct OFO local wiring.
Verify relay OFO operates in the Outputter.	1. Correct OFO wiring to Outputter. 2. Correct Outputter functions.
Verify relay OFOD operates and lamp OFOI lights at OIT.	Correct OIT functions.

CHART RA

OFFO output (OF0=0) is absent at JW131

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B7-30(B21)	See Chart RB.
Verify a logical "1" appears at 2B7-32(B21)	Correct LOF wiring.
Verify a logical "1" appears at 2B7-103(B21)	Correct SC11 wiring.
Verify a logical "1" appears at 2B7-21(B21)	Correct MC34 wiring.
Verify the A, B, C, D traces of Chart P are obtained at: A 2B7-208 B 2B7-207 C 2B7-215 D 2B7-206	Correct A, B, C, D wiring.
Verify logical "1"'s appear at 2B7-102,105,106(B21) when the JW148 reset key is operated.	Correct RST wiring.
Verify a logical "0" appears at 2B7-4(B21)	Replace JW131.

CHART RB

Transmission Enable (EN-1) is absent at JW131

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2A13-28(B15)	Replace JW136.
Verify a logical "1" appears at 2B10-13(B3)	Correct AK wiring.
Verify a logical "1" appears at 2B10-12(B3)	Correct MC34 wiring.
Verify a logical "1" appears at 2B10-6(B3)	Replace JW132.
Verify a logical "1" appears at 2B7-30(B21)	Correct EN wiring.

CHART RC

Thousands lamps (TH4,TH7,THK) are not lit at OIT

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B7-12(B21)	Correct LTH wiring.
Verify logical "0"'s appear at 2B7-6,7(B21)	Replace JW131.
Verify logical "0"'s appear at 2B1-23,22(B21)	Correct 21(TH7), 22(TH4) wiring.
Verify logical "0"'s appear at 2B1-10,9(B21)	Replace JW126(2B1).
Verify logical "0"'s appear at terminals 30, 40 of C t.s.	Correct TH7,TH4 local wiring.
Verify relays TH7,TH4,THK operates in the Outputpulser.	1. Correct TH7,TH4 wiring to Outputpulser. 2. Correct Outputpulser Functions.
Verify lamps TH7,TH4,THK light at OIT.	Correct OIT function.

CHART RD

Hundred lamps (H0,H1,HK) are not lit at OIT

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B7-17(B21)	Correct LH wiring.
Verify logical "0"'s appear at 2B7-203,20(B21)	Replace JW131.
Verify logical "0"'s appear at 2B3-30,29(B21)	Correct 14(H1), 15(H0) wiring.
Verify logical "0"'s appear at 2B3-7,6(B21)	Replace JW126(2B3).
Verify logical "0"'s appear at terminals 01,11 of C t.s.	Correct H0,H1 local wiring.
Verify relays H0,H1,HK operate in the Outputpulser.	1. Correct H0,H1 wiring to Outputpulser. 2. Correct Outputpulser functions.
Verify lamps H0,H1,HK light at OIT.	Correct OIT function.

CHART RE

Tens Lamps (T0,T2,TK) are not lit at OIT

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B7-16(B21)	Correct LT wiring.
Verify logical "0"'s appear at 2B7-211,209(B21)	Replace JW131.
Verify logical "0"'s appear at 2B3-210,35(B21)	Correct 18(T2),20(T0) wiring.
Verify logical "0"'s appear at 2B3-19,201(B21)	Replace JW126(2B3).
Verify logical "0"'s appear at terminals 02,22 of C t.s.	Correct T0,T2 local wiring.
Verify relays T0,T2,TK operate in the Outputpulser.	1. Correct T0,T2,TK wiring to Outputpulser. 2. Correct Outputpulser function.
Verify lamps T0,T2,TK light at OIT.	Correct OIT functions.

CHART RF

Unit Lamps (U1,U2,UK) are not lit at OIT

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 2B7-11(B21)	Correct LU wiring.
Verify ground is standing at 2B7-27(B21)	Correct ground strap.
Verify logical "0"'s appear at 2B7-214,40(B21)	Replace JW131.
Verify logical "0"'s appear at 2B1-210,211(B21)	Correct 28(U2),29(U1) wiring.
Verify logical "0"'s appear at 2B1-19,20(B21)	Replace JW126(2B1).
Verify logical "0"'s appear at terminal 13,23 of C t.s.	Correct U1,U2 local wiring.
Verify relays U1,U2,UK operate in the Outputpulsers.	1. Correct U1,U2,UK wiring to Outputpulsers. 2. Correct Outputpulser function.
Verify lamps U1,U2,UK light at OIT.	Correct OIT functions.

CHART T

ID-ON 0 or 1 indicator does not light

CHECK	CORRECTIVE ACTION
Verify ground appears at 2B10-2,3(B3)	Correct Output Seizure Indications to identifier on leads ST and TP.
Verify a logical "1" appears at 2B10-7,14(B3)	Replace JW132.

CHART TA

TPA, TPB, TPC relays do not operate

CHECK	CORRECTIVE ACTION
Verify a logical "1" appears at 1. 2B14-103(B25) 2. 2B14-106,25(B25)	1. Correct OND wiring to JW148. 2. Correct TP17 wiring to JW132.
Verify a logical "1" appears at 2B14-11(B25)	Replace JW138.
Verify a logical "1" appears at 2B12-12,14,15(B4)	Correct OTP wiring to JW138.
Verify a logical "0" appears at 2B12-6(B4)	1. Verify a ground is present at 2B12-7. 2. Replace JW133.
Verify TPA, TPB, TPC relays are operated.	1. Verify ground appears at U terminal of TPA, TPB, TPC. 2. Verify -48V is standing at L terminal of TPA, TPB, TPC. 3. Replace relay(s) TPA, TPB and/or TPC.

CHART TB

ITP lamp on OIT does not light

CHECK	CORRECTIVE ACTION
Verify the ITP lamp lights at the OIT.	1. Check ground application to TP lead (see B4). 2. Check wiring to OIT and lamp at OIT.

CHART TC

TPK indicator does not light

CHECK	CORRECTIVE ACTION
Verify a ground appears at 2B12-16(B4)	Check ground via operated TST(2-5) relays and operated TPA, TPB, TPC relays as shown on B4.
Verify a logical "1" appears at 2B12-206(B4)	Replace JW133.
Verify a logical "1" appears at 1. 1B16-203(B28B) for Identifier 0 2. 1B16-204(B28B) for Identifier 1	Correct TPK(-) wiring.
TPK indicator is lit.	Replace Identifier Test Set.

CHART TD

ST indicator is not lit

CHECK	CORRECTIVE ACTION
Verify 2B12-207(B4) remains at a logical "0".	Check for false ring party seizure using Chart F.
Verify a logical "1" appears at 1B7-16(B23)	Correct TPK(-) wiring.
Verify a logical "1" appears at 1B7-2(B23)	Replace JW148.

CHART U

Multiparty Indications

CHECK	CORRECTIVE ACTION
Verify OFF display a digit 0 and MEM B, MEM A display 1's.	See Chart UA.
Verify the COS displays a digit 1	See Chart UB.
Verify the PTY lamp lights at the OIT.	See Chart UC
Verify TH-, H-, T-, U- digits are not displayed at OIT and that OFO and PTY lamps are lit. NOTE: The ANI-B test set will display all digits except the TH-digit.	See Chart UD.
Verify the 1AF register is <u>not</u> pegged.	See Chart UE

CHART UA

OFF does not display a 0 digit

CHECK	CORRECTIVE ACTION
Using channel 2 of this oscilloscope at 1A14-20(8B) verify a pulse occur during the expanded pulser of OFA, OFB, OFO Office scans. The OFA pulse is shorter.	<ol style="list-style-type: none"> 1. At OIT verify key PTy is operated. 2. Replace JW122(1A14) 3. Correct ONP4, OPP4 leads to OIT. 4. See Chart KJ
Verify the above scope trace occur at 2A13-35(B15).	Correct PTYA wiring.
Verify the above scope trace occur at 2A13-36(B15)	Replace JW136.
Verify the above scope trace occur at 2A8-19(B14)	Correct PTYAE wiring.
Verify a pulse equal to the expanded pulse occurs at 2A8-213(B14) for scans OFA, OFB, OFO.	Correct MC34 wiring

CHART UA (Cont'd)

CHECK	CORRECTIVE ACTION
Verify the inversion of the above pulse occurs at 2A8-206(B19)	Replace JW139 or JW139B.
Verify the OFF display contains a digit 0.	Replace JW130

CHART UB

COS display is not a digit 1

CHECK	CORRECTIVE ACTION
Verify an pulse occur during the extended pulse of OF0 at 2A8-204(B14)	Replace JW139 or JW139B.
Verify the above pulse occurs at 2A12-203(B17).	Correct PTY-OUT wiring.
Verify the COS displays a digit 1.	Replace JW135.

CHART UC

PTY lamp at OIT is not lit.

CHECK	CORRECTIVE ACTION
Verify a pulse occurs during the extended pulse of OF0 at 2A8-204(B14) option XP or 2A8-212(B14) option ZS.	Replace JW139.
Verify the above pulse occurs at 2B7-1(B21).	Correct TOLL-PTY (ZS option) or PTY-OUT (ZP option) wiring.
Verify a logical "0" occur at 2B7-25(B21) during the extended pulse of OF0 and remains low.	Replace JW131
Verify the above logical "0" occur at 2B5-22(B21).	Correct lead 2 (PTY) wiring.
Verify the above logical "0" occur at 2B5-9(B21).	Replace JW126.
Verify lamp PTY lights at OIT.	1. Check PTY wiring to OIT. 2. Check PTY lamp.

CHART UD

TH-, H-, T-, U- digits are incorrectly displayed at OIT

CHECK	CORRECTIVE ACTION
Verify a pulse occurs during the extended pulse of OFO at 2A8-212(B14)	Replace JW139 or JW139B
Verify the above pulse occurs at 2B10-9(B3)	Correct TOLL PTY wiring.
Verify a dot pulse occurs during the above pulse at 2B10-10(B3).	Correct LTH wiring.
Verify the TH-, H-, T-, U- digits are not displayed at OIT.	Replace JW132.

CHART UE

1AF register is incorrectly pegged

CHECK	CORRECTIVE ACTION
Verify a pulse occurs during the extended pulse of OFO at 2A13-102(B15).	Correct TOLL-PTY wiring.
Verify a dot pulse does not occur during extended pulse of OFO at 2A13-31(B15).	Replace JW136.

CHART W

S0 lamp at OIT is not lit

CHECK	CORRECTIVE ACTION
Verify a pulse occurs during the extended pulse of OFO at 1A14-36(B13).	<ol style="list-style-type: none"> 1. At OIT verify key S0 is operated. 2. Replace JW122(1A14) 3. Correct NS0, PSO wiring to OIT via contacts of relay TST2. 4. See Chart KJ
Verify the above pulse occurs at 2B7-22(B21).	Replace JW131.
Verify a logical "0" occurs at 2B7-26(B21) during the extended pulse of OFO and remains low.	Replace JW131.
Verify the above logical "0" occurs at 2B5-23(B21)	Correct lead 1 (S0) wiring
Verify the above logical "0" occurs at 2B5-10(B21).	Replace JW126.
Verify lamp S0 lights at OIT.	<ol style="list-style-type: none"> 1. Check S0 wiring to OIT. 2. Check S0 lamp.