Installation Engineering Handbook 61
Western Electric Company, Incorporated
Columbus Works

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ORIGINATING MARKER TEST

Replaces: Section 172
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CONTENTS

1. GENERAL INFORMATION

1.1 Description of Test

1.1 Sections 172 to 172.8 describe a method of testing:

(1) Originating Marker Circuit - SD-25016-01
(2) Miscellaneous Circuit for Originating Marker Frame - SD-25054-01

The originating trouble indicator frame is used for testing all features and wiring of the originating markers that are accessible to the trouble indicator.

The marker under test may be made busy to all equipment except the trouble indicator by inserting a 322A make-busy plug into its DB jack.

1.12 Lamps on the trouble indicator are used to check the operation of the marker. When testing a particular feature of the marker, it is necessary to observe only those lamps associated with the feature under test and the lamps that indicate whether or not the call is completed successfully. Other lighted lamps may be disregarded at that time.

1.13 The wiring and functions of the Originating Marker Circuit associated with the Originating Sender Test, the Marker Connector, the District Link and the Zone Registration Circuits, which are not covered by this method, are tested in connection with associated circuits.

1.2 Test Procedure

1.21 Before starting the tests described in these sections, check the route relay strapping for crosses and verify that each route relay is associated with the proper ground supply. Also, with the proper class of service relay operated, verify that only one route relay operates when its associated RC punching is grounded.

1.22 Some tests, such as the check of fuses, contact protection installed on the job, channel selection test, time measure, etc., can be made early in the test interval. The markers should be conditioned to handle district junctor test calls using all district link frames before the remaining tests are performed.

1.221 Insulate ground from the district junctor test line sleeve while checking the district junctor test route relays in order to complete test calls using the trouble indicator.

2. RECORDS AND REQUIREMENTS

2.1 Records: Forms SD-4-1313, SD-4-1315 and SD-4-1334 are required for recording the results of these tests.

2.2 Requirements: The tests of Sections 172 to 172.8 must be applied to meet the performance requirements per BSP 816-007-181.

3. TEST EQUIPMENT

3.1 Test Sets Required

Amt	ITE	Description
1	4033B	Link Frame Test Set

3.2 Cords Required

Amt	Cord or ITE	Lgth	Cdrs	One End	Other End	With ITE
1	9422	12'	1	2455 Plug	2461 Plug	4033B
1	9598	12'	2	310 Plug	310 Plug	4033B
1	9627	12'	3	508A Key	310 Plugs	4023
2	9984	12'	10	Jones P312 CCT Socket	10-ITE-2461 Plugs	4033B

3.3 Accessories Required

Amt	Code	Description	With ITE
As Req	322A, 349A 351C	Make Busy Plugs	4023
2	ITE-4042	Hand Set Telephone	4023
1	ITE-8253	Contact Protection Test Set	
As Req	ITE-4069	Blocking Tool - Multicontact Relay	4023
As Req	ITE-4085	Push On Clips	4023
1	R-9572	Test Receiver	4023
1	R-3314	Stop Watch	4023

4. SETTING UP TEST CALLS

NOTE: The Laboratories, in the process of modifying the Originating Trouble Indicator (OTI), has replaced many jacks and/or keys with correspondingly designated keys and/or switches respectively. Therefore, the office under test may be so arranged that many of the jacks and/or keys, mentioned in this section, may actually be keys and/or switches respectively. If a key or switch is equipped instead of a jack or key, setting the key or switch to the position corresponding to the jack or key designation will satisfy the requirements of this test section.

4.01 Key the number of the code point to be called by operating an A code key (A) 2-9, a B code key (B) 0-9 and a C code key (C) 0-9.

4.02 If the code to be called has the prefix "one-one" (prefix for codes of offices in extended area) operate key EA.

4.03 Set the proper class of service indication for the code to be called by operating class of service keys as follows:

4.031 Key (CS) 1-6 to set up classes 1-6. (Sender CS (0-5) relay.)

4.032 Key (CS) 1-6 and key SG to set up classes 8-13.

4.033 Keys (CS) 1-6 and key SGR to set up classes A1-A6.

4.034 Keys (CS) 1-6, SGR and SG to set up classes A8-A13.

4.035 Key (CS) 8 to set up class 7 simulating a call from K.P. "A" switchboard sender.

4.036 Key NM to set up a class simulating a call from K.P. "A" switchboard sender requiring no marker functions (calls routed over a direct trunk from "A" board through two-wire office selector). This class of call should be made from district link frame 0.

4.037 Where a route relay is not connected through a class of service (S) relay, any CS key may be operated to originate a call.

4.04 Operate a district frame numerical key to transmit the number of the district frame to the marker. District frame keys (F) 0-9 correspond to district frames 0 to 9 respectively. With key F10 operated keys (F) 0-9 correspond to district frames 10 to 19 respectively.

4.05 If the code keyed, as described in Paragraph 4.01 requires a zone charge condition, it is necessary to operate one of the ten zone charge keys ZA to ZJ as provided, (or ZOF) to simulate the proper zone charge condition to the marker and prevent it from blocking.

4.06 Key GS1 is operated for ground supply 2 and keys GS3 and AR for ground supply 4.

4.07 Operate the DT key associated with the marker to be tested.

4.08 After operating the keys described in the preceding paragraphs momentarily operate the ST key to start the test.

4.09 The EC lamp lights as a signal the test is completed and the test circuit has disconnected from the marker.

4.091 Operate the LP key to light the indicator lamps displaying a record of the information taken from the marker. The LP key may be operated in advance to light the indicator lamps while the record is being taken.

4.092 Lamps DR and DL associated with the marker under test light when a test call is made. The DL lamp of any other marker that summoned the trouble indicator while it is busy will light indicating the marker that failed without a record being taken.

4.093 When there are two groups of markers, the G0 or G100 lamp lights indicating the group of the marker under test.

4.10 Momentarily operate the RL key to restore the trouble indicator circuit to normal.

4.11 Other keys such as OF, TP, ZO, PS, etc., are operated to test certain functions of the marker. The operation of these keys is covered in the detailed tests of these methods.

4.12 Where conditions permit, all or any number of originating markers may be checked for the same feature without changing the trouble indicator setup. This is done by operating the DT keys in turn and then originating calls, leaving other keys as they were.

4.13 F Jacks are provided at all marker, district link and office link frames for use with an ITE-9627 cord to originate and release calls as set up at the trouble indicator.

4.131 This feature may be used to observe the operation of the circuits at these frames or for the purpose of verifying certain features, as for example, the group start and group end cross-connections by observing the operation of the TG relays of the marker.

4.132 In case features are verified in this manner, instead of observing lamps as specified in other paragraphs of this method, it will be found that starting and releasing a call several times will facilitate checking the relays that operate.

5. LAMP INDICATIONS

NOTE: The following lamps are listed in the general order they appear on the trouble indicator lamp panel reading from top to bottom. Refer to specific tests in other 172 Sections for lamps which are not listed.

LAMP DESIGNATION	LAMP INDICATION
2L	Indicates operated 2-line entry relay (AMA).
3DT0-3	Indicates the number of the 3-digit translator used in the decoder portion of the marker usage.
7DG	Indicates information transmitted to the sender by the originating marker on calls in which 7 digits are dialed and MF outpulsing from an auxiliary sender is required.
A,0,1,2,4,5 B,0,1,2,4,5 C,0,1,2,4,5	These lamps indicate the number of the office code received by the originating marker from the sender. When there are more than one of these lamps lighted for any one digit, the numbers are added to determine the digit number.
D,0,1,2,4,8	These lamps indicate the class of service as received from the senders. There are various arrangements used in the sender with lamp indications as shown in class of service tables.
	The D1 to D4 leads when not grounded, in the sender; are connected to the CK3 lead in all cases. If the marker should block in the code check part of the decoder stage all the A,B,C,D,F,AR,OF,PD1 and TP leads may be indicated as grounded.
F,0,1,2,4,5,10	Indicates the district link frame number received by the originating marker from the sender. The numbers of the lighted lamps are added to obtain the district link frame number.
A C	These lamps are controlled by the front contacts on the A and C relays in the originating marker circuit and either one or both lighted indicates a trouble condition.
AK	Indicates that the AK lead from the district link and connector circuit has been grounded.
(A,B,C) BK	Lamps provided for marker speed-up as an indication of the office and district links are operating correctly. The A, B and/or C linkages have not encountered an open, a cross or a false ground condition.

LAMP DESIGNATION	LAMP INDICATION
AN	Indicates that the AN relay in the originating marker is operated to route calls to an announcement trunk on an overflow indication from the sender.
ANI	Indicates an automatic number identification type call.
AR	Indicates that an alternate route was requested by the sender. This lamp is also lighted on third trial calls.
B	Indicates that the B relay in the originating marker is operated. Unless trouble is encountered, this relay is shunted down by the release of the F relay in the district junctor circuit.
BK	Indicates that the district link and connector circuit has grounded the BK lead and that the CK and BK relays are operated in the originating marker circuit.
BM	Indicates that at least one or all jacks associated with markers involved in a bridged markers test contain a 329A plug when the ST key is operated.
CC,0,1,2,4,7	These lamps are used on a two-out-of-five basis to indicate the compressed code leads grounded to the translator selector part of the originating marker when code compression and 6-digit translation is provided. They are also used in conjunction with the EA and LA leads to indicate access code information to the marker. More than two CC- lamps lighted, or any CC- lamps lighted with lamp EC also lighted, are trouble indications.
CF,0-9	Indicates the frame on which the originating marker connector circuit is located. There is one of these lamps for each originating marker connector frame in one group. Where there is more than one group of originating marker connector frames, the same numbered relays and lamps are used for like-numbered connector frames in both groups.
CH, L0 to L9 and CH,R0 to R9	Indicates the channel selection relay operated in the decoder marker, the district link secondary switch and the office link primary switch.
CHE	Indicates that the BK, CK and CHE relays are operated in the originating marker circuit and that the CH channel selection relays in the originating marker are released.
CK	Indicates that the CK lead has been grounded by the office link and connector circuit and that the CK relay is operated in the originating marker circuit.
CKG	Indicates that a sender is connected.
CL,1,2,3,4,5	These lamps indicate the class information transmitted to the sende by the originating marker circuit for the particular code received by the originating marker from the sender.
CN,0-2	Indicates the originating marker connector on a particular frame. One per originating marker connector per one frame.
CR,1,2,3,4,5,6,7	These lamps indicate the compensating resistance information transmitted to the sender by the originating marker circuit for the particular code received by the originating marker from the sender.
CRL	All channels busy.
DF,0-19	Indicates the district link and connector frame number as translated by the originating marker from the information received from the sender.

LAMP DESIGNATION	LAMP INDICATION
DL	Indicates the originating markers that failed and were released without a record being taken while the trouble indicator was busy. There is one of these lamps for each originating marker served by the trouble indicator.
DK	Indicates that the DK lead to the district link and connector circuit is grounded.
DR	Indicates the originating marker circuit from which the record was taken. There is one of these lamps for each originating marker in one group of originating markers. When there are two groups, the same lamps are used for like-numbered circuits in both groups.
DT3	Trunk selected by the marker was also seized by a panel selector before it could be made busy.
EA LA	The EA lamp indicates that the EA lead is grounded to the originating marker and the LA lamp indicates that the LA lead is grounded. These leads may be used as follows: (a) to indicate a code in either the extended or local area when the prefix "1-1" is used to reach a single adjacent numbering plan area, and (b) together with the PD1 lead, these leads are used as steering leads when the associated originating marker circuits are arranged for registration of both compressed codes and access codes.
EC	Indicates that the marker has released; lights on test calls only.
G.0-11	Indicates the trunk subgroup relay operated in the originating marker. These lamps directly indicate the trunk subgroup for trunk groups divided into four or more subgroups. For trunk groups divided into two or three subgroups, any even number indicates the 0 group and any odd number indicates the 1 group.
EXBG	Indicates a battery or ground condition (depending on the position of the EXBG key) on the extra lead maintenance test punching EXBG, in the originating marker.
G100 G0 Decoder Group	Indicates the group of the originating marker from which the record was taken. These two lamps are only furnished when there are two groups of originating marker circuits.
GS 1-4	Indicates trunk group start failure to match. Indicates the route relay ground supply (GS) relays operated in the originating marker.
GT1	Indicates the trunk subgroup advance relay operated in the originating marker when the trunk group is divided into exactly two subgroups.
JC 0 to 19	Indicates the JC lead that had been grounded by the originating marker to operate a JC relay in the associated district link and connector circuit. The JC relay, which the JC lamp identifies, must be determined with reference to the cross-connection information.
K EL0 to EL9 K OL0 to OL9 K ER0 to ER9 K OR0 to OR9	These lamps indicate the outgoing trunk selection relay that is operated in the originating marker circuit and, from this indication, the office link primary switch level and the office link secondary switch can be determined. For example, any 0 lamp indicates the 0 office primary switch level and the 0 office secondary switch. There are 40 of these lamps, one for each similarly designated relay in the originating marker circuit.

LAMP DESIGNATION	LAMP INDICATION
K4	Indicates a satisfactory check by the originating marker of the information received from the sender by the A, D, F, AR, OF, TP and PD1 receiving relays, and that the CK4 relay is operated in the originating marker circuit.
K5	Indicates a satisfactory check by the originating marker of the information received by the B and C receiving relays, and that the CK5 relay is operated in the originating marker.
M, 0 to 9	The M lamp that is lighted indicates the select magnet operated on the district primary switch and, therefore, the district link primary switch level.
M1,0,1,2,4,7 MIN	Indicates the AMA message index transmitting leads grounded in the marker.
MIA to MIH MIJ, MICK and MPPS	Indicates AMA transmitting relays operated in the marker.
MR	Indicates that the MR relay is operated in the originating marker and, therefore, a satisfactory check of the "MR" lead to the district junctor circuit.
MR1	Message register lead open towards the district junctor circuit.
MRL	Indicates that the MRL relay in the originating marker is operated and that trouble was encountered by the originating marker circuit which prevented it from returning to normal.
MS	Indicates that the originating marker has released the sender and advanced to the marker stage.
NC1	Indicates NC1 operated in the marker for a no-charge condition.
NM	Indicates a keypulsing test call which does not require marker functions in the originating marker.
NSE	Indicates that the NSE relay is operated in the originating marker circuit (nonsplit even-office frame).
NSO	Indicates that the NSO relay is operated in the originating marker circuit (nonsplit odd-office frame).
OB,1,2,4,5	These lamps indicate the office brush information transmitted to the sender by the originating marker circuit for the particular code received by the originating marker from the sender.
OBT	Indicates that the OBT relay is operated in the originating marker circuit for "high-five" incoming group when the preroute relay is provided.
ODN	Indicates information transmitted to the sender by the originating marker on calls on which MF outpulsing of the calling number from an auxiliary sender is required.
OF	Indicates that an overflow trunk was requested by the sender.
OF, 0 to 9	Indicates the number of the office link and connector frame relay operated in the originating marker. Each lamp represents a pair of odd- and even-numbered frames and, if an even-numbered trunk lamp, Fig 13 is lighted, the even-frame of the pair is the one on which the trunk is located. If an odd-numbered trunk lamp is lighted, the trunk is located on the odd frame of the pair.

LAMP DESIGNATION	LAMP INDICATION
OG,1,2,4,5	These lamps indicate the office group information transmitted to the sender by the originating marker circuit for the particular code received by the originating marker from the sender.
OT	Indicates operator talking lead closed.
OT1	Operator talking relay.
P, 0 to 13	Indicates the correspondingly designated pattern relays that are operated in the originating marker.
PD1	Indicates that the PD1 lead to the originating marker is grounded for prefix-digit "1" information in connection with the code-compression and access-code features.
PTK	Indicates that the originating marker has transmitted tip party information to the outgoing automatic number identification trunk over the S1 lead.
PS1	Indicates relay PS1 operated in the marker for a permanent-signal call.
RL	This lamp is lighted only for test calls, and indicates that the RL lead of the originating marker is grounded, thereby transmitting a sender-release signal.
RO	Reorder signal to an operator as a result of a denied code having been transmitted to the originating marker by a key-pulsing sender. Where the senders and markers are arranged to disconnect from the district junctor without setting up a connection to the out trunk with all trunks busy, the RO lead is used to release the sender on first or second trials. Failure of the sender to respond to this signal will result in an RO lamp.
RP1	Ring party relay.
S	Indicates that the S lead from the office link and connector circuit is grounded by the operation of the select magnet on the office secondary switch and that the S relay in the originating marker circuit should be operated.
SD	These lamps indicate the station delay information transmitted to the sender by the originating marker circuit for the particular code received by the originating marker from the sender.
SGR	Indicates SGR lead grounded to originating marker for class-of-service information.
S1K	Indicates that the S1 lead of the outgoing trunk circuit has been grounded by the operation of the office secondary switch and that the S relay has operated in the originating marker circuit.
SK,2-3	Indicates information transmitted to the sender by the originating marker on calls in which MF outpulsing is required and either two or three of the dialed digits are skipped in outpulsing.
SL	Indicates that the SL lead from the district link and connector circuit is grounded by the operation of the district primary switch select magnet and that the SL relay in the originating marker should be operated.
SPE	Indicates that the SPE relay in the originating marker circuit is operated. Split even-office frame.

LAMP DESIGNATION	LAMP INDICATION
SPO	Indicates that the SPO relay is operated in the originating marker circuit. Split odd-office frame.
SNO-9	Indicates the sender is an originating marker connector group. One lamp per sender, per originating marker connector circuit.
SO	Indicates that the marker has grounded the SO lead to indicate that the route contains no office selector. Skip office.
SR	Indicates that the sender release checking circuit is closed to operate the SR relay and release the sender.
SWO to 9	The SW lamp lighted indicates the district link primary switch and district link secondary switch level. Together with M they indicate the number of the district junctor circuit on the district frame. The M lamps indicate the units digit of the district junctor circuit number and the SW lamps the tens digit. For example, if the M5 and the SW8 lamps are lighted, it would indicate: District Primary Switch Level - -5 District Primary Switch and District Secondary Switch Level - -8 District Junctor Circuit - -85 These indications are taken directly from the district link and connector circuit connected to the originating marker at the time the record is taken.
SW10,11	The SW lamp lighted indicates the district link primary switch and, together with the M lamp, indicates the district junctor circuit which is located on the auxiliary district junctor frame. In a full office with 20 regular district frames, switch No. 10 represents junctor subgroups on auxiliary district junctor frame 0 and 1 while switch No. 11 represents junctor subgroups on auxiliary district junctor frames 2 and 3. The regular district frame number (units digit) agrees with the junctor subgroup on the auxiliary frame. Primary district links are common to existing links in an orderly distributed pattern for best usage.
TB5	All trunks busy.
TC	Talking charge test relay operated.
TC1	Indicates TC1 relay operated to indicate the talking charge condition.
TCK	Talking charge and operator talking checking relay.
TDVK	Indicates that the TDVK relay in the originating marker is operated which operates in series with TDVK in the sender for the toll diversion feature.
TK	Indicates that the sender release checking circuit is closed through the transmitting relays to operate the TK relay in the originating marker circuit.
TK1	Indicates that the sender release checking circuit through the route auxiliary and transmitting relay associated with MF outpulsing and automatic number identification is closed through. Also indicates if no route auxiliary or transmitting relays operate when the relay associated with these features remained normal.

LAMP DESIGNATION	LAMP INDICATION
TKE	Indicates that the TKE relay in the originating marker is operated. This relay operated if all the trunk selection relays are released before an idle trunk is selected, and later releases. Therefore, this lamp will only light in case the marker fails and then blocks with its TKE relay operated.
TLO to 14	Indicates the outgoing trunk level relay operated in the originating marker.
TM6	Indicates operation of marker TM6 relay after time-out.
TP	Indicates a tip party call.
TP1	Tip party relay.
TP2	Tip party class test relay.
TPK	Tip party checking relay.
TRL	Indicates momentary ground on the TRL lead.
TW	For two-wire office route.
NOTE: The following lamps indicate which trouble relays are operated in the marker circuit. These relays are operated and block the marker from completing the call when the leads they test are falsely grounded or crossed.	
SDT	Indicates a falsely grounded ST or SDT lead of the sender test circuit connector circuit.
XC	Shows XC relay normal.
XCH	Indicates a false ground on the S or LS leads to the district link and connector circuit or on the LS leads to the office link and connector circuit.
XCL	Indicates that two windings of the CL transmitting relay are energized.
XCR	Indicates that two windings of the CR transmitting relay are energized.
XDC	Indicates a falsely grounded or crossed DC lead.
XDF1	Indicates a crossed contact on a marker DF relay.
XDK	Indicates a falsely grounded DK or DK1 lead.
XGE	Indicates a cross or a false ground on the GE leads which will cause two or more TG OLO to OL9 or TG ORO to OR9 relays to operate.
XGS	Indicates a cross or a false ground on the GS leads which will cause two or more TG ELO to EL9 or TG ERO to ER9 relays to operate.
XK	Indicates a false ground on the NS, SP or CK leads to the office link and connector circuit or on the BK lead to the district link and connector circuit.
XLCE	Indicates a falsely grounded LC lead to the even-office link and connector circuit.
XLCO	Indicates a falsely grounded LC lead to the odd-office link and connector circuit.
XLG	Indicates a ground cross on one of the register relay locking leads. The trouble indicator is made busy to all markers and cannot be started for marker tests until the trouble has been cleared.

LAMP DESIGNATION	LAMP INDICATION
XOB	Indicates that two windings of the OB transmitting relay are energized.
XOF	Indicates that the windings of two or more office frame relays in the originating marker are energized due to a cross or false ground on the OK leads to the office link and connector circuit.
XOG	Indicates that two windings of the OG transmitting relay are energized.
XRL	Indicates a false ground on the RL or TRL leads of the originating marker. Relay XRL opens the circuit to the XDF1 lamp because the marker XRL locks DF- which operates XDF1.
XS	Indicates a false ground on the S lead to the outgoing trunk that was selected by the originating marker.
XS1	Indicates a falsely grounded S1 lead to the office link and connector circuit.
XSB	Indicates that two windings of the SB transmitting relay are energized.
SXG or XO5	Indicates that two windings of the SG transmitting relay are energized.
XSL	Indicates a false ground on the SL lead to the district link and connector circuit.
XTD	Indicates a false ground on the TDV transmitting lead in the originating marker.
XSM	Indicates a false grounded or crossed SML or SMR lead to the office link and connector circuit.
XSM1	Indicates two primary select magnets energized on the district frame.
XSS	Indicates that two or more SS relays are operated in the office link and connector circuit.
XT	Indicates that one or more transmitting leads to the sender are falsely grounded.
XTC	Indicates a false ground on the TP, TC or OT lead.
XTL	Indicates that more than one trunk relay is operated in the originating marker causing XTL relay of the marker to operate and block the call.
XTL1	Indicates falsely grounded TL lead to the office link and connector circuit.
XTOV	Indicates a false ground on lead TOV to the originating marker.
XX1	Indicates the operation of the master XX1 relay in the originating marker circuit.
XZ	Indicates a falsely grounded zone charge lead.
XZS	Indicates the operation of more than one of the charge KP1, TC1 or OT1 relays.
Z	Zone charge test relay.
ZA1 to ZJ1	Zone charge relays.
ZK	Zone charge check lead.
ZL	Zone charge locking lead.

LAMP DESIGNATION	LAMP INDICATION
ZO	Zone charge overflow lead.
ZR	The originating marker CIA relay operates a relay designated T1 in the zone registration common control circuit. The T1 relay closes the ZR leads, to operate the ZR relay of Fig. 27. The ZR relay has an associated lamp which indicates which one of ten zone registration circuits was selected by the zone registration common control circuit.
ZS	The marker has grounded lead ZS as a zone start signal.
ZCK	Zone charge check relay.

6. LAMP VERIFICATION

6.1 Lamps at the trouble indicator normally not lighted on the marker tests should be verified by manual operations as indicated below.

6.11 Block operated relays CIA and CIE of the marker under test. Relay CIA operated, operates relay CIB, CIC, CID and CIF2. Relay CIE operates CIG. Block nonoperated the XX2 relay of marker.

6.12 Block operated relays LP and LP1 of the trouble indicator to connect battery for lighting the lamps at the trouble indicator. Block nonoperated the KR relay of the trouble indicator.

6.13 On the test of all but one marker block normal relays GD and GD1 of the trouble indicator. Check the hold paths of the progress relays in the trouble indicator by blocking operated the GD and GD1 relays on the test of one marker. Remove blocks when test is completed.

LAMP	OPERATIONS
GT1	Ground T Wdg. (GT1)
GT3	" " " (GT3)
*CRL	" " " (CRL)
TKE	" " " (TKE)
CHE	" " " (CHE)
*DT3	" " " (DT3)
¢C	Operate (C), (AC1) and 9 and 10T (ST1)
B	Operate (B) and GRD. 2T (AK1)
SL	Ground T Wdg. (SL)
S	" " " (S)
SIK	Momentarily operate (SIK)
BK	Ground T Wdg. (BK)
CK	" " " (CK)
RP1	Ground 10T (ST5)
SR	Ground 10B (SR)
MRL	Ground T Wdg. (MRL)
CKG	Ground 6T (CK1)
*TB5	Ground T Wdg. (TB5)
TCK	" " " (TCK)
TPK	" " " (TPK)
ZCK	" " " (ZCK)
ZL	" " " (ZL)
ZO	" " " (ZO)
TP1	" 1T " (TP)
TP	" T " (TP)
AR	" " " (AR)
OF	" " " (OF)
*RO	Fig. D Ground 2T (OF1)
*RO	Fig. C Ground T Wdg. (KP1)
NC1	Ground 1T (NC1)
TK	" T Wdg. (TK)
EA	" " " (EAR)
LA	" " " (LAR)
SGR	" " " (SGR)
MICK	" 6T " (MICK)

¢ Marker probably will time out and connect to trouble indicator unless time out relays are blocked.

* Lamps may remain lighted.

No Changes Indicated Due
To Extensive Revision

Manager, Crossbar Product Engineering
Control Center

Reason for Reissue:
1. Make corrections and clarifications.
2. Make a general revision to update to current engineering standards.