TTI

TTI - TROUBLE ANALYSIS

TTI - LAMP INFO

TERM. MARKER - RELAY DESIG.

5-6200 - 6225 JUMP HUNT TO 5-6250-6254

RELAY DESIGNATIONS - FUNCTIONAL MEANING AND ORIENTATION

TERMINATING MARKER CIRCUIT SD-25283-01

AB-0 to 9	B/38-44	- "A" and "B" Linkage (Channel Busy Test)
AL	B/97	- Allotter
AL-1	B/100	- "
AL-2	B/101	- "
ALA	D/93	- " (A Group of Lines)
ALB	B/94	- " (B " " ")
ALW	D/96	- " (W)(-Allotter Stepping Circuit
ALZ	D/97	- " (Z) " " "
BA	D/42	- Battery "A" Trunk (Incoming Link)
BB	E/18	- Busy Back
BBA	E/137	- Busy Back Auxiliary (Line Overflow Register)
BC	E/40	- Battery "C" Trunk (Line Link)
BC-1	D/43	- " " "
BLK	D/139	- Blank (Number)
BR-1	B/137	- Busy Register (Cuts in Line Overflow Register)
BR-2	C/137	- " " (" " " " ")
CA-0 to 10	E/71-72	- Control "A" Half-choice
CB-0 to 9	E/72-73	- Control "B" Half-choice NOTE: The CA and CB relays are operated due to closure of the NC leads. The designation "C" is evidently used to correspond with "NC" meaning number control.
CBR	E/121	- Connector Busy
CBS	G/121	- " "
CCT	H/45	- Cancel Continuity Test
CH-0 to 9	A/39-44	- Channel (Lockout)
CK-1 to 9	J/34-F/9-12	- Check (Leads to Mkr.)
CN	H/39	- Coin
CNL	H/42	- Coin Lines
CNL-1	J/22	- " "
CNL-2	H/21	- " "
CON	F/44	- Continuity (T and R)
CON-1 to 3	G/40-44	- "
DA-1 & 2	D/121	- Decoder Alarm
DB	D/120	- Decoder Busy
DL	D/54	- Delay (Causes Call to Use Another Mkr.)
DL-1	C/54	- "
EH	B/82	- Even Hold (Magnets on Even Line Link Frames)
ESM	H/160	- Emergency Select Magnets
EXA	H/60	- Extra (Numbers) A (Relay)
EXB	I/59	- " (") B (")
EXC	H/59	- " (") C (")

RELAY DESIGNATIONS - FUNCTIONAL MEANING AND ORIENTATION

TERMINATING MARKER CIRCUIT SD-25289-01

AB-0 to 9	B\38-4μ	- "A" and "B" Linkage (Channel Busy Test)
AL	B\97	- Allotter
AL-1	B\100	- "
AL-2	B\101	- "
ALA	D\93	- " (A Group of Lines)
ALB	B\94	- " (B " " ")
ALW	D\96	- " (W)(-Allotter Stepping Circuit
ALZ	D\97	- " (Z) " " "
BA	D\42	- Battery "A" Trunk (Incoming Link)
BB	E\18	- Busy Back
BBA	E\137	- Busy Back Auxiliary (Line Overflow Register)
BC	E\40	- Battery "C" Trunk (Line Link)
BC-1	D\43	- " " "
BLK	D\139	- Blank (Number)
BR-1	B\137	- Busy Register (Outs in Line Overflow Register)
BR-2	C\137	- " " (" " " " ")
CA-0 to 10	B\172-173	- Control "A" Half-choice
CB-0 to 9	E\172-173	- Control "B" Half-choice
		NOTE: The CA and CB relays are operated due to closure of the NC leads. The designation "C" is evidently used to correspond with "NC" meaning number control.
CBR	E\121	- Connector Busy
CBS	G\121	- " "
CCT	H\45	- Cancel Continuity Test
CH-0 to 9	A\39-4μ	- Channel (Lockout)
CK-1 to 9	1\34-F\9-12	- Check (Leads to Mtr.)
CN	H\39	- Coin
CNL	H\42	- Coin Lines
CNL-1	1\22	- " "
CNL-2	H\21	- " "
CON	F\44	- Continuity (T and R)
CON-1 to 3	0\40-4μ	- "
DA-1 & 2	D\121	- Decoder Alarm
DB	D\120	- Decoder Busy
DL	D\54	- Delay (Causes Call to Use Another Mtr.)
DL-1	C\54	- "
EH	B\82	- Even Hold (Magnets on Even Line Link Frames)
ESM	H\160	- Emergency Select Magnets
EXA	H\60	- Extra (Numbers) A (Relay)
EXB	I\59	- " (") B (")
EXC	H\59	- " (") C (")

F-1	A/4	- Frame (Incoming Link)
F-2	A/5	- " (Incoming Link)
F-4	A/5	- " (" ")
F-5	A/6	- " (" ")
F-10	H/149	- " (" ")
F-10'	B/8	- " (" ")
FCG	G/45	- False Charge Guard
FL	E/100	- Free Lines
FS	G/154	- Full Selector
FH-0 to 9, 0' to 9'	B/87	- Five Hundreds
FH (0X-2X)	B/87	- " " (X Numbers)
FHB-0 to 9 & 0' to 9'	B/87	- " "
GC	D/42	- Ground "C" Trunk
GC-1	D/43	- " " "
GJ	D/41	- Ground Junctor
GLH	F/45	- Ground Line Hold (Magnet)
GLH-1	F/46	- " " " (")
GT, GT1	I/41-H/72	- Ground test (Line T or R)
GT2	I/39	- " " (Proper Ringing Lead)
H-1,2,4,5,5'	D/4-5-C/9-10	- Hundreds (Register)
HCA	H/80	- Half-choice "A"
HCB	H/78	- " " "B"
HF	B/71	- Hunt 'Intermediate Line) Frame (Line Choice)
HG	G/46	- Hold (Magnet) Guard (If sleeve lead is open routes call to intercept)
HF 1-4-5	B 51	
HMT	I/46	- Hold Magnet Timing
HMT-1	C/45	- " " "
HN-0 to 4	C/87	- Hundreds
HP-0 to 8	G & I/94-100	- Hunt Progress
HPE	D/98	- Hunt Progress End
HT-0 to 19	F/31-35	- Hunt
HTR	G/44	- Heavy Traffic
H6	D/155	- Hundreds - Six (Line Overload Control)
HNS	D/154	- Hundreds Number Sleeve
IK	H/49	- Incoming Check (Inc. Link Connected)
IK-1	H/48	- " "
IN	C/17	- Intercept
INA	B/74	- Intercept Auxiliary
INB	B/78	- Intercept B (Aux.)
INC	C/74	- " C (Aux.)
IP	1/73	- Inc. Physical
IPT	1/73	- " " & Theoretical
IT	1/74	- " Theoretical
JA-0 to 9	J/80-81	- Junctors "A" Half-choice
JB	B/108	- Junctor Busy (Meaning No-Test Junctor)
JB-0 to 9	J/78-80	- Junctors "B" Half-choice
JC-0,2,4,6,8	E/87	- Jump Hunt Control
JC-10,12,14,16,18	G/87	- Jump Hunt Control
JF-0 to 4	H &I/87	- Jump Hunt Frame
JGA to JGE	D/64-67	- Junctor Groups "A" to "E"
JHA	G/90	- Jump Hunt
JHB	H/89	- " "
JP-0 to 8	A/47	- Junctor Pattern
JPN	A/48	- Junctor Pattern Normal

F-1	A/4	- Frame (Incoming Link)
F-2	A/5	- " (Incoming Link)
F-4	A/5	- " (" ")
F-5	A/6	- " (" ")
F-10	H/149	- " (" ")
F-10'	B/8	- " (" ")
FCG	G/45	- False Charge Guard
FL	E/100	- Free Lines
FS	G/154	- Full Selector
FH-0 to 9, 0' to 9'	B/87	- Five Hundreds
FH (OX-2X)	B/87	- " " (X Numbers)
FHB-0 to 9 & 0' to 9'	B/87	- " "
GC	D/42	- Ground "C" Trunk
GC-1	D/43	- " " "
GJ	D/41	- Ground Junctor
GLH	F/45	- Ground Line Hold (Magnet)
GLH-1	F/46	- " " " (")
GT, GT1	I/41-H/72	- Ground test (Line T or R)
GT2	I/39	- " " (Proper Ringing Lead)
H-1,2,4,5,5'	D/4-5-G/9-10	- Hundreds (Register)
HCA	H/80	- Half-choice "A"
HCB	H/78	- " " "B"
HF	B/71	- Hunt 'Intermediate Line) Frame (Line Choice)
HG	G/46	- Hold (Magnet) Guard (If sleeve lead is open routes call to intercept)
HMT	I/46	- Hold Magnet Timing
HMT-1	G/45	- " " "
HN-0 to 4	G/87	- Hundreds
HP-0 to 8	G & I/94-100	- Hunt Progress
HPE	D/98	- Hunt Progress End
HT-0 to 19	F/31-35	- Hunt
HTR	G/44	- Heavy Traffic
H6	D/155	- Hundreds - Six (Line Overload Control)
HNS	D/154	- Hundreds Number Sleeve
IK	H/49	- Incoming Check (Inc. Link Connected)
IK-1	H/48	- " "
IN	G/17	- Intercept
INA	B/74	- Intercept Auxiliary
INB	B/78	- Intercept B (Aux.)
INC	G/74	- " C (Aux.)
IP	1/73	- Inc. Physical
IPT	1/73	- " " & Theoretical
IT	1/74	- " Theoretical
JA-0 to 9	J/80-81	- Junctors "A" Half-choice
JB	B/108	- Junctor Busy (Meaning No-Test Junctor)
JB-0 to 9	J/78-80	- Junctors "B" Half-choice
JC-0,2,4,6,8	E/87	- Jump Hunt Control
JC-10,12,14,16,18	G/87	- Jump Hunt Control
JF-0 to 4	H &I/87	- Jump Hunt Frame
JGA to JGE	D/64-67	- Junctor Groups "A" to "E"
JHA	G/90	- Jump Hunt
JHB	H/89	- " "
JP-0 to 8	A/47	- Junctor Pattern
JPN	A/48	- Junctor Pattern Normal

L-0 to 19	D/31/35	- Line
LB-0 to 3	C/30-34	- Line Busy
LBK	C/35	- Line Busy Check
LBKI	C/35	- " " " Aux.
LC-0 to 19	D-E/78	- Line Choice
LCA	A/121	- Line Choice Auxiliary
LCB	B/121	- " " "
LCT	F/47	- Link Cut Through (Simulates Function Of LC relay in inc. link used only on test calls)
LE	A/76	- Line End
LE-1 to 6	E-F/31-34D-E/79	" "
LF-0 to 9	C-D/106	- LL Test for Pos. Batt. (N.T.)
LFA	E/105	- " " " " "
LFB	C/105	- " " " " "
LG-A to D	D/81-83	- Line Group (Control Leads Closed)
LIL	H/80	- Left Incoming Links
LIN	B/18	- Local Intercept
LK	J/49	- Line Choice Check (Connected)
LKO	F/106	- Lockout (One mkr. at a time on spl. calls)
LL-0 to 9	C/38-43	- Line Link (Busy Test)
LLB	J/3	-LL Relay Battery
LLG-A to D	E/74-77	- Line Link Group
LOG-A to D	D/74-77	- Lockout Line Link Group
LTI	B/21	- Local Trouble Intercept
LTR	H/43	- Light Traffic
MAN	G/155	- Manual
MK-0 & 1	F/39	- Mate Check (Inc. Link)
MT	A/60	- Marker Test
MT-1 & 4	G/47-48	- Marker Test
MT-2 & 3	I/63	- " "
MT-5 & 6	A/32-34	- " "
NAL	B/98	- Non-allot
NC	H/115	- Number Checking
NC-1 to 16	C/109-F/116	- " "
NCA to NCD	H/113-118	- " "
NCF	I/115	- Number Check Failure
NCP	J/26	- Number Checking Preference
NCS	J/26	- Number Check (Lead) Simulation
NNX	I/60	- No. Nothing Cross
NCT	C/107	- No. Checking Timing
NFL	E/99	- Non-free Lines
NH	D/107	- No Hunt
NHA	I/106	- No Hunt
NHX	I/60	- " " X Number
NK	J/48	- Number Group Check
NK-1	J/47	- " " "
NN	I/106	- No NT, NC or NH
NT	D/106	- No Test
NT-1	F/106	- " "
NTB	I/107	- No Test Busy (Timing)
NTH	C/107	- No Test Hold Mag. Operating Cct.
NTR	H/110	- No Test Release (Of Mkr.)
NTT	H/109	- No Test Train (Busy Line)
NTX	I/60	- No test X Number

L-0 to L9	D\31\35	- Line
LB-0 to 3	C\30-3\4	- Line Busy
LBK	C\35	- Line Busy Check
LBKI	C\35	- " " " Aux.
LC-0 to L9	D-E\78	- Line Choice
LCA	A\121	- Line Choice Auxiliary
LCB	B\121	- " " "
LCT	F\47	- Link Out Through (Simulates Function Of LC relay in inc. link used only on test calls)
LE	A\76	- Line End
LE-1 to 6	E-F\31-3\4D-E\79	- " "
LF-0 to 9	C-D\106	- LL Test for Pos. Batt. (N.T.)
LFA	E\105	- " " " " " "
LFB	C\105	- " " " " " "
LG-A to D	D\81-83	- Line Group (Control Leads Closed)
LLL	H\80	- Left Incoming Links
LLN	B\18	- Local Intercept
LK	1\49	- Line Choice Check (Connected)
LKO	F\106	- Lockout (One mkr. at a time on spl. calls)
LL-0 to 9	C\38-43	- Line Link (Busy Test)
LLB	1\3	-LL Relay Battery
LLG-A to D	E\71-77	- Line Link Group
LOG-A to D	D\71-77	- Lockout Line Link Group
LTI	B\21	- Local Trouble Intercept
LTR	H\43	- Light Traffic
MAN	G\125	- Manual
MK-0 & 1	F\39	- Mate Check (Inc. Link)
MT	A\60	- Marker Test
MT-1 & 4	G\47-48	- Marker Test
MT-2 & 3	I\63	- " "
MT-5 & 6	A\32-34	- " "
NAL	B\98	- Non-allot
NC	H\115	- Number Checking
NC-1 to 16	C\109-F\116	- " "
NCA to NCD	H\113-118	- " "
NCF	I\115	- Number Check Failure
NCP	1\26	- Number Checking Preference
NCS	1\26	- Number Check (Lead) Simulation
NHX	I\60	- No. Nothing Cross
NCT	C\107	- No. Checking Timing
NFL	E\99	- Non-free Lines
NH	D\107	- No Hunt
NHA	I\106	- No Hunt
NHX	I\60	- " " X Number
NK	1\48	- Number Group Check
NK-1	1\47	- " " "
NN	I\106	- No NT, NC or NH
NT	D\106	- No Test
NT-1	F\106	- " "
NTB	I\107	- No Test Busy (Timing)
NTH	G\107	- No Test Hold Mag. Operating Ort.
NTR	H\110	- No Test Release (Of Mkr.)
NTT	H\109	- No Test Train (Busy Line)
NTX	I\60	- No test X Number

OA	I/142	- Office A
OB	I/145	- " B
OAB	I/146	- " AB (Operated for unit B)
OFB	G/69	- Office B - Overflow
OF	F/17	- Overflow
OF-1	H/22	- "
OFT	H/16	- Overflow Termination (Routes all calls for NBR Groups and line choices with plugs in TMB, JKS to overflow)
OH	B/83	- Odd Hold (Magnets on Odd Line Link Frame)
OK	I/117	- Number Check OK
OR	G/21	- Overflow Release
OVA to OVE	F/64-68	- Overflow Junctors "A" to "E"
P	B/149	- Physical
PG	J/29	- Progress (TB) Group
PG1	J/106	- Progress Aux. (On Number Check Calls)
PGT	D/46	- Progress Group Test of Channels
PJ	B/152	- Peremptory Jack (Line Overload Control)
PN	E/150	- Physical Numbers
PTN	E/150	- Physical and Theoretical Numbers
PU	H/40	- Plugging Up
PU-1 & 2	H/41-J/43	- " "
RC	G/18	- Ringing Control
RC-1	G/17	- " "
REG	E/49	- Register (For percentage of channels busy)
RF	B/71	- Ring (Party Frame (Line Choice)
RIL	H/83	- Right Incoming Links
RLT	E/48	- Release Timing
RO	H/5	- Reorder
RP	J/18	- Ring Party
RP-1	J/18	- " "
RT	F/63	- Retest of Junctor Groups
RTA to RTE	F/64-68	- "
RTA to RTE'	E/64-68	- "
RV	J/20	- Reverse (T and R for Ringing)
RV-1	I/19	- "
S-0 to 19	F/30-35	- Sleeve (Busy Test)
SDT	A/132	- Sender Test
SDT-1	F/132	- " "
SG	J/33	- Sleeve Guard
SGA	B/75	- Sleeve Guard Auxiliary
SH-0 to 19	H/54	- Split Hundreds
SIN	B/17	- Start Intercept
SL	G/44	- Sleeve (Inc.)
SL-1	F/43	- "
SMG	C/41	- Select Magnet Ground
SPA	H/106	- Special Aux. (Delays start of NC call to allow release of X6-1-4 in NBR group*
SPL	F/107	- Special (Class of Call)
SRL	G/22	- Special Release

OA	I/142	- Office A
OB	I/145	- " B
OAB	I/146	- " AB (Operated for unit B)
OFB	G/69	- Office B - Overflow
OF	F/17	- Overflow
OF-1	H/22	- "
OFT	H/16	- Overflow Termination (Routes all calls for NBR Groups and line choices with plugs in TMB, JKS to overflow)
OH	B/83	- Odd Hold (Magnets on Odd Line Link Frame)
OK	I/117	- Number Check OK
OR	G/21	- Overflow Release
OVA to OVE	F/64-68	- Overflow Junctors "A" to "E"
P	B/149	- Physical
PG	J/29	- Progress (TB) Group
PG1	J/106	- Progress Aux. (On Number Check Calls)
PGT	D/46	- Progress Group Test of Channels
PJ	B/152	- Peremptory Jack (Line Overload Control)
PN	E/150	- Physical Numbers
PTN	E/150	- Physical and Theoretical Numbers
PU	H/40	- Plugging Up
PU-1 & 2	H/41-J/43	- " "
RC	G/18	- Ringing Control
RC-1	G/17	- " "
REG	E/49	- Register (For percentage of channels busy)
RF	B/71	- Ring (Party Frame (Line Choice)
RIL	H/83	- Right Incoming Links
RLT	E/48	- Release Timing
RO	H/5	- Reorder
RP	J/18	- Ring Party
RP-1	J/18	- " "
RT	F/63	- Retest of Junctor Groups
RTA to RTE	F/64-68	- "
RTA to RTE'	E/64-68	- "
RV	J/20	- Reverse (T and R for Ringing)
RV-1	I/19	- "
S-0 to 19	F/30-35	- Sleeve (Busy Test)
SDT	A/132	- Sender Test
SDT-1	F/132	- " "
SG	J/33	- Sleeve Guard
SGA	B/75	- Sleeve Guard Auxiliary
SH-0 to 19	H/54	- Split Hundreds
SIN	B/17	- Start Intercept
SL	G/44	- Sleeve (Inc.)
SL-1	F/43	- "
SMG	C/41	- Select Magnet Ground
SPA	H/106	- Special Aux. (Delays start of NC call to allow release of X6-1-4 in NRR group*
SPL	F/107	- Special (Class of Call)
SRL	G/22	- Special Release

T	B/150	- Theoretical
T-1, 2, 4, 5,	E/6-8	- Tens (Register)
TB-0 to 4	A/90	- Twenty Block
TBK	F/29	- Twenty Block Check
TBW	K/31	- Twenty Block Winding
TC	E/151	- Tone Control (BB and OFL)
	J/151	
TC-1	J/16	- Tone Control
TE	H/71	- Trunk End (Channel)
TEV	B/161	- Tens Even
TF	B/73	- Tip (Party) Frame (Line Choice)
TH-1,2,4,8	C/4-7	- Thousands (Register)
TIA to TIF	F/127-129	- Trouble Indicator
TIB	F/129	- Trouble Indicator Busy
TIN	B/20	- Toll Intercept
TK	D/49	- Trunk Check
TKT	D/47	- Timing Channel Test
TLH	F/42	- Time Line Hold (Operate Ground 2nd Trial)
TLT	J/31	- Time Line Test (Of 20 Lines)
TM-1 to 10	D/53-61	- Time Measure
TMB	D/55	- Trouble Make Busy
TMBL	H/16	- Terminal Mkr. Busy Line (Choice Conn.)
TMBN	H/16	- " " " Number (Group Conn.)
TML-1 & 2	D/58-59	- Time Measure Late
TMS-1 & 2	D/60-61	- Time Measure Start
TMW	E/57	- Time Measure (W)
TMZ	E/56	- Time Measure (Z)
TN	E/149	- Theoretical Numbers (Line Overload Control)
TNS	D/153	- Tens Number Sleeve
TOD	C/162	- Tens Odd
TOK	I/118	- Toll Operator Check
TOL	G/156	- Toll (Trks.)
TOL-1	G/19	- "
TR	A/58	- Trouble Release
TR-1 to 3	G/160	- Trial (Second)
TRO	H/17	- Trouble Reorder (On TTl Trouble)
TROl	D/55	- " " Aux. " "
TTl	B/22	- Toll Trouble Intercept
TTIB	C/58	- Terminating Trouble Indicator Busy
U-1,2,4,5,	B/161-163	- Units (Register)
Ul',2', 4', 5'	E/154-155	- Units Reg. (For Line Overload Control)
UT	F.93	- Units Transfer
X	I/4	- Cross (Detecting)
XC	D/71	- Cross (C) Control Leads
XC-1	D/71	- " " "
XF	C/73	- Cross Frame
XF-1-2-3	D/70-C/73-74	- " "
XFC	J/2	- Cross FC Lead
XFCl	J/2	- " " "
XHB	I/88	- Cross Hundred Block
XHG	F/49	- Cross Horizontal Group
XHG-1	F/49	- " " "
XJC	H/88	- Cross Jump Hunt Control
XIN	J/31	- Cross Intercept
XL	J/31	- Cross L Relays

T	B\J50	- Theoretical
T-1, 2, 4, 5,	E\6-8	- Tens (Register)
TB-0 to 4	A\P0	- Twenty Block
TBK	F\29	- Twenty Block Check
TBW	K\31	- Twenty Block Winding
TC	E\J51	- Tone Control (BB and OPL)
	J\J51	
TC-1	J\J6	- Tone Control
TE	H\J1	- Trunk End (Channel)
TEV	B\J61	- Tens Even
TF	B\J3	- Tip (Party) Frame (Line Choice)
TH-1, 2, 4, 8	C\M-7	- Thousands (Register)
TIA to TIF	F\J27-J29	- Trouble Indicator
TIB	F\J29	- Trouble Indicator Busy
TIN	B\20	- Toll Intercept
TK	D\M9	- Trunk Check
TKT	D\M7	- Timing Channel Test
TLH	F\M2	- Time Line Hold (Operate Ground 2nd Trial)
TLT	J\31	- Time Line Test (Of 20 Lines)
TM-1 to 10	D\53-61	- Time Measure
TMB	D\55	- Trouble Make Busy
TMBL	H\J6	- Terminal Mtr. Busy Line (Choice Conn.)
TMBN	H\J6	- " " " Number (Group Conn.)
TML-1 & 2	D\58-59	- Time Measure Late
TMS-1 & 2	D\60-61	- Time Measure Start
TMW	E\57	- Time Measure (W)
TMZ	E\56	- Time Measure (Z)
TN	E\J49	- Theoretical Numbers (Line Overload Control)
TNS	D\J53	- Tens Number Sleeve
TOD	C\J62	- Tens Odd
TOK	I\J18	- Toll Operator Check
TOL	G\J56	- Toll (Trks.)
TOL-1	G\J9	- "
TR	A\58	- Trouble Release
TR-1 to 3	G\J60	- Trial (Second)
TRO	H\J7	- Trouble Recorder (On TTL Trouble)
TROL	D\55	- " " Aux. " "
TTL	B\22	- Toll Trouble Intercept
TTLB	C\58	- Terminating Trouble Indicator Busy
U-1, 2, 4, 5,	B\J61-J63	- Units (Register)
UL', 2', 4', 5'	E\J54-J55	- Units Reg. (For Line Overload Control)
UT	F.93	- Units Transfer
X	I\4	- Cross (Detecting)
XC	D\J1	- Cross (C) Control Leads
XC-1	D\J1	- " " "
XF	C\J3	- Cross Frame
XF-1-2-3	D\J0-C\J3-J4	- " "
XFC	J\2	- Cross FC Lead
XFC1	J\2	- " " "
XHB	I\B8	- Cross Hundred Block
XHG	F\M9	- Cross Horizontal Group
XHG-1	F\M9	- " " "
XJC	H\88	- Cross Jump Hunt Control
XIN	J\31	- Cross Intercept
XL	J\31	- Cross L Relays

XOB	I/5	- Cross Overflow or Busy Back
XP	G/49	- Cross Pattern
XR	I/4	Cross Ringing Control Leads
XRL	E/58	- Cross Release Lead
XS	J/30	- Cross Sleeve
XSM	D/38	- Cross Select Magnet
XT	D/39	- Cross Test
XT-1 to 4	6/132-134	- " " (Under Control of a Plug & Jack)
XTB	E/95	- Cross Twenty Block Leads
XTB-1	E/96	- Cross Twenty Block Leads
XTL	J/93	- Cross Twenty Block Line Leads
XPS1	H/69	- Cross Pri. Sel. Aux.
XS1-2-3-4-5	J/28-29 H/31-32	Crossed Sleeve Lead Aux.
XTMB	H/16	- Crossed (TMB) Leads
XHB1	6/88	- Crossed HB (Lead) Aux.
YB	D/139	- Aux. Busy (Back)
Z	1/114	- (No circuit function. For adj. (NC) relay)
ZB	B/154	- Aux. (Line Overload Control)

XOB	I\5	- Cross Overflow or Busy Back
XP	G\49	- Cross Pattern
XR	I\4	Cross Ringing Control Leads
XRL	E\58	- Cross Release Lead
XS	1\30	- Cross Sleeve
XSM	D\38	- Cross Select Magnet
XT	D\39	- Cross Test
XT-J to 4	6\J32-J3J	- " " (Under Control of a Plug & Jack)
XTB	E\95	- Cross Twenty Block Leads
XTB-J	E\96	- Cross Twenty Block Leads
XTL	1\93	- Cross Twenty Block Line Leads
XPSI	H\69	- Cross Pri. Sel. Aux.
XSI-2-3-4-5	1\28-29 H\31-32	Crossed Sleeve Lead Aux.
XTMB	H\J6	- Crossed (TMB) Leads
XHBJ	6\88	- Crossed HB (Lead) Aux.
YB	D\J39	- Aux. Busy (Back)
Z	I\JJ4	- (No circuit function. For adj. (NC) relay)
ZH	B\J54	- Aux. (Line Overload Control)

TERMINATING TROUBLE INDICATOR ALARM ROUTINE NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers the method of reading the information displayed by the indicating lamps on the terminating trouble indicator frame.

1.02 The purpose of the terminating trouble indicator is to point as nearly as is practicable, to the source of trouble that interfered with the completion of a connection. The terminating trouble indicator is used in case the marker cannot complete its normal function of setting up a connection between an incoming frame and called line. It is also used in case of false grounds on certain leads. When the terminating trouble indicator is used to make manual tests of the terminating marker, the lamp indications provide a means of checking the operation of the marker.

1.03 The indicator lamp panel is arranged to display the following:

(a) Number dialed.

(b) The first or second trial by the sender.

(c) The number of the particular marker from which a record has been taken.

(d) The marker connector frame, the marker connector position on the frame and the sender position in the connector.

(e) The incoming link frames, the trunk level and the trunk group (switch number) on the frames.

(f) The number group connector frames.

(g) The line choice connector frames.

(h) The line link frames.

(i) The progress lamps.

(j) Various cross detecting lamps.

(k) Class lamps.

1.04 The progress lamps as shown in tables 1, 2 and 3, are arranged so as to follow the natural sequence of operative functions of the various features involved when setting up a call. While it is possible for two troubles to occur simultaneously, this condition is unlikely, therefore but one trouble is considered when analyzing the record taken by the indicator, otherwise the information received would not point to the source of trouble with any degree of accuracy.

2. METHOD

2.01 If, in response to a minor intermittent or major alarm, a lighted TI lamp on the terminating trouble indicator frame is found, operate the LP key and obtain a record of the trouble being indicated by the lamps listed in 2.03.

Note: An accurate record of the trouble should be obtained since in some cases it may be necessary to have records of repeated indications in order to locate the trouble.

2.02 Restore the LP key and momentarily operate the RL key to restore the trouble indicator to normal.

Caution: Release the trouble indicator as soon as possible, since a second trouble indicator record cannot be obtained as long as the trouble indicator is busy. If a marker attempts to seize the trouble indicator while it is busy, the major alarm is sounded.

2.03 The various lamps associated with the trouble indicator circuit appearing on the terminating trouble indicator frame are listed below with the general information to be obtained from each lamp. There are other lamps such as those associated with the connector alarms appearing on this frame, which are described in other B.S.P. Sections. It should be noted that the progress lamps do not necessarily remain lighted beyond the stage the particular lamp indicates, so that a lamp being extinguished may also indicate still further progress especially in conjunction with simultaneously lighted lamps, or the following progress lamps. Certain of these lamps light on a satisfactory condition, hence a failure would result in the failure of the particular lamp to light. These lamp designations are listed below and on tables 1, 2 and 3 in the order as determined by the location on the frame starting at the top and going from left to right on each row. This arrangement of lamps is also intended to correspond with the progress of the call-through the marker. It is necessary in general to analyze these lamp indications collectively in order to obtain a trouble indication.

DR 0-9	Indicates the marker circuit from which the record was taken.
DL 0-9	Indicates the markers that failed and were released without a trouble indicator

record being taken, because the trouble indicator was busy. There is one of these lamps for each marker served by the trouble indicator.

CF 0-4 — Indicate the marker connector frame on which the marker connector circuit is located.

CN 0-3 — Indicate the particular marker connector on the connector frame. There is one of these lamps for each marker connector circuit on any one frame.

SN 0-4 — Indicate the sender in a marker connector group. There is one of these lamps for each sender associated with any one marker connector circuit.

TH, 0, 1, 2, 4, 8)
H, 0, 1, 2, 4, 5)
T, 0, 1, 2, 4, 5)
U, 0, 1, 2, 4, 5) — These lamps indicate digits of the called number received by the marker circuit from the sender. Where there are more than one of these lamps lighted for any one digit, the n mbers are added to determine the digit number.

F, 0, 1, 2, 4, 5, 10) — Indicate the incoming link and connector frame number received by the marker from the sender. The number of the lamps lighted are added to obtain the incoming link and connector frame number, but if lamps (F) 1 and 4 are both lighted, this indicates connection with a local Number Checking Trunk Circuit.

TR2 — Indicates that a failure occurred when the marker was making a second trial.

RO — Indicates that a reorder call was requested by the sender.

NGC 0-24 — Indicates the number group connector circuit.

HB 0-24 — Indicate the hundreds block lead grounded by the marker.

HP 0-8 — Indicate the hunt-progress relays operated in the marker circuit. From this indication the twenty block relay lead that was grounded by the marker can be obtained. The 0, 2, 4, 6 and 8 lamps indicate the 0, 1, 2, 3, and 4 twenty block leads, respectively.

L 0-19 — Indicate the individual line relay that was operated in the marker circuit.

JF 0-4 — Indicate the twenty block to which hunting was jumped.

JC 0, 2, 4, 6, 8, 10, 12, 14, 16, 18 — Indicate the operation of similarly designated relays in the marker which determine the terminal in a twenty block at which hunting will start in the twenty block to which hunting is jumped.

AL1)
AL2) — Indicate the position of allotter relays in the marker

LCF 0-19 — Indicate the line choice connector frame number. There is one of these lamps for each line choice connector frame.

LLG A-D — Indicate the line link group in the line choice.

LOG — Indicates that originating traffic was locked out of the line link group in which the called line is located.

HF, TF, RF — Indicate whether the line is a P.B.X., tip party or a ring party line.

CA 0-9)
CB 0-9) — Indicate the line link subgroup relay operated in the marker. From this indication the half choice and the line link horizontal group is obtained.

IF 0-19 — Indicate the incoming link and connector frame to which the marker is connected. There is one of these lamps for each incoming link and connector frame. There will be no IF lamp indication when connection is made to the local number checking trunk circuit. This circuit is indicated only by the F1 and F4 lamps being both lighted.

LC 0-9
M 0-9 — The LC lamp that is lighted indicates the LC relay operated in the incoming link and connector circuit and, therefore, the incoming primary switch. The M lamp that is lighted indicates the select magnet operated on the incoming link primary switch and, therefore, the primary switch level. Together these lamps indicate the number of the incoming trunk circuit. The M lamp indicates the units digit of the incoming trunk circuit number and the LC lamp indicates the tens digit. For example, if the M5 and LC8 lamps are lighted it would indicate:

Incoming primary switch level - 5.
Incoming primary switch - 8
Incoming trunk circuit - 85

(GR) LAMP SD 25036-011 FIG. 10

These indications are taken directly from the incoming link and connector circuit that was connected to the marker at the time the record was taken.

CH 0-9	Indicate the channel selection relay operated in the marker, and from this indication the incoming secondary switch, or the line link secondary switch can be obtained.
LJ 0-9	Indicate the line junctor relay operated in the connector circuit. The vertical on the line link secondary switch is also indicated by these lamps.
JPN) JP 0-8)	Indicate the junctor pattern relays operated in the marker circuit.
JG A-E	Indicate the line junctor group relay operated in the marker circuit.
MK0 and MK1	Indicate the operation of similarly designated relays in the marker circuit. These relays in the marker circuit are controlled by the incoming secondary switch select magnet lockout and throw-over circuit when mate frames are used.
RC	Ringing control.) Indicating
RV	Ringing reverse.) the ringing
RP	Ringing polarity.) combina-
TC	Tone control.) tion set up in the incoming trunks.
LIN	Local intercept.) Indicates
LTI	Local trouble) that the intercept.) call was
TIN	Toll intercept.) re-routed
TTI	Toll trouble) to inter- intercept.) cept.
OF	Overflow - All channels busy
BB	Busy back - Subscribers line busy
SPL	Special) Class lamps
NC	Number check.) indicating
NT	No test.) information
NH	No hunt.) given to
NTT	No test train.) marker by
FS	Full selector.) the incoming
MAN	Manual.) trunks.
TOL	Toll.)
CN	Class lamp indicating that a call is being set-up to coin line.
GS	Ground sleeve test used on a number check test call.
CKG, K1,) K2, K3)	These lamps indicate that numerical registration check leads are satisfactory.
TBK	Indicates that path to TB relay in Number Group Connector is closed.
LE	When lighted, indicates that LO-19 relay in Marker has not yet operated.
FC	Indicates closure of path to operate F relay in incoming trunk.
AK	Indicates operation of LC relay in incoming link and connector.
TK	Indicates closure of check lead through TB, LJ and HG relays of connector frames.
L1L, R1L	Indicate that correspondingly designated relays in the marker have operated.
TE	When operated, indicates that CH0-9 relay in marker has not yet operated for channel selection.
BC	Indicates that channel linkages have been tested and are available.
GJ	Indicates that an attempt was made to operate secondary line link and secondary incoming link hold magnets.
SL	Indicates that primary and secondary incoming hold magnets are operated.
GC	Indicates that secondary line link hold magnet is operated.
GLH	Indicates that an attempt was made to operate a primary line link hold magnet.
CON	Indicates that satisfactory check was made that primary line link hold magnet was operated.
GTZ	No false ground on tip or ring and ringing control relays operated OK.
RL	Indicates that release signal was given to sender.
PG	Indicates an attempt to advance from one junctor retest group to the next junctor retest group.
FL	Free line.
NFL	No free line.
AL	Allotter.
NAL	No allotter.
LTR) HTR)	Indicate that the corresponding relays in the terminating marker circuit are operated. LTR for light traffic and HTR for heavy traffic.
SDT	Indicates that the sender test class relay was operated in the marker circuit.
TCT	Indicates that the current flow test of the CON relay is not yet completed.
TRL	Indicates that the TRL lead is grounded.
FCG	Indicates a grounded tip, battery on the ring or a cross between tip and ring.

X	Indicates operation of marker X relay usually in combination with other cross detecting relays.
XFC	Indicates a false ground on FC lead.
XC	Indicates a false ground or cross to ground on HGA-D or NC leads.
XHG	Indicates that more than one HG relay in the line link was operated.
XIN	Indicates false ground on winding of LIN, TIN, LTI or TTI relays in marker.
XOB	Indicates a false ground on winding of BB or OF relays.
XR	Indicates a false ground on TC or RC ringing control leads.
XRL	Indicates a crossed or grounded release or trouble release lead.
XS	Indicates a crossed or grounded subscribers line sleeve lead.
XSM	Indicates crossed or grounded primary line link select magnet lead.
XTI	Indicates false ground on leads tested by manual test feature.
XTB	Indicates that more than one TB relay was operated.
XTL	Indicates a false ground or cross on a TB lead.
XL	Indicates a false ground on a winding of a marker L relay.
XP	Indicates that more than one JP relay was operated.
XF	Indicates more than one marker LC relay winding is energized.

2.04 Of the above listed lamps the progress lamps shown in Tables 1, 2 and 3 should be considered of primary importance since they indicate points at which the call was blocked. Table 3 is supplementary to Table 2 because it includes indicating lamps which give valuable information concerning the progress of the call between the stages indicated by the lamps of Table 2.

2.05 After the progress lamps have been referred to, information regarding the sender, marker connector, connector frames and important relays in the marker including cross detecting relays should be obtained from the other lamps on the indicator panel.

2.06 The descriptions accompanying indications 1 to 29 in Tables 1, 2 and 3 give general information which illustrate the method of determining the probable causes of trouble. No attempt is made to cover all possible causes of trouble but merely to give representative cases.

2.07 In those cases where more than one indicating lamp is lighted it must first be determined which is true and which false since the false indication generally points directly to the trouble. The true indication may be determined by reference to the records which give the location and cross connection information for the called line identified by the number registered.

Example (± indicates lighted lamp)

		LLG				CA	CB	TH	H	T	U
X	XC	A	B	C	D	4	7	1	2	3	4
±	±		±	±	±	±		±	±	±	±

This lamp display indicates a falsely grounded NC lead. It is assumed that number 1234 is assigned to horizontal group 7 of a line link group D of a line choice otherwise identified. Hence LLGD and CB7 are the true indications of the number called and LLGB and CA4 are false indications. Hence the trouble is probably introduced at the HGB field, #4 multiple strip or some NC punching connected to that strip on the same Block Relay frame as the registered number.

2.08 The above example was given because troubles of that type have a very serious effect on terminating traffic.

2.09 Whenever a cross detecting lamp is lighted it indicates a cross on the leads associated with the lamp as described in the list above. The various frames which are responsible for the trouble indication may also be obtained from lighted lamps. If the cross is between two contacts on a connector relay so that a lead going to one marker is permanently connected to a lead within one of the connector circuits, the trouble indication may give misleading information pointing to a wrong relay. It may also occur very infrequently since to bring in a trouble indication it may be necessary to have the marker in trouble serving a call thru a connector not associated with the trouble and at the same time another marker must be serving a call thru the connector in trouble. Under this condition both markers may attempt to seize the trouble indicator. However, only one would seize it and regardless of which marker left a trouble indication it would not indicate the connector relay in trouble. The indicator may show either the wrong marker or the wrong connector, hence from analysis the wrong connector relay. The second marker in attempting to seize the trouble indicator would light a DL - lamp. Repeated records showing two markers and one connector and the one cross indication, would show one particular marker in each indication but possibly several connectors. Hence it may be necessary to inspect all connector relays associated with the marker reported on each trouble indication on all connector frames for crosses to the leads indicated.

3. REPORTS

3.01 The required record for these alarms should be entered on the proper form.

TABLE I

Progress Lamps

	TH					H					T					U					F					TR2	RO	CKG	K1	K2	K3
	0	1	2	4	8	0	1	2	4	5	0	1	2	4	5	0	1	2	4	5	0	1	2	4	5						
1.			±					±					±					±					±						-	-	-	-
2.		-	±	±	±		±	±	±	±		±	±	±	±		±	±	±	±		±	±	±	±	±	±	+	-	-	-
3.		±	±	±	±		-	±	±	±		±	±	±	±		±	±	±	±		±	±	±	±	±	±	+	-	-	-
4.		±	±	±	±		±	±	±	±		-	±	±	±		±	±	±	±		±	±	±	±	±	±	+	-	-	-
5.		±	±	±	±		±	±	±	±		±	±	±	±		-	±	±	±		±	±	±	±	±	±	+	-	-	-
6.		±	±	±	±		±	±	±	±		±	±	±	±		±	±	±	±		-	±	±	±	±	±	+	-	-	-
7.		-	±	±	±		±	±	±	±		±	±	±	±		-	±	-	-		±	±	±	±	±	±	+	-	-	-
8.		±	±	-	-		±	±	±	±		-	±	-	-		±	±	±	±		±	±	±	±	±	±	+	-	-	-
9.		±	±	±	±		-	±	-	-		±	±	±	±		±	±	±	±		±	±	±	±	±	±	+	-	-	-
10.		±	+					+					+				±	+	±	±			+					+	-	+	+
11.			+	±	±			+				±	+	±	±			+					+				+	+	-	+
12.			+				±	+	±	±			+					+				+	+	+	+			+	+	+	-
13.			+					+					+					+					+				+	+	+	+	+
14.			+					+					+					+					+					+	+	+	+

Assume that number 2222 and frame 2 was registered.

\+ Indicates Lighted Lamp.
± Indicates Lighted Lamp Associated with Trouble.
\- Indicates Non-Lighted Lamp Associated with Trouble.

1. CKG Open
2. TH1 Lead Open
3. H1 Lead Open
4. T1 Lead Open
5. U1 Lead Open
6. F1 Lead Open
7. CK1 Lead Open
8. CK2 Lead Open
9. CK3 Lead Open
10. CK1 Lead Ground or Cross
11. CK2 Lead Ground
12. CK3 Lead Ground
13. Rec. Leads Checked - 2nd Trial
14. Rec. Leads Checked - Reorder

TABLE 2

Progress Lamps

	TBK	LE	FC	AK	TK	LIL RIL	TE	BC	GJ	SL	GC	GLH	CON	GT2	RL
15.	-														
16.	+	±													
17.	+		-												
18.	+		+	-											
19.	+		+	+	-	+	+								
20.	+		+	+	-	-	+								
21.	+		+	+	+	+	±								
22.	+		+	+	+	+		-		+					
23.	+		+	+	+	+		±	-	-					
24.	+		+	+	+	+		+	+	-					
25.	+		+	+	+	+		+	+	+	-				

15. Twenty block relay not operated probably due to open in NGC start lead, HB lead or TB lead. If call is to a number for which a SH relay is used, additional cross connections in the marker may be involved.
16. LE relay not released due to failure of L relay to operate as indicated by no LO-19 lamp in Table 3. This points to wiring trouble in the marker.
17. GT relay not operated.
18. Open AK check lead.
19. Open check lead.
20. Junctor retest circuit not functioning probably due to marker cross connection trouble.
21. CHO-9 relay not operated probably due to failure in Incoming mate frame lock out.
22. Open LLO-9 lead from line link.
23. BA relay not operated probably due to open OL-9L or OR-9R lead from Incoming link.
24. Open SL lead from Incoming link or failure of primary or secondary Incoming link hold magnet to operate.
25. Secondary line link hold magnet failed to operate.

TABLE 2 (Continued)

	TBK	LE	FC	AK	TK	LIL RIL	TE	BC	GJ	SL	GC	GLH	CON	GT2	RL
26.	+		+	+	+	+		+	+	+	+	-			
27.	+		+	+	+	+		+	+	+	+	+	-		
28.	+		+	+	+	+		+	+	+	+	+	+	-	
29.a	+		+	+	+	+		+	+	+	+	+	+	+	-
29.b	+					+		+	+		+	+	+	+	-

26. False ground on the tip, battery on the ring or cross between tip and ring leads as far as the line cross points. Also in case of a failure of the marker to ground the line sleeve lead to operate the line hold magnet.
27. Open subscribers line or primary line link hold magnet not operated.
28. Failure of marker ringing or tone control relays to operate or remain operated.
29.a GT relay not released due to false ground on tip or ring of subscribers line.
29.b Open release lead through marker connector or sender.

TABLE 3

Supplementary Progress Lamps

	L 0-19	LCF 0-19	LLG A-D	LOG	TF HF RF	CA 0-9	CB 0-9	IF 0-19	LC 0-9	M 0-9	CH 0-9	LJ 0-9	JPN	JP 0-8	JG A-E	MKO MK1
16.a	-															
17.a	+							±	-	-						
18.a	+							+	-	-						
18.b	+							-	-	-						
19.a	±	+	+	±	±	±		+	+	+		±				
19.b	±	+	+	-	±	±		+	+	+		±				
19.c	±	-	-	-	-	-		+	+	+		±				
19.d	±	+	+	±	±	±		+	+	+		-				
20.a	+	+	+	+	+	+		+	+	+		+	+		-	
21.a	+	+	+	+	+	+		+	+	+	-	+	+		+	-

16.a LE relay not released due to failure of L relay to operate as indicated by no LO-19 lamp in Table 3. This points to wiring trouble in the marker.
17.a GT relay not operated.
18.a LC relay in Incoming link not operated possibly due to open FC lead or LC lead.
18.b MC relay in Incoming link not operated due to open ST lead.
19.a All junctor cut in relays operated indicating open in AK, CK, BK or TK leads.
19.b Line link not locked out due to open LEA-D or LOA-D lead preventing HG relay in line link from operating.
19.c Twenty block relay not operated.
19.d LJ relay in line choice not operated due to JR lead from incoming link open.
20.a Junctor retest circuit not functioning probably due to marker cross connection trouble.
21.a CHO-9 relay not operated probably due to failure in Incoming mate frame lock out.

TERMINATING TROUBLE INDICATORS
AUTOMATIC TROUBLE ANALYSIS—TROUBLE REFERENCE GUIDE
NO. 1 CROSSBAR SYSTEM

CONTENTS PAGE

1. GENERAL

Scope

1.01 This section provides information to help in understanding the nature of troubles reported by either trouble indicator lamps or by automatic trouble analysis (ATA) exception reports. Information about each category, or bin, is contained in a short narrative description covering the key circuit operations at the time that the trouble is detected. This section also contains specific reference to source documents which may be useful in troubleshooting.

1.02 Whenever this section is reissued, the reasons for reissue will be listed in this paragraph.

1.03 This issue of this section corresponds to:

Issue 47B of SD-25013-01—No. 1 Crossbar Terminating Sender

Issue 30B of SD-25036-01—Terminating Marker Connector Circuit

Issue 24B of SD-25275-01—Line Choice Connector Circuit

Issue 32B of SD-25276-01—Number Group Connector

Issue 26B of SD-25283-01—No. 1 Crossbar Terminating Marker

Issue 39C of SD-25284-01—Terminating Trouble Indicator Circuit

Issue 4 of SD-25286-01—No. 1 Crossbar Misc. Circuit for Block Relay Frame

Issue 22C of SD-25455-01—Multifrequency Terminating Sender Circuit

Issue 15B of SD-25457-01—Incoming Link and Connector Circuit

Issue 35D of SD-25459-01—Terminating Sender Link and Controller

Issue 2 of SD-25919-01—PBX Block Allotter Circuit

Issue 4A of SD-25920-01—PBX Block Register Circuit

Issue 17A of SD-25947-01—Line Insulation Test Control Circuit

Issue 17D of SD-27765-01—No. 1 Crossbar Terminating Marker Applique Circuit for Line Link, Pulsing, and 101 ESS Direct Access

Issue 6A of SD-27961-01—Control and Connector Circuit

Issue 3C of SD-28110—Maintenance Data Transmission Circuit

Description of Bin Format

1.04 The following format will be used to describe each bin:

(a) ***Bin Name***—Consists primarily of letters which identify the trouble category.

(b) ***Description of Circuit Operation***—Description of key circuit operations at the time that the trouble is detected.

(c) ***Description of Failure***—Description of the circuit operation which failed to occur and caused a trouble record to be generated. This could also be a positive indication of troubles such as cross-detecting troubles.

(d) ***Sequence of Operations***—Sequence charts showing normal circuit operations at the time of the failure are referenced in this paragraph.

(e) ***Reference Documents***—SD numbers, associated FS numbers and SC numbers, CD numbers, and paragraph numbers are referenced here and corresponds to the circuit issues listed in 1.03.

2. BIN LISTING

2.01 The following index is a listing of all of the trouble categories, or bins, associated with the terminating trouble indicators:

3. BIN DESCRIPTIONS

3.01 The following pages contain the descriptions of the bins listed in Part 2.

BIN NAME

T-*AL-NO-NGC-HB-

DESCRIPTION OF CIRCUIT OPERATION

Split hundreds relays are operated from number group start punchings.

The AL punching for the desired twenty block is cross-connected to the AL, NAL, AF, or NAF punching operating an AL or NAL relay.

These relays operate the HPE relay by extending a ground through an operated CK7, ALB, NAL, or operated CK7, ALA, AL, and normal HP0 to HP8 relays. HPE then locks itself around the HP- break contacts. HPE then extends 226 ohm battery through the operated TB- and the operated SH- to start the number group for seizure by the marker resulting in a NGC indication. HPE also extends ground from CK6 make, XS break, XHB marginal winding, MT break, JHA break, ALB make or ALA break, NFL make, FL break or NFL break, FL make, the HPE make, the TB- make and the SH- make to extend the HB lead through cross-connections to operate one of the HB relays in a block relay frame. The HB indication indicates which HB lead in the associated NGC is grounded.

DESCRIPTION OF FAILURE

The terminating marker failed to close through the NG-ST and NG-HB leads toward the number group connector. The AL or NAL indication being present indicates that the SH- and TB- relays operated. Since both the NGC- and HB- indications are missing, the condition may be due to the failure to operate the terminating marker HPE relay.

Where the PBX block allotter is equipped, this condition may also result from failure to operate and lock an ALG- relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 4, 7, 37, 38, 39, 40, 47
CD-25283-01 Par. 26.01 & 02, 30.01 & 02, 30.09-13, 31.04-06

BIN NAME

T-*CLI

CALLING LINE IDENTIFICATION (NON-TROUBLE RECORD)

DESCRIPTION OF CIRCUIT OPERATION

The terminating trouble indicator (TTI) is arranged to record data associated with calls terminating to a particular line for the purpose of nuisance call tracing. In No. 1 Crossbar, this feature is called calling line identification (CLI).

A TTI record containing a CLI indication signifies that the data presented is not a trouble record but is a call terminated to a customer's line which is arranged for CLI. When a line is arranged for CLI, all calls terminating to that line will be recorded on the TTI without the completion of the call itself being affected.

The CLI record does not completely define the originating party since the calling line itself is not available to the No. 1 crossbar terminating office. The incoming trunk information, the called directory number, and the time are available, however, to provide a link in the tracing chain.

DESCRIPTION OF FAILURE

This is not a failure.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 4 and SC 5, Loc E5-7.

REFERENCE DOCUMENTS

SD-25283-01 FS57
CD-25283-01 Sect. II, Par. 77

BIN NAME

T-*ERROR

DESCRIPTION OF CIRCUIT OPERATION

Error: When there is a validation failure, it is binned as an error. The "& valid" operator succeeds if the specified field is punched or if the field is not punched at all.

DESCRIPTION OF FAILURE

This failure indicates that an invalid combination of operated relays was encountered.

NORMAL SEQUENCE OF OPERATION

No uniform sequence.

REFERENCE DOCUMENTS

SD-25283-01
CD-25283-01

BIN NAME

T-*EX

DESCRIPTION OF CIRCUIT OPERATION

As a standard feature per GN option, two punchings, designated EXB and EXG, are provided at the terminating marker. The EXB punching is used to detect the presence of battery, and EXH punching is for detecting ground. Individually, these punchings control the EX lamp at the TTI frame. These punchings are used by optionally connecting, one at a time, to any electrical point within the marker circuitry.

This EX lamp feature does not cause a display at the trouble indicator, but instead, provides supplementary information to aid in diagnosing marker troubles.

DESCRIPTION OF FAILURE

This bin does not represent a specific failure, only that battery or ground was present at a particular point in the marker when the trouble was encountered.

NORMAL SEQUENCE OF OPERATION

No uniform sequence.

REFERENCE DOCUMENTS

SD-25283-01-B55 FS47
CD-25284-01 Sect. II, Par. 2, Page 6

BIN NAME

T-*F-NO-K123

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, T-, and U- relays, as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

Incoming trunk, terminating sender link, or terminating sender faults, such as a grounded ring lead, (which will happen if the trunk T relay fails to operate) will prevent digit information from being transmitted to the terminating sender. The terminating sender, when unable to receive digit information, will time out and seize a terminating marker. Seizure of the terminating marker without digit information causes a check failure in the marker which results in seizure of the TTI.

The record associated with the failure will lack K1-3 data indicating a check failure and will also lack digit information (TH-, H-, T-, and U-). The F- information is present from seizure of the terminating sender by the terminating sender link.

APP FIGURE 31 AND IL OPTION

The data provided with this record will provide very little information concerning the equipment involved, such as the trunk number. A trunk identification feature consisting of the TI key (App Fig. 31 and IL option) is available at the TTI to permit the identification of the incoming trunk involved with first trial failures.

The TI key operated, alters the marker sequence in order to obtain the trunk number. In altering the sequence, other data in addition to trunk information results. The FC indication is one item of data resulting from operation of the TI key when a first trial failure occurs. Failures of this type, with the TI key operated, will be binned as "FC-NO-K123" troubles but the trunk information will be provided.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01 E1, SC 1.

REFERENCE DOCUMENTS

SD-25283-01-B2 FS1
CD-25013-01 Par. 9, 11
CD-25283-01 Par. 72

BIN NAME

T-*FALSE-GT2

DESCRIPTION OF CIRCUIT OPERATION

The GT2 relay serves to verify that the terminating marker operated the proper incoming trunk ringing and tone control relays. The path to operate the GT2 relay is determined by the combination of operated ringing control (RC, RC1, RP, RP1, RV, RV1, and TC, TC1) type of call (HF, TF, FL, BB, or OF) and incoming trunk class (FS, MAN, or TOL).

DESCRIPTION OF FAILURE

A foreign ground from the circuitry of the terminating marker, or terminating marker applique was applied to the GT2 relay winding without the CON2 relay being operated.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc V33 and SC 2, Loc H33.

REFERENCE DOCUMENTS

SD-25283-01 FS32, FS42
CD-25283-01 Sect. II, Reg Call: Par. 21; BB Call: Par. 34; OF Call: Par. 36
SD-27765-B13 FS19
BSP 216-331-501 Tests V & X

BIN NAME

T-*FALSE-LE

DESCRIPTION OF CIRCUIT OPERATION

One of the functions in the early part of the terminating marker sequence is the "up-check" in which several marker relays are briefly operated, checked, and released. Following this and other checks, the LE— relays are operated if a successful number group check is received. When all LE— relays are operated, the LE relay operates.

One of the functions of the LE relay is to start a relay-capacitor timer, TLT, to provide an interval of time sufficient to operate the TB- relay in the number group connector and the S- relay in the marker if an operating condition exists.

Operation of the TLT timer relay closes the L- relay operate path and the L- relay operates. The L- relay operation should open the LE1, LE2, and LE12 relay operate path starting their release. Once released, the LE— relays should remove the LE indication.

DESCRIPTION OF FAILURE

A foreign ground is seen on the parallel LE1, LE2, and LE12 relay winding operate path. The LE1, LE2, and LE12 relays operated, hold the LE3-11 relays which hold the LE relay operated to provide the LE indication.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc R4, SC 2, Loc S24, and SC 4, Loc J12.

REFERENCE DOCUMENTS

SD-25283-01 FS6, 6, 8, 10, 11
CD-25283-01 Sect. II, Par. 7

BIN NAME

T-*FALSE-RV

DESCRIPTION OF CIRCUIT OPERATION

Relay RV operates on a normal call when the TF relay is operated. Relay RV grounds lead RV to the incoming link and connector for the purpose of operating incoming trunk relay RV and relay RV1 in the marker.

The RV1 relay is operated in parallel with the RV relay in the incoming trunk. On a regular call the RV1 relay is held operated at the end of the call by the trunk. The RV1 and RV relays in the marker must match as part of the circuit to operate relays GT1 and GT2 to cut off continuity test and apply ground test.

RV in the incoming trunk also is used to apply overflow or busyback tone to a calling subscriber.

DESCRIPTION OF FAILURE

The terminating marker RV1 relay was operated on a call to a nontip party line (RF or HF indications present) blocking the operation of the marker GT1 and GT2 relays. The marker RV1 relay may have operated as a result of a false ground on the RV lead from the incoming link and connector. With the RF or HF indication, only the RC1 relay should have operated.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc T10.

REFERENCE DOCUMENTS

SD-25283-01-B38, B39, FS32
CD-25283-01 Sect. II, Par. 20, 21
SD-25457-01-1 Fig. 15

BIN NAME

T-*FALSE-SL

DESCRIPTION OF CIRCUIT OPERATION

The operation of the incoming link (IL) secondary hold magnet and the closing of the associated secondary crosspoints extends operating ground to the sleeve of the IL to operate the IL primary hold magnet and release relay BA.

The closing of the IL primary crosspoints extends the hold magnet operating ground over the sleeve lead through the incoming trunk F relay back into the marker, on the SL lead, to operate the SL relay.

DESCRIPTION OF FAILURE

The terminating marker SL relay operated falsely. The presence of TE indicates that no channel was selected; therefore, no crosspoints closed while the absence of X indicates that relay IK operated. Under these conditions, the false operate ground occurred on the sleeve lead between the IL primary switch crosspoints and the MC- relay in the IL; therefore, this path should be examined for possible double connections.

NORMAL SEQUENCE OF OPERATION

See SD-25288-01, Sh E1, Loc R23 and Sh E3, Loc C9.

REFERENCE DOCUMENTS

SD-25283-01, FS30
CD-25283-01, Sect. II, Par. 16.16, 17.01
SD-25457-01, Fig. 3, 5
CD-25457-01, Par. 7
BSP 216-661-301

BIN NAME

T-*FC-NO-K123

Second trial failure to overflow - Apparatus Figure 31 and GS wiring.

DESCRIPTION OF CIRCUIT OPERATION

The terminating sender provides the marker with digit and frame information in the course of completing a call in the terminating office. The marker checks the leads which provide this data during the up-check function when the CK1-4 leads are grounded to the sender. The sender loops these grounds back to the marker over the digit and frame leads, among others, to operate recording relays. If all leads check, the marker CK4 and CK5 relays are operated. The CK4 and CK5 relays operated release the CK1-3 relays to provide the K1-3 data.

A terminating marker encountering trouble seizes the trouble indicator to leave a record of the progress of a call. When the trouble indicator has been called in and a trouble recorded, the indicator releases and the marker grounds the TRL lead to the marker connector, rather then the RL lead. The grounded TRL lead causes the connector to release the marker and connect a different marker, normally, for second trial.

Failure of the second trial call, with the "second trial failure to overflow" feature, causes the combination of ringing control relays to be operated in the incoming trunk to provide the calling customer with overflow and again seizes the trouble indicator to record the second trial failure.

The second trial record includes the FC indication since, on this trial, the incoming trunk is involved for reasons stated above.

DESCRIPTION OF FAILURE

The presence of an FC without the K1-3 indications means that an incoming trunk was attached, but the marker CK1-3 relays failed to release. The CK1-3 relays should release if the down-check is successful and the CK4 and CK5 relays operate.

This record should not occur except on a second trial call and will, therefore, likely be preceeded by a "NO-K123-M.DIG" exception report. The "NO-K123-M.DIG" exception report indicates the same failure as the "FC-NO-K123" record, the difference being the FC indication, which the NO-K123 condition blocks on first trial calls.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS1-B1, B4, FS42-B48, FS53-B61
CD-25283-01, Sect. II, Par. 1.02 & 72

BIN NAME

T-*FCG

DESCRIPTION OF CIRCUIT OPERATION

The winding of the FCG relay is applied to the tip and ring conductor of the IL-LL linkage, via the operated incoming trunk F- relay. A false battery on the tip, a false ground on the ring, or a shorted tip and ring in the incoming or line link switches will later operate the IT supervisory relay on "do not answer" calls, and cause a false charge condition on the calling line. The function of the FCG relay is to detect these conditions. This test is started at the time the BC1 operated and continues to progress with the operation of the IL primary and secondary hold magnets, and the LL secondary hold magnet, making the test effective up to the LL primary vertical unit. The test is made only during periods of light traffic.

DESCRIPTION OF FAILURE

The terminating marker FCG relay operated, preventing the TM from operating a LL primary hold magnet.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B37A/FO FS31
CD-25283-01 Sect. II Par. 17, 18.01
BSP 216-651-301
BSP 216-331-501 Test W

BIN NAME

T-*GT-FAILURE

DESCRIPTION OF CIRCUIT OPERATION

When the ringing control check has been completed, the operated GT2 relay opens the original GT relay operating circuit and leaves the operated GT applied to the tip and ring through the office linkage to the called subscribers line. If no line troubles which would interfere with talking transmission or cause a false charge condition are encountered, relay GT releases. The release of GT releases the F relay in the incoming trunk and allows the marker to proceed.

The GT test may be canceled on a selective basis for calls to non-PBX and/or noncoin, PBX or coin lines by inserting a plug into the corresponding NPC, PBX, or CCN jacks at the TTI.

DESCRIPTION OF FAILURE

The terminating marker GT relay failed to release. This failure can occur if:

(1) On first trial ***non-PBX*** and/or ***noncoin*** calls

(a) A double connection causing the supervisory ground of the trunk that the call is doubled with to hold the GT relay operated.

(b) A cross between the tip and message register lead.

(c) A false tip ground on a two-party line.

(d) False ground on either the tip or ring in A, B, or C above.

(2) On first and second trial ***PBX*** and/or ***coin*** calls, a short exists on the called line.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc U34 and Sh E3, Loc S16.

REFERENCE DOCUMENTS

SD-25283-01 FS13, 30, 33
CD-25283-01, Sect. II, Par. 22, 23
BSP 216-331-501 Test V

BIN NAME

T-*INT-NO-NGC-HB

DESCRIPTION OF CIRCUIT OPERATION

The operation of intercept relay LIN, TIN, LTI, or TTI operates relay IN. After release of relays LK, NK, and IK indicating link and number group release, the SIN relay operates. The operation of SIN cuts the ST-, HB-, and other leads to the number group through relay trees formed by the LIN, TIN, LTI, TTI, OA, OB, P, and T relays to indicate both the interrupt trunks and type of interrupt required.

DESCRIPTION OF FAILURE

The terminating marker failed to advance to the point of connecting battery on the NGC "ST-" lead and ground to the NGC "HB-" lead. This condition may be due to failure of the terminating marker SIN relay to operate.

If the marker group is equipped with Apparatus Figure G, physical and theoretical discrimination, this condition may also be due to the failure to operate a P or T relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 4, 7, 43
CD-25283-01 Sect. II, Par. 39—41

BIN NAME

T-*INTC-NO-HB

DESCRIPTION OF CIRCUIT OPERATION

When the marker encounters an intercept condition, it releases the original number group connector, and when relay SIN operates, it makes the contacts of the LIN or TIN relays effective so that a number group connector is seized which contains the address of the intercept trunk.

A ground is applied to the number group connector HB- lead via the number group connector HB- cross-connection associated with the intercept trunk.

DESCRIPTION OF FAILURE

The HB- intercept relay failed to operate, due to the marker failure to ground the NGC- HB- lead via the HBC HB- cross-connection associated with the intercept route.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25583-01-B7, B8 FS4
CD-25583-01 Sect. II, Par. 39-41

BIN NAME

T-*INTC-NO-HP

DESCRIPTION OF CIRCUIT OPERATION

When the marker encounters an intercept condition, it releases the original number group connector, and when relay SIN operates, it makes the contacts of the LIN or TIN relays effective so that a number group connector is seized which contains the address of the intercept trunk.

In this case, the intercept trunks are provided on a hunt basis, and the operation of a HP- relay is necessary.

DESCRIPTION OF FAILURE

The terminating marker failed to operate a HP- relay via the HP-cross-connection associated with the intercept route. The number group connector and HB- indication should be those associated with the intercept route and not the called line, indicating that the marker released the original route NGC, MP-, HP- and TB- relays, and is in the process of operating the marker HP- relay associated with the intercept route.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B8 FS4, B10 FS5, B44 FS37
CD-25283-01 Sect. II, Par. 40, 41

BIN NAME

T-*INTC-NO-NGC

DESCRIPTION OF CIRCUIT OPERATION

The number group connector start lead is closed from 226 ohm battery through break contacts of relays YB, TM7, SPL, and TM9 and make contacts of SIN and LIN, TIN, LTI, or TTI, as well as OA or OB, E, and P or T, if equipped.

This battery operates the marker preference relay in the number group connector circuit. When the marker preference relay in the number group connector operates, it awaits the preference series circuit and then it closes a circuit to operate the MCA relay in the number group connector circuit.

DESCRIPTION OF FAILURE

The terminating marker failed to connect battery to the NGC ST lead via the NGC ST- cross-connection associated with the intercept route. The HB- and HP- indications should be those associated with the intercept route and not the called line (indicating that the TM released the original NGC MP-, HB-, and TB- relays and is in the process of connecting to the number group connector associated with the intercept route).

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 7,
CD-25283-01 Sect. II, Par. 39-41

BIN NAME

T-*INV-M-NO-SL

DESCRIPTION OF CIRCUIT OPERATION

When the incoming trunk F relay operates, ground is extended to the associated incoming link primary select magnet of magnets. The M indication shows which magnets on the switch are grounded in preparation for operation over the B lead from the marker. For 100 trunk incoming links, one of 0 to 9 is grounded. For 160 trunk incoming links, either 0 or 1 and one of 2 to 9 is grounded.

At the time the marker operates the incoming link primary hold magnet, this ground is extended through the closed crosspoints and a make of the incoming trunk F relay to operate the SL relay as verification of closure of the incoming link crosspoints.

DESCRIPTION OF FAILURE

The incoming trunk relay contacts and leads for operating the select magnets are open or crossed.

On 160 trunk incoming links, an open discriminating or nondiscriminating lead will cause this fault. A cross between leads to magnets on the same select bar may also be at fault.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, E1—E3.

REFERENCE DOCUMENTS

Terminating Marker

SD-25283-01 FS 27, 28, 30, 31
CD-25283-01 Sect. II, Par. 15, 16.02, 16.04

Incoming Link Connector

SD-25457-01 Fig. 3
CD-25457-01 Par. 6 & 7

BIN NAME

T-*INVALID-NGC

DESCRIPTION OF CIRCUIT OPERATION

When the Number Group Connector (NGC) is seized, the operation of its MP- and MCA- relays connects ground to the CK lead operating the marker NK and NK1 relays as a signal that it is successfully connected.

If the marker encounters trouble while processing the call, it operates its TIA relay and seizes the TTI. The operation of TIA applies ground through the operated NGC MCA- relay as a numerical indication of which number group connector was involved in the call.

DESCRIPTION OF FAILURE

This exception report indicates that more than one (invalid) NGC was connected to the marker. This condition may be the result of bridged or latched contacts of the:

(a) Terminating marker FH- or HN- relays

(b) Number group connector MCA- relay

If the LIN or TIN indication is also present, the invalid NGC may be due to the failure of the terminating marker to release the NGC when attempting to reroute the call to intercept.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS5, 7
CD-25283-01 Sect. II, Par. 4.06, 4.07, 52.02
BSP 216-717-301

BIN NAME

T-*JF-JC-TBK-UP

DESCRIPTION OF CIRCUIT OPERATION

PBX jump hunting is a feature enabling increase of the size of a terminal hunting group in a number group. To jump hunt, the last terminal of the initial number group must have its NC and NF punchings specially cross-connected to jump hunting fields on the block relay frame. The last terminal NS punching, being unconnected, results in the corresponding L- relay operation. The NF to JF- connection operates one JF- relay, and the NC to JC- connection operates one JC- relay. These relays operating cause jump hunting to the HB24 hundred block and actuating of JHA relay. JHA operation causes TBW, TBK3, (App Fig. 37), and TBK relays to release resulting in JHB operation. JHB, in turn, energizes number group connector HB24 and TB- relays through which jump hunted lines are seized.

DESCRIPTION OF FAILURE

JHA relay did not operate, thereby preventing release of L- relay. Also, TBK did not release, thereby preventing operation of JHB relay and further processing.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01 Fig. 2 & 6
SD-25283-01-B9, B10, FS 5, 6, 8, 41
CD-25283-01 Sect. II, Par. 32
BSP A370.501 Par. 4.12 Block Relay X-Connections
BSP 216-331-501 Tests C, D & E
BSP 216-667-307
BSP 216-719-301 Par. 3.10, 3.16 Fig. 3
BSP 216-718-101 Par. 2.05, Fig. 2

BIN NAME

T-*LE-NO-L

DESCRIPTION OF CIRCUIT OPERATION

The L relay should operate from battery on CK8 through resistance and the PG relay normal, the L relay winding, normal contacts of the associated S- relay, through the operated contacts of either the TEV or TOD relay through the units register, normal contacts of the JHA relay, SIN relay, UT relay, and operated contacts of the LE7 and LE12 relays, normal contacts of the NC14 relay, SPL relay, TRB relay, and operated contacts TLT relay to ground on the CK6 relay. The L relay is operated.

DESCRIPTION OF FAILURE

The terminating marker failed to operate an L0-19 relay to select an idle line. If the marker is in the light traffic mode, this condition may also result from failure to operate an L- relay on the NS lead cross test.

The combination of U, TEV, TOD, LE7, LE12, and TLT relays operated determine the starting point in the chain circuit involving the busy test S-, hunt test HT-, and line selection L- relays.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01 SC 1, Loc N18, V2 and SC 2, P22.

REFERENCE DOCUMENTS

SD-25283-01 FS6, 8, 9, 11, 37
CD-25283-01 Sect. II, Par. 7.11 - 7.13, 28
BSP 216-667-301

BIN NAME

T-*LIN-TIN-UP

DESCRIPTION OF CIRCUIT OPERATION

If the marker encounters missing of incomplete block relay frame cross-connections, it attempts to route the call to local (LIN) or Toll (TIN) intercept.

In addition, the marker will route all calls (office equipped with App Fig. AU and AS) or nonhunt field calls (office equipped with App Fig. AT and App Fig. AU or AV) encountering open sleeves to intercept.

The operation of either the LIN or TIN relay operates relay IN. The operation of IN releases relay FH and operates relay SIN. The release of FH opens the original Number Group Connector (NGC) leads and the subsequent operation of SIN closes (through the operated LIN or TIN relay) the leads to the NGC containing the address of the associated local or toll intercept trunks.

DESCRIPTION OF FAILURE

In attempting to complete a local or toll intercept call, the marker encountered a condition which caused it to again reroute the call to toll or local intercept.

The fact that both LIN and TIN are operated can result in two number group start leads being closed, therefore, records in this bin may also contain X, XTB, and XHB indications.

Because both local and toll routing information is present on the exception report, it is necessary to review the individual records that produced the exception report in order to identify the specific nature of the trouble.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS43
CD-25283-01 Sect. II, Par. 40.06 - 40.08

BIN NAME

T-*MKO-UP

DESCRIPTION OF CIRCUIT OPERATION

If all of the IL primary and secondary switch and LL secondary switch crosspoints closed, the SL1 relay should have operated, advancing the terminating marker and causing the release of the incoming link connector RS relay to remove the MK0 indication. The following conditions must be satisfied in order to operate the SL1 relay:

(1) The terminating marker SL relay must be operated, indicating IL primary switch crosspoints closed. (SL indication present)

(2) Terminating marker GC relay must be operated, indicating LL secondary switch crosspoints closed. (GC indication present)

(3) The terminating marker BC relay must be operated, extending operate and hold ground to IL primary and secondary and LL secondary switch hold magnets. (GJ indication present)

(4) The terminating marker BA relay must be normal, indicating that IL secondary switch crosspoints closed.

Because Items 1, 2, and 3 are verified by discrete indication SL, GC, and GJ respectively, the MK0 indication serves as a verification that IL secondary switch crosspoints closed (Item 4).

> ***Note:*** In many instances when the marker BA relay is applied to an IL primary-secondary switch link sleeve lead, it will operate the IL primary switch hold magnet, closing the associated crosspoints and, in turn, activating the marker SL relay. As a result, the presence of the SL indication is not sufficient as an indication that IL secondary switch crosspoints closed (see NO-SL). The release of the BA relay, reflected by the loss of the MK0 indication, is the only sure check that IL secondary switch crosspoints closed.

DESCRIPTION OF FAILURE

The incoming link and connector circuit failed to release the MK0 relay. The presence of the MK0 indication at this stage of call progress generally indicates that the terminating marker SL1 relay failed to operate.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25457-01 Fig. 1, 2, 3, 4, 5
SD-25283-01 FS15, 30, 54
CD-25283-01 Sect. II, Par. 15, 16.05
CD-25457-01 Par. II
BSP 216-649-301

BIN NAME

T-*MK1-UP

DESCRIPTION OF CIRCUIT OPERATION

Paired Incoming Link Frames: App Fig. 17

With paired IL frames and OPT CV or CW, channel selection is not made until both incoming link frames are available for testing shared line junctors. The MK1 relay operates as an indication that another TM has gained access to the pair of frames. When the other TM completes its functions associated with the pair, the subsequent release of the MK1 indicates that both frames are available.

In normal functioning, the operation of the SL1 relay of the other marker removes resistance battery from the MPS lead (FS 15) releasing the FP and RS relays in the mate IL frame, which in turn releases the MK1 relay of this marker.

DESCRIPTION OF FAILURE

The terminating marker has locked out a pair of incoming link frames by the associated select magnet lockout circuitry. The mate incoming link and connector circuit failed to release the MK1 relay of this marker. If both the MK0 and MK1 indications are present, a false ground exists on one lead of either the MK0 and MK1 or MK2 and MK3 pair of leads to the incoming link.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS15
CD-25283-01 Sect. II, Par. 10.02
CD-25457-01 Par. 8, 12

BIN NAME

T-*NAL-AL-NO-HB

DESCRIPTION OF CIRCUIT OPERATION

The presence of the NAL or AL indication signifies that the group of 100 directory numbers containing the called number, encompasses free numbers, or a PBX directory number of an allotted group, or called lines associated with nonconsecutive end-of-block hunting or end-of-block hunting to unnumbered lines.

AL signal present: The NG-HB path is traced from ground at CK6 make through low resistance XHB relay coil eventually through the make contacts of TB- relay, split hundreds SH-, and allotter AL1 or AL2 relays. The SH-HB- punching associated with SH- relay is cross-connected to ALC-HB- punching, and AL-HB- punching associated with AL1 and AL2 relays is cross-connected to an NG-HG- punching.

NAL signal present: The NG-HB- path is traced from ground at CK6 make-contact through low resistance XHB relay coil eventually through make contacts of TB- and SH- relays to the number group connector to HB- lead. The SH-HB punching associated with SH- relay is cross-connected to NG-HB- punching.

DESCRIPTION OF FAILURE

The terminating marker failed to ground a hundreds block "NG-HB-" lead to the number group connector on a PBX allotter or nonconsecutive end-of-block hunting, or a call involving end-of-block hunting to unnumbered line.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B7 FS4, -B45 FS39, -B46 FS40
CD-25283-01 General Info, Par. 3 & 6.01
PBX Allotter - Par. 30.02
Block Allotter - Par. 30.13
Special Arr - Par. 31

BIN NAME

T-*NAL-AL-NO-HP

DESCRIPTION OF CIRCUIT OPERATION

Split Hundreds Terminal Hunting: Operation of an AL or NAL relay opens the regular operate path through TB0-4 for the even HP- relay and alters the HP- operate path through HPE make, another TB0-4 make, split hundreds SH- relay make-contacts, and SH-TB- to TB- cross-connections.

DESCRIPTION OF FAILURE

The terminating marker failed to actuate an HP- relay with the split hundreds terminal hunting feature activated. An NAL or AL signal present indicates that the SH- and TB- relays operated. Furthermore, since the NGC- and HB- signals and HB- are also present, the HPE relay operated satisfactorily. Both of these conditions directs attention to a continuity failure in the foregoing described split hundreds relay contact continuity path for the HP- relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B44 FS37, -01-B45 FS38 & FS39
CD-25283-01 Par. 29.03, 26, 30.01, 30.13, 31

BIN NAME

T-*NAL-AL-NO NGC

DESCRIPTION OF CIRCUIT OPERATION

The operation of a split hundreds relay closes -48 volt resistance battery from the TB- relay contacts through AL- relay contacts or direct to a number group start punching, to start the number group desired for this call. Number group operation results in the MCA- relay operating.

DESCRIPTION OF FAILURE

The lack of an NGC- indication is attributable to the failure to operate a number group connector MCA relay. This may be due to failure of the terminating marker to connect battery to a NG-ST- number group connector start lead or number group connector trouble preventing the operation of an MCA relay.

NAL indicated: The NG-ST- path is traced through contacts of the operated TB- and SH- relays (SH-ST- punching associated with SH- relay is connected to NG-ST- punching).

AL indicated: The NG-ST- path is traced through contacts of the operated twenty block TB-, split hundreds SH-, and allotter AL1 or AL2 relays (SH-ST punching associated with SH relay is connected to ALC-ST- punching and AL-ST- punching associated with AL1 and AL2 relays is connected to NG-ST- punching).

The OAB, TH-, and H- indications appearing on the exception report should be reviewed to determine if the records that generated the report are directed toward a single number group connector (possible number group connector trouble - check NO-NGC reports).

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Number Group Connector

CD-25276-01 Sect. II, Par. 1.01

Terminating Marker

SD-25283-01 FS7, 38, 39, 47
CD-25283-01 Sect. II, Par. 3,4
Free Lines Sect. II, Par. 26
PBX Allotter Sect. II, Par. 30.01 & .02 Special Arr. Sect. II, Par. 31

BIN NAME

T-*NO-AK

DESCRIPTION OF CIRCUIT OPERATION

The AK ground is supplied through the incoming link and connector LC- and MC- relay contacts to the marker AK lead. This ground, in turn, is conducted through the line choice connector 3-4T contact of LT2 relay, 12 contact of MCA- relay and CR or CE relays to become CK lead to the line link circuit. The ground is further conducted through 5 make-contact of HG- relay in the line link circuit and returns as a BK- lead to the line choice connector. The ground continues through line choice connector 1000-ohm K- resistor, 4 and 5 make-contacts in series of LJA- relay, contact 13 of the MCA relay. The ground maintains its course through the marker contact 11-12B of LIL/RIL relay an 11-12T of JP0-8 or JPN relay to energize the 200-ohm TK relay winding.

DESCRIPTION OF FAILURE

The incoming link connector failed to ground the AK lead toward the terminating marker. The presence of the LC- signal together with the absence of the TK signal indicates that this trouble condition is the result of a continuity failure in the path traced through the operated incoming link and connector LC- and MC- relays.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01 SC 1, Loc J25.

BIN NAME

T-*NO-BC

DESCRIPTION OF CIRCUIT OPERATION

Apparatus Fig. BM: Without marker speedup

Following the release of the marker HMT1 relay, the windings of the BC relay are applied through the operated marker CH- relay to the sleeve lead of the line link primary to secondary switch linkage in order to verify that the sleeve is not grounded and has battery connected to it from the 2500 ohm B inductor.

DESCRIPTION OF FAILURE

Failure of the BC relay to operate may result from:

(1) A foreign ground on the sleeve lead of the line link primary to secondary switch linkage which would shunt the 2500 ohm battery.

(2) Failure of the operated line link HG- relay contact to supply -48V battery via the 2500 ohm B inductor to the link sleeve lead.

(3) Continuity failure in the path through the line choice connector or marker LFA, CH-, HMT1, BC1, and RLT relay contacts which supply the BC relay primary winding.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS30
CD-25283-01 Sect. II, Par. 16.03

BIN NAME

T-*NO-CA-CB-LLG

DESCRIPTION OF CIRCUIT OPERATION

The calling of a line which is idle results in the activation of an L- relay. The operation of the L- relay grounds its associated NC- lead which, through cross-connections in the number group connector, energizes one of the 40 windings of the CA0-9 or CB0-9 relays. The numerical portion of these relays indicates the horizontal group in which the selected line is located, and the A and B indicates the half choice. The ground which operates the CA- or CB- is extended through a CA- or CB- make-contact to operate one of the quarter choice LGA-D relays.

DESCRIPTION OF FAILURE

The terminating marker failed to operate a CA- or CB- relay over the number group connector NC- to HGA- cross-connection. This condition may result from a missing, NC- to HGA-, cross-connection associated with an individual line or may be due to number group MCD, HB-, or TB- relay contact problems. (Affecting more than one line.)

NORMAL SEQUENCE OF OPERATIONS

See SD-25283-01, Sh E1, Loc AA3.

REFERENCE DOCUMENTS

SD-25283-01, FS9
CD-25283-01, Sect. II, Par. 7.03, 8.04, 9.01

BIN NAME

T-*NO-CH

DESCRIPTION OF CIRCUIT OPERATION

A channel for connecting an incoming trunk to a line link consists of an incoming link, A portion; line junctor, B portion, to which the incoming link has access; and line link, C portion, to which the line junctor has access. The A and B portions of the channels are tested on the windings of the AB- relays, and the C portion is tested on the windings of the LL- relays.

The operation of the TK relay, as indicated by the TK data, is evidence that the link and junctor connector relays have been operated. The TK operation also indicates that the horizontal group has been selected, and that a junctor pattern relay is operated, or that a normal junctor pattern condition (ten junctors available) has been determined.

A busy channel has its sleeve lead grounded which will cause the associated AB- or LL- or both relays to operate. An operated AB- or LL- relay will cause the associated CH- relay to be passed by enabling the next CH- relay to operate since all channels are busy. If an AB- or LL- relay is operated corresponding to each CH- relay, all CH- relays are passed. The action taken by the marker on all channels busy condition depends upon the arrangement of incoming links and line choices as follows:

(a) Ten incoming link frames and ten line choices - no junctor pattern arrangements.

With all channels busy, no CH- relays operated, the CH- relay operating ground is extended through the operated AB- or LL- relays to operate the PGT relay which operates the OF relay to cause the call to be set to overflow.

(b) Seven incoming link frames and seven line choices - using junctor pattern arrangement.

With all channels busy, no CH- relays operated, the CH- relay operating ground is extended through the operated AB- or LL- relays to operate the PGT relay. The PGT, in operating, operates the RTE relay which starts a sequence to restore the channel test circuitry in preparation for a second test of the remaining line junctors. This second test is known as channel retest. If the channel retest finds no idle channels, the PGT relay is operated a second time, causing the operation of the OF relay for the purpose of setting the call to overflow.

The role of the junctor pattern circuitry in selecting a channel is discussed in CD-25283-01.

If one or more idle channels are detected by like-numbered marker AB- and LL- relays being normal, the marker will apply energizing current to a CH- relay corresponding to the most preferred idle channel.

DESCRIPTION OF FAILURE

If HF is indicated on all records that were combined to generate the NO-CH report, the trouble condition may be the result of a failure of the marker to make a retest for another line in the called PBX group.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01 Sh E1, Loc V15.

REFERENCE DOCUMENTS

SD-25283-01 FS18
CD-25283-01 Sect. II, Par. 12, 43
BSP 216-331-501 A/AA

BIN NAME

T-*NO-CKG

DESCRIPTION OF CIRCUIT OPERATION

When the terminating marker connector seizes the terminating marker, it applies ground through its operated S- and DS- relay to the CKG lead to the marker.

DESCRIPTION OF FAILURE

The terminating marker connnector failed to supply CKG ground. The failure may have been caused by more than one of the DS relays of the connector chain being simultaneously operated.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc E5.

REFERENCE DOCUMENTS

SD-25036-01 Fig. 11
SD-25283-01 FS1, Loc. 1G1
CD-25036-01 Par. 9.32
CD-25283-01 Sect. II, Par. 1.02

BIN NAME

T-*NO-CKG-K-UP

DESCRIPTION OF CIRCUIT OPERATION

In the normal release sequence, after having processed the call, the marker grounds the RL lead through the marker connector to operate the RL relay in the terminating sender. The RL relay operation removes start battery for the marker connector causing its relays to restore to normal, thereby removing ground from the CKG lead to the marker. Loss of CKG ground results in release of the CK6, CK7, and CK10 relays. Release of these relays causes release of the other check relays which should result in removal of the K1-3 indications.

DESCRIPTION OF FAILURE

This trouble condition is involved with terminating marker malfunctions which prevent the marker from properly restoring to normal.

Prevalent among trouble conditions of this bin are failures associated with the marker OR and SRL relays on calls routed to Busyback or Overflow (OF or BB will generally not be indicated on the exception report since the check relays which supply ground for these indications are in the process of releasing when the trouble is encountered). A possible cause of this malfunction is a missing SRL-contact-locking path for the RV1 relay which could shorten the RL signal to the terminating sender, release the GT1 and GT2 relays prematurely, and allow reoperation of the OR relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS32, 36, 42
CD-25283-01 Par. 24, 34, 36

BIN NAME

T-*NO-CON

DESCRIPTION OF OPERATION

The operation of relay GLH1 connects the (A) tube across the terminating marker TT and RT leads to test the continuity of the T and R leads through the incoming trunk, incoming link and connector, and line link switches to the called line. The operation of the line link primary hold magnet adds sufficient capacity and leak to cause the tube to fire and operate relay CON. Relay CON operating operates relays CON1 and CON2.

DESCRIPTION OF FAILURE

The terminating marker CON, CON1, and CON2 relays failed to operate due to:

(1) An open in the office linkage or insufficient subscribers line capacitance

(2) The failure of the tip or ring crosspoint contact to close before the corresponding line hold magnet break-contact opened. This failure applies only to those "OK" lines whose capacity is insufficient due to their closeness to the central office.

(3) Failure of the CCT relay to operate when plugs are inserted in the CCT and NPC, CCN or PBX jacks at the TTI.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Sh E1, Loc V3.

REFERENCE DOCUMENTS

SD-25283-01, FS31
CD-25283-01, Sect. II Par. 19
BSP 216-331-501 Test V

BIN NAME

T-*NO-F-NO-K123

DESCRIPTION OF CIRCUIT OPERATION

App Figure 31 with "GR" wiring provided: Before any information is transmitted between the terminating sender and terminating marker all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity testing of those registered leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all F, H, T, TH, U, OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of the CK4 and CK5 relays constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release.

DESCRIPTION OF FAILURE

Up check, relays CK4 and/or CK5 failed to operate.

The absence of required F, K1, K2, and K3 signals gives rise to the up-check failure. This condition results from failure of a terminating sender to close its ("F" vertical) crossbar switch crosspoints corresponding to the incoming link frame number of the incoming trunk.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS1
CD-25283-01 Sect. II, Par. 1.02, 1.03, 2.01, 2.04
CD-25013-01 Par. 9

BIN NAME

T-*NO-FC

DESCRIPTION OF CIRCUIT OPERATION

When the incoming link and connector circuit is seized, the operation of its MCA- and MP- relays connects ground to the CK and CK1 leads operating the marker IK and IK1 relays respectively. The operation of relay IK operates relay GT which places ground on the FC lead, through the terminating marker connector, terminating sender, and terminating sender link to eventually operate the incoming trunk F relay.

DESCRIPTION OF FAILURE

The marker failed to ground the FC lead to the terminating marker circuit terminating sender, terminating sender link and incoming trunk. The existence of an IF signal is evidence that the marker gained access to the incoming link and connector.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc J24.

REFERENCE DOCUMENTS

SD-25283-01-1 B21 FS13
CD-25283-01 Sect. II, Par. 15.01
CD-25457-01 Par. 5, 7
BSP 216-331-501 Test V

BIN NAME

T-*NO-FS-MN-TOL

DESCRIPTION OF CIRCUIT OPERATION

Following operation of the marker LK and INB relays, the incoming link primary switch select magnet is activated resulting in closing of its off-normal contacts. This contact closure, together with the CL2-9 and PT2-9 cross-connections, complete the circuit path to operate one of the FS, MAN, or TOL relays in series with one of IT, IP, or IPT relays.

DESCRIPTION OF FAILURE

A terminating marker FS, MAN, or TOL class relay failed to operate. This condition may result from a continuity failure in the FS, MAN, or TOL relay operate path traced through the contacts of the operated incoming link and connector MC- and LC- relays, the off-normal contacts of the operated IL primary select magnet, the PT2-9 and CL2-9 cross-connections, and the (INB) relay.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Sh E1,
Loc G26 and AB13.

REFERENCE DOCUMENTS

SD-25283-01 FS28
SD-25457-01 Notes 108 & 109
CD-25283-01 Par. 15.05
CD-25457-01 Par. 6
BSP 816-702-150 Par. 1.19C

BIN NAME

T-*NO-GC

DESCRIPTION OF CIRCUIT OPERATION

Without marker speedup, App Figure BM:

The marker GC relay serves as a verification that the line link secondary switch crosspoints actually closed. With the operation of the line link secondary hold magnet, ground is applied to the winding of the GC relay via the following route:

Make of LK, break of TTIB and CNL1, make of GJ, break of CON1, NC3, HF4, and HMT1, two makes of CH-, make of EH or OH, make-contacts of the line choice connector MCC and LJA-, line link SH make-contacts, secondary switch crosspoints and HG- make, line choice connector CR and CE and MCC make, and marker LFA break, CH- make, HMT1 break, BC1 make and GC1 break to the winding of the GC relay.

DESCRIPTION OF FAILURE

The terminating marker GC relay failed to operate. The line link secondary switch hold magnet should have operated and closed its associated crosspoints, thereby, extending the hold magnet operating ground to the line link sleeve lead. The link sleeve lead ground should have been returned to the terminating marker via the LCC (LL-lead) to operate the (GC) relay.

In analyzing trouble conditions involving this bin, remember that the presence of the BC signal indicates the existence of a verified path through the line link HG- make-contact, SMB jack, line choice connector CR, CE, and MCC make-contact, and marker LFA break-contact, CH- make, and HMT1 break-contacts. Likewise, the presence of the GJ signal indicates that the marker proceeded to the point of extending ground (on the line choice connector EH or OH- lead) toward the line link frame to operate the LL secondary switch hold magnet.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS30
CD-25283-01 Par. 16.04

BIN NAME

T-*NO-GJ

DESCRIPTION OF CIRCUIT OPERATION

Without marker speedup, App Figure BM:

The operation of the BA relay operates relay GJ via the following path. Ground through LK make-, TR break-, CNLI break-, BC make-, and BA make-contacts to the GJ winding. Following release of the HMT1 relay after channel selection, the differentially connected windings of the BA relay are applied to the IL primary-secondary switch sleeve lead, corresponding to the operated marker CH- relay, to verify that the link sleeve lead is not grounded but has resistance battery from its associated IL primary hold magnet.

DESCRIPTION OF FAILURE

The terminating marker GJ relay failed to operate. This condition generally results from failure to operate the marker BA relay. Failure of the BA relay to operate may result from a grounded IL link sleeve lead, absence of battery from the link's associated primary hold magnet, or a continuity failure in the BA relay operate path through the incoming link and connector to the IL link sleeve lead.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS30
CD-25283-01 Par. 16.02, 16.04

BIN NAME

T-*NO-GLH

DESCRIPTION OF CIRCUIT OPERATION

Without marker speed - up App Figure BM:

The GLH indication is obtained from the GLH1 relay whose operation is dependent upon the type of traffic as follows:

(a) Light Traffic - Relay LTR Operated

When all the crosspoints from the incoming trunk up to the line link primary vertical have closed, relay SL1 operates. The operation of SL1 operates relays GLH and HG which, in turn, operates relay GLH1.

(b) Heavy Traffic - Relay HTR Operated

If traffic is heavy, relay LTR is normal, and relay HTR is operated. With relay HTR operated, the GLH relay operates immediately and does not wait for relay SL1 to operate. Under these conditions, since relay HG has already operated, relay GLH1 operates, causing the line link primary hold magnet to operate at the same time as the other hold magnets.

DESCRIPTION OF FAILURE

The absence of GLH indicates that one or more of the terminating marker GLH, GLH1, HG, or SL1 relays failed to operate.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 - FS31
CD-25283-01 - Sect. II, Par. 16.06 - 16.09, 18

BIN NAME

T-*NO-GT2

DESCRIPTION OF CIRCUIT OPERATION

The GT2 relay serves to verify that the terminating marker operated the proper incoming trunk ringing and tone control relays. The path to operate the GT2 relay is determined by the combination of operated relays for ringing control (RC, RC1, RP, RP1, RV, RV1, TC, TC1), type of call (HF, TF, RF, FL, BB, or OF), and incoming trunk class (FS, MAN, or TOL).

DESCRIPTION OF FAILURE

The terminating marker GT2 relay failed to operate because of faulty continuity through the specific combination of contacts for the ringing control relays operated. The problem may be due to an invalid combination of control relays operated.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc V33 and SC 2, Loc H33.

REFERENCE DOCUMENTS

SD-25283-01, FS32, FS42
CD-25281-01, Sect. II, Reg Call: Par. 21, BB Call: Par. 34, OF Call: Par. 36
BSP 216-331-501 Tests V & X

BIN NAME

T-*NO-HB

DESCRIPTION OF CIRCUIT OPERATION

The NG-HB path is traced through CK6 make, XS break, low resistance XHB relay coil, MT break, JHA break, optional MT-2 break, HN- make, FH- or FHB- make, HB- to NG-HB- cross-connection, number group connector circuit MCA make-contact, NG- to HB- cross-connection, and thence, to the winding of the HB- relay. Successful continuity of this NG-HB- path necessitates proper operation of an HN0 to HN4 relay, whose circuit path involves contacts of the hundreds-digit translation relay H1, H2, or H4. Also involved in this path is proper operation of an FH- or an FHB- relay whose circuit includes the TH1, TH2, TH4, TH8 thousands-digit translation relay contacts together with the H5 and H5' hundreds-digit relay contacts.

DESCRIPTION OF FAILURE

Terminating marker failed to ground a hundreds block NG-HB lead which in turn, failed to ground the HB- relay in the number group connector circuit.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, E1, Loc D17.

REFERENCE DOCUMENTS

SD-25283-01 FS4, FS3
CD-25283-01 Sect. II, Par. 3 and 6.01

BIN NAME

T-*NO-HB-JF-UP

DESCRIPTION OF CIRCUIT OPERATION

In the process of "jump to" operation, the terminating marker JHA relay operates and releases the L-, HP-, HB-, TB-, TW-, S-, HT-, and TBK relays. After these relays have released, the JHB relay operates. The operated JHB relay closes a path over lead HB-24 to operate a different HB- relay in the number group frame.

DESCRIPTION OF FAILURE

The terminating marker failed to ground the HB-24 lead to the number group connector. This condition may be due to failure to operate the marker JHB relay or a continuity failure in the path to ground the NG-HB-24 lead traced through the make-contacts of the operated JHB relay.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 8.

REFERENCE DOCUMENTS

SD-25283-01-B46 FS41, -B7 FS4
CD-25283-01 Par. 32.03, 52.02
BSP A370.501 Par. 4.12 Block relay cross-connections

BIN NAME

T-*NO-HF-TF-RF

DESCRIPTION OF CIRCUIT OPERATION

Under control of the operated marker L- relay, the corresponding LC- and HF/TF/RF relays are actuated through the NGC- circuit relay contacts and cross-connections. The presence of the LCF- signal indicates that the circuitry through the block relay frame NF to HF/TF/RF cross-connection, TB-, and MCB contacts is continuous.

DESCRIPTION OF FAILURE

The terminating marker failed to operate one of the HF, TF, or RF relays.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, Loc E1, and T8.

REFERENCE DOCUMENTS

SD-25283-01-B18 FS10
CD-25283-01 Par. 20.02
SD-25457-01 Fig. 3 & 5
SD-25283-01 FS30
CD-25457-01 Par. 7
BSP (None)

BIN NAME

T-*NO-HP

DESCRIPTION OF CIRCUIT OPERATION

The HP- relay to be operated is determined from the activated TB- relay under control of the T- tens-digit register, relays associated with the tens digit of the called number. The activated TB- relay operates an even-numbered HP- relay from ground at CK6 make through break-contacts of IN, YBA, JHA, ALA, AL, NAL, and MT3 relays.

DESCRIPTION OF FAILURE

The terminating marker failed to operate an even-numbered HP- relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B9 FS5, -01-B44 FS37
CD-25283-01 Par. 3.09, 3.11, 28.01

BIN NAME

T-*NO-HP-E.B.HT

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker found all lines busy in the number group twenty block and attempted to advance to the next group of twenty lines in search for an idle line. The marker operated the next higher odd-numbered marker HP- relay, releasing the number group twenty block. With the odd-numbered HP- activated, the marker TBW, TBK, TLT, and PG relays should release to close the continuity path for the next higher even HP- relay.

DESCRIPTION OF FAILURE

The terminating marker failed to operate and lock the next higher even-numbered HP- relay to advance to the next twenty block.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B10 FS5, B44 FS37, B14 FS8
CD-25283-01 Par. 28.03 & 28.04

BIN NAME

T*NO-HP-JF-UP

DESCRIPTION OF CIRCUIT OPERATION

Jump Hunting

Ground from the marker L0-19 relays through the number group connector MCA-, MCB-, and TB relays and NF0-19 to JF0-4 cross-connect operates one of JF0-4 relays which in turn operates the JHA relay. Also, ground from the marker L0-19 relays through number group connector MCA-, MCD-, and TB relays and NC0-19 to JC0-28 cross-connect, operates one of JC0-18 even relays which corresponds to one of ten even-numbered start points in the 20 block jumped to. The 100 block jumped to is always HB24 of the same number group which is grounded when JHB operates.

DESCRIPTION OF FAILURE

The terminating marker failed to operate the even-numbered HP- relay corresponding to the operated marker JF- relay. The presence of the HB24 signal is an indication that the marker JC-, JHA, and JHB relays operated.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B7 FS4, B44 FS37, B46 FS41
CD-25283-01 Par. 32.03-32.05

BIN NAME

T-*NO-IF

DESCRIPTION OF CIRCUIT OPERATION

Upon satisfactory operation of the number group connector circuit, the NK relay operates which completes the continuity path from the BH resistor battery through SDT break, NK make, MT4 break, CK7 make, XOB break, and the F— relay contacts to supply one of the ST0-19 leads for the incoming link and connector circuit. At the incoming link and connector circuit, the ST- lead continues through the TR2 break, the MP-relay winding, and break-contacts of all MP- relays associated with higher numbered markers to ground. Completion of this continuity path operates the MP- relay which, in turn, energizes the MC-relay.

With Busy Back (BB), Overflow (OF), or Reorder (RO) calls, the number group connector circuit is released immediately to enable its being available for processing other calls. Hence, the NGC signal is not present in these cases.

DESCRIPTION OF FAILURE

An incoming link and connector MC- relay failed to operate. This condition may result from failure of the terminating marker to connect battery to an incoming link and connector ST lead or trouble in the incoming link and connector.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, SC 1, LOC J22.

REFERENCE DOCUMENTS

SD-25283-01-B4 FS1, B20 FS12, FS42
CD-25283-01 Par. 5, 66, 37
SD-25457-01 Fig. 3, 7, 12, 13, 14, 15, 16
CD-25457-01 Par. 7

BIN NAME

T-*NO-IK

DESCRIPTION OF CIRCUIT OPERATION

Automatic Intercept Service W/O LLP: The IK lead is grounded by the AIS outgoing sender to indicate to the terminating marker that the outgoing sender registered a valid called number and that the AIS line circuit functioned satisfactorily. Ground through the AIS outgoing sender LR and DK make-contacts, one of the AIS control and connector SCT0/3 relays contacts, AIS sender test circuit AT2 break-contact, and AIS control and connector TM- make-contact is applied to the terminating marker IK lead to operate the IKA relay.

DESCRIPTION OF FAILURE

The AIS outgoing sender together with the AIS control and connector circuit and the AIS sender test circuit failed to ground the IK lead to the terminating marker.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker

SD-25283-01-B65 FS62
CD-25283-01 Sect. II, Par. 42.08

AIS Control and Connector Circuit

SD-27961-01 FS1
CD-27961-01 Sect. I Par. 2.02

AIS Sender Test Circuit

SD-27965-01-B3 FS3

BIN NAME

T-*NO-IP-IT-IPT

DESCRIPTION OF CIRCUIT OPERATION

Theoretical office feature - FS14

The IP, IT, and IPT relays operate in series with the FS, MAN, and TOL relays through the off-normal contacts of the incoming link primary select magnet associated with the incoming trunk.

DESCRIPTION OF FAILURE

A terminating marker IP, IT, or IPT relay failed to operate. Since the FS/MAN/TOL signal is present, the associated FS, MAN, or TOL relay operated. The trouble, therefore, is probably a foreign ground which shunted the IP, IT, or IPT relay winding, a faulty winding, or lack of continuity through the TIE relay contacts.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc Z14.

REFERENCE DOCUMENTS

SD-25283-01-B22 FS14, B34A FS28
CD-25283-01 Par. 65.10, 65.14, 65.29, 65.30
CD-25457-01 Par. 7

BIN NAME

T-*NO-JC

DESCRIPTION OF CIRCUIT OPERATION

In order to jump hunt, one of the ten relays JC0-JC18, which corresponds to one of ten even start points in the 20-block jumped to must be operated. Ground is connected from the marker L0-19 to relays through the number group connector. MCA-, MCD, and TB relays and NC0-19 to JC0-18 cross-connection, to operate one of ten even-numbered start points in the 20-block jump point.

DESCRIPTION OF FAILURE

The terminating marker failed to operate one of the JC0 to 18 relays.

On nonjump-hunt calls, this trouble may result from a false ground on a number group "JF-" lead.

On jump-hunt calls, this trouble may result from a faulty number group "NC-" to "JC-" cross-connection or other conditions causing an open in the marker JC- relay continuity path. A valid JC- to NC- cross-connection must be provided for the particular numbered L- relay which was energized.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B46 FS41
CD-25283-01 Par. 32.01-32.03
SD-25276-01 Fig. 2 & 6, Note 107
BSP 216-718-101 Par. 2.05, Fig. 2
BSP 216-719-301 Par. 3.10, 3.16, Fig. 3

BIN NAME

T-*NO-JF

DESCRIPTION OF CIRCUIT OPERATION

In order to jump hunt when not PBX alloted, the last line of the number group containing the directory inventory which is usually some terminal other than the twentieth of a 20 block, must be specially cross-connected and is, therefore, not available for cross-connection to a line unit. The NF punching of this terminal cross-connects to jump-hunting fields on the block relay frame, the NF terminal cross-connects to one of five strips designated JF0 to 4. The ground on one of the JF leads operates one of five marker JF- relays, which correspond to the 20 block of the 100 block that is jump hunted to (referred to as jumped to).

DESCRIPTION OF FAILURE

On jump-hunt calls, this trouble may result from a missing number group NF-JF cross-connection or other conditions causing an open in the marker JF - relay operate path.

It may also be the result of a false ground on a number group JC- lead on nonjump-hunt calls.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 B46 FS41
CD-25283-01 Sect. II, Par. 32.01-32.03
BSP 216-718-101 Par. 2.05, Fig. 2
BSP 216-719-301 Par. 3.10, 3.16, Fig. 3

BIN NAME

T-*NO-JGA-E

DESCRIPTION OF CIRCUIT OPERATION

In central offices with less than ten incoming links or groups and more than ten junctors, the marker tests only ten junctors at a time. Therefore, the marker is provided with a retest circuit to select additional junctors, if available, in groups of ten or less when a selected group tests busy.

The RTA relay operates from ground on STA punching through the break-contacts of relays RT, OVA, and OVE. As soon as the NK relay operates, the RTA' relay is operated from ground on the CK8 relay. The JGA relay is then operated through the make-contacts of the RTA and RTA' relays. Depending on the number of subgroups, the marker will test each subgroup of ten or less junctor until a junctor channel is found. Failing this, the call is routed to overflow.

DESCRIPTION OF FAILURE

The terminating marker failed to operate one of the JGA, B, C, D, or E relays (indicating which one of the subgroups has been tested). The problem could be due to a failure of the marker to operate a JGA-E initially or failure to advance to the next JG- relay upon encountering an all-channel-busy condition in the subgroup under test.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B28, FS21
CD-25283-01, Par. 13, 11.21 to 11.40

BIN NAME

T-*NO-JPN/JP

DESCRIPTION OF CIRCUIT OPERATION

The JPN and JP- relays cause unused line junctors of the line junctor subgroup being scanned to appear busy to the terminating marker. The operating path for the JPN or JP- relay is determined from the combination of operated LCA- and JG- relays. The operation of the LCA- relay is controlled by the LCA0-8 to LC0-19 cross-connections.

DESCRIPTION OF FAILURE

The terminating marker failed to operate either a JPN or JP- relay. Since the JGA/JGE signal is present, failures associated with this bin will usually be found in the operate paths of the JPN, JP0-9 or LCA- relays.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25457-01-1 Fig. 5
SD-25283-01-B8 FS10, FS21, FS22
CD-25283-01 Par. 11.10, 11.11, 11.12, 11.17, 13.04, 14.01-14.03

BIN NAME

T-*NO-K1

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These markers tests are identified as the up-down check.

In the up-check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, T-, and U- relays as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

During the down-check, the CK1 relay failed to release, indicating a false ground on the CK1 lead.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc C14 and Sh E3, Loc N11.

REFERENCE DOCUMENTS

Terminating Marker Circuit
SD-25283-01 B1-A4, B2-C0, B61-B9
CD-25283-01 Sect. II, Par. 2
SD-25013-01-3
SD-25455-012 Loc. B29

BIN NAME

T-*NO-K123

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) and tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up-check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, T-, and U- relays as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

This trouble indication is generally the result of a receiving lead continuity failure between the terminating sender and terminating marker. All of the following TM receiving leads should have been grounded:

TH1, 2, 4, 8 H1, 2, 4, 5 T1, 2, 4, 5

U1, 2, 4, 5 F1, 2, 4, 5, 10 TR2, OAB, R0

If one or more of the above indications is missing, an open receiving lead is indicated. An open CK1, CK2, CK3, or CK4 lead will cause more than one of the above indications to be missing.

Failure of a terminating sender to close crosspoints associated with either the IB, IG, or FB vertical of its crossbar switch will also cause more than one of the above indications to be missing (refer to Bin NOK1/K2/K3-M.DIG).

If the checking path is open in the terminating marker, preventing the operation of relays CK4 and CK5, all of the above indications will be present.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, E1-C14 and E2-N11.

REFERENCE DOCUMENTS

Terminating Marker Circuit
SD-25283-01 FS1
CD-25283-01 Sect. II, Par. 2

Terminating Marker Connector
CD-25036-01 Par. 9
SD-25013-01-3
SD-25455-012

BIN NAME

T-*NO-K123-M.DG

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up-check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, T-, and U- relays as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

This condition generally results from failure of a terminating sender to close its crossbar swich crosspoints associated with one or more of the IB, IG, FB, FT, and FU crossbar switch verticals. It may also result from incoming trunk troubles or the presence of a false ground on the terminating sender "D" lead.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc G14 and Sh E2, Loc N11.

REFERENCE DOCUMENTS

Terminating Sender
CD-25013-01, Par. 11
Terminating Marker
CD-25283-01, Sect. II Par. 2
BSP 216-645-301

BIN NAME

T-*NO-K2

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up-check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, T-, and U- relays as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

During the down-check, relay CK2 failed to release indicating a false ground on the CK2 lead.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc G14 and Sh E2, Loc R10.

REFERENCE DOCUMENTS

Terminating Marker Circuit
SD-25283-01 B1B4, B2-D0, B4-A9
CD-25283-01 Sect. II, Par. 2
SD-25013-01-3
SD-25455-012

BIN NAME

T-*NO-K3

DESCRIPTION OF CIRCUIT OPERATION

Before any information is transmitted between the terminating sender and terminating marker, all leads from the terminating sender (which transmit incoming link frame and called number digits to the marker via the terminating marker connector) are tested for continuity and absence of foreign grounds. These marker tests are identified as the up-down check.

In the up-check, ground is supplied via the CK1, CK2, CK3, and CK4 leads to test the continuity of those leads not grounded by information on the sender crossbar switch. Upon satisfactory operation of all the F-, TH-, H-, and U- relays as well as the OAB, TR2, TR3, and RO relays, a path is completed to operate the CK4 and CK5 relays. The operation of relays CK4 and CK5 constitutes a valid up-check.

In the down-check, ground is removed from the CK1, CK2, CK3, and CK4 leads following operation of the CK4 and CK5 relays, and if no foreign grounds exist on these leads, relays CK1, CK2, CK3, and CK11 will release. The release of CK1-3 constitutes a valid down-check and provides for the K1-3 indications.

DESCRIPTION OF FAILURE

During the down-check, CK3 relay failed to release indicating a false ground on the CK3 or CK4 leads.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc H13 and Sh G2, Loc T9.

REFERENCE DOCUMENTS

Terminating Marker Circuit
SD-25283-01 B1-D4, B2-D0, B48-D0
CD-25283-01 Sect. II, Par. 2
SD-25013-01-3
SD-25455-012

BIN NAME

T-*NO-LC

DESCRIPTION OF CIRCUIT OPERATION

When the incoming link and connector is seized, the operation of its MCA- and MP- relays connect ground to the CK and CK1 leads operating the marker IK and IK1 relays, respectively. The operation of relay IK operates relay GT which places ground on the FC lead (through the TMC, TS, and TSL to the IT) operating the incoming trunk F relay. The operation of the F relay operates the LC- relay in the incoming link and connector which provides the LC- indication.

DESCRIPTION OF FAILURE

The incoming trunk failed to operate the incoming link and connector LC- relay associated with the incoming link frame primary switch in which the incoming trunk appears. The incoming trunk F relay either failed to operate over the FC lead (extended from the TM through the TMC, TS, and TSL to the IT), or in operating failed to operate its associated incoming link and connector LC- relay.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc H26 and Sh E2, Loc V22.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 13
CD-25283-01 Sect. II, Par. 15.01

Incoming Link Connector
SD-25457-01 Fig. 3
CD-25457-01 Par. 6

BIN NAME

T-*NO-LCF

DESCRIPTION OF CIRCUIT OPERATION

When an idle line is selected, the corresponding L- relay is operated and grounds the NF lead. This ground through cross-connection in the number group connector circuit operates a triple wound LC relay corresponding to the line choice number in which the selected line is located. The three windings of the LC relay represents a PBX line, a ring-party, or a tip-party line. The LC relay is operated on the winding corresponding to the type of line selected.

DESCRIPTION OF FAILURE

The terminating marker failed to operate an LC- relay over the block relay frame "NF" cross-connection. This condition generally results from a missing NF cross-connection associated with an individual line, but may also be due to number group MCB, MCC, HB-, or TB- relay contact problems (affecting more than one line).

This condition will also result if the block relay frame "NF" cross-connection is inadvertently connected to a JF- punching (JF indication present).

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc T6 and Sh E2, Loc R5.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS10
CD-25283-01 Sect. 11 Par. 7, 8.06

BIN NAME

T-*NO-LE-L

DESCRIPTION OF CIRCUIT OPERATION

When the NK relay operates as a check of the number group connector relay operation, the LE1, LE2, and LE12 relays operate in parallel. On no test and no hunt calls the LE1 and LE2 relays do not operate. Contacts of LE12 operate LE3, 4, 5, 6, 8, 9, 10, and 11 relays. The LE12 relay is released when an L- relay operates, releasing relays LE3, 4, 5, 6, 8, 9, 10, and 11. The LE3, 4, 5, and 6 relays have a make contact circuit connected to the HF leads, and the ground continues to check that LE1, 2, 8, 9, 10, and 11 relays are operated before the circuit is closed to operate the LE-relay. Any one of LE3-6 or LE8-11 operates the LE7 relay which completes the path to operate an L relay. On light traffic calls only, the XS4 relay operates the LE- relays as part of a cross lead test. They are released for use later as described above.

DESCRIPTION OF FAILURE

The terminating marker failed to operate either the L- or LE relay. The operation of the LE relay indicates that all LE- relays operated (LE 1, 2 remain normal on no-test calls) and that all L- relays are normal.

In light traffic, the LE-relay is operated twice, first on the marker test for crossed NS- leads and second in preparation for the operation of an L- relay corresponding to the idle line to which the call is to be completed. In heavy traffic the NS- lead cross test is canceled.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1 and E2.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 11, 10, 6
CD-25283-01 Sect. II, Par. 7.09-7.11, 48.05

BIN NAME

T-*NO-LIL

DESCRIPTION OF CIRCUIT OPERATION

The operation of relay HCA-HCB grounds one of the IL- punchings on relays JGA to JGE. This punching is cross-connected to select left or right incoming links.

DESCRIPTION OF FAILURE

The terminating marker failed to operate the LIL relay.

The LIL relay, that was to operate, was determined by the combination of operated JCA-E (junctor subgroups) and HCA-HCB (line link half choice) relays. The LIL relay determines which of the two groups of ten IL preimary-secondary switch links are to be tested for available links.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E2, Loc AA6 and Sh E2, Loc W28.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS-20
CD-25283-01 Sect. II, Par. 9.05, 11.01, 11.03, 11.13

BIN NAME

T-*NO-LIN-TIN

DESCRIPTION OF CIRCUIT OPERATION

When a subscriber terminal is disconnected, the NF and NC block relay cross-connections are removed. This indicates to the marker that call for that terminal number should be routed to intercept. At the time when the INA relay releases, if the RF, HF, TF, and LLG relays are normal, the INC relay operates and with the BLK relay normal, a circuit is closed to operate relay LIN or TIN.

DESCRIPTION OF FAILURE

The terminating marker failed to reroute the call to intercept upon detecting missing block relay frame NC and NF cross-connections associated with the selected line. If neither the LIN nor TIN indication is present on the exception report, the terminating marker path to operate the LIN or TIN relay may be open. If either the LIN or TIN indication is present on the exception report, the condition may be due to the failure to operate the corresponding intercept relay.

Option AU: The TM LIN relay is operated if the incoming class is either FS or MAN. If the incoming class is TOL, the TIN relay should have operated.

Option AV: The TM LIN relay is to be operated regardless of the incoming class.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 43, 58
CD-25283-01 Sect. II, Par. 40.02 - 40.04

BIN NAME

T-*NO-LJ

DESCRIPTION OF CIRCUIT OPERATION

Ground identifying the incoming connector frame over leads JR0 to 9 to contacts of the JG relays and contacts on relays HCA or HCB will cause operation of a JA or JB relay depending upon the cross-connections between the JG terminals and the JR terminals.

DESCRIPTION OF FAILURE

The terminating marker failed to ground a "JR-" punching to operate a JA- or JB- relay.

For offices equipped with ten incoming frames or groups, the JR- punching to be grounded is the same as the incoming frame or group (indicated by the IF-).

For other than ten incoming frames or groups, the JR punching to be grounded is determined from the combination of the ILC (indicated by the IF-) and terminating marker JGA, B, C, D, or E relay used on the call (refer to SD-25283-01, Table 14).

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc Y6 and Sh E2, Loc Y25.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS-20
CD-25283-01 Sect. II, Par. 11.04, 05, 08, 09, 17

BIN NAME

T-*NO-LLGA-D

DESCRIPTION OF CIRCUIT OPERATION

When the L relay operates, it grounds the NC lead which, through cross-connections in the number group connector, operates one of 40 windings of relays CA0 to CA9 and CB0 to CB9. The numerical portion of the designation of these relays indicates the horizontal group in which the selected line is located and the A or B indicates the half choice. The ground which operates the CA- or CB- relay is carried through a contact to operate one of relays LLGA to LLGD to indicate in which of the four line groups of the choice the selected line is located.

DESCRIPTION OF FAILURE

The terminating marker failed to operate one of the LLGA-D relays. The presence of a CA- or CB- indicates that the block relay frame NC cross-connection was continuous.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 9
CD-25283-01 Sect. II, Par. 9.01

BIN NAME

T-*NO-LOG

DESCRIPTION OF OPERATION

An operated LLG- relay closes the corresponding double - wound LOG- relay to leads LE and LO for the purpose of operating the LA and LB relays in the line link control circuit to lock out originating traffic. A double-wound LOG- relay is used with two lockout leads as a safeguard. Either LA or LB relay in the line link control circuit will lock out originating traffic, although both relays normally operate. A contact on the LOG- relay operates the corresponding LG- relay. The operation of any LG- relay results in an indication of "LOG" on trouble records.

DESCRIPTION OF FAILURE

The terminating marker either failed to gain access to the line line frame via the line choice connector and lock out originating traffic (line link or originating trouble) or failed to recognize its seizure of the link link frame (LCC or TM trouble).

NORMAL SEQUENCE OF OPERATION

See SD-25383-01, Sh E1, Loc X11 and Sh E2, Loc R31.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 16
CD-25283-01 Sect. II, Par. 8.06, 9.01-9.04

BSP 216-603-301
BSP 216-615-301
BSP 216-617-301
BSP 216-619-301
BSP 216-647-301

BIN NAME

T-*NO-M

DESCRIPTION OF CIRCUIT OPERATION

When the incoming trunk F relay operates, ground is extended to the associated incoming link primary select magnet or magnets. The M indication shows which magnets on the switch are grounded in preparation for operation over a B lead from the marker. For 100 trunk incoming links, one of 0 to 9 is grounded. For 160 trunk incoming links, one of 0 or 1 and one of 2 to 9 is grounded.

DESCRIPTION OF FAILURE

The incoming trunk failed to ground the select magnet operate lead(s) toward the incoming link primary select magnet(s) associated with a particular incoming trunk. Where 100 trunk incoming link frames are equipped, a single IL primary select magnet is operated from the operated incoming trunk F relay. Where 160 trunk incoming link frames are equipped, two primary select magnets, discriminating (0 or 1) and nondiscriminating (2-9) are operated from the operated incoming trunk F relay.

The operation of the incoming trunk F relay is indicated by the presence of the LC - indication.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc F25 and Sh E2, Loc U21.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 27, 28
CD-25283-01 Sect. II, Par. 15.04, .05, .07

Incoming Link Connector
SD-25457-01 Fig. 3
CD-25457-01 Par. 6

BIN NAME

T-*NO-MK0

DESCRIPTION OF CIRCUIT OPERATION

On first trials, the marker seizes the select magnet lockout circuit by placing 226- ohm battery on lead MPS which operates the FP relay in the incoming connector. This, in turn, operates the auxiliary RS relay which signals the marker over the MK0 that the preference circuit has been seized. It also signals the marker attached to the mate frame over lead MK1. If marker relay MK0 operates over lead MK0 with relay MK1 normal, it is an indication that the select magnets have satisfactorily been closed and the CH operating circuit is allowed to close. Second trial uses lead EPS and relay FE and ES, but are not recorded in this bin, but in "TR2 discount."

DESCRIPTION OF FAILURE

The incoming link connector RS relay either failed to operate or, in operating, failed to ground the MK0 lead toward the terminating marker.

If the incoming link frames are paired, this condition may result from a failure in the ILC select magnet lockout circuitry associated with a pair of incoming link frames.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS15
CD-25283-01 Sect. II, Par. 10
BSP 216-649-301

Incoming Link Connector
CD-25457-01 Par. 7, 8, 10, 17.13

BIN NAME

T-*NO-NGC

DESCRIPTION OF CIRCUIT OPERATION

The number group connector start lead is closed from 226-ohm battery through break contacts of relays YB, TM7, SPL, and TM9 and make contacts of one of the HN and FH relays. This battery operates the marker preference relay in the number group connector circuit.

When the marker preference relay in the number group connector operates, it awaits the preference series circuit, and closes a circuit to operate the MCA relay in the number group connector circuit.

DESCRIPTION OF FAILURE

The lack of an NGC- indication is attributable to the failure to operate a number group connector MCA-relay. This may be due to failure of the terminating marker to connect battery to a number group connector start lead, NG-ST-, or number group connector trouble preventing the operation of an MCA-relay.

The NG-ST- path is traced through contacts of operated translation relays H-, HN-, and FH-, or FHB- (punching ST- associated with the operated FH- or FHB- relay is connected to punching NG-ST). The OAB, TH-, and H- indications appearing on the exception report should be reviewed to determine if the records that generated the report are directed toward a single number group connector (probable number group connector trouble).

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc C18 and Sh E2, Loc J15.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 7
CD-25283-01 Sect. II, Par. 3 & 4

Number Group Connector
CD-25276-01 Sect. II, Par. 1.01

BIN NAME

T-*NO-NGC-HB

DESCRIPTION OF CIRCUIT OPERATION

The number group HB lead is closed from ground through a make contact of CK6 and a break contact of XS through XHB marginal cross detection relay coil and through breaks of MT, JHA, and MT2 and make contacts of one of the HN and FH relays.

This battery is cross-connected to a NG-HB- lead which is connected to the HB- indication on the trouble record.

If split hundreds is used in the associated hundred block, the path includes the TB- and SH- relays in place of the HN- and FH- relays.

DESCRIPTION OF FAILURE

The lack of both the NGC- and HB- indications may be caused by either the failure to operate a FH- or FHB- relay or the failure to operate an HN- relay in the terminating marker. If the called number is in a hundreds block associated with a split hundreds SH- relay, this condition may be due to failure to operate the SH- relay or failure to operate an NAL or AL relay.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc F16 and Sh E2, Loc R13.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 4, 7, 47
CD-24283-01 Par. 2.04, 3.04-3.10, 4, 29

BIN NAME

T-*NO-PN-TN-PTN

DESCRIPTION OF CIRCUIT OPERATION

Operation of the HB relay in the number group closes a PN, TN, or PTN lead to the marker to operate a like designated relay in the marker.

DESCRIPTION OF FAILURE

A terminating marker PN, TN, or PTN relay failed to operate.

The operation of a number group connector HB- relay (indicated by the presence of the TBK indication) caused one of the PN, TN, or PTN leads to be grounded toward the terminating marker to operate the corresponding relay in the terminating marker. The lack of a PN, TN, or PTN indication may be attributed to a continuity failure in this operate path.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc A19 and Sh E2, Loc F16.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS14
CD-25283-01 Sect. II Par. 65.10

Number Group Connector
CD-25276-01 Par. 6

BIN NAME

T-*NO-RC

DESCRIPTION OF CIRCUIT OPERATION

Relay RC operates on a normal call through a break contact of BB, a make contact of LOG-, a break contact of AIS, break contacts of NC2 and NTT, make contacts of HF or RF and break contacts of SGA, NC8, JF0 to JF4, BBT, YB, STF, CK1, and make contact of CK5 to ground.

Relay RC grounds lead RC to the incoming connect for the purpose of operating incoming trunk relay RC and also operates relay RC1 for checking purposes from ground furnished by relay CK7. On a tip-party call, relay RC is operated from ground on a make of RV relay.

The ground for operating the RC1 relay is controlled with Apparatus Figure G when provided to block the marker in case of a mismatch of physical-theoretical indications between incoming trunk and called number. The RC1 relay is operated in parallel with the RC relay in the incoming trunk.

On a regular call, the RC is held operated at the end of the call by the trunk. The RC1 and RC in the marker must match as part of the circuit to operate relays GT1 and GT2 to cut off continuing test and apply ground test.

RC is also used to apply overflow tone instead of busyback tone to the subscriber when the TC and RV relays are operated.

DESCRIPTION OF FAILURE

The absence of the RC indication signifies that either the terminating marker failed to extend ground to operate the incoming trunk RC relay or the incoming trunk RC relay in operating failed to lock to the operated incoming trunk D relay. The incoming trunk RC relay is operated if the call is to a free line, hunt line, individual, or two-party line (HF, RF, or TF indicated), or if the trunk is to be set to return overflow (OF indicated) to the calling subscriber.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 32, 42
CD-25283-01 Sect. II Gen. Par. 20
Reg. Call Par. 21.01, 25.03
RO or OF Par. 36,38
BSP-216-667-303
BSP-216-667-301

BIN NAME

T-*NO-RIL

DESCRIPTION OF CIRCUIT OPERATION

The operation of relay HCA-HCB grounds one of the IL- punchings on relay JGA-JGE. This punching is cross-connected to select right or left incoming links.

DESCRIPTION OF FAILURE

The RIL relay that was to operate was determined by the combination of operated JGA-E (junctor subgroup) and HCA-HCB (line link half choice) relay. The RIL relay determines which of the two groups of ten IL-primary-secondary switch links are to be tested for available links.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, E1-AA6 and E2-W28.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS-20
CD-25283-01 Sect. II, Par. 9.05, 11.01, 11.03, 11.13

BIN NAME

T-*NO-RIL-LIL

DESCRIPTION OF CIRCUIT OPERATION

The operation of relay HCA or HCB grounds one of the IL punchings on relays JGA to JGE. This punching is cross-connected to operate relays LIL or RIL to select left or right incoming links.

DESCRIPTION OF FAILURE

The terminating marker failed to operate a RIL or LIL relay.

The RIL or LIL relay that was to operate is determined by the combination of operated JGA-E (junctor subgroup) and HCA or HCB (line link half choice) relays (refer to SD-25283-01, Table 18). The RIL and LIL relays determine which of the two groups of ten IL primary - secondary switch links are to be tested for available links.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc AA6 and Sh E2, Loc W28.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS-20
CD-25283-01 Sect. II, Par. 9.05, 11.01 & .03

BIN NAME

T-*NO-RL

DESCRIPTION OF CIRCUIT OPERATION

The release of the incoming trunk F relay and marker relay SL1 grounds the RL lead to the terminating sender causing it to release the connector. The connector, in turn, causes the marker to restore to normal by opening the receiving leads, removing ground from the CKG lead, closing ground to the DA and F leads, and removing ground from the TM and DB leads.

When a busy or overflow condition is encountered by the marker, relay OR releases and relay SRL operates. The operation of SRL with relays GT2 and CON1 operated grounds the RL lead, causing the marker to release.

DESCRIPTION OF FAILURE

The absence of RL indicates:

1. The terminating marker failed to extend ground toward the terminating marker connector to operate the terminating sender RL relay.

2. An open exists in the "RL" lead from the marker through the terminating marker connector to the terminating sender.

3. The terminating sender RL relay failed to operate and/or lock.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, V37 and Sh E3, Loc S20.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS36, 42
CD-25283-01 Sect. II
Reg call Par. 24
OF call Par. 36.03, 36.05
BB call Par. 34.04

BIN NAME

T-*NO-RV

DESCRIPTION OF CIRCUIT OPERATION

Relay RV operates on a normal call when the TF relay is operated. Relay RV grounds lead RV to the incoming connector for the purpose of operating incoming trunk relay RV and also operates relay RV1 for checking purposes.

The RV1 relay is operated in parallel with the RV relay in the incoming trunk. On a regular call, the RV1 is held operated at the end of the call by the trunk. The RV1 and RV in the marker must match as part of the circuit to operate relays GT1 and GT2 to cut off continuity test and apply ground test.

RV in the incoming trunk also is used to apply overflow or busyback tone to a calling subscriber.

DESCRIPTION OF FAILURE

The absence of the RV indication signifies that either the terminating marker failed to extend ground to operate the incoming trunk RV relay or the incoming trunk RV relay, in operating, failed to lock to the operated trunk D relay. The incoming trunk RV relay is operated if the call is to the tip party of a two-party line (TF indicated) or if the incoming trunk is to be set to return busyback (BB indicated) or overflow (OF indicated) to the calling subscriber.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS32, 42
CD-25283-01 Sect. II, Gen Par. 20
Reg call Par. 21.01, 25.03
BB Par. 34.03
OF Par.36

BSP 216-667-303
BSP 216-667-301

BIN NAME

T-*NO-SL

DESCRIPTION OF CIRCUIT OPERATION

Relay SL in the marker operates when the primary switch contacts in the incoming link frame operate.

DESCRIPTION OF FAILURE

The terminating marker SL relay failed to operate. The SL relay serves as a verification that incoming link frame (IL) primary switch crosspoints closed.

The presence of the GJ and GC indications indicates that the terminating marker extended ground to the line link frame (LL) to operate the IL secondary switch hold magnet via the IL-LL junctor sleeve lead. The IL secondary switch hold magnet should have operated and closed IL secondary switch crosspoints to extend the ground over the IL sleeve lead to operate the IL primary switch hold magnet. The IL primary hold magnet, in operating, should have operated IL primary switch hold magnet. The IL primary hold magnet, in operating, should have operated IL primary switch crosspoints to extend the ground back to the TM via the IT and ILC to operate the marker SL relay.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc R23 and Sh E3, Loc L9.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 30,31
CD-25283-01 Sect. II, Par. 15. 16.02, 16.04

Incoming Line Connector
CD-25457-01 Par. 7
BSP 216-649-301

BIN NAME

T-*NO-TBK

DESCRIPTION OF CIRCUIT OPERATION

Assuming a number group translation which does not require the use of an SH relay, the TB- lead is grounded through the operated even numbered HP relay, back contact of the associated odd numbered HP relay, through the winding of XTB, the winding of TBW, back contacts of XTB1, XS5, XS3, XIN, XS, JHA, TM7, and TM9, and through a make contact of CK6. This operated relay TBW which operates the TBK relay and indication.

DESCRIPTION OF FAILURE

The terminating TBW relay failed to operate. The TBW is in series with the operate path for the number group connector twenty block TB- relay. The lack of a TBK indication may be attributed to a continuity failure in this path.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc C37 and Sh E2, Loc R21.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS5
CD-25283-01 Sect. II, Par. 6.01-6.03

Number Group Connector
CD-25276-01
BSP-216-667-305

BIN NAME

T-*NO-TC

DESCRIPTION OF CIRCUIT OPERATION

Relay TC operates on overflow, busyback, and calls to free lines. Relay TC grounds lead TC to the incoming connector for the purpose of operating incoming trunk relay TC and also operates relay TC1 for checking purposes.

The TC1 relay is operated in parallel with the TC relay in the incoming trunk. The TC is held operated at the end of the call by the trunk. The TC1 and TC in the marker must match as part of the circuit to operate relays GT1 and GT2 to permit normal marker progress.

DESCRIPTION OF FAILURE

The absence of the TC indication signifies that either the terminating marker failed to extend ground to operate the incoming trunk TC relay or the incoming trunk TC relay in operating failed to lock to the operated incoming trunk D relay. The incoming trunk TC relay is operated if the call is to a free line (FL indicated), or if the incoming trunk is to be set to return busy back (BB indicated), or overflow (OF indicated) to the calling subscriber.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 32, 42
CD-25283-01 Sect. II Gen. Par. 20, 21
Free Line Par. 26.05
BB Par. 34
OF Par. 36, 38

BIN NAME

T-*NO-TE-CH

DESCRIPTION OF CIRCUIT OPERATION

When CH relay operates, it locks under control of PGT and NK and releases the TE relay which has previously operated through back contacts of the CH relay to ground on relay NK.

DESCRIPTION OF FAILURE

The terminating marker failed to operate the TE relay.

The presence of the TK is an indication that the terminating marker NK relay operated. This indicates a continuity failure in TE relay operate path traced through contacts of the operated NK relay and normal CH- relays.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc V15 and Sh E3, Loc Q2.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS-18
CD-25283-01 Sect. II, Par. 12.06

BIN NAME

T-*NO-TK

DESCRIPTION OF CIRCUIT OPERATION

The links and junctors are cut into the marker, and as the cut-in relays operate, they carry forward a check lead which starts at the incoming connector LC relay through the incoming connector MC relay as lead AK to the line choice connector circuit, through the marker cut-in relay of the line choice connector, through contacts of the CR and CE relays in parallel, through the HG relays of the line group, through resistance in the line choice connector, through contacts of LJA or LJB relays, through the marker TK and XHG relays in series to battery.

DESCRIPTION OF FAILURE

The terminating marker TK relay failed to operate.

The TK relay serves to verify the operation of all TM, LCC, and ILC relays necessary to connect all portions of the channels to the TM for test. For the TK relay to operate, the following conditions must be satisfied:

1. A marker JPN or JP - relay operated, making unused channels appear busy. (Marker groups equipped with less than ten incoming frames or groups)

2. A marker LIL or RIL-relay operated to cause the marker to test either the ten left or right incoming links.

3. A line choice connector LJA - or LJB - relay operated to connect ten IL-LL junctor sleeve leads to the marker for test.

4. A line link frame HG - relay operated to connect ten LL link sleeve leads to the LCC.

5. A line choice connector CR - and CE - relay operated to extend the LL link sleeve leads to the marker for test.

6. Ground is present on the AK lead from the ILC (AK indicated), indicating that the incoming link connector LC - relay operated to connect twenty IL link sleeve leads to the marker for test.

NORMAL SEQUENCE OF OPERATION

See SD-25283-01, Sh E1, Loc V12 and Sh E2, Loc P32.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 17
CD-25283-01 Sect. II, Par. 12.04, 12.05

BIN NAME

T-*PG-TBK-UP

DESCRIPTION OF CIRCUIT OPERATION

Relay PG operates from a make contact of HT19 from ground which otherwise operates the L relay and locks to a make contact of TLT. Relay PG opens the battery circuit of the L- relays.

Relay PG closes ground from a make contact of relay CK6 to break contacts of relays IN and JHA and JHB to the armatures of the even numbered HP relays starting with HP0. The operated even HP relay, thereupon, operates the associated odd numbered HP relay. This removes the ground, releasing the 20-block relay in the number group connector, and at the same time, relay TBW releases followed by TBK releasing.

DESCRIPTION OF FAILURE

Consecutive End of Blocking Hunting - The terminating marker found all lines busy (PG indicated in a number group 20-block and is attempting to advance to the next higher numbered 20-block to test for idle lines). The presence of TBK is an indication that the marker failed to release the present 20-block (NGC TB-) by the operation of the next higher odd numbered marker HP- relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 8 & 5
CD-25283-01 Sect. II, Par. 28

BIN NAME

T-*RL-TRL

DESCRIPTION OF OPERATION

The terminating marker XRL relay is arranged to operate if the "RL" and/or "TRL" leads to the terminating marker connector are falsely grounded.

DESCRIPTION OF FAILURE

The presence of RL indicates that the terminating marker XRL relay failed to operate or a false ground exists on the RL lead multiple between the terminating marker TIB relay and the TTI.

The presence of the TRL indicates that a false ground exists on the TRL lead multiple between the terminating marker and the TTI.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS36, Sh B43
CD-25283-01, Sect. II, Par. 47
BSP 216-665-301

BIN NAME

T-*SPL-NO-TYPE

DESCRIPTION OF CIRCUIT OPERATION

When a special call is to be established, the terminating marker connector circuit selects one of the two terminating marker circuits which are arranged to handle special calls and operates the SPL relay of the marker which is seized. The SPL relay prepares operating circuits for the class of call relay which will be operated from the incoming circuit to indicate which type of special call is to be set up. The NT relay operates for no-test calls from the test desk or the verifiation operator, the NH relay operates for no-hunt calls from the OGT test frame, and the NN relay operates on calls from the local test desk, which are neither no-test or no-hunt.

DESCRIPTION OF FAILURE

A terminating marker NT, NH, or NN relay failed to operate. The terminating marker SPL relay was operated from the terminating sender indicating that a special call was to be established. After the terminating marker gained access to the incoming link connector (ILC-MC- relay operated), the incoming trunk was to identify the type of special call to be established by causing the operation of one, and only one, marker NT, NH, or NN relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01 FS 50, 51, 53
CD-25283-01 Sect. II, Par. 57, 59, 60, 61, 64
Incoming Link Connector
CD-25457-01 Par. 7

BIN NAME

T-*TE-UP

DESCRIPTION OF CIRCUIT OPERATION

After a number group connector is seized, it is checked by the terminating marker, and if a satisfactory test is made, the NK relay operates. Ground from the NK relay operates the TE relay if all of the CH- relays are normal.

DESCRIPTION OF FAILURE

The TE relay did not release when the CH relay operated. This problem could be caused by a shorted back contact of one of the CH- relays.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 -B26 -FS18
CD-25283-01 Sect. II, Par. 12.06

BIN NAME

T-*TERM-SDR-TST

DESCRIPTION OF CIRCUIT OPERATION

This bin is provided to prevent terminating-sender-test calls from entering bins and causing erroneous exception reports.

DESCRIPTION OF FAILURE

This is not a failure but a test call.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01
CD-25283-01 Sect. II, Par. 62

BIN NAME

T-*TR2-DISCOUNT

DESCRIPTION OF CIRCUIT OPERATION

This bin is provided as a means of preventing second trial failures from entering certain bins where they may cause erroneous exception reports to be generated. (The second trial failure will generally duplicate a previously binned first trial failure).

DESCRIPTION OF FAILURE

"TR2 DISCOUNT" exception reports should, therefore, be discounted, in that, they are not intended to identify a specific trouble condition. However, if an abnormal number of "TR2 - DISCOUNT" ERs are issued against a particular terminating marker, the individual trouble records that were combined to generate the reports should be reviewed to determine if a common trouble condition is indicated.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01
CD-25283-01

BIN NAME

T-*TTI-TEST

DESCRIPTION OF CIRCUIT OPERATION

This bin is provided to prevent test calls from entering bins and causing erroneous exception reports.

This bin is also used to aid in reviewing test calls.

DESCRIPTION OF FAILURE

This is not a failure but a test call.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01
CD-25283-01

BIN NAME

T-*USER-DEF-A

DESCRIPTION OF CIRCUIT OPERATION

USER-DEF (User defined data point): Utilization of the data points is up to the discretion of the individual telephone company. These "user defined" points allow most locally designed nonstandard arrangements to be completed with a standard ATA System.

DESCRIPTION OF FAILURE

A nonstandard data point was grounded.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-28110-01
CD-28110-01

BIN NAME

T-*USER-DEF-B

DESCRIPTION OF CIRCUIT OPERATION

USER-DEF (User defined data point): Utilization of the data points is up to the discretion of the individual telephone company. These "user defined" points allows most locally designed nonstandard arrangements to be completed with the standard ATA System.

DESCRIPTION OF SYSTEM

A nonstandard data point was grounded.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-28110-01
CD-28110-01

BIN NAME

T-*X

DESCRIPTION OF CIRCUIT OPERATION

The X relay is the master cross-detection relay and operates whenever one or more of the following relays and/or combinations of relays operate: XALG, XC1, XF1, XF3, XFC, XHB1, XHG1, XIN, XL, XOB, XP, XPS1, XS, XSM, XT1, XTB1, XTL, XTMB, HCA and HCB, PN and TN, PTN and PN or TN, AL and NAL, IP and IT or IPT. In addition, the X relay will also operate if no plug is in the XT jack at the terminating trouble indicator and relays OH and EH, or LIL and RIL operate.

DESCRIPTION OF FAILURE

Normally the X indication is obtained in conjunction with other cross indications, therefore, this failure indicates that a cross was detected but no cross indication found. Check for false operation of the X relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B35 and B57, FS30 and 48
CD-25283-01 Par. 26.04, 75.05

BIN NAME

T-*X-AK-SL

DESCRIPTION OF CIRCUIT OPERATION

Prior to the operation of the IK relay, the master cross relay X will operate over its secondary winding if a false ground is detected on one or more of the following leads:

1. AK lead to the line choice connector
2. AK lead to the incoming link and connector
3. SL lead to the incoming link and connector.

DESCRIPTION OF FAILURE

The X, AK, SL combination indicates that a false ground was detected on the AK and/or SL leads between the marker and the MC- relays of the incoming link and connector and/or line choice connector.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B35 FS30, -01-B25 FS17
CD-25283-01 Sect. III, Par. 3.37
SD-25275-01 Fig. 2, 3, 4, 9
SD-25457-01 Fig. 1, 2, 3, 5
SD-25553-01 Fig. 8
SD-25876-01 Fig. 1
SD-25947-01 Fig. 9

BIN NAME

T-*X-LIL-RIL

DESCRIPTION OF CIRCUIT OPERATION

In normal circuit functioning, either the LIL or RIL relay should operate, but never both. With no plug in the terminating trouble indicator, XT jack, the master cross-detecting X relay serves as a continual monitor to detect simultaneous operation of the LIL and RIL relays.

DESCRIPTION OF FAILURE

The terminating marker LIL and RIL relays operated simultaneously causing the (X) relay to operate.

Possible causes of simultaneous activation are troubles with (LIL) and (RIL) cross-connection.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B27 FS20, -01-B57 FS48
CD-25283-01

BIN NAME

T-*X-NAL-AL

DESCRIPTION OF CIRCUIT OPERATION

In the normal processing of free number or PBX calls, either the AL or NAL relay should operate, but never both. The terminating marker master cross X relay detects simultaneous operation of the AL and NAL relays.

DESCRIPTION OF FAILURE

The terminating marker AL and NAL relays operated simultaneously causing the X relay to energize.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B45 FS39, -01-B57 FS48
CD-25283-01 Par. 26.04

BIN NAME

T-*XALG

DESCRIPTION OF CIRCUIT OPERATION

App Figure At PBX blocks register.

The PBX block register BKT relay operates on every marker PBX call for trouble detection purposes. Ground over lead BTLT from the terminating marker to the PBX block register circuit controls its slow-release BKT relay.

In normal operation, the marker checks each allotted block for idle PBX lines. If there are no idle lines, the PBX block allotter BSA or BSB relay will operate to remove ground from the block register BK lead which releases the BK relay, thereby, opening the operate path for the XALG relay. If, however, because of circuit troubles, the BK relay should remain operated; XALG will operate when BKT restores to normal. Also, if more than one ALG- relay is operated because of crossed ALG leads, XALG relay will operate when the PBX block register BKT relay releases.

DESCRIPTION OF FAILURE

The PBX block register circuit XALG operated, indicates trouble in the PBX block allotter circuit, which might be due to failure of the block allotter relays to operate more than one block register relay operated, or failure to match a marker busy test against the allotter.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

Terminating Marker
SD-25283-01-B46 FS40
CD-25283-01 Sect. II, Par. 30.14

Terminating Trouble Indicator
CD-25284-01 Sect. II, Par. 1.11

PBX Block Register
CD-25920-01 Par. 10.1
SD-25920-01 Fig. 1, 2, 3
SD-25919-01 Fig. 1

BSP 216-331-501 Test H

BIN NAME

T-*XC

DESCRIPTION OF CIRCUIT OPERATION

The XC relay (FS9) is marginal and arranged to detect crosses in the HG- leads associated with the block relay frame NC- cross connect field.

DESCRIPTION OF FAILURE

The terminating marker XC relay operated, indicating that more than one CA- or CB- relay winding was operated.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B17 FS9
CD-25283-01 Par. 8.06, 52.02
SD-25276-01 Fig. 2, 6
BSP 216-331-502 Test B
BSP 216-667-307
BSP 216-667-308

BIN NAME

T-*XF

DESCRIPTION OF CIRCUIT OPERATION

The XF and XF2 (FS10) are marginal relays arranged to detect crosses in the RF-, HF-, and TF- leads associated with the block relay frame NF cross-connect field.

DESCRIPTION OF FAILURE

The terminating marker XF and XF2 relays operated, indicating that two or more LC- relay windings were energized.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01 Fig. 2, 6
SD-25283-01-B18A, FS10
CD-25283-01 Par. 52.03
BSP 216-647-301
BSP 216-667-301
BSP 216-667-302
BSP 216-667-304
BSP 216-667-306
BSP 216-667-310

BIN NAME

T-*XFC

DESCRIPTION OF CIRCUIT OPERATION

The XFC and XFC1 relays detect false ground on the FC lead and on the GT relay winding and front contact circuit. This circuit is protected to guard against false operation of an incoming link and connector circuit.

DESCRIPTION OF FAILURE

The terminating marker XFC relay operated, indicating a false ground on either the FC lead from the terminating marker connector or the GT relay winding and front contact.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25013-01 Fig. 1
SD-25036-01 Fig. 3 to 8
SD-25283-01-B21 FS13, -01-B41 FS33
CD-25283-01 Par. 15.01, 52.05
SD-25459-01 Fig. 1 and 2
BSP 216-641-301, 216-644-301
BSP 216-331-502, Test H
BSP 216-644-301

BIN NAME

T-*XHB

DESCRIPTION OF CIRCUIT OPERATION

When an HN- or TB- (App Fig. 9) relay operates, the marginal XHB relay detects crosses in the HB- leads to the number group connector and/or NG-HB- leads to the PBX block register circuit. The operation of XHB relay operates relay XHB1 which locks to relay CK7.

DESCRIPTION OF FAILURE

The terminating marker XHB1 relay operated. If no number group (NGC-) indication is present, a false cross to battery exists between the marker and the number group connector HB- lead multiple. If a valid NGC- indication is present, a cross exists which caused two or more block relay frame HB- relays to operate.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01, Figs. 2, 14
SD-25283-01, Sh B7, B45, B46, B57, FS4, FS40, FS48
CD-25283-01, Sect. II, Par. 52.02
BSP 216-331-502, Test B

BIN NAME

T-*XHG

DESCRIPTION OF CIRCUIT OPERATION

When the called line has been selected and relay RIL or LIL operates, the terminating marker marginal XHG relay will operate if more than one line choice connector K- resistor is grounded. The operation of XHG relay operates relay XHG1, which locks to relay CK7.

DESCRIPTION OF FAILURE

The terminating marker XHG relay operated, indicating that more than one line link frame HG- relay operated or a false ground exists on the line choice connector MCA- relay multiple.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25275-01 Fig. 2, 3, 4, 5, 9
SD-25283-01-B25 FS17
SD-25553-01 Fig. 8
CD-25283-01 Par. 12.04
CD-25284-01 Sect. II, Page 7

BSP 216-673-301
BSP 216-331-502 Test B

BIN NAME

T-*XIN

DESCRIPTION OF CIRCUIT OPERATION

Terminal hunting and operator intercept cross-detection.

With a shorting plug in the XT jack, at the terminating trouble indicator frame, the XT2 and XT3 relays operate, in turn operating the XT4 relay. The operated XT4 relay closes a path at the terminating marker frame in the XIN relay to check for false ground on the winding of marker relays BBT, LIN, LT1, OIN, TIN, and TT1. Should a foreign ground appear at any of these relays, the XIN relay will operate in series with the relay which has the foreign ground present.

Upon marker seizure, the operation of the CK5 relay, this standing ground test is canceled by the release of relay XT4.

DESCRIPTION OF FAILURE

The terminating marker XIN relay operated, indicating that a foreign ground was detected on the winding of one or more of the LIN, TIN, LTI, TTI, BBT, and OIN (option "AV") relays.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B50, B51, FS42, -01-B42 FS43, -01-B30 FS22
SD-25283-01-B57 FS48
CD-25283-01 Par. 52.04
BSP 216-331-502 Test A

BIN NAME

T-*XL

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker XL relay serves as a standing-ground test on the marker line relays L0-19 and if furnished (KD option) relay LTH and associated HT- contacts. This test is canceled upon seizure of the terminating marker by operation of the CK8 relay.

DESCRIPTION OF FAILURE

The terminating marker XL relay operated, indicating the presence of a false ground on a winding of a marker L- relay or on the winding of the optional LTH relay or associated wiring.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B11 FS6, B12 FS6, B64 FS60, B14 FS8
CD-25283-01 Par. 7, 52.04
BSP 216-331-502 Test B

BIN NAME

T-*X0B

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker XOB relay is electrically connected in parallel with the windings of the BB and OF relays. The XOB relay checks for false relay operation while the circuit is idle. Upon seizure, with the operation of LLB and IK relays early in the marker sequence, this ground-detection monitoring is canceled by opening the XOB operate path.

DESCRIPTION OF FAILURE

The terminating marker XOB relay operated, indicating the presence of a false ground on the winding of the marker BB or OF relay.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 B48 D0-FS42, B57F2, FS48
CD-25283-01 Par. 52.04
BSP 216-331-501 Test B

BIN NAME

T-*XOS

DESCRIPTION OF CIRCUIT OPERATION

The marker, when it operates the primary hold magnet in the line link, also operates relay HG. When slow release relay TLH releases, the marker verifies that the hold magnet has locked by checking that relay HG remained operated. Under these conditions, if relay HG is normal with relay GLH1 operated, in offices ***without marker speedup:***

a. With App Fig. AT and GY wiring, if the call is a hunt-field call, an XOS indication is obtained; otherwise, the call is routed to intercept.

b. With App Fig. AV and GZ wiring, an XOS indication is obtained on all calls.

DESCRIPTION OF FAILURE

The XOS indicates that the marker encountered an open sleeve lead condition. The open could be due to the failure of the terminating marker to operate the line link primary hold magnet, failure of the hold magnet to lock, or a missing or broken NS to LS line distributing frame cross-connect.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS43 Sh B50
CD-25283-01 Par. 30.17, 40.05, 40.08
CD-25284-01 Sect. II, Par. 1.11

BIN NAME

T-*XP

DESCRIPTION OF CIRCUIT OPERATION

The XP relay is a marginal relay for detecting simultaneous operation of two or more of the pattern (JP0-8 and JPN) relays.

DESCRIPTION OF FAILURE

The terminating marker XP relay operated, indicating that more than one junctor pattern relay was operated.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B30 FS22,-01-B18 FS10, -01-B29 FS21
CD-25283-01 Par. 45.02, 52.02
BSP 216-331-502 Test B

BIN NAME

T-*XPS

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker XPS relay is marginal and arranged to detect the operation of more than one incoming link primary select magnet. The operate path for the incoming link primary switch select magnet is from 48V battery through the ten ohm primary winding of XPS relay, the B lead to the incoming link and connector, MC relay contact 51, LC relay contact 9, the primary switch select magnet winding, M lead to incoming trunk circuit F relay make-contact to ground.

The XPS relay also supplements the XFC relay to indicate a crossed FC lead through the terminating marker connector, terminating sender, and terminating sender link train. The discriminating levels 0 and 1 on 160 trunk incoming link frames are not covered by this trouble detection circuit.

DESCRIPTION OF FAILURE

The terminating marker XPS relay operated, indicating that more than one incoming link frame primary switch select magnet was energized.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B33 FS27, -0-B21 FS13
CD-25283-01 Par. 15.04, 52.05
SD-25457-01 Fig. 1, 3, 5
BSP 216-641-301
BSP 216-644-301
BSP 216-331-502 Test B
BSP 216-659-301

BIN NAME

T-*XR

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker XR relay operates whenever a false ground appears on the TC or RC lead from the incoming link and connector circuit. A foreign ground on the TC or RC lead will falsely operate the TC1 or RC1 relay respectively. The operation of either of these relays operates relay XR when relay CK6 operates. On second trial, after encountering trouble during the initial marker call processing, the operate path of the XR relay is broken by operation of relays TR1 or TR3.

DESCRIPTION OF FAILURE

The XR relay operated, indicating that either the RC or TC lead to the incoming link and connector circuit was falsely grounded.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01-B41 FS33, -01-B39 FS32
CD-25283-01 Par. 21.06, 38, 52.06, 53.07
BSP 216-331-501 Test B

BIN NAME

T-*XRL

DESCRIPTION OF CIRCUIT OPERATION

A grounded RL or TRL lead to the terminating marker connector causes the terminating sender to release prematurely; therefore, the XRL relay is arranged to operate whenever either or both of these leads is falsely grounded.

DESCRIPTION OF FAILURE

The terminating marker XRL relay operated indicating a false ground on either or both the RL and TRL leads to the terminating marker connector.

The XRL indication, by itself, indicates the false ground is on the TRL lead; however, if the RL indication is also present, the false ground is either on the RL lead or both the RL and TRL leads.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25283-01 FS36, Sh. B43
CD-25283-01 Par. 47.01
BSP 216-331-502, Test B
BSP 216-665-301

BIN NAME

T-*XS

DESCRIPTION OF CIRCUIT OPERATION

During light traffic (LTR relay operated) the nonmarginal XS relay detects, on the NS0-19 leads, false ground or crosses in the wiring between the MCB and TB- relays in the number group connector.

In addition, if a plug is inserted in the XT jack at the terminating trouble indicator, the XS relay will also test for falsely grounded NF- leads. The NF lead test is made when relays LE1 and LE2 operate and is canceled upon operation of either the CK5 or an L0-19 relay.

DESCRIPTON OF FAILURE

The terminating marker XS relay operated, indicating that a false cross or ground exists on the NS-lead between the MCB- and TB- relays in the number group connector. If a plug is in the XT jack at the TTI, the trouble could be due to a false ground on the number group connector NF- leads.

SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01 Fig. 2, 6, 7, 8, 10
SD-25283-01 FS8, Sh. B16; FS10, Sh. B18; FS48, Sh. B57
CD-25283-01 Par. 48.02/.05, 49.01, 49.02
BSP 216-331-502 Test A
BSP 216-667-309
BSP 216-667-604

BIN NAME

T-*XSM

DESCRIPTION OF CIRCUIT OPERATION

The terminating marker XSM relay operates when a line primary or secondary select magnet lead is falsely grounded or when two select magnet leads are crossed. Its operation results in operating relay X and blocking the marker.

If a shorting plug is inserted into the XT jack at the terminating trouble indicator, the XT2 relay operates, operating the LGA through LGD relays and closing through the SM(A-D)0-9 leads to the line choice connector. With the operation of the LGA through LGD relays, the XSM relay checks for false ground or crosses on all line link select magnet leads toward the line choice connector multiple. This cross detection function is eliminated upon marker seizure by operation of the CK5 relay which releases the XT2 and LGA-LGD relays.

DESCRIPTION OF FAILURE

The XSM relay operated, indicating that a false ground or cross exists on the line link primary and secondary switch, select magnet control SM- leads.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25275-01 Fig. 2
SD-25283-01-B33 FS26, -01-B24 FS16, -01-B57 FS48
CD-25283-01 Par. 52.04
SD-25553-01 Fig. 8, 10, 3, 4, 14
BSP 216-331-502 Test A
BSP 216-667-304
BSP 216-667-309

BIN NAME

T-*XTB

DESCRIPTION OF CIRCUIT OPERATION

The XTB relay is a marginal cross-detecting relay which operates when two or more TB- or JF- leads to the number group connector are crossed. The operation of relay XTB operates relay XTB1 which opens the operate path of the number group connector twenty-block (TB-) relays, operates the master cross X relay, and blocks the marker.

DESCRIPTION OF FAILURE

The terminating marker XTB and XTB1 relays operated, revealing the presence of a cross in the operate path of the number group TB relays.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01 Fig. 2, 14, 6
SD-25283-01-B9, B10 FS5, B57 FS48
CD-25283-01 Par. 6.02, 52.02
BSP 216-331-502 Test B

BIN NAME

T-*XTI

DESCRIPTION OF CIRCUIT OPERATION

When a plug is inserted into the XT jack (located on the terminating marker trouble indicator) the XT2 and 3 relays operate. The operated XT2 and 3 relays operated the LG-A to D relays and the LIL, RIL, and JPN relays.

The LIL, RIL, and JPN relays close through the incoming link and line junctor leads to the winding of the AB relays, the common LL leads from the line link frame being connected to the winding of the AB and LL relays are connected to the windings of the XT relay until the LLB relay operates, at which time the standing ground test is removed.

DESCRIPTION OF FAILURE

The terminating marker detected a false battery or ground on the hold magnet leads toward the incoming link connector or line choice connector.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

CD-25283-01 Sect. II, Par. 50.01
SD-25283-01 FS22, FS23

BIN NAME

T-*XTL

DESCRIPTION OF CIRCUIT OPERATION

The XTL relay checks for the presence of false grounds on the TB0-4 leads to the number group connector circuit. Once the marker seizes the number group, the XTL relay is extended via the operation of the number group connector MCA and MB relays, to the windings of the block relay frame twenty-block TB- relays not used on the call.

DESCRIPTION OF FAILURE

The XTL relay operated, indicating the presence of a false ground on one or more of the TB- leads between the marker and the MCA relay in the number group connector circuit. If the marker progress indicates seizure of the number group, the false ground exists between the MCA relay and the block relay frame, on the winding of one of the TB- relays not used on the call.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25276-01 Fig. 2, 6, 14
SD-25283-01 FS5 Sh B10
CD-25284-01 Sect. II, Page 7
BSP 216-331-502 Test B

BIN NAME

T-*XTMB

DESCRIPTION OF CIRCUIT OPERATION

When a plug is inserted in the TMB jack at the number group connector or line choice connector, all calls to that frame will return overflow. When the marker calls for a connector and finds a plug in the TMB jack, this relay causes resistance start battery to connector to the (line choice connector) TMBL or (number group connector) TNBN operating the relay.

DESCRIPTION OF FAILURE

If either the TMBL or TMBN operate falsely, as indicated by the grounding of the LK or NK lead, ground on the lead through a make contact on the associated TMBL or TMBN relay will operate relay XTMB.

NORMAL SEQUENCE OF OPERATION

Not available.

REFERENCE DOCUMENTS

SD-25275-01, Fig. 2A, 7, 8, 10
SD-25276-01, Fig. 13, 15
SD-25283-01, Sheets B13, B24-25, B49 FS7, FS-16-17, FS42
CD-25275-01, Par. 10
CD-25276-01, Par. 16.01, 19.01
CD-25283-01, Sect. II, Par. 56.02, 56.03, 69.02
BSP 216-331-502, Test B