SD-26022-01

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SUPPORTING INFORMATION

CATEGORY	NO.
LLMC OR SLLMC FRAME EQUIP	J28154G-( )
LL OR IR MC FRAME EQUIP	J28154U-( )
EQUIP DESIGN REQT	J28154

OPTION INDEX

APP OR MIR	LOCATION
Z	2F5
Y	2F5
X	2H5
W	2H5
V	2G5
T	APP FIG. 1
S	APP FIG. 1

DWG 155	CD ISSUE	DATE ISSUED	ORIGIN	APP'D
8D	78 APP 1D	7-7-59	REG. WTT	J.C. MAY
9D	78 APP 2D	12-19-60	JOS WTT	J.C. MAY
10D	78 APP 3D	5-13-62	GDL GLM	MRS MAY AND
11D	8D	4-17-63	WJT TGJ	MRS MAY AND

DWG 155	EE SW CD 155	DWG 188	EE OP CD 188	DWG 189	EE CN CD 193
1	1	2D	2D	3D	3D
4D	4D	5A	5A	6D	6D
7B	7B				

APPARATUS INDEX

DESIG	LOCATION FS	APP FIG.	EQUIP
RELAYS			
MA	2A3	1	
MB	2B3	1	

LEAD INDEX

DESIG	FS LOC
DIAL TONE OR COMBINED MARKER CIRCUIT	
BT	2D6
CKG	2E6
DTK	2A6
FTO,1,2,3	2E7
FUO,1,2,4,7	2F7
HGTO-9	2B6
LFS	2H6
MB	2E6
OBS	2G6
OCI	2C6
OC2	2C6
TC	2D6
TCI	2D6
TM	2E6
TR2	2C6
TRK	2B6
TRL	2D6
TRS	2C6
VGAO-11	2B6
VGTO-11	2A6

DESIG	FS LOC
LINE,LINE LINK AND MKR CONNECTOR CONTROL CKT	
DTK	2A4
HGTO-9	2B4
MK	2A4
MSI	2C4
MS2	2C4
TC	2D4
TCI	2D4
TR2	2C4
TRK	2B4
TRL	2D4
TRS	2C4
VGAO-11	2B4
VGTO-11	2A4

DESIG	FS LOC
MASTER TEST FRAME CONNECTOR CKT OR OFFICE TEST FRAME, TROUBLE INDICATOR AND CONNECTOR CKT	
2W OR 4W	
CN	
CNG	
FR	
FRG	
MG-	

DESIG	FS LOC
OBSERVING LINE CKT	
OBS	2G4

DESIG	FS LOC
PREFERENCE CONTROL CKT FOR MARKER CONN	
CB	2H4
CBI	2H4
LCB	2G4
MA	2B3
RCB	2H4

DESIG	FS LOC
PREFERENCE CONTROL AND HOME BUSY CKT FOR LINE LINK CONNECTOR	
ST-	

DESIG	FS LOC
ORIGINATING LINE IDENTIFIER CKT	
CKG	2C6
DTK	2C6
FTO,1,2,3	2F7
FUO,1,2,4,7	2F7
HGTO-9	2C6
MB	2C6
OCI	2C6
OC2	2C6
TC	2C6
TCI	2C6
TM	2C6
TR2	2C6
TRK	2C6
VGAO-11	2C6
VGTO-11	2C6

DESIG	FS LOC
COMPLETING MARKER CKT	
BT	2D6
	2E6
	2H6

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

REPLACING LINE LINK MKR CONN PART OF SD-25586-01

SD-26022-01

Crossbar Systems
No. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

AT&TCO STANDA

SD-26022-01-A

11

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
A	1-1/3	48V SIG	2 FIG. I SERVED BY SAME MKR
A		*GRD	4 FIGS. 1 PER CONN

*SEPARATE LEADS SHALL BE RUN FROM GROUND BUS TO EACH END OF GROUND MULTIPLE.

BATTERY SYMBOL	VOLTAGE RANGE
-48	45-50V

102.

FEATURE OR OPTION	PROVIDE		
	APP FIG.	APP OR WIR	QUANTITY
CONN REL	I		1 PER LINE LINK PER MKR
WHERE ASSOC LINE LINK CKT IS ARRANGED FOR CALL WAITING SERVICE AND ASSOC MKR IS COMBINED		R	

103.

NETWORK VALUES		
NETWORK NO.	RESISTANCE IN OHMS	CAPITANCE IN UF
1	150	0.3

104.

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES							
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT			
				STD	A&M	MD	
60	Y OR Z	Z	105	Y		Z	
70	X OR W	X	107	W	X		
90	V	NONE	106	V			
11D	S OR T			S		T	
12D	M,N,P	P	202, 304	M,N,P			
	R	NONE	102	R			
15B			202, 304		M,N		

105. WHEN THERE ARE MORE THAN 40 LINE LINK FRAMES, Y OPTION AND CABLING PER NOTE 302a MUST BE PROVIDED.

106. V OPTION IS USED IN OFFICES ARRANGED FOR 4 WIRE NETWORKS. OR IN OFFICES ARRANGED FOR A COMBINATION OF 2 AND 4 WIRE NETWORKS. THE 2W OR 4W LEAD DESIGNATION DEPENDS UPON THE ASSOCIATION OF THE LLMC WITH A 2 WIRE OR 4 WIRE LINE, LINE LINK AND MKR CONN CONTROL CKT.

107. (A&M ONLY) PROVIDE OPTION X FOR ADDITIONS TO CONNECTORS WHERE ASSOCIATED SD-26029-01 IS EQUIPPED WITH APP FIG. I.

EQUIPMENT NOTES:

201. WHERE ALL LLMC OR SLLMC FRAMES AND ALL MARKERS IN A MARKER GROUP ARE OF THE WIRE SPRING RELAY TYPE CONNECT PCHGS 27 & 37, TS(M-) ON LEFT HALF OF FRAME TO CORRESPONDING PCHGS 18,28,38, & 48 AND PCHGS 27 & 37, TS(M-) ON RIGHT HALF OF FRAME TO CORRESPONDING PCHGS 18,28,38, & 48 AS FOLLOWS:

LLMC OR SLLMC FRAME	TS(M-) ON LEFT HALF OF FRAME		TS(M-) ON RIGHT HALF OF FRAME	
	27	37	27	37
0	18	28	48	18
1	38	28	18	38
2	28	38	48	48

FOR MIXED INSTALLATIONS OF 4 OR 8 CONN CAPACITY U TYPE RELAY AND WIRE SPRING RELAY TYPE LLMC OR SLLMC FRAMES OR WHEN ANY MARKERS IN A MKR GROUP ARE OF THE U RELAY TYPE CONNECT PCHG 27 TS(M-) ON LEFT HALF OF FRAME TO CORRESPONDING PCHG 18,28,38, & 48 IN ACCORDANCE WITH THE TENS DIGIT OF THE LL FRAMES SERVED BY CONNECTORS IN THE LOWER HALF OF THE FRAME AND PCHG 37, TS(M-) ON THE LEFT HALF OF FRAME TO CORRESPONDING PCHGS 18,28, 38, & 48 IN ACCORDANCE WITH THE TENS DIGIT OF THE LL FRAMES SERVED BY CONNECTORS IN THE UPPER HALF OF THE FRAME.

202A. OPTION P IS REQUIRED WHERE DIAL TONE MARKERS ARE ARRANGED FOR FULL ACCESS.

202B. (A&M ONLY) OPTIONS P,N AND M ARE WIRING OPTIONS REQUIRED WHEN A LLMC FRAME IS MODIFIED TO SERVE MORE THAN 4 DIAL TONE MARKERS EQUIPPED WITH GRADING BETWEEN CONNECTORS.

CONDITION		OPT
MKR EXPANSION PROVIDED WITH GRADING BETWEEN CONNECTORS	19/20	P
	24/25	N
	29/30	M

INFORMATION NOTES:

301. CONNECT LEADS FUA AND FUB IN ACCORDANCE WITH LINE LINK FRAME UNITS NUMBER AS FOLLOWS:

FR UNITS	FUA	FUB
1	FU0	FU1
2	FU0	FU2
3	FU1	FU2
4	FU0	FU4
5	FU1	FU4
6	FU2	FU4
7	FU0	FU7
8	FU1	FU7
9	FU2	FU7
0	FU4	FU7

302. CONNECT LEADS FT0,1,2,3 IN ACCORDANCE WITH THE TENS DIGIT OF THE LINE LINK FRAME NUMBER AS FOLLOWS: (SEE NOTE 105).

a. (STD) TWO LEADS GROUNDED FOR TENS DIGIT OF LINE LINK FRAME NUMBER:

LL FR TENS DIGIT	CONNECT		TO	
	LEAD DESIG	TERM. LOC*	LEAD DESIG	TERM. LOC*
0	FTA FTB	27L 27R	FT0 FT3	18L 48R
1	FTA FTB	37L 37R	FT1 FT0	28L 18R
2	FTA FTB	27L 27R	FT2 FT0	38L 18R
3	FTA FTB	37L 37R	FT1 FT2	28L 38R
4	FTA FTB	27L 27R	FT1 FT3	28L 48R
5	FTA FTB	37L 37R	FT2 FT3	38L 48R

*TERMINAL STRIPS M- ON LEFT OR RIGHT HALF OF FRAME AS INDICATED.

b. (A&M ONLY) ONE LEAD GROUNDED FOR TENS DIGIT OF LINE LINK FRAME NUMBER:

LL FRAME TENS DIGIT	CONNECT		TO	
	LEAD DESIG	TERM. LOC*	LEAD DESIG	TERM. LOC*
0	FTA	27L	FT0	18L
1	FTA	37L	FT1	28L
2	FTA	27L	FT2	38L
3	FTA	37L	FT3	48L

* TERMINALS STRIPS M- ON LEFT OR RIGHT HALF OF FRAME AS INDICATED.

INFORMATION NOTES (CONT):

303. ON COMBINED LL OR IR MC FRAMES CONNECT LEADS FUA, FUB AND FTA, FTB IN ACCORDANCE WITH THE LINE LINK FRAME UNITS NUMBER AND LINE LINK FRAME TENS NUMBER RESPECTIVELY, AS FOLLOWS:

LLMC	LL FRAME		CONNECT		TO		CONNECT		TO	
	TENS DIGIT	UNIT DIGIT	LEAD DESIG	TERM. LOC	LEAD DESIG	TERM. LOC	LEAD DESIG	TERM. LOC	LEAD DESIG	TERM. LOC
0		0	FUA FUB	11L 21L	FU4 FU7	34L 35L	FTA	17L	FT0	18L
1		1	FUA FUB	11R 21R	FU0 FU1	31R 32R	FTB	37L	FT3	48L
2		2	FUA FUB	12L 22L	FU0 FU2	31L 33L	FTA	27R	FT0	18R
3		3	FUA FUB	12R 22R	FU1 FU2	32R 33R	FTB	47R	FT3	48R
0		4	FUA FUB	11L 21L	FU0 FU4	31L 34L	FTA	17L	FT0	18L
1	0	5	FUA FUB	11R 21R	FU1 FU4	32R 34R	FTB	37L	FT3	48L
2		6	FUA FUB	12L 22L	FU2 FU4	33L 34L	FTA	27R	FT0	18R
3		7	FUA FUB	12R 22R	FU0 FU7	31R 35R	FTB	47R	FT3	48R
0		8	FUA FUB	11L 21L	FU1 FU7	32L 35L	FTA	17L	FT0	18L
1		9	FUA FUB	11R 21R	FU2 FU7	33R 35R	FTB	37L	FT3	48L
2	1	0	FUA FUB	12L 22L	FU4 FU7	34L 35L	FTA	27R	FT0	18R
3		1	FUA FUB	12R 22R	FU0 FU1	31R 32R	FTB	47R	FT1	28R

304. FOR INFORMATION ON LLMC ARRANGEMENTS FOR MKR EXPANSION SEE BSP 819-311-150, PART 6.

DRAWING ISSUE
8D
9D
11D
12D
13D

ISSUE 15B

LINE LINK MARKER CONNECTOR CIRCUIT

SD-26022-01-I

BELL TELEPHONE LABORATORIES INCORPORATED

CIRCUIT REQUIREMENTS

LINE LINK MARKER CONN. CKT (LLMC OR SLLMC)

APPARATUS					MECH REQT			CIRCUIT PREPARATION					DIRECT CURRENT FLOW REQT					
DESIG	CODE	OPTION	FIG.		BSP FIG.	CONT PRESS	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA CONN BAT.	TEST CLIP DATA CONN GRD	TEST SET PREP	SEE NOTE	TEST WDG	TEST FOR	AFTER SOAK MA	TEST MA	READJ MA	REMARKS
MA,	286H	S	1		30 CONT									0		85	80	WDG. ALONE
MB	286B	T	1							T REL TST	GRD	1		0		190	180	COMB. WDG. (MA),(MB) RELS.

DWG ISS: 1, 2, 3, 4, 5, 6, 7, 8, 11D

TEST NOTES:

1. TEST DURING LIGHT TRAFFIC

(PAGES) PAGE

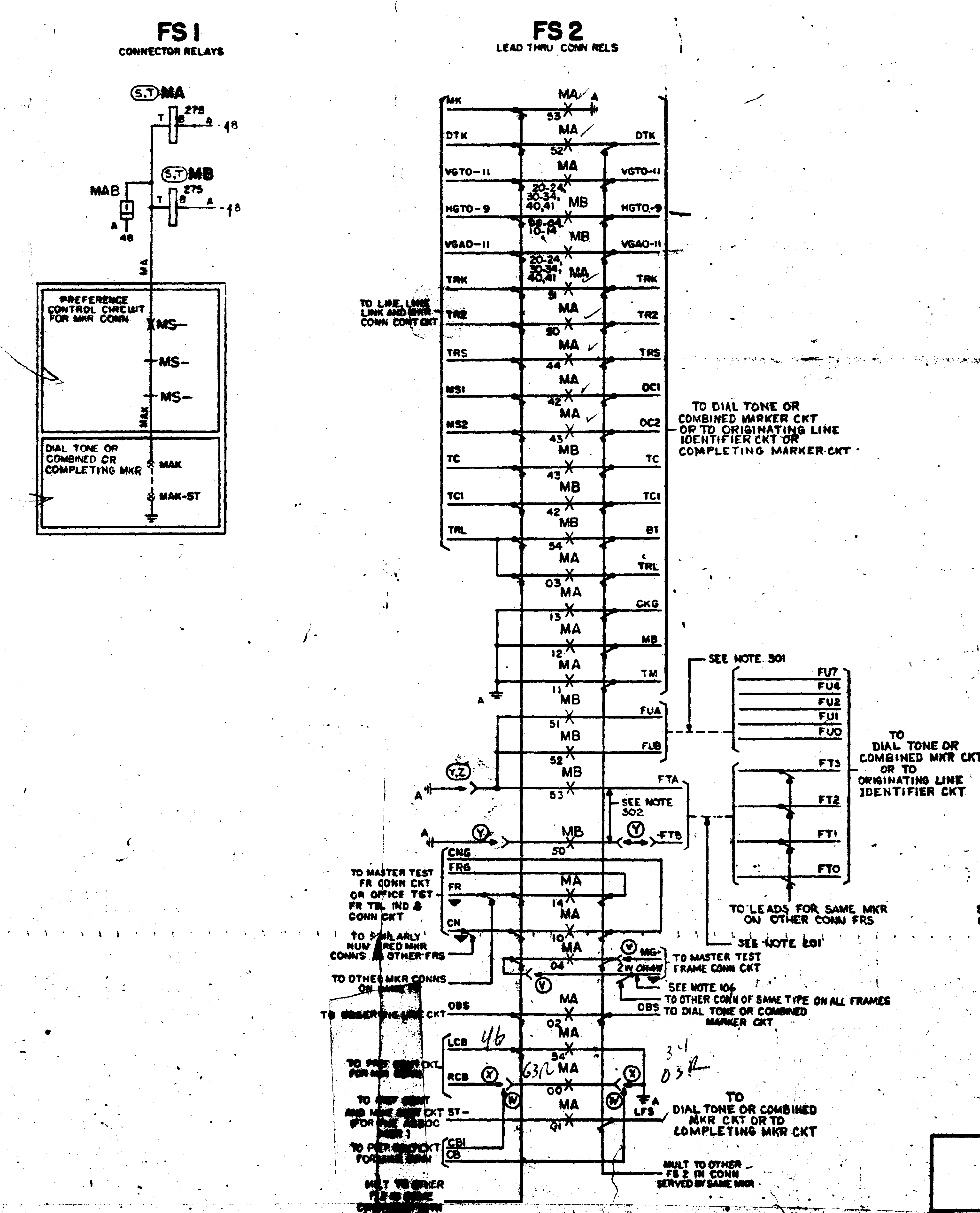
BELL TELEPHONE LABORATORIES, INC

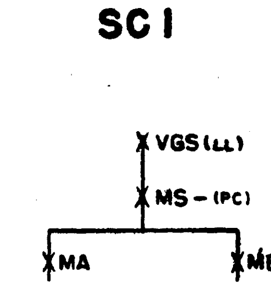
PRINTED IN U.S.A.
E1023-A (11-51)

NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

SD-26022-01-3

-26022-01-3





APP FIG 1

RELAY

DESIG	MA	MB	
CODE	286HB	286HB	
OPTION	S,T	S,T	
54	G5	D5	
53	A5	E5	
52	A5	F5	
51	B5	E5	
50	C5	F5	
44	C5		
43	C5	D5	
42	C5	D5	
41	A5	B5	
40	A5	B5	
34	A5	B5	
33	A5	B5	
32	A5	B5	
31	A5	B5	
30	A5	B5	
24	A5	B5	
23	A5	B5	
22	A5	B5	
21	A5	B5	
20	A5	B5	
14	G5	B5	
13	E5	B5	
12	E5	B5	
11	E5	B5	
10	G5	B5	
04	G5	B5	
03	D5	B5	
02	G5	B5	
01	H5	B5	
00	H5	B5	
COIL	A3	B3	

NETWORK

DESIG	LOC	CODE
MAB	B3	180A

SHEET NOTES:
1. SEQUENCE CHART ABBREVIATIONS:
(LL) - LINE, LINE LINK AND MARKER CONNECTOR CONTROL CIRCUIT.
(PC) - PREFERENCE CONTROL CIRCUIT FOR MARKER CONNECTORS.

CROSSBAR SYSTEMS
NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

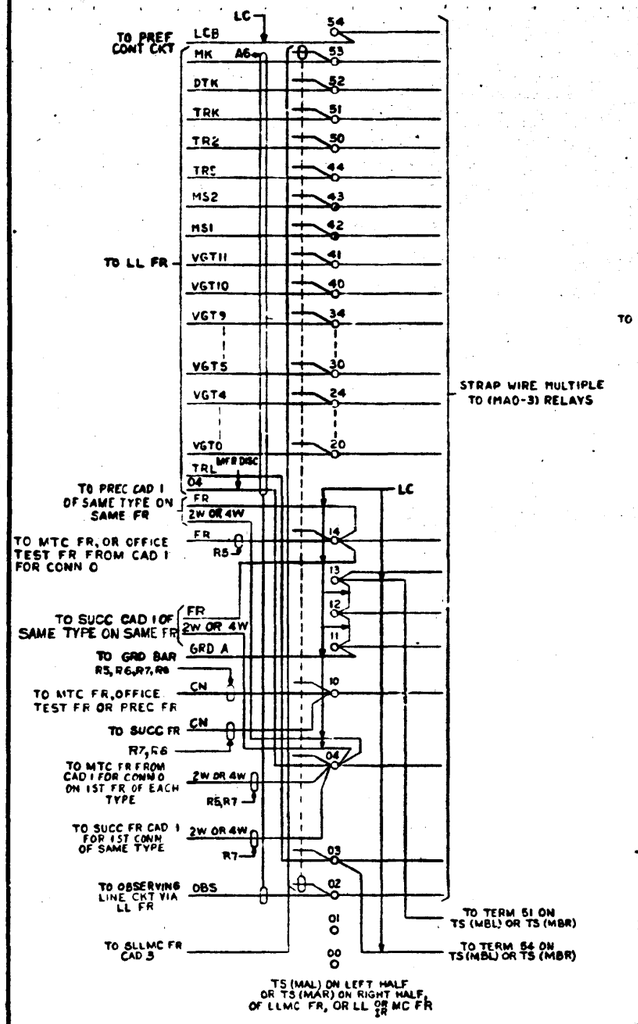
SD-26022-01

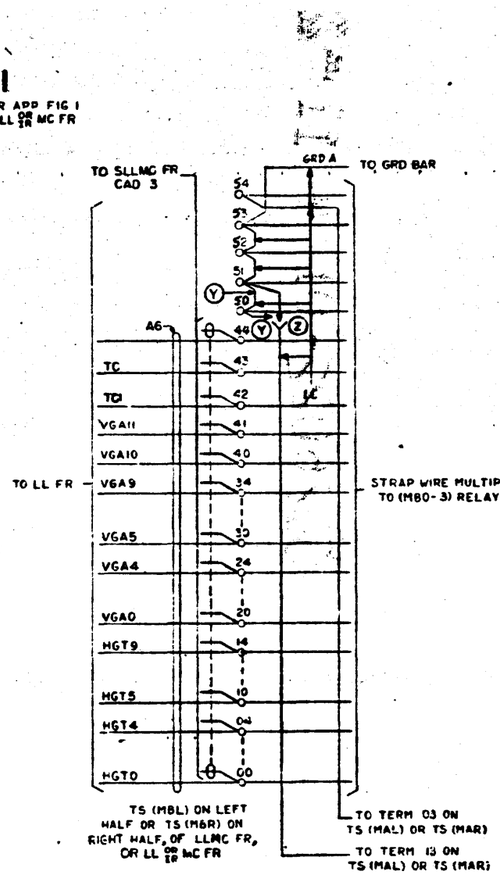
ISSUE 2 — 6S

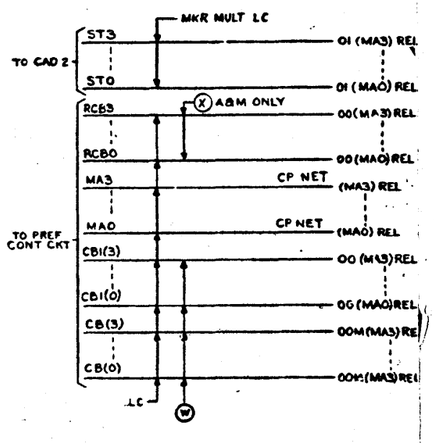
PRINTED IN U.S.A. 1-7421 (6-62)

CAD 1

ONE PER CONN FOR APP FIG 1 ON LLMC FR, OR LL OR IR MC FR



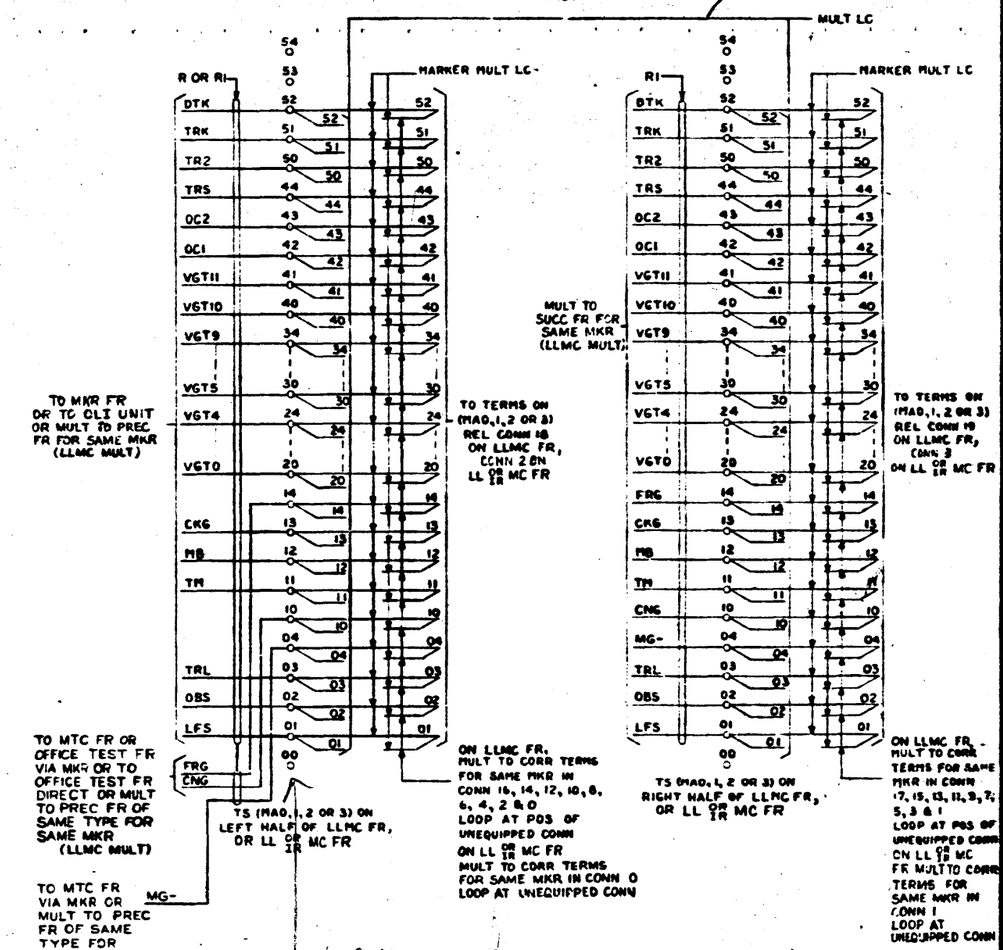




PART OF CAD 2

ONE PER MKR PER LLMC FR, OR LL OR IR MC FR FOR APP FIG 1

See Cad 2 Sht #5



Holtsmore
0, 1, 2 & 1, 2-3

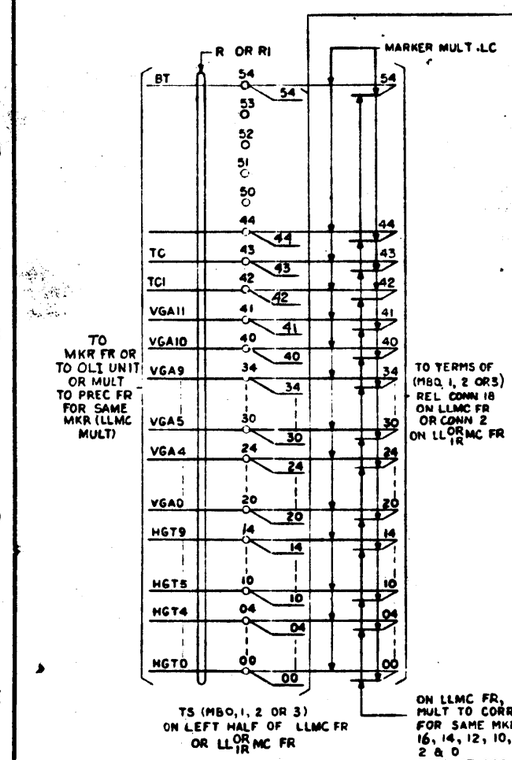
DRAWING ISSUE	
1	
2D	
3C	
4D	
5A	
6D	
7B	
8D	
9D	
10D	
11D	

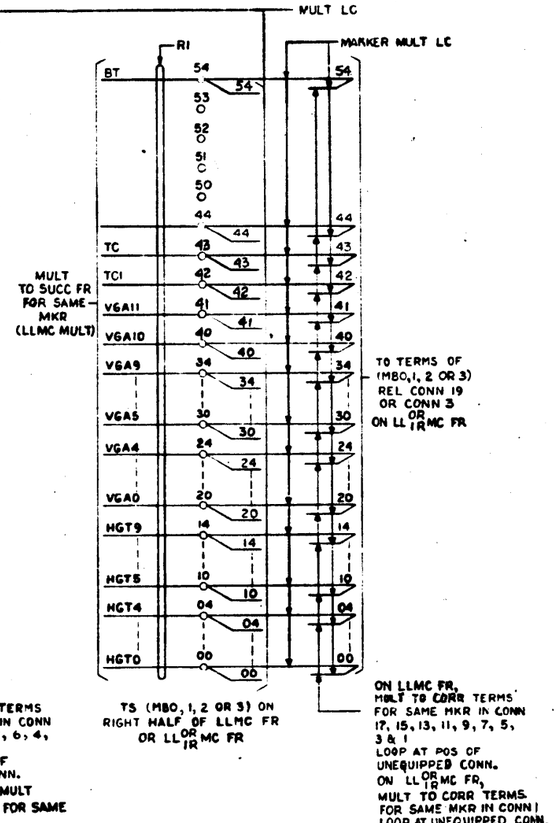
CROSSBAR SYSTEMS
NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT
2
SD-26022-01-4
BELL TELEPHONE LABORATORIES, INC
6S

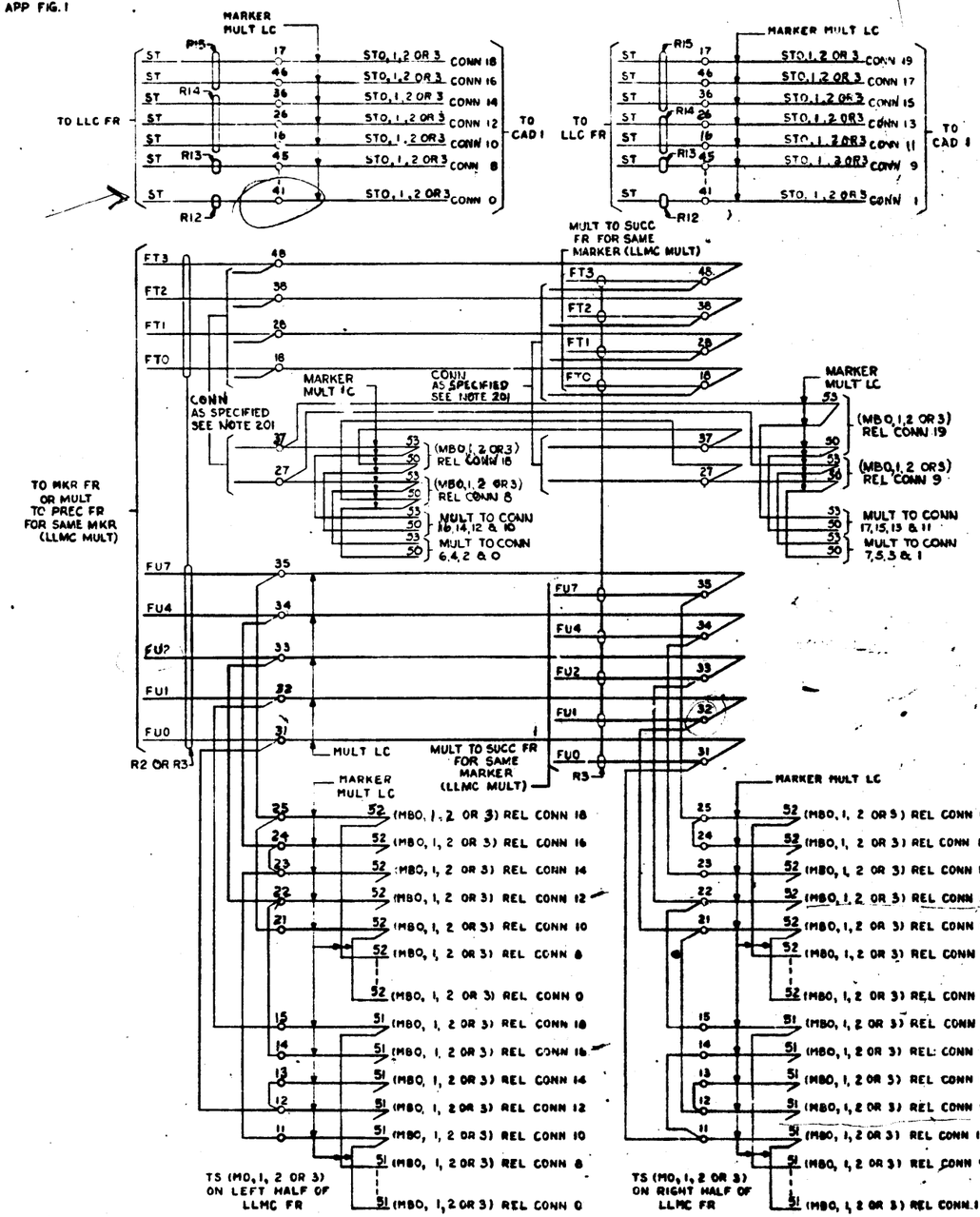
SD-26029-01-4

PART OF CAD 2

ONE PER MKR PER LLMC FR OR LL$^{OR}_{IR}$MC FR FOR APP FIG. 1







DRAWING ISSUE	
1	
2D	
3D	
4D	
5A	
6D	
7B	
8D	
10D	

CROSSBAR SYSTEMS
NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

BELL TELEPHONE LABORATORIES, INC

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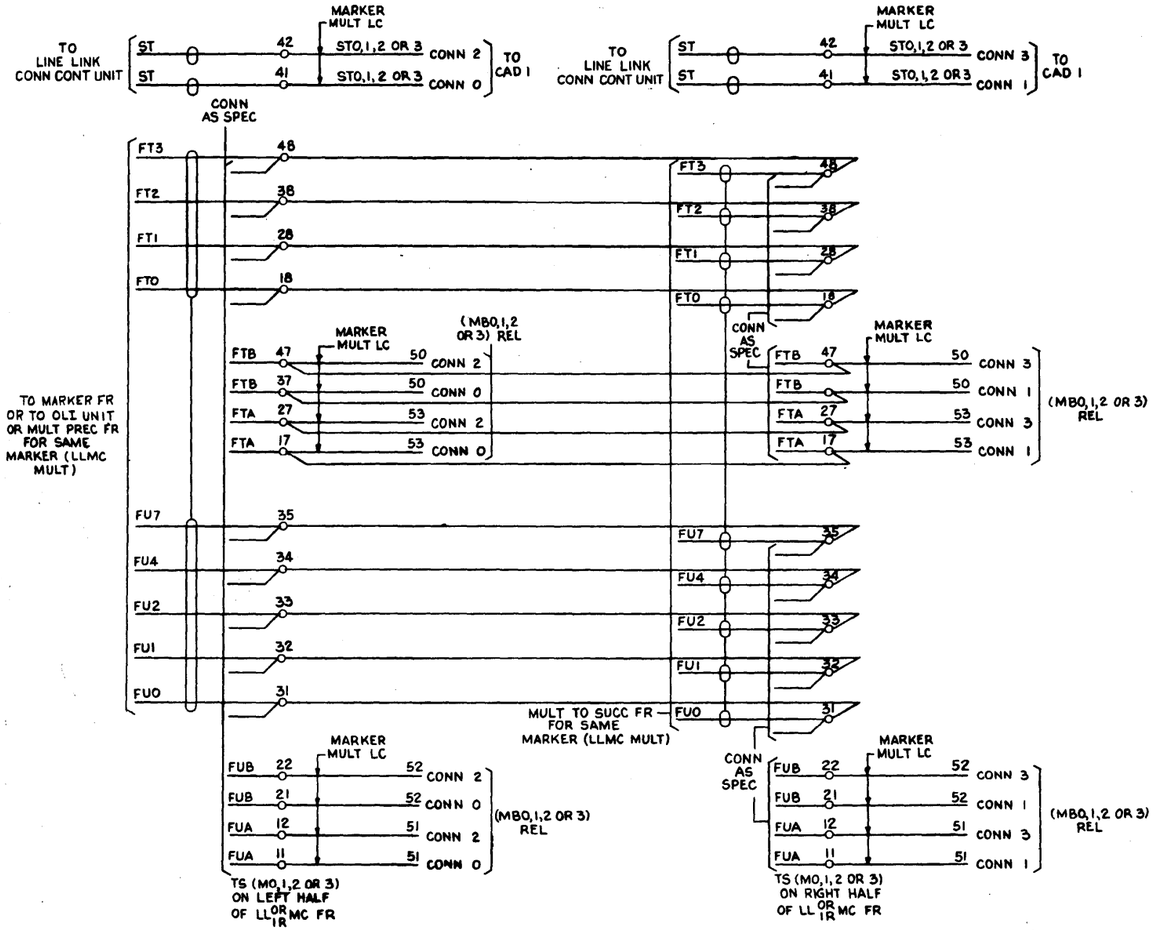
SD-26022-01-5

SD-26022-01-5

PART OF CAD. 2

ONE PER MKR PER LLMC FR
OR LL OR IR MC FR
FOR APP FIG. 1



DRAWING ISSUE	
8D	[illegible]
10D	[illegible]

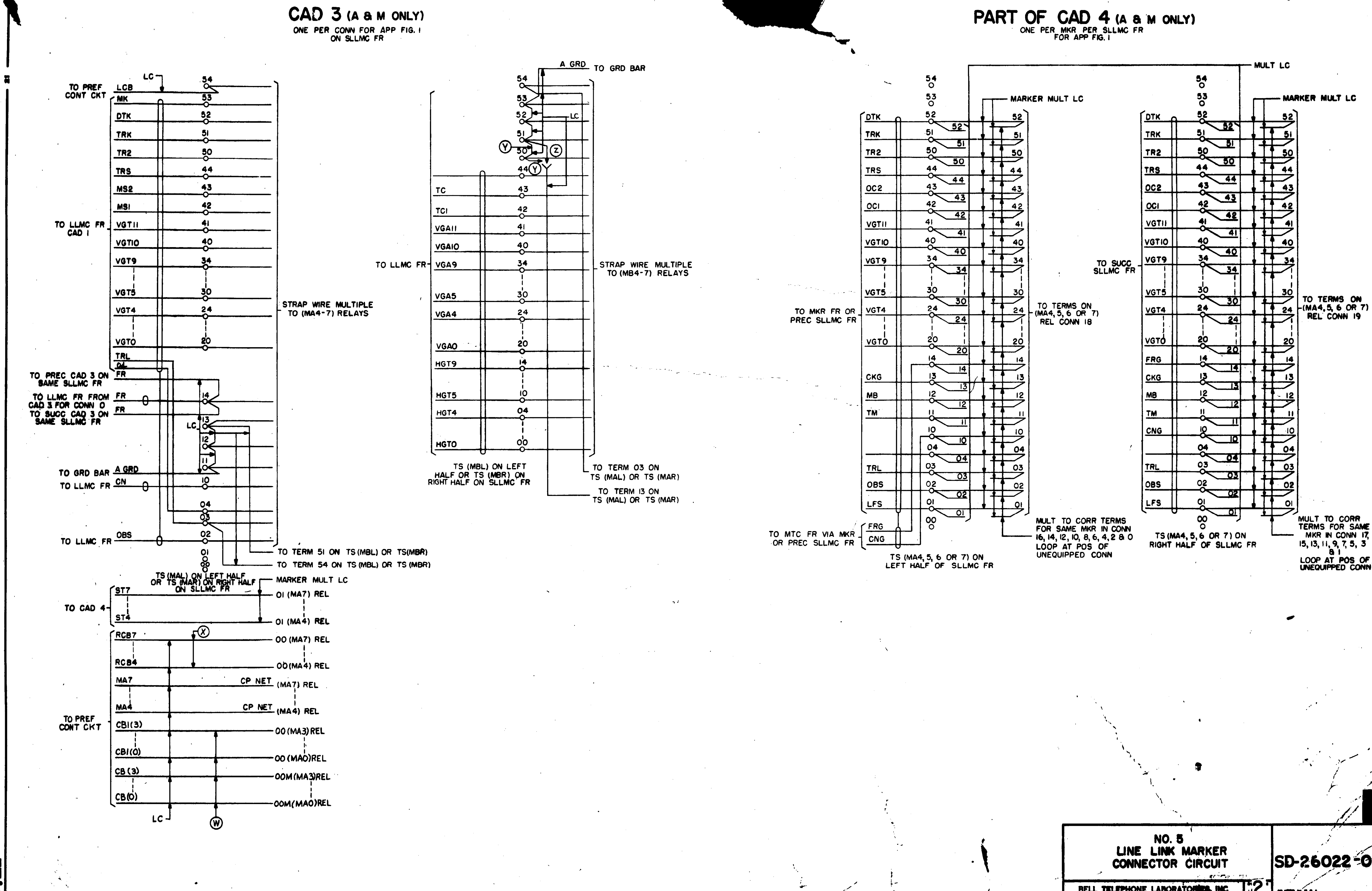
SD-26022-01-6

10

CROSSBAR SYSTEMS
NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

SD-26022-01-6

BELL TELEPHONE LABORATORIES
INCORPORATED
6S


CAD 3 (A & M ONLY)
ONE PER CONN FOR APP FIG. I ON SLLMC FR
PART OF CAD 4 (A & M ONLY)
ONE PER MKR PER SLLMC FR FOR APP FIG. I
TO PREF CONT CKT
TO LLMC FR CAD I
STRAP WIRE MULTIPLE TO (MA4-7) RELAYS
TO PREC CAD 3 ON SAME SLLMC FR
TO LLMC FR FROM CAD 3 FOR CONN 0
TO SUCC CAD 3 ON SAME SLLMC FR
TO GRD BAR
TO LLMC FR
TO TERM 51 ON TS(MBL) OR TS(MBR)
TO TERM 54 ON TS(MBL) OR TS(MBR)
TS(MAL) ON LEFT HALF OR TS(MAR) ON RIGHT HALF ON SLLMC FR
MARKER MULT LC
TO CAD 4
TO LLMC FR
STRAP WIRE MULTIPLE TO (MB4-7) RELAYS
TS (MBL) ON LEFT HALF OR TS (MBR) ON RIGHT HALF ON SLLMC FR
TO TERM 03 ON TS (MAL) OR TS (MAR)
TO TERM 13 ON TS (MAL) OR TS (MAR)
A GRD TO GRD BAR
MULT LC
MARKER MULT LC
TO MKR FR OR PREC SLLMC FR
TO TERMS ON (MA4, 5, 6 OR 7) REL CONN 18
TO MTC FR VIA MKR OR PREC SLLMC FR
TS (MA4, 5, 6 OR 7) ON LEFT HALF OF SLLMC FR
MULT TO CORR TERMS FOR SAME MKR IN CONN 16, 14, 12, 10, 8, 6, 4, 2 & 0 LOOP AT POS OF UNEQUIPPED CONN
TO SUCC SLLMC FR
TO TERMS ON (MA4, 5, 6 OR 7) REL CONN 19
TS (MA4, 5, 6 OR 7) ON RIGHT HALF OF SLLMC FR
MULT TO CORR TERMS FOR SAME MKR IN CONN 17, 15, 13, 11, 9, 7, 5, 3 & 1 LOOP AT POS OF UNEQUIPPED CONN

NO. 5 LINE LINK MARKER CONNECTOR CIRCUIT

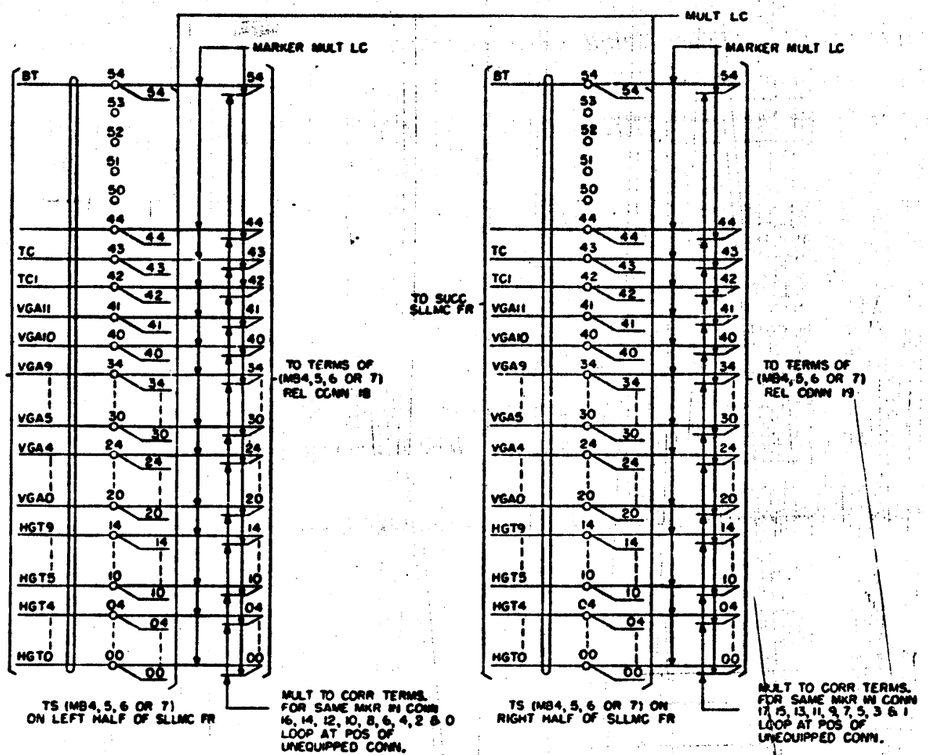
BELL TELEPHONE LABORATORIES, INC

SD-26022-01-7

8

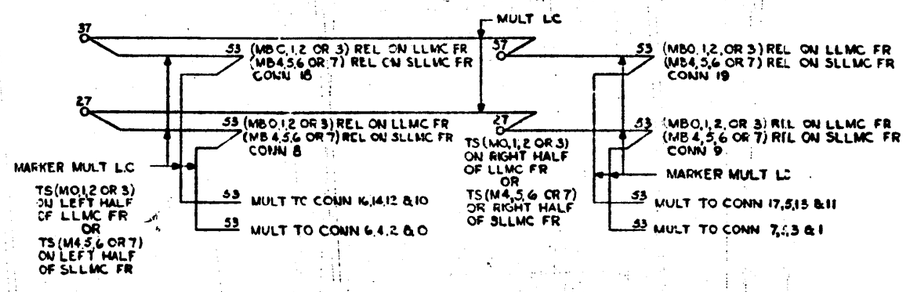
PART OF CAD 4 (A & M ONLY)

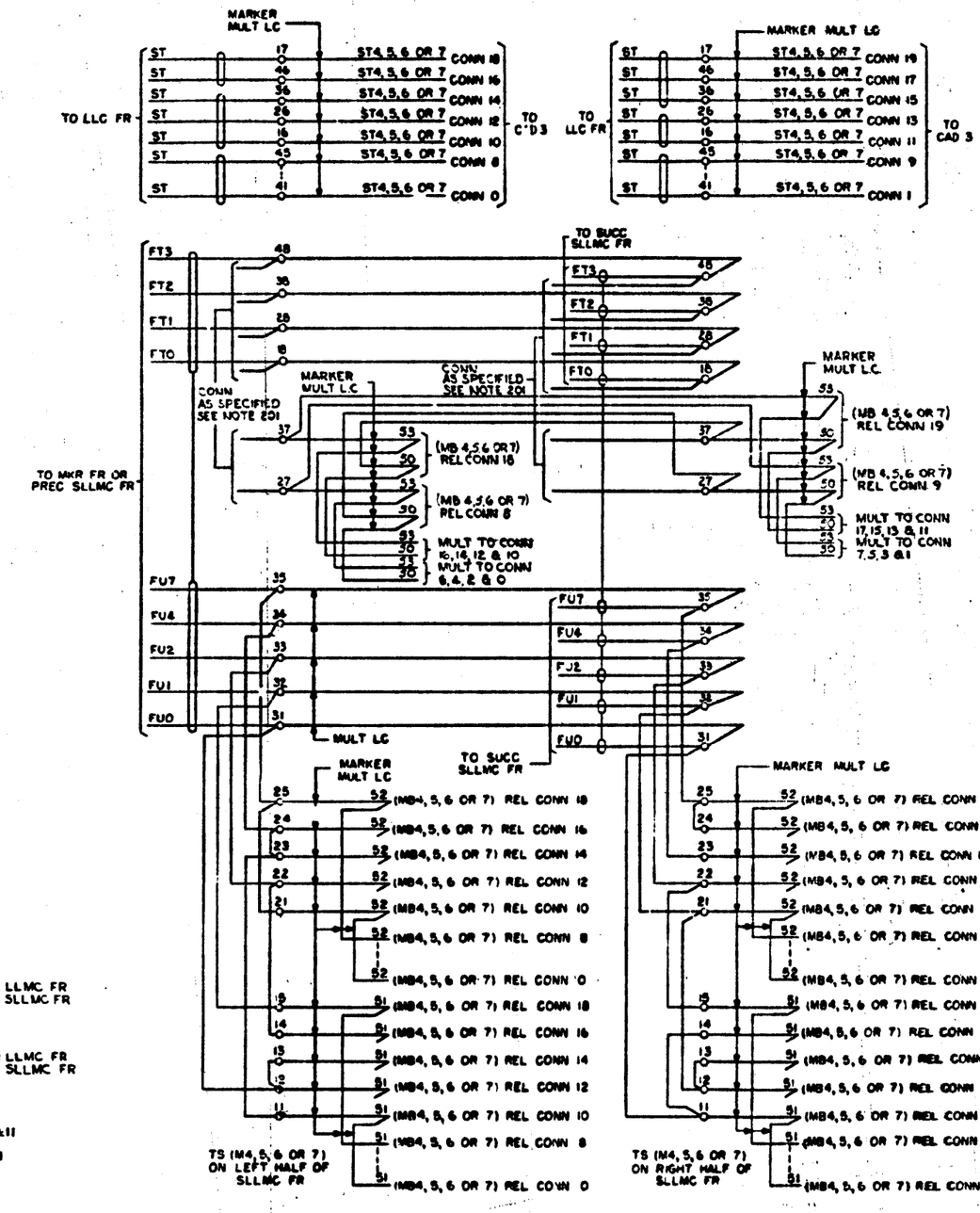
ONE PER MKR PER SLLMC FR
FOR APP FIG.1



CAD 5 (MFR DISC)

FOR STD ARRANGEMENT
SEE CAD 2 FOR LLMC FR
AND CAD4 FOR SLLMC FR





DRAWING ISSUE	
4D	
5A	
6D	
7B	
8D	

NO. 5
LINE LINK MARKER
CONNECTOR CIRCUIT

SD-26022-01-8

8

SD-26022-01-8