

LINC-8
MAINTENANCE MANUAL

VOLUME II

November 1967

F-L87_LINC-8MaintVol2_Nov67.pdf
<http://bitsavers.trailing-edge.com/pdf/dec/linc8/>

***'ed items are on tape chassis
page numbers are relative to PDF paging
for document paging, subtract THREE

p43 backplane for MA,MB cable for tape systems

p44 cable backplane for ME-MJ

p46-50 mag tape driving logic

G882 boards, MB38-39, MC38-39-40

MJ40-LJ04

MF40-LF01

MJ39-LJ02

MJ40-LJ01

MH39-LH03

MH380LH03

p 70 system config

dual tape M9 to M13, Z register

p74 tape cables

p76 cables including tape

MA40, MB40 connectors, W073/W072 cable

MJ39-LJ02 , MJ40-LJ01 Tape System I & II (W034)

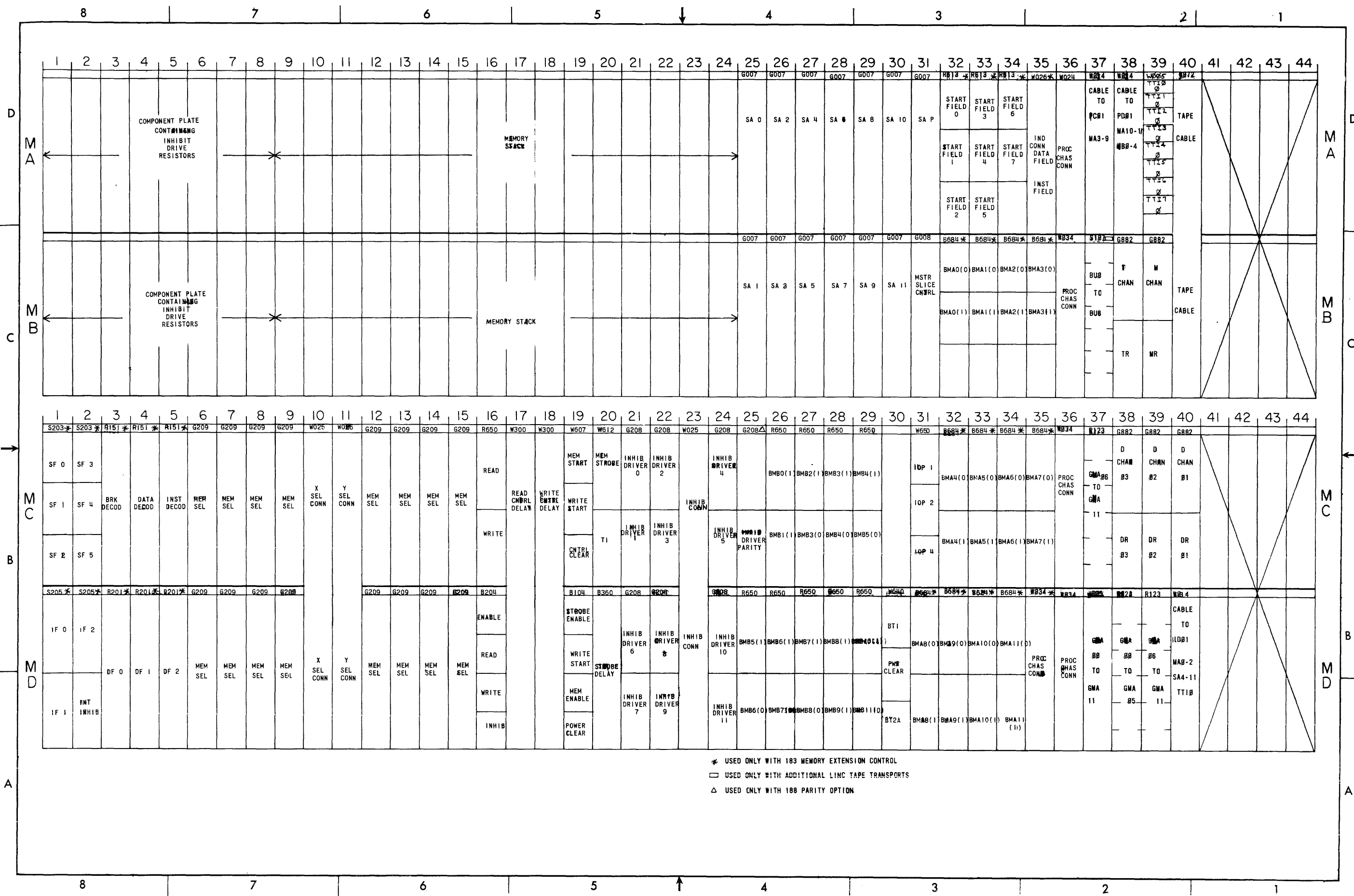
MH38-LH03 Tape System III (W034)

p84 tape head

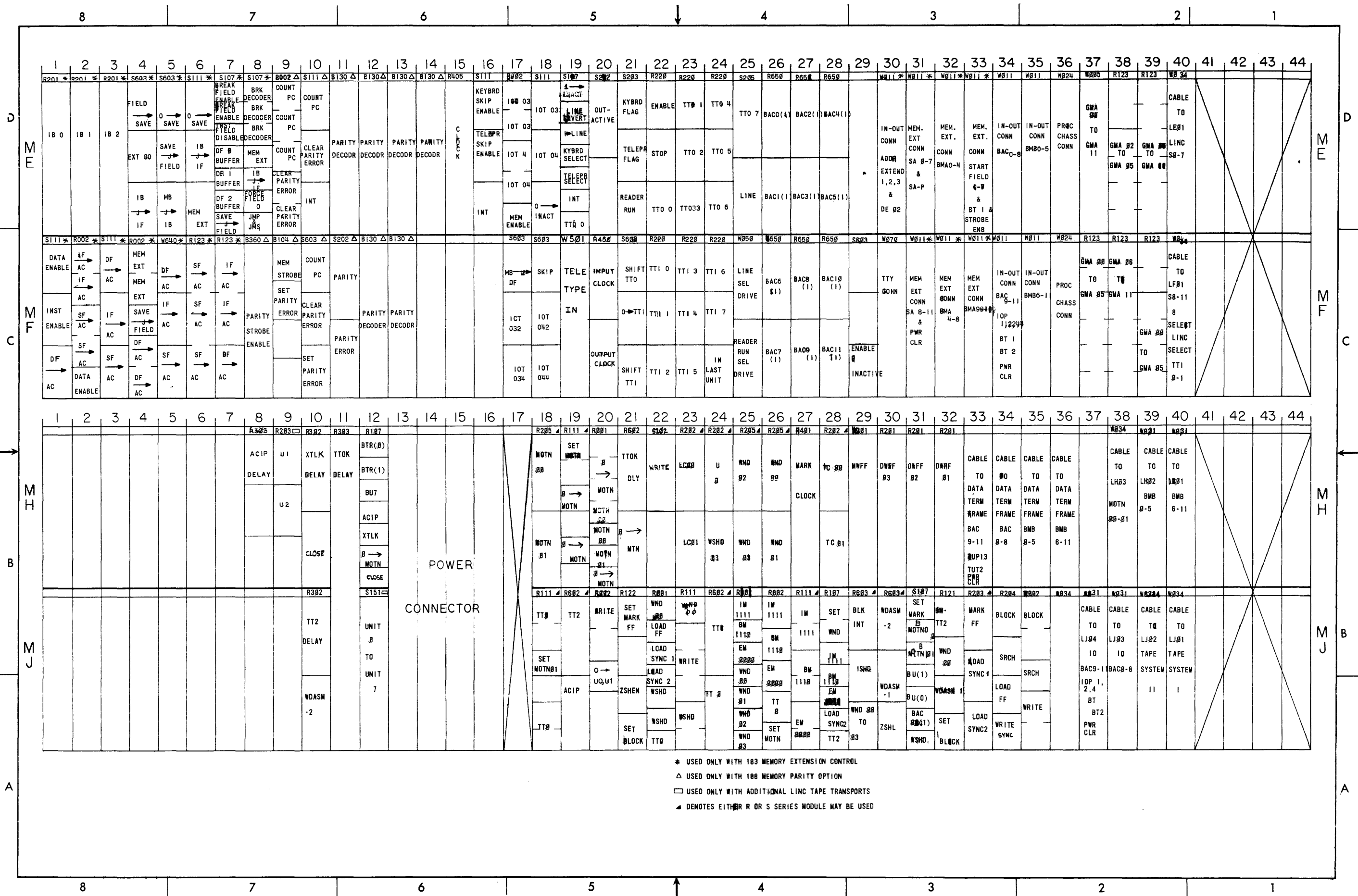
p89-96 *** tape transport mechanics and schematics

socket MA is wired directly to tape heads

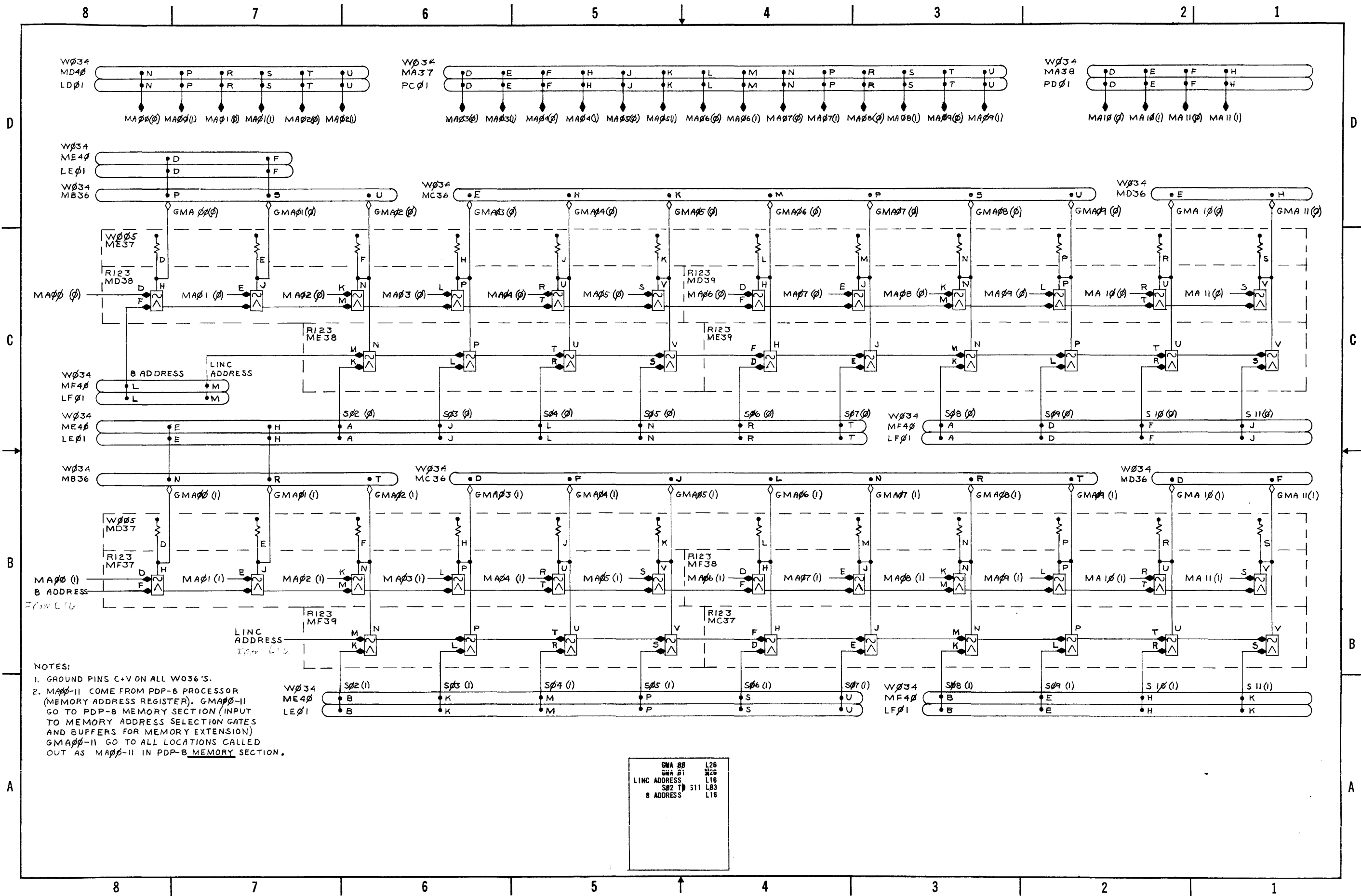
cable wired to W073 , goes to MA40/MB40



D-MU-LINC8-0-M3 LINC-8 UML, MA-MD



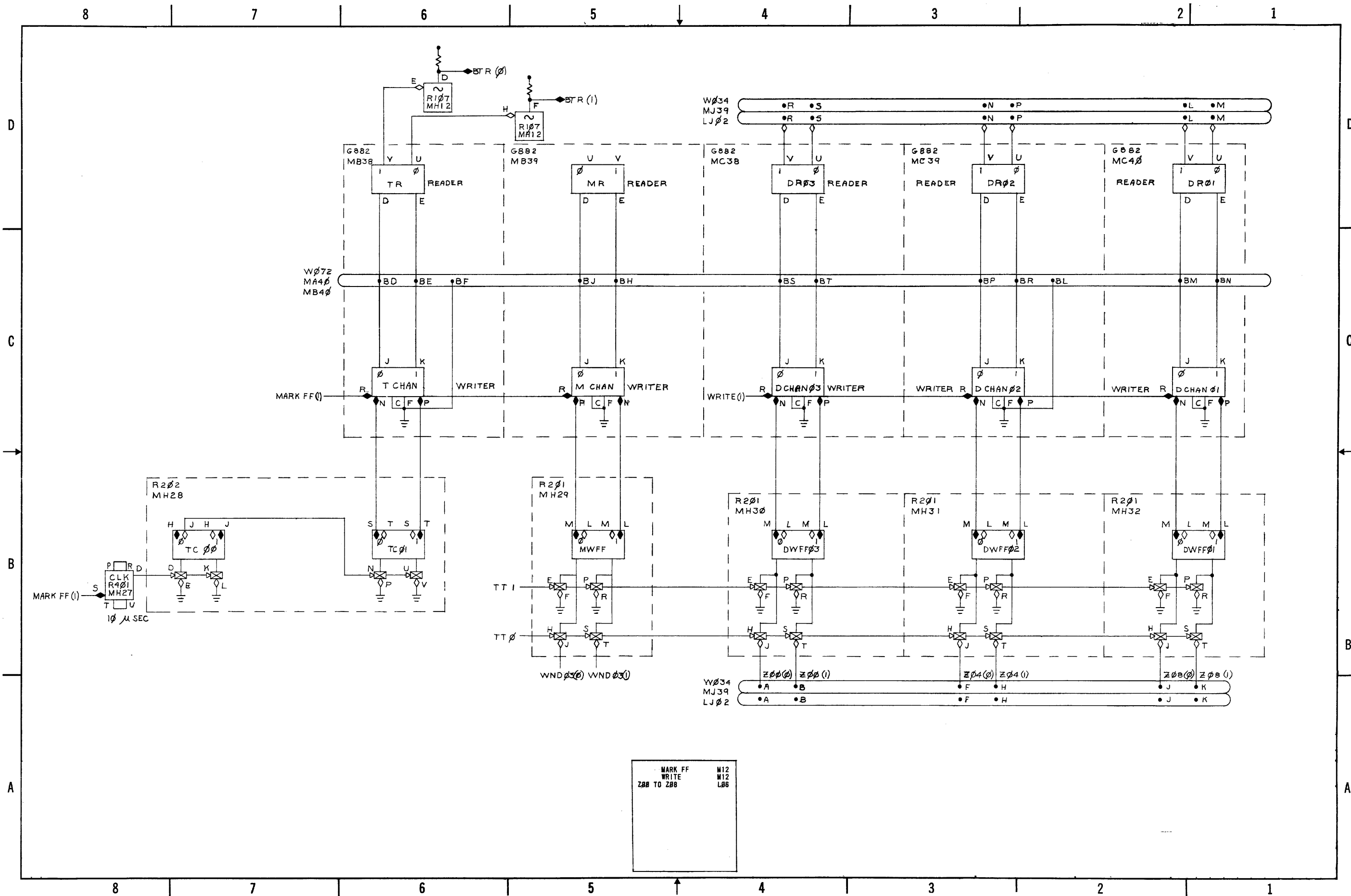
D-MU-LINC8-0-M4 LINC-8 UML, ME-MJ



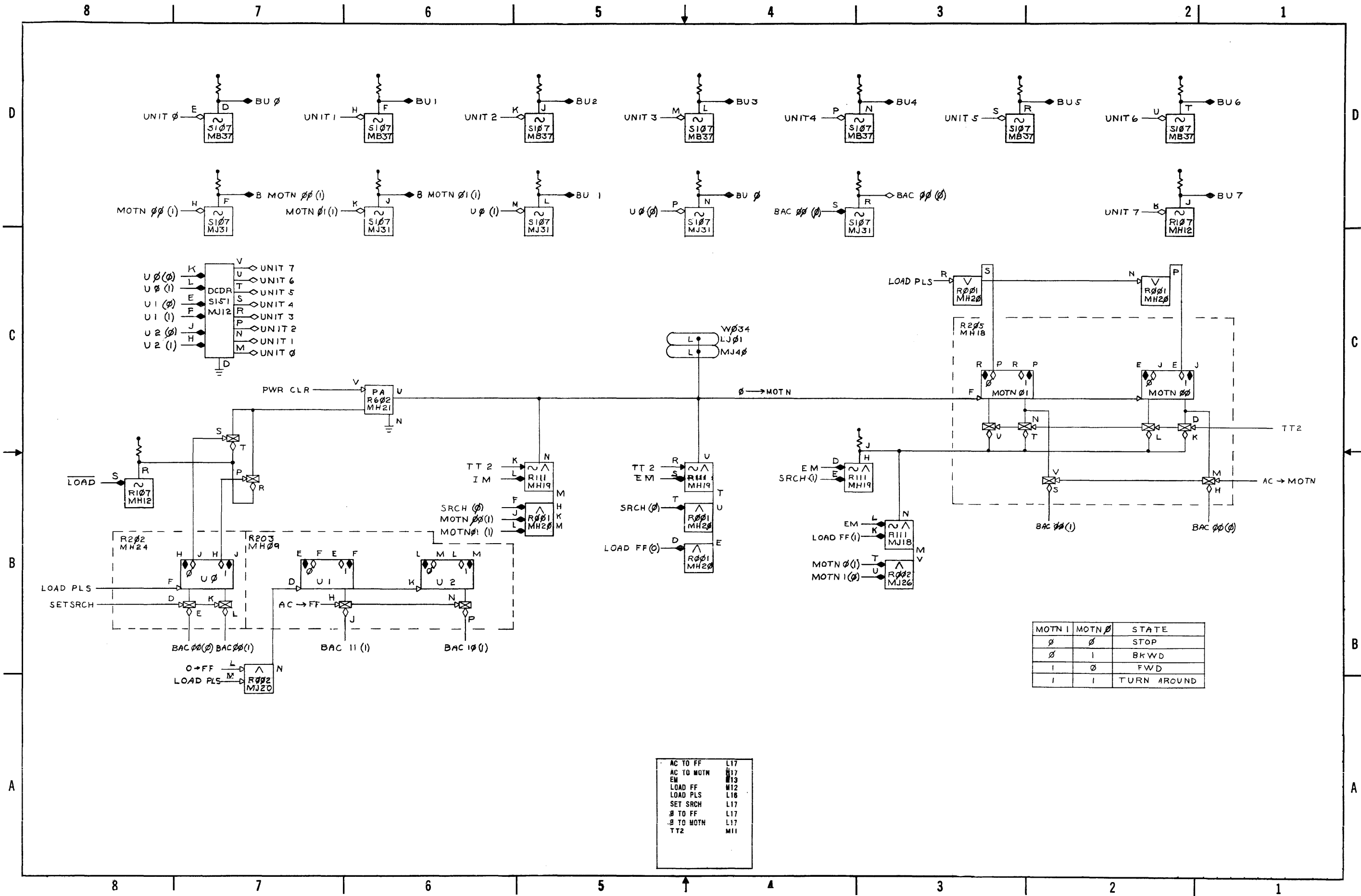
NOTES:
 1. GROUND PINS C+V ON ALL W036'S.
 2. MA00-11 COME FROM PDP-8 PROCESSOR (MEMORY ADDRESS REGISTER). GMA00-11 GO TO PDP-8 MEMORY SECTION (INPUT TO MEMORY ADDRESS SELECTION GATES AND BUFFERS FOR MEMORY EXTENSION) GMA00-11 GO TO ALL LOCATIONS CALLED OUT AS MA00-11 IN PDP-8 MEMORY SECTION.

GMA 00	L26
GMA 01	M22
LINC ADDRESS	L16
S02 TH	S11 L03
B ADDRESS	L16

D-BS-LINC8-0-M8 PDP-8 ADDR Input Gates



D-BS-LINC8-0-M9 Mag Tape Reader/Writer



D-BS-LINC8-0-M10 Mag Tape Motion Control

8

7

6

5

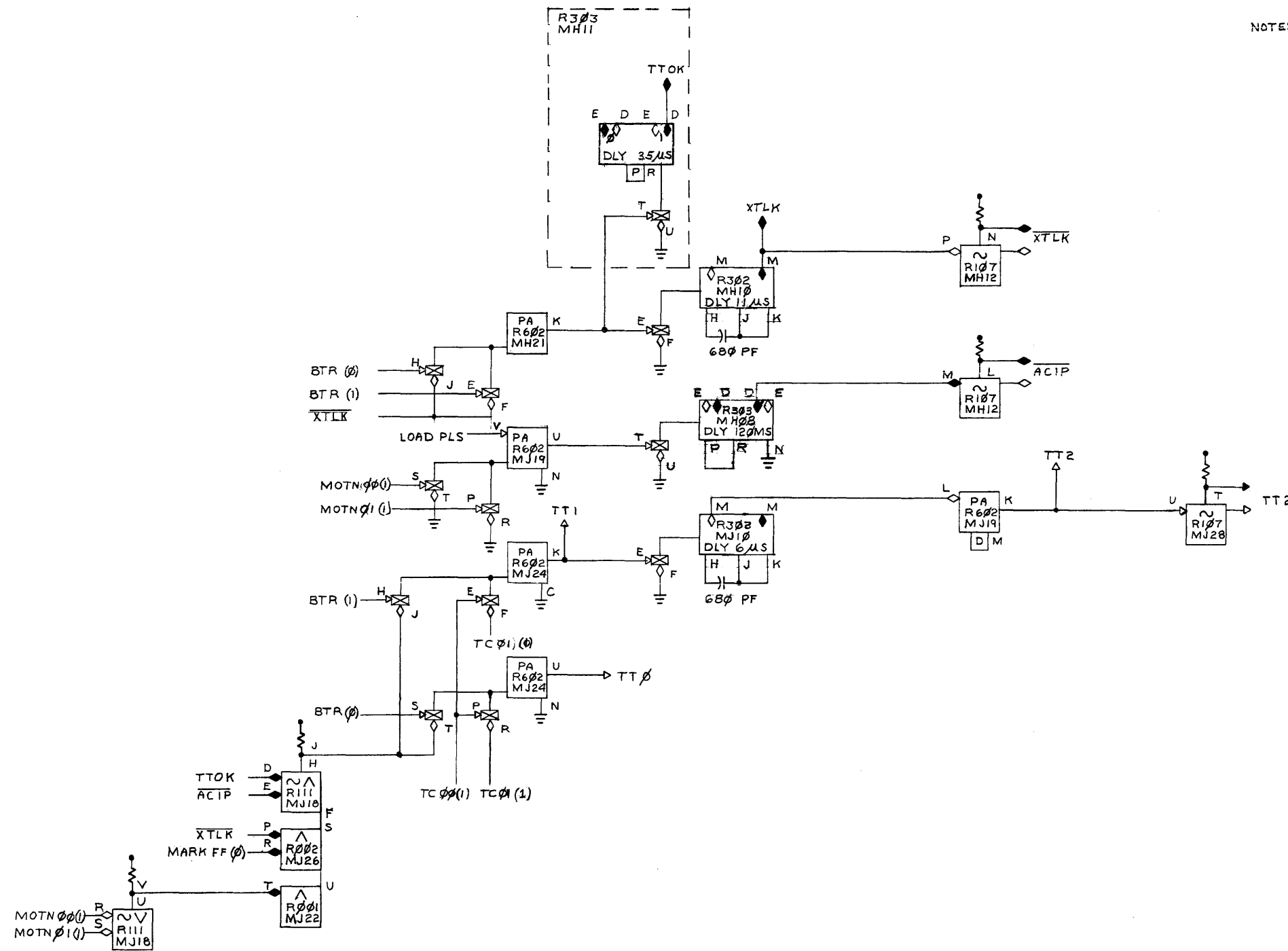
4

3

2

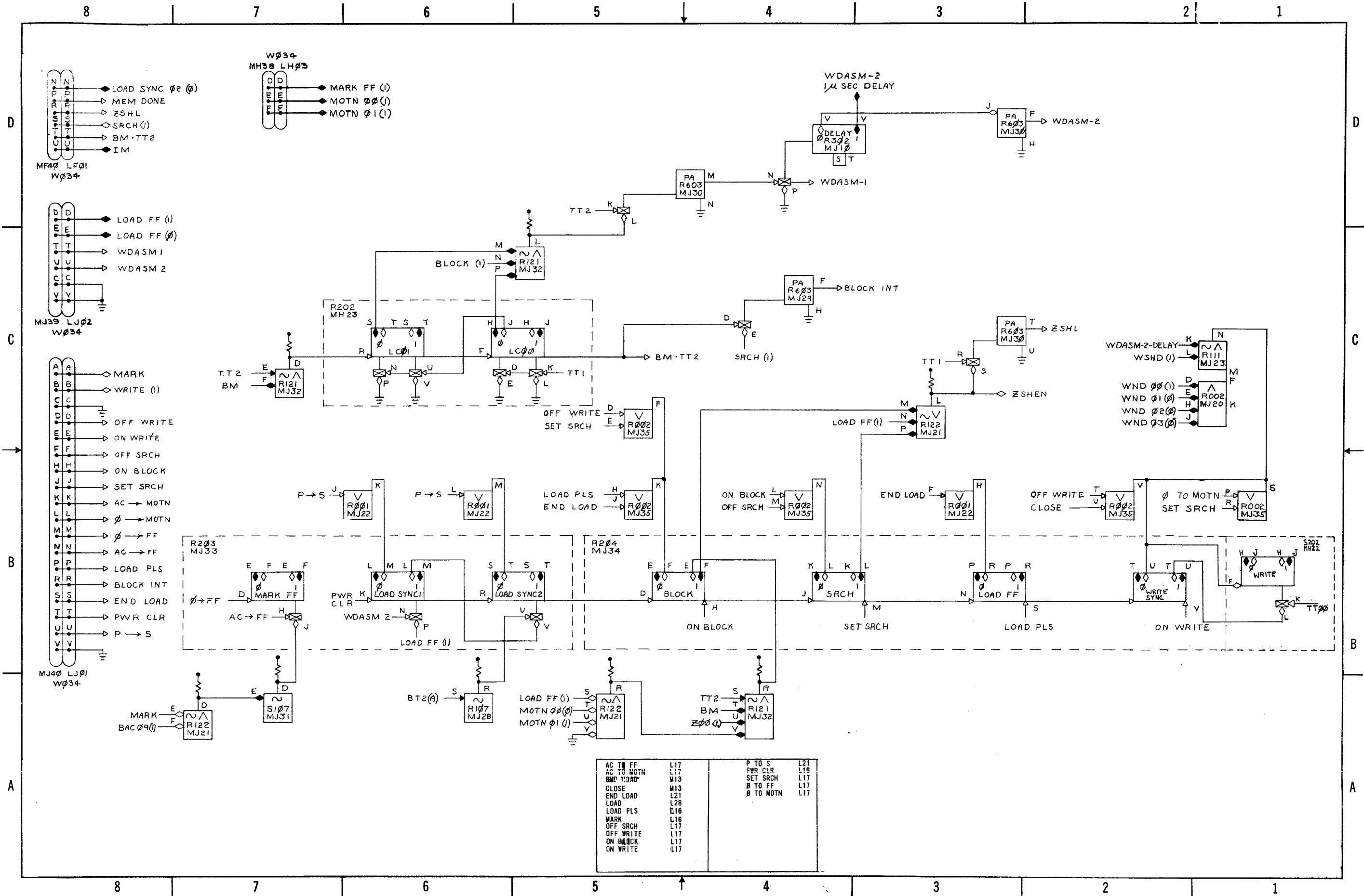
1

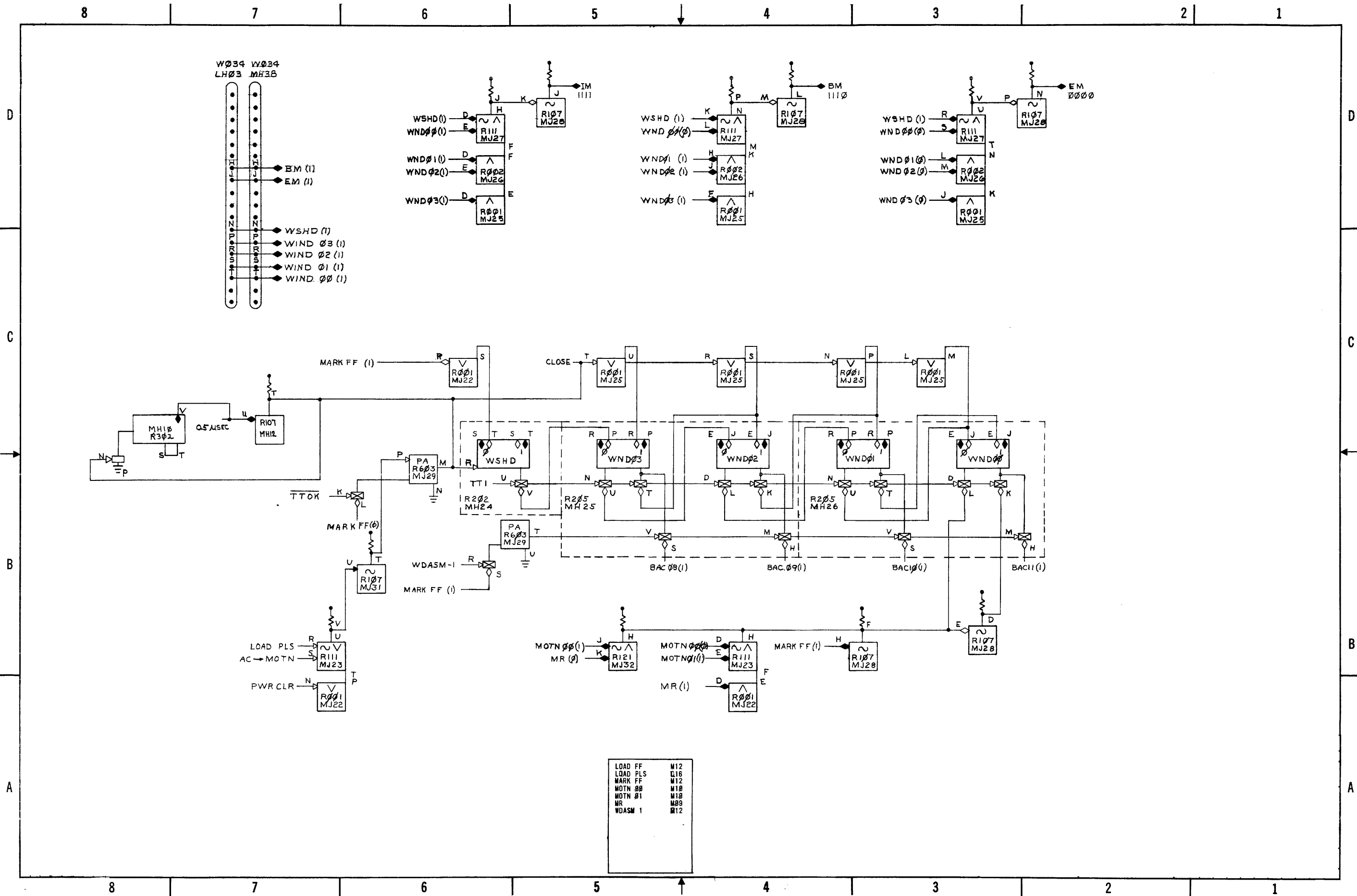
NOTE: TTOK = 40μS ON 50CPS SYSTEMS



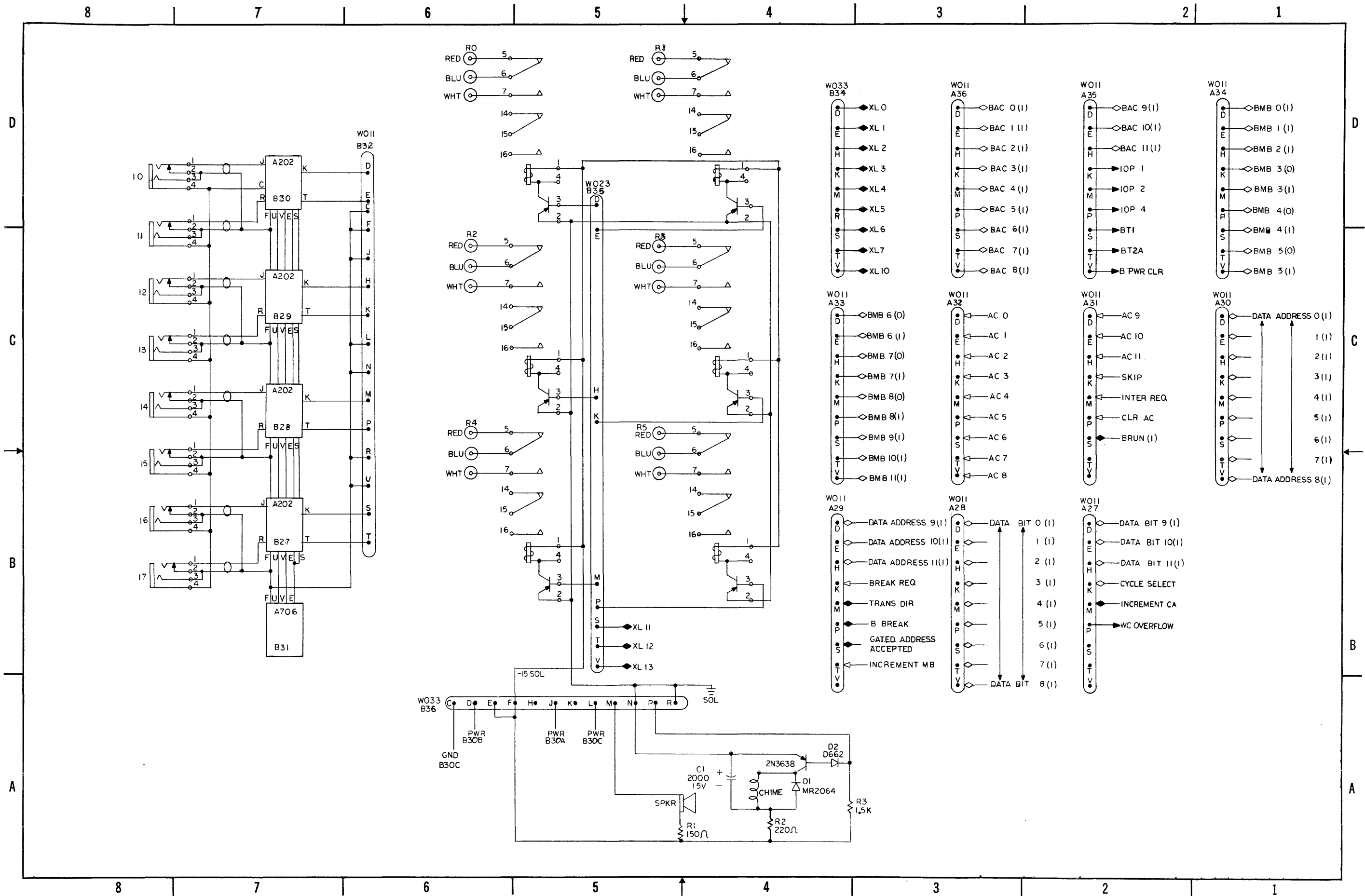
BTR	M89
LOAD FF	M12
MARK FF	M12
MOTN 00	M10
MOTN 01	M10

D-BS-LINC8-0-M11 Mag Tape Timing Generator

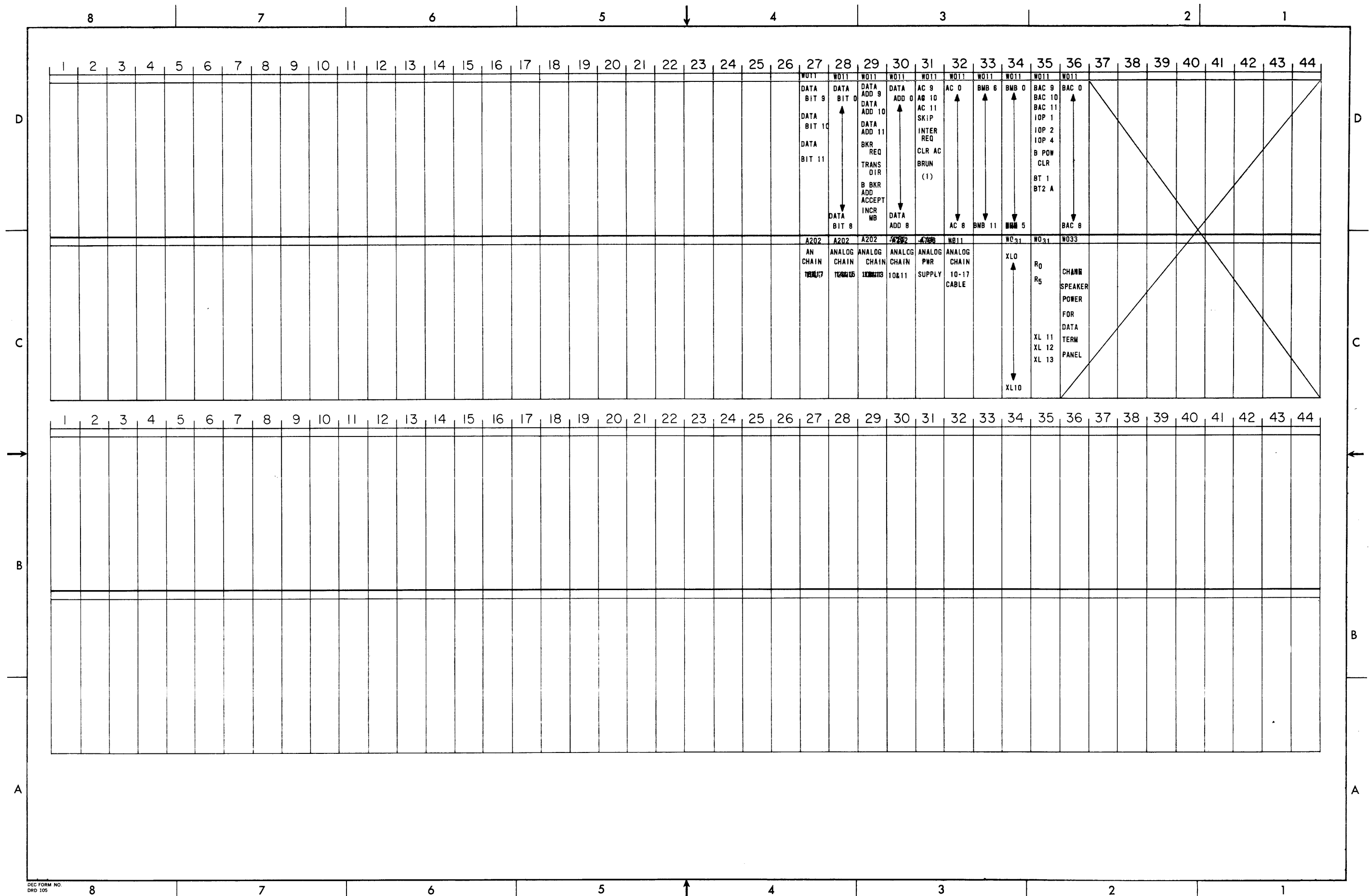




D-BS-LINC8-0-M13 Mag Tape Mark Window

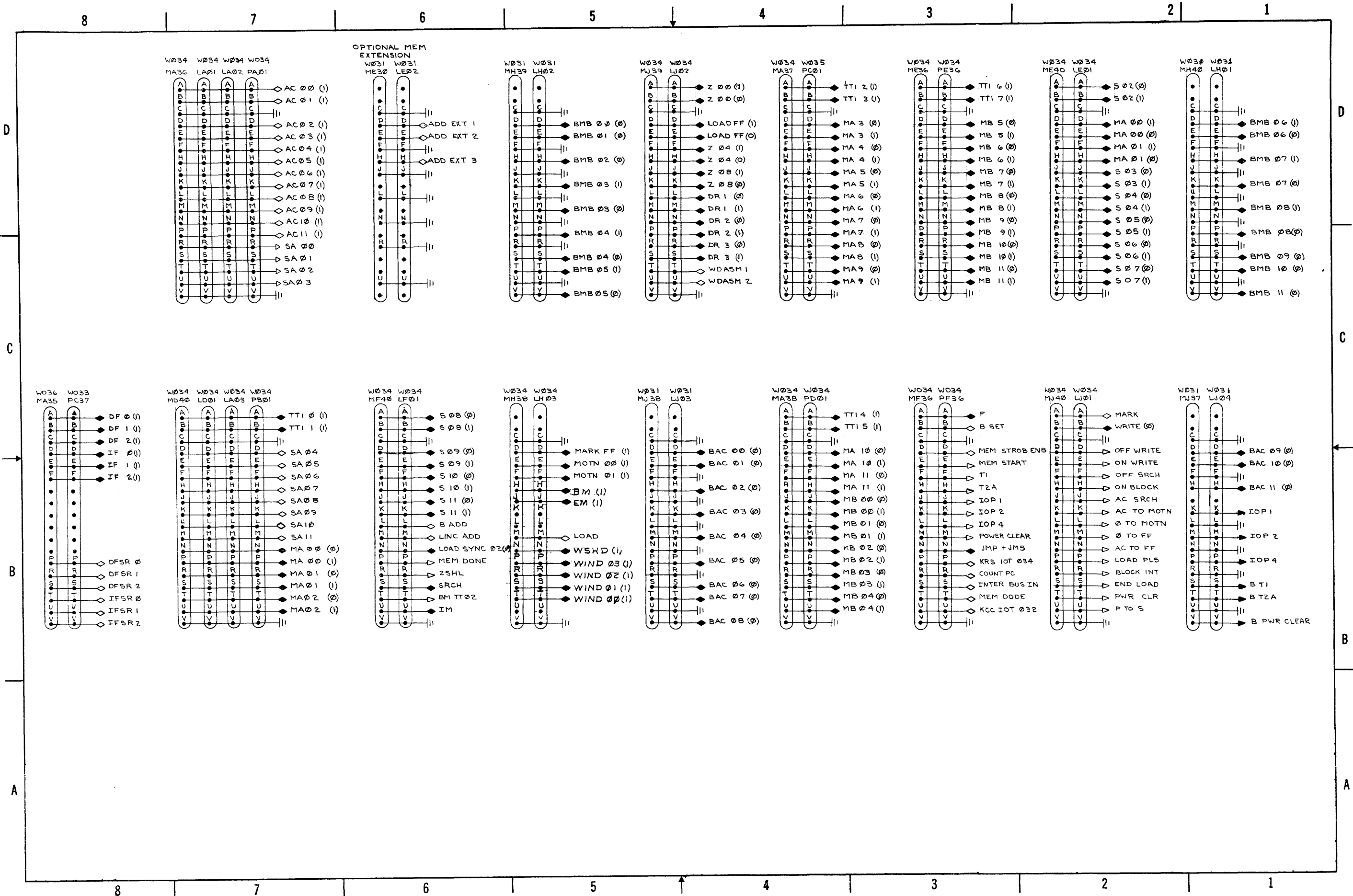


D-BS-LINC8-0-2 Data Terminal Panel Logic

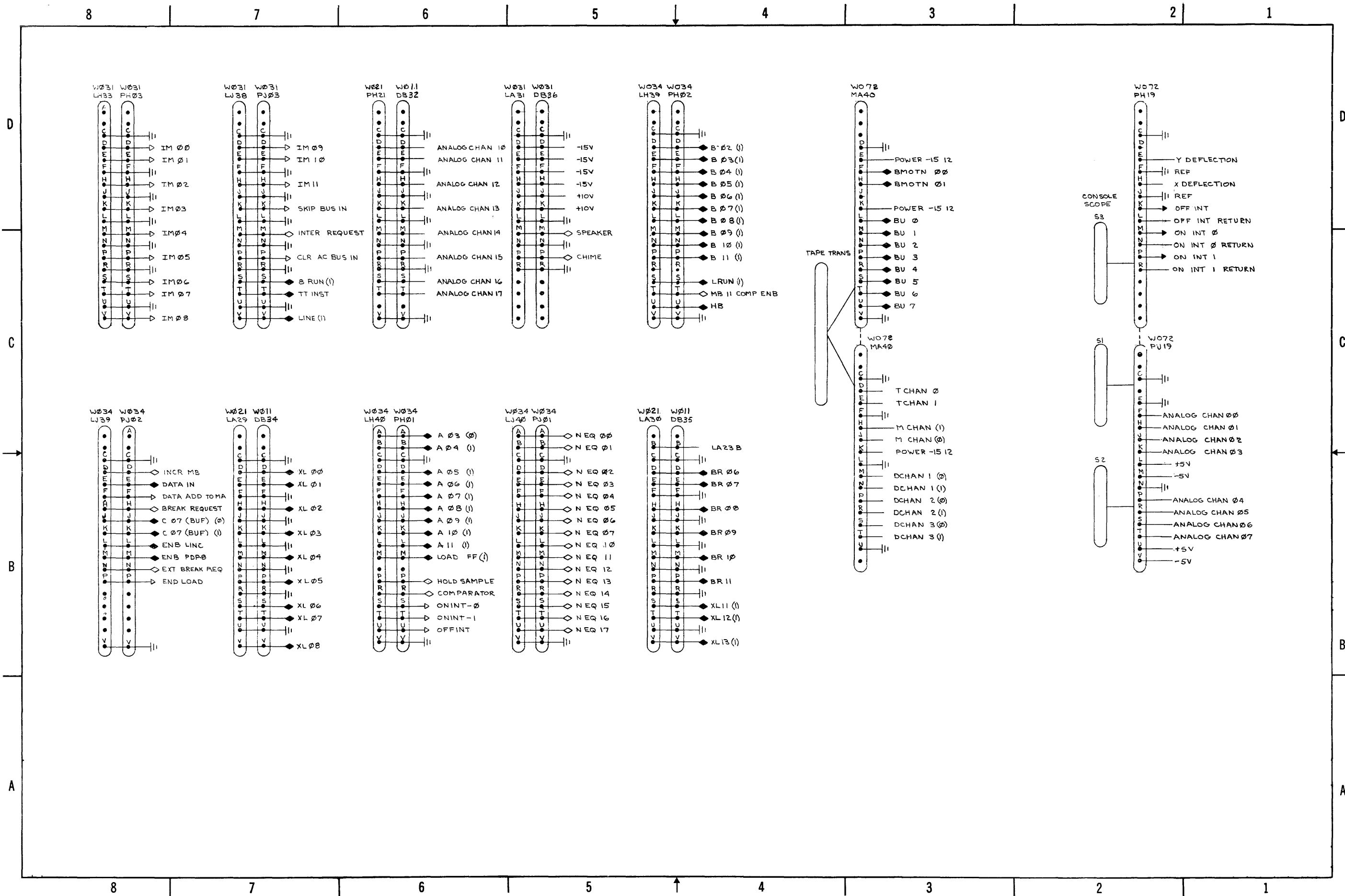


DEC FORM NO. DRD 105

D-MU-LINC8-0-3 Data Terminal Panel UML



D-IC-LINC8-0-4 Cables, LINC-8 (Sheet 1)



D-IC-LINC8-0-4 Cables, LINC-8 (Sheet 2)

D
C
B
A

D
C
B
A

SIGNAL	SYMBOL	INTERF CONN	DATA TERM PNL	MODULE TERMINAL	MODULE TYPE
PROGRAMMED DATA TRANSFER INPUT SIGNALS					
AC 0	PE2D	DA32D	PA7E	R210	
1	E	E	8E		
2	H	H	9E		
3	K	K	10E		
4	M	M	11E		
5	P	P	12E		
6	S	S	13E		
7	T	T	14E		
8	PE2V	DA32V	15E		
9	PP2D	DA31D	16E		
10	E	E	17E		
AC 11	H	H	18E	R210	
CLEAR AC	P	P	PA19J	S603	
INTERRUPT REQUEST	M	M	PD36K	S111	
SKI#	K	DA32K	PB21V	S603	
PROGRAMMED DATA TRANSFER OUTPUT SIGNALS					
BAC 0(1)	ME34D	DA36D	ME26J	R650	
1(1)	E	E	ME26T		
2(1)	H	H	ME27J		
3(1)	K	K	ME27T		
4(1)	M	M	ME28J		
5(1)	P	P	ME28T		
6(1)	S	S	MF26J		
7(1)	T	T	MF26T		
8(1)	ME34V	DA36V	MF27J		
9(1)	MF34D	DA35D	MF27T		
10(1)	E	E	MF28J		
BAC 11(1)	H	H	MF28T	R650	
IOP 1	K	K	MC31H	W640	
2	M	M	MC31N	W640	
IOP 4	ME34P	DA35P	MC31U	W640	
BMB 3(0)	ME35K	DA34K	MC27T	R650	
3(1)	E	E	MC28J		
4(0)	P	P	MC28T		
4(1)	S	S	MC29J		
5(0)	T	T	MC29T		
5(1)	ME35V	DA34V	MD25J		
6(0)	MF35D	DA33D	MD25T		
6(1)	MF35E	E	MD26J		
7(0)	H	H	MD26T		
7(1)	K	K	MD27J		
8(0)	M	M	MD27T		
8(1)	MF35P	DA33P	MD28J	R650	
DATA BREAK TRANSFER INPUT SIGNALS					
DATA ADDRESS 0(1)	PH04D	DA30D	PC7R	R211	
1(1)	E	E	8R		
2(1)	H	H	9R		
3(1)	K	K	10R		
4(1)	M	M	11R		
5(1)	P	P	12R		
6(1)	S	S	13R		
7(1)	T	T	14R		
8(1)	PH04V	DA30V	15R		
9(1)	PJ04D	DA29D	16R		
10(1)	E	E	17R		
DATA ADDRESS 11(1)	PJ04H	DA29H	PC18R	R211	
DATA BIT 0(1)	PH08D	DA28D	PH09E	S107	
1(1)	E	E	H		
DATA BIT 2(1)	PH08H	DA28H	PH09K	S107	

SIGNAL	SYMBOL	INTERF CONN	DATA TERM PNL	MODULE TERMINAL	MODULE TYPE
DATA BIT 3(1)	PH08K	DA28K	PH09M	S107	
4(1)	M	M	P		
5(1)	P	P	S		
6(1)	S	S	PH09W		
7(1)	T	DA28T	PH12E		
8(1)	V	DA28V	H		
9(1)	PJ08D	DA27D	K		
10(1)	E	27E	M		
11(1)	PJ08H	27H	PH12P		
BREAK REQUEST	PJ04K	29K	PJ05H		
TRANSFER DIRECTION	D4M	29M	PJ05K	S107	
INCREMENT MB	D4T	29T	PD31M	S107	
CYCLE SELECT	D8K	27K	PE7S	S107	
INCREMENT CA	PJ08M	DA27M	PE7OF	RT21	
DATA BREAK TRANSFER OUTPUT SIGNALS					
BMB 0(1)	ME35D	DA34D	MC26J	R650	
1(1)	E	E	26T		
2(1)	H	H	27J		
3(1)	M	M	28J		
4(1)	S	S	MC29J		
5(1)	ME35V	DA34V	MD25J		
6(1)	MF35E	DA33E	MD26J		
7(1)	K	K	27J		
8(1)	P	P	28J		
9(1)	S	S	28T		
10(1)	T	T	29J		
11(1)	MF35V	DA33V	MD29T		
B BREAK	PJ04P	DA29P	PE8T	R650	
ADDRESS ACCEPTED	PJ04S	DA29S	PF10U	W640	
WC OVERFLOW	PJ08P	DA27P	PF10N	W640	
MISCELLANEOUS INPUT SIGNALS					
ADDR EXTENSION 1	ME30D	ME8K, MC3K	S107, S151		
2	E	ME8H, MC3E	S107, S151		
ADDR EXTENSION 3	ME30H	ME8E, MC3J	S107, S151		
MISCELLANEOUS OUTPUT SIGNALS					
B RUN (1)	PF2S	DA31S	PE8J	R650	
DATA FIELD 0(1)	ME30K	F	ME7L	S107	
1(1)	M		ME7N		
DATA FIELD 2(1)	ME30P		ME7R	S107	
BT 1	MF34S	DA35S	MD30H	W640	
BT 2A	T	T	U		
B POWER CLEAR	MF34V	DA35V	MD30N	W640	

*DIRECTION IS INTO PDP-8 WHEN SIGNAL IS -3v, OUT OF PDP-8 WHEN GROUND POTENTIAL.
*THE INCREMENT MB INPUT TO THE PDP-8 MUST BE THE OUTPUT OF A GATING CIRCUIT THAT ENABLES GENERATION OF THE GROUND LEVEL SIGNAL ONLY WHEN THE B BREAK SIGNAL IS PRESENT.

8

7

6

5

4

3

2

1

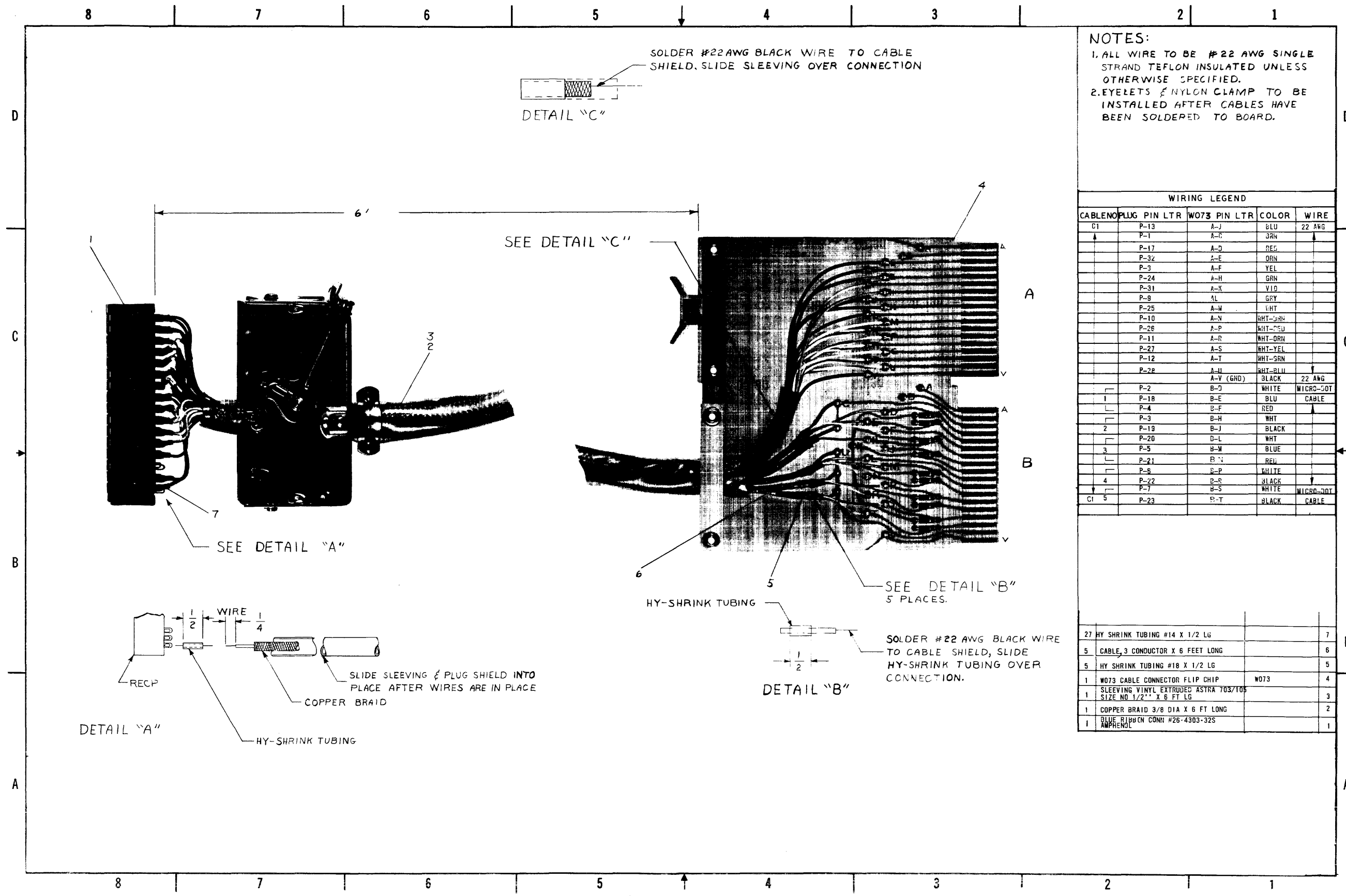
CABLE NO	TYPE	FROM-TO	FUNCTION REMARKS
7405554-1-0	W034-W034	MA36-LA01	PDP-8 MEM-PROC I (11)
7405559-4-0	W034-W035	MA37-PC01	PDP-8 MEM-PROC III
7405554-4-0	W034-W034	MA38-PD01	PDP-8 MEM-PROC IV (9)
↑ -5-0	↑	ME36-PE01	LINC ADDRESS I (9)
↑ -5-0	↑	MF36-PF01	LINC ADDRESS II
↑ -1-0	↑	WD40-LD01	PDP-8 MEM-PROC II (11)
↓ -1-0	↓	WE40-LE01	PDP-8 MEM-PROC V
7405554-8-0	W034-W034	WF40-LF01	PDP-8 MEM-PROC VI
7405554-2-0	W034-W034	MH38-LH03	TAPE SYSTEM III
7405552-2-0	W031-W031	MH39-LH02	BMB 0-5
↑ -1-0	↑	MH40-LH01	BMB 6-11
↓ -2-0	↓	MJ37-LJ04	BAC 9-11 IOP 1,2,4, ETC.
7405552-2-0	W031-W031	MJ38-LJ03	BAC 0-8
7405554-1-0	W034-W034	MJ39-LJ02	TAPE SYSTEM II
7405554-1-0	W034-W034	MJ40-LJ01	TAPE SYSTEM I
7405555-1-0	W033-W036	MA35-PC37	OPTIONAL MEM EXT SW & IND (4&6)
7005187-0-0	W073	MA40 TAPE UNIT MB40	TAPE TRANSPORT CABLE (10)
7405552-3-0	W031-W031	ME30-LA02	OPTIONAL EXT DAT ADD
7005186-0-0	W072	PH19 SCOPE PJ19	SCOPE DISPLAY
7405552-2-0	W031-W031	LH38-PH03	INPUT MIXER (AC 0-8)
↑ 4-1-0	↑	LH39-PH02	BC-11 & A 0-2
↓ 4-1-0	↓	LH40-BH01	A 3-11 & A-D SIGNAL
7405552-2-0	W031-W031	LJ38-PJ03	INPUT MIXER (AC 9-11) ETC.
7405554-1-0	W034-W034	LJ39-PJ02	MISC BREAK & A-D SIGNAL
↑ -1-0	↑	LJ40-PJ01	N00-N17
↓ -3-0	↓	LA02-PA01	PDP-8 MEM-PROC I
7405554-3-0	W034-W034	LA03-PB01	PDP-8 MEM-PROC II
			DATA TERMINAL PANEL
7405556-7-0	W021-W011	MH33-DA35	PDP-8 IO BAC 9-11 IOP (5)
↑	↑	MH34-DA36	PDP-8 IO BAC 0-8 (5)
		MH35-DA34	PDP-8 IO BMB 0-5 (5)
		MH36-DA33	PDP-8 IO BMB 6-11 (5)
		PH04-DA30	PDP-8 IO DATA ADD 0-8 (5)
		PJ04-DA29	PDP-8 IO DATA ADD 9-11 (5)
		PH06-DA32	PDP-8 IO INPUT MIXER 0-8 (5)
		PJ06-DA31	PDP-8 IO INPUT MIXER 9-11 (5)
		PH08-DA28	PDP-8 IO DATA BITS 0-8 (5)
		PJ08-DA27	PDP-8 IO DATA BITS 9-11 (5)
7405556-7-0	W021-W011	PH21-DB32	LINC ANALOG CHAIN 10-17 (5)
7405553-7-0	W033-W033	LA31-DB36	LINC CHIME POWER SPEAKER
7405556-7-0	W021-W011	LA29-DB34	LINC XL 0-10
7405556-7-0	W021-W011	LA30-DB35	LINC RELAYS XL 11-19
			INDICATOR CABLES
7405553-6-0	W033-W033	IND01-PC-38	PDP-8 RUN FETCH ETC. (1)
↑ -5-0	↑	02-PB-38	PDP-8 INSTRUCTIONS (1)
↑ -4-0	↑	03-PA40	PDP-8 BITS 9-11 (1)
↑ -4-0	↑	04-PB40	PDP-8 BITS 6-8 (1)
↑ -3-0	↑	05-PA39	PDP-8 BITS 3-5 (1)
↑ -3-0	↑	06-PB39	PDP-8 BITS 0-2 (1)
↑ -2-0	↑	07-PA38	PDP-8 INST-FIELD & DATA FIELD (1)
↑ -2-0	↑	08-LA23	LINC BITS 9-11 (1)
↑ -2-0	↑	09-LA22	6-8 (1)
↑ -2-0	↑	10-LA19	3-5 (1)
↑ -2-0	↑	11-LA16	LINC BITS 0-2 (1)
↑ -2-0	↑	12-LA27	LINC LMB, R LMB (1)
7405553-1-0	W033-W033	IND13-LA24	LINC AUTO IBI BTC (1)

CABLE NO	TYPE	FROM-TO	FUNCTION REMARKS
			CONTROL CONSOLE
7405553-1-0	W033-W033	CA02-LA36	LINC CONTROL SWITCHES (1)
↑ -1-0	↑	CB02-LA37	DELAY; AUDIO CHIME (1)
↑ -1-0	↑	CA03-LA05	LEFT SWITCH (1)
7405553-1-0	W033-W033	CB03-LA35	LINC SENSE SW& CONTROL SW (1)
7405555-2-0	W036-W033	CA04-PB37	PDP-8 RIGHT SWITCH (2)
7405555-2-0	W036-W033	CB04-PA37	PDP-8 CONTROL SWITCH (3)
			STANDARD IO CABLE TO PERIPHERAL
	W021	ME34	BAC 0-8
		MF34	BAC 9-11 IOP
		ME35	BMB 0-5
		MF35	BMB 6-11
		PE02	INPUT MIXER 0-8
		PF02	INPUT MIXER 9-11
		PH04	DATA ADD 0-8 (8)
		PJ04	DATA ADD 9-11 (8)
		PH08	DATA BITS 0-8 (8)
		PJ08	DATA BITS 9-11 (8)
	W021		
7005423-0-0			TAPE UNIT TO TAPE UNIT
			LINC 8 TAPE EXTENSION CABLE (10)

M = MEMORY SECTION
L = LINC SECTION
P = PROCESSOR SECTION
D = DATA TERM PANEL
IND = INDICATORS
C = CONTROL SWITCHES

NOTES:

- JUMPER PIN 'B'
- JUMPER PIN 'B' OF W033, JUMPER PIN 'B' & 'C' OF W036, 100 OHM PINS U-V OF W036
- JUMPER PIN 'B' OF W033, JUMPER PIN 'B' & 'C' OF W036, 100 OHM ON PINS: D-H, K & M-V 10 OHM ON PINS: J & L OF W036
- 0664 DIODES PINS A-N, 100 OHM RESISTORS PINS P-V OF W036
JUMPER PINS A & B OF W033
- COAX CABLE
- OPTIONAL FOR EXTENDED MEMORY
- OPTIONAL FOR EAE
- ONLY ONE BREAK DEVICE IS ALLOWED UNLESS DM01 (MULTIPLEXER) IS USED THEREFORE EITHER DATA TERM PANEL OR PERIPHERAL BREAK DEVICE MAY BE USED.
- 220 OHM RESISTORS IN MEMORY END OF CABLE 100 OHM RESISTORS IN PROCESSOR END OF CABLE.
- ONE CABLE ADDITIONAL FOR EACH ADDITIONAL DUAL TAPE UNIT.
- 100 OHM RESISTORS IN SERIES WITH PINS A AND B IN BOTH ENDS OF THE CABLE.



SOLDER #22AWG BLACK WIRE TO CABLE SHIELD, SLIDE SLEEVING OVER CONNECTION

DETAIL "C"

SEE DETAIL "C"

SEE DETAIL "A"

SEE DETAIL "B" 5 PLACES.

DETAIL "A"

DETAIL "B"

NOTES:
 1. ALL WIRE TO BE #22 AWG SINGLE STRAND TEFLON INSULATED UNLESS OTHERWISE SPECIFIED.
 2. EYELETS & NYLON CLAMP TO BE INSTALLED AFTER CABLES HAVE BEEN SOLDERED TO BOARD.

WIRING LEGEND

CABLE NO	PLUG	PIN LTR	W073 PIN LTR	COLOR	WIRE
01	P-13	A-J		BLU	22 AWG
	P-1	A-C		GRN	
	P-17	A-D		RED	
	P-32	A-E		ORN	
	P-3	A-F		YEL	
	P-24	A-H		GRN	
	P-31	A-K		VID	
	P-9	AL		GRY	
	P-25	A-M		LHT	
	P-10	A-N		WHT-GRN	
	P-26	A-P		WHT-RED	
	P-11	A-R		WHT-ORN	
	P-27	A-S		WHT-YEL	
	P-12	A-T		WHT-GRN	
	P-28	A-U		WHT-BLU	
		A-V (GND)		BLACK	22 AWG
	P-2	B-D		WHITE	MICRO-DOT
1	P-18	B-E		BLU	CABLE
	P-4	B-F		RED	
	P-3	B-H		WHT	
2	P-19	B-J		BLACK	
	P-20	B-L		WHT	
3	P-5	B-M		BLUE	
	P-21	B-N		RED	
	P-6	B-P		WHITE	
4	P-22	B-R		BLACK	
	P-7	B-S		WHITE	MICRO-DOT
01	5	P-23	P-T	BLACK	CABLE

27	HY SHRINK TUBING #14 X 1/2 LG		7
5	CABLE, 3 CONDUCTOR X 6 FEET LONG		6
5	HY SHRINK TUBING #18 X 1/2 LG		5
1	W073 CABLE CONNECTOR FLIP CHIP	W073	4
1	SLEEVING VINYL EXTRUDED ASTRA 703/105 SIZE NO 1/2" X 6 FT LG		3
1	COPPER BRAID 3/8 DIA X 6 FT LONG		2
1	BLUE RIBBON CONN #26-4303-325 AMPHENOL		1

8

7

6

5

4

3

2

1

D

C

B

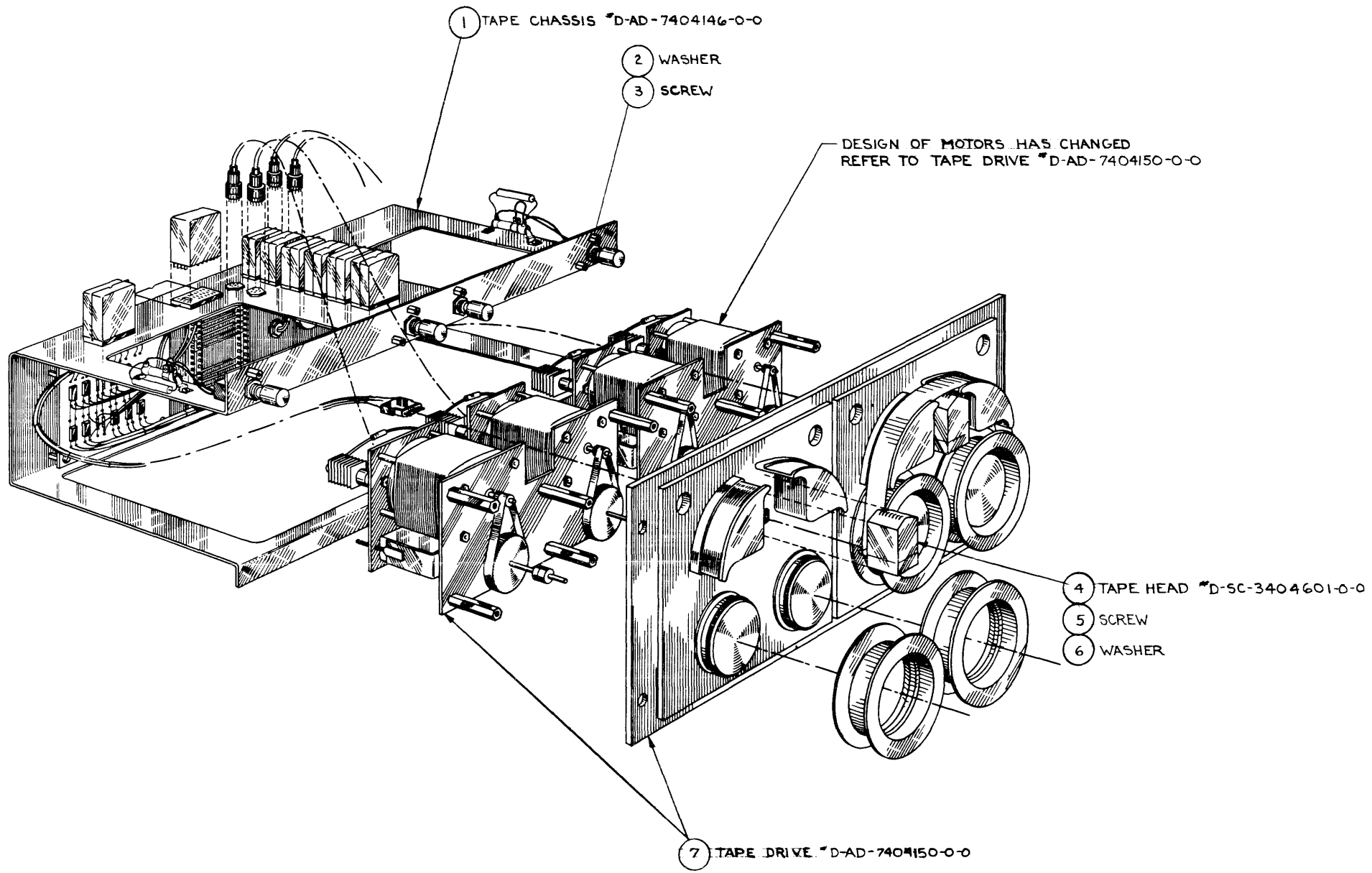
A

D

C

B

A



D-UA-7005260-0-0 Tape Transport

8

7

6

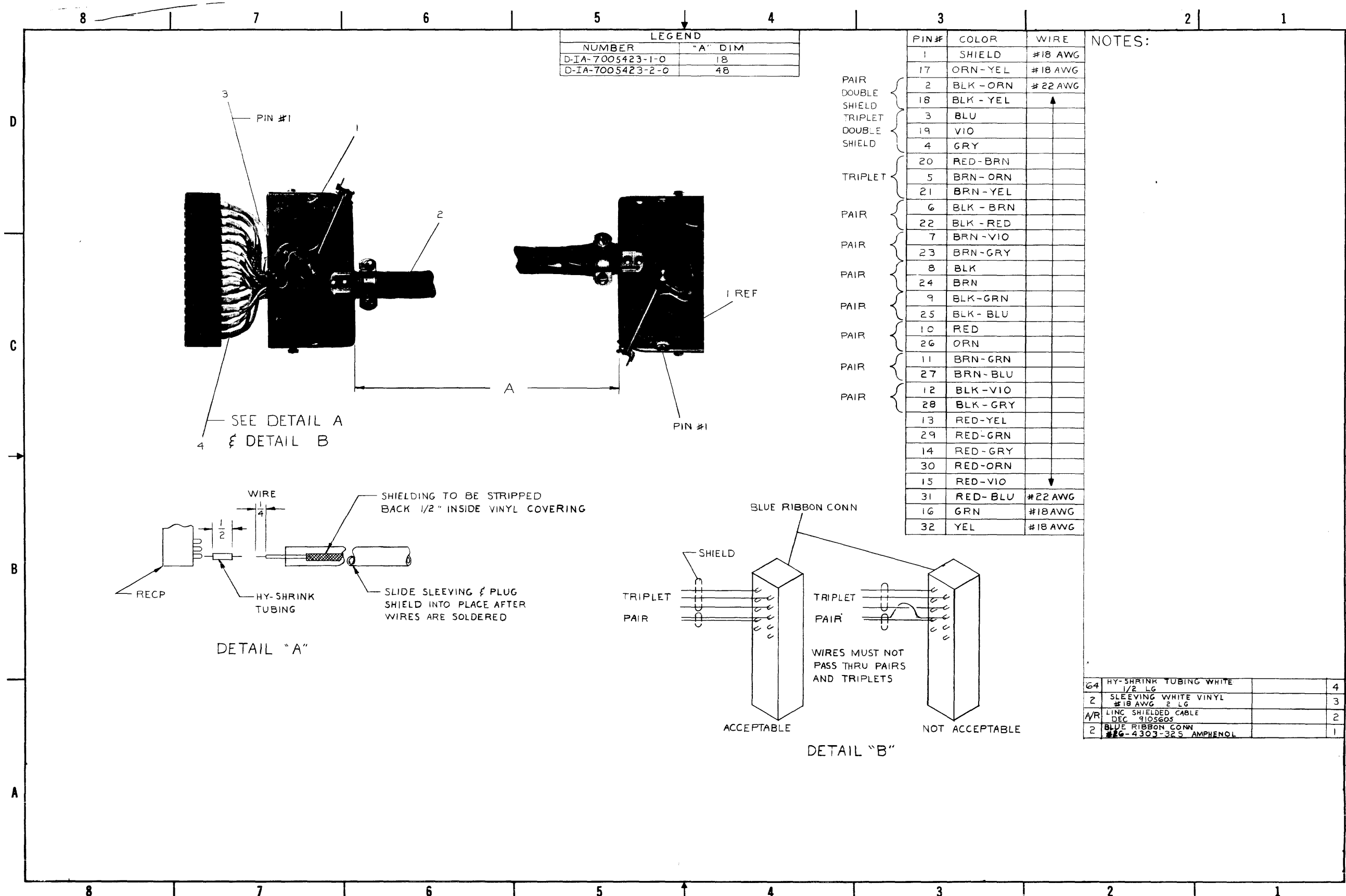
5

4

3

2

1



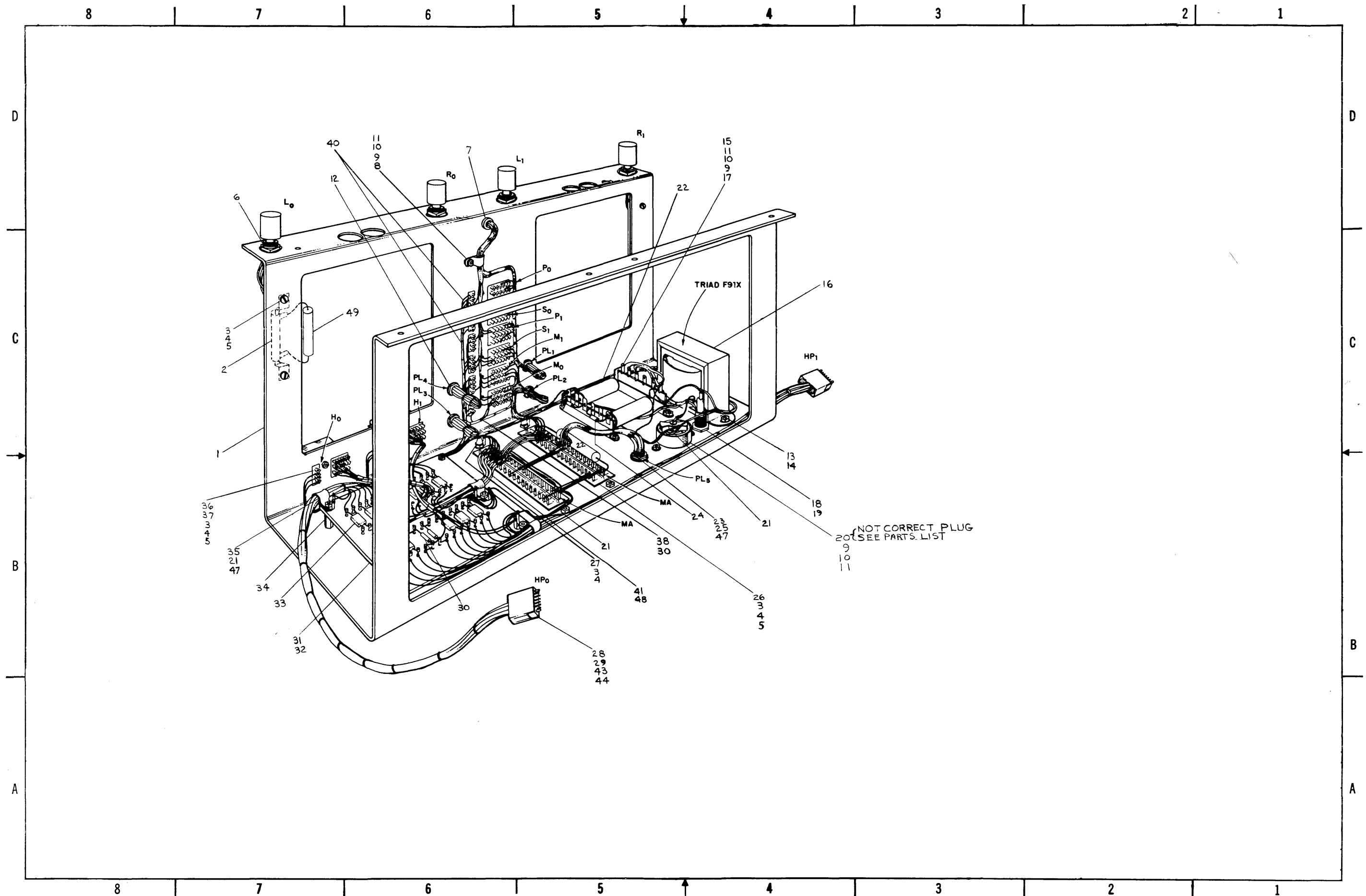
LEGEND	
NUMBER	"A" DIM
D-IA-7005423-1-0	18
D-IA-7005423-2-0	48

PIN#	COLOR	WIRE
1	SHIELD	#18 AWG
17	ORN-YEL	#18 AWG
2	BLK-ORN	#22 AWG
18	BLK-YEL	▲
3	BLU	
19	VIO	
4	GRY	
20	RED-BRN	
5	BRN-ORN	
21	BRN-YEL	
6	BLK-BRN	
22	BLK-RED	
7	BRN-VIO	
23	BRN-GRY	
8	BLK	
24	BRN	
9	BLK-GRN	
25	BLK-BLU	
10	RED	
26	ORN	
11	BRN-GRN	
27	BRN-BLU	
12	BLK-VIO	
28	BLK-GRY	
13	RED-YEL	
29	RED-GRN	
14	RED-GRY	
30	RED-ORN	
15	RED-VIO	▼
31	RED-BLU	#22 AWG
16	GRN	#18 AWG
32	YEL	#18 AWG

NOTES:

G4	HY-SHRINK TUBING WHITE 1/2 LG	4
2	SLEEVING WHITE VINYL #18 AWG 2 LG	3
A/R	LINC SHIELDED CABLE DEC 9105605	2
2	BLUE RIBBON CONN #26-4303-325 AMPHENOL	1

D-IA-7005423-0-0 LINCtape Extension Cable



D-AD-7404146-0-0 Tape Chassis (Sheet 1)

D

D

C

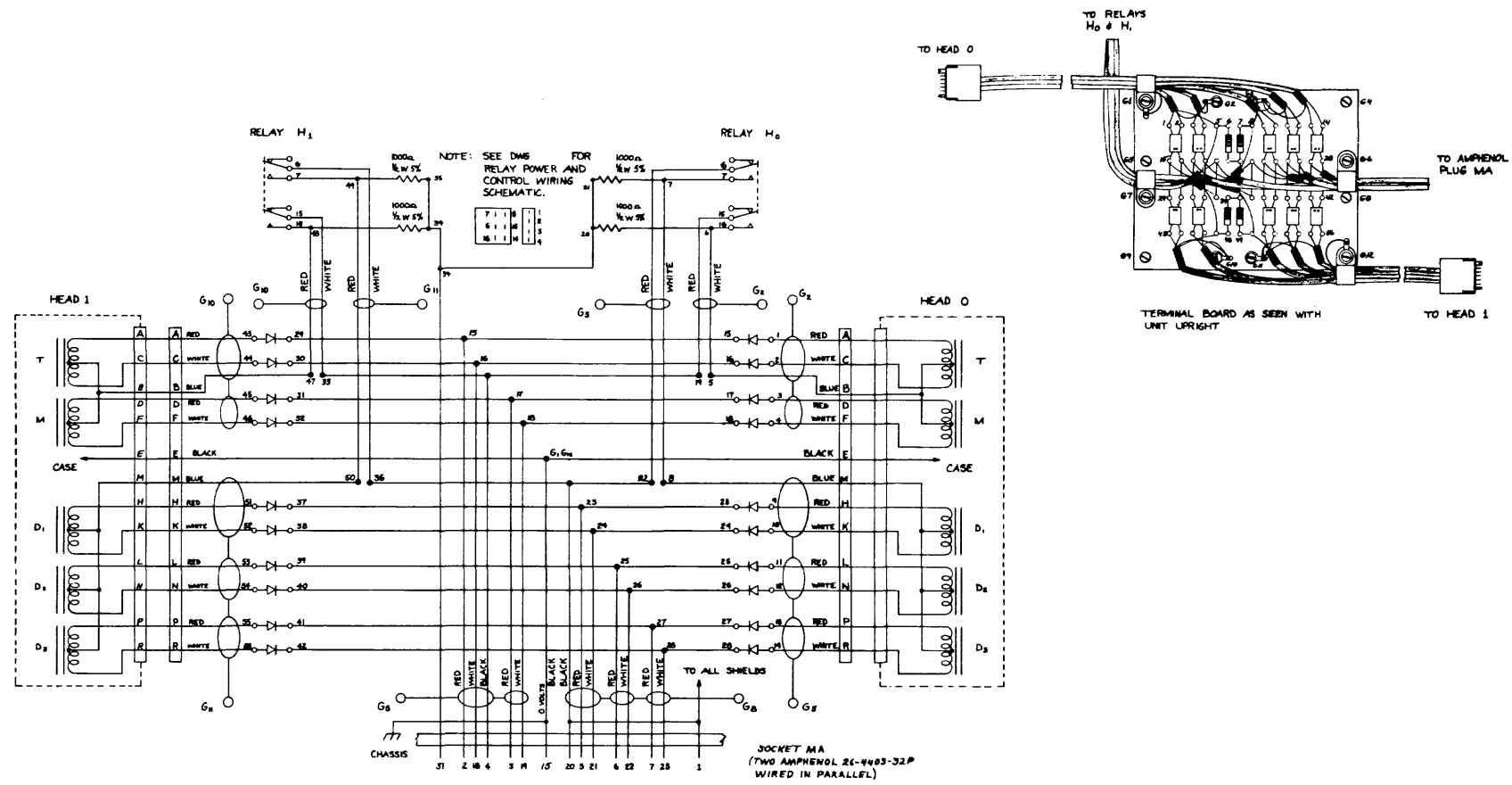
C

B

B

A

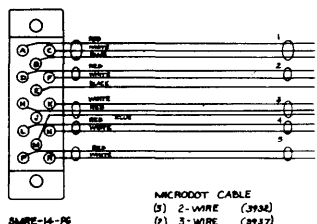
A



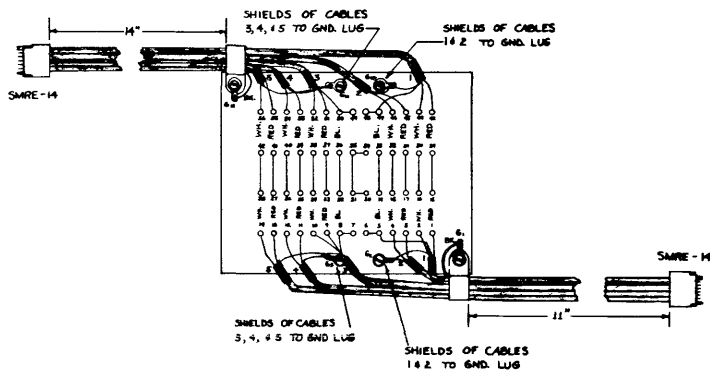
D-AD-7404146-0-0 Tape Chassis (Signal Wiring) Sheet 3

D

TAPE HEAD CABLE ASSEMBLY



1. MAKE 2 PER CHASSIS. ONE WITH 15" CABLE & ONE WITH 15" CABLE.
2. SHIELDS MAY NOT CONTACT ONE ANOTHER AT CONNECTOR END OF CABLE.
3. POT CONNECTOR END, USING MODIFIED WINCHESTER SMRE-14 HODD WITH ENLARGED CABLE OPENING.
4. DO NOT STRIP OTHER END OF CABLE.
5. ALL CABLE CLAMPS 9/16"



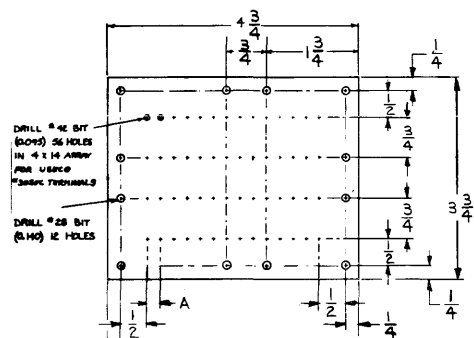
JUMPERS AND CONNECTIONS ON LOWER LANDS OF TERMINALS.

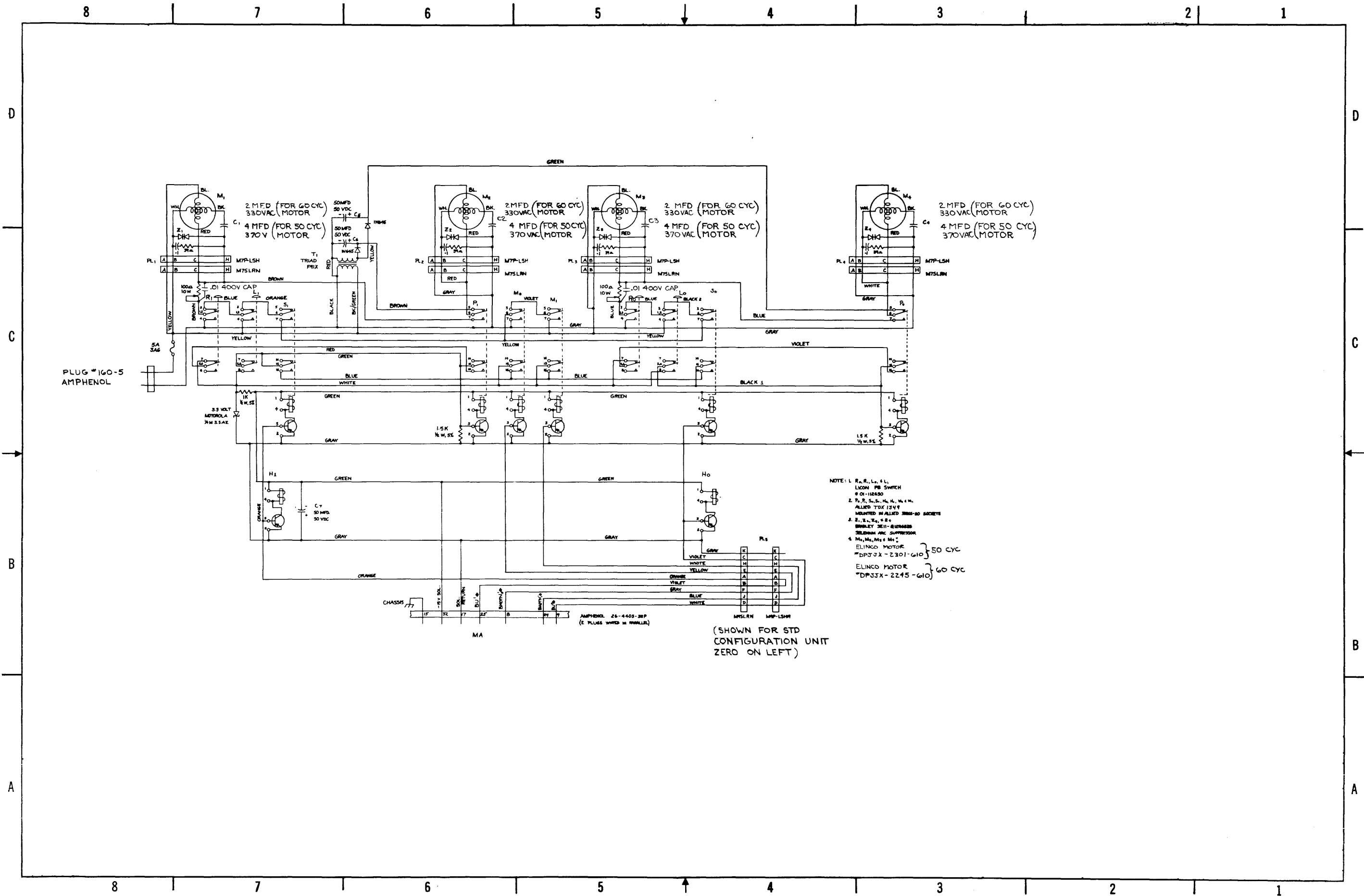
NOTES ON PREPARATION OF ENDS OF MOVING SHIELDED CABLE.

1. STRIP OUTER INSULATION BACK ABOUT 1" LEAVING SHIELD EXPOSED.
2. STRIP OFF ABOUT 3/4" OF SHIELD.
3. WRAP EXPOSED SHIELD WITH 4-TURN #24 AND SOLDER, BRING OUT ONE END OF WIRE WRAP ABOUT 3" IF REQUIRED.
4. INSULATE WRAPPED SHIELD WITH EMBROIDERY TUBING AND INSULATE #24 WIRE WITH SLEEVING.

NOTES ON PREPARATION OF BELDEN SHIELDED CABLE.

1. STRIP OUTER INSULATION BACK AS REQUIRED AND REMOVE FOIL.
2. USE DRAIN WIRE FOR SHIELD GROUND CONNECTION WHEN REQUIRED.
3. INSULATE SHIELD END AND DRAW WIRE AS ABOVE.





PLUG #160-5
AMPHENOL

- NOTE: 1. R₁, R₂, L₁, L₂
LEON PB SWITCH
01-112430
2. P₁, P₂, S₁, S₂, M₁, M₂, M₃, M₄
ALLIED TCM 12V4
MOUNTED IN ALLED 388-30 SOCKET
3. Z₁, Z₂, Z₃, Z₄
BRIDLEY 3E11-4 SUPPRESSOR
3ELBOM ARC SUPPRESSOR
4. M₁, M₂, M₃ & M₄
ELINGO MOTOR
"DP3JA-2301-610" 50 CYC
ELINGO MOTOR
"DP3JA-2245-610" 60 CYC

(SHOWN FOR STD
CONFIGURATION UNIT
ZERO ON LEFT)

D-BS-7404146-0-1 Tape Chassis, Power and Control

8

7

6

5

4

3

2

1

NOTES:
 1 USE STAINLESS ST. SET SCREWS IN ALL PULLEYS & BEARINGS.

D

C

B

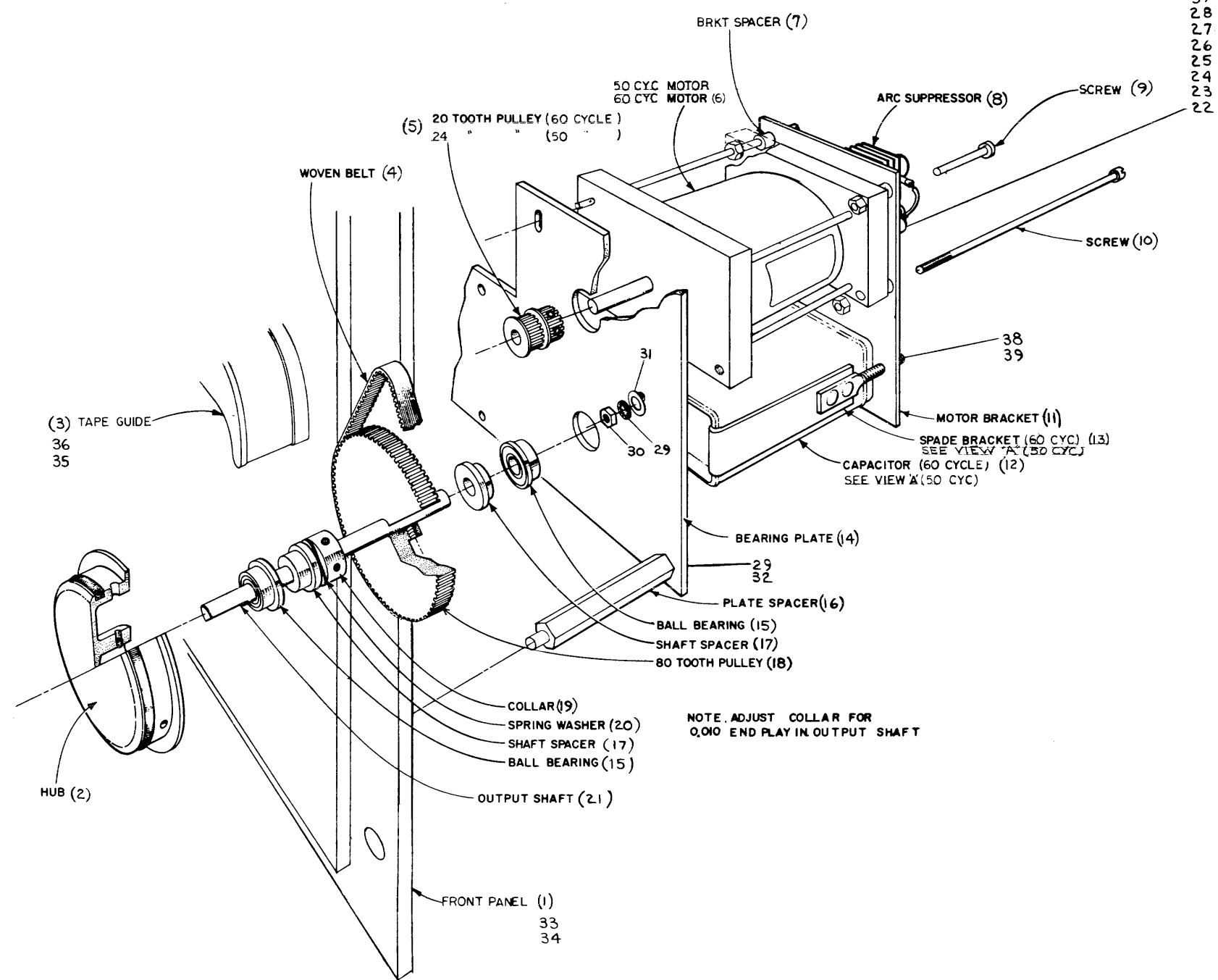
A

D

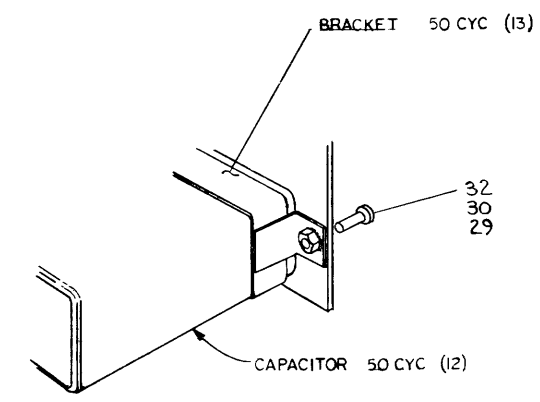
C

B

A



D-AD-7404150-1-0	60 CYCLE UNIT
D-AD-7404150-2-0	50 " "



VIEW "A"

8

7

6

5

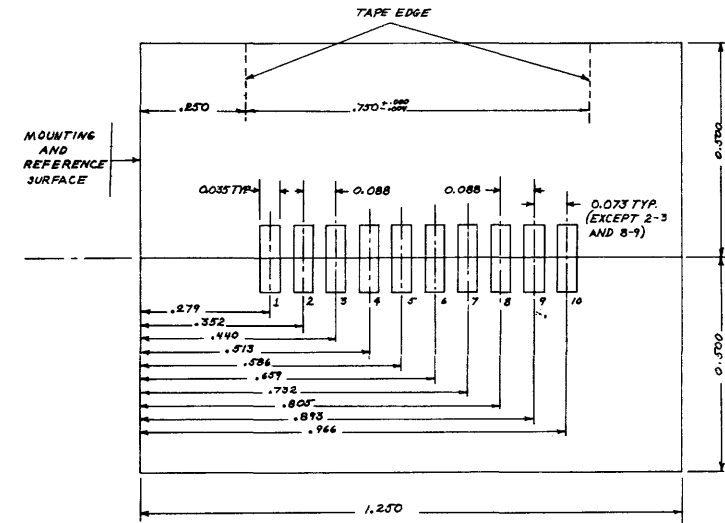
4

3

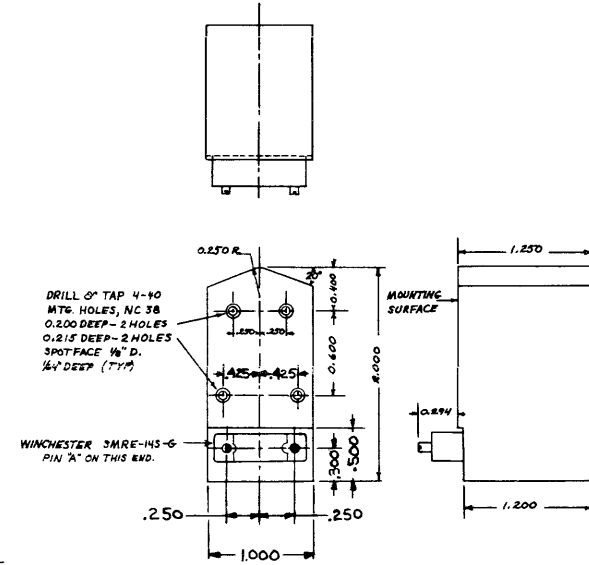
2

1

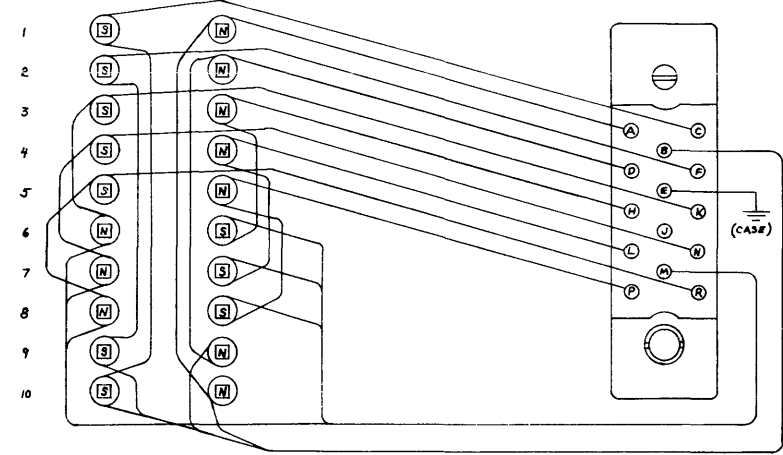
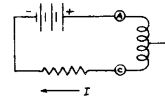
NOTES:
 1. ALL BURRS TO BE REMOVED FROM MFG. SURFACE BY GRINDING OR LAPPING AFTER DRILLING, TAPPING & SPOTFACING.
 2. TAPE HEAD TO BE PURCHASED FROM INSCO CORP.



GAP WIDTH - 500 MICRONS
 GAP SCATTER - 5.00 MICRONS
 GAP LINE PERPENDICULARITY - 100 MICRONS
 SKEW BETWEEN TRACKS 1 & 10
 SHIELD LOCATIONS - AS REQUIRED TO MEET CROSSTALK SPECIFICATIONS.



NOTE: POLE PIECES ARE SHOWN AS VIEWED FROM END OF HEAD WHICH CONTACTS TAPE. 'N'S' DESIGNATE NORTH-SEEKING & SOUTH-SEEKING POLES RESPECTIVELY. WHEN PINS A, D, H, L & P ARE CONNECTED TO A POSITIVE SOURCE & C, F, N, Q & R ARE CONNECTED TO THE NEGATIVE RETURN.



WIRING

VIEW OF EXPOSED RECEPTACLE OF WINCHESTER 3MRE-145-G

8

7

6

5

4

3

2

1