

digital

TSO3-M

Engineering Drawings
Digital Equipment Corporation

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DRAWING DIRECTORY

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CUSTOMER PRINT SET INDEX

THIS IS PRINT SET

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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SEQUENCE

SEQUENCE

(SHEET 1 ONLY)

DRAWING DIRECTORY	B-DD-TS03-M
TS03 SYSTEM OVERVIEW	C-IC-TS03-0-1
TS03 MODULE UTILIZATION	C-MU-TS03-0-2
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INTERFACE BOARD	D-CS-M8920-0-1

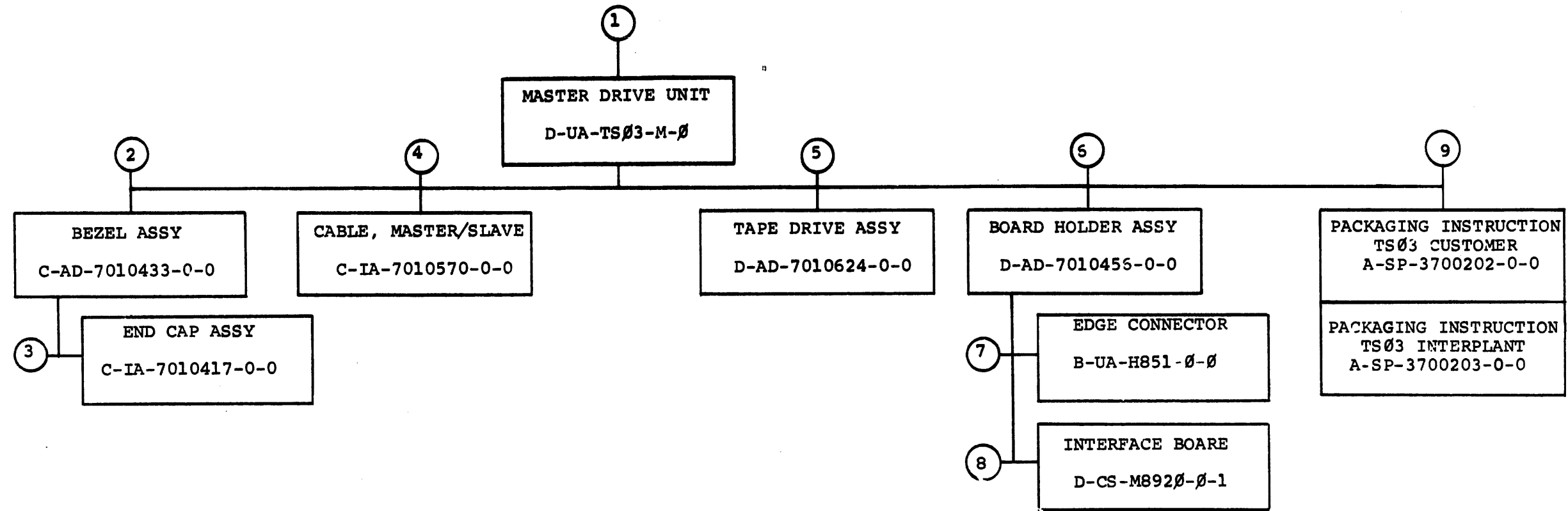
UNIT VARIATIONS		PRINT SET		
VAR	TITLE	1		
TS03-MA	MASTER DRIVE, 225V, 60 HZ	X		
TS03-MB	MASTER DRIVE, 220V, 50 HZ	X		

DEC 14-1980-1063-1A-0072

DATE	CHG. NO.	REV
6-75	TS03M-1	A

USED ON OPTION/MODEL	DATE	DATE
	F. Carberry	1/24/75
	CHK'D.	
	H. Frazier	12-1-75
	PROJ ENG.	
	H. Frazier	12-1-75
	PROD.	
	H. Frazier	
	FIELD SERV.	
	H. Frazier	12-1-75
SHEET 1 OF 3		

TITLE	NUMBER	REV
MASTER DRIVE UNIT		
SIZE CODE	TS03-M	A
B DO		
DIST		



TITLE	SHEET	SIZE	CODE	NUMBER	REV
MASTER DRIVE UNIT	2 OF 3	B	DD	TS03-M	A

CUSTOMER PRINT SET		ELECTRICAL					CUSTOMER PRINT SET		MECHANICAL				
1	1	NO. OF SHEETS	NO. OF SHEETS	DESCRIPTION	OPTION NO./FILE DATE	1	1	NO. OF SHEETS	NO. OF SHEETS	DESCRIPTION	OPTION NO./FILE DATE		
X		1	*	DRAWING DIRECTORY				1	#	1	MASTER DRIVE UNIT		
X			#	TS03 SYSTEM OVERVIEW					#	1	PLATE, CABLE CLAMP		
X			#	TS03 MODULE UTILIZATION					#	1	PLATE, PRESSURE		
X			#	TS03 FUNCTIONAL DIAGRAM					#	1	HARNESS, INTERFACE POWER		
X			#	POWER SUPPLY					#	1	MASTER/SLAVE CABLE		
X			#	SERVO PREAMP TAPE TENS. SERVO									
X			#	SERVO PREAMP CAPSTAN DR SERVO									
X			#	RAMP GENERATOR									
X			#	SENSOR AMPL/DRIVER									
X			#	MOTION CONTROL LOGIC									
X			#	CONTROL TERM. & OTHER SOURCES				2	#	1	BEZEL ASSY		
X			#	CONTROL INTERFACE LOGIC					#	1	EXTRUSION, BEZEL		
X			#	READ LOGIC									
X			#	READ CONNECTIONS									
X			#	DELAY TIMING/SKEW GATE									
X			#	WRITE LOGIC 4 CHAN, STROBES									
X			#	WRITE LOGIC 5 CHAN									
X			#	TS03 SIGNAL GLOSSARY				3	#	1	END CAP ASSY		
			#	TS03-M/TS03-S ACCEPTANCE PROC					#	1	CAP, END		
			#	INCOMING INSPECTION PROCEDURE					#	1	BAR, MOUNTING		
			#	TS03-M/TS03-S RELIABILITY TEST									
			#	TS03 CHECKOUT PROCEDURE									
		4	#	CABLE, MASTER/SLAVE				5	#	1	TAPE DRIVE ASSY		
			#	CABLE TERMINATOR					#	21	MAG TAPE DRIVE		
			#						#	1	COVER, PERFORATED		
		6	#	BOARD HOLDER ASSY									
			#										
		7	#	EDGE CONNECTOR									
			#	ETCH BOARD									
X		8	#	INTERFACE BOARD									
			#	M8920 PRELIM CHECKOUT PROC				6	#	1	BOARD HOLDER ASSY		
X		9	2	PACKAGING INSTRUCTIONS TS03 CUSTOMER					#	1	RETAINER ETCH BOARD		
			2	FULL TELESCOPE CAP					#	1	RETAINER, ETCH BOARD SIDE		
			2	FOAM PAD					#	1	INSULATOR		
			2	LAMINATED BUILDUP					#	1	BRKT, HINGE		
			2	PLASTIC STRAPPING									
				PKG. INST. TS03 INTERPLANT									
				LAMINATED BUILDUP									
				REGULAR SLOTTED CARTON									
				SCORED SHEET									
				CARTON SEALING TAPE									

CUSTOMER PRINT SET CODES
X = PRINT OF DOCUMENT INCLUDED IN PRINT SET
C = INCLUDES ALL PRINTS INDICATED ON DOCUMENT
S = CONFIDENTIAL AUTHORIZED SIGNATURE REQUIRED

TITLE

MASTER DRIVE UNIT

SHEET 3 OF 3

SIZE CODE
B DD

NUMBER
TS03-M

REV
A

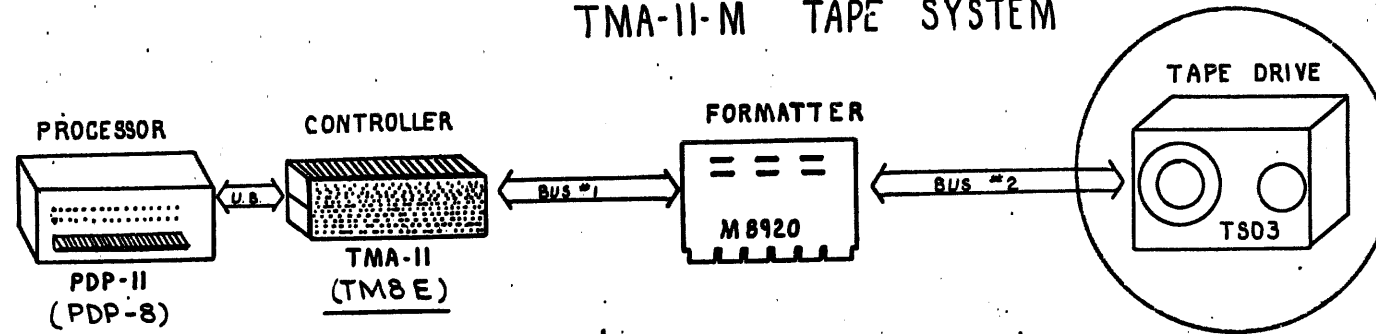
DRB 108

digital

EN-01062-2B-16-R972-(325)

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TMA-II-M TAPE SYSTEM



CONTROLLER PROVIDES:

- Control Functions (CR)**
1. command reception
 2. command decoding
 3. illegal command detection
 4. illegal drive detection
- Data Transfer Operations (DPA)**
1. memory interfacing
 2. bus addressing
 3. data synchronization
 4. word/byte formatting
 5. RECORD/word counting
 6. bus error indication
- Status Maintenance**
1. drive status to processor
 2. tape run-away prevention
 3. drive selection

FORMATTER PROVIDES:

1. command buffering
2. drive related timing (write)
3. gap width control
4. record, VPE, CRC, LRC, & tape-mark detection
5. VPE, CRC & tape-mark generation
6. EOT status for two drives
7. non-existent drive detection

TAPE DRIVE PROVIDES:

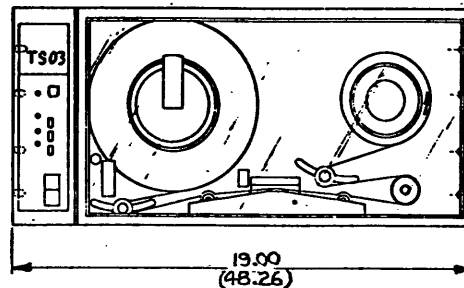
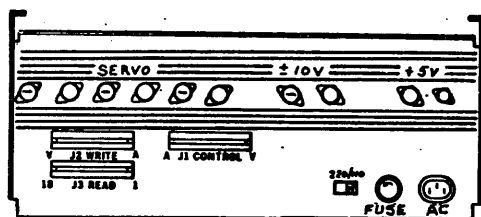
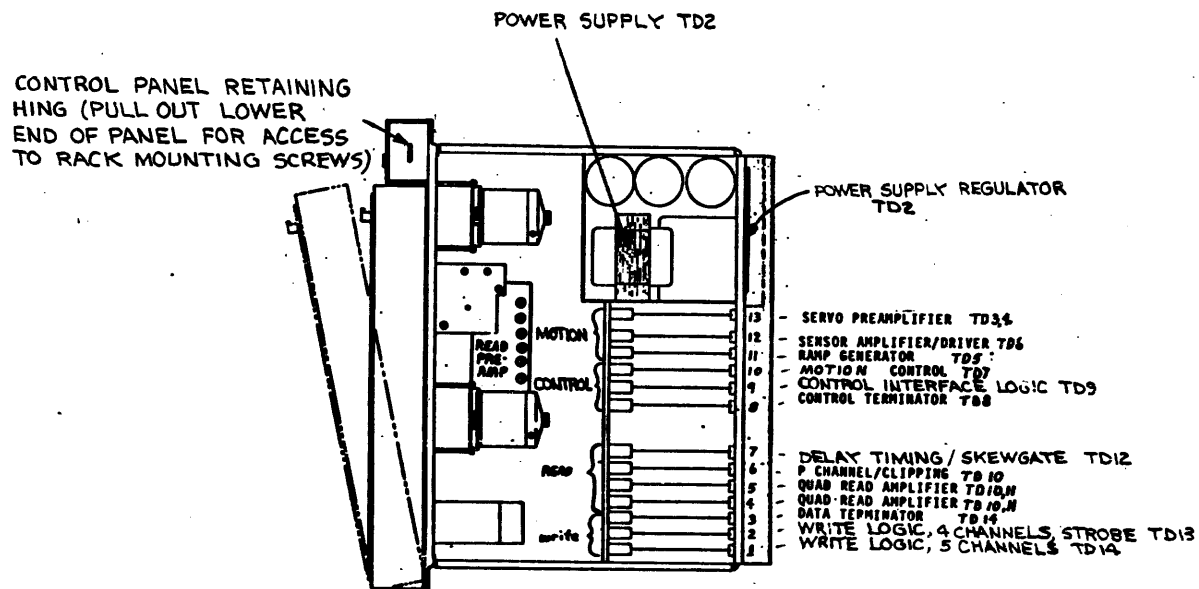
- Tape Handling**
1. constant 8oz. tension
 2. three sources of control
 3. tape threaded, LP, & EOT indication
- Data Functions**
1. erase, write, read, capability
 2. LRC generation
 3. automatic data error recovery

REV.	
CHANGE NO.	
CHK	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	DRN. <i>A. Robinson</i>	DATE 9/5/75	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
TOLERANCES	CHK'D. <i>C. Schwabe</i>	DATE 9/15/75		
DECIMALS	ENG. <i>John C. Edwards</i>	DATE 9/15/75		
ANGLES	PROJ. ENG. <i>H. F. ...</i>	DATE 7/16/75		
.XXX = .005	PROD. <i>T. ...</i>	DATE 8/16/75		
.XX = .02				
.X = .1				
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY V			TITLE TS03 SYSTEM OVERVIEW	
MATERIAL	NEXT HIGHER ASSY.		SIZE CODE	NUMBER
			CIC	TS03-0-1
FINISH	SCALE			REV.
	SHEET 1 OF 1			

SIZE CODE: CIC
 NUMBER: TS03-0-1
 REV:

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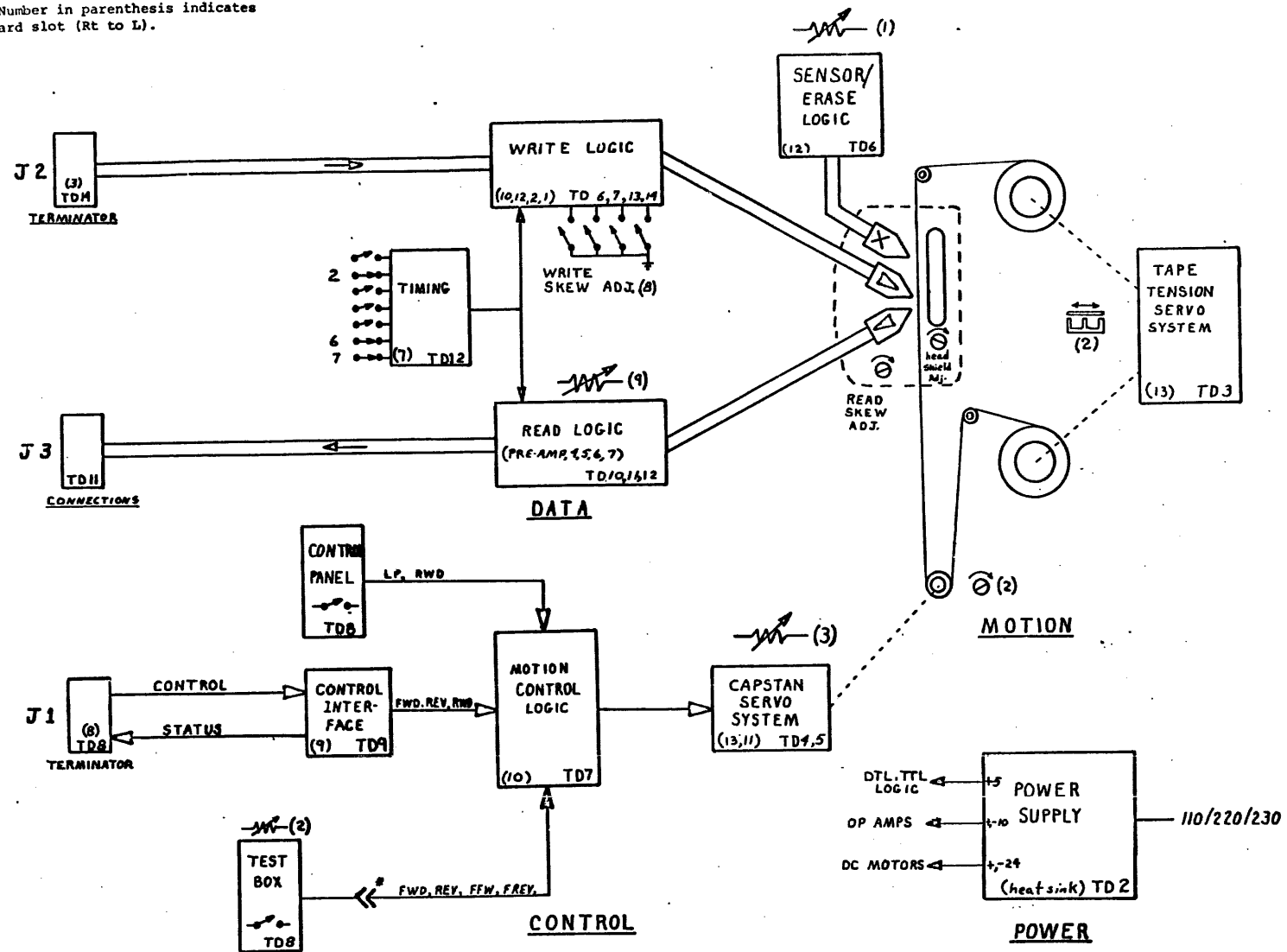
REV.	CHANGE NO.	REV.
A	TS03-00002	A
REVISED AND REDRAWN		
9/15/75		
H. F. Edwards		
10.3.75		

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		DRN, <i>H. F. Edwards</i>	DATE 3 SEPT 75		
		CHK'D, <i>C. Edwards</i>	DATE 9/15/75		
		ENG, <i>C. Edwards</i>	DATE 9/15/75		
		PROJ. ENG., <i>H. F. Edwards</i>	DATE 9/16/75		
THIRD ANGLE PROJECTION		PROD., <i>H. F. Edwards</i>	DATE 9/16/75	TITLE TS03 MODULE UTILIZATION	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.		SIZE CODE CMU	NUMBER TS03-0-2
MATERIAL		B-DD-TS03-M		REV. A	
FINISH					
		SCALE			
		SHEET 1 OF 1			

REV. A
NUMBER TS03-0-2
SIZE CODE CMU

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NOTE: Number in parenthesis indicates P.C. card slot (Rt to L).

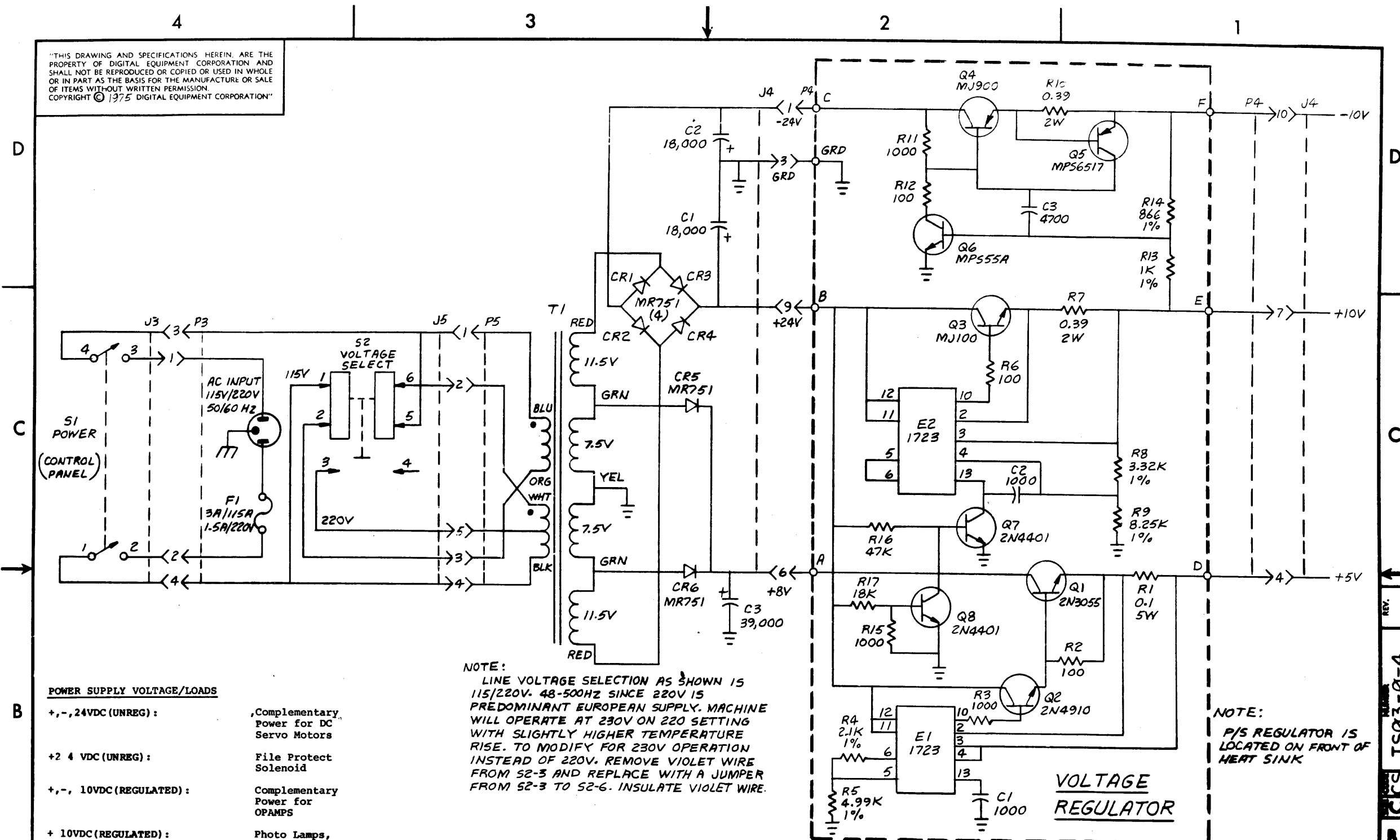


REV.	
CHANGE NO.	
CHK	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03		PARTS LIST		
DIMENSIONAL TOLERANCE		DRN. <i>H. Danahy</i>	DATE 3 SEPT 75	digital
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		CHK'D. <i>C. L. ...</i>	DATE 9/15/75	
MILLIMETERS	INCHES	ANGLES	DATE 9/15/75	TITLE TS03 FUNCTIONAL DIAGRAM (TDI)
X,XX ±0.10	.XXX ±0.005	±0° 30'	DATE	
X,X ±0.5	.XX ±0.02		DATE	
X ±2	.X ±0.1		DATE	
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	NEXT HIGHER ASSY.	DATE	
MATERIAL	+	B-DD-TS03-M	SIZE CODE C BS	NUMBER TS03-0-3
FINISH	+	SCALE	DIST.	REV.
		SHEET 1 OF 1		

REV. NUMBER TS03-0-3
SIZE CODE C BS

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POWER SUPPLY VOLTAGE/LOADS

+,-, 24VDC (UNREG):	Complementary Power for DC Servo Motors
+2.4 VDC (UNREG):	File Protect Solenoid
+,-, 10VDC (REGULATED):	Complementary Power for OPAMPS
+ 10VDC (REGULATED):	Photo Lamps, Photo Resistors
+ 5VDC (REGULATED):	TTL, DTL, CMOS, Led Power

NOTE:
 LINE VOLTAGE SELECTION AS SHOWN IS 115/220V. 48-500HZ SINCE 220V IS PREDOMINANT EUROPEAN SUPPLY. MACHINE WILL OPERATE AT 230V ON 220V SETTING WITH SLIGHTLY HIGHER TEMPERATURE RISE. TO MODIFY FOR 230V OPERATION INSTEAD OF 220V. REMOVE VIOLET WIRE FROM S2-3 AND REPLACE WITH A JUMPER FROM S2-3 TO S2-6. INSULATE VIOLET WIRE.

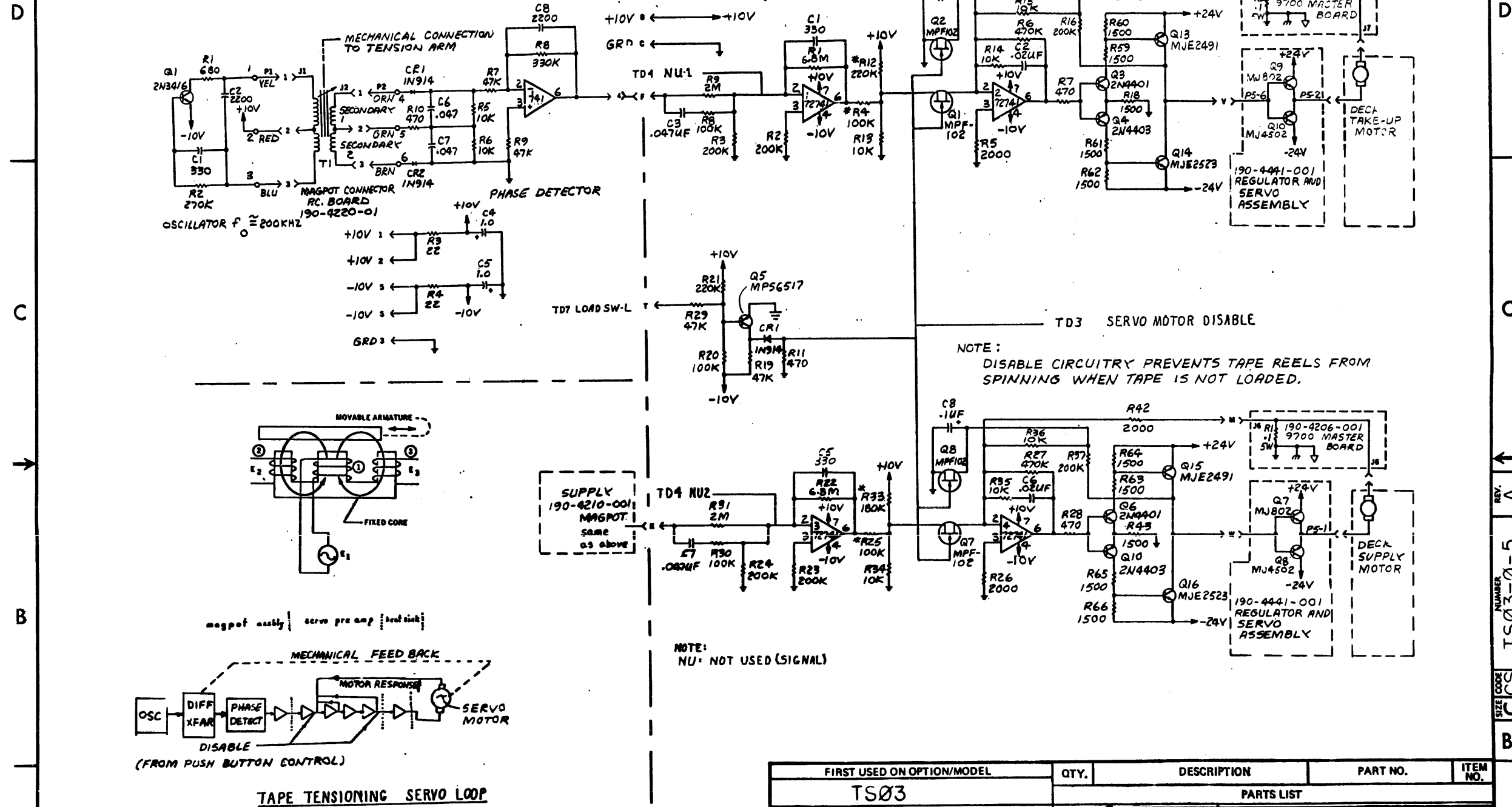
NOTE:
 P/S REGULATOR IS LOCATED ON FRONT OF HEAT SINK

REV.	REV.
CHANGE NO.	REV.
REV.	REV.

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		DRN.	DATE		
		CHK'D.	DATE		
		ENG.	DATE		
		PROJ. ENG.	DATE		
TITLE		PROD.	DATE	POWER SUPPLY (TD2)	
MATERIAL		NEXT HIGHER ASSY.		SIZE CODE	NUMBER
FINISH		B-DD-TS03-M		C CS	TS03-0-4
TWO ANGLE PROJECTION		SCALE		REV.	
		SHEET 1 OF 1			

REV. C CS TS03-0-4

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REV.	REV.
CHANGE NO.	TS03-00002
REVISED AND REDRAWN	H. FINDEISEN
DATE	10.2.75

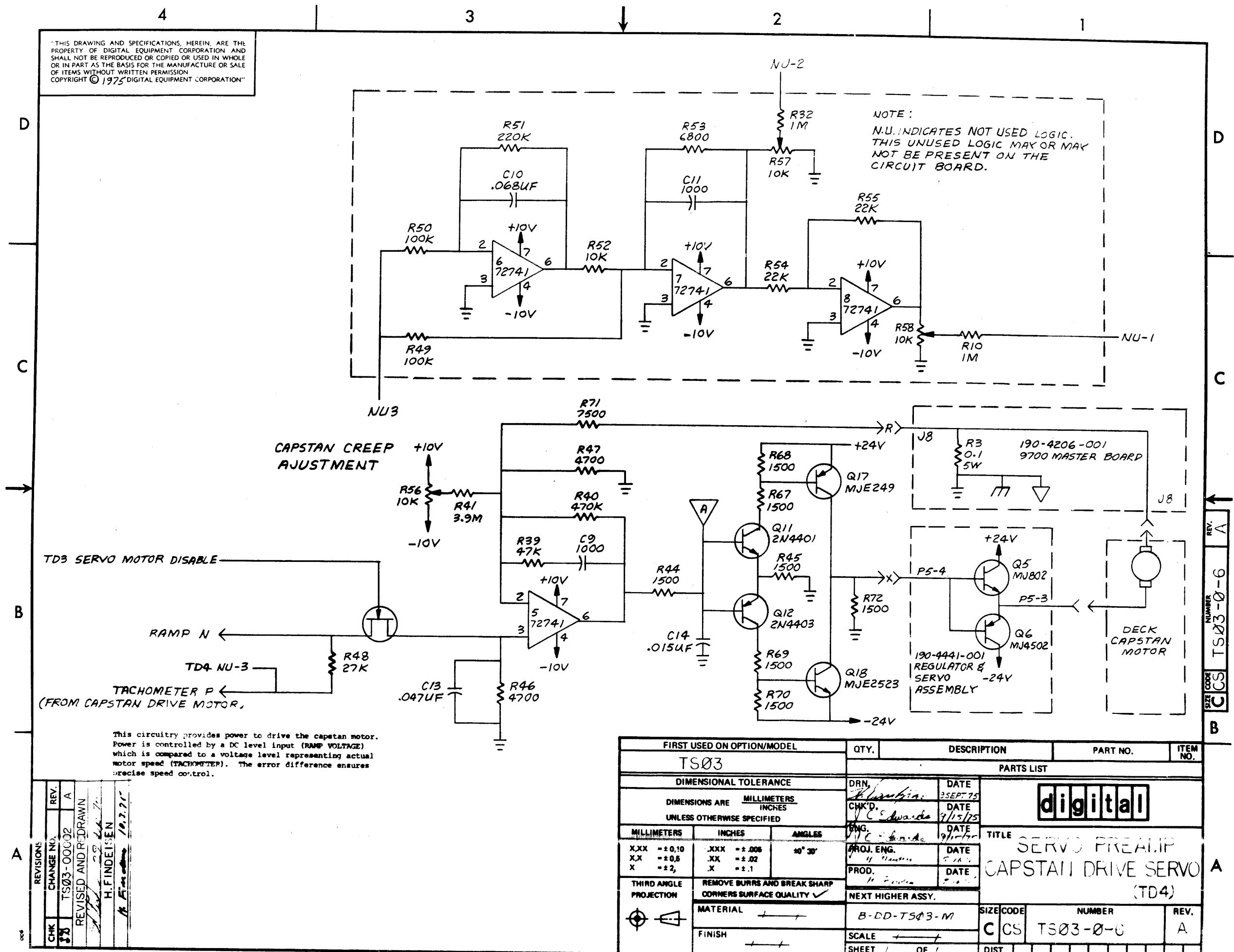
DEC FORM NO. 500 113

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03		PARTS LIST		
DIMENSIONAL TOLERANCE		DRN.	DATE	
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		CHK'D.	DATE	
MILLIMETERS	INCHES	ANGLES	DATE	
XXX ±0.10	XXX ±.006	±0° 30'	DATE	
XX ±0.5	XX ±.02		DATE	
X ±2	X ±.1		DATE	
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	NEXT HIGHER ASSY.		
MATERIAL		B-DD-TS03-M	SIZE CODE	NUMBER
FINISH			C CS	TS03-0-5
		SHEET 1 OF 1	DIST.	REV. A

REV. A
NUMBER TS03-0-5
SIZE CODE C CS

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NOTE:
N.U. INDICATES NOT USED LOGIC. THIS UNUSED LOGIC MAY OR MAY NOT BE PRESENT ON THE CIRCUIT BOARD.



CAPSTAN CREEP ADJUSTMENT

TD3 SERVO MOTOR DISABLE

RAMP N ←

TD4 NU-3

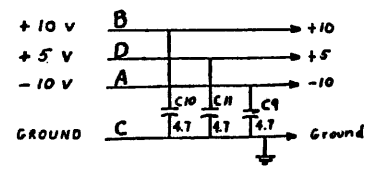
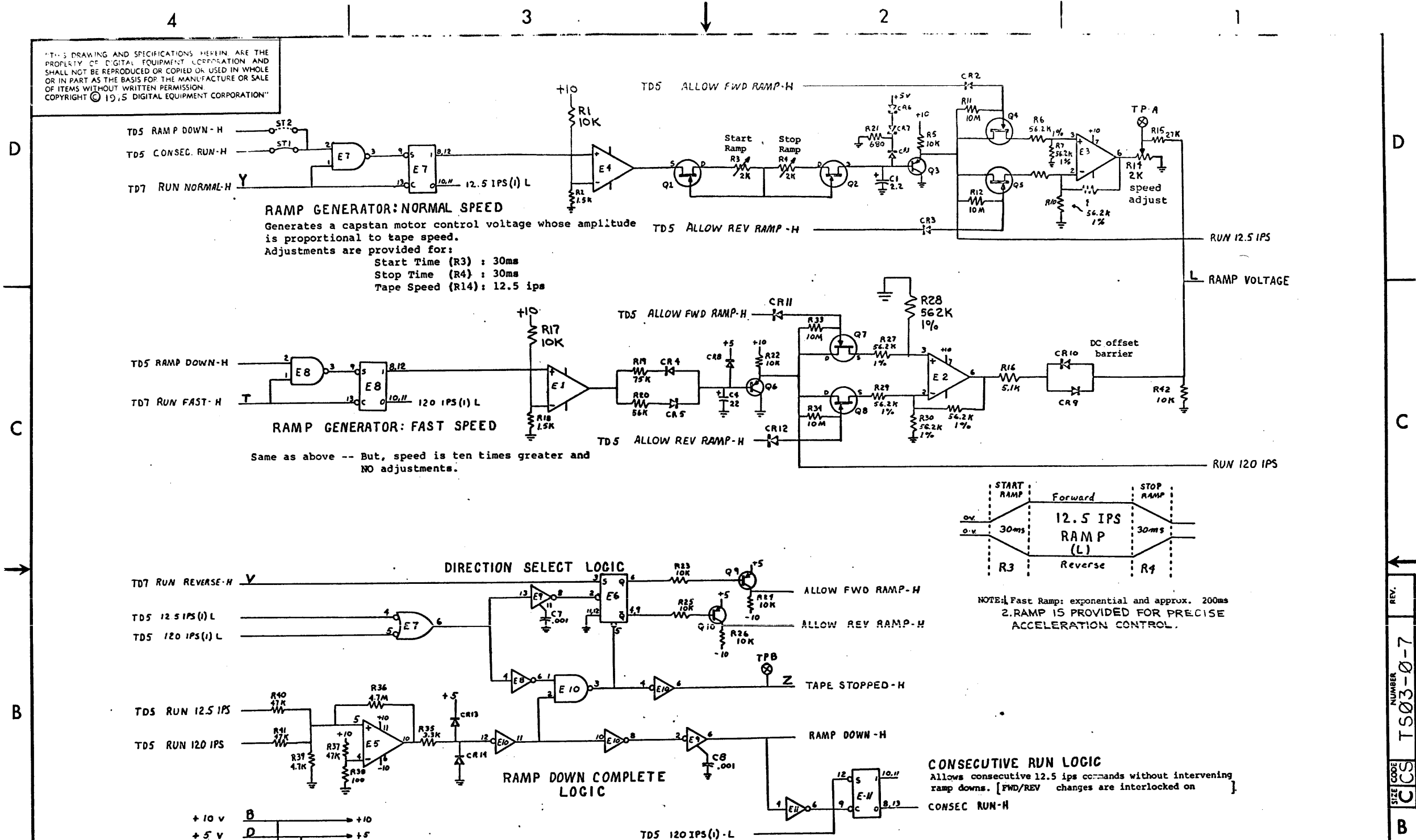
TACHOMETER P ←
(FROM CAPSTAN DRIVE MOTOR)

This circuitry provides power to drive the capstan motor. Power is controlled by a DC level input (RAMP VOLTAGE) which is compared to a voltage level representing actual motor speed (TACHOMETER). The error difference ensures precise speed control.

REV. A	CHANGE NO. TS03-0002	REV. A
33	REVISED AND RE-DRAWN	
	H. FINDEISEN	
	10.7.75	

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.	
TS03						
DIMENSIONAL TOLERANCE		PARTS LIST				
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		DRN	DATE			
		CHK'D	DATE			
		ENG.	DATE			
		PROJ. ENG.	DATE			
		PROD.	DATE	TITLE		
		SERVO PREAMP			CAPSTAN DRIVE SERVO (TD4)	
THIRD ANGLE PROJECTION		REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.		
MATERIAL		B-DD-TS03-M		SIZE CODE	NUMBER	
FINISH		SCALE		C CS	TS03-0-0	
		SHEET 1 OF 1		DIST.		

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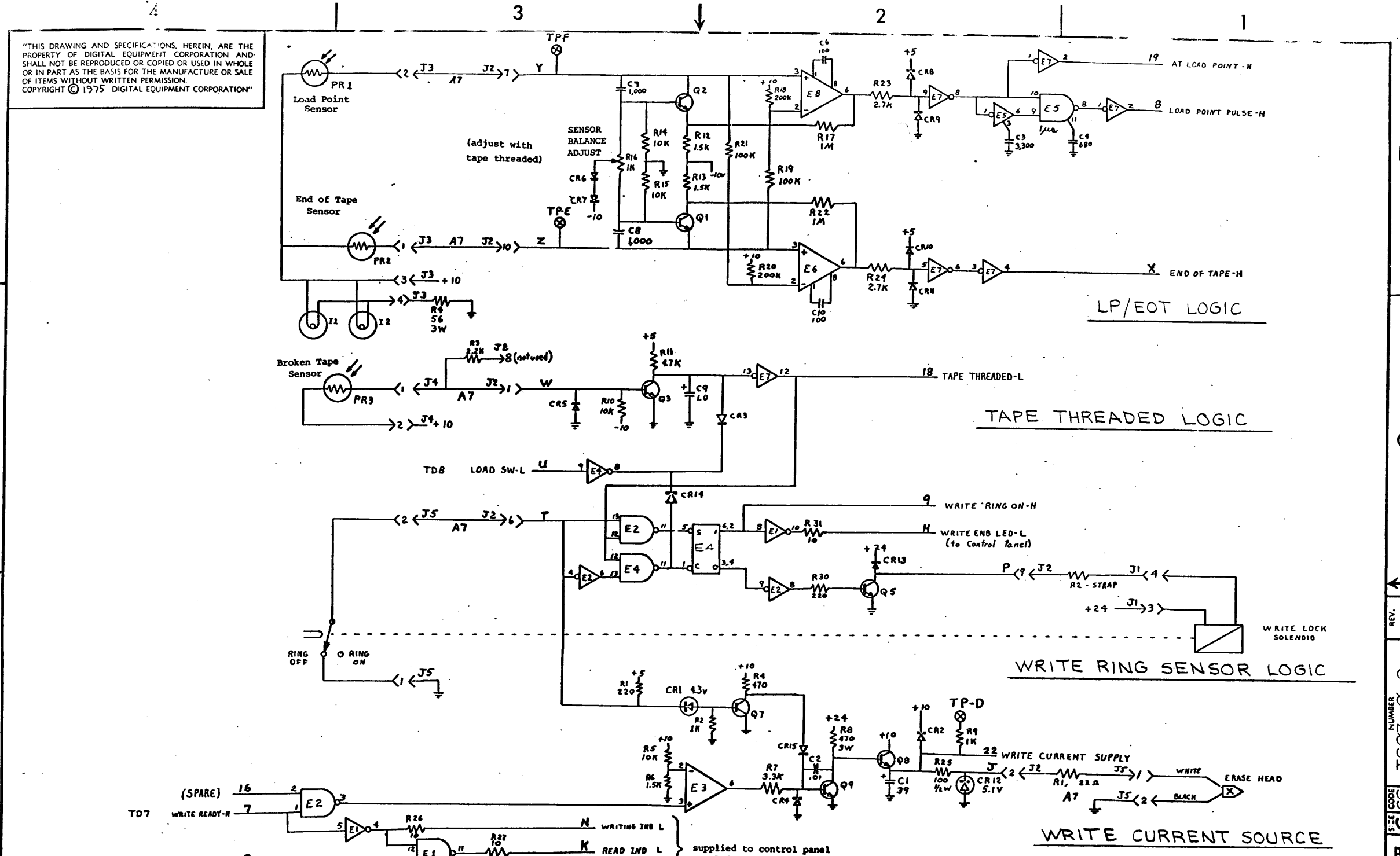


REV.	
CHANGE NO.	
CHK	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03				
PARTS LIST				
DIMENSIONAL TOLERANCE		DRN. <i>J. C. Edwards</i>	DATE 2 SEPT 75	digital
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		CHK'D. <i>J. C. Edwards</i>	DATE 9/15/75	
MILLIMETERS	INCHES	ANGLES	DATE 9/15/75	
X,XX = ±0.10	.XXX = ±.005	±0° 30'	DATE 2/16/75	
X,X = ±0.5	.XX = ±.02		DATE 2/16/75	RAMP GENERATOR (TD5)
X = ±2	.X = ±.1		DATE 2/16/75	
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	PROJ. ENG. <i>J. C. Edwards</i>	DATE 2/16/75	
MATERIAL	FINISH	PROD. <i>J. C. Edwards</i>	DATE 2/16/75	
		NEXT HIGHER ASSY.		
		B-DD-TS03-M	SIZE CODE C CS	NUMBER TS03-0-7
		SCALE		REV.
		SHEET 1 OF 1	DIST.	

REV. NUMBER TS03-0-7

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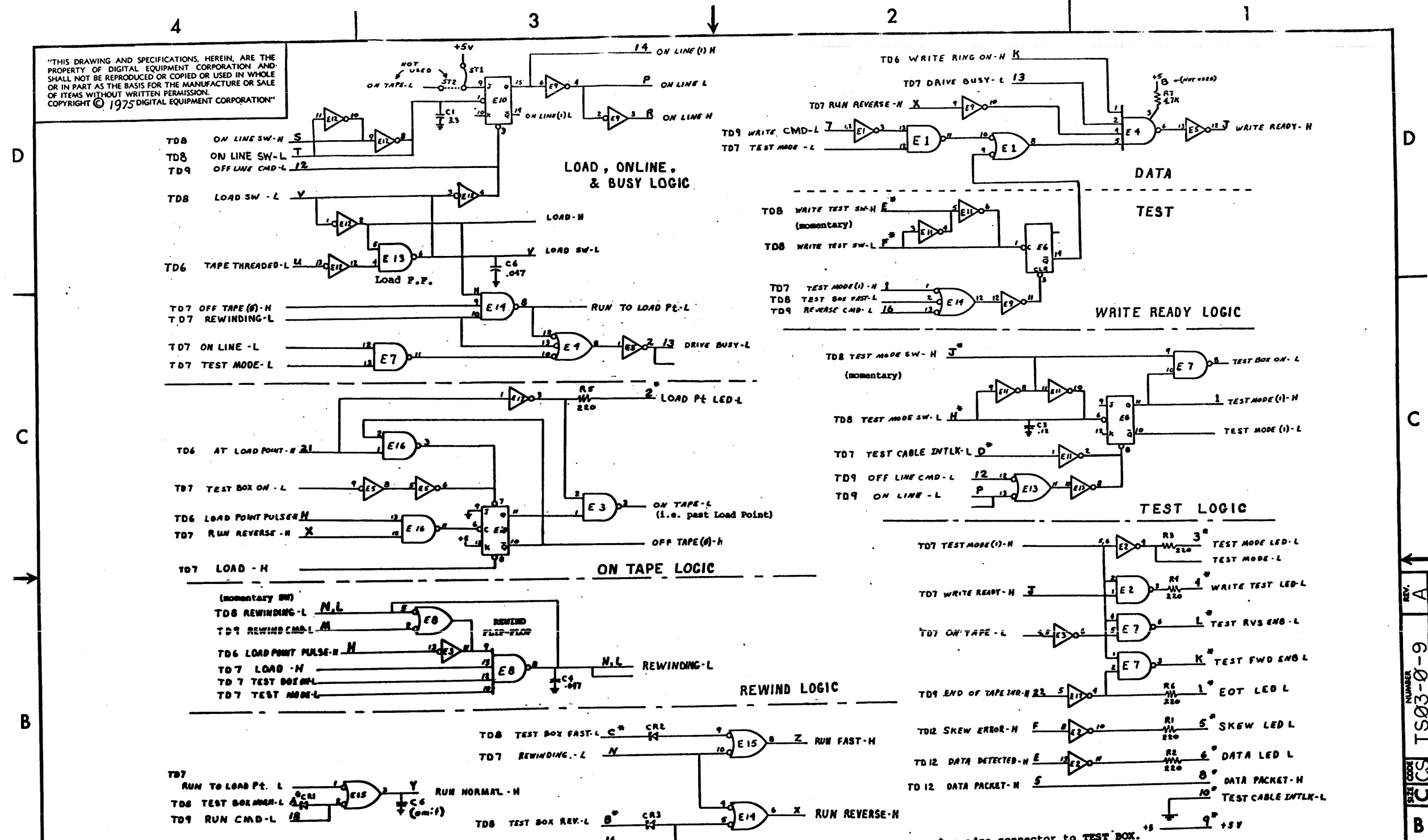


REV.	
CHG	
NO.	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03				
PARTS LIST				
DIMENSIONAL TOLERANCE		DRN. <i>H. Anderson</i>	DATE 9/5/75	digital
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		CHK'D. <i>J. Edwards</i>	DATE 9/15/75	
MILLIMETERS	INCHES	ANGLES	DATE 9/15/75	
XXX = ±0.10	XXX = ±0.005	90° ±30'	DATE	
XX = ±0.08	XX = ±0.002		DATE	TITLE SENSOR AMPL/DRIVER (TD6)
X = ±0.2	X = ±0.1		DATE	
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	NEXT HIGHER ASSY.		
MATERIAL	+	B-DD-TS03-M	SIZE CODE C·CS	NUMBER TS03-0-8
FINISH	+	SCALE		REV.
		SHEET 1 OF 1	DIST.	

REV. NUMBER TS03-0-8

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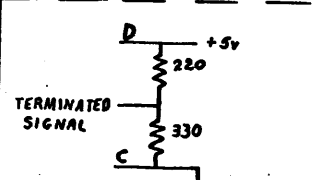
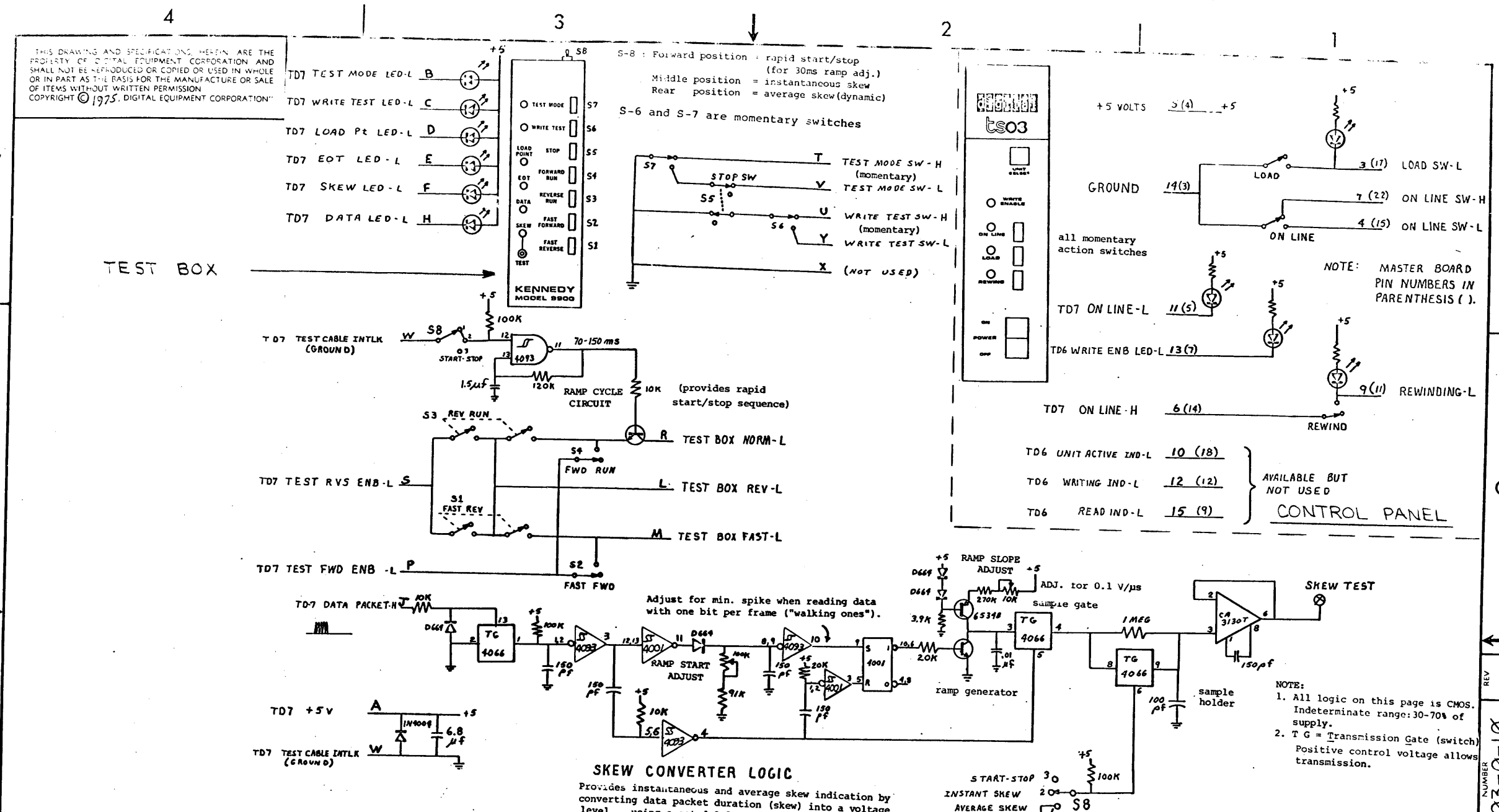


REV.	CHG. NO.	REV.
A	TS03-0002	
REVISED AND REDRAWN		
H. FINDEISEN		

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03					
DIMENSIONAL TOLERANCE		DRN.	DATE		
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		CHKD.	DATE		
MILLIMETERS INCHES ANGLES		ENG.	DATE		
X,XX ±0.10 JXX ±0.08 X ±0.1		PROJ. ENG.	DATE		
THIRD ANGLE PROJECTION		PROD.	DATE	TITLE	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.		MOTION CONTROL LOGIC (TD7)	
MATERIAL		B-DD-TS03-M		SIZE CODE	NUMBER
FINISH		SCALE		C/CS	TS03-0-9
		SHEET 1 OF 1		DIST.	REV. A

REV. A
 NUMBER TS03-0-9
 CODE C/CS

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CONTROL		STATUS	
FWD MOT L	J1-C	E	TERM
REV MOT L	J1-E	J	TERM
RWMD PLS L	J1-H	L	TERM
SEL DRIVE L	J1-J	H	(TERM ON TD9)
OFF LINE PLS - L	J1-L	P	TERM
WRK LITCH - L	J1-K	N	TERM
NOT USED			
OVER WRITE	J1-B	A	TERM
WRITE ENB.	J1-S		
TAPE RUNNING	J1-V		

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03					
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES					
TOLERANCES					
DECIMALS	ANGLES				
.xxx = .005	±0° 30'				
.xx = .02					
.x = .1					
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY V					
MATERIAL					
NEXT HIGHER ASSY.					
FINISH					

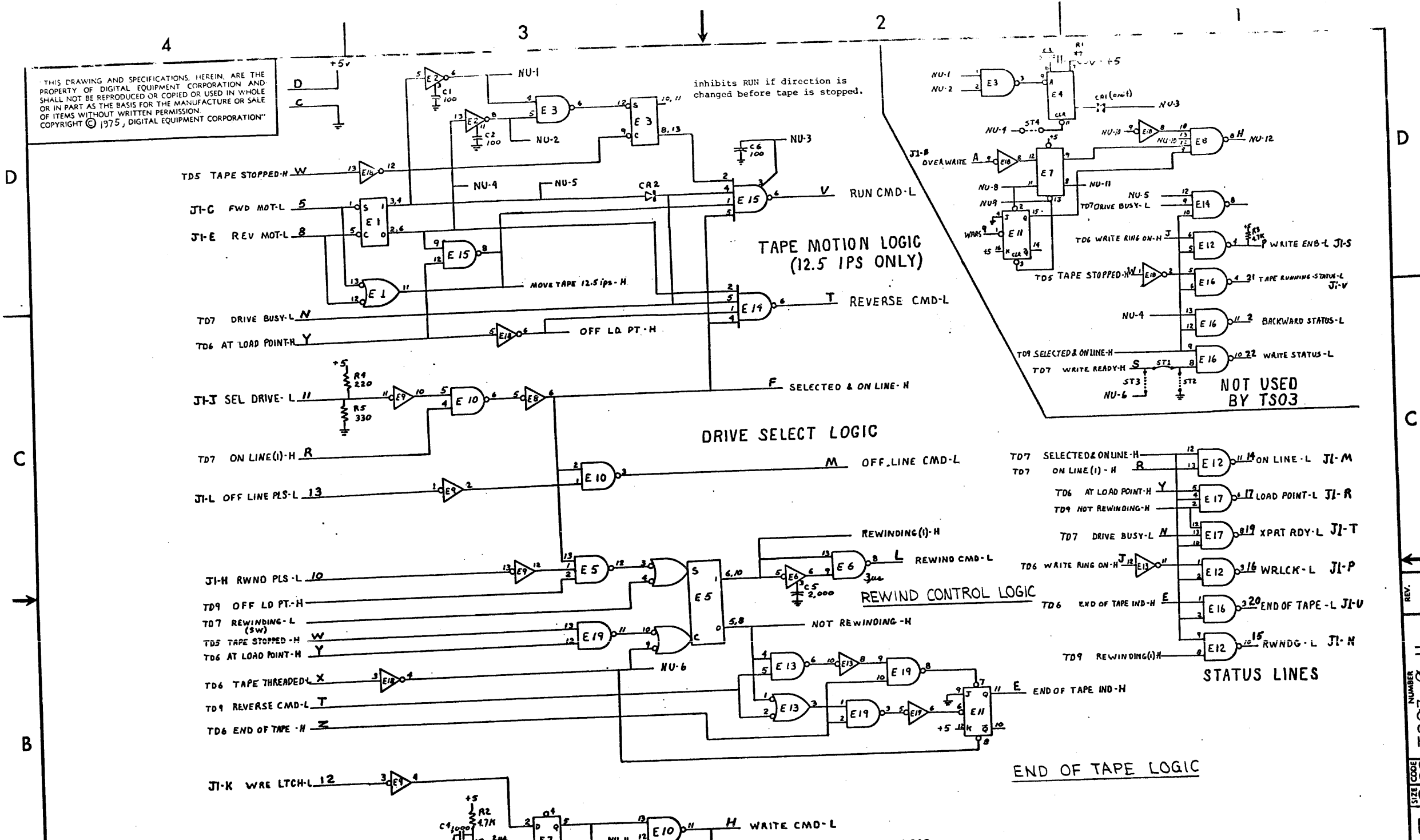
CONTROL TERMINATOR & OTHER SOURCES (TD8)		SIZE CODE	NUMBER	REV.
B-DD-TS03-M		C CS	TS03-0-10	
SCALE				
SHEET 1 OF 1				

REV. NO.	REV.
CHANGE NO.	
CHK	

DEC FORM NO. 100-8

REV. NO. 0-10
SIZE CODE C CS
NUMBER TS03-0-10

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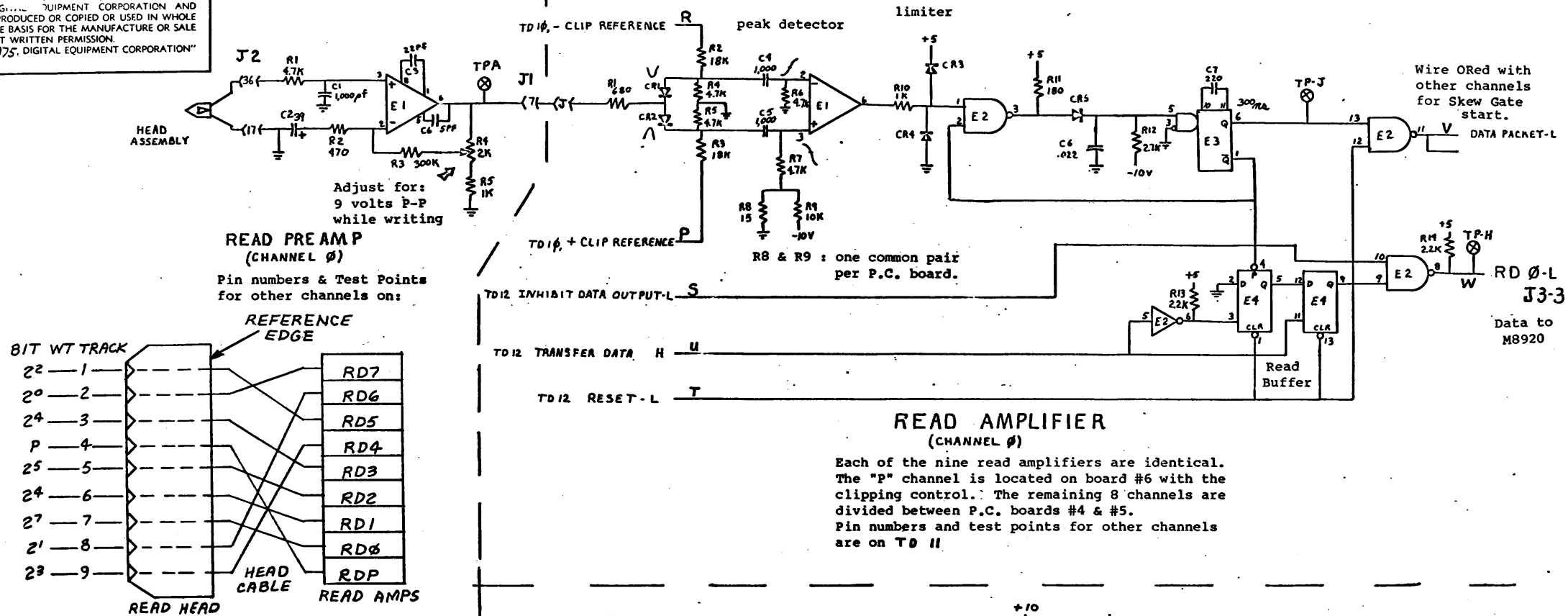


REV.	
CHANGE NO.	
CHK	

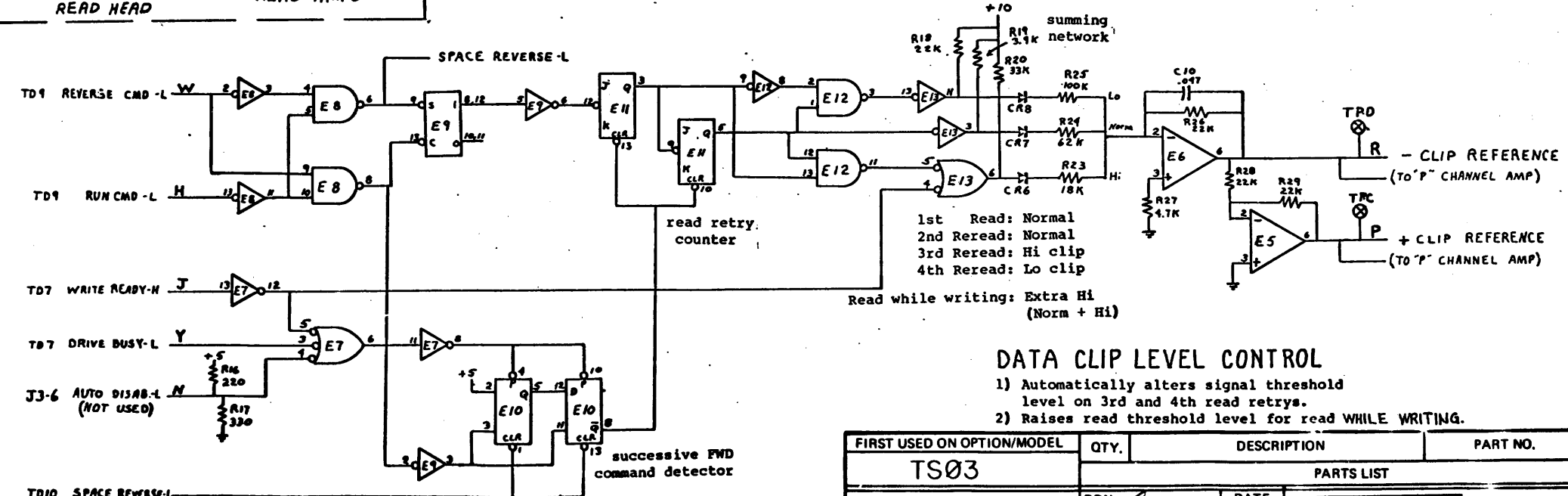
FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS / INCHES		DRN. <i>H. Edwards</i>	DATE 9/5/75		
UNLESS OTHERWISE SPECIFIED		CHK'D. <i>H. Edwards</i>	DATE 9/15/75		
MILLIMETERS	INCHES	ANGLES	DATE 9/15/75		
X,XX ±0.10	.XXX ±0.005	±0° 30'	DATE 9/15/75		
X,X ±0.5	.XX ±0.02		DATE 9/15/75	TITLE CONTROL INTERFACE LOGIC (TD9)	
X ±2	.X ±.1		DATE 9/15/75	NUMBER TS03-0-11	
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.		
MATERIAL	++		B-DD-TS03-M		
FINISH	++		SCALE ++		
SHEET 1 OF 1		DIST.			

REV. NUMBER TS03-0-11

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READ AMPLIFIER (CHANNEL 0)
 Each of the nine read amplifiers are identical. The "P" channel is located on board #6 with the clipping control. The remaining 8 channels are divided between P.C. boards #4 & #5. Pin numbers and test points for other channels are on T0 11



DATA CLIP LEVEL CONTROL
 1) Automatically alters signal threshold level on 3rd and 4th read retries.
 2) Raises read threshold level for read WHILE WRITING.

REV.	CHANGE NO.	REVISIONS
A	0002	TS03-0002
		REVISED AND REDRAWN
		2/10/75
		H. FINDEISEN

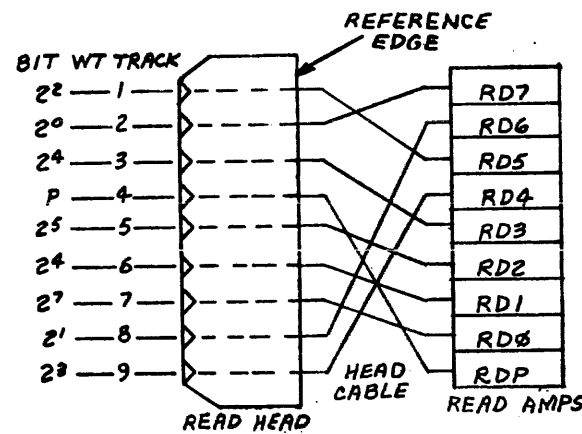
FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03		PARTS LIST		
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	DRN. <i>[Signature]</i>	DATE 9/5/75		
TOLERANCES	CHK'D. <i>[Signature]</i>	DATE 9/15/75		
DECIMALS ANGLES	ENG. <i>[Signature]</i>	DATE 9/15/75		
.XXX = .005 ±0° 30'	PROJ. ENG. <i>[Signature]</i>	DATE 9/16/75		
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY V	PROD. <i>[Signature]</i>	DATE 9/16/75	TITLE	
MATERIAL	NEXT HIGHER ASSY.	READ LOGIC (TD10)		
FINISH	B-DD-TS03-M	SIZE CODE	NUMBER	REV.
	SCALE	CCS	TS03-0-12	A
	SHEET 1 OF 1	DIST.		

REV. A
 NUMBER TS03-0-12
 CODE CCS

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READ PREAMPLIFIER PIN NUMBERS

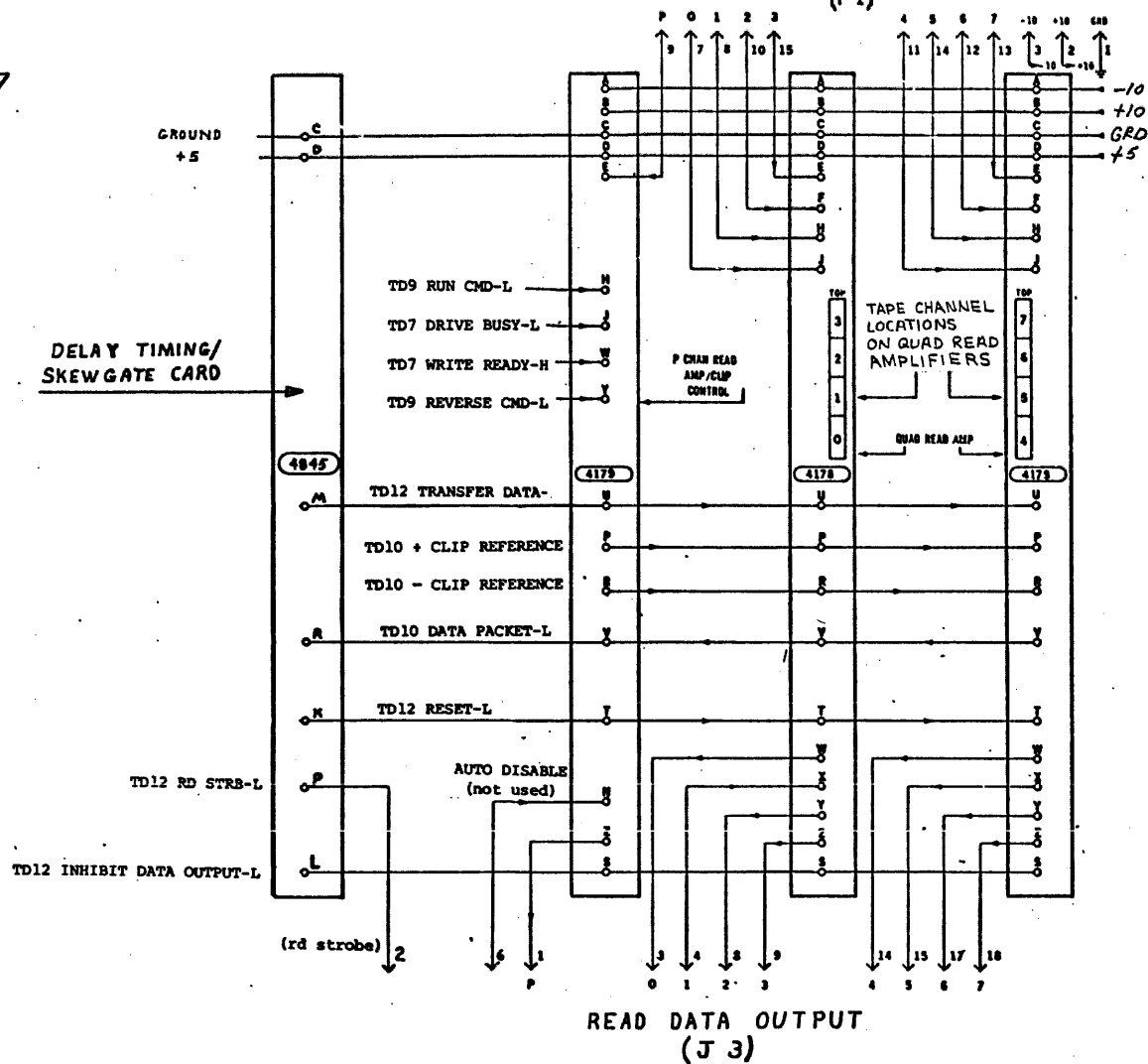
Read Channel #	Test Point	Head Connector Pin #
0	A	17,36
1	B	15,34
P	C	13,32
2	D	11,30
4	E	9,28
6	F	7,26
7	H	5,24
5	J	3,22
3	K	1,20



READ AMPLIFIER TEST POINTS

MODULE SLOT #	6	5	4
CHANNEL #	P	0, 1, 2, 3	4, 5, 6, 7
DATA OUTPUT	A	H, E, C, A	H, E, C, A
DATA PACKET	B	J, F, D, B	J, F, D, B

READ PREAMP CONNECTOR (P1)



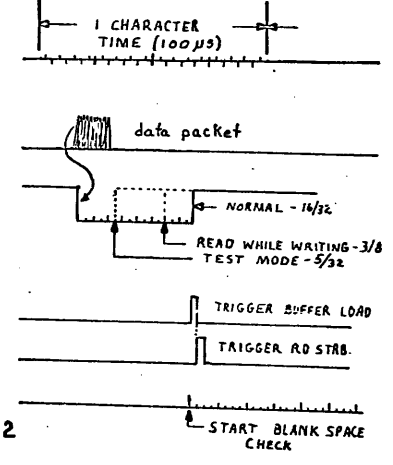
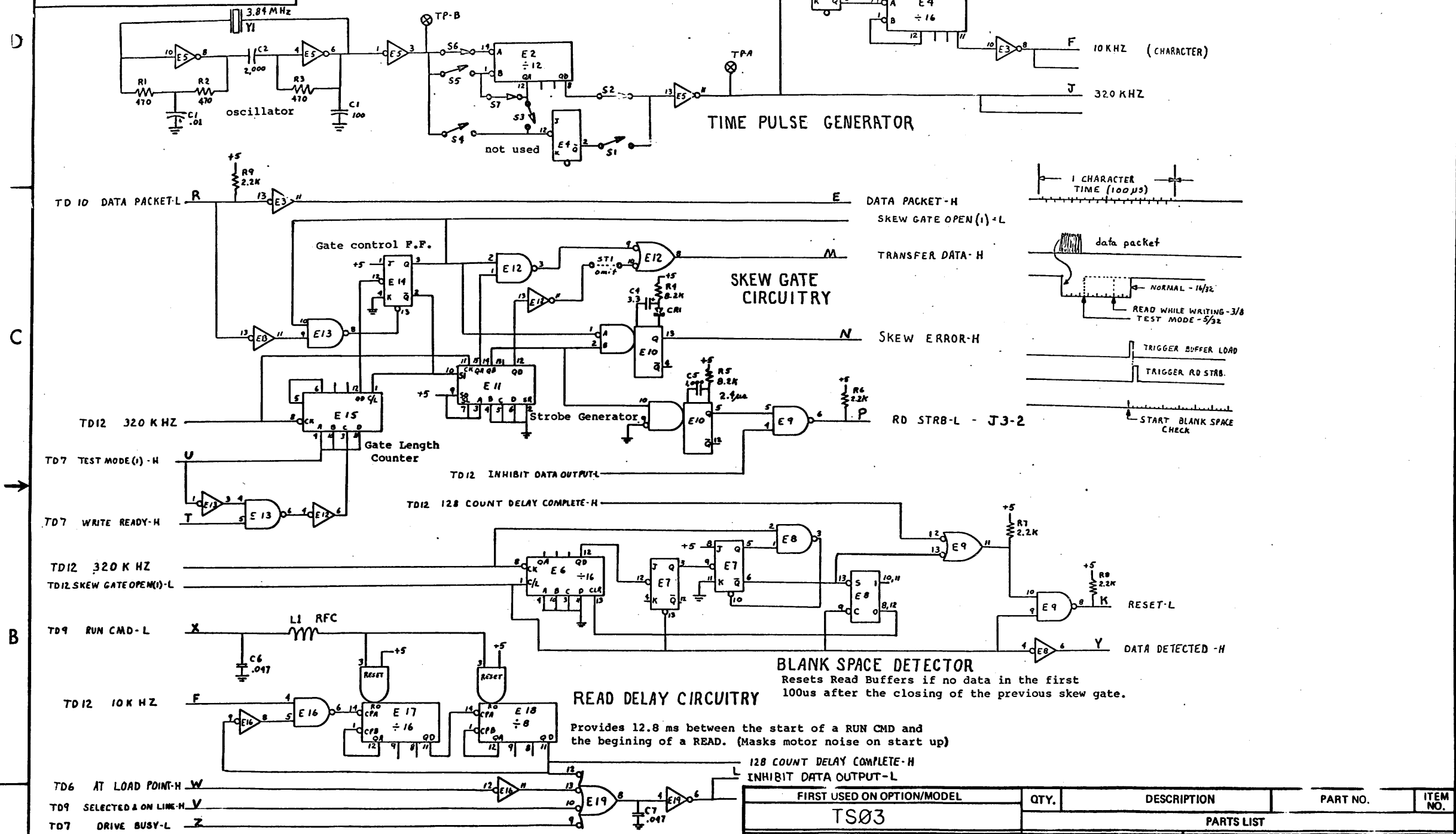
REV.	CHANGE NO.	CHK

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03		PARTS LIST		
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	DRN. <i>H. Friedman</i>	DATE 9/15/75	 digital EQUIPMENT CORPORATION <small>MAYNARD MASSACHUSETTS</small>	
TOLERANCES	CHK'D. <i>J. C. Edwards</i>	DATE 9/15/75		
DECIMALS .xxx = .005	ENG. <i>J. C. Edwards</i>	DATE 9/15/75		
ANGLES ±0° 30'	PROJ. ENG. <i>H. Friedman</i>	DATE 9/15/75		
.xx = .02	PROD. <i>H. Friedman</i>	DATE 9/15/75	TITLE READ CONNECTIONS (TD11)	
.x = .1			NUMBER CCS TS03-0-13	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓			REV.	
MATERIAL + + +	NEXT HIGHER ASSY.		SCALE + + +	
FINISH + + +	B-DD-TS03-M		SHEET 1 OF 1	
			DIST.	

REV. NUMBER
CCS TS03-0-13

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D I P switches 2, 6, & 7 (ONLY) must be set to 1 for drive to operate.

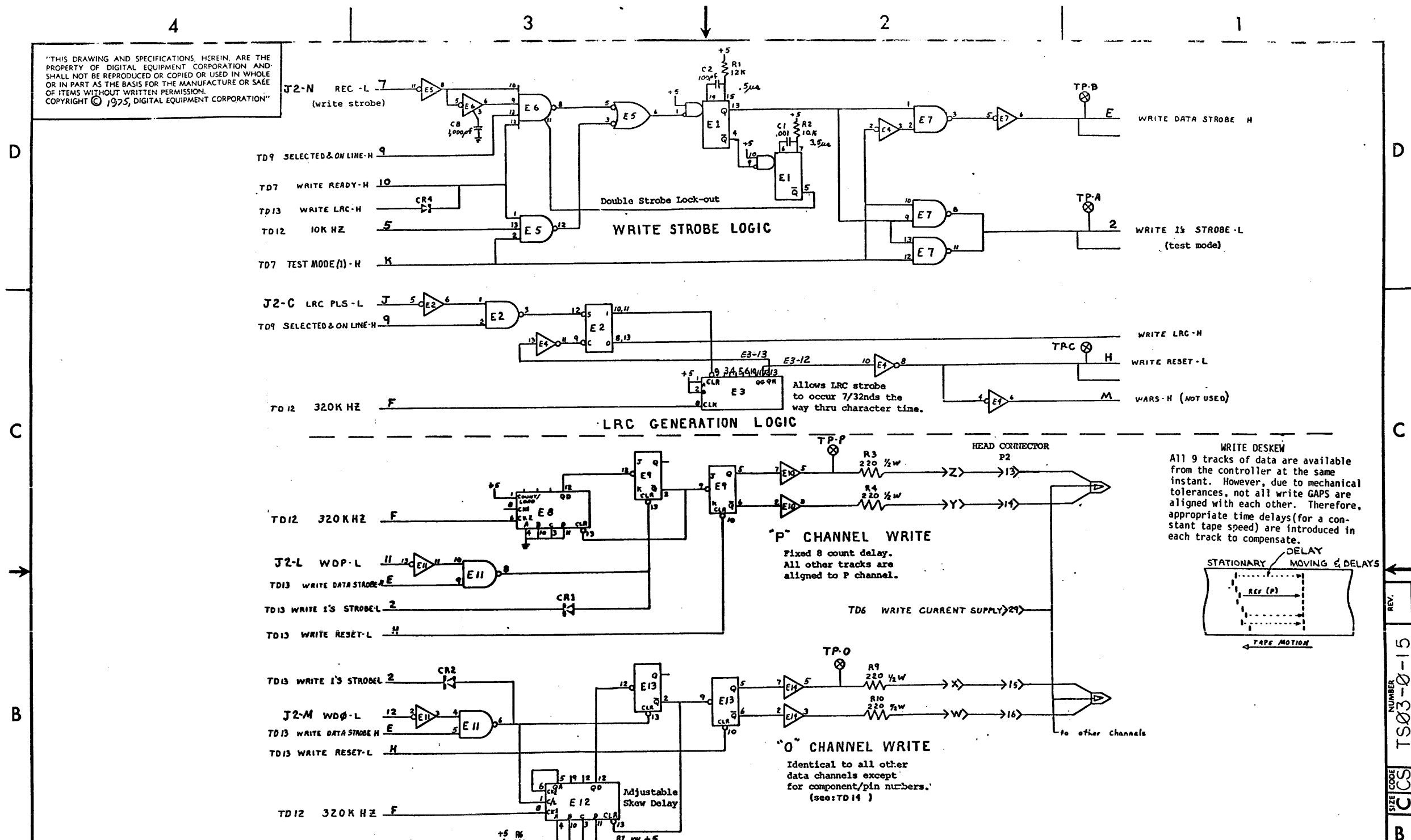


REV.	CHANGE NO.

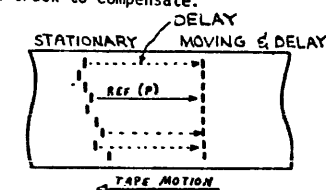
FIRST USED ON OPTION/MODEL TS03		QTY.	DESCRIPTION	PART NO.	ITEM NO.
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		DRN. <i>H. Edwards</i>	DATE 9 SEPT 75	digital	
MILLIMETERS INCHES ANGLES		CHK'D. <i>H. Edwards</i>	DATE 9/15/75		
XXX ±0.10 XX ±0.5 X ±2		ENG. <i>H. Edwards</i>	DATE 9/15/75		
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	PROJ. ENG. <i>H. Edwards</i>	DATE 9/15/75	TITLE DELAY TIMING/ SKREW GATE (TD12)	
MATERIAL	FINISH	PROD. <i>H. Edwards</i>	DATE 9/15/75	SIZE CODE C CS	NUMBER TS03-0-14
NEXT HIGHER ASSY.		SCALE		REV.	
SHEET 1 OF 1		DIST.			

REV. NUMBER TS03-0-14

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WRITE DESKEW
 All 9 tracks of data are available from the controller at the same instant. However, due to mechanical tolerances, not all write GAPS are aligned with each other. Therefore, appropriate time delays (for a constant tape speed) are introduced in each track to compensate.



REV.	
CHANGE NO.	
CHK	

REV. NUMBER TS03-0-15
 SIZE CODE CCS

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03				
PARTS LIST				
DIMENSIONAL TOLERANCE		DRN. <i>M. Friedman</i>	DATE 9/5/75	digital
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		CHK'D. <i>C. Edwards</i>	DATE 9/15/75	
MILLIMETERS INCHES ANGLES		ENG. <i>C. Edwards</i>	DATE 7/15/75	
THIRD ANGLE PROJECTION REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		PROJ. ENG. <i>M. Friedman</i>	DATE 7/16/75	
MATERIAL		PROD. <i>M. Friedman</i>	DATE 7/14/75	TITLE WRITE LOGIC 4 CHANNELS, STROBES (TD13)
FINISH		NEXT HIGHER ASSY.		SIZE CODE C CS
		MATERIAL + + +		NUMBER TS03-0-15
		FINISH + + +		REV.
		SCALE + + +		
		SHEET 1 OF 1		

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TS03 SIGNAL GLOSSARY

SERVO LOOP (TD-3)	
Servo Motor Disable	TD4
RAMP GENERATOR (TD5)	
12.5 IPS (1) L	
RUN 12.5 IPS	
RAMP VOLT	TD4
120 IPS (1) L	
RUN 120 IPS	
ALLOW FWD RAMP	
ALLOW REV RAMP	
TAPE STOPPED-H	TD9
RAMP DOWN-H	
CONSEC RUN-H	
SENSOR LOGIC (TD6)	
AT LOAD POINT-H	TD7,9,12
LOAD POINT PULSE-H	TD7
END OF TAPE-H	TD9
TAPE THREADED-L	TD7,9
WRITE RING ON-H	TD7,9
WRITE ENB LED L	TD8
WRITE SUPPLY CURRENT	
WRITING IND L	TD8
READ IND L	TD8
UNIT ACTIVE IND L	TD8
MOTION CONTROL LOGIC (TD7)	
ON LINE (1) H	TD9
ON LINE L	TD8
ON LINE H	TD8
LOAD -H	
* LOAD SW -L	TD3,6,7
LOAD PT LED-L	TD8
RUN TO LOAD PT -L	TD6,7,9,10,12
DRIVE BUSY-L	TD7,8
* REWINDING - L	TD5
RUN NORMAL - H	TD5
RUN FAST - H	TD5
RUN REVERSE - H	TD5,7
WRITE READY - H	TD6,7,10,12,13


MOTION CONTROL LOGIC (cont.)	
TEST BOX ON-L	TD7
TEST MODE (1) -H	TD7,12,13
TEST MODE (1) -L	
TEST MODE LED - L	TD8
TEST MODE - L	TD8
WRITE TEST LED - L	TD8
TEST RVS ENB - L	TD8
TEST FWD ENB - L	TD8
EOT LED - L	TD8
SKEW LED - L	TD8
DATA LED - L	TD7,8
TEST PULSE - H	
TEST CABLE INTLK - L	
OFF TAPE (β) -H	

CONTROL SOURCES (TD8)	
TEST MODE SW - L	TD7
TEST MODE SW - H	TD7
WRITE TEST SW - L	TD7
WRITE TEST SW - H	TD7
TEST BOX REV - L	TD7
TEST BOX NORM - L	TD7
TEST BOX FAST - L	TD7
* LOAD SW - L	TD3,6,7
ON LINE SW - H	TD7
ON LINE SW - L	TD7
* REWINDING - L	TD7,8

CONTROL INTERFACE LOGIC (TD9)	
RUN CMD-L	TD7,10,12
REVERSE CMD-L	TD7,10
MOVE TAPE 12.4 IPS-H	
OFF LD PT-H	
SELECTED & ON LINE-H	TD6,12,13
OFF LINE CMD -L	TD7
REWINDING (1) -H	
REWIND CMD -L	
NOT REWINDING -H	
END OF TAPE IND-H	TD9
WRITE CMD - L	TD7
ON LINE - L	
LOAD POINT - L	
XPRT RDY - L	
WRCK - L	
END OF TAPE - L	
RMNDG - L	

READ LOGIC (TD10)	
DATA PACKET -L	TD12
RDβ - L	
SPACE REVERSE - L	
- CLIP REFERENCE	TD11
+ CLIP REFERENCE	TD11
DELAY TIMING (TD12)	
10 K HZ	TD13
320 K HZ	TD13
TEST PULSE H	
SKEW GATE OPEN (1) - L	
TRANSFER DATA - H	TD10,11
SKEW ERROR - H	
RD STROBE - L	
RESET - L	TD10,11
DATA DETECTED - H	
128 COUNT DELAY COMPLETE - H	
INHIBIT DATA OUTPUT - L	TD10,11
WRITE LOGIC (TD13)	
WRITE DATA STROBE	TD14
WRITE 1's STROBE - L	TD14
WRITE LRC - H	
WRITE RESET - L	
WARS - H	

REV.	
CHG	
CHK	

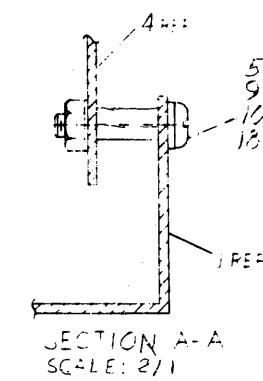
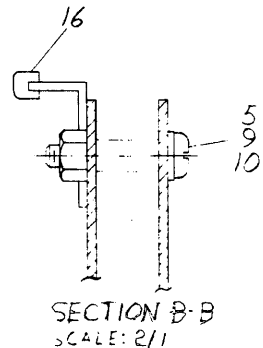
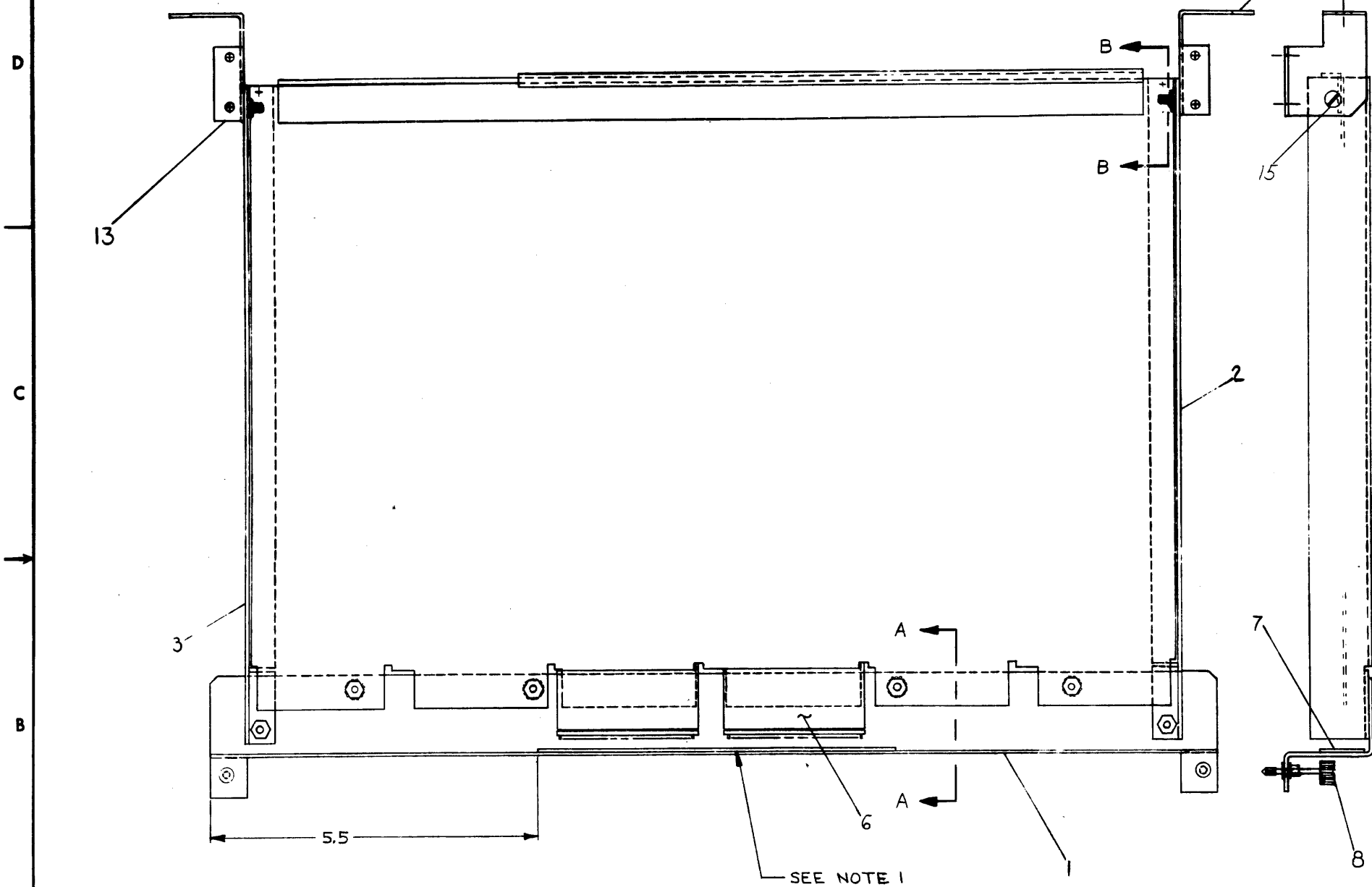
FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TS03				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES				
TOLERANCES		DRN. <i>J. C. Edwards</i>	DATE 9/25/75	 digital EQUIPMENT CORPORATION <small>MAYNARD, MASSACHUSETTS</small>
DECIMALS	ANGLES	CHK'D. <i>J. C. Edwards</i>	DATE 9/15/75	
.xxx = .005	±0° 30'	ENG. <i>J. C. Edwards</i>	DATE 9/15/75	
.xx = .02		PROJ. ENG. <i>M. F. ...</i>	DATE 7/6/75	
.x = .1		PROD. <i>M. F. ...</i>	DATE 7/6/75	TITLE TS03
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓				SIGNAL GLOSSARY
MATERIAL		NEXT HIGHER ASSY.		
		B-DD-TS03-M	SIZE CODE C AR	NUMBER TS03-0-17
FINISH		SCALE		REV.
		SHEET 1 OF 1	DIST.	

REV. NUMBER TS03-0-17

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DO NOT SCALE DRAWING

NOTES:
1. EDGE OF ITEM #7 (INSULATOR) TO BE FLUSH WITH EDGE OF ITEM #1 (RETAINER).



QTY.	DESCRIPTION	PART NO.	ITEM NO.
1	PACKAGING INSTRUCTIONS	4-2-5770204-0-0	9
4	WASHER, NYLON #6	1026707	18
1	HARNESS INTERFACE POWER	7010832	17
1	GROMMET	3007035	16
2	SCR, SHDR #8-32	9009641	15
1	BRKT, HINGE (L.H.)	C-MD-7412888-20	14
1	BRKT, HINGE (R.H.)	C-MD-7412888-10	13
2	LOCK WASHER #6 EXT TOOTH	9007649-00	12
2	SCR, PHL PAN HD #6-32x3/8	9008020-01	11
6	NUT #6-32 KEP	9006560-00	10
6	SCR, #6-32x3/8 PHL PAN HD	9006026-01	9
2	SCR, CAPTIVE PANEL #10-32x3/8	9008105-00	8
1	INSULATOR	5-MD-7412907-0-0	7
2	HBSI EDGE CONNECTOR	B-UA-HBSI-0-0	6
6	SPACER, #6x3/8 LG. FIBRE	9008213-00	5
1	TS03/TUI0 INTERFACE BD	D-CS-M8920-0-1	4
1	RETAINER, ETCH BD SIDE (RT)	D-IA-7412889-01	3
1	RETAINER, ETCH BD SIDE (LT)	D-IA-7412889-02	2
1	RETAINER, ETCH BOARD	D-IA-7412892-0-0	1

REV.	DATE	BY	CHK'D
A	4-23-75	H. FINDE	
B	5-27-75	H. FINDE	
C	10-2-77	H. FINDE	
D	10-16-78	H. FINDE	
E	10-16-78	H. FINDE	
F	10-16-78	H. FINDE	
G	10-16-78	H. FINDE	
H	10-16-78	H. FINDE	
I	10-16-78	H. FINDE	
J	10-16-78	H. FINDE	
K	10-16-78	H. FINDE	
L	10-16-78	H. FINDE	
M	10-16-78	H. FINDE	
N	10-16-78	H. FINDE	
O	10-16-78	H. FINDE	
P	10-16-78	H. FINDE	
Q	10-16-78	H. FINDE	
R	10-16-78	H. FINDE	
S	10-16-78	H. FINDE	
T	10-16-78	H. FINDE	
U	10-16-78	H. FINDE	
V	10-16-78	H. FINDE	
W	10-16-78	H. FINDE	
X	10-16-78	H. FINDE	
Y	10-16-78	H. FINDE	
Z	10-16-78	H. FINDE	

FIRST USED ON OPTION/MODEL		DRN.		DATE	
TS03		10/21/77		10/21/77	
DIMENSIONAL TOLERANCE		CHK'D		DATE	
DIMENSIONS ARE INCHES		7/26		11/14/77	
UNLESS OTHERWISE SPECIFIED		ENG.		DATE	
MILLIMETERS		4/11		8-75	
.XXX	±.010	PROJ. ENG.		DATE	
.XX	±.006	4/11		11-77	
.X	±.003	ENG'D.		DATE	
.0	±.001	6/26/78		11-77	
THIRD ANGLE PROJECTION		REMOVE BURRS AND BREAK SHARP CORNERS/SURFACE QUALITY		NEXT HIGHER ASSEMBLY	
MATERIAL		D-UA-TS03-M-0		SIZE CODE	
FINISH		1/1		NUMBER	
SCALE		1/1		D AD 7010456-0-0	
SHEET		1 OF 1		REV.	
				C	

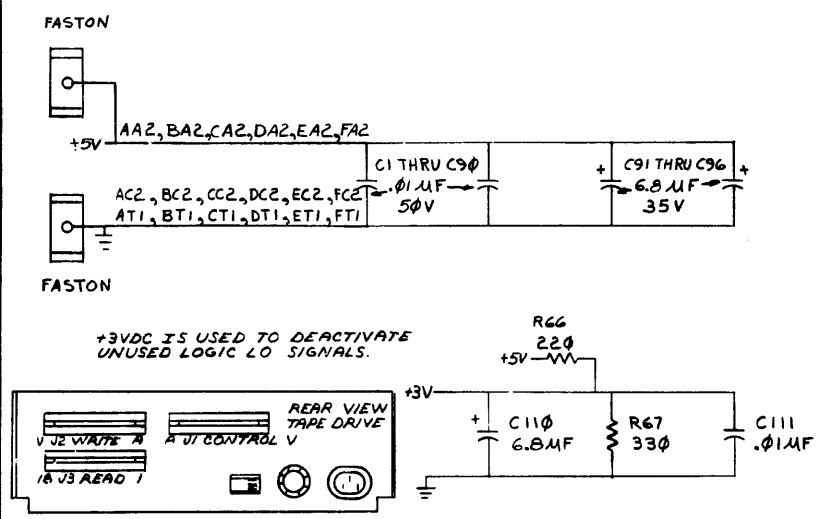
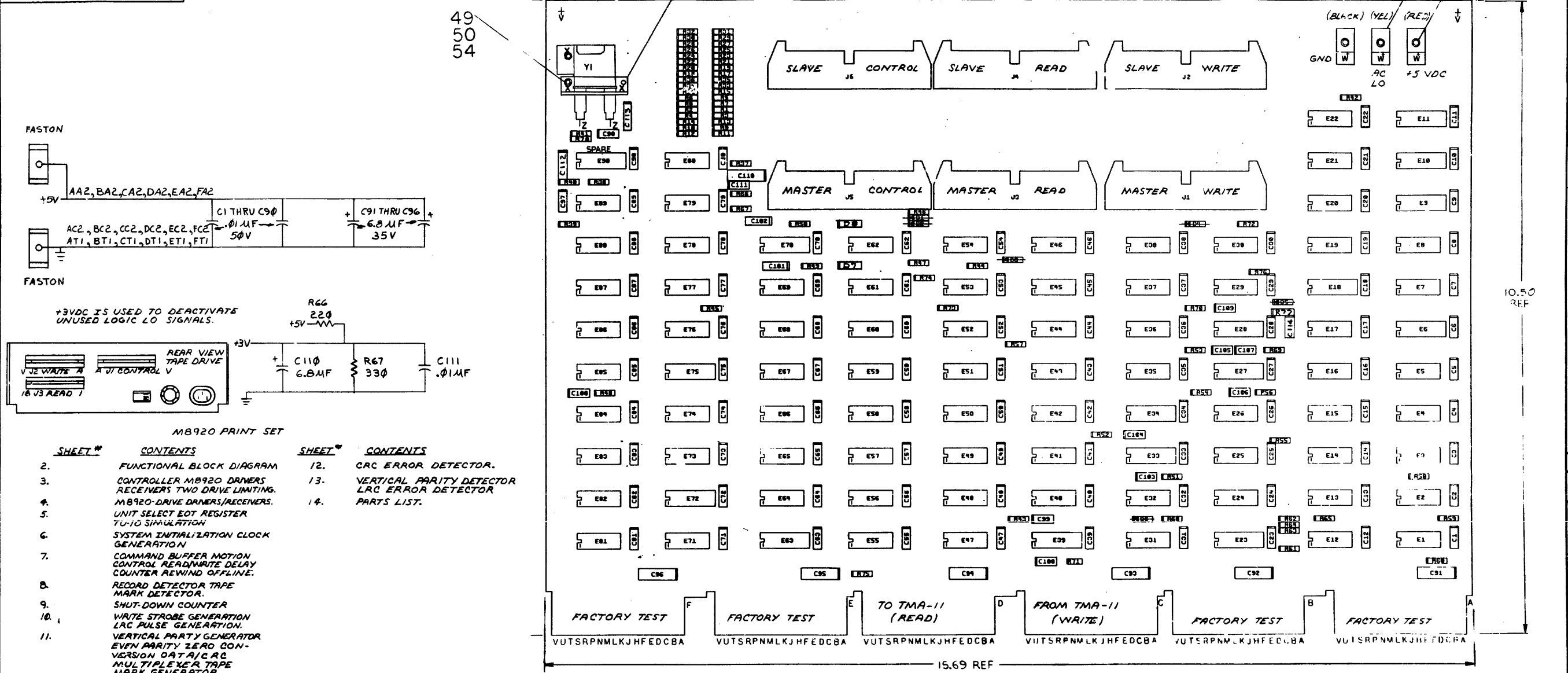


TITLE
BOARD HOLDER
ASSY

DIST. SHEET 1 OF 1

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NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 A. RESISTORS ARE 1/4 W ±5%



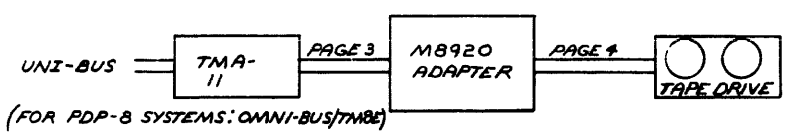
M8920 PRINT SET

SHEET #	CONTENTS	SHEET #	CONTENTS
2.	FUNCTIONAL BLOCK DIAGRAM	12.	CRC ERROR DETECTOR.
3.	CONTROLLER M8920 DRIVERS RECEIVERS TWO DRIVE LIMITING.	13.	VERTICAL PARITY DETECTOR LRC ERROR DETECTOR
4.	M8920-DRIVE DRIVERS/RECEIVERS. UNIT SELECT EOT REGISTER TU-10 SIMULATION	14.	PARTS LIST.
5.	SYSTEM INITIALIZATION CLOCK GENERATION		
6.	COMMAND BUFFER MOTION CONTROL READ/WRITE DELAY COUNTER REWIND OFFLINE.		
7.	RECORD DETECTOR TAPE MARK DETECTOR.		
8.	SHUT-DOWN COUNTER WRITE STROBE GENERATION LRC PULSE GENERATION.		
9.	VERTICAL PARITY GENERATOR EVEN PARITY ZERO CONVERSION DATA/CRC MULTIPLEXER TAPE MARK GENERATOR.		
10.			
11.			

IC TYPE	QTY	LOC
74175	8	16
74174	8	16
74123	8	16
8266	8	16
8640	1	8
384	1	8
IC TYPE	QTY	LOC

QTY AND BY ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPT WHERE STATED ABOVE

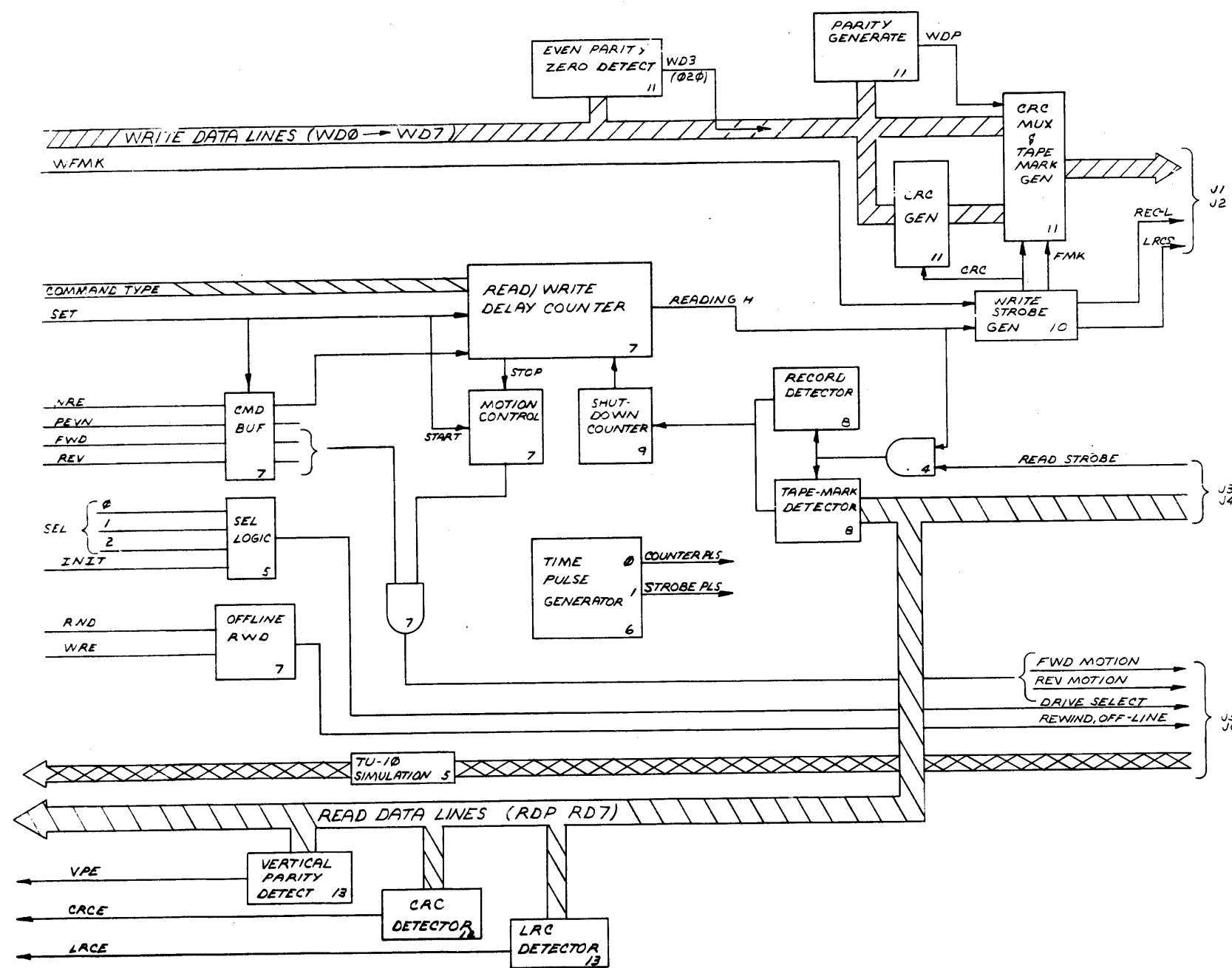
IC PIN LOCATIONS



NOTES:
 1. POWER FOR THIS MODULE IS DERIVED FROM AN EXTERNAL POWER SUPPLY (M720)
 2. THE TMA-11 CONNECTION USES A DUAL HEIGHT CONNECTOR (HBS1) ATTACHED TO A UNI-BUS TYPE CABLE.

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.										
PARTS LIST														
FIRST USED ON OPTION MODEL: TS03-M														
ETCH BOARD REV. C														
<table border="1"> <tr> <td>DATE</td> <td>2/14/75</td> </tr> <tr> <td>DATE</td> <td>2/14/75</td> </tr> <tr> <td>DATE</td> <td>2/14/75</td> </tr> <tr> <td>DATE</td> <td>2/14/75</td> </tr> <tr> <td>DATE</td> <td>2/14/75</td> </tr> </table>					DATE	2/14/75	DATE	2/14/75	DATE	2/14/75	DATE	2/14/75	DATE	2/14/75
DATE	2/14/75													
DATE	2/14/75													
DATE	2/14/75													
DATE	2/14/75													
DATE	2/14/75													
TITLE: TS03-TUIOM INTERFACE (TTII)														
SEMICONDUCTOR CONVERSION CHART			SCALE: 1:1 SHEET: 1 OF 14											

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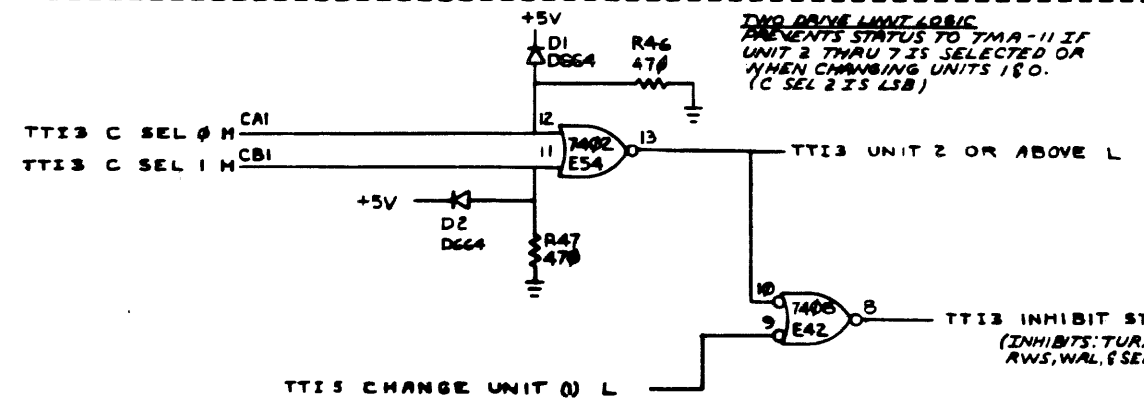
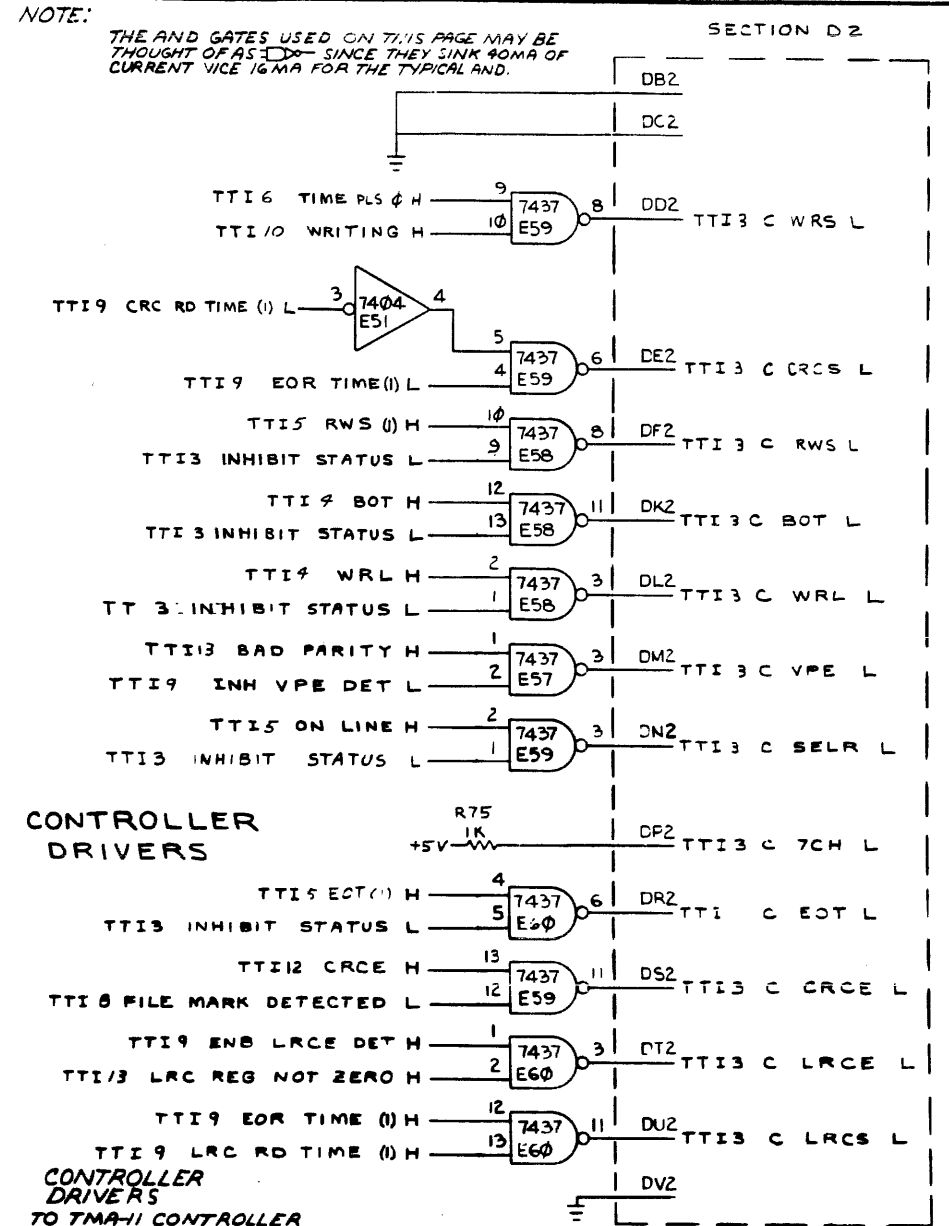
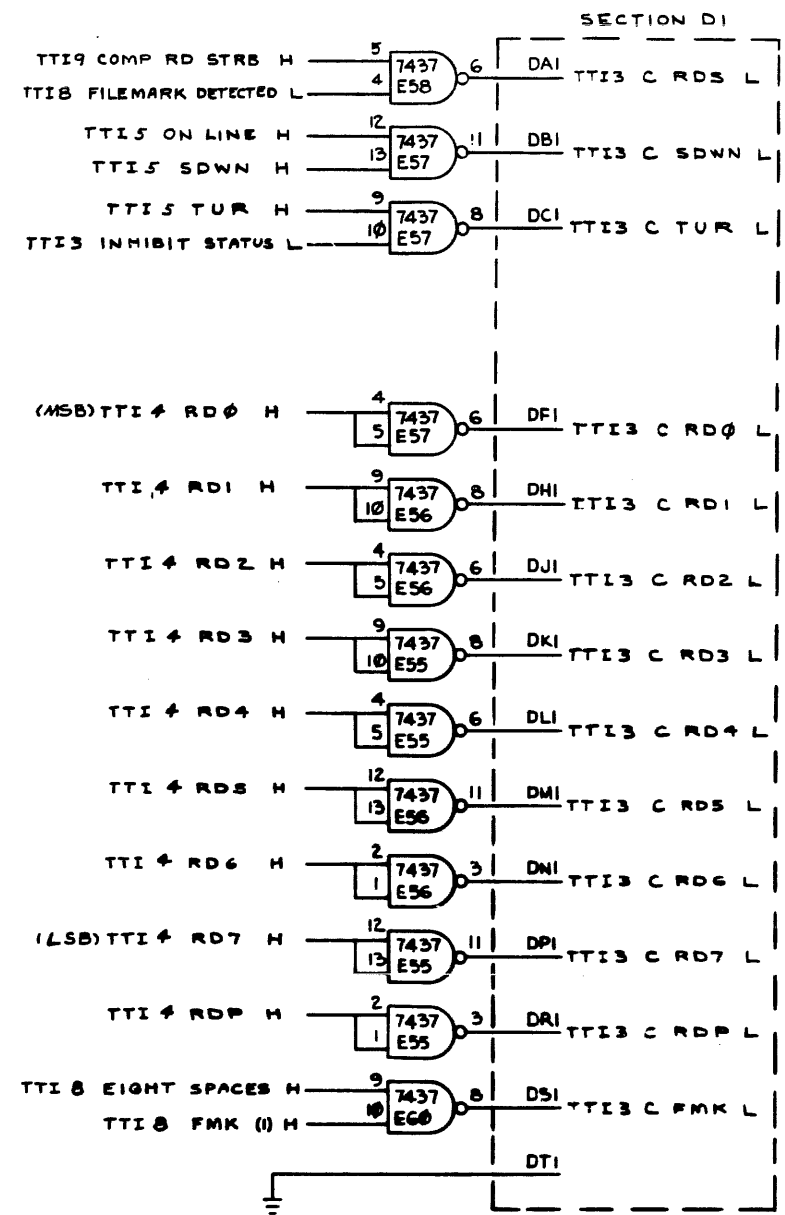
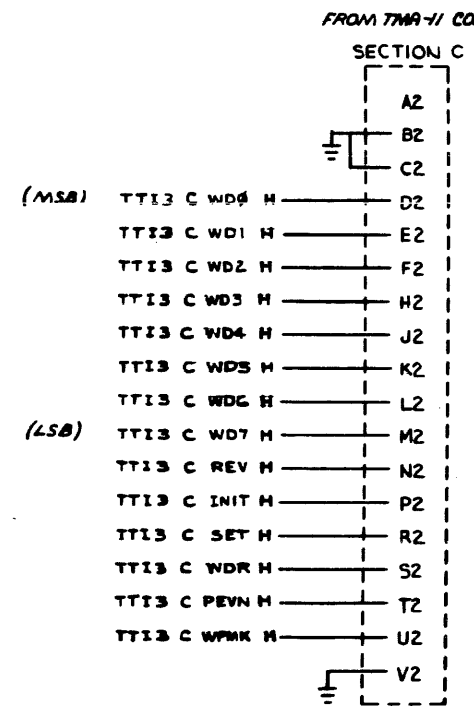
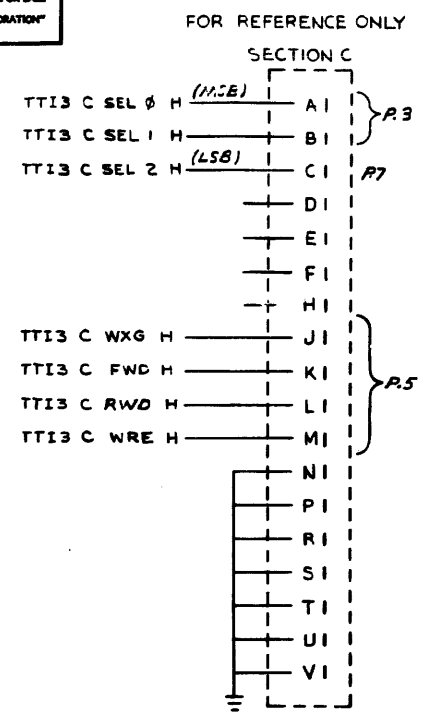


REVISIONS		
CHK	CHANGE NO.	REV.

TITLE TS03 TU10M INTERFACE (TTI2)
 SCALE SHEET 2 OF 14
 SIZE CODE DCS
 NUMBER M8920-0-1

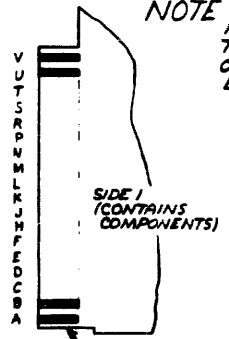
PART NO. M8920-0-1
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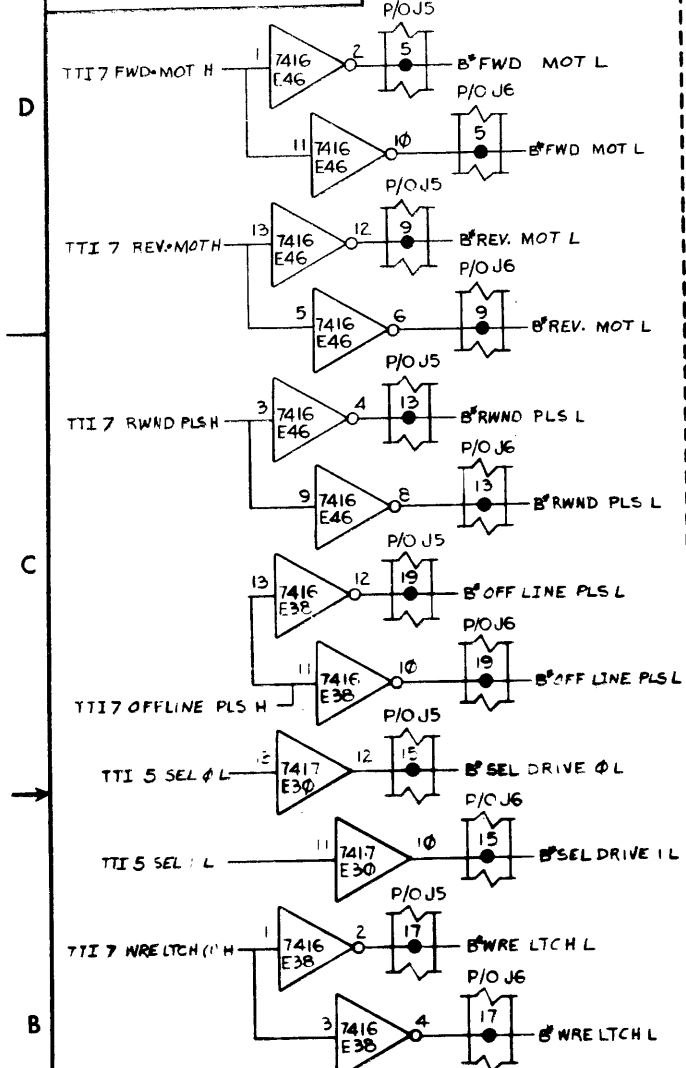
TWO DRIVE UNIT 68BIC PREVENTS STATUS TO TMA-11 IF UNIT 2 THRU 7 IS SELECTED OR WHEN CHANGING UNITS 180. (C SEL 2 IS LSB)

NOTE PREFIX "C" INDICATES THAT SIGNAL IS FOUND ON 1AB920 CONTROLLER BUS.



REV.	CHANGE NO.	REV.

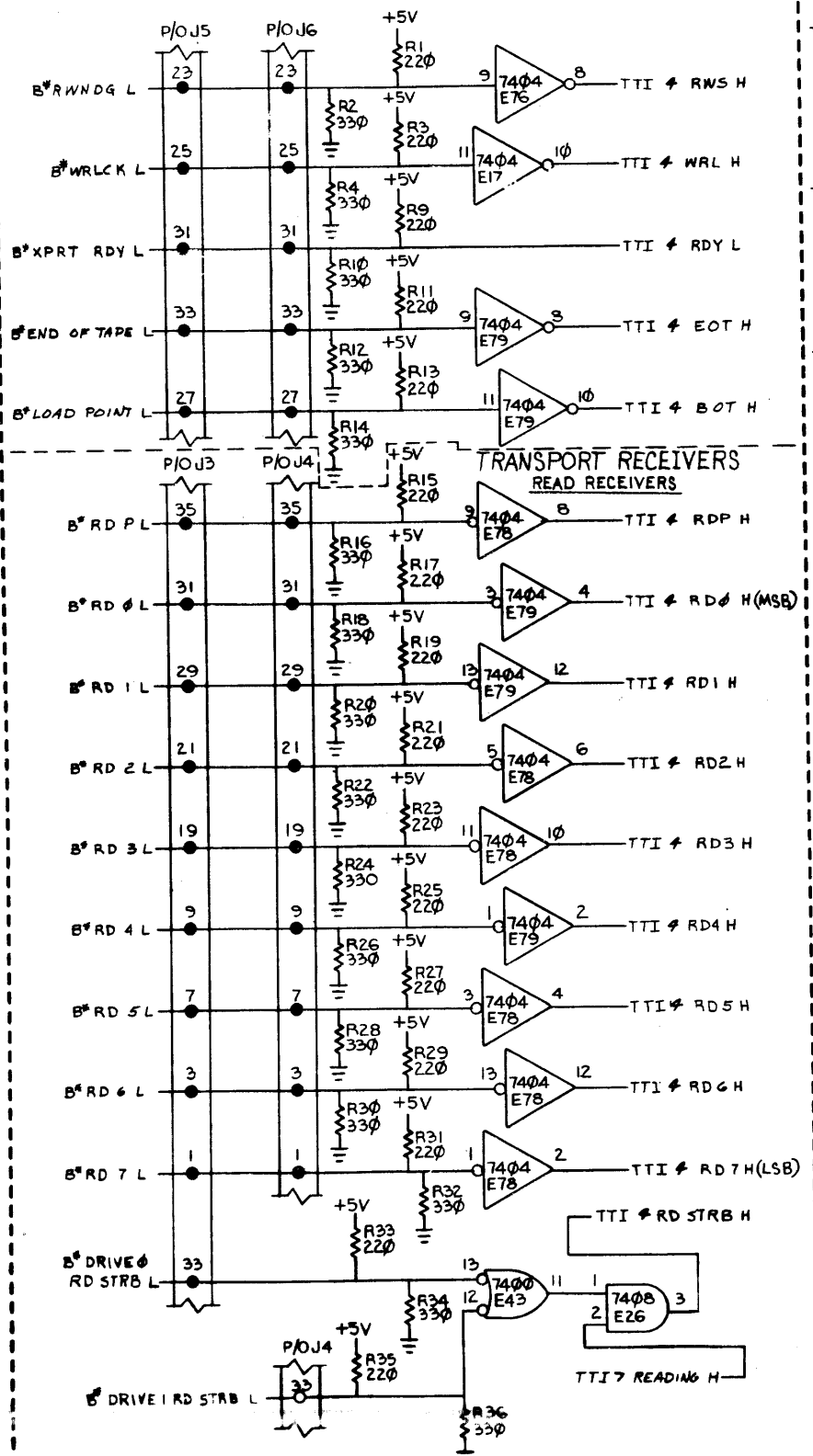
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CONTROL DRIVERS

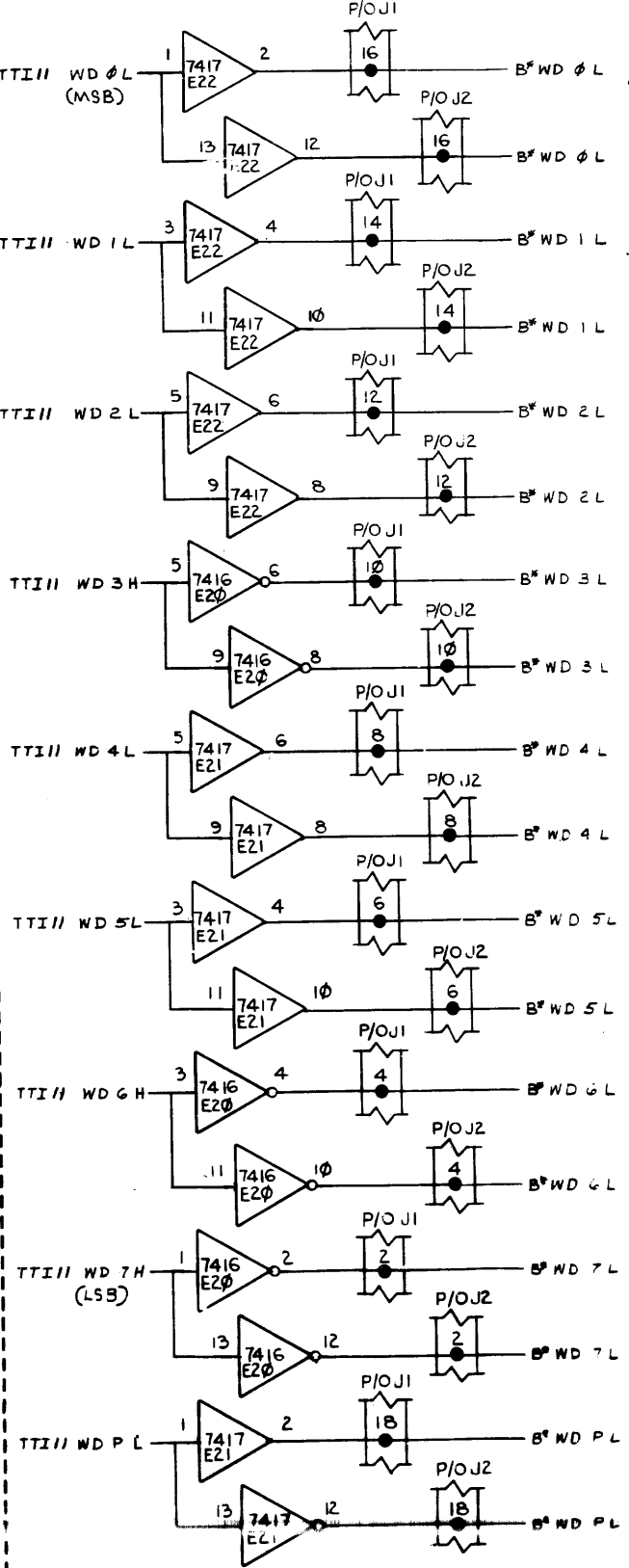
TRANSPORT DRIVERS

TRANSPORT RECEIVERS CONTROL RECEIVERS



TRANSPORT RECEIVERS READ RECEIVERS

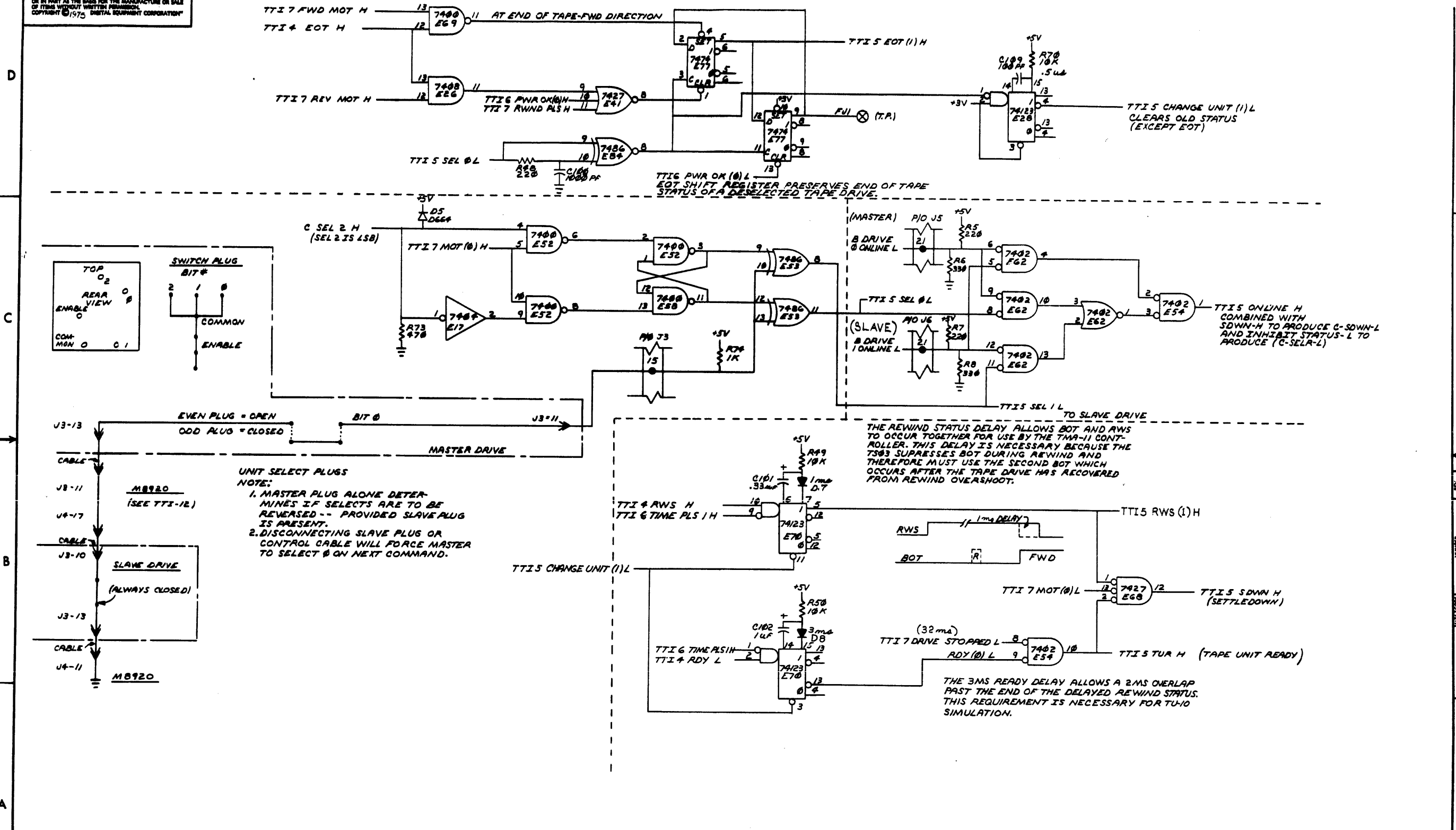
TRANSPORT DRIVERS



- NOTES:
1. PREFIX B* INDICATES SIGNAL IS FOUND ON M8920 TRANSPORT BUS.
 2. WRITE DATA (WD) LINES AND THE READ DATA (RD) LINES ARE LABELED IN THE REVERSE ORDER OF THE UNI-BUS LINES.
 3. WRITE DATA LINES WD3, WD6, AND WD7 REQUIRE DRIVER INVERTERS SINCE THEY ARE USED AS PART OF THE WRITE TAPE MARK LOGIC (SEE TTI-11).
 4. READ STROBES FROM THE TAPE DRIVE ARE GATED BY READING H ON THIS PAGE.
- TAPE DRIVE INTERFACE LOGIC PROVIDES THE INPUT RECEIVERS AND OUTPUT DRIVERS FOR DATA AND CONTROL LOGIC. SEPARATE DRIVERS ARE PROVIDED TO EACH TRANSPORT TO ALLOW AN OFF LINE DRIVE TO BE POWERED DOWN WITHOUT AFFECTING AN ON LINE DRIVE.
- OTHER DRIVE SIGNALS NOT SHOWN ON THIS PAGE ARE:
- | | | |
|-------------------|---------------------|--------|
| DRIVE 0 ON LINE-L | J5-21 | TTI 5 |
| DRIVE 1 ON LINE-L | J6-21 | |
| DRIVE SEL SVN GND | J3-15, J3-11, J4-17 | |
| LRC PLS-L | J1-32, J2-32 | TTI-10 |
| REC-L | J1-34, J2-34 | |
- GROUND CONNECTIONS ARE FOUND ON TTI-12 TTI-13

REVISIONS		
CHK	CHANGE NO.	REV.

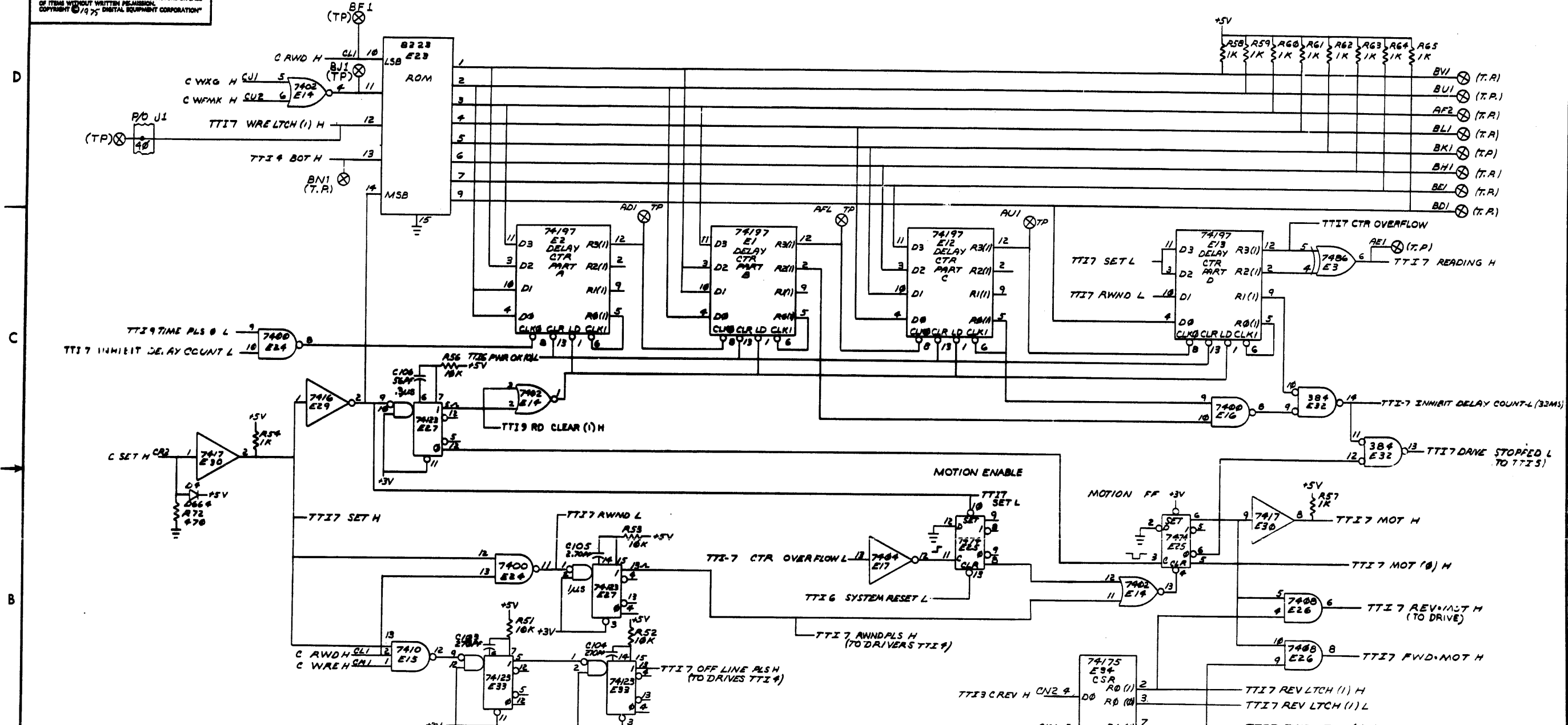
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UNIT SELECT PLUGS
 NOTE:
 1. MASTER PLUG ALONE DETERMINES IF SELECTS ARE TO BE REVERSED -- PROVIDED SLAVE PLUG IS PRESENT.
 2. DISCONNECTING SLAVE PLUG OR CONTROL CABLE WILL FORCE MASTER TO SELECT 0 ON NEXT COMMAND.

REVISIONS		
CHK	CHANGE NO.	REV.

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ROM TRUTH TABLE AND COMMAND DELAY TIMES

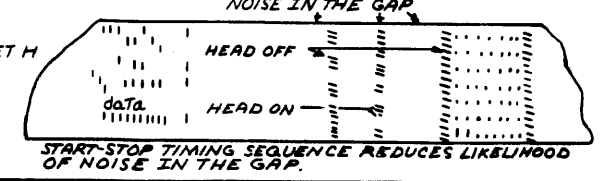
COMMANDS	ADD.	OUT	LOAD	DELAY (MS)	DELAY (INCHES)
FWD - BOT	2	872	37423	23.7	0.117
(WFMK+WRE) BOT	4	280	31400	332.0	3.47
WRE-FWD - BOT	6	366	37230	35.7	0.256
FWD - BOT	12	270	33400	256.0	3.01
(WFMK+WRE) - BOT	14	000	20000	819.2	10.05
WRE-FWD - BOT	16	120	25000	569.2	6.85
STOP* WRE	20,22	377	37777	0.1	0.001
STOP* WRE	24,26	375	37759	2.0	0.025

STOP* = DECELERATION DELAY (-NO FURTHER LOGICAL OPERATIONS REQUIRED)

MOTION DELAY COUNTER PROVIDES A PROGRAMMABLE DELAY BETWEEN THE START OF TAPE MOTION, DUE TO COMMAND INITIATION, AND THE ACTUAL EXECUTION (READING OR WRITING) OF THAT COMMAND. EIGHT DIFFERENT DELAYS ARE PROVIDED TO ENSURE:

- A) NOTHING IS WRITTEN WITHIN 6" OF BOT.
- B) NOTHING IS READ WITHIN 3" OF BOT.
- C) NO READ OR WRITE FOR THE .11 TO .25 INCHES OF TAPE ACCELERATION.
- D) APPROXIMATELY 3.5 INCHES OF ADDITIONAL SPACE IS PROVIDED FOR EXTENDED RECORD GAP OR TAPE MARK SPACE.
- E) WRITE SHUTDOWN OVERLAPS READ START-UP TO ELIMINATE NOISE IN THE GAP.

IN ADDITION TO THE PRECEDING DELAYS, AN ADDITIONAL 32 MILLISECONDS IS PROVIDED TO ALLOW TAPE MOTION TO STOP AFTER THE MOTION COMMAND HAS BEEN CLEARED. THE DELAY COUNTER IS LOADED AND INITIATED BY THE CONTROLLER SET PULSE. READING.H IS ASSERTED WHEN THE COUNTER OUTPUT REACHES 40,000 (OCTAL). THIS SIGNAL ENABLES WRITE STROBES, READ STROBES AND RECORD DETECTION LOGIC (TTI-10 & TTI-4).



REVISIONS

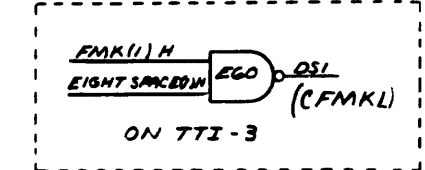
CHK	CHANGE NO.	REV.

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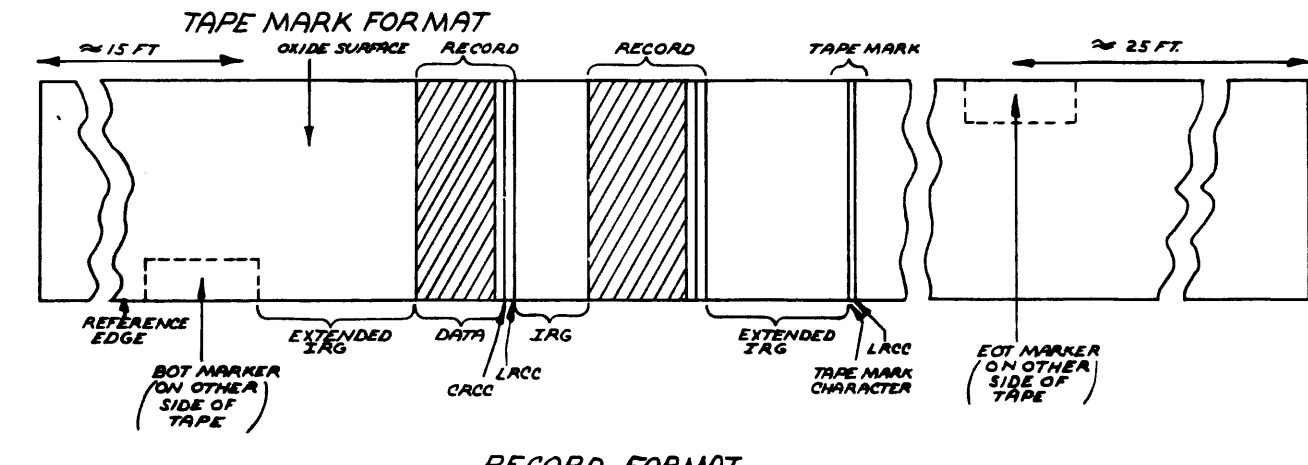
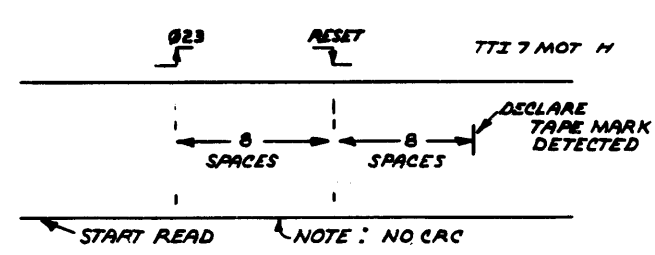
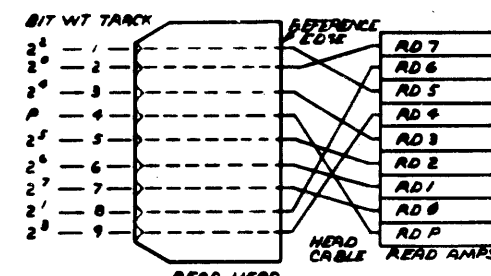
(MSB) TTI 4 RD0 H
 TTI 4 RD1 H
 TTI 4 RD2 H
 TTI 4 RD4 H
 TTI 4 RD5 H
 TTI 4 RD6 H
 TTI 4 RD3 H
 (LSB) TTI 4 RD7 H

TAPE MARK DETECTION LOGIC USES THE RECORD DETECTION COUNTER TO COUNT TWO READ STROBES (COUNTER=3). THE ABSENCE OF FURTHER READ STROBES ENABLES THE TAPE MARK COUNTER TO CHECK FOR EIGHT BLANK CHARACTER SPACES. IF BOTH OF THE INITIAL READ STROBES WERE EQUAL TO 023; A TAPE MARK SIGNAL WILL BE PROVIDED TO THE CONTROLLER AND RECORD ACTIVE WILL BE ASSERTED.

NOTE: THE LRC OF A TAPE MARK IS THE SAME AS THE TAPE MARK.

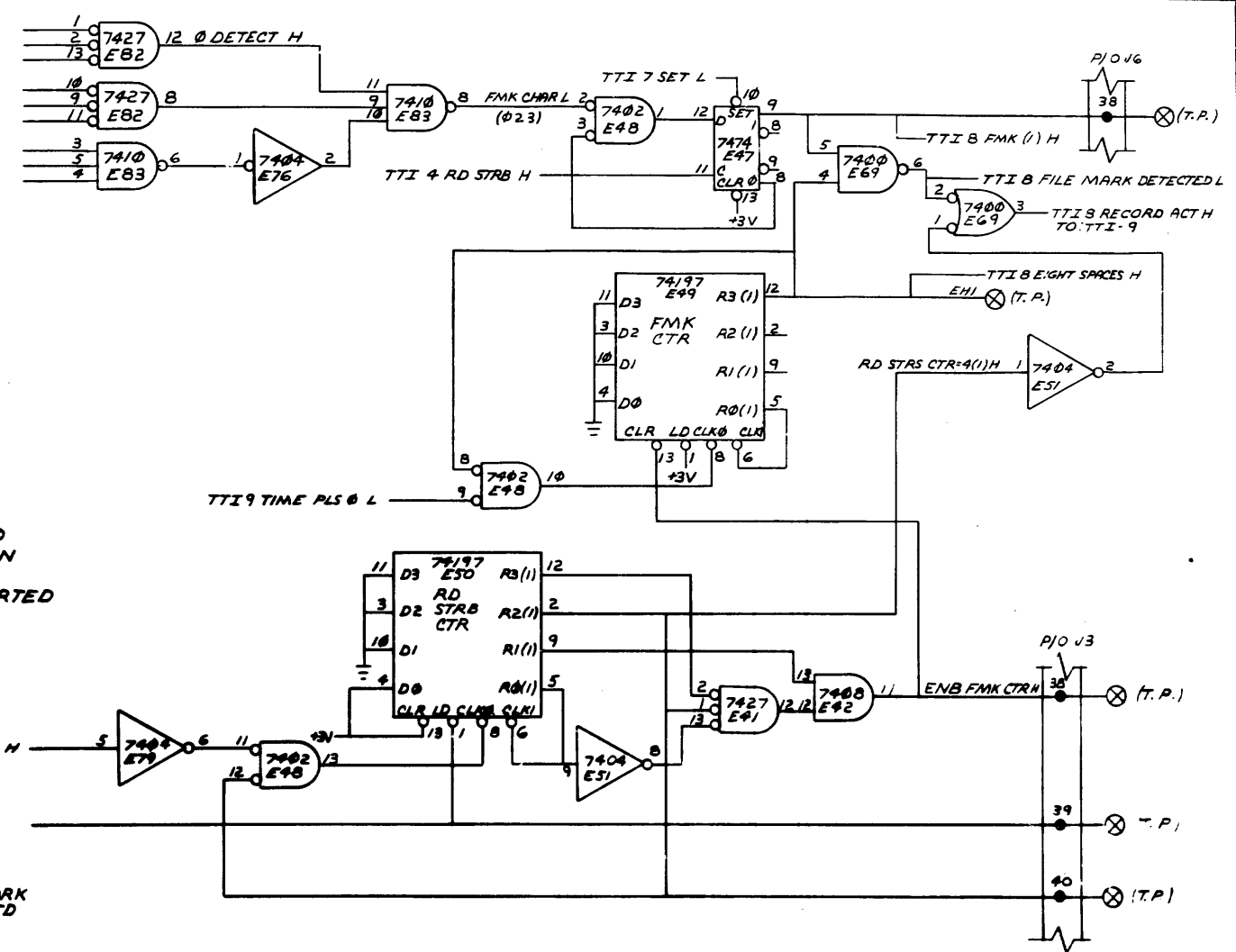


RECORD DETECTION COUNTER IS PRESET TO A ONE AT THE END OF THE PREVIOUS MOTION COMMAND. AFTER THREE READ STROBES (MINIMUM RECORD), RECORD ACTIVE IS ASSERTED

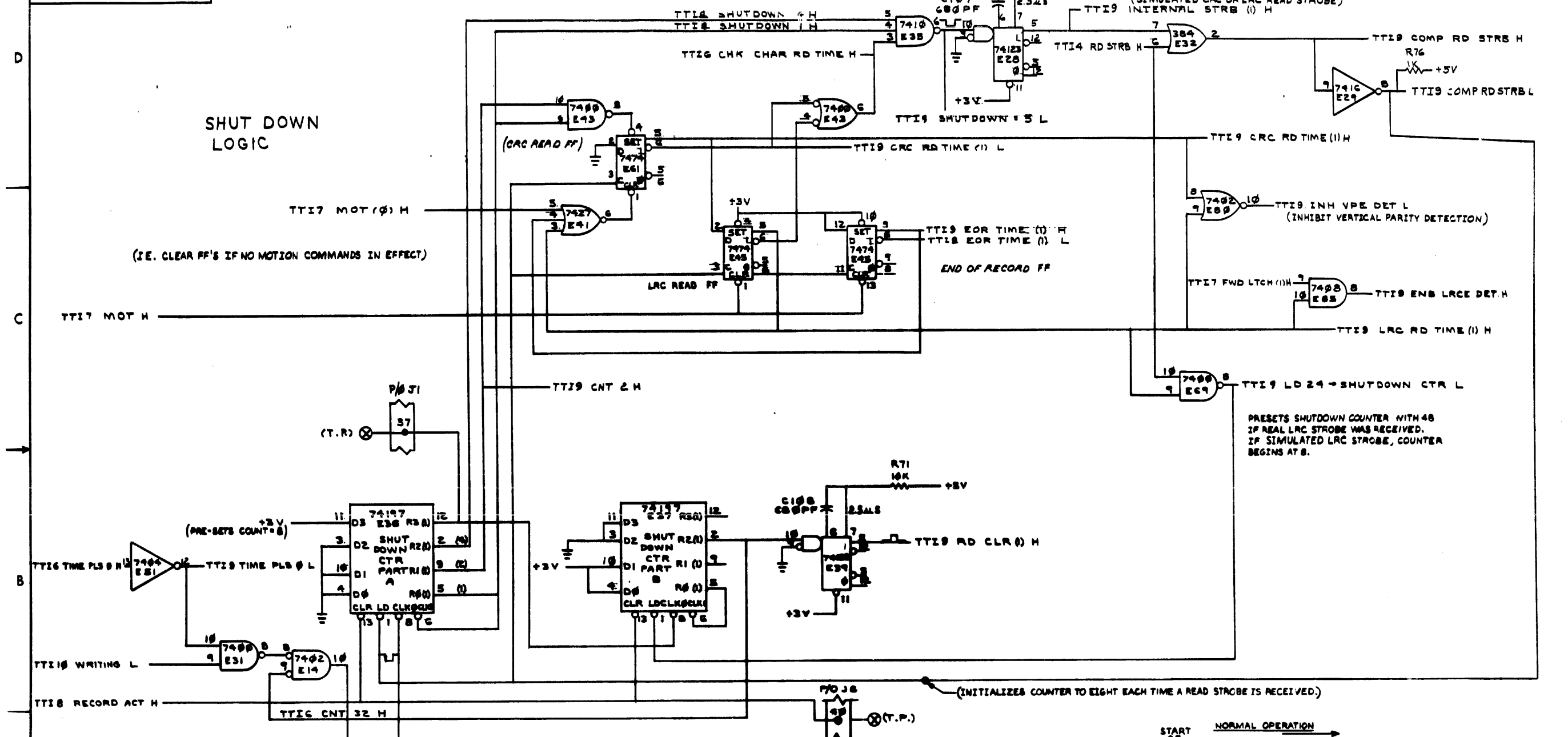


RECORD DETECTION AND TAPE MARK DETECTION LOGIC THERE ARE TWO PURPOSES TO THE LOGIC ON THIS PAGE:

1. DETECT A TAPE MARK (FILE MARK) CHARACTER (023) FOR USE BY THE CONTROLLER.
2. ENABLE THE SHUTDOWN LOGIC TO STOP THE TAPE DRIVE AFTER THE MINIMUM RECORD SIZE (3 DATA FRAMES) HAS BEEN DETECTED OR AFTER A TAPE MARK (FMK) HAS BEEN DETECTED. THE SHUTDOWN LOGIC (TTI-9) IS ENABLED BY QUALIFYING RECORD ACTIVE H.



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SHUT DOWN LOGIC

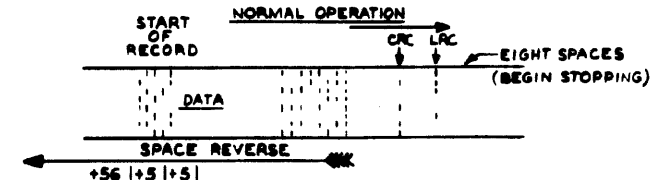
(I.E. CLEAR FF'S IF NO MOTION COMMANDS IN EFFECT)

PRESETS SHUTDOWN COUNTER WITH 48 IF REAL LRC STROBE WAS RECEIVED. IF SIMULATED LRC STROBE, COUNTER BEGINS AT 8.

(INITIALIZES COUNTER TO EIGHT EACH TIME A READ STROBE IS RECEIVED.)

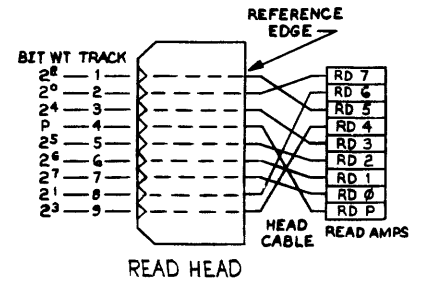
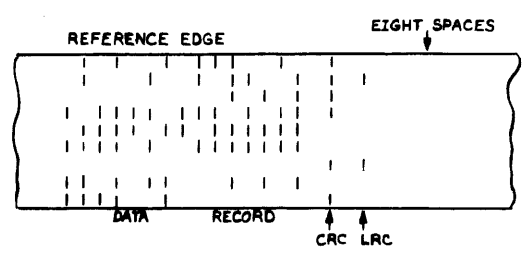
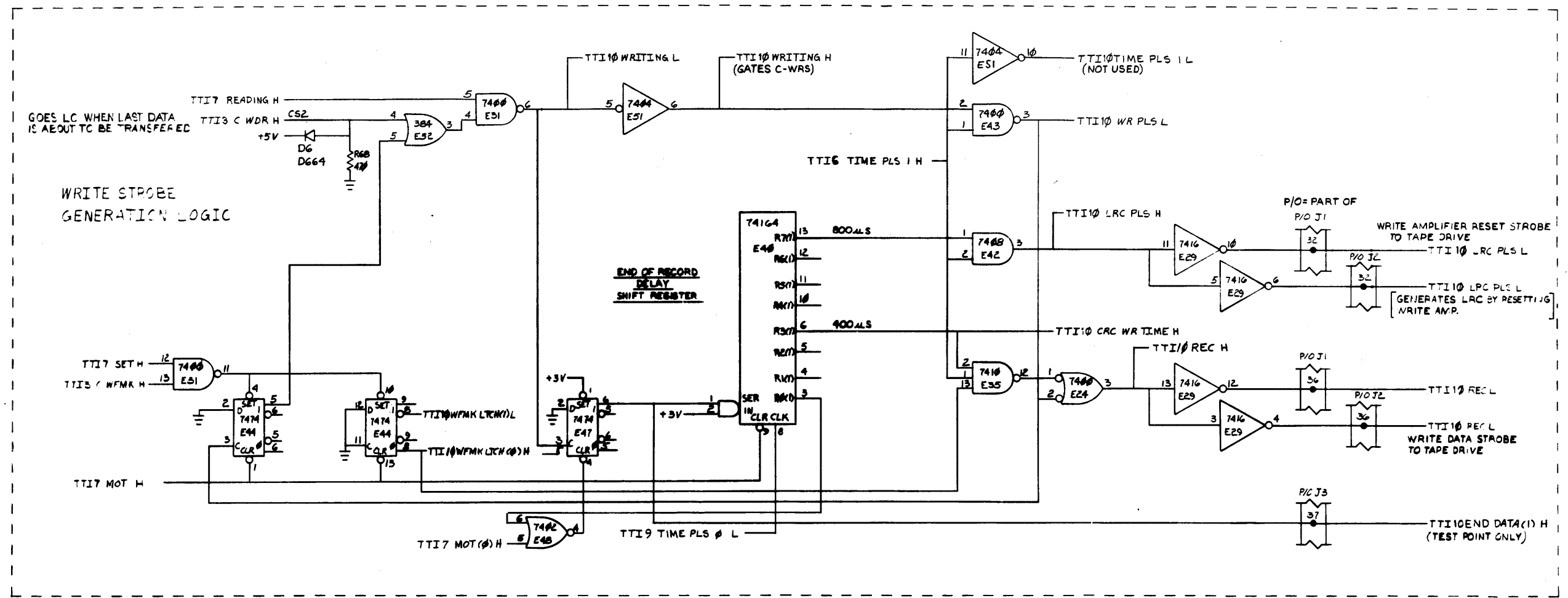
THE SHUTDOWN COUNTER LOGIC CHECKS FOR THE PRESENCE OF CRC AND LRC CHARACTERS, AS WELL AS FOR SUFFICIENT ERASED TAPE AT THE END OF EACH RECORD, BEFORE ALLOWING THE TAPE DRIVE TO STOP. SPECIFICALLY, THIS LOGIC:

1. ENABLES THE CRC CHARACTER TO BE READ AFTER 300µS HAVE PASSED WITHOUT A READ STROBE BEING DETECTED (E-43-8).
2. ENABLES THE LRC CHARACTER TO BE READ ANY TIME WITHIN THE FIRST FIVE SPACES PAST THE CRC CHARACTER. (E-45-5).
3. GENERATES A SIMULATED READ STROBE WHEN SPACING REVERSE, OR IN THE RARE INSTANCE WHEN THE CRC AND/OR LRC CHARACTER EQUALS ZERO (E-28-5).
4. ENSURES THAT THERE IS NO DATA WITHIN THE EIGHT CHARACTER SPACES FOLLOWING THE LRC READ STROBE BEFORE ALLOWING THE TAPE DRIVE TO STOP. (E-39-5).
5. ENSURES THAT THERE IS NO DATA FOR 56 CHARACTER TIMES AFTER A SIMULATED LRC STROBE (I.E. NO LRC STROBE RECEIVED FROM TAPE) BEFORE ALLOWING THE TAPE DRIVE TO STOP. (E-68-8).



SHUT DOWN CONTROL LOGIC

REVISIONS		
CHK	CHANGE NO.	REV.

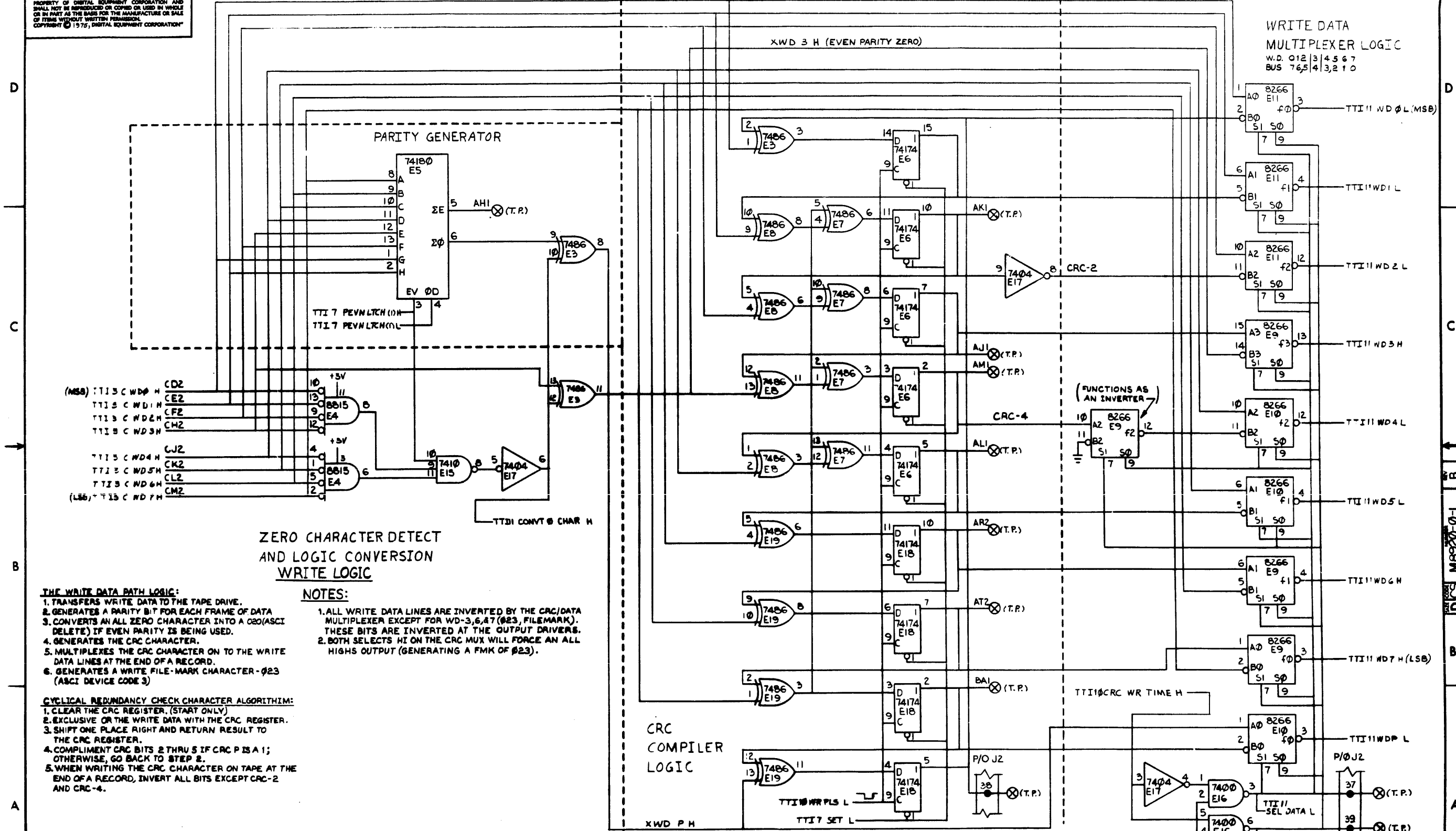


WIRE LOGIC

- THE WRITE LOGIC ON THIS PAGE:
1. DETECTS END OF A WRITE DATA COMMAND (C-WDR); SEQUENCES A WRITE FILE MARK COMMAND (C-WFMK)
 2. GENERATES WRITE STROBE PULSES FOR DATA AND CRC CHARACTERS (REC-L)
 3. GENERATES A PULSE TO WRITE AN LRC CHARACTER (LRC-PLS-L)
 4. PROVIDES 3 BLANK FRAMES BETWEEN DATA AND THE CRC CHARACTER, AS WELL AS BETWEEN THE CRC AND LRC CHARACTERS.

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ZERO CHARACTER DETECT AND LOGIC CONVERSION WRITE LOGIC

- THE WRITE DATA PATH LOGIC:**
1. TRANSFERS WRITE DATA TO THE TAPE DRIVE.
 2. GENERATES A PARITY BIT FOR EACH FRAME OF DATA.
 3. CONVERTS AN ALL ZERO CHARACTER INTO A 020(ASCII DELETE) IF EVEN PARITY IS BEING USED.
 4. GENERATES THE CRC CHARACTER.
 5. MULTIPLEXES THE CRC CHARACTER ON TO THE WRITE DATA LINES AT THE END OF A RECORD.
 6. GENERATES A WRITE FILE-MARK CHARACTER - 023 (ASCII DEVICE CODE 3)

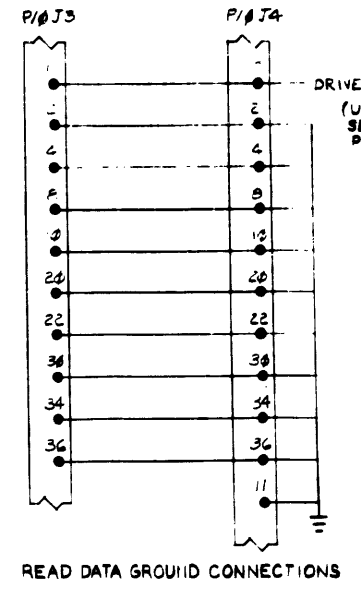
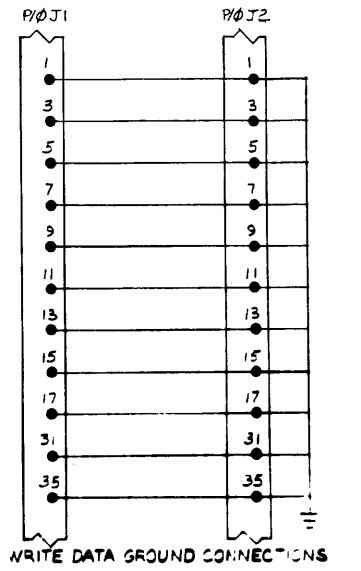
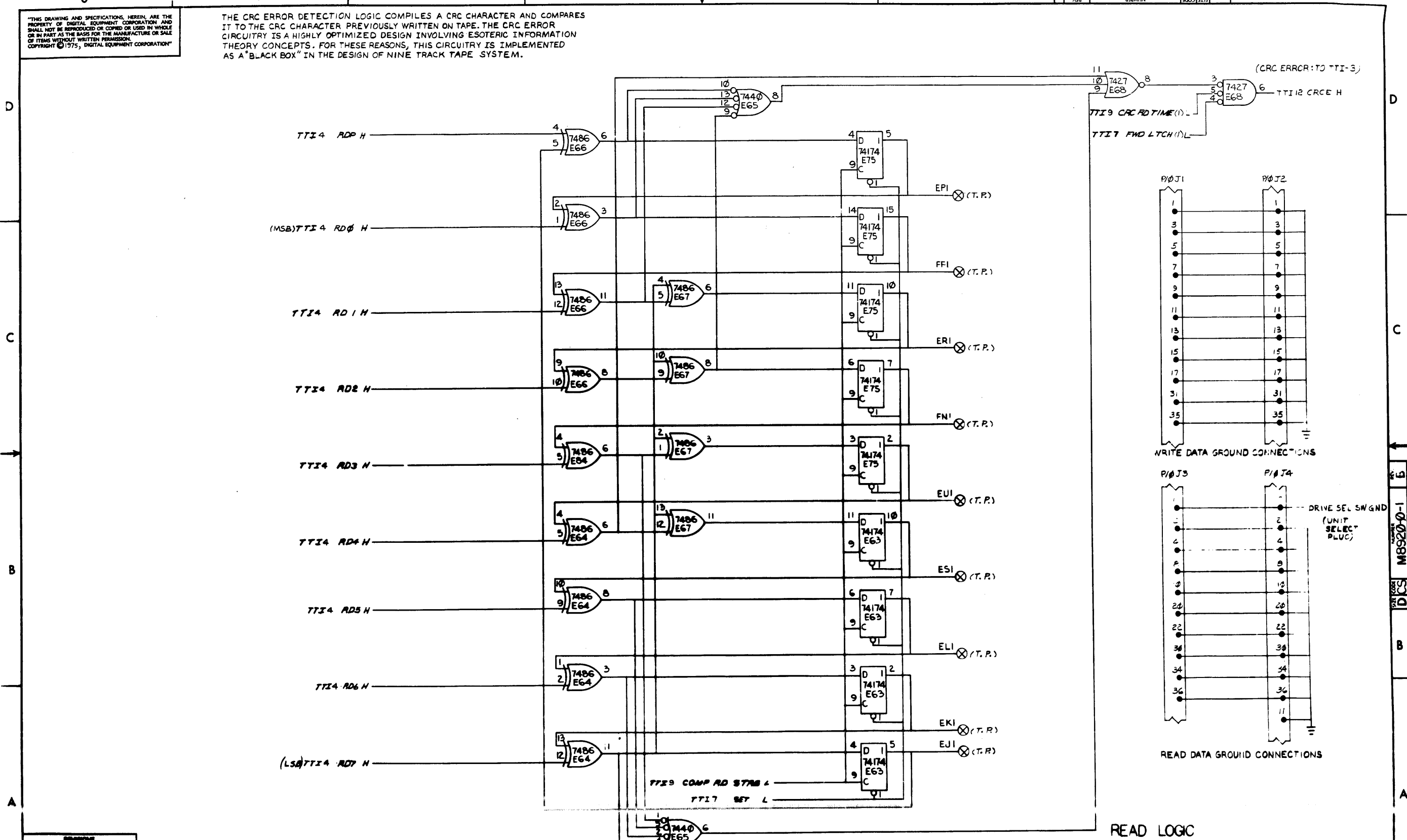
- NOTES:**
1. ALL WRITE DATA LINES ARE INVERTED BY THE CRC/DATA MULTIPLEXER EXCEPT FOR WD-3,6,47 (#23, FILEMARK). THESE BITS ARE INVERTED AT THE OUTPUT DRIVERS.
 2. BOTH SELECTS HI ON THE CRC MUX WILL FORCE AN ALL HIGHS OUTPUT (GENERATING A FMK OF 023).

- CYCLICAL REDUNDANCY CHECK CHARACTER ALGORITHM:**
1. CLEAR THE CRC REGISTER. (START ONLY)
 2. EXCLUSIVE OR THE WRITE DATA WITH THE CRC REGISTER.
 3. SHIFT ONE PLACE RIGHT AND RETURN RESULT TO THE CRC REGISTER.
 4. COMPLIMENT CRC BITS 2 THRU 5 IF CRC P IS A 1; OTHERWISE, GO BACK TO STEP 2.
 5. WHEN WRITING THE CRC CHARACTER ON TAPE AT THE END OF A RECORD, INVERT ALL BITS EXCEPT CRC-2 AND CRC-4.

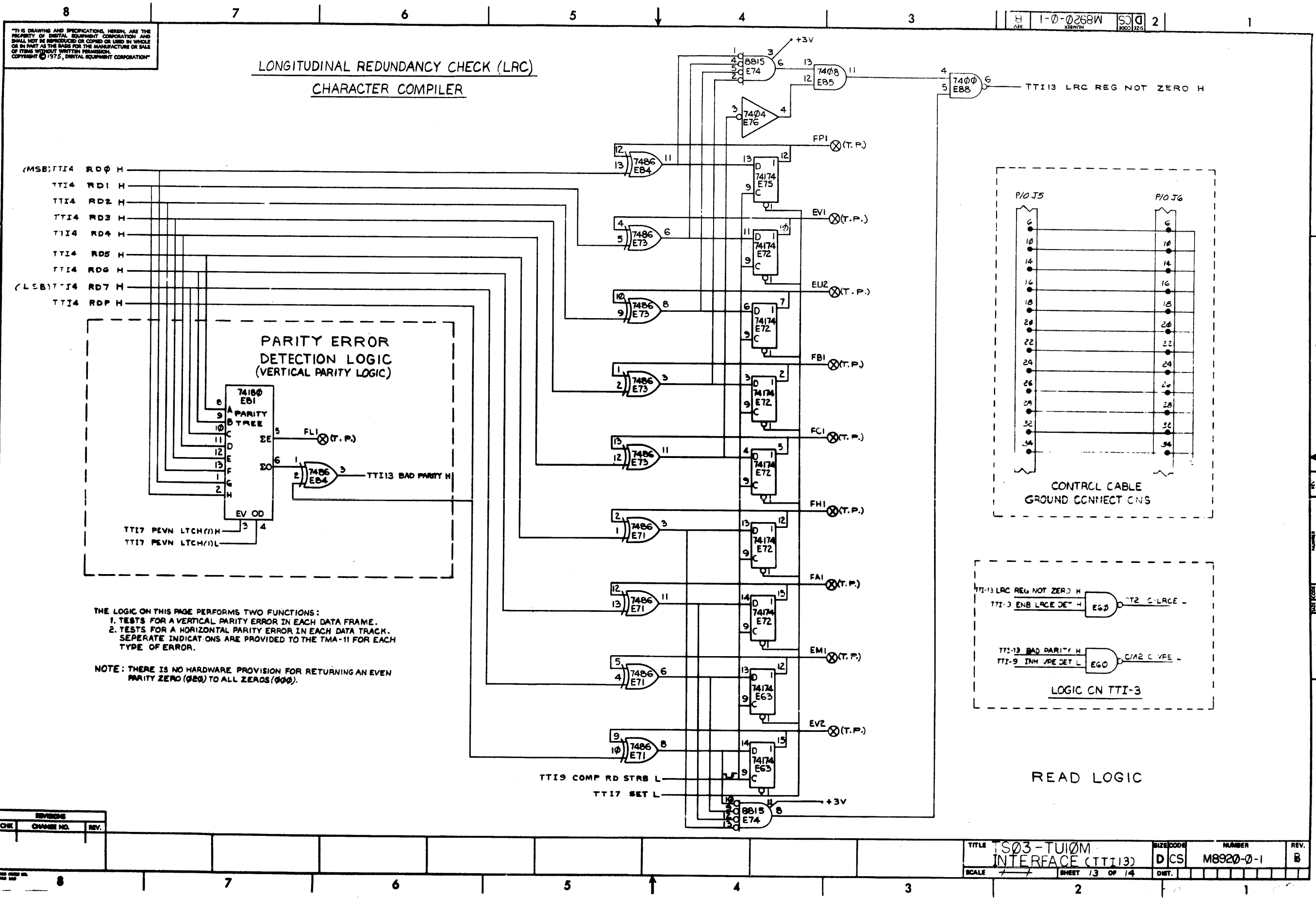
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THE CRC ERROR DETECTION LOGIC COMPILES A CRC CHARACTER AND COMPARES IT TO THE CRC CHARACTER PREVIOUSLY WRITTEN ON TAPE. THE CRC ERROR CIRCUITRY IS A HIGHLY OPTIMIZED DESIGN INVOLVING ESOTERIC INFORMATION THEORY CONCEPTS. FOR THESE REASONS, THIS CIRCUITRY IS IMPLEMENTED AS A "BLACK BOX" IN THE DESIGN OF NINE TRACK TAPE SYSTEM.



REVISIONS		
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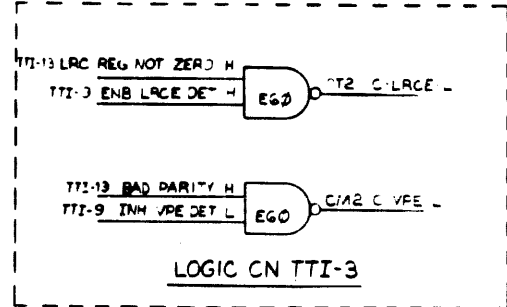
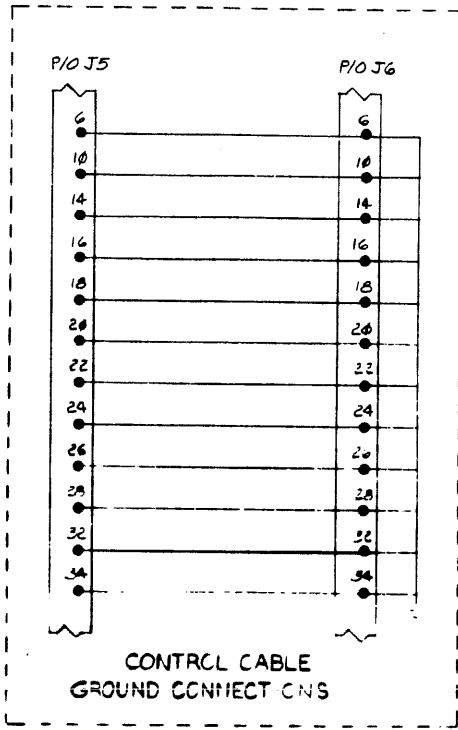
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LONGITUDINAL REDUNDANCY CHECK (LRC)
CHARACTER COMPILER

PARITY ERROR
DETECTION LOGIC
(VERTICAL PARITY LOGIC)

THE LOGIC ON THIS PAGE PERFORMS TWO FUNCTIONS:
1. TESTS FOR A VERTICAL PARITY ERROR IN EACH DATA FRAME.
2. TESTS FOR A HORIZONTAL PARITY ERROR IN EACH DATA TRACK.
SEPARATE INDICATIONS ARE PROVIDED TO THE TMA-11 FOR EACH TYPE OF ERROR.

NOTE: THERE IS NO HARDWARE PROVISION FOR RETURNING AN EVEN PARITY ZERO (000) TO ALL ZEROS (000).



READ LOGIC

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PARTS LIST				
QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8920-0-4	1
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M8920-0-5	2
REF		MODULE ECO HISTORY	B-MH-M8920-0-6	3
1		ETCHED CIRCUIT BOARD	5011300	4
1	C106	CAPACITOR 50PF 100V 5% DM	1000012-00	5
2	C109, C114	CAPACITOR 100PF, 100V, 5% DM	1000016-00	6
2	C103, C104	CAPACITOR 270 PF, 100V, 5% DM	1000022-00	7
3	C99, C107, C108	CAPACITOR 600 PF, 100V, 5% DM	1000026-00	8
2	C100, C105	CAPACITOR 1000PF, 100V, 5% DM	1000042-00	9
91	C1 THRU C90, C111	CAPACITOR .01UF 100V, 20% DISC	1001810-01	10
2	C97, C98	CAPACITOR 5000PF, 100V, 20% DISC	1001785-00	11
7	C91 THRU C96, C110	CAPACITOR 6.0UF 35V 10% S.TANT	1005306-00	12
1	C102	CAPACITOR .10UF, 35V, 10% S.TANT	1001776-00	13
6	J1 THRU J6	3M CONN 40 PIN	1209941-01	14
8	D1 THRU D6	DIODE D664	1100114-00	15
2		INSULATOR 8000 PGI	1202812-00	16
21	R15, R19, R23, R27, R31, R35, R3, R13, R11, R9, R17, R21, R25, R29, R33, R1, R48, R5, R66, R7, R79	RESISTOR 220 1/4W 5%	1300271-00	17
19	R16, R20, R24, R28, R32, R36, R2, R14, R12, R10, R18, R22, R26, R30, R34, R8, R4, R6, R67	RESISTOR 330 1/4W 5%	1300295-00	18
8	R44, R40, R41, R47, R46, R73, R68, R72	RESISTOR 470 1/4W 5%	1300316-00	19
17	R55, R45, R37, R75, R57, R74, R59, R59, R60 THRU R65, R42, R49, R26	RESISTOR 1K 1/4W 5%	1300365-00	20
12	R52, R43, R39, R38, R50, R49, R70, R71, R69, R53, R51, R56	RESISTOR 10K 1/4W 5%	1300479-00	21
1	Y1	CRYSTAL 400 KHZ	1805504-02	22
7	E61, E86, E77, E47, E44, E45, E25	I.C. 7474	1905547-00	23
7	E16, E88, E69, E24, E43, E52, E31	I.C. 7460	1905575-00	24
3	E15, E83, E35	I.C. 7410	1905576-00	25
1	E65	I.C. 7440	1905579-00	26
5	E54, E82, E80, E14, E48	I.C. 7402	1909004-00	27
1	E87	I.C. 7490	1909051-00	28
1	E32	I.C. 384	1909486-00	29
5	E17, E76, E78, E79, E51	I.C. 7404	1909686-00	30
2	E4, E74	I.C. 8815	1909713-00	31
4	E20, E46, E38, E29	I.C. 7416	1909928-00	32
3	E22, E21, E30	I.C. 7417	1909929-00	33
3	E8 THRU E11	I.C. 8288	1909934-00	34
11	E3, E8, E18, E7, E84, E86, E84, E87, E73, E71, E53	I.C. 7488	1910011-00	35
8	E1, E2, E12, E13, E36, E37, E48, E50	I.C. 74187	1910035-00	36
1	E40	I.C. 74184	1910041-00	37
8	E59, E60, E57, E58, E55, E56	I.C. 7437	1910081-00	38
3	E85, E28, E42	I.C. 7488	1910195-00	39
1	E88	I.C. 8G48	1911439-00	40
5	E38, E78, E33, E27, E28	I.C. 74123	1910438-00	41
1	E34	I.C. 74175	1910651-00	42
5	E6, E18, E75, E83, E72	I.C. 74174	1910652-00	43

PARTS LIST				
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2	E5, E81	I.C. 74180	1910724-00	44
3	E88, E82, E41	I.C. 7427	1910878-00	45
1	E23	PROM 16 PIN	23092A1	46
1		BRACKET, HOLDER	5302825-00	47
1		HOLDER, CRYSTAL	5303154-00	48
3		SCREW, PPH 2-56 X 1/4	9006001-01	49
3		NUT, HEX 2-56 X 3/16	9006555-00	50
3		FASTON TAB	9007112-00	51
7		EYELET	9006732-00	52
1	C101	CAPACITOR .33UF 20V 10% S.TANT	1005328-00	53
3		WASHER, LOCK #2	9006631	54
1		STIFFENER, ETCH BOARD	7413774	55
1	R77	RESISTOR, 47, 1/4W, 5%	1300202	56
				57
1	C112	CAPACITOR, 180PF, 100V, D.M.	1000020	58
1	C113	CAPACITOR, 470PF, 100V, D.M.	1000024	59

REVISIONS		
CHK	CHANGE NO	REV