CONTROL DATA CORPORATION

CONTROL DATA®
CARTRIDGE DISK DRIVE
9427H

DEVICE SPECIFICATIONS & SWITCH SELECTIONS I/O BOARD DOCUMENTATION

MAGNETIC PERIPHERALS INC.
a subsidiary of
CONTROL DATA CORPORATION

HPC—HARDWARE MAINTENANCE MANUAL DOCUMENT PACKAGE

HARDWARE PRODUCT CONFIGURATOR DOCUMENT PACKAGE AND MANUAL TO EQUIPMENT LEVEL CORRELATION

SCOPE

The documentation provided in this package supplements the Model 9427H Hardware Maintenance Manual and makes it unique to the equipment described below. This documentation package, when referenced, should be identified by the Hardware Product Configurator (HPC) number, and the title 'HPC Document Package', i.e., 83448215 HPC Document Package.

EQUIPMENT

HPC NUMBER	83448215
TOP MECHANICAL ASSEMBLY	75741190

PACKAGE CONTENTS

DEVICE SPEC AND SWITCH SELECTION	83449215
I-O DIAGRAM PACKAGE (RACK)	77834701
SUB READ GATE FOR READ IN SYNC	75886535
READ GATE ELIMINATION	75891654
SEEK TERM TO ADDRESS REGISTER	75890885
PARTS DATA CONFIGURATOR	TMA-190

MANUAL/EQUIPMENT CORRELATION

This package and the Hardware Maintenance Manual listed below will support the above described equipment containing the following ECO's:

ENGINEERING CHANGE ORDER	PL19078
ENGINEERING CHANGE ORDER	PL19098
ENGINEERING CHANGE ORDER	PL19148
ENGINEERING CHANGE ORDER	PL19494
ENGINEERING CHANGE ORDER	PL19575

OTHER INFORMATION

HARDWARE MAINTENANCE MANUAL	77834675

DEVICE SPECIFICATIONS AND SWITCH SELECTIONS

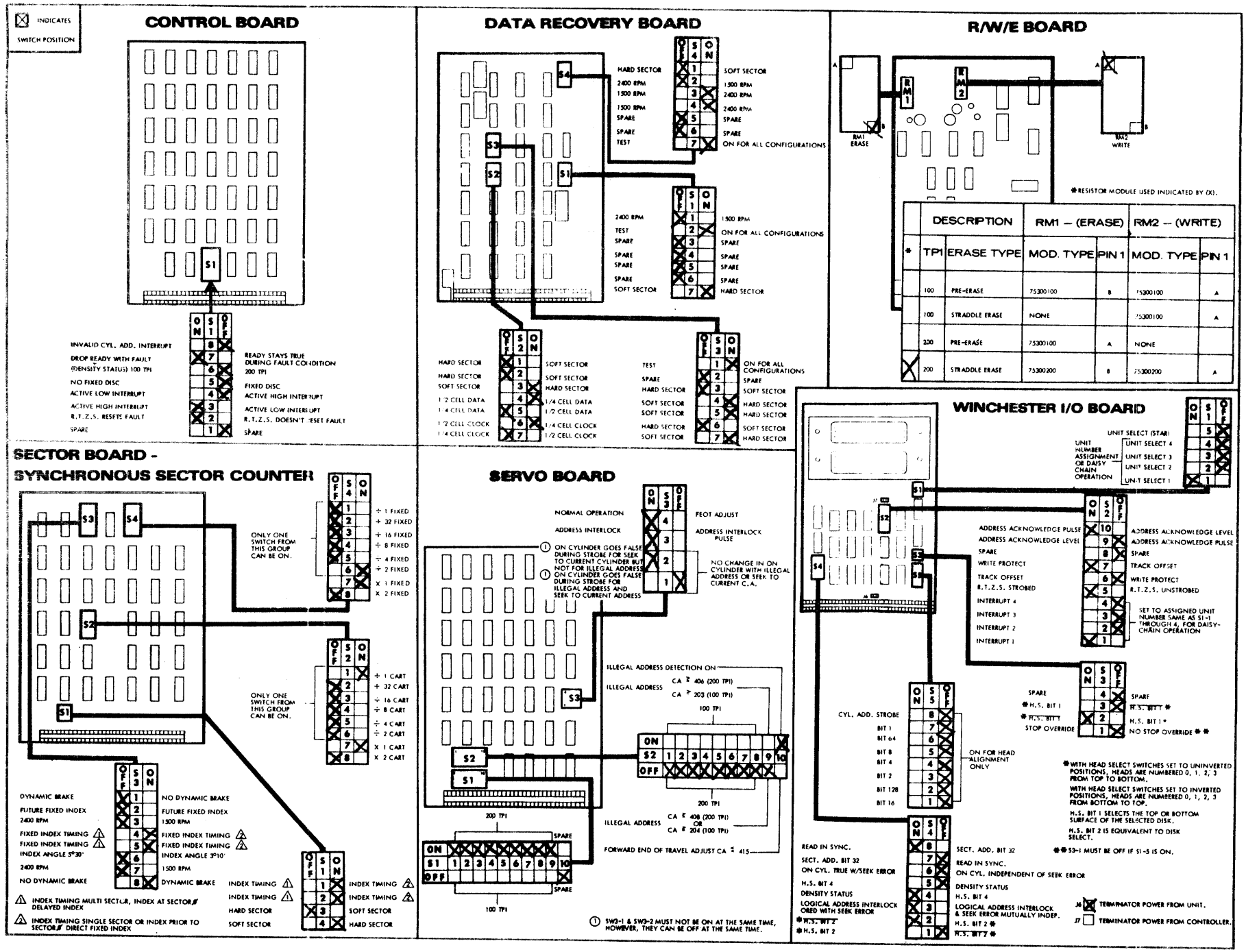
SCOPE

This document defines the unique mechanical/electrical requirements and switch adjustment selections for the 9427H Disk Storage Drive Hardware Product Configurator (HPC) number 83448215.

The following is a summary of customer selected items. This configuration has been prepared to meet the requirements of the HPC specified above. Immediately following the summary are the Printed Circuit Board switch selections.

DEVICE SPECIFICATION SUMMARY

INPUT VOLTAGE:	110 Volts, 5.0 Amps
SECTORING (HARD):	20 Sectors,Mt Hole #2,divided by 2
MOUNTING:	Rack
TERMINATOR:	110-330 Ohms
REVOLUTIONS PER MINUTE:	2400
HEADS:	200 Tracks Per Inch
HEADS:	Straddle Erase
HEADS:	Fixed Disk
FREQUENCY:	60 Hz
SPINDLE DRIVE:	With Dynamic Brake
CONTROLLER INTERFACE:	Non-Standard
I-O CONNECTOR:	Winchester
MAXIMUM TRACK:	407
TERMINATOR POWER:	Unit
INDEX ANGLE:	5 degrees 30 minutes
INDEX TIMING:	Single Sector or Index prior to '0' degrees
ADDRESS ACKNOWLEDGE:	Pulse
HEAD & DISK SELECT:	Numbered Bottom Up
UNIT SELECT:	Daisy Chain
DRIVE TRACKS PER INCH:	200
LOGICAL ADDR INTERLOCK:	OR'd with Seek Error
ACTIVE INTERRUPT:	High
FEATURE:	Write Protect
FEATURE:	ON Cyl Independent of Seek Error
FEATURE:	Density Status
FEATURE:	Drop Ready with Fault
FEATURE:	RTZS Resets Fault
FEATURE:	ON Cyl goes false during strobe for Seek
:	to current Cyl but not for Illegal Addr.

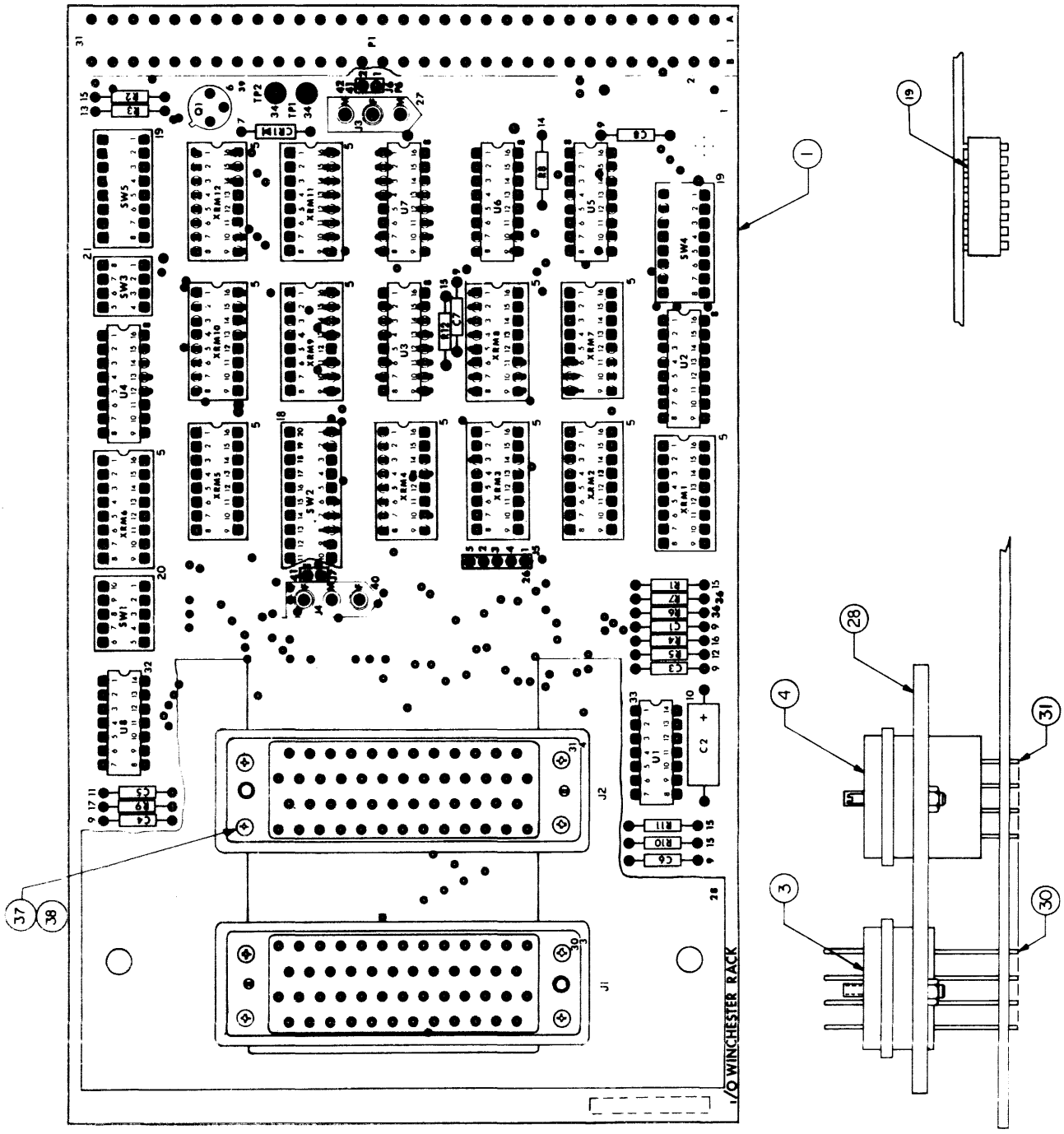

INDICATES SWITCH POSITION
CONTROL BOARD
S1
INVALID CYL. ADD. INTERRUPT
DROP READY WITH FAULT (DENSITY STATUS) 100 TPI
NO FIXED DISC
ACTIVE LOW INTERRUPT
ACTIVE HIGH INTERRUPT
R.T.Z.S. RESETS FAULT
SPARE
READY STAYS TRUE DURING FAULT CONDITION 200 TPI
FIXED DISC
ACTIVE HIGH INTERRUPT
ACTIVE LOW INTERRUPT
R.T.Z.S. DOESN'T RESET FAULT
SPARE
DATA RECOVERY BOARD
S4
HARD SECTOR
2400 RPM
1500 RPM
1500 RPM
SPARE
SPARE
TEST
SOFT SECTOR
1500 RPM
2400 RPM
2400 RPM
SPARE
SPARE
ON FOR ALL CONFIGURATIONS
S3
S2
S1
2400 RPM
TEST
SPARE
SPARE
SPARE
SPARE
SOFT SECTOR
1500 RPM
ON FOR ALL CONFIGURATIONS
SPARE
SPARE
SPARE
HARD SECTOR
HARD SECTOR
HARD SECTOR
1/2 CELL DATA
1/4 CELL DATA
1/2 CELL CLOCK
1/4 CELL CLOCK
SOFT SECTOR
SOFT SECTOR
HARD SECTOR
1/4 CELL DATA
1/2 CELL DATA
1/4 CELL CLOCK
1/2 CELL CLOCK
TEST
SPARE
HARD SECTOR
SOFT SECTOR
SOFT SECTOR
SOFT SECTOR
HARD SECTOR
HARD SECTOR
SOFT SECTOR
HARD SECTOR
ON FOR ALL CONFIGURATIONS
SPARE
SOFT SECTOR
HARD SECTOR
HARD SECTOR
SOFT SECTOR
R/W/E BOARD
RM1
RM2
RM1 ERASE
RM2 WRITE
* RESISTOR MODULE USED INDICATED BY (X).
DESCRIPTION
RM1 – (ERASE)
RM2 – (WRITE)
* TPI ERASE TYPE MOD. TYPE PIN 1 MOD. TYPE PIN 1
100 PRE-ERASE 75300100 B 75300100 A
100 STRADDLE ERASE NONE 75300100 A
200 PRE-ERASE 75300100 A NONE
200 STRADDLE ERASE 75300200 B 75300200 A
SECTOR BOARD - SYNCHRONOUS SECTOR COUNTER
S3
S4
S2
S1
ONLY ONE SWITCH FROM THIS GROUP CAN BE ON.
÷ 1 FIXED
÷ 32 FIXED
÷ 16 FIXED
÷ 8 FIXED
÷ 4 FIXED
÷ 2 FIXED
X 1 FIXED
X 2 FIXED
ONLY ONE SWITCH FROM THIS GROUP CAN BE ON.
÷ 1 CART
÷ 32 CART
÷ 16 CART
÷ 8 CART
÷ 4 CART
÷ 2 CART
X 1 CART
X 2 CART
DYNAMIC BRAKE
FUTURE FIXED INDEX 2400 RPM
FIXED INDEX TIMING
FIXED INDEX TIMING
INDEX ANGLE 5°30'
2400 RPM
NO DYNAMIC BRAKE
NO DYNAMIC BRAKE
FUTURE FIXED INDEX 1500 RPM
FIXED INDEX TIMING
FIXED INDEX TIMING
INDEX ANGLE 3°10'
1500 RPM
DYNAMIC BRAKE
INDEX TIMING
INDEX TIMING
HARD SECTOR
SOFT SECTOR
INDEX TIMING
INDEX TIMING
SOFT SECTOR
HARD SECTOR
INDEX TIMING MULTI SECTOR, INDEX AT SECTOR # DELAYED INDEX
INDEX TIMING SINGLE SECTOR OR INDEX PRIOR TO SECTOR # DIRECT FIXED INDEX
SERVO BOARD
NORMAL OPERATION
ADDRESS INTERLOCK
ON CYLINDER GOES FALSE DURING STROBE FOR SEEK TO CURRENT CYLINDER BUT NOT FOR ILLEGAL ADDRESS
ON CYLINDER GOES FALSE DURING STROBE FOR ILLEGAL ADDRESS AND SEEK TO CURRENT ADDRESS
FEOT ADJUST
ADDRESS INTERLOCK PULSE
NO CHANGE IN ON CYLINDER WITH ILLEGAL ADDRESS OR SEEK TO CURRENT C.A.
S3
S2
S1
200 TPI
100 TPI
ILLEGAL ADDRESS DETECTION ON
ILLEGAL ADDRESS
CA ≥ 406 (200 TPI)
CA ≥ 203 (100 TPI)
100 TPI
200 TPI
ILLEGAL ADDRESS
CA ≤ 408 (200 TPI) OR CA ≤ 204 (100 TPI)
FORWARD END OF TRAVEL ADJUST CA ≤ 415
SPARE
SPARE
① SW3-1 & SW3-2 MUST NOT BE ON AT THE SAME TIME, HOWEVER, THEY CAN BE OFF AT THE SAME TIME.
WINCHESTER I/O BOARD
UNIT SELECT (STAR)
UNIT NUMBER ASSIGNMENT OR DAISY CHAIN OPERATION
UNIT SELECT 4
UNIT SELECT 3
UNIT SELECT 2
UNIT SELECT 1
S1
S2
S3
S4
S5
J1
J2
ADDRESS ACKNOWLEDGE PULSE
ADDRESS ACKNOWLEDGE LEVEL
SPARE
WRITE PROTECT
TRACK OFFSET
R.T.Z.S. STROBED
INTERRUPT 4
INTERRUPT 3
INTERRUPT 2
INTERRUPT 1
ADDRESS ACKNOWLEDGE LEVEL
ADDRESS ACKNOWLEDGE PULSE
SPARE
TRACK OFFSET
WRITE PROTECT
R.T.Z.S. UNSTROBED
SET TO ASSIGNED UNIT NUMBER SAME AS S1-1 THROUGH 4, FOR DAISY-CHAIN OPERATION
CYL. ADD. STROBE
BIT 1
BIT 64
BIT 8
BIT 4
BIT 2
BIT 128
BIT 16
ON FOR HEAD ALIGNMENT ONLY
SPARE
* H.S. BIT 1
* H.S. BIT 1
STOP OVERRIDE
SPARE
* H.S. BIT 1
* H.S. BIT 1
NO STOP OVERRIDE * *
* WITH HEAD SELECT SWITCHES SET TO UNINVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM TOP TO BOTTOM.
WITH HEAD SELECT SWITCHES SET TO INVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM BOTTOM TO TOP.
H.S. BIT 1 SELECTS THE TOP OR BOTTOM SURFACE OF THE SELECTED DISK.
H.S. BIT 2 IS EQUIVALENT TO DISK SELECT.
READ IN SYNC.
SECT. ADD. BIT 32
ON CYL. TRUE W/SEEK ERROR
H.S. BIT 4
DENSITY STATUS
LOGICAL ADDRESS INTERLOCK ORED WITH SEEK ERROR
* H.S. BIT 2
* H.S. BIT 2
SECT. ADD. BIT 32
* * S3-1 MUST BE OFF IF S1-5 IS ON.
READ IN SYNC.
ON CYL. INDEPENDENT OF SEEK ERROR
DENSITY STATUS
H.S. BIT 4
LOGICAL ADDRESS INTERLOCK & SEEK ERROR MUTUALLY INDEP.
H.S. BIT 2 *
H.S. BIT 2 * *
J6 TERMINATOR POWER FROM UNIT.
J7 TERMINATOR POWER FROM CONTROLLER.

VA
DIAGRAMS
(I/O PACKAGE)

SCOPE

This publication, when used with the HAWK Product Manual makes the manual unique to a specific equipment configuration. The following data pertains to the Winchester I/O Rack printed circuit board and is to be used as part of Section 5 of the manual.

- Sheet 5A-2 Circuit Board Assembly (75857706)
- Sheet 5A-4 Interconnection Diagram
- Sheet 5A-5 Schematic (75857805)

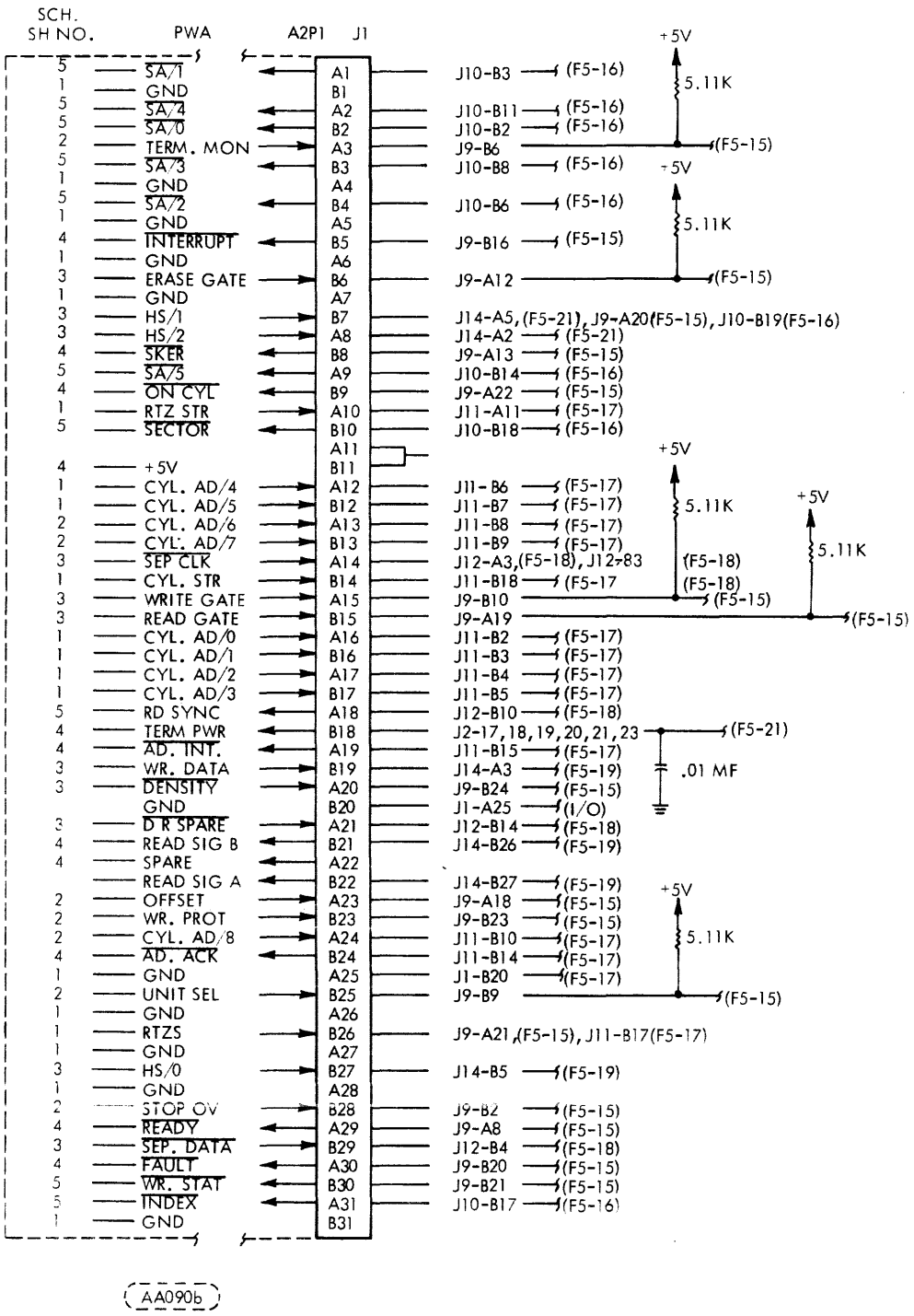


Circuit Board Assembly

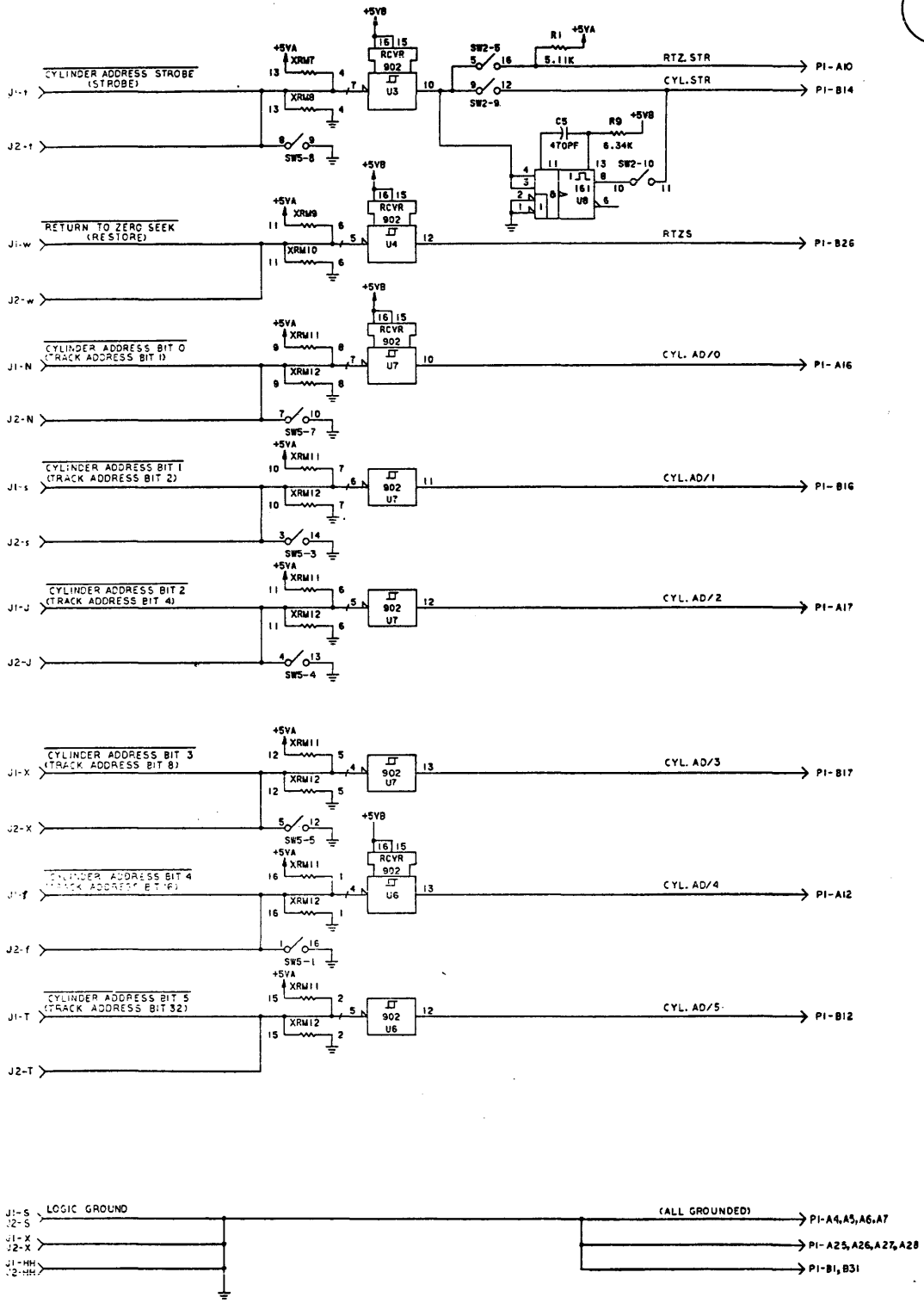
ITEM NO.	IDENTIFICATION NUMBER	DRAWING TITLE
	75857706	Comp Bd Assy - I/O Rack
1	75857604	Bd P.C. - I/O Rack WNH
2	94243400	Conn-Card Mtd 62Sock
3	75770501	Connector
4	75770502	Connector
5	94260301	Socket 16 Pin
6	75722201	Transistor NPN
7	50241001	Diode Silicon
8	50254500	IC Rec2
9	92496227	Cap 100V 20% .01UF
10	24504353	Cap 10V 20% 33UF
11	75808521	Cap 100V 10% 470
12	94360467	Res 1/4W 1% 49.1K
13	94360264	Res 1/4W 1% 464
14	94360400	Res 1/4W 1% 10.0K
15	94360368	Res 1/4W 1% 5.11K
16	94360328	Res 1/4W 1% 1.96K
17	94360377	Res 1/4W 1% 6.34K
18	83452207	Switch-10 Position
19	83452205	Switch-8 Position
20	83452202	Switch-5 Position
21	83452201	Switch-4 Position
22	75300006	Switch Cover 10-Sect
23	75300004	Switch Cover 8-Sect
24	75300001	Switch Cover 5-Sect
25	75300000	Switch Cover 4-Sect
26	76379303	Header-Straight 5 PI
27	75808403	Conn Wafer 3-Pin
28	75798902	Plate-Winchester Fac
30	75771101	Pin Contact
31	75771201	XX
32	51718600	IC TTL Adnr MV-A
33	51768200	IC Dual
34	92498021	Terminal, Swaged
36	94360500	Res 1/4W 1% 100K
37	95125309	Loctite
38	93728082	Screw Fil Hd Mach 4-
39	94335900	Pad-Transistor Mtg
40	75808406	Conn Molex F-M-F
41	76379300	Header-Straight 2 PI
42	83433002	Shunt Assembly

Circuit Board Assembly

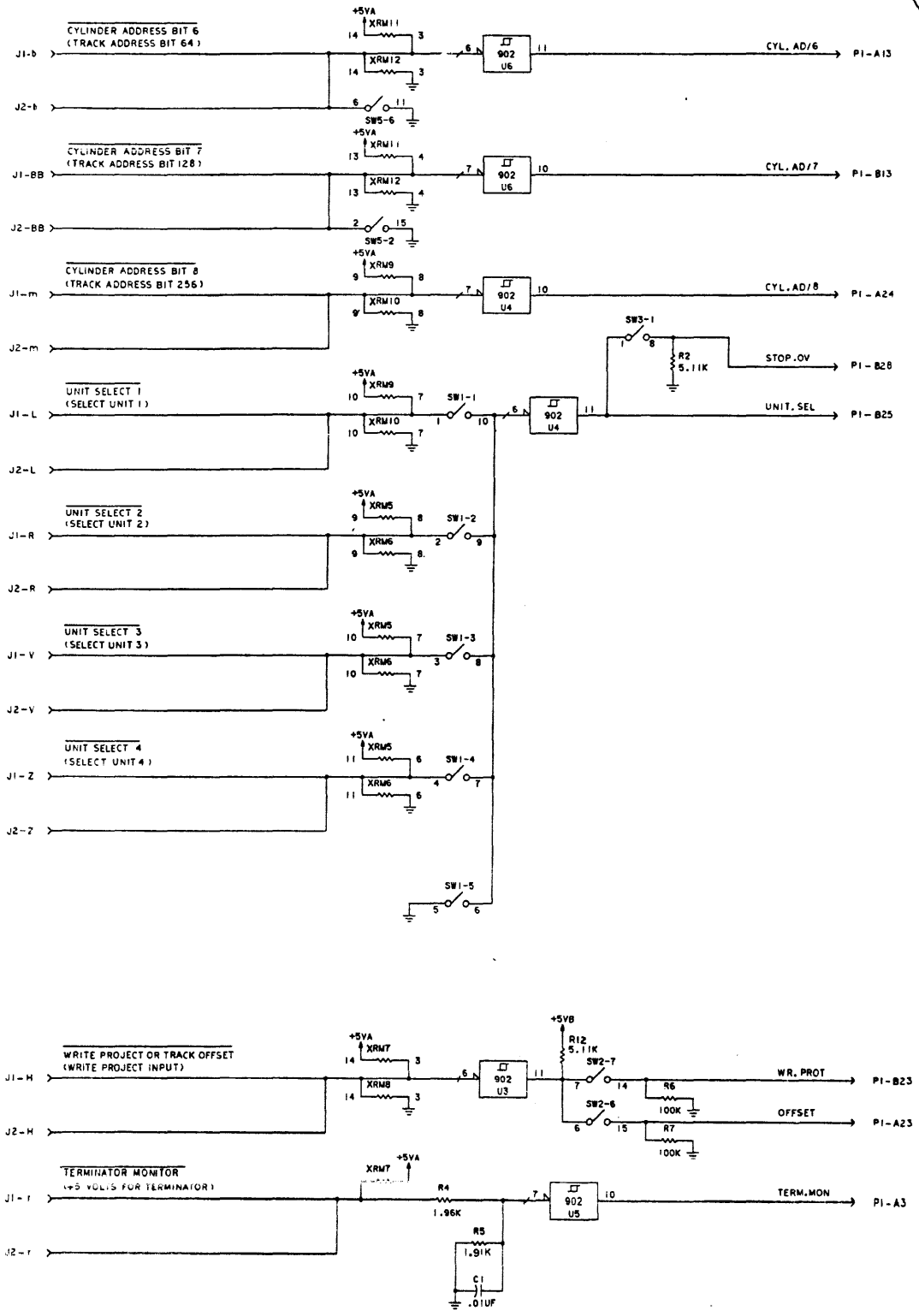
I/O CARD



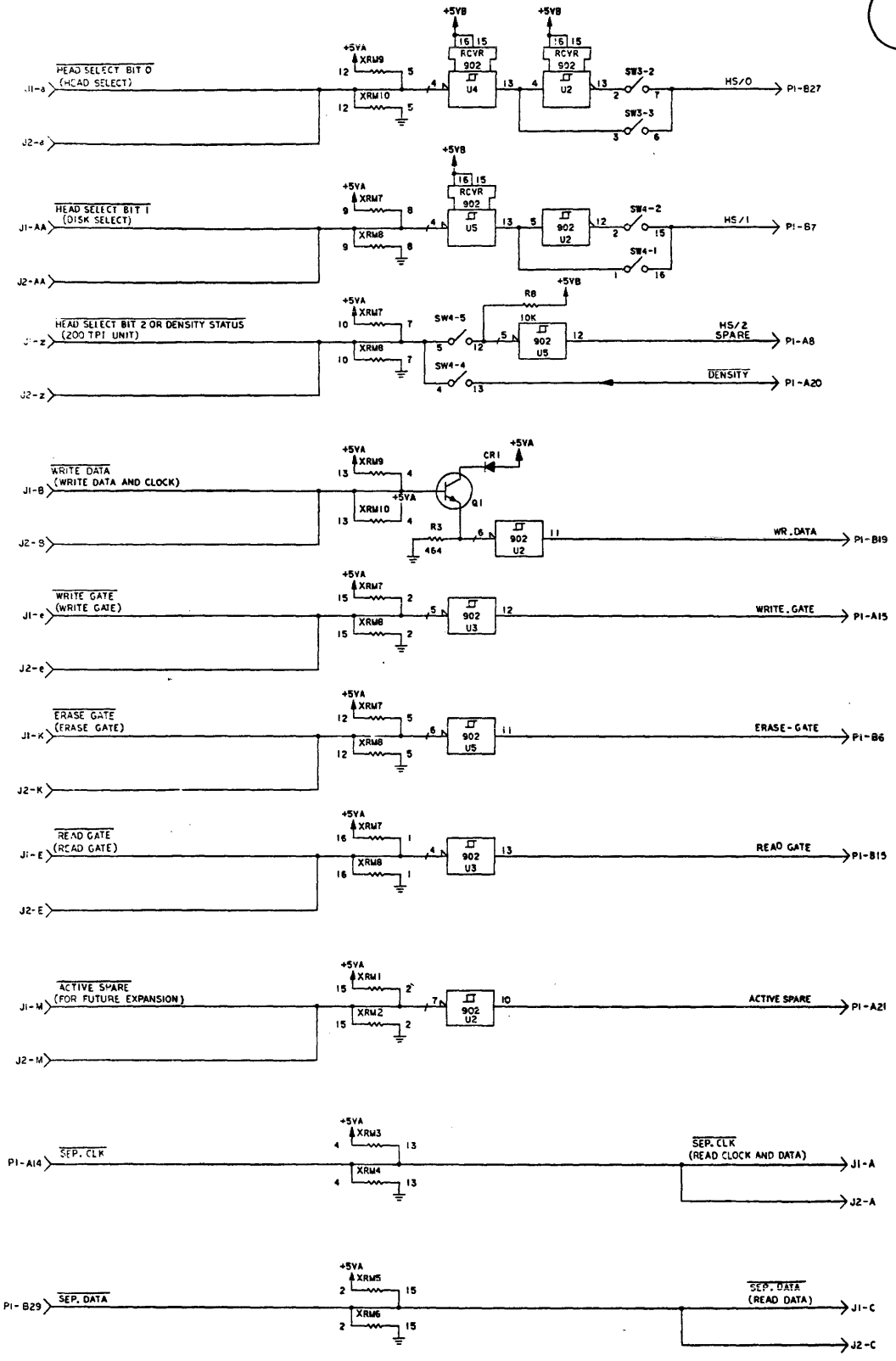
Interconnection Diagram


CYLINDER ADDRESS STROBE (STROBE)
RETURN TO ZERO SEEK (RESTORE)
CYLINDER ADDRESS BIT 0 (TRACK ADDRESS BIT 1)
CYLINDER ADDRESS BIT 1 (TRACK ADDRESS BIT 2)
CYLINDER ADDRESS BIT 2 (TRACK ADDRESS BIT 4)
CYLINDER ADDRESS BIT 3 (TRACK ADDRESS BIT 8)
CYLINDER ADDRESS BIT 4 (TRACK ADDRESS BIT 16)
CYLINDER ADDRESS BIT 5 (TRACK ADDRESS BIT 32)
LOGIC GROUND
+5VA
+5VB
RCVR 902
SW5-8
SW5-7
SW5-3
SW5-4
SW5-5
SW5-1
SW2-9
SW2-10
5.11K
470PF
6.34K
RTZ.STR
CYL.STR
RTZS
CYL. AD/0
CYL.AD/1
CYL. AD/2
CYL. AD/3
CYL. AD/4
CYL. AD/5
(ALL GROUNDED)
P1-A10
P1-B14
P1-B26
P1-A16
P1-B16
P1-A17
P1-B17
P1-A12
P1-B12
P1-A4,A5,A6,A7
P1-A25,A26,A27,A28
P1-B1,B31

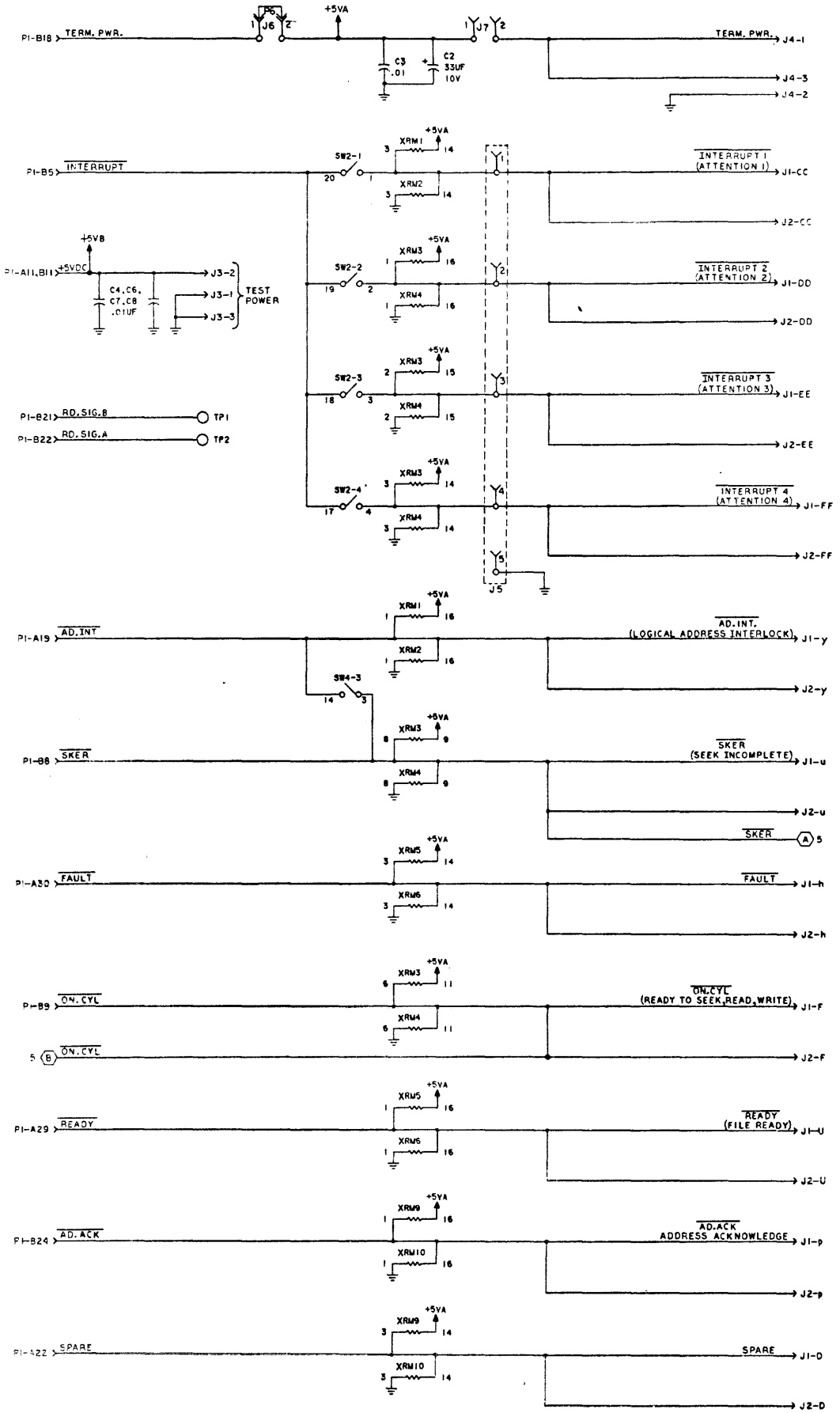
Schematic


CYLINDER ADDRESS BIT 6
(TRACK ADDRESS BIT 64)
J1-b
J2-b
CYL. AD/6
P1-A13
CYLINDER ADDRESS BIT 7
(TRACK ADDRESS BIT 128)
J1-BB
J2-BB
CYL. AD/7
P1-B13
CYLINDER ADDRESS BIT 8
(TRACK ADDRESS BIT 256)
J1-m
J2-m
CYL. AD/8
P1-A24
UNIT SELECT 1
(SELECT UNIT 1)
J1-L
J2-L
UNIT. SEL
P1-B25
STOP.OV
P1-B28
UNIT SELECT 2
(SELECT UNIT 2)
J1-R
J2-R
UNIT SELECT 3
(SELECT UNIT 3)
J1-V
J2-V
UNIT SELECT 4
(SELECT UNIT 4)
J1-Z
J2-Z
WRITE PROJECT OR TRACK OFFSET
(WRITE PROJECT INPUT)
J1-H
J2-H
WR. PROT
P1-B23
OFFSET
P1-A23
TERMINATOR MONITOR
(+5 VOLTS FOR TERMINATOR)
J1-r
J2-r
TERM.MON
P1-A3
+5VA
+5VB
902
U6
U4
U3
U5
XRM1
XRM2
XRM9
XRM10
XRM5
XRM6
XRM7
XRM8
SW1-1
SW1-2
SW1-3
SW1-4
SW1-5
SW2-7
SW2-6
SW3-1
SW5-6
SW5-2
R2
5.11K
R12
5.11K
R6
100K
R7
100K
R4
1.96K
R5
1.91K
C1
.01UF

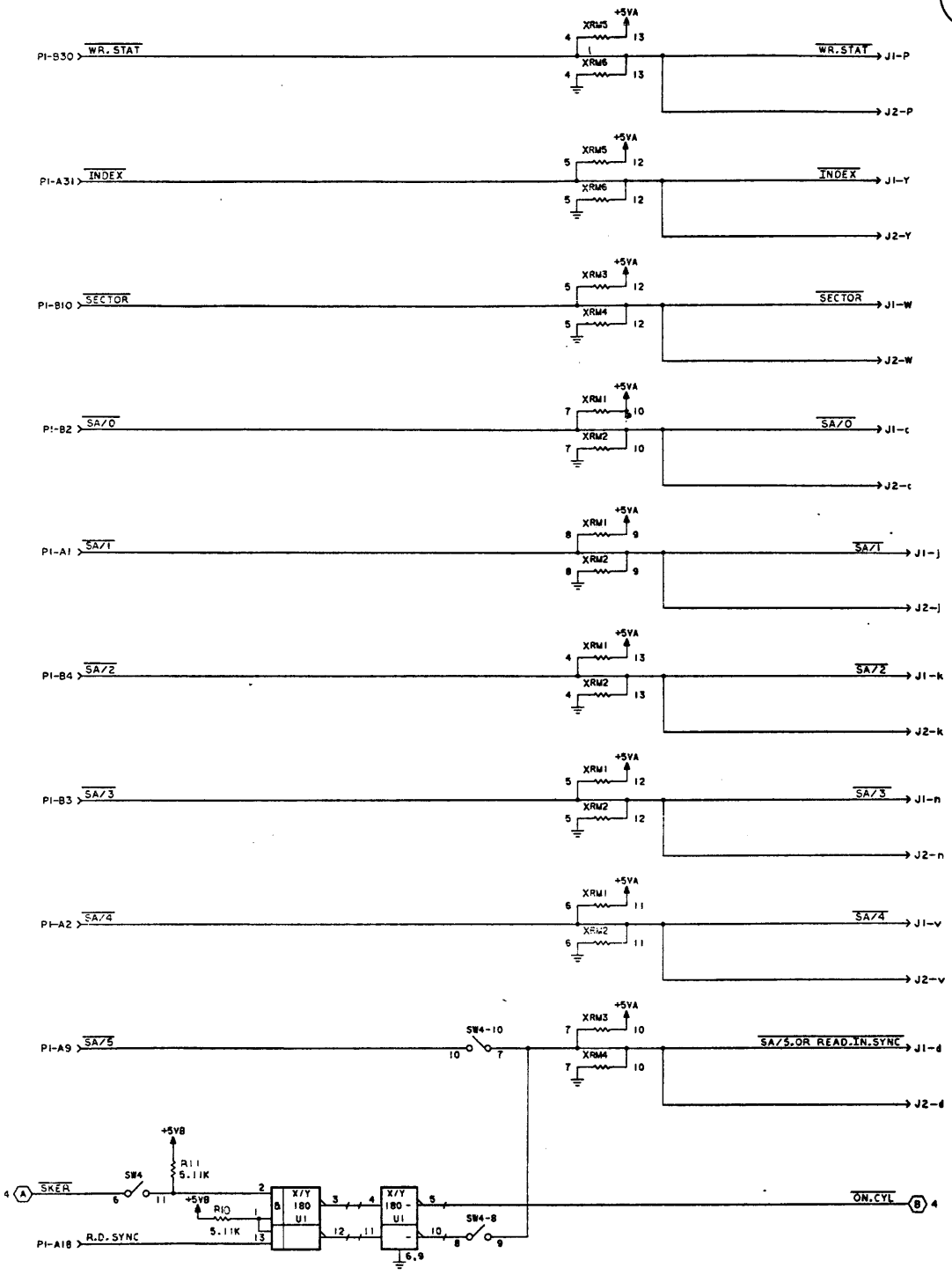
Schematic


HEAD SELECT BIT 0 (HEAD SELECT)
J1-A
J2-A
HS/0
P1-B27
HEAD SELECT BIT 1 (DISK SELECT)
J1-AA
J2-AA
HS/1
P1-B7
HEAD SELECT BIT 2 OR DENSITY STATUS (200 TPI UNIT)
J1-Z
J2-Z
HS/2 SPARE
P1-A8
DENSITY
P1-A20
WRITE DATA (WRITE DATA AND CLOCK)
J1-B
J2-B
WR.DATA
P1-B19
WRITE GATE (WRITE GATE)
J1-C
J2-C
WRITE.GATE
P1-A15
ERASE GATE (ERASE GATE)
J1-K
J2-K
ERASE-GATE
P1-B6
READ GATE (READ GATE)
J1-E
J2-E
READ GATE
P1-B15
ACTIVE SPARE (FOR FUTURE EXPANSION)
J1-M
J2-M
ACTIVE SPARE
P1-A21
SEP. CLK
P1-A14
SEP. CLK (READ CLOCK AND DATA)
J1-A
J2-A
SEP. DATA
P1-B29
SEP. DATA (READ DATA)
J1-C
J2-C
+5VA
+5VB
RCVR 902
902
XRM1
XRM2
XRM3
XRM4
XRM5
XRM6
XRM7
XRM8
XRM9
XRM10
U2
U3
U4
U5
SW3-2
SW3-3
SW4-1
SW4-2
SW4-4
SW4-5
R3
R8
10K
464
CR1
Q1

Schematic


P1-B18 TERM. PWR.
P6
J6
+5VA
J7
C3 .01
C2 33UF 10V
TERM. PWR. J4-1
J4-3
J4-2
P1-B5 INTERRUPT
SW2-1
XRM1
XRM2
INTERRUPT 1 (ATTENTION 1) J1-CC
J2-CC
+5VB
P1-A11,B11 +5VDC
C4,C6, C7,C8 .01UF
J3-2
J3-1
J3-3
TEST POWER
SW2-2
INTERRUPT 2 (ATTENTION 2) J1-DD
J2-DD
P1-B21 RD.SIG.B
P1-B22 RD.SIG.A
TP1
TP2
SW2-3
INTERRUPT 3 (ATTENTION 3) J1-EE
J2-EE
SW2-4
INTERRUPT 4 (ATTENTION 4) J1-FF
J2-FF
J5
P1-A19 AD.INT
XRM3
XRM4
AD.INT. (LOGICAL ADDRESS INTERLOCK) J1-y
J2-y
SW4-3
P1-B8 SKER
SKER (SEEK INCOMPLETE) J1-u
J2-u
SKER A 5
P1-A30 FAULT
XRM5
XRM6
FAULT J1-h
J2-h
P1-B9 ON.CYL
ON.CYL (READY TO SEEK,READ,WRITE) J1-F
5 B ON.CYL
J2-F
P1-A29 READY
READY (FILE READY) J1-U
J2-U
P1-B24 AD.ACK
XRM9
XRM10
AD.ACK ADDRESS ACKNOWLEDGE J1-p
J2-p
P1-A22 SPARE
SPARE J1-D
J2-D

Schematic


P1-B30
WR. STAT
WR.STAT
J1-P
J2-P
P1-A31
INDEX
INDEX
J1-Y
J2-Y
P1-B10
SECTOR
SECTOR
J1-W
J2-W
P1-B2
SA/0
SA/0
J1-c
J2-c
P1-A1
SA/1
SA/1
J1-j
J2-j
P1-B4
SA/2
SA/2
J1-k
J2-k
P1-B3
SA/3
SA/3
J1-n
J2-n
P1-A2
SA/4
SA/4
J1-v
J2-v
P1-A9
SA/5
SW4-10
SA/5.OR READ.IN.SYNC
J1-d
J2-d
+5VA
XRM1
XRM2
XRM3
XRM4
XRM5
XRM6
+5V8
R11
5.11K
R10
SW4
SKEW
X/Y 180 U1
X/Y 180 - U1
SW4-8
ON.CYL
P1-A18
R.D. SYNC

Schematic

A	75886535-6 THRU 75886539-8

REV	AUTHORITY	DATE YR	DATE MO	DATE DAY	SIGNATURE	DWG SHT 1	DWG SHT 2	DWG SHT 3	DWG SHT 4	P/L TAB 36	P/L TAB 37	P/L TAB 38	P/L TAB 39
A	ISSUED	77	APR	7	T. Crandell	A	A	A	A	A	A	–	–

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
LOC OKLA. CITY, OKLA. U.S.A.

MADE BY V. LAFFOON 7 APRIL 1977
APPROVED L.O. Bowling 4/7/77
REVISION STATUS FOR EACH PAGE, SHEET OR ASSEMBLY IS SHOWN BY LAST ENTRY IN THE CORRESPONDING NUMBERED COLUMN

TITLE SPECIAL OPTION 68688-1

P.C.	REVISION STATUS FOR	SHEET	REV
A	75886535 THRU 75886539	1/1	A

DISTR A2-DR1,5

REFERENCE SPECIFICATION NUMBER		
		900
		901
		902
		903

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP
X	FOR DOC STATUS SEE REV STATUS SHT					

SPECIAL OPTION 68688-1
FIRST USED ON BR7K6C-08

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES		
3 PLACE	2 PLACE	ANGLES
±	±	±

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
OKLAHOMA CITY, OKLAHOMA

TITLE: SPECIAL OPTION 68688-1

DO NOT SCALE DRAWING

MATERIAL

FINISH

DWN	V. LAFFOON	4/4/7
CHKD	V. LAFFOON	4/4/7
ENGR		
MFG		
APPR		

SIZE	DRAWING NUMBER	CD	REV
A	75886535	6	A

SCALE

SHEET 1 OF 4

DISTR

MP521—1/77

NOTES:

1. DESCRIPTION: THIS SPO DELETES A 16 BIT COUNTER, ON THE DATA RECOVERY BOARD, SO READ DATA IS AVAILABLE WITH READ GATE.

2. PARTS: PARTS SHALL BE PACKAGED IN KIT FORM AND IDENTIFIED AS 75886536-4.

3. INSTALLATION:

   A. POWER DOWN THE UNIT BY OPENING CB1.
   B. REMOVE THE DATA RECOVERY BOARD FROM THE CARD CAGE.
   C. ON THE DATA RECOVERY BOARD, CUT THE ETCH RUN BETWEEN U5-9 AND U6-6 ON THE COMPONENT SIDE OF THE BOARD (REFER TO FIGURE 1).
   D. ADD A 30 AWG JUMPER WIRE (SUPPLIED IN THE KIT) FROM U5-9 TO U2-2 ON THE COMPONENT SIDE OF THE BOARD (REFER TO FIGURE 1).
   E. REIDENTIFY THE DATA RECOVERY BOARD AS 75886537 REV. "A".

4. CHECKOUT:

   A. WITH THE UNIT POWERED DOWN, PLACE THE MODIFIED DATA RECOVERY BOARD IN THE UNIT ON AN EXTENDER BOARD. CONNECT A FIELD TESTER TO THE UNIT.
   B. POWER THE DRIVE UP AND ISSUE A LOAD COMMAND. ALLOW THE DRIVE TO LOAD.
   C. PERFORM A READ MODE AND MONITOR B16 (READ ENABLE) OF THE DATA RECOVERY BOARD ON CHANNEL "A" OF AN OSCILLOSCOPE AND TRIGGER POSITIVE INTERNALLY ON THE CHANNEL "A" ONLY.
   D. CONNECT CHANNEL "B" FIRST TO B3 (SEP CLK) AND THEN TO B4 (SEP DATA) OF THE DATA RECOVERY BOARD AND VERIFY THAT BOTH CLOCK AND DATA ARE PRESENT AS SOON AS READ ENABLE GOES HIGH (TRUE).
   E. STOP THE TESTER AND UNLOAD THE DRIVE. POWER THE UNIT DOWN BY OPENING CB1.
   F. REMOVE THE EXTENDER AND REINSTALL THE DATA RECOVERY BOARD IN THE CARD CAGE.
   G. RETURN THE DRIVE TO ITS ORIGINAL STATE SKINS, CABLING, ETC. REMOVE THE TESTER AND RETURN THE DRIVE TO THE SYSTEM.

5. LOG THE SPO NUMBER ON THE UNIT FEATURE LIST.

6. SPARE PARTS: WHEN ORDERING A REPLACEMENT FOR THE DATA RECOVERY BOARD WITH SPO 68688-1 INSTALLED, ORDER PART NUMBER 75886537.

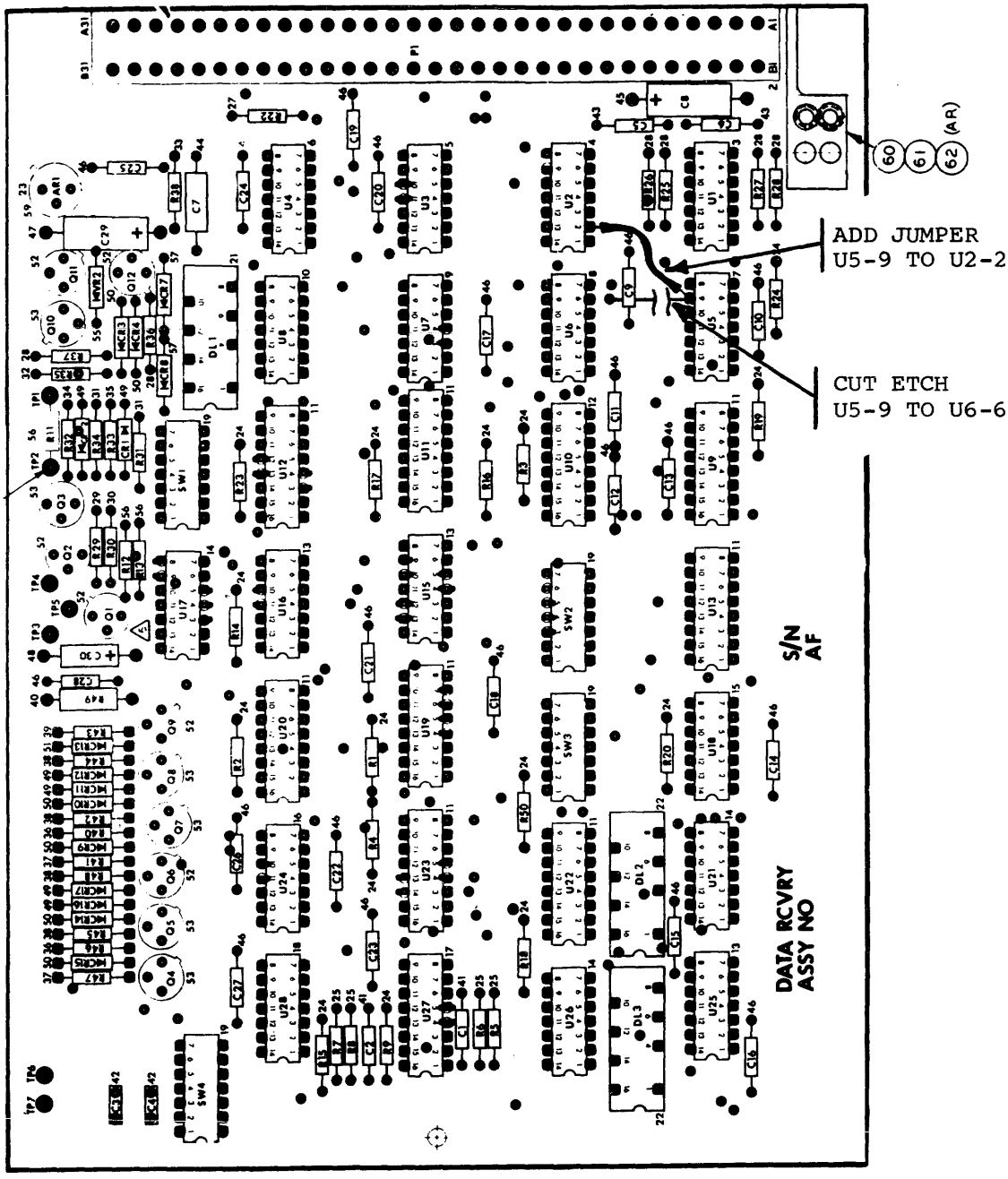
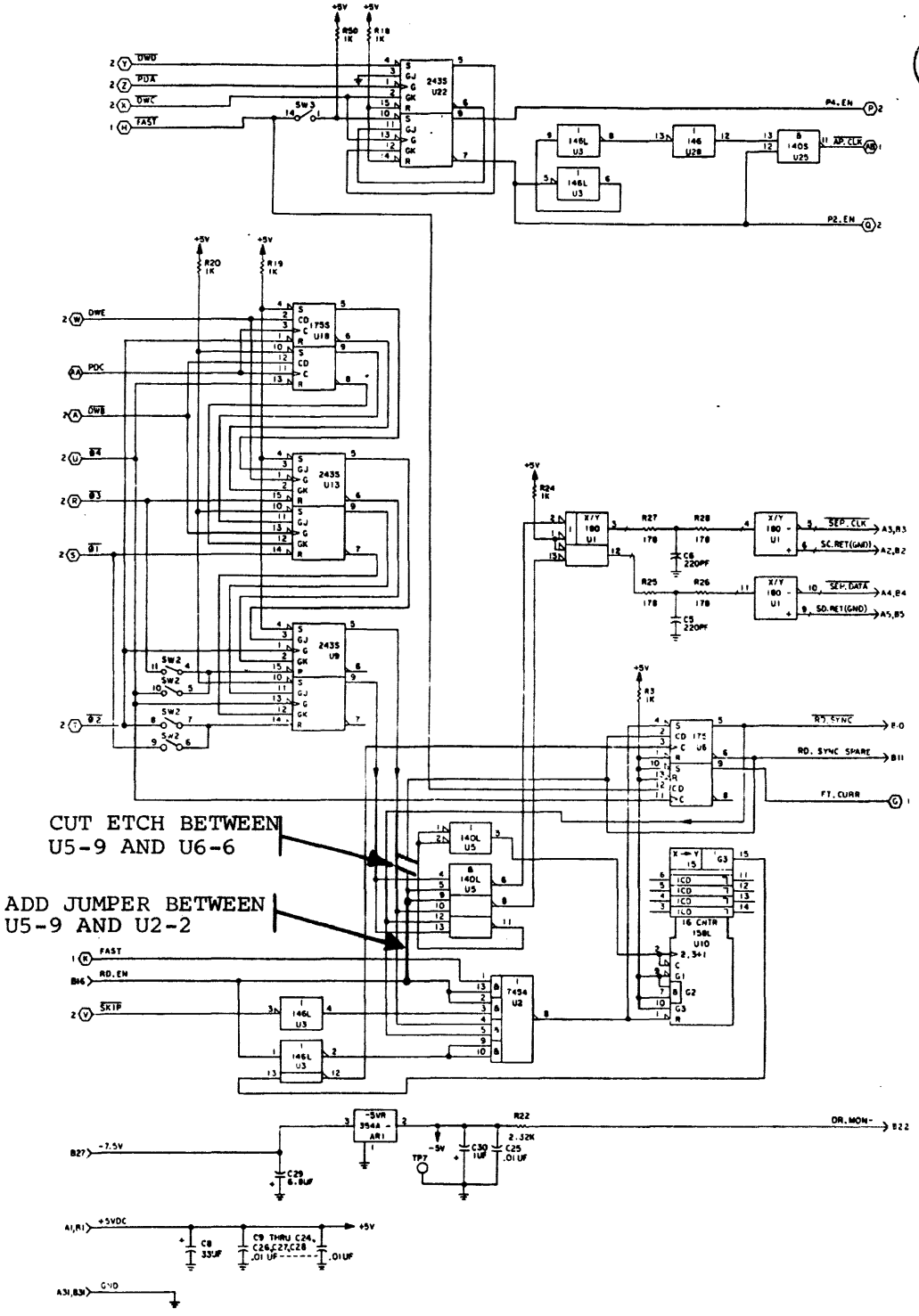


FIGURE 1- DATA RECOVERY BOARD

MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	SIZE	DRAWING NUMBER	CD	SH	REV
	A	75886535	6	3	A



CHANGES TO SCHEMATIC- DATA RECOVERY BOARD

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75886535	6	4F	A

04/06/77	A	75886536-4	1/ 1	A

*	ITEM NO.	PC	IDENTIFICATION NUMBER	SC	DRAWING TITLE	ASSEMBLY / QUANTITY 001	002	003	004	005	006	007	008	UM
*	1	1A	94243731-0	P	WIRE AWG 30 BLUE	12								IN
*	2	0A	75886535-6	U	SPECIAL OPT 68688-1	1								EA

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION USA
LOC: OKLAHOMA CITY, OKLAHOMA

UM = UNIT OF MEASURE
EA = EACH IN = INCHES
CM = CENTIMETER OZ = OUNCE
G = GRAMS

* ITEMS REVISED SINCE PREVIOUS ISSUE

TITLE SPO 68688-1 KIT

SIZE	P.L. NO.	SHEET	REV.
A	75886536-4	1/ 1	A

DISTR

DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

MP528C-9/75

04/06/77	A	75886537-2	1/ 1	A

*	ITEM NO.	PC	IDENTIFICATION NUMBER	SC	DRAWING TITLE	ASSEMBLY / QUANTITY 001	002	003	004	005	006	007	008	UM
*	1	1D	75297105-1	A	COMP 3D ASSY-DATA RE	1								EA
*	2	0A	75886536-4	A	SPO 68688-1 KIT	1								EA
*	3	0A	75886535-6	D	SPECIAL OPT 68688-1	REF								EA

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION USA
LOC: OKLAHOMA CITY, OKLAHOMA

UM = UNIT OF MEASURE
EA = EACH IN = INCHES
CM = CENTIMETER OZ = OUNCE
G = GRAMS

* ITEMS REVISED SINCE PREVIOUS ISSUE

TITLE: SPARE ASSY SPO 68688

SIZE	P.L. NO.	SHEET	REV.
A	75886537-2	1/ 1	A

DISTR

DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

MP528C-9/75

A	75891654-8 THRU 75891659-7

REV	AUTHORITY	DATE YR	DATE MO	DATE DAY	SIGNATURE	DWG SHT 1	2	3	4	5	6	PL 55	56	57	58	59	ASSY 55	56	57	58
A	ISSUED	77	AUG	4	T. Crandale	A	A	A	A	H	H	A	A	–	–	–	A	A	–	–
B	PL 19494	77	SEP	14	T. [illegible]	A	B	B	A	A	A	A	A	B	–	–	A	A	B	–
C	PL 19575	77	NOV	14	J. Barnett	A	C	C	A	A	A	A	A	B	C	–	A	A	B	C

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
LOC OKLA CITY, OKLA-USA

MADE BY E. Barnett 7-26-77
APPROVED J. D. Burg 8/3/77

REVISION STATUS FOR EACH PAGE, SHEET OR ASSEMBLY IS SHOWN BY LAST ENTRY IN THE CORRESPONDING NUMBERED COLUMN

TITLE SPECIAL OPTION 68697

P.C.	REVISION STATUS FOR	SHEET	REV
A	75891654-8 75891659-7	1/1	C

DISTR AZ-DR1,5

PO-OC 100.527 (2/72)

DISTR A2-S01,5

A	75891654-8	

REVISIONS

REV	AUTHORITY	DATE YR MO DAY	SIGNATURE

FOR DOCUMENT STATUS SEE REVISION STATUS SHEET

SPECIAL OPTION 68697-1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS = MILLIMETERS / INCHES
TOLERANCE OF SIZE AND FORM PER
INITIAL DESIGN
PROJECTION

MATL
TREAT.
FIN.

SCALE | CODE

DR E Barrett 7/26/77
APPD

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
LOC OKLA. CITY, OKLA. U. S. A.

TITLE
SPECIAL OPTION 68697-1

SIZE	DWG NO	SH	REV
A	75891654-8 THRU 75891659-7	1/6	A

1. DESCRIPTION:
   THIS SPO MODIFIES THE STANDARD 9427H HAWK TO FUNCTION ON A SYSTEM WHICH DOES NOT FURNISH A READ GATE COMMAND. THREE AREAS ARE AFFECTED BY THIS CHANGE AND ARE AS FOLLOWS:
   A. READ ENABLE BECOMES TRUE WITH UNIT SELECT AND READ GATE IS NO LONGER FUNCTIONAL.
   B. READING AND WRITING COMMANDS WILL NO LONGER AFFECT THE INTERRUPT STATUS OR ACTIVE INDICATOR LAMP.
   C. THE FAULT CONDITIONS ASSOCIATED WITH READING AND WRITING OFF CYLINDER ARE NO LONGER FUNCTIONAL.

2. PARTS:
   PARTS SHALL BE PACKAGED IN KIT FORM AND IDENTIFIED AS 75891655-5.

3. INSTALLATION:
   A. THOROUGHLY READ THE ENTIRE PROCEDURE BEFORE ATTEMPTING ANY MODIFICATIONS.
   B. POWER DOWN "HAWK" BY OPENING CB1.
   C. REMOVE THE CONTROL CARD FROM THE ELECTRONICS MODULE.
   D. MAKE TWO CUTS ON THE COMPONENT SIDE AS SHOWN ON THE ATTACHED DRAWING. MAKE ONE CUT ON THE SOLDER SIDE AS SHOWN ON THE ATTACHED DRAWING.
   E. ADD 30 AWG JUMPERS AS SHOWN ON THE ATTACHED DRAWING. JUMPER U7-8 TO U7-9: JUMPER U24-8 TO U24-9: JUMPER U24-7 TO U24-8.
   F. REIDENTIFY CONTROL PWA AS 75891658 REV C .

4. CHECKOUT:
   A. INSTALL THE CONTROL CARD USING AN EXTENDER CARD. ATTACH THE FIELD TESTER AND POWER THE DRIVE UP BY CLOSING CB1 AND INITIATE A LOAD.
   B. MONITOR B19 ON THE CONTROL CARD USING AN EXTENDER CARD WITH AN OSCILLOSCOPE. VERIFY THAT READ ENABLE B19 IS TRUE (LOGICALLY HIGH) WHEN THE UNIT IS SELECTED WITH THE TESTER. VERIFY UNIT SELECT IS DROPPED WHEN READ ENABLE GOES FALSE (LOGICALLY LOW).
   C. SELECT THE UNIT WITH THE TESTER AND MONITOR B19-READ ENABLE. TOGGLE THE READ/WRITE SWITCH AND VERIFY THAT READ ENABLE STAYS TRUE.
   D. MONITOR INTERRUPT - B16 WITH THE OSCILLOSCOPE, WITH "SEEK CONTINUOUS" SWITCH OFF, ISSUE AN RTZ COMMAND. THE INTERRUPT - B16 TERM SHOULD RETURN TO A LOGICAL LOW AT THE COMPLETION OF THE RTZ.
   E. WITH INTERRUPT - B16 LOW, TOGGLE THE READ/WRITE SWITCH. VERIFY THAT B16 REMAINS LOW.
   F. ISSUE AN RTZ AND VERIFY THAT ACTIVE INDICATOR LAMP FLASHES ON FOR AN INSTANT.
   G. REMOVE THE EXTENDER CARD FROM THE DEVICE.
   H. REINSTALL THE CONTROL CARD AND RETURN THE UNIT TO ITS ORIGINAL CONFIGURATION. BE SURE TO SET ALL PWA SWITCHES TO THE CUSTOMER'S SWITCH SPECIFICATION

5. LOG THE SPO NUMBER ON THE UNIT FEATURE LIST.

6. SPARE PARTS:
   WHEN ORDERING A REPLACEMENT FOR THE CONTROL BOARD WITH SPO 68697-1 INSTALLED, ORDER PART NUMBER 75891658-9.

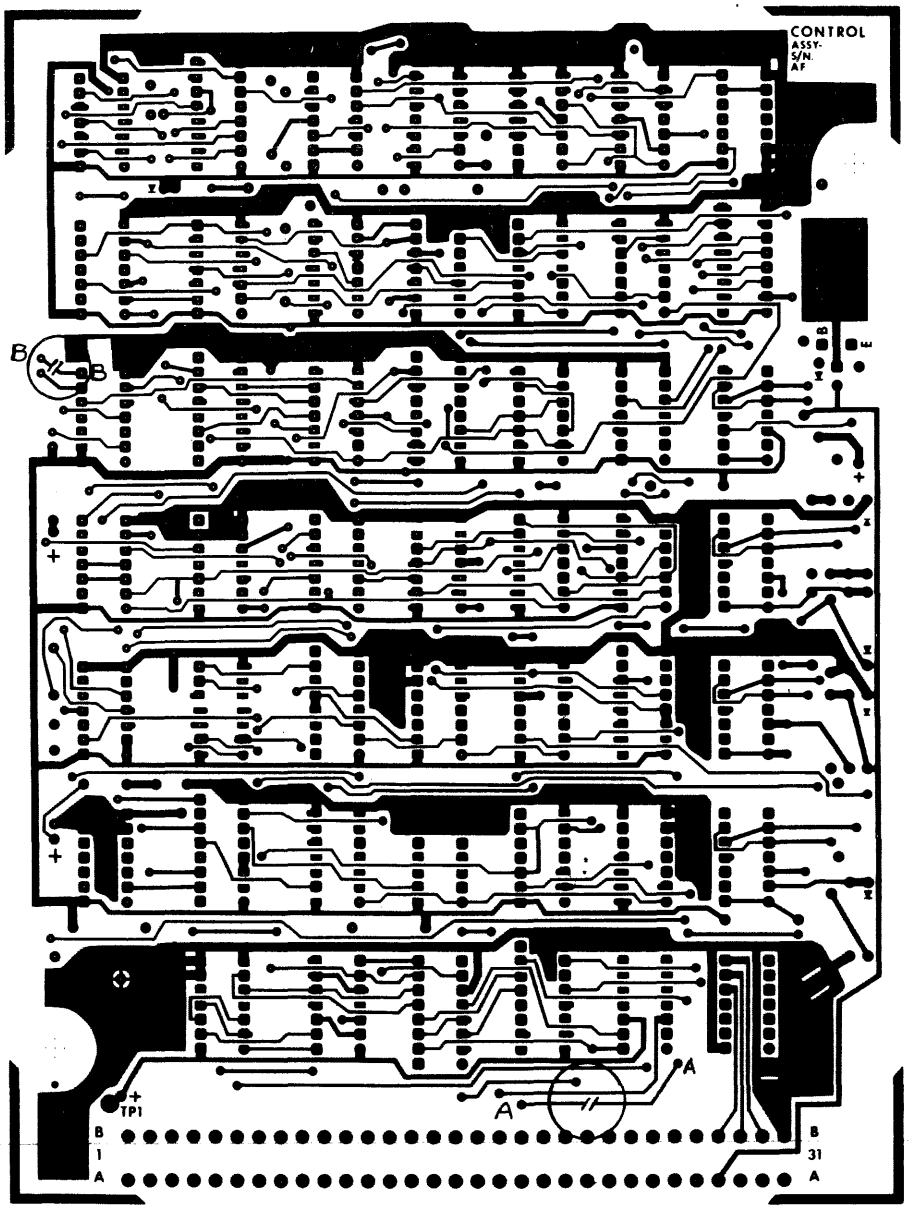


FIGURE 1

CUT RUN LIST

NO	FROM	TO
A-A	U2-15	U24-9
B-B	U43-2	U24-8

MAGNETIC PERIPHERALS INC.	SIZE	DRAWING NUMBER	CD	SH	REV
a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75891654 THRU 75891659	8 7	4	A

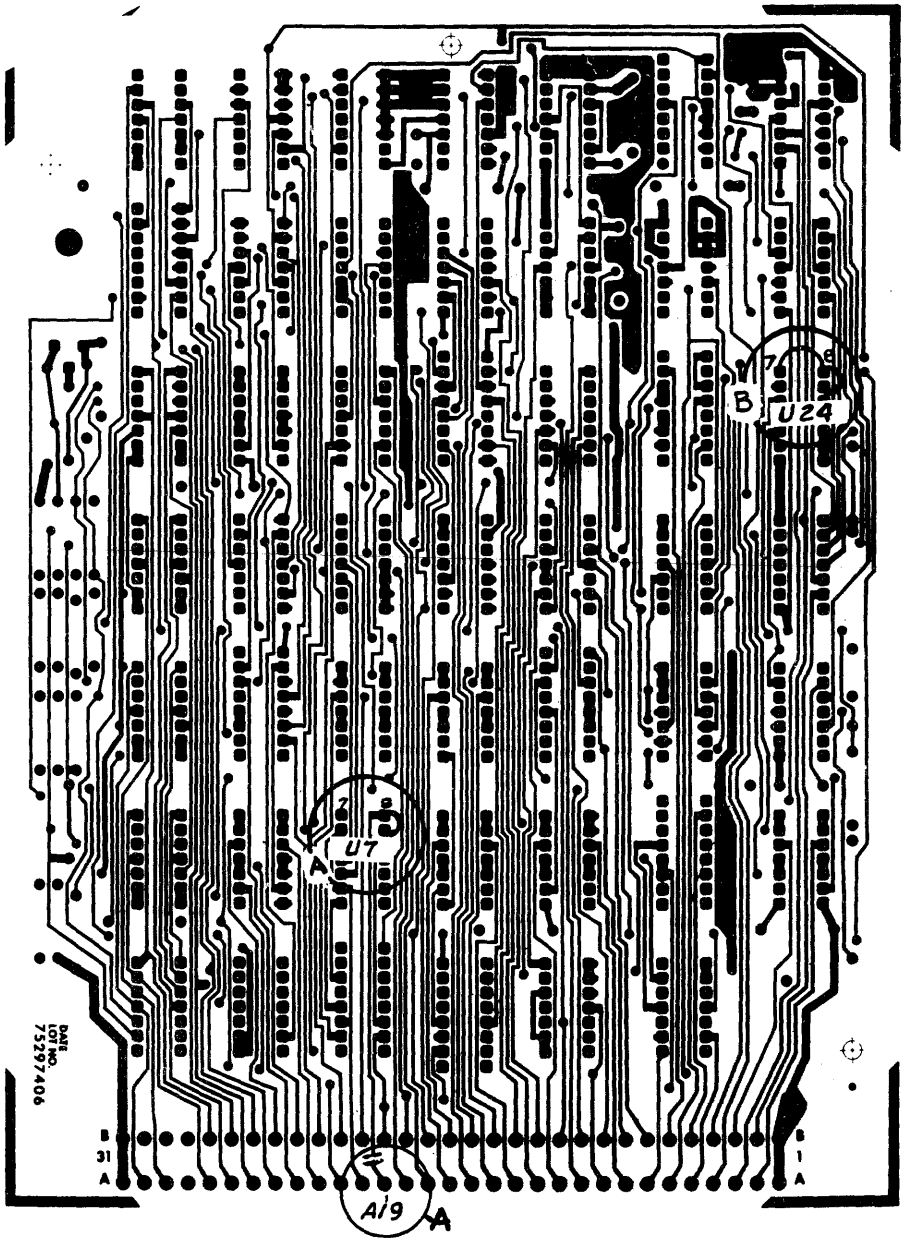


FIGURE 2

JUMPER LIST

NO	FROM	TO
A	U7-8	U7-9
B	U24-8	U24-9
B	U24-7	U24-8

CUT RUN LIST

NO	FROM	TO
A-A	A19	U7-8

	SIZE	DRAWING NUMBER		CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75891654 75891659	THRU	8 7	5	A

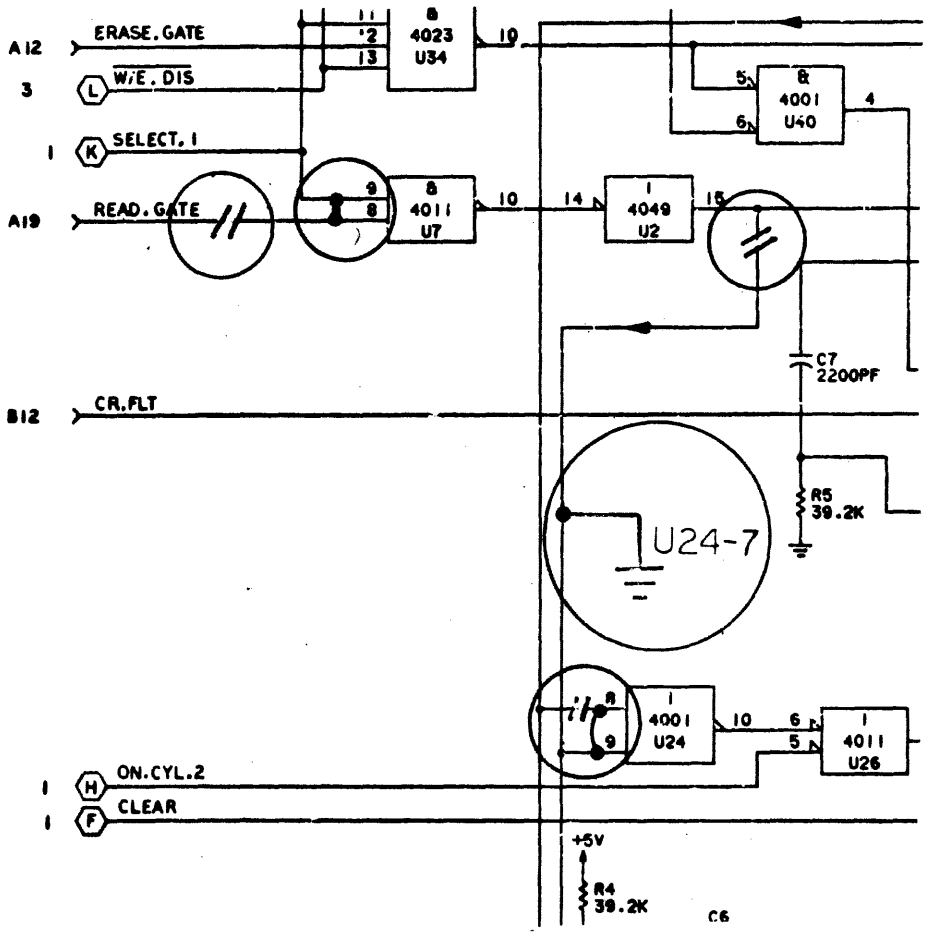


FIGURE 3
SCHEMATIC - SHT 6

MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	SIZE	DRAWING NUMBER	CD	SH	REV
	A	75891654 THRU 78591659	8 7	6F	A

03/02/77 A 75891655-5 1/ 1 A

				001	002	003	004	005	006	007	008	
1	1A	94243731-0	P WIRE AWG 30 BLUE	24								IN
2	0A	75891654-8	D SPC 68697-1	1								EA

SPECIAL OPT68697 KIT

USA

A 75891655-5 1/ 1 A

08/02/77 A 75891656-3 1/ 1 A

				001	002	003	004	005	006	007	008	
1	0D	75297507-8	A COMP BD ASSY CONTROL	1								EA
2	0A	75891655-5	A SPECIAL OPT68697 KIT	1								EA
3	0A	75891654-8	D SPO 68697-1	REF								EA

SPARE ASSY 68697

USA A 75891656-3 1/ 1 A

09/10/77 A 75891657-1 1/ 1 B

					001	002	003	004	005	006	007	008	
*	1	0D	75297508-6	A COMP BD ASSY CONTROL	1								EA
*	2	0A	75891655-5	A SPECIAL OPT68697 KIT	1								EA
*	3	0A	75891654-8	D SPO 68697-1	REF								EA

SPARE ASSY 68697

USA A 75891657-1 1/ 1 B

11/11/77 A 75891658-9 1/ 1 C

					001	002	003	004	005	006	007	008	
*	1	0D	75297509-4	A COMP BD ASSY CONTROL	1								EA
*	2	0A	75891655-5	A SPECIAL OPT68697 KIT	1								EA
*	900	0A	75891654-8	D SPO 68697-1	REF								EA

SPARE ASSY SPO 68697

USA A 75891658-9 1/ 1 C

A	75890885-9 75890892-5 THRU

REV	AUTHORITY	DATE			SIGNATURE	DWG SHT						PL							ASSY						
		YR	MO	DAY		1	2	3	4	5	6	86	87	88	89	90	91	92	86	87	88	89	90	91	92
A	ISSUED	77	JUL	27	J. Auberckle	A	A	A	A	A	A	A	A							A					

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
LOC OKLA CITY, OKLA - USA

MADE BY E Baizett 20 Jul 77
APPROVED

REVISION STATUS FOR EACH PAGE, SHEET OR ASSEMBLY IS SHOWN BY LAST ENTRY IN THE CORRESPONDING NUMBERED COLUMN

TITLE
SPECIAL OPTION 68698-1

P. C.	REVISION STATUS FOR	SHEET	REV
A	75890885 THRU 75890892	1/1	A

DISTR A2-S01,5

PO-OC 100.527 (2/72)

REFERENCE SPECIFICATION NUMBER		
		900
		901
		902
		903

REVISION RECORD						
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	APP

SPECIAL OPTION 68698

FIRST USED ON BR7K6A

(TABS 132, 195)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES		
3 PLACE	2 PLACE	ANGLES
±	±	±

MAGNETIC PERIPHERALS INC.
a subsidiary of CONTROL DATA CORPORATION
OKLAHOMA CITY, OKLAHOMA

TITLE: SPECIAL OPTION 68698

DO NOT SCALE DRAWING

MATERIAL

FINISH

DWN	E Barrett	22 JUL 77
CHKD	D. C. [illegible]	7/26/77
ENGR		
MFG		
APPR	[illegible]	7/25/77

SIZE	DRAWING NUMBER	CD	REV
A	75890885 THRU 75890892	9 5	A

SCALE: NONE

SHEET 1 OF 6

DISTR A2-S01,5

MP521-1/77

NOTES:

1. DESCRIPTION:

   THIS SPO SUPPLIES A KIT TO MODIFY THE 9427H "HAWK" TO IMPLEMENT A LOGIC CHANGE THAT INVERTS THE SEEK TERM TO THE ADDRESS REGISTER.

2. PARTS:

   PARTS SHALL BE PACKAGED IN KIT FORM AND IDENTIFIED AS PART NUMBER 75890886-7.

3. INSTALLATION:

   A. POWER DOWN THE UNIT BY OPENING CB-1.
   B. REMOVE UNIT TOP COVER AND ELECTRONICS COVER.
   C. REMOVE SERVO BOARD FROM CARD CAGE.
   D. CUT ETCH ON SOLDER SIDE U6-09 TO FEED THROUGH EAST. (FIG. 1)
   E. CUT ETCH ON COMPONENT SIDE TO U21-12. (FIG. 2)

   F. ADD 2 JUMPERS (30GA WIRE) ON COMPONENT SIDE U6-09 TO U10-11 AND U21-12 TO U8-13. (FIG. 3)

   G. REIDENTIFY MODIFIED SERVO BOARD AS 75890887 REV. "A"

   H. INSTALL THE MODIFIED SERVO BOARD IN ITS PROPER SLOT IN THE CARD CAGE ON AN EXTENDER CARD AND POWER UP THE UNIT.

4. CHECKOUT:

   A. ISSUE AN ALTERNATE SEEK CYL 0 TO CYL 64 WITH A FIELD TESTER OR ON LINE.

   B. CONNECT SCOPE CHAN. 1/SYNC TO B-18 (CYL. STR)
   CONNECT SCOPE CHAN. 2 TO U15-08 (AD/6)

   C. VERIFY U15-08 CHANGES STATE AFTER THE RISING EDGE AND BEFORE THE FALLING EDGE OF B-18.

   D. POWER DOWN THE UNIT, REMOVE THE EXTENDER CARD AND INSTALL THE MODIFIED SERVO BOARD IN ITS PROPER SLOT.

5. INSTALL COVERS FROM STEP B. UNIT IS READY FOR NORMAL OPERATION.

6. LOG S PO NUMBER 68698 ON UNIT FEATURE LIST.

7. SPARE PARTS:

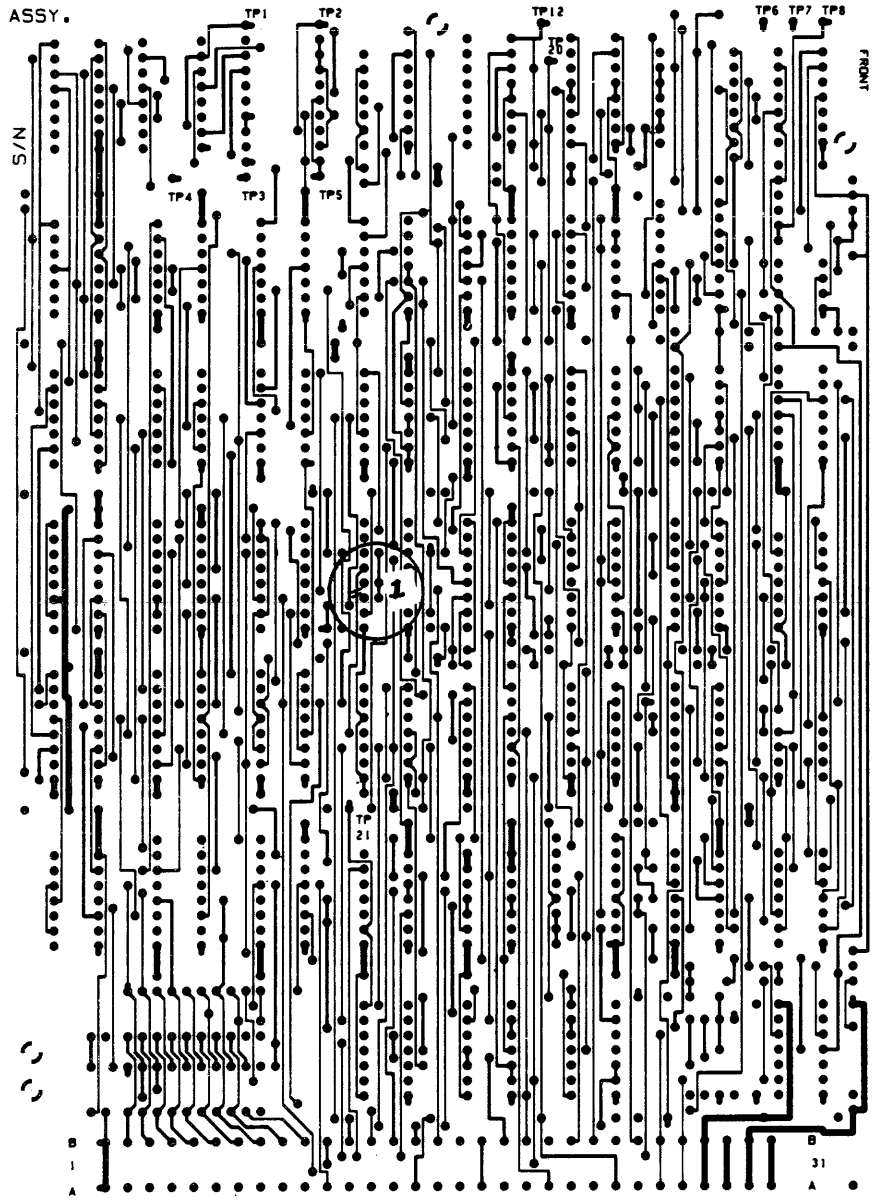
   WHEN ORDERING REPLACEMENT FOR SERVO BOARD WITH SPO 68698-1 INSTALLED, ORDER PART NUMBER 75890887-5.

8. PWB TEST (MANUFACTURING USE ONLY)

   VERIFY OUTPUTS OF U5, U6 AND U15-8 CHANGE STATE OR RISING EDGE OF B-18.

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75890885 THRU 75890892	9 5	2	A

NORTH



SOUTH

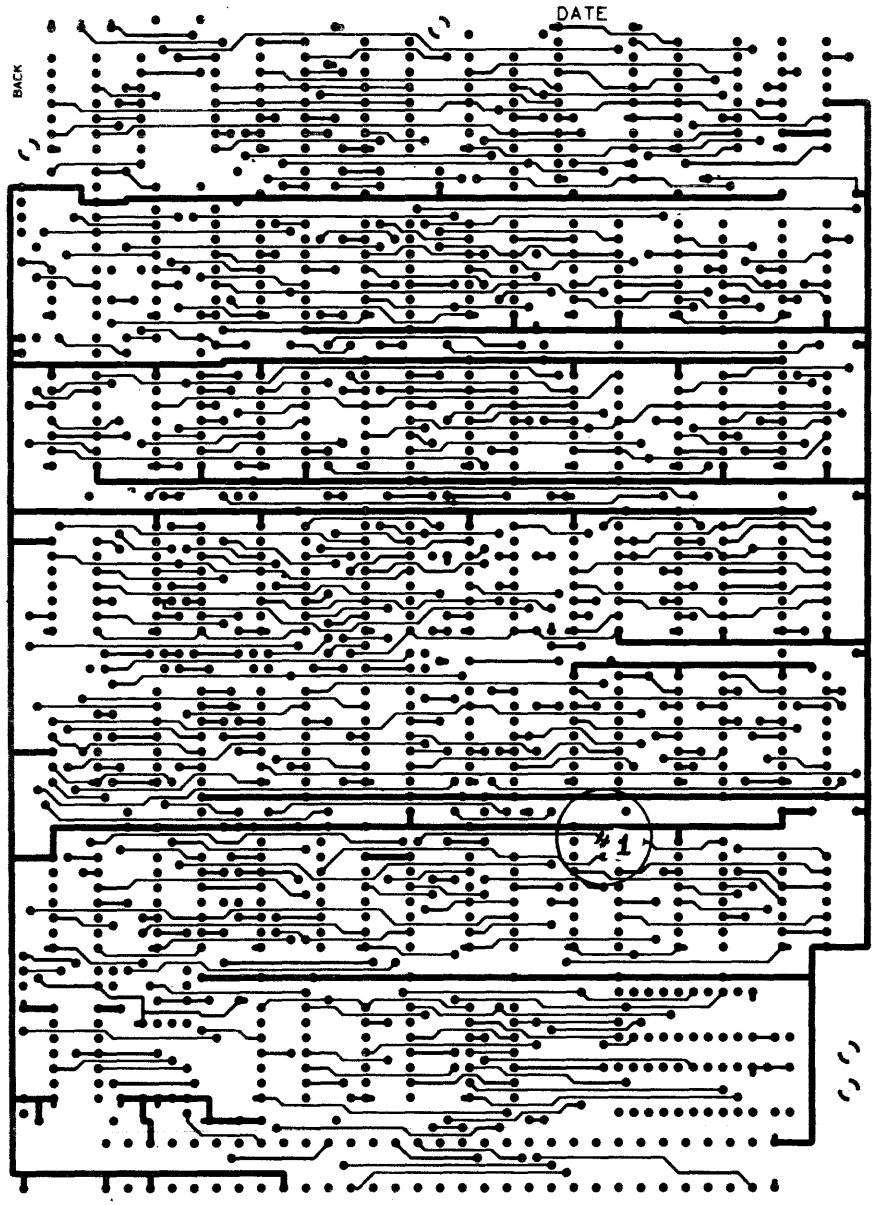
FIGURE 2 - COMPONENT SIDE

CUT RUN LIST

NO	FROM	TO
1	U21-12	SEEK ⟨A⟩ 3F1

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75890885 THRU 75890892	9 5	3	A

NORTH



WEST

EAST

SOUTH

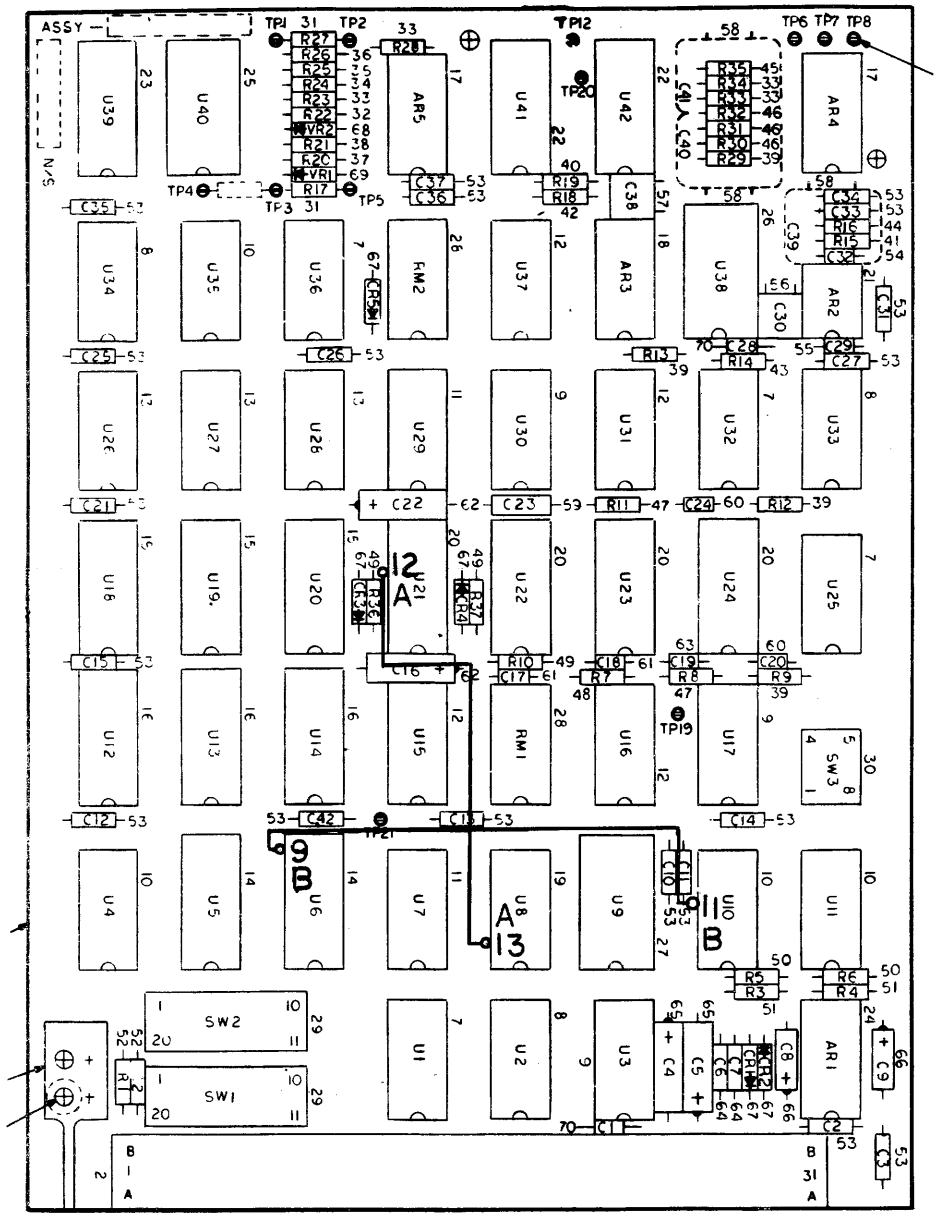
FIGURE 1 - SOLDER SIDE

CUT RUN LIST

NO	FROM	TO
1	U6-9	SEEK (A) 3F1

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75890885 THRU 75890892	9 5	4	A

MP521A-1/77



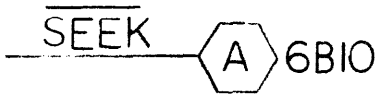
JUMPER LIST

NO	FROM	TO
AA	U21-12	U8-13
BB	U6-9	U10-11

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75890885 THRU 75890892	9 5	5	A

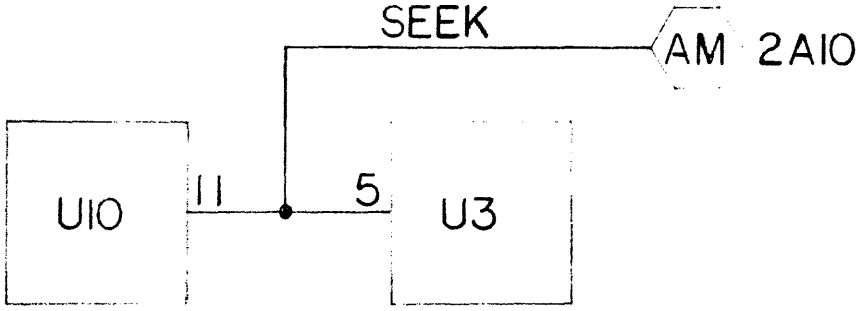
SH2 - A10

FIGURE 1



SH3 - F1

FIGURE 2



SH3 - G3

FIGURE 3

SCHEMATIC

	SIZE	DRAWING NUMBER	CD	SH	REV
MAGNETIC PERIPHERALS INC. a subsidiary of CONTROL DATA CORPORATION OKLAHOMA CITY, OKLAHOMA	A	75890885 THRU 75890892	9 5	6	A

MP521A-1/77

07/21/77 A 75890886-7 1/ 1 A

					001	002	003	004	005	006	007	008	
*	1	1A	94243731-0	P WIRE AWG 30 BLUE	12								IN
*	2	0A	75890885-9	D SPECIAL OPTION 68698	1								EA

SPO 68698-1 KIT

USA A 75890886-7 1/ 1 A

07/21/77 A 75890887-5 1/ 1 A

					001	002	003	004	005	006	007	008	
*	1	0D	77831400-5	A PWA SERVO (OEM)	1								EA
*	2	0A	75890886-7	A SPO 68698-1 KIT	1								EA
*	3	0A	75890885-9	D SPECIAL OPTION 68698	REF								EA

SPARE ASSY SPO 68698

USA A 75890887-5 1/ 1 A

VIII - A
PARTS
DATA
CONFIGURATOR

SCOPE

This attachment, when used with Section 8 of the Model 9427H Hardware Maintenance Manual, physically describes the equipment which this document package is designed to support. It may be desirable to insert this sheet in front of Section 8.

INSTRUCTIONS

The tables below consists of a horizontal listing by item number of the parts illustrated in Figures 8-2 and 8-3. The X's and 0's below the dashed (-) line determines applicability of each item. X = Part Used. 0 = Part Not Used. Refer to the parts lists in Figures 8-2 and 8-3 for part numbers and descriptions.

- TOP MECHANICAL ASSEMBLY

The following Table must be used with Figure 8-2 Top Mechanical Assembly (TMA). It identifies the TMA number (first three digits); applicable parts and assemblies and; the Module Assembly (Mod Asm) used on the TMA (last two digits). Row #1 lists items 201 through 250, Row #2 lists items 251 through 300.

ROW	**********	***PART***	***ITEM***	**NUMBER**	**********	
#	2222222222	2222222222	2222222222	2222222222	2222222222	MA
1	0000000001	1111111112	2222222223	3333333334	4444444445	OS
TMA	1234567890	1234567890	1234567890	1234567890	1234567890	DM
---	----------	----------	----------	----------	----------	--
190	0000000000	0000000000	000000000X0	0000000000	0000000000	21

ROW	**********	***PART***	***ITEM***	**NUMBER**	**********	
#	2222222222	2222222222	2222222222	2222222222	2222222223	MA
2	5555555556	6666666667	7777777778	8888888889	9999999990	OS
TMA	1234567890	1234567890	1234567890	1234567890	1234567890	DM
---	----------	----------	----------	----------	----------	--
190	0X00X00000	0000000000	0000000000	000000X000	0000000000	21

- **MODULE ASSEMBLY**

The following table must be used with Figure 8-3 Module Assembly (Mod Asm). It identifies the MOD ASM number referenced in the TMA Table and the applicable parts and assemblies.

	********** PART	******* ITEM ***** ***	NUMBER **********
	33 33 33 33 33 33 33 33 33 33	3 33 33 33 33 33 33 33 33 333	33 33 33 33 33 33 33 33 33 33
MODULE	0000 000001 11 11 11 11 12	2 22 22 22 22 33 33 33 33 334	44 44 44 44 45 55 55 55 55 56
ASSEMBLY	1 2345678901 2345678 90	1 2345678901 2345678 90	1 2345678901 2345678 90
83429721	X0 0000 X000 00 0000 0000	X 00 00 0X 00 00 00 X0 00 000	00 000X 00 0000 00 00 XX 00