IMMEDIATE SERVICE NOTICE

NO. 85

DATE: 8/25/75

ITEM(S) / PRODUCT(S):

SHUGART TECHNICAL MEMORANDA

#16, 17 and 18

The following Shugart Technical Memoranda should be attached to S.B. #46.2 as an addendum to the Shugart Manual.

WANG LABORATORIES, INC.
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SHUGART ASSOCIATES

TECHNICAL MEMO

SA900/901/902

Number 16

July 11, 1975

SUBJECT: NEW STYLE CARRIAGE ASSEMBLY

The following changes have been incorporated in the Shugart floppy disc drives. All drives and carriage assemblies now being shipped have these changes incorporated.

1. New type track zero flag to make adjustment easier. This flag is not compatible on early carriages. The carriage must have a recessed area as shown in Fig. 1 to be compatible.

2. New type load button. This button is a snap-in type for ease of replacement. This load button can ONLY be used on the black plastic load arm. See Fig. 1 for identification. On metal arms, continue using load button kit, P/N 50929.

   To remove new type button, (1) pull the load arm away from the head, (2) squeeze the tabs together with needle nose pliers, and push the button out of its mounting hole in the load arm.

   To install a new button simply snap it into the hole in the load arm.

3. New type load arm. The new load arm was implemented to incorporate the new snap-in load button and eliminate the two spring positions required if the drive was horizontally mounted with the PCB up. The new load arm is black plastic and is not field replaceable onto carriages with metal arms, see Fig. 1.

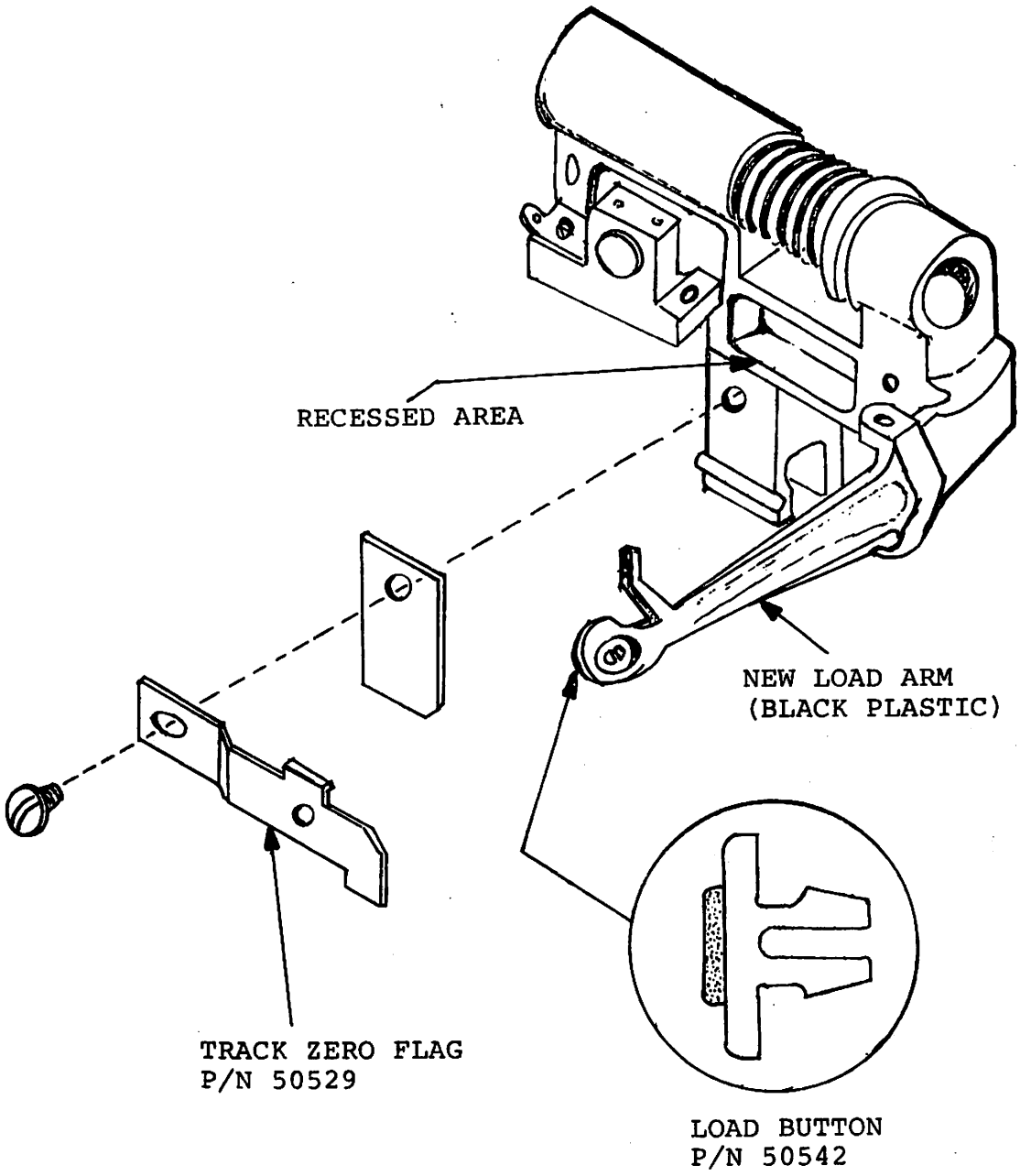

RECESSED AREA
NEW LOAD ARM
(BLACK PLASTIC)
TRACK ZERO FLAG
P/N 50529
LOAD BUTTON
P/N 50542

FIGURE 1

Load Bail Gauge, P/N 50391, has been reworked to allow for the new load arm. All gauges shipped after this date will be reworked. The gauges currently in the field should be reworked so they can be used on drives with the new load arm. Figure 2 illustrates the rework necessary. Reworked tools are usable on old style carriages.

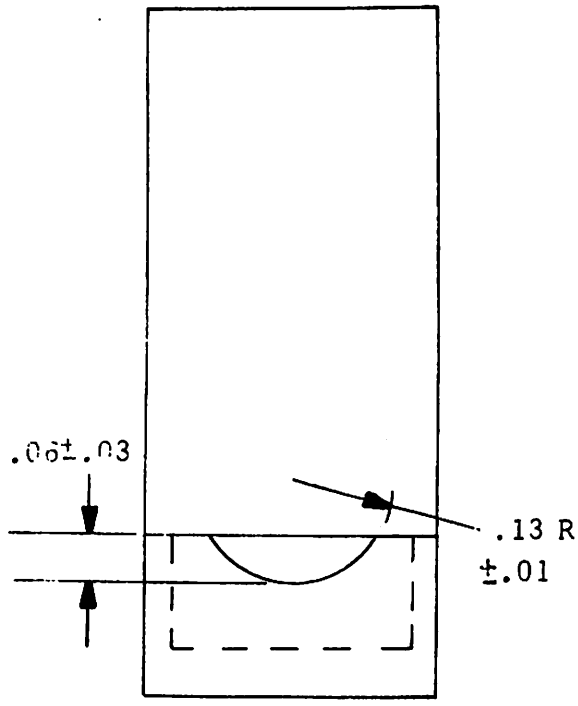
FIGURE 2

LOAD BAIL GAUGE REWORK INSTRUCTIONS

PURPOSE: Provide clearance so Load Bail Gauge can be used with plastic load arm.

FIELD REWORK: Using an Exacto Knife or equivalent, carve the end of the tool approximately as shown.

FACTORY REWORK: Machine notch in part as shown.



SHUGART ASSOCIATES

TECHNICAL MEMO

SA900/901/902

Number 17

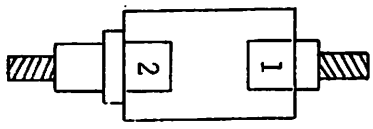
July 11, 1975

SUBJECT: NEW CARTRIDGE GUIDE ASSEMBLY

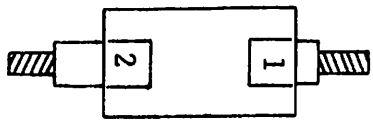
This is to announce that all SA900/901 drives, serial number 18100 and up, and all SA902's, serial number 80297 and up, will have a new Cartridge Guide assembly installed. The new Cartridge Guide is die cast aluminum, and is funtionallly equivalent to the old style.

The new Cartridge Guide requires a new adjustment tool. The new tool, P/N 50377-1, is illustrated below, along with the old one. The adjustment procedure for the Cartridge Guide remains the same and is outlined in section 3.4.9.2 of the Maintenance Manual.

Attached to this memo is an illustration of the Cartridge Guide and the parts listing. These two pages may be added to the parts catalog for future reference.



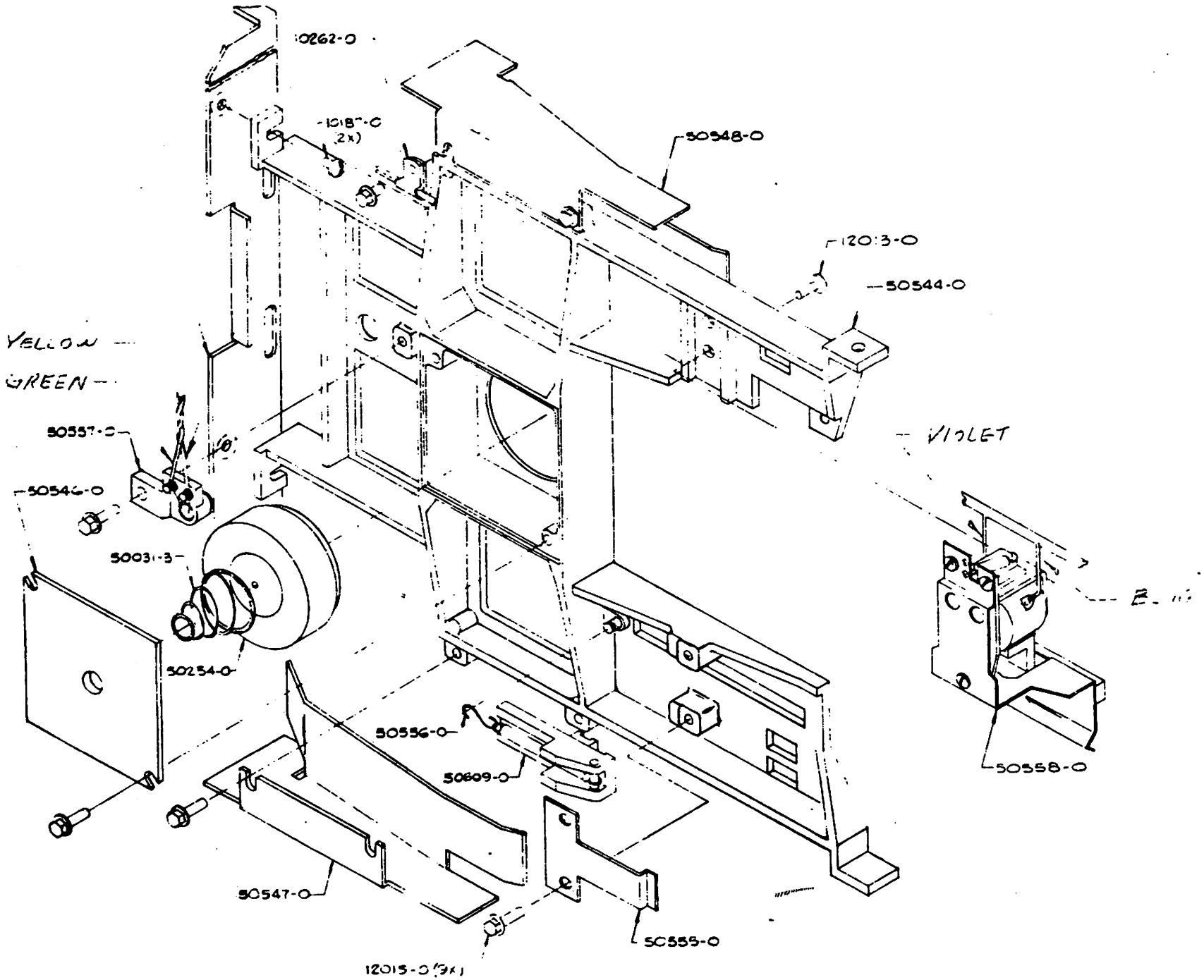
New Style



Old Style

SA900/901/902
Number 17
July 11, 1975

PART NUMBER	DESCRIPTION	QTY PER ASM
50550	Cartridge Guide Assembly (basic)	
50603	Cartridge Guide Assembly (902 right)	
50609	• Ejector Assembly	1
50553	• • Ejector	1
50146	• • Spring, Ejector	1
11800	• • Roll Pin	1
50555	• Spring, Clamp, Ejector	1
50556	• Hook, Spring	1
12015	• Screw 8-32	9
12013	• Screw 6-32	1
10262	• Clamp, Cable	1
10187	• Screw	2
50031	• Spring, Hub Clamp	1
50254	• Hub Clamp Assembly	1
50410	• Cable Asm, Index (902 right)	1
50448	• Cable Asm, Index (basic)	1
50544	• Guide	1
50546	• Plate, Hub Clamp	1
50547	• Stripper, Bottom	1
50548	• Stripper, Top	1
50557	• L.E.D. Assembly	1
50558	• Head Load Actuator Assembly	1
50579	• Latch Plate	1


10262-0
10187-0 (2x)
50548-0
12013-0
50544-0
YELLOW
GREEN
50557-0
50546-0
50031-3
50254-0
VIOLET
50556-0
50609-0
50558-0
50547-0
50555-0
12015-0 (3x)

SHUGART ASSOCIATES

TECHNICAL MEMO

SA900/901/902

Number 18

July 17, 1975

SUBJECT: NEW STYLE STEPPER MOTOR MOUNTING CLAMP

Shugart floppy disk drives above S/N 17762 shipped after 7/20/75 have a new style stepper motor mounting clamp. With this new mounting clamp, head removal and radial adjustments will be easier to make. The three cleats have been eliminated and replaced with a clamp (refer to Fig. 1). This clamp cannot be installed on drives where the stepper is held with the three cleats unless the stepper plate is replaced. This is NOT RECOMMENDED.

To remove stepper, loosen the two clamp screws and pivot the clamp off of the ridge in the stepper. To make adjustments it is only necessary to loosen the two screws slightly and turn the stepper. The rest of the adjustment is identical.

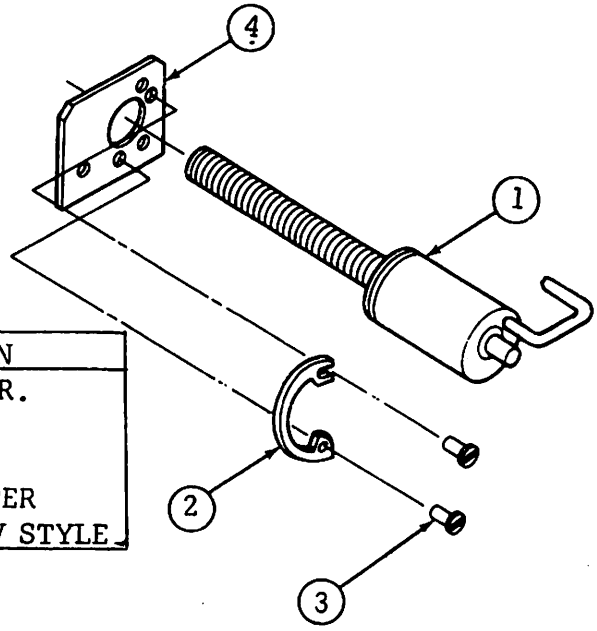


FIG.	PART NO.	DESCRIPTION
1-1	50130	STEPPER MTR.
-2	50584	CLAMP
-3	10205	SCREW
-4	50112-1	PLATE STEPPER MOTOR NEW STYLE

FIGURE 1

IMMEDIATE SERVICE NOTICE

NO. 153B	DATE: 10/16/78
CATEGORY MASS STORAGE DEVICES #13B 3107	
SUBJECT CAUTION ABOUT ECN 7128 ON 7018 BOARDS CAUTION ABOUT ECN 7180 ON 6718 BOARDS	

This ISN replaces #153A; more accurate information is contained herein.

CAUTION:

DO NOT PERFORM ECN 7128 (7018 PCB)

DO NOT PERFORM ECN 7180 (6718 PCB)

ECN 7128 changed the 7018 for the 2270/WCS disk system to allow the 7169 board to be used in the WCS-15 System (ECN 7180 does the same for the 6718 board). However, if either of these ECNs are performed on their respective boards, and if that same board is then used in a standard 2270, DAMAGE to the 2200 CPU Power Supply will result.

Instead, for 7018 E REV 3 boards, update directly to E REV 5 by implementing ECN #7522, and then to E REV 6, by implementing ECN 7917. (Ref: Technical Procedures Manual, ECN 7128). For 6718 E REV 9 boards, update directly to E REV 11 by implementing ECN 7918. (Ref: Tec. Proc. Manual, ECN 7180)

The problem here arises from the fact that ECN 7128 inadvertently specified a connection from J1 pin 11 to +5V on the 7018. However, J1 pin 11 is also connected to -12V from the CPU, via I/O cable WL# 220-0066-3.

Now, ECN 7635, subsequently issued, takes the first step to correct this overall problem. In short, ECN 7635 specifies that: "for all new 2270's and 2270A's, either the -3 I/O cable must be modified (thus making the -3 cable a -4), or a new WL# 220-0066-4 I/O cable assembly must be used". To modify a -3 cable to a -4, cut and tie back the wire on pin 11 of the cable assembly fingerboard.

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13-757
10-76-3C

Many 7018 boards from Manufacturing have already surfaced with this problem, and a significant number of these 7018's have been distributed to the field. Therefore, before installing any 7018 board in a 2270, ENSURE THAT J1 PIN 11 IS NOT CONNECTED TO +5V. If it is connected, REMOVE the wire (or etch) that makes that connection.

If a 6718 is to be used on a service call, be sure wire 11 of the cable is reconnected. Pin 11 of the cable supplies -12V to the PROMs on the 6718 and must be present. Once pin 11 of the cable is reconnected at the fingerboard, be sure that if a 7018 is installed later, J1 pin 11 on the 7018 is NOT connected to +5V.

ECN 7128 has, of course, been rescinded, and ECN 7917 specifies the corrected hardware change for the 7018. (Ref: T.P.M.)

NOTE that for WCS-15 systems, ECN 7924 creates a new board -- the 7018-2 (READ ECN 7924 in the Tech. Procedure Manual). The I/O cable that should be used with this system is WL #220-0182.

IMMEDIATE SERVICE NOTICE

NO. 101 | DATE: 1/20/76

ITEM(S) / PRODUCT(S):

MODEL 2270/WCS DISKS - DEFECTIVE DISKETTES

Several complaints of intermittent ERROR 67 and/or ERROR 72s occurring in Model 2270 Disk Drives led to the probability that a particular lot of Shugart SA 101 diskettes were defective.

Upon further evaluation of diskettes of different lot numbers, it was found that diskettes with lot #81175 could intermittently produce these errors (the lot # is located on the upper left corner of the diskette).

If the situation of a customer experiencing intermittent ERROR 67 or 72s using diskettes with lot #81175 is encountered, the diskettes should be replaced with those of another lot # and the suspect diskettes returned to the Home Office to the attention of Bill Dorazio. The part # of the diskette is 177-0063.

To amplify on the above subject in general, namely troubleshooting a system containing a flexible disk drive in which intermittent errors occur, many of the errors which cannot be traced back to the electronics can be attributed to the floppy disks and diskettes used in the 2240s and 2270s.

It is an impossible task to verify every disk distributed by Wang. However, the Quality Control Department does check a quantity of disks having the same lot number. With this procedure, it is possible that defective disks reach the field. Some of these defective disks may prove to be defective immediately upon attempted use, while others may perform error free while deteriorating rapidly causing intermittent errors with minimum use.

Another problem area that results in intermittent errors is a decrease in disk rotational speed. This could be caused by the disk binding in the cartridge, the clamp assembly and disk slipping where they contact the hub, or the drive belt slipping on the pulley in the rear of the drive.

The problems described above may cause the following indications after several weeks of experiencing intermittent errors:

1. If the disk media is defective, the cartridge could wear rings into the surface.

2. If the disk cartridge is slipping, the edges of the hole in the center could be worn (refer to memorandum below).

3. If the belt is slipping, it could have highly polished spots on it.

If ERROR 67s and/or ERROR 72s are occurring, attempt to correct the problem by exchanging some or all of the above mentioned hardware.

MEMORANDUM

TO: ALL AREA CUSTOMER ENGINEERS

FROM: HOME OFFICE ENGINEERING SUPPORT GROUP

DATE: SEPTEMBER 18, 1975

SUBJECT: MEMOREX DISK CARTRIDGE SLIPPAGE

In recent months it has been discovered that there is a problem with the Memorex media slipping on the drive hub. To resolve this problem we have purchased paper rings to be mounted on the hub opening of the disk cartridge. This ring is mounted in the following manner:

1) Place the ring on the ring mounting jig, adhesive side up.

2) Place the cartridge, label side down, on the mounting jig.

3) Apply pressure to the circumference of the hub opening of the cartridge to insure that the ring adheres to the cartridge.

The part number for the rings is WLI #615-0370. The mounting jig was specially made in a limited quantity.

IMMEDIATE SERVICE NOTICE

NO. 122 | DATE: 9/10/76

ITEM(S) / PRODUCT(S):

MASS STORAGE DEVICES #2
SHUGART MODEL 901 DISK DRIVE
SPINDLE PULLEY PROBLEMS

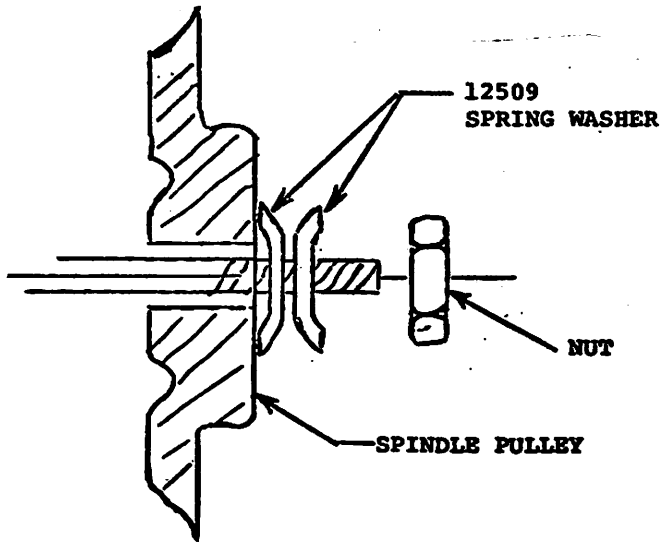
NOTE:

ISN #97 is obsolete. The information contained in this ISN supercedes that contained in ISN #97.

Problems were being experienced with the Shugart spindle pulleys loosening or falling off even after the implementation of ISN 97 (which stated that improper torque of the spindle pulley nut caused it to loosen and fall off). Shugart now suggests removing the existing washer and installing spring washers between the pulley and nut (see figure). As an added precaution, use Loctite (Cat. No. 88-31) between the nut and washer, then tighten the nut until the washers are compressed.

NOTE:

For reference refer to SB No. 46.2, page 90, items 2,3,4.



(OVER)

The use of lock washers is not recommended since they do not apply as much holding force as the spring washer arrangement.

The spring washers may be obtained domestically from Bill Dorazio and internationally from Carl Holmes. Input concerning the effectiveness of this change is desired. Address correspondence to the attention of Ken Dillon, Tewksbury, Mass.

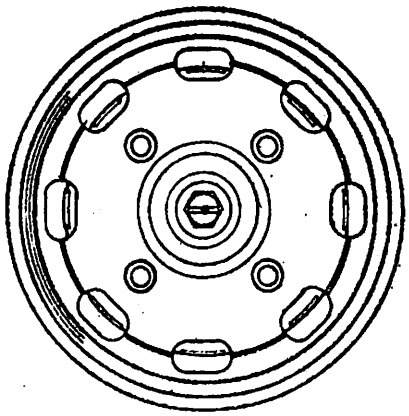
IMMEDIATE SERVICE NOTICE

NO. 129	DATE: 2/16/77
CATEGORY MASS STORAGE DEVICES #5	
SUBJECT SHUGART DISKETTE DRIVE UNITS; BROKEN HUB CLAMP ASSEMBLIES	

The Hub Clamp assembly in a Shugart Diskette drive holds the diskette at the center hole and the diskette rotates freely about this center-point.

Four versions of this assembly (item 13, page 6, S.B. #46.2) have been produced; only the last (most recent) version is not prone to breakage of the finger ring (item 16, page 96, S.B. #46.2) and/or center post (items 17/18/19, page 98, S.B. #46.2).

The versions are as follows:



FIRST VERSION - Disk drive units up to Shugart serial number 33600. Hub Clamp assembly has small rivets on the Hub Clamp. The Finger Ring is fragile.

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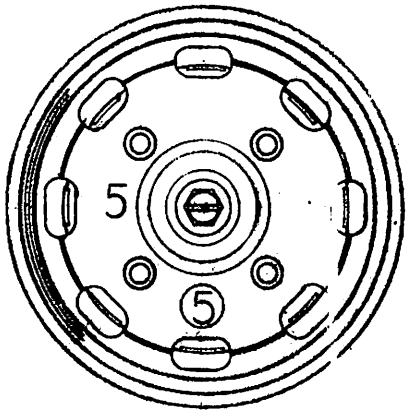
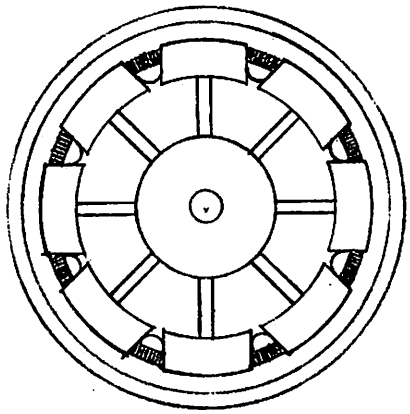


SECOND VERSION - Disk drive units with Shugart serial numbers from 33601 to 40000. Hub Clamp assembly has larger rivets on the Hub Clamp. The finger-ring is stronger, but still likely to break.



THIRD & FOURTH VERSIONS - Disk drive units with Shugart serial numbers from 40001 and up. Hub Clamp assembly has no rivets. The Finger-ring is made of a strong, light color plastic substance similar to Teflon^{R}. The *third* version has a fragile center post made from a glasslike material; the *fourth* version has the same style center post, but it is made from a stronger plastic material. The part number for this latest, durable Hub Assembly is Shugart #50254-2; WL #726-1021.

IMMEDIATE SERVICE NOTICE

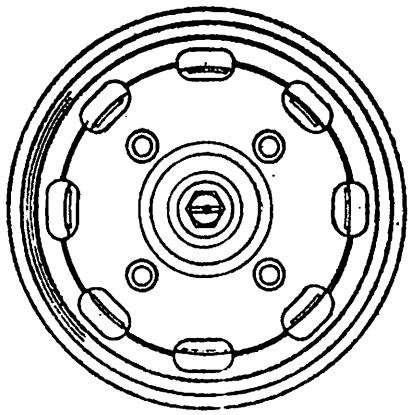
NO. 129A	DATE: 2/22/77
CATEGORY MASS STORAGE DEVICES #5	
SUBJECT SHUGART DISKETTE DRIVE UNITS; BROKEN HUB CLAMP ASSEMBLIES	

ISN #129 IS OBSOLETE, ISN 129A REPLACES ISN 129.

The Hub Clamp assembly in a Shugart Diskette drive holds the diskette at the center hole and the diskette rotates freely about this center-point.

Four versions of this assembly (item 13, page 6, S.B. #46.2) have been produced; only the last (most recent) version is not prone to breakage of the finger ring (item 16, page 96, S.B. #46.2) and/or center post (items 17/18/19, page 98, S.B. #46.2).

The versions are as follows:



FIRST VERSION - Disk drive units up to Shugart serial number 33600. Hub Clamp assembly has small rivets on the Hub Clamp. The Finger Ring is fragile.

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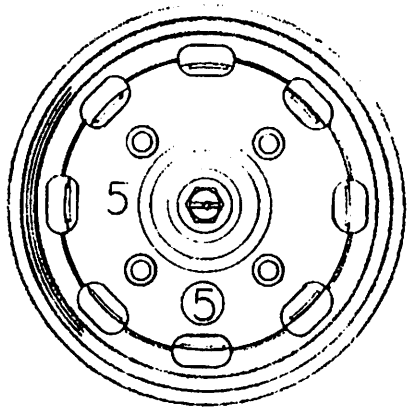
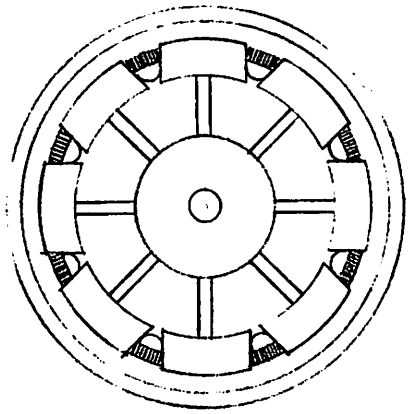


SECOND VERSION - Disk drive units with Shugart serial numbers from 33601 to 40000. Hub Clamp assembly has larger rivets on the Hub Clamp. The finger-ring is stronger, but still likely to break.



THIRD & FOURTH VERSIONS - Disk drive units with Shugart serial numbers from 40001 and up. Hub Clamp assembly has no rivets. The Finger-ring is made of a strong, light color plastic substance similar to Teflon^{R}. The *third* version has a fragile center post made from a glasslike material; the *fourth* version has the same style center post, but it is made from a stronger plastic material. The part number for this latest, durable Hub Assembly is Shugart #50254-2; WL #726-1021.

If only the latest style center post is needed, order WL #726-1065 (Shugart #50684). The center post is easily removed from the backside of the Hub Clamp assembly, using needle-nose pliers.

IMMEDIATE SERVICE NOTICE

NO. 154	DATE: 11/14/77
CATEGORY MASS STORAGE DEVICES #14	
SUBJECT 2270 TO 2270A CONVERSION	

The 2270A-1, 2270A-2, and 2270A-3 are improved versions of the Model 2270 Shugart Floppy Disk Chassis. While the 2270 accommodates only Wang formatted diskettes, the 2270A can accommodate Wang diskettes and the IBM 3740 diskettes as well. However, before the IBM 3740 diskettes can be used in the 2270A, they must be formatted by IBM.

The older 2270 may be upgraded to the 2270A by a conversion kit. This kit (WLI #200-0270) contains the 210-7218 Microprocessor Board (IBM Format Compatible) and the ribbon cables for connecting this board to the Shugart Diskette Drives. These ribbon cables are R2 versions of the old cables used in the 2270; the R1 cables cannot be used with the IBM diskettes.

The I/O cable assembly (WLI #220-0066-4) supplied with newly manufactured 2270A's is compatible with both the 2270 and the new 2270A. This I/O cable is not contained in the conversion kit.

The older 2270 I/O cable assembly (WLI #220-0066-3) may be upgraded for use with the 2270A by cutting and tying back pin 11 on the cable fingerboard. Pin 11 is +5V.

CAUTION:

Do not use the 2270 I/O cable with the 2270A unless it is first upgraded by disconnecting pin 11. Failure to regard this warning may result in damage to the I/O controller in the 2200 CPU.

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IMMEDIATE SERVICE NOTICE

NO. 154.1	DATE: 4/5/78
CATEGORY MASS STORAGE DEVICES #14.1	
SUBJECT 2270 TO 2270A CONVERSIONS	

The 2270-1, -2 or -3 system can be upgraded to a 2270A-1, -2 or -3. However, for upgrading the 2270 system, the following parts are needed:

1) PCB 210-7218A.
2) Ribbon cable 220-3011.
3) I/O cable 220-0066-4.

NOTE:

Item #1 is only supplied when the conversion kit is ordered. Items #2 and #3 can be converted from the existing 2270 system.

The 210-7218A is totally different in artwork and design, and handles IBM formatted diskettes as well as Wang diskettes.

The ribbon cable, 220-3011 with an R2 version 6766, has an artwork change so an unused pin can be used for the IBM diskette version. However, the 220-3011 with an R1 version 6766 and 6767 must be converted as follows:

1) Isolate pin 12 on the 6766 R1 connector by cutting the etch as shown in the figure.
2) Connect a small piece of wire from pin #1 of the 40 pin connector on solder side to pin 12 on the 6766 board.
3) Connect a small piece of jumper wire from pin 4 to pin 16 on solder side, on PC board 6767 R1.

Steps 1 through 3 upgrade the 220-3011 cable. The cable is now compatible for all 2270 series diskette drives.

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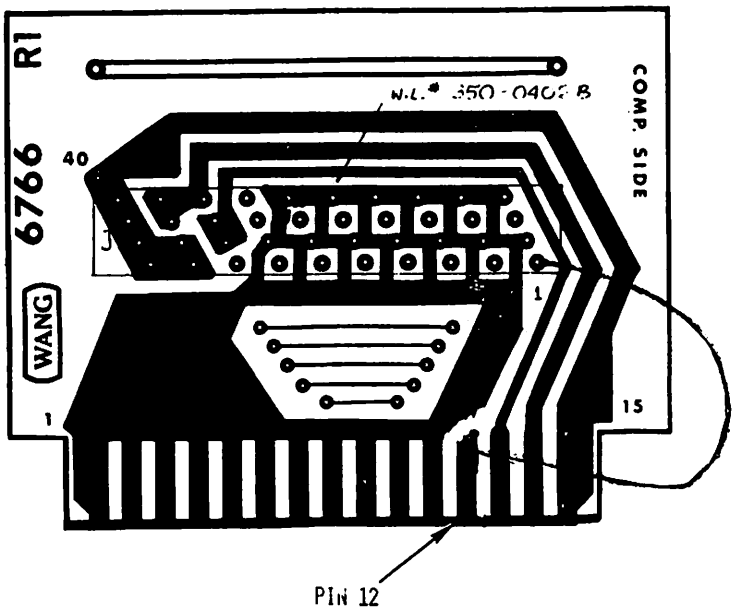
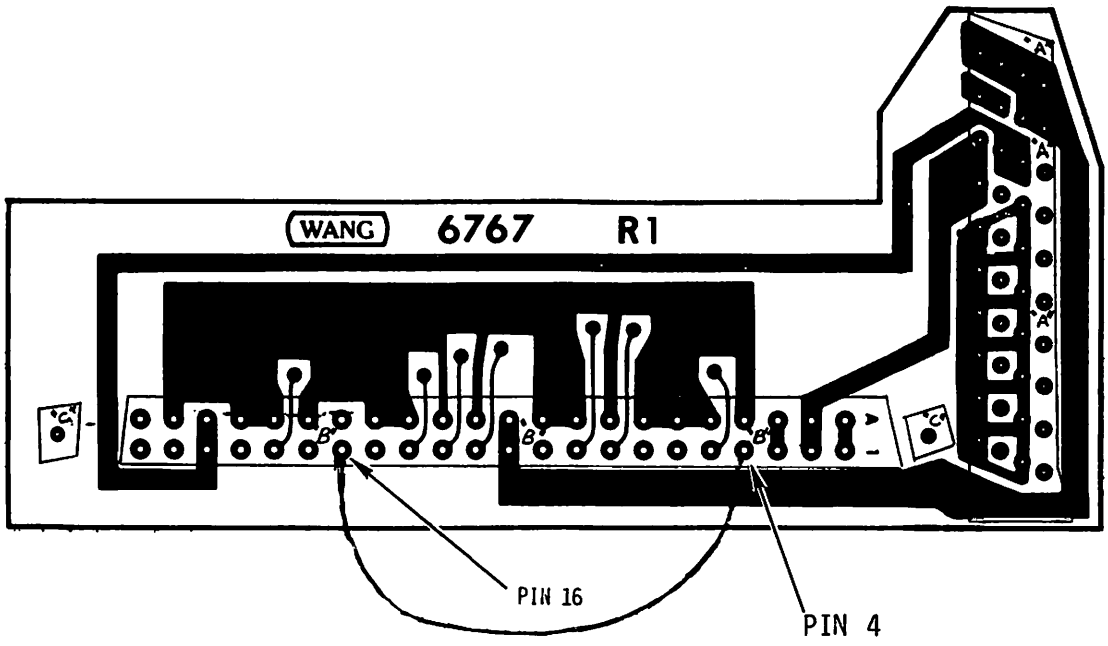
The I/O cable, 220-0066-3 can be converted to a 220-0066-4 by cutting pin 11 on the cable fingerboard which goes to connector J1 on PC board 210-7218. Pin 11 is +5V.

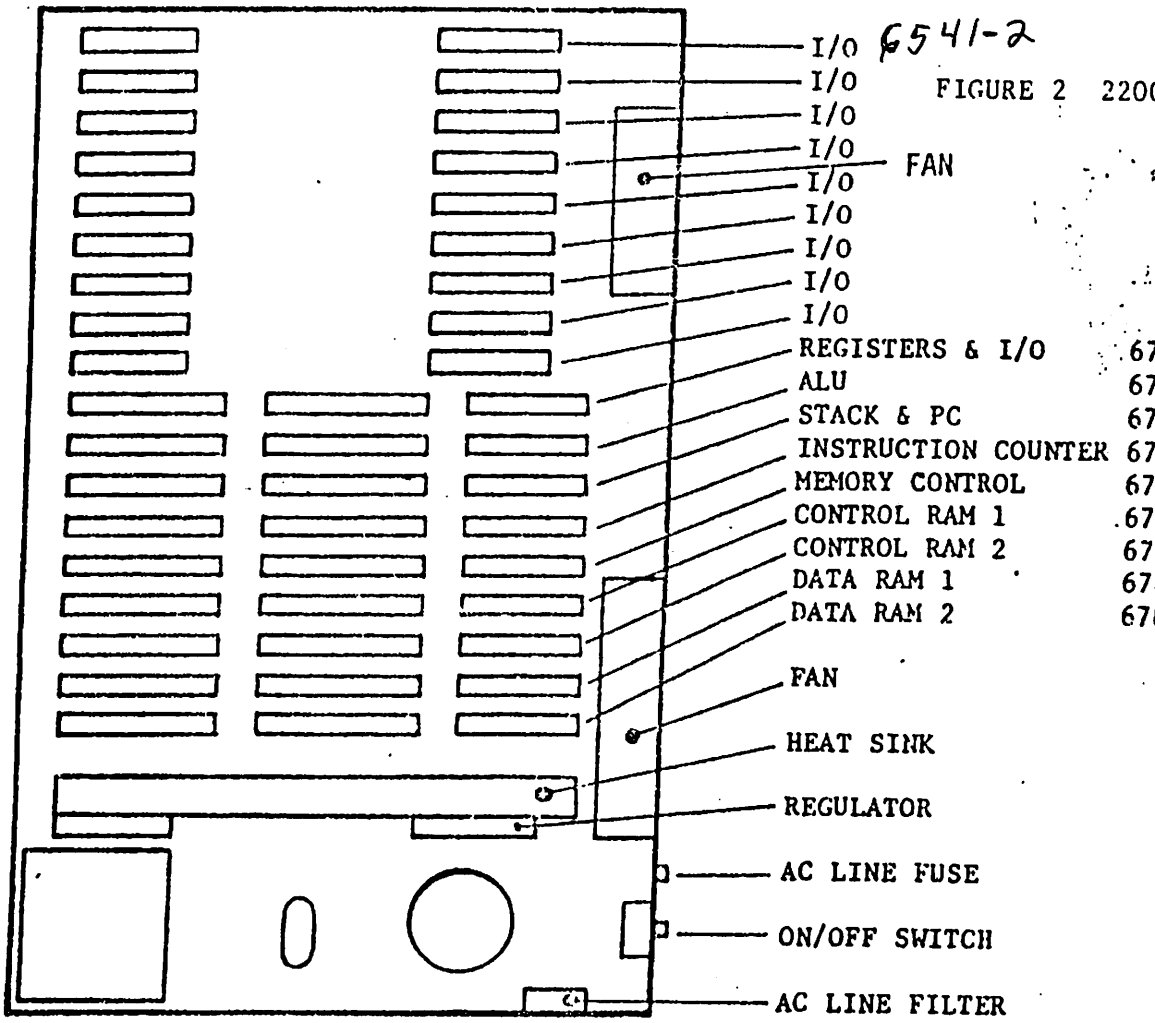
CAUTION:

DO NOT USE the existing 220-0066-3 2270 I/O cable with the 2270A unless it is first upgraded to a 220-0066-4 by disconnecting pin 11. Failure to regard this warning may result in damage to the I/O controller and the power supply on the 2200 CPU.

BOARD 2R1 WILL NOT WORK







6541-2

FIGURE 2 2200 MVP CHASSIS LA

Changed from standard 2200VP

R2 ROMs

7292-1 in 2236

FIG. 1.2

MUST USE MUXD

left SW MUX D SW #1 all off.

2nd MUX D SW #1 first on rest off

Baud rate SW 12+13 can be different baud rates

SHUGART SA 901 FLOPPY DRIVE

There have been some questions concerning the differences between the following Shugart Floppy Drives. All drives are interchangable with the only differences being jumper configuration and exterior hardware, meaning face plate and guide bar.

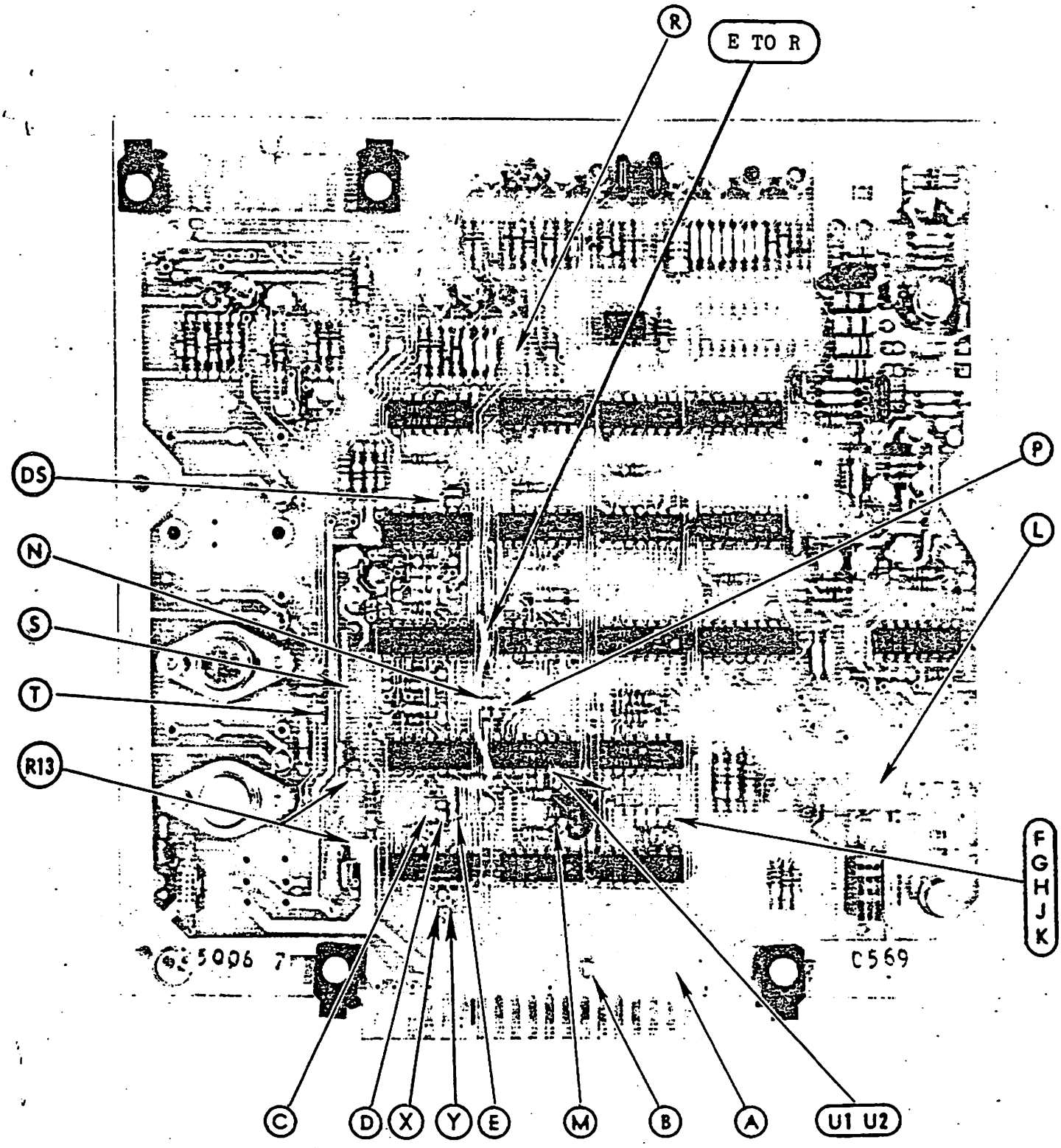
278-4000	Basic Shugart Drive
278-4001	Same as 4000 with face plate and guide bar
278-4002	Set up for VS
278-4003	Replaces 278-4000
278-4003M	Locking door (see note)

There are three jumper configurations as shown in the following table. Those jumpers followed by a * are the ones which are altered for different configurations.

JUMPER	2200,WP,OIS	VS WITH 10 MEG DRIVE	VS WITHOUT 10 MEG
A	IN	IN	IN
B	IN	IN	IN
C	OUT	OUT	OUT
D	OUT	OUT	OUT
E	IN	IN	IN
F*	OUT	OUT	IN
G*	OUT	IN	IN
H*	OUT	OUT	IN
J	OUT	OUT	OUT
K*	OUT	IN	IN
L	IN	IN	IN
M	IN	IN	IN
N	IN	IN	IN
P	OUT	OUT	OUT
R*	OUT	IN	IN
S	OUT	OUT	OUT
T	OUT	OUT	OUT
X*	OUT	IN	IN
Y*	IN	OUT	OUT
U1	IN	IN	IN
U2	OUT	OUT	OUT
DS*	IN	OUT	OUT
E to R*	IN	OUT	OUT
R13* (150 OHM)	OUT	IN	IN

Please check the configuration if any problems arise installing a new drive from stock. R13 can be used as a quick guide to differentiate between (2200 WP OIS) and VS. Out for (2200, WP, OIS), in for VS

NOTE:
The procedure for removal and replacement of the locking door may be found in District Newsletter #9.



FLOPPY LOGIC CARD

JUMPER LOCATIONS

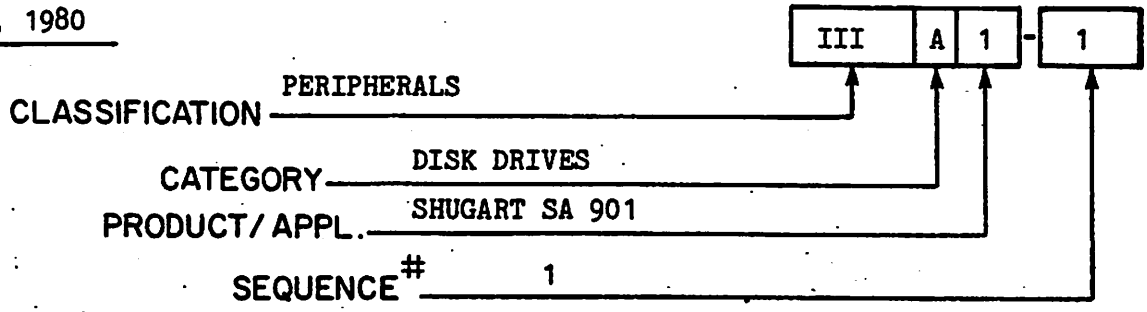
NOTE:

THE PROCEDURE FOR REMOVAL AND REPLACEMENT OF THE LOCKING DOOR MAY BE FOUND IN DISTRICT NEWSLETTER #9.

CUSTOMER ENGINEERING

PRODUCT SERVICE NOTICE

DATE: JANUARY 25, 1980



TITLE:

PCB 25006-1 MODEL IDENTIFICATION AND JUMPER CONFIGURATION

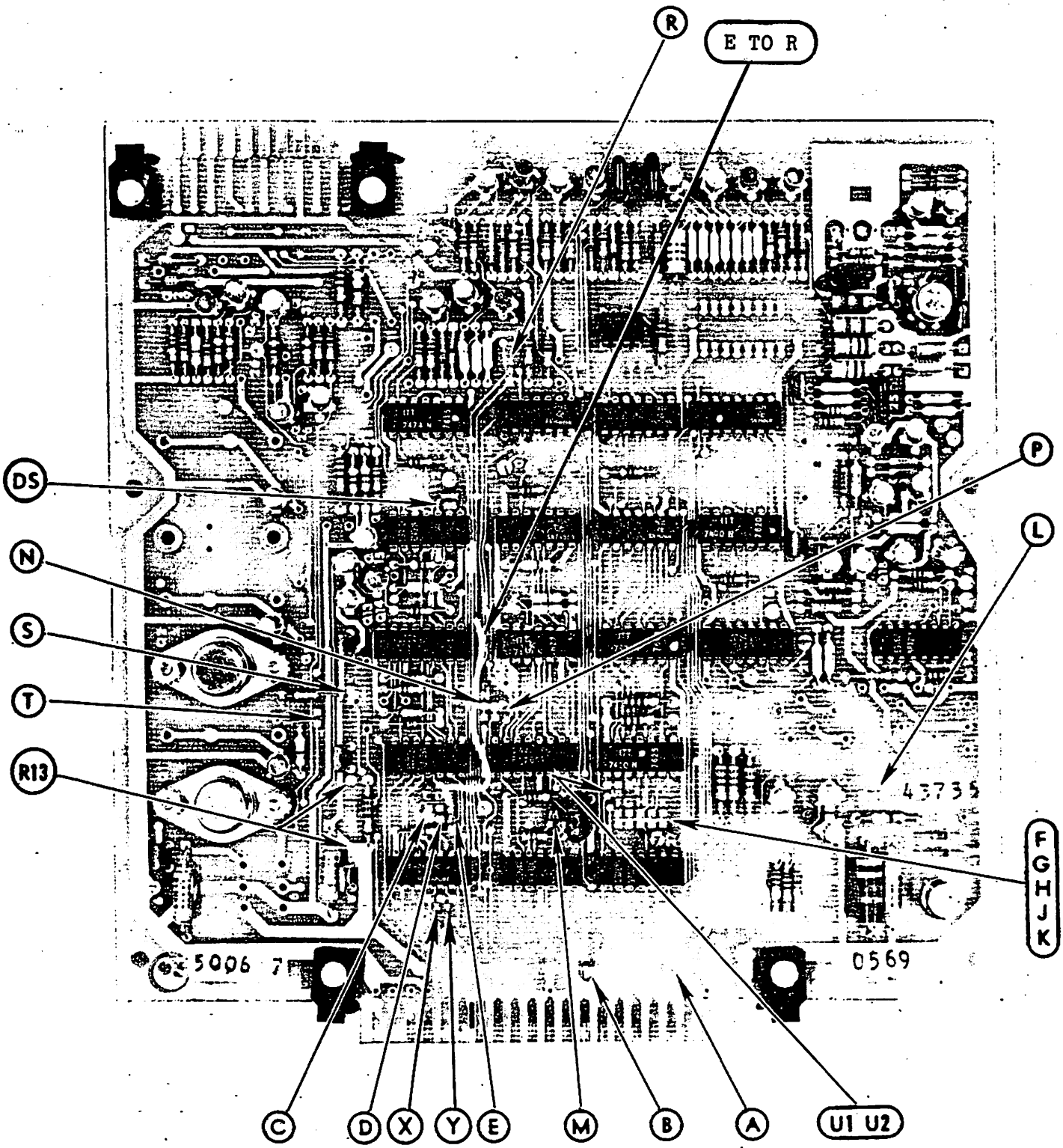
This PSN lists the jumper configurations for the following Shugart models: 2200 versions, WP versions, and VS versions. The information presented supersedes all previous information pertaining to the Shugart jumper configurations in Service Newsletter #123 and in the 60 & 80 Manual, Volume 2, (03-0068) page 3-21.

MODEL NUMBERS

WL NUMBER	MODEL DESCRIPTION
278-4000	Shugart Drive
278-4000-1	Shugart Drive, 50 Hertz
278-4001	Shugart Drive with Guide Bar
278-4002	Shugart Drive for VS
278-4002-1	Shugart Drive for VS, 50 Hertz
278-4003	Shugart Drive for WP
278-4003-1	Shugart Drive for WP, 50 Hertz
278-4003-M	Shugart Drive for WP Sys 140

The Jumper Configuration Table on the following page lists three versions of the 25006-7 PCB, WL #726-1009. The 2200 and the WP versions are combined in the first column since they are jumpered identically. The two versions of the VS Models are also listed, each having a different jumper configuration. For VS systems having a 10 Meg disk drive, refer to the center column to configure the PCB, and for VS systems without the 10 Meg disk drive refer to the right-hand column in the table.

WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL. (617) 459-5000, TWX 710 343-6769, TELEX 94-7421
Printed in U.S.A.
13-5852 12-79



FLOPPY LOGIC CARD

JUMPER LOCATIONS

SHUGART FLOPPY DISK DRIVE JUMPER CONFIGURATION TABLE, 25006-7 PC

Jumper Title	2200/ WPS	2200VS with 10 Meg Dr.	2200VS w/o 10 Meg Dr.
A	IN	IN	IN
B	IN	IN	IN
C	OUT	OUT	OUT
D	OUT	OUT	OUT
E	IN	IN	IN
F	OUT	OUT	IN
G	OUT	IN	IN
H	OUT	OUT	IN
J	OUT	OUT	OUT
K	OUT	IN	IN
L	IN	IN	IN
M	IN	IN	IN
N	IN	IN	IN
P	OUT	OUT	OUT
R	OUT	IN	IN
S	OUT	OUT	OUT
T	OUT	OUT	OUT
X	OUT	IN	IN
Y	IN	OUT	OUT
U1	IN	IN	IN
U2	OUT	OUT	OUT
DS	IN	OUT	OUT
* R13	OUT	IN	IN

E To

Remove the jumper wire from between E and R for VS operation. The jumper is used only for operation in the 2200 and the WPS to alter the Head-Loading circuitry.

* R13 1s 150 ohms.

MODEL IDENTIFICATION

For quick model identification use the following guide:

1. Neither the 2200 nor the WP Models have R13 installed.
2. Both of the VS Models will contain R13.
3. VS Models without the 10 Meg Dr. will have jumpers F and H "IN".

SHUGART

Modification of the Shugart 901 8" floppy drive to operate the door locking mechanism and active light.

When replacing the floppy drive in a system with one that does not have the locking door latch and active light, swap the face plate and locking door latch with the new drive and modify the drive according to the instructions below.

1. Remove old face plate and door latch

2. Install new face plate with locking door latch and active light

3. Cut etch going between pins 1 and 2 of 8 pin IC 3F as per figure #1 (This etch runs from IC 3E Pin 2 to IC 3F Pin 7)

4. Add a jumper wire between pin 7 of IC 3F and the plate thru above point (B), which is tied to pin 13 component side of the I/O connector.

5. Cut bottom or top pin off of plug J6 and save pin for next step

6. Solder pin cut from plug into plate thru next to TP(8)

7. Connect 3 pin plug coming from the locking mechanism PCB located on the back of the door latch to J6

8. Connect the single wire coming from the locking mechanism PCB to the pin that you soldered next to TP 8

MODIFICATION FOR LOCKING DOOR LATCH

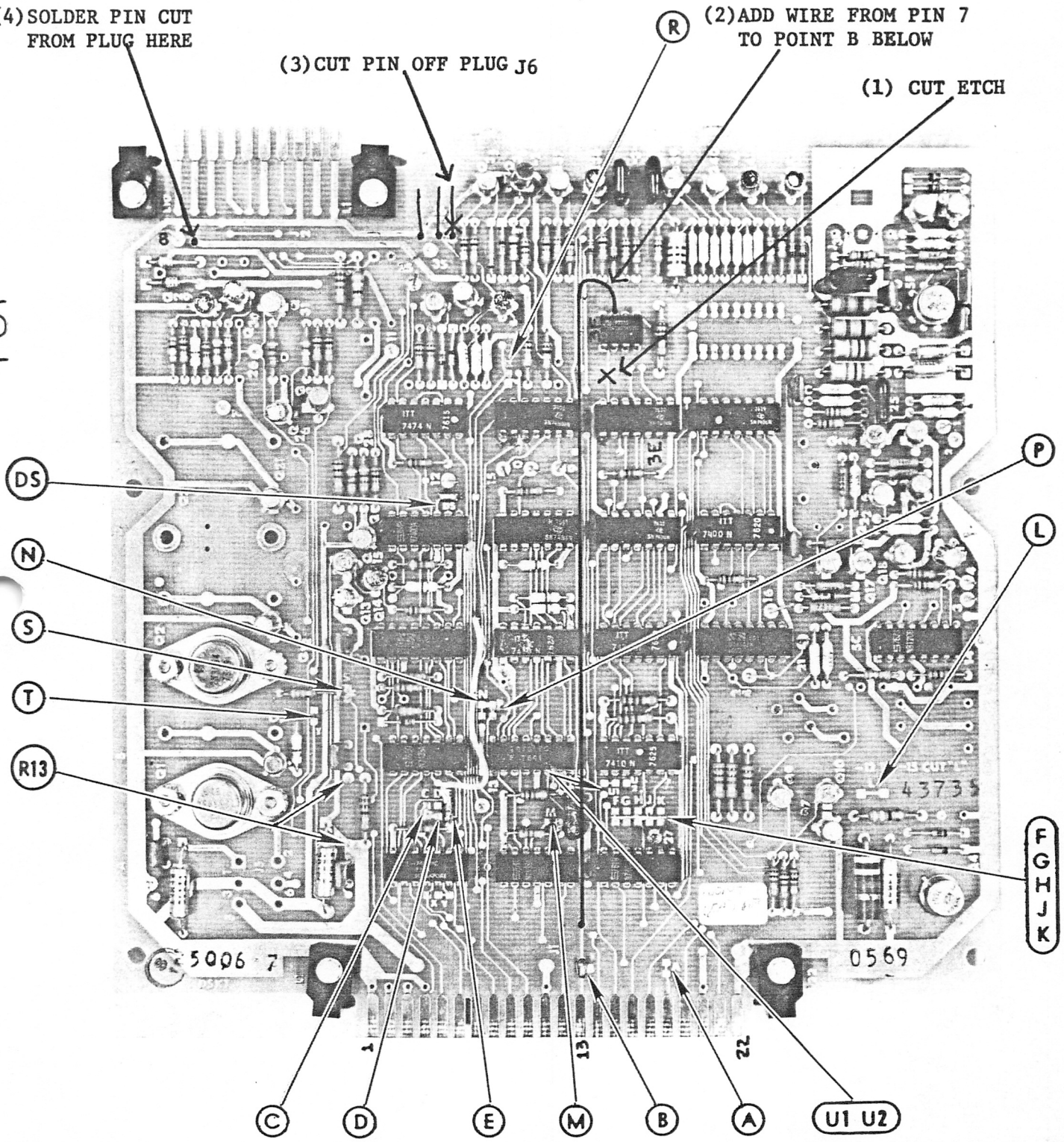


FIGURE 1

FLOPPY DISKS

SERVICE BULLETIN 46.2

DISK - 256 BYTES OF DATA PLUS CHECKSUM & FORMATTING / SECTOR

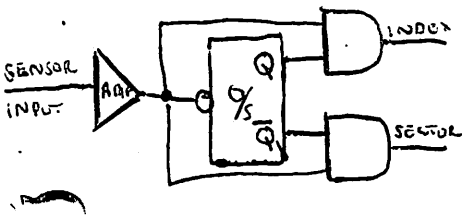
8 BITS / BYTE

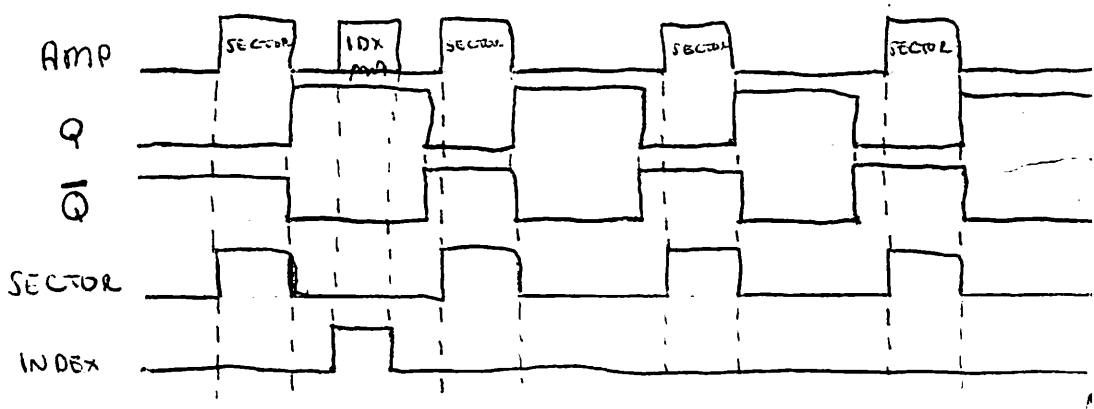
SECTOR - PHYSICAL SECTOR MARKS TO LOCATE, EITHER HOLES IN PLATTER ON NOTCHES IN SPINDLE HUB.

INDEX MARK - ADDITIONAL SECTOR MARK BTWN TWO SECTOR MARKS

IT IS IDENTIFIED BECAUSE IT FALLS OUT OF TIME W/ SECTOR MARKS

* A ONE SHOT WHICH OUTPUTS MOST OF THE TIME BETWEEN SECTORS, SEPARATES INDEX FROM SECTOR.





INDEX MARK - DEFINES STARTING POINT

DISK DRIVE - HAS OWN WRITE DRIVE & READ AMP. SO INTERFACE REC. LOGIC AT NORMAL TTL LEVE

DATA SENT TO DISK IN SERIAL FORM W/ CLOCK PULSE

DATA REC. ON TWO SERIAL LINES, CLOCK & DATA

CLOCK SYNCHRONIZES DATA TO 8 BIT PARALELL

DRIVE PRODUCES STATUS SIGNALS TO LET CONTROLLER KNOW IF USABLE

SHUGART 901 - SIMPLEST - USED W/ 2270 & WPS SERIES WORD PROC.

MEMOREX 651 USED IN 2240/2/3

* WE USE ONLY 64 OF 77 TRACKS GIVEN & ONLY 16 OF 32 SECTORS IGNORING EVOL OTHER

OPPY - SA900/901 - LOW COST, HIGHLY RELIABLE, DIRECT ACCESS, REMOVABLE DRIVE: 31,250 BYTES/SE

STORAGE FOR 3.1 MILLION BITS OF DATA W/ RATE OF 250,000 BITS/SE

SA900 - CAN BE USED FOR INPUT OR OUTPUT FROM IBM 3740 DATA ENTRY SYS.

* ANY SA100 DISKETTE SHUGART OR IBM OR EQUIVALENT DISKETTE MAYBE R/W ON SA900, IBM 3741/42/47 OR 3540

SA900/901 - ~~FLEXI~~ GREATER PERFORMANCE & RELIABILITY THAN CASSETTE OR CARTRIDGE DRIVE, LOWER COST W/ INCREASED FUNCTION OVER CARD I/O & REEL TO REEL TAPE DRIVES

SA900/901 - KEY ENTRY SYS., PT. OF SALE RECORDING SYS., BATCH TERM. DATA STORAGE, MICROPROGRAM LOAD & ERR. LOGGING, MINICOMPUTER PROG. & AUX. DATA STORAGE, WORD PROCESSING SYS., & SM. BUSINESS SYS.

SA900/901 - COMPOSED OF DRIVE MECHANISM, R/W HEAD, TRK. POSITIONING MECH. & ASSOC. ELEC.

SA100 DISKETTE - MAY BE R/W W/ SHUGART OR ABOVE IBM * SYS.

SA101 - ONLY USED ON SA 901

SPECS - UNFORMATTED CAPACITY 3.1 MEGABITS/DISK 41K BITS/TRACK

TRANSFER RATE 250 K BITS/SEC.

ACCESS TIME TRACK TO TRACK 10 ms SETTING TIME 10 ms

AVG. ACCESS TIME 260 ms AVG. LATENCY 83 ms

360 RPM RECORDING MODE - FREQ. MODULATION

SA900 - SA100 OR IBM DISKETTE SA901 - SA101

0 SECTORS 1 INDEX 32 SECTORS

77 TRACKS

3200 BPI (INSIDE TRACK) TRK 48 TPI (TRACKS PER INCH)

SA900/901 ALL SINGLE PHASE, 50 Hz 110V OR 208/230V, 60 Hz 208/230V

USER FEATURES - MULTIPLEX INTERFACE, RADIAL INTERRUPT, RADIAL ROTATIONAL SENSING, RADIAL HEAD LOAD, & RADIAL DC POWER CONNECTOR

SA900/901 - INTERPRET & GENERATE CONTROL SIGNALS, MOVE R/W HEAD, R/W DATA

HEAD POSITIONING ACTUATOR - POSITIONS R/W HEAD ON TRACK

HEAD LOAD ACTUATOR - POSITIONS DISKETTE AGAINST R/W HEAD

HEAD POS ACTUATOR - STEPPING ~~MOTOR~~ W/ LEAD SCREW ROTATED 15° INCREMENTS / 1 TRACK

FLOPPY DISKS

ELECTRONICS ON 1 CIRC. BOARD - 1. INDEX DETECTOR CIRC. (SECTOR/INDEX FOR 901), 2. HEAD POS. ACTUATOR DRIVER, 3. HEAD LOAD ACTUATOR DRIVER, 4. R/W AMP & TRANSITION DETECTOR, 5. DATA CLK. SEPARATION CIRC. & SAFETY SENSING CIRC., 7. WRITE PROTECT, 8. DRIVE READY DETECTOR CIRC. 9. DRIVE SELECT CIRC.

DRIVE MOTOR - BELT DRIVEN AT 360RPM 50 OR 60 H_Z ACCOMODATED BY CHANGING DRIVE PULLEY

REGISTRATION HUB, WHICH POSITIONS DISKETTE, ON CTR OF SPINDLE

R/W HEAD DIRECT CONTACT W/ DISKETTE

HEAD DESIGNED FOR MAX SIG. TRANSFER W/ MIN HEAD/DISKETTE WEAR

SA900/901 - SINGLE ELEMENT R/W HEAD W/ STRADDLE ERASE ELEMENTS TO ERASE AREAS BTWN TRKS - THUS SIGNAL TO NOISE RATIO GOOD

R/W HEAD ON CARRIAGE LOCATED ON HEAD POS ACT. SCREW.

1 DISKETTE HELD PERPENDICULAR TO R/W HEAD BY PLATEN ON BASE CASTING

" LOADED AGAINST HEAD W/ LOAD PAD ACTUATED BY HEAD LOAD SOL.

SA900 - MYLAR DISKETTE IN PLASTIC ENVELOPE 7.875" DIA 8"X8" ENVELOPE

166.67 MS ROTATIONAL PERIOD 83.33 MS AVG LATENCY

TRACK ACCESSING - SEEKING CORRECT HEAD DONE BY DECIDING DIRECTION BY DIRECTION SELECT INTERFACE, LOADING HEAD, PULSING STEP LINE.

EA PULSE OF STEP LINE MOVES HEAD 1 TRACK

SA900/901 - STEPPER MOTOR - 3 PHASE, 15°, VARIABLE RELUCTANCE, 12 STATOR WINDINGS, & A ROTOR W/ 8 TEETH, 45° APART

12 WINDINGS WIRED TOGETHER IN GROUPS OF 4 90° APART, 1 PHASE

PHASE 1 - 0°-90°-~~180°~~-270° - W/ PHASE 1 APPLIED 4 TEETH CLOSEST THESE WINDINGS TO LINE UP

PHASE 2 - 30°-120°-210°-300° PHASE 3 - 60°-150°-240°-330°

AT POWER ON, FF1 & FF2 RESET & THE NOT OUTPUTS ACTIVATE PHASE 1

PHASE 1 - $\overline{FF1}$ & $\overline{FF2}$ PHASE 2 - $\overline{FF1}$ & FF2 PHASE 3 - FF1 & $\overline{FF2}$

FORWARD SEEK MOVES LEAD SCREW COUNTER-CLOCKWISE

REVERSE = " CLOCKWISE

TRACK ZERO INDICATOR (P1L12) - TELLS SYS. WHEN R/W HEAD AT TRACK 00,
TRACK ZERO FLAG ADJUSTED SO FLAG COVERS PHOTOTRANSISTOR AT TRACK 1.
WHEN FF1 & FF2 SET OFF & STEPPER MOTOR MOVES TO TRK. 00, PHASE 1 ANDED W/
TRACK ZERO DTECT & TRACK ZERO INDICATION SENT TO SYS

MEMOREX 651 DRIVE - MICROSWITCH TO SENSE TRACK 00

HEAD LOAD LINE MUST BE ACTIVE (LOGICAL 0 LEVEL) TO ACTIVATE STEPPER

* IF NOT ACCESSING, READING, OR WRITING HEAD LOAD LINE AT 24V (1 LEVEL) & REMOVES POWER TO STEPPER ROTOR ALLOWING IT TO COOL (THIS CAN BE STOPPED W/ TRACE CALLED "R" BEING CUT ON PCB)

W/ DIRECTION SELECT LINE AT + LOGIC LEVEL (2.5-5.5V) A PULSE ON STEP LINE WILL MOVE R/W HEAD 1 TRK AWAY FROM CENTER
- LOGIC LEVEL (0V-.4V) 1 TRK CLOSER TO CENTER

* AFTER AC & DC POWER ON NEED 2 SEC DELAY BEFORE R/W ATTEMPTED
2 SEC. - STABILIZES DISK SPEED

AFTER POWER ON NO WAY TO TELL WHAT TRK R/W HEAD ON

* TO INSURE PROPER TRACK POSITIONING, STEP OUT OPERATION SHOULD BE DONE UNTIL TRK 00 INDICATOR GOES ACTIVE

HEAD LOAD MAY BE APPLIED ANY TIME AFTER DC POWER ON, BUT SIGNAL MUST BE TRUE MIN. 50 MSEC. BEFORE R/W OPERATION.

SA900/901 - USED DOUBLE FREQUENCY NRZI (NON RETURN TO ZERO INVERTED) RECORDING METHOD

READ/WRITE OPERATIONS

SA900/901 - DOUBLE FREQ. - INSERTS CLK BIT ~~REGS~~ AT BEGINNING OF EA. BIT CELL, DOUBLING FREQ OF RECORDED BITS - BOTH CLK & DATA PROVIDED BY SYS

FLOPPY DISKS

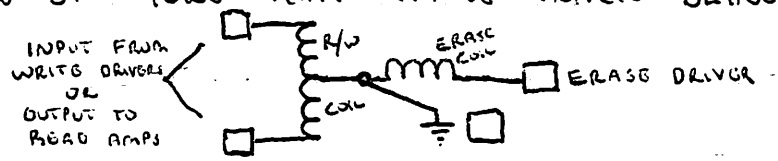
R/W HEAD - RING W/ A GAP W/ COIL WOUND SOMEWHERE ON RING

WHEN I THRU COIL, FLUX FRINGES AT GAP, FRINGE FLUX MAGNETIZING DISK SURFACE

WRITE - "1" BIT WRITTEN BY REVERSING I IN COIL WHICH CHANGES FLUX DIRECTION IN RING

READ - "1" BIT WHEN FLUX DIRECTION IN RING REVERSED BY REVERSAL OF FLUX ON DISKETTE W/ FLUX IN 1 DIRECTION NO OUTPUT V BUT WHEN "1" BIT ENCOUNTERED FLUX THRU RING & COIL DOES 180° REVERSAL CAUSING OUTPUT PULSE

R/W HEAD - 3 COILS - 2 R/W COILS WOUND ON SINGLE CORE, CTR-TAPPED & 1 ERASE COIL WOUND ON YOKE THAT SPANS TRACK BEING WRITTEN



WRITE OPERATION - ERASE COIL ENERGIZED ERASING OUTER EDGES OF TRACK SO TRACK WON'T EXCEED .012" TRK WIDTH & TO ALLOW FOR DEVIATIONS IN R/W HEADS WHICH MIGHT OTHERWISE AFFECT ADJACENT TRACKS.

EA. BIT WRITTEN WILL USE ALTERNATE R/W COILS FOR FLUX CHANGE

AS BITS ARE READ EA. BIT ALTERNATES COIL TO BE INDUCED

WRITE - SYS. SUPPLIES CLK. & DATA BITS, A WRITE TRIGGER FLIPS W/ EA PULSE (BIT) & WRITE DRIVERS ARE ALTERNATED W/ THIS

WRITE GATE SYS & FILE INOP DK AND TOGETHER FOR WRITE "I"

WHEN WRITE I SENSED TO W DRVR, A SIGNAL DELAYED 196 μsec GIVE ERASE COIL "I"

READ - W/ HEAD LOADED & WR. GATE INACTIVE, READ SIGNAL SENT TO AMP, THEN NOISE FILTERED, THEN DIFFERENTIAL AMP

CLK PULSE EVERY 4 μsec & W/ DATA, PULSE EVERY 2 μsec READ AMPLITUDE ↓ FREQ ↑

DIFFERENTIAL AMP - AMP. SIGNAL TO EVEN SQ. WAVES FROM SINE WAVES

DATA SEPARATOR SEPARATES CLOCK & DATA AS LONG AS FALL WITHIN CERTAIN WINDOW TIME

2 TIMES (WINDOW) USED, 2.9 μs IF LAST BIT CELL HAD DATA, 3.1 μs IF DIDN'T

DATA PULSE DECIDES WHICH WINDOW, CLOCK WINDOW GETS REST OF BIT CELL TIME 1.1 OR .9 μs

SS1 - SHORT WINDOW SS2 - LONG

DIABLO BASICALLY SAME AS SHUGART BUT SPEEDS & FREQUENCIES DIFFER

SAFETY CIRCUITS - CHECKS COMPONENT FAILURE, SYS OPERATIONAL ERROR, OPERATOR ERROR

FILE INOP - CHECKS 1. WR. GATE W/ NO WR. I SENSE

2. NO WR. GATE W/ WR. I SENSE

3. WRITE GATE W/OUT HEAD LOADED

4. WR. GATE W/ $\overline{\text{WR. DATA}}$

5. WR. GATE W/ DOOR OPEN

SYS. SHOULD TEST FILE INOP INTERFACE LINE & IF ON HIT FILE INOP RESET & RETRY

FILE INOP ACTIVATED - INHIBITS WRITE UNTIL FAULT CORRECTED & FILE INOP RESET OR POWER ON RESET IS DONE.

INTERFACE - VIA 2 CONNECTORS, 1 CARRIES SIGNALS & DC POWER, P1 & OTHER AC POWER + FRAME GROUND P4

INTERFACE CIRCUITS - 2 - LINES W/ DATA & LINES W/ CONTROL INFO

AC FOR DRIVE MOTOR & DC FOR ELEC & STEP MOTOR

AC - $110 \pm 10\%$ VAC @ .75A, $50/60 \pm .5$ Hz SINGLE PHASE

DC - $+5 \pm .25$V @ 1.5A MAX & 50mV RIPPLE

$-5 \pm .25$V @ .20A MAX & 50 mV RIPPLE

$+24 \pm 1.2$V @ 2A MAX & 100 mV RIPPLE

LINE RECEIVER FOR WR. DRVR IS BASICALLY - SCHMITT TRIGGER

2N2222A XSISTOR CIRC. DRIVE - READ DATA, - SEP. CLK., - SEP DATA

* ALL DATA LINES TERMINATED W/ 100Ω R & 100Ω COAXIAL CABLE SHOULD BE USED

CONTROL LINE DRIVERS - OPEN COLLECTOR CIRC.

" RECEIVERS - 7400 TTL GATES & 150Ω TERMINATOR R

MICROPROCESSOR - SPECIAL PURPOSE, PREPROGRAMMED COMPUTER WHICH CONVERTS DATA BTWN DRIVE & CPU & CONTROLS DRIVE

FLOPPY DISK

DIFFERENCES BETWN. MEMOREX 651 & SHUGART 901

1. SPINDLE ROTATES OPPOSITE DIRECTION
2. SPINDLE TURNS AT 375 RPM INSTEAD OF 360
3. SECTOR & INDEX HOLES ON OUTER EDGE
4. WRITE PROTECT DONE W/ GLUED PLASTIC TAB & MICRO SW.
5. TAB ON FOR PROTECTION.
6. TRK 00 SENSED W/ MICRO SW, NOT LED.
7. HEAD HAS 64 POSITIONS NOT 77.
8. PLATTER NOT EJECTED WHEN DOOR OPENED

2270 MICROPROCESSOR

MICROPROCESSOR MANUAL FOR MASS STORAGE DEVICES

CONSISTS OF - ROM - CONTROLS ALL DISK MICROPROCESSOR OPERATIONS
RAM - USED AS TRANSITIONAL WORK AREA
ALU - ARITH/LOGIC UNIT
A & K REGISTERS - GENERAL PURPOSE
ST_0 & ST_1 REG. - STATUS REG. CONTROL INDICATORS & SENSE & SET VARYING COND

ALL ON 6718 OR 7018 BOARD

WRITE - STROBED FROM SYS TO K REG, CLKED TO A BUS MULTIPLEXER, TO ALU, TO RAM, TO A REG TO DISK.

READ - FROM DISK TO A REGISTER, TO A BUS MULTIPLEXER, TO ALU, TO RAM, TO CPU

ROM - CONTAINS MICROPROGRAM 6718 - USES 4 INTEL 1702A PROM CHIPS

7018 - USES 4 PROMs & 2 EA4000 ROM CHIPS

1702A PROM - 256 X 8 BIT MATRIX EA4000 ROM - 512 X 8 MATRIX

ROM INSTRUCT REQUIRES 16 BITS, 2 PROMs SELECTED SAME TIME FOR THE 16 BIT OUTPUT GIVING ROM CAPACITY OF 512 BYTES OR STEPS

ROM steps - 0000_{16} to $00FF_{16}$ (0-255) use L11 & L13

0100_{16} to $01FF_{16}$ (256-511) use L12 & L14

ROM addressed by instruct. counter (IC) which increments ROM 1 step aft instruct. decoded & performed

Instruct Counter - applies 9 bits to ROM

IC_{7-0} provides addressing & IC_8 & $\overline{IC_8}$ used for chip select

IC can cause ROM to branch from increment oper to any address w/ branch instruct

16 bit ROM output, RI_{15}-RI_0, latched to D-latches & becomes R_{15}-R_0

RAM - 4 2101-1 chips w/ 256x4 bit capacity so 512 byte capacity

RAM Addr. Counter - AD_8-AD_0 bits can increment or decrement or preset RAM to any addr.

Info loaded into RAM by ALU, C_7-C_0, only

Output from RAM may go to A reg, ALU, or CPU

RAM - 2 sections $8C00_{16}$-$8CFF$ (0-255) used for R/W buffer

$8D00_{16}$-$8DFF_{16}$ (256-511) used as work buffer

RAM Allocation - P6 5

ALU - 2 74181 chips - responds to 16 instruct. from ROM

had A bus, B bus, Carry-In bit, & funct. select code decoded from ROM outputs on C bus to either A or K reg, RAM, or ST0 or ST1

K Register - stores data from either controlling CPU or ALU selected by ROM outputs to ALU

A Register - stores data 1. from RAM to put on disk

2. read from disk

3. CRC circuitry which verifies disk data accuracy

4 from ALU

2270 MICROPROCESSOR

STATUS REGISTORS (ST_0 & ST_1) $\xrightarrow{ST_0}$ REPORT 8 CONDITIONS TO MICROPROCESSOR

1. WORD READY 2. ADDR. BIT 8 3. 10 msec DELAY 4. FILE INOP 5. CAK 6. CALCULATOR INPUT STROBE
7. DISK #3 8. CALCULATOR BUSY

– SAMPLED WHEN ROM BITS $R_9^{=1}$ & $R_8^{=0} = 10_2$ BY ALU VIA A BUS

ST_1 REPORTS 5 CONDITIONS 1. SECTOR BITS 0-3 2. SECTOR MARK PULSE 3. TRK 00
4. CARRY 5. HEAD LOAD

– SAMPLED BY ALU VIA A BUS WHEN $R_9^{=1}$ & $R_8^{=1} = 11_2$

ROM - CONTROLS MICROPROCESSOR – 16 BIT ROM INSTUCTIONS (BITS R_{15}-R_0)

* A SINGLE 16 BIT INSTRUCT TELLS - TYPE OF OPER., REGISTERS USED, RESULTANT DATA DESTINATION, INFO. SOURCE, ETC. —— THIS SEQUENCE OF MICROINSTUCTIONS CALLED MICROPROGRAM

24 BASIC INSTRUCT. IN 2270 W/ VARIABLES

INSTRUCT - OPERATION CODE - (R_{15}-R_8) - INDICATES ACTION TO BE PERFORMED
OPERAND - (R_7-R_0) - QUANTITY ENTERING INTO OR ARISING FROM OPERATION

MICROPROCESSOR INSTRUCTIONS HAVE FIVE MAJOR CATEGORIES

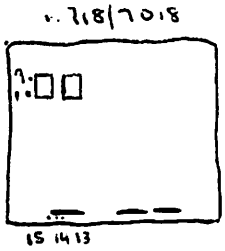
1. REGISTER INSTRUCTIONS - NOOP, B TO M, M TO B, ADD W/OUT CARRY, OR, XOR, ADD W/ CARRY, & AND
2. IMMEDIATE INSTRUCTIONS - OR IMMEDIATE, XOR IMMED, ADD W/CARRY IMM., AND IMMED.
3. BRANCH INSTRUCTIONS -
   CONDITIONAL - BR. IF REG = 0, BR IF REG ≠ 0 (BR IF TRUE L,H), (BR IF FALSE L,H), BR IF = MASK
   BR IF ≠ MASK
   UNCONDITIONAL - UB TO STEPS 0-255, UB TO STEPS 256-511
4. RAM ADDRESS INSTRUCTIONS - LOAD AUX (0-255), LOAD AUX (256-511)
5. CONTROL INSTRUCTIONS - EC01 (READ GATE ON), EC02 (WRITE GATE ON), EC04 (BUSY ON), EC08 (FORMAT), EC10 (HEAD DIRECTION SELECT), EC20 (PRESET CRC), EC40 (HEAD STEP), EC80 (HEAD LOAD), FC01 (DR. #3), FC02 (DR. 2), FC04 (DR. 1), FC08 (CLR. FILE INOP), FC10 (STROBE TO 2200),

ROM INSTRUCTIONS - R_{15} - R_{12} DON'T CHANGE ONCE SET

R_{11} & R_{10} - VARY & ARE USED TO INCREMENT OR DECREMENT, I/D, RAM ADDR.

R_9 & R_8 - VARY & DETERMINE WHAT REGISTER TO BE USED; REG

2270



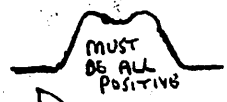
PIN 1 (TOP LEFT PROM) +12
PIN 9 " -12
PIN 15 - +5
PIN 14 - +24
PIN 13 - -5

2230 & 2260A

+24 POWER - SPINDLE
+24 CIRCUIT - EVERYTHING ELSE

CHECK IN PS, R/W BRD, & HS BOARD

WITH -24
+5V PIN 6 ACROSS CARD CAGE OR ON R/W BOARD ADJ. IN PS B62
+15 & -15V PIN 10 OF SL, SR, OR, ETC. -15
PIN 13 OF SD, OR, TC, & SL +15
+5V - EMITTER OF J28 R/W BOARD
-5V - EMITTER OF J22 R/W BOARD
FUSE IN BACK OF PS 7A - NO POWER AT ALL

ALIGNMENT 1V/CM 1msec/cm ADJ. ALLEN 

MIN PK 70-80% OF MAX PK

1. TRACK 0 A. SAME ENVIRON - 15 MIN WARM, DIFFERENT - 30 MIN WARM, REMOVE & RERUN FOR 15 MIN. B. RESTORE SW. ON C. CH. 1 TO TP 13 ON SO
2. RADIAL ALIGNMENT A. SET TO TRACK 146 OR 73 PKS ALL EVEN
A. CH 1 TO TP 1 OF EXERCISER, SYNC. PIN 11 SR BOARD C. CHECK OTHER HEAD
3. INDEX A. SET TO TRACK 10 OR 5 B. CH 1 TO TP 1, SYNC. SP PIN 11, NEG
C. CHECK AT 402 & 201 FOR AZIMUTH D. CENTER BETWEEN UP & LOW HEAD

SHUGART ALIGNMENT

1. VISUAL CHECKOUT - CLEAN HEAD, HEAD LOAD PAD, HEAD LOAD BAIL

2. ADJUST DOOR

3. CHECK FOR HEAD LOAD, & THAT HEAD SEEKS

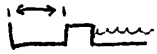
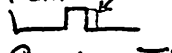
ELECTRICAL ADJUSTMENTS

1. INDEX WIDTH  1.7 MIL. SEC. NEG. PULSE — INSERT ALIGNMENT PLATTER
   CH 1 - TP12 2V/DIV. DC SYNC. CH 1 DC NEG.
   ADJ. INDEX POT

2. INDEX  200 μ SEC ± 50 μ SEC. — GROUND PIN 11, SEEK TRACK 1
   CH. 1 - TP1 .2V/DIV CH 2 - TP2 .2V/DIV ADD & INVERT
   SYNC. TP12 NEG SLOPE DC
   ADJ. INDEX ASS'Y.

3. RADIAL HEAD ALIGNMENT  CAT'S EYES EVEN & ≥ .4V pp — SEEK TRACK 38
   CH. 1 - TP1 .2V/DIV. CH 2 - TP2 .2V/DIV. ADD & INVERT GROUND PIN 11
   20 MIL. SEC/DIV SYNC. TP12 NEG. SLOPE DC
   TURN STEPPING MOTOR, RESTORE, SEEK TRACK 38

4. HOME POSITION — HEAD AT TRACK Ø OR 1 = 5V LEVEL — ALL OTHER TRACKS = ØV LEVEL
   CH 1 - TP26 1V/DIV. DC
   ADJ. FLAG

5. POT ADJUSTMENTS
   (a)  2.7 μSEC. ± .05 — REMOVE ALIGNMENT PLATTER, INSERT FORMATTED DISK
   SEEK TRACK 38 GROUND PIN 11
   CH 1 - TP21 2V/DIV DC .5 μSEC/DIV SYNC. CH 1 NEG
   ADJ. RIGHT VERTICAL POT
   (b)  2.9 μSEC ± .05, LIMIT NOISE — SEEK TRACK 38 GROUND PIN 11
   CH 1 - TP24 2V/DIV DC .5 μSEC./DIV SYNC. CH 1 NEG.
   ADJ. LEFT VERTICAL POT FOR 2.9 μSEC., ADJ. HORIZONTAL POT TO LIMIT NOISE TO MIN.

```
2200 ALIGNMENT PROGRAM
10 DEFFN'00
20 VERIFY F R (0,0)
30 GOTO 20
40 DEFFN'01
50 VERIFY F R (24,24)
60 GOTO 50
70 DEFFN'02
80 VERIFY F R (36,36)
90 GOTO 80
100 DEFFN'03
110 VERIFY F R (608,608)
120 GOTO 110
```

PRESS DESIRED FUNCTION KEY

3741-2200 UTILITY SYSTEM

FN KEY	DESCRIPTION	FN KEY	DESCRIPTION
01	CONVERT 3741 TO TC FORMAT	06	LIST 3741 CATALOG
02	CONVERT TC FORMAT TO 3741	07	DUMP 3741 SECTOR(S)
03	LIST 3741 FILE	08	APPLICATION/SUBROUTINES
04	LIST TC FORMAT FILE (CONVERTED 3741 FILE)	09	CHANGE DISK ADDRESSES
		10	INITIALIZE 3741 DISK
05	CONVERT 5110 TO TC FORMAT	11	COPY 3741 DISK
15	RESTART UTILITY	31	RETURN TO START

WANG

ECO

ECO NO.

SHEET OF

ORIGINATOR	Mike Bahia	M/S	014-A3A	EXT. 60256	DATE
WRITTEN BY		M/S		EXT.	DATE

PART NO. 210-8824	DESCRIPTION 2275 MUX MASTER
DWG NO. 8824	
MODEL NO. 2275 MUX	PEP #
CLASS I (II) III	

DESCRIPTION OF CHANGE

1. Rework Artwork 2 Board as follows:
   On circuit side cut etch to L30 Pin 13 on both sides of Pin 13.
   Add wire from L31 Pin 10 to L33 Pin 5.
   On circuit side add wire from L2 Pin 9 to L18 Pin 5.
   On component side add wire from L6 Pin 7 to L22 Pin 5.
   On component side add wire from L10 Pin 7 to L26 Pin 5.

2. Make following correction to schematic, sheet 3 of 3, loc C12:
   Line from L2 Pin 10 (3I2) should tie to line between
   L30 Pin 2 and L18 Pin 5 (3C12). It should not connect to
   L18 Pin 7 (3C12).

   NOTE: Do not create R3 Artwork, not cost justifiable at this time.

REASON/SYMPTOM FOR CHANGE

1. To correct Artwork error on Artwork 2 Board.

2. To correct SCHEMATIC

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY

CONFORMANCE DATE

APPROVALS

	DATE
ECO CHAIRPERSON	
DES. ENGRG. Kelly Carrico	1/29/91
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR Michael Bahia	
OTHER	

14-19030 Printed in U.S.A. 5-85-7M

WANG

ECO

ECO NO.

SHEET OF

ORIGINATOR	MIKE BAHIA	M/S 014-A3A	EXT. 60256	DATE
WRITTEN BY		M/S	EXT.	DATE

PART NO. 210-8824	DESCRIPTION 2275 MUX MASTER
DWG NO. 8824	
MODEL NO. 2275 MUX	PEP #
CLASS I (II) III	

DESCRIPTION OF CHANGE

1) REWORK ARTWORK 2 BOARD AS FOLLOWS:
   ON CIRCUIT SIDE CUT ETCH TO L30 PIN 13 ON BOTH SIDES OF PIN 13.
   ADD WIRE FROM L31 PIN 10 TO L33 PIN 5.
   ON CIRCUIT SIDE ADD WIRE FROM L2 PIN 9 TO L18 PIN 5.
   ON COMPONENT SIDE ADD WIRE FROM L6 PIN 7 TO L22 PIN 5.
   ON COMPONENT SIDE ADD WIRE FROM L10 PIN 7 TO L26 PIN 5.

2) MAKE FOLLOWING CORRECTION TO SCHEMATIC, SHEET 3 OF 3, LOC C12:
   LINE FROM L2 PIN 10 (3I2) SHOULD TIE TO LINE BETWEEN L30 PIN 2 AND L18 PIN 5 (3C12). IT SHOULD NOT CONNECT TO L18 PIN 7 (3C12).

REASON/SYMPTOM FOR CHANGE

1) TO CORRECT ARTWORK ERRORS ON ARTWORK 2 BOARD.

2) TO CORRECT SCHEMATIC

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY

CONFORMANCE DATE

APPROVALS

DATE

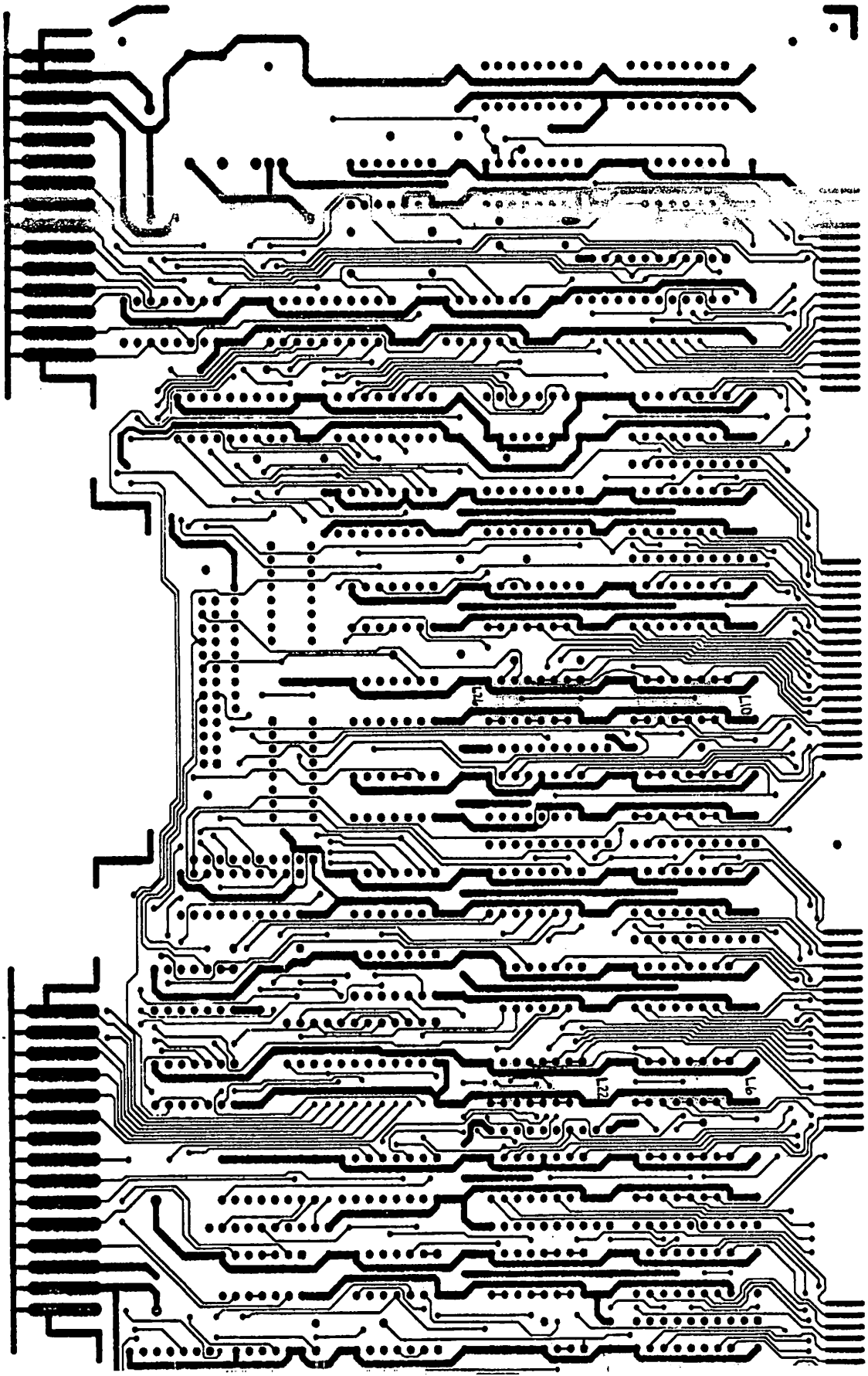
ECO CHAIRPERSON	
DES. ENGRG.	
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR	Michael Bahia
OTHER	

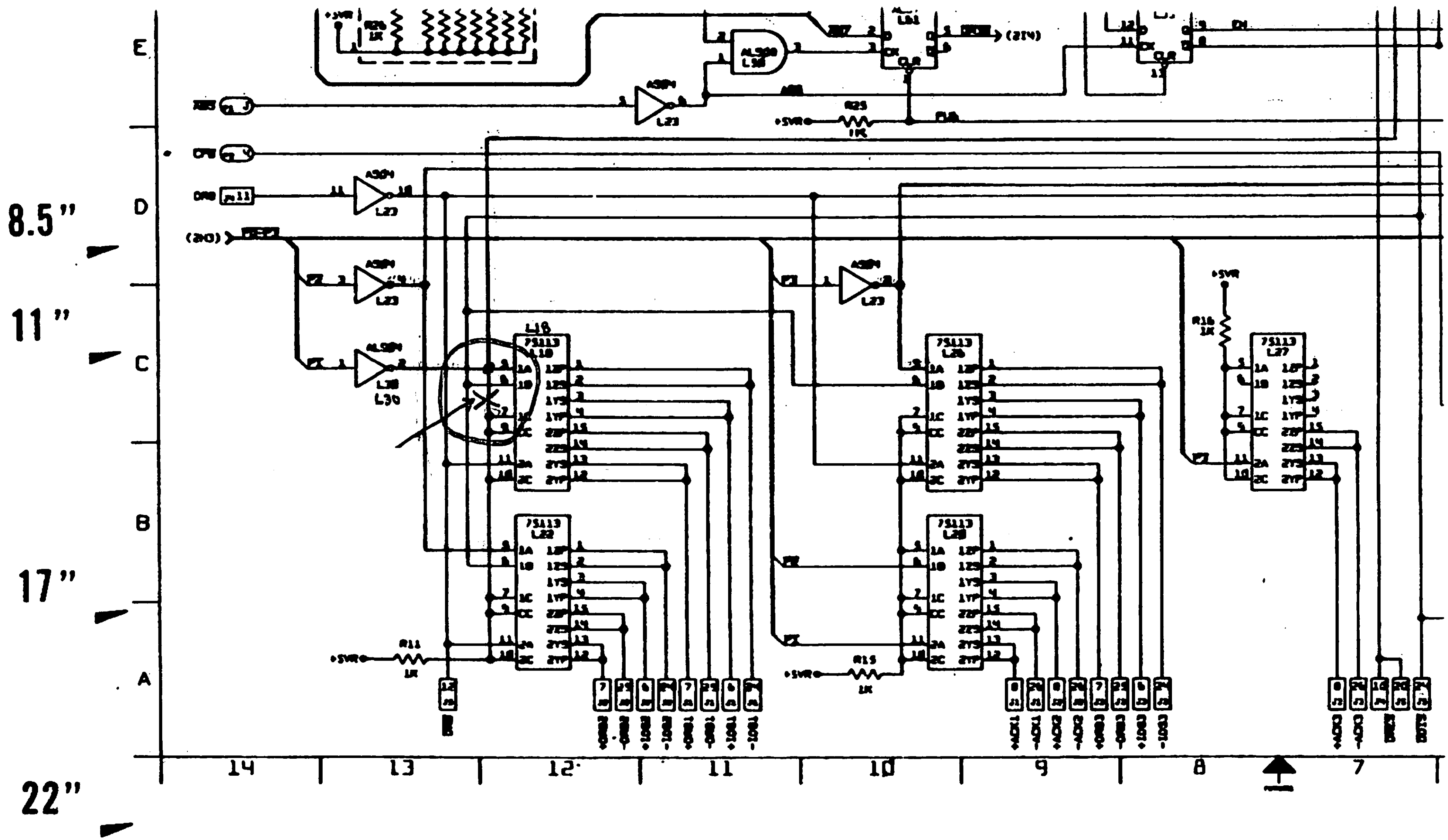
14-19030 Printed in U.S.A. 5-85-7M

8.5"

8.5"

11"


L24
L10
L22
L6



8.5"
11"
17"
22"
E
D
C
B
A
14
13
12
11
10
9
8
7
75113
L18
L22
L26
L28
L27
L23
L30
L38
R11
R15
R16
R25
1K
+5VR
(210)
(214)
+DRB2
-DRB2
+IOB2
-IOB2
+DRB1
-DRB1
+IOB1
-IOB1
+ACK1
-ACK1
+ACK2
-ACK2
+DRB3
-DRB3
+IOB3
-IOB3
+ACK3
-ACK3