

Commodore  
Single Disk Drive

**Technical Manual**

Model 1540/1541



**commodore**  
COMPUTER

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## Chapter One

### 1.1 Scope

In this chapter, a description is made of the procedures necessary for servicing the Model 1540/1541 Floppy Disk Drive.

### 1.2 Unpacking

Special care should be exercised during unpacking not to damage the unit.

Unpacking procedures are as follows:

- a) Remove cardboard sleeve from styro-foam box
- b) Open 'styro-foam' box and remove drive
- c) Check the drives front door for proper operation

```
*****  
*                                     *  
*           Caution                 *  
*                                     *  
*   Do Not Use Magnetized Tools   *  
*                                     *  
*****
```

### 1.3 Protection against noise

A weak signal from the media is detected in the head section of the drive. Hence, do not install the drive near a TV set or other areas where electromagnetic noise is generated. (i.e. motors, air-conditioners, etc)

### 1.7 Input/Output Cable

The length of the cable between the host and the drive (between the host and the last drive when the drives are daisy chained) should not exceed 5 meters (16 feet).

### 1.8 DC power source

The drive is powered by a internal power supply providing the drive with +12V and +5V.

### 1.9 Initial inspection

The drive can be briefly inspected for its operation by the following procedure. Install the drive, connect the power and I/O cables. Turn drive on and make sure the front panel power lamp is on. Proceed to step 2.2.

#### 1.10 Outline of functions

The 1540/1541 Minifloppy Disk Drive mechanism is composed of the data read/write head, track positioning mechanism, spindle drive mechanism and eject mechanism.

#### 1.11 Read/Write Head

The Read/Write head uses a glass-bonded, ferrite/ceramic head. Track-to-track erasing is accomplished by the straddle erase method. The surface of the Read/Write head is mirror-ground to minimize wear of the head and media. Also, the head is designed in such a way that the maximum signal can be obtained from the media surface.

#### 1.12 Track positioning mechanism

Positioning of the Read/Write Head is accomplished by a stepping motor and steel belt. The stepping motor rotates clockwise or counter-clockwise by two steps per track. The control circuit on the logic board selects the direction and number of step to the desired track.

#### 1.13 Spindle drive mechanism

The spindle drive motor operates on 12 VDC and turns the spindle, through a belt drive, at 300 revolutions per minute. The speed of the drive motor is controlled by a feedback signal from a tachometer which is housed in the drive motor assembly. The feedback signal controls a servo amp that supplies the 12 VDC drive current.

#### 1.14 Eject mechanism

When the media is inserted in the Disk Drive and the door is closed the media is clamped by the spindle and hub. At this time the ejector mechanism is loaded by the insertion of the disk and locked. When the door is opened, the ejector mechanism is unlocked and the media pops out of the door.

## Chapter Two

### 2.1 Mechanism Explanation

The 1540/1541 mechanism is installed in the system horizontally, however the drive will function if mounted vertically. The mechanical parts of the drive include an aluminum chassis, a stepping motor, head positioning assembly, drive motor, a hub and spindle assembly for centering and retaining the media during operation. The magnetic head is of a glass ceramic construction.

### 2.2 Function explanation

The drive is itself an independent memory device. The drive is composed of a media clamp rotating mechanism, head positioning mechanism and an eject mechanism. When the front door opens, the media can be inserted. All positioning operation excluding insertion and removal of the media are controlled by the internal guide mechanism. Closing the front door causes the media clamp mechanism to operate. Two operations are performed in the following order:

- a) The media is centered.
- b) The media is clamped and retained between the spindle and the hub.

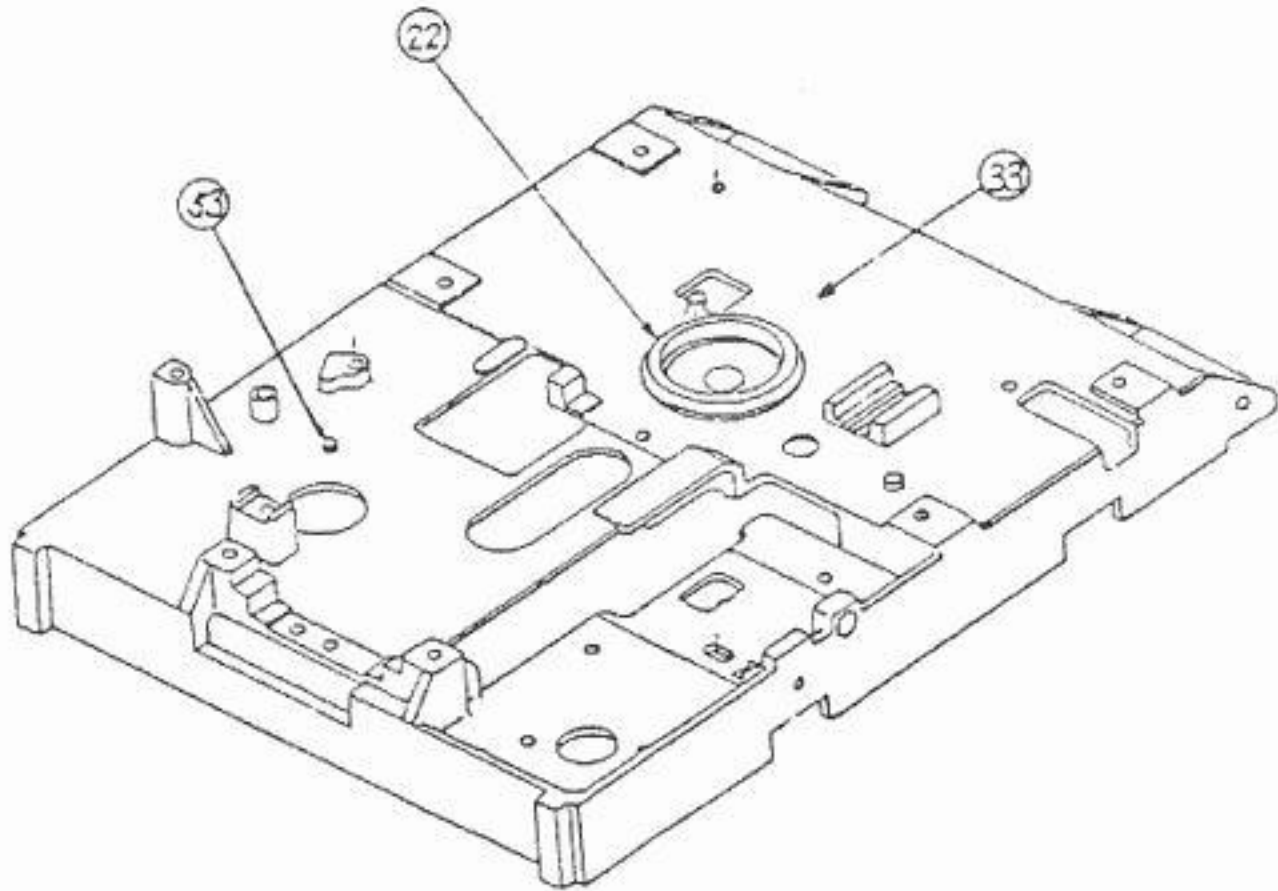
The spindle and hub rotate at 300 r.p.m. through a closed-loop control circuit employing a D.C. motor/tachometer. It is important that the relationship between the head and the media is maintained correctly during operation. For this purpose, a pressure pad is used to hold and press down the media (about 12g) from the opposite side of the head, to maintain the correct contact with the head. This head assembly is coupled by a metal band to a four phase stepping motor the performs the track positioning. One step of the stepping motor corresponds to a 1/2 track movement. Use of a high-speed stepping motor and metal band drive, this series of disk drives can perform access operations at a very high speed.

### 2.3 Assembly Procedure

- 2.3.1 The housing assembly; install the eject pin and the spindle.
- 2.3.2 The housing assembly; on the reverse side install the spindle pulley.

2.3.3 FIG 1, The housing unit.

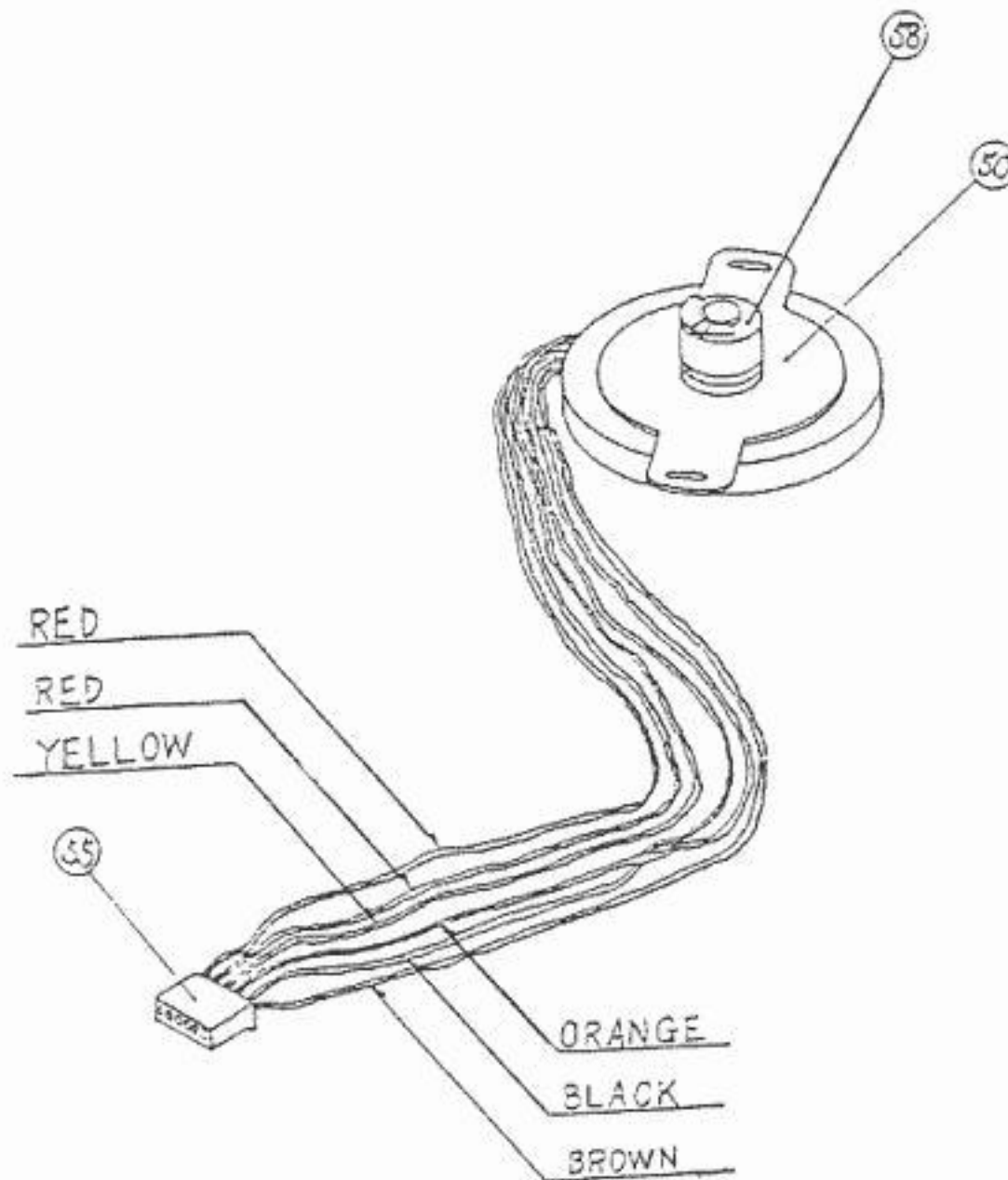
Part	Description
22	spindle
33	housing assembly.
53	eject pin



2.3.4 The stepping motor assembly; install the stepping pulley.

2.3.5 FIG 2, The stepping motor unit

Part	Description
50	stepping motor assembly
55	connector housing
58	stepper pulley



2.3.6 The D.C. motor assembly; install the motor pulley.

2.3.7 FIG 3, D.C. motor and control PCB

Part	Description
44	motor control PCB
48	D.C. motor
51	connector housing
59	D.C. motor pulley

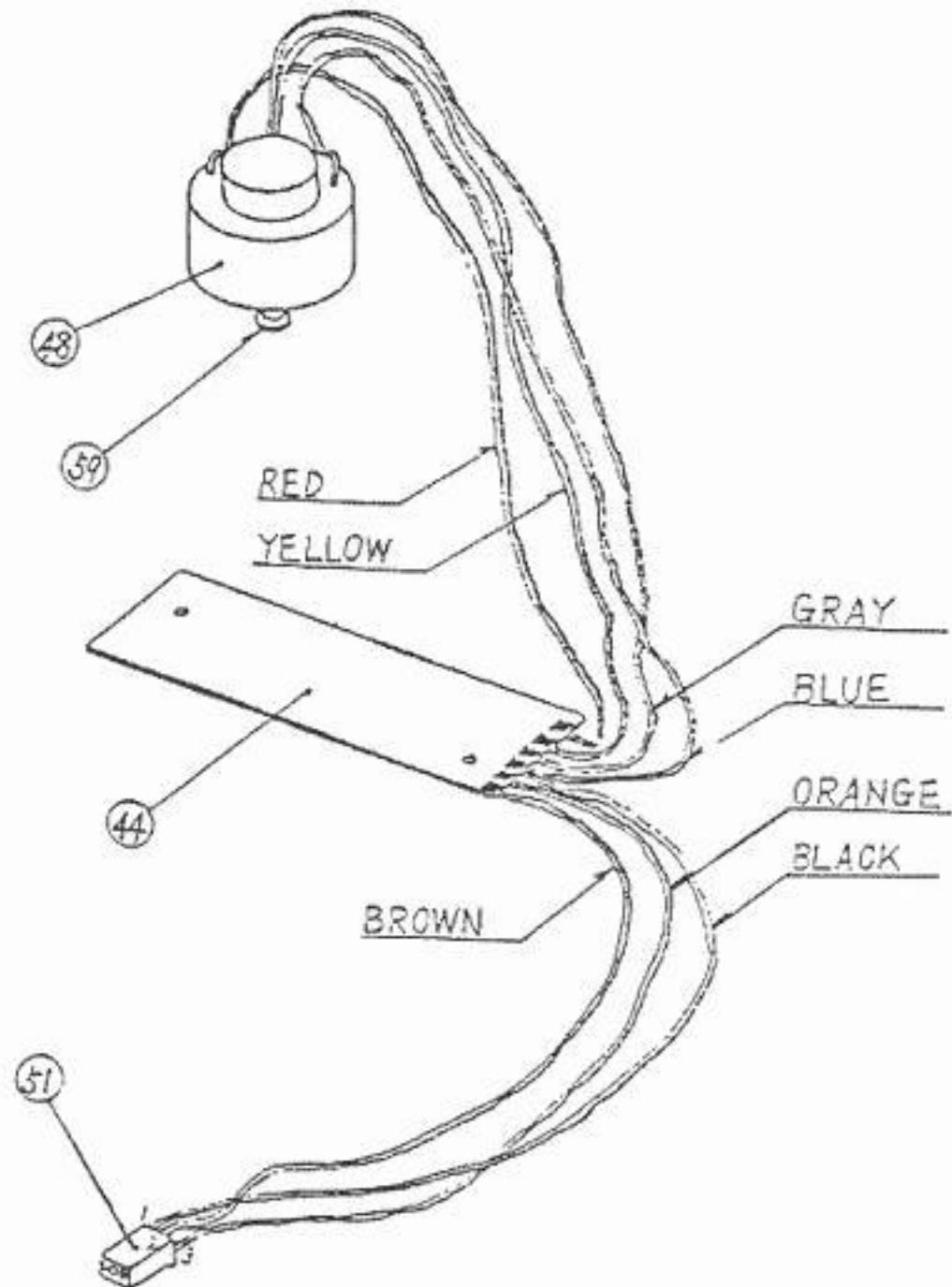




FIG. 6

Part	Description	Part	Description
20	binder screw	37	washer
21	diskette guide	38	eject spring
28	LED clamp	39	eject plate
29	front panel	40	slider
30	Flush screw	43	diskette guide
31	LED assembly	52	connector housing
32	LED holder ring		

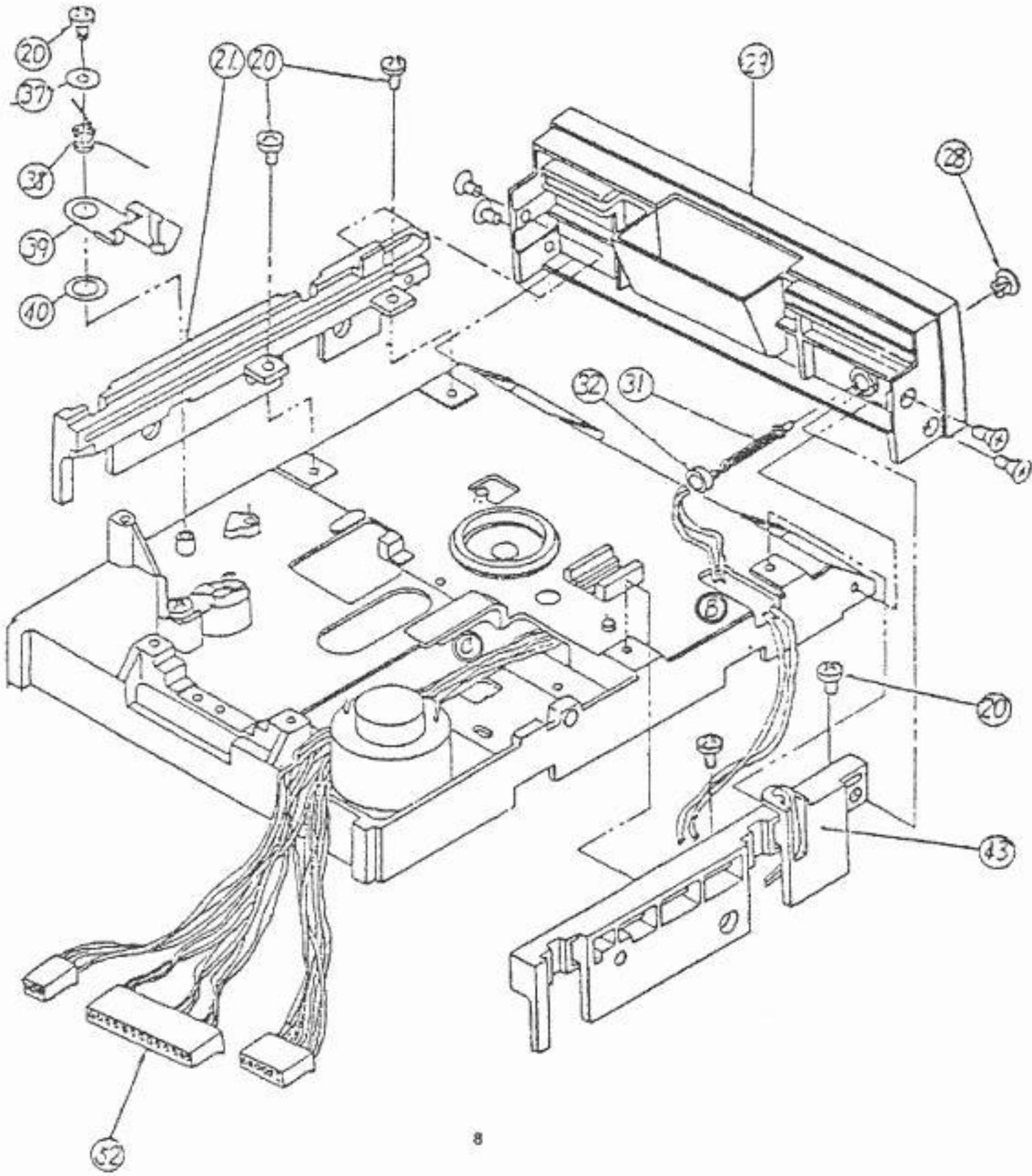


FIG 7.

Part	Description
15	binder screw
18	binder screw
24	tension pulley
25	guide shaft keeper
26	guide shaft
34	metal band
35	washer
36	head assembly
56	tension spring

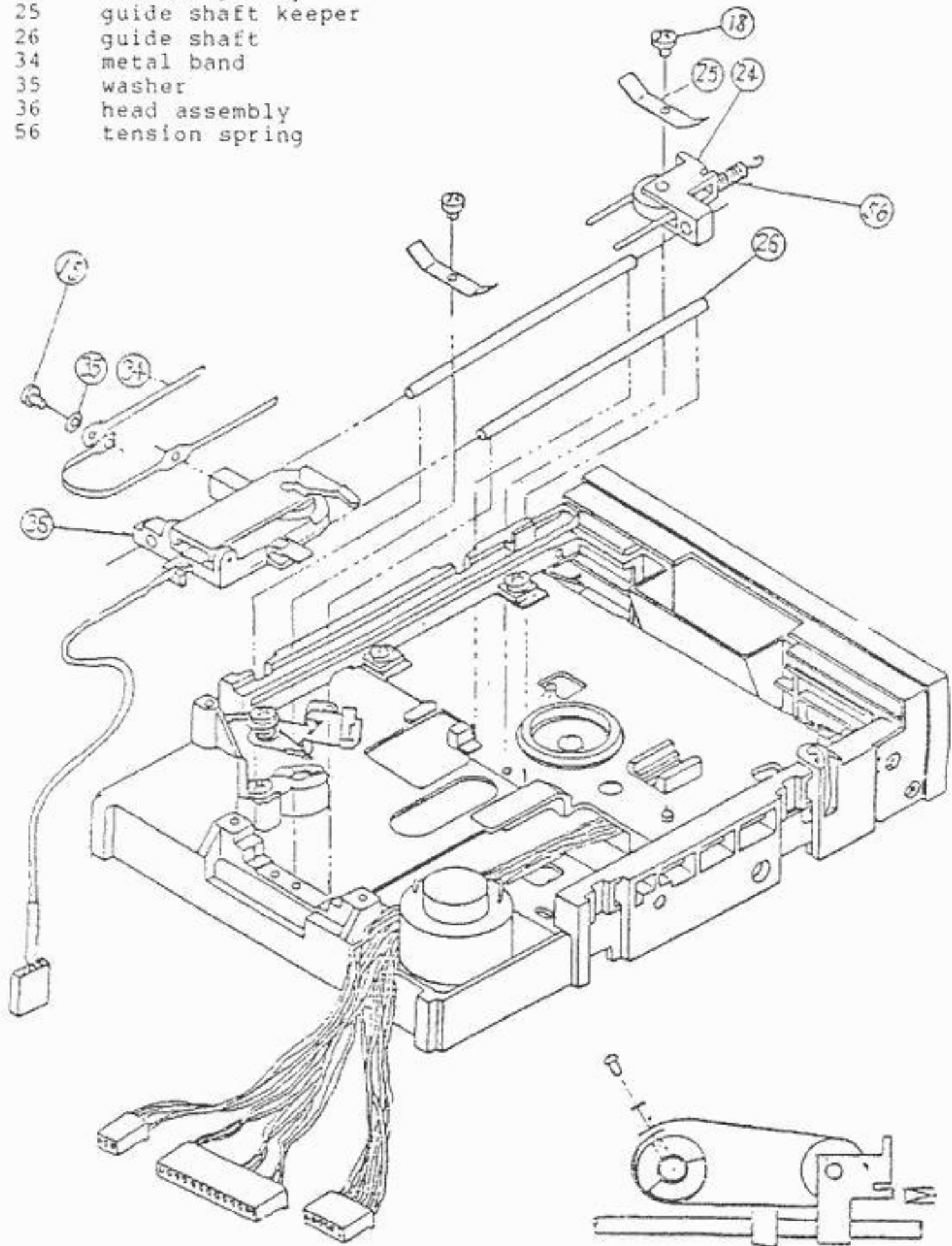


FIG 8

Part	Description
20	binder screw
45	cable clamp
49	cable ties

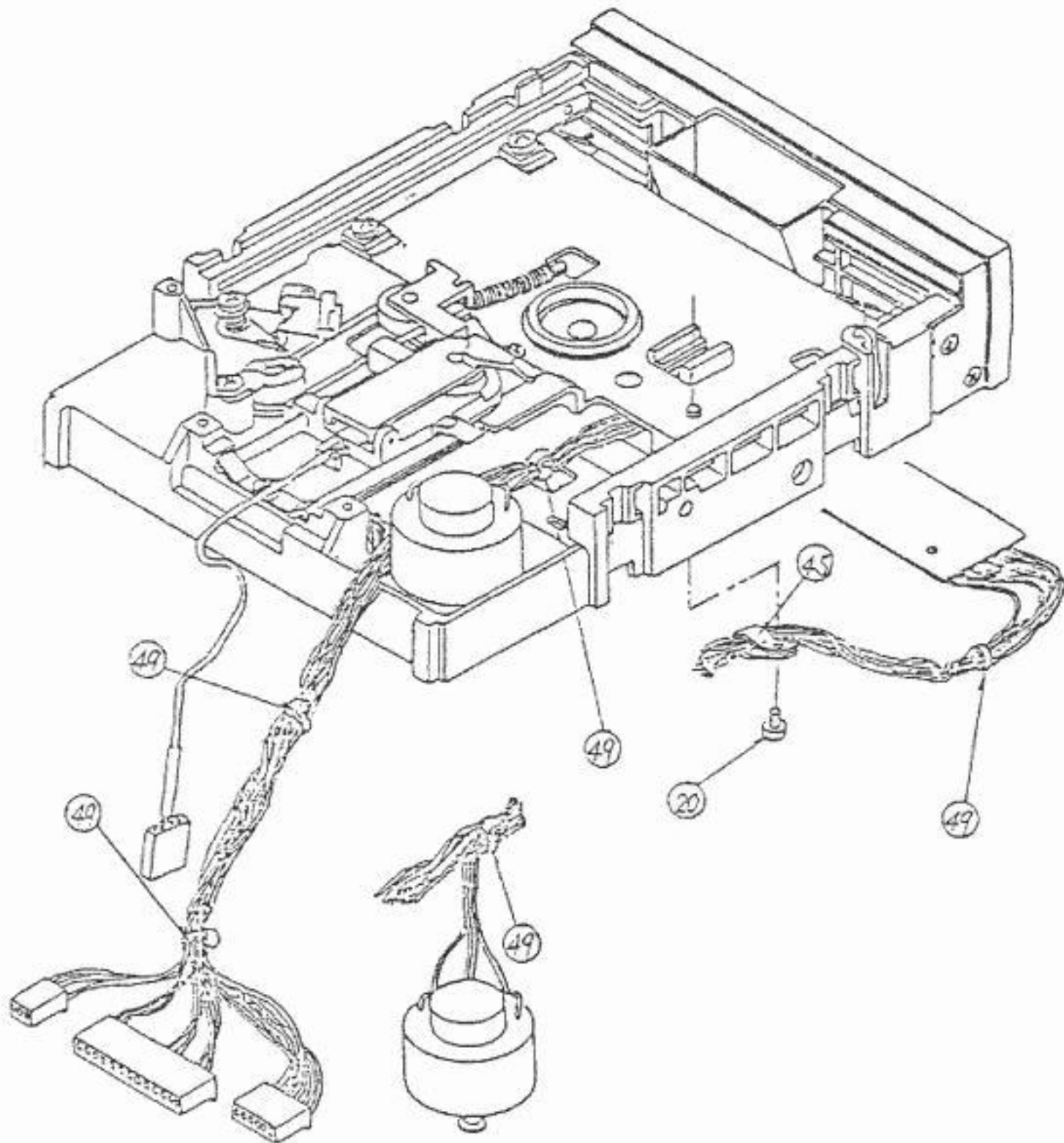
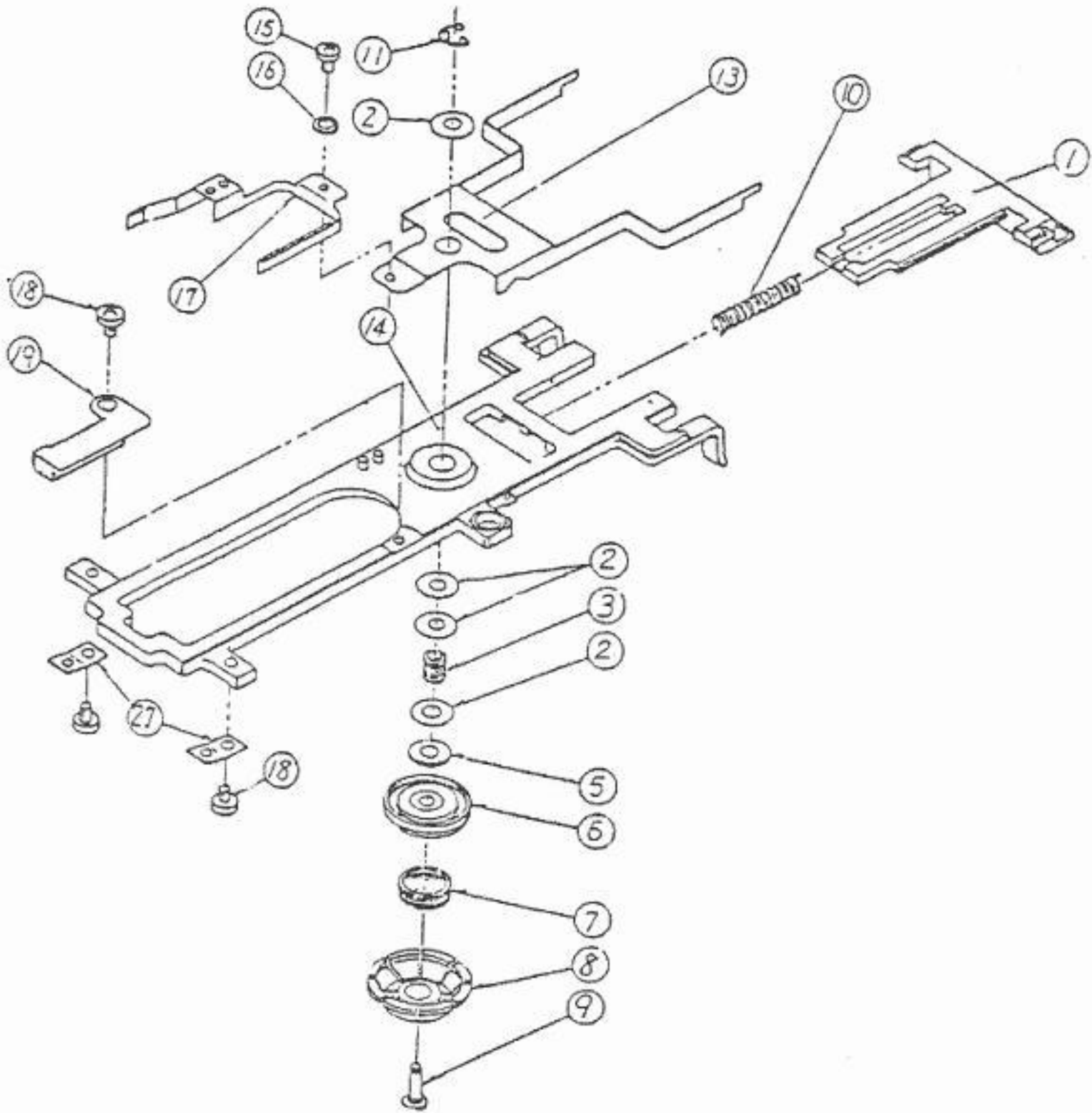


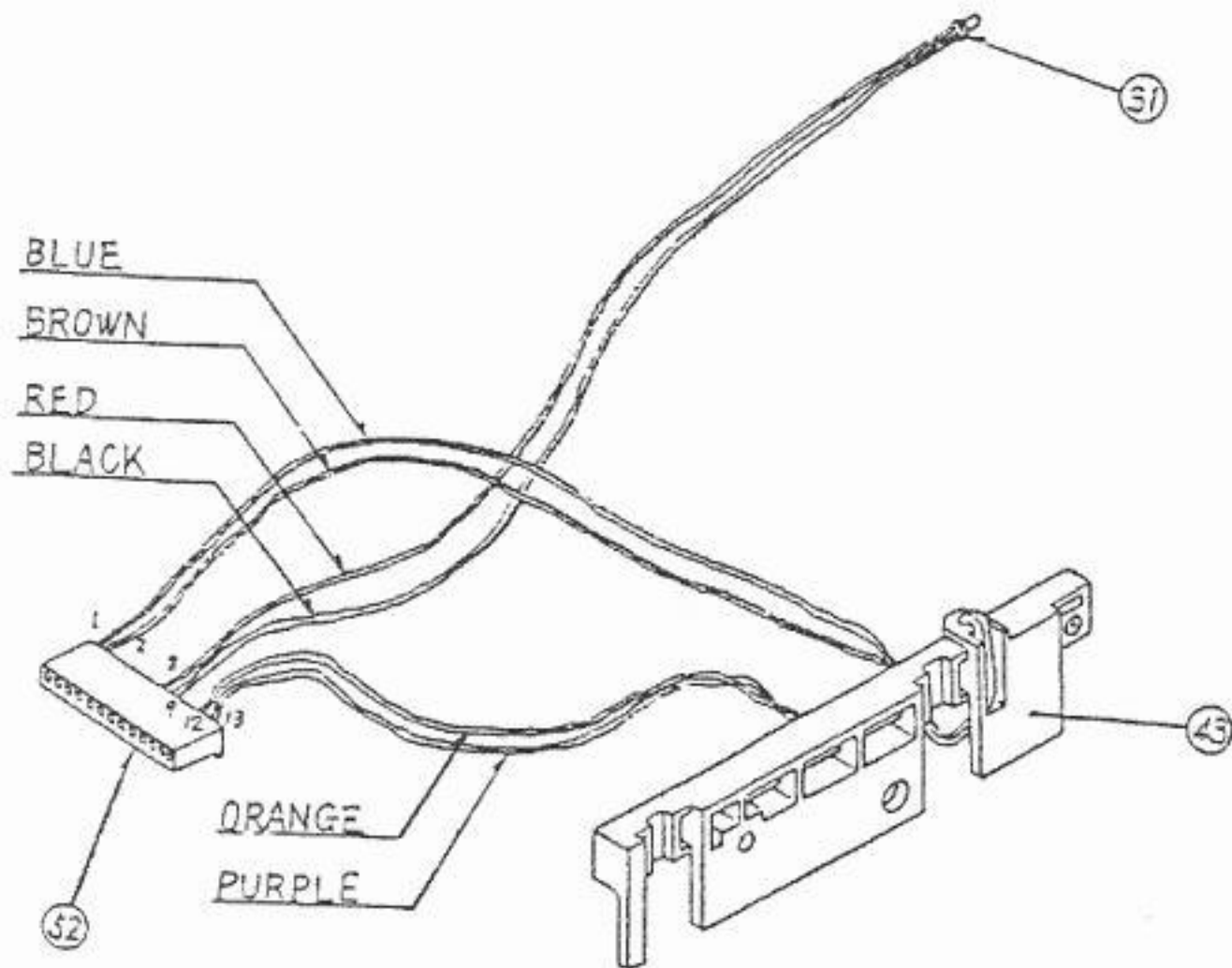
FIG 9

Part	Description	Part	Description
1	door assembly	13	hub support
2	collar	14	hub frame
3	clamp spring	15	binder screw
5	thrust washer	16	spring washer
6	collet assembly	17	arm support assembly
7	hub spring	18	binder screw
8	hub	19	pad plate assembly
9	hub shaft	27	hinge spring
10	door spring	60	collet
11	E-washer	61	collet bearing



2.3.8 FIG. 4, Diskette guide, LED assembly and connector housing.

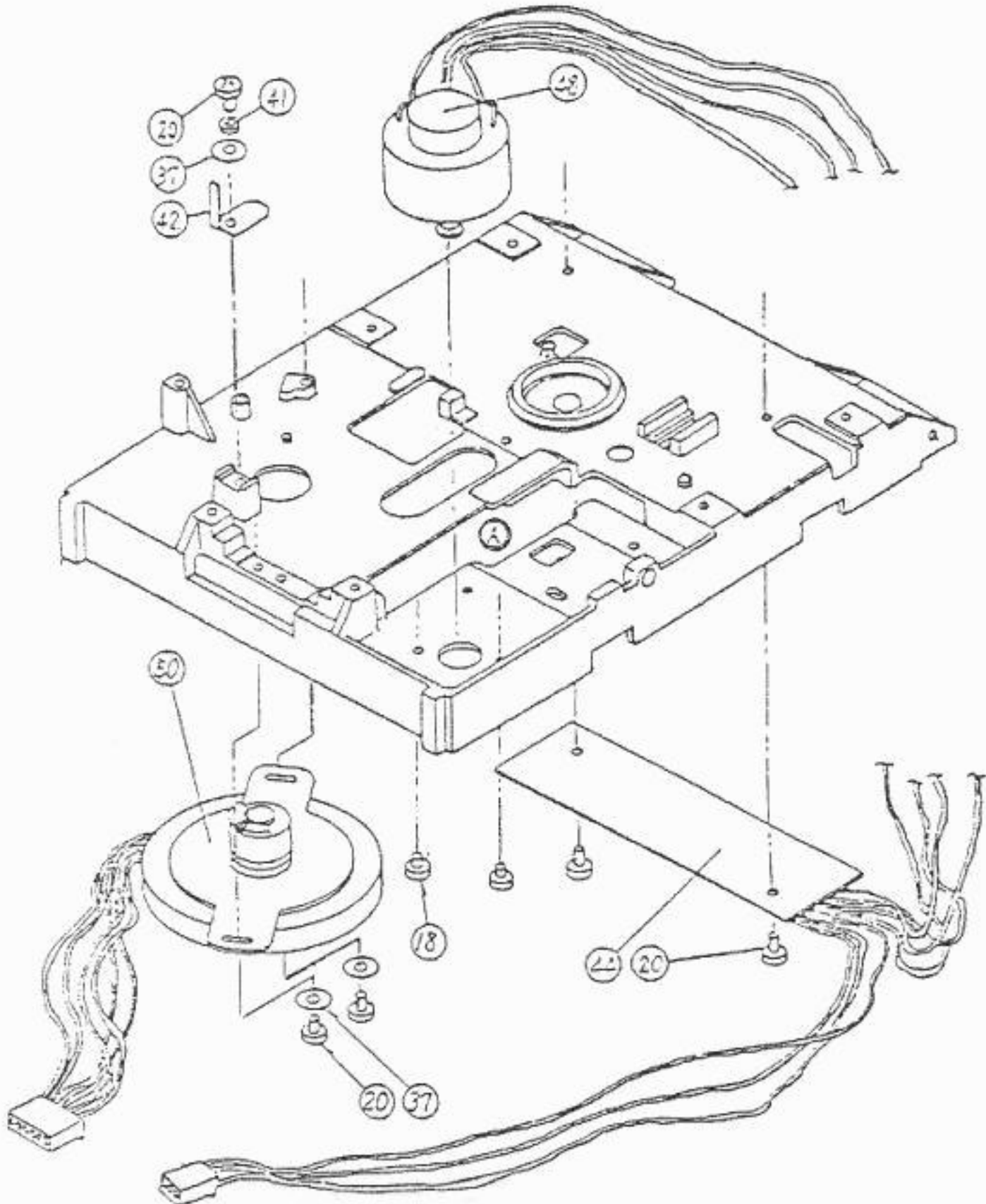
Part	Description
31	LED assembly
43	diskette guide
52	connector housing



- 2.3.9 Secure the D.C. motor from the reverse side of the housing assembly with two screws.
- 2.3.10 Put the motor control PCB into hole 'A' and secure it with two screws.
- 2.3.11 Secure the stepping motor with two screws.
- 2.3.12 Secure the carriage stopper with a screw.
- 2.3.13 Install the connector housing '52' into the hole 'B' and remove through hole 'C'.
- 2.3.14 Secure the two diskette guides '21' and '43' with two screws each.
- 2.3.15 Install the LED holder in the front panel.
- 2.3.16 Insert the LED assembly into the LED holder ring.
- 2.3.17 Install the led into the LED holder, then push the LED holder ring onto the LED holder.
- 2.3.18 Attach the front panel with four flush screws.
- 2.3.19 Secure the eject plate with a screw.
- 2.3.20 Wind the metal band around the tension pulley.
- 2.3.21 Insert the guide shafts into the head assembly. Install the tension pullet as shown in figure 8
- 2.3.22 Secure the guide shaft keepers by two screws each.
- 2.3.23 Wind the metal band around the stepper pulley and secure it with a screw to the stepper motor pulley.
- 2.3.24 Hook the spring to the tension pulley and install unit in the slot in the housing assembly.
- 2.3.25 Hook the opposite end of the spring to the housing assembly.
- 2.3.26 Fasten cable ties to the cables.
- 2.3.27 Secure the cable clamp with a screw as shown in FIG 8.
- 2.3.28 Secure the arm support assembly with a screw to the hub support.
- 2.3.29 Insert the hub shaft into the hub, the hub spring, the collet assy, the thrust washer, the collar, the clamp spring and two collars.
- 2.3.30 Insert the hub shaft into the frame and the hub support and fasten it at the E-washer.
- 2.3.31 Set the door assembly and the door spring at the hub frame.
- 2.3.32 Secure the pad plate assembly with a screw to the frame at the location shown in FIG 9
- 2.3.33 Secure the two hinge springs with two screws each.

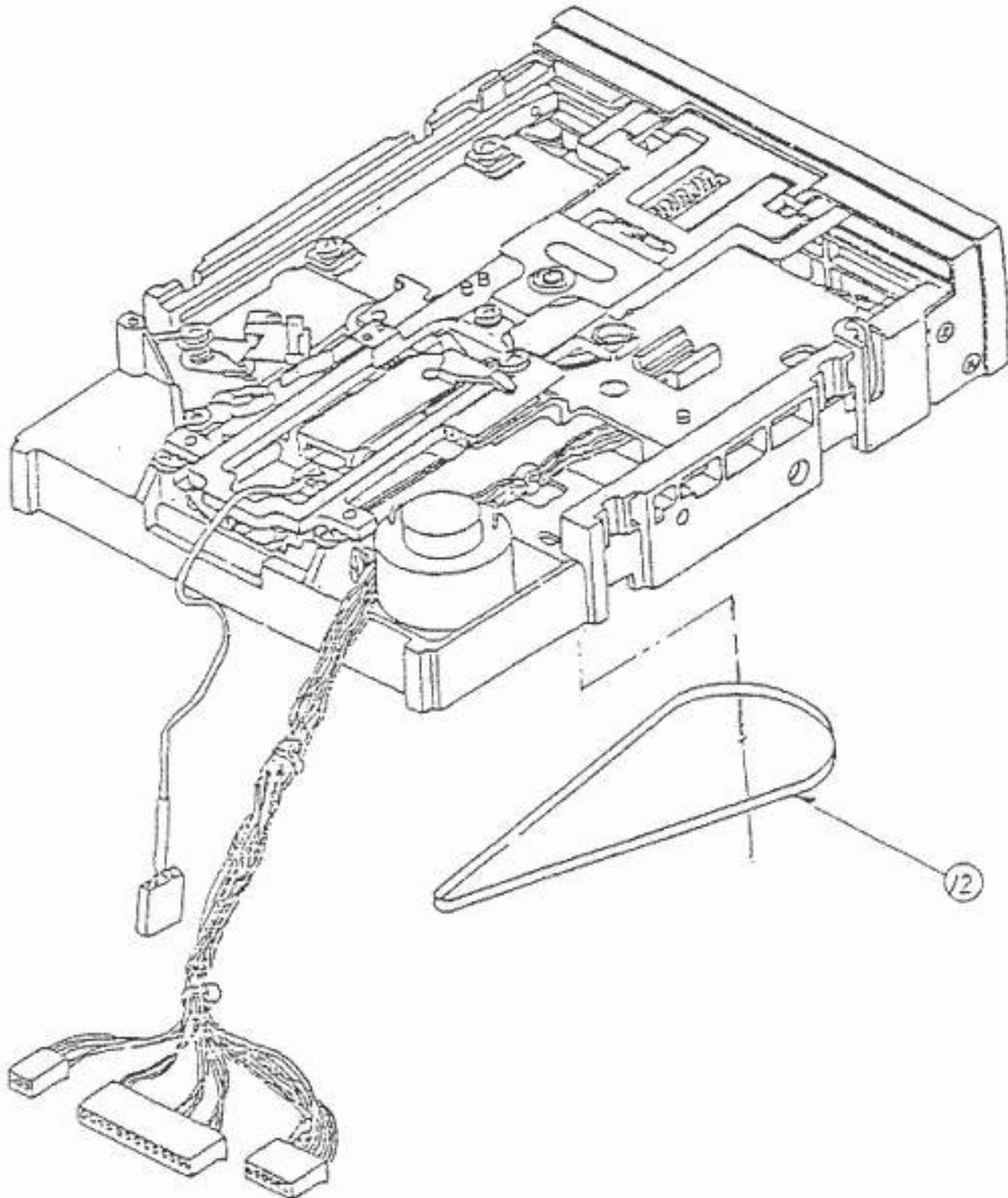
FIG. 5

Part	Description
18	binder screw
20	binder screw
37	washer
41	spring washer
42	carriage stopper
44	motor control PCB
50	stepping motor assembly



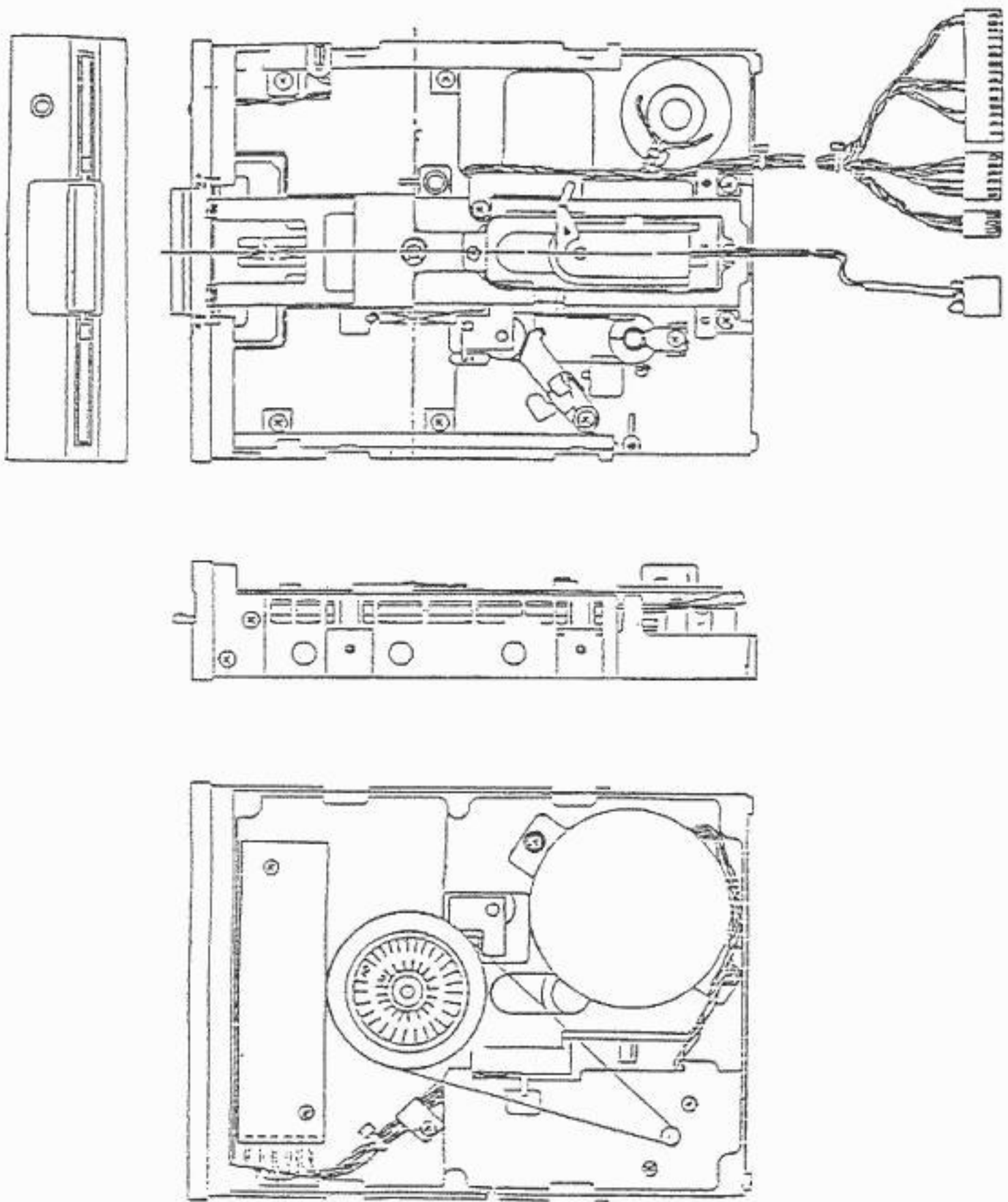
- 2.3.36 Place the belt over the D.C. motor pulley and partially on the spindle pulley.
- 2.3.37 By turning the spindle pulley the rest of the belt will seat completely on the pulley.
- 2.3.38 FIG 10

Part	Description
12	drive belt





2.3.39 FIG 11; Completed Drive Mechanism



### 3.1 Description

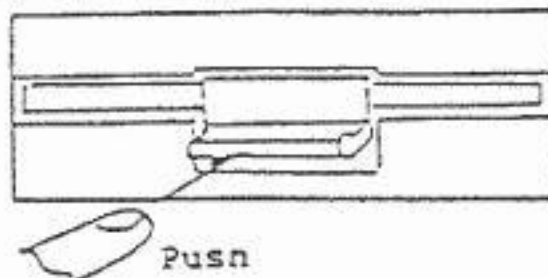
Since the disk drive is placed under direct control of the interface and power supply, no special procedure is required for starting and operation.

### 3.2 Operating procedure

Make sure that the power supply and I/O connector are connected, then insert the disk in accordance with the following procedure.

#### 3.2.1 Inserting the media

- a) Apply DC voltage to the drive.
- b) Open the front door.



- c) With the index hole and write protect notch being placed on the left side of the jacket, push the media in, when the media is fully inserted the locking action can be felt.
- d) Push the door downward and close the door so that it is locked firmly

#### 3.2.2 Extracting the media

- a) Open the front door. The media will pop out automatically to a position where you can extract it easily.
- b) For protection of the recorded data, the media should always be stored in its envelope.
- c) Close the door of the drive.

### 3.3 Media handling procedure

Since the media has been subjected to a write operation it naturally contains information, adequate attention must be paid to its handling.

In order to extend the life of the media and eliminate the causes of errors, it is best to take the following steps:

- a) When writing something on the jacket label of the media, do not use a ball point pen or pencil, use felt-tipped pens.
- b) Do not hold the edges of the media with paper clips or the like.
- c) Do not touch the media exposed in the slot of the jacket.
- d) Do not attempt to clean the media.
- e) Do not keep the media in the areas where there is a strong magnetic field.
- f) The diskette should be kept in its jacket.
- g) Special care should be exercised so that the media is kept free from liquid, dust, metal particles, etc.
- h) Take care not to exceed the following environmental conditions:

Temperature	10 to 51°C
Relative humidity	8 to 80 %

#### 3.4 Seek error

Few seek errors will be experienced due to the low stepping rate, less than 12 msec/track. In case of a seek error, however, recalibration of track position can be performed. This can be done by repeatedly stepping the head towards track 0 until track 0 status is detected.

#### 3.5 Write error

In order to check the quality of the data, perform a read-after-write operation. When data can not be read, rewrite that track and sector once again.

When data can not be read after four such operations track is defective.

#### 3.6 Read error

What happens quite often when performing a read operation is a soft error. A soft error is defined to be a read error which is recoverable by making ten or less read operations. However, in the event no recovery is made in ten operations, move one step from the track in the same direction as the previous step, then return one step. If this fails to read the data, this error is unrecoverable.

### 3.7 Description

Periodic maintenance is indispensable so that this type of peripheral equipment operates properly. It is particularly important to periodically clean the head and check the load pad. Repairs and adjustments should be made in accordance with the procedures below.

### 3.8 Head Cleaning

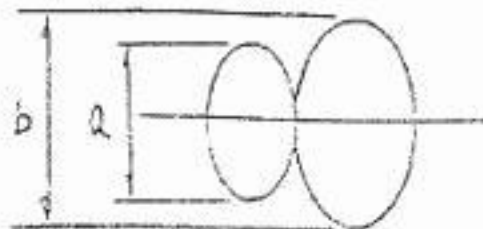
Check for excessive dust or magnetic oxide on the load pad. With the door open (do not move upper arm greater than what is provided by opening the front door) clean head with lint free cotton cloth or 'Q-tip' in 91% isopropyl alcohol. Wipe the head carefully to remove any dust and/or oxide.

### 3.9 Adjustment procedure

In case of a malfunction or parts replacement, make the following adjustments. In order to maintain the interchangeability of the media between drives it is desirable to check each drive against a master alignment diskette.

#### 3.9.1 Track adjustment (radial track)

- a) Connect I/O cable and restore the head to track 00.
- b) Insert a 48tpi alignment diskette and close the door.
- c) Connect two oscilloscope probes to pin 1 and pin 14 of UH6 (592), set oscilloscope to analog mode at 50mV/cm and 200 msec/div.
- d) Load the head and allow it to seek to track 16, check for cats eye wave form. When the cats eye lobe ratio is 70% or less, loosen the stepping motor mounting screws, turn the stepping motor to obtain the lobe ratio of 90% or less.
- e) After allowing the head to track 34, return it to track 16 and recheck the cats eye. If the ratio is correct tighten the stepping motor screws.



$$\frac{a}{b} \times 100 \geq 70$$

Cats eye lobe ratio

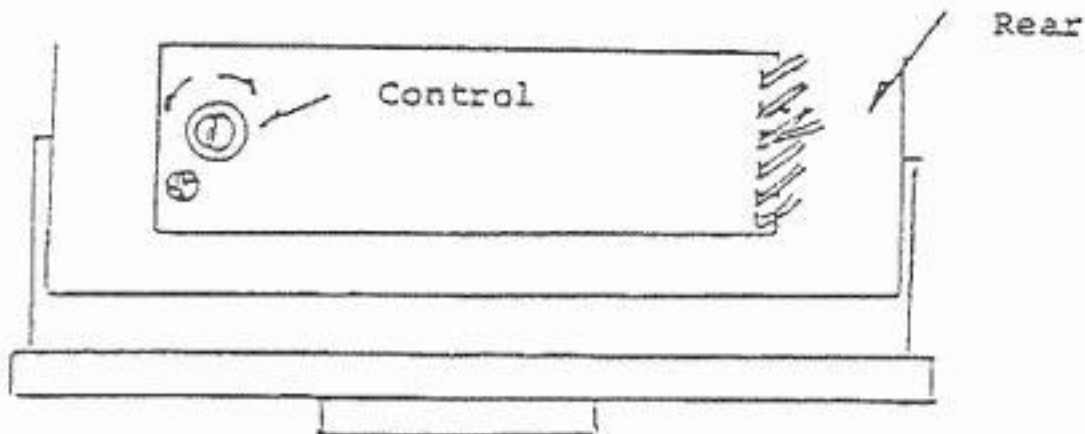
### 3.9.2 Track 00 adjustment

The drive is not provided with a track 00 sensor. To adjust, let the head over step in the track 00 direction and adjust the limiter position to obtain a clearance less than 0.25mm (0.01inches).



### 3.9.3 Speed control

Turn the variable resistor on the motor control board until the tachometer disk on the spindle pulley appears stationary when viewed with a fluorescent lamp.



PART NO.	DESCRIPTION	TITLE: P.C.B ASSY. VIC-1541	
1540048-01	FCC (UL) P.C.B ASSY. VIC-1541. USED LOGIC ARRAY.		

LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	12/10/82	T. Tokub
B		REVISED PER ECO 830085	2/27/83	J. H. S.
C		REVISED PER ECO 830125	3/25/83	J. H. S.

1. SHEET 7 OF 8 OF 8 ARE B-SIZE  
ASSY DWG  
NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	DRAWN BY:	T. Tokub	DATE:	11/16/82	ENGR:	J. H. S.	SIZE:	B	SHEET:	1	OF 8
	CHKD:				APPR.:	J. H. S.					

QUANTITY RECD PER PART / DASH NO.

ITEM	8	PART NUMBER	DESCRIPTION	REF DES	QTY	NOTES
1	B	1540050	PC BOARD 238 x155 x1.6t			GLASS EPOXY. G-10
2						
3						
4						
5	C	1540049-01	SCHEMATIC DRAWING			USED LOGIC ARRAY. FCC (UL)
7						
8						
9						
10						
11						
12	B	901435-01	IC MPS 6502 CPU	UC4		
13	B	901437-01	MPS 6522 VIA	UC2, UC3		
14	B	901229-03	2364-197 ROM	UB4		\$E000 ~ \$FFFF
15	B	325302-01	2364-130 ROM	UB3		\$C000 ~ \$DFFF
16	B	325572-01	LOGIC ARRAY 40 PIN DIP	UC1		
17	B	901521-01	74LS00 2-NAND	UC6		
18	B	901521-17	74LS42 DEC.	UC7		
19	B	901522-01	7417 BUFFER	UD2		
20	B	901521-32	74LS86 2-EX-OR	UD3		
21	B	901522-06	7406 INV. BUF.	UB1, UD1		
22	B	901521-02	74LS04 INV.	UC5		
23	B	901521-30	74LS14 SCH. INV.	UA1		
24	B	901521-26	74LS193 4BIT. COV.	UE6		
25	B	901521-54	74LS197	UD5		
26	B	901522-03	74177	UD5		SUBSTITUTE FOR ITEM 25.
27	B	901510-01	9602	UD4		
28	B	901523-04	LM311	UE4		
29	B	901523-08	IC NE592	UF3, UF4		
30	B	325502-03	IC TMH2016P RAM	UB2		
31	B	325502-01	IC M58725P RAM	UB2		SUBSTITUTE FOR ITEM 30.
32	B	901522-30	IC 7407	UD2		SUBSTITUTE FOR ITEM 19.
33						
34						
35						
36						
37						

commodore

TITLE: PCB ASSY. VIC-1541

DRAWN BY: J.T. Kudo

DATE: 11/16/82

ENGR: J.D.

DATE: 12/7 1982

SIZE: B

REV: C 1540048

SHEET: 2/8

QUANTITY RECD PER PART / DASH NO.

QTY	REF DES	DESCRIPTION	PART NUMBER	QTY	QTY	NOTES
2	Q2-Q7	TRANSISTOR NPN 2SC945	902671	B		
5	Q2-Q7	2SC1815	902693-01			SUBSTITUTE FOR ITEM 38.
4	Q8-Q11	2SD467	902679			
5	Q8-Q11	NPN 2SC2120	902682			SUBSTITUTE FOR ITEM 40.
1	Q1	PNP 2SA673	902720			
4	Q3-Q6	2SA733	902717			
5	Q3-Q6	TRANSISTOR PNP 2SA1015	902744-01	B		SUBSTITUTE FOR ITEM 43.
45						
46						
47						
48						
49						
50						
51						
6	CR2,4,8-11	DIODE RECTIFIER IN4002	900750-02	B		
8	CR6,7,12,14-18	SIGNAL WGT13C	900850-05			
5	CR6,7,12,14-18	SIGNAL IN4148	900850-01			SUBSTITUTE FOR ITEM 53.
1	CR5	ZENER 3.3V 500 mW ±5%	325505-01			HE3C-2
5	CR5	3.3V 500 mW ±5%	325505-02			HE4A-1 SUB. FOR ITEM 55.
5	CR5	3.3V 500 mW ±5%	900948-06			IN3226B SUB. FOR ITEM 55.
1	CR13	5.1V 500 mW ±5%	325506-01			HE5C-2
5	CR13	ZENER 5.1V 500 mW ±5%	900948-11			IN5231 SUB. FOR ITEM 58.
2	CR1,CR3	DIODE BRIDGE 1.5A 50V	900756-01	B		KBP-005
61						
62						
63						
1	Y1	CRYSTAL MODULE 16 MHz 50ppm	325566-01	B		
5	Y1	CRYSTAL MODULE 16 MHz 100ppm	325566-02	B		SUBSTITUTE FOR ITEM 64.
66						
67						
68						
1	L1	COIL, INDUCTOR 2.2 μH	325513-01	B		
2	L9, L10	COIL, INDUCTOR 22 μH	325513-02	B		
3	L8, L11, L12	COIL, INDUCTOR 100 μH	325513-03	B		
72						
73						
74						

**commodore** TITLE: PCB ASSY. VIC-1541  
 DRAWN BY: J. Zickler  
 CHECKED: [Signature]  
 DATE: 11/14/82  
 ENGR: [Signature]  
 APPR: J. H.  
 DATE: 12/17/82  
 SIZE: B  
 REV: C  
 QTY: 3  
 PART NO: 1540048



QTY	QUANTITY REQD PER PART / DASH NO.	PART NUMBER	DESCRIPTION	REF DES	REVISION	NOTES
1	76	B 901528-04	VOLTAGE REGULATOR 12V.1.5A	VR 1		LM340-12 T0-3
1	76	B 901528-03	VOLTAGE REGULATOR 5V.1.2A	VR 2		LM340-5 T0-3
2	79	B 904914	INSULATION MYLAR T0-3			
5	80	B 325551-01	INSULATION SILICONE T0-3			SUBSTITUTE FOR ITEM 79.
2	88	B 903361	CONNECTOR, PIN 6P	P2, P3		
4	87	B 904150-06	SOCKET IC LOW PRO 40 PIN			
3	88	B 904150-03	SOCKET IC LOW PRO 24 PIN			
1	96	B 251065-04	HEADER ASSY. 2.5 PITCH 4 PIN	PB		MOLEX 5048-04 AG
1	97	325562-06	6 PIN	P7		3022-06A
1	98	325562-15	15 PIN	P6		3022-15A
2	99	325562-03	2.5 PITCH 3 PIN	P4, P5		3022-03A
1	100	B 903316-04	HEADER ASSY. 3.96 PITCH 4 PIN	P1		MOLEX 5271-04A
	101					
	102					
	103					
	104					
	105					
	106					
	107					
	108					
	109					
	110					
	111					

commodore	TITLE: PCB ASSY. VIC-1541	DRAWN BY: T. J. ...	DATE: 10/11/83	ENGR: J. D.	DATE: 12/12	SIZE: B	REV: C	SHT: 4
		CHKD:		APPR: J. M.	12/18		1540048	B

QUANTITY REQD PER PART / DASH NO.	REV	8	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
1	112	B	900301-04	CAPACITOR ELECT. 220µF/10V	C13		
1	113		900101-45	6800µF/25V	C17		
1	114		900101-32	4700µF/16V	C16		
2	115		900100-33	47µF/16V	C2,C5		
2	116		900100-32	ELECT. 1µF/25V	C1,C4		
1	117		900402-15	TANTALIUM 10µF/25V	C15		
1	118		900402-11	TANTALIUM 3.3µF/25V	C44		
1	119		900010-52	CERAMIC 150µF/50V	C31		± 5%
2	120		-53	330µF/50V	C32,C36		± 5%
3	121		-54	680µF/50V	C45,C33,C34		± 5%
1	122		-25	1000µF/50V	C41		
24	123		-20	0.1µF/50V	C3,6-10		14,18,19,20,22-30,35,40,43,47,48
2	124		900010-14	CERAMIC 0.022µF/50V	C39,C42		
1	125		900100-40	ELECT. 100µF/16V	C46		
2	126		900402-17	TANTALIUM 0.47µF/25V	C37,C38		
1	127		-08	4.7µF/25V	C21		
1	128		900402-14	TANTALIUM 1µF/16V	C11		
1	129	B	900465-02	CAPACITOR CERAMIC 0.033µF/25V	C12		
	130						
	131						
	132						
	133						
1	134	B	901550-56	RESISTOR CARBON 1/4W ± 5% 47Ω	R1		
2	135	B	901550-108	RESISTOR CARBON 1/4W ± 5% 360Ω	R14,R24		
4	136		-89	150Ω	R17,R45,R46		
4	137		-52	220Ω	R4,16,36,55		
2	138		-14	330Ω	R3,R23		
6	139		-58	470Ω	R10,R2,30,27,38	41	
1	140		-38	510Ω	R27		
6	141		-31	680Ω	R1,R42,R1-50		
6	142		-01	1KΩ	R2,5,6,7,8,R3		
3	143		-53	2KΩ	R9,10,26		
6	144		-18	2.2KΩ	R11,19,21,32-34		
1	145		-69	1.5KΩ	R40		
4	146		-12	22KΩ	R12,35,39,52		
2	147	B	901550-07	RESISTOR CARBON 1/4W ± 5% 100KΩ	R25,R44		
	148						

**commodore** TITLE: PCB ASSY. VIC-1541  
 DRAWN BY: J. J. Kuch / CHKD:  
 DATE: 11/1/82 ENGR: 1/10  
 DATE: 12/7/82 SIZE: B 1540048 REV: C 5/8  
 APPR: T.M.

QTY	PART NUMBER	DESCRIPTION	REF DES	QTY	NOTES
1	901751-43	RESISTOR METAL OXIDE 1/4W 11% 91Ω	R51		
1	-18	100Ω	R28		
1	-44	150Ω	R29		
2	901751-45	RESISTOR METAL OXIDE 1/4W 11% 9.1KΩ	R22, R24		
153					
154					
155					
156					
157					
10	325563-01	FERRITE BEAD	L2-7, 13-16		
5	903025-01	FERRITE BEAD	L2-7, 13-16		SUBSTITUTE FOR ITEM 158.
160					
161					
162					
2	4022048	SHIELD BOX			
2	4022047	SHIELD CAP			
2	1540023	HEAT SINK 70-3			
1	1540011	HEAT SINK REGULATOR			
1/2	904907-01	COMPOUND THER FOR HEAT SINK			
168					
169					
170					
171					
4	925541-05	SCREEN AIR HEAD/EXT TOOTH WASHER M3-12			
2	905655-03	EXTERNAL TOOTH WASHER M3			
4	905960-03	NUT HEX. M3			
175					
176					
4	905477-02	TUBING VINYL 3.5 DIA X 5 MM			
178					
179					
180					
181					
182					
183					
184					
185					

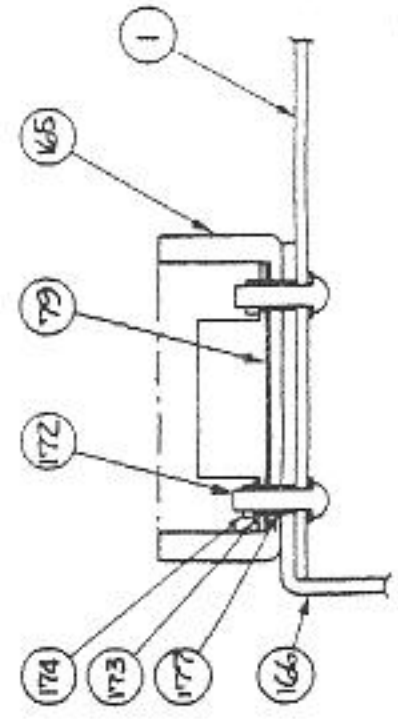
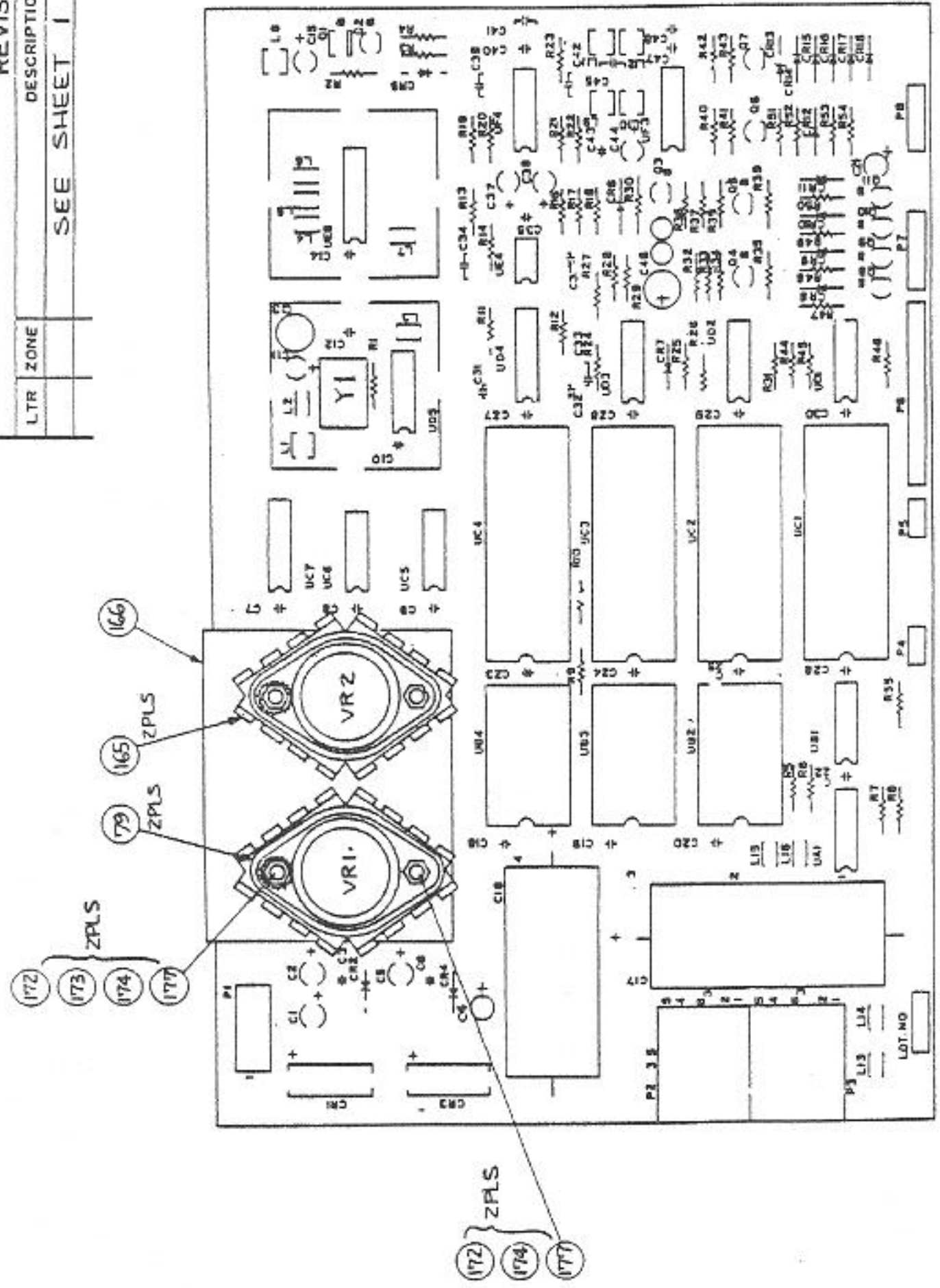
DATE	12/12	DATE	12/12	DATE	12/12
ENGR:	J. Tokuda	ENGR:	10	ENGR:	10
CHKD:	J. Tokuda	CHKD:		CHKD:	
APPR:	17.7	APPR:	17.7	APPR:	17.7
REV	C	REV	C	REV	C
SIZE	B	SIZE	B	SIZE	B
1540048		1540048		1540048	
SHT	6	SHT	6	SHT	6

commodore

TITLE: PCB ASSY. VIC-1541

REVISIONS

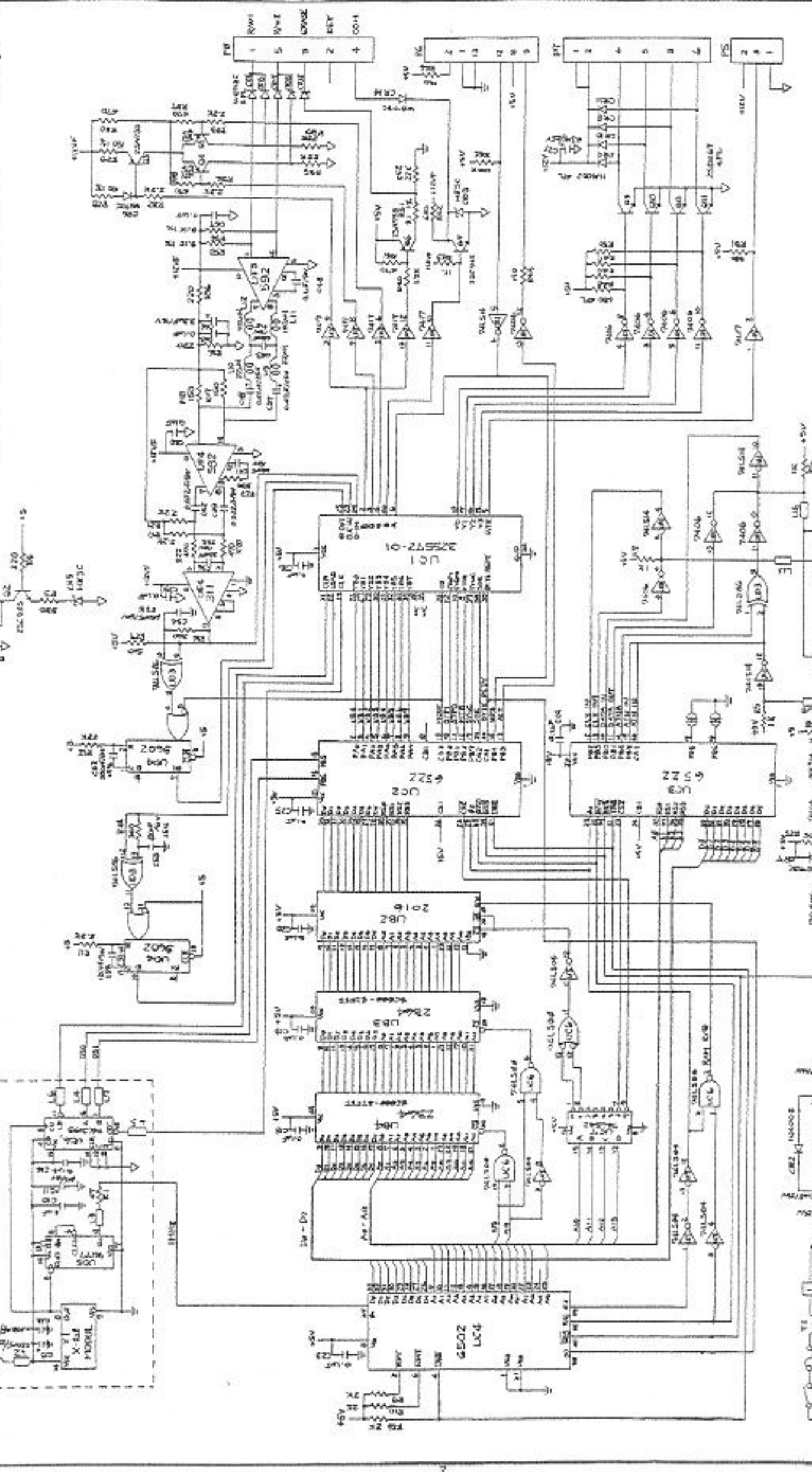
LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



<b>commodore</b>		DATE
P.C.B ASSY		DATE
VIC-1541		DATE
SIZE B	REV C	DATE
SCALE NONE	SHEET 7 OF 8	DATE
DRAWN BY: K. Maruyama		DATE
CHKD BY: T. Iwano		DATE
ENGR BY: P. J. S.		DATE
APPR BY: T. Iwano		DATE
USED ON VIC-1541	NEXT ASSY	
UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XX .XXX .X'S		
MATERIAL:		
FINISH:		

REVISIONS		
LTR	ZONE	DESCRIPTION
A		PRODUCTION RELEASE
B		REV PER ECC 020225

DATE	APPROVED
1/24/71	[Signature]



<b>commodore</b> SMI54 FLOPPY CONTROLLER	
DESIGNED BY: [Name] CHECKED BY: [Name] DRAWN BY: [Name]	USED ON: [List] REV: [List]
USABLE ADDRESS: [List] REGISTER IN: [List] ADDRESS: [List]	SCALE: [List] SHEET 1 OF 2

PART NO.	DESCRIPTION	A	B	C	D	E	DATE	BY	DATE	BY	DATE	BY	DATE	BY
1540001-01	PCB ASSY VIC-1540(FCC) UL	A	5/20/81											
		B	7/24/81											
		C	8/13/81											
		D	7/20/82											
1540001-03	PCB ASSY VIC-1541(FCC) UL	E	7/2/82											

PRODUCTION RELEASE  
 ADDED SHEET 6 OF 7 (FOR FCC)  
 ADDED DASH -03 AND -04  
 ADDED ITEM 6.  
 REVISED PER ECO B30084

THIS ROM CAN BE USED ON ONLY USA · CANADA AND JAPAN'S VERSION FOR SUBSTITUTE FOR ITEM 35.

1. SHEET 6&7 OF 7 ARE B-SIZE  
 ASSY DWG.  
 NOTES.

c b m ENGINEERING OSAKA JAPAN	TITLE Pcb Assy VIC-1540	DRAWN BY Y. Higashi	DATE 7/1/81	DATE 7/1/81	DATE 7/1/81	DATE 7/1/81	DATE 7/1/81
		CHKD C. J.	APPR 8/26/81	APPR 8/26/81	APPR 8/26/81	APPR 8/26/81	APPR 8/26/81
		SIZE E	1540001-		1 of 7		SHEET

QUANTITY REQD PER PART / DASH NO.	REV	PART NUMBER	DESCRIPTION	REF. DES	NOTES
		1540007	P.C. BOARD 3.5x155x1.6t		MTL: GLASS EPOXY 9-10
		1540008-01	SCHEMATIC DIAGRAM		
1	6	901229-03	IC 2364-197 ROM	UAB5	\$E000 ~ \$FFF
1	7	901435-01	IC MPS 6502 CPU	UCD5	
1	8	325302-01	2364-130 ROM	UAB4	\$C000 ~ \$DFFF
1	9	325303-01	2364-131 ROM	UAB5	\$E000 ~ \$FFFF
2	10	901437-01	MPS 6522 VIA	UAB1,UCD4	
4	11	901471-01	MPS 2114 RAM	UA2,3,UB2,3	
2	12	901521-01	74LS00 2-NAND	UB7,UF5	
1	13	901521-21	74LS02 2-NOR	UE5	
1	14	901521-02	74LS04 INV.	UB6	
1	15	901521-24	74LS10 3-NAND	UF3	
1	16	901521-30	74LS14 SCH. INV.	UC1	
1	17	901521-17	74LS42 DEC.	UB8	
2	18	901521-06	74LS74 D-FF	UE4,UF6	
1	19	901521-32	74LS86 2-EX-OR	UG2	
1	20	901521-15	74LS133 13-NAND	UC2	
1	21	901521-18	74LS139 Dem.P	UE2	
1	22	901521-28	74LS164 8 Bit Shift Reg	UD2	
1	23	901521-12	74LS165 8 Bit Shift Reg	UD3	
1	24	901521-40	74LS191 4 Bit Count.	UE3	
2	25	901521-26	74LS193 4 Bit Count.	UE7,UF4	
1	26	901521-45	74LS245 Bus Transceiver	UC3	
1	27	901522-32	7402	UC7	
2	28	901522-06	7406 INV. OC.	UD1,UF2	
1	29	901522-03	74177	UC6	
1	30	901510-01	9602	UG3	
1	31	901523-04	LM311	UH4	
2	32	901523-08	NE592	UH5,UH7	
1	33	901522-01	7417	UG4	
5	34	901521-54	74LS197	UC6	
5	35	901229-02	2364-186 ROM	UAB5	SUBSTITUTION FOR ITEM 29
5	36	901229-01	IC 2364-173 ROM	UAB5	\$E000 ~ \$FFFF SUB. FOR ITEM 6.
					\$E000 ~ \$FFFF SUB. FOR ITEM 6.

DATE: 1/11  
 SIZE: B  
 1540001-2 of 7

DATE: 1/11  
 DRAWN BY: D. Johnson  
 CHNO: 8/21/88  
 APPR:

TITLE: PCB ASSY VIC-1540

c b m ENGINEERING  
 OSAKA JAPAN

QUANTITY REQD PER PART/DASH NO.	PART NUMBER	DESCRIPTION	REF. DES	NOTES	DATE		SIZE		SHEET
					DATE	DATE	DATE	DATE	
	902671	TRANSISTOR NPN 2SC945	02, Q3						
	902693-01	NPN 2SC1815	02, Q3	SUBSTITUTION FOR ITEM 37					
	902679	NPN 2SD467	04-07						
	902682	NPN 2SC2120	04-07	SUBSTITUTION FOR ITEM 39					
	902720	PNP 2SA673	01						
	902717	PNP 2SA733	08-Q11						
	902744-01	TRANSISTOR PNP 2SA1015	08-Q11	SUBSTITUTION FOR ITEM 42					
	901522-30	IC 7407	UG4	SUBSTITUTION FOR ITEM 33					
	900750-02	DIODE, SIGNAL IN4002	CR7, 4, 13-16						
	900850-05	SIGNAL WIG 713C	CR6-11, 17, 18						
	900850-01	SIGNAL IN4148	CR6-11, 17, 18	SUBSTITUTION FOR ITEM 47					
	325505-01	GENER 3.3V 500mW ±5%	CR5	HZ3C-2					
	325505-02	3.3V 500mW ±5%	CR5	HZ4A-1 SUB. FOR ITEM 49					
	900948-06	3.3V 500mW ±5%	CR5	IN5226B SUB. FOR ITEM 49					
	325506-01	5.1V 500mW ±5%	CR12	HZ5C-2					
	900948-11	GENER 5.1V 500mW ±5%	CR12	IN5231 SUB. FOR ITEM 52					
	900756-01	BRIDGE 1.5A 50V	CR1	KBP-005					
	900755-02	BRIDGE 4A 50V	CR3	KBL-02					
	900556-02	CRYSTAL 16MHz	Y1						
	325513-01	COIL, INDUCTOR 2.2mH	L1						
	325513-02	COIL, INDUCTOR 22mH	L8, L11						
	325513-03	COIL, INDUCTOR 100mH	L7, L9, L10						
	901528-04	VOLTAGE REGULATOR 12V 1.5A	VR1	LM340-12					
	901528-01	VOLTAGE REGULATOR 5V 3A	VR2	LM323					
	904914	INSULATION MYLAR 70-3		ATTACHED WITH VOLT REGULATOR					
	325551-01	INSULATION SILICONE 70-3		SUBSTITUTION FOR ITEM 65.					
	903361	CONNECTOR, DIN 6PIN	P3, P4	HASHIDENKI TCS4460-01-101					
	904150-06	SOCKET IC LOW PRO. 40PIN							
	904153-03	SOCKET IC LOW PRO. 24PIN							

c b m ENGINEERING  
 OSAKA JAPAN  
 TITLE: PCB ASSY VIC-1540  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 DATE: / /  
 DATE: / /  
 DATE: / /  
 DATE: / /  
 APPR: [Signature]  
 SIZE: B  
 SHEET: 3 of 7



QUANTITY REQD PER PART/DASH NO.	E	PART NUMBER	DESCRIPTION	REF. DES	NOTES
1	B	325514-04	HEADER ASSY 2.5 PICH RANG. 4PIN	P2	MOLEX 5049-04AG
1	B	325515-06	6PIN	P7	3094-06A
1	B	325515-15	15PIN	P6	3094-15A
2	B	325515-03	2.5 PICH RANG. 3PIN	P5, P8	3094-03A
1	B	903316-04	HEADER ASSY 3.96 PICH 4PIN	P1	MOLEX 5271-04A
1	B	900100-03	CAP. ELECTROLYTIC 220 μF/25V	C65	
1	B	900101-44	CAP. ELECTROLYTIC 1000 μF 16V	C52	AXIAL LEAD φ22x.52
1	B	900101-45	6800 μF 25V	C51	AXIAL LEAD φ22x.52
2	B	900100-33	47 μF 16V	C2, C5	
2	B	900100-32	1 μF 25V	C1, C4	
1	B	900402-15	ELECTROLYTIC	C12	
1	B	900402-11	TANTALIUM	C23	
1	B	900010-51	TANTALIUM	C10	
1	B	900010-52	CERAMIC	C33	± 5%
2	B	900010-53	1.50PF 50V	C28, C49	± 5%
3	B	900010-54	3.30PF 50V	C16, C27, C50	± 5%
1	B	900010-25	680PF 50V	C26	
40	B	900010-20	1000PF 50V		28, 29, 32, 34, 48, 53, 55, 57, 60, 61
2	B	900010-14	0.1 μF/50V	C3, 6, 9, 11, 13, 14, 17, 22	
1	B	900100-40	CERAMIC 0.022 μF 50V	C58, C59	
2	B	900402-17	ELECTROLYTIC 100 μF 16V	C56	
1	B	900402-08	CAP. TANTALIUM 0.47 μF 16V	C15, C24	± 20%
1	B	900402-14	CAP. TANTALIUM 4.7 μF 25V	C62	
1	B	900465-02	CAP. TANTALIUM 1 μF 10V	C63	
2	B	901550-108	CAP. CERAMIC 0.033 μF 25V	C64	
1	B	901550-56	RESISTOR, CARBON 1/4W 5% 360 Ω	R25, R30	
4	B	901550-89	RESISTOR, CARBON 1/4W 5% 47 Ω	R3	
4	B	901550-52	RESISTOR, CARBON 1/4W 5% 150 Ω	R18, R19, R35, R36	
5	B	901550-14	220 Ω	R4, R6, R7, R45	
6	B	901550-58	330 Ω	R1, R2, R5, R20, R37	
1	B	901550-38	470 Ω	R27, R28, R29, R30, R35, R37	
5	B	901550-31	510 Ω	R24	
8	B	901550-01	680 Ω	R9, R39, R42	
4	B	901550-53	1 K Ω	R6, R11, R31-34, R44, R47	
6	B	901550-18	2 K Ω	R21, R23, R38	
			RESISTOR, CARBON 1/4W 5% 2.2 K Ω	R2, R10, R12, R13, R14, R15, R16, R17, R20, R22, R26, R32, R33, R34, R36, R40, R41, R43, R46, R48, R49, R50, R51, R52, R54, R56, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108	

TITLE: PCB ASSY VIC-1540  
 DRAWN BY: A. Takashi 5/12/71  
 DATE: 1/1  
 CHECKED: A. Takashi 5/12/71  
 DATE: 1/1  
 APPR.:  
 DATE: 1/1  
 SIZE: B  
 SHEET: 4 of 7

C b m ENGINEERING  
 OSAKA JAPAN

QUANTITY REQD PER PART/DASH NO.	QTY	PART NUMBER	DESCRIPTION	REF. DES	QTY	NOTES
1	109	B	RESISTOR, CARBON 1/4W 5% 1.5K $\Omega$	R48		
4	110	B	RESISTOR, CARBON 1/4W 5% 22K $\Omega$	R49, R49.53		
2	111	B	RESISTOR, CARBON 1/4W 5% 100K $\Omega$	R43, R46		
1	112	B				
1	113	B	RESISTOR, METAL OXIDE 1/4W 1% 91 $\Omega$	R8		
1	114	B	RESISTOR, METAL OXIDE 1/4W 1% 100 $\Omega$	R49		
1	115	B	RESISTOR, METAL OXIDE 1/4W 1% 150 $\Omega$	R54		
2	116	B	RESISTOR, METAL OXIDE 1/4W 1% 9.1 K $\Omega$	R12, R43		
	117					
	118					
	119					
	120					
10	121	B	FERRITE BEAD	12-16, 12-16B		
	122					
	123					
2	124	B	SHIELD BOX			
2	125	B	SHIELD CAP			
2	126	B	HEAT SINK T0-3			
1	127	B	HEAT SINK REGULATOR			
1	128	B	COMPOUND THER FOR HEAT SINK			CONJUNCTION WITH ITEM 65
	129					
	130					
	131					
4	132	B	SCREW PAN HEAD M3x10			
4	134	B	EXTERNAL TOOTH WASHER M3			
4	135	B	NUT HEX. M3			
	136					
4	137	B	TUBE VINYL $\phi$ 3.5 x L5mm			
	138					
	139					
	140					
	141					
	142					
	143					
	144					
	145					

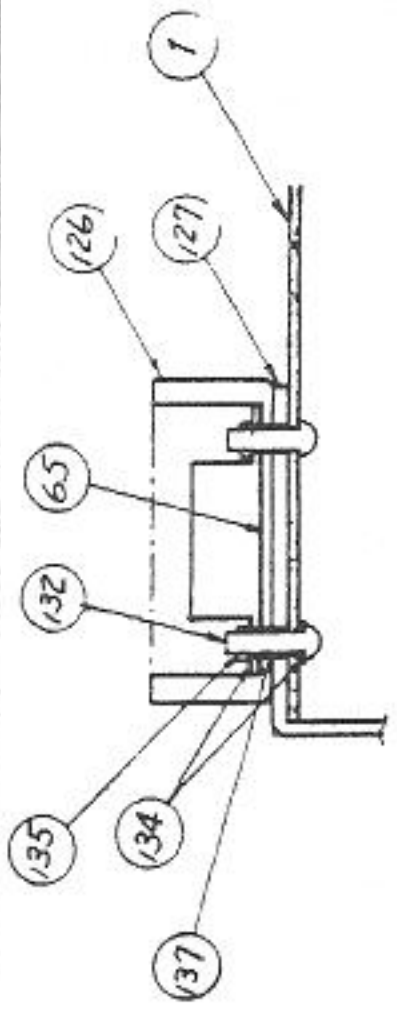
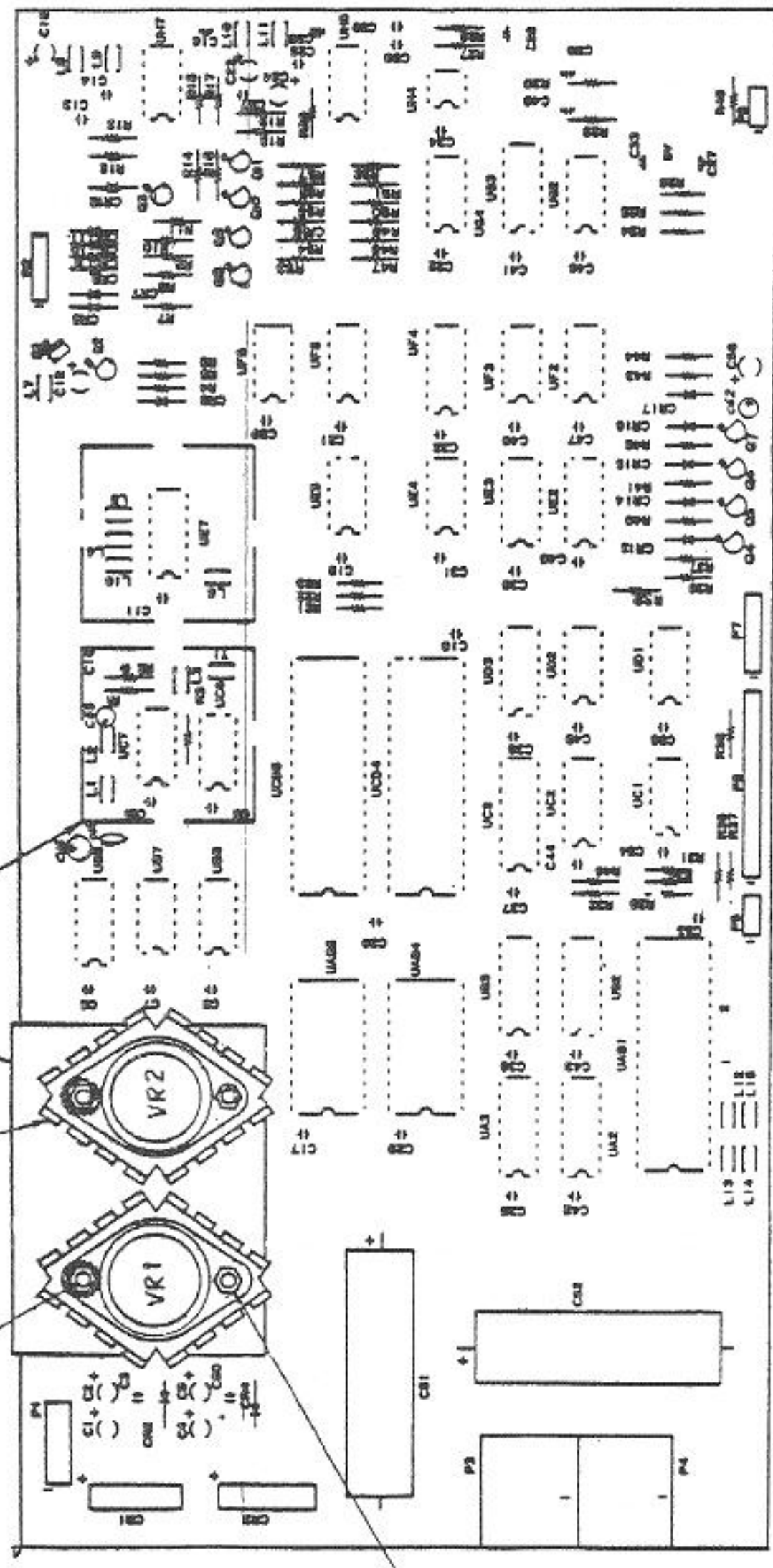
DRAWN BY: C. Takahashi DATE: 1/1 / 11 / 11 APPR: 1540001-5 of 7  
 CHECKED: C. Takahashi DATE: 1/1 / 11 / 11 APPR: 1540001-5 of 7  
 TITLE: PCB ASSY VIC-1540  
 DATE: 1/1 / 11 / 11

c b m ENGINEERING  
 OSAKA JAPAN

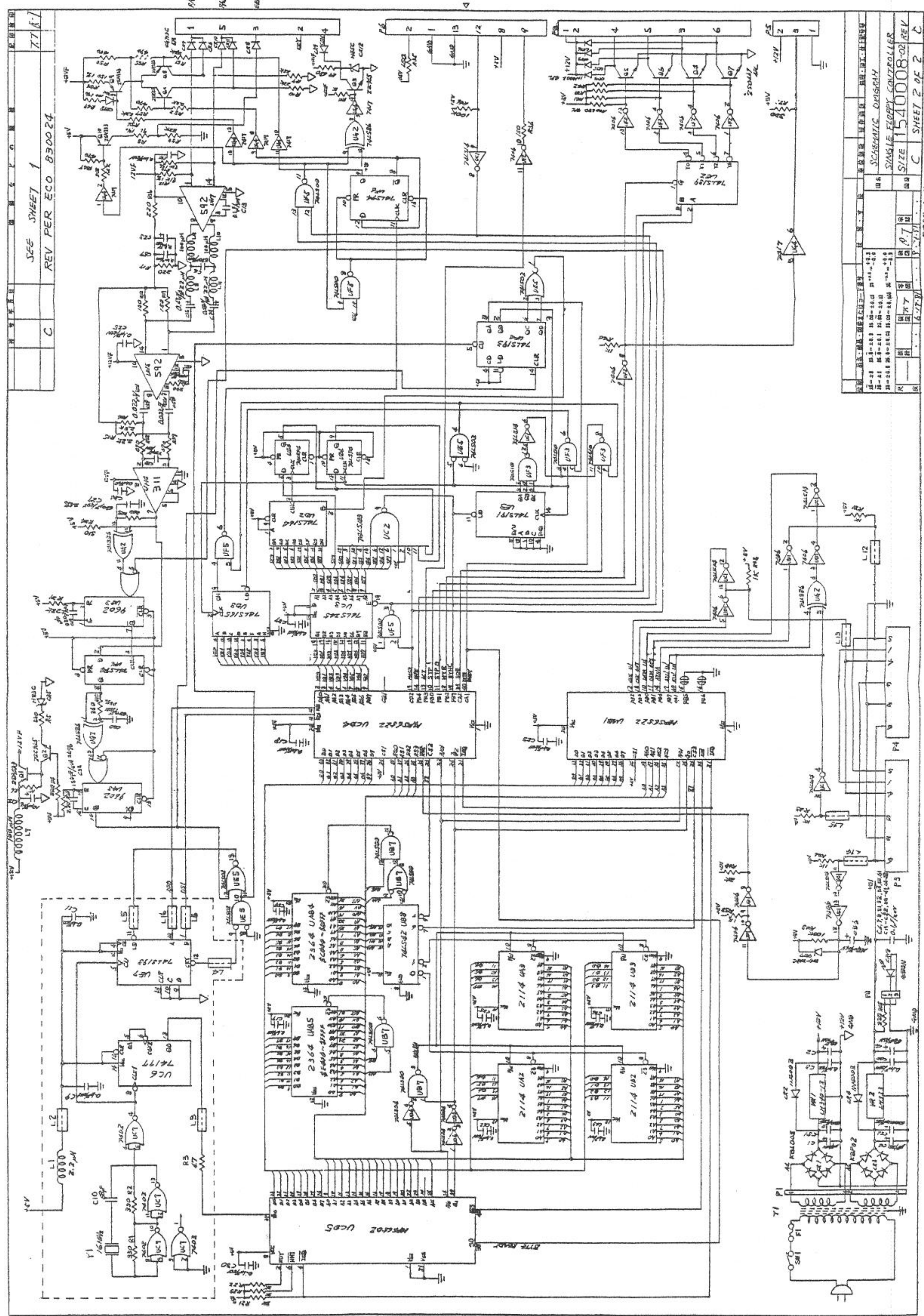
REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		
				A-7

- (135) (137) (134) 2 PLS (132)
- (126) (127) (124) 2 PL (125)
- (135) (132)



DRAWN BY: I. Takahashi		DATE: 9/14/71
CHECKED BY:		
DESIGNED BY:		
APPROVED BY:		
USED ON: VIC-1540 VIC-1541		NEXT ASSY:
MATERIAL:		
FRESH:		
TOLERANCES UNLESS SPECIFIED: DIMENSIONS ON DECIMALS: .X .X1 .X15 .X2 .X3 .X4 .X5 .X6 .X7 .X8 .X9 .X10 .X15 .X20 .X30 .X40 .X50 .X60 .X70 .X80 .X90 .X100 .X150 .X200 .X300 .X400 .X500 .X600 .X700 .X800 .X900 .X1000		
C b m OSAKA JAPAN		
PCB ASSY. VIC-1540		
SIZE B	REV E	SCALE A/G/E SHEET 6 OF 7



REV PER ECO 830024

SEE SHEET 1

7.7.R.1

C

SCHEMATIC DISPLAY

SINGLE FLOPPY CONTROLLER

SIZE 1540008-02

REV 2

REV 1

REV 2

REV 3

REV 4

REV 5

REV 6

REV 7

REV 8

REV 9

REV 10

REV 11

REV 12

REV 13

REV 14

REV 15

REV 16

REV 17

REV 18

REV 19

REV 20

8012

UAB4

UAB5

UAB6

UAB7

UAB8

UAB9

UAB10

UAB11

UAB12

UAB13

UAB14

UAB15

UAB16

UAB17

UAB18

UAB19

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UAB86

UAB87

UAB88

UAB89

UAB90

UAB91

UAB92

UAB93

UAB94

UAB95

UAB96

UAB97

UAB98

UAB99

UAB100

PART NO.	DESCRIPTION	REV	DATE	BY	REVISION	QTY
1540002-01	POWER SUPPLY ASSY VIC-154G UL	A	7/16/81		PRODUCTION RELEASE	1
		B			CHANGED FILTER POWER CONNECTOR FOR CSA (ITEM 24 WAS ITEM 23)	7.7
		C	8/14/82		CHANGED FILTER POWER CONNECTOR FOR FCC (ITEM 25 WAS ITEM 23)	7.7
		D	9/22/82		CHANGED ACCESSORY OF TRANSFORMER	7.7
		E	9/17/82		CHANGED SCREW TO M3-6 FROM M3-8. ADDED DASH 06 THRU 10 AND ITEM 21.	7.7
		F	12/7/82		ADDED ITEM 8, 9 AND 63. ADDED SHEET 5 OF 5.	7.7
		G	2/8/83		REVISED PER ECO 830060	80
		H	7/5/83		REVISED PER ECO 830101	80

-06 VIC-154I UL

4. NO CHANGE QTY FOR ITEM 54 IF USED ITEM 6 OR 7.
3. USE ONLY WHEN USED ITEM 8 OR 9.
2. IF ITEM 8 OR 9 ARE USED THEN QTY FOR ITEM 54 WILL CHANGE FROM 7 TO 9 PCS AND USED WITH ITEM 63.
1. SHEET 4 & 5 OF 5 ARE D-SIZE ASSY DWG. NOTES.

c b m ENGINEERING OSAKA JAPAN	TITLE: POWER SUPPLY ASSY VIC-154G	DRAWN BY:	DATE:	SIZE:	SHEET
		Y. IMAI	1/1	B	1540002-1 of 5
		CHKD:	DATE:		
			1/1		

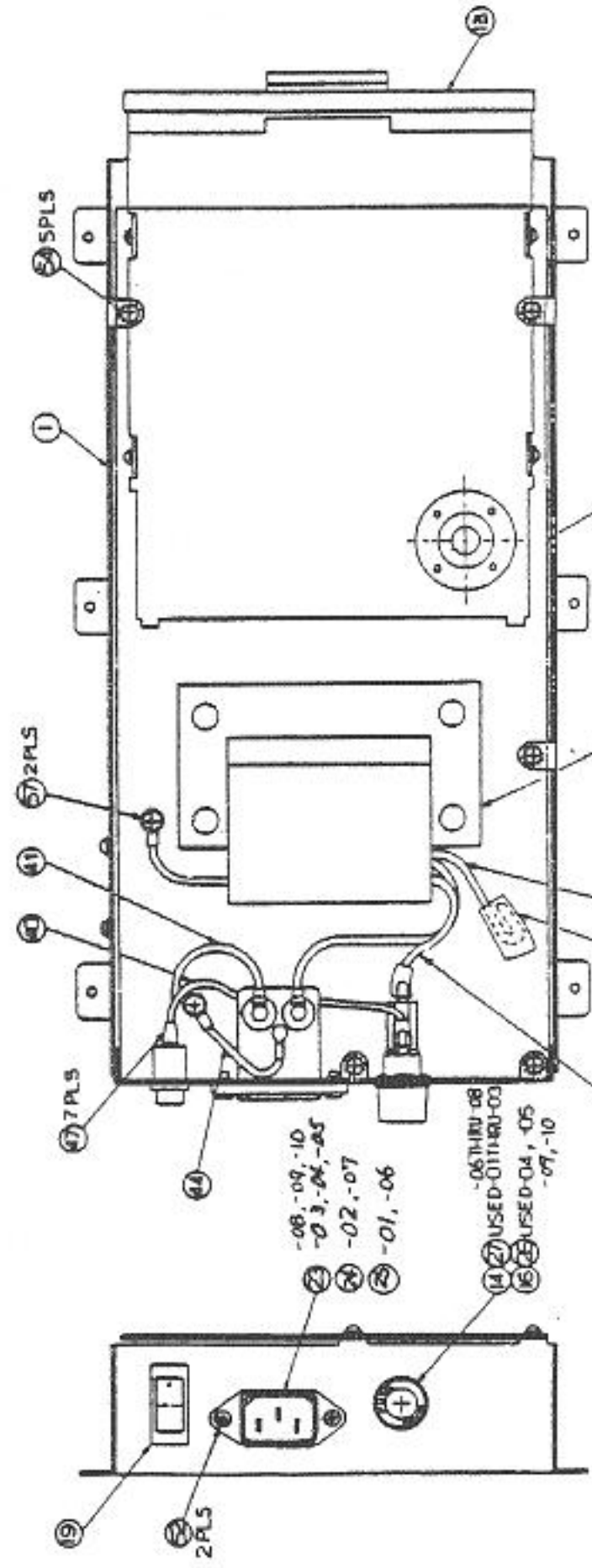
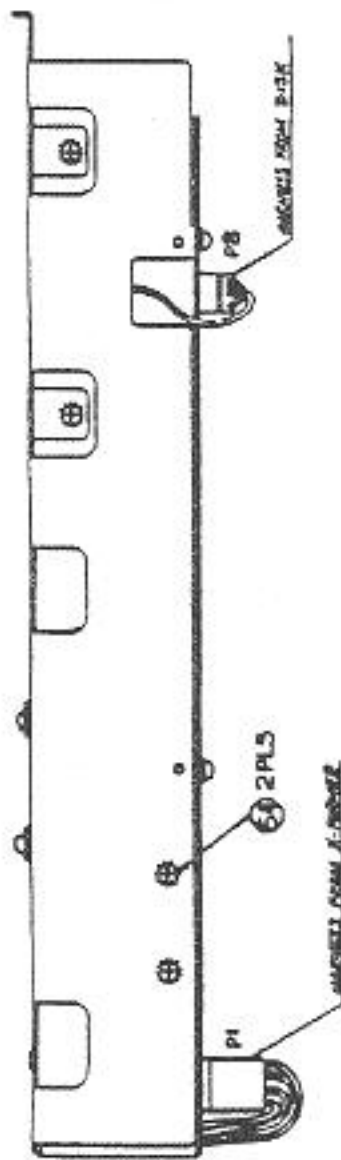
QUANTITY RECD PER PART / DASH NO.		QTY	UNIT	PART NUMBER	DESCRIPTION	REF. DES	NOTES									
10	09	08	07	06	05	04	03	02	01	1	D	1540012	POWER CHASSIS			SUBSTITUTE FOR ITEM 2. SEE NOTE 2
										2	D	251153	POWER CHASSIS			SEE NOTE 3
										3						
										4	B	1540001 - 01	PCB ASSY (FCC) UL			SUBSTITUTE FOR ITEM 8
										5	B	1540001 - 02	PCB ASSY			SUBSTITUTE FOR ITEM 9
										6	B	1540001 - 03	PCB ASSY (FCC) UL			USED LOGIC ARRAY
										7	B	1540001 - 04	PCB ASSY			USED LOGIC ARRAY
										8	B	1540048 - 01	PCB ASSY (FCC) UL			
										9	B	1540048 - 02	PCB ASSY			
										10						
										11						
										12	B	325519 - 01	FLOPPY DISK (BLACK)			SUBSTITUTE FOR ITEM 13
										13	B	325519 - 02	FLOPPY DISK (BROWN)			
										14	B	903614 - 01	FUSE HOLDER FH 032			
										15						
										16	B	903615 - 01	FUSE HOLDER FH 033			
										17						
										18						
										19	B	904509 - 01	SWITCH, ROCKER	S.W.I		
										20						
										21	B	325552 - 01	FILTER POWER CONNECTOR			SUBSTITUTE FOR ITEM 23 (TOKIN)
										22						SUBSTITUTE FOR ITEM 23
										23						
										24						
										25	B	903467 - 03	FILTER POWER CONNECTOR			SUBSTITUTE FOR ITEM 23 (MURAI PA-126)
										26						
										27	B	903555 - 20	FUSE, SLO BLO 250V 1.0A			5.2" x 20mm
										28						6.3" x 30mm
										29	C	1540009 - 01	POWER TRANSFORMER UL 120/100V	T 1		
										30	C	1540009 - 02	POWER TRANSFORMER C.S.A	T 1		
										31						
										32						
										33	B	325548 - 04	SCREEN PAN HEAD WITH SPRING WASHER MS-10			TO BE ATTACHED WITH X-FORMER
										34						
										35						
										36						

c b m ENGINEERING OSAKA JAPAN		DRAWN BY: <u>T. HIRAYAMA</u> DATE: <u>11/11</u>		DATE: <u>11/11</u>	SIZE: <u>B</u>	SHEET: <u>2</u> OF <u>5</u>
TITLE: POWER SUPPLY ASSY V.C. 1540				CHKD: <u>T. HIRAYAMA</u>	APPR: <u>T. HIRAYAMA</u>	

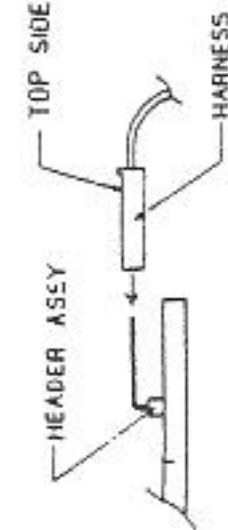


REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1	3/24/68	C.T.



- ① USED -01, -03, -06, -08
- ② USED -01, -06
- ③ USED -02, -07
- ④ USED -02 THRU -05
- ⑤ USED -02 THRU -05
- ⑥ USED -04, -05, -08, -10
- ⑦ USED -04, -05, -08, -10
- ⑧ USED -04, -08, -09
- ⑨ USED -04, -08, -09
- ⑩ USED -04, -08, -09
- ⑪ USED -04, -08, -09
- ⑫ USED -04, -08, -09
- ⑬ USED -04, -08, -09
- ⑭ USED -04, -08, -09
- ⑮ USED -04, -08, -09
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- ㊿ USED -04, -08, -09



DETAILS

1. ALL OF HARNESS EXCEPT P1 SHOULD BE CONNECTED TO EACH HEADER ASSY (SEE DETAIL).
2. ALL LEADS WILL HAVE A MINIMUM OF ONE WRAP AROUND TERMINALS PRIOR TO SOLDERING.

REV	DATE	DESCRIPTION	BY	CHKD
1	3/24/68	POWER SUPPLY ASSY		

POWER SUPPLY ASSY  
1540002



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