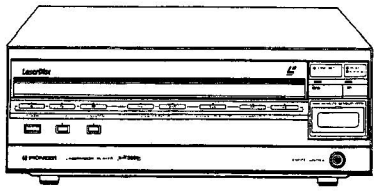
PIONEER®

Service Manual



ORDER NO.
ARP1279-A

REPAIR & ADJUSTMENTS

LaserVision

LASERVISION PLAYER

LD-V6000A

- **This service manual is applicable to the KUC type.**
- **As to the circuit descriptions, please refer to the LD-V6000A service manual (ARP1305-A).**

CONTENTS

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1. SPECIFICATIONS

1. General

System and Disc spec. ..... LaserVision Videodisc System

*1 Maximum playing time .....
12-inch standard play disc: 30 min/side
12-inch extended play disc: 60 min/side
8-inch standard play disc: 14 min/side
8-inch extended play disc: 20 min/side

Spindle motor speed
Standard play disc ..... 1,800 RPM
Extended play disc .... 1,800 RPM (inner circumference) to 600 RPM (outer circumference) [When using 12-inch disc]

Power requirements ..... 120V AC, 50/60 Hz
Max. power consumption 110W
Dimensions ..... 420 (W) x 415 (D) x 150 (H) mm
16-17/32 (W) x 16-5/16 (D) x 5-15/16 (H) in
Net weight (without package) ..... 14 kg (30.9 lb)
Operating temperature ..... +5 to +35 °C
Operating humidity ..... 0 to 90%
(There should be no condensation.)

2. Video characteristics

Format ..... NTSC specifications
Video output
Level ..... 1Vp-p nominal, sync. negative, terminated
Impedance ..... 75Ω unbalanced
Terminal ..... BNC jack
VHF output
Channel ..... Channel 3 or 4 (switchable)
Impedance ..... 75Ω unbalanced
Terminal ..... F jack

3. Audio characteristics

Audio output ..... Two-channels; stereo or two individual channels
Level ..... 650 mV nominal (1 kHz 100% mod. 50 kΩ terminated)
Terminal ..... Two RCA jacks

4. External Sync and Sc.

Subcarrier
Level ..... 2 $V_{p\text{-}p}$
Impedance 75Ω
Terminal ..... BNC jack
Composite sync
Level ..... MIN: +2 ~ −2V, MAX: +2 ~ −4V
Impedance 75Ω
Terminal ..... BNC jack

5. External Controls

Remote control (Front panel)
Terminal ..... Miniature phone jack
RS-232C (Rear panel)
Terminal RS-232C

6. Digital out

Terminal ..... 5pin, DIN

7. Furnished accessories

VHF connecting cable with F-type plugs (2m) 1
Audio connecting cords with RCA-plugs (1.5m) 1
Antenna adaptor ($\frac{75\Omega}{300\Omega} \rightarrow 75\Omega F$) 1
Operating instructions 1

8. Functions

	CAV	CLV
Play (Normal play mode with sound)	YES	YES

9. Functions with the optional remote control unit

	CAV	CLV
Play(Normal play mode with sound)	YES	YES
Stop	YES	YES
Step forward/reverse	YES	NO
Multi-speed play forward/reverse	YES	NO
Multi speed set	YES	NO
Scan forward/reverse	YES	YES
Frame number search	YES	NO
Timer number search	NO	YES
Chapter number search	YES	YES
Auto stop	YES	YES
Frame number display	YES	NO
Elapsed time number display	NO	YES
Chapter number display	YES	YES
User programing and program play	YES	YES

NOTES:
Specifications and design subject to possible modifications without notice, due to improvements.
**1 Actual playback time differs for each disc.*

2. PANEL FACILITIES

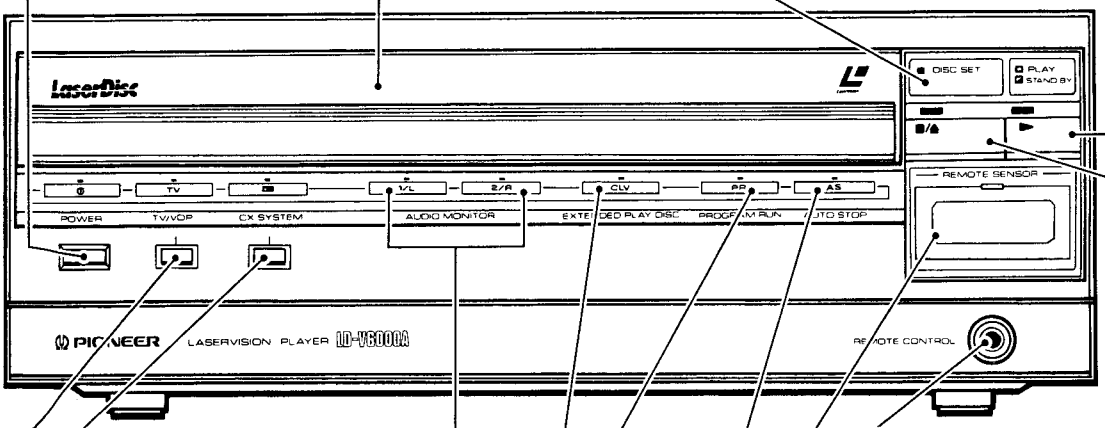
2.1 FRONT

DISC SET indicator
This indicator lights when a disc is loaded onto the disc table, to show that a disc has been set inside the player.

POWER button
Press this button to turn the power on and off.

PLAY/STAND-BY indicator
During playback in the play mode, this indicator lights (PLAY). Also, at the beginning of playback, or during execution of search, when a button is pressed, it may require a short while for the command to be executed, and in this case, the indicator wil flash (STAND-BY).

DISC TABLE
When the REJECT/OPEN button (■/▲) is pressed, the disc table will open slightly toward the front. It can then be pulled out further by hand to load a disc.



PLAY (►) button

REJECT/OPEN button (■/▲)
This button is used when stopping playback and to remove a disc. When the button is pressed, the player will enter the reject mode, and the disc table will open slightly toward the front.

PROGRAM RUN indicator
This indicator lights when beginning program playback.

EXTENDED PLAY (CLV) DISC indicator
When extended play (CLV) discs are played back, this indicator will light.

REMOTE CONTROL terminal
When the optional remote control unit is used in the wired format, its connector cord is plugged in here.

AUDIO MONITOR indicator
These are to show the audio channels being reproduced.

REMOTE CONTROL receiver and indicator
When using the optional remote control unit in the wireless format, the infrared commands from the unit are received here.
The indicator lights up when a function command is received by the player.

CX SYSTEM button
This is the ON/OFF switch for the CX noise reduction system. When playing discs with the CX symbol, press this button; the CX indicator will light.

TV/VDP button
This switch is for selecting either LaserVision disc playback or VHF television reception. When the TV indicator is lit, the player is in the TV reception mode; when the indicator is out, the player is in the disc playback mode.

AUTO STOP indicator
This indicator lights when the player has received an "AUTO STOP" command, until the player reaches the designated frame (time) or chapter number on normal playback. When the designated frame (time) or chapter is reached, the indicator goes out.

2.2 REAR

AUDIO OUTPUT terminals
These jacks provide the left and right channel audio signals for connection to a stereo system.

VIDEO OUTPUT terminal
This terminal is only for connection to a color video TV monitor (one which has a video input terminal). It provides an NTSC video signal. This terminal is not for connection to conventional TV sets.

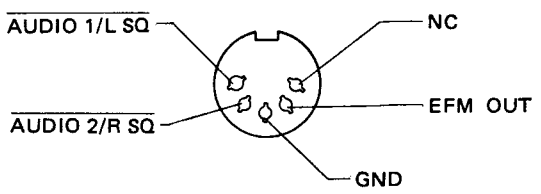
ANTENNA (75Ω UNBAL) terminal
If your VHF antenna cable is a 75Ω coaxial cable type, connect it to this terminal. If your VHF antenna cable is a 300Ω twin-lead feeder type, connect it to this terminal through the antenna adapter (furnished with the player).

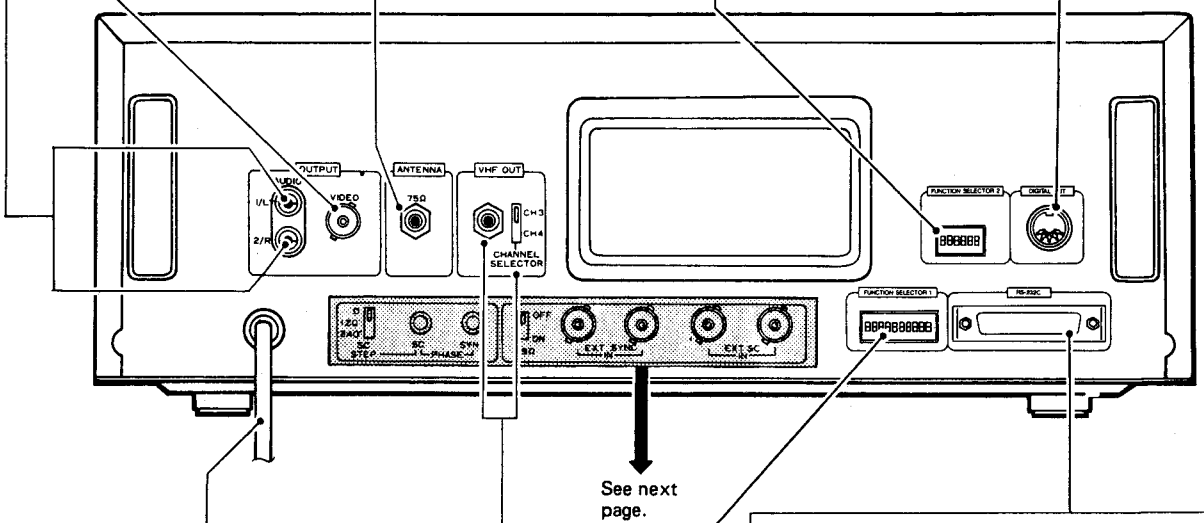
FUNCTION SELECTOR 2 Switches
The functions for the various switches are not set.

OPEN = "1"

1	2	3	4	5	6

DIGITAL OUT Terminal
Outputs the EFM signal when playing back using LaserVision with Digital Sound Discs.





See next page.

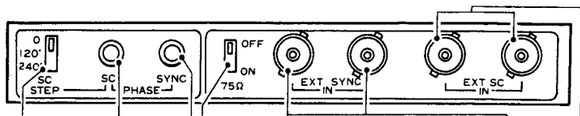
POWER CORD
Plug this into wall outlet (120V, 50/60 Hz).

RS-232C terminal
This is a serial interface that links the player to RS-232C serial devices such as terminals, printers, and external computers.

VHF CHANNEL SELECTOR switch
This slide switch is for selecting a VHF output channel. Set to the channel which is not used for TV broadcasts in your area.

CH3/4 VHF OUT terminal
This terminal provides audio and video signals which are converted to VHF channel 3 or channel 4 by the built-in VHF converter.

FUNCTION SELECTOR 1 switches
These switches are utilized when using the RS-232C terminal, to select the various circuit control information (Baud rate, Data length, Parity check, etc.). These switches are effective only when power is first switched ON. As a result, even if they are switched during player operation, the information entered when the power was previously turned on cannot be changed.



SYNC PHASE knob

This is used to adjust the horizontal phase with an external video signal. When EXT SC input is provided, the horizontal phase changes gradually in increments corresponding to each 1 subcarrier phase.

*Adjustment rage: [More than ±280ns with respect to EXT SYNC]

SC STEP switch, SC PHASE knob

This is used when it is necessary to perform hue phase adjustment with an external video signal during EXT SC input. On SC STEP, 3 levels of coarse adjustment can be made, and on SC PHASE, fine adjustments can be made.

*Adjustment range: [0 ~ 360 deg. MIN]

NOTE:
The SC STEP values are not absolute values for EXT SC.

EXT SC IN terminals

One of these terminals is used when it is necessary to synchronize the color phase in the EXT SYNC MODE, and the other is used for loop through. A subcarrier signal from the same sync generator attached to the EXT SYNC terminals is attached here.

*Input condition: [75Ω, 2 Vp-p]

EXT SYNC IN terminals

One of these terminals is used for inputting an external sync signal from a sync generator, and the other is used for loop through when the player is operated in the EXT SYNC MODE. When the external sync signal is present at the input, the player enters the EXT SYNC MODE automatically.

*Input condition: [75Ω, MIN: +2 ~ −2V, MAX: +2 ~ −4V, Negative]

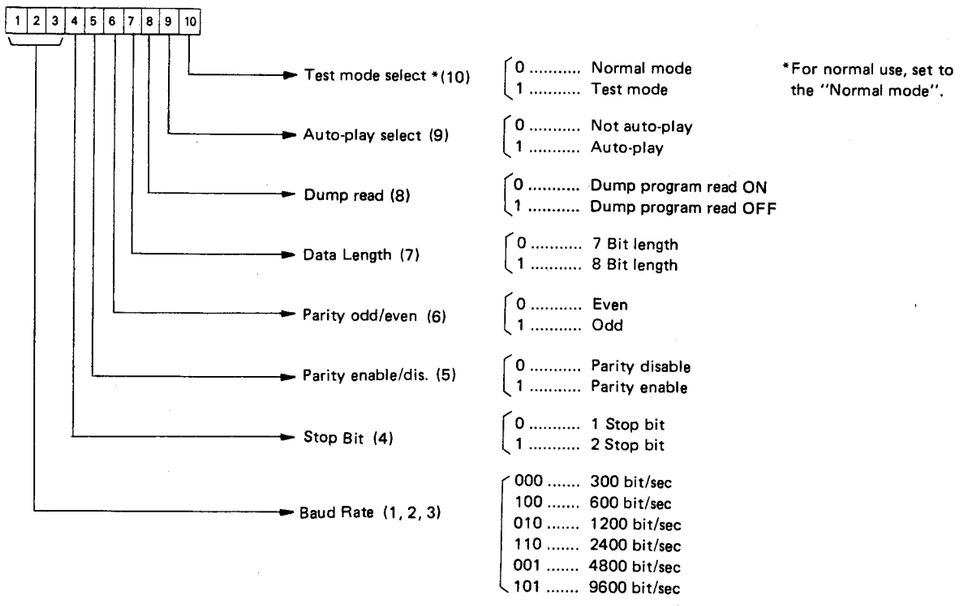
EXT SYNC, EXT SC TERMINATION selector

This switch is used for selecting whether the signal input to EXT SYNC, or EXT SC is given 75Ω termination within the player (ON position), or looped through (OFF position).

FUNCTION SELECTOR 1 setting

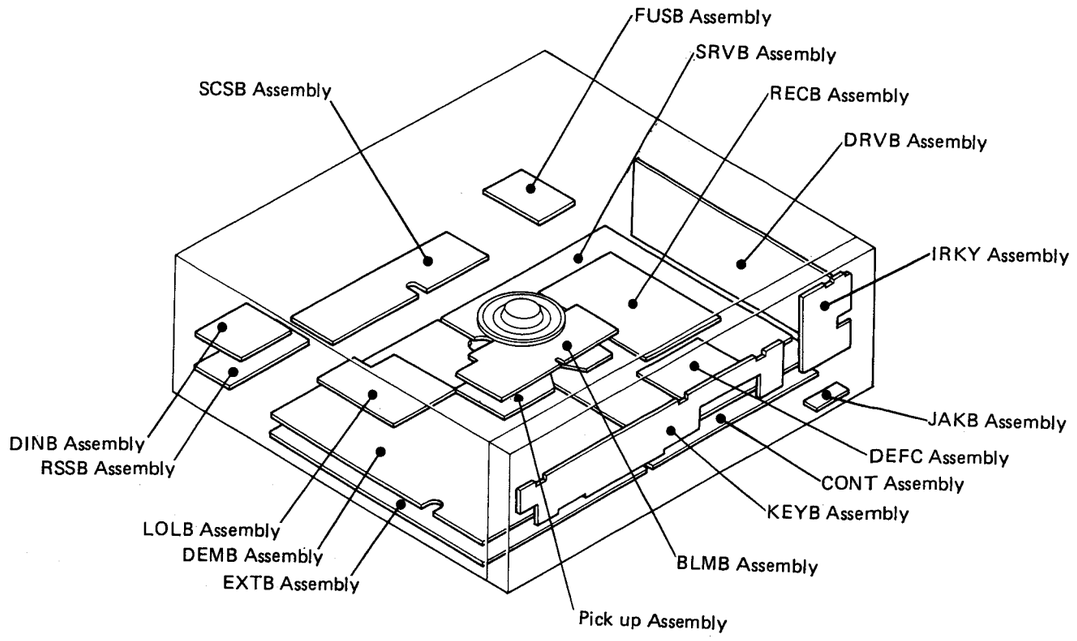
FUNCTION SELECTOR 1 setting is effective only when power is switched on.
As a result, even if they are switched during player operation, the information entered when the power was previously turned on cannot be changed.

OPEN = "1"



3. LOCATIONS OF P.C. BOARDS

NOTES:
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

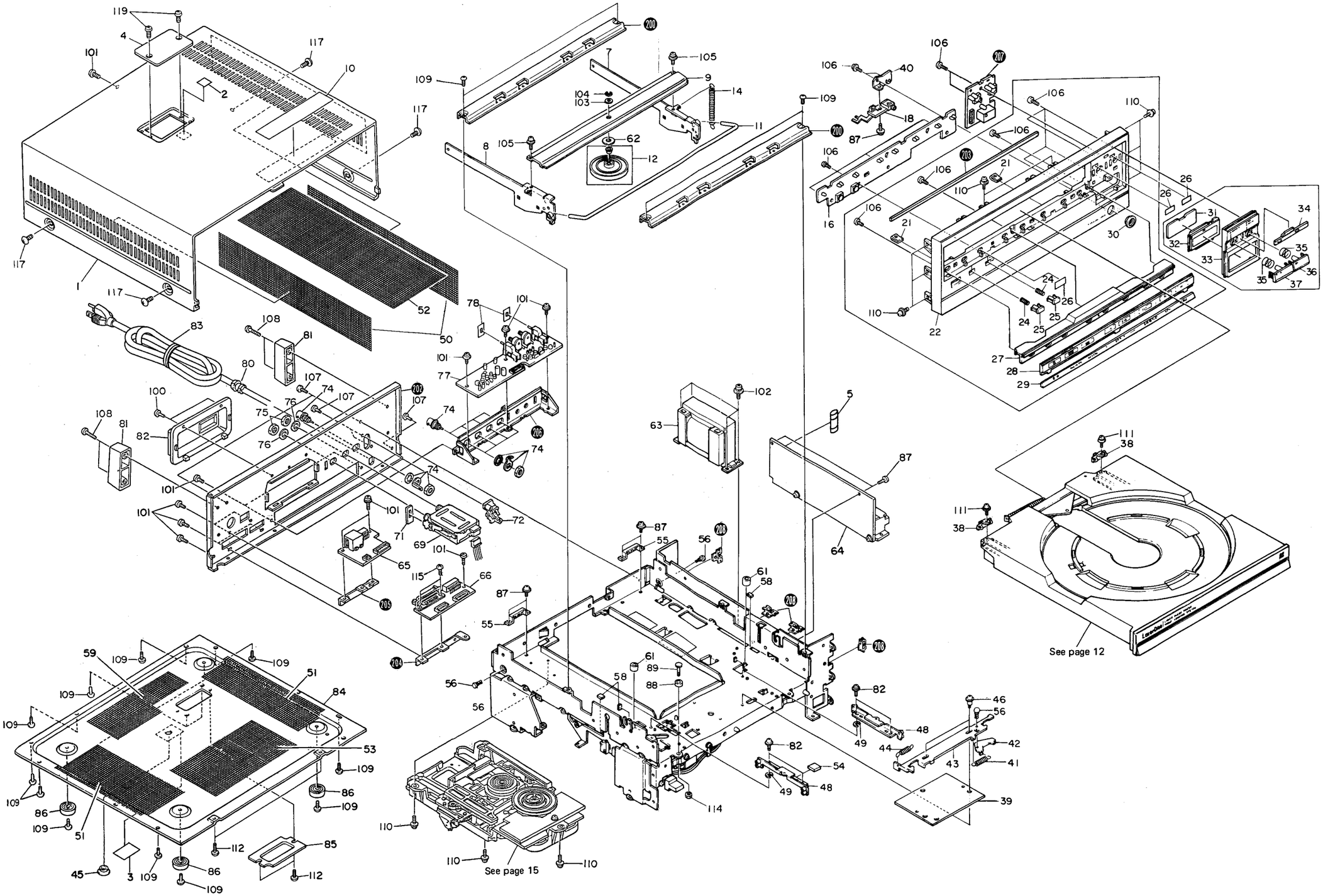


FUSB : Fuse Board
RECB : Rectifier Board
LOLB : Loading Logic Board
CNNB : Connection Board
DRVB : Drive Board
RSSB : RS-233C and Switch Board
CONT : Control Board
DINB : DIN Connector Board
IRKY : Infrared and Key
KEYB : Key Board B
JAKB : Jack Board

SRVB : Servo Board
EXTB : External Sync Board
CTCB : Cross Talk Canceler Board
DEFC : Defocus Canseller
RFMD : RF Modulator
DEMB : Demodulation Board
SCSB : Sub Carrier Phase Shift Board
PREB : Pre-processing Board
BLMB : Blushless Motor Board (Spindle Motor)

4. EXPLODED VIEWS AND PARTS LIST

4.1 EXTERNAL TOP VIEW



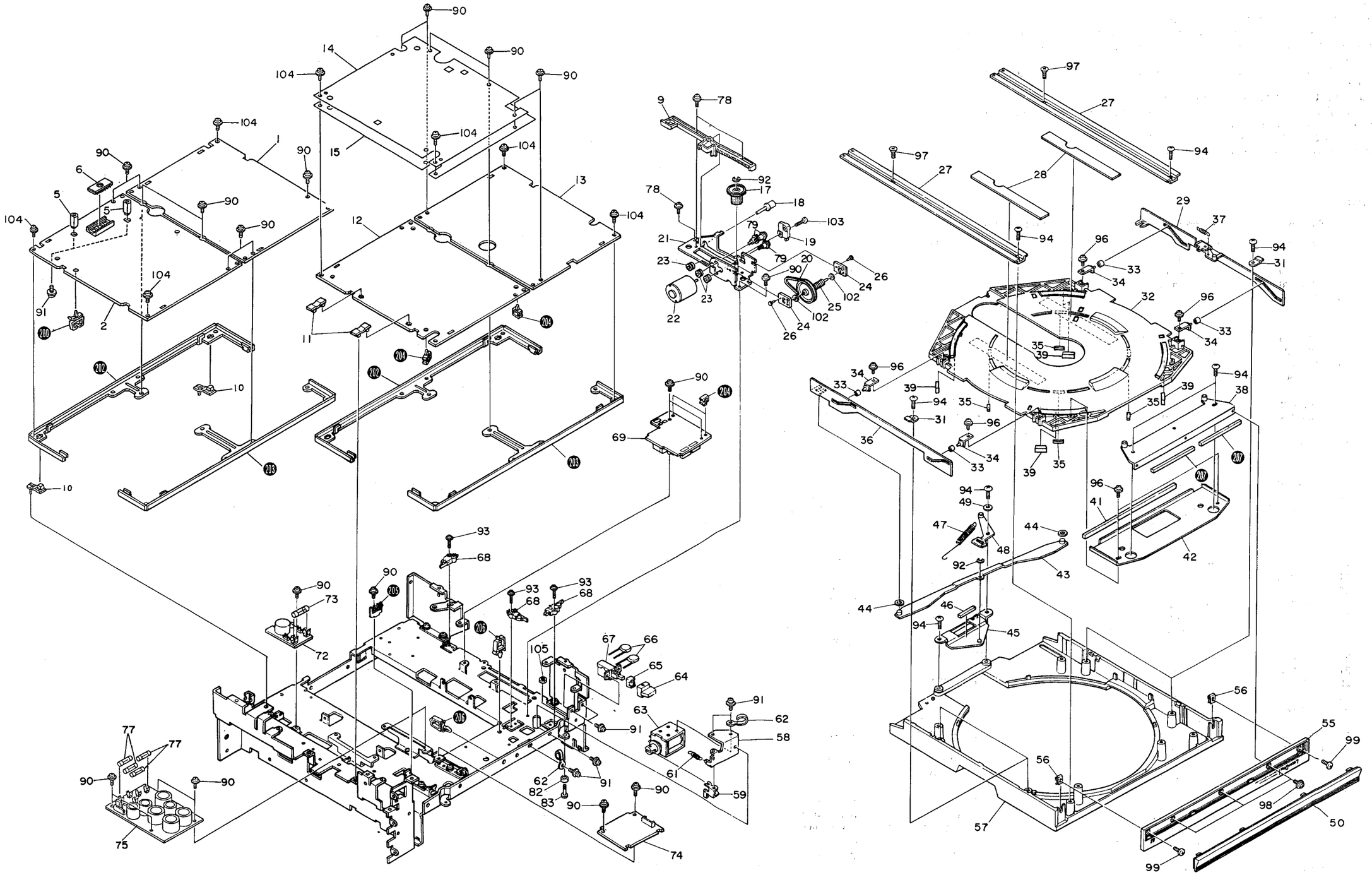
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List

Mark	No.	Part No.	Description
	1.	VNA-056	Bonnet
	2.	VRW-386	Caution label
	3.	VRW-344	Shipping label
	4.	VNK-636	Bonner cover
	5.	VCX-006	Hour meter
	6.		.....
	7.	VXA-129	Clamper arm (R) assembly
	8.	VXA-128	Clamper arm (L) assembly
	9.	VNE-432	Clamper holder
	10.	VRW-296	Caution label
	11.	VLL-182	Rod
	12.	VXX-249	Clamper assembly
	13.		.....
	14.	VBH-087	Clamper spring
	15.		.....
	16.	VWG-149	KEYB assembly
	17.		.....
	18.	DWG1016	JAKB assembly
	19.		.....
	20.		.....
	21.	VBN-002	Speed nut
	22.	DNK1052	Front panel
	23.		.....
	24.	VBH-090	Key spring (B)
	25.	DAC1012	Select button (TV/VDP, CX SYSTEM)
	26.	VEC-148	Sheet
	27.	VNK-225	Top panel
	28.	DNK1083	Display panel
	29.	DNK1088	Under panel
	30.	DAP1002	Plug escutcheon
	31.	VNK-144	IR filter
	32.	DNK1085	IR window
	33.	DNK1087	Control panel
	34.	DNK1084	Acrylic window
	35.	VBH-051	Key spring
	36.	DXA1022	Play button assembly (PLAY/STANDBY)
	37.	DXA1021	Reject button assembly (DISC SET)
	38.	VNL-176	Stopper
	39.	VEC-118	Black sheet
	40.	VNE-576	Mini jack holder
	41.	VBH-083	Cum spring
	42.	VNE-427	Lock sensor board
	43.	VNE-442	Slide board
	44.	VBH-086	Slide board spring
	45.	VEB-072	Shipping cap
	46.	VLL-185	Screw
	47.		.....
	48.	VXA-125	Roller plate R assembly
	49.	VEB-011	Hight adj. washer
	50.	DED-117	Net (E)
	51.	DED-118	Net (F)
	52.	DED-119	Net (H)
	53.	DED-120	Net (K)
	54.	VEB-056	Slide cushion
	55.	VNL-177	Caddy guide
	56.	VEC-143	Plastic rivet
	57.		.....
	58.	VEB-068	Rubber stopper
	59.	DED-121	Net (L)
	60.		.....
	61.	VEB-070	Rubber tube
	62.	VEB-049	Bearing cushion
⚠	★ 63.	DTT1005	Power transformer
	64.	DYR1002	DRVB assembly
	65.	DYG1002	DINB assembly
	66.	VWG1007	RSSB assembly
	67.		.....
	68.		.....
	69.	VWL-016	RFMD assembly
	70.		.....
	71.	VEC-105	Blind
	72.	VKB-003	2P terminal
	73.		.....
	74.	VKN-155	BNC Terminal
	75.	VLL-082	F. nut
	76.	VNE-270	F. washer
	77.	DWS1025	SCSB assembly
	78.	VEC-170	Lever blind
	79.		.....
	80.	VEC-201	Strain relief
	81.	VNL-181	Protecter
	82.	VNK-637	Rear cover
⚠	83.	DDG1001	Power cord
	84.	VNE-643	Bottom plate
	85.	VNE-575	ROM lid
	86.	VEC-119	Foot
	87.	ACZ30P060FMC	Screw
	88.	VLL-187	Sub roller
	89.	VXX1025	Sub roller shaft (S)
	100.	VCZ30P080FZK	Screw
	101.	BCZ30P060FZK	Screw
	102.	PMB40P080FMC	Screw
	103.	WA32N100C080	Washer
	104.	YE20FUC	Washer
	105.	PMB30P050FUC	Screw
	106.	VPZ30P080FMC	Screw
	107.	BPZ30P080FZK	Screw
	108.	VCZ30P200FZK	Screw
	109.	VCZ30P060FMC	Screw
	110.	PMB30P060FMC	Screw
	111.	PMB26P100FMC	Screw
	112.	BBZ30P080FNI	Screw
	113.		.....
	114.	NB20FMC	M2 Nut
	115.	VCZ30P100FMC	Screw
	116.		.....
	117.	ECZ40P080FZK	Screw
	118.		.....
	119.	BCZ30P080FZK	Screw
	200.		Bridge
	201.		.....
	202.		Rear panel
	203.		Cushion
	204.		Terminal holder
	205.		Holder
	206.		Under rear panel
	207.		IRKY assembly
	208.		Cable clip

4.2 BOTTOM VIEW



NOTES:

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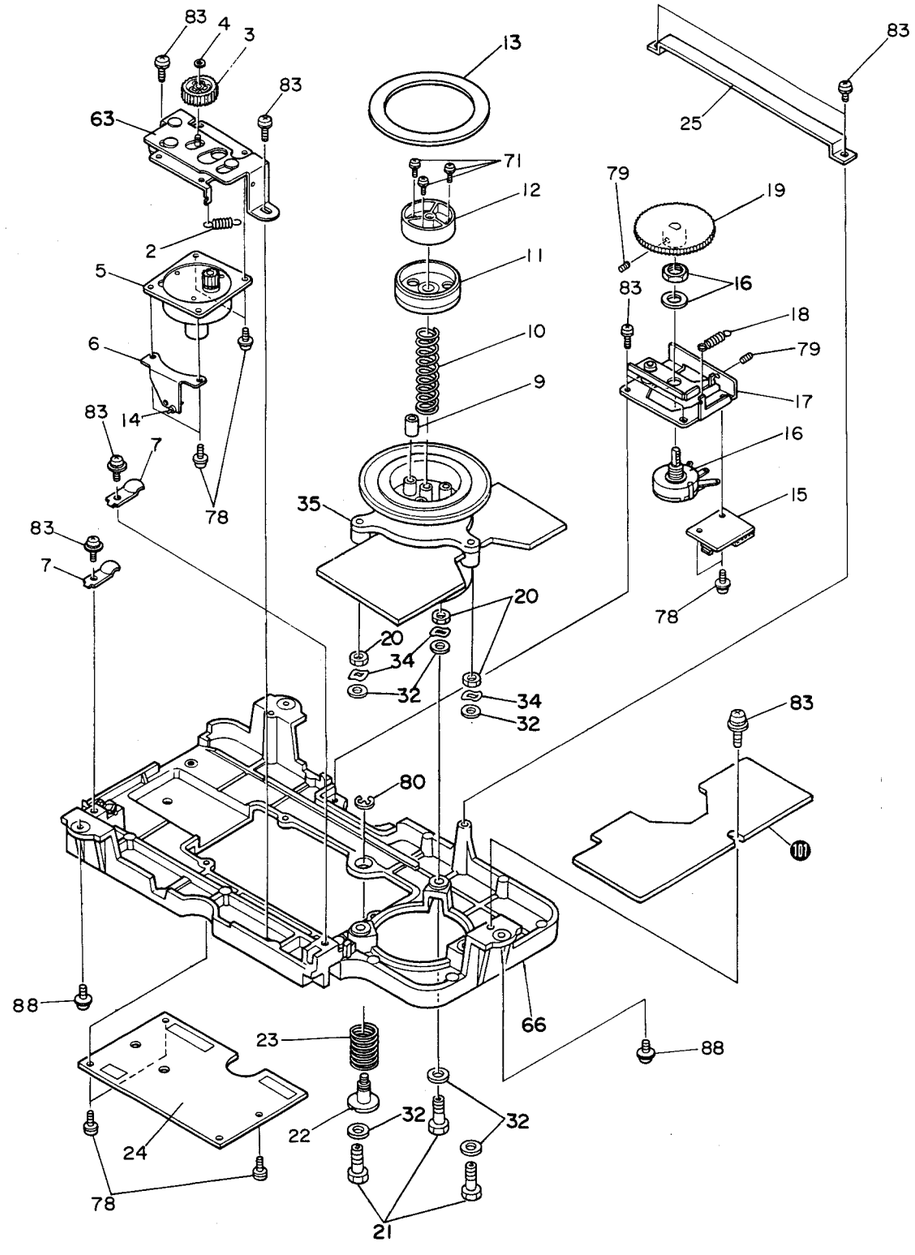
Parts List

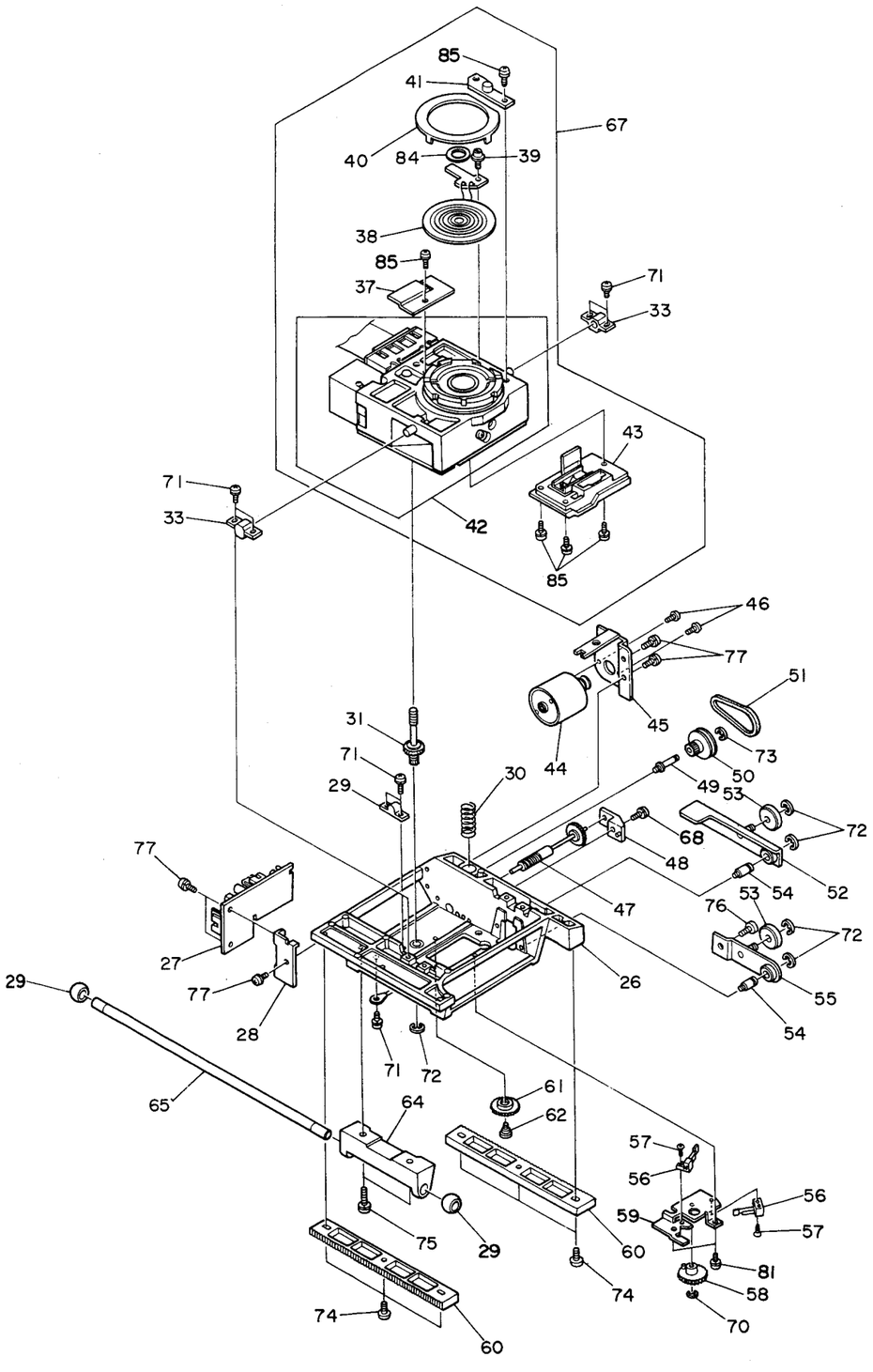
Mark	No.	Part No.	Description
	1.	DWS1005	EXTB assembly
	2.	DWG1005	CONT assembly
	3.		.....
	4.		.....
	5.	VLA-083	Post
	6.	DYW1010	EP. ROM
	7.		.....
	8.		.....
	9.	VNL-174	FL. rack
	10.	VEC-169	PC hinge A
	11.	VEC-124	PC hinge
	12.	DWS1004	SRVB assembly
	13.	DWV1003	DEMB assembly
	14.	VEC-175	Protect sheet
	15.	VEC-270	Shield sheet
	16.		.....
	17.	VNL-173	Worm wheel
	18.	VXA-175	Arm roller assembly
★★	19.	VSF-009	Slide switch (DOOR, S5)
	20.	VEB-071	FL. belt
	21.	VXA-126	M. holder assembly
★★	22.	VXM-028	Loading motor
	23.	VEB-050	Bushing
	24.	VNL-172	Shaft holder
	25.	VXA-127	Worm assembly
	26.	VEC-179	Plastic rivet (A)
	27.	VNG-013	Rail
	28.	VEB-063	Dumping rubber
	29.	VXA-263	Container cum (L) assembly
	30.		.....
	31.	VNE-434	Cum guide
	32.	VNK-136	Container
	33.	VLL-179	Lifter roller
	34.	VXA-134	Container lifter assembly
	35.	VEB-080	Container rubber (A)
	36.	VNE-439	Cum (R)
	37.	VBH-083	Cum spring
	38.	VXA-187	Caddy joint assembly
	39.	VEB-106	Disc gurd
	40.		.....

Mark	No.	Part No.	Description
	41.	VEC-144	Cushion
	42.	VNE-467	C plate
	43.	VXA-130	Rink assembly
	44.	VEB-069	Rink spacer
	45.	VXA-131	Rink holder assembly
	46.	VED-042	Container cushion
	47.	VBH-128	Spring
	48.	VXA-135	Ejecter assembly
	49.	VLL-180	Ejecter washer
	50.	DNK1053	Panel escutcheon
	51.		.....
	52.		.....
	53.		.....
	54.		.....
	55.	DNK1086	Loading panel
	56.	VBN-002	Speed nut
	57.	VNK-235	Caddy
	58.	VXA-123	Plunger holder assembly
	59.	VNE-426	Plunger lever
	60.		.....
	61.	VBH-085	Plunger spring
	62.	VNF-069	Cord holder
	63.	VXP-009	Plunger
	64.	DAC1011	Power button
	65.	VEC-151	Flexible ring
⚠	66.	RCG-009 (VCG-044)	Capacitor (0.01μF: C1, C3)
⚠ ★★	67.	VSA-011	Power switch
★★	68.	VSK-004	Lever switch (S2–S4)
	69.	DYG1005	LOLB assembly
	70.		.....
	71.		.....
	72.	VWR-080	FUSB assembly
⚠ ★★	73.	VEK-004	Fuse (2A, FU1)
	74.	DYV1001	DEFC assembly
	75.	DYR1001	RECB assembly
	76.		.....
⚠ ★★	77.	VEK-018	Fuse (3A, FU2–FU5)
	78.	VLL-184	Screw 7
	79.	VLL-183	Screw 4

Mark	No.	Part No.	Description
	80.		.....
	81.		.....
	90.	ACZ30P060FMC	Screw
	91.	PMB30P060FMC	Screw
	92.	YE30FUC	Washer
	93.	AMZ20P080FMC	Screw
	94.	VPZ40P120FMC	Screw
	95.		.....
	96.	IPZ30P080FMC	Screw
	97.	CPZ40P120FMC	Screw
	98.	BMZ30P050FNI	Screw
	99.	BBZ30P100FMC	Screw
	100.		.....
	101.		.....
	102.	WA20P060-010	Washer
	103.	PMZ26P100FMC	Screw
	104.	ACZ30P060FGN	Screw
	200.		Wire clip
	201.		Wire clip
	202.		PCB holder (B)
	203.		PCB holder (A)
	204.		Wire clip
	205.		GND terminal (4P)
	206.		Wire clip (D)
	207.		Cushion

4.3 MECHANISM VIEW





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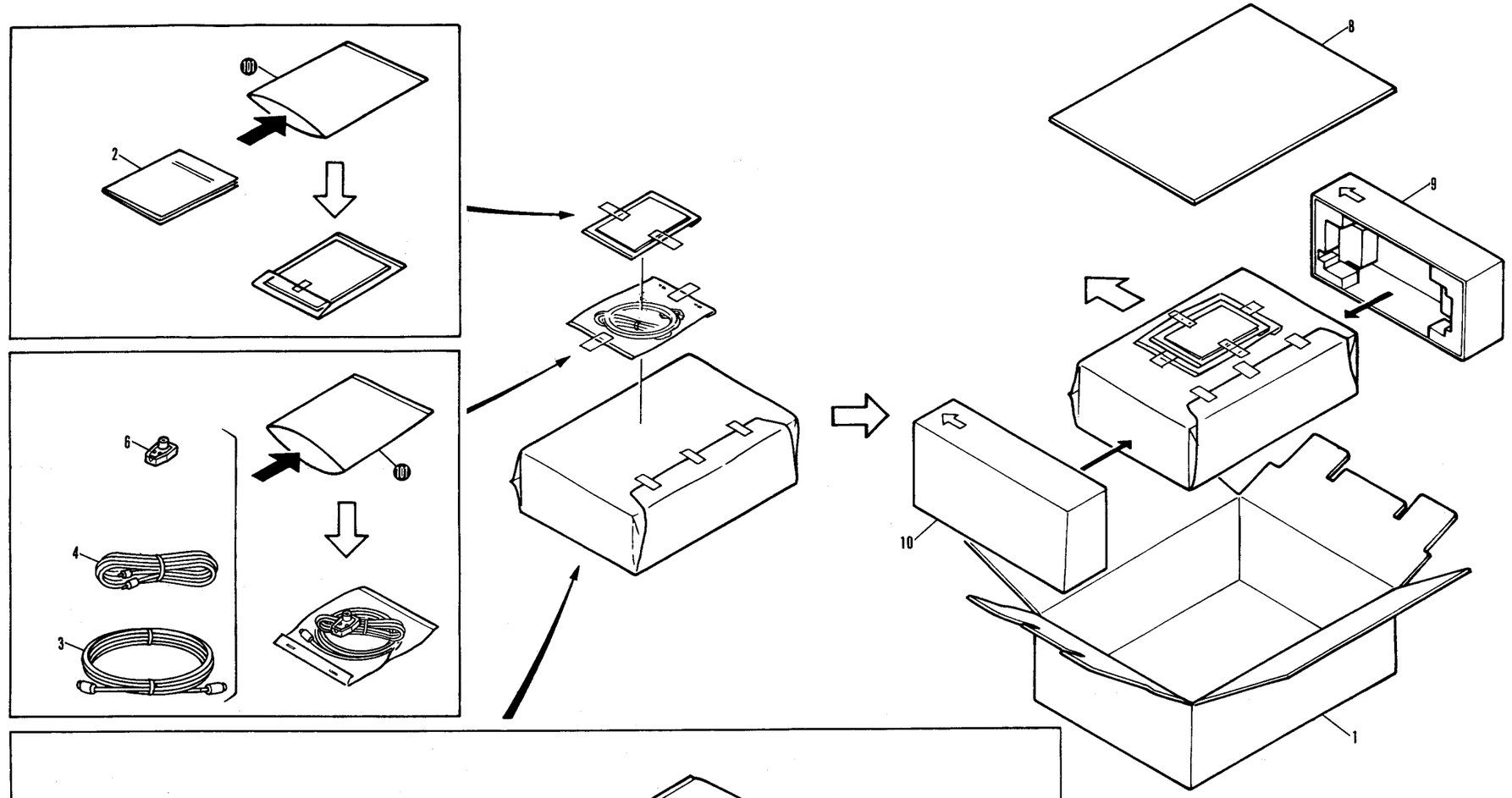
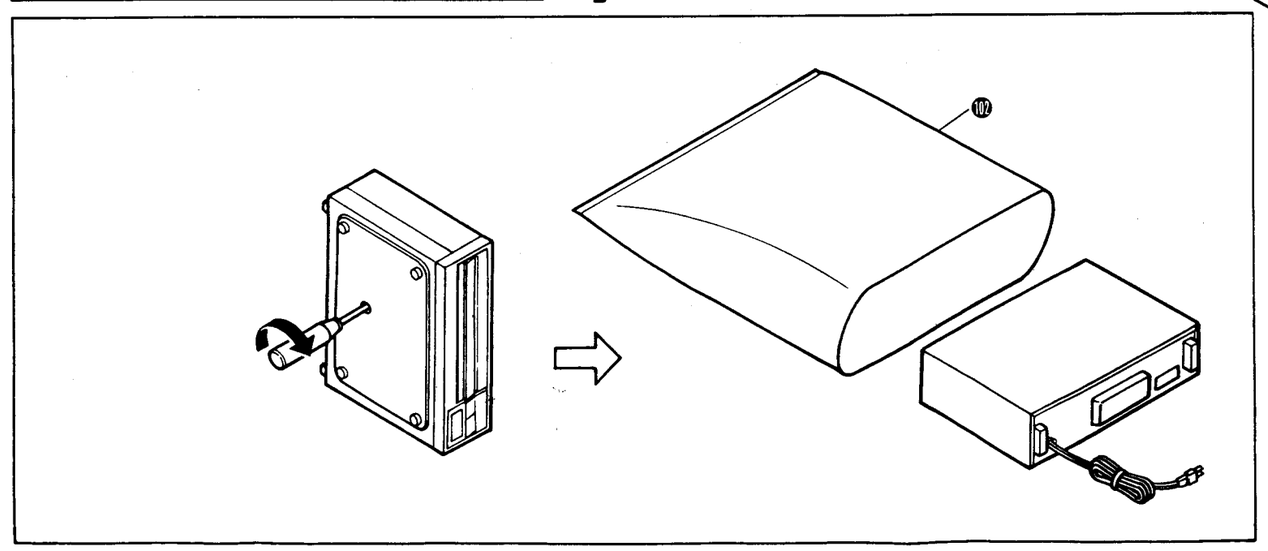
	1.		.....
	2.	VBH-078	Motor holder spring
	3.	VNL-028	Pinion B
	4.	WT17D035D025	Polyethylene washer
★★	5.	DXM1007	Slider motor
	6.	VNE-248	Filter holder (A)
	7.	VBK-018	Holder
	8.		.....
★	9.	VDM-007	Spacer tube
	10.	VBH-081	Centering spring
	11.	VNV-012	Centering hab
	12.	VNL-168	Yoke
	13.	VEB-048	Rubber spacer
	14.	VCG-005	Thru type capacitor (1000 pF)
	15.	DYY1002	CNNB assembly
	16.	VCS-017	Potentiometer
	17.	VXA-116	Gear assembly
	18.	VBH-079	Gear spring
	19.	VNL-045	Potentio pinion
	20.	VLA-061	M5 nut
	21.	VLL-162	Adj. nut
	22.	VLL-161	Shipping screw
	23.	VBH-082	Shipping spring
	24.	VWV-074	PREB assembly
	25.	VNE-424	Roller retainer
	26.	VXA-163	Slider assembly
	27.	VWS-053	CTCB assembly
	28.	VNE-515	CTCB holder
	29.	VNL-226	Shaft holder
	30.	VBH-080	Spring
	31.	VXA-161	Tilt adj. shaft assembly
	32.	WA50B090N050	Washer
	33.	VNL-229	Optical holder
	34.	WW50FBT	Wave washer
	35.	VXM-027 (VXM-041)	Spindle motor
	36.		.....
	37.	VNE-525	Wire holder
	38.	VGX-037	Objective lens assembly
	39.	VLL-238	Screw
	40.	VNH-046	Stopper
	41.	VGX-041	Senser assembly
	42.	VGX-053	Pickup body assembly
	43.	VGX-038	Grating assembly
★★	44.	VXM-038	TILT motor
	45.	VNE-513	TILT motor holder
	46.	DBA1005	Screw
	47.	VXA-160	Worm shaft assembly
	48.	VNL-225	Worm shaft holder (A)
	49.	VLL-224	Pulley shaft
	50.	VNL-222	TILT adj. pulley (B)
	51.	VEB-060	TILT belt
	52.	VXA-119	Roller arm assembly
	53.	VNL-165	Roller
	54.	VLL-159	Roller shaft (A)
	55.	VXA-165	Roller holder assembly
★★	56.	VSK-003	Leaf switch (TILT LIMIT)
	57.	DBA1004	Screw
	58.	VNL-228	Limit gear (C)
	59.	VXA-162	Limit holder assembly
	60.	VNL-166	Rack S
	61.	VNL-227	Limit gear B
	62.	VLL-228	Limit gear (B) shaft
	63.	VXA-201	Motor holder assembly
	64.	VNT-024	Bearing holder
	65.	VLL-219	Coating shaft
	66.	VXX-255	Mechanism chassis assembly
	67.	VWY-084	Pickup assembly
	68.	PMA26P060FMC	Screw
	69.		.....
	70.	YE15FUC	Washer
	71.	PMH26P060FMC	Screw
	72.	YE30FUC	Washer
	73.	YE20FUC	Washer
	74.	BMZ30P060FMC	Screw
	75.	PMA30P100FMC	Screw
	76.	SMZ30H050FBT	Screw
	77.	PMA26P040FMC	Screw
	78.	PMA30P060FMC	Screw
	79.	ZMD30H060FBT	Screw
	80.	YE40FUC	Washer
	81.	BMZ26P040FMC	Screw
	82.		.....
	83.	PMB30P060FMC	Screw
	84.	WB26FMC	Washer
	85.	PMA26P060FMC	Screw
	86.		.....
	87.		.....
	88.	PMB30P080FMC	Screw
	101.		BLMB support

5. PACKING



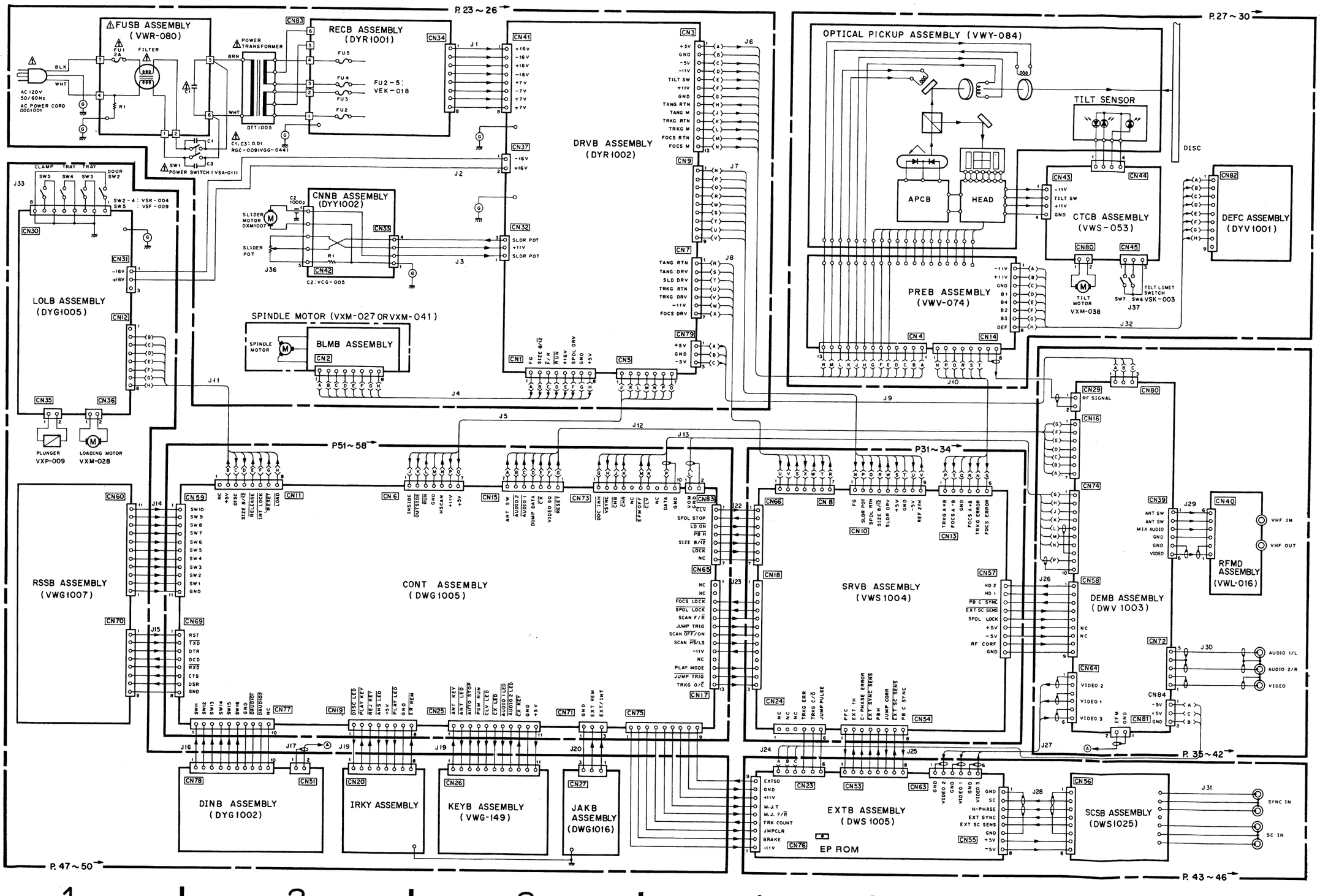


Parts List

Mark	No.	Part No.	Description
	1.	DHG1016	Packing case
	2.	DRB1004	Operating instructions
	3.	VDE-054 (VDE-011)	RF antenna cable
	4.	VDE-010	Connection cable
	5.		
	6.	VKX-020	Antenna adaptor
	7.		
	8.	VHC-018	Spacer
	9.	VHA-092	Side pad (L)
	10.	VHA-093	Side pad (R)
	101.		Polythylene bag
	102.		Bag

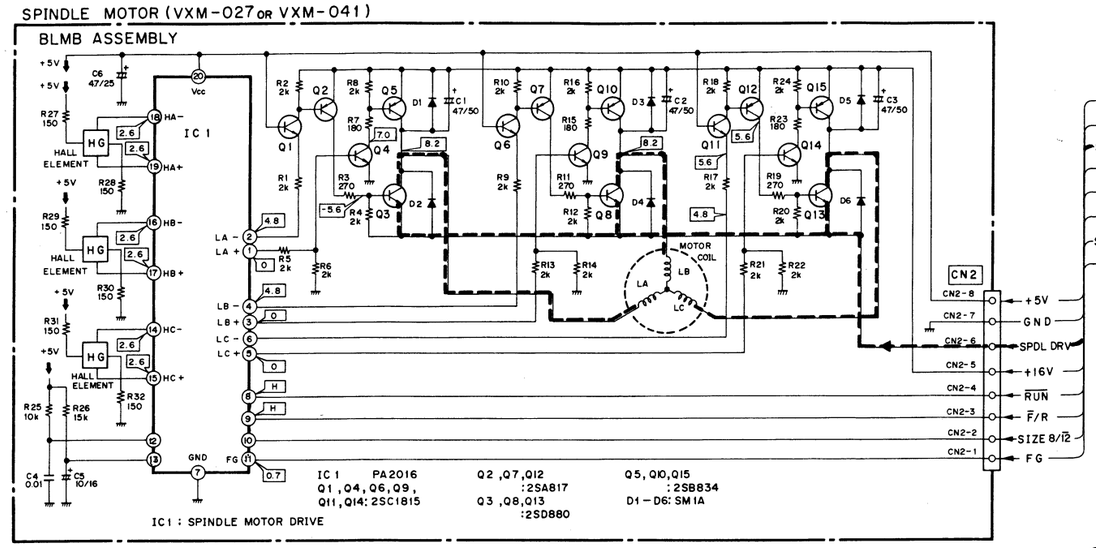
6. SCHEMATIC DIAGRAM AND P.C. BOARD PATTERNS

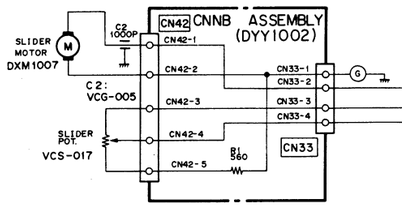
6.1 OVERALL CONNECTION DIAGRAM

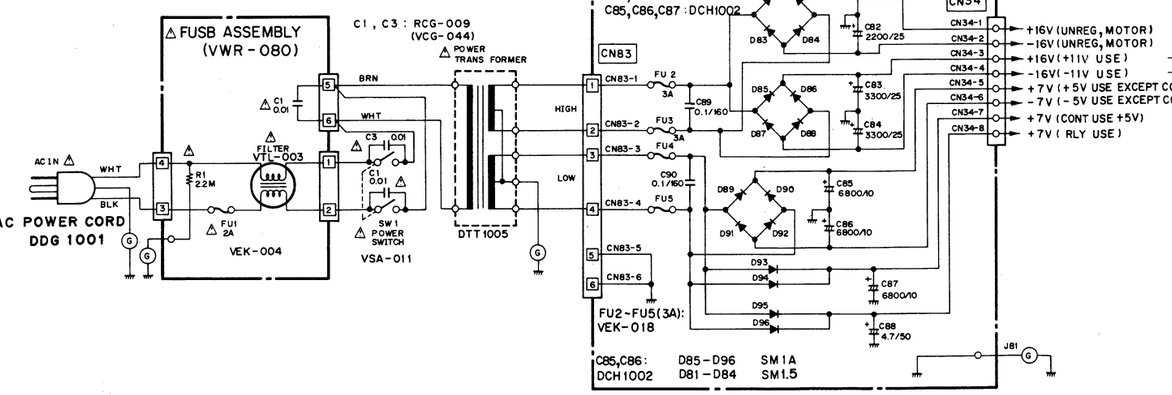


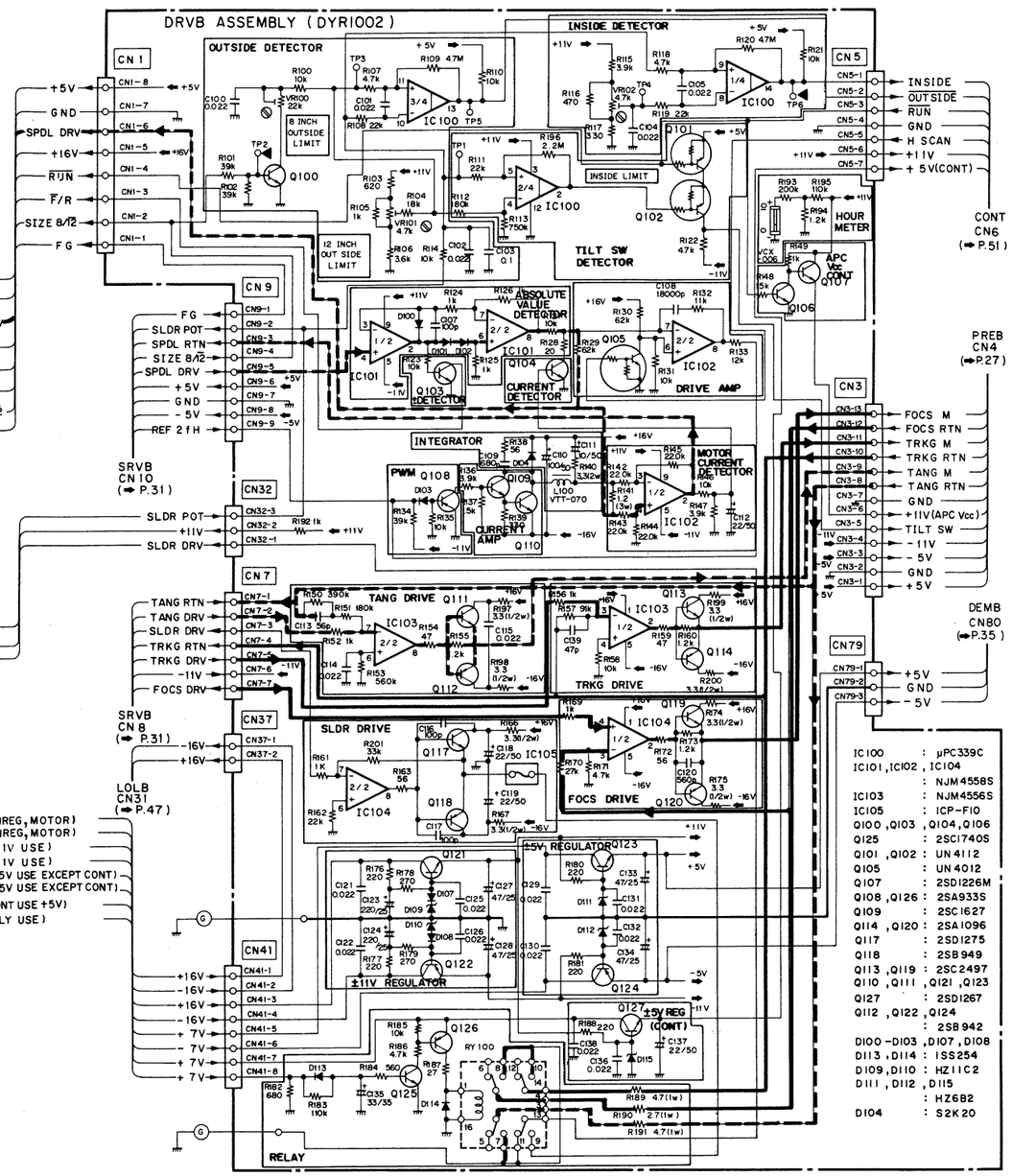
6.2 SP

6.2 SPINDLE MOTOR (VXM-072 or VXM-041, BLMB), DRVB (DYR1002), CNNB (DYY1002), FUSB (VWR-080) and RECB (DYR1001) ASSEMBLIES









TRKG (TRACKING) SERVO LOOP
SPDL (SPINDLE) SERVO LOOP
FOCS (FOCUS) SERVO LOOP
TANG (TANGENTIAL) SERVO LOOP
SLDR (SLIDER) SERVO LOOP

1. RESISTORS

Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS

Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT

□: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
➡ mA: DC current at no input signal.

4. OTHERS

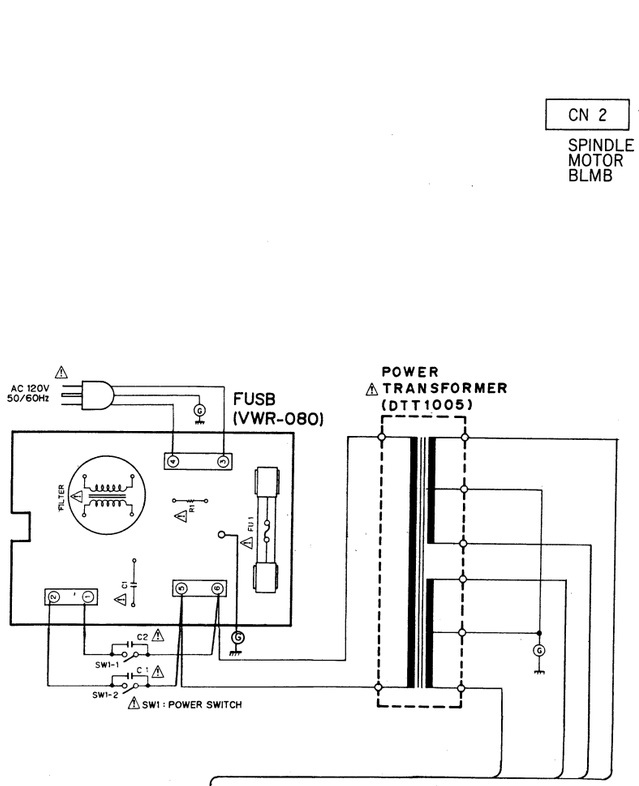
➡ : Signal route.
⊘ : Adjusting point.

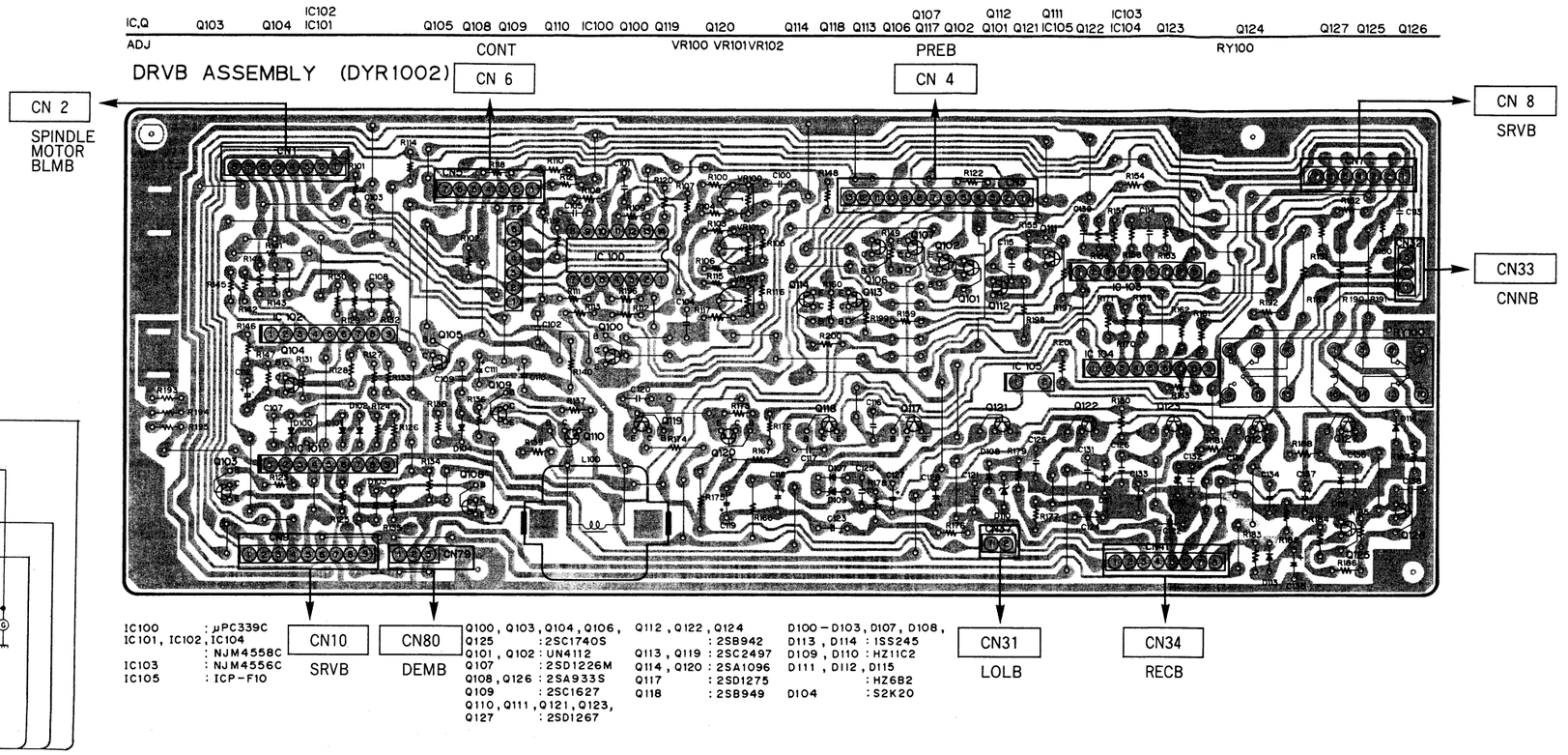
The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

* marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

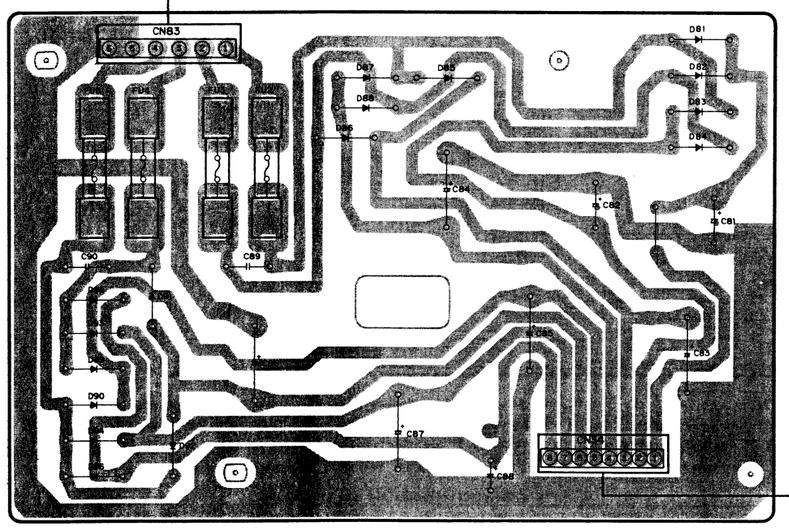




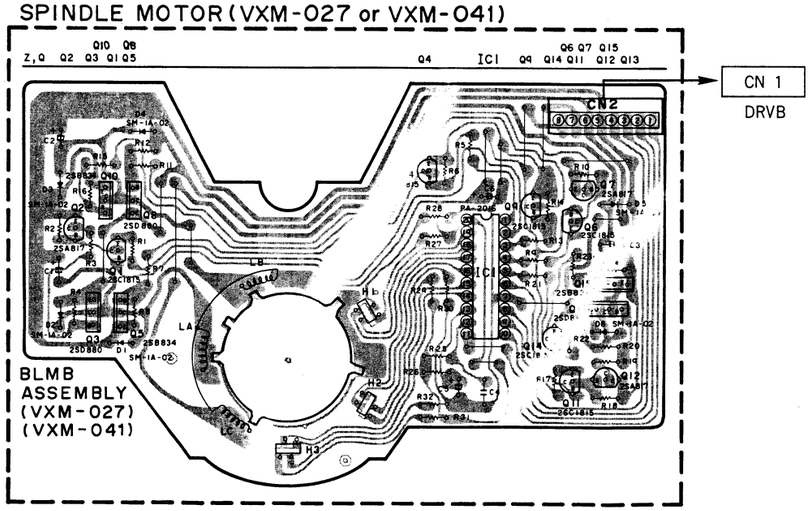
IC100 : μPC339C
IC101, IC102 : IC104
: NJM4558C
IC103 : NJM4556C
IC105 : ICP-F10

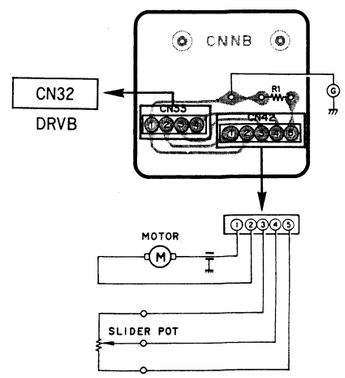
Q100, Q103, Q104, Q106, Q125 : 2SC1740S
Q101, Q102 : UN4112
Q107 : 2SD1226M
Q108, Q126 : 2SA933S
Q109 : 2SC1627
Q110, Q111, Q121, Q123, Q127 : 2SD1267
Q112, Q122, Q124 : 2SB942
Q113, Q119 : 2SC2497
Q114, Q120 : 2SA1096
Q117 : 2SD1275
Q118 : 2SB949

D100 – D103, D107, D108 : 1SS245
D113, D114 : 1SS245
D109, D110 : HZ11C2
D111, D112, D115 : HZ6B2
D104 : S2K20

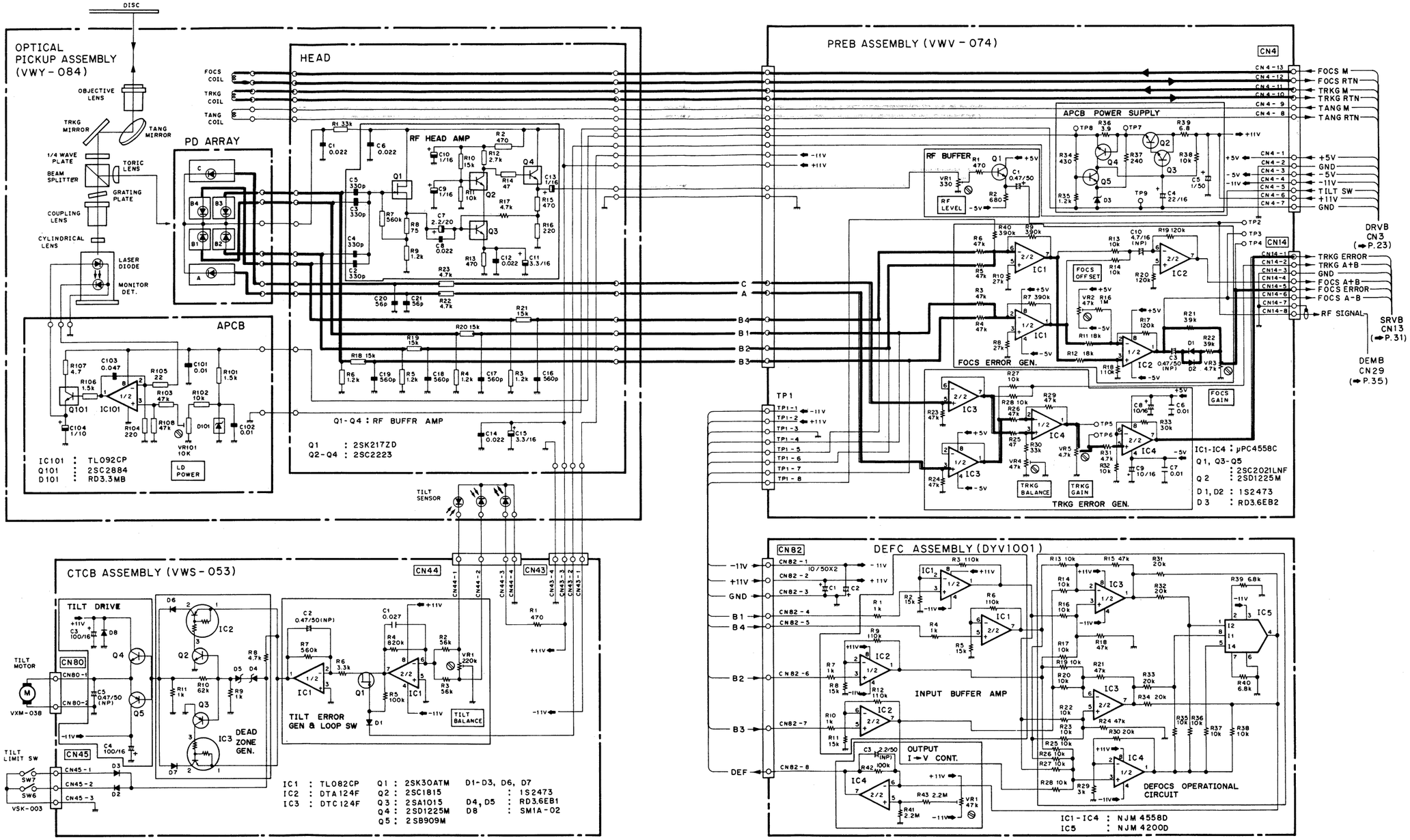


DB1-DB4 : SM1.5
D85-D96 : SM1A





6.3 PICK-UP (VWY-084), HEAD, APCB, PREB (UWV-074), DEFC (DYV1001), SENS (VWV-074) and CTCB (VWY-053) ASSEMBLIES



NOTE

- CHIP PACKAGED TRANSISTOR
- CAPACITOR CHIP
- CHEMICAL CAPACITOR CHIP
- RESISTOR CHIP
- CHIP PACKAGED ZD

- TRKG (TPACKING) SERVO LOOP
- FOCS (FOCUS) SERVO LOOP
- RF SIGNAL
- SLDR (SLIDER) SERVO LOOP

1. RESISTORS
   Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
   k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS
   Indicated in capacity (μF)/voltage (V) unless otherwise noted
   p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT
   : DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power
   mA: DC current at no input signal.

4. OTHERS
   : Signal route.
   : Adjusting point.

The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

* marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

PREB ASSEMBLY (VWV-074)

IC,Q IC4 IC3 Q1 IC2 IC1 Q2 Q3 Q4 Q5

ADJ VR4 VR5 VR3 VR1

DEFC

CN82

HEAD

PD ARRAY

B1 B4 K A B2 B3 C

Q Q1 Q3 Q2 Q4

Q1 : 2SK217ZD Q2~4 : 2SC2223

FOCS TRKG TANG

N43

CN14

CN4

CN 3

DRVB

CN13

SRVB

CN29

DEMB

IC IC3 IC5 IC4 IC1 IC2

DEFC ASSEMBLY

(DYV1001)

CN82

TP-1

PREB

IC1-IC4 : NJM4558D

IC5 : NJM4200D

TILT MOTOR

IC,Q Q5 Q4 Q2 IC2 IC3 Q1 IC1

ADJ CTCB ASSEMBLY

(VWS-053)

VR1

CN43

CN80

CN45

CN44

Z1 : TL082CP

Z2 : DTA124F

Z3 : DTC124F

Q1 : 2SK30ATM

Q2 : 2SC1815

Q3 : 2SA1015

Q4 : 2SD1225M

Q5 : 2SB909M

D1~3,6,7 : 1S2473

D4,5 : RD3.6EB1

D8 : SM1A-02

N44

N45

TILT LIMIT SW

SENS

MONITOR DET

LASER DIODE

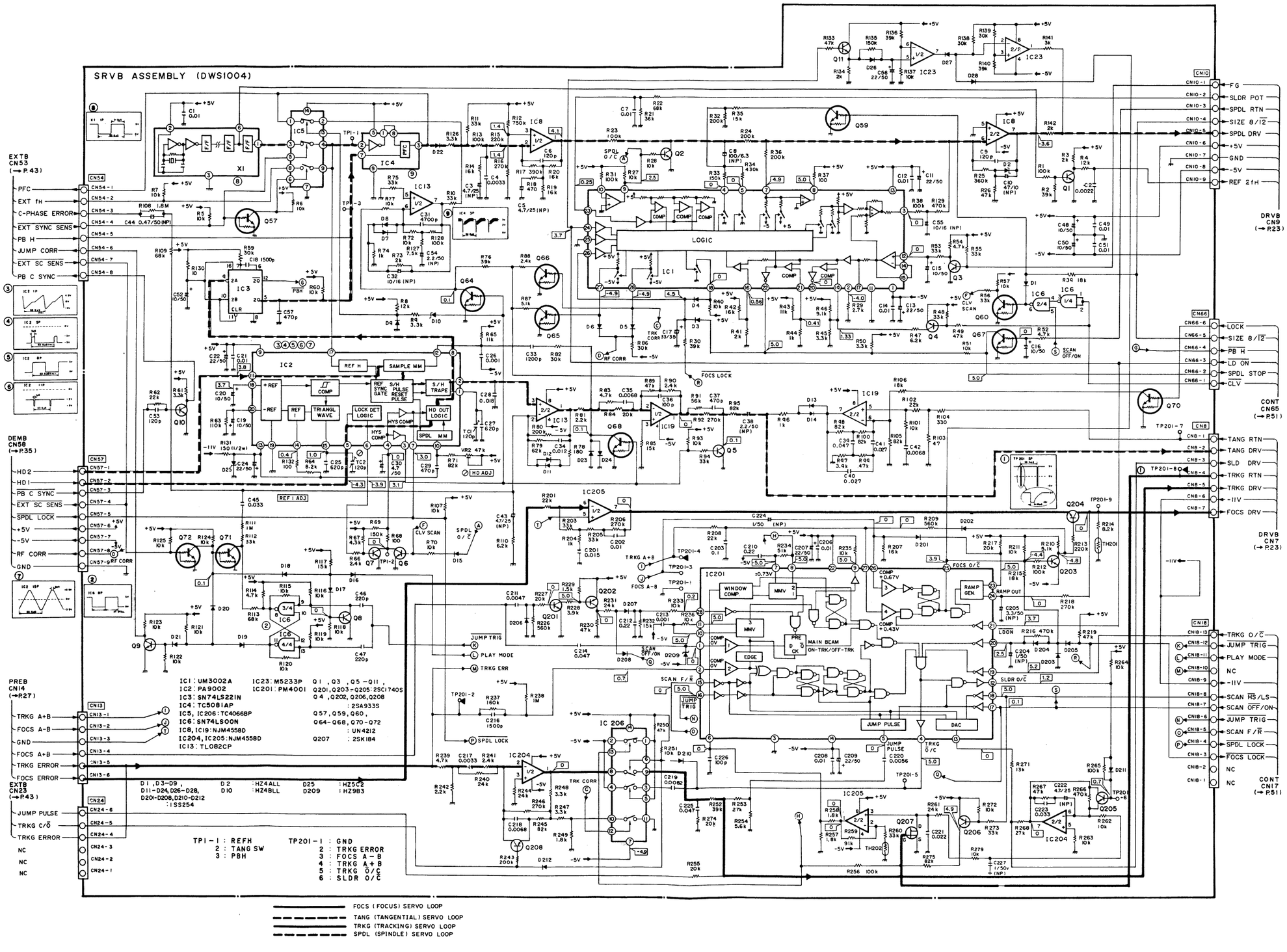
PD LD

IC,Q IC101 Q101

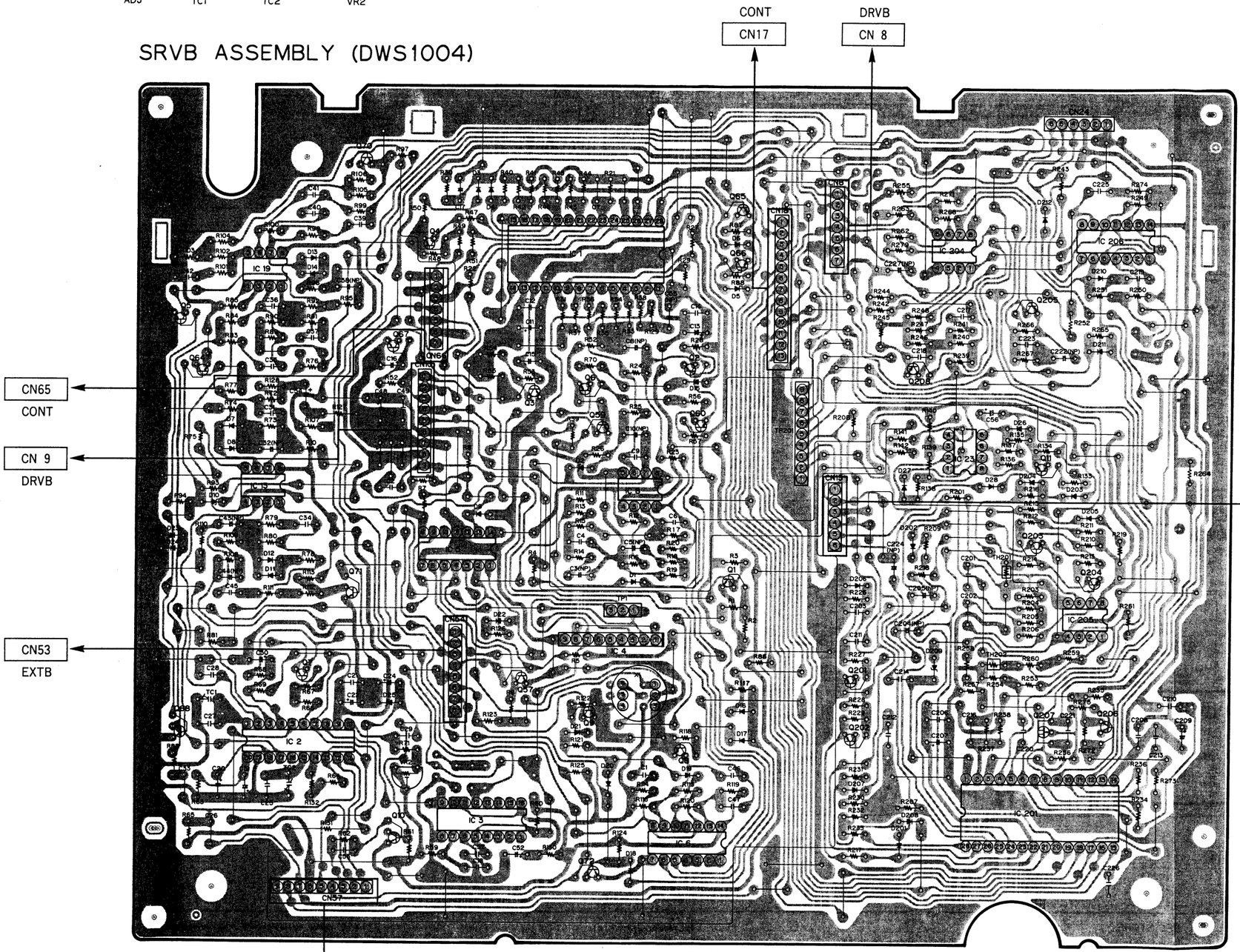
ADJ VR101

APCB

6.4 SRVB (DWS1004) ASSEMBLY



SRVB ASSEMBLY (DWS1004)

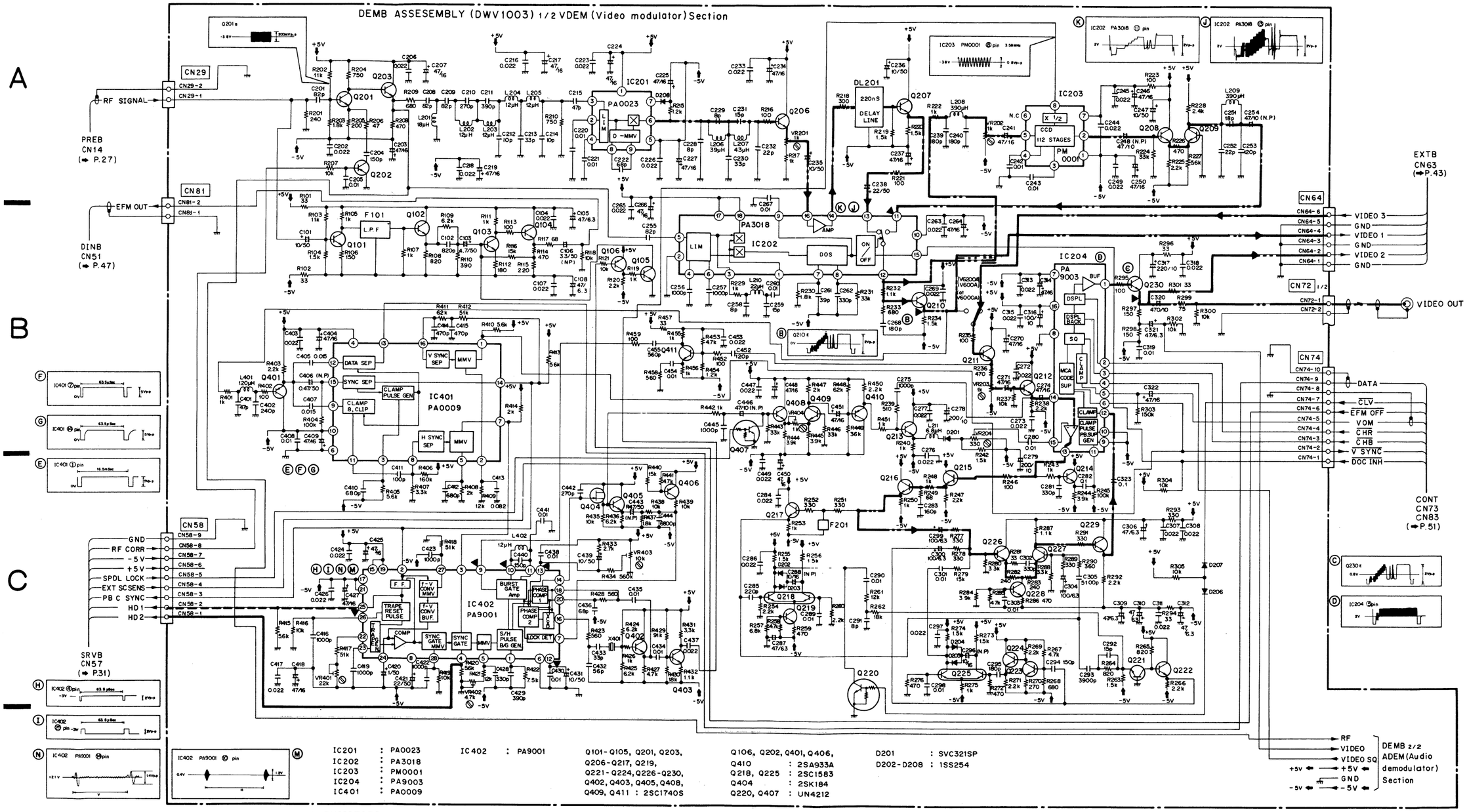


IC1	: UM3002A
IC2	: PA9002
IC3	: SN74LS221N
IC4	: TC5081AP
IC5 , IC206	: TC4066BP
IC6	: SN74LS00N
IC8 , IC19	: IC204, IC205 NJM4558D
IC13	: TL082CP
IC23	: M5233P
IC201	: PM4001

Q1 – Q3 , Q5 – Q11	
Q201 , Q203 – Q205	: 2SC1740S
Q4 , Q202, Q206, Q208	: 2SA933S
Q57 , Q59 , Q60 ,	
Q64 – Q68 , Q70 – Q72	: UN4212
Q207	: 2SK184

D1 , D3 – D9 ,	
D11 – D24 , D26 , D28	
D201 – D208 , D210 – D212	: 1SS245
D2	: HZ4ALL
D10	: HZ4BLL
D25	: HZ5C2
D209	: HZ9B2

6.5 DEMB (DWV1003) 1/2 ASSEMBLY, VDEM (VIDEO MODURATOR) SECTION



IC201 : PA0023
IC202 : PA3018
IC203 : PM0001
IC204 : PA9003
IC401 : PA0009

IC402 : PA9001

Q101-Q105, Q201, Q203, Q206-Q217, Q219, Q221-Q224, Q226-Q230, Q402, Q403, Q405, Q408, Q409, Q411 : 2SC1740S

Q106, Q202, Q401, Q406, Q410 : 2SA933A
Q218, Q225 : 2SC1583
Q404 : 2SK184
Q220, Q407 : UN4212

D201 : SVC321SP
D202-D208 : 1SS254

FOCS (FOCUS) SERVO LOOP
VIDEO SIGNAL
AVDIO SIGNAL
SPDL (SPINDLE) SERVO LOOP

1. RESISTORS

Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS

Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT

: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
➡ mA: DC current at no input signal.

4. OTHERS

➡ : Signal route.
⊘ : Adjusting point.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

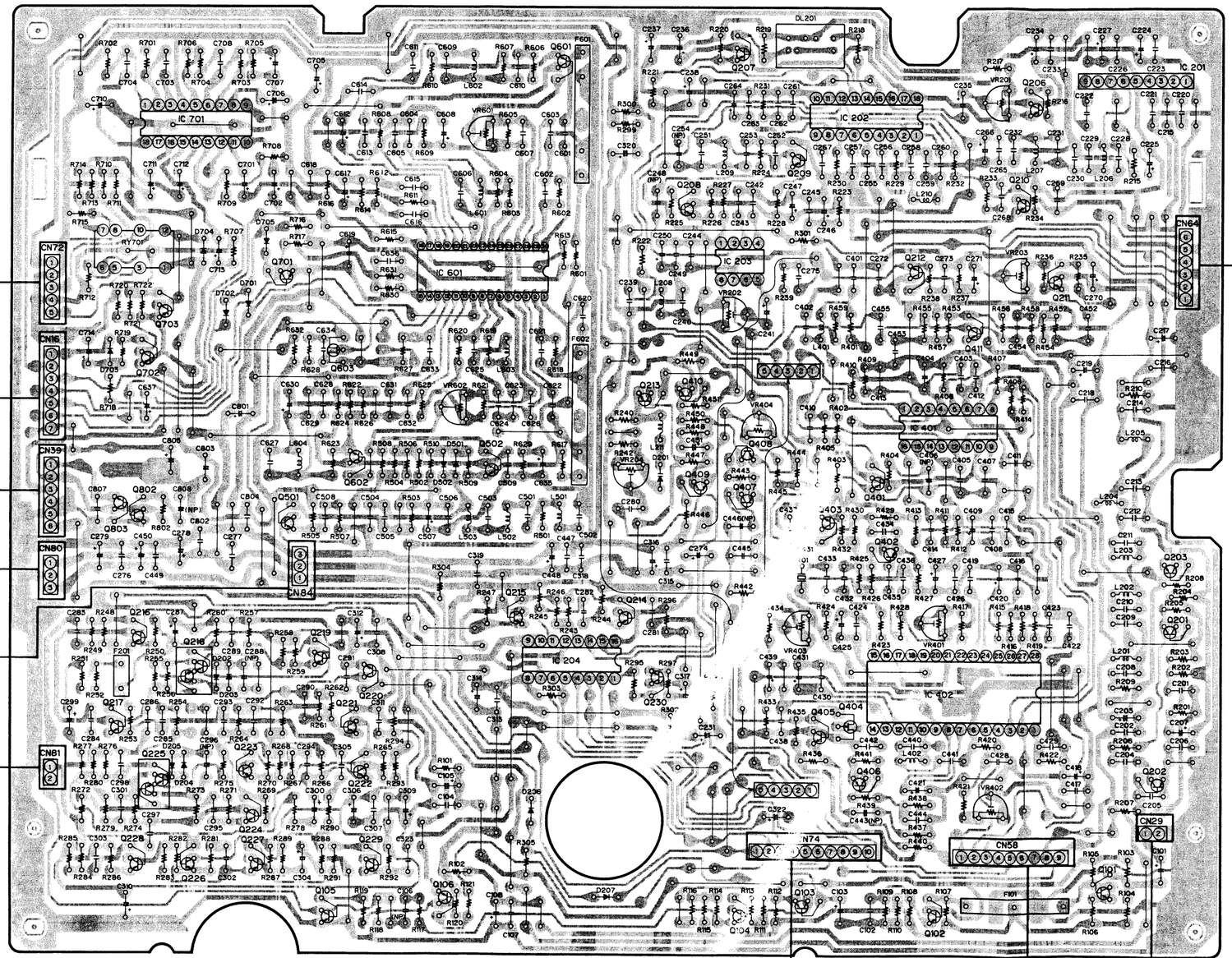
* marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

IC, Q																																		
			Q228								Q229																								
			Q216	Q225			Q227				Q222							Q409	Q407		Q103			Q401											
	Q803	Q702	Q703				Q602	Q221							Q230	Q410	Q408	Q104	Q405	Q404	Q102	IC402		Q210			Q101		Q202	
	Q217	Q802	IC701	Q218	Q223	Q701	Q219	Q603	Q106	IC601	Q215	IC204	Q214	Q213	Q208	IC203	Q209	Q403	IC202	Q406	Q212	IC401	Q411	Q206	Q211	IC201		Q201	
ADJ									VR602	VR601			VR204			VR202		VR404	VR403			VR401	VR201	VR402	VR203									

DEMB ASSEMBLY (DWV 1003)



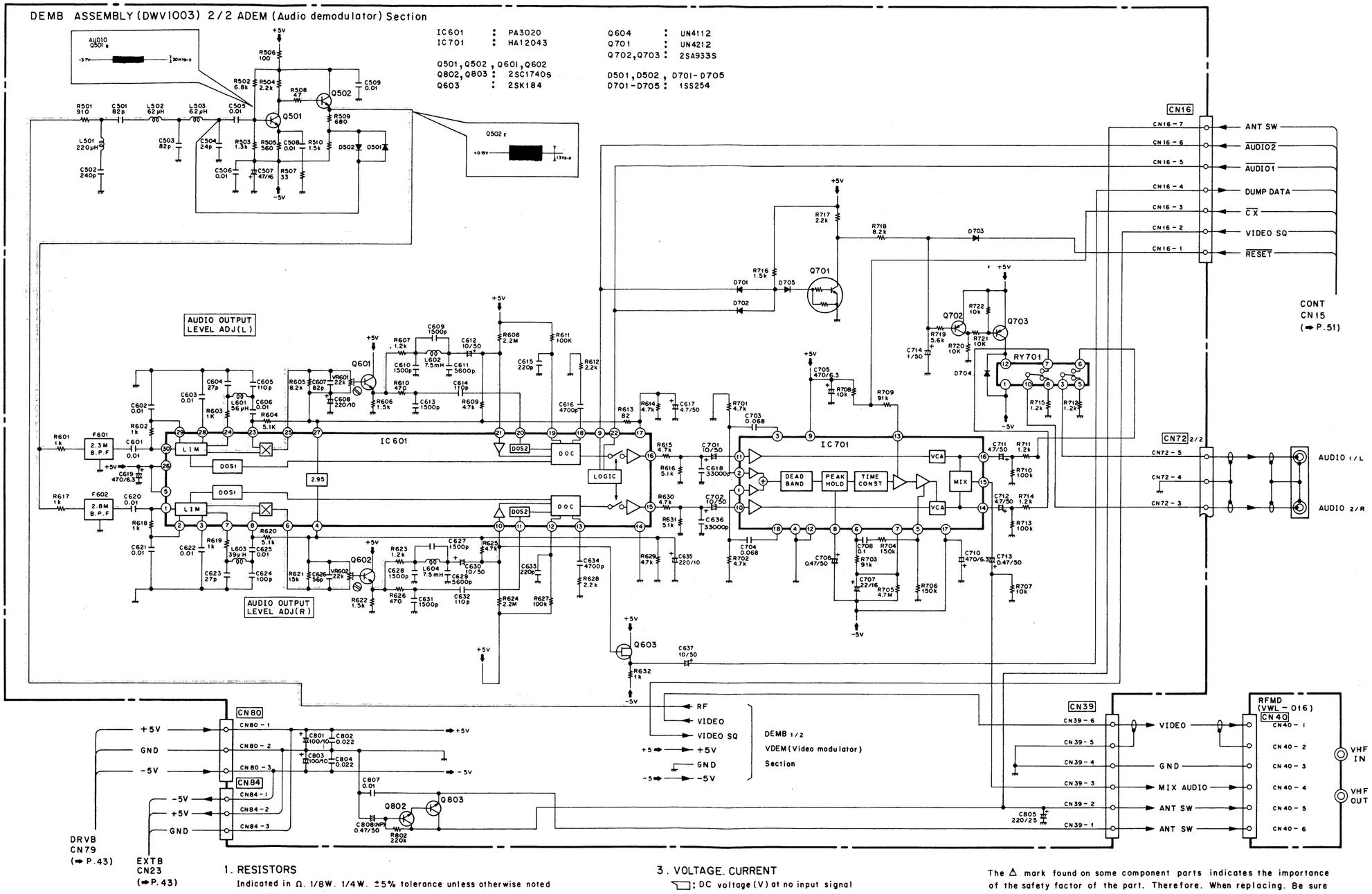
IC201 :PA0023
IC202 :PA3018
IC203 :PM0001
IC204 :PA9003
IC401 :PA0009
IC402 :PA9001
IC601 :PA3020
IC701 :HA12043

Q106,Q202,Q401,Q406
Q410,Q702,Q703
:2SA933S
Q218,Q225:2SC1583
Q101-Q105,Q201,Q203,
Q206-Q217,Q219,
Q221-Q224,Q226-Q230,
Q402,Q403:2SC1740S

Q405,Q408,Q409,Q411,
Q501,Q502,Q601,Q602,
Q802,Q803 :2SC1740S
Q404,Q603 :2SK184
Q220,Q407,Q701
:UN4212
Q604 :UN4112

D202-D207,D501,D502
D701-D705 :1SS254
D201 :SVC321SP

6.6 DEMB (DWV1003) 2/2 ASSEMBLY, ADEM (AUDIO DEMODURATOR) SECTION



AUDIO SIGNAL

1. RESISTORS
Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS
Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
➡ mA: DC current at no input signal.

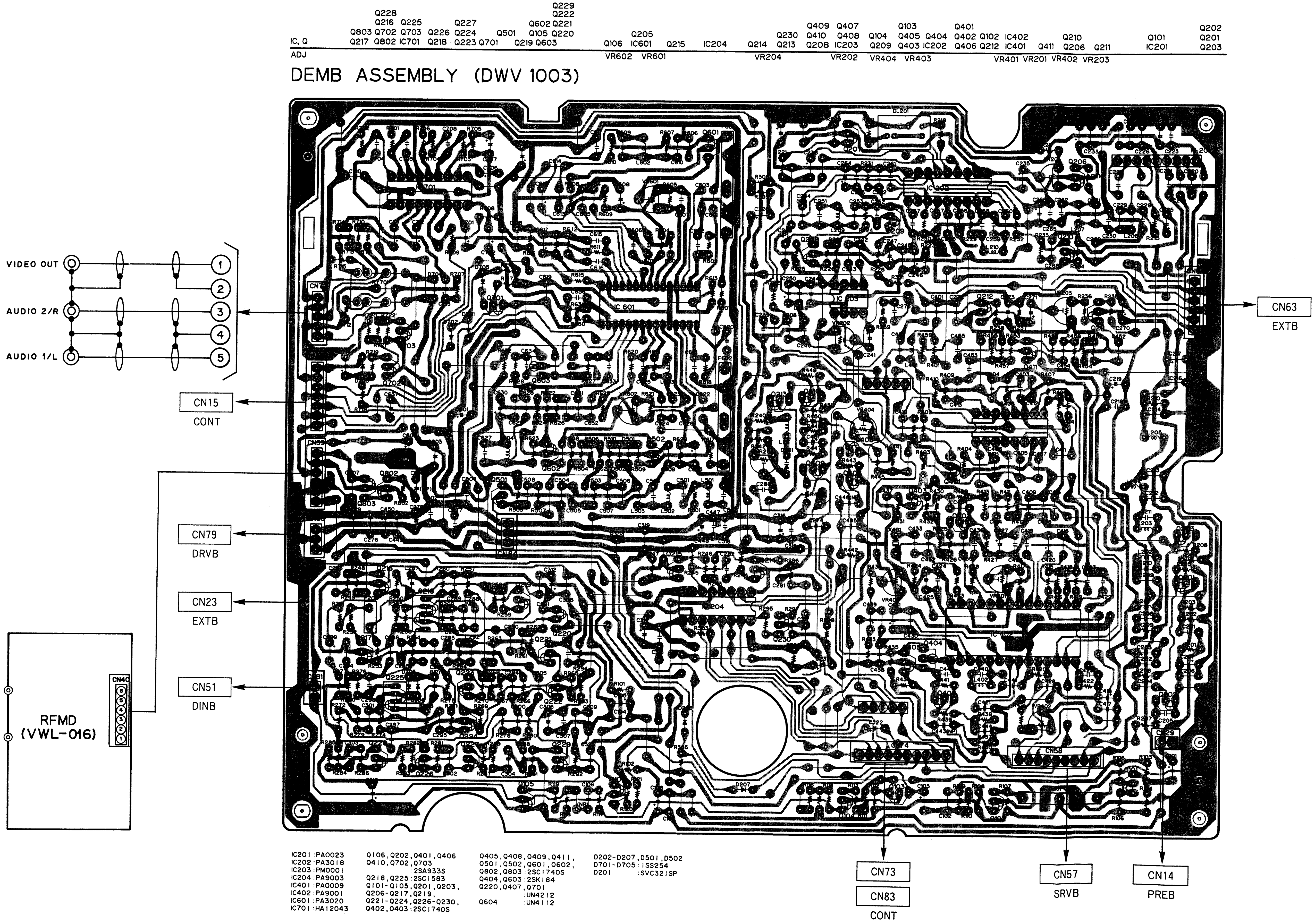
4. OTHERS
➡ : Signal route.
⊘ : Adjusting point.

The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.
*marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

DEMB ASSEMBLY (DWV 1003)



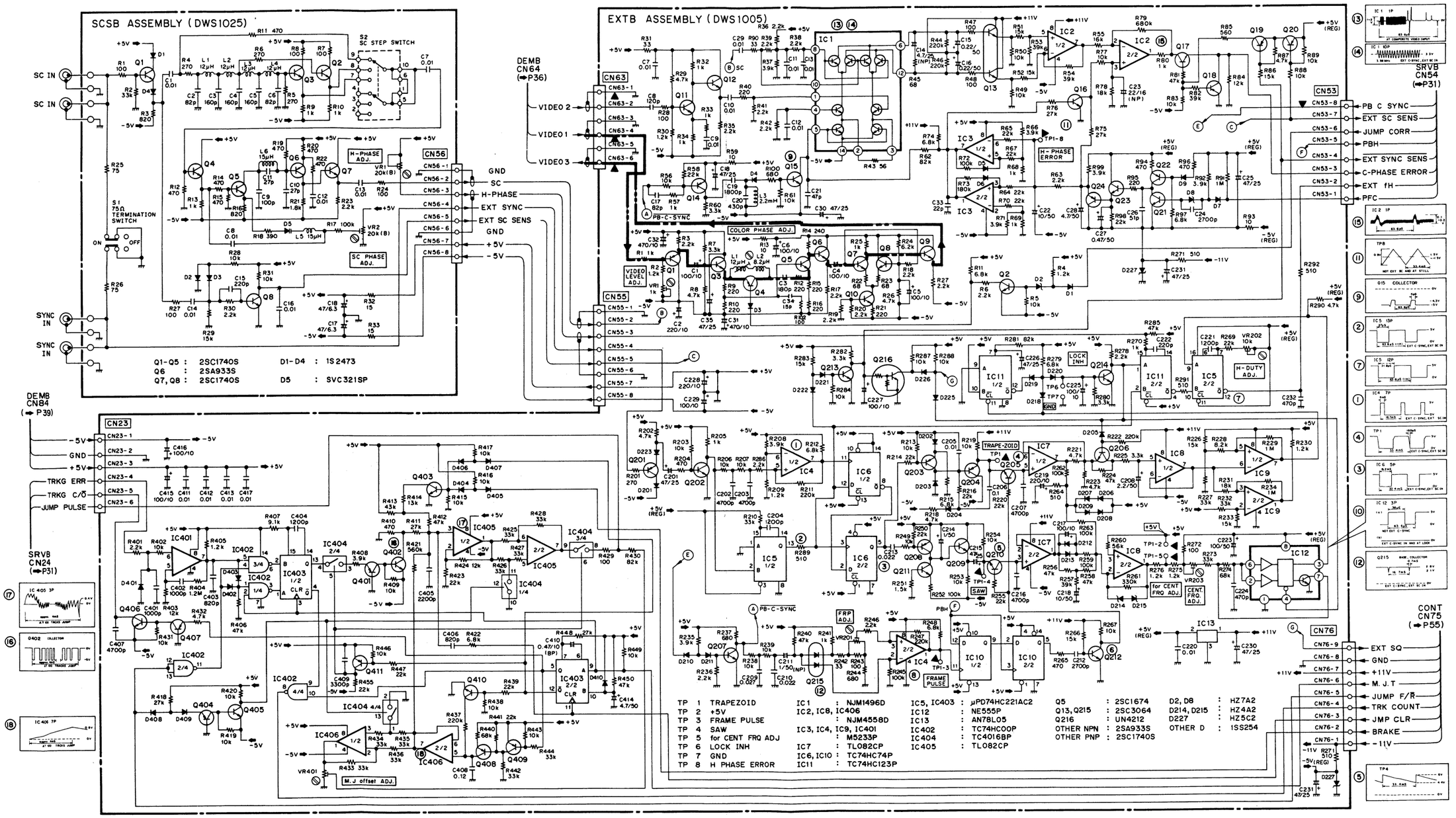
IC201 :PA0023
IC202 :PA3018
IC203 :PM0001
IC204 :PA9003
IC401 :PA0009
IC402 :PA9001
IC601 :PA3020
IC701 :HA12043

Q106, Q202, Q401, Q406
Q410, Q702, Q703 :2SA933S
Q218, Q225 :2SC1583
Q101-Q105, Q201, Q203,
Q206-Q217, Q219,
Q221-Q224, Q226-Q230,
Q402, Q403 :2SC1740S

Q405, Q408, Q409, Q411,
Q501, Q502, Q601, Q602,
Q802, Q803 :2SC1740S
Q404, Q603 :2SK184
Q220, Q407, Q701 :UN4212
Q604 :UN4112

D202-D207, D501, D502
D701-D705 :1SS254
D201 :SVC321SP

6.7 EXTB (DWS1005) and SCSB (DWS1025) ASSEMBLIES



VIDEO SIGNAL

1. RESISTORS

Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS

Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT

▭: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
➡ mA: DC current at no input signal.

4. OTHERS

➡ : Signal route.
⊘ : Adjusting point.

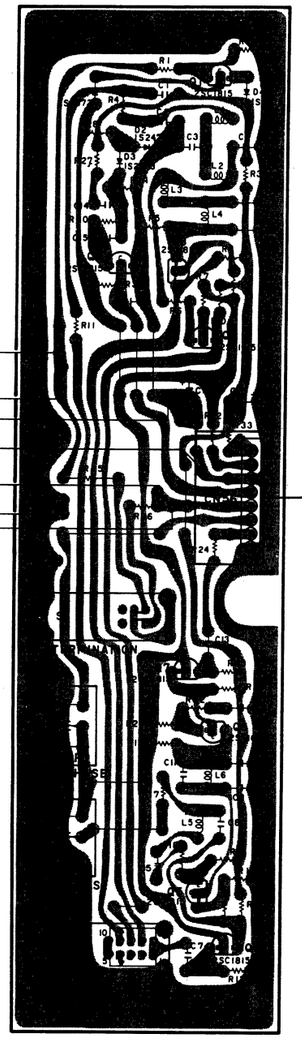
The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

* marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

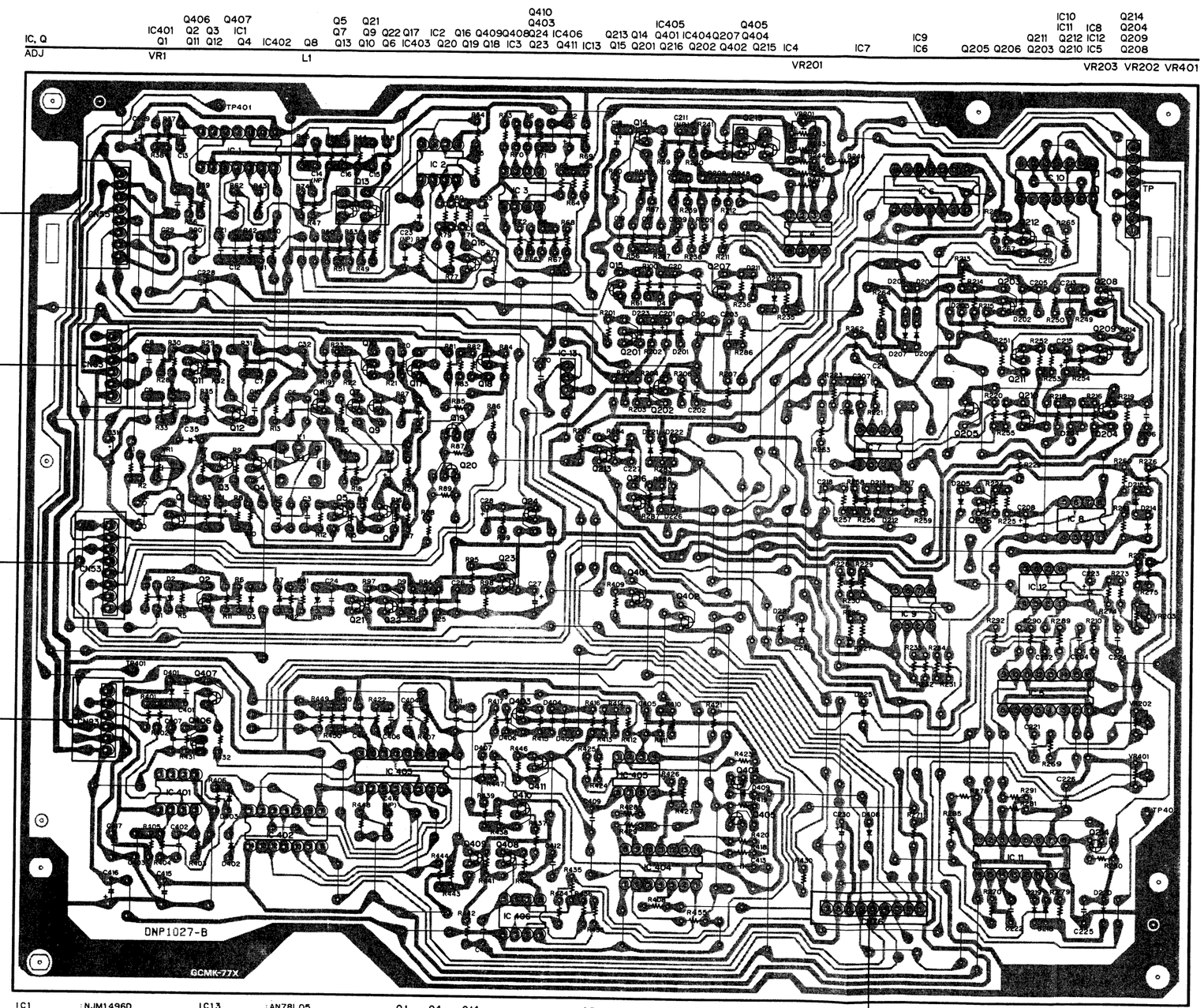
This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

SCSB ASSEMBLY (DWS1025)



Q1-Q5 : 2SC1740S
Q6 : 2SA933S
Q7, Q8 : 2SC1740S
D1-D4 : 1S2473
D5 : SVC321SP

EXTB ASSEMBLY (DWS1005)

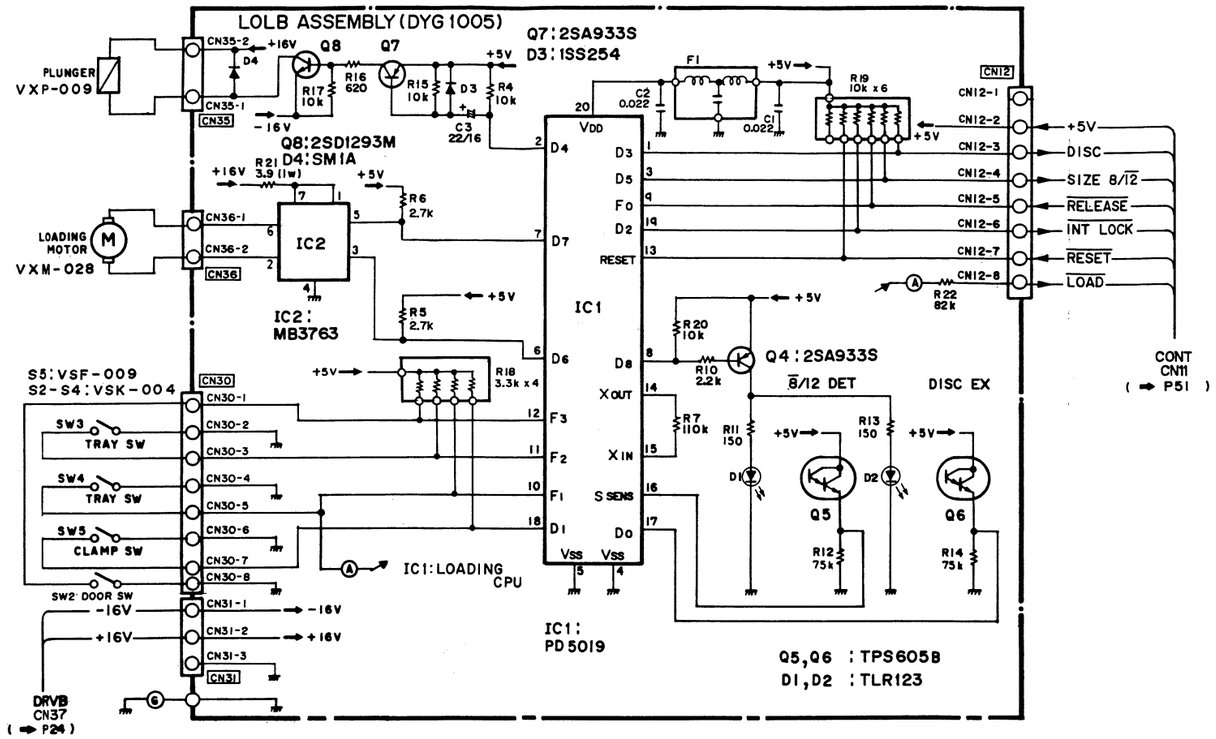


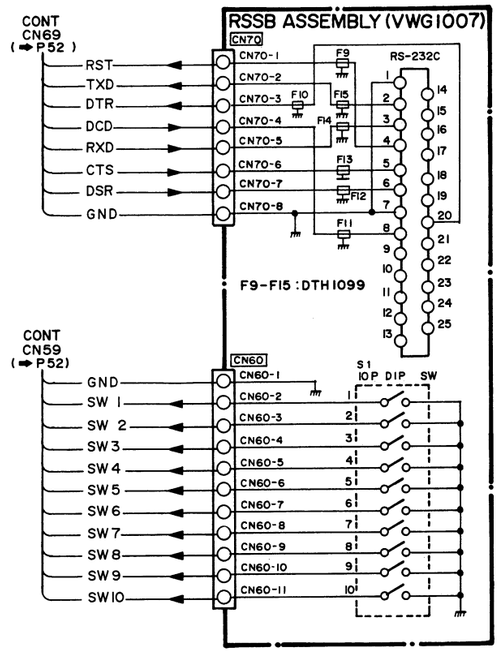
IC1 : NJM1496D
IC2 , IC8 , IC406 : NJM4558D
IC3 , IC4 , IC9 , IC401 : M5233P
IC5 , IC403 : μPD74HC221AC
IC6 , IC10 : TC74HC74P
IC7 : TL082CP
IC11 : TC74HC123P
IC12 : NE555P
IC13 : AN78L05
IC402 : TC74HC00P
IC404 : TC4016BP
IC405 : TL082CP

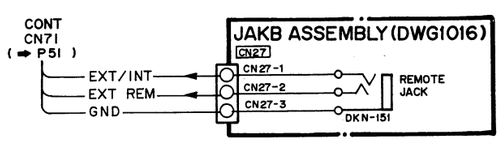
Q1 , Q4 , Q14 , Q18 - Q20 , Q22 , Q24 , Q201 , Q203 , Q204 , Q208 , Q204 , Q208 , Q401 , Q404 , Q407 - Q409 , Q411 : 2SA933S
Q2 , Q3 , Q6 - Q12 , Q15 - Q17 , Q21 , Q23 , Q202 , Q205 - Q207 , Q209 - Q214 , Q402 , Q403 , Q405 , Q406 , Q410 : 2SC1740S

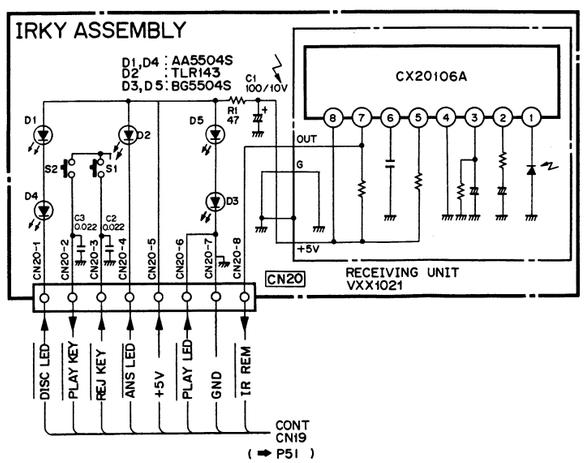
Q5 : 2SC1674
Q13 , Q215 : 2SC3064
Q216 : UN4212
D1 , D3 - D7 , D9 D201 - D213 , D218 - D223 D225 , D226 , D401 - D410 : 1SS254
D2 , D8 : HZ7A2
D214 , D215 : HZ4A2
D227 : HZ502

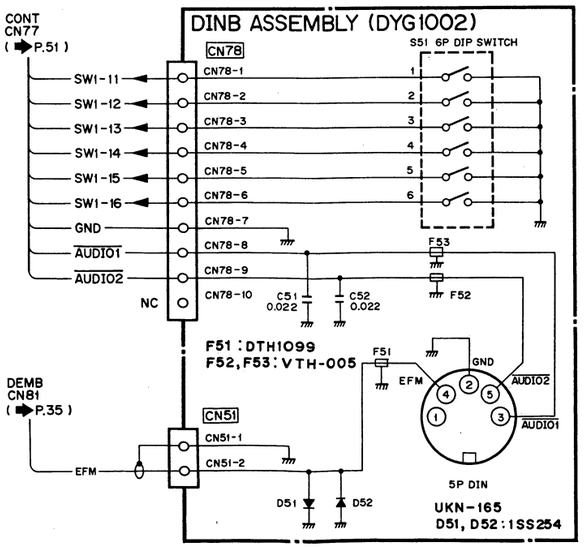
6.8 LOLB (DYG1005), JAKB (DWG1016), RSSB (VWG1007), IRKY, KEYB (VWG-149) and DINB (DYG1002) ASSEMBLIES

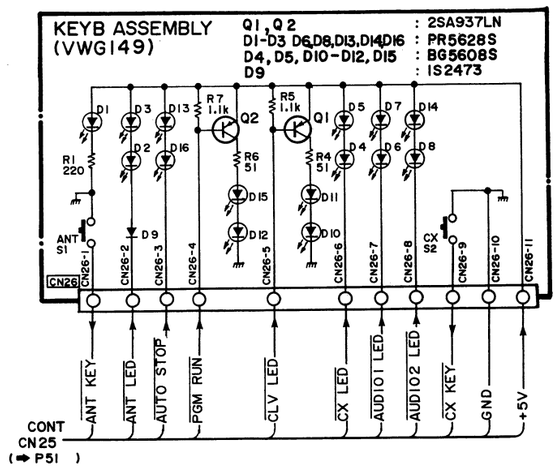






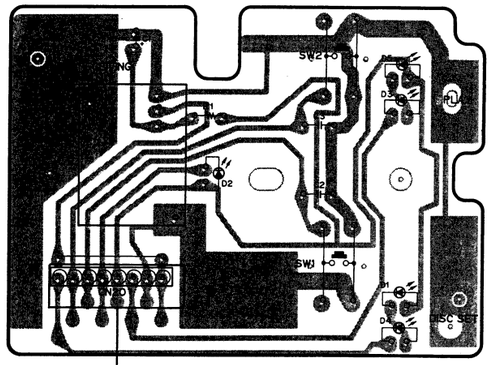






60-12 LD-V6200 KUC
59-3 LD-V6000
LOLB, IRAB, IIOB, KEY A, KEY B, JAKB, RSSB

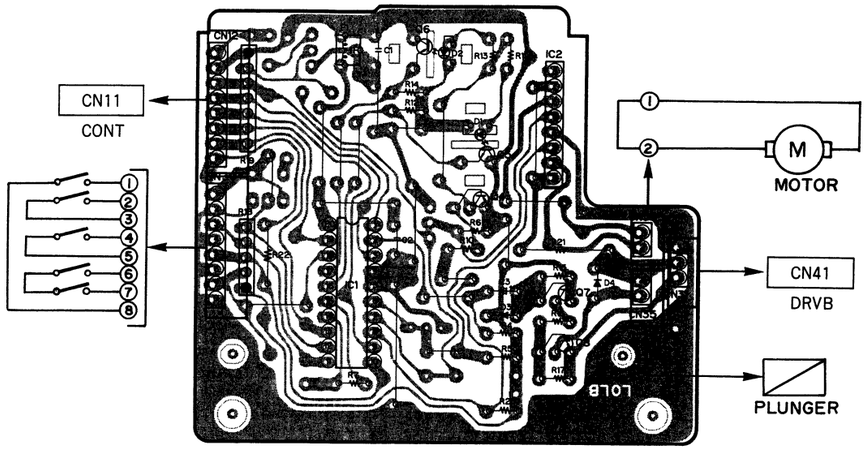
IRKY ASSEMBLY (DWG 1017)



CN19
CONT

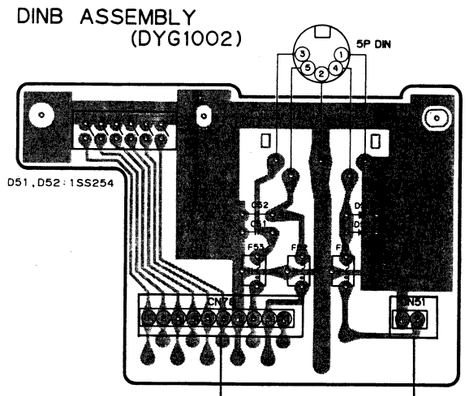
LOLB ASSEMBLY (DYG1005)

IC,Q IC1 Q6 Q4 Q5 IC2 Q7 Q8

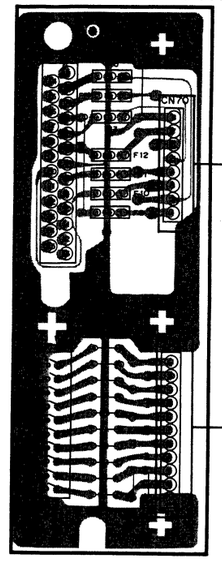


IC1 : PD5019
IC2 : MB3763
Q4,Q7 : 2SA933S
Q5,Q6 : TPS605B
Q8 : 2SD1293M
D1,D2 : TLR123
D3 : 1SS254
D4 : SM1A

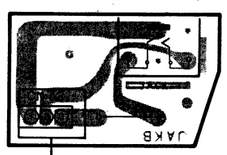
DINB ASSEMBLY (DYG1002)



RSSB ASSEMBLY (VWG1007)

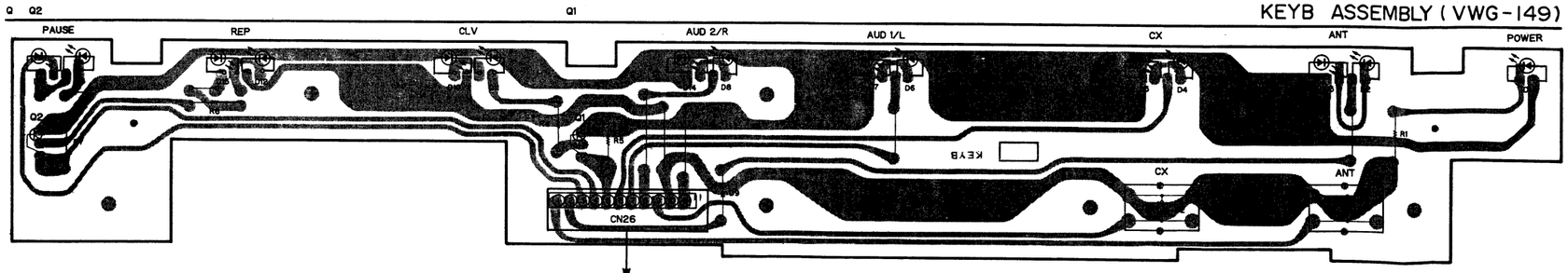


JAKB ASSEMBLY (DWG1016)



CN71
CONT

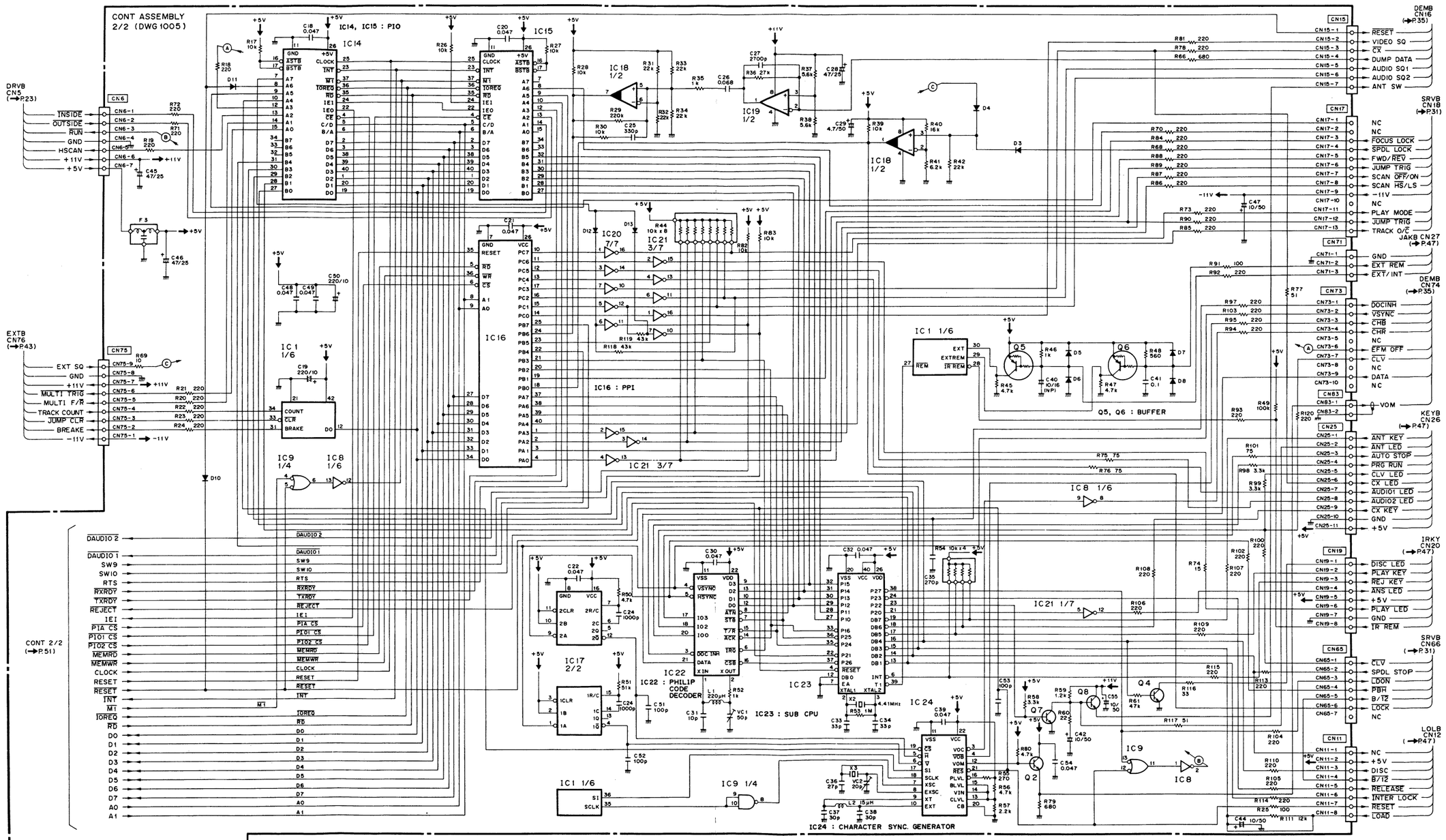
KEYB ASSEMBLY (VWG-149)



Q1,Q2:2SA937LNF
D1-D3,D6 D8 D13,D14,D16 :PR5628S
D4,D5 D10-D12,D15 :BG5608S

CN25
CONT

6.9 CONT (DWG1005) 1/2 ASSEMBLY



IC14, IC15 : LH5081A
IC16 : μPD71055C
IC17 : μPD74HC221C
IC18 : M5233P
IC19 : μPC4558C
IC20, IC21 : TD62504P
IC22 : PD0011
IC23 : PD8011
IC24 : MB89011

Q2, Q4 : 2SC1740S
Q5, Q6 : UN4112
Q7 : 2SC1740S
Q8 : 2SD1225M
D3-D11 : 1SS254

1. RESISTORS
Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS
Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
: mA: DC current at no input signal.

4. OTHERS
: Signal route.
: Adjusting point.

The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

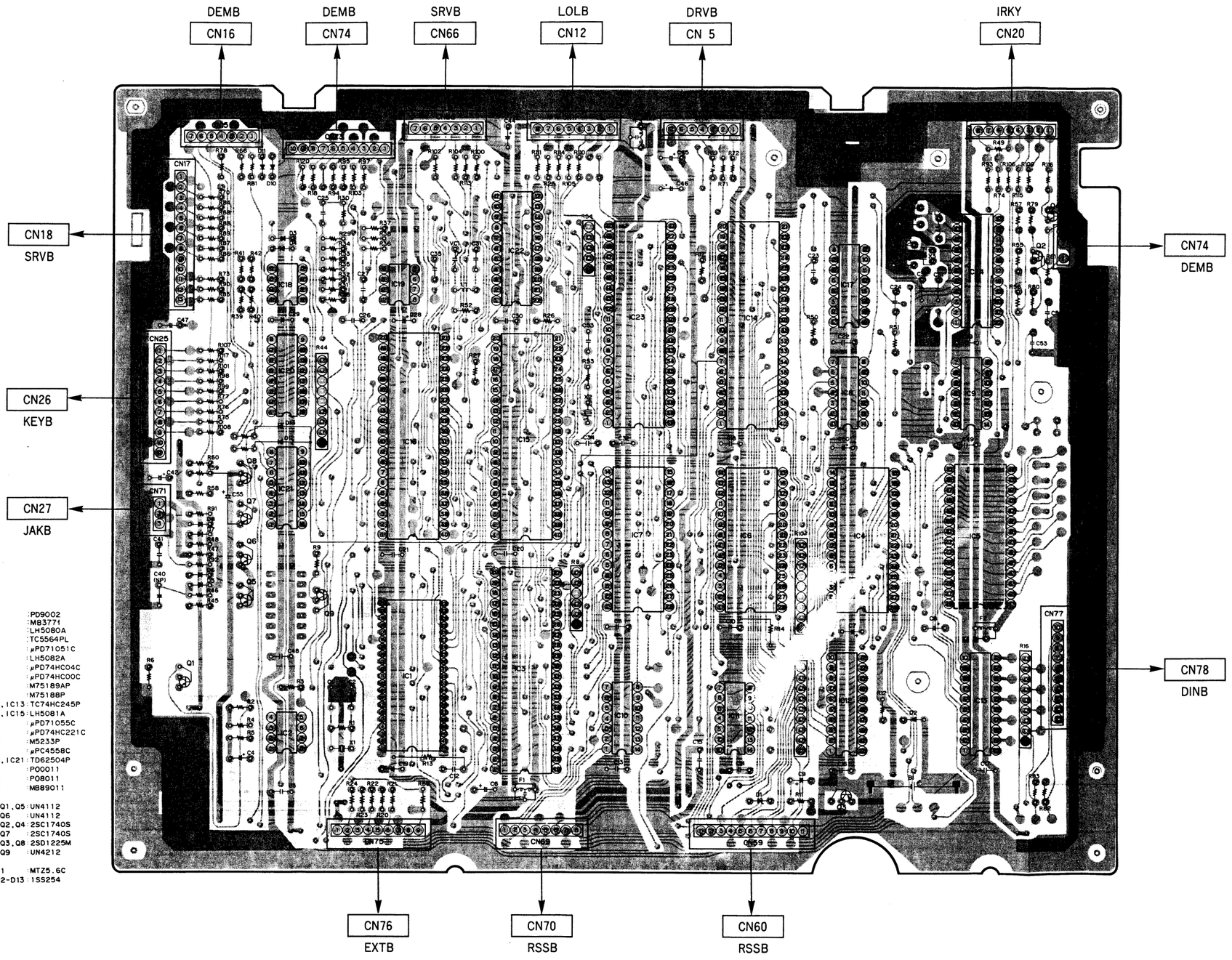
✱marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

IC,Q ADJ | Q1 | Q8 Q7 Q6 Q5 IC20 IC21 | IC18 | Q9 | IC16 IC1 | IC19 VC1 | IC15 IC3 | IC22 | IC7 IC10 | IC23 | IC6 IC11 | IC14 | Q3 IC4 | IC12 IC17 IC8 | IC9 | IC5 IC13 | IC24 | Q4 Q2

CONT ASSEMBLY (DWG 1005)

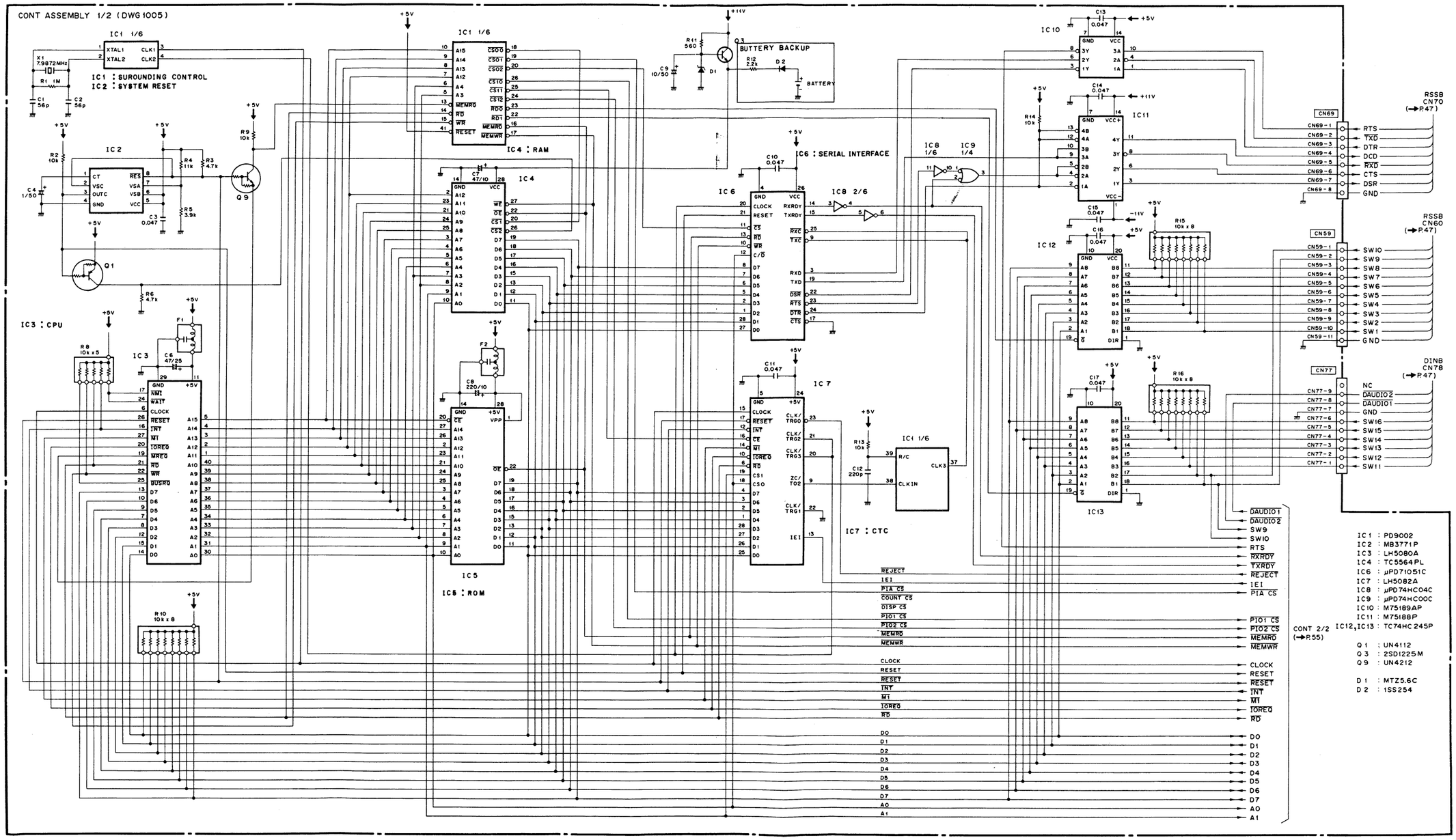


IC1 :PD9002
IC2 :MB3771
IC3 :LH5080A
IC4 :TC5564PL
IC6 :μPD71051C
IC7 :LH5082A
IC8 :μPD74HC04C
IC9 :μPD74HC00C
IC10 :M75189AP
IC11 :M75188P
IC12, IC13 :TC74HC245P
IC14, IC15 :LH5081A
IC16 :μPD71055C
IC17 :μPD74HC221C
IC18 :M5233P
IC19 :μPC455BC
IC20, IC21 :TD62504P
IC22 :P00011
IC23 :P08011
IC24 :MB89011

Q1, Q5 :UN4112
Q6 :UN4112
Q2, Q4 :2SC1740S
Q7 :2SC1740S
Q3, Q8 :2SD1225M
Q9 :UN4212

D1 :MTZ5.6C
D2-D13 :1SS254

6.10 CONT (DWG1005) 2/2 ASSEMBLY



1. RESISTORS
Indicated in Ω. 1/8W. 1/4W. ±5% tolerance unless otherwise noted
k: KΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10% (M): ±20% tolerance

2. CAPACITORS
Indicated in capacity (μF)/voltage (V) unless otherwise noted
p: pF. indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE. CURRENT
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
mA: DC current at no input signal.

4. OTHERS
: Signal route.
: Adjusting point.

The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore. When replacing. Be sure to use parts of identical designation.

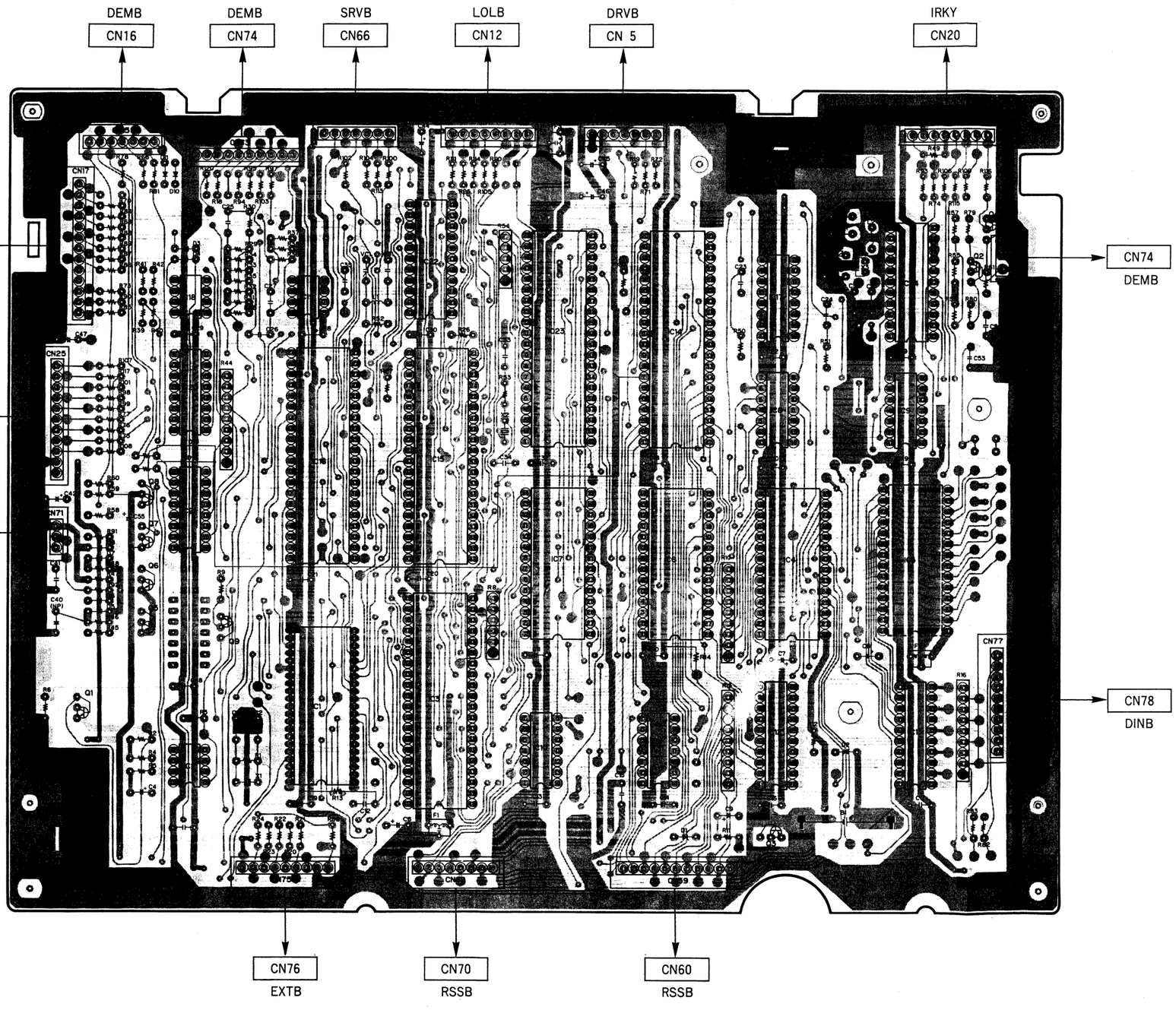
✱marked capacitors and resistors have parts numbers.

The underlined indicates the switch position.

This is the basic schematic diagram. but the actual circuit may vary due to improvements in design.

IC,Q ADJ — Q1 — Q8 Q7 Q6 Q5 IC20 IC21 — IC18 — Q9 — IC16 IC1 IC19 VC1 — IC15 IC3 IC22 — IC7 IC10 IC23 — IC6 IC11 IC14 — Q3 IC4 IC12 IC17 IC8 — IC9 IC5 IC13 IC24 — Q4 Q2

CONT ASSEMBLY (DWG 1005)



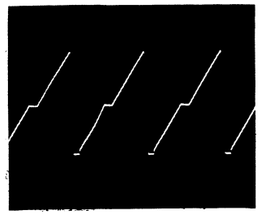
IC1 :PD9002
IC2 :MB3771
IC3 :LH5080A
IC4 :TC5564PL
IC6 :μPD71051C
IC7 :LH5082A
IC8 :μPD74HC04C
IC9 :μPD74HC00C
IC10 :M75189AP
IC11 :M75188P
IC12, IC13 :TC74HC245P
IC14, IC15 :LH5081A
IC16 :μPD71055C
IC17 :μPD74HC221C
IC18 :M5233P
IC19 :μPC4558C
IC20, IC21 :TD62504P
IC22 :P00011
IC23 :P08011
IC24 :MB89011

Q1, Q5 :UN4112
Q6 :UN4112
Q2, Q4 :2SC1740S
Q7 :2SC1740S
Q3, Q8 :2SD1225M
Q9 :UN4212

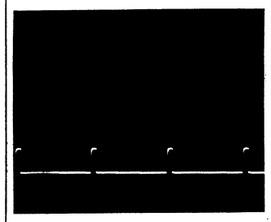
D1 :MTZ5.6C
D2-D13 :1SS254

6.11 WAVE FORMS

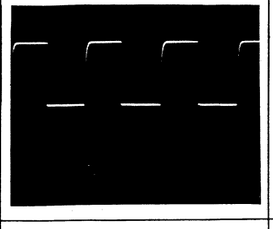
SRVB IC2 ①
V:2V/div H:20μs/div



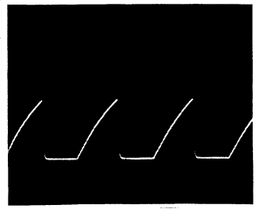
SRVB IC2 ⑤
V:2V/div H:20μs/div



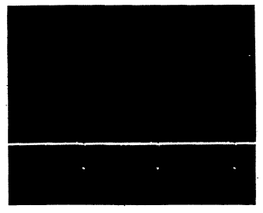
SRVB IC2 ⑧
V:2V/div H:20μs/div



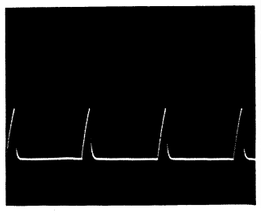
SRVB IC2 ⑩
V:2V/div H:20μs/div



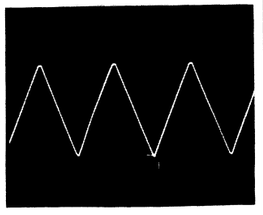
SRVB IC2 ⑪
V:2V/div H:20μs/div



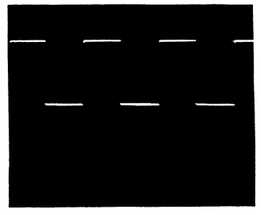
SRVB IC2 ⑫
V:2V/div H:20μs/div



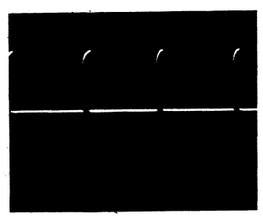
SRVB IC2 ⑮
V:2V/div H:20μs/div



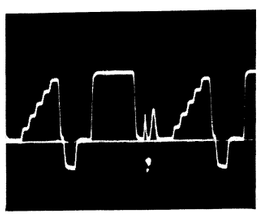
SRVB IC2 ①
V:2V/div H:20μs/div



SRVB IC8 ⑤
V:2V/div H:20μs/div

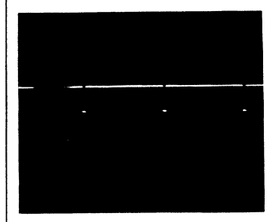


DEMB IC202 ⑪
V:0.5V/div H:10μs/div

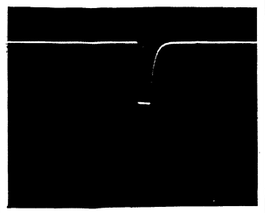


DEMB IC202 ⑬
V:0.5V/div H:10μs/div

DEMB IC401 ①
V:5V/div H:5ms/div

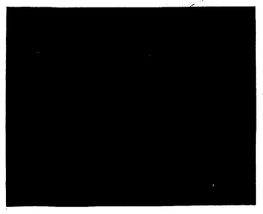


DEMB IC401 ⑦
X:2V/div H:2μs/div



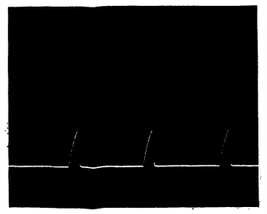
DEMB IC401 ⑧
V:0.1V/div H:20μs/div

DEMB IC401 ⑯
V:2V/div H:0.2ms/div

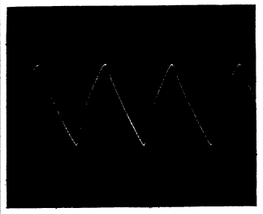


DEMB IC401 ①
V:2V/div H:20μs/div

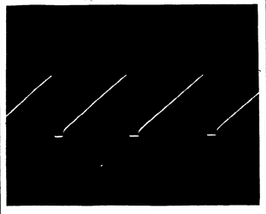
DEMB IC401 ⑤
V:2V/div H:20μs/div



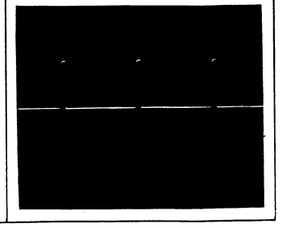
DEMB IC401 ⑯
V:0.2V/div H:0.1μs/div



DEMB IC401 ㉓
V:0.1V/div H:20μs/div
(10:1)

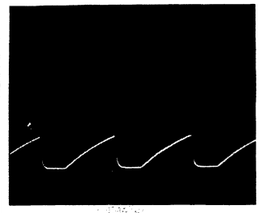


DEMB IC401 ㉕
V:1V/div H:20μs/div

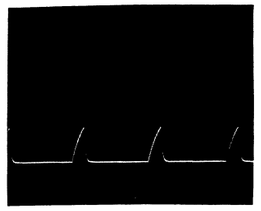


DEMB IC401 ㉖
V:2V/div H:20μs/div

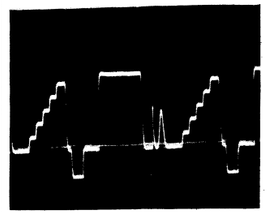
DEMB IC401 ㉗
V:2V/div H:20μs/div



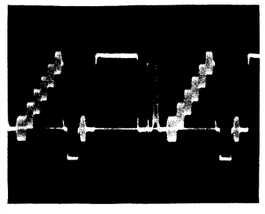
DEMB IC401 ㉘
V:2V/div H:20μs/div



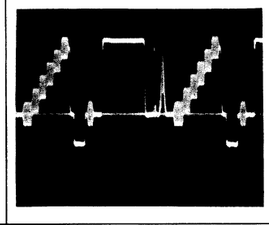
DEMB IC204 ⑪
V:0.5V/div H:10μs/div



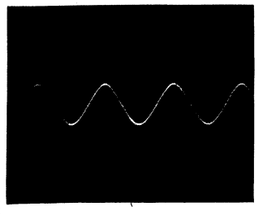
DEMB IC204 ⑫
V:0.5V/div H:10μs/div



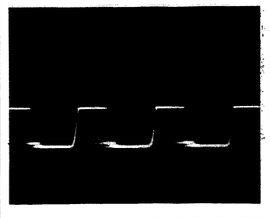
DEMB IC204 ⑬
V:0.5V/div H:10μs/div



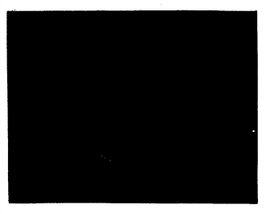
DEMB IC203 ⑧
V:0.1V/div H:0.1μs/div



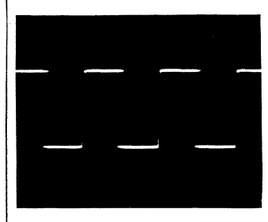
DRVB Q108 ⓒ
V:0.1V/div H:10μs/div



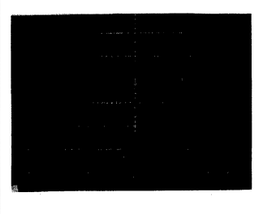
DRVB CN9-9
V:0.5V/div H:10μs/div



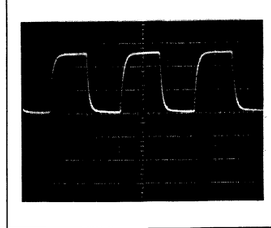
DRVB Q110 ⓒ
V:0.1V/div H:10μs/div



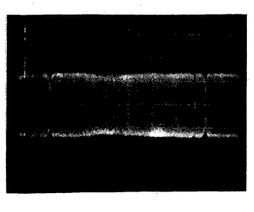
PREB TP2 (RF)
V:5mV/div
MODE; #1000 STILL
H:2msec/div



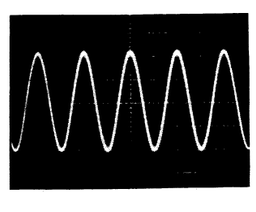
LOLB IC1 ⑭
V:0.2V/div
MODE; PLAY
H:1μsec/div



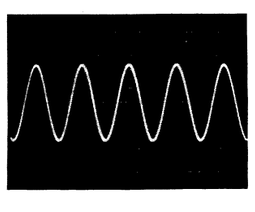
ADEM IC601 ①
V:20mV/div
MODE; PLAY
H:5msec/div



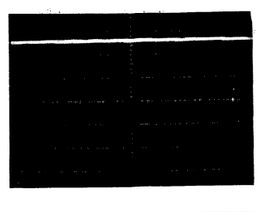
ADEM IC601 ⑮
V:10mV/div
MODE; #3600 PLAY
H:0.5msec/div



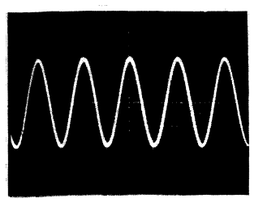
ADEM IC701 ②
V:20mV/div
MODE; #3600 PLAY
H:0.5msec/div



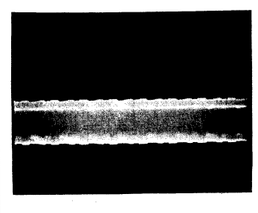
ADEM IC701 ⑥
V:0.1V/div
MODE; #3600 PLAY
H:0.5msec/div



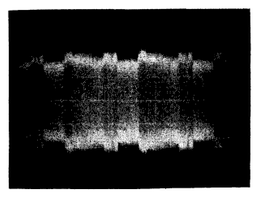
ADEM IC701 ⑪
V:10mV/div
MODE; #3600 PLAY
H:0.5msec/div



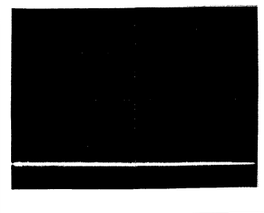
VDEM IC202 ③
V:50mV/div
MODE; #1000 PLAY
H:20μsec/div



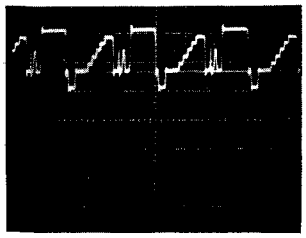
VDEM IC202 ⑤
V:10mV/div(AC)
MODE; #1000 PLAY
H:20μse/div



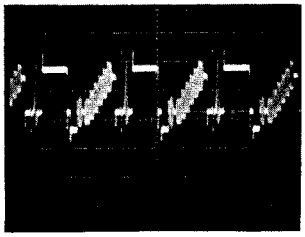
VDEM IC202 ⑨
V:0.1V/div
MODE; #1000 STILL
H:2msec/div



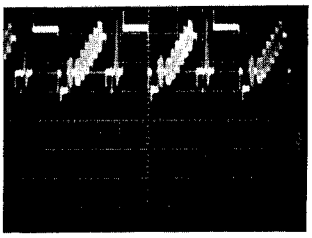
VDEM IC202 ⑪ V:0.1V/div MODE; #1000 STILL H:20μsec/div



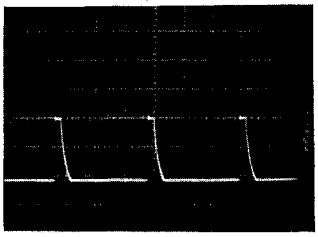
VDEM IC202 ⑫ V:0.1V/div MODE; #1000 STILL H:20μsec/div



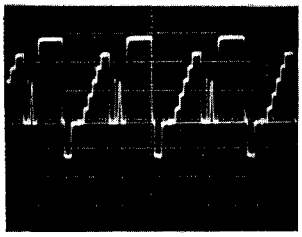
VDEM IC202 ⑬ V:0.1V/div MODE; #1000 STILL H:20μsec/div



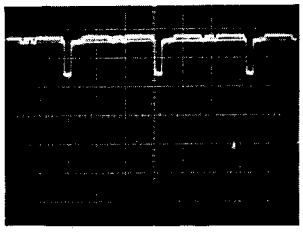
VDEM IC401 ③ V:0.2V/div MODE; PLAY H:20μsec/div



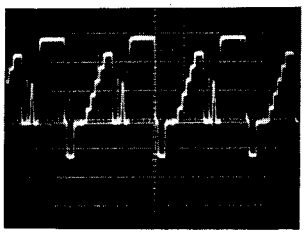
VDEM IC401 ⑨ V:50mV/div MODE; #1000 STILL H:20μsec/div



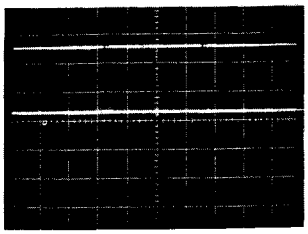
VDEM IC401 ⑪ V:50mV/div MODE; #1000 STILL H:20μsec/div



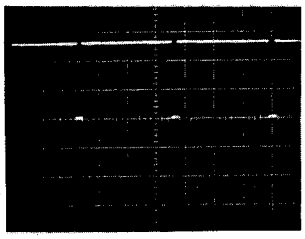
VDEM IC401 ⑫ V:50mV/div MODE; #1000 STILL H:20μsec/div



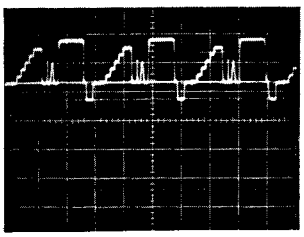
VDEM IC401 ⑬ V:0.2V/div MODE; #1000 STILL H:5msec/div



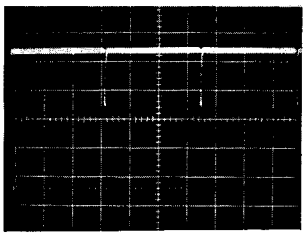
VDEM IC401 ⑭ V:0.2V/div MODE; #1000 STILL H:20μsec/div



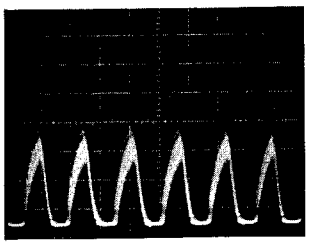
VDEM IC401 ⑮ V:0.1V/div MODE; #1000 STILL H:20μsec/div



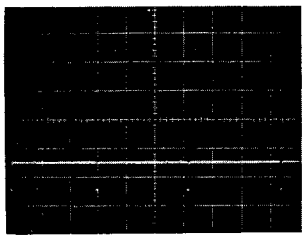
VDEM IC401 ⑯ V:0.2V/div MODE; #1000 STILL H:5msec/div



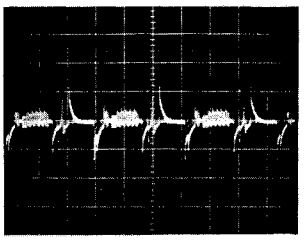
DRVB Q208 Ⓑ V:20mV/div MODE; PLAY H:20μsec/div



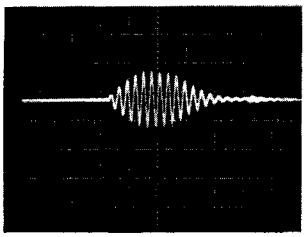
VDEM IC402 ④ V:0.2V/div MODE; PLAY H:20μsec/div



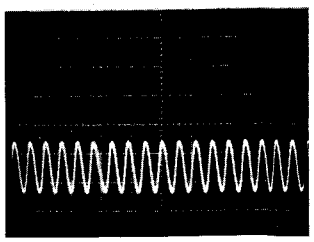
VDEM IC402 ⑨ V:0.1V/div MODE; PLAY H:20μsec/div



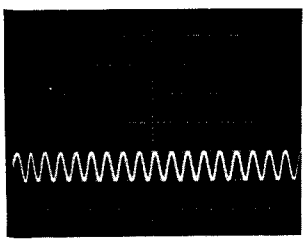
VDEM IC402 ⑩ V:50mV/div MODE; #1000 STILL H:1μsec/div



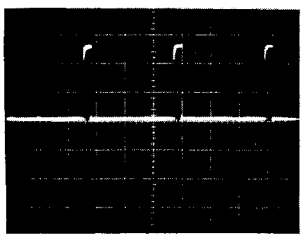
VDEM IC402 ⑱ V:50mV/div MODE; STAND-BY H:0.5μsec/div



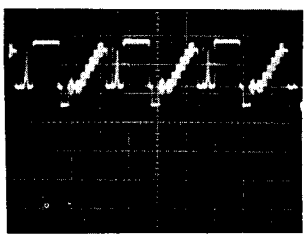
VDEM IC402 ⑳ V:50mV/div MODE; STAND-BY H:0.5μsec/div



SRVB IC4 ⑦ (PB H) V:0.2V/div MODE; PLAY H:20μsec/div

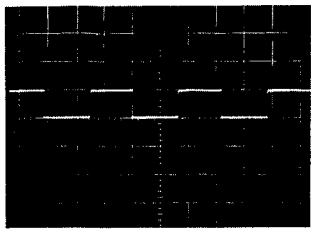


VDEM IC204 ① V:0.1V/div MODE; #1000 STILL H:20μsec/div

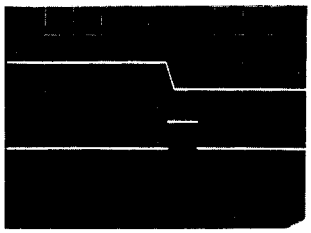


VDEM IC201 ⑥ V:10mV/div(AC) MODE; #1000 STILL H:10μsec/div

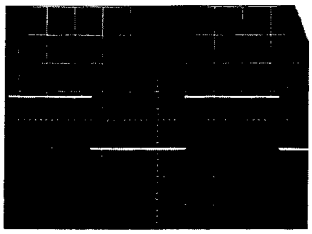
EXTB CN53-5 ⑤ MODE; PLAY
V:5V/div H:20μs/div



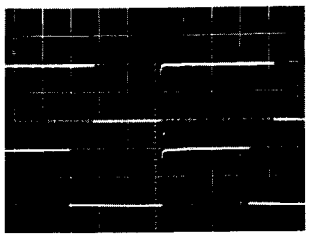
EXTB UPPER; TP1
LOWER: TP1
MODE; EXT SYNC LOCK
V:5V/div H:0.5ms/div



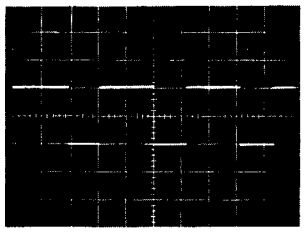
EXTB IC10 ⑤ MODE; PLAY
V:2V/div H:5ms/div



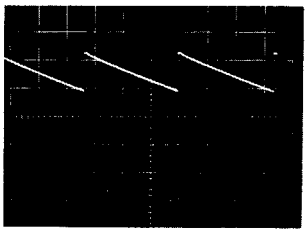
EXTB EXT SYNC LOCK
UPPER; IC6 ⑪ LOWER; IC6 ⑤
V:2V/div H:10μs/div



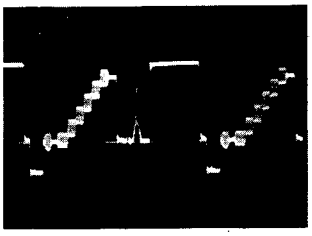
EXTB MODE; STAND BY
IC12 ③
V:2V/div H:20μs/div



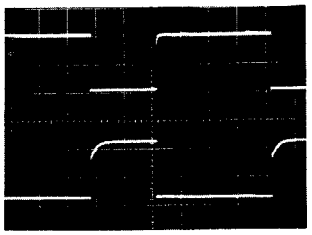
EXTB EXT SYNC LOCK
TP4
V:0.2V/div H:10ms/div



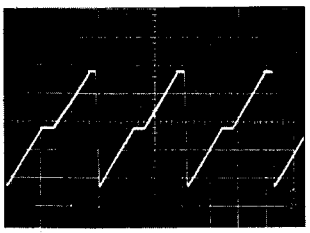
EXTB EXT SYNC LOCK
CN63-5 ⑤
V:0.5V/div H:10μs/div



EXTB
UPPER; IC11 ② LOWER; IC11 ⑫
V:2V/div H:10μs/div

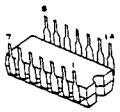


EXTB MODE; PLAY
TP8
V:0.5V/div H:20ms/div

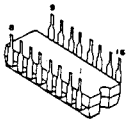


6.12 ICS AND TRANSISTORS

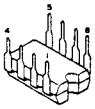
TC74HC74P
TC74HC00P
TC4016BP
TC4066BP
NJM1496D
SN74LS00N
M75188P
M75189AP
μPD74HC00C
μPD74HC04C
μPC339C



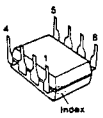
PA0009
PA9003
TD62504P
SN74LS221N
μPD74HC221AC



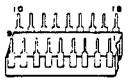
μPC4558C
μPC4558BC
M5233P
TL082CP



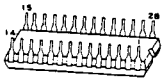
PM0001
MB3771P
NJM4200D
NJM4558D
NE555P



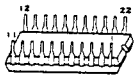
PA3018



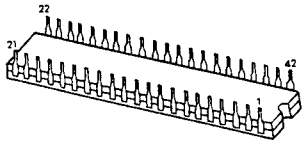
PA9001
LH5082A
TC5564PL
μPD71051C
PM4001



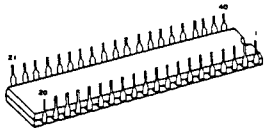
MB89011P
TC74HC123P



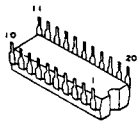
PA9002
PD9002



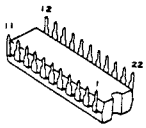
LH5080A
LH5081A
PD8011
μPD71055C



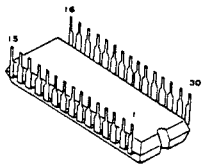
TC74HC245P



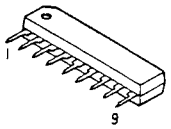
PD0011



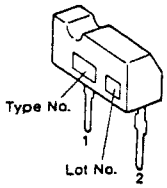
PA3020



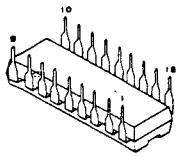
PA0023
NJM4558S
TC5081AP
NJM4556S



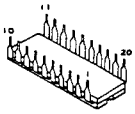
ICP-F10



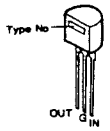
HA12043



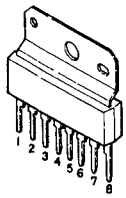
PD5019



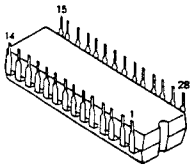
AN78L05



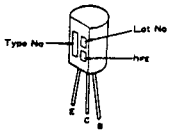
MB3763



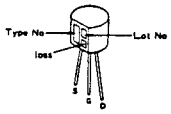
UM3002A



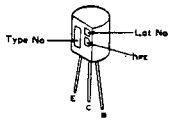
2SB949



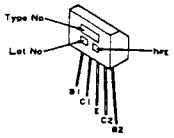
2SK30ATM



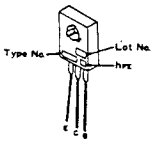
2SC1627
2SA1015
2SC1815



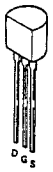
2SC1583



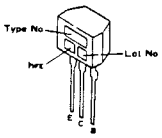
2SA1096
2SC2497



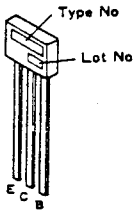
2SK184



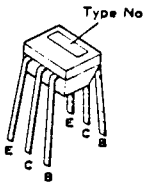
2SA933S
2SC1740S



UN4012
UN4112
UN4212

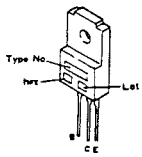


2SC3064

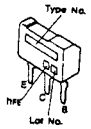


TPS605B

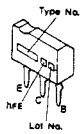
2SD1267
2SD1275



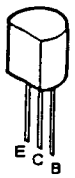
2SB909M
2SD1226M
2SD1255M
2SD1293M



2SA937LNF
2SC2021LNF



2SC1674



7. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 x 10^1*	*561*	*RD¼PS [5][6][1] J*
47kΩ	*47 x 10^3*	*473*	*RD¼PS [4][7][3] J*
0.5Ω	*0R5*		*RN2H [0][R][5] K*
1Ω	*010*		*RS1P [0][1][0] K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 10^1*	*5621*	*RN¼SR [5][6][2][1] F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts List

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
⚠	RECB assembly	DYR1001
	DRVB assembly	DYR1002
	DINB assembly	DYG1002
	DEFC assembly	DYV1001
⚠	FUSB assembly	VWR-080
	IRKY assembly	
	LOLB assembly	DYG1005
	CNNB assembly	DYY1002
	SRVB assembly	DWS1004
	EXTB assembly	DWS1005
	SCSB assembly	DWS1025
	DEMB assembly	DWV1003
	CONT assembly	DWG1005
	RSSB assembly	VWG1007
	KEYB assembly	VWG-149
	JAKB assembly	DWG1016
	PREB assembly	VWV-074
	CTCB assembly	VWS-053
	RFMD assembly	VWL-016

OTHERS

Mark		Symbol & Description		Part No.
			Pick up assembly	VWY-084
⚠	**		(APCB, HEAD)	
⚠			Power switch	VSA-011
⚠			Power cord	DDG1001
			Strain relief	VEC-201
⚠		C1, C3	Capacitor (0.01)	RCG-009 (VCG-044)
⚠	*		Power transformer	DTT1005
⚠	**	FU2–FU5	Fuse (3A)	VEK-004
⚠	**	FU1	Fuse (2A)	VEK-018
⚠	*		Hour meter	VCX-006
			BNC connector	VKN-155
			2P terminal	VKB-003
	**		Spindle motor (BLMB)	VXM-027 (VXM-041)
	**		Slider motor	DXM1007
	**		Loading motor	VXM-028
			Plunger	VXP-009
	*		Potentio meter	VCS-017
		C2	Thru type capacitor (1000pF)	VCG-005
	**		Tilt motor	VXM-038
	**	S5	Slide switch	VSF-009
	**	S2–S4	Lever switch	VSK-004
		IC5	EP ROM	DYW1010
			Control IC (Spindle)	PA2016

⚠RECB ASSEMBLY (DYR1001)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
*	D81–D84	SM1.5
*	D85–D96	SM1A

CAPACITORS

Mark	Symbol & Description		Part No.
	C88		CEAS4R7M50
	C89, C90		CQMA104K160
	C83, C84	Electlytic capacitor (3300 μF/25V)	DCH1001
	C85–C87	Electlytic capacitor (6800 μF/10V)	DCH1002
	C81, C82	Electlytic capacitor (2200 μF/25V)	VCH-033

DRVB ASSEMBLY (DYR1002)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC105	ICP-F10
**	IC103	NJM4556S
**	IC101, IC102, IC104	NJM4558S
**	IC100	μPC339C
**	Q101, Q102	UN4112
**	Q105	UN4012
**	Q114, Q120	2SA1096
**	Q108, Q126	2SA933S
**	Q112, Q122, Q124	2SB942
**	Q118	2SB949
**	Q109	2SC1627
**	Q100, Q103, Q104, Q106, Q125	2SC1740S
**	Q113, Q119	2SC2497
**	Q107	2SD1226M
**	Q110, Q111, Q121, Q123, Q127	2SD1267
**	Q117	2SD1275
*	D109, D110	HZ11C2
*	D111, D112, D115	HZ6B2
*	D104	S2K20
*	D100–D103, D107, D108, D113, D114	1SS254

RELAY

Mark	Symbol & Description	Part No.
**	RY100	DSR1002

COIL

Mark	Symbol & Description	Part No.
	L100 Choke coil	VTT-070

CAPACITORS

Mark	Symbol & Description	Part No.
	C139	CCPUSL470J50
	C113	CCPUSL560J50
	C111	CEAS100M50
	C110	CEAS101M50
	C112, C118, C119, C137	CEAS220M50
	C123, C124	CEAS221M25
	C135	CEAS330M35
	C127, C128, C133, C134	CEAS470M25
	C107, C116, C117	CKPUYB101K50
	C120	CKPUYB561K50
	C109	CKPUYB681K50
	C100–C102, C104, C105, C114, C115, C121, C122, C125, C126, C129–C132, C136, C138	CKPUYF223Z25
	C103	CQMA104J50
	C108	CQMA183J50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
*	VR100	Semi-fixed resistor	VRTB6VS223
*	VR101, VR102	Semi-fixed resistor	VRTB6VS472
	R154, R159	(47Ω)	DCN1003
	R166, R167, R174, R175, R197–R200		RD 1/2 RMF3R3J
	R109, R120		RD 1/4 PM475J
	R142–R145		RN 1/6 PQ2202F
	R141	(1.2 Ω, 3W)	VCN-092
	R140	(3.3 Ω, 2W)	VCN-093
	R189, R191	(4.7 Ω, 1W)	VCN-099
	R190	(2.7 Ω, 1W)	VCN-100
		Other resistors	RD 1/6 PM□□□J

DINB ASSEMBLY (DYG1002)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
*	D51, D52	1SS254

SWITCH

Mark	Symbol & Description		Part No.
**	S51	6P DIP switch	DSX1002

FILTERS

Mark	Symbol & Description		Part No.
	F51	3 terminal filter	DTH1099
	F52, F53	3 terminal filter	VTH-005

CAPACITORS

Mark	Symbol & Description	Part No.
	C51, C52	CKPUYF223Z25

OTHERS

Mark	Symbol & Description	Part No.
	5P DIN socket	VKN-165

DEFC ASSEMBLY (DYV1001)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC5	NJM4200D
**	IC1–IC4	NJM4558D

CAPACITORS

Mark	Symbol & Description	Part No.
	C1, C2	CEAS100M50
	C3	CEANP2R2M50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
*	VR1	Semi-fixed resistor	VRTB6VS473
	R1, R4, R7, R10, R39–R41, R43		RD1/6PM□□□J
		Other resistors	RN1/6PQ□□□□F

⚠FUSB ASSEMBLY (VWR-080)

FILTER

Mark	Symbol & Description	Part No.
⚠	Line filter	VTL-003 (VTL-004)

CAPACITOR

Mark	Symbol & Description		Part No.
⚠	C1	(Power) 0.01 μF	VCG-018 (VCG-033) (VCG-011)

RESISTORS

Mark	Symbol & Description	Part No.
⚠	R1	RD1/2VS225J

OTHERS

Mark	Symbol & Description	Part No.
⚠	P.C.B. fuse holder	VKR-001

IRKY ASSEMBLY

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
*	D1, D4	AA5504S
*	D3, D5	BG5504S
*	D2	TLR143

SWITCHES

Mark	Symbol & Description		Part No.
**	S1, S2	Tact switch	VSC-004

CAPACITORS

Mark	Symbol & Description	Part No.
	C1	CEJA101M16
	C2, C3	CKPUYF223Z25

RESISTOR

Mark	Symbol & Description	Part No.
	R1	RD 1/6 PM470J

OTHERS

Mark	Symbol & Description	Part No.
	IR Receiving unit	VXX1021

LOLB ASSEMBLY (DYG1005)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC2	MB3763
**	IC1	PD5019
**	Q5, Q6	TPS605B
**	Q4, Q7	2SA933S
**	Q8	2SD1293M
*	D4	SM1A
*	D1, D2	TLR123
*	D3	1SS254

FILTER

Mark	Symbol & Description		Part No.
	F1	3 terminal filter	VTH-005

CAPACITORS

Mark	Symbol & Description	Part No.
	C3	CEJA220M16
	C1, C2	CKPUYF223Z25

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
	R22		RD1/4PM823J
	R18	(3.3 kΩ x 4)	VCN-094
	R19	(10 kΩ x 6)	VCN-095
	R21	(10 kΩ)	VCN-096
		Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
		Sensor cover	VNL-179

CNNB ASSEMBLY (DYY1002)

RESISTOR

Mark	Symbol & Description	Part No.
	R1	RD1/6PM561J

SRVB ASSEMBLY (DWS1004)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC23	M5233P
**	IC8, IC19, IC204, IC205	NJM4558D
**	IC2	PA9002
**	IC201	PM4001
**	IC6	SN74LS00N
**	IC3	SN74LS221N
**	IC5, IC206	TC4066BP
**	IC4	TC5081AP
**	IC13	TL082CP
**	IC1	UM3002A
**	Q57, Q59, Q60, Q64–Q68, Q70–Q72	UN4212
**	Q4, Q202, Q206, Q208	2SA933S
**	Q1–Q3, Q5–Q11, Q201, Q203–Q205	2SC1740S
**	Q207	2SK184
*	D2	HZ4ALL
*	D10	HZ4BLL
*	D25	HZ5C2
*	D209	HZ9B3
*	D1, D3–D9, D11–D24, D26–D28, D201–D208, D210–D212	1SS254
*	TH201, TH202	D33A

CAPACITORS

Mark	Symbol & Description		Part No.
	TC1, TC2	Ceramic trimmer	VCM-006
	C36, C226		CCCSL101J50
	C6, C9, C53		CCCSL121J50
	C46, C47		CCCSL221J50
	C37, C57		CCCSL471J50
	C44		CEANPR47M50
	C204, C224, C227		CEANP010M50
	C32, C55		CEANP100M16
	C8		CEANP101M6R3
	C38		CEANP2R2M50
	C205		CEANP3R3M50
	C3, C5, C43, C222		CEANP4R7M25
	C10		CEANP470M10
	C15, C16, C19, C20, C48, C50, C52		CEAS100M50
	C11, C13, C22, C24, C56, C207, C209		CEAS220M50
	C17		CEAS330M35
	C30		CEAS4R7M50
	C210, C212		CFTA224J50
	C39, C214, C225		CFTA473J50
	C216		CKCYB152K50
	C1, C7, C12, C14, C21, C49, C51, C206, C208		CKCYF103Z50
	C26, C213		CQMA102J50
	C202		CQMA103J50
	C33		CQMA122J50
	C34		CQMA123J50
	C201		CQMA153J50
	C28		CQMA183J50
	C2		CQMA222J50
	C203, C221		CFTA104J50
	C40, C41		CQMA273J50
	C4, C217		CQMA332J50
	C45, C223		CQMA333J50
	C31, C211		CQMA472J50
	C220		CQMA562J50
	C35, C42, C218		CQMA682J50
	C219		CQMA822J50
	C18		CQPA152G100
	C29		CQSA471J50
	C25, C27		CQSA621J50
	C54		CEANP2R2M50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR2	Semi-fixed Resistor	VRTB6VS473
	R131		RD1/2PM151J
	R127		RD1/4VM752J
	R10–R13, R15–R17, R59, R63, R64, R132		RN1/6PQ□□□□F
		Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
	X1	Oscillating module	VSS-020 (VSS-024)

EXTB ASSEMBLY (DWS1005)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC13	AN78L05
★★	IC3, IC4, IC9, IC401	M5233P
★★	IC12	NE555P
★★	IC1	NJM1496D
★★	IC2, IC8, IC406	NJM4558D
★★	IC404	TC4016BP
★★	IC402	TC74HC00P
★★	IC11	TC74HC123P
★★	IC6, IC10	TC74HC74P
★★	IC7, IC405	TL082CP
★★	IC5, IC403	μPD74HC221AC
★★	Q216	UN4212
★★	Q1, Q4, Q14, Q18–Q20, Q22, Q24, Q201, Q203, Q204, Q208, Q401, Q404, Q407–Q409, Q411	2SA933S
★★	Q5	2SC1674
★★	Q2, Q3, Q6–Q12, Q15–Q17, Q21, Q23, Q202, Q205–Q207, Q209–Q214, Q402, Q403, Q405, Q406, Q410	2SC1740S
★★	Q13, Q215	2SC3064
★	D214, D215	HZ4A2
★	D227	HZ5C2
★	D2, D8	HZ7A2
★	D1, D3–D7, D9, D201–D213, D218–D223, D225, D226, D401–D410	1SS254

COILS

Mark	Symbol & Description		Part No.
	L2		LRA8R2K
	L1	(12 μH)	VTF-019
	L3	(2.2 mH)	VTL-137

CAPACITORS

Mark	Symbol & Description	Part No.
	C3	CCDCH181J50
	C26	CCCCH510J50
	C8	CCCSL121J50
	C20	CCCSL431J50
	C21	CCCSL470J50
	C17	CCCSL820J50
	C410	CEANP010M50
	C211	CEANP010M50
	C23	CEANP220M16
	C14	CEANP4R7M25
	C15, C16	CEASR22M50
	C27	CEASR47M50
	C214	CEAS010M50
	C22, C218	CEAS100M50
	C1, C4–C6, C217, C223, C227, C229, C415, C416	CEAS101M10
	C208	CEAS2R2M50
	C219, C2, C228	CEAS221M10
	C28, C414	CEAS4R7M50
	C18, C25, C30, C201, C215, C226, C230, C231	CEAS470M25
	C206	CFTA104J50
	C232	CKCYB471K50
	C403, C406	CKCYB821K50
	C7, C9–C13, C29, C220, C225, C411–C413, C417	CKCYF103Z50
	C401, C402, C404	CQMA102J50
	C204, C404	CQMA122J50
	C408	CQMA124J50
	C19	CQMA182J50
	C405	CQMA222J50
	C210, C213	CQMA223J50
	C24, C212	CQMA272J50
	C209	CQMA273J50
	C409	CQMA332J50
	C202, C203, C207, C216, C407	CQMA472J50
	C205	CQPA103G100
	C221	CQSA102J50
	C222	CQSA221J50
	C224	CQSA471J50
	C33	CCPUSL220J50
	C31, C32	CEAS471M10
	C34	CCDCH150J50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR1	Semi-fixed Resistor	VRTB6VS102
★	VR401	Semi-fixed Resistor	VRTG6HS103
★	VR201	Semi-fixed Resistor	VRTS6HS101
★	VR202	Semi-fixed Resistor	VRTS6HS103
★	VR203	Semi-fixed Resistor	VRTS6HS333
	R13, R59		RD1/4VM100J
	R9, R10, R12, R15, R16, R44, R46, R51–R54, R206–R209, R216, R221, R223, R269, R273, R274		RD1/6PQ□□□J
		Other resistors	RD1/6PM□□□J

SCSB ASSEMBLY (DWS1025)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q6	2SA933S
★★	Q1–Q8	2SC1740S
★	D5	SVC321SP
★	D1–D4	1S2473

SWITCHES

Mark	Symbol & Description		Part No.
★★	S1	Lever switch	VSK-005
★★	S2	Lever switch	VSK-006

COILS

Mark	Symbol & Description		Part No.
	L1–L4	(12 μH)	VTL-024
	L5, L6	(15 μH)	VTL-025

CAPACITORS

Mark	Symbol & Description	Part No.
	C9	CCDSL101J50
	C3–C5	CCDSL161J50
	C15	CCDSL221J50
	C10, C11	CCDSL270J50
	C2, C6	CCDSL820J50
	C17, C18	CEAS470M16
	C1, C7, C8, C12–C14, C16	CKDYF103Z50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
★	VR1, VR2	Semi-fixed resistor	VCS-015
		Other resistors	RD1/4VM□□□J

DEMB ASSEMBLY (DWV1003)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC701	HA12043
★★	IC401	PA0009
★★	IC201	PA0023
★★	IC202	PA3018
★★	IC601	PA3020
★★	IC402	PA9001
★★	IC204	PA9003
★★	IC203	PM0001
★★	Q604	UN4112
★★	Q220, Q407, Q701	UN4212
★★	Q106, Q202, Q401, Q406, Q410, Q702, Q703	2SA933S
★★	Q218, Q225	2SC1583
★★	Q101–Q105, Q201, Q203, Q206–Q217, Q219, Q221–Q224, Q226–Q230, Q402, Q403, Q405, Q408, Q409, Q411, Q501, Q502, Q601, Q602, Q802, Q803	2SC1740S
★★	Q404, Q603	2SK184
★	D201	SVC321SP
★	D202–D207, D501, D502, D701–D705	1SS254

RELAY

Mark	Symbol & Description	Part No.
★★	RY701	VSR-005

COILS AND FILTERS

Mark	Symbol & Description	Part No.
	L603 (39 μH)	DTH1074
	L601 (56 μH)	DTH1076
	L202–L205, L402	LAU120J
	L401	LAU121J
	L201	LAU180J
	L206	LAU390J
	L210	LRA220K
	L501	LRA221K
	L208, L209	LRA391K
	L211	LRA6R8K
	L502, L503 (62 μH)	VTL-048
	L207 (43 μH)	VTL-051
	L602, L604 (7.5 mH)	VTL-265
	F601 (2.3MHz) B.P.F	VTF-501
	F602 (2.8MHz) B.P.F	VTF-052
	F101 Low pass filter	VTF-060
	F201 3.58MHz Trap	VTF-062

CAPACITORS

Mark	Symbol & Description	Part No.
	C228, C229, C258, C291	CCCCH080D50
	C212, C214	CCCCH100D50
	C411, C624	CCCCH101J50
	C605, C614, C632	CCCCH111J50
	C253, C452	CCCCH121J50
	C231, C259, C292	CCCCH150J50
	C251	CCCCH180J50
	C239, C240, C268, C295	CCCCH181J50
	C252	CCCCH220J50
	C504	CCCCH240J50
	C604, C623	CCCCH270J50
	C213, C230, C433	CCCCH330J50
	C261	CCCCH390J50
	C215, C401	CCCCH470J50
	C432, C626	CCCCH560J50
	C222, C436	CCCCH680J50
	C201, C208, C209, C501, C503, C607, C255	CCCCH820J50
	C204, C294, C440	CCCSL151J50
	C283	CCCSL161J50
	C285, C615, C633	CCCSL221J50
	C402, C502	CCCSL241J50
	C210	CCCSL271J50
	C262, C281, C302	CCCSL331J50
	C211	CCCSL391J50
	C414, C415	CCCSL471J50
	C455	CCCSL561J50
	C410, C412	CCCSL681J50
	C706	CEANLR47K50
	C707	CEANL220K16
	C232	CCPUSL220J50
	C406, C443	CEANPR47M50
	C248, C254, C446	CEANP470M10
	C713, C808	CEASR47M50
	C420, C714	CEAS010M50
	C101, C235, C236, C612, C630	CEAS100M50
	C316, C801, C803, C314	CEAS101M10
	C238, C421	CEAS220M50
	C278, C279, C608, C635, C317	CEAS221M10
	C103, C617, C709, C711, C712	CEAS4R7M50
	C203, C207, C217, C219, C224, C225, C227, C234, C237, C241, C246, C250, C264, C266, C270, C271, C274, C322, C404, C409, C418, C425, C427, C448, C450, C451, C507	CEAS470M16
	C805	CEAS221M25
	C320	CEAS471M10
	C288, C296	CEJANP100M16
	C299, C300, C304	CEJA101M6R3
	C106	CEJANP3R3M50
	C105, C108, C287, C306, C309, C310, C312, C321	CEJA470M6R3
	C282, C323, C708	CFTA104J50
	C703, C704	CFTA683J50
	C413	CFTA823J50
	C256, C257, C445	CKCYB102K50
	C293	CKCYB392K50
	C616, C634	CKCYB472K50
	C205, C220, C221, C242, C243, C260, C267, C280, C289, C290, C298, C301, C303, C319, C408, C430, C434, C435, C441, C454, C505, C506, C508, C509, C601–C603, C606, C620–C622, C625, C807	CKCYF103Z50
	C104, C107, C202, C206, C216, C218, C223, C226, C233, C244, C245, C249, C263, C265, C269, C272, C273, C276, C277, C284, C286, C297, C307, C308, C311, C313, C315, C318, C403, C417, C424, C426, C437, C447, C449, C453, C802, C804	CKPUYF223Z25
	C275, C416, C422	CQMA102J50
	C438	CQMA103J50
	C609, C610, C613, C627, C628, C631	CQMA152J50
	C405, C407	CQMA153J50
	C618, C636	CQMA333J50
	C611, C629	CQMA562J50
	C444	CQMA682J50
	C419, C423	CQSA102K50
	C442	CQSA271K50

Mark	Symbol & Description	Part No.
	C305	CQMA512J50
	C428	CQSA331K50
	C429	CQSA391K50
	C102	CQSA821K50
	C619, C705, C710 Electrolytic capacitor (470 μF/6.3V)	VCH-036
	C247, C431, C439, C637, C701, C702 Electrolytic capacitor (10 μF/16V)	VCH-037

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR201–VR203 Semi-fixed resistor	VRTB6VS102
★	VR403 Semi-fixed resistor	VRTB6VS103
★	VR401, VR601, VR602 Semi-fixed resistor	VRTB6VS223
★	VR204 Semi-fixed resistor	VRTB6VS331
★	VR404 Semi-fixed resistor	VRTG6VS102
★	VR402 Semi-fixed resistor	VRTG6VS472
	R705	RD1/4VM475J
	R109, R418, R603, R613, R614, R619	RN1/6PQ□□□□F
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X401 Crystal resonator (3.58 MHz)	VSS-034
	DL201 Delay line (220 ns)	VTF-063

CONT ASSEMBLY (DWG1005)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC3	LH5080A
★★	IC14, IC15	LH5081A
★★	IC7	LH5082A
★★	IC2	MB3771
★★	IC24	MB89011P
★★	IC18	M5233P
★★	IC11	M75188P
★★	IC10	M75189AP
★★	IC22	PD0011
★★	IC23	PD8011
★★	IC1	PD9002
★★	IC4	TC5564PL
★★	IC12, IC13	TC74HC245P
★★	IC20, IC21	TD62504P
★★	IC19	μPC4558C
★★	IC6	μPD71051C
★★	IC16	μPD71055C
★★	IC9	μPD74HC00C
★★	IC8	μPD74HC04C
★★	IC17	μPD74HC221AC
★★	Q1, Q5, Q6	UN4112
★★	Q9	UN4212
★★	Q2, Q4, Q7	2SC1740S
★★	Q3, Q8	2SD1255M
★	D1	MTZ5.6C
★	D2–D8, D10–D13	1SS254

COILS AND FILTERS

Mark	Symbol & Description	Part No.
	L2	LAU150K
	L1	LAU221K
	F1–F3 3 terminal filter	VTH-005

CAPACITORS

Mark	Symbol & Description		Part No.
	VC1	Ceramic trimmer	VCM-003
	VC2	Ceramic trimmer (20pF)	VCM-008
	C31		CCCSL100D50
	C51–C53		CCCSL101J50
	C12		CCCSL221J50
	C36		CCCSL270J50
	C35		CCCSL271J50
	C37, C38		CCCSL300J50
	C33, C34		CCCSL330J50
	C25		CCCSL331J50
	C1, C2		CCCSL560J50
	C7		CEANL470M10
	C40		CEANP100M16
	C4		CEAS010M50
	C9, C42, C44, C47, C55		CEAS100M50
	C8, C19, C50		CEAS221M10
	C29		CEAS4R7M50
	C6, C28, C45, C46		CEAS470M25
	C3, C10, C11, C13–C18, C20–C22, C30, C32, C39, C48, C49, C54		CKCYX473M25
	C23, C24		CQMA102J50
	C41		CQMA104J50
	C27		CQMA272J50
	C26		CQMA683J50

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description		Part No.
	R54		RA4S103J
	R8		RA5S103J
	R10, R15, R16, R44		RA8S103J
		Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description		Part No.
	X1	Crystal resonator	DSS1003
	X2	Ceramic oscillator	VSS-036
	X3	Crystal resonator	VSS-043
		Lithium battery	DEM1001
		28 pin IC socket	VKH-027

RSSB ASSEMBLY (VWG1007)

SWITCH

Mark	Symbol & Description		Part No.
**	S1	Dip switch	VSM-003

OTHERS

Mark	Symbol & Description		Part No.
		I/O connector	VKN-163

KEYB ASSEMBLY (VWG-149)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	Q1, Q2	2SA937LNF
*	D9	1S2473
*	D4, D5, D10–D12, D15	BG5608S
*	D1–D3, D6–D8, D13, D14, D16	PR5628S

SWITCHES

Mark	Symbol & Description	Part No.
**	S1, S2	VSC-004

RESISTORS

Note: When ordering resistors, convert the resisance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R1, R4–R7	RD1/4PM□□□J

JAKB ASSEMBLY (DWG1016)

FILTERS

Mark	Symbol & Description	Part No.
	F9–F15	DTH1099

OTHERS

Mark	Symbol & Description		Part No.
		Stereo mini-jack	DKN1001

PREB ASSEMBLY (VWV-074)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC1–IC4	μPC4558BC (BA4558DX)
**	Q1, Q3–Q5	2SC2021LNF
**	Q2	2SD1225M
*	D1, D2	1S2473
*	D3	RD3.6EB2

CAPACITORS

Mark	Symbol & Description	Part No.
	C1, C3	CEANPR47M50
	C4	CEA220M16
	C5	CEA010M50
	C6, C7	CKDYF103Z50
	C8, C9	CEA100M16
	C10	CEANP4R7M16

RESISTORS

Mark	Symbol & Description	Part No.
*	VR1 Semi-fixed resistor (330Ω)	VCP-067
*	VR2, VR4 Semi-fixed resistor (47kΩ)	VCP-080
*	VR3, VR5 Semi-fixed resistor (4.7kΩ)	VCP-074
	R1–R14, R17–R38, R40	RD1/6PS□□□J
	R16, R39	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	FPC connector (19P)	VKN-094

BLMB ASSEMBLY

There are no supply parts in the BLMB assembly.
Included in the spindle motor (VXM-027).

RFMD ASSEMBLY (VWL-016)

There are no supply parts in the RFMD assembly.

CTCB ASSEMBLY (VWS-053)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
**	IC1	TL082CP
**	IC2	DTA124F
**	IC3	DTC124F
**	Q1	2SK30ATM
**	Q3	2SA1015 (2SA933) (2SA933S)
**	Q2	2SC1815 (2SC1740) (2SC1740S)
**	Q5	2SB909M
**	Q4	2SD1225M
*	D1–D3, D6, D7	1S2473
*	D8	SM1A
*	D4, D5	RD3.6EB1

CAPACITORS

Mark	Symbol & Description	Part No.
	C1	CQMA273J50
	C3, C4	CEJA101M16
	C2, C5	CEANPR47M50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
*	VR1 Semi-fixed resistor (47kΩ)	VCP-120
	R5 RD1/4PM104J	RD1/4PM104J
	R1	RD1/4VM471J
	R2–R4, R6–R11	RD1/6PS□□□J

8. MECHANISM ASSEMBLY AND ADJUSTMENTS

8.1 Pickup and Slider Assembly

Assembly Procedure:

1) Screw the tilt adjustment shaft into the pickup.
2) Place the pickup in the slider and attach the holder.

Note: Be careful not to apply pressure to the area around the objective lens or magnetic circuitry when doing this.

3) Adjust the tilt adjustment shaft to the slider using the E type washer.
4) Turn the slider upside down and attach limit gear B.

Note: Be careful not to apply pressure to the area around the objective lens or magnetic circuitry when doing this.

5) Rotate the worm gear until the worm gear and the slider are parallel to each other (lines A and B).
6) Attach the tilt motor and the CTCB assembly.
7) Properly route the wires around the CTCB assembly.

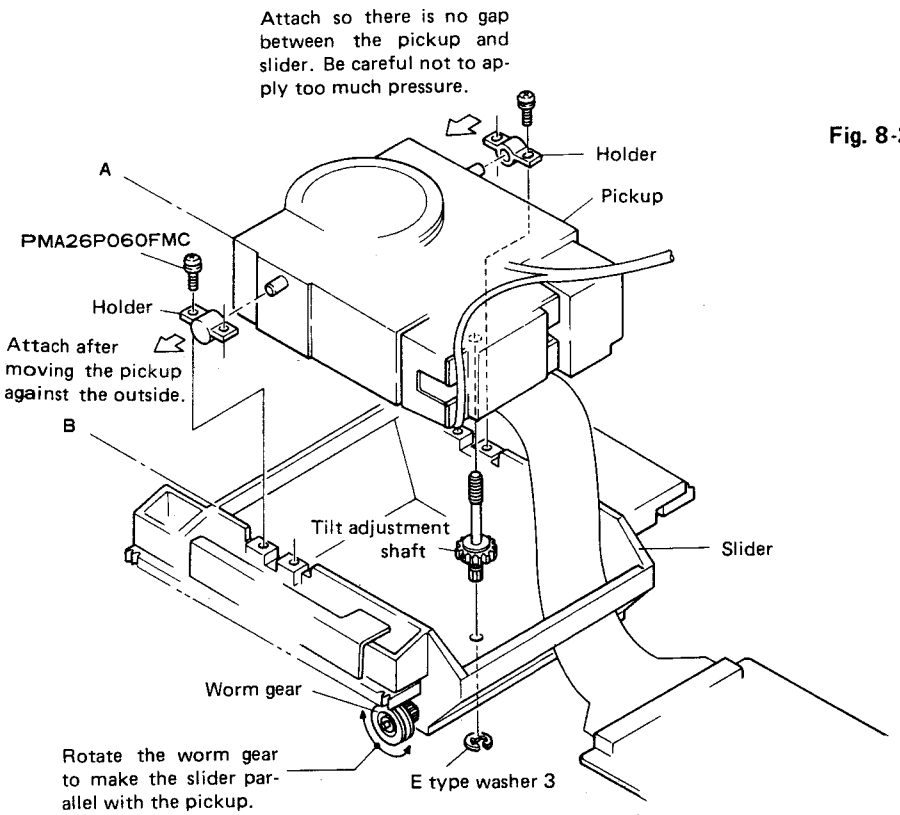


Fig. 8-1 Pickup and slider assembly

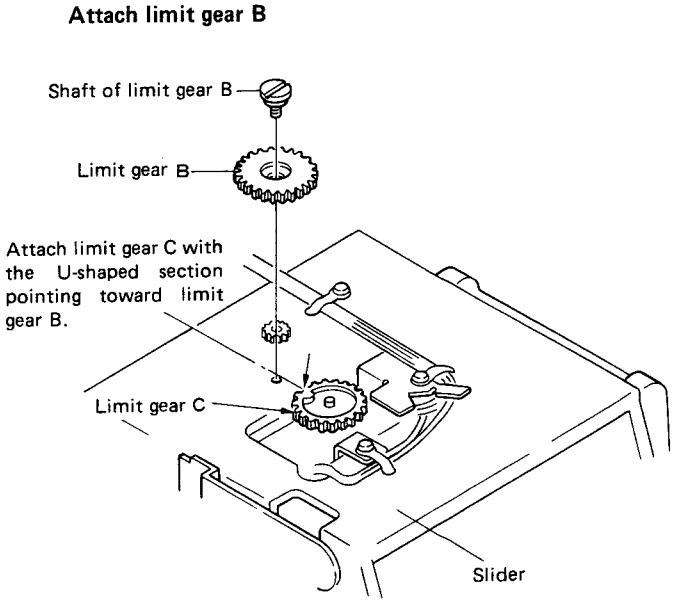


Fig. 8-2 Attachment of limit gear B

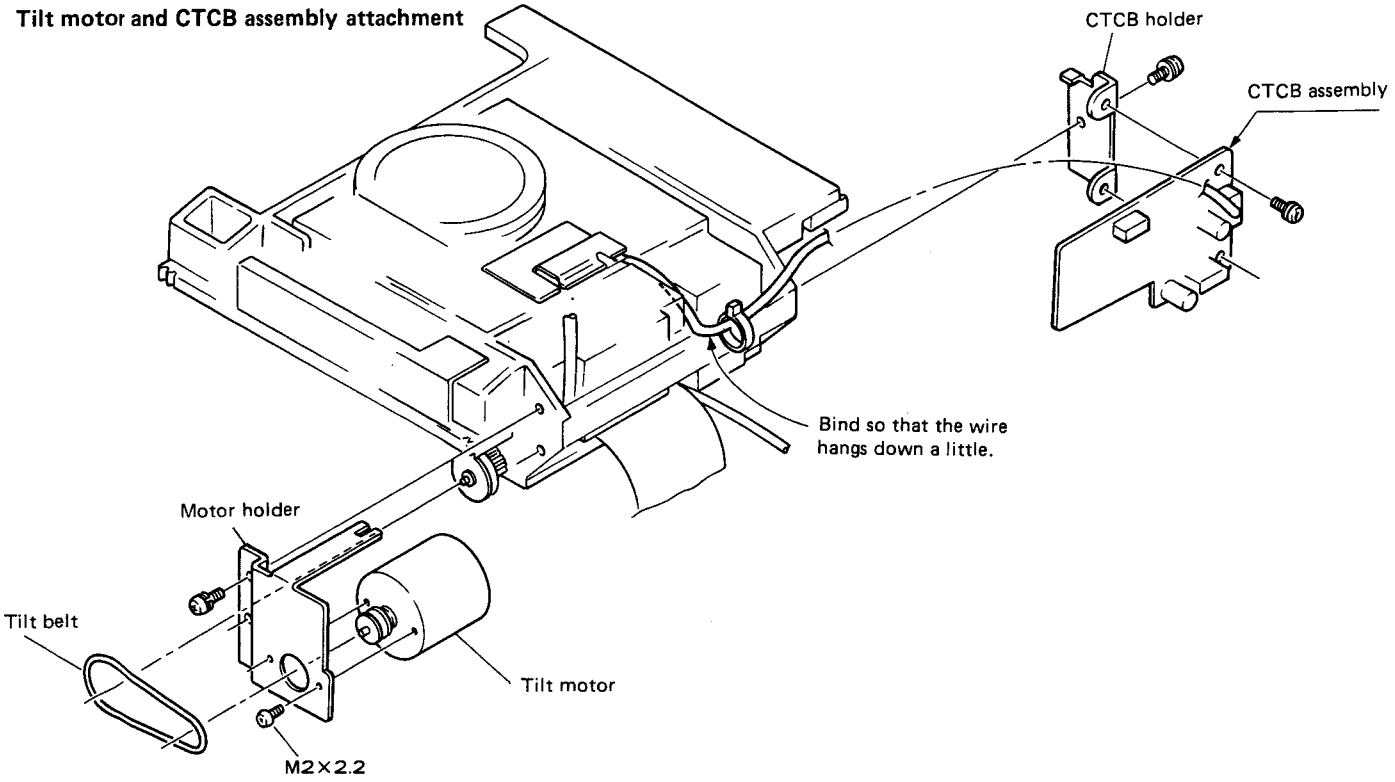


Fig. 8-3 Tilt motor and CTCB assembly attachment

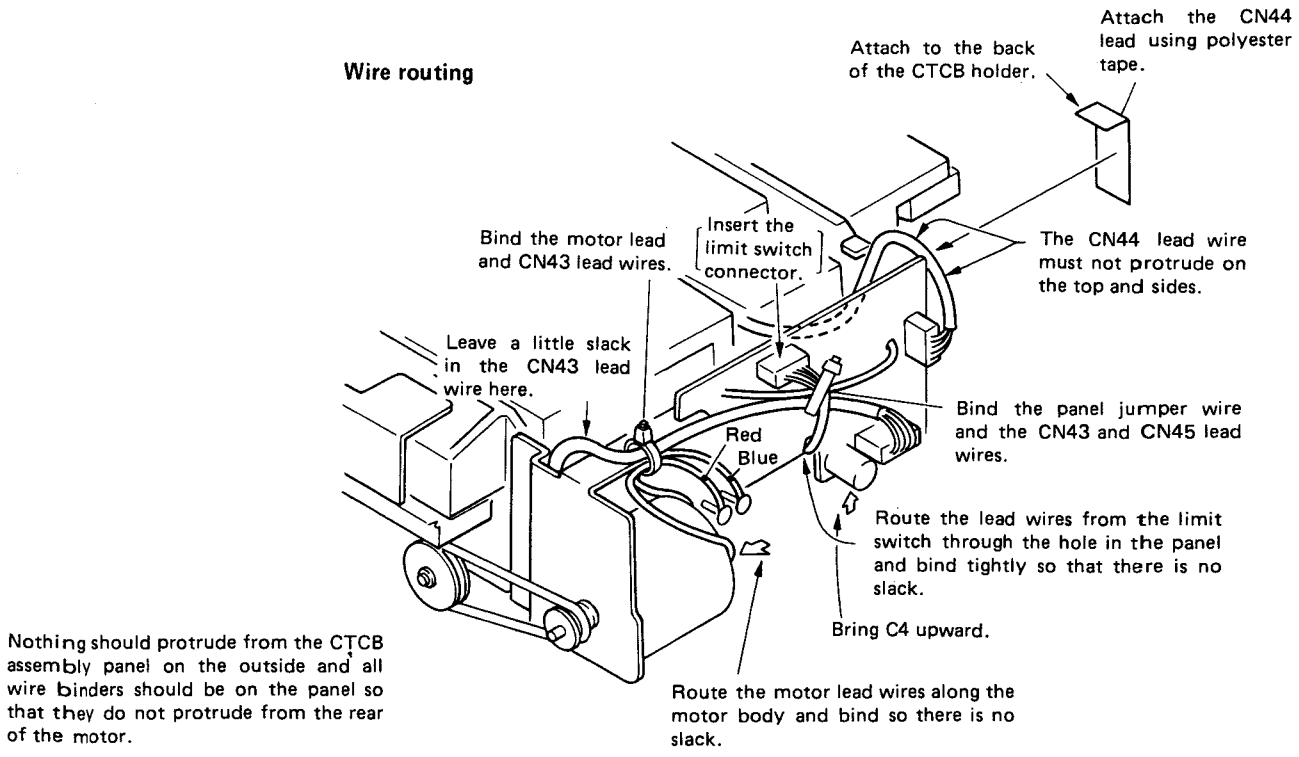


Fig. 8-4 Wire routing

8.2 Positioning of Potentiometer Pinion Gear

- Adjust the projection of the pinion gear to the upper portion shown in the figure by idling the pinion gear when the pickup is moved to the innermost position.

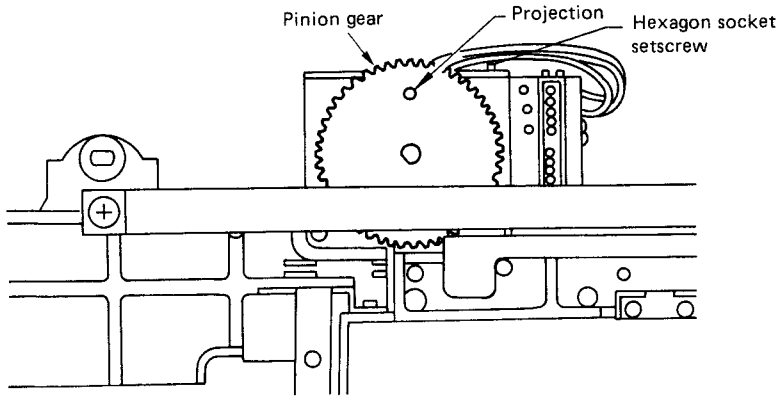


Fig. 8-5 Pinion gear positioning

- After positioning the pinion, turn the hexagon socket setscrew clockwise until the end of the screw lightly touches the potentiometer holder. Then, turn back one full turn and apply the screw lock around the screw.

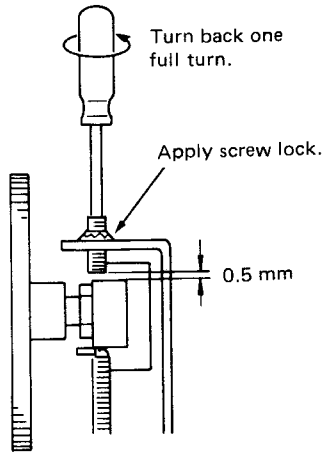


Fig. 8-6 Hexagon socket setscrew positioning

8.3 Adjustment of Clamp Switch

Adjustment shoud always be done after replacing the clamp switch.

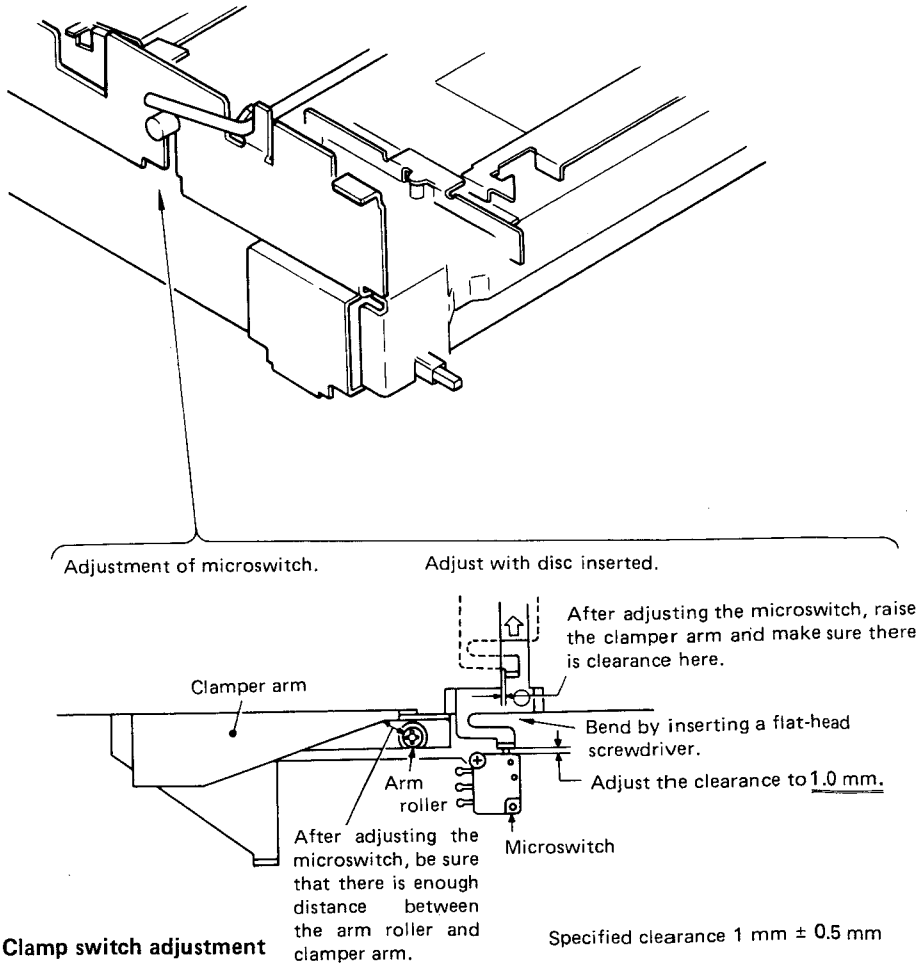


Fig. 8-7 Clamp switch adjustment

9. ELECTRICAL ADJUSTMENTS

Instruments and tools used:

- Color monitor TV
- Stereo system
- Dual trace oscilloscope (with time delay sweep, DC–35 MHz)
- Audio SG
- Frequency counter
- Shorting clips
- Test disc (F1 or F2)
- RU-V6000 (remote control unit)
- TRKG, FOCS gain adjusting jig, FTG adjuster
- Optical path checking jig
- NTSC synchronizing signal generator (sync generator)

Precautions:

- Confirm that all power supply voltages are correct.
- Confirm that there are no mechanical problems.
- Pinion gear adjustment of the slider potentiometer must be completed.
- All parts of the pickup except the grating must be correctly adjusted.
- The oscilloscope range figures here assume the use of a 1 : 1 probe.
- Do not insert and remove discs when the player is on its side up. (Do not press the □/△ button on the player.)

Preparations:

- Connect a monitor TV and stereo amplifier to the player.
- Remove the bottom plate and rear panel.
- Insert a test disc.
- Perform PREB, SRVB, DEMB and EXTB adjustments with the player standing on its right side.
- Perform the PREB assembly adjustment with the SRVB, DEMB, CONT and EXTB assemblies open, i.e. the set-screws of SRVB, DEMB, CONT and EXTB should be removed.

Adjustment volume:

VR 1: RF level
VR 2: FOCS offset
VR 3: FOCS gain
VR 4: TRKG bal
VR 5: TRKG gain

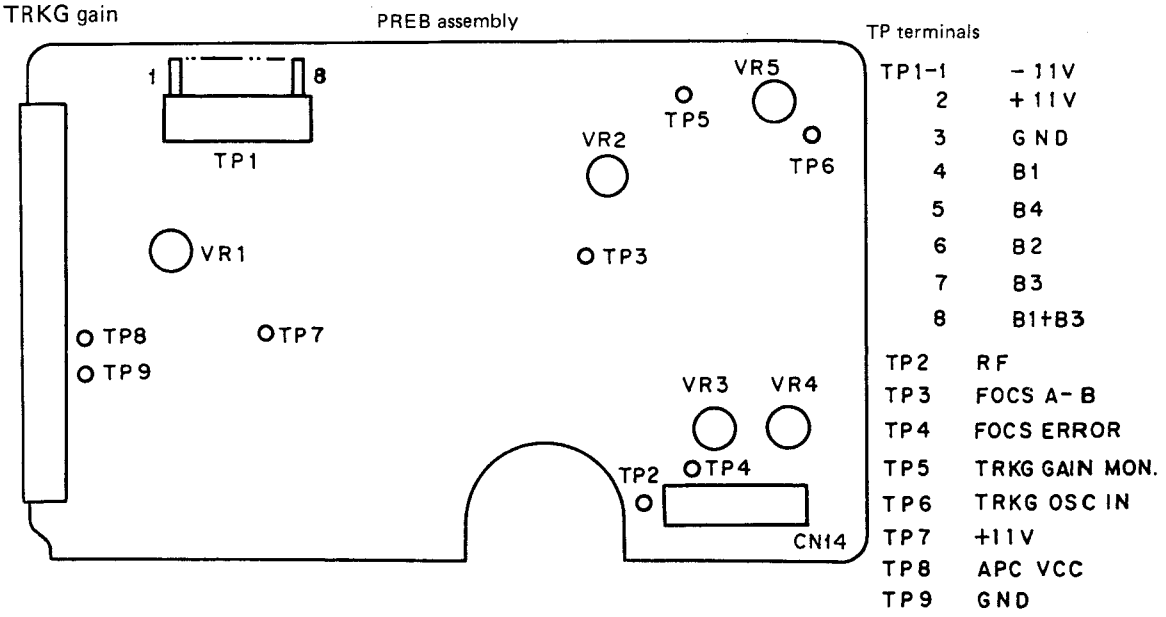


Fig. 9-1 PREB assembly adjustment points

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
			On PREB unless otherwise specified.	On PREB unless otherwise specified.		**PREB adjustment** • Always perform the following adjustments after replacing, repairing or adjusting the pickup or replacing the PREB.
			TP7 TP8	0.25V~ 0.5V		**Confirmation of the LD Power** • Measure the voltage between TP7 and TP8. • Make sure that the voltage is in the 0.25~0.5V range. • Replace the pickup if it is not in the above range.
	50mV/div	1mS/div	DEFC TP4	VR1	0V	**DEFC Offset Adjustment** (DEFC: Defocus canceller) • Short circuit TP201-1 and TP201-9 to prevent FOCUS lens-up. • Connect a 120 kohm resistor between pin 3 and pin 8 of DEFC assembly IC4. • When the PLAY button is pressed, the spindle motor will rotate slowly for about 5 seconds. Adjust during this period.

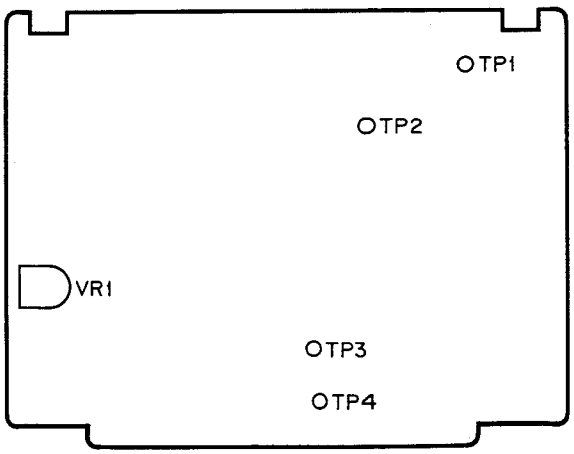


Fig. 9-2 DEFC assembly Offset Adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	0.2V/div	5mS/div	TP5	VR4	Positive amplitude = Negative amplitude	**TRKG (Tracking) Balance Adjustment** • Use search to locate frame #20,000. • Open TRKG loop. (Connecting pins 20 and 22 of SRVB assembly IC201, PM4001 using the short clips.) • Adjust so that the positive and negative sides of the tracking error wave are equal.

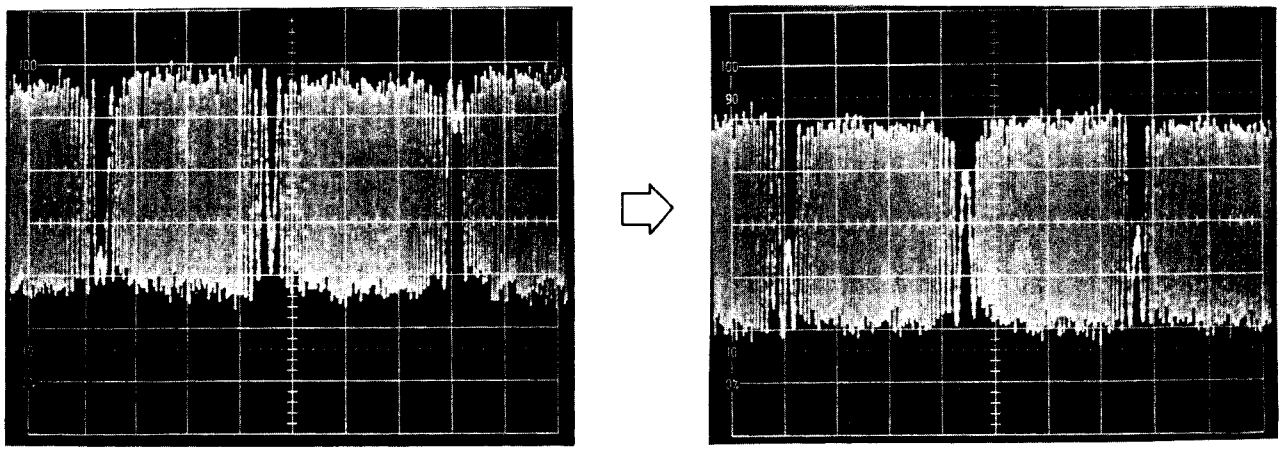


Photo. 9-1 Adjust so that the positive and negative sides of the tracking error wave are equal

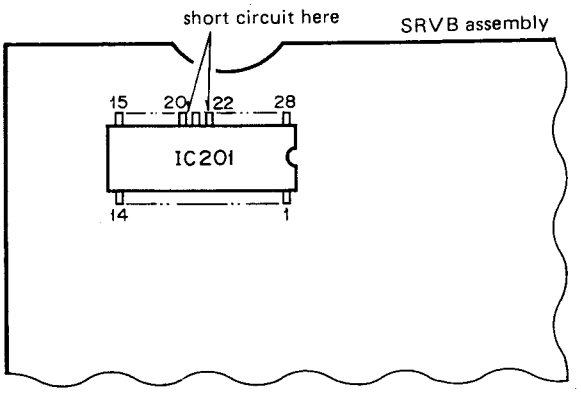


Fig. 9-3 Tracking balance adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	X: 0.2V/div Y: 0.2V/div		SRVB TP201-2 TP201-4	Grating	Min. on X axis Max. on Y axis Max. on X axis Min. on Y axis	**TRKG Error Level Check and Grating Adjustment** ● Use search to locate frame #15,000 (F1). ● Open the TRKG loop. ● Set the oscilloscope to the X-Y mode and observe the tracking error (TP 201-2: X) and tracking A+B (TP-201-4: Y) lissajous waveforms. ● Insert a screwdriver in the PREB hole and slowly rotate the grating until the amplitude of the lissajous waveform is at its lowest point on the X axis and its highest point on the Y axis. The waveform should also be smooth. ● Now rotate the screwdriver clockwise to adjust the grating to the point where the amplitude of the lissajous waveform is at its highest point on the X axis and its lowest point on the Y axis. **Note:** If the lissajous waveform does not become horizontal but remains slanted, the position of the shaft holder may not be correct.

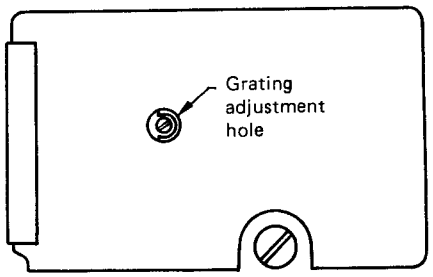


Fig. 9-4 PREB assembly

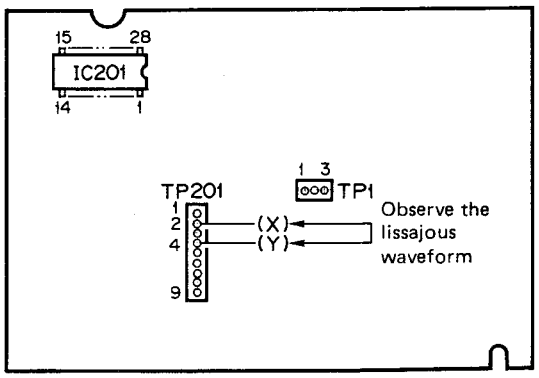


Fig. 9-5 SRVB assembly

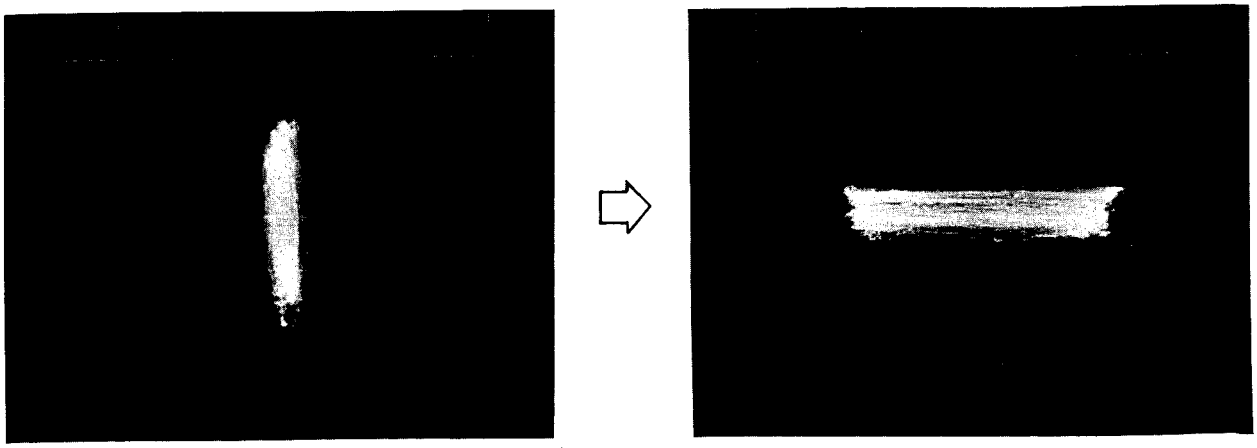
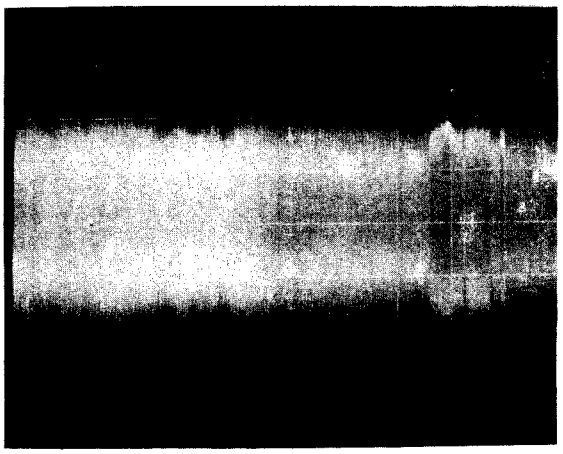


Photo. 9-2 Grating adjustment

NO.	OSCILLOSCOPE RANGE		TEST POINT	ADJUST-MENT POINT	CHECK POINT/ ADJUST-MENT STANDARD	ADJUSTMENT PROCEDURE
	V	H				
	50mV/div	1mS/div	TP2	VR1	400mVp-p	**RF Level Adjustment** ● Close the TRKG loop. ● At about frame #18,000 adjust so that the TP2 output is 400 mVp-p.  **Photo. 9-3 RF level adjustment of TP2 output**

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	X: 0.5V/div Y: 0.2V/div		X: TP6 Y: TP5	VR5	Lissajous 90°	**TRKG Loop Gain Adjustment** • Use search to locate frame #15,000. • Connect gain adjustment jig, AF oscillator and oscilloscope as shown on the left. • Set AF oscillator output to 3.0 kHz, 4 Vp-p when the F1 disc is used (3.7 kHz 4 Vp-p for F2 disc). • Set the oscilloscope to the X-Y mode and adjust VR5 to obtain a horizontal and oval lissajous waveform.

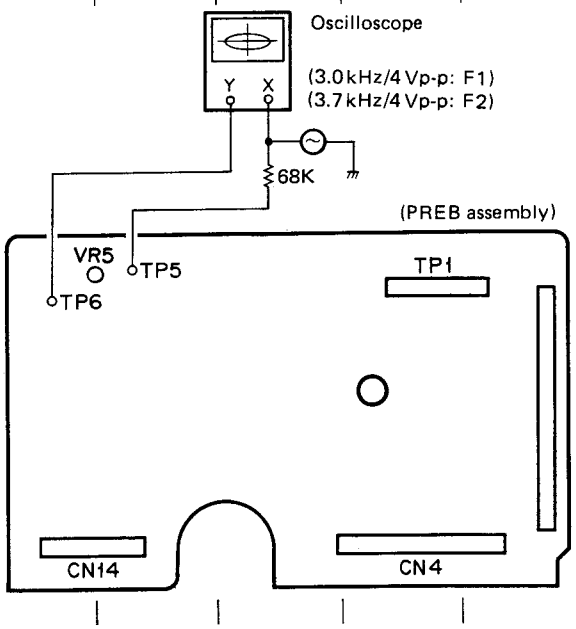
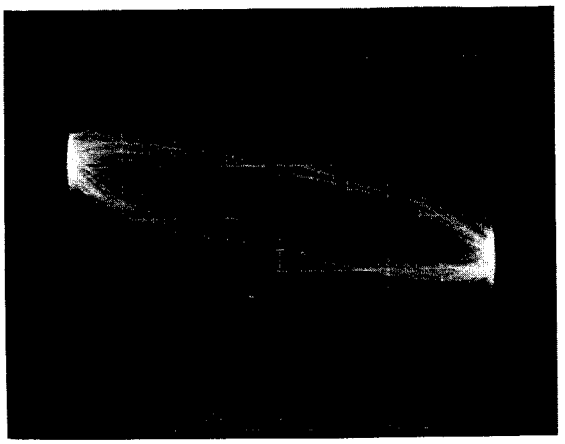


Fig. 9-6 Tracking loop gain adjustment



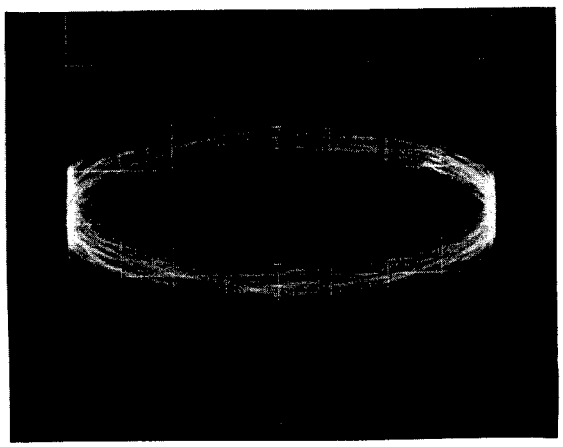


Photo. 9-4 Tracking loop gain adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	50mV/div	1mS/div	PREB TP3	VR2	0V	**Focus Offset Adjustment** ● Remove PREB assembly TP1 housing and remove the DEFC assembly circuit. ● Set the POWER switch to position "ON".
	X: 0.2V/div Y: 1V/div		X: TP4 Y: TP3	VR3	Lissajous 90°	**FOCS (Focsus) Loop Gain Adjustment** ● Use search to locate frame #15,000. ● Connect gain adjustment jig, AF oscillator and oscilloscope as shown on the Fig. 9-7. ● Set AF oscillator output to 2.1 kHz, 1.2 Vp-p when the F1 disc is used (1.6 kHz 1.2 Vp-p for F2 disc). ● Set the oscilloscope to the X-Y mode and adjust VR3 to obtain a horizontal oval lissajous waveform.

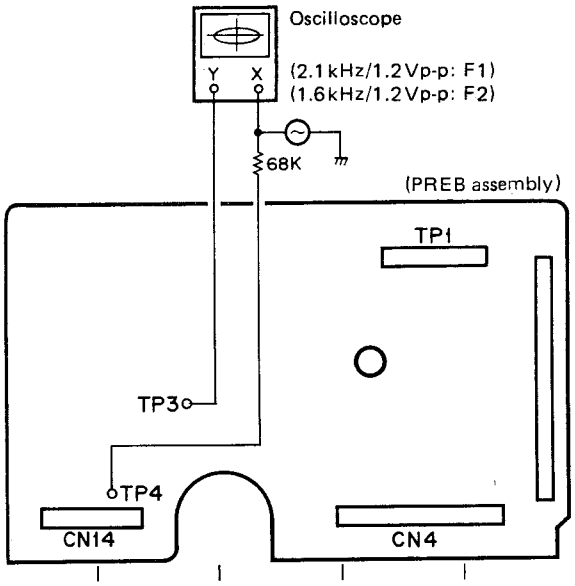


Fig. 9-7 Focus loop gain adjustment

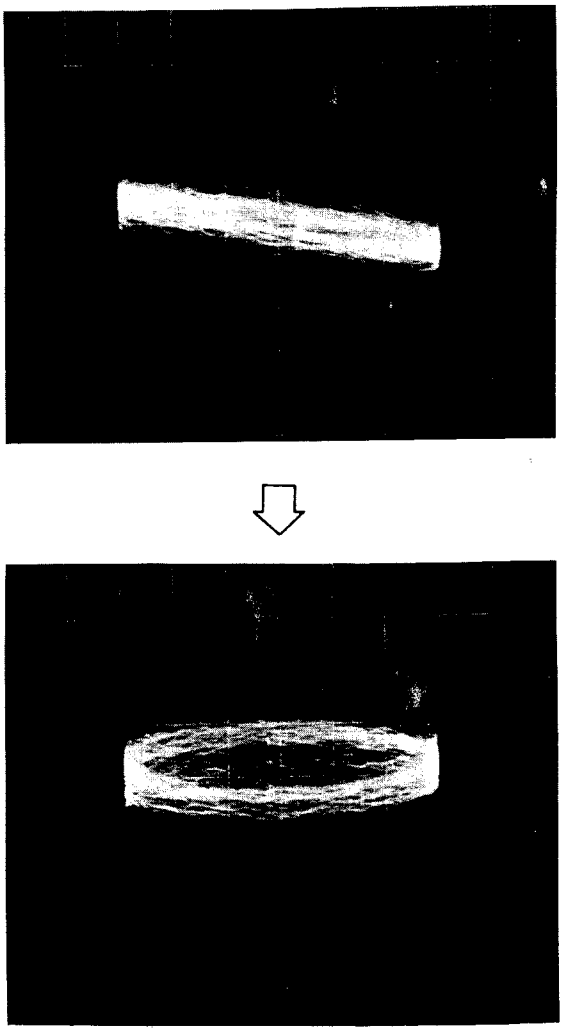


Photo. 9-5 Focus loop gain adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
			SRVB TP201-8 PREB TP5	Jig mirror bias VR	Max TRKG error	**Pickup Optical Axis Check** Always perform this procedure after replacing the pickup and when it is suspected that the pickup is malajusted. • Play a disc at about track number #20,000. • Open the TRKG loop. (Connect SRVB assembly, IC201, PM4001, pins 20 and 22 with the shorting clips.) • Open the TANG loop. (Connect SRVB assembly TP2 to ground.) (See Fig. 9-5.) **Confirmation of Optical Axis in Tracking Direction** • Connect the bias voltage output terminal of the optical axis checking jig (the current setting resistor should be set to 200 ohms) to TP201-8 (TRKG RTN) of the SRVB assembly. • Measure the TRKG error level at TP5 of the PREB assembly. Adjust the mirror bias VR of the jig so that the error level is maximized and then record the peak-to-peak value Eo and the voltage Vbm being applied. • Next, rotate the bias mirror VR all the way to the +12 V side and record the TRKG error p-p value Ep. Then, rotate the mirror all the way to the −12 V side and record the TRKG error p-p value En. • If Vbm is within the range of ±2.4 V: Ep > 0.63 Eo and En > 0.63 Eo • If Vbm is outside the range of ±2.4 V: Ep > 0.70 Eo and En > 0.70 Eo • If the above conditions are not met, replace the pickup.

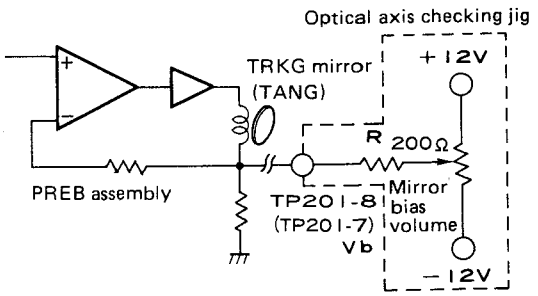
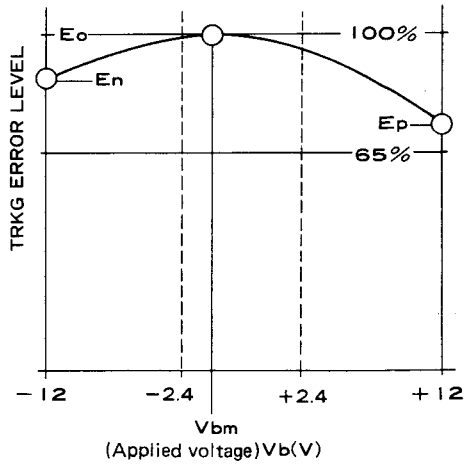


Fig. 9-8 Confirmation of optical axis in tracking direction

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
			SRVB TP201-7 PREB TP-5	Jig mirror bias VR Jig mirror bias VR	Max TRKG error	**Confirmation of Optical Axis in TANG Direction** ● Connect the bias voltage output terminal of the optical axis checking jig to TP201-7 (TANG RTN) of the SRVB assembly. ● Measure the TRKG error level at TP5 of the PREB assembly. Adjust the mirror bias VR of the jig so that the error level is maximized and then record the peak-to-peak value Eo and the voltage Vbm being applied. ● Next, rotate the bias mirror VR all the way to the +12 V side and record the TRKG error p-p value Ep. Then, rotate the mirror all the way to the −12 V side and record the TRKG error p-p value En. ● If Vbm is within the range of ±2.4 V: Ep > 0.63 Eo and En > 0.63 Eo ● If Vbm is outside the range of ±2.4 V: Ep > 0.70 Eo and En > 0.70 Eo ● If the above conditions are not met, replace the pickup.  **Fig. 9-9 Confirmation of optical axis in TANG direction**

SRVB and DEMB Adjustment Points

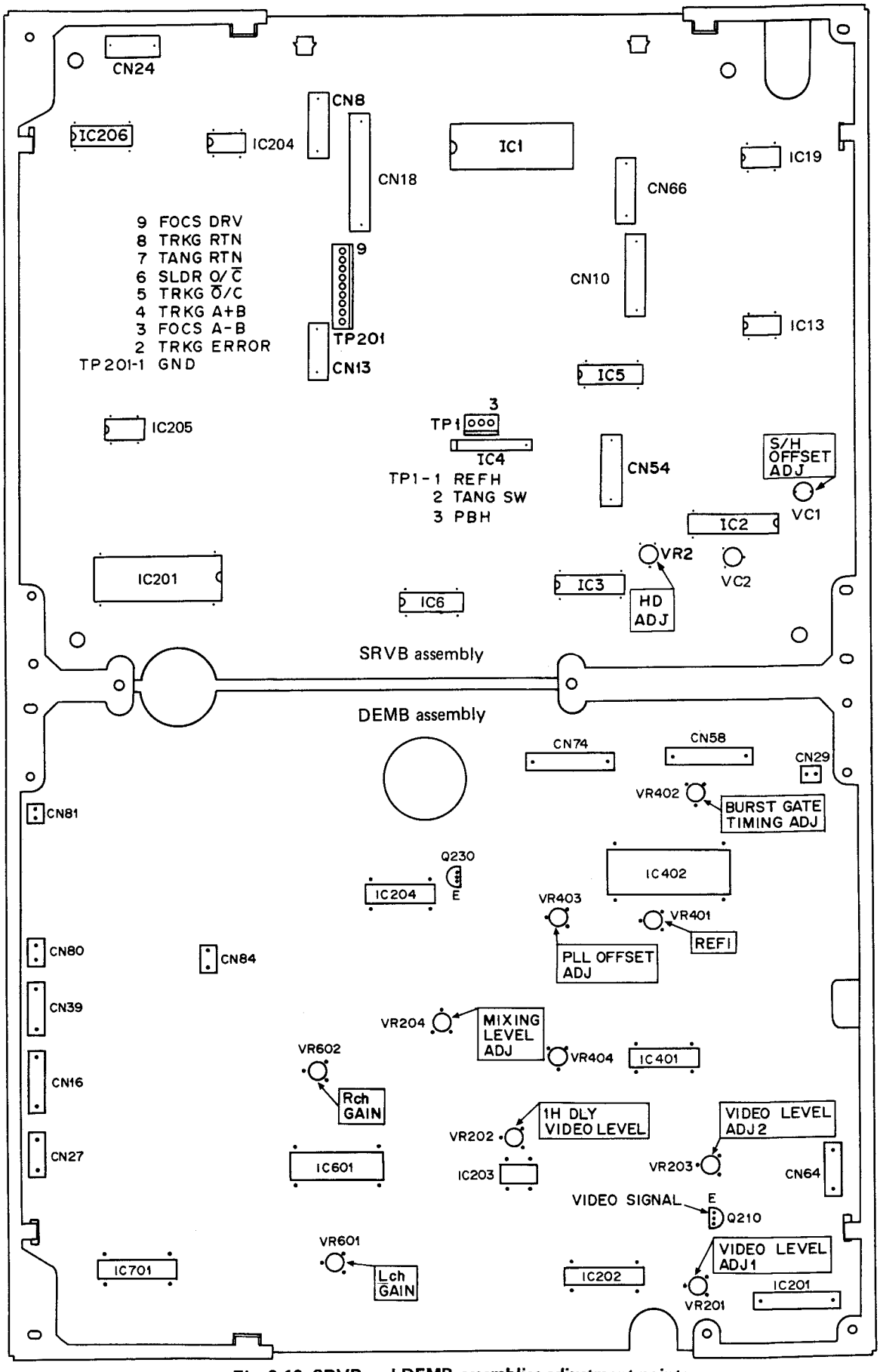


Fig. 9-10 SRVB and DEMB assemblies adjustment points

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
			On DEMB unless otherwise specified.	On DEMB unless otherwise specified.		**DEMB Assembly**
	0.5V/div	10μs/div	Q210 emitter	VR201	2Vp-p	**Main line Video Level 1 Adjustment** ● Use search to locate the composite test pattern of chapter 15. ● Observe the video signal from the Q210 emitter and confirm that the level between the white peak and sync tip is 2 V. If the voltage is not correct, adjust VR201.
	0.5V/div	10μs/div	IC202	VR202	2Vp-p	**1H Delay Video Level Adjustment** ● Play back the same test pattern in the still mode. ● Observe the video signal at pin 11 of PA3018 (IC202) and confirm that the level between the white peak and sync tip is 2 V. If the voltage is not correct, adjust VR202.

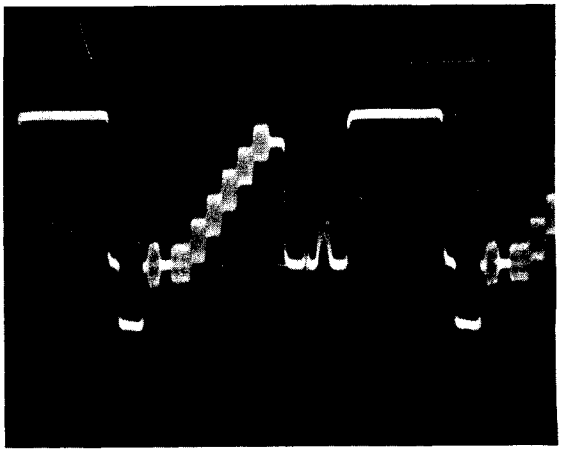


Photo. 9-6 Video level 1 adjustment

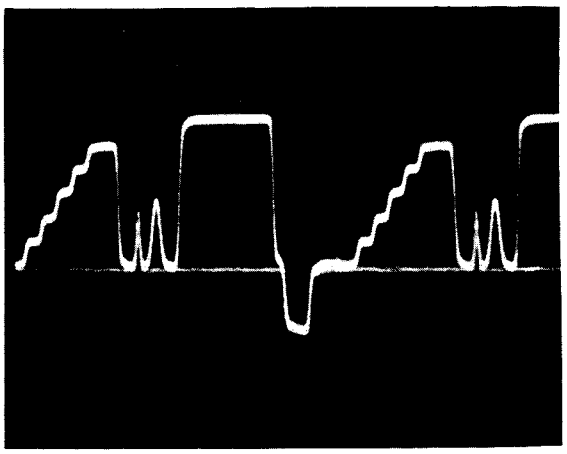


Photo. 9-7 1H Delay video adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUST-MENT POINT	CHECK POINT/ ADJUST-MENT STANDARD	ADJUSTMENT PROCEDURE
	0.5V/div	10μs/div	Q230 emitter	VR203	2Vp-p	**Video Level 2 Adjustment** ● Observe the video signal from the Q230 emitter and confirm that the level between the white peak and sync tip is 2 V. If the voltage is not correct, adjust VR203.
	0.5V/div 0.5V/div	10μs/div	Q210 Ⓔ Q230 Ⓔ	VR204	Same chroma level	**Mixing Level Adjustment** ● Use search to locate the magenta pattern of chapter 20. ● Adjust VR204 so that the chroma levels of emitters Q210 and Q230 are the same.
	1V/div	5μs/div	IC402 ㉕ (PA9001)	VR401	5μs	**HD 1 Pulse Width Adjustment** ● While playing a disc (with SPDL lock on), adjust so that the HD 1 signal pulse width at pin 25 of IC402 (PA9001) is 5 μs.

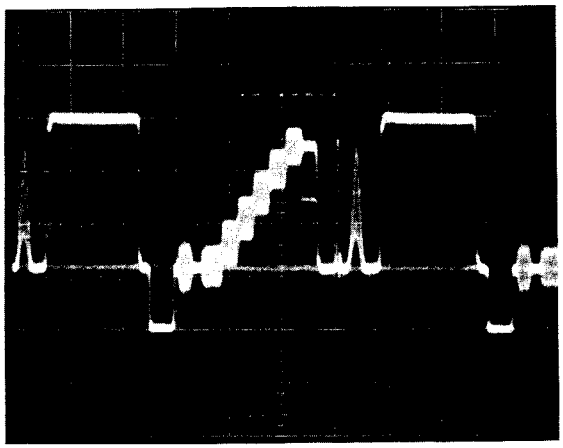


Photo. 9-8 Video level 2 adjustment

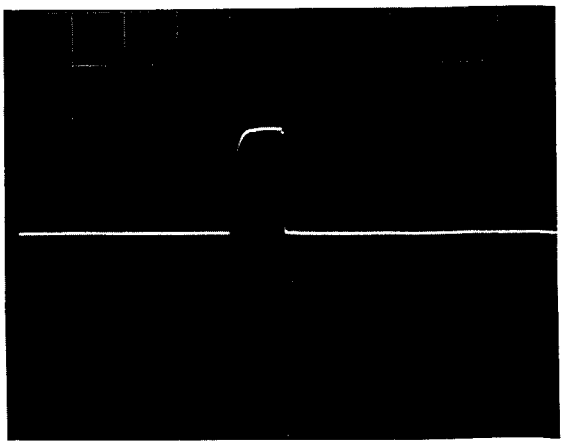
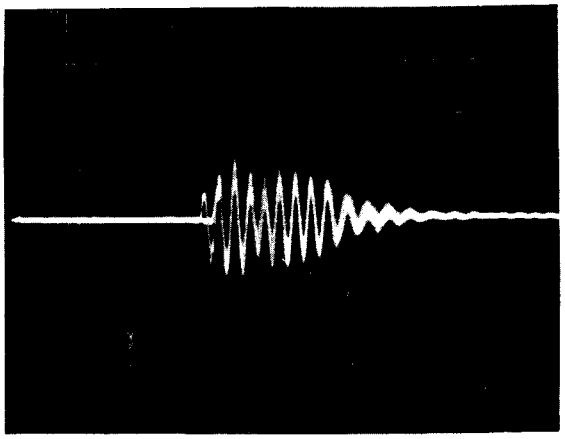


Photo. 9-9 HD 1 Pulse width adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	0.1V/div	1μs/div	IC402⑩ (PA9001)	VR402		**Burst Gate Position Adjustment** • Use search to locate the composite test pattern of chapter 15. • Adjust so that the color burst signal is clearly gated at pin 10 of IC402 (PA9001).  **Photo. 9-10 Burst gate position adjustment**
	1V/div	1mS/div	IC402 ⑭ IC402 ⑫ (PA9001)	VR403	V1=V2	**PLL Loop Offset Adjustment** • Play the composite test pattern in the still mode. • Observe the DC voltage V1 between pin 14 and pin 12 of the IC402 (PA9001). • Next, connect a capacitor of about 0.047 μF between pin 9 of the same IC and ground and observe the DC voltage V2 between pin 14 and pin 12. • V1 should equal V2. If not, adjust VR403.
			Screen	VR404	Min. color unevenness	**PL Error Level Adjustment** • Use search to locate the magenta image of chapter 20 and adjust VR404 to the point where color unevenness is minimized.

NO.	OSCILLOSCOPE RANGE		TEST POINT	ADJUST-MENT POINT	CHECK POINT/ ADJUST-MENT STANDARD	ADJUSTMENT PROCEDURE
	V	H				
	50mV/div	1ms/div	IC701 ⑪	VR601	65mVrms	**Audio Output Level Adjustment** ● Play chapter 9, the 40% modulated 1 kHz signal (only in the left channel). ● Measure the level of the 1 kHz signal at pin 11 of IC701 (HA12043) and adjust VR601 so the level is 65 mVrms. ● Play chapter 10, the 40% modulated 1 kHz signal (only in the right channel). ● Measure the level of the 1 kHz signal at pin 10 of IC701 (HA12043) and adjust VR602 so the level is 65 mVrms.
	50mV/div	1ms/div	IC701 ⑩	VR602	65mVrms	

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	2V/div	10μs/div	On the SRVB unless otherwise specified. IC2 ⑧ (PA9002)	On the SRVB unless otherwise specified. VR2	33μs±1μs	**SRVB Servo Adjustment** **HD Head Adjustment** ● Load and play the test disc. ● Observe the HD waveform of pin 8 of IC2 (PA9002). ● Adjust VR2 to obtain an HD L interval of 33 μs.
	2V/div	20ms/div	IC2 ① (PA9002)	VC2	8μs±1μs	**REFI Sample Hold Offset Adjustment** ● Switch the player to still mode. ● Observe pin 1 (trapezoidal waveform) of IC2 and TP1-8 H-phase error of EXTB assembly on the oscilloscope. ● Check that the interval from the positive peak of the trapezoidal waveform is 8 μs ± 1 μs. Adjust by VC2 if this rating is not satisfied. Check that the DC level at TP1-8 on the EXTB assembly is varied linearly when VC2 is turned slightly clockwise and counterclockwise about the adjusted position.
	2V/div		EXTB TP1-8	VC1	0V	● Adjust VC1 to set the DC voltage appearing at TP1-8 on the EXTB to 0 V. **Note:** Set to internal synchronization mode.

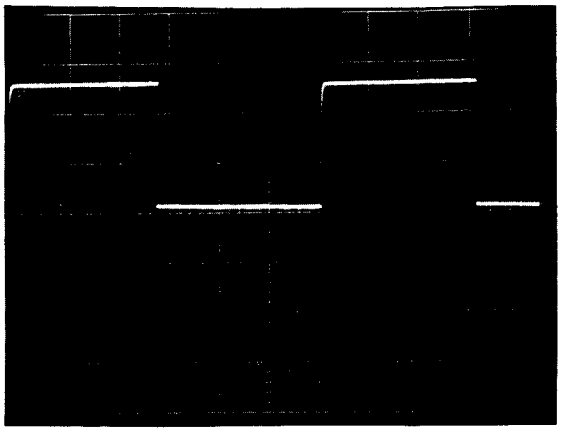


Photo. 9-11 Head adjustment

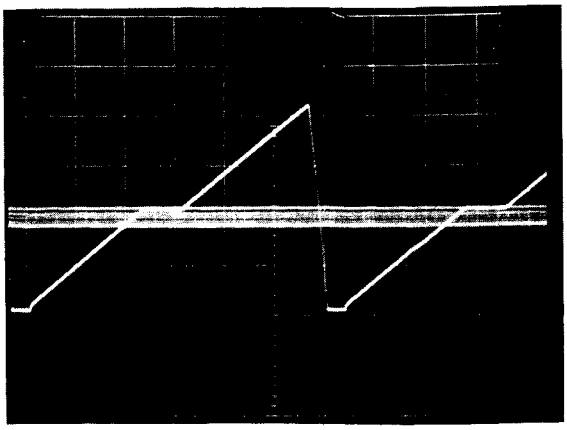


Photo. 9-12 REFI Sample Hold Offset Adjustment

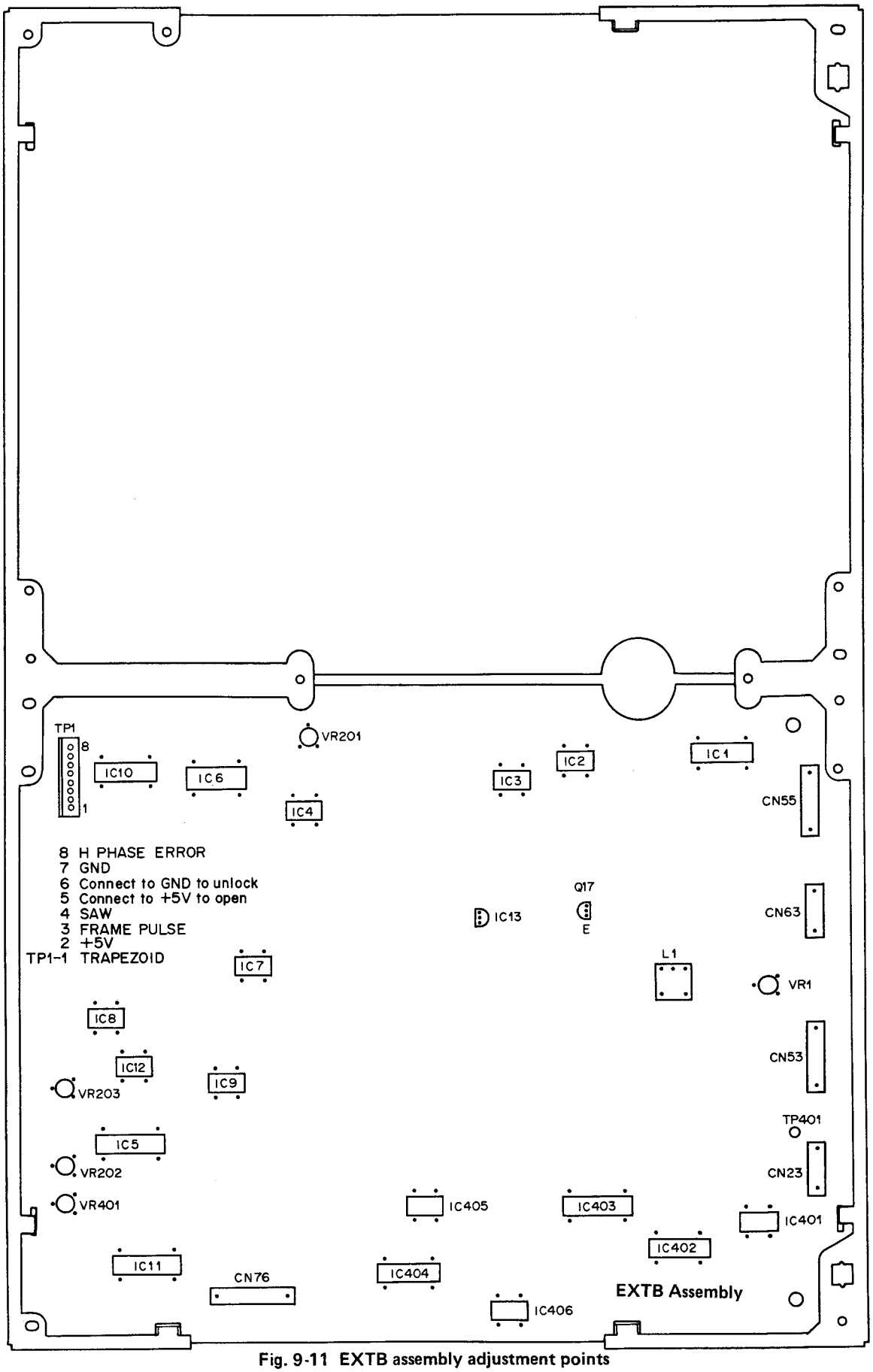


Fig. 9-11 EXTB assembly adjustment points

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	2V/div	50μs/div	On the EXTB unless otherwise specified. CN53-8 TP1-3	On the EXTB unless otherwise specified. VR201	See accompanying photograph.	**EXTB Adjustment** **Frame Pulse Phase Check** ● Load and play a test disc. ● Observe the TP1-3 frame pulse and V blanking area in the first field of the CN53-8 PB-C-SYNC. ● Check that the phase relationship is as shown in the photograph (A = B). ● Adjust VR201 if the phase relationship in the photograph has not been achieved.
	5V/div	5ms/div	TP1-6 TP1-7 TP1-5 TP1-2 TP1-3 TP1-1	VR203	Stationary TP3 waveform	**VCO Center Frequency Adjustment** ● Search for frame #20,000. ● Input a C-SYNC signal (2 Vp-p ~ 4 Vp-p) from an NTSC sync generator through the EXT SYNC IN input of the player and terminate in 75 ohm resistance. ● Connect TP6 to TP7 (GND) with a shorting clip. ● Connect TP5 and TP2 (+5 V) with a shorting clip. ● Observe the TP1 trapezoidal waveform and the TP1-3 frame pulse in the oscilloscope, and adjust VR203 to keep the waveform still.

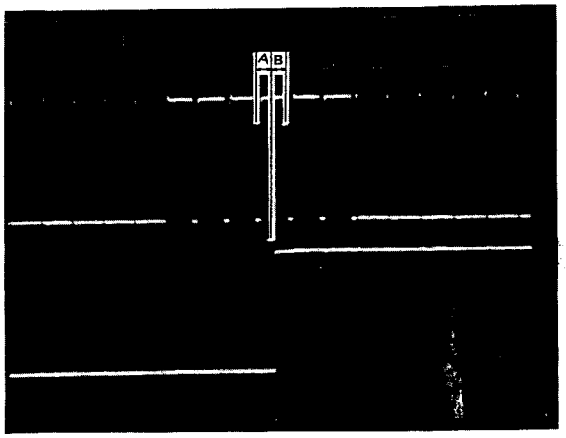


Photo. 9-13 Frame pulse phase check

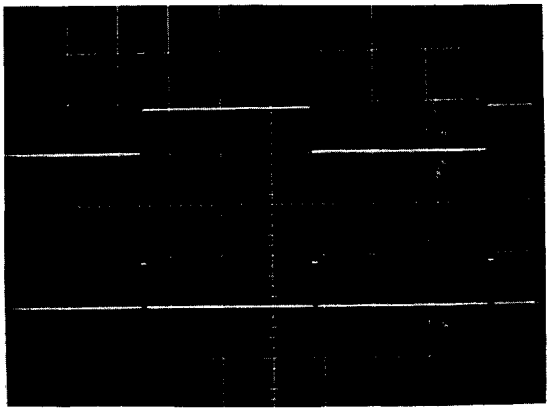
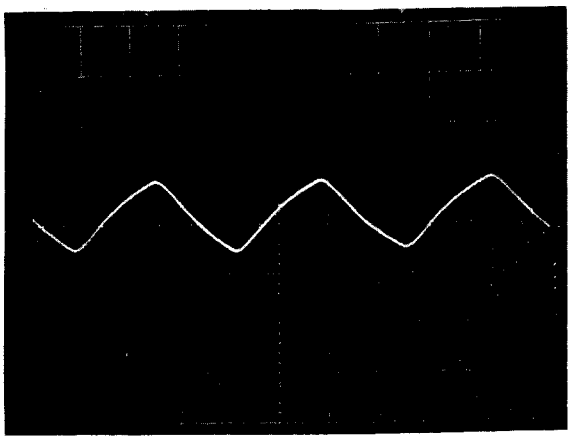
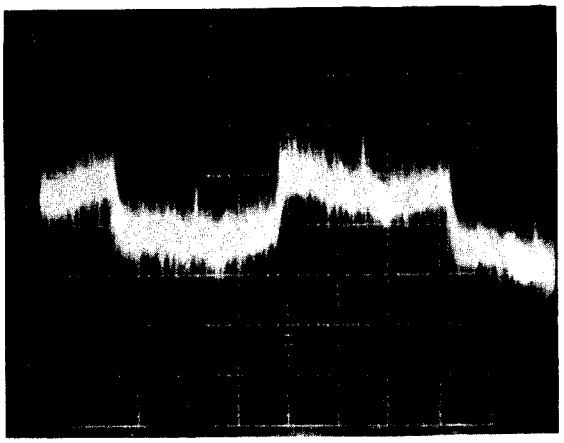
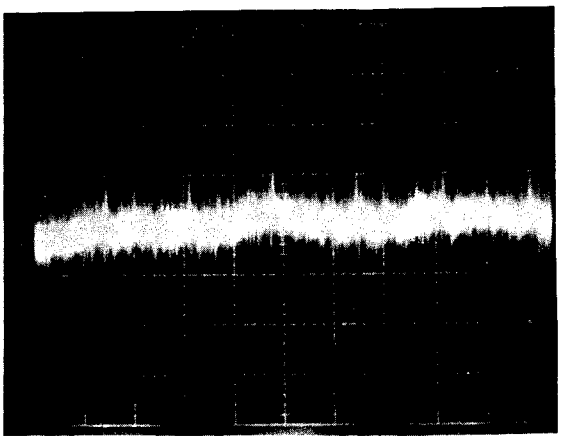


Photo. 9-14 VCO center frequency adjustment

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	0.5V/div	20ms/div	TP1-8	VR202		**H-Duty Adjustment** ● Switch the player to still mode. ● Input a C-SYNC signal from an NTSC sync generator through the EXT SYNC IN input of the player and terminate in 75 ohms resistance. Note, however, that SC subcarrier is not to be applied. ● Adjust VR202 to obtain a 0 V reading for the central value in the TP1-8 waveform.  **Photo. 9-15 H-duty adjustment** **Note:** Complete the SRVB VC1 adjustment before proceeding with this adjustment. **Video Level Adjustment** ● Adjust VR1 to obtain the same video level at CN63-4 and CN63-2.
	0.5V/div	10μs/div	CN63-4 CN63-2 (Q9E)	VR1		

NO.	OSCILLOSCOPE RANGE		TEST POINT	ADJUST-MENT POINT	CHECK POINT/ ADJUST-MENT STANDARD	ADJUSTMENT PROCEDURE
	V	H				
	50mV/div (AC mode)	10mS/div	Q17 emitter	L1	Minimum screen flicker	**Jump Color Phase Adjustment** • Input the C-SYNC signal from the NTSC sync generator through the SYNC IN terminal on the player and at the same time input a subcarrier (SC) signal through the EXT SC IN terminal also on the player. • Use search to locate #7000 magenta screen and switch to still mode. • Minimize the variations in the phase of the Q17 emitter.  ⇩  **Photo. 9-16 Jump color phase adjustment**

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
	0.5V/div 2V/div	1mS/div 1mS/div	TP401 CN76-6 (IC403-9)	VR401	CH1 (TRK ERR) CH2 (MJT)	**Multi Jump Offset Adjustment** ● Press the program key on the remote control unit and execute programs "20000 Search", "20500 Search", "0 Branch" and "END". ● Input the tracking error signal from TP401 through CH1 and the MJT (multi jump offset) signal from CN76-6 or pin 9 of IC403 through CH2 of the oscilloscope and observe the waveforms. ● Adjust VR401 so that the signals converge after tracking error signal has jumped.

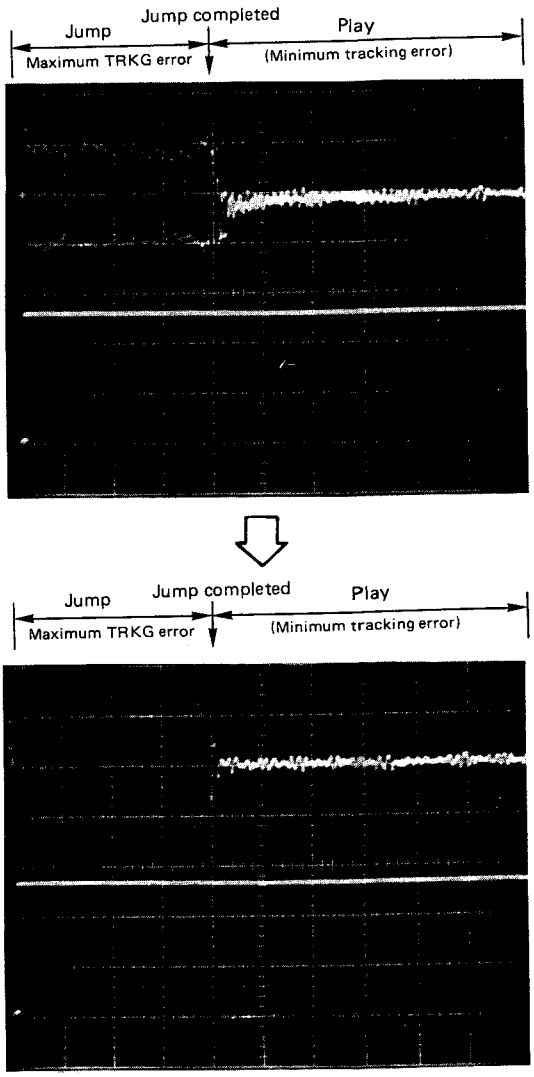
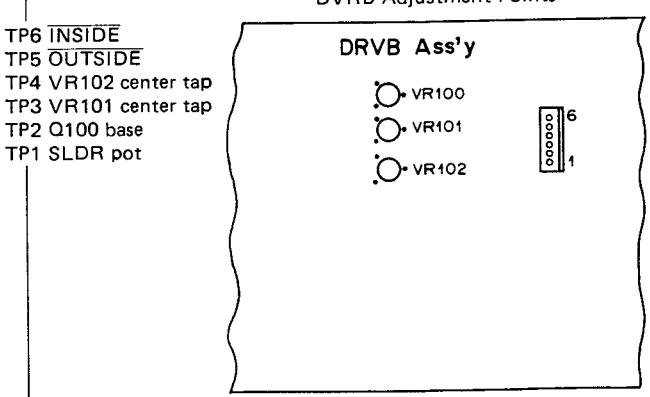


Photo. 9-17 Multi jump offset adjustment

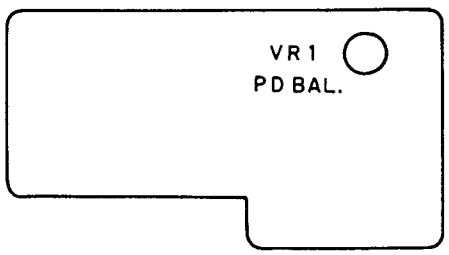
NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
				On the DRVB unless otherwise specified.		**DRVB Adjustments** • Since the x3 speed mode is employed in the DRVB adjustments, switch the player to test mode. Details of this test mode are outlined below. **Test mode** 1. Before switching on the power, set the FUNCTION SELECTOR (switch 10) to the "OPEN" (upper) position. 2. Then, after switching on the power, four different test modes can be executed by input of a variable (1 to 4) followed by the PROGRAM key. [1] [PROGRAM] Test mode version display. [END] Display cleared. [2] [PROGRAM] Display of FUNCTION SELECTOR status. [END] Display cleared. [3] [PROGRAM] Execution of x3 FWD mode operation. [END] END of operation. [4] [PROGRAM] Execution of x3 REV mode operation. [END] End of operation. [5] [PROGRAM] RAM cleared. [END] End of operation. **Note:** Normal program modes cannot be executed during these test modes. **Inside Limit Position Adjustment** • Insert the test disc and begin disc play. • Enter 4, PROGRAM key when the inside of the disc is being played. (The player will then be switched to x3 REV mode.) • Confirm that it switches to the inside limit at the lead-in sector 19-21 indication and returns to the outside of the disc. • If the player does not return to the outside of the disc at above specified indication, perform as follows. Depress the END key on the remote control unit, then move the pickup to within the program area and adjust VR102. • Check the limit position again in the same way. • Repeat this process until the limit position is correct.
				VR102	Lead-in 19 ~ 21	

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
				VR101	Lead-outs 23 ~ 25	**12-Inch Outside Limit Position Adjustment** ● Use search to locate frame #50,400. Enter 3 PROGRAM (x3 FWD mode) to move the pickup to the outside of the disc and confirm that it switches to the outside limit and returns to the inside of the disc at the lead out sector 23-25 indication. ● If the player does not return to the inside of the disc at above specified indication, perform as follows. Depress the END key, and after the pickup has moved slightly toward the inside of the disc, check the limit position again using the above procedure. ● Repeat this process until the limit position is correct.
				VR100	(F1) #23,800	**8-Inch Outside Adjustment** ● Connect a 15 kohm resistor between TP2 and TP6. ● Move the pickup to the outside of the disc with the x3 FWD mode. Check that the pickup returns to the inside of the disc when it reaches the 8-inch disc outside limit which is located between frame #24,200 and frame #24,800. If the pickup does not return to the inside within the above range, adjust VR100.



VR102: Inside limit
VR101: 12-inch outside limit
VR100: 8-inch outside

Fig. 9-12 DRVB assembly adjustment points

NO.	OSCILLOSCOPE RANGE		TEST POINT	ADJUST-MENT POINT	CHECK POINT/ ADJUST-MENT STANDARD	ADJUSTMENT PROCEDURE
	V	H				
				VR1	Minimum crosstalk	**CTCB** ● If crosstalk is prominent with the CLV disc, perform the following adjustment procedure. **PD Balance Adjustment** ● Insert the test disc. ● Use search to locate the vertical bar image (frame #18,914) and play it in the still mode. ● Adjust VR1 so that the darkness of the vertical bars that appear on the left and right sides of the screen due to crosstalk is about the same and so that the bars are as weak as possible. ● Use search to locate the vertical bar image in frame #42314. ● Confirm that the vertical bars appearing on the right and left sides of the screen due to crosstalk are as weak as possible. If there is a difference in the darkness of the left and right bars, return to frame #18,914 and adjust VR1. ● Replace the test disc with the CLV disc and confirm that there is no crosstalk.  **Fig. 9-13 CTCB assembly adjustment points**

NO.	OSCILLOSCOPE RANGE V	OSCILLOSCOPE RANGE H	TEST POINT	ADJUSTMENT POINT	CHECK POINT/ ADJUSTMENT STANDARD	ADJUSTMENT PROCEDURE
			IC22 ③	VC1	3.0MHz ± 0.1MHz	**Control Adjustment** **1. Clock Adjustment 1** ● Turn on the power to the player. ● Connect a 1 kohm resistor to pin 3 (DOC INH) of IC22 (PD0011) and apply a +5 V voltage. (Or connect a 1 kohm resistor between pin 3 and pin 22 of IC22). ● Connect a frequency counter to pin 3 of IC22. **2. Clock Adjustment 2** ● Connect pin 12 (VOM) of IC24 (MB89011-102) to CH1 on an oscilloscope. Connect the output of a C-SYNC generator to CH2 and compare the waveforms. ● Synchronize the output of pin 12 of IC24 with the C-SYNC generator output.
			IC24 ⑫ C-SYNC generator	VC2	Flow of H SYNC: Less than 3 times during 1 second.	

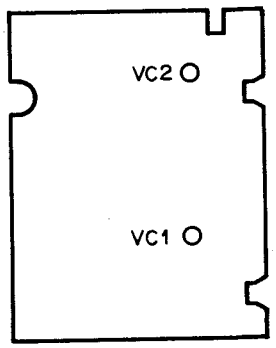


Fig. 9-14 CONT assembly adjustment points

10. SAFEY INFORMATION

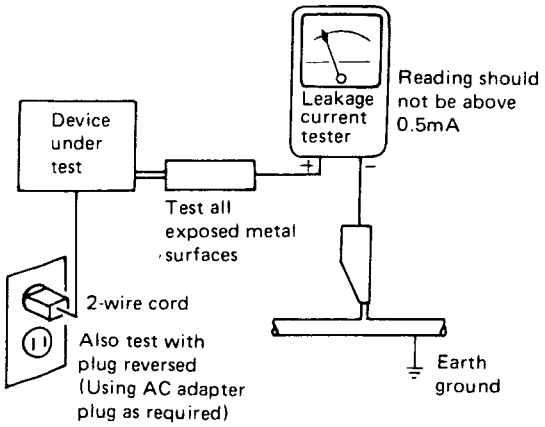
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VAROITUS!
LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASÄTEILYÄ LAITTEEN SISÄLLÄ ON LASERDIODIN LÄHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VIKTIGT
APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

LASER
Picture 1
Warning sign for laser radiation

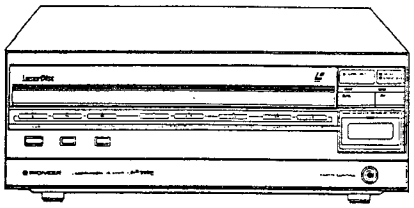
IMPORTANT
PIONEER COMPACT DISC PLAYER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

NEW3331

PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS



ORDER NO.
ARP1305-A

LASERVISION PLAYER

LD-V6000A

- This service manual is applicable to the KUC type.
- As to the repair and adjustments , please refer to the LD-V6000A service manual. (ARP1279-A)

CONTENTS

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3331

1. BLOCK DRAWING AND DESCRIPTION OF CONTROL SYSTEM

(1) CPU BLOCK
The CPU block consists of the CPU, the ROM, the RAM and the CTC and controls the entire system via the CPU bus.

(2) PARALLEL PORT BLOCK
This block consists of two PIO, a PPI and two 74HC245. It controls the SUB bus which controls player control signal output, player status signal input and switch data input as well as remote control reception, loading control block and decoder block.

(3) SERIAL INTERFACE BLOCK
This block controls the input and output from the RS232C interface.

(4) REMOTE CONTROL RECEPTION AND LOADING CONTROL BLOCK
This block controls reception from the wireless infrared remote control, the main unit decoder, some of the main unit LEDs and loading.

(5) DECODE BLOCK
This block decodes the frame, time, chapter code and user code data which are recorded on the disc.

(6) DISPLAY BLOCK
This block outputs the system display (frame numbers, time, chapter numbers, input number keys, program etc.), user display and blueback output.

(7) PERIPHERAL CONTROL BLOCK
This block generates the system clock (3.9936 MHz), controls the writing of data to the display block and address decode in addition to controlling multi track jump.

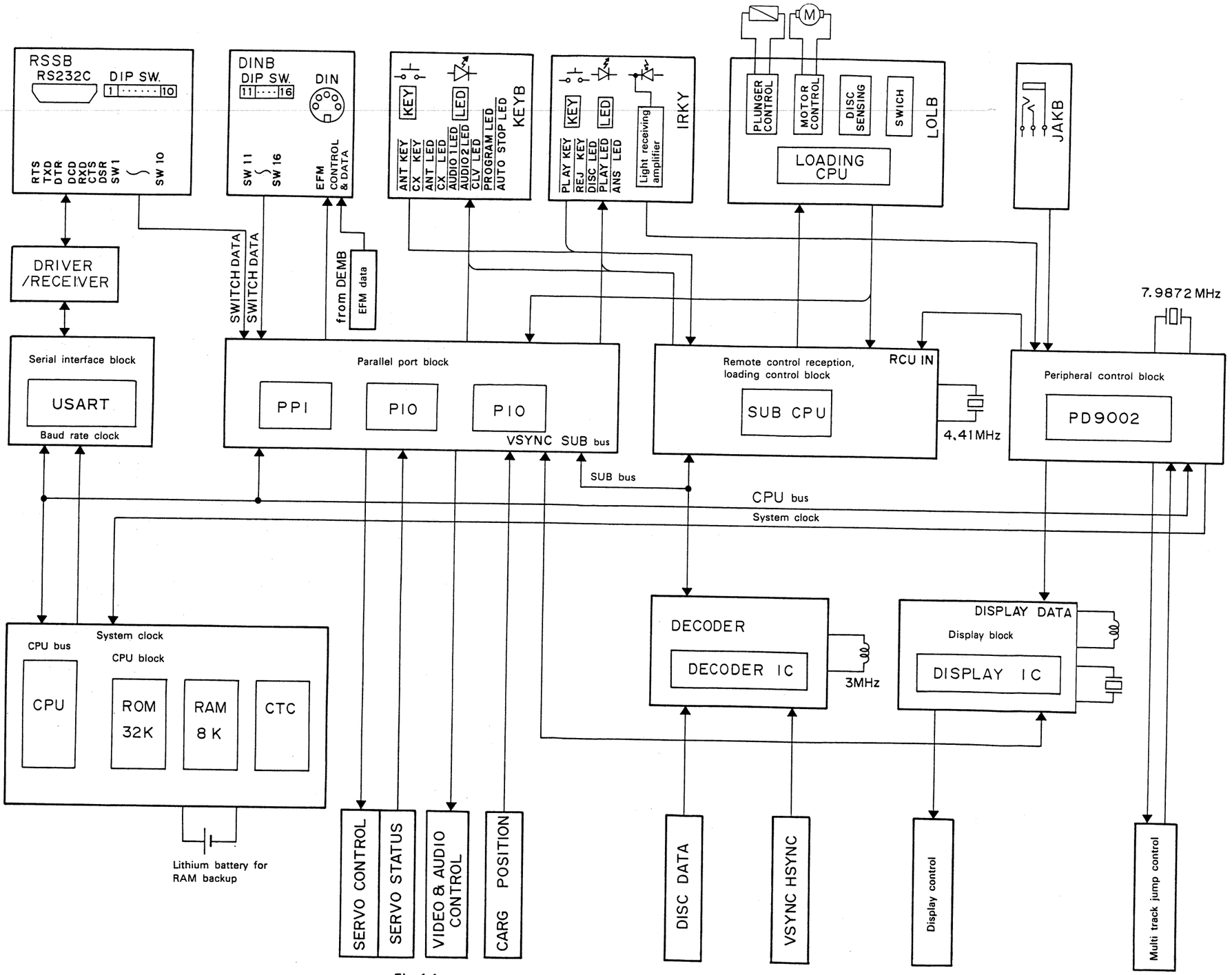


Fig. 1-1 LD-V6000A Control System Block Diagram

2. CONTROL SYSTEM HARDWARE

OUTLINE

The control system of the LD-V6000A consists of IRKY, KEYB, RSSB, DINB, LOLB and CONT printed circuit boards.
Figure 2-1 shows a block diagram of the control system.
The control system serves to ensure that commands entered with the keys on the main unit or on the remote control as well as commands from the external controller via the RS-232C generate the correct processes and responses. The control system has three CPUs to perform these operations. Should the player for any reason start to malfunction, the control system will return it to correct operating mode or will turn it off if that is not possible.

(1) CPU BLOCKS

Main CPU

The main CPU (LH5080A: Compatible with Z80A) is an 8-bit CMOS multichip CPU and has a clock that uses 3.9936 MHz signals or half the original oscillation frequency (7.9872 MHz) of the crystal oscillation circuit.
The main CPU is connected to the parallel IO (PIO: LH5081A), the counter timer (CTC: LH5082A), the PPI (μPD71055C), USART (μPD71051C), the ROM (32 Kbyte: 27256) and the RAM (8 Kbyte: TC5564PL) via the 8-bit main data bus. Position data for the DIP switch on the rear panel (SW 1 — SW 16) are also read via the parallel port block.
The selection of these peripheral devices is performed by the IC1 (PD9002) which decodes data passing along the A13 — A15 data bus into a chip select signal (CS) and the $\overline{WR}$, $\overline{RD}$ and $\overline{MREQ}$ output of the CPU.

CTC

The CTC is an IC used for pulse count down. It counts the CLK/TRG input pulses and when a set value is reached, it interrupts and outputs a zero count pulse through the ZC/TO terminal. With this player, a pulse obtained by dividing the previously mentioned crystal oscillating circuit output by four is added to the CLK/TRG 2 output to fetch the $\overline{TXC}$ and $\overline{RXC}$ signals, which control USART reception and transmission, from the ZC/TO2 output. The $\overline{TXC}$ and $\overline{RXC}$ signals are programmed to change the internal dividing ratio depending on the baud rate data read through the DIP switch (SW 1 — SW 8) on the rear panel when the power is on. When the set baud rate is 300 or 600 baud, the internal dividing ratio becomes a frequency which is 64 times the baud rate and when the baud rate is 1200 or more, the frequency is 16 times the baud rate.

The CTC also receives outputs from the P21 port of the SUB CPU to issue interrupts to the main CPU in order to set the player in reject mode. Interrupts from the CTC has priority over interrupts coming through the PIO.

(2) PARALLEL PORT BLOCK (PIO)

This block receives signals from the main CPU and outputs them to each section of the player and transmits inputs which it receives from the different sections of the player to the CPU. The PIO consists of two almost identical I/O ports. The A port monitors the control and status of each section of the player and the RS-232 interface control signal. The B port is connected to the sub data bus to control the flow of data between the display IC, decoder IC and the SUB CPU.
It also controls the USART receiver and transmitter buffers by monitoring the RS-232C control signals (TXRDY, RXRDY). When a buffer becomes empty or full, it issues an interrupt to the CPU to stop or start the transmission or reception of data.

PPI

The PPI is a programmable IO interface which outputs control signals to all sections of the player and to the monitors that control the status of each section of the player.

(3) SERIAL INTERFACE BLOCK

USART

The μPD71051C is a 28-pin CMOS IC and serves as the RS-232C interface. It is used for programmable serial data communication and is usually called USART (Universal Synchronous/Asynchronous Receiver/Transmitter).
It receives serial data from the RS-232C port and converts these data for transmission to the CPU and converts parallel data from the CPU into serial data for transmission to external devices.
Its operating mode is programmed by the CPU and to support the required communication format it determines the baud rate, character length, stop bit number and the existence of odd and even parity. Once programmed, the USART performs the specified communication operation.
During transmission, the TXRDY signal becomes level H and announces via the PIO port to the CPU that it is ready to accept 1 character. The TXRDY signal is automatically reset after the CPU has written the character. When data is transferred from the CPU, the USART automatically adds a start bit (level L) and the programmed stop bit to each character. An odd or even parity bit is inserted before the stop bits. In this way characters are transmitted through the TXD output as serial data. The TXD shifts out at the trailing edge of TXC. The RDX input terminal is usually level H, but as soon as a signal enters, the trailing edge of the signal triggers the beginning of the start bit. The data and parity bits are sampled by the RXD input by means of the leading edge of RXC. Thus, characters received are loaded in the USART received data buffer and when the RXRDY signal becomes level H it requests the CPU to accept the data received.

(4) REMOTE CONTROL RECEPTION, LOADING CONTROL BLOCK

Sub CPU

The SUB CPU is a CMOS 8-bit, 1-chip microcomputer with a 1K byte programmable memory, registers and a 64 byte data store RAM. The clock pulse rate is 4.41 MHz.
The SUB CPU is closely connected to system initializing, disc loading, starting and stopping playback after the power has been turned on. It also decodes key input signals from the remote control received by the IRKY printed circuit board and the EXT REM signals input by the JAKB printed circuit board which are stored as key data and output on the data bus as required by the main CPU.
The following is a description of the output signals from the SUB CPU to each section of the player and their operating conditions.

1. $\overline{LD\ ON}$

- This signal is output when the play button has been pressed and the DISC signal from the loading CPU announces that a disc has been inserted. Then the LD lights, the focus servo starts operating and the SPDL motor begins to rotate.
- When the reject button on the main unit or the remote control is pressed, the $\overline{LD\ ON}$ and the LD go out, the focus servo stops operating and the SPDL motor stops rotating.

2. $\overline{RELEASE}$

- This signal is transmitted to the loading CPU to cancel disc loading mode. It is output when the REJECT button on the main unit is pressed and a SPDL STOP signal has been input to indicate that the SPDL motor has stopped completely.

3. $\overline{ANS\ LED}$

- This signal is output when the remote control signal input is of a specified code and the custom code is "A8".
- It cannot be output with the main unit keys.

4. $\overline{ANT}$

- This signal is used for RF switching of the VHF modulator and is output in full whenever the key is pressed.

(5) DECODE BLOCK

Decoder IC

The decoder IC PD0011 decodes the 24-bit Philips code which is added to the 16H — 18H and 279H — 281H playback video signals and outputs the decoded signals along the data bus according to CPU commands.
When the play button is pressed, the disc starts to rotate, the SPDL servo locks and the video signal is demodulated. Then the PA0009 extracts the Philips code which is fetched by the decoder IC and each line of code is decoded into a 6-digit hexadecimal code.

(6) DISPLAY BLOCK

Display IC

The display IC (MB89011-102) is a CMOS type IC which has a character signal and character back signal generating function to display frames (time) during playback and messages to indicate remote control key inputs on a TV screen.
Displayed are 64 types of characters which are in the form of a 6-bit binary code as shown in the figure 20 characters can be displayed in one line and a maximum of 9 lines can be displayed on the screen.

(7) PERIPHERAL CONTROL BLOCK

PD 9002

The PD 9002 is a CMOS gate array designed to perform player peripheral control.

(8) LOADING CPU

The player loading mechanism is controlled by the 4-bit CPU (PD5019) on the LOLB printed circuit board and by the peripheral circuits.

The IC1 (PD5019) has the following functions:

- It detects whether the front loading mechanism is locked by the door switch (SW2) or not. If the door is locked, an $\overline{\text{INT LOCK}}$ signal is output.
- It detects whether the disc has been properly inserted with the clamp switch (SW5) or not.
- It outputs a control signal to the motor drive IC2 (MB3763) to rotate the loading motor (forwards and backwards).
- It detects when a disc is inserted by lighting an LED, the light of which is reflected off the surface of an inserted disc and sensed by a photodiod. If a disc is inserted a DISC signal (correct logic) is output.
- It makes use of the same LED and photodetector to detect disc sizes that are also used to sense the presence of a disc and outputs the SIZE 8/12 signal accordingly.
- It detects when loading is over with the SW 4. Then it stops the motor and outputs a $\overline{\text{LOAD}}$ signal to the SUB CPU at the same time.
- It outputs a control signal to the motor drive IC to rotate the motor in the opposite direction to that used during motor loading when it receives a $\overline{\text{RELEASE}}$ signal from the SUB CPU.
- It detects when unloading is finished by means of the SW3.
- It outputs a control signal for the plunger drive circuit.

The PD5019 serves under the SUB CPU and hands over all data detected to the SUB CPU with the exception of the SIZE 8/12 signal.

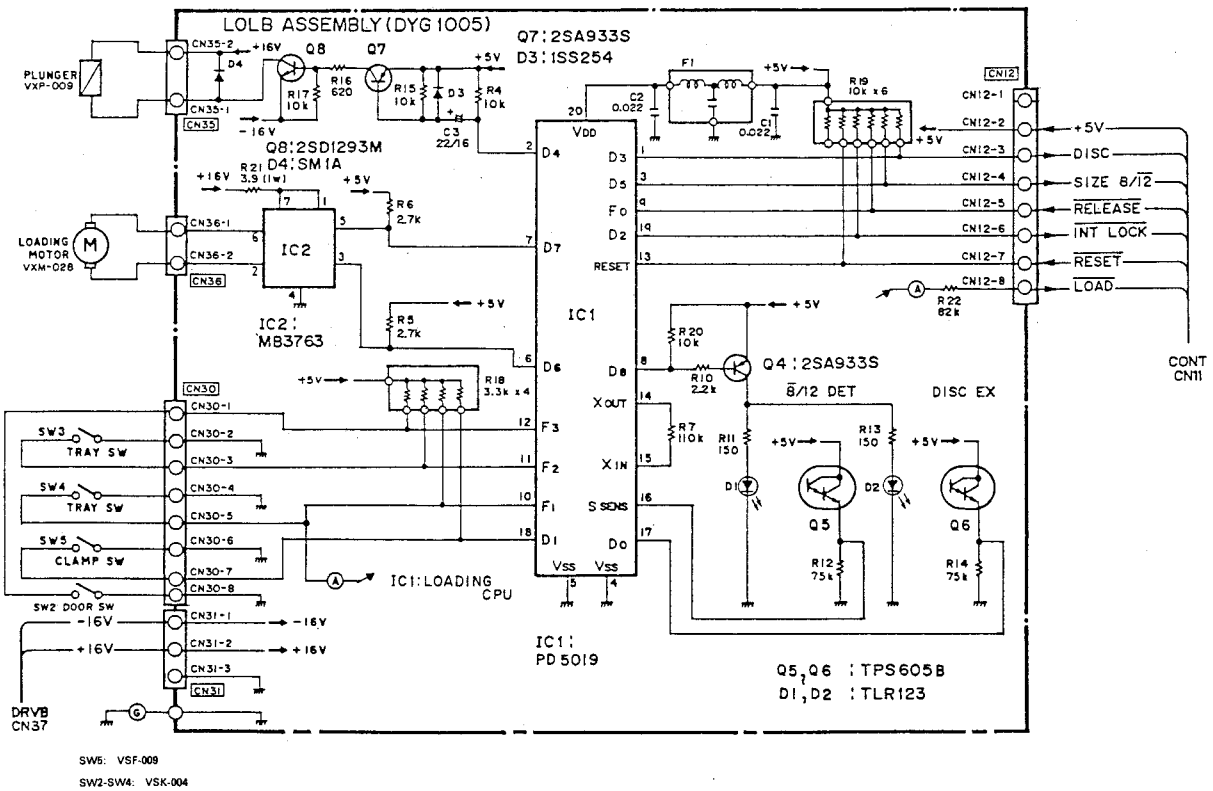


Fig. 2-1 LOLB Circuit diagram

3. CONTROL SYSTEM SOFTWARE

THE RELATIONSHIP BETWEEN THE MAIN CPU AND THE SUB CPU WHEN THE POWER IS ON

When the power is turned on, the IC2 circuit resets the main CPU, the loading CPU and the SUB CPU. The PIO initializes the peripheral ICs and then waits for the ACK signal from the SUB CPU. The SUB CPU transmits the $\overline{ACK}$ signal to the PPI after it has received the SPDL STOP signal. The main CPU stands by until the the play button is pressed.

When disc loading has been completed, the loading CPU will transmit the DISC and $\overline{LOAD}$ signals to the SUB CPU. When the play key is pressed, the main CPU is notified by the SUB CPU via the PIO and the SUB CPU causes the stand-by LED to flash. Then the SUB CPU outputs the $\overline{LD\ ON}$ signal which lights the LD, starts focus servo operation and the SPDL motor.

After this the main CPU controls the $\overline{FOCS\ LOCK}$ and the $\overline{SPDL\ LOCK}$ via the the PPI and the SUB CPU transmits the key codes it has received to the main CPU. If the $\overline{SPDL\ LOCK}$ is not input in the main CPU within 40 seconds, it will transmit a REJECT code to the SUB CPU and the main CPU is reset by the SUB CPU.

CAV/CLV DECISION

When the SPDL LOCK is input, the main CPU will read data from the decoder IC via the PIO and the CAV/CLV decision depends on this data. In case of CLV, the CLV LED is turned on and initial search is started.

In case of CAV, initial search starts when a search map has been generated.

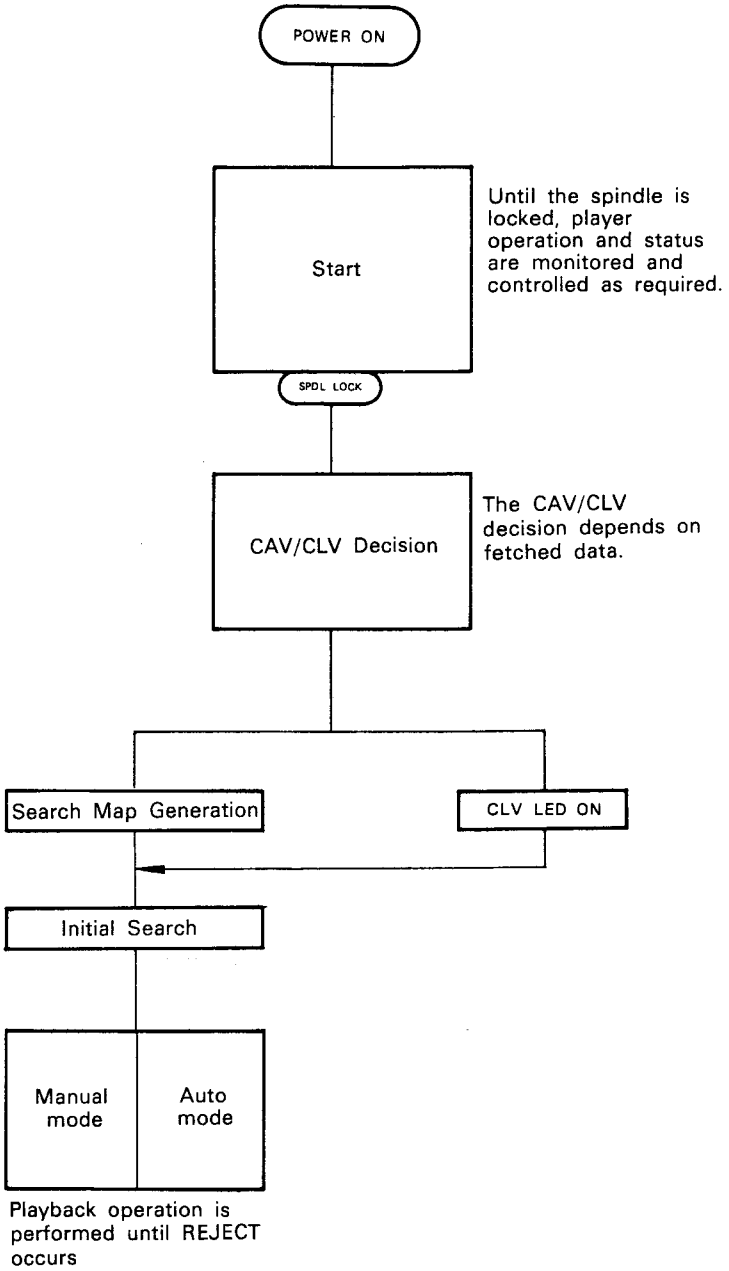
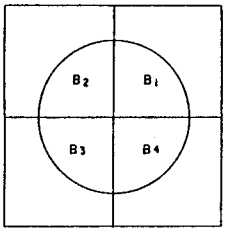


Fig. 3-1 Flow chart outline of start

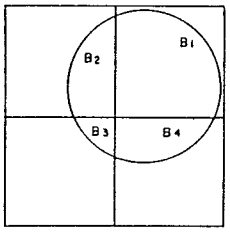
4. DEFC CIRCUIT

DEFC is a circuit used to compensate the defocusing which occurs when the laser beam spot becomes off-center on the photo detector (P.D.).
Normally, the beam on the P.D. is as shown in Fig. 4-1, but when the beam is off-center as shown in Fig. 4-2, the focus servo operates so that (B1 + B3) - (B2 + B4) = 0; therefore, the actual shape of the spot becomes an oval, as shown in Fig. 4-3. This is called defocus and is caused because the distance between the focus lens and disc is not correct. Defocus causes deterioration of the RF level and TRKG error level, increases crosstalk, leak age between the various error signals, etc., and, consequently, general deterioration of playability.



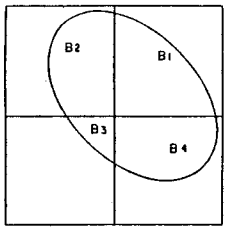
$(B_1+B_3)-(B_2+B_4)=0$

Fig. 4-1



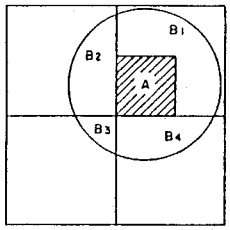
$(B_1+B_3)-(B_2+B_4)>0$

Fig. 4-2



$(B_1+B_3)-(B_2+B_4)=0$

Fig. 4-3



$(B_1+B_3)-(B_2+B_4+A)=0$

Fig. 4-4

Fig. 4-1 and Fig.4-4 beam spot on the 4-section P.D.

The role of the DEFC circuit is to correct this situation. As shown in Fig. 4-4, (B1 + B3) is larger than (B2 + B4) by the amount A when the beam spot is off-center. Because of that, the focus servo operates to increase (B2 + B4) by expanding the beam spot in the (B2 + B4) direction. The size of A in Fig. 4-4 is then calculated and the value (B1 + B3) - (B2 + B4 + A) = 0 is reached by adding this to (B2 + B4). The beam spot then becomes round, solving the above problem.
The value of A =

$$\frac{4}{\pi} \cdot \frac{|(B_1+B_2)-(B_3+B_4)|\,|(B_1+B_4-(B_2+B_3)|}{B_1+B_2+B_3+B_4} \quad \text{(formula 1)}$$

Therefore, the DEFC circuit performs the formula 1 calculation and adds this value to PREB Assembly IC1 6P through 390kΩ of resistance.

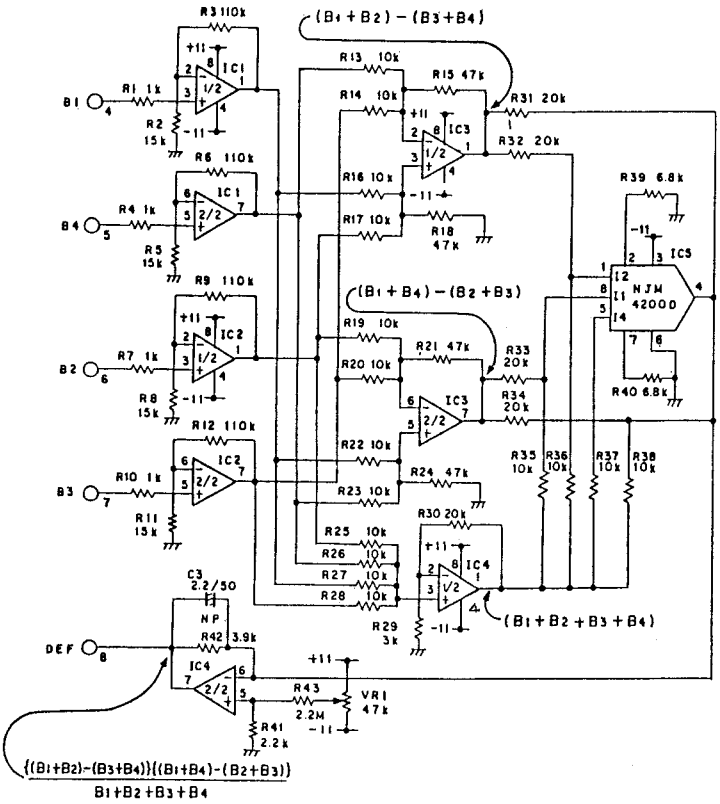


Fig. 4-5 DEFC Circuit

Fig. 4-5 shows the DEFC circuit. Signals B1 - B4 from the 4-section P.D. are input to the add-subtract amp in the next stage through the buffer amps IC1 and IC2. A voltage proportional to (B1 + B2) - (B3 + B4) is output to IC3 1P, a voltage proportional to (B1 + B4) - (B2 + B3) is output to IC3 7P and a voltage proportional to B1 + B2 + B3 + B4 is output to IC4 1P. NJM4200D of IC5 can execute addition and division calculations simultaneously, and the three outputs mentioned above are multiplied and divided by connecting it as shown in Fig. 4-5. The IC5 4P output is a current output; therefore, this output is converted to voltage by the last IC4 (2/2) to obtain a computed output voltage proportional to that found in formula 1.
The amps IC1, IC2, IC3 and IC4 (1/2) all have different gains. This gain matches the I → V conversion ratio of the last IC4 (2/2) and becomes the product of the gain of PREB Assembly IC1 and the coefficient found in formula 1, and is converted to P.D. output to satisfy formula 1.

5. MULTI-TRACK JUMP CIRCUIT

The function of multi-track jump is to set the counter in the CONT assembly to a number less than 100 and to jump in either the minus or plus direction only the number of tracks indicated by that value.

When the multi-jump trigger ($\overline{\text{M.J.T.}}$) comes from the CONT assembly, the TRKG loop is opened, a certain DC voltage is applied to the TRKG mirror and the mirror moves either inward (minus) or outward (plus), as determined. In this case, when the mirror moves at a constant speed, any disc eccentricity or track pitch differential causes the track intersect time to fluctuate and the time required to jump the same track becomes non-uniform, depending on the disc. Because of that, the track intersect time can be determined from the TRKG error and the drive voltage controlled in accordance with that frequency, thus keeping the time required for jumps constant.

Each time a track is intersected, a track count pulse is sent to the CONT assembly, decrementing the counter by "1" each time. When the number of tracks remaining reaches 8, the CONT assembly outputs the BRAKE signal to lower the drive voltage, which lowers the relative speed of the mirror movement. When the counter reaches "0", the CONT assembly outputs the $\overline{\text{JUMP CLR}}$ signal, the TRKG loop is closed and the tracking servo is locked in.

1) Jump Control Circuit (Fig. 5-1)

When the 80μS width multi-jump trigger pulse is output by the CONT assembly, IC403 (2/2) is triggered, 5P becomes "H" and 12P becomes "L." This turns on Q406 and Q411, as well as the IC404 (2/4), (3/4) loop switch. Q407 and Q406 are also turned on and the TRKG servo loop is opened.

Now, if JUMP $\overline{\text{F/R}}$ is "H", the F/R selector switch of IC404 (1/4), (4/4) is turned off, and IC405 (2/2) and IC406 (1/2) operate as a non-inverting amp to set the plus direction jump mode. The track count pulse generator circuit outputs the track count pulse used as the track intersect timing signal to the CONT assembly. Each time this occurs, the CONT assembly counter is decremented by "1." When 8 tracks are remaining, CN76 2P becomes "H", Q403 turns on, the IC405 3P level drops and the speed of the mirror movement decreases. When the set number of tracks have been jumped, the CONT assembly outputs the $\overline{\text{JUMP CLR}}$ signal, IC403 is cleared, the jump loop is opened, the TRKG loop is closed and the jump operation ends. Just before the jump operation ends, however, a minus pulse differentiated from the fall edge of the $\overline{\text{JUMP CLR}}$ signal by C406 and R422 is applied to IC405 3P to make it easier to stay on track.

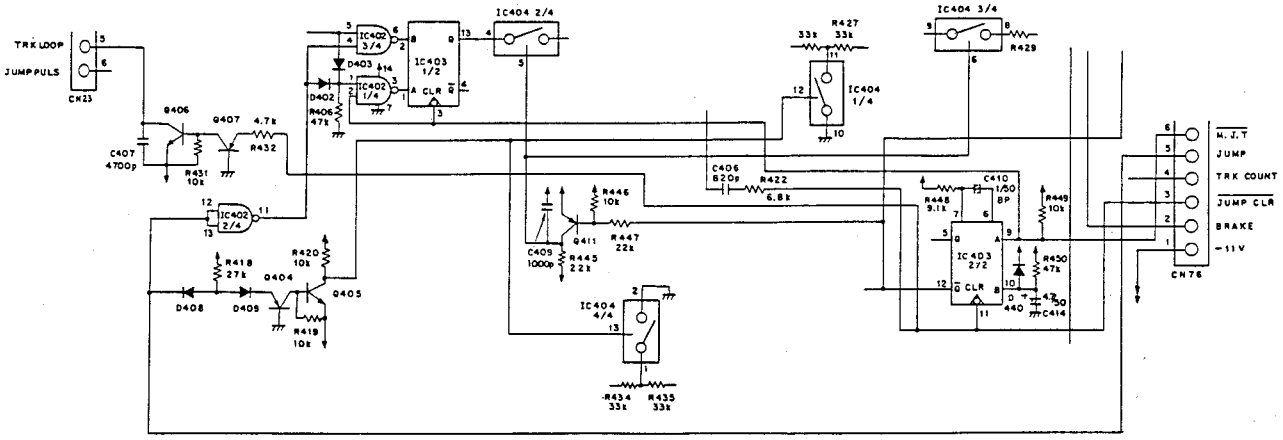


Fig. 5-1 Jump control circuit

2) Track Count Pulse Generator Circuit (Fig. 5-2)

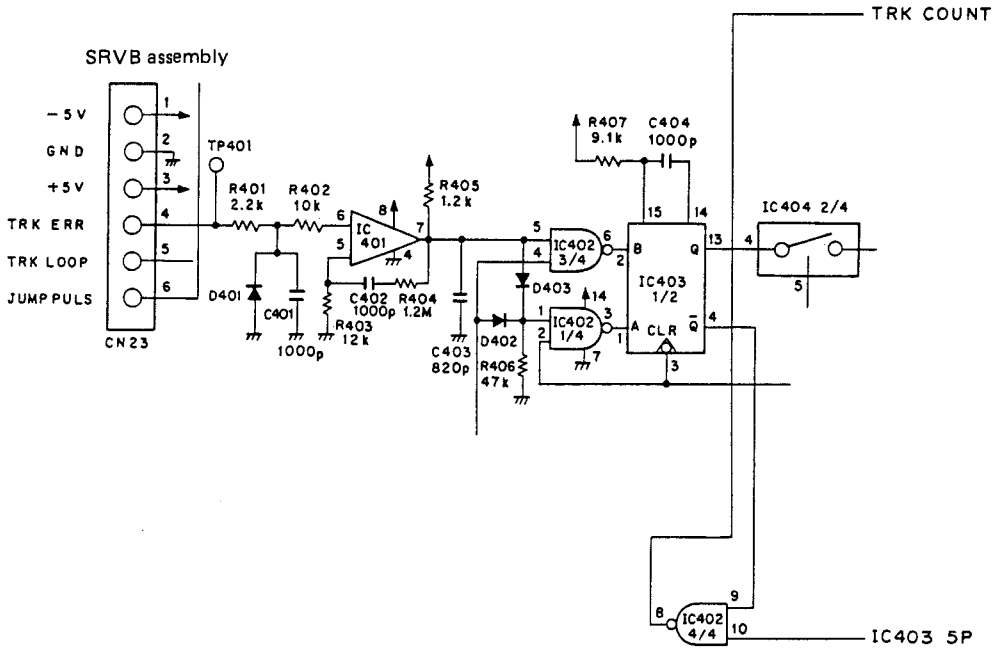


Fig. 5-2 Track count pulse generator circuit

The high band noise in the TRKG error signal output from the SRVB assembly is removed by R401 and C401, after which this signal is input into IC401 6P and the TTL level is converted. D401 is used to clip below -0.6V since IC401 uses one power supply. IC402 11P becomes "L" in the case of a jump in the plus direction; therefore, IC402 (1/4) is delayed and IC403 1P becomes the input. This is because the phase of the TRKG error signal is reversed depending on whether the mirror is moved in the minus or plus direction. Thus, the output of IC403 (1/2) 13P, 4P have the same timing, regardless of whether the mirror is moved in the minus or plus direction.

IC402 (4/4) uses the output of IC403 4P to gate the track count pulse from IC403 4P so that it is sent to the CONT assembly only while multi-track jumping is being executed. The timing chart is shown in Fig. 5-3.

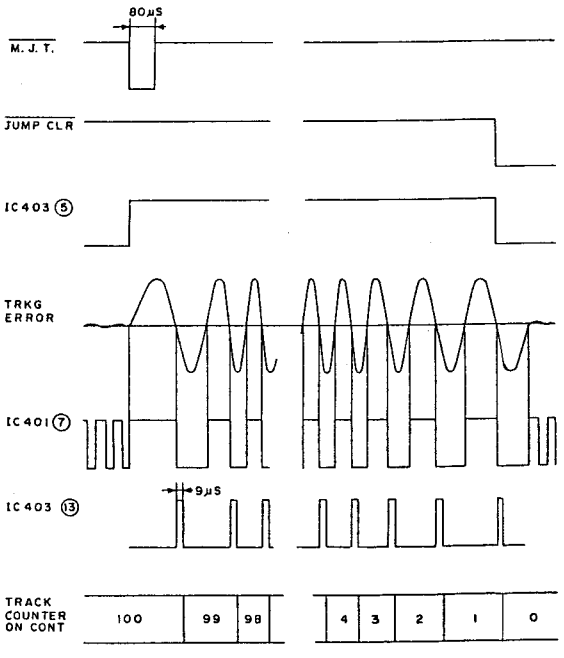


Fig. 5-3 Timing chart

3) Jump Pulse Generator Circuit (Fig. 5-4)

The track count pulse output from IC403 13P passes through Q401 and is level converted to -5V to 0V by Q402. After being level converted, this pulse is differentiated by C405, R410 — R413 to create the pulse used to drive the TRKG mirror. IC405 3P is set to the DC level determined by R410-R413. During braking, this level is lowered by turn ing on Q403 to lower the speed of the mirror.

When the track count pulse interval is increased due to eccentricity, etc., the time required to charge C405 also increases, the level of IC405 3P is raised and the mirror drive force is increased. Consequently, the jumping of one track is completed in a uniform time regardless of the track spacing.

The polarity of the jump pulse is determined by IC405 (2/2) for plus or minus jumps and this pulse is applied to the TRKG loop of the SRVB assembly.

4) Offset Generator Circuit (Fig. 5-5)

Since 100 tracks can be jumped in approximately 4 μS with multi-track jump, a slider servo cannot follow the mirror movement; therefore, when a jump starts, the TRKG error has a constant error DC voltage. The offset generator circuit serves to suppress this voltage.

When $\overline{\text{M.J.T.}}$ arrives and IC403 5P becomes "H", Q409 is turned off, Q408 is turned on, C408 is charged at the time constant determined by R440 and C408, and the potential of IC406 5P is raised. This size of this value depends on the number of jump tracks. The plus or minus direction is next determined by IC406 (1/2) and set to the appropriate level by VR401 and is added to the jump pulse. When the $\overline{\text{JUMP CLR}}$ signal arrives and the jump is completed, Q408 is turned off, Q410 is turned on and C408 discharges.

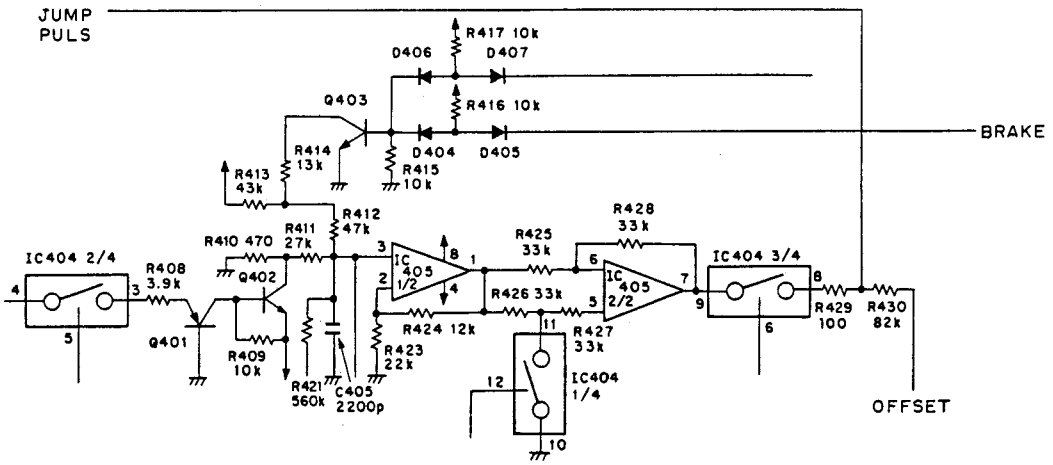


Fig. 5-4 Jump pulse generator circuit

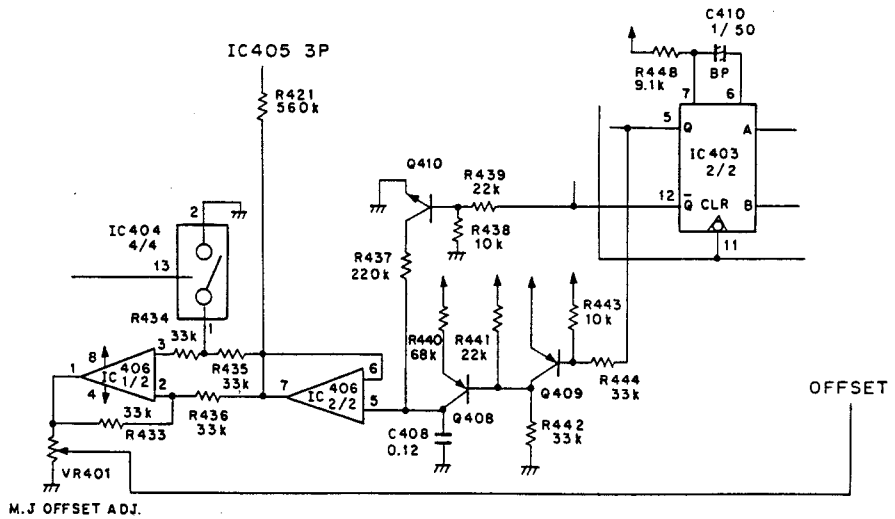


Fig. 5-5 Offset generator circuit