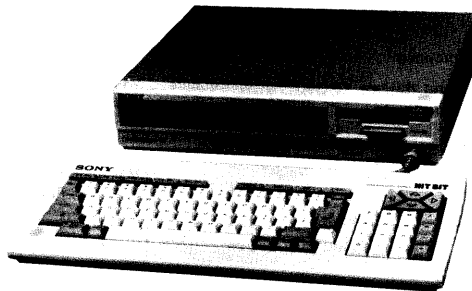


# HB-F700P/F700S/F700F/F700D

## SERVICE MANUAL



HB-F700P:  
*AEP Model*  
HB-F700S:  
*SPAIN Model*  
HB-F700F:  
*FRANCE Model*  
HB-F700D:  
*GERMANY Model*


# HIT BIT

### SPECIFICATIONS


<b>CPU</b>		<b>Keyboard (KBD-12P)</b>	
Processor used	Z80A	Scanning method	Software scanning
Clock frequency	3.58 MHz	Total number of keys	90
WAIT	1 WAIT at CPU M1 cycle		Control keys: 12
Interrupt	Maskable interrupt		Function keys: 5
	Z80A mode 1		Edit keys: 8
Resetting	Automatic at power on/Manual (Memory contents are not maintained.)		Numeric keys: 16
<b>Memory</b>			
ROM	64K bytes (BASIC 48K bytes, Disk BASIC 16K bytes)		
MAIN RAM	256K bytes		
VRAM	128K bytes		
<b>CRT display</b>			
CRT controller	V9938		
Display screen	Character/graphic display and border area Initial state: Screen 0:37 characters x 24 lines		
Character display	Screen 0: Max. 80 characters x 24 lines 16 colors out of 512 colors Screen 1: Max. 32 characters x 24 lines 16 colors out of 512 colors		
Graphic display	Screen 2: 256(horizontal) x 192(vertical) dots 16 colors out of 512 colors Screen 3: 64 x 48 dots 16 colors out of 512 colors Screen 4: 256 x 192 dots 16 colors out of 512 colors Screen 5: 256 x 212 dots, 16 colors out of 512 colors, 4 pages Screen 6: 512 x 212 dots, 4 colors out of 512 colors, 4 pages Screen 7: 512 x 212 dots, 16 colors out of 512 colors, 2 pages Screen 8: 256 x 212 dots, 256 colors, 2 pages		
Border area	16-color display		
Character font	5 x 7 dot matrix/character		

— Continued on page 2 —

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

#### ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.



# HOME COMPUTER

# SONY®

Scanned and converted to PDF by HansO, 2001  
Original by Bas Kornalijnslijper, MCWF

# HB-F700P / F700S / F700F / F700D

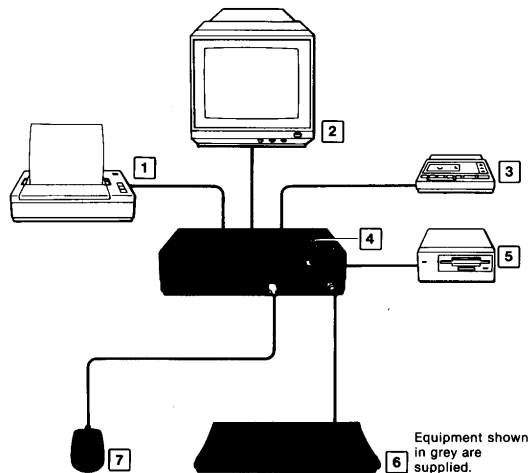
<b>Input/Output</b>		Recording method	MFM (Modified-Frequency Modulation)
RGB output	8-pin DIN RGB video: 0-0.7 V, 75 ohms Audio: -5 dBs (0 dBs = 0.775 V)	Disk rotation speed	300 rpm
AUDIO/VIDEO output	6-pin DIN Composite video: 1 Vp-p, black and white, 75 ohms, sync negative Audio: -5 dBs	Data transfer rate	250K bits/sec
Sound generator	8-octave, 3 tones and 1 noise output	Average latency time	100 msec
Audio cassette interface	8-pin DIN jack Baud rate: 1200/2400 bps Remote control function provided	Access time	Average: 350 msec Between tracks: 12 msec Settling time: 30 msec
Printer interface	14-pin connector TTL level Standard 8-bit parallel transfer	<b>General</b>	
General purpose interface	9-pin connector (2) For connection of mouse, joystick, etc.	Power requirement	240 V AC, 50/60 Hz (HB-F700B) 220 V AC, 50/60 Hz (HB-F700P)
MSX cartridge slot	2	Power consumption	42 W (main unit only)
<b>Disk drive section</b>		Operating conditions	Temperature: 5°C to 35°C (41°F to 95°F) Humidity: 20% to 80%
Disk used	3.5" micro floppydisk	Storage temperature	-15°C to +60°C (5°F to 140°F)
Disk type	Double-sided or single-sided	Dimensions	Main unit: Approx. 355×76×325 mm (w/h/d) (14×3×13 inches)
Recording capacity (double-sided)	Unformatted: 1M bytes Formatted: 720K bytes Bytes/sector: 512 Sectors/track: 9 Tracks/cylinder: 2 Tracks/disk: 160 Bytes/disk: 720K	Weight	Keyboard: Approx. 409×32×183 mm (w/h/d) (16 <sup>1</sup> / <sub>16</sub> ×1 <sup>1</sup> / <sub>4</sub> ×7 <sup>1</sup> / <sub>8</sub> inches)
Recording density	8717 bits/inch		Main unit: Approx. 6.1 kg (13 lb 14 oz), Keyboard: Approx 1.2 kg (2 lb 10 oz)
Track density	135 tracks/inch		
Total no. of cylinders	80 cylinders		
Total no. of tracks	160 tracks		

## SECTION 1 OUTLINE

### 1-1. FEATURES

- Home computer with MSX-BASIC Version 2.0\* incorporated.
- HiBrid disk supplied for easy, visual operation using the mouse instead of the keyboard.
  - Four application programs included.
  - Clock, calculator and calendar available on the same display as the application program.
  - Disk formatting and copying function included.
- Floppydisk drive for quick and easy data processing (4).
- Easy to use free-standing keyboard (6).
- Mouse for operation of the supplied softwares (7).
- Various connectors for up-grading the system:
  - for a printer (1)
  - for a color monitor to create high resolution picture (2)
  - for a second floppydisk drive unit (5)
  - for a tape recorder used as an external memory device (3)

The numbers in the descriptive text are keyed to that in the illustrations.



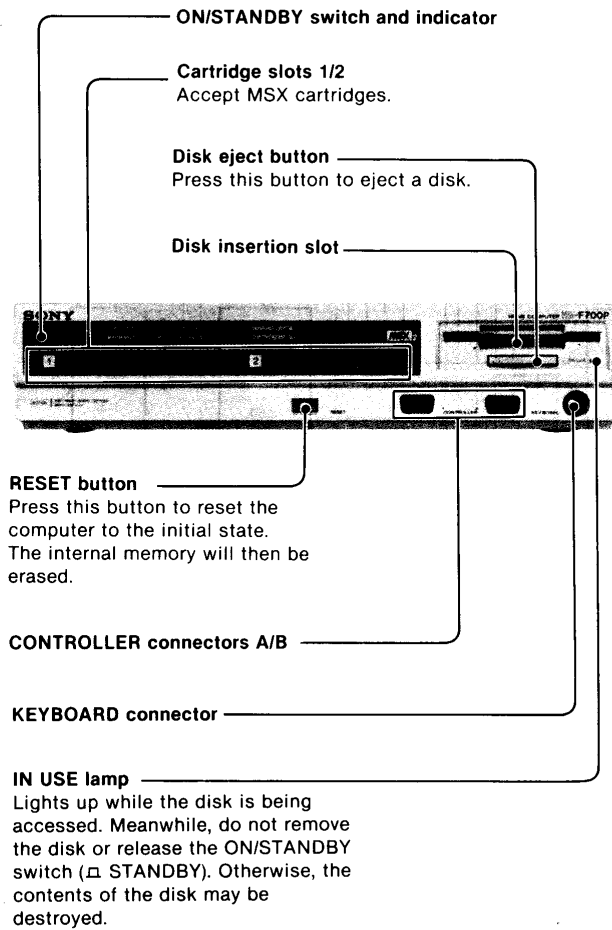
Equipment shown  
in grey are  
supplied.

\* In this manual, MSX-Version 2.0 is referred to as MSX2-BASIC.

# HB-F700P/F700S/F700F/F700D

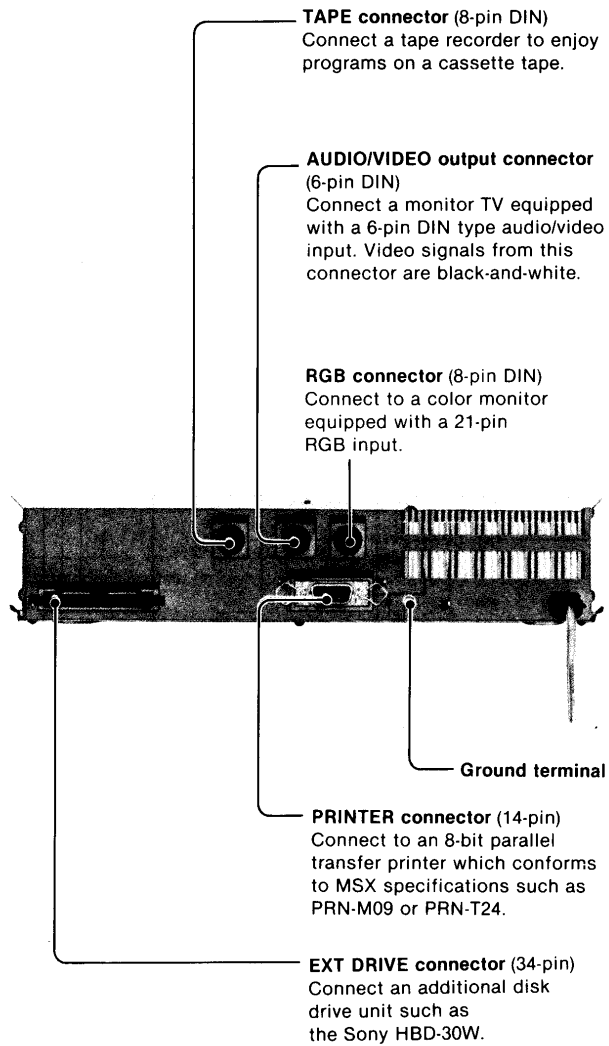
## 1-2. LOCATION AND FUNCTION OF PARTS

### Front panel



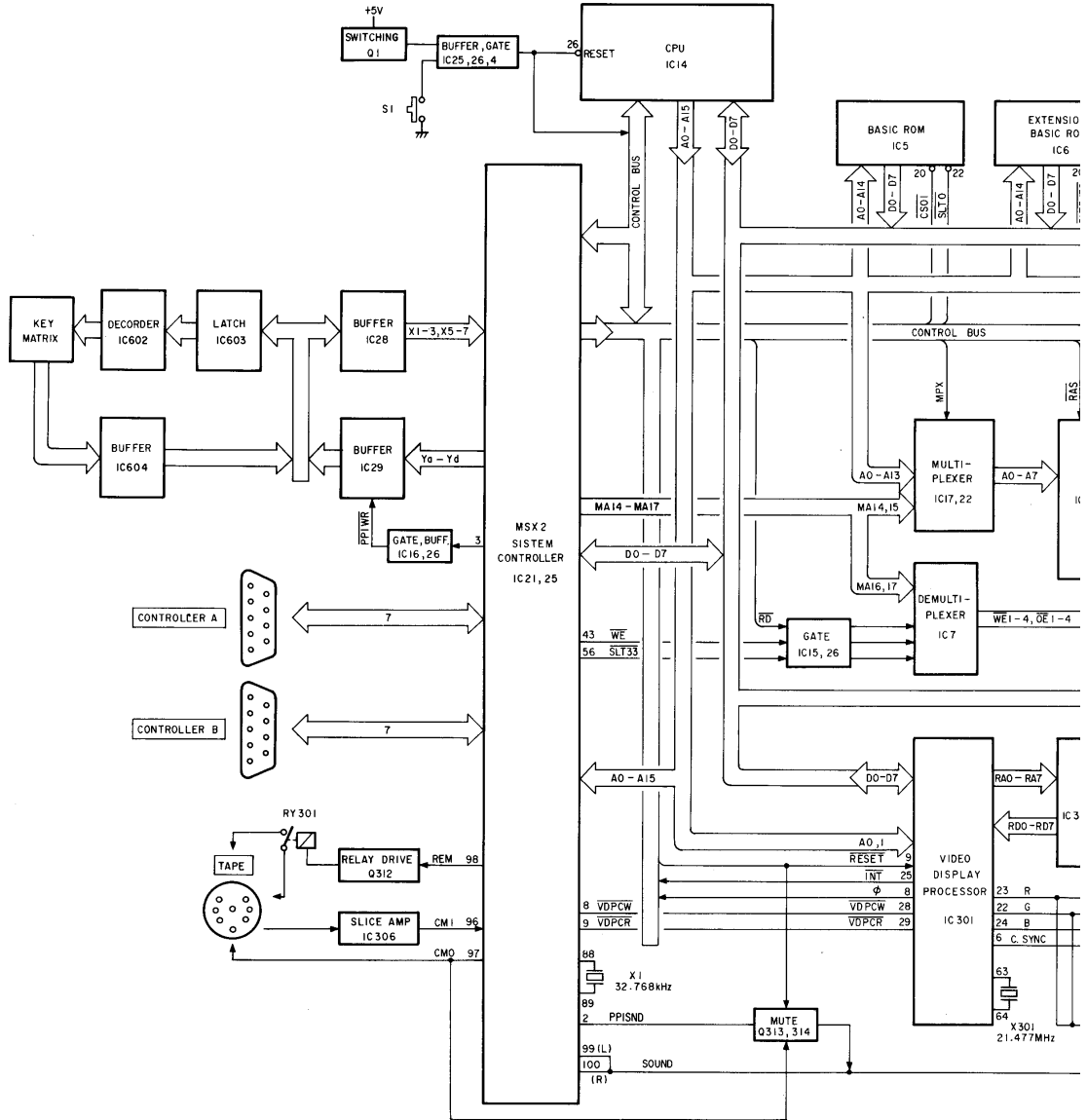
## HB-F700P/F700S/F700F/F700D

### Rear panel

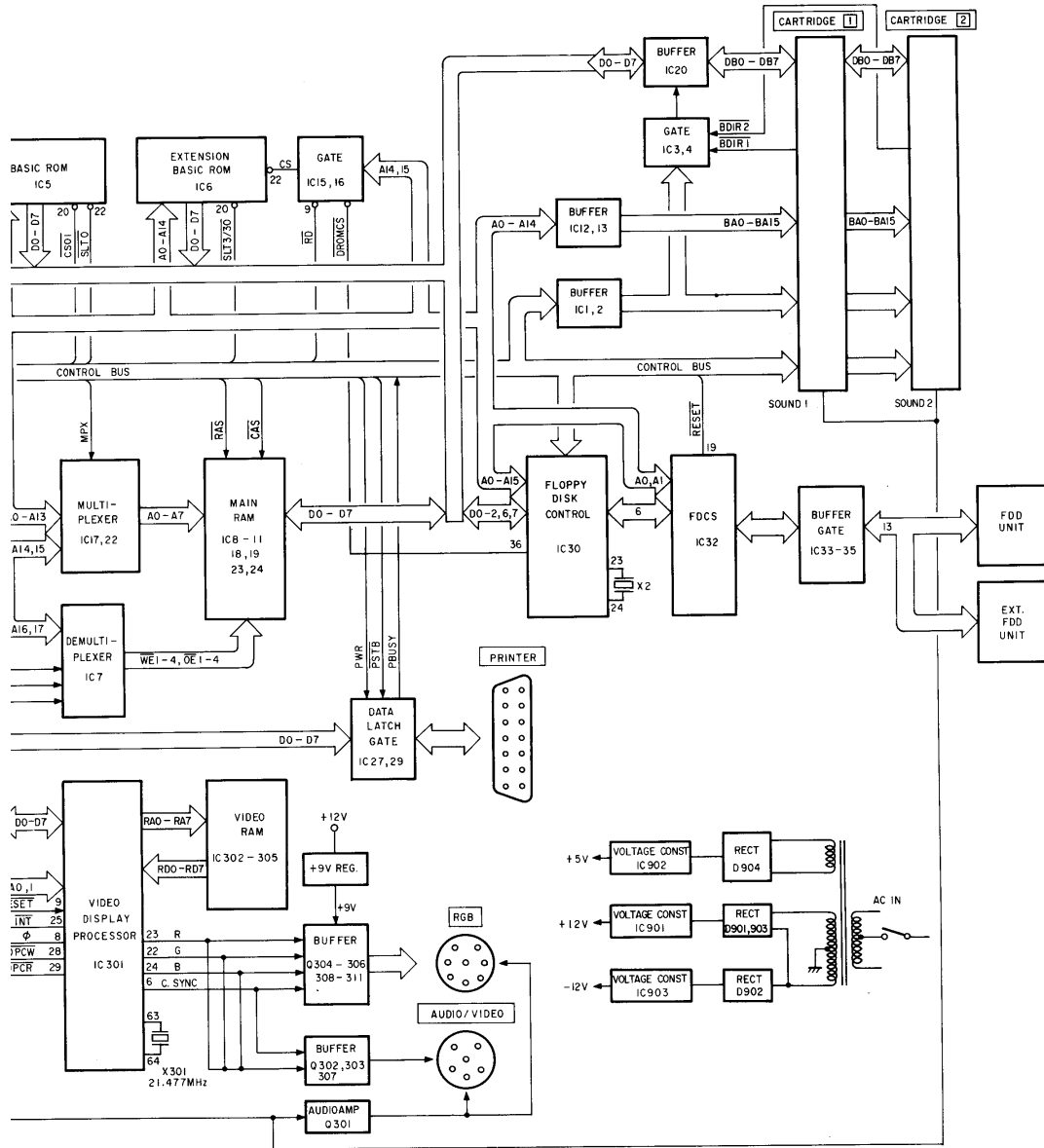




SECTION 2  
BLOCK DIAGRAM

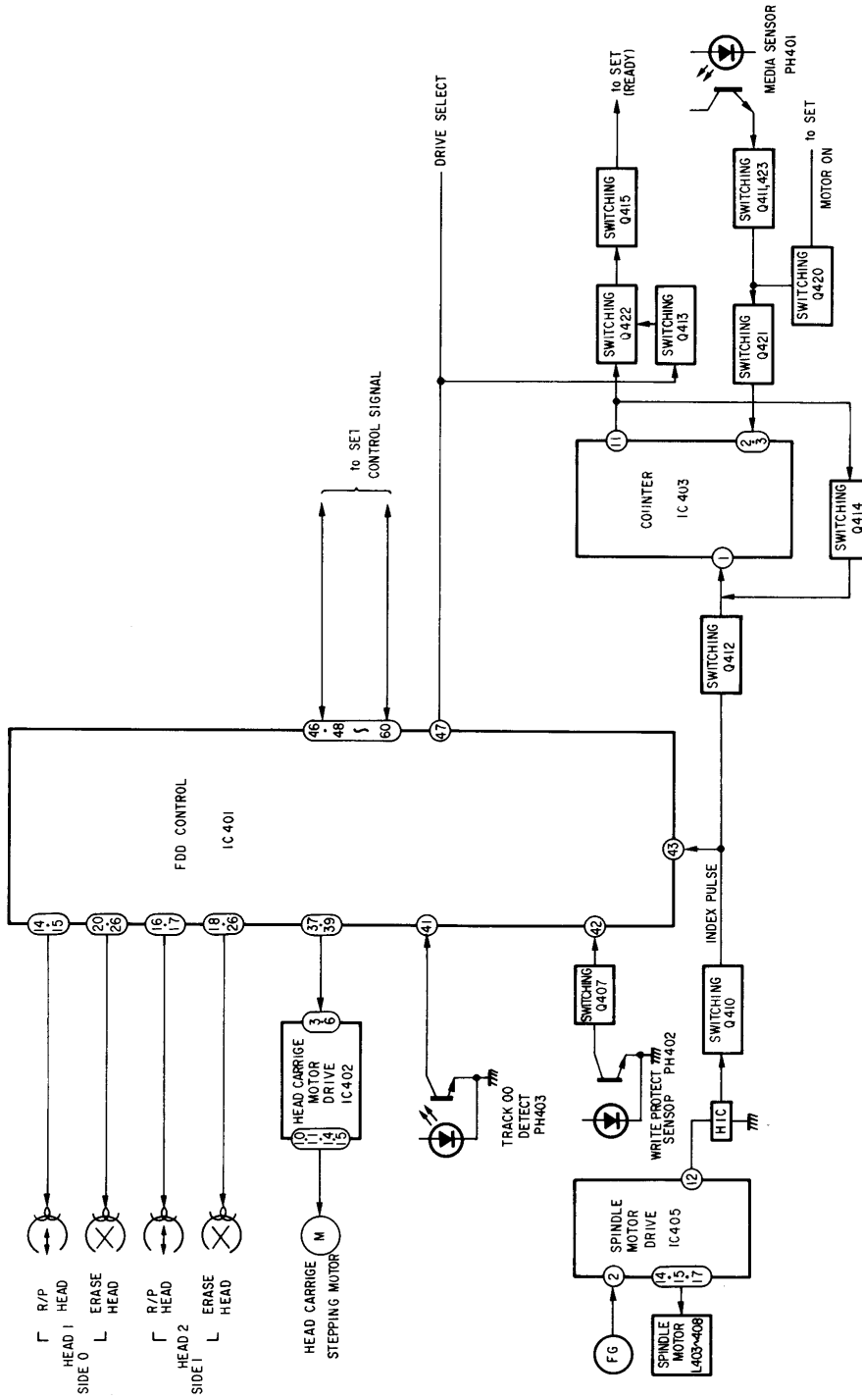


# DD HB-F700P/F700S/F700F/F700D



# HB-F70OP/F70OS/F70OF/F70OD

DRIVE SECTION BLOCK DIAGRAM



# HB-F700P/F700S/F700F/F700D

## SECTION 3 OUTLINE

### S1985

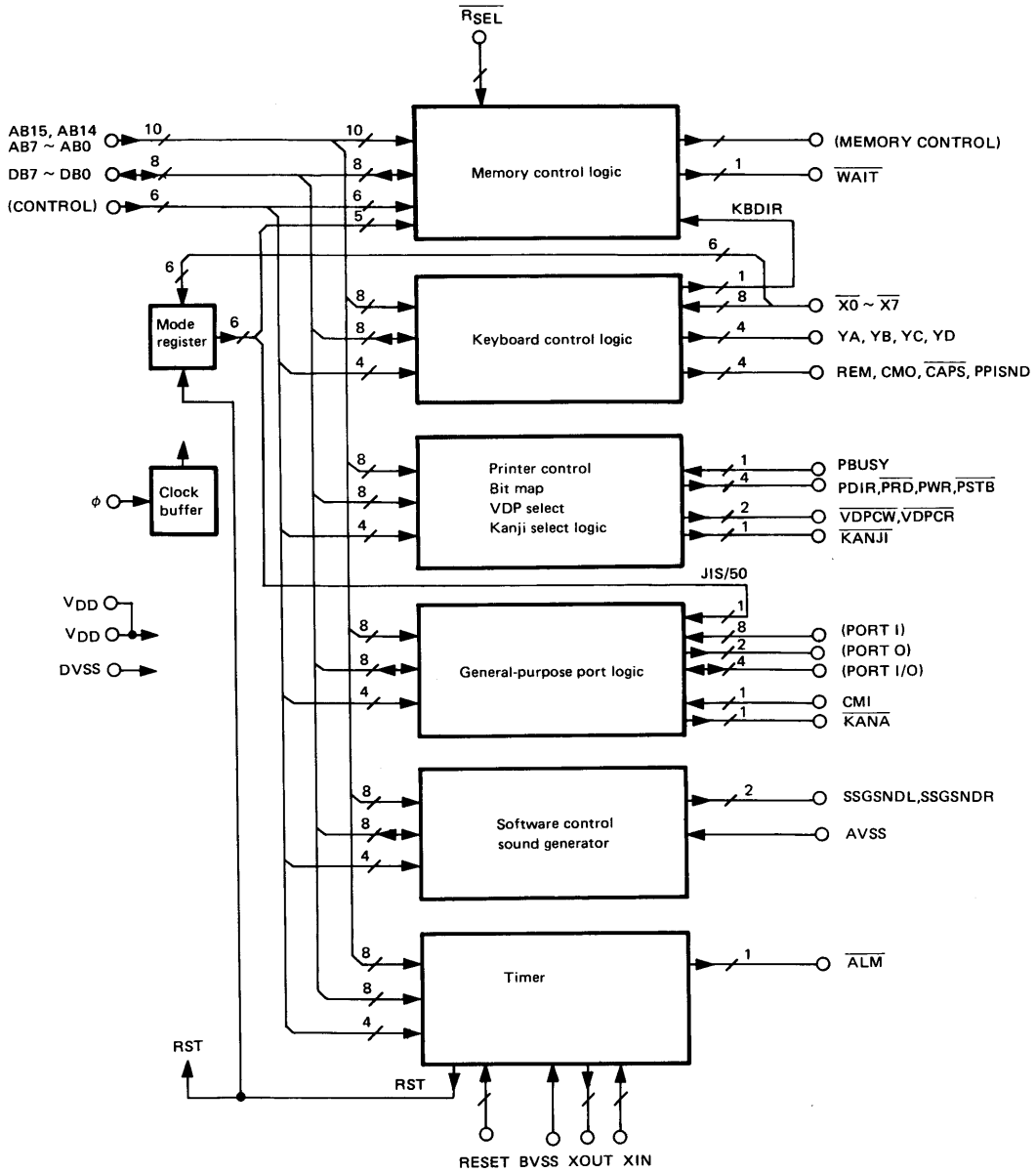
Yamaha S1985 is an LSI developed for the MSX2 computer. The S1985, which can be extended based on the MSX2 specification, is used to control peripherals such as a memory control, VDP, keyboard, and printer. It is also internally provided with a sound signal generator (SSG) to generate a tone signal and a timer.

### PIN FUNCTION

Pin name	I/O	Function	Pin name	I/O	Function
AB15, AB14, AB7-AB0 10 - 19	I	Z80A CPU address bus input (10 bit)	$\overline{X7-X0}$ 73 - 80	I	Keyboard return signal input
DB7-DB0 20 - 27	I/O	Z80A CPU data bus input/output (8-bit)	CAPS 71	O	CAPS LED signal output
$\overline{M1}$ 32	I	Z80A CPU $\overline{M1}$ input	KANA 72	O	KANA LED signal output
$\overline{RFSH}$ 33	I	Z80A CPU $\overline{RFSH}$ input	CMI 96	I	Cassette read signal input
$\overline{MREQ}$ 34	I	Z80A CPU $\overline{MREQ}$ input	CMO 97	O	Cassette write signal output
$\overline{IORQ}$ 35	I	Z80A CPU $\overline{IORQ}$ input	REM 98	O	Cassette control signal output
$\overline{RD}$ 36	I	Z80A CPU $\overline{RD}$ input	PBUSY 95	I	Printer busy signal input
$\overline{WR}$ 37	I	Z80A CPU $\overline{WR}$ input	PSTB 94	O	Printer strobe signal output
$\overline{WAIT}$ 38	O	WAIT signal output to Z80 CPU (wired logic possible)	PWR 93	O	Printer write signal output
MPX 41	O	DRAM address multiplex signal output	PRD 92	O	Printer read signal output
$\overline{RAS}$ 39	O	DRAM $\overline{RAS}$ signal output	PDIR 91	O	Printer direction signal output
$\overline{CAS}$ 42	O	DRAM $\overline{CAS}$ signal output	FWD1, FWD2 57 , 64	I	Joystick FWD signal input (general-purpose port input)
$\overline{WE}$ 43	O	DRAM $\overline{WE}$ signal output	BACK1, BACK2 58 , 65	I	Joystick BACK signal input (general-purpose port input)
$\overline{SLT33}$ 56	O	SLOT #33 select signal output	LEFT1, LEFT2 59 , 66	I	Joystick LEFT signal input (general-purpose port input)
$\overline{SLT32}$ 55	O	SLOT #32 select signal output	RIGHT1, RIGHT2 60 , 67	I	Joystick RIGHT signal input (general-purpose port input)
$\overline{SLT31}$ 54	O	SLOT #31 select signal output	TRGA1, TRGA2 61 , 68	I/O	Joystick TRGA signal input/output (general-purpose port input/output)
$\overline{SLT3/30}$ 53	O	SLOT #3 or SLOT #30 select signal output	TRGB1, TRGB2 62 , 69	I/O	Joystick TRGB signal input/output (general-purpose port input/output)
$\overline{SLT2}$ 52	O	SLOT #2 select signal output	STB1, STB2 63 - 70	O	General-purpose port output
$\overline{SLT1}$ 51	O	SLOT #1 select signal output	$\overline{VDPCW}$ 8	O	VDP write signal output
$\overline{SLT03/CS01}$ 50	O	SLOT #03 select or ROM select 0000H-7FFFH signal output	$\overline{VDPCR}$ 9	O	VDP read signal output
$\overline{SLT02/CS0}$ 49	O	SLOT #02 select or ROM select 0000H-3FFFH signal output	KANJI 29	O	Kanji ROM select signal output
$\overline{SLT01}$ 48	O	SLOT #01 select signal output	RSEL 28	I	Extended slot assigned register control signal input
$\overline{SLT0/00}$ 47	O	SLOT #0 or SLOT #00 select signal output	RESET 85	I	Reset signal input
$\overline{CS2}$ 45	O	ROM select 8000H-BFFFH signal output	PPISND 2	O	PPI sound signal output
$\overline{CS1}$ 44	O	ROM select 4000H-7FFFH signal output	SSGSNDL 99	O	SSG sound LEFT signal output
$\overline{CS12}$ 46	O	ROM select 4000H-BFFFH signal output	SSGSNDR 100	O	SSG sound RIGHT signal output
MA18/KBDIR 3	O	Mapper address or keyboard bus direction signal output	$\phi$ IN 30	I	Clock signal input
MA17-14 4 - 7	O	Mapper address signal output	VDD 40		+5V
YD-YA 81 - 84	O	Keyboard drive signal input	DVSS 31		0V (GND)
			AVSS 1		Sound GND
			XIN 89	I	Input from crystal timer
			XOUT 88	O	Output to crystal timer
			$\overline{ALM}$ 87	O	Alarm signal output
			BVSS 86		Timer backup power supply

# HB-F700P/F700S/F700F/F700D

## BLOCK DIAGRAM



(CONTROL):  $\overline{MI}$ ,  $\overline{RFSH}$ ,  $\overline{MREQ}$ ,  $\overline{IORQ}$ ,  $\overline{RD}$ ,  $\overline{WR}$

(MEMORY CONTROL):  $\overline{RAS}$ ,  $\overline{MPX}$ ,  $\overline{CAS}$ ,  $\overline{WE}$ ,  $\overline{CS1}$ ,  $\overline{CS2}$ ,  $\overline{CS12}$ ,  $\overline{SLT0/00}$ ,  $\overline{SLT01}$ ,  $\overline{SLT02/CS0}$ ,  $\overline{SLT03/CS01}$ ,  $\overline{SLT1}$ ,  $\overline{SLT2}$ ,  $\overline{SLT3/30}$ ,  $\overline{SLT31}$ ,  $\overline{SLT32}$ ,  $\overline{SLT33}$ , MA14, MA15, MA16, MA17, MA18/KBDIR

(PORT I) : FWD1, FWD2, BACK1, BACK2, LEFT1, LEFT2, RIGHT1, RIGHT2

(PORT O) : STB1, STB2

(PORT I/O) : TRGA1, TRGA2, TRGB, TRGB2

# HB-F700P/F700S/F700F/F700D

## FUNCTION DESCRIPTION

### Selecting the Functions

Each function is selected by latching the signal level added to the keyboard return input terminal using a reset signal which is internally loaded during the reset signal input.

### Levels and Functions during Initialization

Pin name	Level	Function
$\overline{X2}$	0	Enters the RAS Only Refresh mode.
	1	Enters the Hydon Refresh mode.
$\overline{X5}$	0	The MA18/KBDIR pin outputs a mapper address signal.
	1	The MA18/KBDIR pin outputs a keyboard bus direction signal.
$\overline{X6}$	0	Kana JIS array
	1	Kana syllabary array
$\overline{X7}$	0	Requests one wait cycle during the VDP read or write operation.
	1	Not request one wait cycle during the VDP read or write operation.
$\overline{X3}$	0	The SLT03/CS01 and SLT02/CS0 pins output a slot select signal.
	1	The SLT03/CS01 and SLT02/CS0 pins output a ROM select signal.
$\overline{X1}$	0	Extends slot 0.
	1	For $\overline{X3} = 1$ , slot 0 is not extended.

### Extended Slot Register

The extended slot register has a set of registers used for slots 0 and 3 which can be extended at the same time. This register outputs inverted data during the read operation.

Since address FFFF is high, the slot can be extended when a NAnDED signal at addresses AB8 through AB13 is input to the RSEL terminal; no extended slot select signal is output during access to address FFFF(H).

Extended slot	Address	R/W	B7	B6	B5	B4	B3	B2	B1	B0
Slot 0	FFFF (8H)	R/W								
Slot 3	FFFF (8H)	R/W								

□
□
□
□  
\*4
\*3
\*2
\*1

\*1 Extended slot designation at addresses 0000 (H) through 3FFF (H)

\*2 Extended slot designation at addresses 4000 (H) through 7FFF (H)

\*3 Extended slot designation at addresses 8000 (H) through BFFF (H)

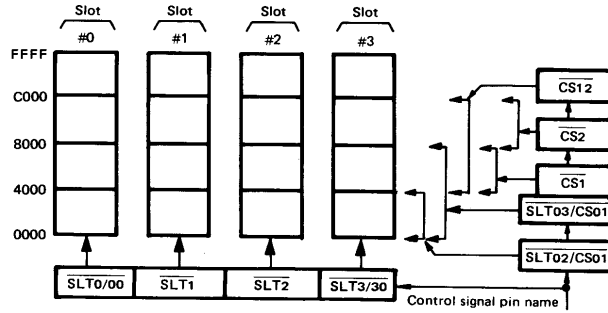
\*4 Extended slot designation at addresses C000 (H) through FFFF (H)

The function for extending each slot is controlled depending on the signal level at X1 and X3 terminals during the reset operation.

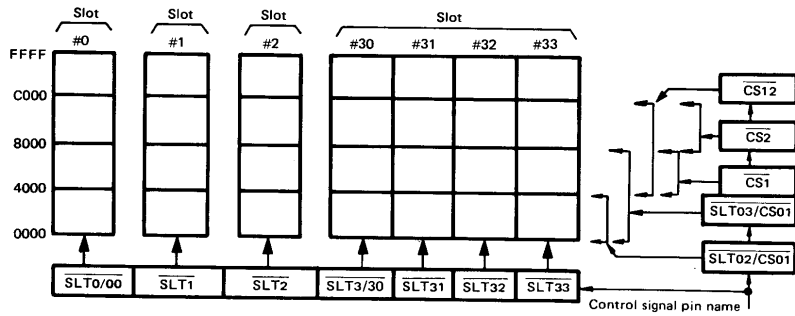
# HB-F700P/F700S/F700F/F700D

## Address Map and Slot Extension

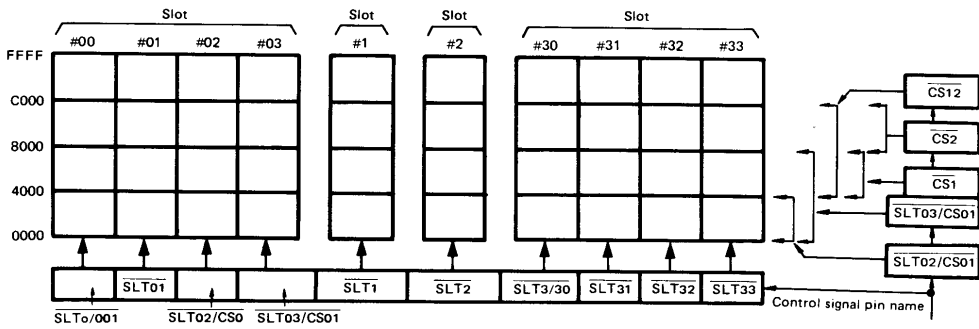
When no slot is extended



When slot 3 is extended



When slots 0 and 3 are extended



# HB-F700P/F700S/F700F/F700D

I/O Address and Function

Function	I/O address	W/R	Description
Backup RAM	40 (H)	W/R	Maker ID number register
	41	W	Backup RAM address latch
	42	W/R	Backup RAM write/read
Bit map	46	W	Foreground/background color write
	47	W/R	Pattern write, foreground/background color read
Printer	90	W/R	Printer strobe write
	91	W/R	Printer status read
	93	W	Printer data write/read Printer bus direction
VDP	98-9F	W	VDP write
	98-9F	R	VDP read
SSG	AB0	W	SSG address latch
	AB1	W	SSG data write
	AB2	R	SSG data read
Keyboard and slot designation	A8	W/R	Slot designated register
	A9	R	Keyboard return signal read
	AA	W/R	Keyboard drive, cassette, PPI sound write/read
	AB3	W	Mode selection
Timer and slot designation	B4	W	Timer and backup RAM address latch
	B5	W/R	Timer and backup RAM data write/read
Kanji	D8, D9	W/R	Kanji write/read
System control	F5	W	System control
Mapper	FC	W/R	Mapper register page 0
	FD	W/R	Mapper register page 1
	FE	W/R	Mapper register page 2
	FF	W/R	Mapper register page 3

Bit Assignment of Keyboard and Slot-Designated Register

Function	Bit	W/R	Description	
Slot-designated register	0	W/R	Slot-designated signal at addresses 0000 (H) through 3FFF (H)	
	1			
	2			
	3			
	4			
	5			
	7			
Keyboard return	0	R	Keyboard return signal	
	1			
	2			
	3			
	4			
	5			
	6			
Keyboard drive register	0	W/R	Keyboard drive signals YA through YD	
	1			
	2			
	3		YD	
	4		Cassette control REM signal	
	5		Cassette write CMO signal	
	6		CAPS signal for CAPS lamp	
7	Sound PPISND signal			
Mode selection	0	W	The level shown on the left allows all of the slot-designated registers and keyboard drive registers to be cleared. This function is the same as that in which ports PA and PC are set to the output position and port PB to the input position in MODE 0 of 8255A.	
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	0			B0
	1			B1
2	B2			
3	B3			
4	0			
5	0			
6	0			
7	0			



# HB-F700P/F700S/F700F/F700D

### Backup RAM (8 bits x 16)

When I/O address 40 (H) is read after ASCII ID number FF (H) is written into I/O address 40 (H), inverted data 01 (H) is obtained. This indicates that the backup RAM (8 bits x 16) and bit map function are ready to be used. When RAM addresses XO (H) through XF (H) are set using low-order four bits of the address data in I/O address 40 (H), data can be written or read using I/O address 42 (H).

### Bit Map Function

As described above, after I/O address 40 (H) is accessed, data is written into I/O address 46 (H) two times (or more), then written into I/O address 47 (H). When I/O address 47 (H) is read, the last data written into I/O address 47 (H) is obtained if bit 7 of data written into I/O address 47 (H) is "0", and the preceding data last written into I/O address 46 (H) is obtained if bit 7 is "1". After that, data written into I/O address 47 (H) is shifted by one bit to the high-order digit, and data of bit 7 is shifted to bit 0. Therefore, data can be obtained in accordance with the data level acquired every time I/O address 47 (H) is read.

### Printer

**PBUSY:** When a signal is input to the PBUSY pin for read operation, the same signal level as that input to B1 is output.

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0	
90 (H)	R	X								X

**PSTB:** When data is written as B0=0, the  $\overline{\text{PSTB}}$  pin becomes "0" when the WR signal is returned to "1". After that, when data is written as B0=1, the  $\overline{\text{PSTB}}$  pin is not returned to "1".

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0	
90 (H)	W	X								

**PWR:** If data is written when the PDIR pin is "1" (in the output state), a positive PWR signal corresponding to the  $\overline{\text{WR}}$  signal's pulse width is output to the PWR pin. When this PWR signal is returned to "0", the external circuit latches and outputs the data. When the PDIR pin is "0" (in the input state), the PWR pin remains "1". When the PDIR pin is returned again to the output state, the PWR pin remains unchanged. After I/O address 91 (H) is accessed, the PWR pin becomes "0".

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0
91 (H)	W	Data							

**PRD:** If data is read when the PDIR pin is "0" (in the input state), a negative PRD signal corresponding to the  $\overline{\text{RD}}$  signal's pulse width is output to the PRD pin. Using this PRD signal, the external gate is opened and data can be read.

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0
91 (H)	R	Data							

# HB-F700P/F700S/F700F/F700D

**PDIR:** When data is written as B1=0 and B0=1, "1" is continuously output from the PDIR pin. MSX then enters the output state. When data is written as B1=0 and B0=1, "0" is continuously output from the PDIR pin. MSX then enters the input state.

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0	
93 (H)	W	X						1	1	*1
								1	0	*2
								0	1	*3
								0	0	*4

- \*1 Output state or  $\overline{\text{PRST}}$  canceled
- \*2 Input state or  $\overline{\text{PRST}}$  canceled
- \*3  $\overline{\text{PRST}}$  output
- \*4  $\overline{\text{PRST}}$  canceled

The  $\overline{\text{PRST}}$  signal can be generated using an external circuit.

When data is written as B1=0 and B0=1 during the reset operation, "0" is continuously output from the PRD pin and "1" from the PDIR pin. The  $\overline{\text{PRST}}$  signal is produced using the resultant two signals. When data is set to and written into the level other than B1=0 and B0=1, the  $\overline{\text{PRST}}$  signal is canceled.

## Mapper

I/O addresses FC (H) through FF (H) have mapper register pages 0 through 3. Their effective number of bits is five (B4 through B0) which correspond to mapper addresses MA18 through MA14. Mapper register pages 0 through 3 are selected using addresses AB15 and AB14, and the resultant content is output as an address.

For a 512k-byte RAM using mapper addresses MA18 through MA14, the 16k-byte area obtained by dividing the 512k-byte capacity which the mapper register content indicates is selectively accessed using addresses AB15 and AB14 by 32. As a result, the function appears if the address is extended.

I/O address	R/W	B7	B6	B5	B4	B3	B2	B1	B0	Register	AB15	AB14
FC (H)	R/W	X								Mapper register page 0	0	0
FD	R/W	X								Mapper register page 1	0	1
FE	R/W	X								Mapper register page 2	1	0
FF	R/W	X								Mapper register page 3	1	1

Mapper address	MA18	MA17	MA16	MA15	MA14

## Keyboard Bus Direction

When data is written into I/O addresses AA (H) and AB (H), the keyboard bus direction signal is output at a period of one and a half cycles at the completion of the I/O cycle. This reduces the number of signal lines between the keyboard and main system.

## SSG and General-Purpose Port

The SSG is controlled using 14 registers which are capable of reading or writing (the registers can be read without being influenced by sound).

Sound is generated by the following: an 8-octave, 3-sequence rectangular wave generator; a one-sequence pseudo random noise generator; an envelope generator for 5-bit single attenuation and repeated attenuation; a volume controller; a mixer for mixing music and noise; and a 5-bit DA converter. The general-purpose port consists of output and input port portions through a register which is capable of reading or writing.

# HB-F700P/F700S/F700F/F700D

## Register Array

When high-order bits DB7 through DB4 of 8-bit address data are "0 (H)", low-order bits DB3 through DB0 select 15 registers. The address data which has been loaded is held until the next address is loaded and is not influenced by the data write/read operation.

The register array is shown in the table below.

**Register Array Table**

Reg- ister	Ad- dress (H)	Function	Bit								
			B7	B6	B5	B4	B3	B2	B1	B0	
R0	00	Frequency of channel A	Fine adjustment of 8-bit tone								
R1	01		X				Coarse adjustment of 4-bit tone				
R2	02	Frequency of channel B	Fine adjustment of 8-bit tone								
R3	03		X				Coarse adjustment of 4-bit tone				
R4	04	Frequency of channel C	Fine adjustment of 8-bit tone								
R5	05		X				Coarse adjustment of 4-bit tone				
R6	06	Noise frequency Setting emixer and general port	5-bit noise frequency								
R7	07		* Port	Noise			Tone				
			"1"	"0"	C	B	A	C	B	A	
R8	08	Volume of channel A	X				M	L3	L2	L1	L0
R9	09	Volume of channel B	X				M'	L3	L2	L1	L0
RA	0A	Volume of channel C	X				M	L3	L2	L1	L0
RB	0B	Envelope frequency	8-bit fine adjustment								
RC	0C		8-bit coarse adjustment								
RD	0D	Envelope shape	X				CONT ATT ALTHOLD				
X	0E	General input port data	See the general port bit assignment table.								
X	0F	General output port data									

\* The port of register R7 should always be set to the level shown in the table.

## General-Purpose Port

The input and output ports are controlled by output port data holding register RF which is operated at address 0E (H) (input) and address 0F (H) (output). The relationship between the bits and input/output pins is shown in the general-purpose port bit assignment table.

**GENERAL-PURPOSE PORT BIT ASSIGNMENT TABLE**

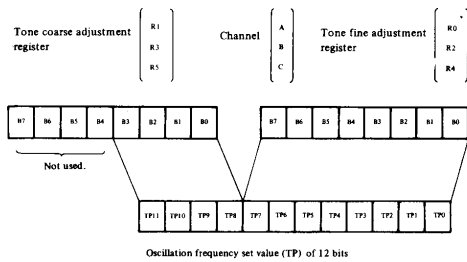
Port	Bit	I/O	Pin name connected	
Input	B0	I	FWD1 or FWD2 BACK 1 or BACK 2 LEFT1 or LEFT2 RIGHT1 or RIGHT2 TRGA1 or TRGA2 JIS/50 CM1	FWD1 and FWD2 are selected using B6 at the output port. For B6="1",
	B1			
	B2			
	B3			
	B4			
	B6			
	B7			
Output	B0	O	TRGA1 TRGB1 TRGA2 TRGB2 STB1 STB2 Input select of input ports B0 through B5 (not output externally)	
	B1			
	B2			
	B3			
	B4			
	B5			
	B6			
	B7			

# HB-F700P/F700S/F700F/F700D

## Setting the Tone Frequency (controlled using registers R0 through R5)

The rectangular wave frequency produced by a 3-sequence tone generator in channels A, B, and C is set using registers R0 through R5. R0 and R1 control channel A, R2 and R3 channel B, and R4 and R5 channel C. Oscillation frequency FT is determined by register value TP (decimal) as shown below. In this case, Fφ indicates the clock frequency.

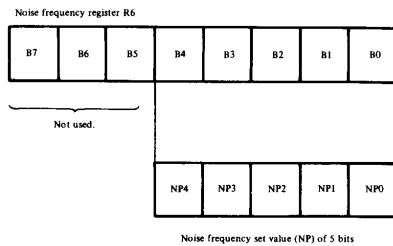
$$FT = \frac{F\phi}{32TP}$$



## Setting the Noise Frequency (controlled by register R6)

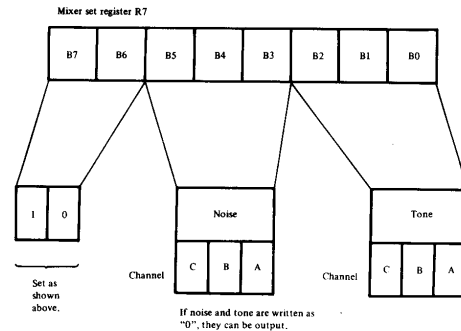
Noise frequency FN is determined by register value NP (decimal) as shown below. In this case, Fφ indicates the clock frequency.

$$FN = \frac{F\phi}{32NP}$$



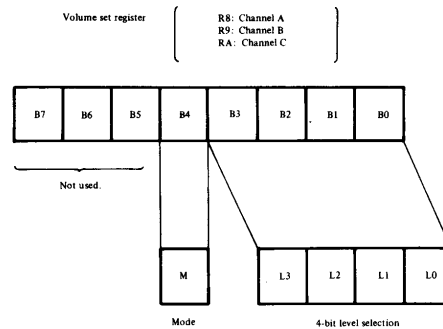
## Setting the Mixer (controlled by register R7)

The mixer is used to mix a tone and noise. Mixing is determined by bits B5 through B0 of register R7. If "0" is written into the register, sound is output. Therefore, if both noise and tone are written as "0", they are mixed and output. If either noise or tone is written as "0", only the sound written as "0" is output. If both noise and tone are written as "1", they are not output.



## Volume Control (controlled by registers R8 through RA)

The volume in channels A, B, and C is controlled using registers R8 through RA. Whether the volume is fixed (M=0) or changed (M=1) is selected in mode M. For M=0, one of the 16 combined levels is selected using 4-bit level select signals L3, L2, L1, and L0 to generate a sound. To change the volume, change select signals L3, L2, L1, and L0. For M=1, the volume is controlled using 5-bit signals E4, E3, E2, E1, and E0 which are produced by an internal envelope generator. In this case, signals E4, E3, E2, E1, and E0 are changed with the lapse of time, so the volume is also changed.

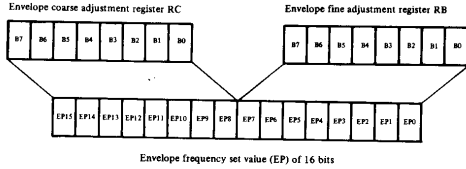


# HB-F700P/F700S/F700F/F700D

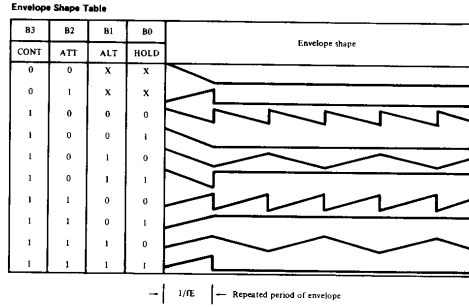
## Setting the Envelope Frequency (controlled by registers RB and RC)

Envelope repeated frequency FE is determined by envelope frequency set value EP (decimal) as shown below. In this case,  $F\phi$  indicates the clock frequency.

$$FE = \frac{F\phi}{512EP}$$

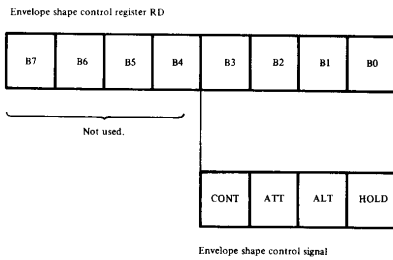


Using the CONT, ATT, ALT, and HOLD signals, the envelope has various shapes as shown below.



## Envelope Shape Control (controlled by register RD)

The envelope level is determined by a 5-bit (L4, L3, L2, L1, and L0) envelope generator. The envelope shape is produced by incrementing or decrementing the count of the envelope generator and by stopping or repeating it at one cycle. The resultant shape is controlled by bits B3 through B0 of register RD.



## Sound Outputs (SSGSNDL, SSGSNDR)

Among the 3-sequence tone signals in channels A, B, and C which are generated by data set in each register, channel B outputs the tone signal to the SSGSNDL pin and channel C outputs it to the SSGSNDR pin. Channel A outputs the tone signal to the SSGSNDL and SSGSNDR pins for mixing. As described above, the sound output is used as a stereophonic output with the outputs in the right and left channels. It can also be used as a monaural output by strapping between the SSGSNDL and SSGSNDR pins.

## Timer and RAM (4 bits x 26)

The timer block consists of a counter in the next stage of the crystal oscillation circuit; a timer counter indicating seconds, minutes, hours, day of the week, days, month, and year; and an alarm register for minutes, hours, day of the week, and day. Setting or reading the time, calendar timer data, or alarm data is controlled through a mode register. All data can be backed up. The RAM (4 bits x 26) block can also be backed up as in the timer block.

# HB-F700P/F700S/F700F/F700D

## Address Assignment and Initial Condition of Each Counter and Register

If the high-order 4-bits of 8-bit address data are set to any value, the function is selected by the four modes which are indicated using the low-order 4-bits (DB3 through DB0) and address XD (H) mode registers M1 and M0. Addresses X0 (H) through XC (H) can be read and written. Addresses XD (H) through XF (H) can be written only irrespective of their mode state.

Counters and registers have no fixed value during the power-on sequence.

## Address Assignment and Function

Mode	0				1				2	3		
	Function	B3	B2	B1	B0	Function	B3	B2			B1	B0
x 0	1 sec counter											
x 1	10 sec counter	X										
x 2	1 min counter					1 min alarm register						
x 3	10 min counter	X				10 min alarm register		X				
x 4	1 hr counter					1 hr alarm register						
x 5	10 hr counter	X				10 hr alarm register		X			RAM	RAM
x 6	Week counter	X				Week alarm register		X			4 bits x 13	4 bits x 13
x 7	1 day counter					1 day alarm register						
x 8	10 day counter	X				10 day alarm register		X				
x 9	1 month counter											
x A	10 month counter	X				12/24 hr selector		X				
x B	1 year counter					Leap year counter		X				
x C	10 year counter											

Address (H)	Function	Bit			
		B3	B2	B1	B0
X D	Mode register	Timer EN	Alarm EN	Mode	
				M1	Mo
X E	Test register	Test			
		T3	T2	T1	T0
X F	Reset controller 16.1Hz register	1Hz ON	16Hz ON		Alarm

**Note:** The week counter counts from 0 to 6 with the relationship with respect to the day of the week defined voluntarily.

## Mode Setting and Alarm and Timer EN Functions (Address XD (H))

The 4-bit mode register consists of mode selectors M1 and M2, timer EN, and alarm EN. The function is as shown in the table below.

Mode	M1	M0	Description
0	0	0	Enables setting and reading of the time and calendar.
1	0	1	Enables setting and reading of the alarm, 12/24 hour, and leap year.
2	1	0	Enables writing and reading of the RAM (4 bits x 13).
3	1	1	Enables writing and reading of the RAM (4 bits x 13).

Function	Level	Description
Alarm EN	0	No alarm signal is output to the AML pin.
	1	An alarm signal is ready to be output to the AML pin.
Timer EN	0	Stops the counter operation after second.
	1	Starts counting.

## Reset Controller Function and 16Hz/1Hz Register Setting (Address XF (H))

The alarm and time RESET functions are activated during the write operation, and they have no register.

The 16Hz ON and 1Hz ON functions provided with registers are shown below.

Function	Level	Description
Alarm RESET	1	All the alarm registers are reset during the write operation.
Time RESET	1	The counter operation before second is reset during the write operation.
16Hz ON	0	A 16Hz signal is output to the ALM pin.
1Hz ON	0	A 1Hz signal is output to the ALM pin.

**Test Register (Address x E (H))**

The test register consists of T3 through T0. The register is used for testing (except test 0). To activate the timer for the first time, therefore, set each bit to 0 to obtain test 0.

Test	T3	T2	T1	T0	Description
0	0	0	0	0	Activated as a timer.
1	0	0	0	1	Enters the test 1 state.
2	0	0	1	0	Enters the test 2 state.
3	0	0	1	1	Enters the test 3 state. Output to the ALM pin.
4	0	1	0	0	Enters the test 4 state.
8	1	0	0	0	Enters the test 8 state.

**Setting the 12/24-Hour Selector (Mode 1, Address XA (H))**

Whether a 12-hour timer or 24-hour timer is set when the level shown in the table below is written into this register can be determined. The timer should be set after this setting.

Function	Level	Description
12/24-hour selector	0	Activated as a 12-hour timer. In this case, the 10-hour counter and alarm register B1 indicate AM and PM. For B1=0, it indicates AM. For B1=1, it indicates PM.
	1	Activated as a 24-hour timer.

**Setting the Leap Year Counter (Mode 1, Address XB(H))**

When the level shown in the table below is set in this counter, the counter corresponds to a leap year. The time and calendar should be set after this setting. This counter is also counted up simultaneously with a year counter.

Function	B1	B0	Description
Leap year counter	0	0	Activated as a leap year this year.
	0	1	Activated as a leap year three years later.
	1	0	Activated as a leap year two years later.
	1	1	Activated as a leap year next year.

**Setting and Reading the Time and Calendar (Mode 0, Addresses X0 (H) through XC (H))**

The timer counter is set by setting the address and writing a valid value into the required bits as time and calendar timer data, in accordance with the address assignment and function table. During the read operation, the timer data can also be obtained by setting and reading the address. Invalid bit levels are always set to "0".

**Setting and Reading the Alarm (Model 1, Addresses X2 (H) through X8 (H))**



The alarm register is set by setting the address and writing a valid value into the required bits as time and calendar alarm, in accordance with the address assignment and function table. During the read operation, data in the alarm register can also be obtained by setting and reading the address.

When the alarm register indicating minutes, hours, day of the week, day, and year coincides with those of the timer counter (the alarm EN register is in the output enable state), level "0" is output to the ALM pin.

When the alarm register is reset using an alarm RESET bit, the consequent written alarm register data coincides with the timer counter. Assume that the alarm register data which has not been written has already coincided with the timer counter. The alarm register data is output to the ALM pin. Therefore, the output level at the ALM pin is "0" at all times while the alarm register is reset using the alarm RESET bit.

# HB-F70OP/F70OS/F70OF/F70OD

Pin Function Description (M51017AP)

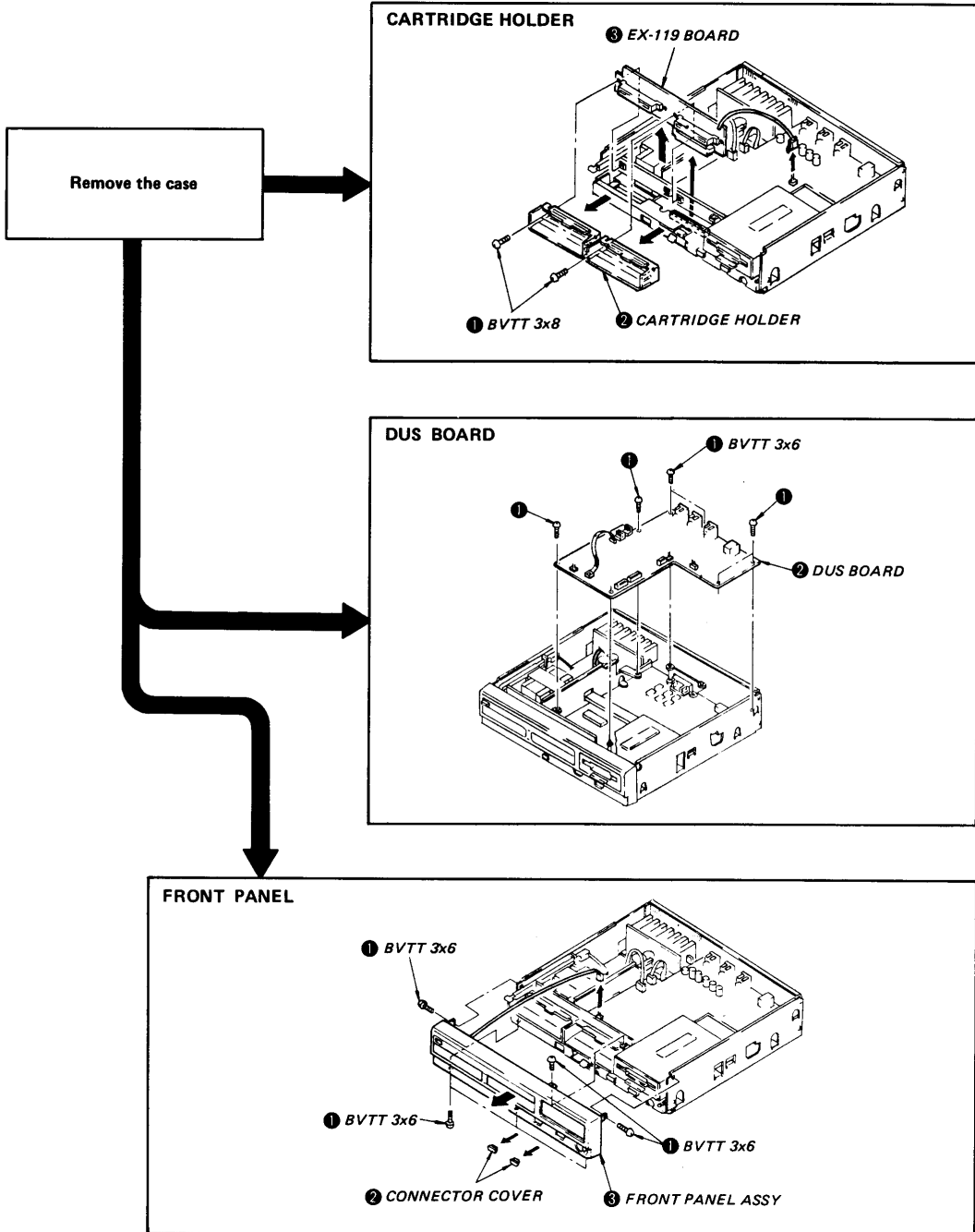
Pin No.	Name	Function	Pin No.	Name	Function
Common block			44	INUSE	Goes "L" when DRIVE SELECT (at pin 47) is "L".
13	VCC	5V power supply	46	INDEX	Goes "L" when TRACK 0 SENSOR input (at pin 41) is "H" and stepping motor drive pulse outputs A and B (at pins 39 and 37) are "H".
19	VBB	12V power supply			
21 - 25	GND	Ground (analog)	57	TRACK 0	Goes "L" when TRACK 0 SENSOR input (at pin 41) is "H" and stepping motor drive pulse outputs A and B (at pins 39 and 37) are "H".
51 - 55	GND	Ground (digital)			
18	CT0	Supplies write and erase currents during the write operation.	58	WR PROTECT	Goes "L" when EPT SENSOR input (at pin 42) is "L".
20	CT1				
14, 15	HEAD1	Inputs current from the head during the read operation and receives it from the head during the write operation.	59	RD DATA	Read data output pin. Output is blocked during the write/erase operation.
16, 17	HEAD0				
Read circuit			36	VOLTAGE CONTROL	Output pin to control the high-voltage (12V) circuit for driving a stepping motor. Goes "L" when M/M-5 output is "H" or RESET input (at pin 35) is "L".
12, 13	OFFSET DECOUPLING (GAIN ADJ)	Connect capacity with a voltage gain of 49dB.			
10, 11	AMPLIFIER OUTPUT	Differential output pin of preamplifier	Totem pole output		
8, 9	ACTIVE DIFFERENTIATOR INPUT	Differentiator input pin	40	STEPPER DRIVE PULSE	A Generates a 2-phase exciting drive pulse. Generates a 1 step/1 pulse when STEP SWITCH input (at pin 30) is "L" and generates a 1 step/2 pulse when it is "H".
			39		
38					
37					
6, 7	DIFFERENTIATOR COMPONENT	Determines the differential characteristics and externally adjusts the peak shift.	Schmidt input		
4, 5	M/M COMPONENT	Sets the timer constant of a monostable multivibrator to prevent read data from the erroneous output.	47	DRIVE SELECT	Indicates the select state of a drive unit. Selected during "L".
2, 3	M/M COMPONENT	Sets the timer constant of a monostable multivibrator to determine the output pulse width of read data.	48	DIRECTION	Input pin to designate the head moving direction. The head moves in the center direction when the pin is "L". It moves in the outer circumference direction when "H".
Write circuit					
27	WRITE CURRENT ADJ	Sets the write current.	49	STEP	Input pin to generate a pulse for moving the head. Input is blocked during the write operation.
26	Erase	Receives the erase current. Set using an external resistor.	50	WR DATA	Recording data input pin.
Monostable multivibrator			56	WR GATE	Recording becomes valid during the "L" input.
28	M/M-1	Sets the operation start timing of an erase circuit. WR GATE (at pin 56) is activated at trailing edge (  ).	60	SIDE 1	Side select input pin. Selects side 1 when "L" and side 0 when "H". Input is blocked during the write/erase operation.
29	M/M-2	Sets the operation stop timing of an erase circuit. WR GATE is activated at the leading edge. (  ).	43	INDEX SENSOR	Indicates the disk rotation state and senses input every rotation. INDEX (at pin 46) goes "L" when "H".
31	M/M-3	Outputs 2 pulses from 1-step pulse input to trigger M/M-4.	42	FPT SENSOR	Input pin to determine the disk recording capacity. WR PROTECT (at pin 58) goes "L" when "L".
32	M/M-4	Triggered using M/M-3. Output 2 pulses from 1-step pulse input.	41	TRACK 0 SENSOR	TRACK 0 SENSOR input pin. TRACK 0 (at pin 57) goes "L" when "H".
34	M/M-5	Sets the time for controlling the high-voltage (12V) circuit to drive a stepping motor.	Input		
Open collector output			35	RESET	POWER ON RESET input pin. Initializes each monostable multivibrator and flop-flop when "L".
			30	STEP SW	Input pin to select a 1 step/1 pulse and 1 step/2 pulse.



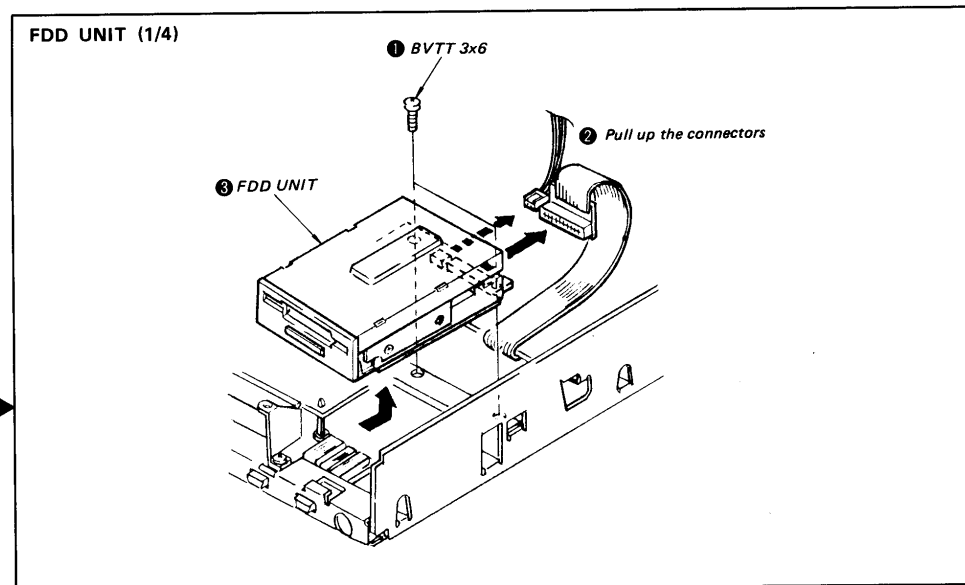
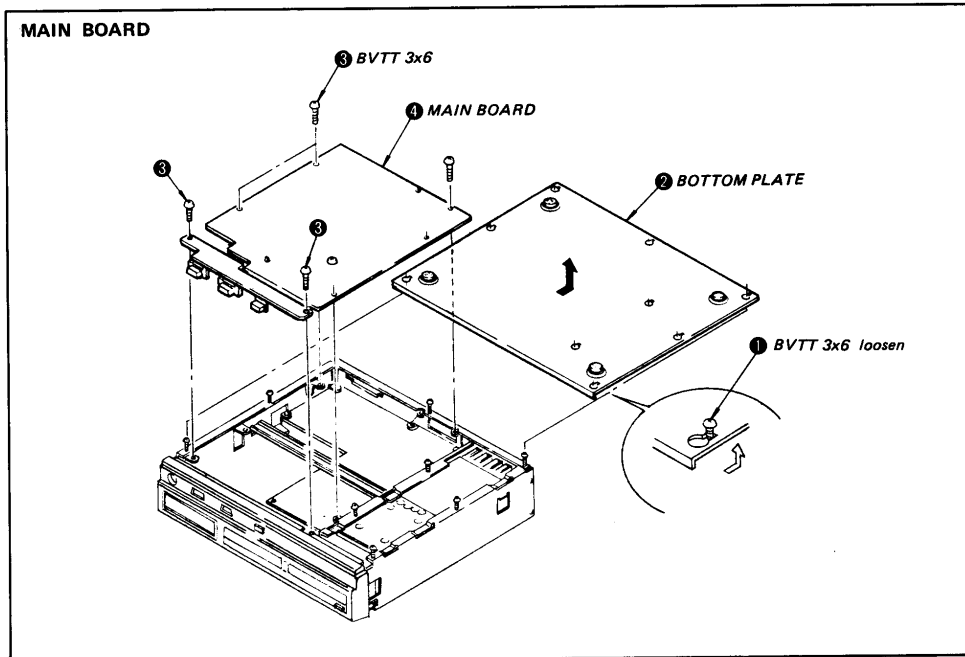
# HB-F700P/F700S/F700F/F700D

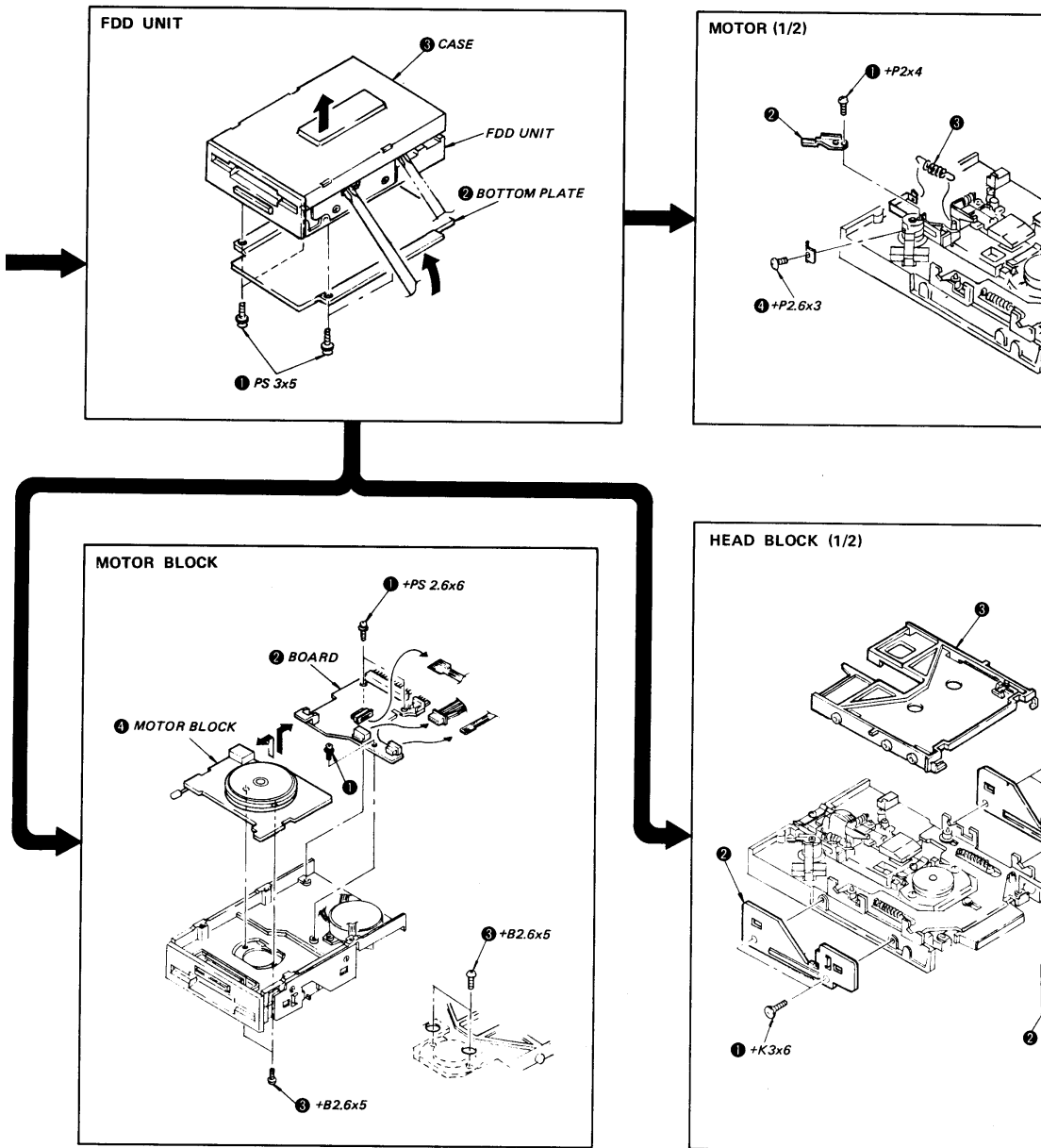
## SECTION 4 DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

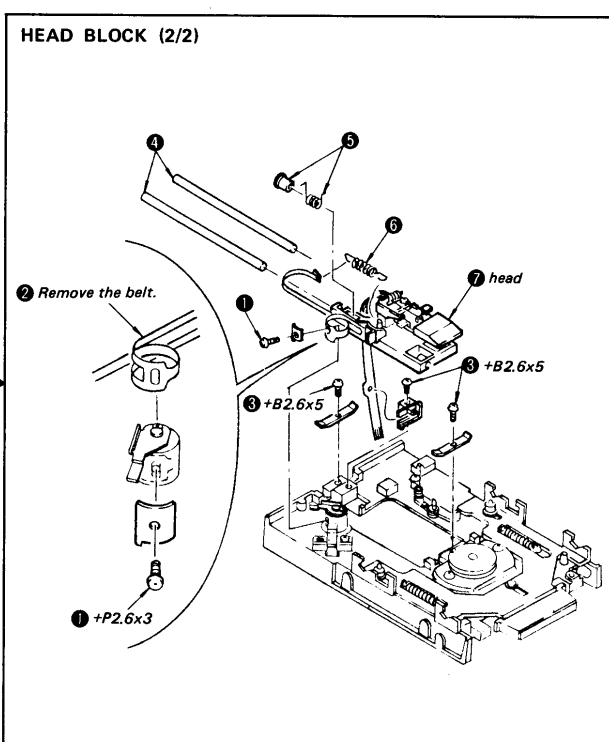
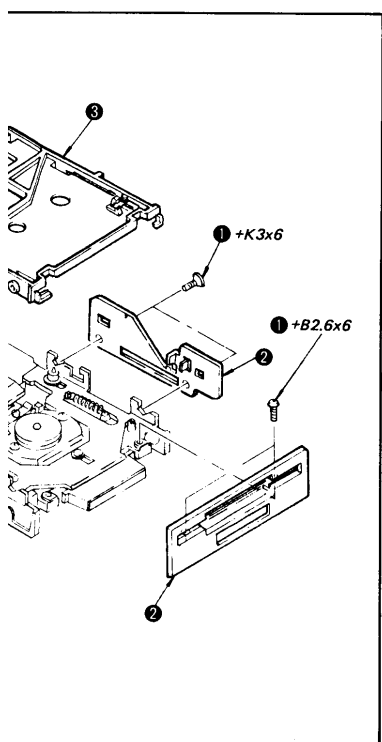
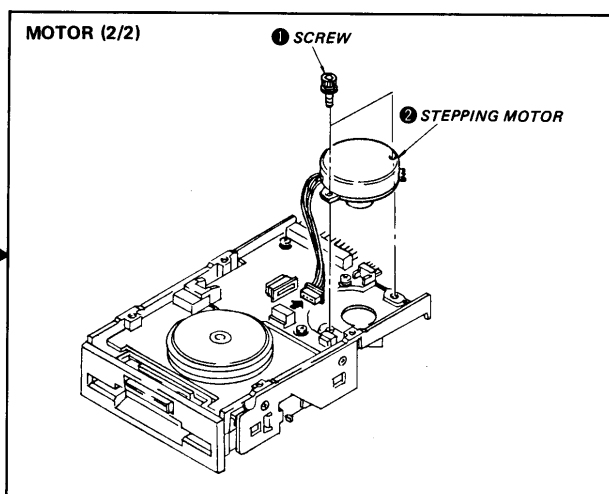
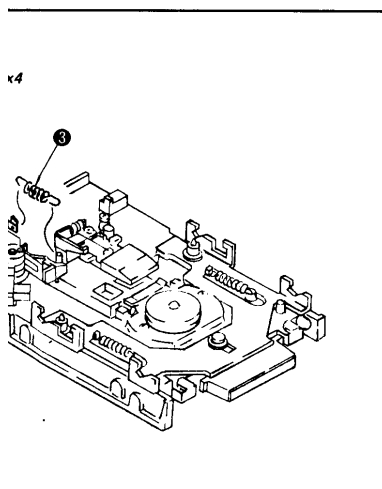


# HB-F700P/F700S/F700F/F700D





# HB-F700P/F700S/F700F/F700D



## SECTION 5 ADJUSTMENTS

### 5-1. PREPARATION

#### 5-1-1. Example of Adjusting Program (BASIC)

```

10 '*****
20 '* *
30 '* CHECK PROGRAM *
40 '* for HB-F5/F500 *
50 '* *
60 '*****
70 CLS
80 PRINT:"Push any key?":PRINT
90 PRINT:"1.Push W key=RGB level adj."
100 PRINT:"2.Push S key=Timer Clock adj.(set)"
110 PRINT:"3.Push R key=Timer Clock adj.(reset)"
120 A$=INKEY$
130 IF A$="W" OR A$="w" THEN 170
140 IF A$="S" OR A$="s" THEN 190
150 IF A$="R" OR A$="r" THEN 230
160 GOTO 120
170 SCREEN 1:COLOR 15,15,15:'White
180 GOTO 120
190 SCREEN 1:COLOR 15,4,7:'MENU
200 OUT &HB4,14:OUT &HB5,0
210 OUT &HB4,15:OUT &HB5,8:'Timer Clock adj.(set)
220 GOTO 80
230 SCREEN 1:COLOR 15,4,7:'MENU
240 OUT &HB5,12:'Timer Clock adj.(reset)
250 GOTO 80
    
```

#### 5-1-2. Use of Adjusting Program Example

When the program is run, the MENU display appears on the screen.

1. Press the W key.  
The whole screen display turns white.  
Used for the RGB level adjustment.
2. Press the S key.  
Used for the timer block adjustment.  
A 16 Hz frequency appears at IC11 through IC15.
3. Press the R key.  
Cancels the timer clock adjustment.

#### 5-1-3. Connection

- Connect the KX-14CP1 RGB monitor to RGB connector CN309 or terminate the RGB output terminals (pins 6, 7, and 8) of CN309 in 75 ohms.

### 5-2. CPU CLOCK FREQUENCY ADJUSTMENT

Equipment Required: Frequency counter

Condition: Power ON  
 Check Point: IC301, pin 8/PUS-135 board  
 Specification: 3,579,540 Hz ~ 3,579,549 Hz  
 Adjustment: CV301/DUS-135

### 5-3. TIMER CLOCK FREQUENCY ADJUSTMENT

Connection: Connect 100k-ohm pull-up resistors between TP4 and +5 V dc.

Equipment Required: Frequency counter  
 Condition:
 

- Run the adjusting program and press the S key.
- After adjustment is completed, press the R key.

Check Point: TP4/PU-53 board  
 Specification: 15.9999 Hz ~ 16.0001 Hz  
 Adjustment: CV1/PU-53 board

### 5-4. RGB OUTPUT LEVEL ADJUSTMENT

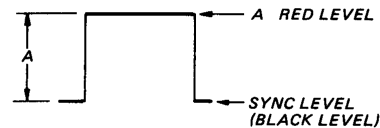
#### 5-4-1. R Level Adjustment

Equipment Required: Oscilloscope

Condition:
 

- Run the adjusting program and press the W key.
- After adjustment is completed, press the R key.

Check Point: CN309, pin 6/DUS-135 board  
 Specification:  $A = 0.7 \text{ V} \pm 0.02 \text{ V}$



Adjustment: RV302/DUS-135 board

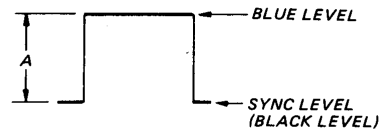
#### 5-4-2. B Level Adjustment

Equipment Required: Oscilloscope

Condition:
 

- Run the adjusting program and press the W key.
- After adjustment is completed, press the R key.

Check Point: CN309, pin 8/DUS-135 board  
 Specification:  $A = 0.7 \text{ V} \pm 0.02 \text{ V}$

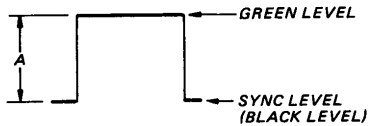


Adjustment: RV301/DUS-135 board

# HB-F700P/F700S/F700F/F700D

## 5-4-3. G Level Adjustment

Equipment Required: Oscilloscope  
 Condition:   
 • Run the adjusting program and press the W key.  
 • After adjustment is completed, press the R key.  
 Check Point: CN309, pin 7/DUS-135 board  
 Specification:  $A = 0.7 \text{ V} \pm 0.02 \text{ V}$

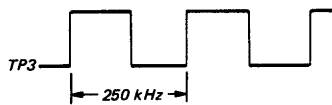


Adjustment: RV303/DUS-135 board

## 5-5. FDC ADJUSTMENT

### 5-5-1. VCO Frequency Adjustment

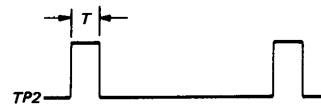
Equipment Required: Frequency counter  
 Condition: Three minutes after the power is turned on, connect TP1 to ground using a jumper wire.  
 Check Point: TP3/PU-53 board



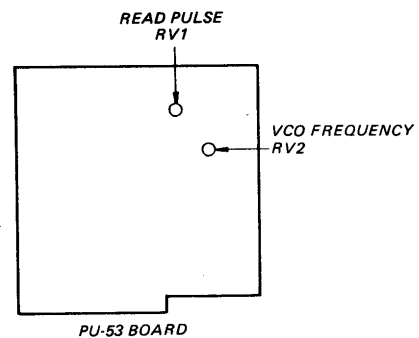
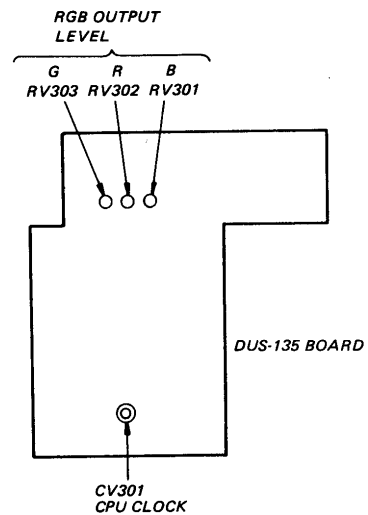
Specification:  $250 \text{ kHz} \pm 1 \text{ kHz}$   
 Adjustment: RV2/PU-53 board  
 Note: After adjustment is completed, remove the jumper wire.

## 5-5-2. Read Pulse Width Adjustment

Equipment Required: Oscilloscope  
 Condition: Three minutes after the power is turned on, connect TP1 to ground using a jumper wire.  
 Check Point: TP2/PU-53 board

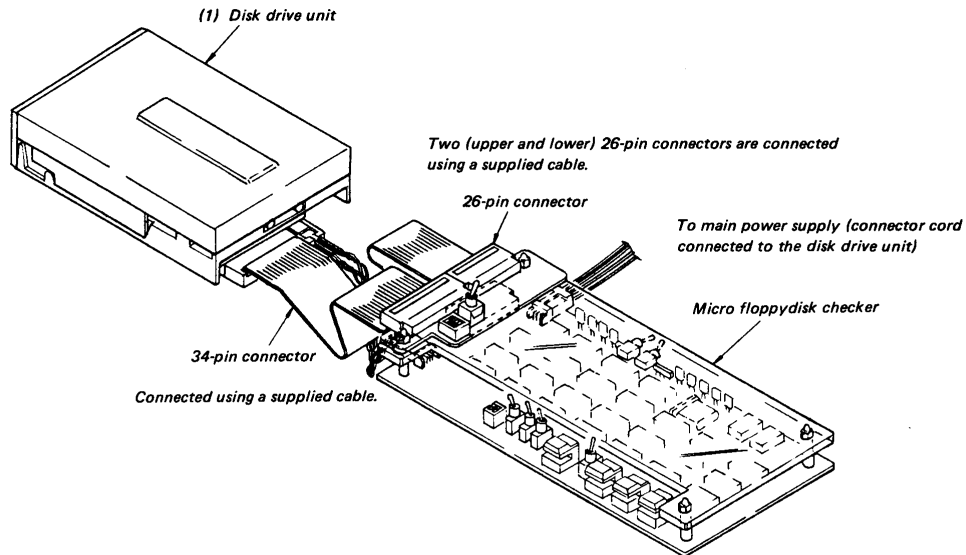


Specification:  $T = 0.5 \mu\text{sec} \pm 10 \text{ nsec}$   
 Adjustment: RV1/PU-53 board  
 Note: After adjustment is completed, remove the jumper wire.





## FDD UNIT ADJUSTMENT

### Connection of Micro Floppydisk Checker with Disk Drive Unit



#### Initialization

- Set the DIP switch on the disk drive unit to 0 (refer to Fig. A).
- Micro floppydisk checker II
  - RPM : 300
  - Track : 80
  - SW102 : Upper position
  - SW102 : Upper position
  - SW101 :  Only switch 1 is set to on.
  - Drive select switch :  Both switches 1 and 2 are set to the lower position.
  - Side select switch : 0
  - Motor ON switch : OFF
  - HD load switch : OFF

#### After initialization is completed, check the following operations:

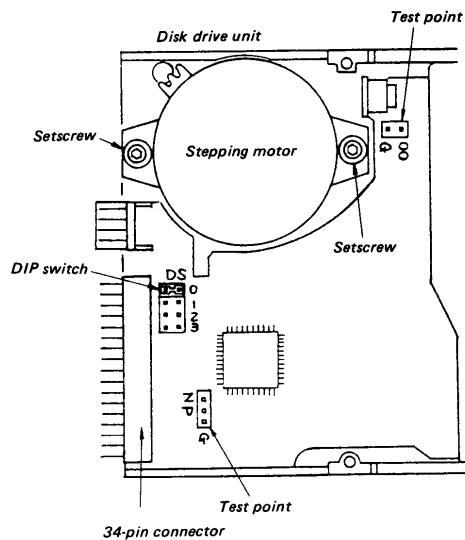
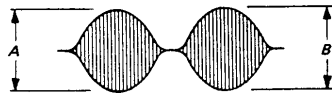
1. When the power is turned on, the WRTprt LED indicator lights.
2. When the STEP OUT switch is pressed continuously, the head moves in the outer circumference direction until it arrives at track 00. When the head arrives at track 00, the TRK00 LED indicator lights.
3. When the STEP IN switch is pressed continuously, the head moves in the inner circumference direction until it arrives at track 79.
4. When the motor ON switch is turned on with a 50 auto S disk inserted, the motor rotates and the index LED indicator blinks.  
The RDY LED indicator lights approximately 1.5 seconds after the motor ON switch is turned on.

# HB-F700P/F700S/F700F/F700D

## Index Positioning Precision Adjustment

1. Connect CH-1 on an oscilloscope to the test point (P) of the disk drive unit.
2. Connect CH-2 on an oscilloscope to the test point (N) of the disk drive unit.
3. Connect CH-3 on an oscilloscope to TP5 (index) of micro floppydisk checker II to use CH-3 as a trigger.
4. Insert a 50 auto S disk (OR-D163VA) and move the head to track 40.
5. Set CH-1 and CH-2 on an oscilloscope to the ADD mode.
6. Loosen the stepping motor setscrews using a hexagonal head wrench (2mm) and move the stepping motor adjusting teeth using a screwdriver so that the ratio of amplitude A to B is one as shown in the illustration below.
7. Check that amplitude A is equal to B by setting the side select switch to 0 and 1.
8. Move the head to track 79 by setting the side select switch to 0 and check that amplitudes A and B are equal. If not, repeat Steps 6, 7, and 8.

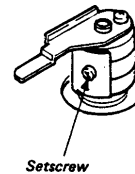
## Specifications:



## 00 Sensor Adjustment

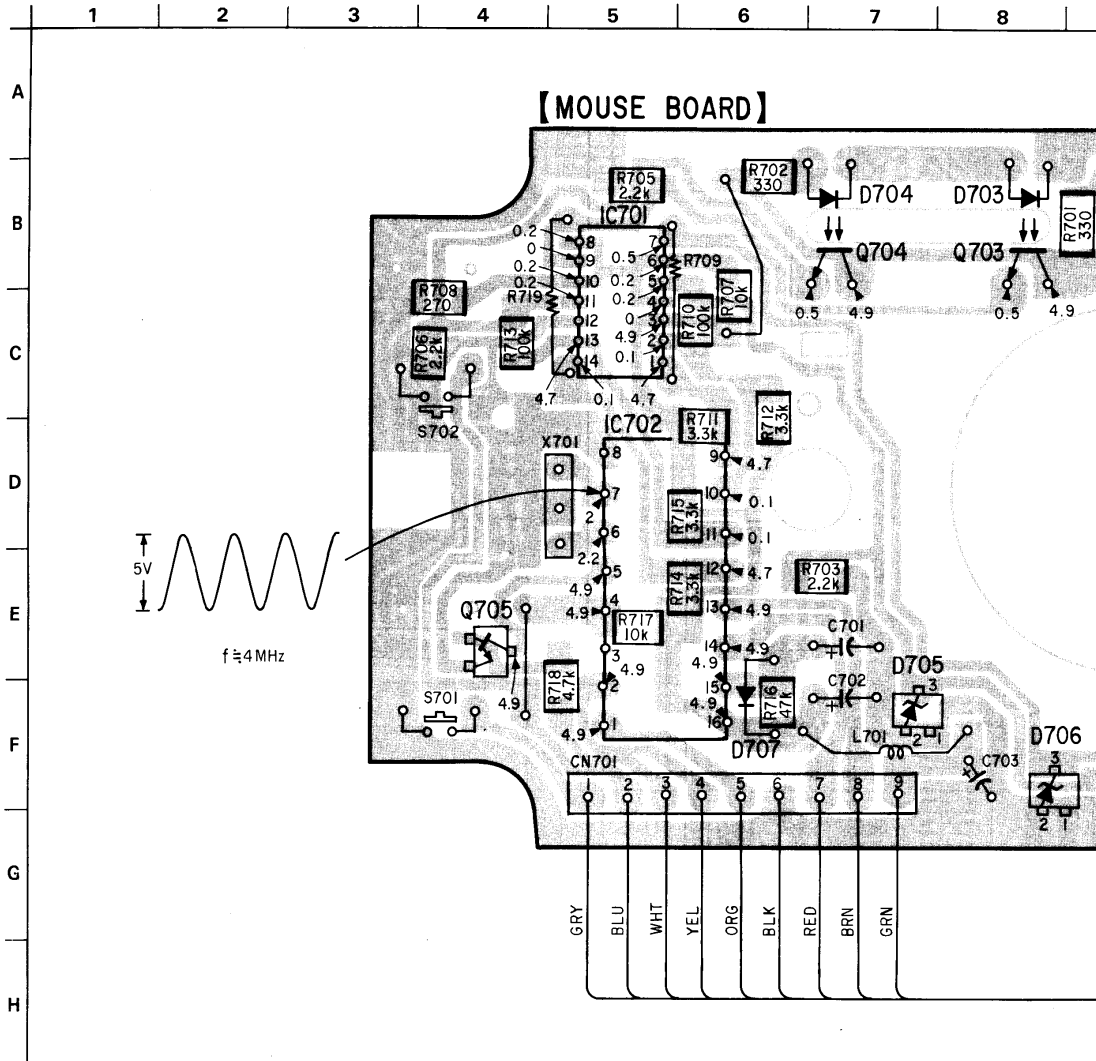
1. Connect an oscilloscope to the test point (00) of the disk drive unit.
2. Move the head to track 00, track 01, track 02 in sequence.
3. In this case, the waveforms appearing on the oscilloscope are as follows:  
Track 00: "H"  
Track 01: "L"  
Track 02: "L"  
Track 03: "L"

Loosen and adjust the 00 sensor assembly setscrew so that the signal waveform goes high only at track 00.





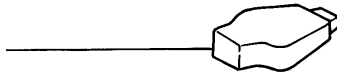
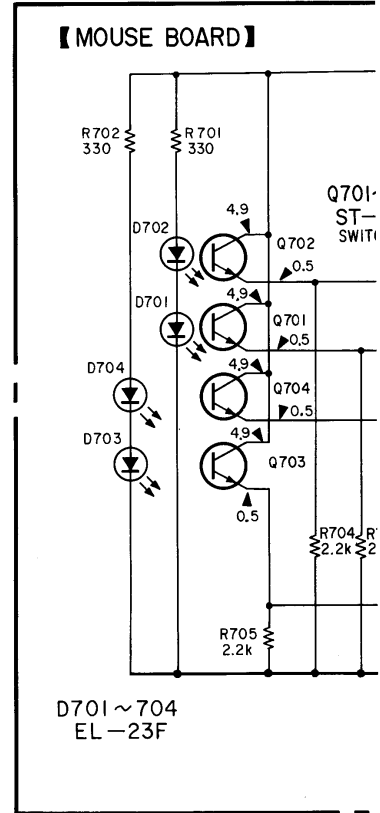
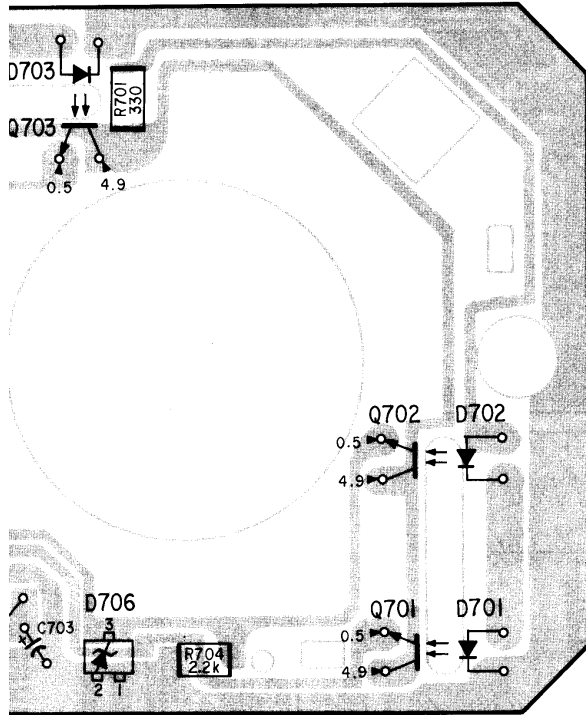
MOUNTING DIAGRAM — mouse section — SECTION 6  
 — Conductor Side — DIAGRAMS



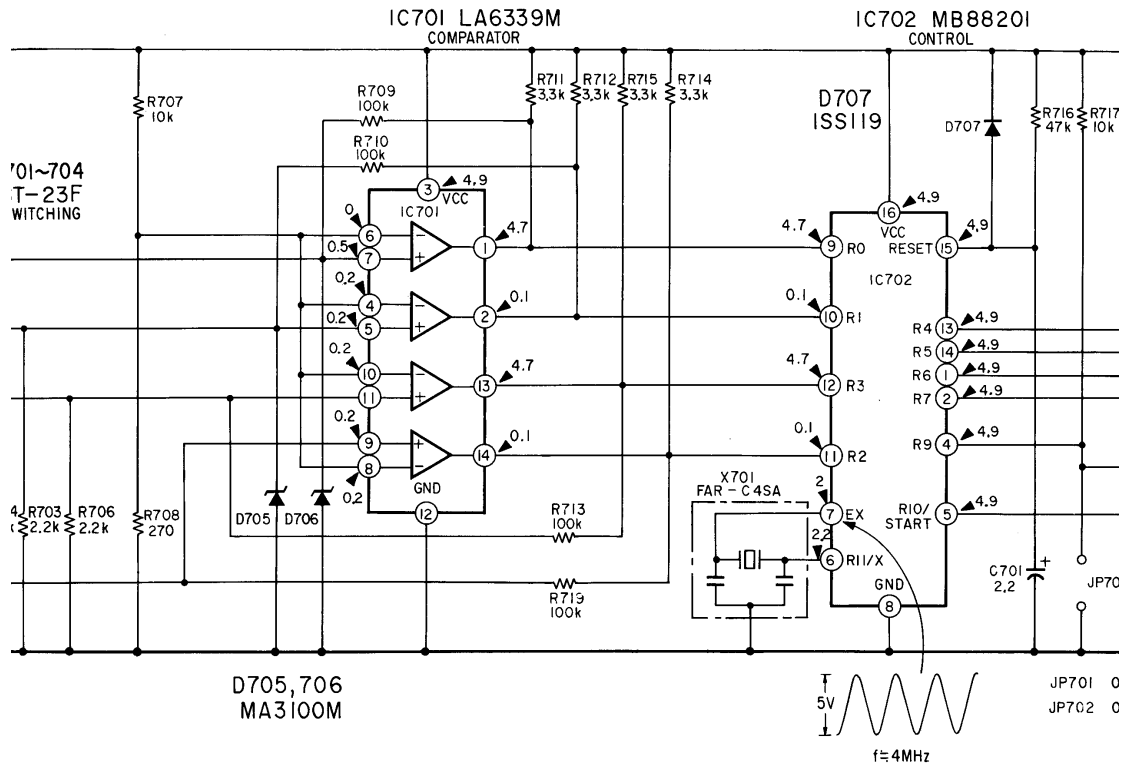
**DD HB-F700P/F700S/F700F/F700D**

SCHMATIC DIAGRAM — mouse section —

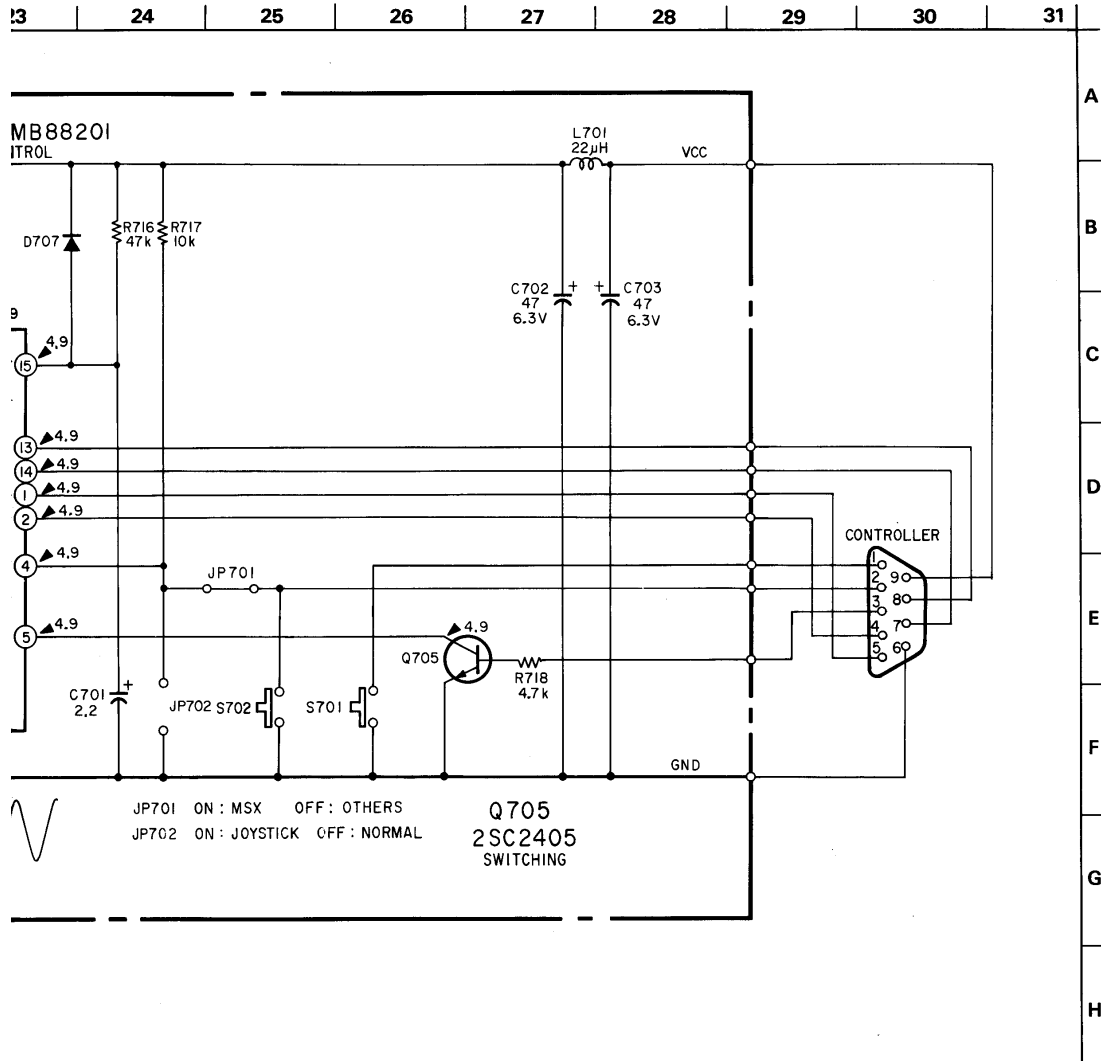
8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 1



16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24



**FOOD HB-F700P/F700S/F700F/F700D**

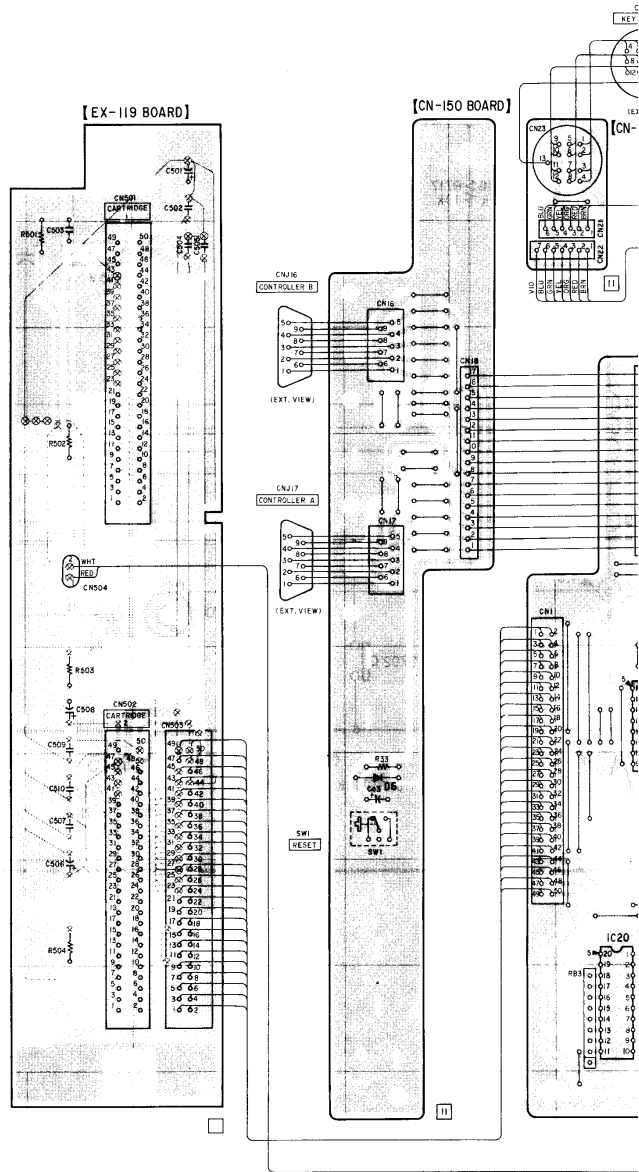


● SEMICONDUCTOR LOCATION

Ref. No.	Location	Ref. No.	Location
D1	F-15	IC301	H-25
D2	D-10	IC302	H-27
D3	C-12	IC303	H-27
D4	E-14	IC304	G-27
D5	D-16	IC305	G-27
D6	H-5	IC306	C-21
D7	D-14	IC307	C-27
D301	B-21	IC901	A-31
D302	B-22	IC902	A-30
D303	B-22	IC903	C-31
D304	D-19		
D901	D-31		
D902	F-31		
D903	F-31		
D904	D-30		
D905	K-29		
IC1	F-8	Q1	F-16
IC2	G-7	Q301	F-24
IC3	G-10	Q302	F-24
IC4	H-10	Q303	D-24
IC5	J-11	Q304	D-25
IC6	J-13	Q305	D-25
IC7	J-14	Q306	D-26
IC8	J-15	Q307	D-24
IC9	J-16	Q308	D-24
IC00	I-15	Q309	D-25
IC11	I-16	Q310	D-26
IC12	H-8	Q311	D-27
IC13	I-9	Q312	C-21
IC14	I-9	Q313	F-19
IC15	H-11	Q314	F-20
IC16	H-13		
IC17	H-14		
IC18	I-15		
IC19	I-16		
IC20	I-7		
IC21	H-9		
IC22	G-13		
IC23	H-15		
IC24	H-16		
IC25	F-9		
IC26	F-15		
IC27	F-16		
IC28	B-9		
IC29	B-10		
IC30	C-13		
IC31	C-14		
IC32	D-15		
IC33	F-16		
IC34	D-17		
IC35	B-16		

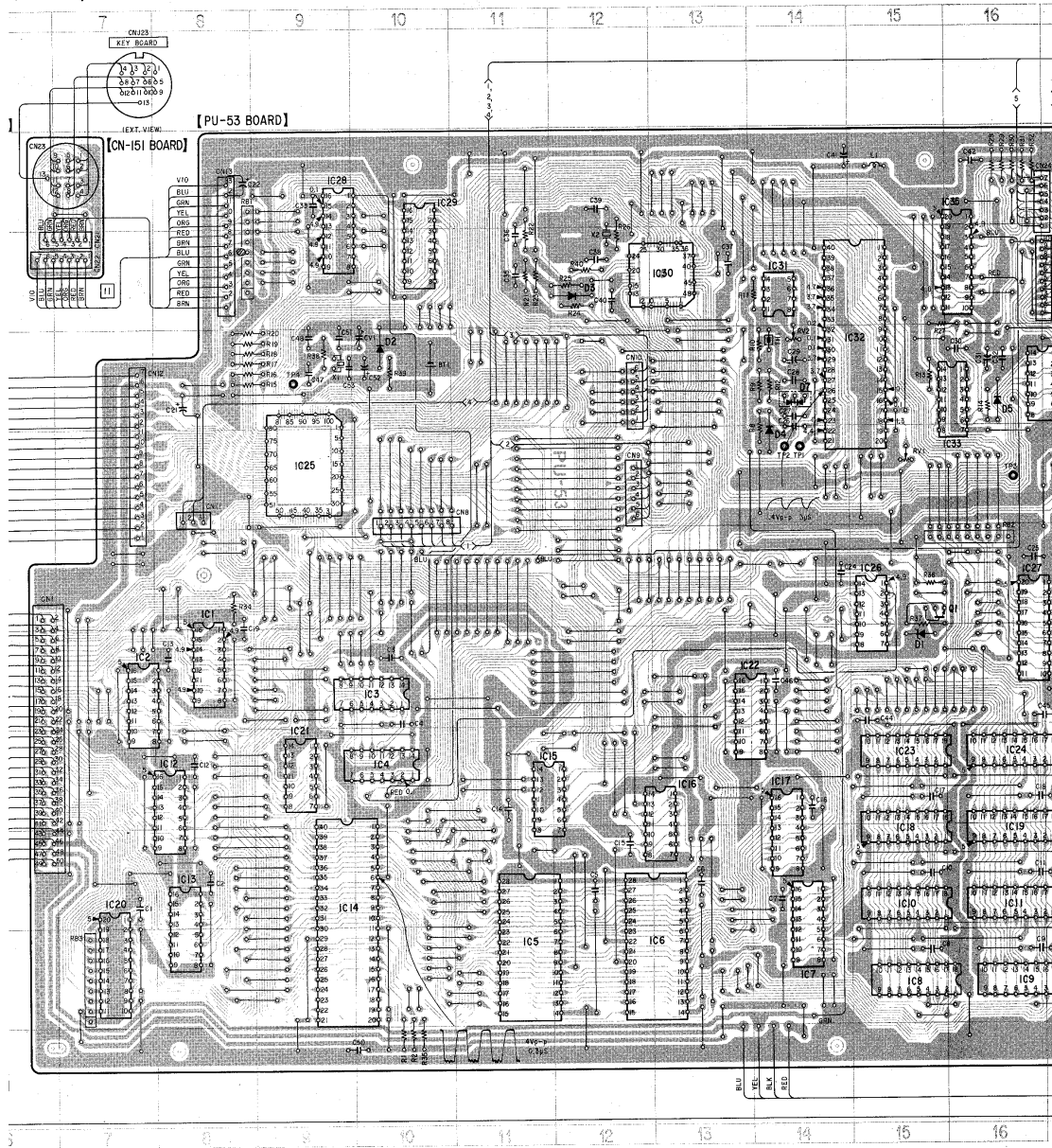
MOUNTING DIAGRAMS -- main section --  
-- Conductor Side --

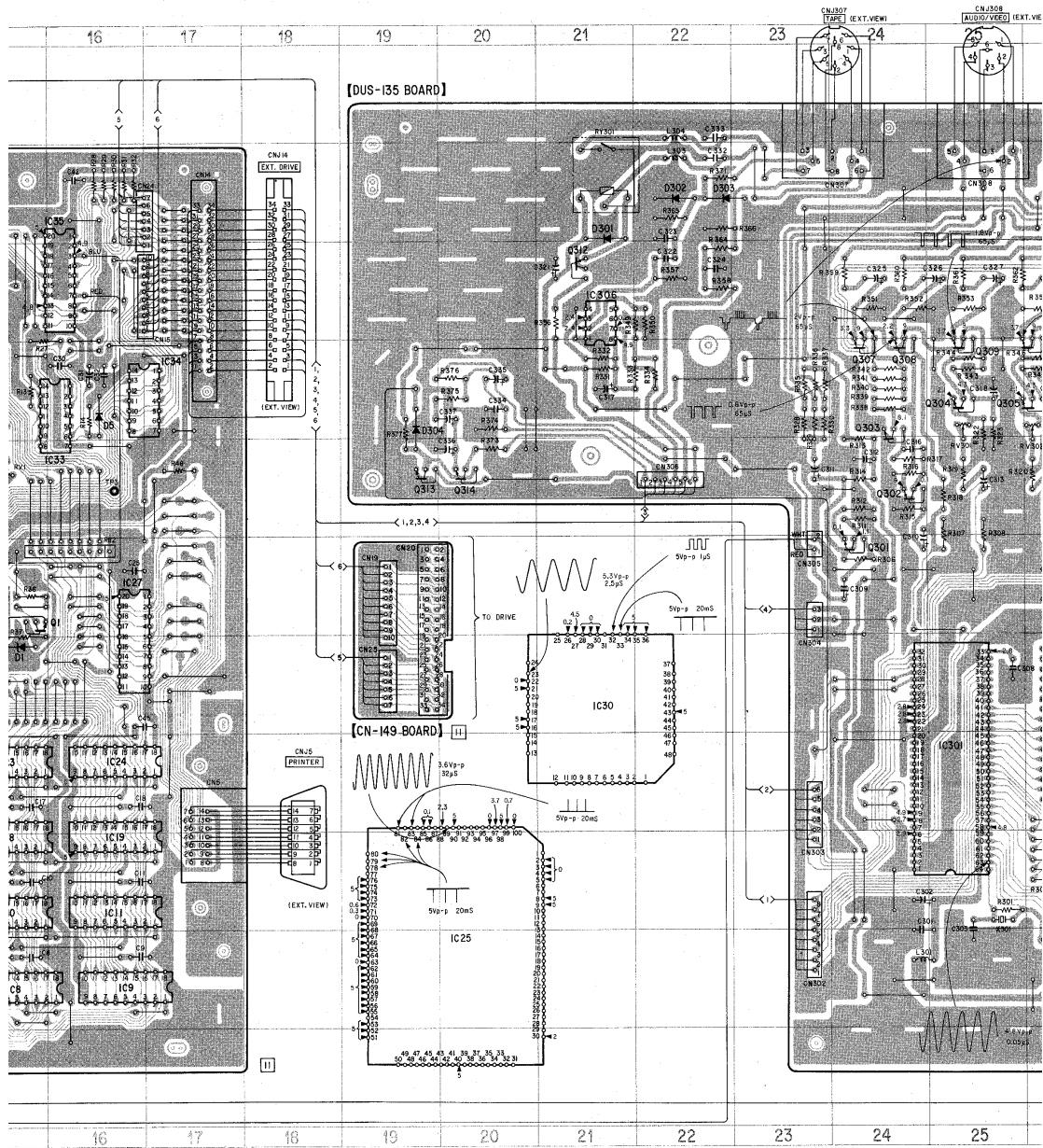
- See page 59 for note.
- See page 65 for Semiconductor lead layouts.



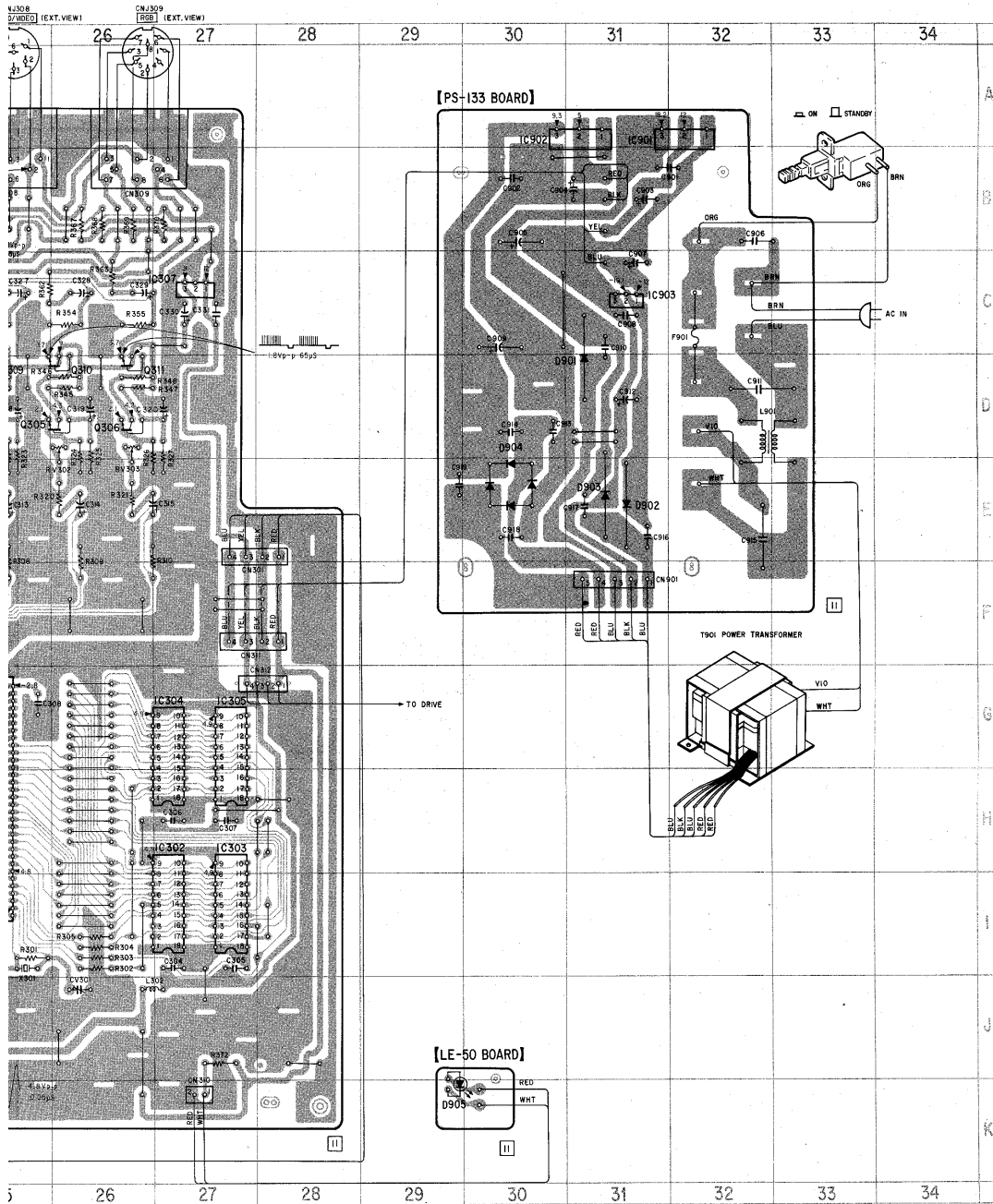
# HB-F700P/F700S/F700F/F700D

tor lead layouts.





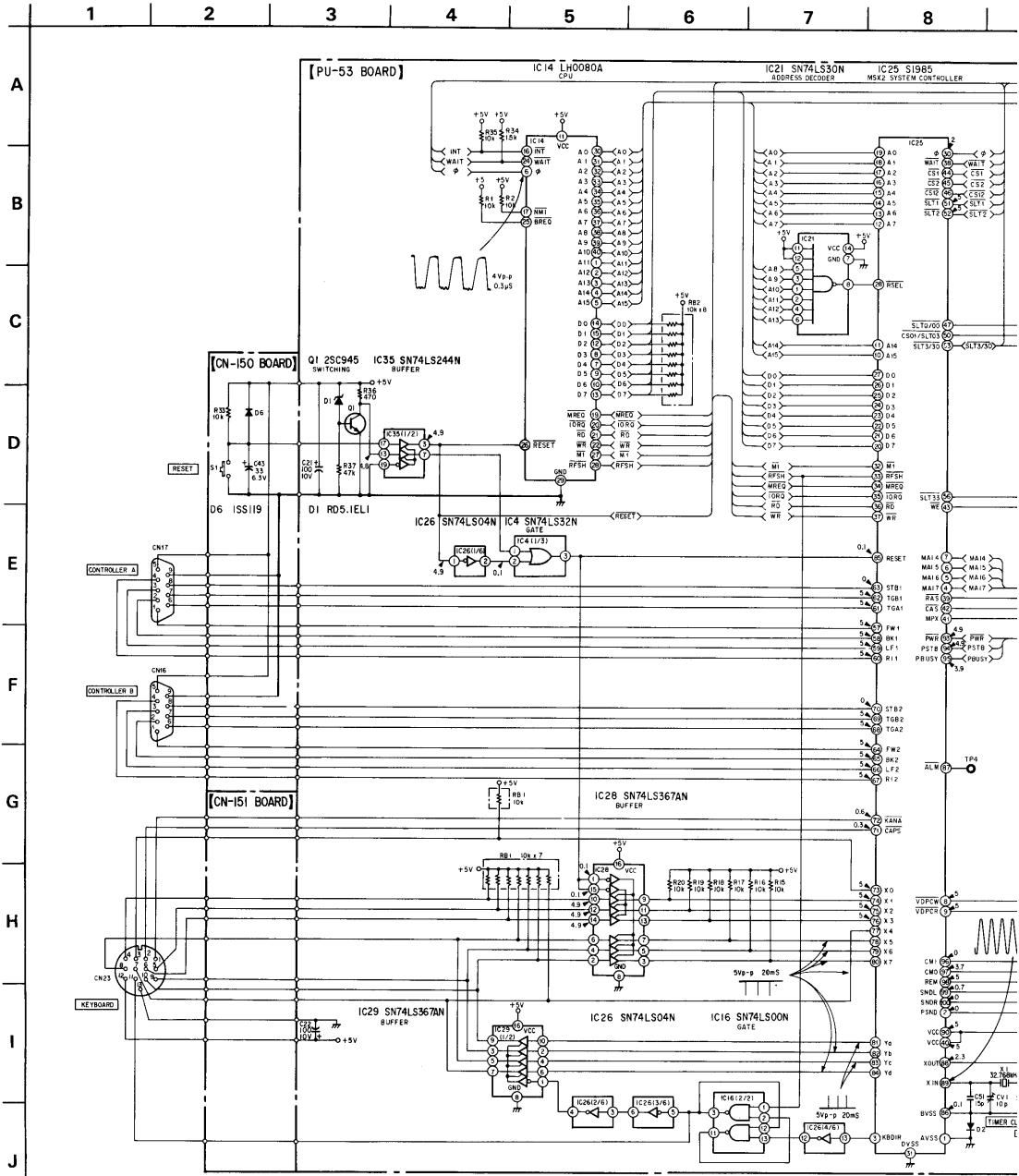
# HB-F700P/F700S/F700F/F700D





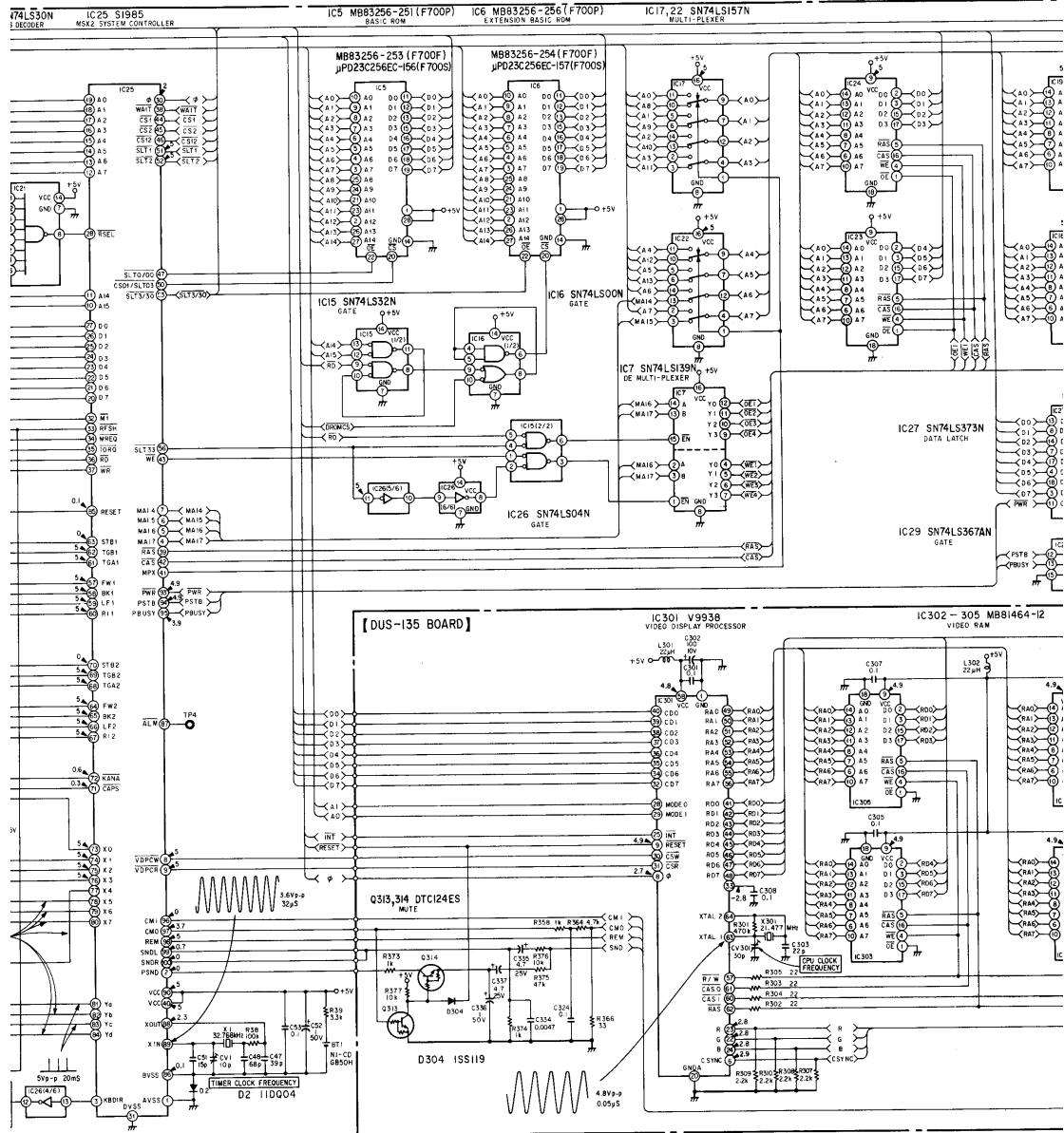
# HB-F700P/F700S/F700F/F700D HB-

SCHEMATIC DIAGRAM — main section — • See page 59 for note.



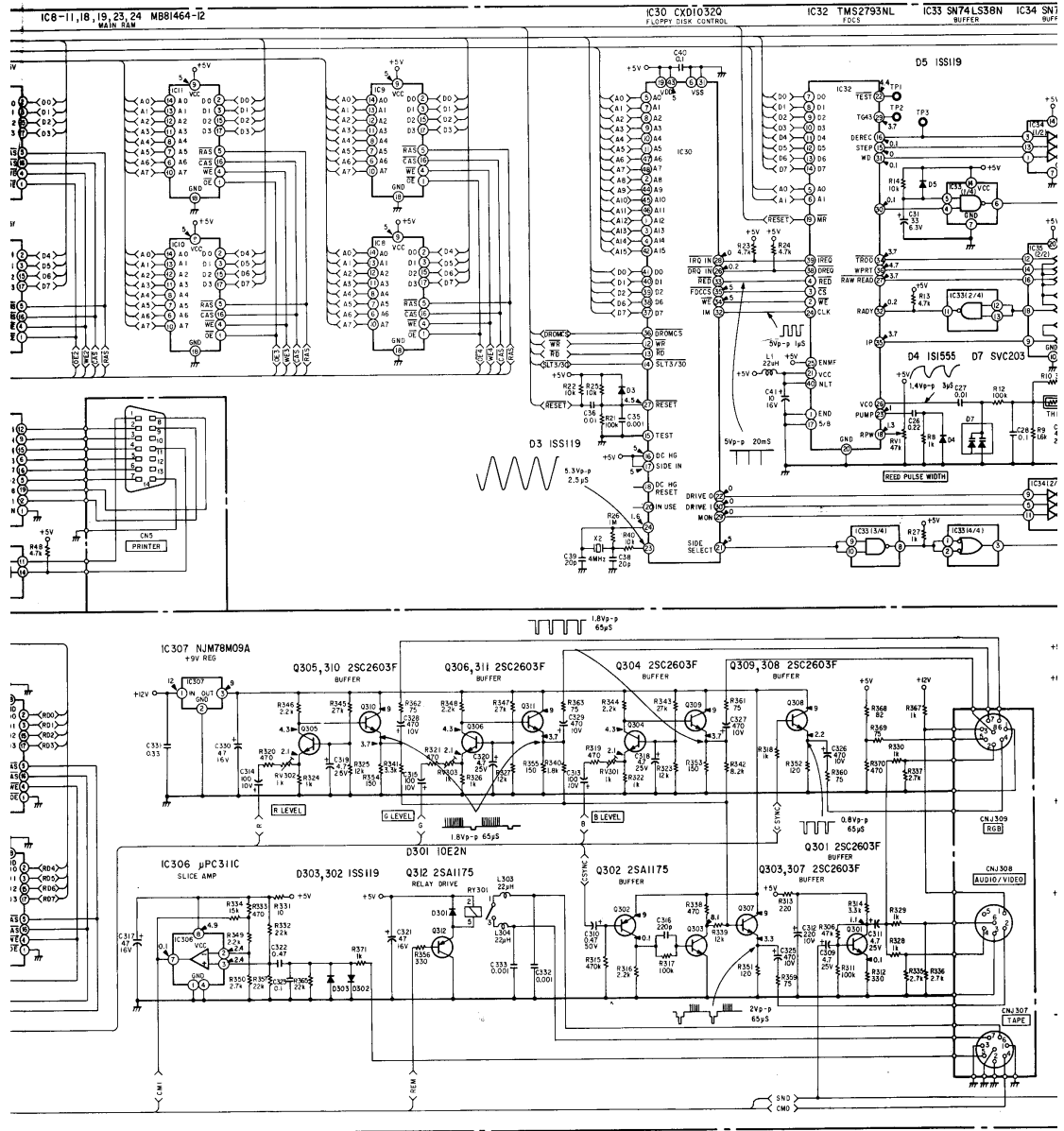
# F/F700D HB-F700P/F700S/F700F/F700D

7	8	9	10	11	12	13	14	15
---	---	---	----	----	----	----	----	----



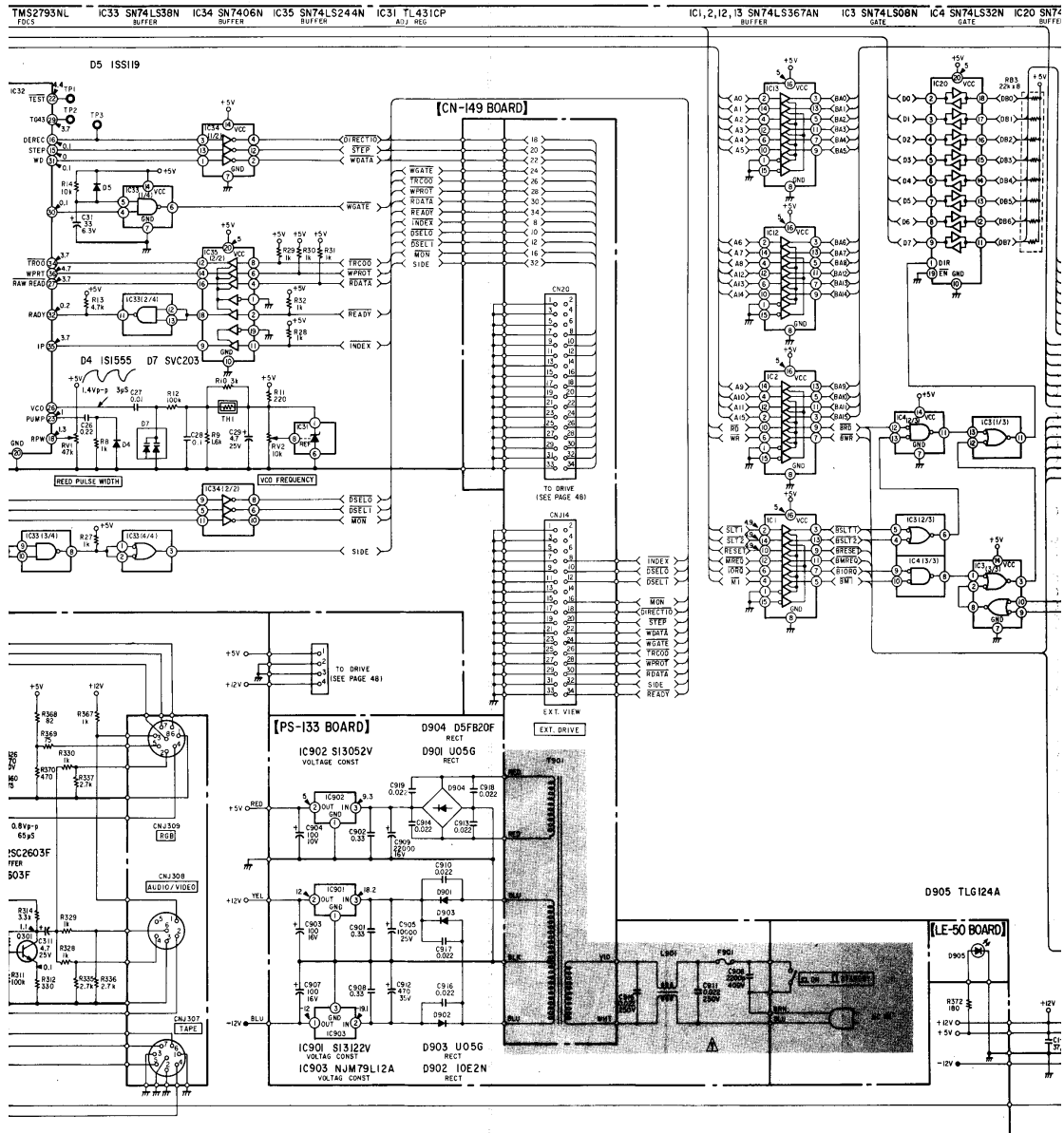
HB-F700P/F700S/F700F/F700D HB-F7

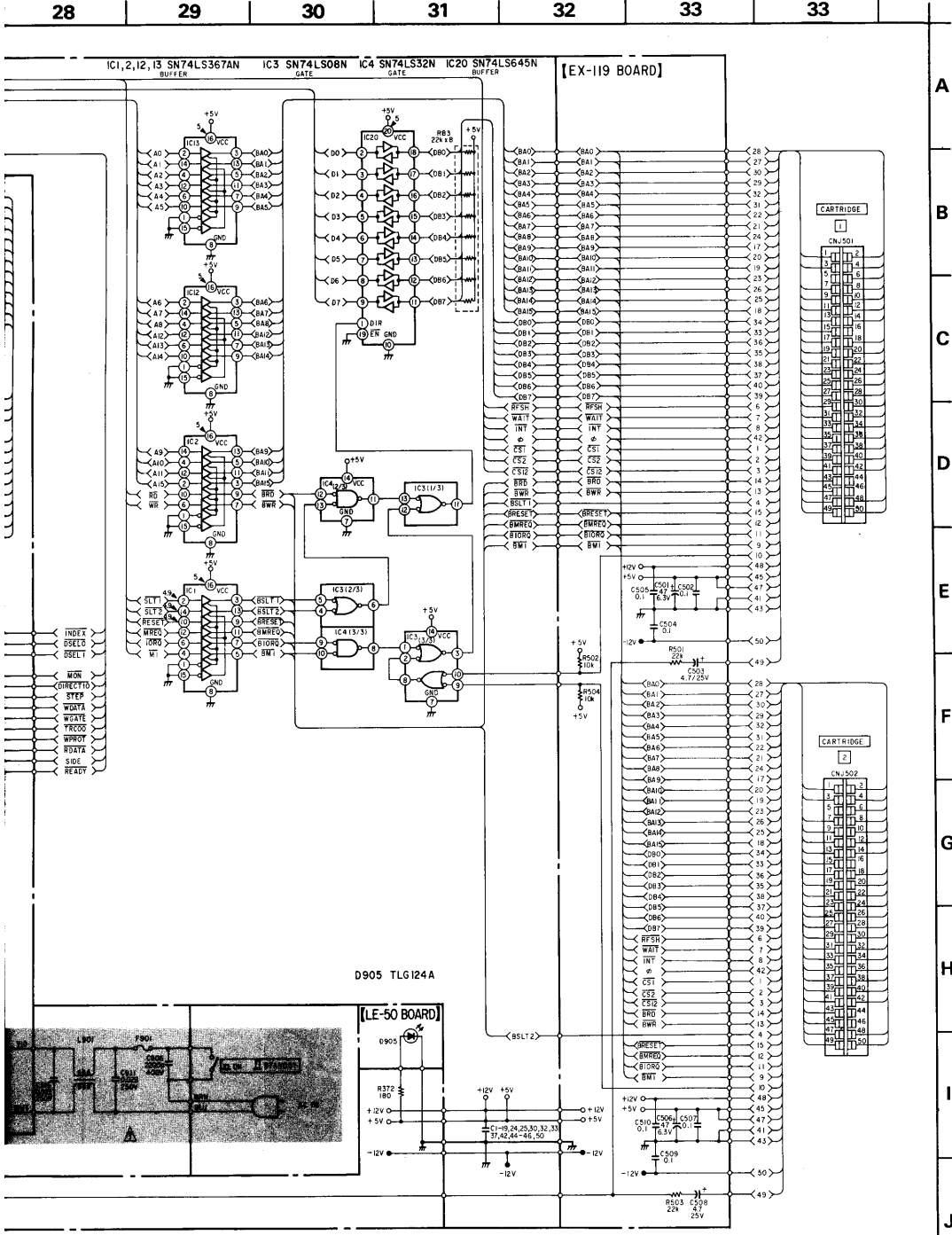
16 17 18 19 20 21 22 23 24



# F700D HB-F70OP/F70OS/F70OF/F70OD

23 24 25 26 27 28 29 30 31



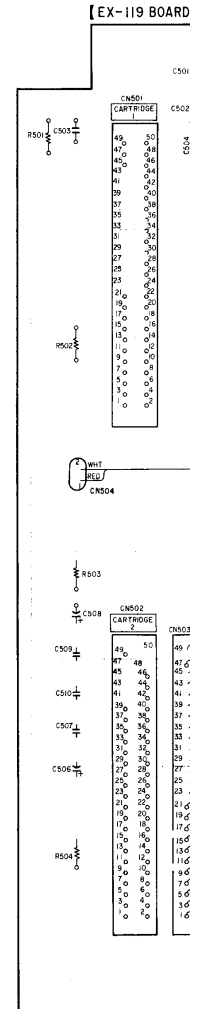


**MOUNTING DIAGRAMS — main section —**  
 — Conductor Side —

- See page 59 for note.
- See page 65 for Semiconductor lead la

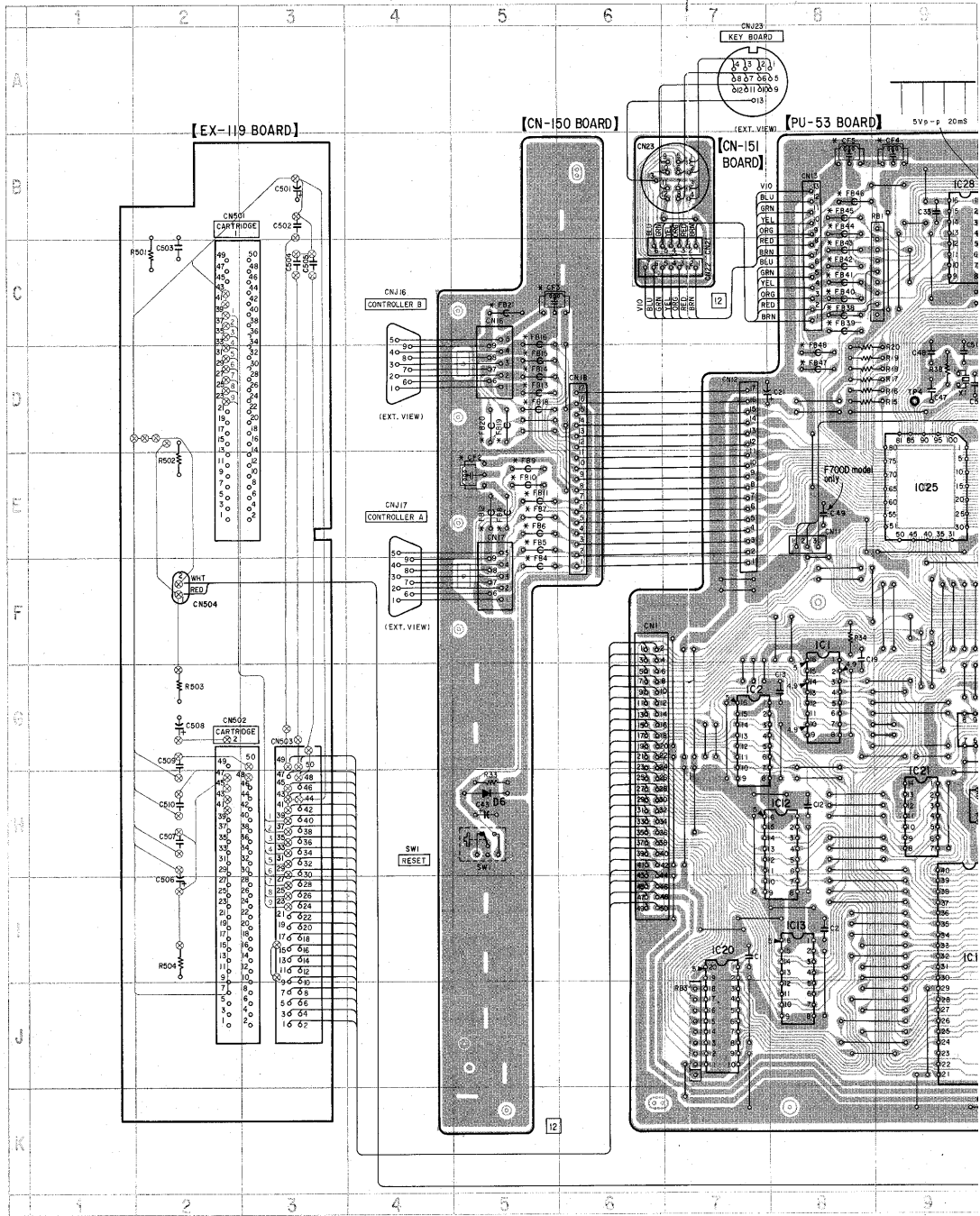
**● SEMICONDUCTOR LOCATION**

Ref.No.	Location	Ref.No.	Location
D1	F-15	IC301	H-25
D2	D-10	IC302	H-27
D3	C-12	IC303	H-27
D4	E-14	IC304	G-27
D5	D-16	IC305	G-27
D6	H-5	IC306	C-21
D7	D-14	IC307	C-27
D301	B-21	IC901	A-31
D302	B-22	IC902	A-30
D303	B-22	IC903	C-31
D304	D-19		
D901	D-31		
D902	E-31		
D903	E-31		
D904	D-30		
D905	K-29		
IC1	F-8	Q1	F-16
IC2	G-7	Q301	F-24
IC3	G-10	Q302	E-24
IC4	H-10	Q303	D-24
IC5	J-11	Q304	D-25
IC6	J-13	Q305	D-25
IC7	J-14	Q306	D-26
IC8	J-15	Q307	D-24
IC9	J-16	Q308	D-24
IC00	I-15	Q309	D-25
IC11	I-16	Q310	D-26
IC12	H-8	Q311	D-27
IC13	I-8	Q312	C-21
IC14	I-9	Q313	E-19
IC15	H-11	Q314	E-20
IC16	H-13		
IC17	H-14		
IC18	I-15		
IC19	I-16		
IC20	I-7		
IC21	H-9		
IC22	G-13		
IC23	H-15		
IC24	H-16		
IC25	E-9		
IC26	F-15		
IC27	F-16		
IC28	B-9		
IC29	B-10		
IC30	C-13		
IC31	C-14		
IC32	D-15		
IC33	E-16		
IC34	D-17		
IC35	B-16		

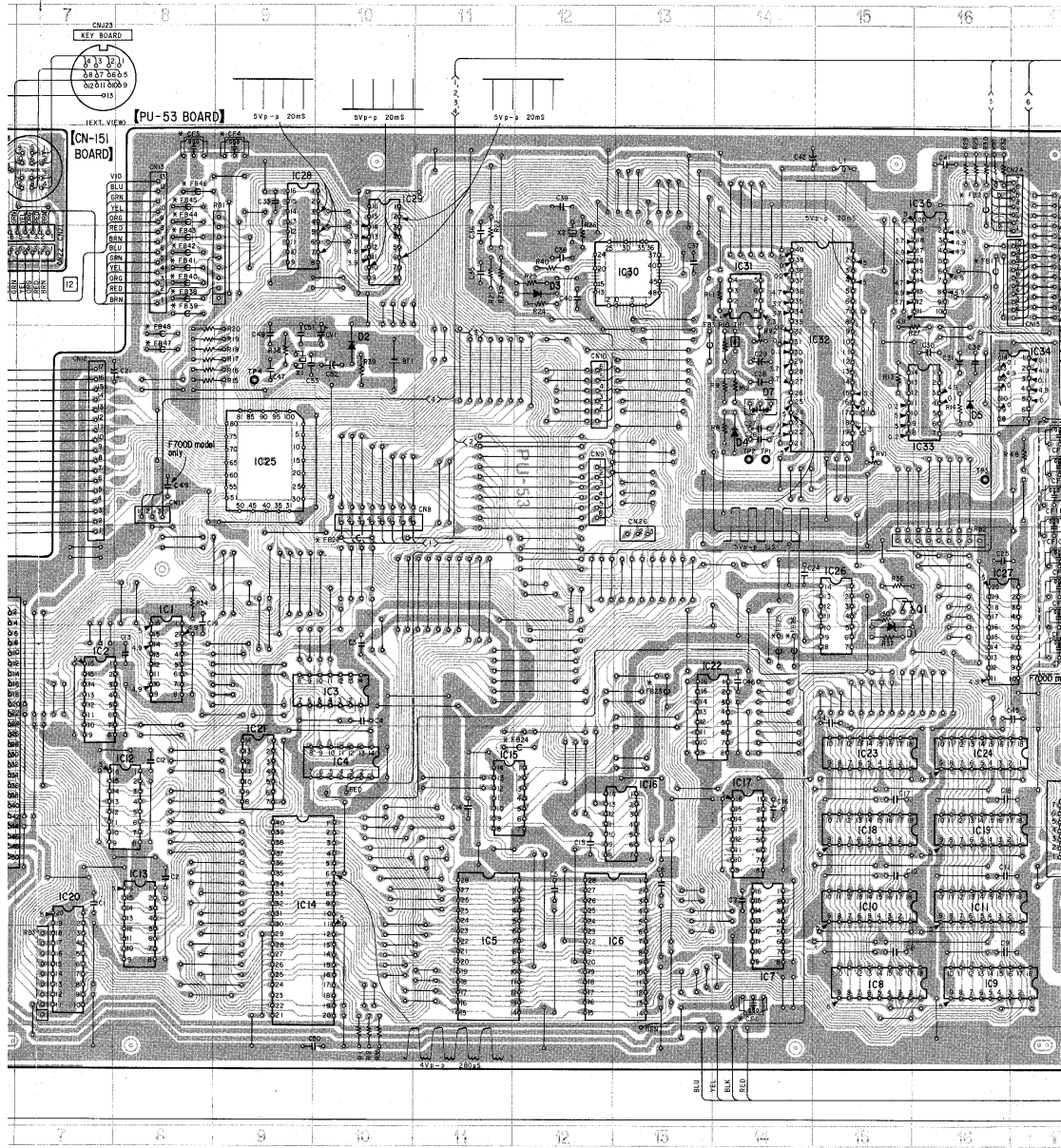


# HB-F700P/F700S/F700F/F700D HB-F700P/F700S,

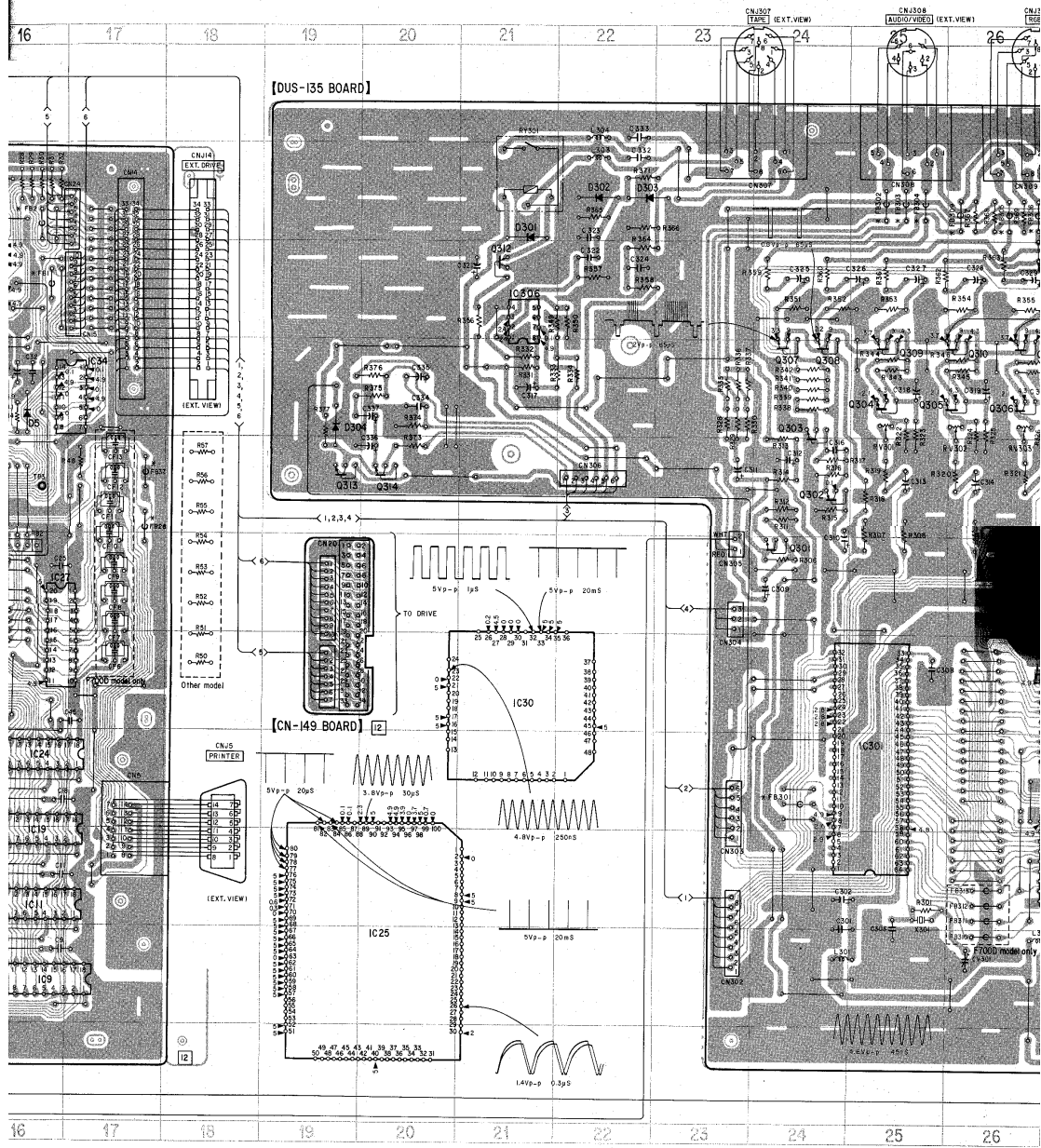
- See page 59 for notes.
- See page 65 for Semiconductor lead layouts.



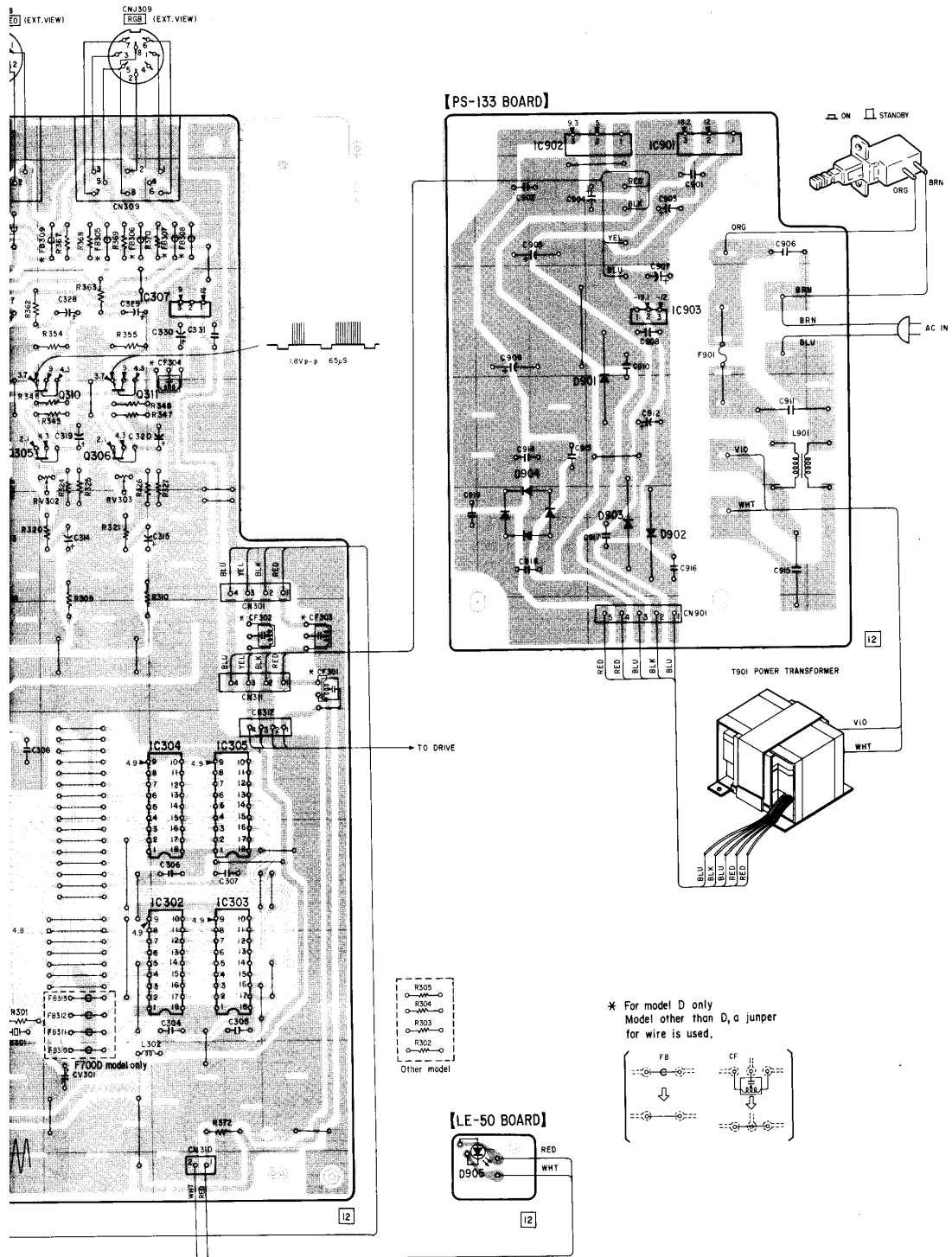
# HB-F700P/F700S/F700F/F700D





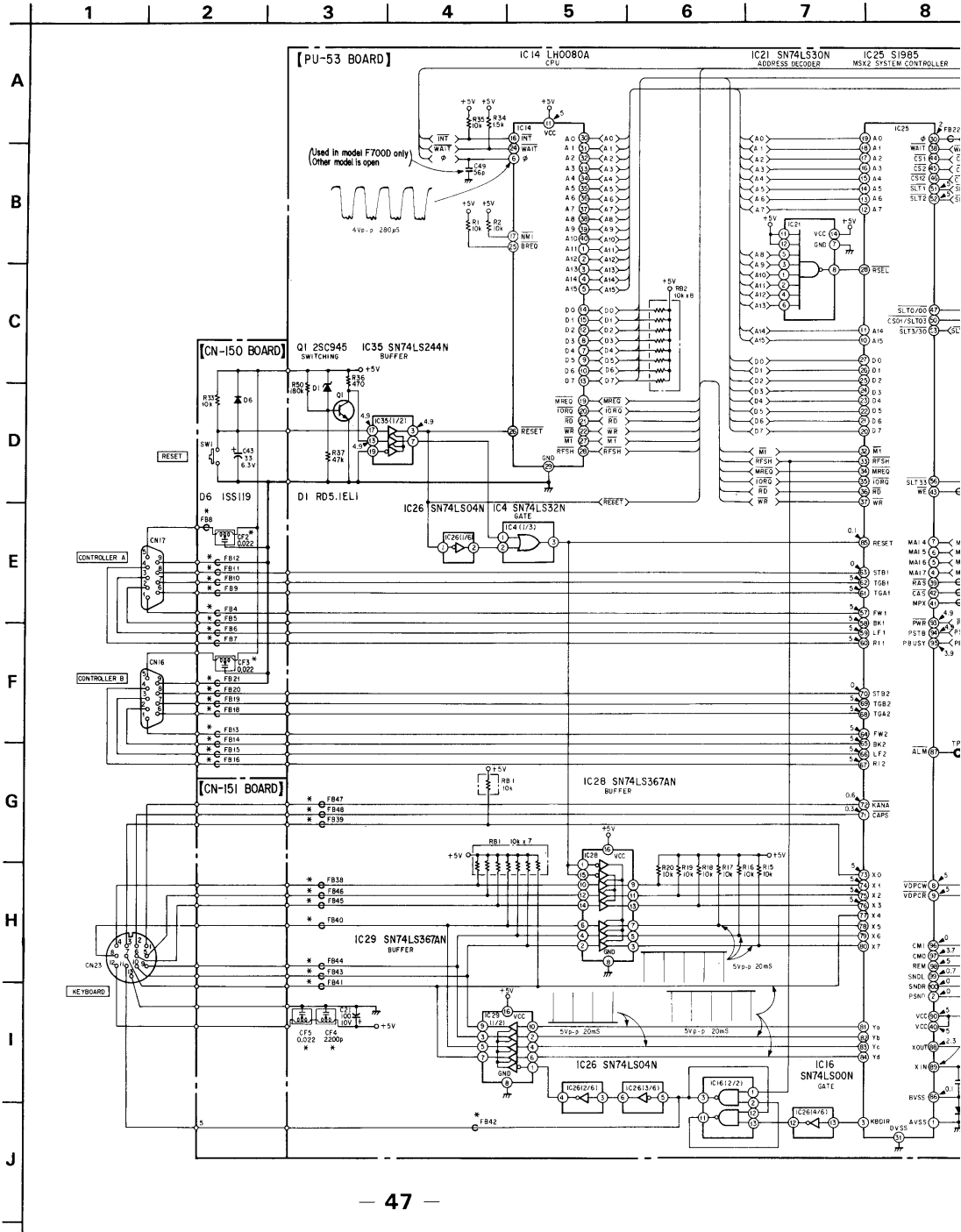


# DD HB-F700P/F700S/F700F/F700D



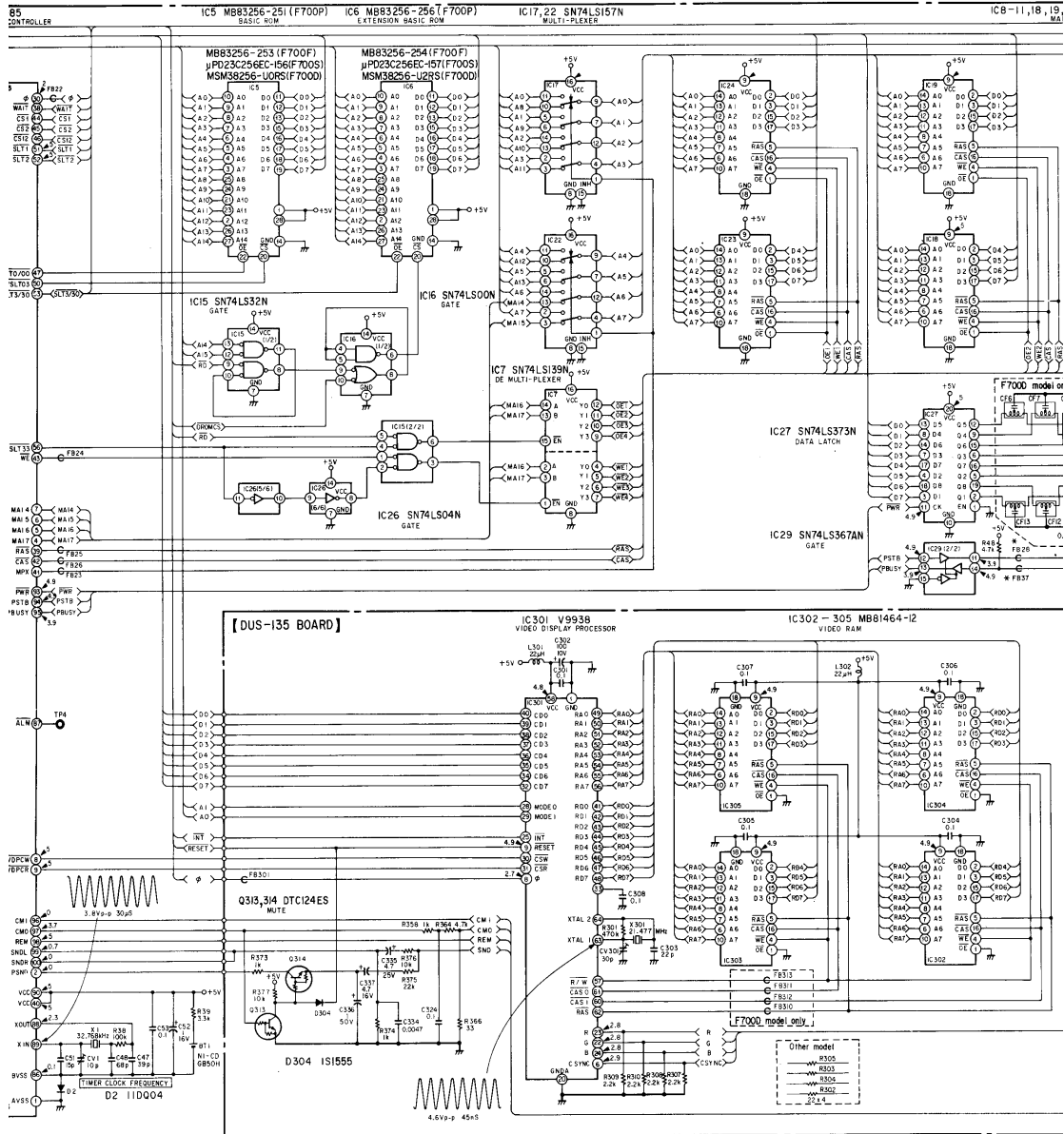
# HB-F700P/F700S/F700F/F700D

SCHEMATIC DIAGRAM — main section — • See page 59 for note.

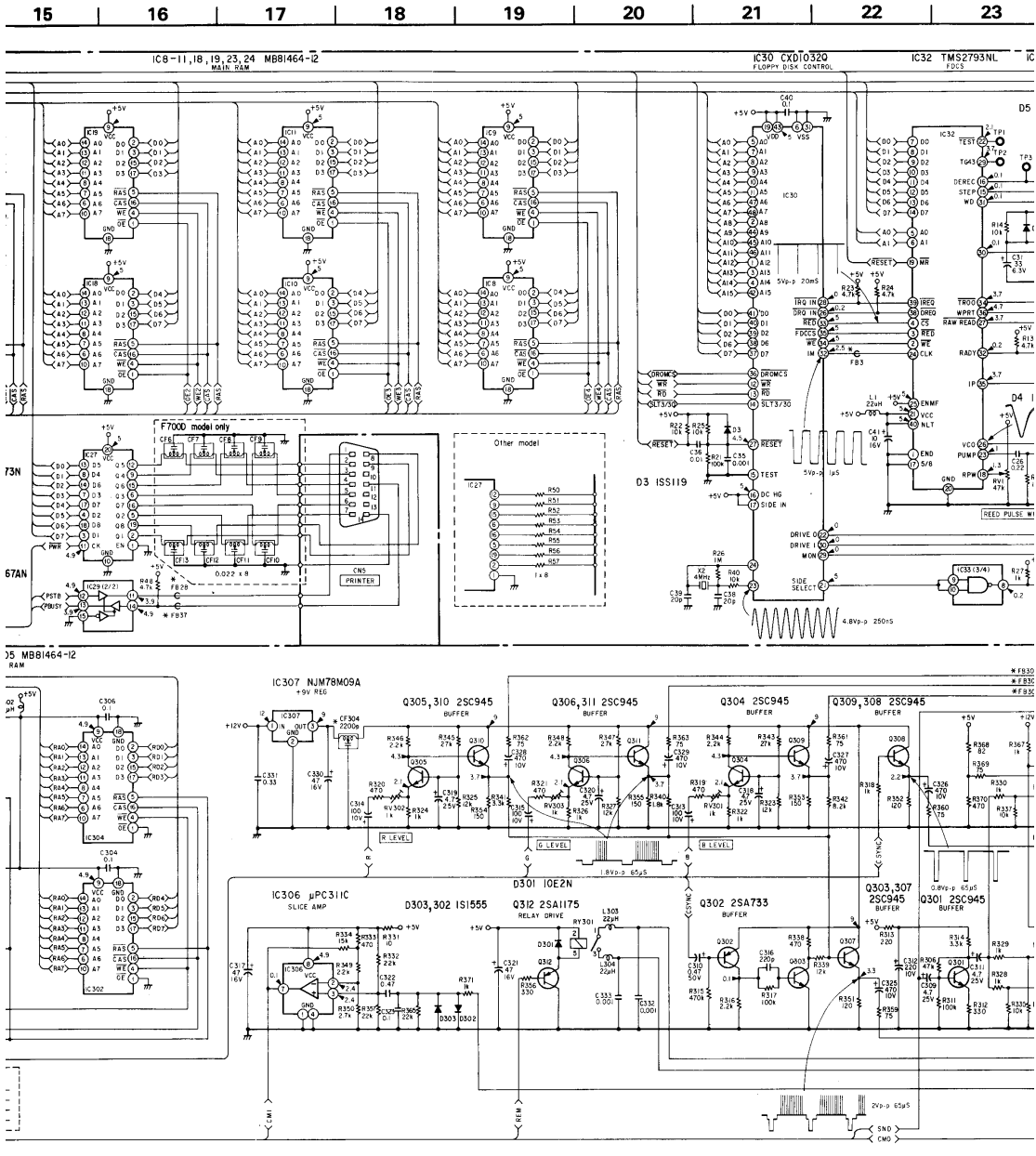


# HB-F700P/F700S/F700F/F700D

8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16

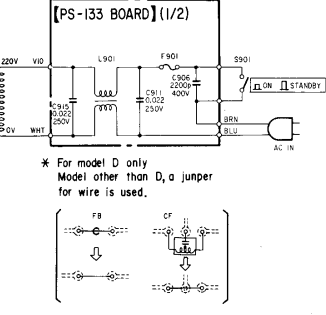
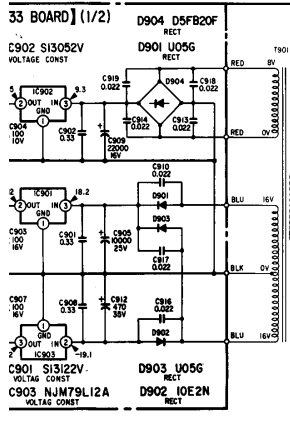
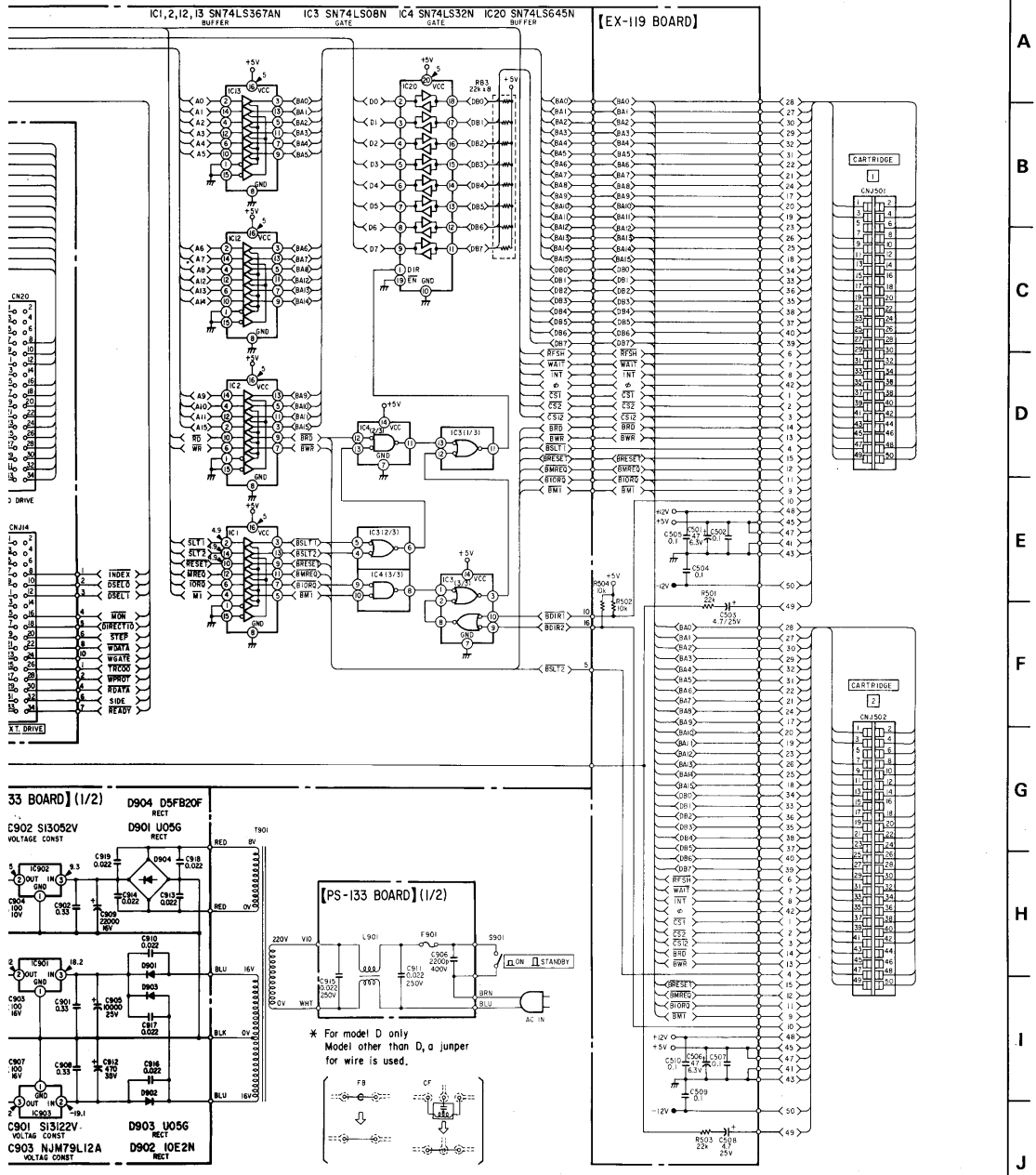


# HB-F700P/F700S/F700F/F700





7 28 29 30 31 32 33 34 35



**HB-F700P/F700S/F700F/F700D**



MOUNTING DIAGRAMS — drive section —  
— Conductor Side —

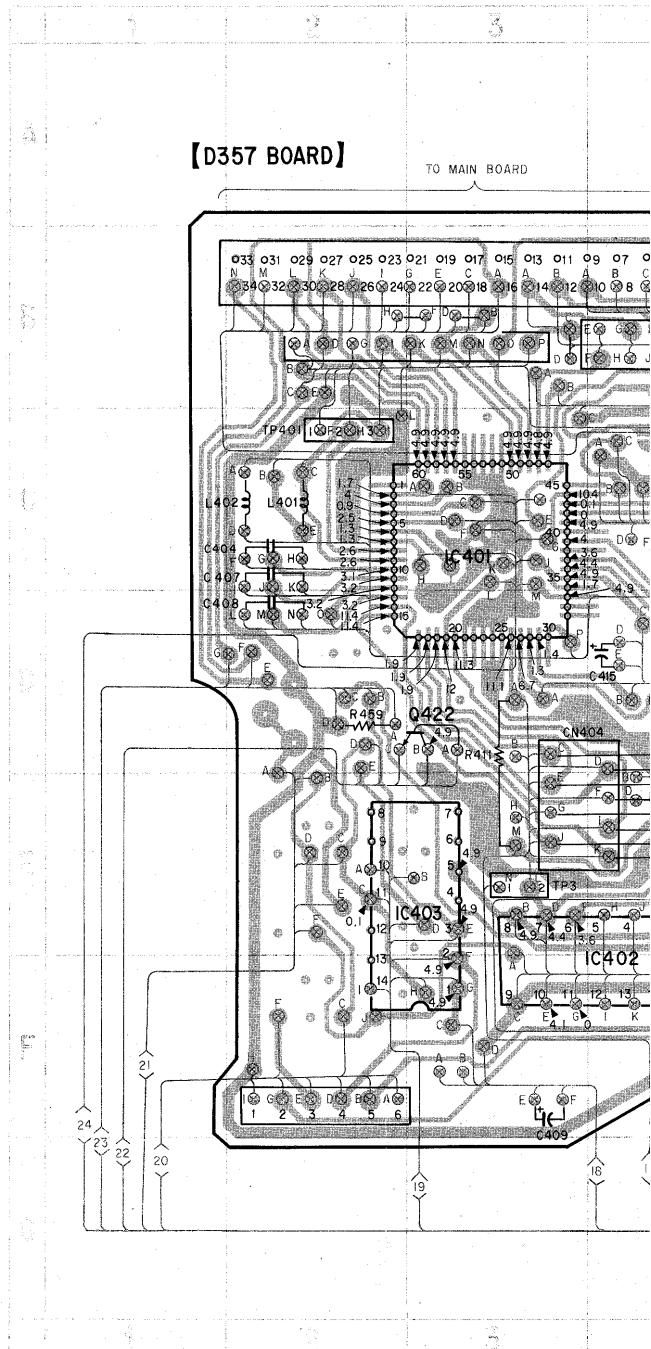
● See page 59 for note.  
● See page 65 for Semiconduct

● SEMICONDUCTOR LOCATION

Ref. No.	Location
D401	E-11
IC401	C-3
IC402	F-4
IC403	E-3
Q407	C-11
Q410	F-13
Q411	F-10
Q412	F-12
Q413	F-12
Q414	F-12
Q415	E-12
Q420	D-12
Q421	D-12
Q423	D-3
Q424	F-8

● SEMICONDUCTOR LOCATION

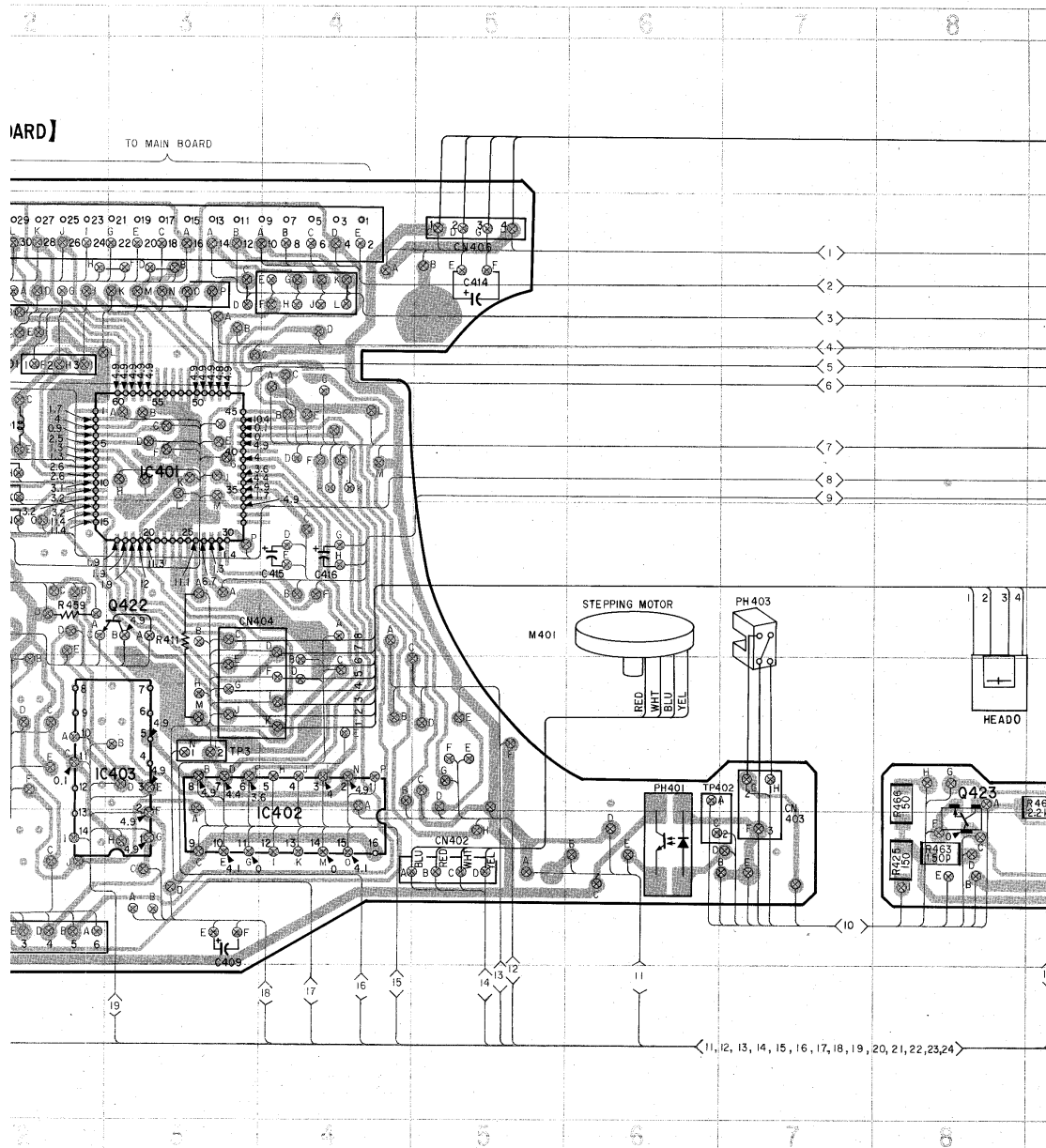
Ref. No.	Location
D401	B-14
IC405	E-19

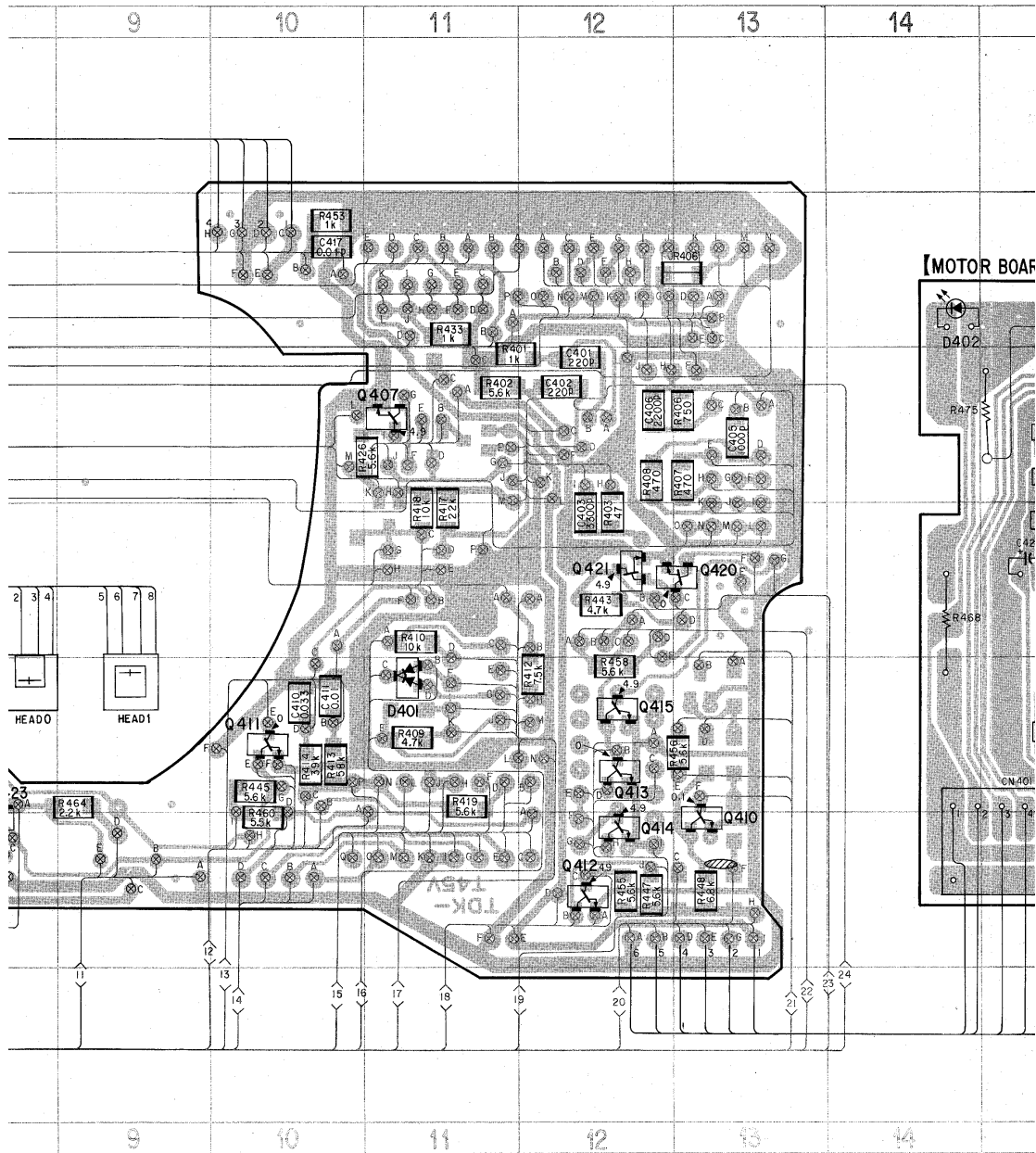


# OOD HB-F700P/F700S/F700F/F700D

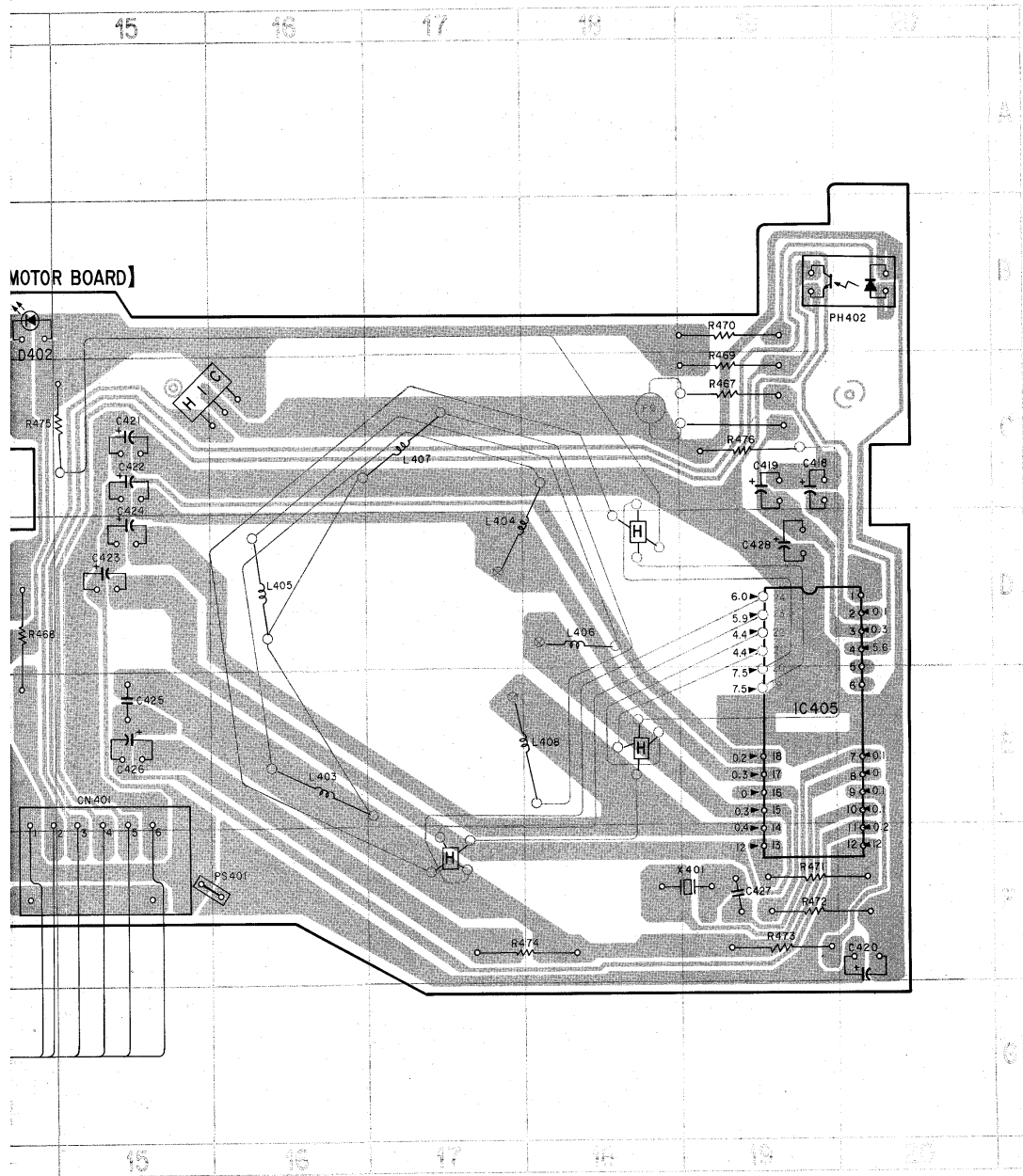
section —

- See page 59 for note.
- See page 65 for Semiconductor lead layouts.



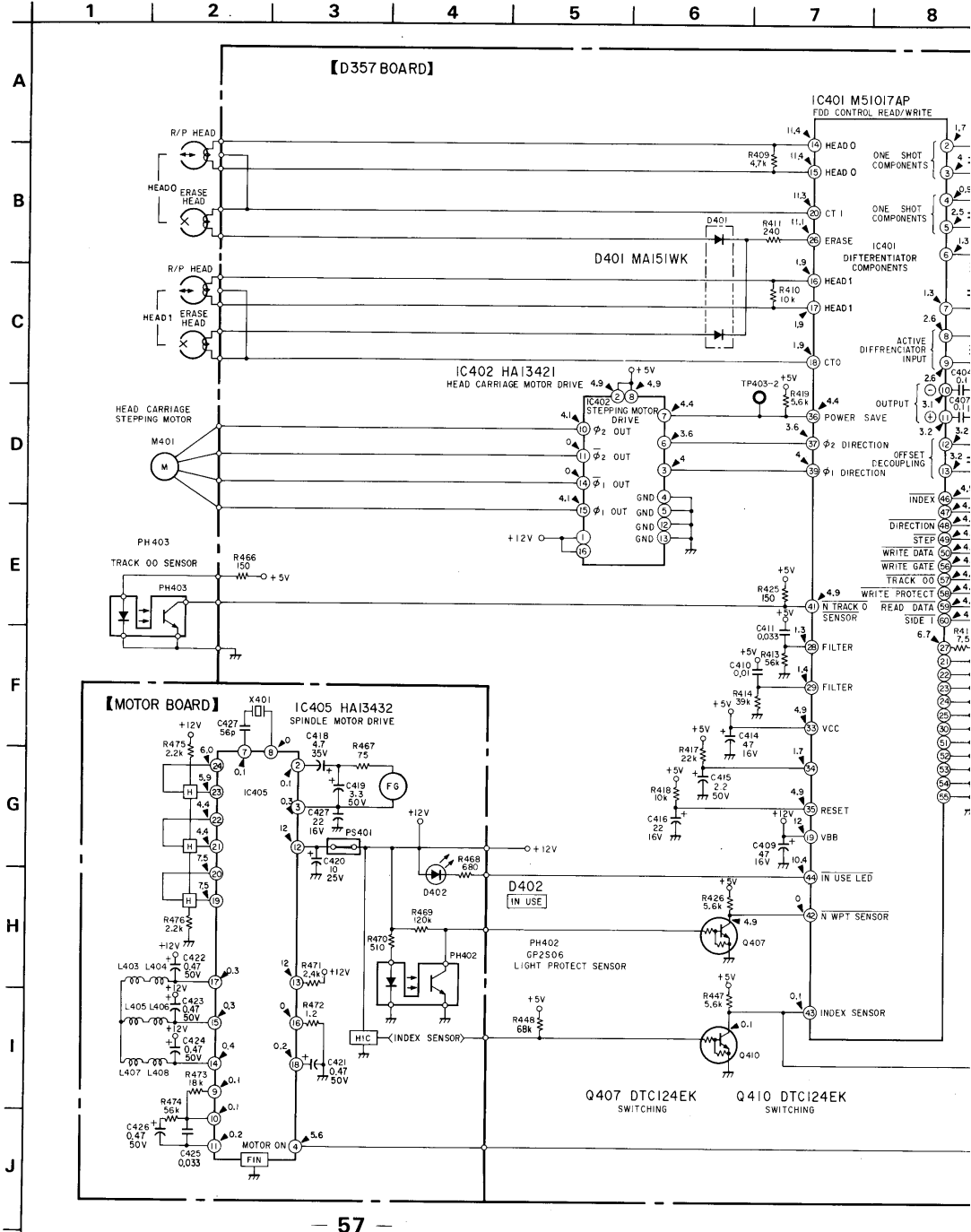


**DD HB-F700P/F700S/F700F/F700D**



# HB-F70OP/F70OS/F70OF/F70OD HB-

SCHEMATIC DIAGRAM — drive section — • See page 59 for note.





# HB-F700P/F700S/F700F/F700D

**Note:**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\mu\text{F}$  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $\frac{1}{4}\text{W}$  or less unless otherwise specified.

**Note: The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**

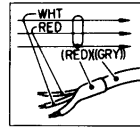
• Switch

Ref. No.	Switch	Position
S1	RESET	OFF
S701	SWITCH	OFF
S702	SWITCH	OFF
S901	POWER	OFF

- : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50k $\Omega$ /V).
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground by using oscilloscope. Voltage variations may be noted due to normal production tolerances.

**Note:**

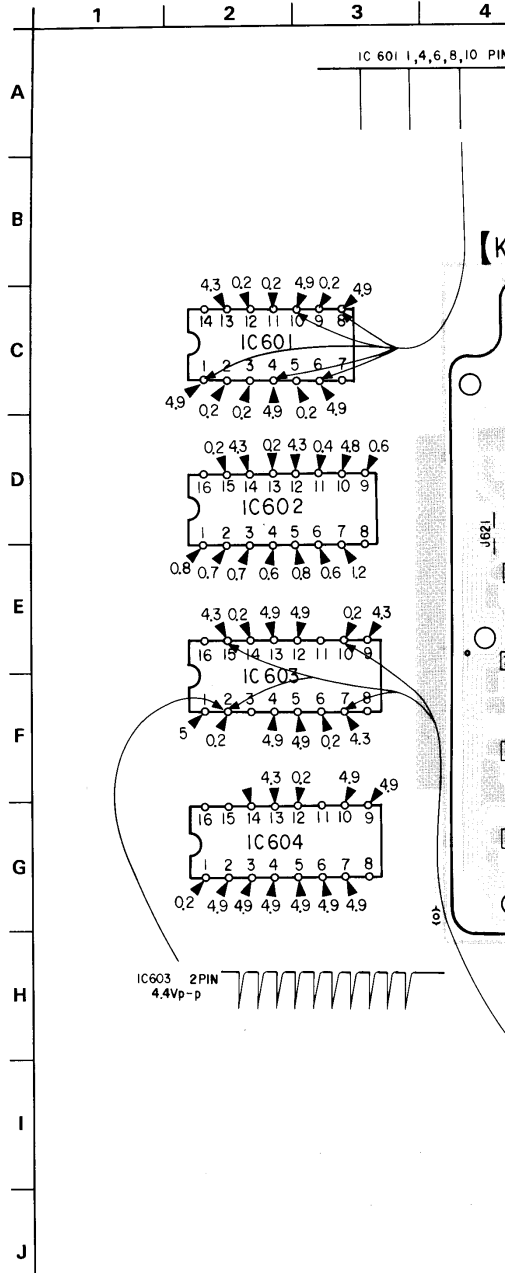
- Color code of sleeving over the end of the jacket.



- $\otimes$  : Through hole.

**HB-F700P/F700S/F700F/F700D**

**MOUNTING DIAGRAM**  
 - Conductor Side -

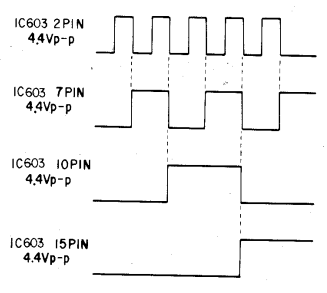
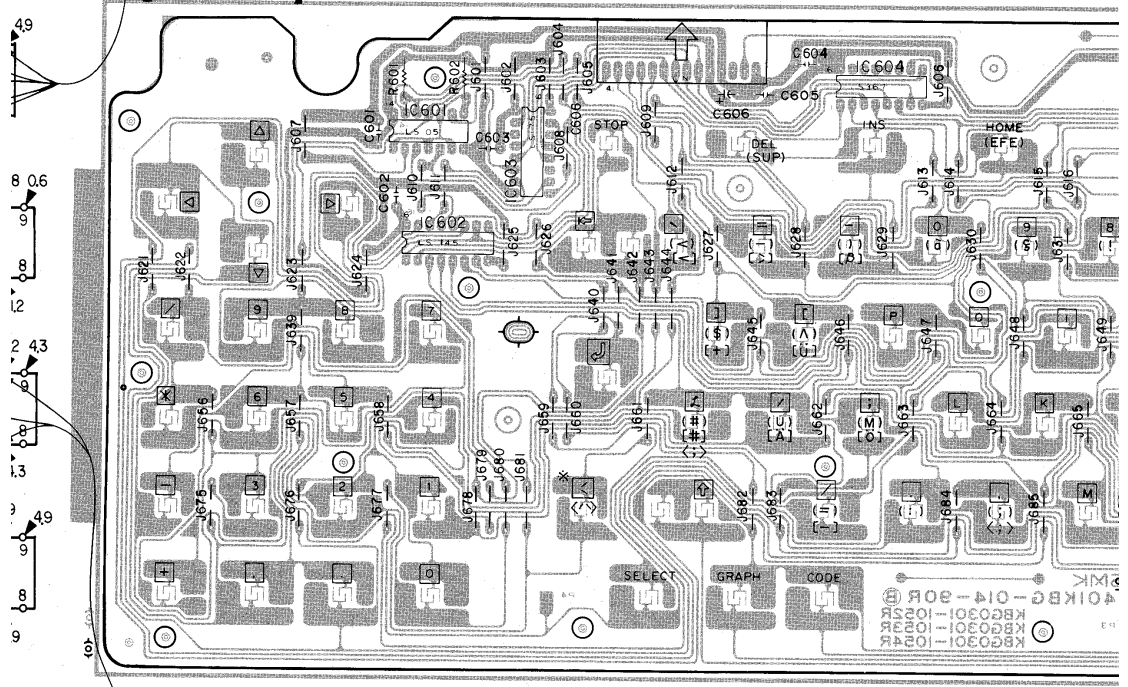




3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11

IC 601 1,4,6,8,10 PIN 5.0Vp-p

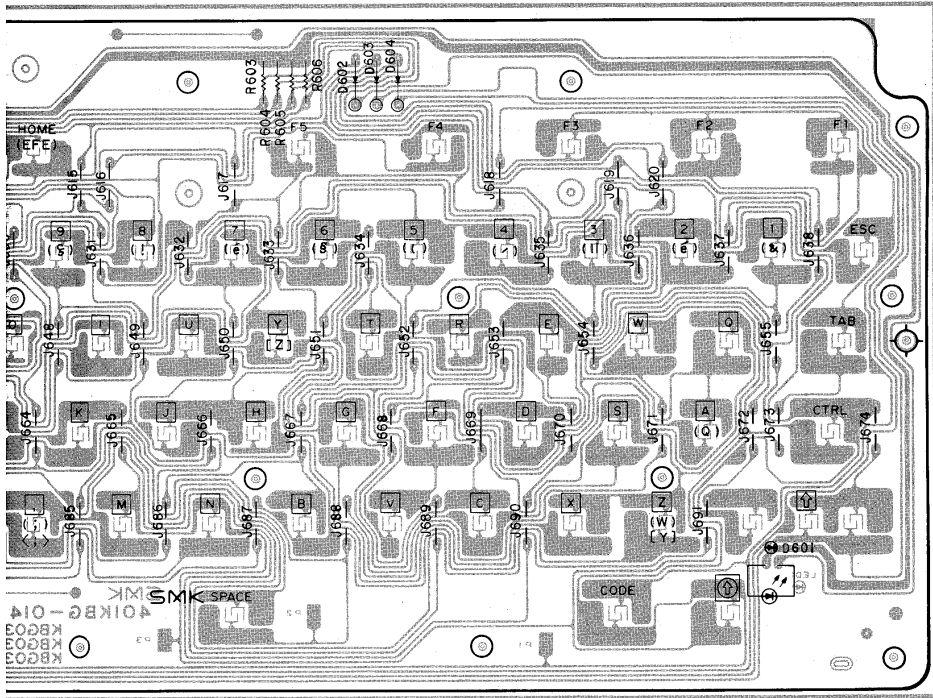
**【KEYBOARD】**



**0D HB-F700P/F700S/F700F/F700D**

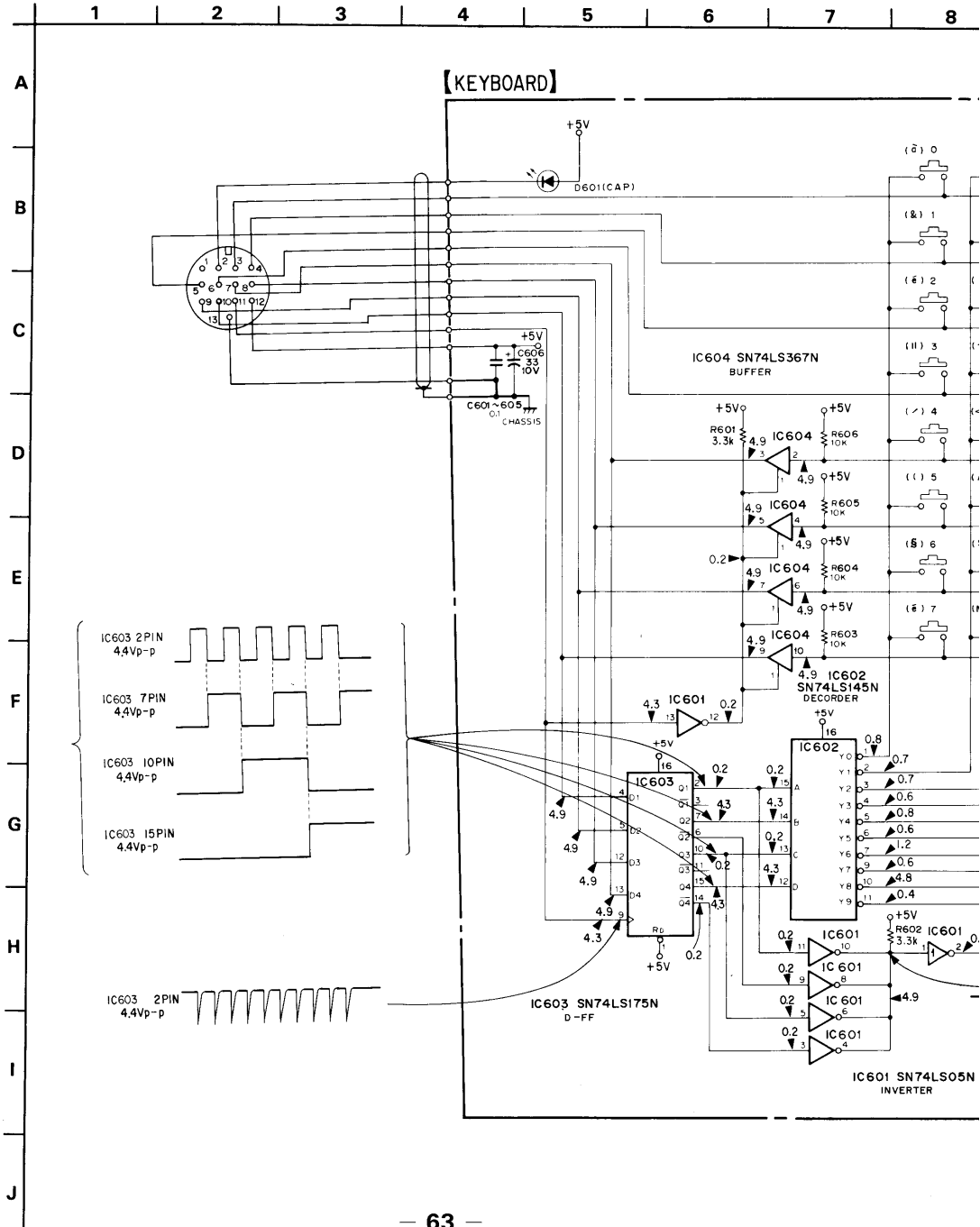
11 12 13 14 15 16 17 18

A  
B  
C  
D  
E  
F  
G  
H  
I  
J

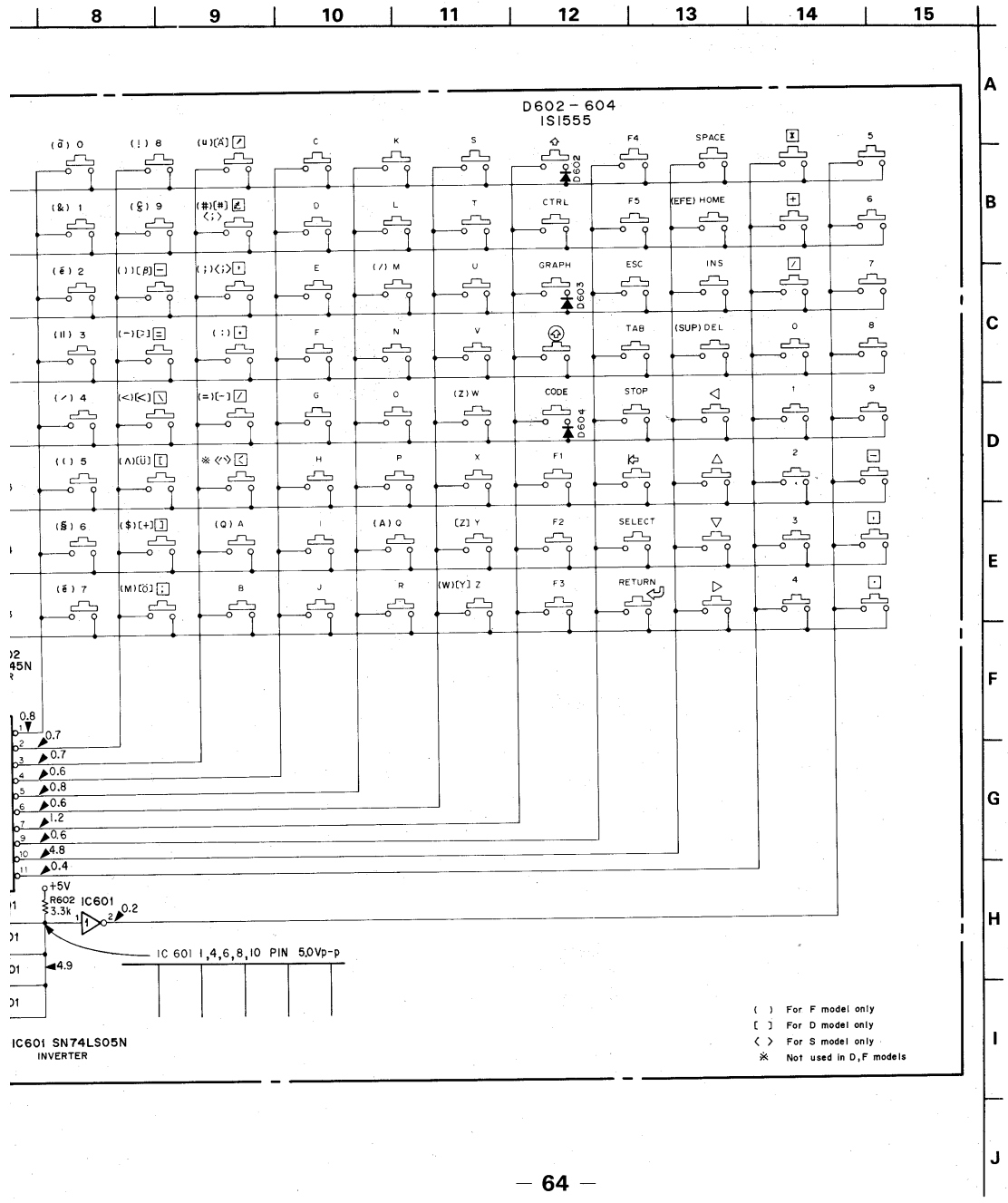


- ( ) For F model only
- [ ] For D model only
- < > For S model only
- \* Not used in D, F models

SCHEMATIC DIAGRAM

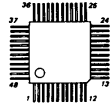


**DOD HB-F700P/F700S/F700F/F700D**

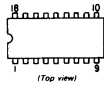


Semiconductor Lead Layouts

CXD1032Q



MB81464-12



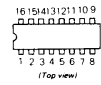
SI3052V  
SI3122V



V9838



HA13421  
MB882101518M  
SN74LS139N  
SN74LS145N  
SN74LS157N  
SN74LS175N  
SN74LS367AV



MB83256  
μPD23C256EC-156



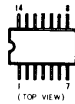
SN74LS00N  
SN74LS04N  
SN74LS05N  
SN74LS06N  
SN74LS08N  
SN74LS30N  
SN74LS32N  
SN74LS38N  
SN74LS93N



2SA1175



LA6339M



NJM78M09A



SN74LS244N  
SN74LS373N  
SN74LS645N  
TMS2793NL



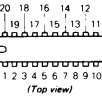
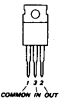
2SC2603F  
DTC124ES



LH0080A



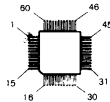
NJM79L12A



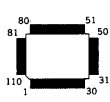
ST23F



M51017AP



S-1985



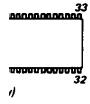
TL431CP  
μPC311C



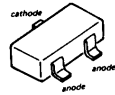
1S1555  
10E2N  
11D004  
RD5.1E-L1



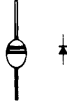
# HB-F700P/F700S/F700F/F700D



**1S2837**



**U06G**



**DTC114EK  
DTC124EK  
RTIN441C**



**1SS119**



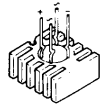
**BR3432S**



**2SC2021**



**D5FB20F**



**EL23F**



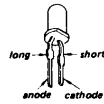
**GP2S06**



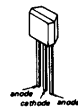
**MA3100M**



**GL-3PG5  
TLG124A**



**SVC203**



**LED4**



# HB-F700P/F700S/F700F/F700D

## SECTION 7

### EXPLODED VIEWS AND PARTS LIST

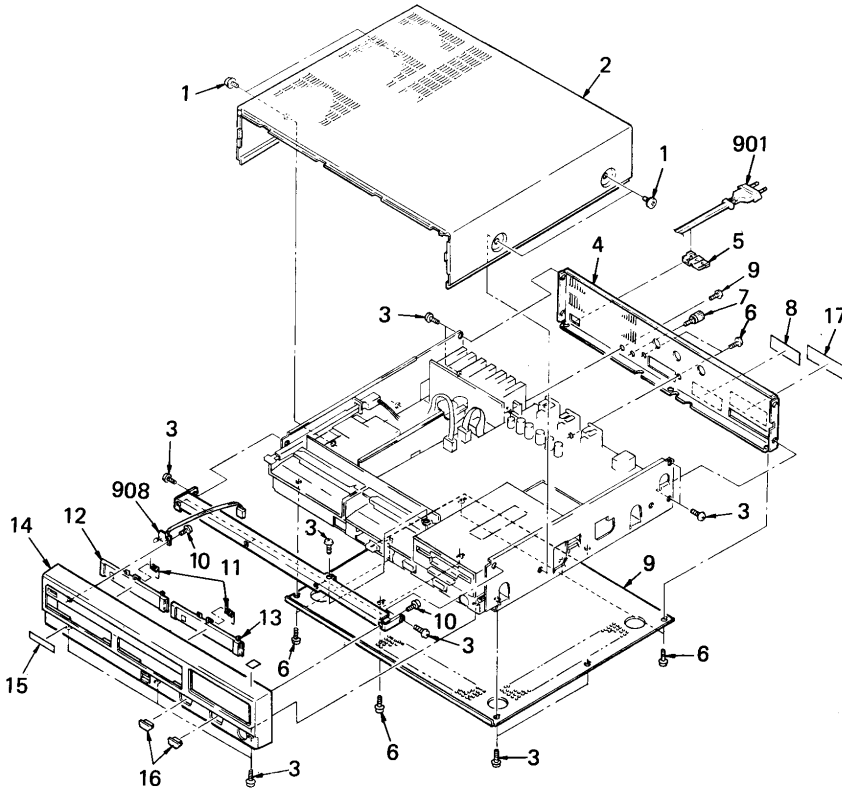
**NOTE:**

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

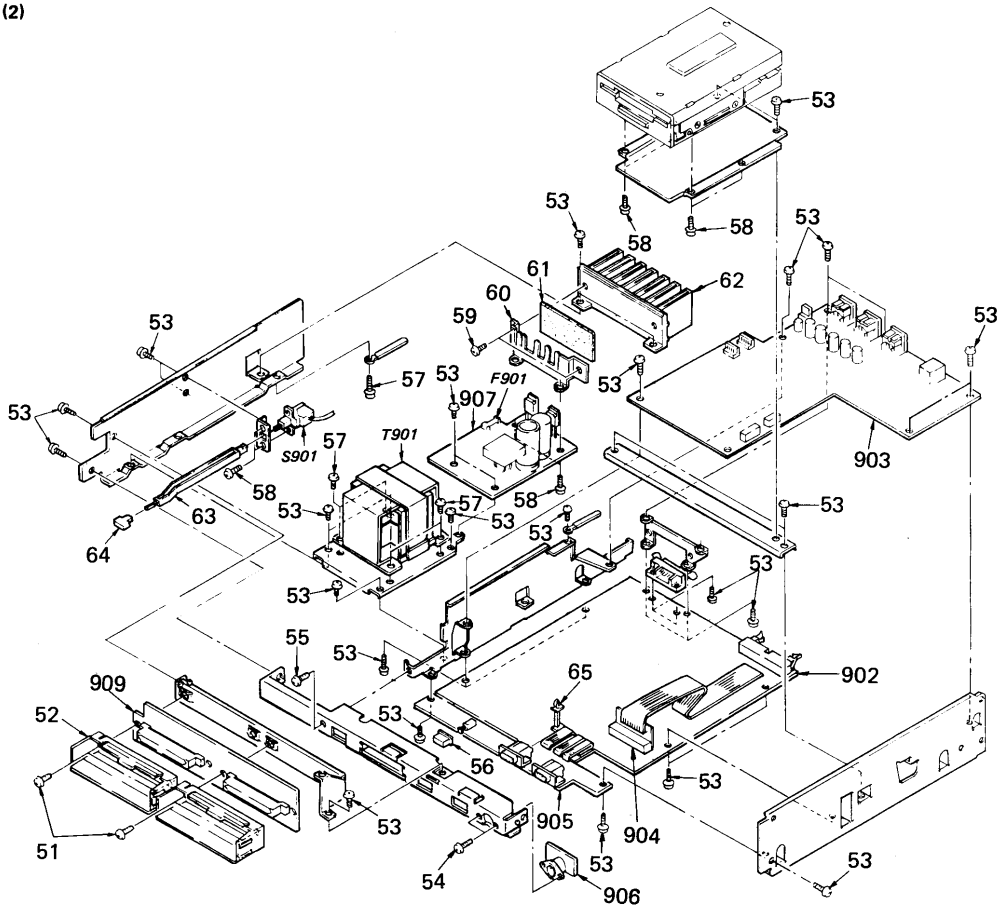
(1)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
1	4-889-321-01	SCREW		14	X-4608-905-1	(HB-F700P)...PANEL ASSY, FRONT	
2	4-608-924-02	CASE			X-4608-906-1	(HB-F700S)...PANEL ASSY, FRONT	
3	7-685-871-01	SCREW +BVTT. 3X6 (S)			X-4608-907-1	(HB-F700F)...PANEL ASSY, FRONT	
4	4-608-932-01	PLATE, JACK			X-4608-908-1	(HB-F700D)...PANEL ASSY, FRONT	
5	2-352-626-01	(HB-F700S).....BUSHING, CORD		15	*4-605-464-01	(HB-F700P)...LABEL, CAUTION	
	3-703-244-00	(HB-F700P/F700F)...BUSHING (2104), CORD			*4-605-478-01	(HB-F700F)...LABEL, CAUTION	
6	7-685-751-09	SCREW +BVTT 3X6 (S)			*4-608-460-01	(HB-F700S)...LABEL, CAUTION	
7	*3-706-165-00	SCREW			*4-608-459-01	(HB-F700D)...LABEL, CAUTION	
8	4-608-935-01	(HB-F700F)...LABEL, MODEL NUMBER		16	*4-605-456-11	COVER, CONNECTOR	
	4-608-936-01	(HB-F700S)...LABEL, MODEL NUMBER		17	4-608-945-01	(HB-F700S)...LABEL, CONNECTOR	
	4-608-937-01	(HB-F700P)...LABEL, MODEL NUMBER					
	4-608-943-01	(HB-F700D)...LABEL, MODEL NUMBER					
9	*4-608-925-11	PLATE, BOTTOM		908	1-619-769-11	PC BOARD, LE-50	
10	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S					
11	4-605-615-01	SPRING					
12	4-608-914-01	LID, CARTRIDGE					
13	4-608-914-11	LID, CARTRIDGE					

# HB-F700P/F700S/F700F/F700D

(2)



The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

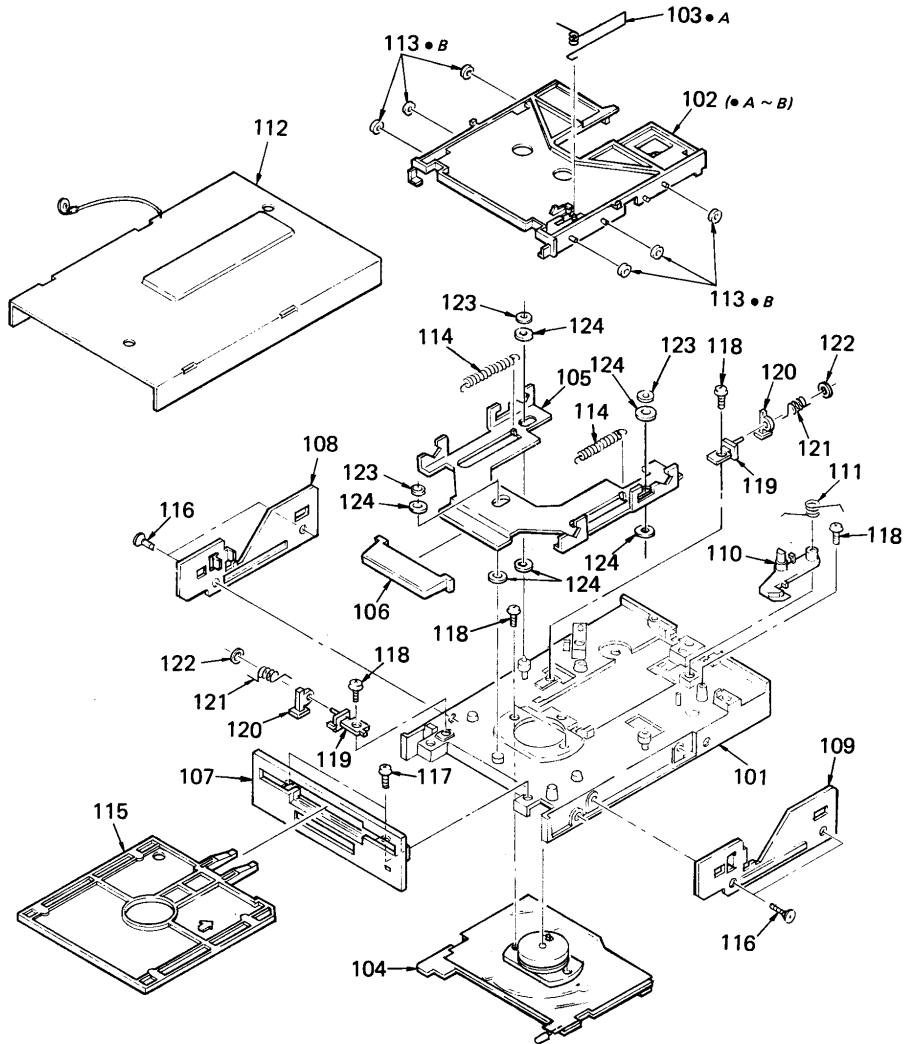
Les composants identifiés par une trame et une marque ▲ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
51	7-685-872-09	SCREW +BVTT 3X8 (S)		902	*A-8080-183-A	(HB-F700P)...MOUNTED PCB, PU-53P	
52	4-608-915-01	HOLDER, CARTRIDGE			*A-8080-188-A	(HB-F700F)...MOUNTED PCB, PR-53F	
53	7-685-871-01	SCREW +BVTT 3X6 (S)			*A-8080-189-A	(HB-F700S)...MOUNTED PCB, PR-53S	
54	7-621-259-25	SCREW +P 2.6X4			*A-8080-193-A	(HB-F700D)...MOUNTED PCB, PU-53D	
55	7-685-751-04	SCREW +PTT 3X6 (S)		903	*A-8080-186-A	(HB-F700P/F/S)...MOUNTED PCB, DUS-135	
					*A-8080-195-A	(HB-F700D)...MOUNTED PCB, DUS-135D	
56	4-608-904-11	BUTTON, RESET		904	1-619-764-11	PC BOARD, CN-149	
57	7-685-880-01	SCREW +BVTT 4X6 (S)		905	1-619-765-11	PC BOARD, CN-150	
58	7-682-646-01	SCREW +PS 3X5		906	1-619-766-11	PC BOARD, CN-151	
59	7-685-145-19	SCREW +BTP 3X6 TYPE2 N-S		907	1-619-768-11	PC BOARD, PS-133	
60	*4-608-901-11	SUPPORT, POWER		909	*1-619-770-11	PC BOARD, EX-119	
61	*4-608-931-01	SHEET, COOL		F901	▲1-532-284-11	FUSE 1630MA	
62	4-902-825-01	HEAT SINK (SMALL)		S901	▲1-553-318-00	SWITCH, PUSH (PC POWER) (1 KEY)	
63	4-608-905-01	ROD, PS		T901	▲1-448-626-11	TRANSFORMER, POWER	
64	4-605-609-21	BUTTON, POWER					
65	*4-875-735-00	SUPPORT, PC					



# HB-F700P/F700S/F700F/F700D

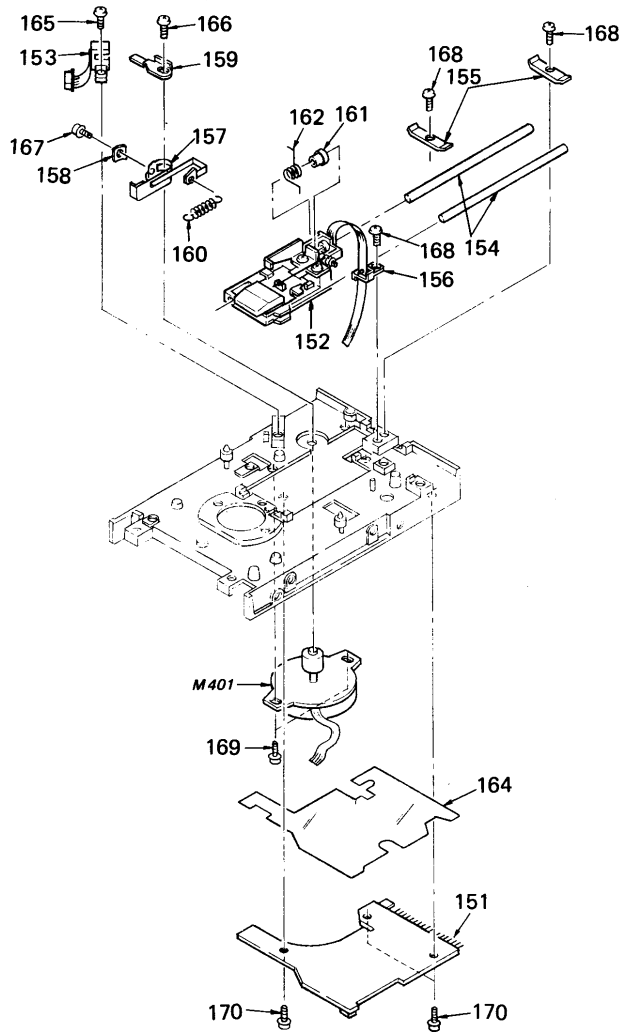
(3)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
101	9-991-097-01	FRAM UNIT (B)		113	9-991-110-01	ROLLER	
102	9-991-098-01	DISK HOLDER		114	9-991-111-01	EJECTOR SPRING	
103	9-991-099-01	INSERT SPRING		115	9-990-318-01	DUMMY DISK	
104	9-991-101-01	D.D MOTOR		116	7-682-247-13	SCREW +K 3X6	
105	9-991-102-01	EJECTOR		117	7-621-770-67	SCREW +B 2.6X6	
106	9-991-103-01	P BUTTON (D)		118	7-621-770-87	SCREW +B 2.6X5	
107	9-989-204-01	FRONT BEZEL (S) ASSY		119	9-991-119-01	SWITCH HOLDER (A)	
108	9-991-104-01	SIDE PLATE (A)		120	9-991-121-01	SWITCH LEVER	
109	9-991-105-01	SIDE PLATE (B)		121	9-991-122-01	LEVER SPRING (B)	
110	9-989-206-01	EJECT HOOK		122	9-991-991-01	WASHER	
111	9-991-108-01	EJECT HOOK SPRING (B)		123	9-991-992-01	WASHER	
112	9-991-109-01	FDD COVER (D)		124	9-9910993-01	WASHER	

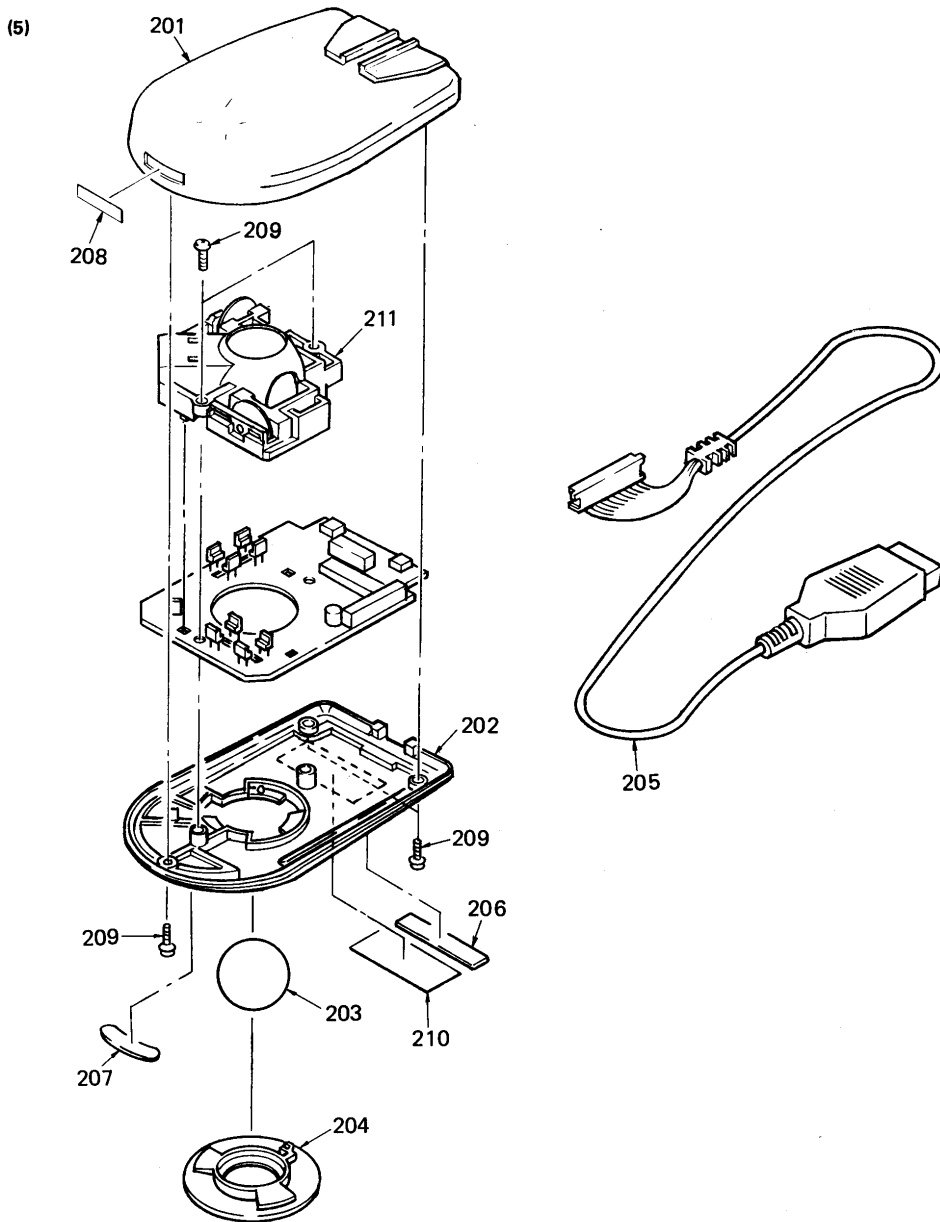
# HB-F700P/F700S/F700F/F700D

(4)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
151	9-991-100-01	MOUNTED BOARD		161	9-991-117-01	GUIDE SHAFT SPACER	
152	9-989-202-01	CARRIAGE ASSY		162	9-991-118-01	SHTLING SPRING (A)	
153	9-989-205-01	OO SENSOR ASSY		164	9-991-123-01	INSULATING SHEET (E)	
154	9-991-106-01	GUIDE SHAFT (C)		165	7-682-147-13	SCREW +P 3X6	
155	9-991-107-01	GUIDE SHAFT CLAMPER		166	7-621-255-22	SCREW +P 2X4	
156	9-991-112-01	FPC HOLDER		167	7-621-259-12	SCREW +P 2.6X3	
157	9-991-113-01	STEEL BELT (A)		168	7-621-770-87	SCREW +B 2.6X5	
158	9-991-114-01	BELT CLAMPER (B)		169	9-991-124-01	BOLT	
159	9-991-115-01	SHUTTER		170	7-628-254-10	SCREW +PS 2.6X6	
160	9-991-116-01	CARRIAGE SPRING		M401	9-989-207-01	STEPPING MOTOR	

# HB-F700P/F700S/F700F/F700D



No.	Part No.	Description
201	9-991-858-01	COVER ASSY
202	9-990-859-01	CASE
203	9-990-860-01	BOLL
204	9-990-861-01	RETAINER
205	9-990-862-01	CORD
206	9-990-863-01	FOOT A

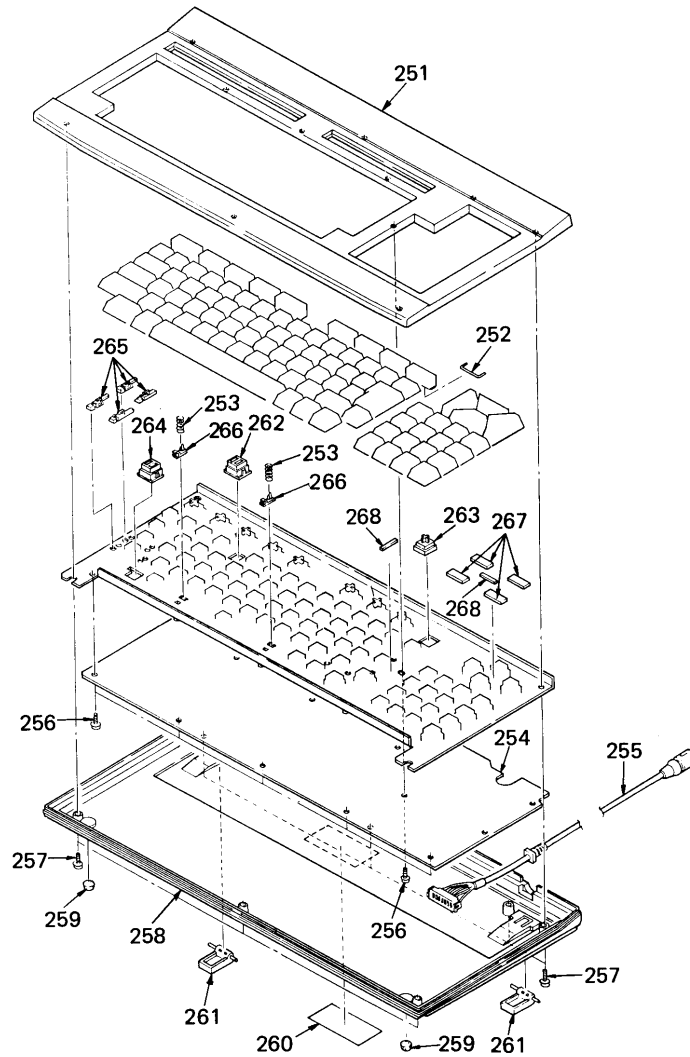
Remarks

No.	Part No.	Description
207	9-990-864-01	FOOT B
208	9-990-865-01	LABEL
209	7-685-134-01	SCREW +P 2.6X8
210	9-990-866-01	LABEL
211	9-990-869-01	ENCODER

Remarks

# HB-F700P/F700S/F700F/F700D

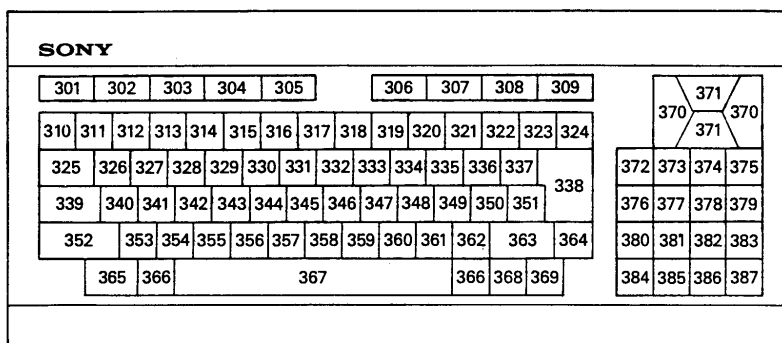
(6)



No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
251	9-990-852-01	CASE, UPPER		261	9-989-305-01	BRACKET	
252	9-989-300-01	SHAFT (FUNCTION SWITCH)		262	9-990-850-01	KEY SWITCH	
253	9-989-301-01	SPRING		263	9-989-295-01	KEY SWITCH (FUNCTION)	
254	9-989-365-01	BOARD, PW		264	9-989-851-01	KEY SWITCH (LED KEY SWITCH)	
255	9-989-366-01	CORD ASSY		265	9-989-293-01	HOOK D	
256	7-682-145-01	SCREW +P 3X4		266	9-989-291-01	HOOK A	
257	7-682-148-01	SCREW +P 3X8		267	9-991-989-01	CUSHION	
258	9-990-853-01	CASE, LOWER		268	9-991-967-01	CUSHION	
259	9-989-306-01	FOOT					
260	9-990-910-01	(HB-F700P)...LABEL (A)					
	9-990-913-01	(HB-F700S)...LABEL (A)					
	9-990-909-01	(HB-F700F)...LABEL (A)					
	9-990-854-01	(HB-F700D)...LABEL (A)					

# HB-F700P/F700S/F700F/F700D

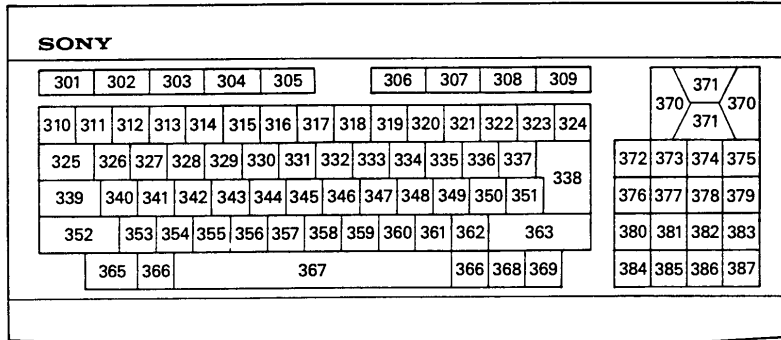
(7)



HB-F700P/F700S			HB-F700P/F700S			HB-F700P/F700S		
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks	Remarks
301	9-989-209-01	KEY TOP		346	9-989-346-01	KEY TOP		
302	9-989-210-01	KEY TOP		347	9-989-347-01	KEY TOP		
303	9-989-211-01	KEY TOP		348	9-989-348-01	KEY TOP		
304	9-989-212-01	KEY TOP		349	9-989-349-01	(HB-F700P)...KEY TOP		
305	9-989-213-01	KEY TOP			9-990-911-01	(HB-F700S)...KEY TOP		
306	9-989-214-01	KEY TOP		350	9-989-350-01	KEY TOP		
307	9-989-215-01	KEY TOP		351	9-989-351-01	(HB-F700P)...KEY TOP		
308	9-989-216-01	KEY TOP			9-990-911-01	(HB-F700S)...KEY TOP		
309	9-989-217-01	KEY TOP		352	9-989-311-01	SHIFT KEY LEFT ASSY		
310	9-989-218-01	KEY TOP		353	9-989-352-01	KEY TOP		
311	9-989-314-01	KEY TOP		354	9-989-353-01	KEY TOP		
312	9-989-315-01	KEY TOP		355	9-989-354-01	KEY TOP		
313	9-989-316-01	KEY TOP		356	9-989-355-01	KEY TOP		
314	9-989-317-01	KEY TOP		357	9-989-356-01	KEY TOP		
315	9-989-318-01	KEY TOP		358	9-989-357-01	KEY TOP		
316	9-989-319-01	KEY TOP		359	9-989-358-01	KEY TOP		
317	9-989-320-01	KEY TOP		360	9-989-359-01	KEY TOP		
318	9-989-321-01	KEY TOP		361	9-989-360-01	KEY TOP		
319	9-989-322-01	KEY TOP		362	9-989-361-01	(HB-F700P)...KEY TOP		
320	9-989-323-01	KEY TOP			9-990-912-01	(HB-F700S)...KEY TOP		
321	9-989-324-01	KEY TOP		363	9-989-312-01	SHIFT KEY RIGHT ASSY		
322	9-989-325-01	KEY TOP		364	9-989-362-01	KEY TOP		
323	9-989-326-01	KEY TOP		365	9-989-363-01	KEY TOP		
324	9-989-327-01	KEY TOP		366	9-989-364-01	KEY TOP		
325	9-989-233-01	KEY TOP		367	9-989-313-01	KEY TOP		
326	9-989-328-01	KEY TOP		368	9-989-270-01	KEY TOP		
327	9-989-329-01	KEY TOP		369	9-989-272-01	KEY TOP		
328	9-989-330-01	KEY TOP		370	9-989-273-01	KEY TOP		
329	9-989-331-01	KEY TOP		371	9-989-274-01	KEY TOP		
330	9-989-332-01	KEY TOP		372	9-989-275-01	KEY TOP		
331	9-989-333-01	KEY TOP		373	9-989-276-01	KEY TOP		
332	9-989-334-01	KEY TOP		374	9-989-277-01	KEY TOP		
333	9-989-335-01	KEY TOP		375	9-989-278-01	KEY TOP		
334	9-989-336-01	KEY TOP		376	9-989-279-01	KEY TOP		
335	9-989-337-01	KEY TOP		377	9-989-280-01	KEY TOP		
336	9-989-338-01	KEY TOP		378	9-989-281-01	KEY TOP		
337	9-989-339-01	KEY TOP		379	9-989-282-01	KEY TOP		
338	9-989-369-01	RETVRN KEY ASSY		380	9-989-283-01	KEY TOP		
339	9-989-310-01	CTRL KEY ASSY		381	9-989-284-01	KEY TOP		
340	9-989-340-01	KEY TOP		382	9-989-285-01	KEY TOP		
341	9-989-341-01	KEY TOP		383	9-989-286-01	KEY TOP		
342	9-989-342-01	KEY TOP		384	9-989-287-01	KEY TOP		
343	9-989-343-01	KEY TOP		385	9-989-288-01	KEY TOP		
344	9-989-344-01	KEY TOP		386	9-989-289-01	KEY TOP		
345	9-989-345-01	KEY TOP		387	9-989-290-01	KEY TOP		

# HB-F700P/F700S/F700F/F700D

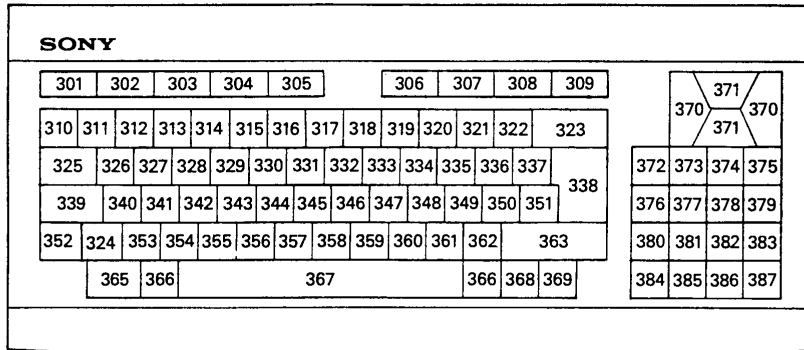
(8)



HB-F700F				HB-F700F			
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
301	9-989-209-01	KEY TOP		346	9-989-346-01	KEY TOP	
302	9-989-210-01	KEY TOP		347	9-989-347-01	KEY TOP	
303	9-989-211-01	KEY TOP		348	9-989-348-01	KEY TOP	
304	9-989-212-01	KEY TOP		349	9-989-406-01	KEY TOP	
305	9-989-213-01	KEY TOP		350	9-989-350-01	KEY TOP	
306	9-989-370-01	KEY TOP		351	9-989-351-01	KEY TOP	
307	9-989-215-01	KEY TOP		352	9-989-311-01	SHIFT KEY LEFT ASSY	
308	9-989-371-01	KEY TOP		353	9-989-352-01	KEY TOP	
309	9-989-217-01	KEY TOP		354	9-989-353-01	KEY TOP	
310	9-989-218-01	KEY TOP		355	9-989-354-01	KEY TOP	
311	9-989-372-01	KEY TOP		356	9-989-355-01	KEY TOP	
312	9-989-373-01	KEY TOP		357	9-989-356-01	KEY TOP	
313	9-989-374-01	KEY TOP		358	9-989-357-01	KEY TOP	
314	9-989-375-01	KEY TOP		359	9-989-415-01	KEY TOP	
315	9-989-376-01	KEY TOP		360	9-989-416-01	KEY TOP	
316	9-989-377-01	KEY TOP		361	9-989-417-01	KEY TOP	
317	9-989-378-01	KEY TOP		362	9-989-418-01	KEY TOP	
318	9-989-379-01	KEY TOP		363	9-989-422-01	SHIFT KEY RIGHT ASSY	
319	9-989-380-01	KEY TOP		364	9-989-363-01	KEY TOP	
320	9-989-381-01	KEY TOP		365	9-989-364-01	KEY TOP	
321	9-989-382-01	KEY TOP		367	9-989-313-01	KEY TOP	
322	9-989-383-01	KEY TOP		368	9-989-270-01	KEY TOP	
323	9-989-384-01	KEY TOP		369	9-989-272-01	KEY TOP	
324	9-989-327-01	KEY TOP		370	9-989-273-01	KEY TOP	
325	9-989-233-01	KEY TOP		371	9-989-274-01	KEY TOP	
326	9-989-385-01	KEY TOP		372	9-989-275-01	KEY TOP	
327	9-989-386-01	KEY TOP		373	9-989-276-01	KEY TOP	
328	9-989-387-01	KEY TOP		374	9-989-277-01	KEY TOP	
329	9-989-331-01	KEY TOP		375	9-989-278-01	KEY TOP	
330	9-989-332-01	KEY TOP		376	9-989-279-01	KEY TOP	
331	9-989-333-01	KEY TOP		377	9-989-280-01	KEY TOP	
332	9-989-334-01	KEY TOP		378	9-989-281-01	KEY TOP	
333	9-989-335-01	KEY TOP		379	9-989-282-01	KEY TOP	
334	9-989-336-01	KEY TOP		380	9-989-283-01	KEY TOP	
335	9-989-337-01	KEY TOP		381	9-989-284-01	KEY TOP	
336	9-989-395-01	KEY TOP		382	9-989-285-01	KEY TOP	
337	9-989-396-01	KEY TOP		383	9-989-286-01	KEY TOP	
338	9-989-369-01	RETVRN KEY ASSY		384	9-989-287-01	KEY TOP	
339	9-989-310-01	CTRL KEY ASSY		385	9-989-288-01	KEY TOP	
340	9-989-397-01	KEY TOP		386	9-989-289-01	KEY TOP	
341	9-989-341-01	KEY TOP		387	9-989-290-01	KEY TOP	
342	9-989-342-01	KEY TOP					
343	9-989-343-01	KEY TOP					
344	9-989-344-01	KEY TOP					
345	9-989-345-01	KEY TOP					

# HB-F70OP / F70OS / F70OF / F70OD

(9)



HB-F700D				HB-F700D			
No.	Part No.	Description	Remarks	No.	Part No.	Description	Remarks
301	9-989-209-01	KEY TOP		346	9-989-346-01	KEY TOP	
302	9-989-210-01	KEY TOP		347	9-989-347-01	KEY TOP	
303	9-989-211-01	KEY TOP		348	9-989-348-01	KEY TOP	
304	9-989-212-01	KEY TOP		349	9-989-976-01	KEY TOP	
305	9-989-213-01	KEY TOP		350	9-989-977-01	KEY TOP	
306	9-989-214-01	KEY TOP		351	9-989-978-01	KEY TOP	
307	9-989-215-01	KEY TOP		352	9-990-033-01	SHIFT KEY LEFT ASSY	
308	9-989-216-01	KEY TOP		353	9-989-980-01	KEY TOP	
309	9-989-217-01	KEY TOP		354	9-989-353-01	KEY TOP	
310	9-989-218-01	KEY TOP		355	9-989-354-01	KEY TOP	
311	9-989-941-01	KEY TOP		356	9-989-355-01	KEY TOP	
312	9-989-942-01	KEY TOP		357	9-989-356-01	KEY TOP	
313	9-989-943-01	KEY TOP		358	9-989-357-01	KEY TOP	
314	9-989-944-01	KEY TOP		359	9-989-986-01	KEY TOP	
315	9-989-945-01	KEY TOP		360	9-989-987-01	KEY TOP	
316	9-989-946-01	KEY TOP		361	9-989-988-01	KEY TOP	
317	9-989-947-01	KEY TOP		362	9-989-989-01	KEY TOP	
318	9-989-948-01	KEY TOP		363	9-989-422-01	SHIFT KEY RIGHT ASSY	
319	9-989-949-01	KEY TOP		364	9-989-363-01	KEY TOP	
320	9-989-950-01	KEY TOP		365	9-989-364-01	KEY TOP	
321	9-989-951-01	KEY TOP		367	9-989-313-01	KEY TOP	
322	9-989-952-01	KEY TOP		368	9-989-270-01	KEY TOP	
323	9-989-953-01	KEY TOP		369	9-989-272-01	KEY TOP	
324	9-989-979-01	KEY TOP		370	9-989-273-01	KEY TOP	
325	9-989-233-01	KEY TOP		371	9-989-274-01	KEY TOP	
326	9-989-955-01	KEY TOP		372	9-989-275-01	KEY TOP	
327	9-989-956-01	KEY TOP		373	9-989-276-01	KEY TOP	
328	9-989-387-01	KEY TOP		374	9-989-277-01	KEY TOP	
329	9-989-331-01	KEY TOP		375	9-989-278-01	KEY TOP	
330	9-989-332-01	KEY TOP		376	9-989-279-01	KEY TOP	
331	9-989-333-01	KEY TOP		377	9-989-280-01	KEY TOP	
332	9-989-334-01	KEY TOP		378	9-989-281-01	KEY TOP	
333	9-989-335-01	KEY TOP		379	9-989-282-01	KEY TOP	
334	9-989-336-01	KEY TOP		380	9-989-283-01	KEY TOP	
335	9-989-337-01	KEY TOP		381	9-989-284-01	KEY TOP	
336	9-989-965-01	KEY TOP		382	9-989-285-01	KEY TOP	
337	9-989-966-01	KEY TOP		383	9-989-286-01	KEY TOP	
338	9-989-369-01	RETRN KEY ASSY		384	9-989-287-01	KEY TOP	
339	9-989-310-01	CTRL KEY ASSY		385	9-989-288-01	KEY TOP	
340	9-989-967-01	KEY TOP		386	9-989-289-01	KEY TOP	
341	9-989-341-01	KEY TOP		387	9-989-290-01	KEY TOP	
342	9-989-342-01	KEY TOP					
343	9-989-343-01	KEY TOP					
344	9-989-344-01	KEY TOP					
345	9-989-345-01	KEY TOP					

# HB-F700P/F700S/F700F/F700D

## SECTION 8 ELECTRICAL PARTS LIST

**NOTE:**

Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

**CAPACITORS:**

MF:  $\mu$ F, PF:  $\mu$ F.

**RESISTORS**

All resistors are in ohms.

F : nonflammable

**COILS**

MMH : mH, UH :  $\mu$ H

**SEMICONDUCTORS**

In each case, U :  $\mu$ , for example:

UA...:  $\mu$ A..., UPA...:  $\mu$ PA..., UPC...:  $\mu$ PC,

UPD...:  $\mu$ PD...

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

**ELECTRICAL PARTS**

Ref.No.	Part No.	Description
901	$\Delta$ 1-558-245-11	(HB-F700P/F700F/F700D)...CORD, POWER
	$\Delta$ 1-558-777-11	(HB-F700S)...CORD, POWER
902	*A-8080-183-A	(HB-F700P)...MOUNTED PCB, PU-53P
	*A-8080-188-A	(HB-F700F)...MOUNTED PCB, PR-53F
	*A-8080-189-A	(HB-F700S)...MOUNTED PCB, PR-53S
	*A-8080-193-A	(HB-F700D)...MOUNTED PCB, PU-53D
903	*A-8080-186-A	(HB-F700P/F/S)...MOUNTED PCB, DUS-135
	*A-8080-195-A	(HB-F700D)...MOUNTED PCB, DUS-135D
904	1-619-764-11	PC BOARD, CN-149
905	1-619-765-11	PC BOARD, CN-150
906	1-619-766-11	PC BOARD, CN-151
907	1-619-768-11	PC BOARD, PS-133
908	1-619-769-11	PC BOARD, LE-50
909	*1-619-770-11	PC BOARD, EX-119
910	*1-464-682-11	(HB-F700F)...KEY BOARD UNIT
	*1-464-683-11	(HB-F700P)...KEY BOARD UNIT
	*1-464-684-11	(HB-F700S)...KEY BOARD UNIT
	*1-464-681-11	(HB-F700D)...KEY BOARD UNIT
911	1-550-246-11	MOUSE
BT1	1-528-171-11	BATTERY, STORAGE, NI-CD(GB50H)
C1	1-162-561-11	CERAMIC 0.1MF 16V
C2	1-162-561-11	CERAMIC 0.1MF 16V
C3	1-162-561-11	CERAMIC 0.1MF 16V
C4	1-162-561-11	CERAMIC 0.1MF 16V
C5	1-162-561-11	CERAMIC 0.1MF 16V
C6	1-162-561-11	CERAMIC 0.1MF 16V
C7	1-162-561-11	CERAMIC 0.1MF 16V
C8	1-162-561-11	CERAMIC 0.1MF 16V
C9	1-162-561-11	CERAMIC 0.1MF 16V
C10	1-162-561-11	CERAMIC 0.1MF 16V
C11	1-162-561-11	CERAMIC 0.1MF 16V
C12	1-162-561-11	CERAMIC 0.1MF 16V
C13	1-162-561-11	CERAMIC 0.1MF 16V
C14	1-162-561-11	CERAMIC 0.1MF 16V
C15	1-162-561-11	CERAMIC 0.1MF 16V
C16	1-162-561-11	CERAMIC 0.1MF 16V
C17	1-162-561-11	CERAMIC 0.1MF 16V
C18	1-162-561-11	CERAMIC 0.1MF 16V
C19	1-162-561-11	CERAMIC 0.1MF 16V
C24	1-162-561-11	CERAMIC 0.1MF 16V
C25	1-162-561-11	CERAMIC 0.1MF 16V
C26	1-136-169-00	FILM 0.22MF 5% 50V
C27	1-136-153-00	FILM 0.01MF 5% 50V
C28	1-162-561-11	CERAMIC 0.1MF 16V
C29	1-123-369-00	ELECT 4.7MF 20% 25V

**ELECTRICAL PARTS**

Ref.No.	Part No.	Description
C30	1-162-561-11	CERAMIC 0.1MF 16V
C31	1-123-318-00	ELECT 33MF 20% 6.3V
C32	1-162-561-11	CERAMIC 0.1MF 16V
C33	1-162-561-11	CERAMIC 0.1MF 16V
C35	1-102-074-00	CERAMIC 0.001MF 10% 50V
C36	1-136-153-00	FILM 0.01MF 5% 50V
C37	1-162-561-11	CERAMIC 0.1MF 16V
C38	1-102-958-00	CERAMIC 20PF 5% 50V
C39	1-102-958-00	CERAMIC 20PF 5% 50V
C40	1-162-561-11	CERAMIC 0.1MF 16V
C41	1-123-356-00	ELECT 10MF 20% 16V
C42	1-162-561-11	CERAMIC 0.1MF 16V
C43	1-123-646-00	ELECT 33MF 20% 6.3V
C44	1-162-561-11	CERAMIC 0.1MF 16V
C45	1-162-561-11	CERAMIC 0.1MF 16V
C46	1-162-561-11	CERAMIC 0.1MF 16V
C47	1-102-965-00	CERAMIC 39PF 5% 50V
C48	1-101-888-00	CERAMIC 68PF 5% 50V
C49	1-101-884-00	(HB-F700D)...CERAMIC 56PF 50V
C50	1-162-561-11	CERAMIC 0.1MF 16V
C51	1-102-951-00	CERAMIC 15PF 5% 50V
C52	1-123-380-00	ELECT 1MF 20% 50V
C53	1-162-561-11	CERAMIC 0.1MF 16V
C301	1-162-561-11	CERAMIC 0.1MF 16V
C302	1-123-307-00	ELECT 100MF 20% 10V
C303	1-102-959-00	CERAMIC 22PF 5% 50V
C304	1-162-561-11	CERAMIC 0.1MF 16V
C305	1-162-561-11	CERAMIC 0.1MF 16V
C306	1-162-561-11	CERAMIC 0.1MF 16V
C307	1-162-561-11	CERAMIC 0.1MF 16V
C308	1-162-561-11	CERAMIC 0.1MF 16V
C309	1-123-369-00	ELECT 4.7MF 20% 25V
C310	1-123-379-00	ELECT 0.47MF 20% 50V
C311	1-123-369-00	ELECT 4.7MF 20% 25V
C312	1-123-308-00	ELECT 220MF 20% 10V
C313	1-123-307-00	ELECT 100MF 20% 10V
C314	1-123-307-00	ELECT 100MF 20% 10V
C315	1-123-307-00	ELECT 100MF 20% 10V
C316	1-102-978-00	CERAMIC 220PF 5% 50V
C317	1-123-332-00	ELECT 47MF 20% 16V
C318	1-123-369-00	ELECT 4.7MF 20% 25V
C319	1-123-369-00	ELECT 4.7MF 20% 25V
C320	1-123-369-00	ELECT 4.7MF 20% 25V
C321	1-123-332-00	ELECT 47MF 20% 16V
C322	1-136-173-00	FILM 0.47MF 5% 50V
C323	1-162-561-11	CERAMIC 0.1MF 16V



# HB-F7OOP / F7OOS / F7OOF / F7OOD

## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C324	1-162-561-11	CERAMIC	0.1MF		16V
C325	1-123-310-00	ELECT	470MF	20%	10V
C326	1-123-310-00	ELECT	470MF	20%	10V
C327	1-123-310-00	ELECT	470MF	20%	10V
C328	1-123-310-00	ELECT	470MF	20%	10V
C329	1-123-310-00	ELECT	470MF	20%	10V
C330	1-123-332-00	ELECT	47MF	20%	16V
C331	1-136-171-00	FILM	0.33MF	5%	50V
C332	1-102-074-00	CERAMIC	0.001MF	10%	50V
C333	1-102-074-00	CERAMIC	0.001MF	10%	50V
C334	1-106-188-00	MYLAR	0.0047MF	10%	50V
C335	1-123-369-00	ELECT	4.7MF	20%	25V
C336	1-123-380-00	ELECT	1MF	20%	50V
C337	1-123-369-00	ELECT	4.7MF	20%	25V
C401	1-163-189-11	CERAMIC CHIP	220PF		50V
C402	1-163-199-11	CERAMIC CHIP	560PF		50V
C403	1-163-053-11	CERAMIC CHIP	0.0033MF		50V
C404	9-989-169-01	CERAMIC	0.1		50V
C405	1-163-047-11	CERAMIC CHIP	0.001MF		50V
C406	1-216-051-11	CERAMIC CHIP	0.0022MF		50V
C407	9-989-169-01	CERAMIC	0.1		50V
C408	9-989-169-01	CERAMIC	0.1		50V
C409	9-989-170-01	ELECT	47		16V
C410	1-163-059-11	CERAMIC CHIP	0.01MF		50V
C411	1-163-078-11	CERAMIC CHIP	0.033MF		50V
C414	9-989-170-01	ELECT	470		16V
C415	9-989-171-01	ELECT	2.2		50V
C416	9-989-172-01	ELECT	22		50V
C417	1-163-059-11	CERAMIC CHIP	0.01MF		50V
C418	1-124-245-11	ELECT	4.7MF		35V
C419	1-124-258-11	ELECT	3.3MF		50V
C420	1-124-240-11	ELECT	10MF		25V
C421	1-124-253-11	ELECT	0.47MF		50V
C422	1-124-253-11	ELECT	0.47MF		50V
C423	1-124-253-11	ELECT	0.47MF		50V
C424	1-124-253-11	ELECT	0.47MF		50V
C425	1-130-522-11	FILM	0.033MF		50V
C426	1-124-253-11	ELECT	0.47MF		50V
C501	1-123-306-00	ELECT	47MF	20%	6.3V
C502	1-161-974-00	CERAMIC	0.1MF	20%	16V
C503	1-123-369-00	ELECT	4.7MF	20%	25V
C504	1-161-974-00	CERAMIC	0.1MF	20%	16V
C505	1-161-974-00	CERAMIC	0.1MF	20%	16V
C506	1-123-306-00	ELECT	47MF	20%	6.3V
C507	1-161-974-00	CERAMIC	0.1MF	20%	16V
C508	1-123-369-00	ELECT	4.7MF	20%	25V
C509	1-161-974-00	CERAMIC	0.1MF	20%	16V
C510	1-161-974-00	CERAMIC	0.1MF	20%	16V
C701	9-990-877-01	TANTAL	2.2MF		
C702	9-990-875-01	ELECT	47MF		6.3V
C703	9-990-875-01	ELECT	47MF		6.3V
C901	1-136-171-00	FILM	0.33MF	5%	50V
C902	1-136-171-00	FILM	0.33MF	5%	50V
C903	1-123-333-00	ELECT	100MF	20%	16V
C904	1-123-307-00	ELECT	100MF	20%	10V
C905	1-124-772-11	ELECT	10000MF	20%	25V
C906	1-161-742-00	CERAMIC	0.0022MF	20%	400V
C907	1-123-333-00	ELECT	100MF	20%	16V
C908	1-136-171-00	FILM	0.33MF	5%	50V

## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C909	1-125-413-00	ELECT(BLOCK)	22000MF	20%	16V
C910	1-101-005-00	CERAMIC	0.022MF		50V
C911	1-136-211-00	FILM	0.022MF	20%	250V
C912	1-123-348-00	ELECT	470MF	20%	35V
C913	1-101-005-00	CERAMIC	0.022MF		50V
C914	1-101-005-00	CERAMIC	0.022MF		50V
C915	1-136-211-00	FILM	0.022MF	20%	250V
C916	1-101-005-00	CERAMIC	0.022MF		50V
C917	1-101-005-00	CERAMIC	0.022MF		50V
C918	1-101-005-00	CERAMIC	0.022MF		50V
C919	1-101-005-00	CERAMIC	0.022MF		50V
CF1	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF2	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF3	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF4	1-421-752-21	(HB-F700D)...FILTER, NOISE			
CF5	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF6	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF7	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF8	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF9	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF10	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF11	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF12	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF13	1-235-056-21	(HB-F700D)...FILTER, LINE			
CF301	1-421-752-21	(HB-F700D)...FILTER, NOISE			
CF302	1-421-752-21	(HB-F700D)...FILTER, NOISE			
CF303	1-421-752-21	(HB-F700D)...FILTER, NOISE			
CF304	1-421-752-21	(HB-F700D)...FILTER, NOISE			
CN1	*1-562-877-11	RECEPTACLE, MULTI CONNECTOR			50P
CN5	1-563-005-31	CONNECTOR			14P
CN8	*1-562-564-11	SOCKET, CONNECTOR			8P
CN9	*1-562-251-00	SOCKET, CONNECTOR			6P
CN10	*1-562-251-00	SOCKET, CONNECTOR			6P
CN11	*1-562-327-00	SOCKET, CONNECTOR			3P
CN13	*1-564-376-11	PIN, CONNECTOR			
CN14	1-506-948-11	PIN, CONNECTOR			34P
CN16	1-564-372-00	PIN, CONNECTOR			9P
CN17	1-564-372-00	PIN, CONNECTOR			9P
CN20	*1-563-436-11	CONNECTOR, MULTI			34P
CN23	1-563-111-11	JACK			13P
CN301	*1-564-241-00	PIN, CONNECTOR			4P
CN302	*1-506-611-11	PIN, CONNECTOR			8P
CN303	*1-506-947-11	PIN, CONNECTOR			6P
CN304	*1-506-945-11	PIN, CONNECTOR			3P
CN305	*1-506-944-11	PIN, CONNECTOR			2P
CN306	*1-506-947-11	PIN, CONNECTOR			6P
CN307	1-561-468-00	SOCKET, CONNECTOR (DIN8P)			
CN308	1-562-121-00	CONNECTOR, DIN			6P
CN309	1-561-468-00	SOCKET, CONNECTOR (DIN8P)			
CN310	*1-506-944-11	PIN, CONNECTOR			2P
CN311	*1-564-241-00	PIN, CONNECTOR			4P
CN501	1-562-383-00	SOCKET, CONNECTOR			
CN502	1-562-383-00	SOCKET, CONNECTOR			
CN503	*1-562-728-11	CONNECTOR, MULTI			50P
CN901	*1-564-242-00	PIN, CONNECTOR			5P
CV1	1-141-304-21	TRIMMER, CERAMIC			
CV301	1-141-254-00	CAP, TRIMMER			
D1	8-719-101-49	DIODE RDS.1E-L1			
D2	8-719-200-29	DIODE 11DQ04			
D3	8-719-911-19	DIODE 1SS119			

# HB-F700P/F700S/F700F/F700D

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
D4	8-719-911-19	DIODE 1SS119
D5	8-719-911-19	DIODE 1SS119
D6	8-719-911-19	DIODE 1SS119
D7	8-719-908-57	DIODE SVC203
D301	8-719-200-77	DIODE 10E2N
D302	8-719-911-19	DIODE 1SS119
D303	8-719-911-19	DIODE 1SS119
D304	8-719-911-19	DIODE 1SS119
D401	8-719-100-05	DIODE 1S2837
D402	9-989-197-01	DIODE LED4
D601	8-719-934-35	DIODE BR3432S
D602	8-719-815-55	DIODE 1S1555
D603	8-719-815-55	DIODE 1S1555
D604	8-719-815-55	DIODE 1S1555
D701	9-990-867-01	DIODE EL23F
D702	9-990-867-01	DIODE EL23F
D703	9-990-867-01	DIODE EL23F
D704	9-990-867-01	DIODE EL23F
D705	8-719-400-82	DIODE MA3100M
D706	8-719-400-82	DIODE MA3100M
D707	8-719-911-19	DIODE 1SS119
D901	8-719-011-55	DIODE U05G
D902	8-719-200-77	DIODE 10E2N
D903	8-719-011-55	DIODE U05G
D904	8-719-500-09	DIODE D5FB20F
D905	8-719-912-43	DIODE TLG124A
F901	A.1-532-284-11	FUSE T630mA
FB	1-543-274-21	(HB-F700D)...BAND FERRITE
IC1	8-759-903-67	IC SN74LS367AN
IC2	8-759-903-67	IC SN74LS367AN
IC3	8-759-900-08	IC SN74LS08N
IC4	8-759-900-32	IC SN74LS32N
IC5	8-759-111-42	(HB-F700S)...IC UPD23C256EC-156
IC5	8-759-925-62	(HB-F700P)...IC MB83256-251
IC5	8-759-927-68	(HB-F700F)...IC MB83256-253
IC5	8-759-938-81	(HB-F700D)...IC MSM38256-U0RS
IC6	8-759-111-43	(HB-F700S)...IC UPD23C256EC-157
IC6	8-759-925-61	(HB-F700P)...IC MB83256-256
IC6	8-759-927-69	(HB-F700F)...IC MB83256-254
IC6	8-759-938-82	(HB-F700D)...IC MSM38256-U2RS
IC7	8-759-901-39	IC SN74LS139N
IC8	8-759-922-42	IC MB81464-12
IC9	8-759-922-42	IC MB81464-12
IC10	8-759-922-42	IC MB81464-12
IC11	8-759-922-42	IC MB81464-12
IC12	8-759-903-67	IC SN74LS367AN
IC13	8-759-903-67	IC SN74LS367AN
IC14	8-759-916-80	IC LH0080A
IC15	8-759-900-32	IC SN74LS32N
IC16	8-759-900-00	IC SN74LS00N
IC17	8-759-901-57	IC SN74LS157N
IC18	8-759-922-42	IC MB81464-12
IC19	8-759-922-42	IC MB81464-12
IC20	8-759-906-45	IC SN74LS645N
IC21	8-759-900-30	IC SN74LS30N
IC22	8-759-901-57	IC SN74LS157N
IC23	8-759-922-42	IC MB81464-12
IC24	8-759-922-42	IC MB81464-12

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
IC25	8-759-933-46	IC S1985
IC26	8-759-900-04	IC SN74LS04N
IC27	8-759-903-73	IC SN74LS373N
IC28	8-759-903-67	IC SN74LS367AN
IC29	8-759-903-67	IC SN74LS367AN
IC30	8-759-922-98	IC CXD1032Q
IC31	8-759-911-41	IC TL431CP
IC32	8-759-974-69	IC TMS2793NL
IC33	8-759-900-38	IC SN74LS38N
IC34	8-759-974-06	IC SN7406N
IC35	8-759-902-44	IC SN74LS244N
IC301	8-759-922-51	IC V9938
IC302	8-759-922-42	IC MB81464-12
IC303	8-759-922-42	IC MB81464-12
IC304	8-759-922-42	IC MB81464-12
IC305	8-759-922-42	IC MB81464-12
IC306	8-759-131-11	IC UPC311C
IC307	8-759-700-14	IC NJM78M09A
IC401	9-989-165-01	IC M51017AP
IC402	8-759-303-01	IC HA13421
IC403	8-759-900-93	IC SN74LS93N
IC601	8-759-900-05	IC SN74LS05
IC602	8-759-901-45	IC SN74LS145N
IC603	8-759-901-75	IC SN74LS175N
IC604	8-759-903-67	IC SN74LS367
IC701	9-988-485-01	IC LA6339M
IC702	9-990-870-01	IC MB882101518M
IC901	8-749-931-22	IC S13122V
IC902	8-749-930-52	IC S13052Y
IC903	8-759-700-69	IC NJM79L12A
L1	1-408-413-00	MICRO INDUCTOR 22UH
L301	1-408-413-00	MICRO INDUCTOR 22UH
L302	1-408-413-00	MICRO INDUCTOR 22UH
L303	1-408-413-00	MICRO INDUCTOR 22UH
L304	1-408-413-00	MICRO INDUCTOR 22UH
L401	9-989-168-01	COIL 330MH
L402	9-989-168-01	COIL 330MH
L701	9-990-876-01	COIL 22MH
L901	1-421-895-11	COIL, SU
M401	9-989-207-01	STEPPING MOTOR
PH401	9-911-127-01	PHOTO INTERRUPTER GP2S06
PH402	9-911-127-01	PHOTO INTERRUPTER GP2S06
PS401	1-532-679-11	IC PROTECTOR
Q1	8-729-117-54	TRANSISTOR 2SA1175
Q301	8-729-606-33	TRANSISTOR 2SC2603-F
Q302	8-729-117-54	TRANSISTOR 2SA1175
Q303	8-729-606-33	TRANSISTOR 2SC2603-F
Q304	8-729-606-33	TRANSISTOR 2SC2603-F
Q305	8-729-606-33	TRANSISTOR 2SC2603-F
Q306	8-729-606-33	TRANSISTOR 2SC2603-F
Q307	8-729-606-33	TRANSISTOR 2SC2603-F
Q308	8-729-606-33	TRANSISTOR 2SC2603-F
Q309	8-729-606-33	TRANSISTOR 2SC2603-F
Q310	8-729-606-33	TRANSISTOR 2SC2603-F
Q311	8-729-606-33	TRANSISTOR 2SC2603-F

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

# HB-F700P/F700S/F700F/F700D

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q312	8-729-117-54	TRANSISTOR 2SA1175
Q313	8-729-900-36	TRANSISTOR DTC124ES
Q314	8-729-900-36	TRANSISTOR DTC124ES
Q407	8-729-901-00	TRANSISTOR DTC124EK
Q410	8-729-901-00	TRANSISTOR DTC124EK
Q411	8-729-901-00	TRANSISTOR DTC124EK
Q412	8-729-901-00	TRANSISTOR DTC124EK
Q413	9-991-128-01	TRANSISTOR RT1N441C
Q414	8-729-901-00	TRANSISTOR DTC124EK
Q415	8-729-900-53	TRANSISTOR DTC114EK
Q420	8-729-901-00	TRANSISTOR DTC124EK
Q421	8-729-901-11	TRANSISTOR DTC124EK
Q422	8-729-902-11	TRANSISTOR 2SC2021
Q423	8-729-901-00	TRANSISTOR DTC124EK
Q701	9-990-868-01	TRANSISTOR ST23F
Q702	9-990-868-01	TRANSISTOR ST23F
Q703	9-990-868-01	TRANSISTOR ST23F
Q704	9-990-868-01	TRANSISTOR ST23F
Q705	1-806-827-11	TRANSISTOR 2SC2405
R1	1-247-855-00	CARBON 10K 5% 1/6W
R2	1-247-855-00	CARBON 10K 5% 1/6W
R8	1-247-831-00	CARBON 1K 5% 1/6W
R9	1-247-836-00	CARBON 1.6K 5% 1/6W
R10	1-247-842-00	CARBON 3K 5% 1/6W
R11	1-247-815-00	CARBON 220 5% 1/6W
R12	1-249-441-11	CARBON 100K 5% 1/6W
R13	1-247-847-00	CARBON 4.7K 5% 1/6W
R14	1-247-855-00	CARBON 10K 5% 1/6W
R15	1-247-855-00	CARBON 10K 5% 1/6W
R16	1-247-855-00	CARBON 10K 5% 1/6W
R17	1-247-855-00	CARBON 10K 5% 1/6W
R18	1-247-855-00	CARBON 10K 5% 1/6W
R19	1-247-855-00	CARBON 10K 5% 1/6W
R20	1-247-855-00	CARBON 10K 5% 1/6W
R21	1-249-441-11	CARBON 100K 5% 1/6W
R22	1-247-855-00	CARBON 10K 5% 1/6W
R23	1-247-847-00	CARBON 4.7K 5% 1/6W
R24	1-247-847-00	CARBON 4.7K 5% 1/6W
R25	1-247-855-00	CARBON 10K 5% 1/6W
R26	1-247-903-00	CARBON 1M 5% 1/6W
R27	1-247-831-00	CARBON 1K 5% 1/6W
R28	1-247-831-00	CARBON 1K 5% 1/6W
R29	1-247-831-00	CARBON 1K 5% 1/6W
R30	1-247-831-00	CARBON 1K 5% 1/6W
R31	1-247-831-00	CARBON 1K 5% 1/6W
R32	1-247-831-00	CARBON 1K 5% 1/6W
R33	1-247-855-00	CARBON 10K 5% 1/6W
R34	1-249-419-11	CARBON 1.5K 5% 1/6W
R35	1-247-855-00	CARBON 10K 5% 1/6W
R36	1-247-823-00	CARBON 470 5% 1/6W
R37	1-247-871-00	CARBON 47K 5% 1/6W
R38	1-249-441-11	CARBON 100K 5% 1/6W
R39	1-249-423-11	CARBON 3.3K 5% 1/6W
R40	1-247-855-00	CARBON 10K 5% 1/6W
R48	1-247-847-00	CARBON 4.7K 5% 1/6W
R50	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R51	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W

## ELECTRICAL PARTS

Ref.No.	Part No.	Description
R52	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R53	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R54	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R55	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R56	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R57	1-249-447-11	(HB-F700P/F700F/F700S) ...CARBON 1 5% 1/4W
R301	1-247-895-00	CARBON 470K 5% 1/6W
R302	1-247-791-00	CARBON 22 5% 1/6W
R303	1-247-791-00	CARBON 22 5% 1/6W
R304	1-247-791-00	CARBON 22 5% 1/6W
R305	1-247-791-00	CARBON 22 5% 1/6W
R306	1-247-871-00	CARBON 47K 5% 1/6W
R307	1-247-839-00	CARBON 2.2K 5% 1/6W
R308	1-247-839-00	CARBON 2.2K 5% 1/6W
R309	1-247-839-00	CARBON 2.2K 5% 1/6W
R310	1-247-839-00	CARBON 2.2K 5% 1/6W
R311	1-249-441-11	CARBON 100K 5% 1/6W
R312	1-247-819-00	CARBON 330 5% 1/6W
R313	1-247-815-00	CARBON 220 5% 1/6W
R314	1-249-423-11	CARBON 3.3K 5% 1/6W
R315	1-247-895-00	CARBON 470K 5% 1/6W
R316	1-247-839-00	CARBON 2.2K 5% 1/6W
R317	1-249-441-11	CARBON 100K 5% 1/6W
R318	1-247-831-00	CARBON 1K 5% 1/6W
R319	1-247-823-00	CARBON 470 5% 1/6W
R320	1-247-823-00	CARBON 470 5% 1/6W
R321	1-247-823-00	CARBON 470 5% 1/6W
R322	1-247-831-00	CARBON 1K 5% 1/6W
R323	1-247-857-00	CARBON 12K 5% 1/6W
R324	1-247-831-00	CARBON 1K 5% 1/6W
R325	1-247-857-00	CARBON 12K 5% 1/6W
R326	1-247-831-00	CARBON 1K 5% 1/6W
R327	1-247-857-00	CARBON 12K 5% 1/6W
R328	1-247-831-00	CARBON 1K 5% 1/6W
R329	1-247-831-00	CARBON 1K 5% 1/6W
R330	1-247-831-00	CARBON 1K 5% 1/6W
R331	1-247-783-00	CARBON 10 5% 1/6W
R332	1-249-433-11	CARBON 22K 5% 1/6W
R333	1-247-823-00	CARBON 470 5% 1/6W
R334	1-247-859-00	CARBON 15K 5% 1/6W
R335	1-249-422-11	CARBON 2.7K 5% 1/6W
R336	1-249-422-11	CARBON 2.7K 5% 1/6W
R337	1-249-422-11	CARBON 2.7K 5% 1/6W
R339	1-247-857-00	CARBON 12K 5% 1/6W
R340	1-249-420-11	CARBON 1.8K 5% 1/6W
R341	1-249-423-11	CARBON 3.3K 5% 1/6W
R342	1-247-853-00	CARBON 8.2K 5% 1/6W
R343	1-249-434-11	CARBON 27K 5% 1/6W
R344	1-247-839-00	CARBON 2.2K 5% 1/6W
R345	1-249-434-11	CARBON 27K 5% 1/6W
R346	1-247-839-00	CARBON 2.2K 5% 1/6W
R347	1-249-434-11	CARBON 27K 5% 1/6W
R348	1-247-839-00	CARBON 2.2K 5% 1/6W
R349	1-247-839-00	CARBON 2.2K 5% 1/6W

# HB-F70OP/F70OS/F70OF/F70OD

## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R350	1-249-422-11	CARBON	2.7K	5%	1/6W
R351	1-247-809-00	CARBON	120	5%	1/6W
R352	1-247-809-00	CARBON	120	5%	1/6W
R353	1-247-811-00	CARBON	150	5%	1/6W
R354	1-247-811-00	CARBON	150	5%	1/6W
R355	1-247-811-00	CARBON	150	5%	1/6W
R356	1-247-819-00	CARBON	330	5%	1/6W
R357	1-249-433-11	CARBON	22K	5%	1/6W
R358	1-247-831-00	CARBON	1K	5%	1/6W
R359	1-247-804-00	CARBON	75	5%	1/6W
R360	1-247-804-00	CARBON	75	5%	1/6W
R361	1-247-804-00	CARBON	75	5%	1/6W
R362	1-247-804-00	CARBON	75	5%	1/6W
R363	1-247-804-00	CARBON	75	5%	1/6W
R364	1-247-847-00	CARBON	4.7K	5%	1/6W
R365	1-249-433-11	CARBON	22K	5%	1/6W
R366	1-247-795-00	CARBON	33	5%	1/6W
R367	1-247-831-00	CARBON	1K	5%	1/6W
R368	1-247-805-00	CARBON	82	5%	1/6W
R369	1-247-804-00	CARBON	75	5%	1/6W
R371	1-247-831-00	CARBON	1K	5%	1/6W
R372	1-247-813-00	CARBON	180	5%	1/6W
R373	1-247-831-00	CARBON	1K	5%	1/6W
R374	1-247-831-00	CARBON	1K	5%	1/6W
R375	1-247-871-00	CARBON	47K	5%	1/6W
R376	1-247-855-00	CARBON	10K	5%	1/6W
R377	1-247-855-00	CARBON	10K	5%	1/6W
R401	1-216-214-11	CARBON CHIP	4.7K		1/8W
R402	1-216-216-11	CARBON CHIP	5.6K		
R403	1-216-166-11	CARBON CHIP	47		
R406	1-216-195-11	CARBON CHIP	750		
R407	1-216-190-11	CARBON CHIP	470		
R408	1-216-190-11	CARBON CHIP	470		
R409	1-216-214-11	CARBON CHIP	4.7K		1/8W
R410	1-216-222-11	CARBON CHIP	10K		
R411	9-989-175-01	CARBON	240		
R412	1-216-219-11	CARBON CHIP	7.5K		
R413	1-216-240-11	CARBON CHIP	56K		
R414	1-216-236-11	CARBON CHIP	39K		
R417	1-216-222-11	CARBON CHIP	10K		
R418	1-216-230-11	CARBON CHIP	22K		
R419	1-216-216-11	CARBON CHIP	5.6K		
R425	1-216-178-11	CARBON CHIP	150		
R426	1-216-216-11	CARBON CHIP	5.6K		
R433	1-216-198-11	CARBON CHIP	1K		
R434	9-989-173-01	CARBON	1K		
R439	9-989-173-01	CARBON	1K		
R440	1-216-242-11	CARBON CHIP	68K		
R443	1-216-214-11	CARBON CHIP	4.7K		1/8W
R445	1-216-216-11	CARBON CHIP	5.6K		
R447	1-216-216-11	CARBON CHIP	5.6K		
R448	1-216-242-11	CARBON CHIP	68K		
R453	1-216-246-11	CARBON CHIP	100K		
R455	1-216-216-11	CARBON CHIP	5.6K		
R456	1-216-216-11	CARBON CHIP	5.6K		
R458	1-216-216-11	CARBON CHIP	5.6K		
R459	9-991-126-01	CARBON	180		

## ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R460	1-216-216-11	CARBON CHIP	5.6K		
R463	1-216-178-11	CARBON CHIP	150		
R464	1-216-230-11	CARBON CHIP	22K		
R467	1-246-446-15	CARBON	75		1/4W
R468	1-246-469-15	CARBON	680		1/4W
R469	1-246-523-15	CARBON	120K		1/4W
R470	1-246-466-15	CARBON	510		1/4W
R471	1-246-506-15	CARBON	2.4K		1/4W
R472	1-246-401-15	CARBON	1.2		1/4W
R473	1-246-503-15	CARBON	18K		1/4W
R501	1-249-433-11	CARBON	22K	5%	1/6W
R502	1-247-855-00	CARBON	10K	5%	1/6W
R503	1-249-433-11	CARBON	22K	5%	1/6W
R504	1-247-855-00	CARBON	10K	5%	1/6W
R701	1-216-186-11	CARBON CHIP	330		
R702	1-216-186-11	CARBON CHIP	330		
R703	1-216-206-11	CARBON CHIP	2.2K		
R704	1-216-206-11	CARBON CHIP	2.2K		
R705	1-216-206-11	CARBON CHIP	2.2K		
R706	1-216-206-11	CARBON CHIP	2.2K		
R707	1-216-222-11	CARBON CHIP	10K		
R708	1-216-256-11	CARBON CHIP	270K		
R709	1-246-521-35	CARBON	100K		1/4W
R710	1-216-246-11	CARBON CHIP	100K		
R711	1-216-210-11	CARBON CHIP	3.3K		
R712	1-216-210-11	CARBON CHIP	3.3K		
R713	1-216-246-11	CARBON CHIP	100K		
R714	1-216-210-11	CARBON CHIP	100K		
R715	1-216-210-11	CARBON CHIP	100K		
R716	1-216-238-11	CARBON CHIP	47K		
R717	1-216-222-11	CARBON CHIP	10K		
R718	1-216-214-11	CARBON CHIP	4.7K		
R719	1-246-521-35	CARBON	100K		1/4W
RB1	1-235-724-11	RES, ENCAPSULATED CERMET			
RB2	1-235-724-11	RES, ENCAPSULATED CERMET			
RB3	1-235-728-11	RES, ENCAPSULATED CERMET			
RV1	1-226-774-00	RES, ADJ, METAL GLAZE	47K		
RV2	1-230-523-11	RES, ADJ, METAL GLAZE	10K		
RV301	1-230-520-11	RES, ADJ, METAL GLAZE	1K		
RV302	1-230-520-11	RES, ADJ, METAL GLAZE	1K		
RV303	1-230-520-11	RES, ADJ, METAL GLAZE	1K		
RY301	1-515-520-00	RELAY			
S1	1-553-522-00	SWITCH, PUSH (RESET)			
S701	9-990-872-01	SWITCH			
S702	9-990-872-01	SWITCH			
<del>S901</del>	<del>1-553-318-00</del>	<del>SWITCH, PUSH (AC POWER)(1) KEY</del>			
<del>T901</del>	<del>1-448-626-11</del>	<del>TRANSFORMER, POWER</del>			
TH1	1-800-198-XX	THERMISTOR S-1K			
X1	1-567-098-00	VIBRATOR, CRYSTAL (32.768kHz)			
X2	1-527-726-00	VIBRATOR, CRYSTAL (4MHz)			
X301	1-567-530-11	VIBRATOR, CRYSTAL (21.477MHz)			
X701	9-990-871-01	CRYSTAL			

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

## HB-F700P/F700S/F700F/F700D

### ACCESSORY & PACKING MATERIAL

<u>Part No.</u>	<u>Description</u>
1-550-246-11	MOUSE
1-557-759-11	CABLE, AUDIO VIDEO CONNECTION
3-701-619-00	BAG, POLYETHYLENE, STANDARD
3-701-624-00	BAG, POLYETHYLENE
3-701-630-00	BAG, POLYETHYLENE
*3-764-300-11	(HB-F700P)...CHART, REFERENCE
*3-764-300-32	(HB-F700F)...CHART, REFERENCE
*3-764-300-52	(HB-F700D)...CHART, REFERENCE
3-764-301-32	(HB-F700F)...MANUAL, MSX-BASIC VERSION(2.0)
3-764-301-52	(HB-F700D)...MANUAL, MSX-BASIC VERSION(2.0)
3-764-318-32	(HB-F700D)...MANUAL, MSX-BASIC VERSION(2.0)
3-764-622-11	(HB-F700P)...GUIDE, HIBRID USERS
3-764-622-51	(HB-F700D)...GUIDE, HIBRID USERS
3-764-622-71	(HB-F700P)...GUIDE, HIBRID USERS
3-764-622-81	(HB-F700D)...GUIDE, HIBRID USERS
3-765-517-11	(HB-F700P)...MANUAL, INSTRUCTION
3-765-517-42	(HB-F700F)...MANUAL, INSTRUCTION
3-765-517-51	(HB-F700D)...MANUAL, INSTRUCTION
3-765-517-61	(HB-F700S)...MANUAL, INSTRUCTION
4-608-311-01	CUSHION (KEYBOARD LEFT)
4-608-312-01	CUSHION (KEYBOARD RIGHT)
4-608-940-01	SPACER
4-608-941-01	CUSHION (MAIN RIGHT)
4-608-942-01	CUSHION (MAIN LEFT)
4-609-321-51	(HB-F700P)...INDIVIDUAL CARTON
4-609-321-61	(HB-F700S)...INDIVIDUAL CARTON
4-609-321-71	(HB-F700F)...INDIVIDUAL CARTON
4-609-321-81	(HB-F700D)...INDIVIDUAL CARTON
4-609-356-01	SHEET, PROTECTION
4-832-728-00	SHEET, PROTECTION

# SERVICE MANUAL

*AEP Model*

## CORRECTION

File this correction with the service manual.

No. 1  
April, 1987

See page 78

Incorrect			Correct		
PH401	9-911-127-01	PHOTO INTERRUPTER GP2S06	PH401	9-991-127-01	PHOTO INTERRUPTER GP2S06
PH402	9-911-127-01	PHOTO INTERRUPTER GP2S06	PH402	9-991-127-01	PHOTO INTERRUPTER GP2S06



9-952-495-81

Sony Corporation  
Audio Group

HOME COMPUTER  
**SONY**<sup>®</sup>

English  
87E0240-1  
Printed in Japan  
© 1987. 5