

# HBK-30/HBD-30W

## SERVICE MANUAL



INTERFACE CABLE/  
MICRO FLOPPYDISK DRIVE UNIT  
**SONY**<sup>®</sup>

*Scanned and converted to PDF by HansO, 2001*

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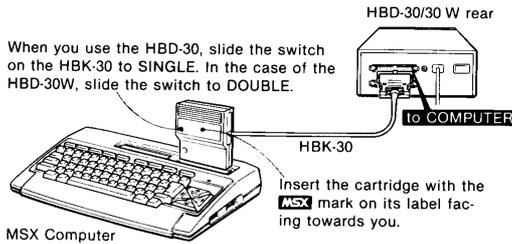
# CHAPTER 1 OPERATION

The HBK-30 floppy disk interface cable is designed exclusively for connecting the Sony HBD-30 or HBD-30W micro floppydisk unit to an MSX computer. The HBK-30 offers MSX-Disk BASIC on ROM and can control up to two HBD-30/30Ws. By sliding the switch on the HBK-30, you can use it with both of micro floppydisk units for a single-sided disk and for a double-sided disk.

## INSTALLATION

### Notes on connection

- Turn off the power for both units before connecting them.
- When disconnecting the connector or cartridge, take hold of the plug or the cartridge. Pulling the cord may break the wires.



- Read "Introduction to MSX-Disk BASIC" (supplied), or refer to the MSX-Disk BASIC section in the operating instructions of the HBD-30/30W.

## CAUTIONS

Turn off the computer whenever you insert or remove a cartridge.

Handle the cartridge with care.

- Do not allow a solid object or liquid to fall into the cartridge case.
- Do not disassemble the cartridge.
- Do not drop the cartridge or bump it against another object.

Do not place the cable near a heat source such as a radiator or air duct, or in a place subject to direct sunlight, excessive dust, mechanical vibration or moisture.

Use this interface cable only with **MSX** or **MSX2** computer.

## SPECIFICATIONS

Interface specifications	Fits MSX slots
Internal ROM	16 K bytes
	Standard I/O routines
	Standard DOS routines
	MSX-Disk BASIC
	Utility routines
Power consumption	+ 12 V 50 mA, 5 V 300 mA or less
Weight	Approx. 280 g (9.9 oz)

While the information given is true at the time of printing, small production changes in the course of our company's policy of improvement through research and design might not necessarily be indicated in the specifications. We would ask you to check with your appointed Sony dealer if clarification on any point is required.

**MSX** is a trademark of Microsoft Corp.

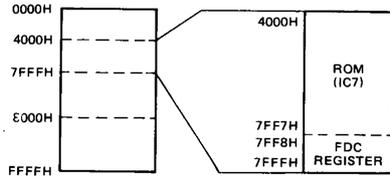


# CHAPTER 3 CIRCUIT DESCRIPTION

## 3-1. FDI

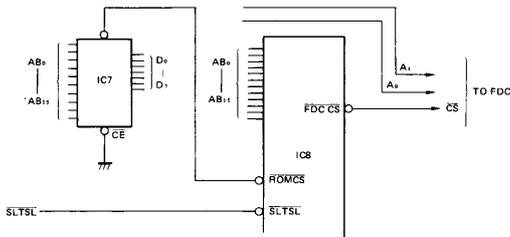
### 3-1-1. Memory Map

The FDI cartridge uses the MSX computer cartridge slot. Addresses 4000H through 7FFFH on the memory map have been allocated to the FDI cartridge.



### 3-1-2. Selection by FDC Controller

Individual registers of the FDC have been allocated to the memory space for addresses 7FF8H through 7FFFH, and are selected by address signals A0 through A1 and signal  $\overline{CS}$ .



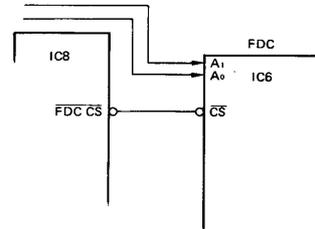
## 3-2. FDC

### 3-2-1. Memory Map Det

Address Port	Write Mode of CPU	Read Mode of CPU
7FF8H	Command Register	Status Register
7FF9H	Track Register	Track Register
7FFAH	Sector Register	Sector Register
7FFBH	Data Register	Data Register
7FFCH	Side Select	Side Select
7FFDH	Drive Select	Drive Select
7FFFH		IRQ/DRQ Status

### 3-2-2. Selection of Individual FDC (IC6) Registers

Individual registers of the FDC (IC6) have been allocated to addresses 7FF8H through 7FFBH, and are selected by address signals A0 through A1 and signal  $\overline{CS}$ .



CR ;COMMAND REGISTER  
 DR ;DATA REGISTER  
 DSR ;DATA SHIFT REGISTER  
 SCR ;SECTOR REGISTER  
 TR ;TRACK REGISTER  
 STR ;STATUS REGISTER

#### REGISTER SELECTION

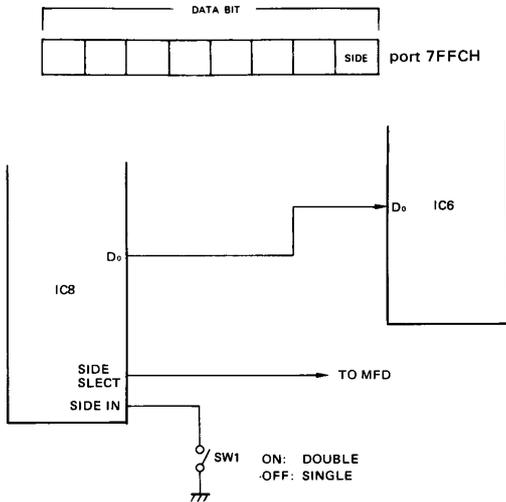
CS	A1	A0	RE = 0	WE = 0
1	X	X	NON SELECT	DAL=HI-Z
0	0	0	STR	CR
0	0	1	TR	TR
0	1	0	SCR	SCR
0	1	1	DR	DR

0 ; LOW LEVEL  
 1 ; HIGH LEVEL  
 X ; DON'T CARE  
 HI-Z; HIGH IMPEDANCE

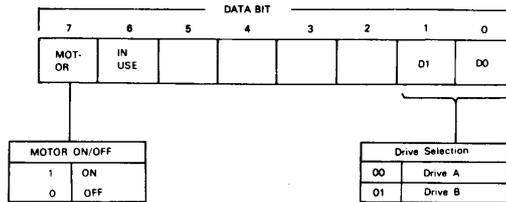
### 3-2-3. Operation of Individual Registers

#### 1. Side Select

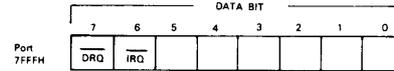
The AND signal of the D0 pin and SIDE IN input pin (pin ①⑦) is output as a SIDE SELECT signal from pin ②① at the rising edge of BWR input (pin ②②), when the input at SLTSL (pin ④④) of IC8 is low and the address is 7FFCH. Only one side is selected when output is low and double sides when output is high.



#### 2. Drive Select



#### ① IRQ/DRQ Status



IRQ will be made "0" when the completion of a command has been either concluded or terminated during process. DRQ will be made "0" when the data write/read are being requested.

#### ② Command Register (CR)

This is an 8-bit write register, where the commands that correspond to the FDC (TMS, WD2793) operation will be written from the processor. With the exception of a forced interrupt command, the command writing operation takes place after completion of the previous FDC command.

#### ③ Status Register (STR)

This is an 8-bit read register. This register indicates the FDC (TMS, WD2793) internal status, the command execution processed status, and the disk drive status. The significance of individual bits will vary depending on whether the command is being executed or the command execution has already been concluded.

#### ④ Data Register (DR)

This is a read/write register. In a disk reading mode, the data read of the disk will be loaded into this register. In a disk writing mode, the data that has been written earlier into this register will be written into the disk. In a seek mode, the target track address will be written into this register.

#### ⑤ Track Register (TR)

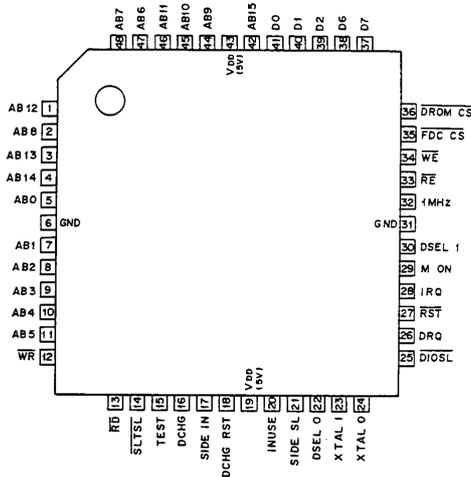
This is an 8-bit read/write register. The low-high transition of MR (master reset) will set TR at FFH. When TR00 becomes low, TR will be made 00H. The track number at which the head is located will usually be set in this register. At FDC (TMS, WD2793), this value may either be updated or not, depending on the command. In the case of a read data command or a write data command, the contents of this register will be compared with an ID field track number read of the disk, and when they coincide with each other, the read or write operation will duly be carried out.

#### ⑥ Sector Register (SCR)

This is an 8-bit read/write register. In the case of a read data command or a write data command, the contents of this register will be compared with an ID field track number read of the disk, and when they coincide with each other, the read or write operation will duly be carried out. When under a read address command, the ID field track number will be retained intact.

### 3-2-4. LSI (CXD-1032Q) for Controlling Floppy Disk Drive Interface

By integrating the address decoder, timer, clock oscillator and selector onto one chip the CXD-1032Q significantly reduces the number of ICs used over existing circuit configurations and also simplifies the circuitry itself. Connectors have 48 pins and possess the following configuration.



Block Diagram of External Pins of CXD-1032Q

- ⑨ DRQ IN  
This is a data request input pin. It sets data values into the registers during FDC read operations and checks the registers to see that they are cleared during write operations. It also controls the floppy disk drive motor.
- ⑩ IRQ IN  
The signal at this pin is input when FDC commands terminate.
- ⑪ MON  
The signal at this pin switches the disk drive's motor on and off.
- ⑫ DRIVE 1  
This pin is used for Drive 1 output selection.
- ⑬ 1 MHz Clock  
This pin is used for the 1 MHz clock output and the FDC clock input.
- ⑭  $\overline{RE}$   
The signal at this pin is a WE signal, which is the control signal used for outputting data written to the FDC registers.
- ⑮ WE  
This is a control signal that writes data in the DAL of the FDC to the registers.
- ⑯  $\overline{CS}$   
The signal at this pin is a CS signal output to the FDC, which enables the FDC to transfer data.
- ⑰ ROMCS  
This is the disk ROM selection signal.

### 3-3. PINS AND THEIR FUNCTIONS

- ① AB0 – AB15 (Address Bus)  
This is a bus line used for inputting addresses when performing memory read/write or input/output operations.
- ② D0 – D2, D6, D7 (Data Bus)  
This bus line is used for reading data and outputting data.
- ③  $\overline{BWR}$   
This is an input pin used for write operations. Internally, the signal passes through the SLTSL signal and gate and is output as a WE signal to the FDC.
- ④  $\overline{BRD}$   
This is an input pin used for read operations. Internally, the signal passes through the SLTSL signal and gate and is output as an RE signal to the FDC.
- ⑤ SLTSL  
This is a slot select input pin.
- ⑥ TEST  
This is used for test input and is normally set to low.
- ⑦ SIDE IN  
This is a single-/double-side select switch pin. When low, the switch is on and selects the single side mode.
- ⑧ Drive 0  
This is a Drive 0 select output pin.

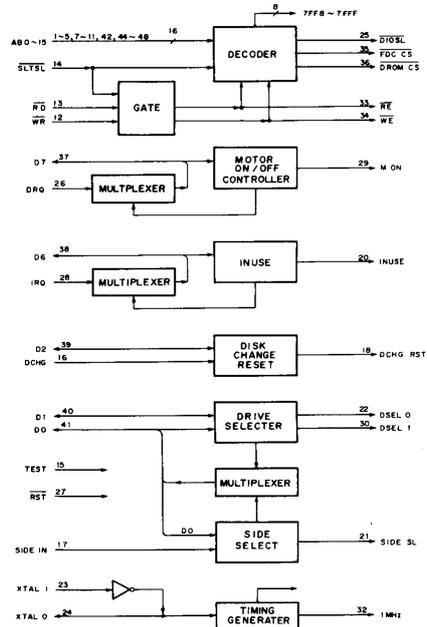
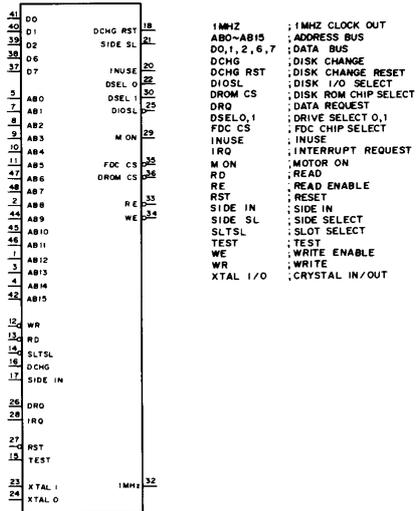
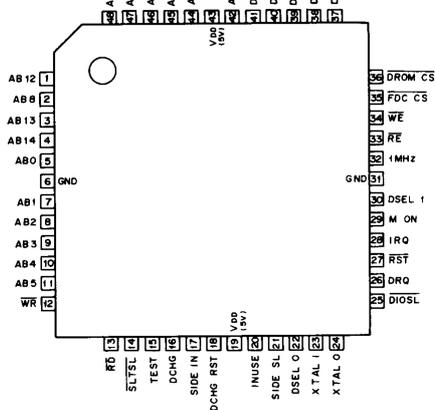
## CHAPTER 4

### SCHEMATIC DIAGRAM AND PRINTED CIRCUIT BOARD

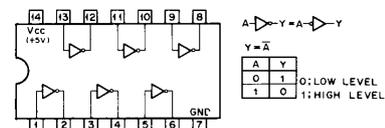
#### 4-1. SEMICONDUCTOR PIN ASSIGNMENTS

TYPE	PAGE
1S1555	4-4
1SS119	4-4
1SS133	4-4
1SS148	4-4
CXD1032Q	4-2
MB74LS04	4-2
MB74LS14	4-2
SN74LS04N	4-2
SN74LS06N	4-3
SN74LS14N	4-2
SN74LS38N	4-3
SVC203	4-4
TL431CP	4-3
TMS2793NL	4-3
WD2793A-PL02	4-3
$\mu$ PD23128EC	4-4

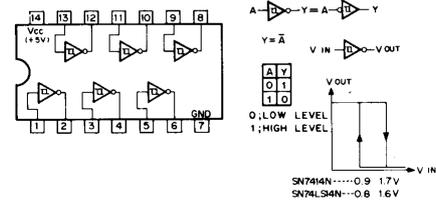
CXD1032Q (SONY)  
C-MOS MSX FLOPPY DISK INTERFACE CONTROLLER  
— TOP VIEW —



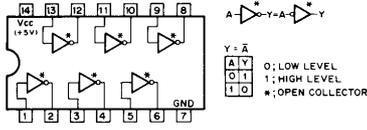
SN74LS04N (TI)  
MB74LS04  
TTL INVERTER  
— TOP VIEW —



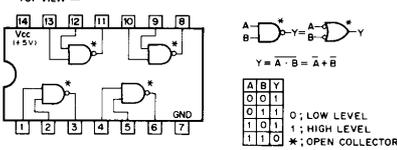
SN74LS14N (TI)  
MB74LS14  
TTL SCHMITT TRIGGER INVERTER  
— TOP VIEW —



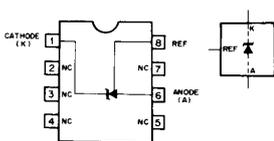
**SN7406N (TI)**  
TTL INVERTER BUFFER/DRIVER WITH OPEN-COLLECTOR  
— TOP VIEW —



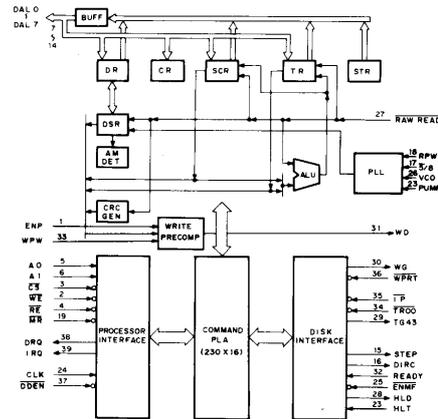
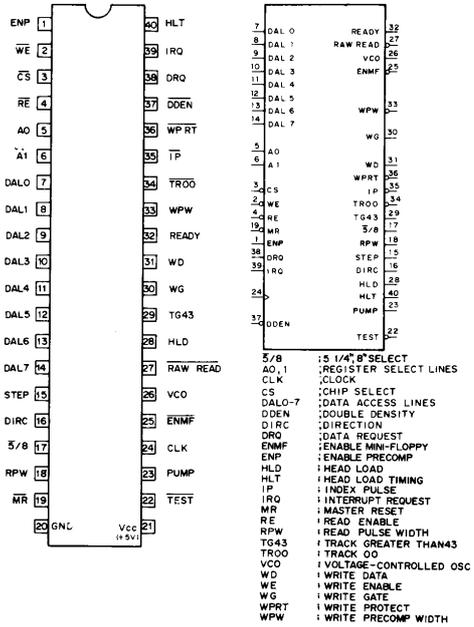
**SN74LS38N (TI)**  
TTL 2-INPUT POSITIVE-NAND GATE BUFFER WITH OPEN-COLLECTOR  
— TOP VIEW —



**TL431CP (TI)**  
ADJUSTABLE PRECISION SHUNT REGULATOR  
— TOP VIEW —



**TMS2793NL (TI)**  
**WD2793A-PL02 (WESTERN DIGITAL)**  
N CHANNEL E/D MOD FLOPPY DISK FORMATTER/CONTROLLER  
— TOP VIEW —



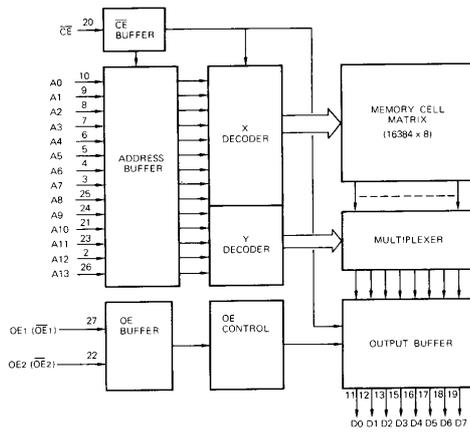
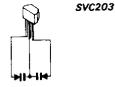
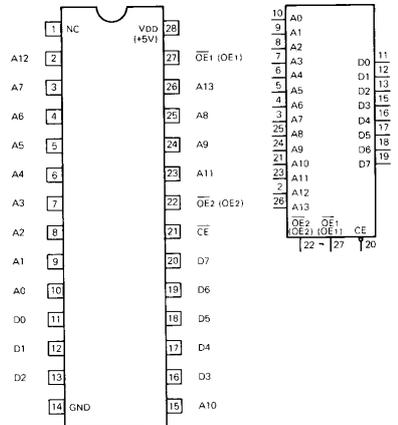
- CR : COMMAND REGISTER
- DR : DATA REGISTER
- DSR : DATA SHIFT REGISTER
- SCR : SECTOR REGISTER
- TR : TRACK REGISTER
- STR : STATUS REGISTER

REGISTER SELECTION

CS	A1	A0	RE = 0	WE = 0
1	X	X	NON SELECT	DAL=HI-Z
0	0	0	STR	CR
0	0	1	TR	TR
0	1	0	SCR	SCR
0	1	1	DR	DR

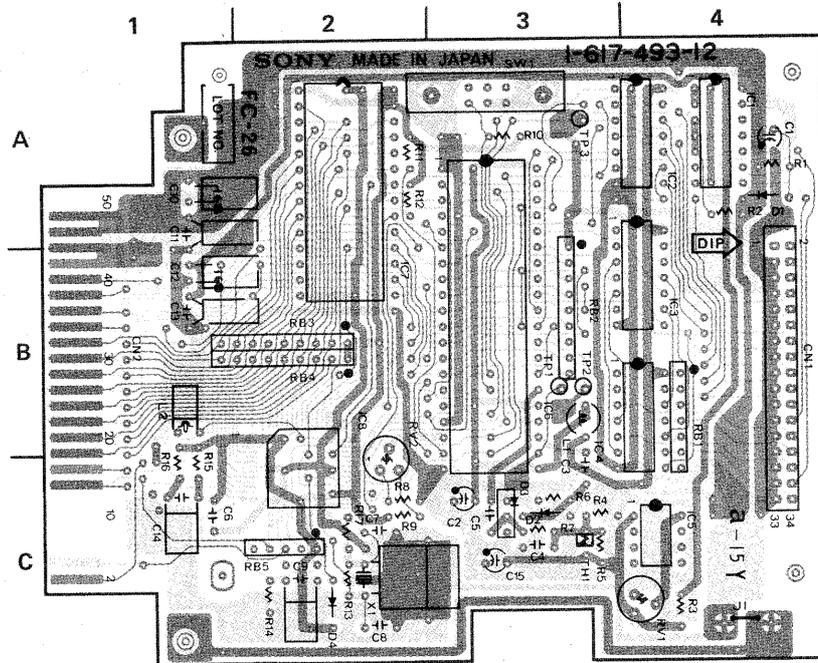
0 : LOW LEVEL  
1 : HIGH LEVEL  
X : DON'T CARE  
HI-Z : HIGH IMPEDANCE

μPD12128EC(NEC)  
N-MOS MASK PROGRAMMABLE ROM 128K-BIT (1634x8)  
- TOP VIEW



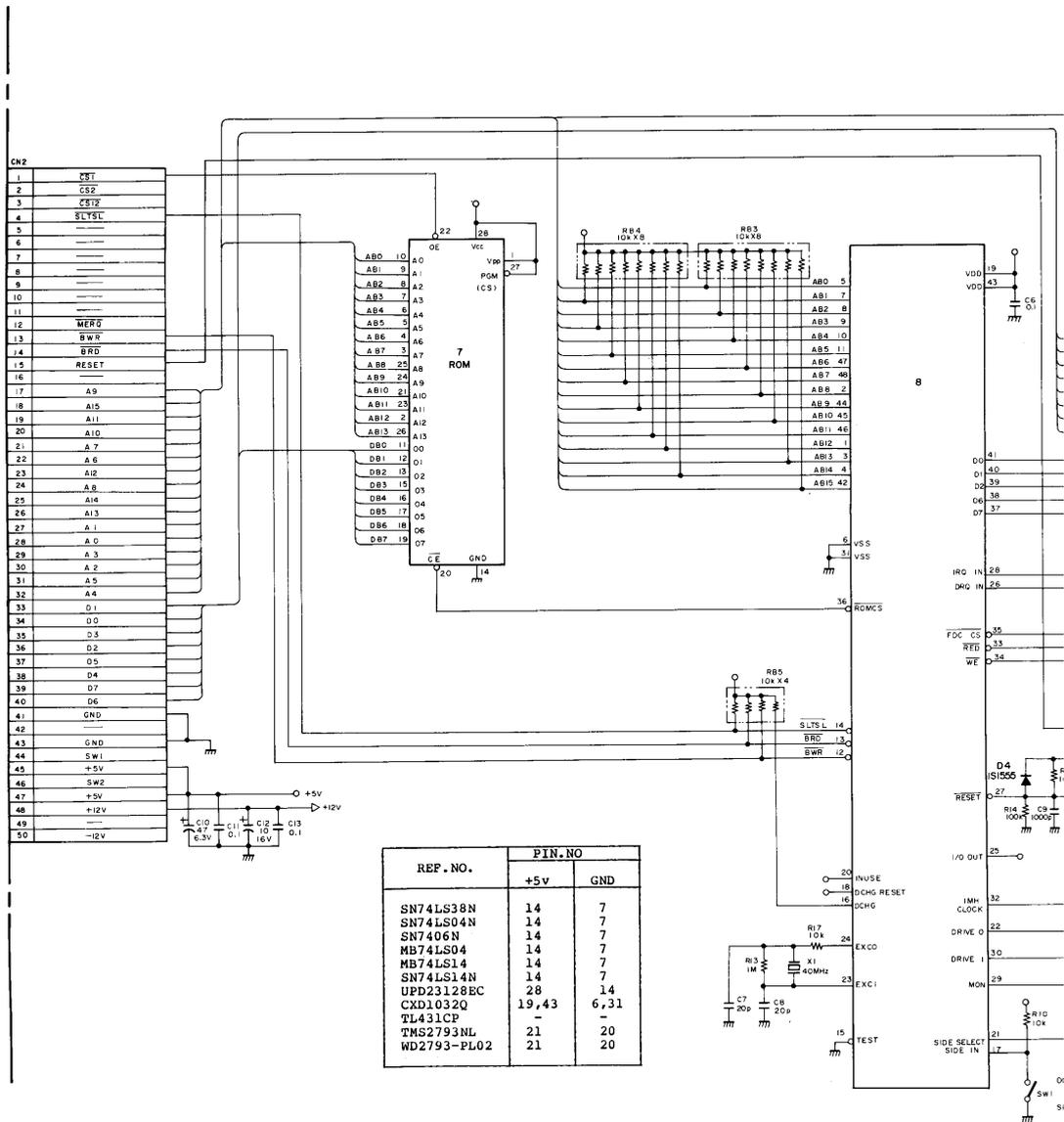
A0 ~ A12 : ADDRESS INPUT  
CE : CHIP ENABLE  
D0 ~ D7 : DATA  
OE (OE) : OUTPUT ENABLE

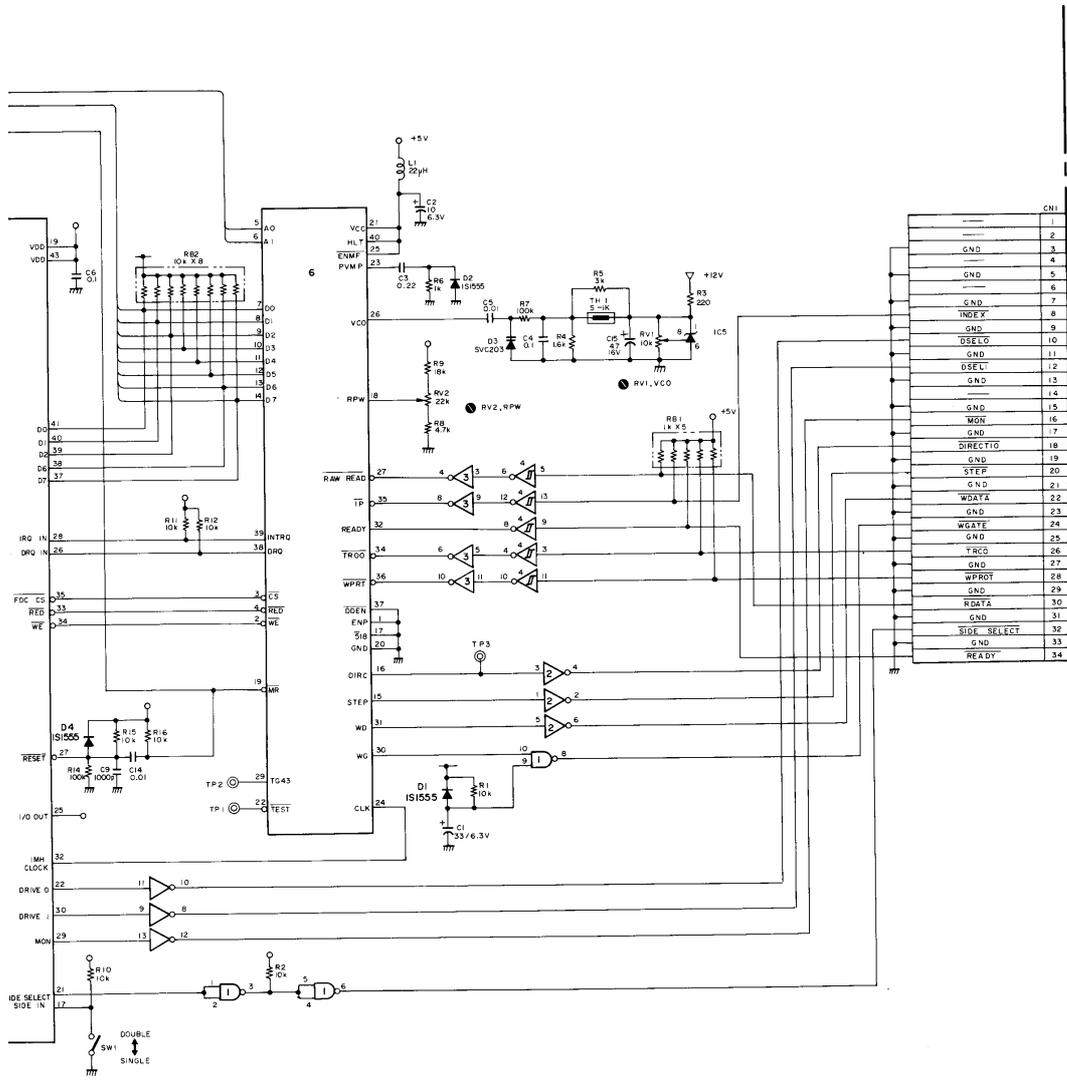
4-2. FC-26 BOARD



**FC-26**  
**COMPONENT SIDE**  
 HBK-30 (AE/UK)  
 HBK-30 (J)

C1	A-4	D1	A-4	R1	A-4	RB1	B-4
C2	C-3	D2	C-3	R2	A-4	RB2	B-3
C3	C-3	D3	C-3	R3	C-4	RB3	B-2
C4	C-3	D4	C-2	R4	C-3	RB4	B-2
C5	C-3			R5	C-3	RB5	C-2
C6	C-1	IC1	A-4	R7	C-3		
C7	C-2	IC2	A-4	R8	C-2	RV1	C-4
C8	C-2	IC3	B-4	R9	C-2	RV2	B-2
C9	C-2	IC4	B-3	R10	A-3		
C10	A-1	IC5	C-4	R11	A-2	SW1	A-3
C11	A-1	IC6	B-3	R12	A-2		
C12	B-1	IC7	A-2	R13	C-2	TH1	C-3
C13	B-1	IC8	B-2	R14	C-2		
C14	C-1			R15	C-1	X1	C-2
C15	C-3	L1	B-3	R16	C-1		
		L2	B-1	R17	C-2		
CN1	B-4						
CN2	B-1						



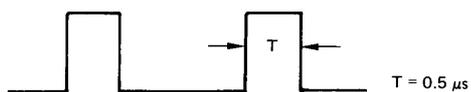


FC-26

## CHAPTER 5 ALIGNMENT

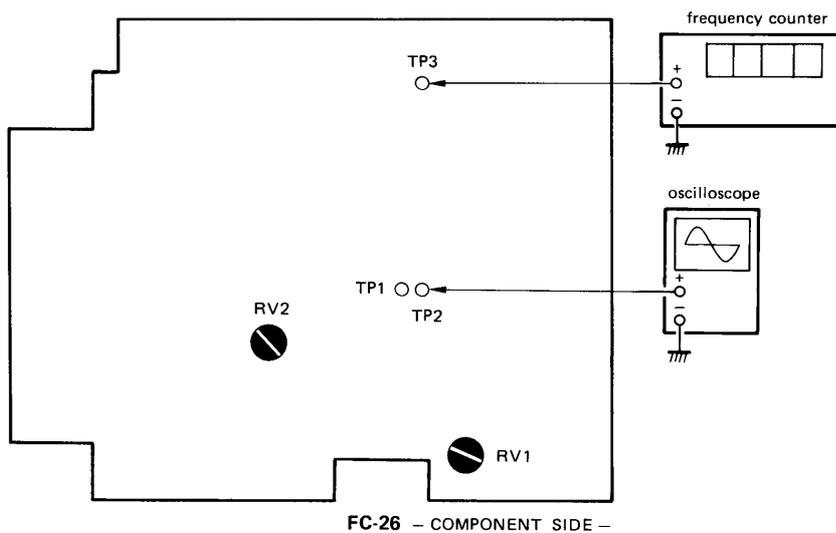
### 5-1. ADJUSTMENT OF READ PULSE WIDTH

1. After turning the power on about 3 minutes, connect jumper between TP-1 and ground.
2. Connect oscilloscope to TP-2 of FDC board, with the desk not accessed, and adjust with RV1 so that T portion of the waveform become  $0.5 \mu\text{sec}$ .
3. Disconnect the jumper.



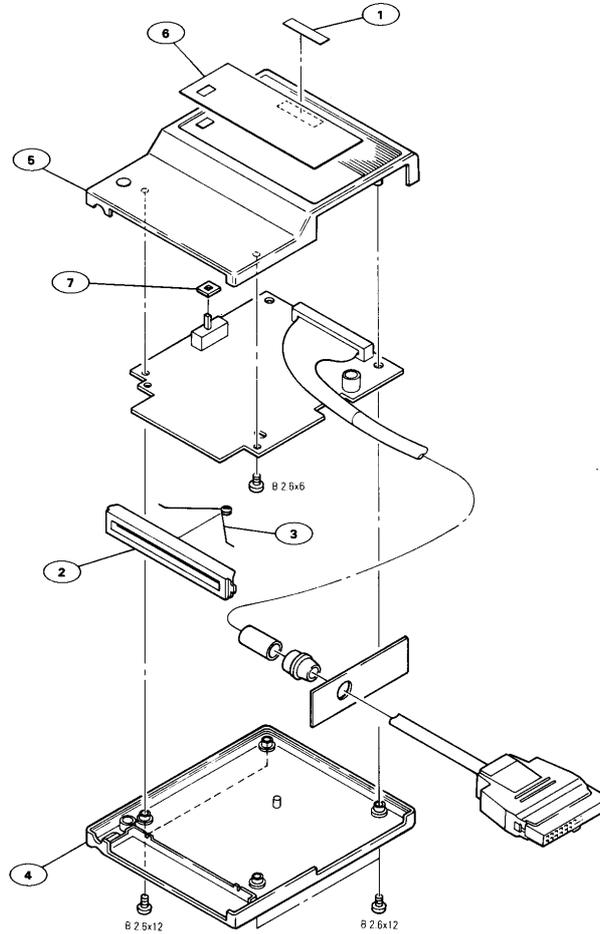
### 5-2. ADJUSTMENT OF VCO

1. After turning the power on about 3 minutes, connect jumper between TP-1 and ground.
2. Connect frequency counter to TP-3 of FDC board, with the desk not accessed, adjust with RV2 so that the frequency becomes  $250 \text{ kHz} \pm 2.5 \text{ kHz}$ .
3. Disconnect the jumper.



## CHAPTER 6 REPAIR PARTS AND FIXTURE

### 6-1. EXPLODED VIEW



No.	Parts No.	Description
1	3-701-690-00	LABEL (MADE IN JAPAN)
2	<b>4-606-567-02</b>	<b>PROTECTOR</b>
3	<b>4-606-568-01</b>	<b>SPRING, TORSION</b>
4	<b>4-606-569-02</b>	<b>CASE (REAR), CARTRIDGE</b>
5	<b>4-606-570-02</b>	<b>CASE (FRONT), CARTRIDGE</b>
6	<b>4-606-594-01</b>	<b>LABEL, CARTRIDGE</b>
7	<b>4-608-657-01</b>	<b>COVER, SWITCH</b>

#### NOTE:

1. **The shaded and  $\Delta$ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

6-2. ELECTRICAL PARTS LIST

Ref. No.	Parts No.	Description	Ref. No.	Parts No.	Description
<b>FC-26 Board</b>			R1	1-249-429-11	CARBON 10K 5% 1/6W
	1-558-354-11	CABLE WITH CONNECTOR	R2	1-249-429-11	CARBON 10K 5% 1/6W
	1-526-835-11	SOCKET, IC 40P	R3	1-247-704-11	CARBON 220 5% 1/4W
	3-662-075-00	COVER, CONTROL	R4	1-215-426-00	METAL 1.6K 1% 1/6W
			R5	1-215-432-00	METAL 3K 1% 1/6W
C1	1-124-223-51	ELECT 33 20% 6.3V	R6	1-247-831-00	CARBON 1K 5% 1/6W
C2	1-124-233-00	ELECT 10 20% 6.3V	R7	1-247-879-00	CARBON 100K 5% 1/6W
C3	1-136-169-00	FILM 0.22 5% 50V	R8	1-247-847-00	CARBON 4.7K 5% 1/6W
C4	1-136-165-00	FILM 0.1 5% 50V	R9	1-247-861-00	CARBON 18K 5% 1/6W
C5	1-136-153-00	MYLAR 0.01 10% 50V	R10	1-249-429-11	CARBON 10K 5% 1/6W
C6	1-161-974-00	CERAMIC 0.1 20% 16V	R11	1-249-429-11	CARBON 10K 5% 1/6W
C7	1-102-962-21	CERAMIC 30PF 5% 50V	R12	1-249-429-11	CARBON 10K 5% 1/6W
C8	1-102-962-21	CERAMIC 30PF 5% 50V	R13	1-247-903-00	CARBON 1M 5% 1/6W
C9	1-130-471-00	MYLAR 0.001 5% 50V	R14	1-247-879-00	CARBON 100K 5% 1/6W
C10	1-124-224-00	ELECT 47 20% 6.3V	R15	1-249-429-11	CARBON 10K 5% 1/6W
C11	1-161-974-00	CERAMIC 0.1 20% 16V	R16	1-249-429-11	CARBON 10K 5% 1/6W
C12	1-124-233-00	ELECT 10 20% 16V	RB1	1-235-750-11	RES, ENCAPSULATED CERMET
C13	1-161-974-00	CERAMIC 0.1 20% 16V	RB2	1-235-672-11	RES, ENCAPSULATED CERMET
C14	1-130-483-00	MYLAR 0.01 5% 50V	RB3	1-235-672-11	RES, ENCAPSULATED CERMET
C15	1-124-245-00	ELECT 4.7 20% 16V	RB4	1-235-672-11	RES, ENCAPSULATED CERMET
			RB5	1-235-667-11	RES, ENCAPSULATED CERMET
D1	8-719-815-55	1S1555	RV1	1-226-703-00	RES, ADJ, METAL GLAZE 10K
D2	8-719-815-55	1S1555	RV2	1-226-773-00	RES, ADJ, METAL GLAZE 22K
D3	8-719-908-57	SVC203			
D4	8-719-815-55	1S1555			
IC1	8-759-900-38	SN74LS38N	SW1	1-570-145-11	SWITCH, SLIDE
IC2	8-759-974-06	SN7406N			
IC3	8-759-900-04	SN74LS04N	TH1	1-800-198-XX	THERMISTOR S-1K
IC4	8-759-900-14	SN74LS14N			
IC5	8-759-911-41	TL431CP	X1	1-527-726-00	VIBRATOR, CRYSTAL
IC6	8-759-910-82	WD2793A			
IC7	8-759-106-47	μPD23128EC-158			
IC8	8-759-922-98	CXD1032Q			
L1	1-408-413-00	MICRO INDUCTOR 22μH			
L2	1-407-164-XX	MICRO INDUCTOR 39μH			

NOTE:

1. The shaded and **A**-marked components are critical to safety. Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.

**6-3. PACKING MATERIAL AND ACCESSORY**

No.	Parts No.	Description
	3-760-899-11	MANUAL, INSTRUCTION
	3-764-270-11	MANUAL, DISK BASIC (ENGLISH)
	3-764-270-31	MANUAL, DISK BASIC (FRENCH)
	3-764-270-41	MANUAL, DISK BASIC (SPANISH)
	3-764-270-51	MANUAL, DISK BASIC (GERMAN)
	3-764-270-61	MANUAL, DISK BASIC (ITALIAN)
	3-764-270-71	MANUAL, DISK BASIC (DUTCH)
	3-764-270-81	MANUAL, DISK BASIC (SWEDISH)
	3-701-627-00	BAG, POLYETHYLENE
	4-608-630-01	CUSHION
	4-608-631-02	SPACER
	4-608-633-02	INDIVIDUAL CARTON

**NOTE:**

1. **The shaded and -marked components are critical to safety. Replace only with same components as specified.**

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