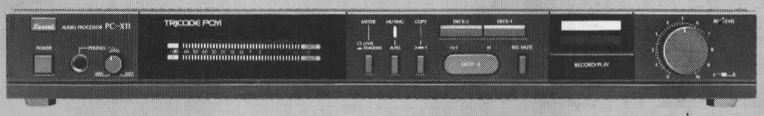
SERVICE MANUAL

TRICODE PCM AUDIO PROCESSOR

SANSUI PC-X11



CAUTION

1. Parts identified by the ⚠ symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

Sansui

SANSUI ELECTRIC CO., LTD.

•SPECIFICATIONS

Signal format ..... **NTSC** or **PAL/SECAM**
Code format ..... **EIAJ** standard format
Audio channels ..... 2 channels
Sampling frequency..... 44.056 kHz
Quantized bits ..... 14-bit linear quantization
Emphasis
Preemphasis (during recording)
..... Fixed at ON
Deemphasis (during playback)
..... Automatic switching ON/OFF (identity code detection)
Error compensation type. Error correction and compensation by CRCC and parity
Input sensitivity/Input impedance (1 kHz)
LINE IN..... 90mV/47 kohms
VIDEO IN..... 1Vp-p/75 ohms
Maximum permissible input (1 kHz, Total harmonic distortion: 0.02%)
LINE IN..... 500mV
Output voltage (1 kHz)
LINE OUT ..... 250mV/10 kohms
(Maximum output voltage: 1.4V/10 kohms)
VIDEO OUT..... 1Vp-p/75 ohms
Total harmonic distortion (1 kHz)
..... less than 0.007%
Frequency response..... 5Hz to 20,000Hz
+0dB, —0.5dB
Dynamic range ..... more than 86 dB
Power requirements 120/220/240V
50/60 Hz
For U.S.A. and Canada
..... 120V (60Hz)
Power consumption ..... 35 watts
Dimensions..... 430 mm (16-15/16″)W
57 mm (2-1/4″)H
312 mm (12-5/16″)D
Weight..... 5.0 kg (11.0 lbs) net
5.5 kg (12.0 lbs) packed

* Design and specifications subject to changes without notice for improvements.

CAUTION

1. The symbols, UL, CSA, SA, BS, UK, EU, AS and XX (EXPORT) on the parts list and the schematic diagram mean followings respectively.

   UL..... Manufactured for U.S.A market.
   (Underwriters Laboratories approved model.)
   CSA ..... Manufactured for Canadian market.
   SA..... Manufactured for South African market.
   BS, UK ..... Manufactured for United Kingdom market.
   EU ..... Manufactured for European market.
   AS..... Manufactured for Australian market.
   XX (EXPORT) ..... Standard Version.
   NON MARK ..... Common Parts.

2. Some printed circuit boards are not supplied as the assembled. To separate these in this service manual, the stock No's are not indicated at the ends of the board names. However, the individual parts on the circuit boards are provided by orders.

3. Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on February 1983.

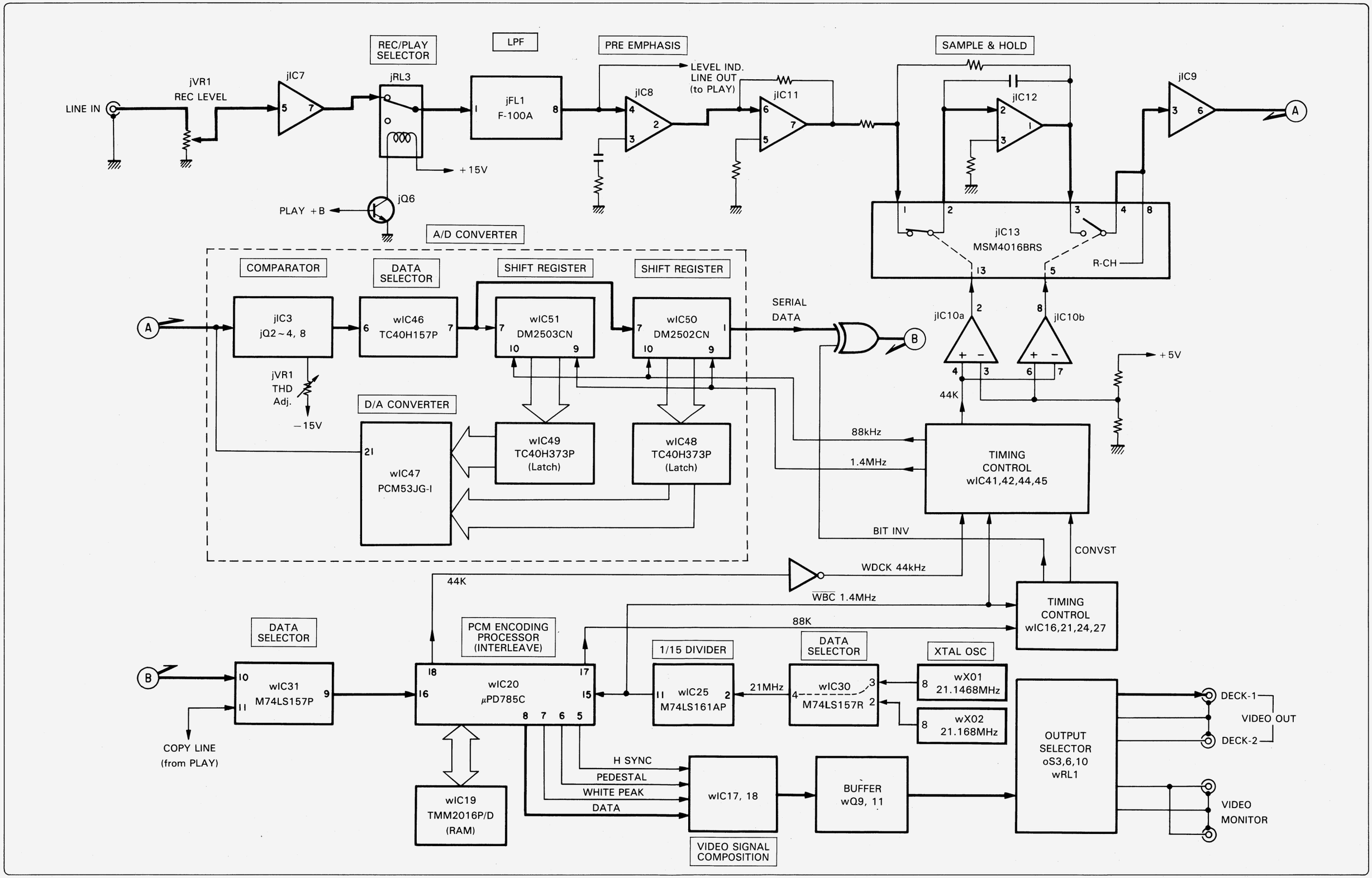
4. Abbreviations in this service manual are as follows.

•Abbreviations List

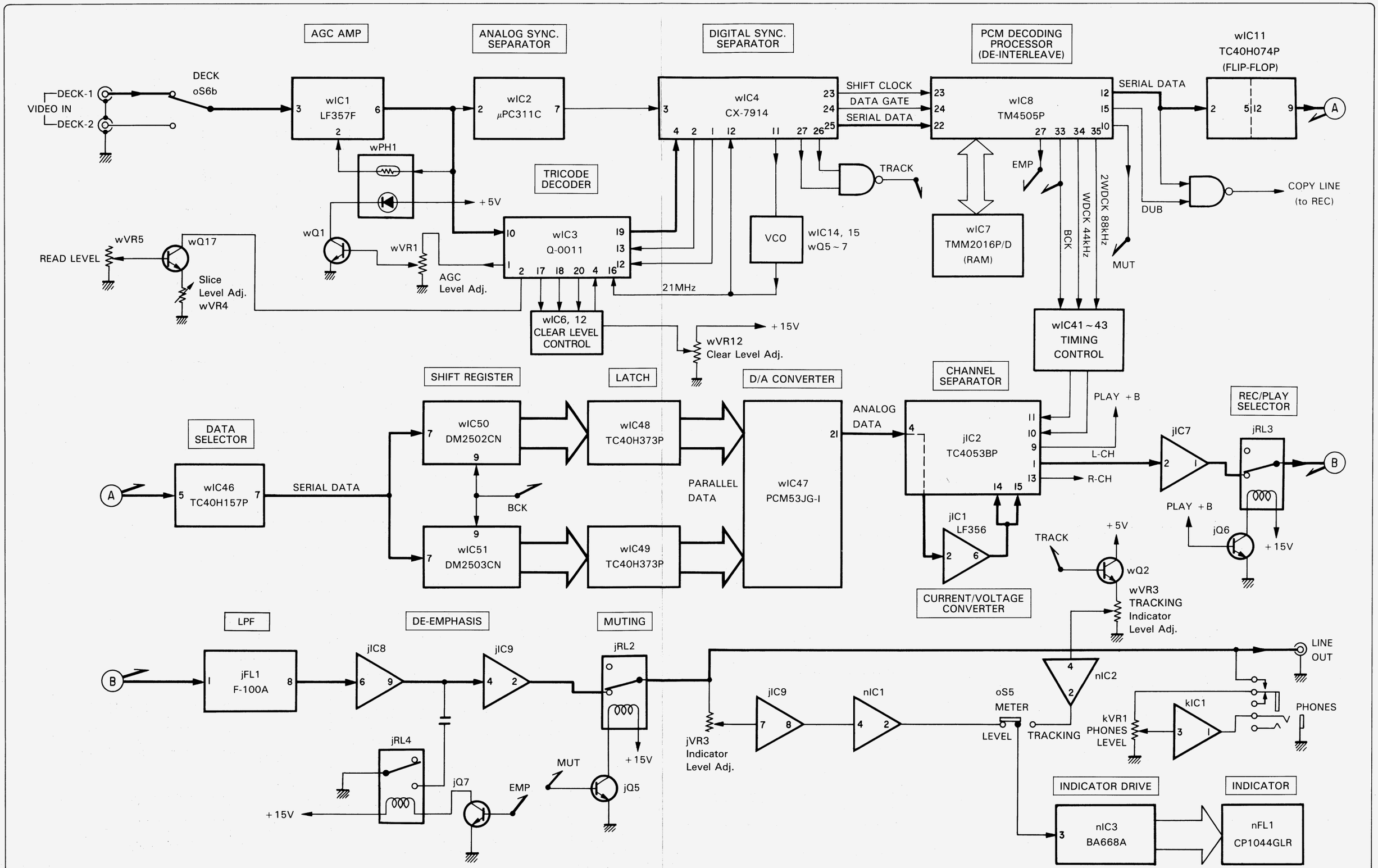
C.R.	: Carbon Resistor	E.B.L.	: Low Leak Bi-Polar Electrolytic Capacitor
S.R.	: Solid Resistor		
Ce.R.	: Cement Resistor	Ta.C.	: Tantalum Capacitor
M.R.	: Metal Film Resistor	F.C.	: Film Capacitor
F.R.	: Fusing Resistor	M.P.	: Metalized Paper Capacitor
N.I.R.	: Non-Inflammable Resistor	P.C.	: Polystyrene Capacitor
A.R.	: Array Resistor	G.C.	: Gimmic Capacitor
C.C.	: Ceramic Capacitor	A.C.	: Array Capacitor
C.T.	: Ceramic Capacitor, Temperature Compensation	V.R.	: Variable Resistor
		S.V.R.	: Semi Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic Capacitor	Chip R.	: Chip Resistor
		Chip C.	: Chip Capacitor
E.B.	: Bi-Polar Electrolytic Capacitor		

1. BLOCK DIAGRAM

1-1. Recording Operation

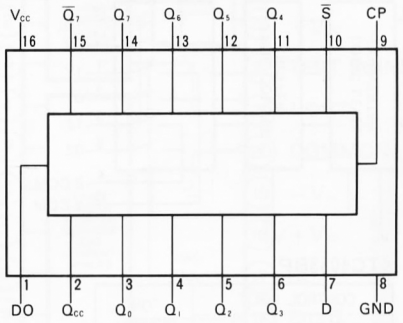


1-2. Play Back Operation



2. INTERIOR BLOCK DIAGRAM & TERMINAL FUNCTION OF IC

•DM2502CN (8 bit Shift Register)

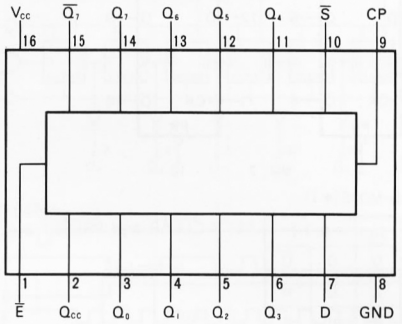


<DM2502>

TIME	INPUTS		OUTPUTS									
tn	D	S	D0	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0	Qcc
0	×	L	×	×	×	×	×	×	×	×	×	×
1	D7	H	×	L	H	H	H	H	H	H	H	H
2	D6	H	D7	D7	L	H	H	H	H	H	H	H
3	D5	H	D6	D7	D6	L	H	H	H	H	H	H
4	D4	H	D5	D7	D6	D5	L	H	H	H	H	H
5	D3	H	D4	D7	D6	D5	D4	L	H	H	H	H
6	D2	H	D3	D7	D6	D5	D4	D3	L	H	H	H
7	D1	H	D2	D7	D6	D5	D4	D3	D2	L	H	H
8	D0	H	D1	D7	D6	D5	D4	D3	D2	D1	L	H
9	×	H	D0	D7	D6	D5	D4	D3	D2	D1	D0	L
10	×	×	×	D7	D6	D5	D4	D3	D2	D1	D0	L
	×	×	×	H	NC	NC	NC	NC	NC	NC	NC	NC

H = High Level L = Low Level × = Don't Care NC = No Change

•DM2503CN (8 bit Shift Register)

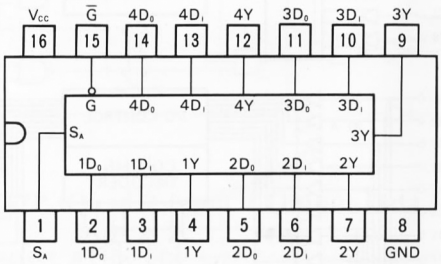


<DM2503>

TIME	INPUTS			OUTPUTS								
tn	D	S	E	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0	Qcc
0	×	L	L	×	×	×	×	×	×	×	×	×
1	D7	H	L	L	H	H	H	H	H	H	H	H
2	D6	H	L	D7	L	H	H	H	H	H	H	H
3	D5	H	L	D7	D6	L	H	H	H	H	H	H
4	D4	H	L	D7	D6	D5	L	H	H	H	H	H
5	D3	H	L	D7	D6	D5	D4	L	H	H	H	H
6	D2	H	L	D7	D6	D5	D4	D3	L	H	H	H
7	D1	H	L	D7	D6	D5	D4	D3	D2	L	H	H
8	D0	H	L	D7	D6	D5	D4	D3	D2	D1	L	H
9	×	H	L	D7	D6	D5	D4	D3	D2	D1	D0	L
10	×	×	L	D7	D6	D5	D4	D3	D2	D1	D0	L
	×	×	H	H	NC	NC	NC	NC	NC	NC	NC	NC

H = High Level L = Low Level × = Don't Care NC = No Change

•M74LS157P (Quad 2 Line-1 Line Data Selector)

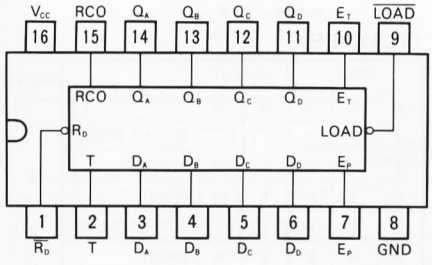


<M74LS157P>

INPUTS				OUTPUT
$\overline{G}$	S_A	D_0	D_1	Y
H	×	×	×	L
L	L	L	×	L
L	L	H	×	H
L	H	×	L	L
L	H	×	H	H

× = Don't Care

•M74LS161AP (Synchronous 4 bit Binary Counter)

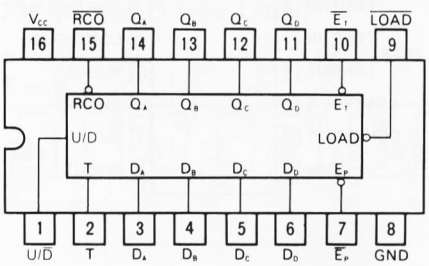


<M74LS161AP>

INPUTS					OUTPUTS				
$\overline{R_D}$	$\overline{LOAD}$	E_T	E_P	T	Q_A	Q_B	Q_C	Q_D	RCO
L	×	×	×	×	L	L	L	L	L
H	L	L	×	↑	D_A	D_B	D_C	D_D	L
H	L	H	×	↑					*
H	H	H	H	↑	Count				*
H	H	L	×	×	Non-Count				L
H	H	H	L	×	Non-Count				*

↑ = Positive Edge Trigger
× = Don't Care
* = $Q_A \cdot Q_B \cdot Q_C \cdot Q_D \cdot E_T$

•M74LS669P (Synchronous 4 bit Binary Counter)

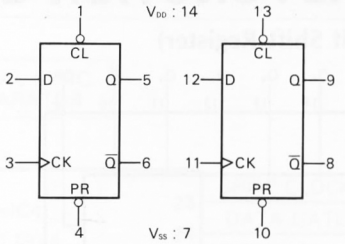


<M74LS669P>

INPUTS					OUTPUTS				
LOAD	EP	ET	U/D	T	QA	QB	QC	QD	RCO
L	X	X	X	↑	DA	DB	DC	DD	H
H	L	L	H	↑	Count UP				*
H	L	L	L	↑	Count DOWN				*
H	H	X	X	X	Non-Count				H
H	X	H	X	X					

↑ = Positive Edge Trigger
X = Don't care
*Count UP RCO = QA·QB·QC·QD·(U/D)·ET
Count DOWN RCO = QA·QB·QC·QD·(U/D)·ET

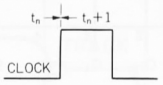
•TC40H074P (Dual D-type Flip-Flop)



D-MODE (*1)

tn	tn+1	
D	Q	$\overline{Q}$
L	L	H
H	H	L

*1 ····· $\overline{CLEAR}$ and $\overline{PRESET}$ are kept "H" level.

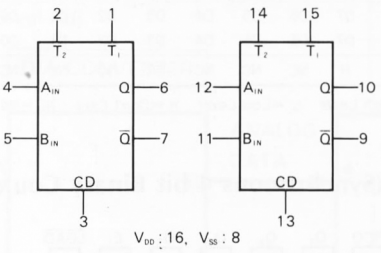


R-S MODE (*2)

INPUTS		OUTPUTS	
$\overline{CLEAR}$	$\overline{PRESET}$	$\overline{Q}$	Q
H	L	L	H
L	H	H	L
L	L	H	H
H	H	D-MODE	

*2 ····· D and CLOCK are Kept "H" or "L" level.

•TC4528BP (Dual Monostable Multi-vibrator)



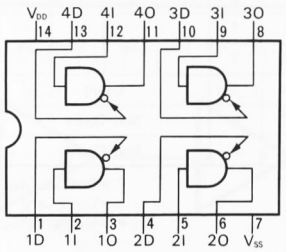
VDD : 16, VSS : 8

〈TC4528BP〉

INPUT			OUTPUT		NOTE
A	B	CD	Q	$\overline{Q}$	
↑	H	H	⊓	⊔	OUTPUT PULSE
↑	L	H	L	H	INHIBIT
H	↓	H	L	H	INHIBIT
L	↓	H	⊓	⊔	OUTPUT PULSE
×	×	L	L	H	INHIBIT

× = Don't Care

•TC5024BP (Quad BUS Buffer)

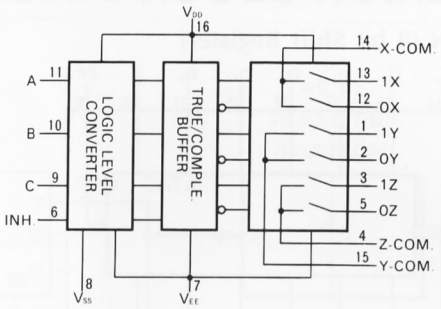


〈TC5024BP〉

INPUT		OUTPUT
IN	DIS	OUTf
L	L	L
H	L	H
L	H	HZ
H	H	HZ

HZ = High Impedance

•TC4053BP (Triple 2-CH Multiplexer)

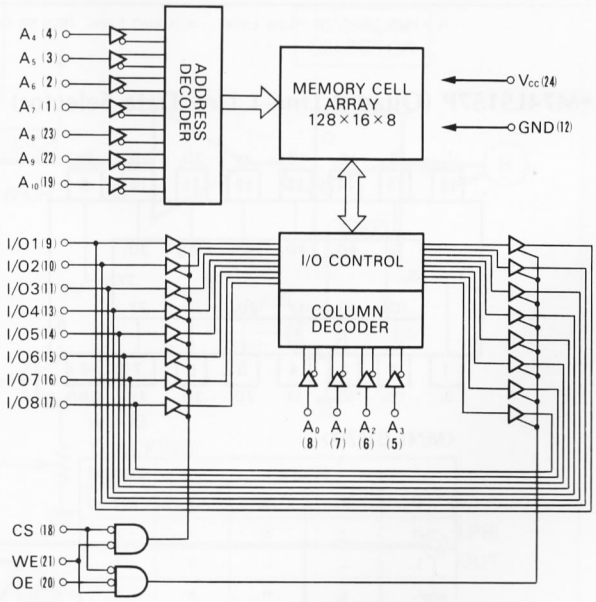


〈TC4053BP〉

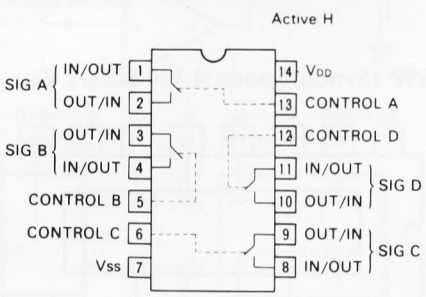
CONTROL INPUT				"ON" CHANNEL
INHIBIT	C	B	A	
L	L	L	L	0X, 0Y, 0Z
L	L	L	H	1X, 0Y, 0Z
L	L	H	L	0X, 1Y, 0Z
L	L	H	H	1X, 1Y, 0Z
L	H	L	L	0X, 0Y, 1Z
L	H	L	H	1X, 0Y, 1Z
L	H	H	L	0X, 1Y, 1Z
L	H	H	H	1X, 1Y, 1Z
H	×	×	×	NONE

× = Don't Care

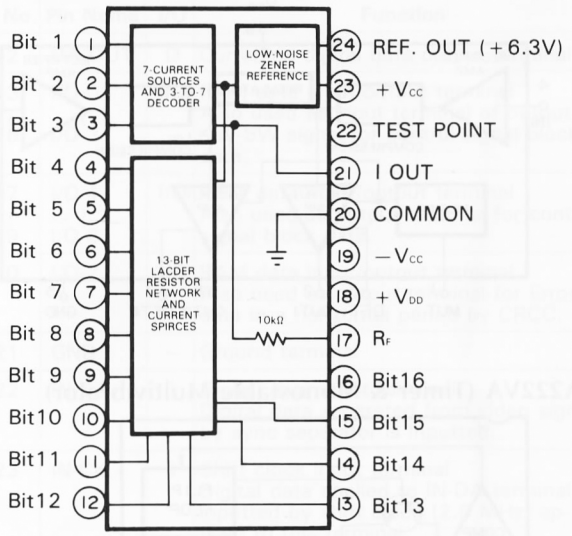
•TMM2016P/D (2K Word × 8 bit Static RAM)



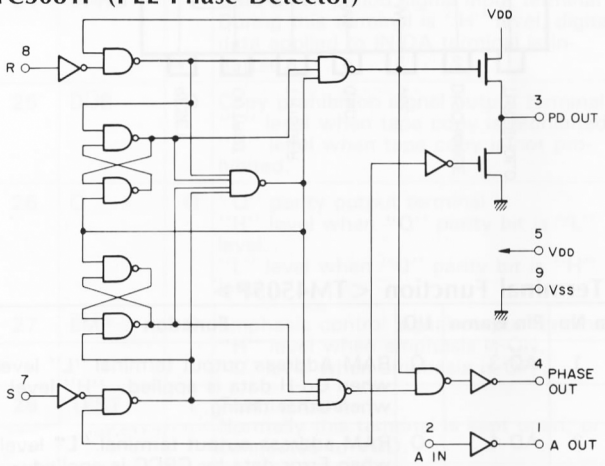
•MSM4016BRS (Analog Switch)



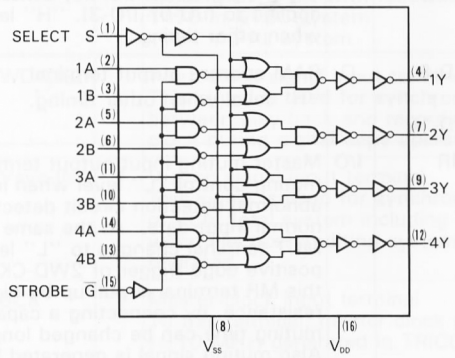
•PCM53JG-I (D/A Converter)



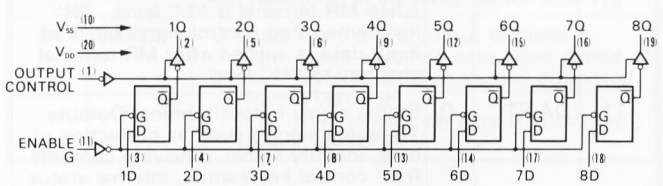
•TC5081P (PLL Phase Detector)



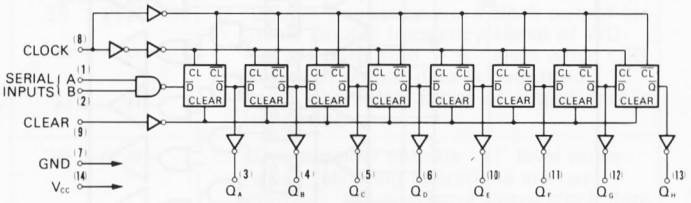
•TC40H157P (Quad 2 Input 1 Output Data Selector)



•TC40H373P (Octad D-type Latch)



•MM74HC164N
(8 bit Serial Input Parallel Output Shift Register)



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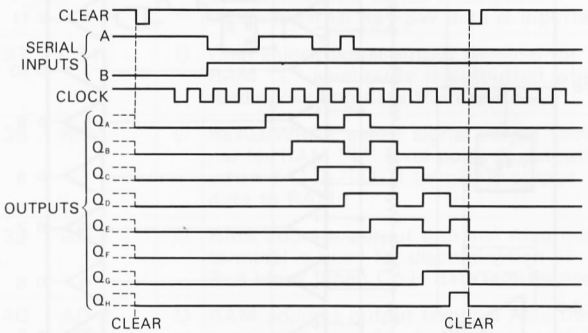
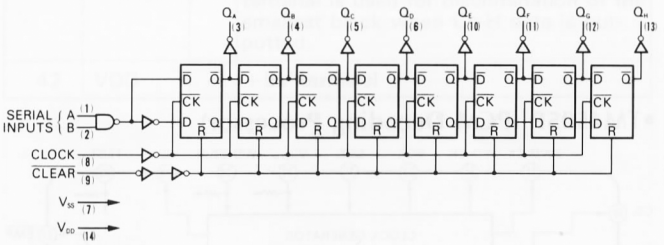


•TC40H164P
(8 bit Serial Input Parallel Output Shift Register)



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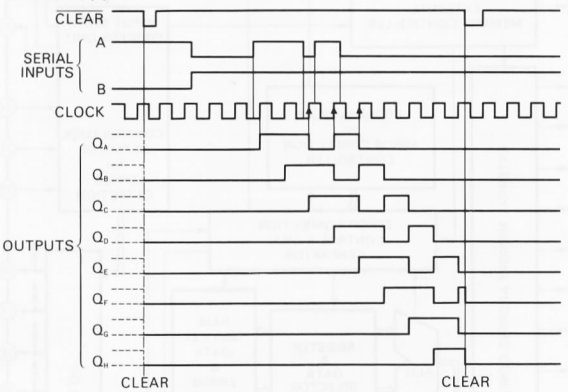
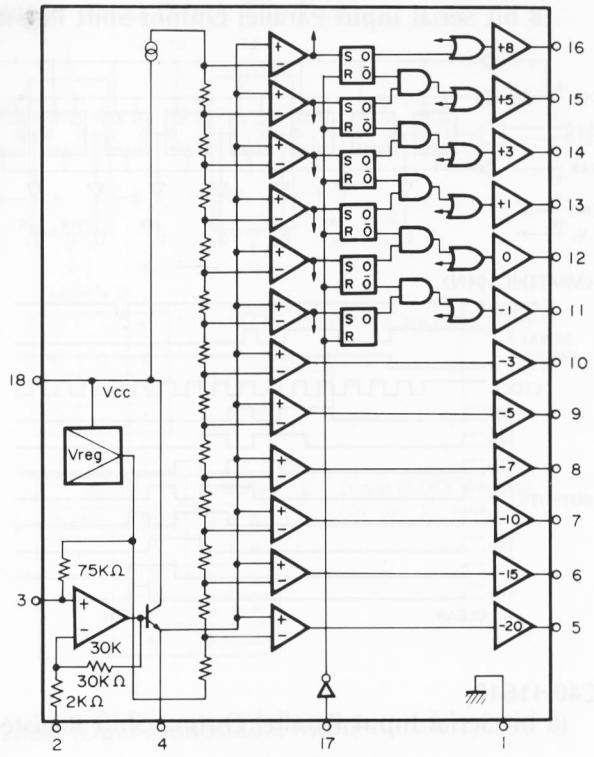


<TC40H373P>

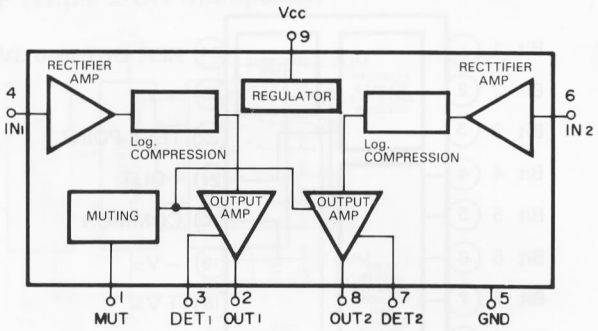
INPUTS			OUTPUT
OUTPUT CONTROL	ENABLE G	DATA	Q
L	H	H	H
L	H	L	L
L	L	×	Q_0
H	×	×	High Impedance

× = Don't Care

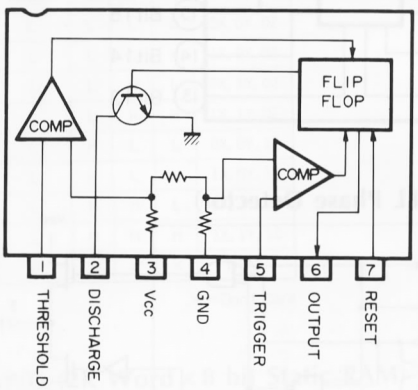
•BA668A (Level Indicator)



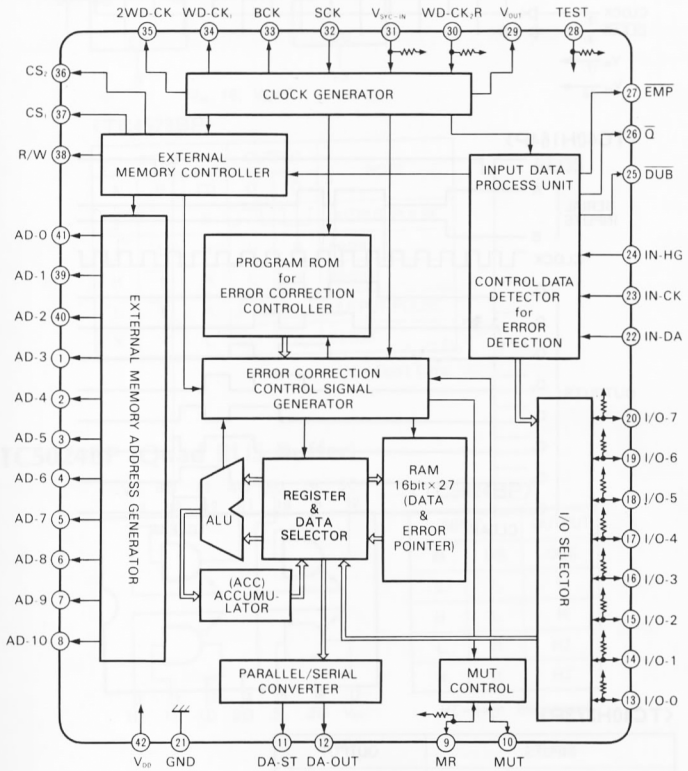
•BA6138 (Log. Compression Amp)



•BA222VA (Timer & Monostable Multivibrator)



•TM4505P (PCM Decoding Processor)



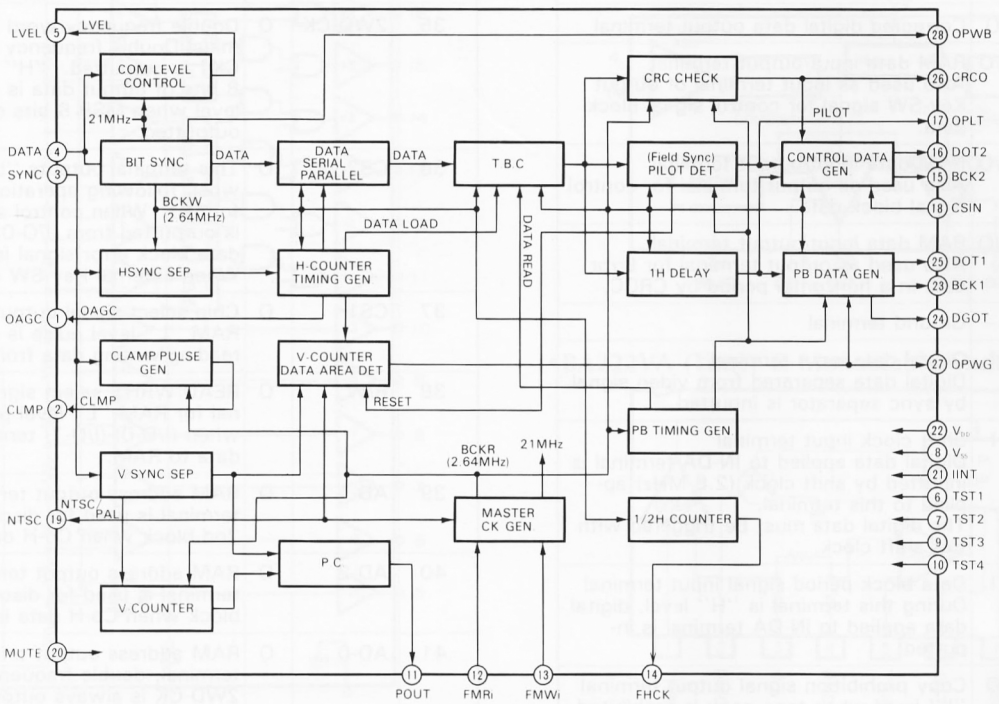
◆Terminal Function <TM4505P>

Pin No.	Pin Name	I/O	Function
1	AD-3	O	RAM Address output terminal "L" level when Co-H data is applied. "H" level when other timing.
2	AD-4	O	RAM address output terminal "L" level when Error data by CRCC is applied from I/O-7 terminal.
3	AD-5	O	RAM address output terminal "L" level when external control key switch data is applied to (I/O-0)-(I/O-3). "H" level when other timing.
4 ≀ 8	AD-6 ≀ AD-10	O	RAM address output terminal "H" level when other timing.
9	MR	I/O	Master muting input/output terminal for muting control "L" level when internal abnormal detection circuit detects abnormal input data. At the same time, MUT terminal changes to "L" level by positive edge trigger of 2WD-CK. Since this MR terminal is pull up by high resistance, by connecting a capacitor, muting time can be changed longer. Also muting signal is generated by grounding this terminal.
10	MUT	O	Muting signal output terminal "L" level by positive edge trigger of 2WD-CK when MR terminal is "L" level. "H" level when 2nd control signal block of input data is applied after MR terminal changes to "H" level.
11	DA-ST	O	Status signal output terminal Outputs 15 status signals such as correction of data, identity signal, receiving contents from control key switch, internal status of LSI and etc.

◆ Terminal Function <TM4505P>

Pin No.	Pin Name	I/O	Function
12	DA-OUT	O	Corrected digital data output terminal
13 ~ 16	I/O-0 ~ I/O-3	I/O	RAM data input/output terminal Also used as input terminal of output Key-SW signal for control signal block data.
17 ~ 19	I/O-4 ~ I/O-6	I/O	RAM data input/output terminal Also used as output terminal for control signal block data.
20	I/O-7	I/O	RAM data input/output terminal Also used as output terminal for Error data in a horizontal period by CRCC.
21	GND	—	Ground terminal
22	IN-DA	I	Digital data input terminal Digital data separated from video signal by sync separator is inputted.
23	IN-CK	I	Shift clock input terminal Digital data applied to IN-DA terminal is inputted by shift clock (2.6 MHz) applied to this terminal. The digital data must be triggered with this shift clock.
24	IN-HG	I	Data block period signal input terminal During this terminal is "H" level, digital data applied to IN-DA terminal is inputted.
25	$\overline{\text{DUB}}$	O	Copy prohibition signal output terminal "L" level when tape copy is prohibited. "H" level when tape copy is not prohibited.
26	$\overline{\text{Q}}$	O	"Q" parity output terminal "H" level when "Q" parity bit is "L" level. "L" level when "Q" parity bit is "H" level
27	$\overline{\text{EMP}}$	O	Emphasis control signal output terminal "H" level when emphasis is ON. "L" level when emphasis is OFF.
28	TEST	I	Test terminal Normally this terminal is kept open, or connected to VDD.
29	V-OUT	O	V-sync clock signal output terminal This signal is used for PLL circuit of play-back system, and generated by dividing 2WD-CK with following rates. 1470 in NTSC system 1764 in PAL system
30	WD-CK2R	I	Word clock signal input terminal This signal is used for synchronization between play-back and recording word clock during digital copy operation.
31	Vsyc-IN	I	V-sync signal input terminal This signal is used for synchronization of PCM total system including VTR when electronic editing system is operated.
32	SCK	I	Master clock input terminal To this terminal, master clock signal (≒10 MHz) generated in TRICODE decoder is inputted.
33	BCK	O	Data bit clock output terminal This signal is used to output data from TM4505P in bit serial. BCK = SCK/7.5
34	WD-CK1	O	Data word clock output terminal This signal specifies data word period. "H" level when R-ch data is outputted from TM4505P. "L" level when L-ch data is outputted from TM4505P.
35	2WD-CK	O	Double frequency word clock output terminal Double frequency signal of WD-CK1 is outputted. "H" level when LSB 8 bits of output data is outputted. "L" level when MSB 8 bits of output data is outputted.
36	CS2	O	This terminal outputs "L" level pulse when following operations are performed. When control signal block data is outputted from (I/O-0)-(I/O-7). When data block error signal is outputted. When external Key-SW data is inputted.
37	CS1	O	Chip select signal output terminal for RAM "L" level pulse is outputted when reading/writing data from/to RAM.
38	R/W	O	READ/WRITE select signal output terminal for RAM "L" level pulse is outputted when (I/O-0)-(I/O-7) terminals output data to RAM.
39	AD-1	O	RAM address output terminal Also this terminal is used for discrimination of 2nd block when Co-H data is outputted.
40	AD-2	O	RAM address output terminal Also this terminal is used for discrimination of 3rd block when Co-H data is outputted.
41	AD-0	O	RAM address output terminal From this terminal, double frequency signal of 2WD-CK is always outputted. Also this terminal is used for discrimination of the smallest block when Co-H data is outputted.
42	VDD	—	+5V terminal

•CX-7914 (Digital Sync Separator)

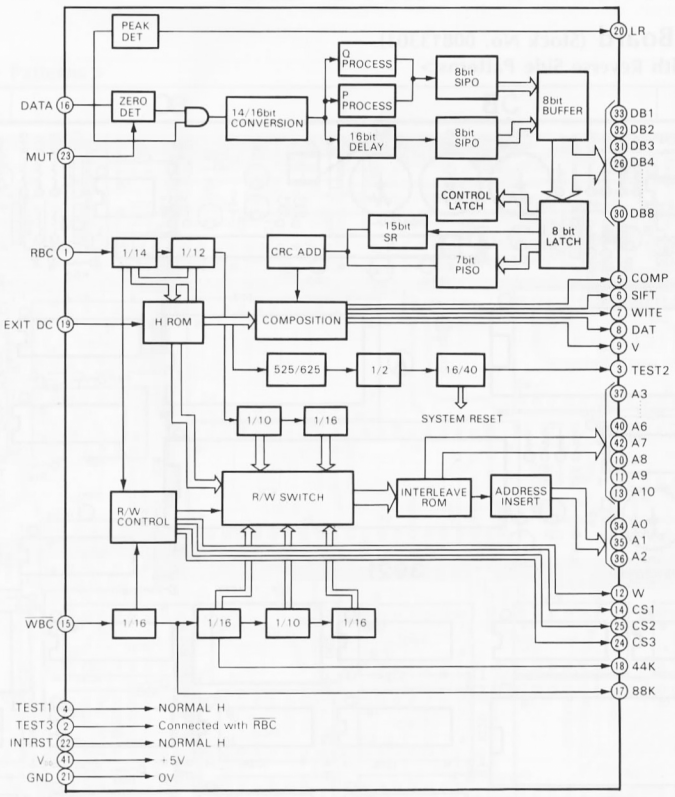


◆Terminal Function <CX-7914>

Pin No.	Pin Name	I/O	Function
1	OAGC	(I)/O	Gate signal output terminal This terminal outputs gate signal for AGC level detection when data is separated from video signal. (''H'' active) Also this terminal is used as input terminal for measurement.
2	CLMP	(I)/O	Pedestal clamp signal output terminal. This signal is used for pedestal clamp to video signal. (''H'' clamp). Also this terminal is used as input terminal for measurement.
3	SYNC	I	Composite sync signal input terminal (''L'' active) Input signal must be TTL level.
4	DATA	I	PCM data input terminal (''H'' active) Input signal must be TTL level.
5	LVEL	O	Slice level control signal output terminal By detecting bit width of input data, tri-state output is applied from this terminal. ''H'' level when under width. ''L'' level when over width. High impedance when optimum width.
6	TST1	I	Test terminal Normally connected to ''L'' level.
7	TST2	I	Test terminal Normally connected to ''L'' level.
8	Vss	—	(−) Power supply terminal
9	TST3	I	Test terminal Normally connected to ''L'' level.
10	TST4	I	Test terminal Normally connected to ''L'' level.
11	POUT	O	READ PLL phase comparator output terminal
12	FMRI	I	Master clock input terminal Master clock signal (21 MHz) generated in READ PLL circuit, is inputted to this terminal. (This terminal is used instead of FMWI when FMWI is kept in ''H'' or ''L'' level.)
13	FMWI	I	Master clock input terminal Master clock signal (21 MHz) generated in WRITE PLL circuit, is inputted to this terminal.
14	FHCK	O	1/672 frequency output of WRITE PLL master clock
15	BCK2	O	Shift clock (2.64 MHz) output terminal This signal is used for inputing control data applied from DOT2 terminal to external circuit. Control data is outputted from DOT2 at positive edge of this signal.

Pin No.	Pin Name	I/O	Function
16	DOT2	O	Control data terminal 7 bits of control data are outputted at negative edge of CSIN signal.
17	OPLT	O	Control signal output terminal Control signal which specifies control data period, is outputted from this terminal. ''H'' level during control data is outputted.
18	CSIN	I	Trigger pulse input terminal By this trigger pulse, control data of DOT2 and shift clock of BCK2 are outputted. (''L'' active) When OPLT terminal is ''H'' level, trigger pulse is not effective.
19	NTSC	(I)/O	Television system mode output terminal ''H'' level when composite sync signal is NTSC system. ''L'' level when composite sync signal is PAL system. Also this terminal is used as input temrinal for measurement.
20	MUTE	I	Muting state input terminal ''L'' level is inputted when play back circuit is in muting operation. ''H'' level must be inputted for initialization when power is turned on. (Output of OPLT may be inputted.)
21	IINT	I	Test terminal Normally connected to ''H'' level.
22	VDD	—	(+) power supply terminal
23	BCK1	O	Shift clock (2.6 MHz) output terminal. This signal is used for inputing serial data applied from DOT1 terminal to play back section.
24	DGOT	O	Control signal output terminal. Control signal which specifies serial data period, is outputted from this terminal.
25	DOT1	O	Serial data output terminal. This terminal outputs serial data (128 bits) separated from video signal. This data is delayed 1H from input data.
26	CRCO	O	Error signal output terminal. This terminal outputs ''H'' pulse of 128 bits width when error data is inputted.
27	OPWG	(I)/O	Gate signal output terminal. This terminal outputs ''H'' level gate signal during data block period. Also this terminal is used as input terminal for measurement.
28	OPWB	O	Clock signal output temrinal. This signal is used for selection of input data.

•μPD785C (PCM Encoding Processor)



◆ Terminal Function <μPD785C>

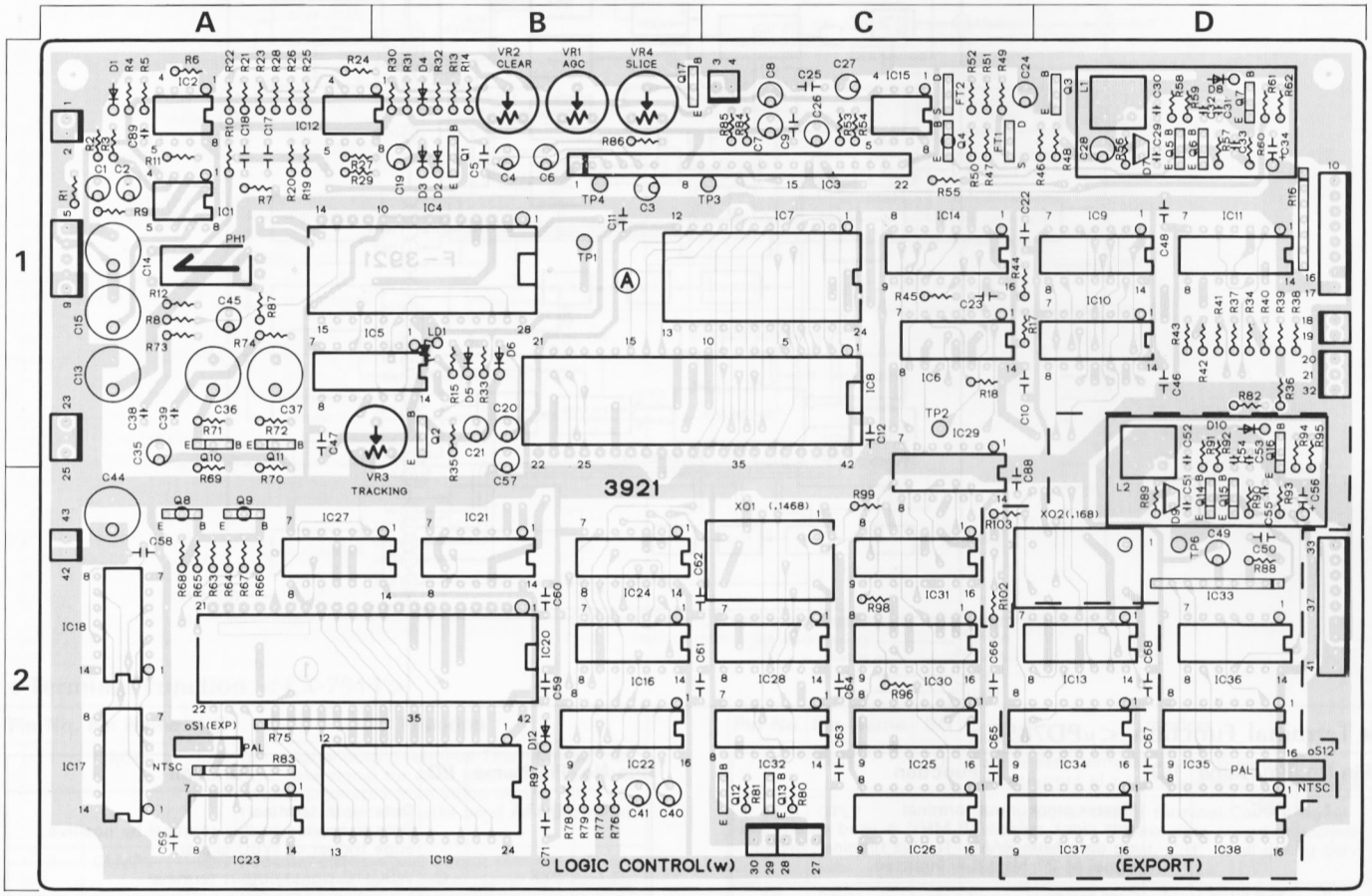
Pin No.	Pin Name	I/O	Function
1	$\overline{RBC}$	I	Master clock input terminal This clock pulse (2.6 MHz) is used when reading data from RAM. To this terminal, divided signal of 21 MHz/8 is inputted.
2	TEST3	I	Test terminal Normally this terminal is connected to $\overline{RBC}$ terminal.
3	TEST2	O	Test terminal Normally this terminal outputs system reset pulse. In NTSC system, 1 pulse every 16 flames. In PAL system, 1 pulse every 40 flames.
4	TEST1	I	Test terminal Normally ketp in "H" level.
5	COMP	O	Composite pulse (Television sync signal) output terminal
6	SIFT	O	Shift pulse output terminal This pulse is used for separation between Zero level and Pedestal level. (133 bits)
7	WITE	O	White pulse output terminal This pulse is used to generate white level at the end of horizontal scanning period. (4 bits)
8	DAT	O	Data output terminal Data applied to DATA terminal is outputted from this terminal after interleave of the data and addition of difuseness bit.
9	V	O	Vertical sync signal output terminal
10	A8	O	RAM address output terminal
11	A9	O	RAM address output terminal
12	W	O	Write pulse output terminal Write pulse is applied when writing data to RAM. This terminal is connected to $\overline{WE}$ terminal of RAM.
13	A10	O	RAM address output terminal
14	CSI	O	Chip select signal output terminal
15	$\overline{WBC}$	I	Master clock input terminal This clock pulse (1.4 MHz) is used when writing data to RAM. To this terminal, divided signal of 21 MHz/15 is inputted.

Pin No.	Pin Name	I/O	Function
16	DATA	I	Data input terminal Data is applied to this terminal by positive edge trigger of WBC signal.
17	88K	O	$\overline{WBC}$/16 signal output terminal
18	44K	O	88K/2 signal output terminal This signal specifies L-ch and R-ch data. "H" level when R-ch data is outputted. "L" level when L-ch data is outputted.
19	EXITDC	I	Emphasis control signal input terminal "L" level when emphasis is ON. "H" level when emphasis is OFF.
20	LR	O	Peak level output terminal "L" level when peak level is detected.
21	GND	–	0V terminal
22	INTRST	I	Test terminal Normally kept "H" level.
23	MUT	I	Recording mute control signal input terminal Muting is performed when "L" level is inputted.
24	CS3	O	Timing signal output terminal for reading codes of tape copy prohibition and changing scanning line to 625. "L" level pulse is outputted once in 1 field.
25	CS2	O	Timing signal output terminal for reading codes of address signal and contents disclimination signal. "L" level pulse is outputted 9 times in 1 field.
26 / 30 31 32 33	DB4 / DB8 DB3 DB2 DB1	I/O	Data bus terminals DB8: Emphasis ON/OFF DB7: 14/16 bit select DB6: 525/625 line select DB5: Tape copy prohibition DB2: Reset when power is applied.
34 / 40	A0 / A6	O	RAM address terminals
41	V_{DD}	–	+5V terminal
42	A7	O	RAM address terminal

3. PARTS LOCATION & PARTS LIST

3-1. F-3921 PCM Decoder Board (Stock No. 00813301)

<Top View (Component Side) with Reverse Side Patterns>

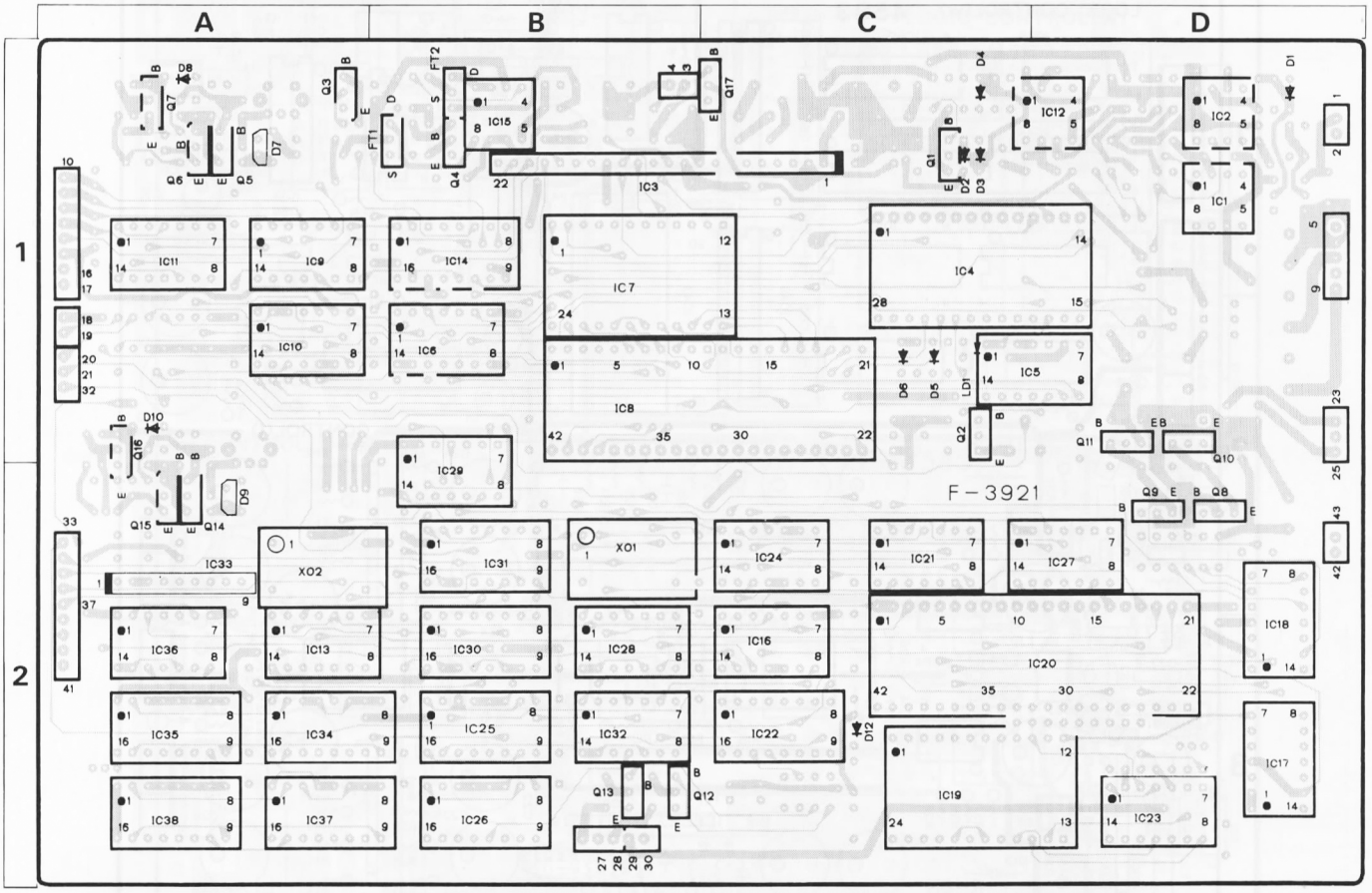


Parts List

Parts No.	Stock No.	Description
•Transistor		
wQ1	46078801	2SC2458
wQ2	46078801	2SC2458
wQ3	46078801	2SC2458
wQ4	46078701	2SA1048
wQ5	46614501	2SC3078M
wQ6	46614501	2SC3078M
wQ7	46614501	2SC3078M
wQ8	46078701	2SA1048
wQ9	46078701	2SA1048
wQ10	46614501	2SC3078M
wQ11	46614501	2SC3078M
wQ12	46078801	2SC2458
wQ13	46078801	2SC2458
wQ14	46614501	2SC3078M
wQ15	46614501	2SC3078M
wQ16	46614501	2SC3078M
wQ17	46078801	2SC2458
•FET		
wFT1	03703401	2SK163-K2
	or 03703402	2SK163-L1
	or 03703403	2SK163-L2
wFT2	03703405	2SK163-M2
•IC		
wIC1	46427600	LF-357N
wIC2	46436800	μPC311C
wIC3	46543100	Q-0011
wIC4	46427700	CX-7914
wIC5	46428700	TC40H000P
wIC6	46613500	MM74HC86N
	or 48065600	TC74HC86P
	or 48123800	LR74HC86
wIC7	46436900	TMM-2016P
wIC8	46437100	TM4505P

Parts No.	Stock No.	Description
wIC9	46545300	M74LS05P
	or 48067400	MB74LS05
	or 48067800	HD74LS05P
wIC10	46545300	M74LS05P
	or 48067400	MB74LS05
	or 48067800	HD74LS05P
wIC11	46429200	TC40H074P
wIC12	07208900	NJM4558D-X
wIC13	46636600	M74LS08P
	or 48003000	HD74LS08P
	or 48003100	MB74LS08M
wIC14	03612900	TC4528BP
wIC15	07208900	NJM4558D-X
wIC16	46429000	TC40H008P
wIC17	46545400	M74LS27P
	or 48067500	MB74LS27
	or 48067900	HD74LS27P
wIC18	46545300	M74LS05P
	or 48067400	MB74LS05
	or 48067800	HD74LS05P
wIC19	46436900	TMM-2016P
wIC20	46427800	μPD785C
wIC21	46428900	TC40H004P
wIC22	03612900	TC4528BP
wIC23	46545900	TC5024BP
wIC24	07265400	MB74LS02
	or 48067100	M74LS02
wIC25	46430100	MB74LS161AM
	or 46613600	M74LS161AP
	or 48068200	HD74LS161P
wIC26	46430100	MB74LS161AM
	or 46613600	M74LS161AP
	or 48068200	HD74LS161P
wIC27	46429300	TC40H164P
wIC28	46429200	TC40H074P
wIC29	46675000	MM74HC164N
wIC30	46430000	MB74LS157M

<Bottom View with Reverse Side Patterns>



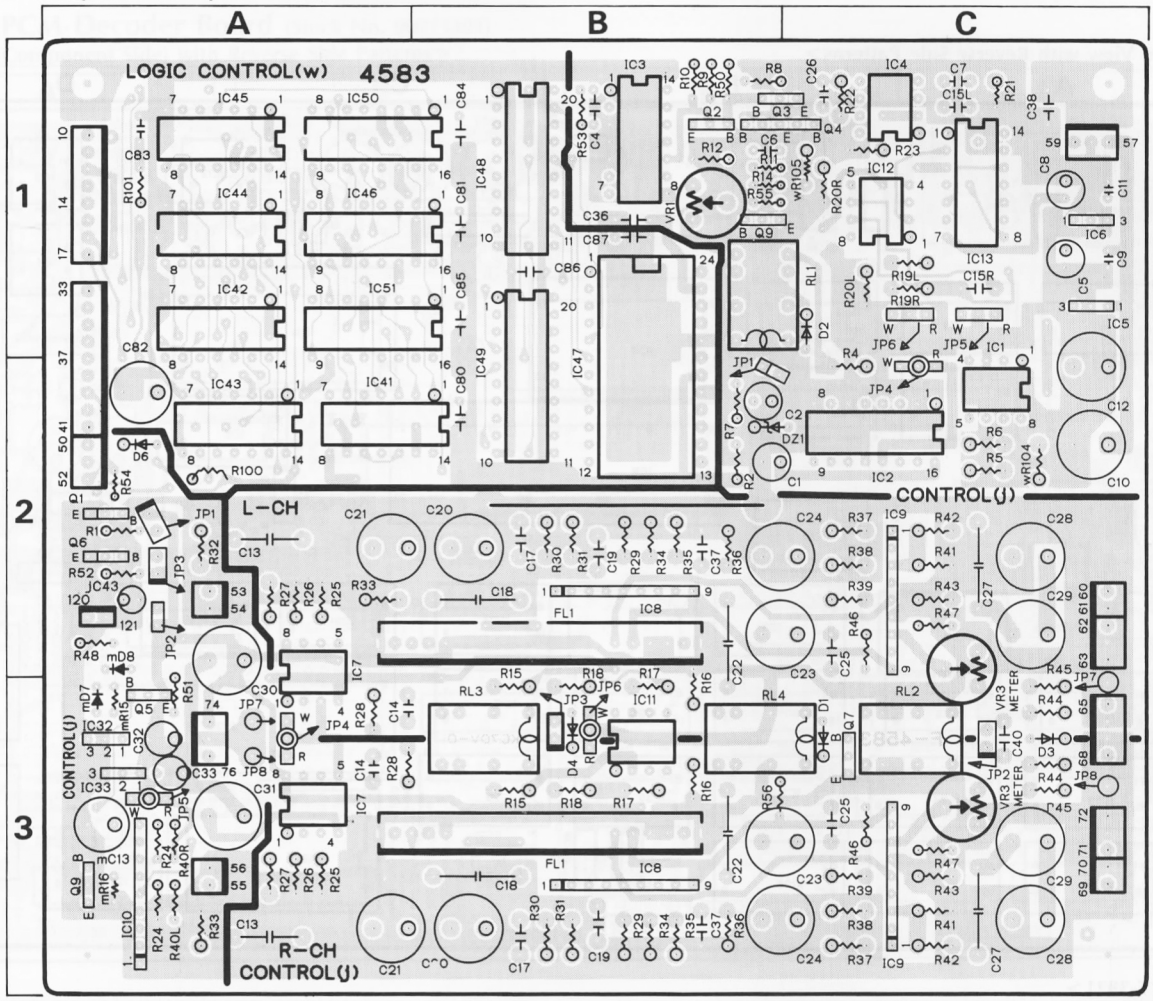
Parts List <F-3921>

Parts No.	Stock No.	Description
	or 46545700	M74LS157P
	or 48068100	HD74LS157P
wIC31	46430000	MB74LS157M
	or 46545700	M74LS157P
	or 48068100	HD74LS157P
wIC32	46429200	TC40H074P
wIC33	03604600	TC5081P
wIC34	46636700	M74LS669P
	or 48068300	HD74LS669P
wIC35	46636700	M74LS669P
	or 48068300	HD74LS669P
wIC36	46636800	M74LS74
	or 48068000	HD74LS74AP
	or 46429600	MB74LS74AM
wIC37	46636700	M74LS669P
	or 48068300	HD74LS669P
wIC38	46636700	M74LS669P
	or 48068300	HD74LS669P
•Diode		
wD1	03111600	1S2473
wD2	03111600	1S2473
wD3	03111600	1S2473
wD4	03111600	1S2473
wD5	03111600	1S2473
wD6	03401700	MV103 Varistor
wD7	46546400	SVC-201SP Variable Capacitance Diode
•Diode		
wD8	03111600	1S2473
wD9	46546400	SVC-201SP Variable Capacitance Diode
wD10	03111600	1S2473
wD12	03111600	1S2473
wPH1	09201100	Photo Coupler

Parts No.	Stock No.	Description
wLD1	46095200	LED TLR123
wR16	46344400	1kΩ×6 1/8W A.R.
wR75	46349300	10kΩ×8 1/8W A.R.
wR83	46345600	10kΩ×6 1/8W A.R.
wC1	46276800	4.7μF 50V E.C.
wC2	46276800	4.7μF 50V E.C.
wC3	46276200	0.22μF 50V E.C.
wC4	46275700	22μF 16V E.C.
wC6	46275700	22μF 16V E.C.
wC7	46275700	22μF 16V E.C.
wC8	46275700	22μF 16V E.C.
wC20	46276200	0.22μF 50V E.C.
wC21	46276600	2.2μF 50V E.C.
wC24	46276500	1μF 50V E.C.
wC26	46275500	0.68μF 50V E.C.
wC27	46276300	0.33μF 50V E.C.
wC28	46276800	4.7μF 50V E.C.
wC34	46638600	3.3μF 16V Ta.C.
wC35	46275900	47μF 16V E.C.
wC40	46276500	1μF 50V E.C.
wC41	46276500	1μF 50V E.C.
wC45	46276600	2.2μF 50V E.C.
wC57	46276600	2.2μF 50V E.C.
wXO1	46546300	21.1468MHz Crystal Element
wL1	46541700	VCO Coil
wL2	46541700	VCO Coil
wL3	46166600	2.2μH Inductor
wL4	46166600	2.2μH Inductor
wVR1	10343300	100kΩ(B) S.V.R., AGC Level Adj.
wVR2	10342500	4.7kΩ(B) S.V.R., Clear Level Adj.
wVR3	10342500	4.7kΩ(B) S.V.R., TRACKING Indicator Level Adj.
wVR4	10342700	10kΩ(B) S.V.R., Slice Level Adj.

3-2. F-4583 PCM Encoder Board (Stock No. 00814101)

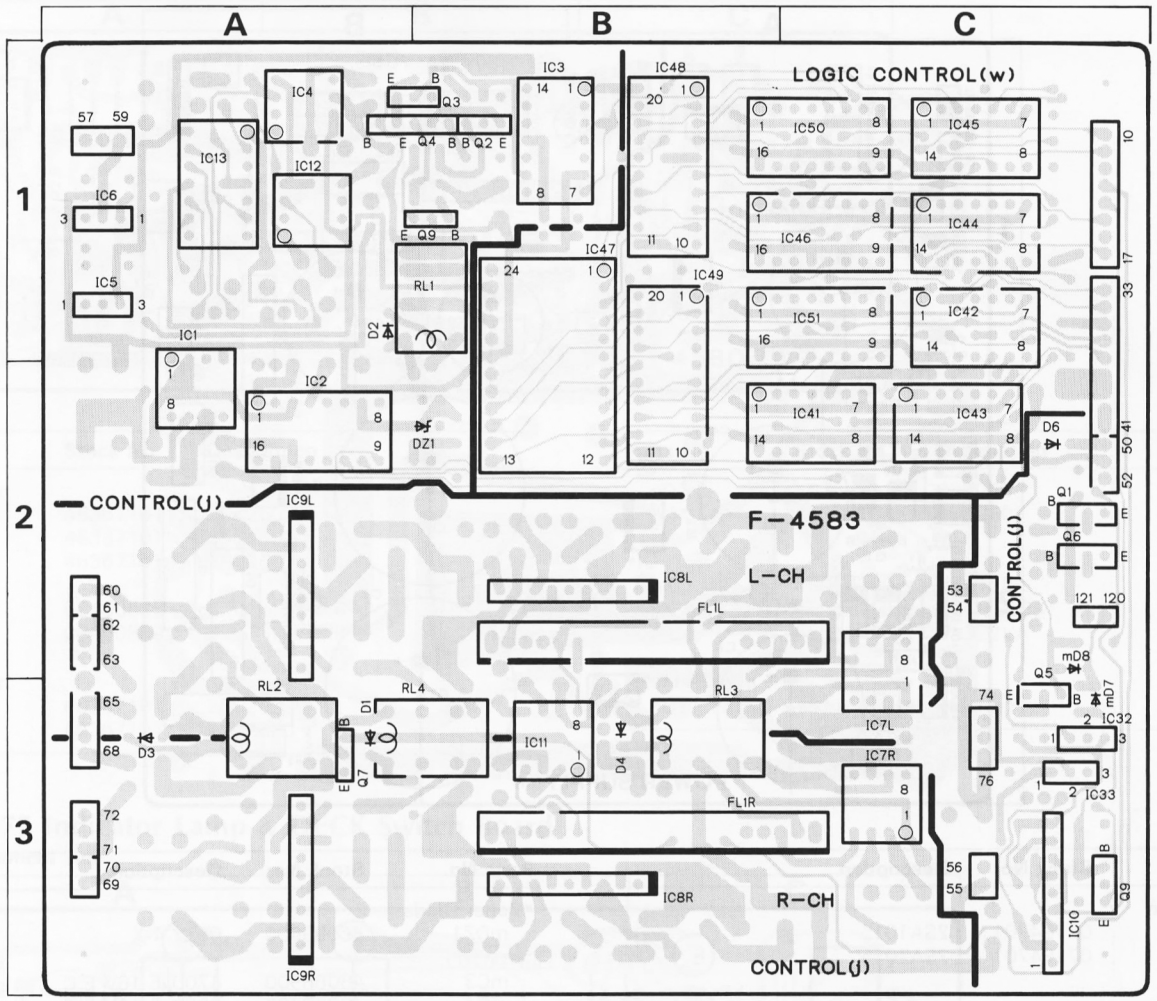
<Top View (Component side) with Reverse Side Patterns>



Parts List

Parts No.	Stock No.	Description
•Transistor		
jQ1	46614600	DTC124F
jQ2	46614501	2SC3078M
jQ3	46614501	2SC3078M
jQ4	03064901	2SC1583
jQ5	46118801	2SC2878
jQ6	46614600	DTC124F
jQ7	07299701	2SC2603
jQ8	07194701	2SA1015
•IC		
jFL1	46546200	F-100A
jIC1	46545000	LF-356
jIC2	46545800	TC4053BP
jIC3	46544800	μPC319C
jIC4	46427600	LF-357N
jIC5	46148600	NJM78L05A
jIC6	46544000	NJM79L05A
jIC7	46544900	LF-353N
jIC8	46613900	NJM072S
jIC9	46613900	NJM072S
jIC10	48066700	NJM2903S
jIC11	46544900	LF-353N
jIC12	46544900	LF-353N
jIC13	48065500	MSM4016BRS
jIC14	46148600	NJM78L05A
jIC15	46544000	NJM79L05A
•Diode		
jD1	03111600	1S2473
jD2	03111600	1S2473
jD3	03111600	1S2473
jD4	03111600	1S2473
jD6	03111600	1S2473
•Zener Diode		
jDZ1	46101000	05Z5.1-Y
jR4	46017000	1kΩ 1/2W C.R.
jR5	46018200	3.3kΩ 1/2W C.R.
jR6	46018200	3.3kΩ 1/2W C.R.
jR16	46019100	7.5kΩ 1/2W C.R.
jR17	46019800	15kΩ 1/2W C.R.
jR18	46017800	2.2kΩ 1/2W C.R.
jR19	46017800	2.2kΩ 1/2W C.R.
jR20	46017800	2.2kΩ 1/2W C.R.
jR25	46023400	470kΩ 1/2W C.R.
jR26	46019300	9.1kΩ 1/2W C.R.
jR27	46019400	10kΩ 1/2W C.R.
jR28	46019400	10kΩ 1/2W C.R.
jR29	46019400	10kΩ 1/2W C.R.
jR30	46020200	22kΩ 1/2W C.R.
jR31	46017200	1.2kΩ 1/2W C.R.
jR33	46019400	10kΩ 1/2W C.R.
jR34	46020500	30kΩ 1/2W C.R.
jR35	46019400	10kΩ 1/2W C.R.
jR36	46020200	22kΩ 1/2W C.R.
jR37	46020200	22kΩ 1/2W C.R.
jR38	46017200	1.2kΩ 1/2W C.R.
jR39	46019400	10kΩ 1/2W C.R.

<Bottom View with Reverse Side Patterns>



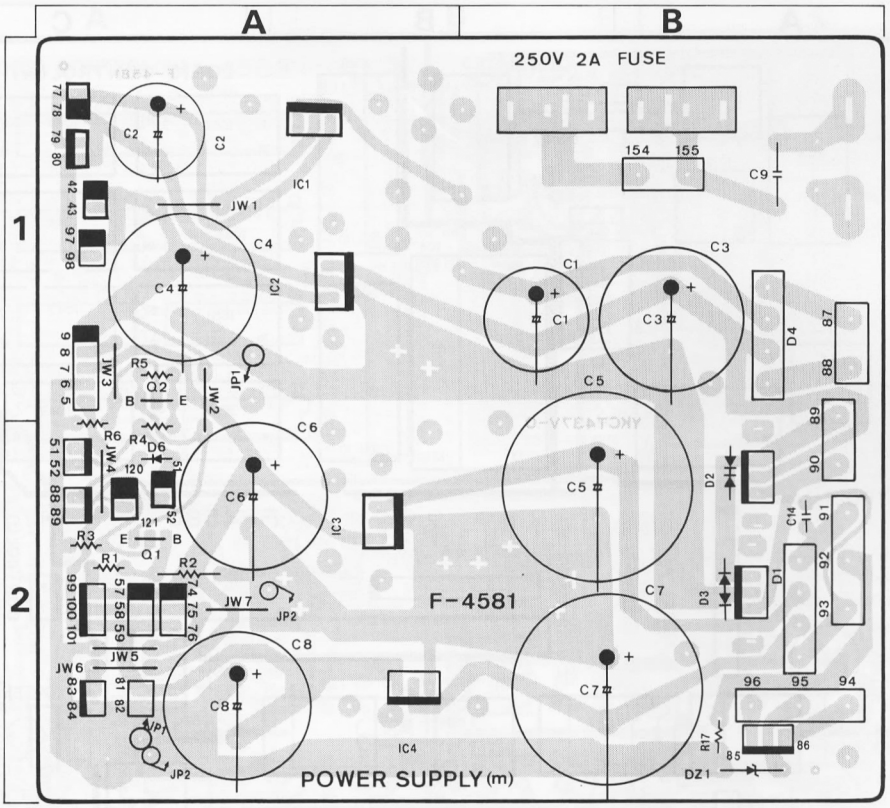
Parts List <F-4583>

Parts No.	Stock No.	Description
jR41	46018600	4.7kΩ 1/2W C.R.
jR42	46018600	4.7kΩ 1/2W C.R.
jR43	46019600	12kΩ 1/2W C.R.
jR44	46016600	680Ω 1/2W C.R.
jR45	46016600	680Ω 1/2W C.R.
jC6	46689500	0.01μF 50V F.C.
jC10	46627900	47μF 50V E.C.
jC12	46627900	47μF 50V E.C.
jC13	46222800	0.22μF 100V F.C.
jC18	46643200	0.01μF 50V P.C.
jC19	46642900	1500pF 125V P.C.
jC20	46627900	47μF 50V E.C.
jC21	46627900	47μF 50V E.C.
jC22	46643200	0.01μF 50V P.C.
jC23	46627900	47μF 50V E.C.
jC24	46627900	47μF 50V E.C.
jC25	46642900	1500pF 125V P.C.
jC27	46643200	0.01μF 50V P.C.
jC28	46627900	47μF 50V E.C.
jC29	46627900	47μF 50V E.C.
jC30	46628100	100μF 50V E.C.
jC31	46628100	100μF 50V E.C.
jVR1	10342900	22kΩ(B) S.V.R., THD Adj.
jVR3	10351700	47kΩ(B) S.V.R., Indicator Level Adj.
jRL1	46630700	Relay, RECORD/PLAY
jRL2	46630700	Relay, MUTING

Parts No.	Stock No.	Description
jRL3	46630700	Relay, RECORD/PLAY
jRL4	46630700	Relay, DE-ENPHASIS
•Transistor		
mQ6	07194701	2SA1015
mQ7	46118801	2SC2878
•Diode		
mD7	46421300	1N60PSP
mD8	03111600	1S2473
•IC		
wIC41	46429000	TC40H008P
wIC42	46429200	TC40H074P
wIC43	46429300	TC40H164P
wIC44	46429000	TC40H008P
wIC45	46613500	MM74HC86N
	or 48065600	TC74HC86P
	or 48123800	LR74HC86
wIC46	46613700	TC40H157P
wIC47	46436510	PCM53JG-I (GREEN)
	or 46436511	PCM53JG-I (YELLOW)
	or 46436512	PCM53JG-I (BROWN)
wIC48	46546000	TC40H373P
wIC49	46546000	TC40H373P
wIC50	46436700	DM-2502CN
wIC51	46436600	DM-2503CN
wR104	46018100	3kΩ 1/2W C.R.
	or 46018200	3.3kΩ 1/2W C.R.
	or 46018300	3.6kΩ 1/2W C.R.

3-3. F-4581 Power Supply Circuit Board (Stock No. 00814001)

Component Side



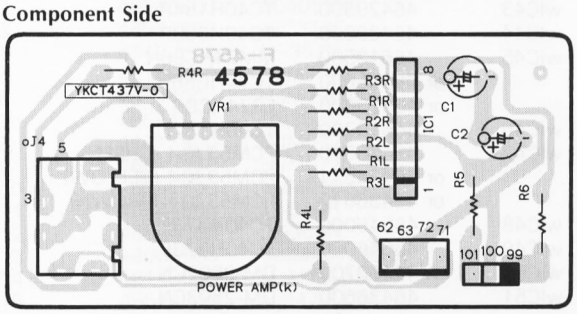
Parts List

Parts No.	Stock No.	Description
•Transistor		
mQ1	07194701	2SA1015
mQ2	07194701	2SA1015
•IC		
mIC1	46144600	NJM78M12A
mIC2	48053500	NJM7805A
mIC3	46144700	NJM78M15A
mIC4	46581300	NJM79M15A
•Diode		
mD1	03117000	RB152-LFF
mD2	46534000	CTU21S
mD3	46533900	CTU21R
mD4	03117000	RB152-LFF
mD6	46421300	1N60PSP

Parts No.	Stock No.	Description
•Zener Diode		
mDZ1	46098600	05Z2.4-X
mC3	48068900	4700μF 16V E.C.
mC4	48068700	3300μF 10V E.C.
mC5	48068600	4700μF 35V E.C.
mC6	48068800	3300μF 16V E.C.
mC7	48068600	4700μF 35V E.C.
mC8	48068800	3300μF 16V E.C.
⚠ mC9	46425800	0.01μF 400V C.C.
mC14	46879400	0.01μF 100V F.C.
⚠ mFU1	07188600	2A 250V Fuse, Power (XX,UL,CSA)
⚠	07184200	315mA 250V Fuse, Power (EU,BS)

3-4. F-4578 PHONES Amp. Circuit Board

Component Side

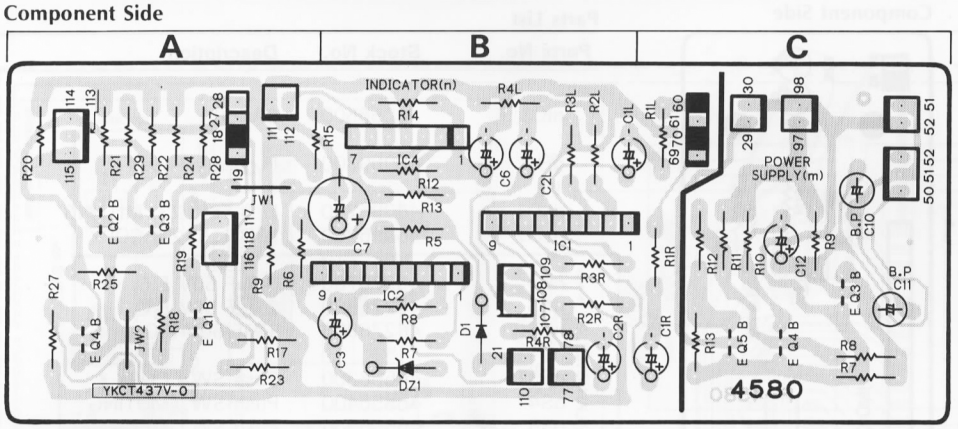


Parts List

Parts No.	Stock No.	Description
•IC		
kIC1	46579100	M5219L
kVR1	46631500	50kΩ(A)×2 V.R., PHONES LEVEL
oJ4	46636900	Jack, PHONES

3-5. F-4580 Indicator Control Circuit Board (Stock No. 00813901)

Component Side

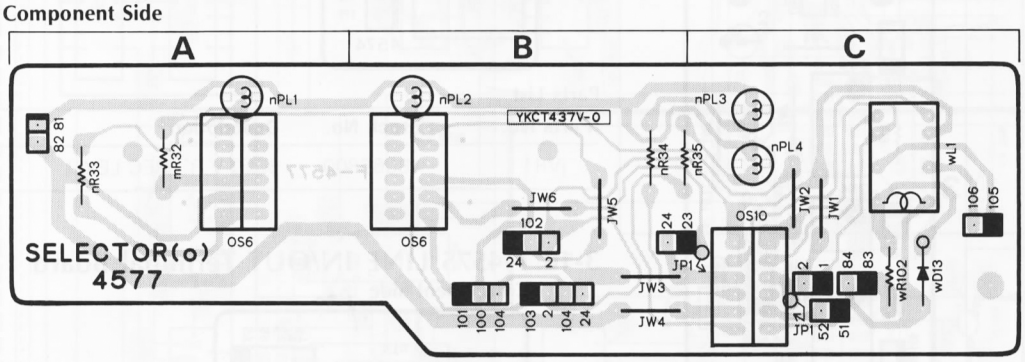


Parts List

Parts No.	Stock No.	Description
•Transistor		
mQ3	46367101	2SC2603
mQ4	46367101	2SC2603
mQ5	46367101	2SC2603
mC10	08450800	3.3μF 16V E.B.
mC11	08450800	3.3μF 16V E.B.
•Transistor		
nQ1	46367101	2SC2603
nQ2	46367101	2SC2603
nQ3	46367101	2SC2603
nQ4	46367101	2SC2603
•IC		
nIC1	48066600	BA6138
nIC2	46087100	NJM4558S
nIC4	48066400	BA222VA
•Zener Diode		
nDZ1	46113600	05Z11-Y

3-6. F-4577 Indicator Lamp & DECK Switch Board

Component Side

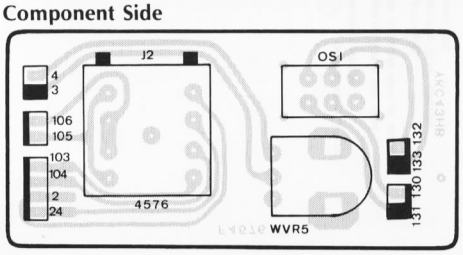


Parts List

Parts No.	Stock No.	Description
nPL1	48075800	14V 80mA Pilot Lamp, DECK-2
nPL2	48075800	14V 80mA Pilot Lamp, DECK-1
nPL3	48075900	14V 80mA Pilot Lamp, RECORD
nPL4	48075800	14V 80mA Pilot Lamp, PLAY
oS6	48066900	Push SW., DECK-1/DECK-2
oS10	46556300	Push SW., RECORD/PLAY
•Diode		
wD13	03117600	1S2473T77
wRL1	46630700	Relay

3-7. F-4576 READ Level & VIDEO IN/OUT Terminal Board

Component Side

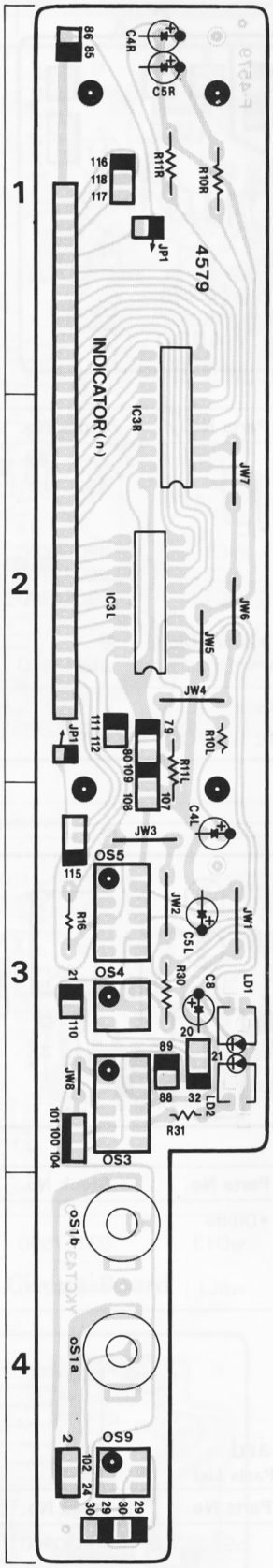


Parts List

Parts No.	Stock No.	Description
oS1	46630900	Slide SW., NTSC/PAL SECAM
oJ2	48067000	4P Terminal Board, DECK-1 VIDEO IN/OUT, MONITOR
wVR5	46631600	10kΩ(B) V.R., READ LEV

3-8. F-4579 Level Indicator & Control Switch Circuit Board (Stock No. 00813801)

Component Side

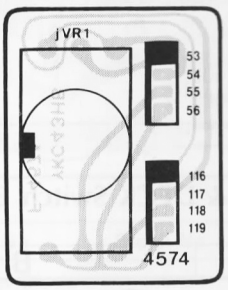


Parts List

Parts No.	Stock No.	Description
•IC		
nIC3	48066500	BA668A
nFL1	48059300	FL Display Tube
nLD1	46095200	LED TLR123, MUTING
nLD2	46095200	LED TLR123, COPY
nC4	46276700	3.3μF 50V E.C.
nC5	46276600	2.2μF 50V E.C.
nC8	46276900	10μF 50V E.C.
oS3	46556300	Push SW., COPY
oS4	46556400	Push SW., MUTING
oS5	46556300	Push SW., METER
oS9	46917000	Push SW., REC MUTE
oJ1	48072900	1P Terminal Board, DECK-2 VIDEO IN/OUT

3-9. F-4574 REC Level Control Board

Component Side

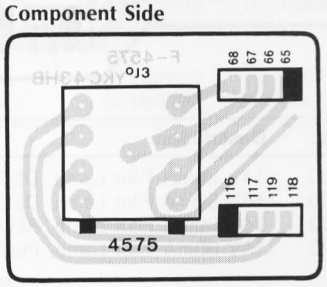


Parts List

Parts No.	Stock No.	Description
jVR1	48066800	50kΩ V.R., REC LEVEL

3-10. F-4575 LINE IN/OUT Terminal Board

Component Side



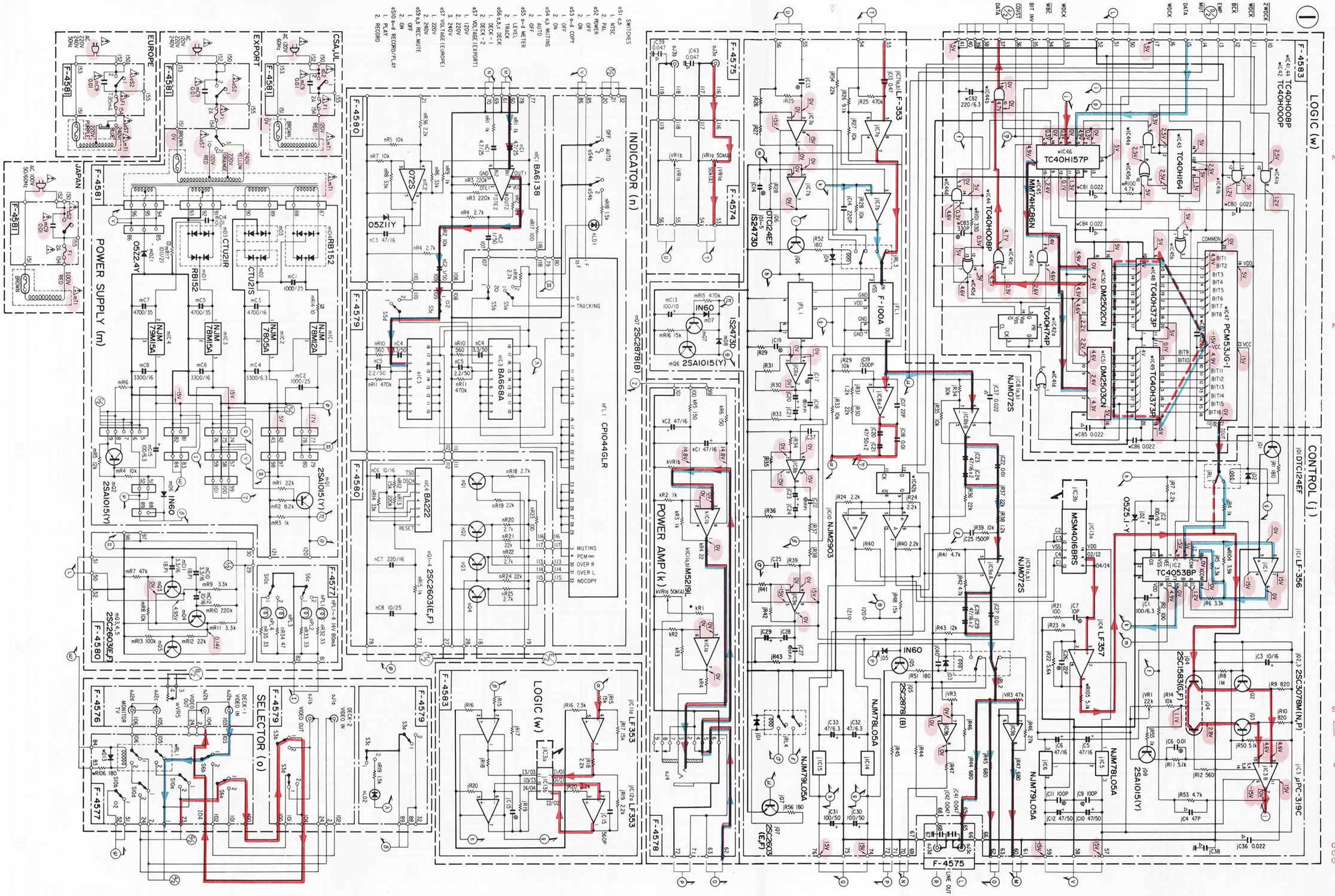
Parts List

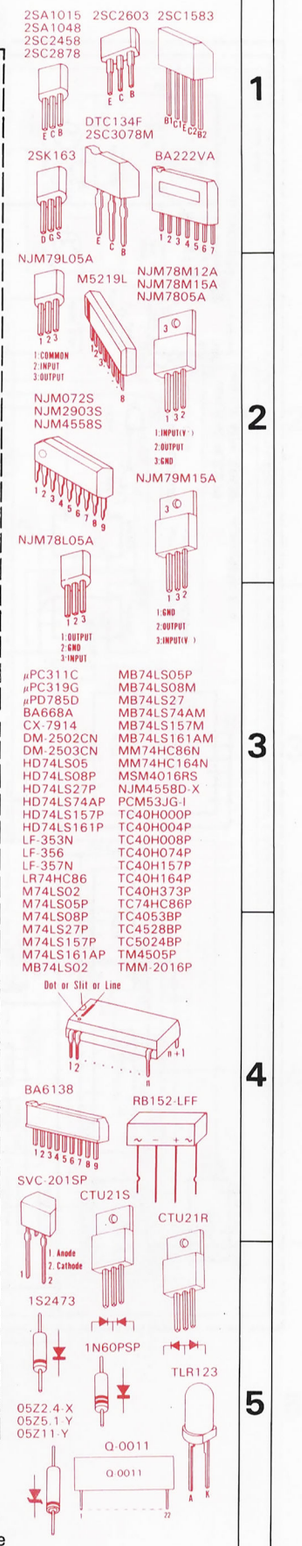
Parts No.	Stock No.	Description
oJ3	48072800	4P Terminal Board, LINE IN/OUT

4. SCHEMATIC DIAGRAM

4-1. Decorder & Power Supply Section

* Design and specifications subject to change without notice for improvement.
* La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

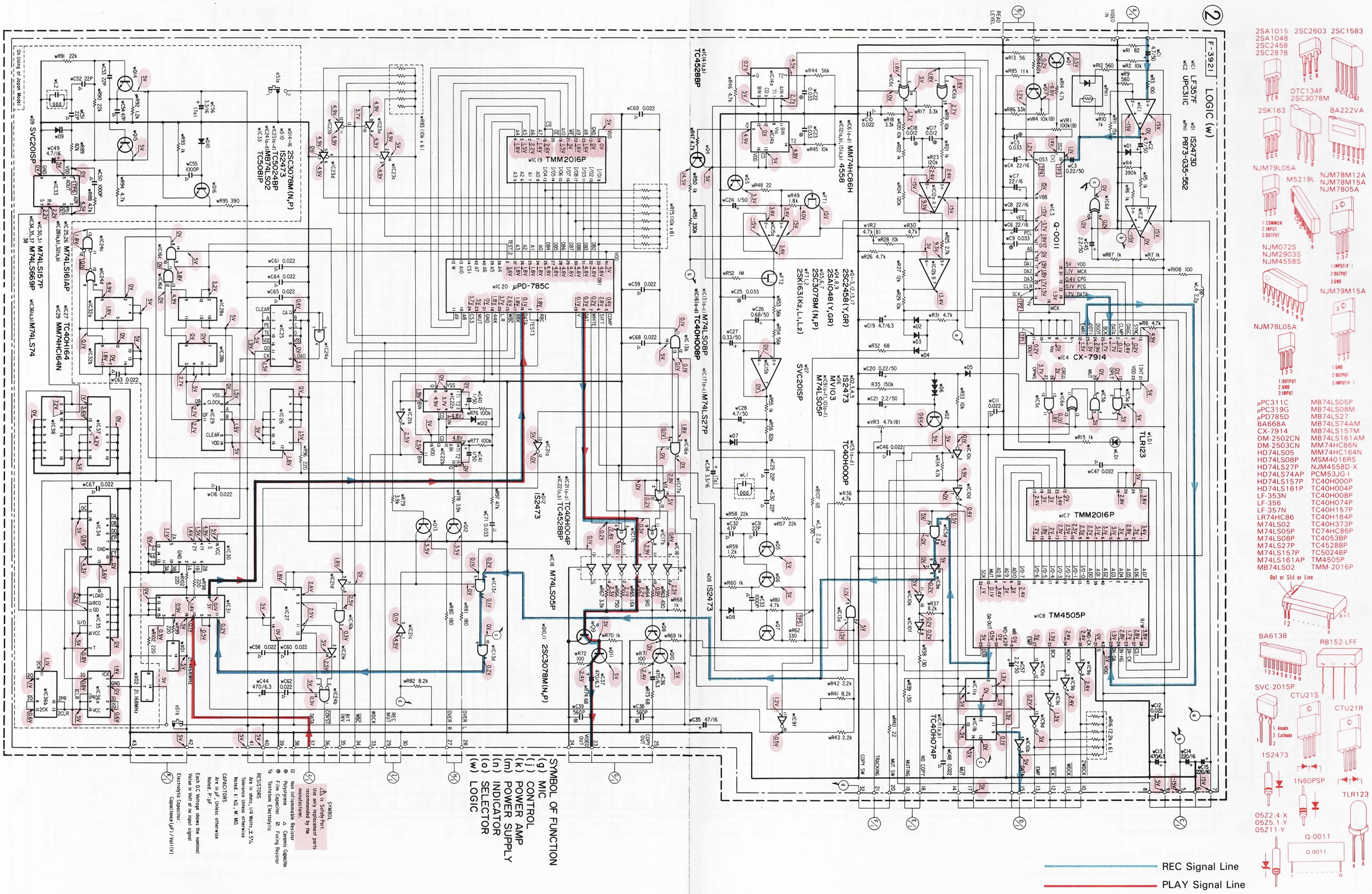




μPC311C	MB74LS05P
μPC319G	MB74LS08M
μPD785D	MB74LS27
BA668A	MB74LS74AM
CX-7914	MB74LS157M
DM-2502CN	MB74LS161AM
DM-2503CN	MM74HC86N
HD74LS05	MM74HC164N
HD74LS08P	MSM4016RS
HD74LS27P	NJM4558D-X
HD74LS74AP	PCM53JG-I
HD74LS157P	TC40H000P
HD74LS161P	TC40H004P
LF-353N	TC40H008P
LF-356	TC40H074P
LF-357N	TC40H157P
LR74HC86	TC40H164P
M74LS02	TC40H373P
M74LS05P	TC74HC86P
M74LS08P	TC4053BP
M74LS27P	TC4528BP
M74LS157P	TC5024BP
M74LS161AP	TM4505P
MB74LS02	TMM-2016P

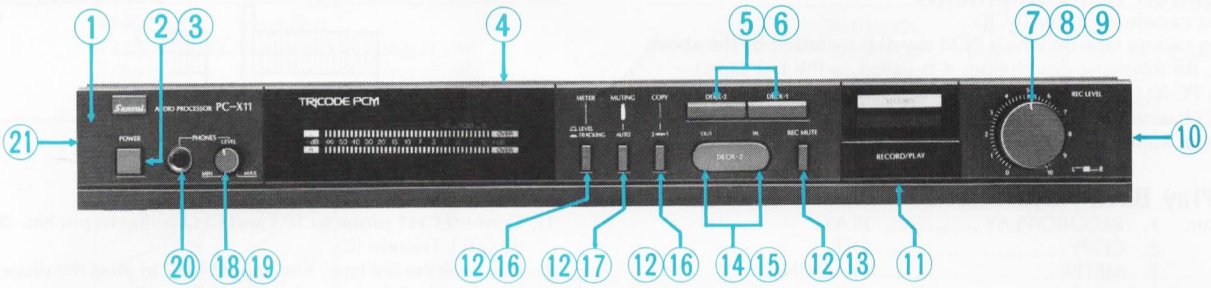
4-2. Encoder Section

* Design and specifications subject to change without notice for improvement.
* La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

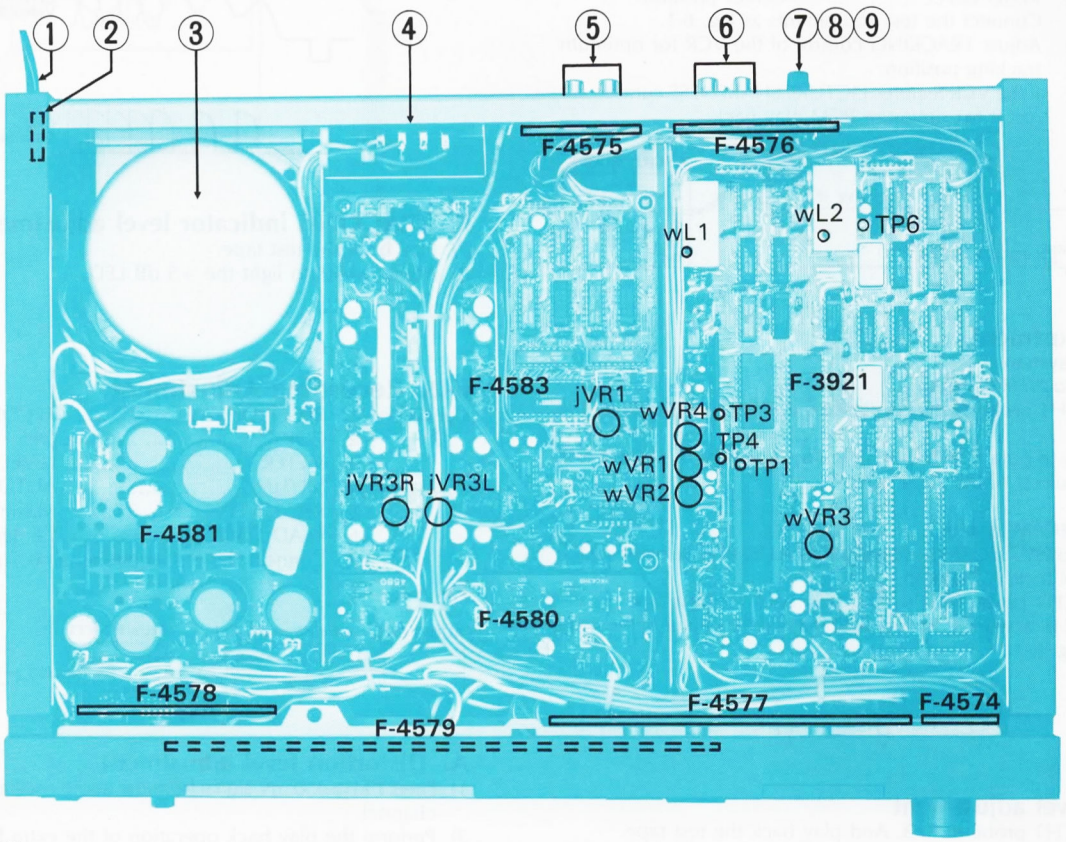


5. OTHER PARTS

5-1. Front View



5-2. Top View



Parts List <Front View>

Parts No.	Stock No.	Description
1	47589900	Front Panel Ass'y
2	47588100	Knob, POWER
⚠ 3	46364300	Push SW., POWER
4	47588500	Bonnet
5	47588000	Knob, DECK-1, DECK-2
6	48066900	Push SW., DECK-1/DECK-2
7	47588300	Knob, REC LEVEL (Left)
8	47588400	Knob, REC LEVEL (Right)
9	48066800	50kΩ V.R., REC LEVEL
10	47588910	Side Panel Ass'y (Right)
11	46556300	Push SW., RECORD/PLAY
12	47587900	Knob, REC MUTE, COPY, MUTING, METER
13	46917000	Push SW., REC MUTE
14	48072900	1P Terminal Board, DECK-2 VIDEO IN/OUT
15	47587400	Pin Jack Cover
16	46556300	Push SW., COPY, METER
17	46556400	Push SW., MUTING
18	47623000	Knob, PHONES LEVEL
19	46631500	50kΩ(A)×2 V.R., PHONES LEVEL
20	46636900	Jack, PHONES
21	47589010	Side Panel Ass'y (Left)

Parts List <Top View>

Parts No.	Stock No.	Description
⚠ 1	38004700	Power Cord (XX, UL, CSA)
⚠	38004500	Power Cord (EU, BS)
2	47168610	Cord Cover
⚠ 3	15017501	Power Transformer (XX)
⚠	15017502	Power Transformer (UL, CSA)
⚠	15017505	Power Transformer (EU, BS)
⚠ 4	48062100	Voltage Selector (XX)
⚠	07204700	Voltage Selector (EU, BS)
5	48072800	4P Terminal Board, LINE IN/OUT
6	48067000	4P Terminal Board, DECK-1 VIDEO IN/OUT, MONITOR
7	47223500	Knob, READ LEV
8	46631600	10kΩ(B) V.R., READ LEV
9	46630900	Slide SW., NTSC/PAL SECAM

6. ADJUSTMENT (Refer to Top View on Page 20)

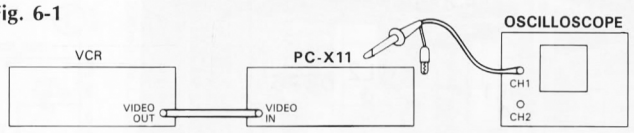
• Required test equipments

1. Video cassete recorder (VCR)
2. Video cassete tape on which PCM signal is recorded by the above VCR. (In following description, it is called as the test tape.)
3. Extra PC-X11 which is completely adjusted.
4. Dual channel oscilloscope
5. General audio test equipments

6-1. Play Back Adjustment

Condition:
1. RECORD/PLAY ..... PLAY
2. COPY ..... OFF
3. METER ..... TRACKING
4. MUTING ..... AUTO
5. INPUT ..... LINE
6. READ LEVEL ..... Center position
7. Connect the test equipments as Fig. 6-1.
8. Adjust TRACKING control of the VCR for optimum tracking position.
9. If the VCR features PICTURE SHARPNESS control, adjust it for optimum PCM play back.

Fig. 6-1



A. PLL adjustment

1. For NTSC system

1) Turn oS1 to NTSC position.
2) Connect CH1 probe of the oscilloscipe to TP1. And play back the test tape.
3) Adjust wL1 to obtain 50% duty ratio (equal widths of positive and negative pulses) of the pulse wave.

2. For PAL/SECAM system

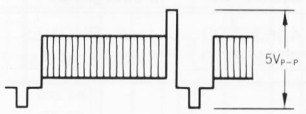
1) Turn oS1 to PAL/SECAM position and COLOR-B/W selector switch of the VCR to B/W position.
2) Connect CH1 probe to TP6. And play back the test tape.
3) Adjust wL2 to where DC level is positioned at the center of the wave form as Fig. 6-2.

Fig. 6-2

B. AGC level adjustment

1) Connect CH1 probe to TP3. And play back the test tape.
2) Adjust wVR1 to obtain 5Vp-p video signal as Fig. 6-3.

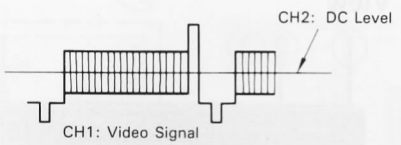
Fig. 6-3



C. Slice level adjustment

1) Turn CH1 and CH2 INPUT SELECTORs of the oscilloscipe to GND position.
2) Adjust both V-POSITIONs to meet both sweep lines at the center of the scope.
3) Return the INPUT SELECTORs to DC position. And set both INPUT SENSITIVITY switches to 1V/cm position.
   Note: If 10:1 probe is used, INPUT SENSITIVITY must be 0.1V/cm.
4) Connect CH1 probe to TP3 and CH2 probe to TP4.
5) Play back the test tape. Then adjust wVR4 to where DC level of the CH2 is positioned at the center of the data portion of the CH1 video signal as Fig. 6-4.

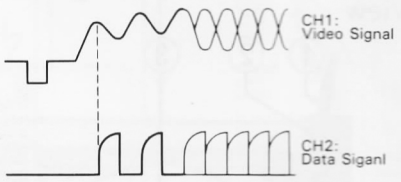
Fig. 6-4



D. Clear level adjustment

1) Connect CH1 probe to TP3 and CH2 probe to pin No. 18 of wIC3 (Q-0011 Tricode IC).
2) Play back the test tape. And adjust wVR2 to meet the phases of video signal and of data signal as Fig. 6-5.

Fig. 6-5



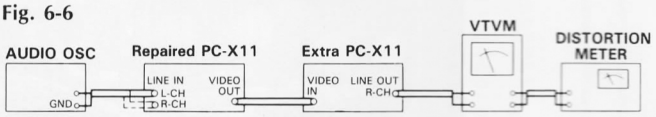
E. TRACKING indicator level adjustment

1) Play back the test tape.
2) Adjust wVR3 to light the +5 dB LED.

6-2. Recording Adjustment

Condition:
1. RECORD/PLAY ..... RECORD
2. COPY ..... OFF
3. METER ..... LEVEL
4. MUTING ..... AUTO
5. REC LEVEL ..... Maximum
6. READ LEVEL ..... Center position
7. Connect the test equipments as Fig. 6-6.

Fig. 6-6



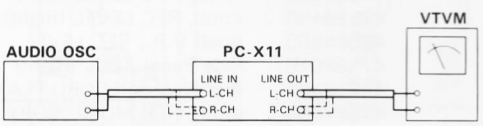
A. Distortion level adjustment

1) Feed 1 kHz 450 mV signal from the audio oscillator to LINE IN right channel.
2) Perform the play back operation of the extra PC-X11.
3) Adjust jVR1 to minimize distortion level (especially noise level) from LINE OUT right channel of the extra PC-X11.

6-3. Indicator Level Adjustment

Condition:
1. Same condicition as 1 to 8 of Recording Adjustment.
2. Connect the test equipments as Fig. 6-7.

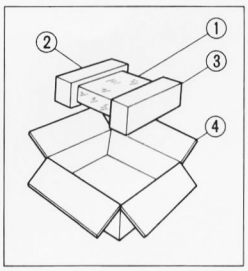
Fig. 6-7



1) Feed 1 kHz signal from the audio oscillator to LINE IN left (right) channel.
2) Adjust output control of the audio oscillator to apply 250 mV output signal from LINE OUT left (right) channel.
3) Adjust jVR3L (jVR3R) to light the 0 dB LED.

7. PACKING LIST

Parts No.	Stock No.	Description
1	47431100	Vinyl Bag
2	47325700	Styrofoam Packing (Left)
3	47697500	Styrofoam Packing (Right)
4	47626500	Carton Case



8. ACCESSORY LIST

Stock No.	Description
38103300	PJP Cord
46639600	Video Cord (XX, UL, CSA)
46898500	Video Cord (EU, BS)
46958000	Operating Instruction

Sansui

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