

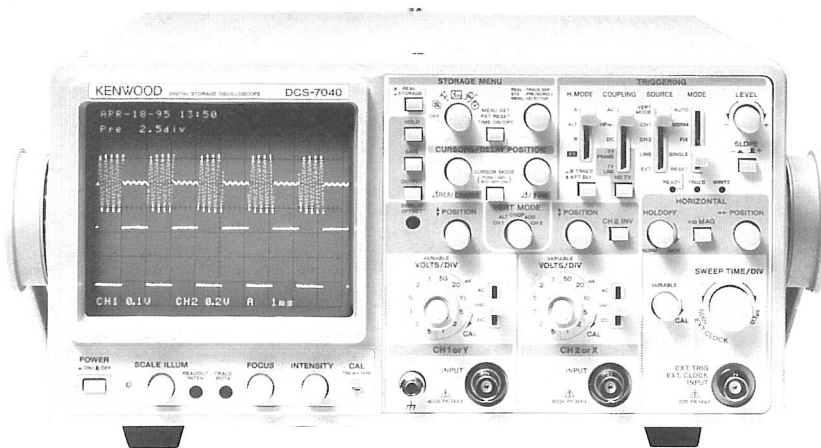
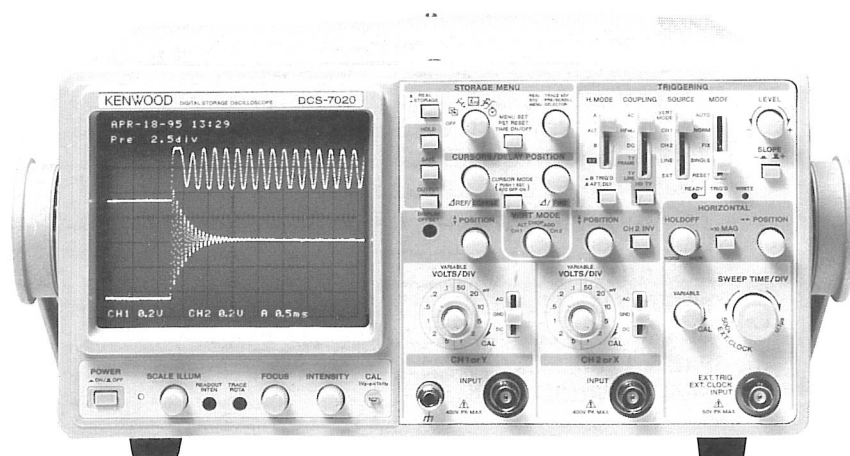
KENWOOD

DIGITAL STORAGE OSCILLOSCOPE

DCS-7020 DCS-7040

SERVICE MANUAL

KENWOOD CORPORATION



WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

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SPECIFICATIONS

【Real-Time Oscilloscope】

Items		
CRT		
Type	150mm rectangular CRT with internal graticule	
Acceleration voltage	Approx. 12kV	
Effective display area	8div×10div (1div=10mm)	
Vertical axis (Common to CH1 & CH2)		
Sensitivity (+10 to +35°C)	1 or 2mV/div: ±5%, 5mV/div to 5V/div: ±3%	
Attenuator	12 ranges at 1-2-5 steps, ranges fine-adjustable	
Input impedance	1MΩ±2%, approx. 25pF	
Frequency response (+10 to +35°C)	5mV/div to 5V/div	DC: DC to 50MHz (within -3dB) AC: 5Hz to 50MHz (within -3dB)
	1 or 2mV/div	DC: DC to 20MHz (within -3dB) AC: 5Hz to 20MHz (within -3dB)
Rise time (+10 to +35°C)	5mV/div to 5V/div	Approx. 7ns.
	1 or 2mV/div	Approx. 17.5ns
Crosstalk	-40dB or less (at 1kHz)	
Operation modes	CH1	CH1 single trace
	ALT	Alternated CH1 and CH2 signal display
	CHOP	Chopped CH1 and CH2 signal display
	ADD	Added CH1 and CH2 signal display
	CH2	CH2 single trace
Chop frequency	Approx. 250kHz	
Polarity reversal	CH2 only	
△ Max. input voltage	800Vp-p or 400V (DC+ACpeak at 1kHz or less)	
Horizontal axis (CH2)		
Sensitivity (+10 to +35°C)	Same as vertical axis (CH2).	
Input impedance	Same as vertical axis (CH2).	

SPECIFICATIONS

Items		
Frequency response (+10 to +35°C)		DC: DC to 1MHz (within -3dB) AC: 5Hz to 1MHz (within -3dB)
X-Y phase difference		3° or less at 50kHz
Operation modes		X-Y mode is selectable with H. MODE switch. CH1: Y-axis, CH2: X-axis
△ Max. input voltage		Same as vertical axis (CH2).
Sweep		
Sweep method	A	A sweep
	ALT	Alternated A sweep and B sweep
	B	B sweep
	X-Y	X-Y oscilloscope operation
Sweep time	A sweep	0.5s/div to 0.1 μs/div ±3%, 1-2-5 steps, 21 fine-adjustable ranges
	B sweep	50ms/div to 0.1 μs/div ±3%, 1-2-5 steps, 18 fine-adjustable ranges
Sweep magnification (+10 to +35°C)		×10±5% (±8% at 0.5μs/div or more)
Linearity (+10 to +35°C)		±3% (×10: ±5%)
Holdoff		A sweep is continuously variable from NORM position.
Trace separation		B sweep is continuously variable by ±4 divisions or more with resp. to A sweep.
Delayed sweep		Continuous delay (AFTER DELAY) and triggered delay (B TRIG'D) triggered by trigger signal
Delay time		Continuously variable from 0.2 division to 10 divisions for 0.5s/div to 0.1 μs/div
Delay time error (+10 to +35°C)		±(3% of set value+1% of full scale)+(0 to 300ns)
Delay jitter		10000: 1 of 10 times as large as A sweep set value
Triggering		
Trigger modes	AUTO	Automatic free running with no signals input
	NORM	Triggered sweep
	FIX	Sweep by setting trigger point at center of signal amplitude
	SINGLE	Single sweep mode
	RESET	Single sweep is restarted.

SPECIFICATIONS

Items																																																																		
Trigger signal sources	VERT	Input signal selected with VERT MODE switch.																																																																
	CH1	CH1 input signal																																																																
	CH2	CH2 input signal																																																																
	LINE	Commercial source frequency																																																																
	EXT	Signal input to EXT. TRIG connector																																																																
The trigger source is fixed to CH1 if VERT MODE is set to ALT in the Chop and Storage mode. Or, it is fixed to CH2 if X-Y operation is selected in the Storage mode.																																																																		
Trigger coupling	AC	AC coupling from 10Hz																																																																
	HFrej	Low-pass filter coupling up to 10Hz																																																																
	DC	DC coupling																																																																
	TV FRAME	Composite video signal with vertical synchronizing signal separated																																																																
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Triggering sensitivity (+10 to 35°C)																																																																		
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2" style="text-align: left;">Mode coupling</th> <th style="text-align: left;">Signal freq.</th> <th colspan="2" style="text-align: left;">Int.sensitivity(Amp.)</th> <th colspan="2" style="text-align: left;">Ext.sensitivity(Amp.)</th> </tr> <tr> <th colspan="2"></th> <th></th> <th style="text-align: left;">NORM</th> <th style="text-align: left;">FIX*</th> <th style="text-align: left;">NORM</th> <th style="text-align: left;">FIX*</th> </tr> </thead> <tbody> <tr> <td rowspan="8" style="vertical-align: middle;">Norm</td> <td rowspan="2" style="text-align: center;">AC</td> <td>10Hz to 20MHz</td> <td>1div</td> <td>1.5div</td> <td>100mV</td> <td>150mV</td> </tr> <tr> <td>20MHz to 50MHz</td> <td>1.5div</td> <td>2div</td> <td>150mV</td> <td>200mV</td> </tr> <tr> <td rowspan="2" style="text-align: center;">HFrej</td> <td>10Hz to 10kHz</td> <td>1div</td> <td>1.5div</td> <td>100mV</td> <td>150mV</td> </tr> <tr> <td>more than 10kHz</td> <td>>min.</td> <td>>min.</td> <td>>min.</td> <td>>min.</td> </tr> <tr> <td rowspan="2" style="text-align: center;">DC</td> <td>DC to 20MHz</td> <td>1div</td> <td>1.5div</td> <td>100mV</td> <td>150mV</td> </tr> <tr> <td>20MHz to 50MHz</td> <td>1.5div</td> <td>2div</td> <td>150mV</td> <td>200mV</td> </tr> <tr> <td rowspan="2" style="text-align: center;">TV-F, TV-L</td> <td>composite video signal</td> <td>1.5div</td> <td>1.5div</td> <td>150mV</td> <td>150mV</td> </tr> <tr> <td>HDTV</td> <td>High Vision video signal</td> <td>1.5div</td> <td>1.5div</td> <td>150mV</td> <td>150mV</td> </tr> </tbody> </table>							Mode coupling		Signal freq.	Int.sensitivity(Amp.)		Ext.sensitivity(Amp.)					NORM	FIX*	NORM	FIX*	Norm	AC	10Hz to 20MHz	1div	1.5div	100mV	150mV	20MHz to 50MHz	1.5div	2div	150mV	200mV	HFrej	10Hz to 10kHz	1div	1.5div	100mV	150mV	more than 10kHz	>min.	>min.	>min.	>min.	DC	DC to 20MHz	1div	1.5div	100mV	150mV	20MHz to 50MHz	1.5div	2div	150mV	200mV	TV-F, TV-L	composite video signal	1.5div	1.5div	150mV	150mV	HDTV	High Vision video signal	1.5div	1.5div	150mV	150mV
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<ul style="list-style-type: none"> • AUTO: The above-shown ratings are met at 40Hz or more. • FIX*: The above-shown ratings are met at 50Hz or more. • The internal sensitivity is expressed in terms of the amplitude on the CRT. • HFrej sensitivity ">min." shows that the amplitude needed for triggering increases. 																																																																		
External trigger terminal (Also used as external clock terminal.)																																																																		
Input impedance			1MΩ ±2%, approx. 25pF																																																															
△ Max. input voltage			100Vp-p or 50V (DC+ACpeak at 1kHz or less)																																																															
Calibration signal			Square wave, positive polarity, 1Vp-p ±3%, approx. 1kHz																																																															

SPECIFICATIONS

Items		
Intensity modulation		
Input voltage		Darkens at TTL level (+5V).
Input impedance		Approx. 10k Ω
Frequency range (+10 to +35°C)		DC to 3.5MHz
Δ Max. input voltage		100Vp-p or 50V (DC+ACpeak at 1kHz or less)
CH1 signal output (with 50 Ω load)		
Output voltage		Approx. 50mVp-p/div
Output impedance		Approx. 50 Ω
Frequency response (+10 to +35°C)	5mV/div to 5V/div	100Hz to 50MHz (-3dB or less)
	1 or 2mV/div	100Hz to 20MHz (-3dB or less)
Trace rotation		Trace line is adjustable with semi-fixed control on panel.

【Storage Oscilloscope】 (The values enclosed in [] are those of the DCS-7020.

Vertical axis (Common to CH1 & CH2)		
Vertical resolution		8 bits (25 dots/div)
Dynamic range		± 5 div
Effective storage frequency		DC: DC to 16MHz [8MHz] (Sine interpolation) AC: 5Hz to 16MHz [8MHz] (Sine interpolation)
Effective rise time		40ns [80ns] or less (Linear interpolation)
Frequency response (+10 to +35°C)	5mV/div to 5V/div	DC: DC to 16MHz (-3dB or less)
		AC: 5Hz to 16MHz (-3dB or less)
	1 or 2mV/div	DC: DC to 12MHz (-3dB or less)
		AC: 5Hz to 12MHz (-3dB or less)
Memory capacity (Memory capacity used in each mode)		
NORM sampling		Display memory (for data): 2K words/channel (200 dots/div)
		Display memory (for REF) : 2K words/channel
		Acquisition memory : 4K words/channel
		REF memory : 2K words/channel

SPECIFICATIONS

Items		
Roll mode		Display memory (for data): 2K words/channel (200 dots/div)
		Display memory (for REF) : 2K words/channel
		Acquisition memory : 4K words/channel
		REF memory : 2K words/channel
Memory backup		Backed up by battery for approx. 30000 hours (at room temperature). Acquisition memory : 4K words/channel REF memory : 2K words/channel
Sweep time & display mode		
NORM sampling		0.1 μ s/div to 500s/div (Magnification range: 0.1 μ s/div to 2 μ s/div [5 μ s]) (Max. sampling speed: 40MS/s [20MS/s])
Peak detector		10 μ s [20 μ s]/div to 500 μ s/div (Sampling speed: 40MS/s)
Roll mode		0.2s/div to 500s/div
Storage method		
AUTO		Same as NORM when triggered. Data is updated by free running in other condition.
NORM		Data is updated every time acceptable trigger signal is input.
SINGLE		Storage operation is carried out when first acceptable trigger signal is input after resetting, then data is saved.
PEAK	MAX	Positive voltage glitches of up to 25ns [50ns] wide are detected.
	MIN	Negative voltage glitches of up to 25ns [50ns] wide are detected.
	MAX/MIN	Positive and negative voltage glitches of up to 50ns [100ns] wide are detected (and displayed alternately).
AVE (Averaging)		Arithmetic average of 4, 16 and 64 times
SMT (Smoothing)		Moving average of 32 words
PST (Persistence)		Maximum and minimum values are displayed alternately in Storage mode. Reset by selecting PST. RESET.
ROLL	NORM	Data is displayed and updated continuously on CRT.
	SINGLE	Data is updated at pre-trigger set value after acceptable trigger signal is input. Then, data is saved.

SPECIFICATIONS

Items		
Magnification		
Magnification		Data is magnified up to $\times 10$ from CRT center by linear interpolation when $\times 10\text{MAG}$ is pressed in Hold state.
Interpolation		Previous value interpolation in magnification range (interpolation: OFF), linear interpolation and sine interpolation
Triggering		
Pre-triggering	NORM	0 to 20 divisions (in 2.5div steps)
	ROLL-SINGLE	10 to 20 divisions (in 2.5 div steps)
B triggering	AFT. DLY	B starts after delay time.
	B TRIG'D	B TRIG'D after delay time.
X-Y		DC to 16MHz [8MHz] (-3dB or less, sampling speed is variable with SWEEP TIME/DIV.)
External clock(Also used as external trigger terminal.)		
Operation		Data is sampled at leading edge of signals input to external clock connector when SWEEP TIME/DIV is set to EXT.
Input impedance		$1\text{M}\Omega \pm 2\%$, approx. 25pF
Δ Max. input voltage		100Vp-p or 50V (DC+ACpeak at 1kHz or less)
Input signal level		TTL level L level: +0.4V or less H level: more than +3.2V
Input signal frequency range		DC to 1MHz(1 kHz max. at roll mode)
Input signal duty ratio		20 to 80% (L level: +0.4V, H level: +3.2V)
Output		
		Optional IF-10 or IF-20 may be connected. (Both cannot be connected together.)
IF-10		GP-IB interface (Conforms to IEEE-488 1978.)
	Operation	Waveform displayed on CRT and CRT readout data are output to plotter through GP-IB interface (using TALK ONLY and HP-GL commands). Numeric data of waveform displayed on CRT and CRT readout data are output to computer through GP-IB interface.

SPECIFICATIONS

Items		
IF-20	EIA RS-232C interface	
	Operation	Waveform displayed on CRT and CRT readout data are output to plotter through RS-232C interface (using HP-GL commands). Numeric data of waveform displayed on CRT and CRT readout data are output to computer through RS-232C interface. Waveform displayed on CRT and CRT readout data are output to printer (DPU-412 made by SEIKO) through RS-232C interface.
	Baud rate	9600/1200bps
	Data transmission	Data length: 8bits, stop bit: 1bit or more, parity bit : none, delimiter: CR+LF, handshake: CTS-RTS method

【Readout Section】

Items	
Display	Turned on and off by keeping CURSOR MODE switch depressed for 1 second or so.
Calendar	
Display	M/D/Y/H/M which is turned on and off by keeping TIME ON/OFF switch depressed for 1 second or so.
Clock accuracy	±2 minutes/month
Battery life	Approx. 30000 hours (at room temp.)
Clock correction & setting	Set on Storage menu.
Set values	
Vertical axis	CH1 & CH2 scale factors (with probe detection), V-UNCAL, ADD & INV
Horizontal axis	A/B sweep scale factors (magnification conversion), ×10MAG, X-Y, external clock, & SWEEP VARIABLE UNCAL
Triggering	Delay time, B TRIG'D
Storage	X-Y sampling speed, display scroll & setting storage function (peak types, average and number of times, SMT, PST, ROLL & interpolation types), pre-triggering point, REF memory setting condition, menu, & output

SPECIFICATIONS

Items		
Cursor measurement		
Cursor mode		Measurement between Δ REF and Δ cursors. Only Δ V1 may be set in X-Y mode.
	Δ V1	Voltage converted using CH1 scale factor is displayed.
	Δ V2	Voltage converted using CH2 scale factor is displayed.
	Δ T	Time converted using A sweep scale factor is displayed.
	1/ Δ T	Frequency converted using A sweep scale factor is displayed.
When V or H. VARI are UNCAL condition	RATIO	Voltage ratio and time ratio are displayed based on 5 divisions on CRT as 100%.
	PHASE	Phase difference is displayed based on 5 divisions as 360° .
Cursor measurement	Resolution	10bits
	Measurement error	$\pm 4\%$
	Measurement range	± 3.6 divisions or more from CRT center vertically ± 4.6 divisions or more from CRT center horizontally
Display offset		Vertical or horizontal shift between waveform displayed on CRT and waveform output from oscilloscope is corrected.

【Power Supply】

Items		
Power supply		
Supply voltage		100/120/220/230VAC $\pm 10\%$
Frequency		50 or 60Hz
Power consumption (on 100VAC)		Approx. 57W, 69VA (when optional IF-10 GP-IB interface is used)
Withstand voltage		1.5kVAC, 1 minute or more
Insulation resistance		100M Ω or more at 500VDC

SPECIFICATIONS

【Other Specifications】

Items		
Dimensions & weight (Values enclosed in parentheses include projections.)		
Width	305mm (344mm)	
Height	150mm (165mm)	
Depth	400mm (459mm)	
Weight	Approx. 9.6kg	
Operating temperature & humidity		
Operating	0 to +40°C, 85% or less (No dew condensation)	
Storage	-20 to +70°C, 85% or less (No dew condensation)	
Accessories		
Probe	PC-33, two	
	Attenuation	1/10
	Input impedance	10M Ω \pm 1%, 22pF \pm 10%
Instruction manual	1 copy	
Adjusting screwdriver	1	
Power cord	1	
Replacement fuse	1	

SAFETY

SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. The specified voltage is shown at the fuse holder of the AC inlet. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

Line voltage

This instrument operates using ac-power input voltages that 100/120/220/230 V at frequencies from 50 Hz to 60 Hz.

Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied by an option that is specified when the instrument is ordered.

The optional power cords are shown as follows in Fig. 1.

Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

Voltage conversion

This oscilloscope may be operated from either a 100 V to 230 V, 50/60 Hz power source. Use the following procedure to change from 100 to 230 volt operation or vice versa.

1. Remove the fuse holder.
2. Replace fuse F 1 with a fuse of appropriate value, 1 amp for 100 VAC to 120 VAC operation. 400 mA for 220 VAC to 230 VAC operation.
3. Reinsert it for appropriate voltage range.
4. When performing the reinsertion of fuse holder for the voltage conversion, the appropriate power cord should be used. (See Fig.1.)

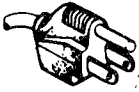




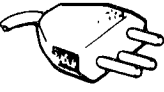
Plug configuration	Power cord and plug type	Factory installed instrument fuse	Line cord plug fuse	Parts No. for power cord
	North American 120 volt/60 Hz Rated 15 amp (12 amp max; NEC)	1 A, 250 V Slow blow 5 × 20 mm	None	E30-1951-05
	Universal Europe 220 volt/50 Hz Rated 16 amp	North Europe 400 mA, 250 V Slow blow 5 × 20 mm	None	E30-1952-05
	U.K. 240 volt/50 Hz Rated 5 amp	400 mA, 250 V Slow blow 5 × 20 mm	5 A	E30-1963-05
	Australian 240 volt/50 Hz Rated 10 amp	400 mA, 250 V Slow blow 5 × 20 mm	None	E30-1953-05
	North American 240 volt/60 Hz Rated 15 amp (12 amp max; NEC)	400 mA, 250 V Slow blow 5 × 20 mm	None	—
	Switzerland 240 volt/50 Hz Rated 10 amp	400 mA, 250 V Slow blow 5 × 20 mm	None	—

Fig. 1 Power Input Voltage Configuration

CIRCUIT DESCRIPTION

PREAMPLIFIER UNIT

CH1, CH2

Each of the CH1 and CH2 inputs passes through an AC/DC/GND switch and enters the 1st attenuator (1/1, 1/10, 1/100).

The 1st attenuator is used in combination with the 2nd attenuator (1/1, 1/2, 1/4, 1/10) and the 5-fold function of the 2nd amplifier, to switch the 12 vertical ranges.

The head amp is composed of Q102 and IC101 (Q202 and IC201) and is a 1/1 buffer amp with an input impedance of 1 megohms and used for conversion of impedance. Q102 (Q202) is the source-follower. This head amp is installed between the 1st and 2nd attenuators.

Starting from the 2nd amp, this unit takes the differential amplifier configuration. The functions of IC102 (IC 202) include the variation and inversion functions. The variation function allows to vary the gain continuously according to the voltage applied to pin 5. The inversion function allows to invert the phase according to the voltages applied to pins 6 and 7. As this function is provided only for CH2, CH1 is fixed. At the CH2 side, switch is done by Q215, Q103 (Q203) is the regulated current supply for IC102 (IC202).

Q106 and Q107 (Q206 to Q207) form an emitter follower. Q108 to Q111 (Q208 to Q211) form the cascode amp of the differential amp. The vertical position can be moved by regulating the current applied to the emitter of Q111 (Q211) based on the panel operation.

Q501 and Q502 (Q601 and Q602) form the amplifier which obtains the signals for the DSP unit and sends them to the DSP unit differentially.

EXT. TRIG, EXT. CLOCK

A fixed attenuator is used for the EXT. TRIG signal. After the impedance has been converted by the source-follower of Q303 and the buffer amp of regulated current supply Q304, the signal is sent to the emitter-follower of Q314. Q315 is the feedback amp for the EXT. CLOCK signal, which is inverted by IC4a and sent to the DSP unit.

Channel selector

The output from the position amp of each channel is transmitted to the channels selector composed of Q110 and Q111 (Q210 and Q211) and D103 to D106 (D203 to D206). The signal from the V-MODE logic turns the cathodes of D104 and D105 (CH1) or D204 and D205 (CH2) "H", and the signal of the channel turned "H" is transmitted to the feedback amp composed of Q2 and Q3.

Q1 lets the excessive bias current flow when CH1 or CH2 is in ADD mode.

Trigger amp, trigger selector

With CH1 (CH2), the differential outputs from IC102 (IC202) are input to the differential amp Q152 and Q153 (Q252 and Q253), where Q153 (Q253) forms a cascode amp with Q114 (Q214).

With EXT. TRIG the signal after the buffer amp is sent through

the buffer of emitter-follower Q314, feedback amp Q312 an output as current from the collector of emitter ground amp Q313.

Only the single of the channel with which the cathode of CH1-D108, CH2-D208, EXT-D308 is turned "H" by the signal from the trigger controller is sent through CH1-D107, CH2-D207, EXT-D307 and output as current to the Horizontal unit. Q31 lets the excessive bias current flow when CH1 or CH2 is in ADD mode.

CH1 OUT

The CH1 output is sent from the collector of Q152, through emitter-follower Q51 and output at CH1 OUT of the Final unit.

Trigger controller

The data on the trigger source set on the panel is input to pin 1 of IC1 and "H" or "L" is output at pins 4 to 8 according to the set state.

IC2 is used to switch between the data from IC1 and the CRT display data of each channel from V-MODE LOGIC. If the current mode is not V mode, the former data is selected. If the current mode is V mode, the latter data is selected for use in controlling the trigger selector.

Among CH1-IC2 pin 7, CH2-IC2 pin 9, CH3-IC2 pin 12, the terminal set with the panel is turned "H".

V-MODE LOGIC

IC3 and IC4 generates a signal synchronized with the display channel select signal from the panel and the end of horizontal sweep, and a signal for controlling the channel selector based on the CHOP signal. (Figure 1)

Vertical range converter

IC401, IC403, S102 and S202 output the vertical range, CAL and UNCAL data by turning them into analog values using an opamp for use as the R/O data. (Tables 1, 2)

H/V control, level converter

The sweep code is sent in the form of serial data to IC408 and IC409, converted from serial to parallel, and converted into a signal between 0 and -12 V by IC404, IC405, IC406 and IC407.

IC410 outputs the CH1/CH2/ADD select signal and the Horizontal unit control signal. For the serial codes, refer to Tables 3 and 4.

FINAL UNIT

Final amplifier

The signal sent from the vertical preamp through the delay line is input to the feedback amp of Q1 and Q2. During A ALT B sweep, the variation of the vertical position of sweep B is controlled by the signal to the base of Q2 from the Sweep unit.

Q3, Q4, Q105, Q106 and IC1 are used to amplify the vertical signal and IC1, Q105 and Q106 are used to amplify the R/O

CIRCUIT DESCRIPTION

characters. IC1 is used to switch between the vertical signal and R/O signal.

Q9-Q12, Q113 and Q114 are cascode-connected for use in driving the CRT.

AC inlet, fuse

An external commercial supply voltage switch and fuse holder are provided.

Line filter

A filter for elimination of common mode noise and normal mode noise is provided.

CH1 OUT

The signal from the vertical preamp is output externally via Q201 and Q202 as a signal with 50-ohm impedance.

SWEEP UNIT

Trigger

The trigger signal supplied from the Preamp unit (X73-2120) is AC/DC coupled and the trigger level is added to it.

The obtained signal is input to the trigger shaping circuit to become a pulse signal.

If FIX is selected, the trigger level is fixed so that it is always around the center of the waveform.

With TV-FRAME the composite video signal is separated by the V sync separator and input to the trigger shaping circuit.

With TV-FRAME the composite video signal is separated by the H sync separator and input to the trigger shaping circuit.

HFrej is used to apply a 10 kHz LPF to the trigger signal.

The polarity of the trigger pulse signal can be changed with SLOPE +/- . The output signal is input to the sweep logic circuit.

There is an additional circuit which applies the trigger signal to the sweep logic in case the trigger pulse signal has not been input for a certain period and auto free-run mode has been selected.

Sweep

When the trigger pulse is input to the sweep logic, the sweep gate is activated and the sweep wave is output.

When the sweep wave reaches a certain level, the sweep stop circuit is activated to close the sweep gate and end sweep.

When sweep gate is closed, the hold-off circuit is activated and, in a certain period after it, the sweep logic enters the trigger standby state.

The delayed sweep is performed either as the AFTER DELAY sweep or B TRIG'D sweep.

With the AFTER DELAY sweep, the voltage level of the main sweep wave and the voltage set with DTP are compared and delayed sweep is performed using the result signal as the trigger.

With the B TRIG'D sweep, sweep is triggered by the next trigger signal input after the voltage level of sweep wave have reached the voltage set with DTP.

In case ALT sweep is set, the main sweep and delayed sweep are sent alternately to the Horizontal amp.

Horizontal amp

This circuitry switches between the sweep wave generated in the sweep block and the X signal and add H-POSITION.

After being magnified by 10 times if MAG has been selected, the signal is input to the R/O switch.

Here, the R/O signal is added to the vertical signal and the signal is amplified by the final amp to a high enough voltage level to drive the CRT.

Intensity circuit

The intensity signal is generated with the sweep gate of the main sweep and that of the delayed sweep. During ALT sweep, a waveform for increasing the intensity of the delayed sweep section is generated with the main sweep. The voltage set with the INTEN potentiometer is added to the intensity signal and the voltage set with the R/O INTEN potentiometer is added to the R/O blanking signal and they are input to the high voltage circuit.

The high voltage circuits generates the CRT cathode voltage, G1 voltage and P1 voltage based on the intensity signal and the FOCUS potentiometer

The cathode voltage is controlled always constant by the opamp. For use with the after-accelerating CRT, the anode voltage is also generated by the high voltage circuit.

Power supply

AC voltages for astables DC voltage of 7. 7V, 15. 5V, 69V and 173V are input from the transformer, and they are turned into stable DC voltages of respectively +12, -12V, +5V, +55V and +140V, which are supplied to their respective units.

CHOP

To observe signals of two each channels simultaneously, the vertical amp is switched with the CHOP signal.

The switching frequency rate is about 250 kHz.

PANEL UNIT

This unit sends the potentiometer and switch data from the control panel to other units.

The circuitry has been designed so that, even when the V MODE is selected as the TRIG SOURCE during the ALT setting in the CHOP or STO mode, CH1 is selected as the TRIG SOURCE automatically.

The voltage setting of DTP is made by the opamp in the range from 0 to +4 V. The DISPLAY OFFSET control is a potentiometer for use in fine adjustment of the vertical position of the R/O characters and STO waveform displayed on the CRT. The CAL signal is a 1 kHz, 1 Vp-p square wave.

The intensity is controlled by the PWM based on the output from the original oscillator of CAL.

CIRCUIT DESCRIPTION

DSP UNIT

The DSP unit (X79-1300-0*) is used in the A/D conversion, control of the preamp and sweep units, output of characters to the CRT and output of stored waveforms to the CRT.

The waveform signals from the vertical unit are converted from analog to digital by IC100 (CH1) and IC200 (CH2). Each of the A/D converters (IC100, IC200) executes A/D conversion at the positive-going edge of the CLK signal input at pin 2. The output data is input to IC102 (CH1) or IC202 (CH2) and latched inside the IC for peak detection and write in the 2-phase memory, and the latched data is written in the memory of IC103 and IC104 (CH1) or IC203 and IC204 (CH2). Fig. 2 shows the interior of gate array IC102 or IC202 and its connection with the memory. Fig. 3 shows the timings of ILA1 and ILA4 of IC102 and IC202, and data is recorded in IC104 (IC204) then IC103 (IC203).

The memory devices used in the DSP unit are the serial access memory with separate input/output configuration and with built-in address generating counters. The built-in counter is reset when ADRW goes "L" or when WRES is generated with the timing shown in Fig. 4. Data is written in memory when pin 12 (WE) of IC103, IC104, IC203 or IC204 is "L", at the timing of the negative going of pin 15. The recorded data is output at the negative going of pin 2 (RCLK) of IC103, IC104, IC203 or IC204. The signals read out from the 2-phase memory are input to IC102 and IC202, and 2 words of signal is transferred simultaneously to the 16-bit data bus of ADD0 to ADD15.

The operation clock of these ICs is variable between 40 MHz and 0.4 Hz (20 MHz and 0.4 Hz) according to the sweep time. The output from the 80 MHz oscillator composed of X1, Q301 and Q302 is divided by the counter of IC42 into 40 MHz, 20 MHz and 10 MHz, which are input to the multiplexer of IC38. The 40 MHz clock is input to pin 6 of IC41 and divided with the division ratio which is set with the serial data sent according to the sweep time. The signal output from pin 12 of IC41 is divided into two by IC37a and input to pin 1 of IC38 and pin 15 of IC41, and a signal between 0.4 Hz and 4 kHz is output according to the sweep range. Among the 40 MHz, 20 MHz, 10 MHz, between 10 kHz and 4 MHz and between 0.4 Hz and 4 kHz and EXTCLK signals input to IC38, one signal is selected according to the sweep code sent to IC38 and output from pin 5 of IC38. The output signal is input to the multiplexer of IC40 and the gate array of IC102 and IC202. The clock selected with IC40 is used as the operation clock for A/D converters IC100 and IC200 and the timebase PLD of IC45.

The main operations performed inside the timebase PLD of IC45 are the latch control, memory control and pretrigger control operations.

For the data write operation, LATCK is input to pin 61 and latch clocks CH1L1, CH1L4, CH2L1 and CH2L4 for the gate array and clocks WCLK, WRES and ADRW for the memory are generated based on it. The number of write data which is determined by the set pretrigger value is counted using SGA

(SGB) input to pin 58 (pin 57). The CPU is informed of the completion of data write with the interrupt applied when ADRW goes "L". The PLD includes a counter which is synchronized with the counters built in the memory and, when 4K words of data has been written, it outputs address data (YBUS0 to YBUS7) upon request from the CPU.

The data read operation is performed based on the timing shown in Fig. 5. The read data is sent through the line driver of C28 and IC30 and written in the memory of IC24 and IC25.

C13, IC14, IC16 and IC47 are decoders which output the serial data for use in the horizontal timebase PLD, divider circuit and gate array control and the signal for use in the port control.

The position of the readout cursor and the DTP are converted into 12-bit serial data by A/D converter IC2 and the data is transmitted to the CPU.

IC10 and IC15 transfers data to the data bus when pin 9 of IC47 in the import section goes "L".

The transferred data includes the panel information (SINGLE, READY*, 10MAG, encoder), timebase PLD information and the battery detection result.

The rotary encoders used as the menu select knob and switch time switching knob have two outputs (phase A, phase B). The timings of phases A and B are as shown in Fig. 6. The outputs of phases A and B are input to the Schmitt circuit of IC11 and IC12 to eliminate chattering and shape the waveforms. When phase A varies, pin 8 of IC11 outputs a trigger pulse to inform the CPU of the change in the rotary encoder by turning pin 8 of IC9 "L". The CPU judges the rotation direction from the variations in phases A and B at the moment it is interrupted.

IC16 is a calendar clock which is battery-backed up by lithium battery BA1 even when the power is OFF. The 32.768 reference clock generated by X'tal oscillator X3 is also running while the power is OFF. When power is ON, the CPU reads data at a constant interval and updates the calendar on the SRT whenever there is a change in the data.

The battery power is detected with IC36a. When the battery voltage drops below 2.4 V, it sets pin 17 of IC15 "H" to inform the CPU of it and displays "BATT. DOWN" on the CRT. IC32 is the D/A converter which converts the trace position data of B sweep into analog voltage.

The display clock has been designed to implement the readout display function. It is composed of VRAM IC19, the VRAM address buss switch for IC20, IC21, IC22 and IC23, R/D PLD IC17, D/A converters IC33 and IC34 and opamp IC 35. For the vertical range input operation, the analog voltages (CH1ATT, CH2ATT) set according to the ranges are input directly to the CPU. As the CPU incorporates A/D converters, it judge the range settings by converting the input voltages from analog to digital.

The R/O PLD contains the latch for operation mode selection, display blanking generator, VRAM address counter, VRAM data bus switch, latch for X-Y data readout and latch for Y-axis

CIRCUIT DESCRIPTION

D/A data expansion (for use with the cursor), and generates the signal for use in R/O display.

The X data output from the R/O PLD is sent to IC33 and the Y data is sent to IC34. The analog signals obtained by conversion in IC33 and IC34 are input in the horizontal and vertical final amps.

In the storage mode, every dot of waveform is output in $1 \mu\text{s}$ so the waveform display period is about 8 ms with 4 waveforms (CH1, CH2, REF1, FEF2) each of which uses 2K words of data. As every dot of character is displayed in $2 \mu\text{s}$, the character display period is about 6 ms and the period required for updating the CRT display in the storage mode becomes about 20 ms which is equal to the total of the waveform display, character and data transfer periods.

In the realtime mode, every character dot is output in $5.3 \mu\text{s}$ so the character display period is about 16 ms while the data transfer period is about 5 ms. As a result, the period of display for a screen becomes about 21 ms.

Fig. 7 shows the timings of R/O UBL, R/O REQ and R/O BLK used for displaying characters. R/O UBL is output so that the dots light for $0.75 \mu\text{s}$. R/O REQ in the realtime mode is output for $1.25 \mu\text{s}$ providing margins of $0.25 \mu\text{s}$ before and after R/O UBL. This signal is fixed at "L" in the storage mode. R/O BLK in the realtime mode is output for $2 \mu\text{s}$ to clear the waveforms, providing margins of $0.75 \mu\text{s}$ before and $0.5 \mu\text{s}$ after R/O UBL. In the storage mode, only the waveform(s) which require(s) waveform display are lit.

PREAMPLIFIER UNIT

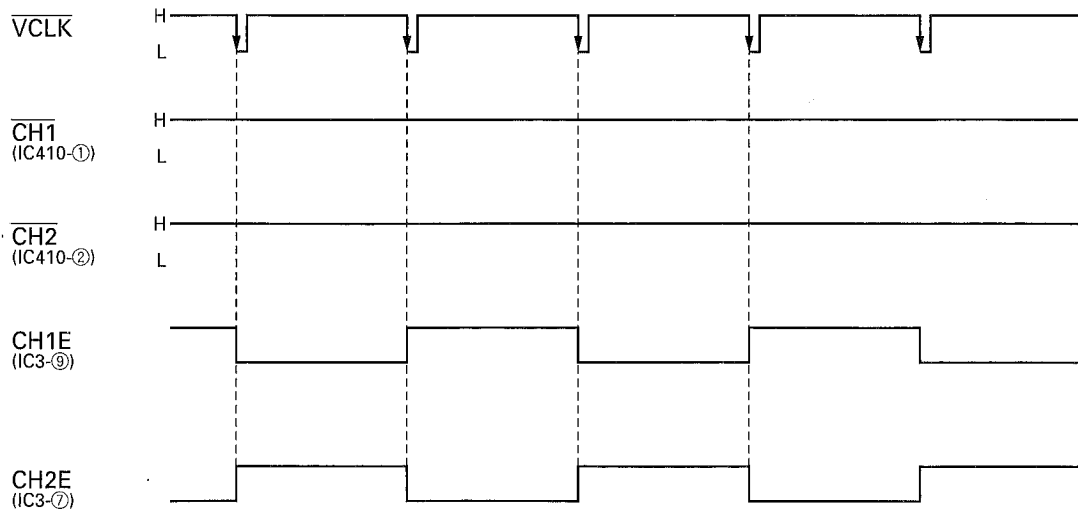


Fig. 1 V Mode Logic in ALT or CHOP Mode

Table. 1 CHIATT. CH2

V-Range (/div)	Voltage Range (V)
5 V	4.124 ~ 5.000
2 V	3.790 ~ 4.123
1 V	3.456 ~ 3.789
0.5 V	3.130 ~ 3.455
0.2 V	2.804 ~ 3.129
0.1 V	2.470 ~ 2.803
50 mV	2.136 ~ 2.469
20 mV	1.810 ~ 2.135
10 mV	1.484 ~ 1.809
5 mV	1.150 ~ 1.483
2 mV	0.816 ~ 1.149
1 mV	0.000 ~ 0.815

Table. 2 UNCAL Voltage Check Table

CH1 CAL	CH2 CAL	SWP CAL	Voltage Range (V)
>	>	>	4.406 ~ 5.000
>	>	CAL	3.777 ~ 4.405
>	CAL	>	3.147 ~ 3.776
>	CAL	CAL	2.518 ~ 3.146
CAL	>	>	1.888 ~ 2.517
CAL	>	CAL	1.257 ~ 1.887
CAL	CAL	>	0.626 ~ 1.256
CAL	CAL	CAL	0.000 ~ 0.625

CIRCUIT DESCRIPTION

Table. 3 Horizontal Serial Codes

Order of Transfer	Contents
Bit 00	"H" in STO mode, "L" in REAL mode.
Bit 01	"L" when B TRIG'D is ON, "H" when OFF.
Bit 02	"L" with x10MAG display in REAL mode, "H" in other cases.
Bit 03	"L" with X-Y display in REAL mode, "H" in other cases.
Bit 04	"H" with ADD display, "L" in other cases.
Bit 05	"H" with CH1 display and X-Y display, "L" in other cases.
Bit 06	"H" with CH2 display, "L" in other cases.
Bit 07	Not used: "L"
Bit 08	B SWEEP 5
Bit 09	B SWEEP 4
Bit 10	A SWEEP 5
Bit 11	A SWEEP 4.
Bit 12	"L" during adjustment, "H" in other cases.
Bit 13	Not used: "L"
Bit 14	Not used: "L"
Bit 15	Not used: "L"
Bit 16	B SWEEP 3
Bit 17	B SWEEP 2
Bit 18	B SWEEP 1
Bit 19	A SWEEP 3
Bit 20	A SWEEP 2
Bit 21	A SWEEP 1
Bit 22	Not used: "L"
Bit 23	Not used: "L"

Table. 4 Sweep Codes

SWEEP TIME/DIV	SWEEP1	SWEEP2	SWEEP3	SWEEP4	SWEEP5
0.1 μ s	0	0	0	0	1
0.2 μ s	0	1	0	0	1
0.5 μ s	1	1	0	0	1
1 μ s	0	0	0	1	0
2 μ s	0	1	0	1	0
5 μ s	1	1	0	1	0
10 μ s	0	0	0	0	0
20 μ s	0	1	0	0	0
50 μ s	1	1	0	0	0
0.1 ms	0	0	1	1	1
0.2 ms	0	1	1	1	1
0.5 ms	1	1	1	1	1
1 ms	0	0	1	0	1
2 ms	0	1	1	0	1
5 ms	1	1	1	0	1
10 ms	0	0	1	1	0
20 ms	0	1	1	1	0
50 ms	1	1	1	1	0
0.1 s	0	0	1	0	0
0.2 s	0	1	1	0	0
0.5 s or less	1	1	1	0	0

DSP UNIT

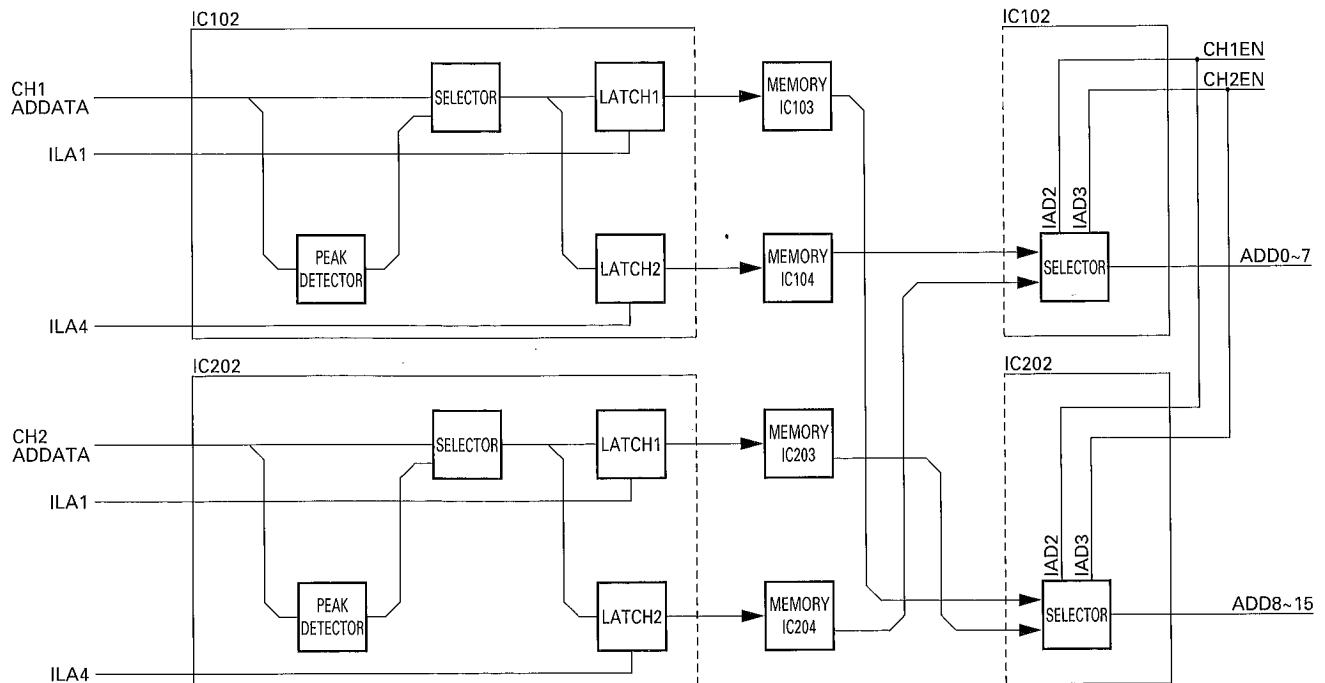


Fig. 2 Internal Block Diagram of Gate Array

CIRCUIT DESCRIPTION

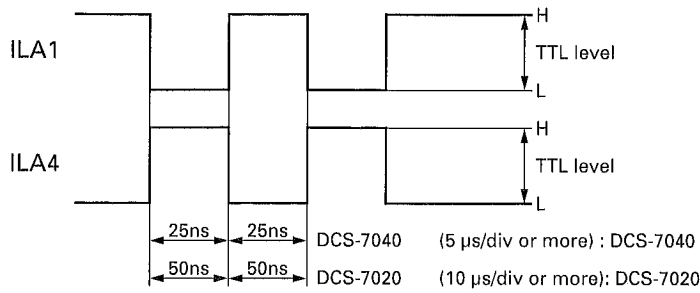


Fig. 3 Clocks ILA1 and ILA4

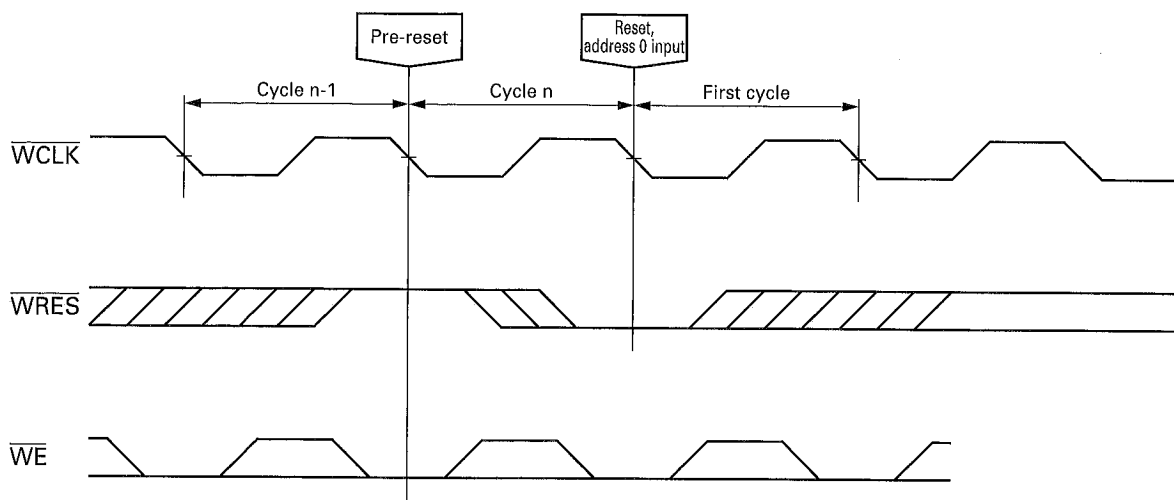


Fig. 4 Acquisition Memory Write Reset Cycle

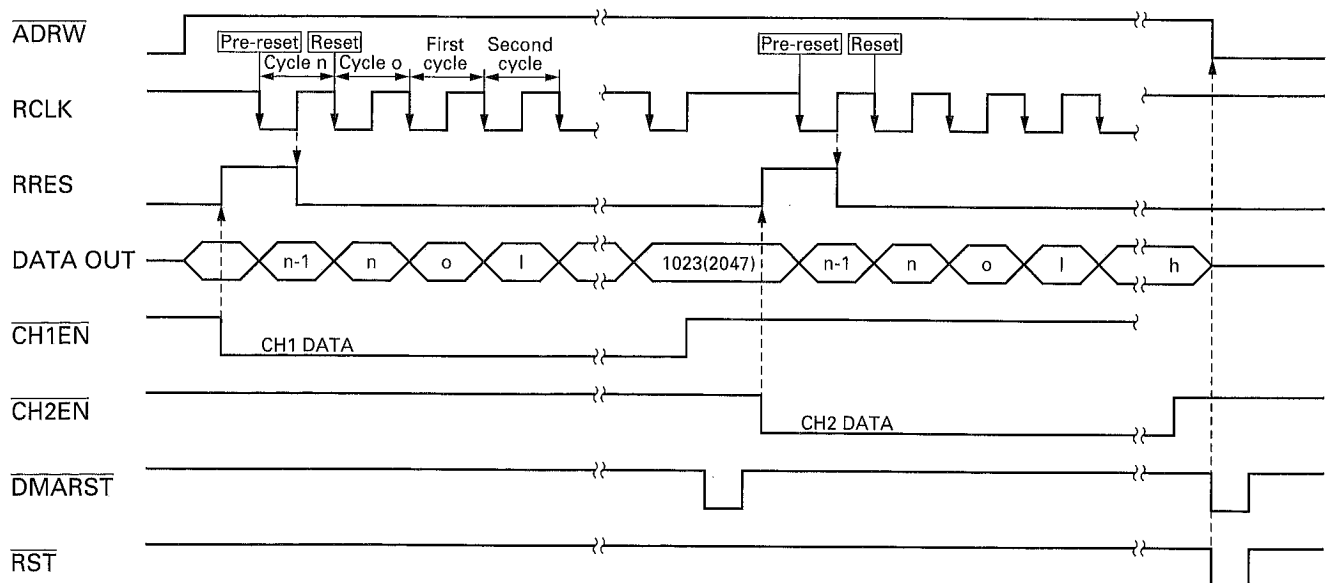


Fig. 5 Normal Sampling Read Cycle

CIRCUIT DESCRIPTION

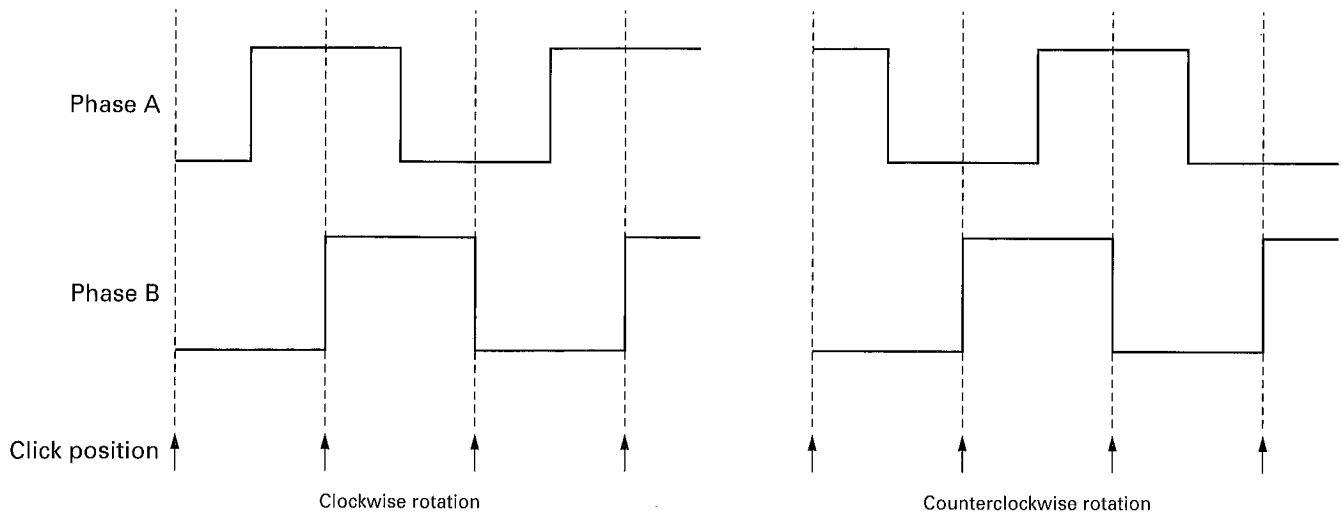


Fig. 6 Rotary Encoder Pulses

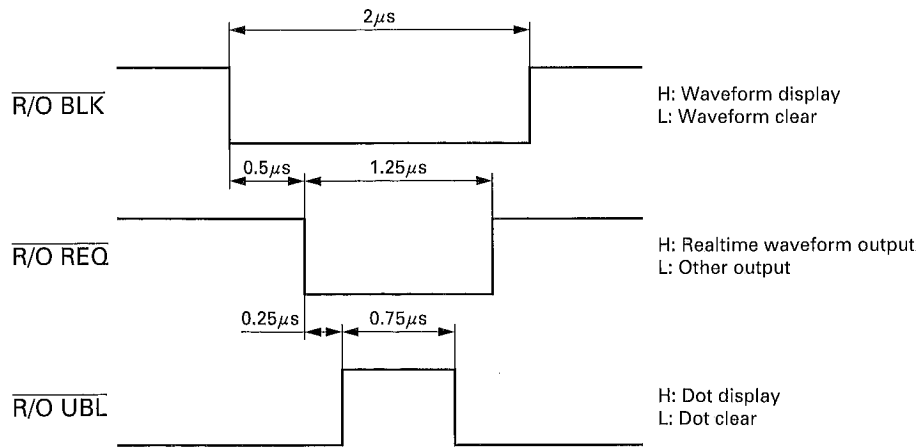
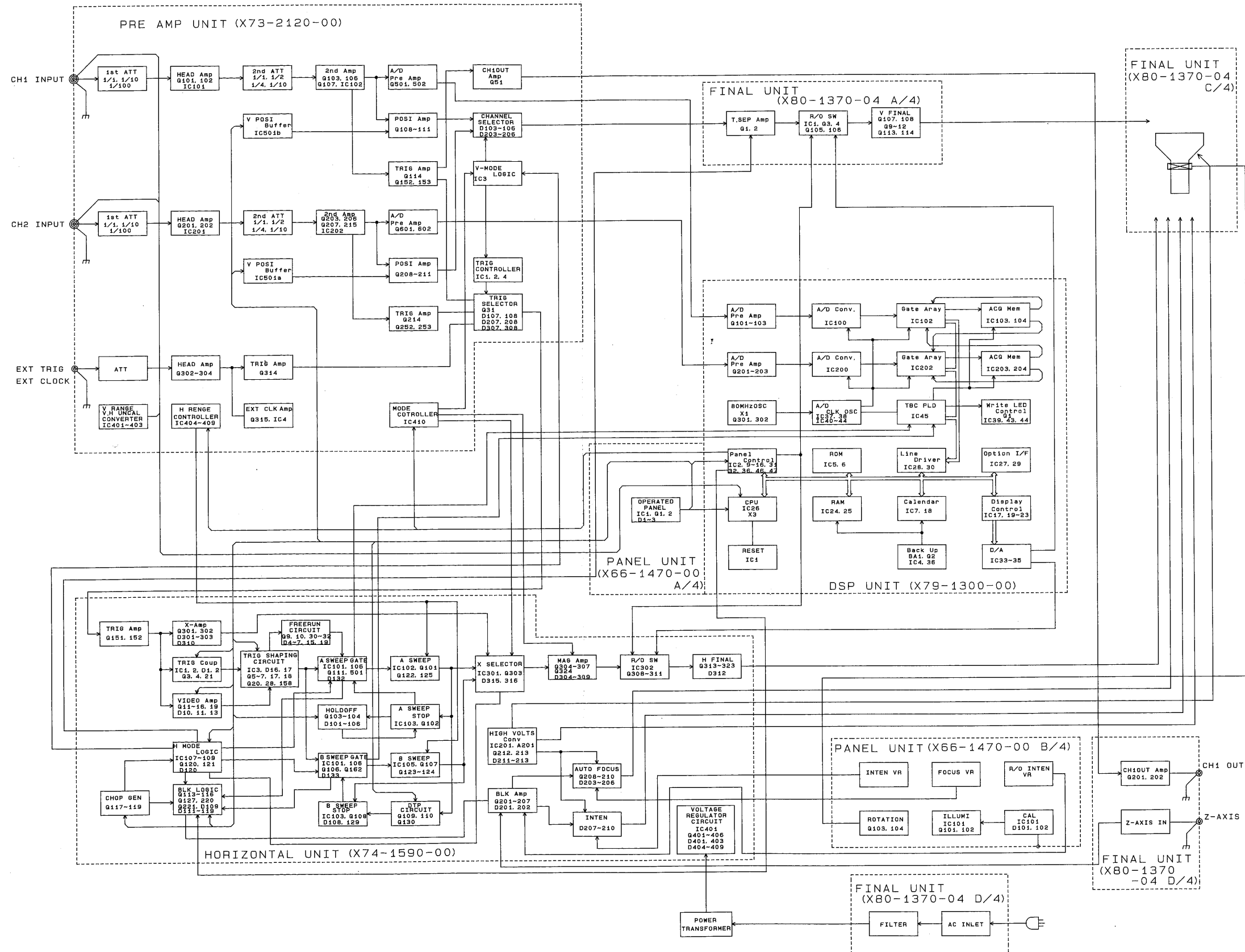
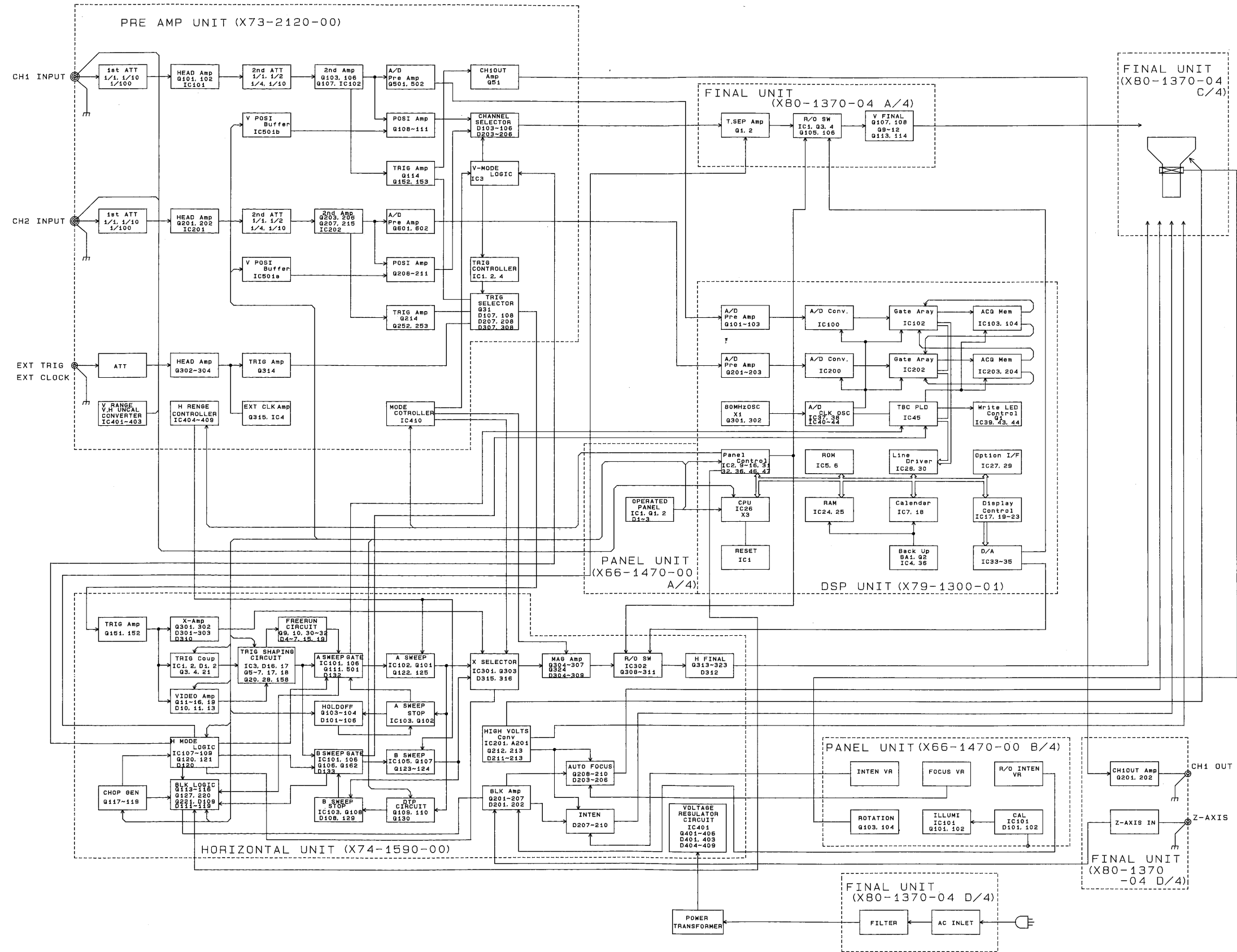


Fig. 7 Blanking Timing in Realtime Mode

DCS-7020 BLOCK DIAGRAM



DCS-7040 BLOCK DIAGRAM



ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.

The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the scope sufficiently (more than 30 minutes) before starting.

Before calibrating the scope, check the power supply voltage.

TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

Test Equipment	Model	Minimum Specification
Digital Multi-Meter	DL-712 (KENWOOD)	Impedance: More than 10 M Ω , Measuring range: 0.2 V to 1000 V
Sine-Wave Generator	651 B (YHP)	Frequency: 10 Hz to 10 MHz, constant voltage over tuning range
Sine-Wave Generator	SG-503 (Tektronix)	Frequency: 50 kHz to 100 MHz, Output impedance: 50 Ω , constant voltage over tuning range
Square-Wave Generator	PG-506 (Tektronix)	Output signal: 1 kHz, Amplitude: 10 mVp-p to 10 Vp-p, Accuracy: within $\pm 1\%$, Rise time: 35ns or less 100 kHz, Rise time: 1 ns or less
Q Meter	4343B (YHP)	—
Color Pattern Generator	CG-921 (KENWOOD)	—
Oscilloscope	CS-6040 (KENWOOD)	Sensitivity: more than 1 mV Frequency response: More than 150 MHz
Time-Marker Generator	TG-501 (Tektronix)	Time mark: 0.5 s to 0.1 μ s repetitive waveform
High-Voltage Probe	—	Input Impedance: 1000 M Ω
Termination	—	Impedance: 50 Ω Accuracy: within 3%
Termination	—	3 watts type impedance: 50 Ω
Attenuator	—	-20 dB attenuation (50 Ω)

Table 1

PREPARATION FOR ADJUSTMENT

Control Settings

The control settings listed below must be used for each adjustment procedure.

Exceptions to these settings will be noted as they occur. After completing a adjustment, return the controls to the following settings.

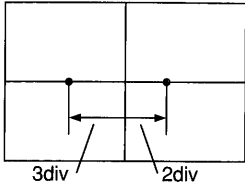
NAME OF KNOBS	POSITION
INTEN	12 o'clock
FOCUS	Optimum position
CH1, CH2, \blacklozenge POSITION	Mechanical center
\blacktriangleleft \blacktriangleright POSITION	Mechanical center
$\times 10$ MAG	OFF
VARIABLE, H.VARIABLE (VOLTS/DIV, SWEEP TIME/DIV)	CAL
AC-GND-DC (CH1 and CH2)	AC (GND at no signal)
VERTICAL MODE	CH1
HORIZONTAL MODE	A
TRIGGERING COUPLING	AC
TRIGGERING SOURCE	VERT MODE
TRIGGERING MODE	AUTO
TRIGGERING LEVEL	Mechanical center
VOLTS/DIV (CH1 and CH2)	5 V/DIV
A/B SWEEP TIME/DIV	0.5 s/50 ms
CH2 1 NV	OFF
HOLD OFF	Fully CCW
SLOPE	\blacksquare +

Table 2

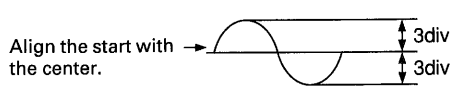
ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure
Operating voltage	VR4 VR303	X80-1370 X74-1590	V. MODE : CH1 H. MODE : X-Y AC-DC : GND R/O : OFF VOLTS : 10 mV 1) With each POSI, place the spot on the CRT center. 2) Adjust VR4 so that the voltage across P105-1 or 3 on X80-1370 and GND is 33.5 [V]. 3) Adjust VR303 so that the voltage across CN7-1 on X74-1590 and GND is 70 [V]. 4) Check that the voltage across CN7-4 on X74-1590 and GND is about 70 [V].
Focus Center and ASTIG	VR201 VR305	X74-1590	V. MODE : CH1 VOLTS : 10 mV AC-DC : GND H. MODE : X-Y 1) Move the spot to the CRT center by operating the POSI controls. 2) Adjust the spot to the best point with FOCUS on the panel and ASTIG (VR305). 3) Set FOCUS on the panel to the 12:00 position and adjust VR201 to move the spot to the best point.
Intensity	VR202	X74-1590	V. MODE : CH1 VOLTS : 10 mV AC-DC : GND H. MODE : X-Y 1) Set INTEN to the 10:00 position. 2) Adjust VR202 so that the spot disappears at the 10:00 position.
Cursor Y-Gain and POSI	VR3(Gain) VR2(POSI)	X80-1370	V. MODE : CH1 H. MODE : A AC-DC : GND R/O : ON (Δ T) VOLTS : 10 mV A. SWEEP : 1 ms 1) Ensure that the R/O display to 80 mV when turn the Δ REF knob fully counterclockwise and Δ knob fully clockwise. 2) Adjust VR3 and VR2 so that the interval between cursor is 8 div. 3) Adjust VR2 to make it uniform.
Cursor X-Gain and POSI	VR304 (Gain) VR306 (POSI)	X74-1590	V. MODE : CH1 H. MODE : A AC-DC : GND R/O : ON (Δ T) VOLTS : 10 mV A. SWEEP : 1 ms 1) Ensure that the R/O display to 10.0 ms when turn the Δ REF knob fully counterclockwise and Δ knob fully clockwise. 2) Adjust VR304 and VR306 so that the interval between cursor is 10 div. 3) Adjust VR306 to make it uniform.
CH1 Gain	VR1 (10 mV) VR102 (1 mV)	X80-1370 X73-2120	V. MODE : CH1 VARI : CAL AC-DC : DC H. MODE : A VOLTS : 10 mV 1) Input a 50 mV square wave signal. 2) Adjust VR1 so that the amplitude is 5 div. (10 mV range) 3) Switch VOLTS to 1 mV and input a 5 mV square wave signal. 4) Adjust VR102 so that the amplitude is 5 div. (1 mV range)
CH2 Gain	VR207 (10 mV) VR202 (1 mV)	X73-2120	V. MODE : CH2 VARI : CAL AC-DC : DC H. MODE : A VOLTS : 10mV 1) Input a 50 mV square wave signal. 2) Adjust VR207 so that the amplitude is 5 div. (10 mV range) 3) Switch VOLTS to 1 mV and input a 5 mV square wave signal. 4) Adjust VR202 so that the amplitude is 5 div. (1 mV range)

ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure
X-Gain	VR308	X74-1590	<p>V. MODE : CH2 VARI : CAL AC-DC : DC H. MODE : X-Y VOLTS : 10 mV</p> <p>1) Input a 50 mV square wave signal to CH2. 2) Adjust so that the amplitude is 5 div. (10 mV range) * Make the adjustment to 5 div., at the CRT center.</p> 
CH1 Step ATT Balance	VR103	X73-2120	<p>V. MODE : CH1 VOLTS : 5 mV AC-DC : GND H. MODE : A</p> <p>Adjust so that the luminescent line does not move when VOLTS is switched from 5 mV to 2 mV. * Adjust after switching to 2 mV with reference to the 5 mV position.</p>
CH1 VARIABLE Balance	VR104	X73-2120	<p>V. MODE : CH1 VOLTS : 5 mV AC-DC : GND H. MODE : A</p> <p>Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position. * Ensure that the luminescent line does not move when VARIABLE is switched between MIN ↔ MAX.</p>
CH2 Step ATT Balance	VR203	X73-2120	<p>V. MODE : CH1 VOLTS : 5 mV AC-DC : GND H. MODE : A</p> <p>Adjust so that the luminescent line does not move when VOLTS is switched from 5 mV to 2 mV. * Adjust after switching to 2 mV with reference to the 5 mV position.</p>
CH2 VARIABLE Balance	VR204	X73-2120	<p>V. MODE : CH2 VOLTS: : 5 mV AC-DC : GND H. MODE : A</p> <p>Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position. * Ensure that the luminescent line does not move when VARIABLE is switched between MIN ↔ MAX.</p>
CH2 INV Balance	VR208	X73-2120	<p>V. MODE : CH2 VOLTS : 5 mV AC-DC : GND H. MODE : A</p> <p>1) Adjust so that the trace does not move when CH2 INV is switched ON-OFF. 2) Check CH2 STEP ATT BAL and VARI BAL and, if any is deviated, re-adjust following the adjustment procedure.</p>
ADD POSI	VR1	X73-2120	<p>V. MODE : CH1 → CH2 → ADD AC-DC : GND VOLTS : 5 mV H. MODE : A</p> <p>1) Move the luminescent line to the CRT center by operating CH1 POSI and set V. MODE to the CH2. 2) Move the luminescent line to the CRT center by operating CH2 POSI and set V. MODE to the ADD. 3) Move the luminescent line to the CRT center by operating VR1.</p>

ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure
V. POSI Center	VR106 (CH1) VR206 (CH2)	X73-2120	V. MODE : CH1 or CH2 AC-DC : GND VOLTS : 5 mV H. MODE : A 1) Set V. MODE to CH1 and set POSI of CH1 to the 12:00 position. 2) Adjust the luminescent line to the center of scale by operating VR106. 3) Switch V. MODE to CH2 and set POSI of CH2 to the 12:00 position. 4) Adjust the luminescent line to the center of scale by operating VR206.
CH1 Waveform Shaping	TC102 (0.1 V) TC104 (1 V)	X73-2120	V. MODE : CH1 AC-DC : DC VARI : CAL H. MODE : A VOLTS : 10 mV (ideal waveform) → 0.1 V → 1 V 1) Input a 1 kHz square wave to the CH1 input. 2) Adjust TC102 so that the waveform at 0.1 V range is flat. 3) Adjust TC104 so that the waveform at 1 V range is flat.
CH2 Waveform Shaping	TC202 (0.1 V) TC204 (1 V)	X73-2120	V. MODE : CH2 AC-DC : DC VARI : CAL H. MODE : A VOLTS : 10 mV (ideal waveform) → 0.1 V → 1 V 1) Input a 1 kHz square wave to the CH2 input. 2) Adjust TC202 so that the waveform at 0.1 V range is flat. 3) Adjust TC204 so that the waveform at 1 V range is flat.
CH1 Input Capacity	TC101 (0.1 V) TC103 (1 V)	X73-2120	V. MODE : CH1 AC-DC : DC VARI : CAL H. MODE : A VOLTS : 10 mV (reference) → 0.1 V → 1 V 1) Connect a capacity meter to the CH1 input. 2) Measure the capacity of the 10 mV range. (No more tha 25 p) 3) At 0.1 V range, adjust TC101 to obtain the same values as 10 mV. 4) At 1 V range, adjust TC103 to obtain the same values as 10 mV.
CH2 Input Capacity	TC201 (0.1 V) TC203 (1 V)	X73-2120	V. MODE : CH2 AC-DC : DC VARI : CAL H. MODE : A VOLTS : 10 mV (reference) → 0.1 V → 1 V 1) Connect a capacity meter to the CH2 input. 2) Measure the capacity of the 10 mV range. (No more tha 25 p) 3) At 0.1 V, adjust TC201 to obtain the same values as 10 mV. 4) At 1 V, adjust TC203 to obtain the same values as 10 mV.
FIX Level	VR2	X74-1590	V. MODE : CH1 H. MODE : A AC-DC : DC SWEEP-TIME : 0.2 ms VOLTS : 0.1 V TRIG. MODE : FIX 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust so that the waveform starts from the scale center line when SLOPE is switched between +/-. 3) Set the amplitude to 1 div., switch SLOPE to + and -, and ensure that triggering is applied. (If it is not applied, re-adjust now.) 

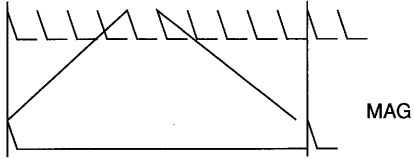
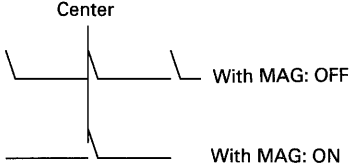
ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure
TRIG Level	VR1	X74-1590	<p>V. MODE : CH1 H. MODE : A AC-DC : DC SWEEP-TIME : 0.2 ms VOLTS : 0.1 V TRIG. MODE : AUTO</p> <ol style="list-style-type: none"> 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Set TRIG LEVEL to the 12:00 position and adjust so that the waveform starts from the scale center line. <div style="text-align: center;"> </div>
CH1 TRIG DC Coupling	VR105	X73-2120	<p>V. MODE : CH1 SWEEP-TIME : 0.2 ms AC-DC : DC TRIG. MODE : AUTO VOLTS : 0.1 V COUPLING : AC H. MODE : A</p> <ol style="list-style-type: none"> 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line. <div style="text-align: center;"> </div>
CH2 TRIG DC Coupling	VR205	X73-2120	<p>V. MODE : CH2 SWEEP-TIME : A=0.2 ms AC-DC : DC TRIG. MODE : AUTO VOLTS : 0.1 V COUPLING : AC H. MODE : A</p> <ol style="list-style-type: none"> 1) Input 1 kHz sine wave to CH2 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line. <div style="text-align: center;"> </div>

ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure
EXT TRIG DC Coupling	VR303	X73-2120	<p>V. MODE : CH1 SWEEP-TIME : 0.2 ms AC-DC : DC TRIG. MODE : AUTO VOLTS : 0.1 V TRIG. SOURCE : EXIT H. MODE : A</p> <ol style="list-style-type: none"> 1) Divide 1 kHz sine wave into two and apply the inputs to CH1 and EXT, and display them for 3 div above and below the scale center line. 2) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line. <div style="text-align: center;"> </div>
TRIG ADD	VR31	X73-2120	<p>V. MODE : CH1 → CH2 → ADD SWEEP-TIME : A=0.2 ms VOLTS : 0.1 V TRIG. MODE : AUTO AC-DC : DC COUPLING : AC H. MODE : A</p> <ol style="list-style-type: none"> 1) Set the luminescent line of each CH to the scale center position by operating V. POSI. 2) Set V. MODE to ADD. 3) Input a 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 4) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 5) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.
A/B sweep start points	VR102	X74-1590	<p>V. MODE : CH1 AC-DC : GND H. MODE : ALT SWEEP-TIME : A=1 ms, B=0.1 ms D. T. POSI : MIN (fully counterclockwise)</p> <p>Adjust so that the start points of A. SWEEP and B. SWEEP are aligned.</p> <div style="text-align: center;"> </div>
A, B SWEEP TIME 1 ms	VR403 (A, SWEEP) VR402 (B, SWEEP)	X73-2120	<p>H. MODE : ALT D. T. POSI : MIN (fully counterclockwise) SWEEP-TIME : A, B=1 ms B. TRIG'D : ON</p> <ol style="list-style-type: none"> 1) Input a 1 ms marker signal. 2) Adjust so that the marker peak and scale coincides at every div. <div style="text-align: center;"> </div>

ADJUSTMENT

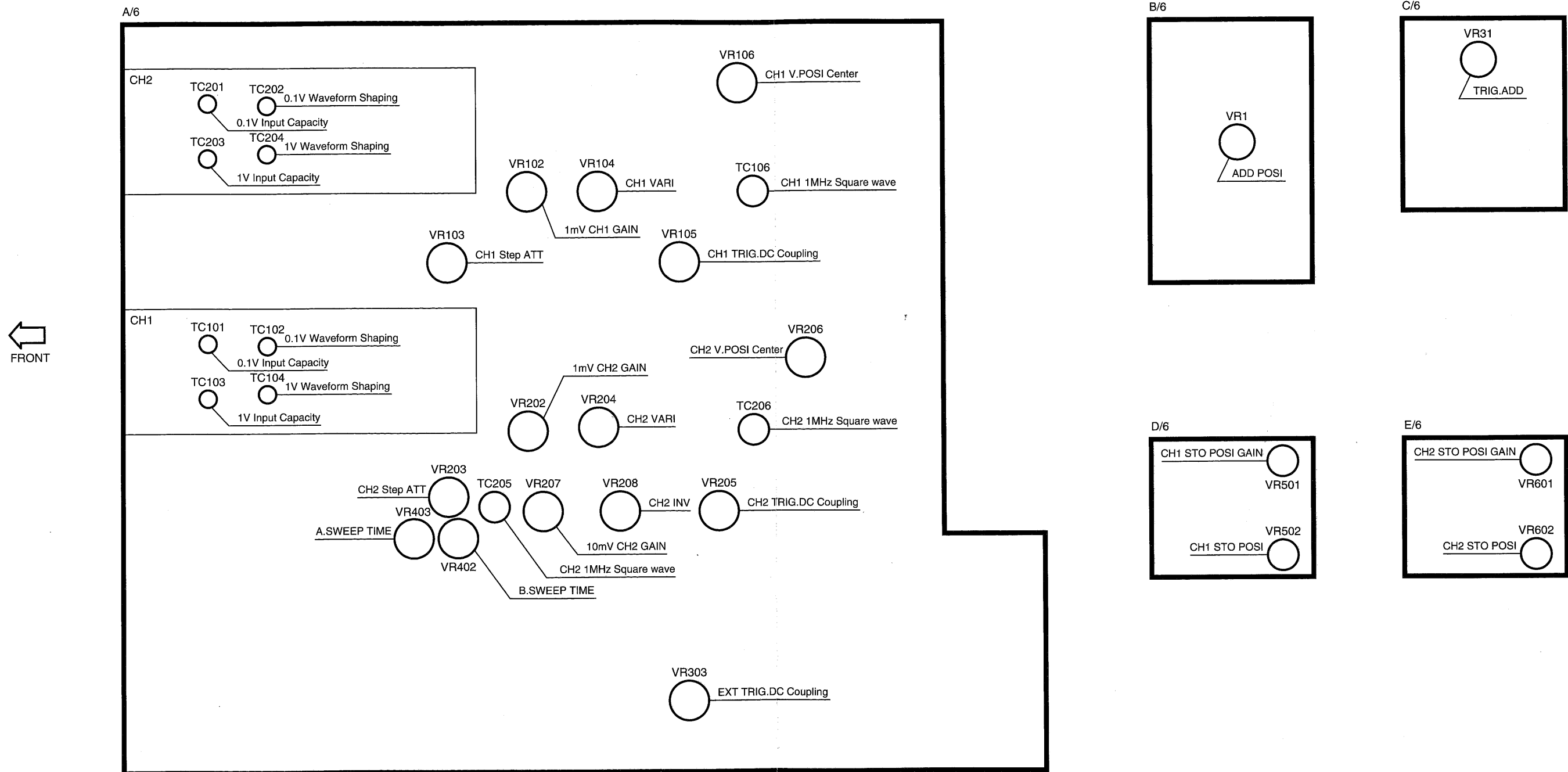
Item	Adjustment	P. C. B.	Procedure
MAG GAIN	VR302	X74-1590	<p>H. MODE : A SWEEP-TIME : A=1 ms AC-DC : DC B. TRIG'D : ON</p> <ol style="list-style-type: none"> 1) Input a 1 ms marker signal. 2) Adjust H. POSI so that the marker peak and scale coincides at every div. 3) Switch X10 MAG ON and adjust so that the interval between two peaks is 10 div. 
MAG Center	VR309	X74-1590	<p>H. MODE : A SWEEP-TIME : A=1 ms AC-DC : DC</p> <ol style="list-style-type: none"> 1) Input a 5 ms marker signal. 2) Switch X10 MAG ON and adjust H. POSI so that the center marker peak is aligned with the scale center. 3) Switch X10 MAG OFF and adjust VR 309 so that the center marker peak is aligned with the scale center. 4) Adjust by 2) and 3) is repeating a few times. 5) After the adjustment, switch MAG between ON-OFF and ensure that the center marker peak does not move. 
H. POSITION X-POSITION	VR301 (H. POSI) VR307 (X-POSI)	X74-1590	<p>H. MODE : A or X-Y SWEEP-TIME : A=1 ms</p> <ol style="list-style-type: none"> 1) Set the AC-DC switch to GND. (The marker signal can be left input.) 2) Set H. POSI to the 12:00 position. 3) Adjust VR301 so that the trace start point is aligned with the left end of scale. 4) Set H. MODE to X-Y. 5) Adjust VR307 so that the spot comes on the scale center.
A, B SWEEP TIME 1 μ s	TC101 (A, SWEEP) TC102 (B, SWEEP)	X74-1590	<p>H. MODE : ALT SWEEP-TIME : A, B=1 μs D.T.POSI : MIN (fully counterclockwise) B. TRIG'D : ON</p> <ol style="list-style-type: none"> 1) Input a 1 μs marker signal. 2) Adjust TC101 (A. SWEEP) so that the marker peak and scale coincides at every div. 3) Also adjust the B SWEEP time in the same way as above using TC102.

ADJUSTMENT

Item	Adjustment	P. C. B.	Procedure									
A SWEEP TIME 0.1 μ s	TC303 (A, SWEEP)	X74-1590	H. MODE : A SWEEP-TIME : A=0.1 μ s 1) Input a 0.1 μ s marker signal. 2) Adjust so that the marker peak and scale coincides at every div.									
D. T. POSI	VR103 (Start) VR104 (Stop)	X74-1590	H. MODE : ALT SWEEP-TIME : A=1 ms, B=10 μ s AD-DC : DC 1) Turn the COARSE and FINE potentiometers of D.T.POSI control fully counterclockwise. 2) Adjust the R/O display to 0.40 ms with FINE. 3) Adjust VR103 so that the start of B sweep is aligned with 0.4 div., of the scale. 4) Turn the COARSE and FINE potentiometers of D.T.POSI control fully clockwise. 5) Adjust the R/O display to 10.00 ms with FINE. 6) Adjust VR104 so that the start of B sweep is aligned with 10.00 div., of the scale. <div style="text-align: center;"> <table style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">0.4</td> <td style="width: 100px;"></td> <td style="text-align: center;">10.00</td> </tr> <tr> <td style="text-align: center;">-----</td> <td></td> <td style="text-align: center;">-----</td> </tr> <tr> <td style="text-align: center;">Start</td> <td></td> <td style="text-align: center;">Stop</td> </tr> </table> </div>	0.4		10.00	-----		-----	Start		Stop
0.4		10.00										
-----		-----										
Start		Stop										
CH1 1 MHz square wave	TC1 TC62 TC106	X80-1370 X73-2120	V. MODE : CH1 VOLTS : 10 mV AD-DC : DC H. MODE : A 1) Input a 1 MHz square wave to CH1 and set its amplitude to 6 div. 2) Adjust the waveform to the best point. 3) Check that the overshoot in each range from 5 mV to 0.1 V is within the specification.									
CH2 1 MHz square wave	TC205 TC206	X73-2120	V. MODE : CH2 VOLTS : 10 mV AD-DC : DC H. MODE : A 1) Input a 1 MHz square wave to CH2 and set its amplitude to 6 div. 2) Adjust the waveform to the best point. 3) Check that the overshoot in each range from 5 mV to 0.1 V is within the specification.									
STORAGE GAIN	VR102 (CH1) VR202 (CH2)	X79-1300	V. MODE : CH1 or CH2 H. MODE : A AC-DC : DC VARI : CAL VOLTS : 10 mV REAL/STORAGE : STORAGE 1) Input a 50 mV square wave signal to CH1. 2) Adjust VR102 so that the amplitude is 5 div. 3) Adjust VR202 so that the amplitude is 5 div. * If the waveforms are not displayed, display them using the following potentiometers. CH1 : X73-2120 : VR502 CH2 : X73-2120 : VR602									

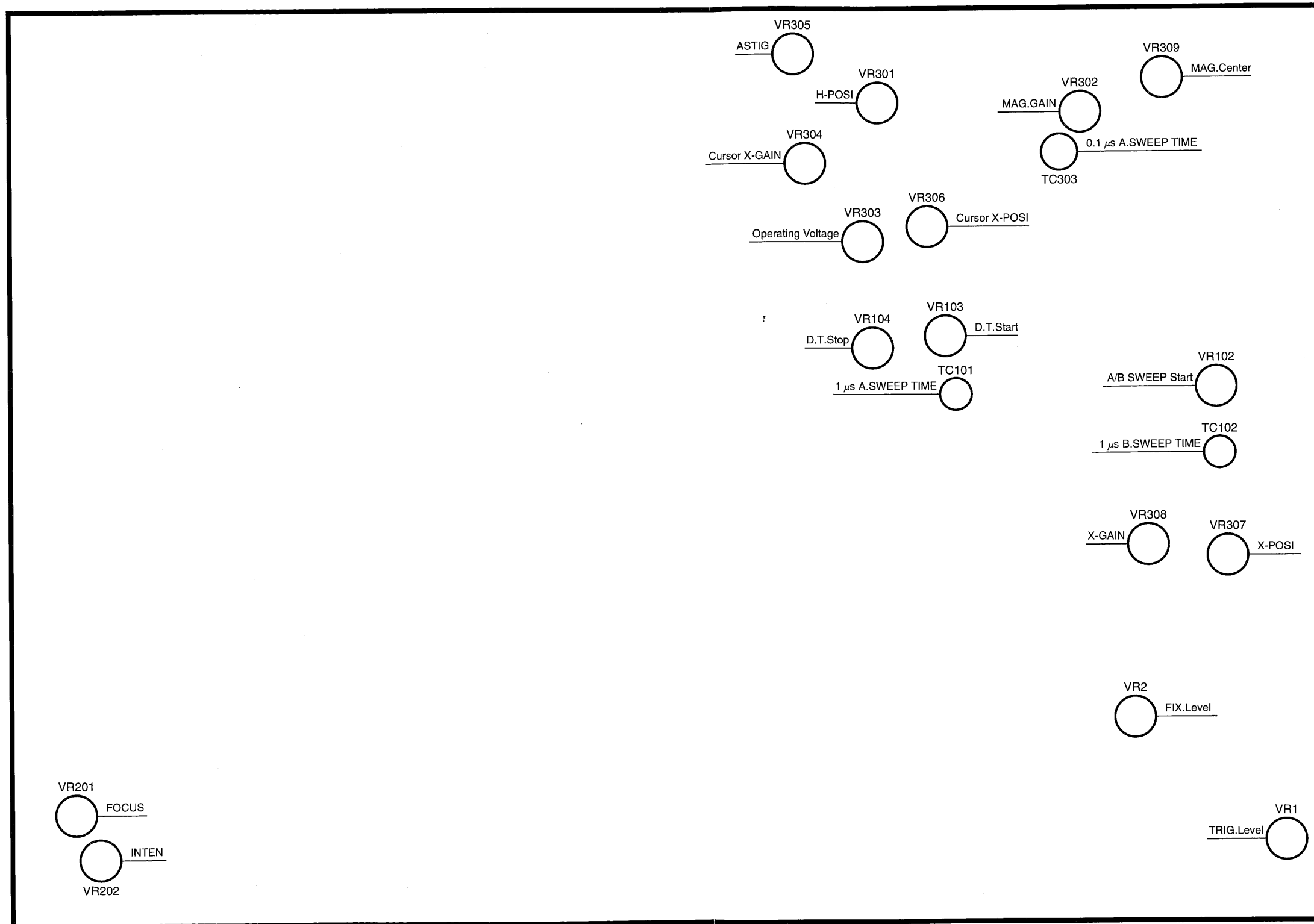
ADJUSTMENT

PRE AMP UNIT (X73-2120-00)



ADJUSTMENT

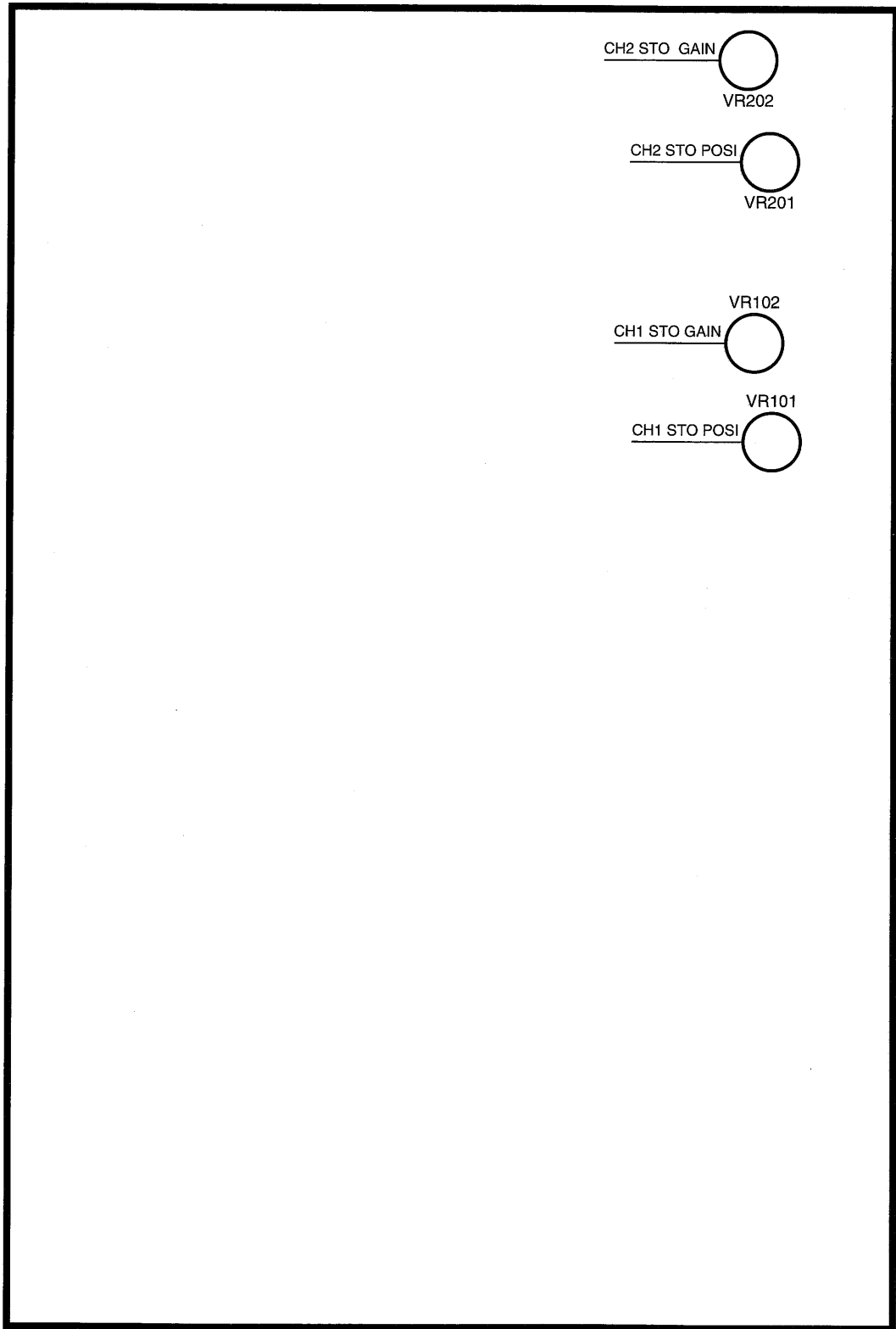
SWEEP UNIT (X74-1590-00)



FRONT

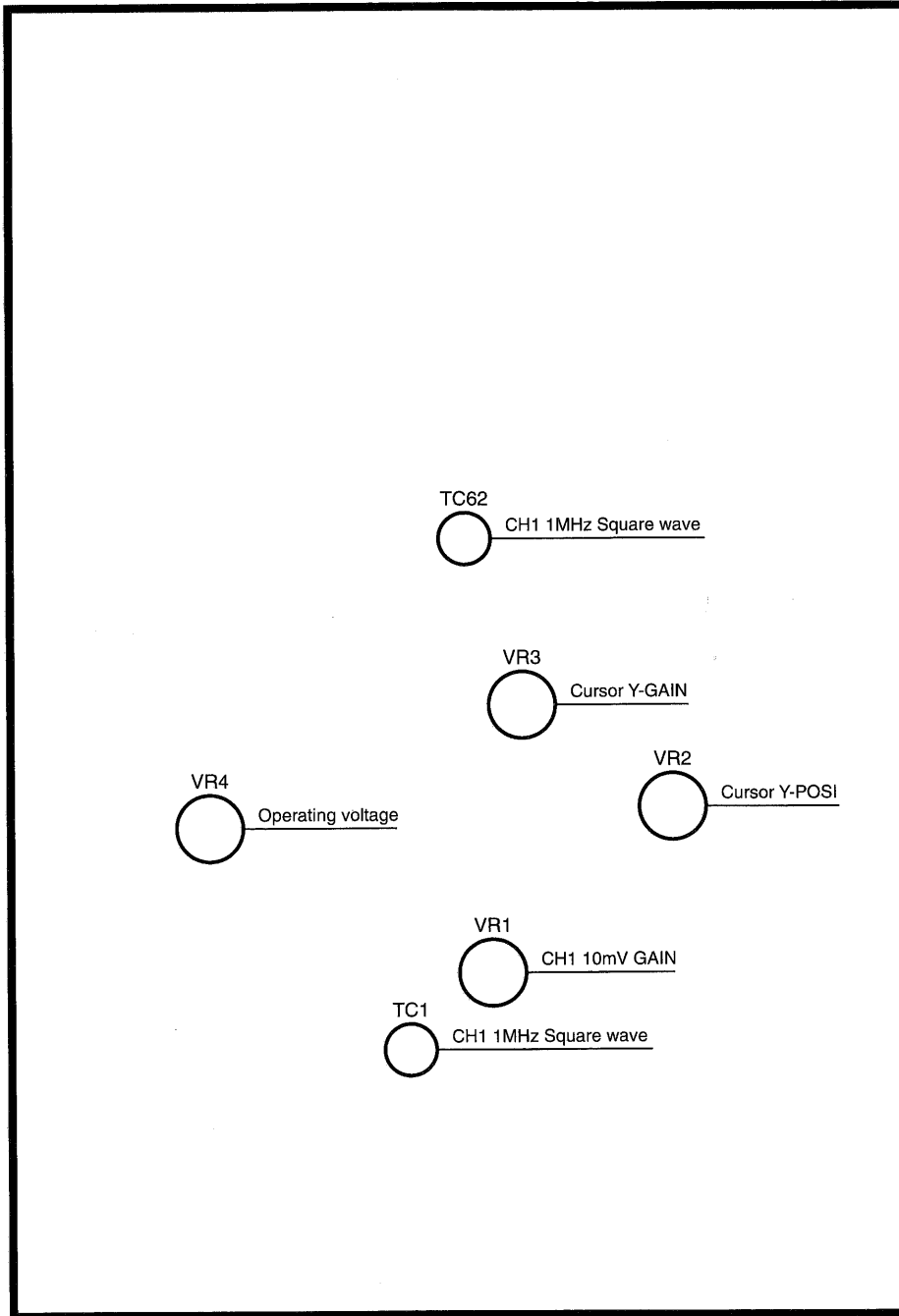
ADJUSTMENT

DSP UNIT (X79-1300-0X)



ADJUSTMENT

FINAL UNIT (X80-1370-00)



FRONT

TROUBLESHOOTING

When operating the DCS-7020/7040, be sure to use the proper procedure and check all panel settings.

A wrong setting cause abnormal operation from even a good product. For example, observation of a waveform with high noise components is accompanied by jitter. In such a case, the jitter can be corrected by setting the trigger coupling to HFrej. If there is any function which you do not understand, check out by reading the instruction manual.

If the operation is abnormal even when the operating procedure is correct, remove the top case and bottom panel.

CAUTION

HIGH VOLTAGE PARTS ARE INSIDE THE EQUIPMENT. THEY ARE EXTREMELY DANGEROUS.

Check all PC boards to ensure that there is no unplugged connector or soldering defect.

Some problems may be corrected by applying correct adjustment. For example, if the trace moves up and down when the Vertical Variable control is turned, it can be corrected by adjusting the Variable balance. For the adjustment methods, read the descriptions of adjustment procedures.

The description in the troubleshooting section use the same circuit names as those used in the block diagram. Refer to the block diagram when reading the troubleshooting.

First, start with checking the power supply block. Check the voltages at IC401 on X74-1590.

pin no.	voltage
1	+140
4	+55
6	+12
8	-12
10	+5
11	-8

OK (Acceptable): Go to next step.

NG (Unacceptable): There is a problem in the power supply block. Check the regulator circuit

a: In case no spot is displayed on the CRT in the X-Y mode.

Check that voltages at pins 1 and 4 of CN7 on the X74-1590.

OK: Check the voltages at pins 1 and 3 of CN5 on the X80-1370.

NG: There is a problem in the vertical amp. (Go to i.)

NG: There is a problem in the horizontal amp. (Go to c.)

b: Check if the voltage at W18 on X74-1590 is correct.

OK: There is a problem in the BLK amp.

NG: There is a problem in the HIGH Volts converter.

c: Short-circuit the bases of Q306 and Q307 on X74-1590.

A spot is displayed on the CRT:

There is a problem somewhere before the X amp. (Go to d.)

Nothing is displayed on the CRT:

Short the collectors of Q310 and Q311.

A spot is displayed on the CRT:

There is a problem in the MAG amp or R/O SW.

Nothing is displayed on the CRT:

There is a problem in H-FINAL.

d: Short-circuit the collector of Q151 on X74-1590 with the chassis.

A spot is displayed on the CRT:

There is a problem in the Vertical block.

Nothing is displayed on the CRT:

There is a problem in the X amp.

e: In case no trace is displayed on the CRT in the A sweep mode.

Measure the waveform at pin 12 of IC102 on X74-1590.

OK: Measure every waveform after IC102 to locate the defective position.

NG: Measure the A SWEEP GATE, A SWEEP, A SWEEP STOP and HOLD OFF waveforms to locate the defective position.

f: In case no trace is displayed on the CRT in the B sweep mode.

Measure the waveform at pin 12 of IC105 on X74-1590.

OK: Measure every waveform after U105 to locate the defective position.

NG: Measure the B SWEEP GATE, B SWEEP, B SWEEP STOP and DTP circuit waveforms to locate the defective position.

g: Intensity is not modulated in ALT sweep mode.

Check the waveform at the collector of Q116 on X74-1590.

OK: There is a problem in INTEN.

NG: There is a problem in the BLK amp.

h: Triggering cannot be applied.

Check the waveform at the collector of Q151 on the X74-1590.

OK: Check the waveform at the collector of Q158 on X74-1590.

OK: There is a problem in the Schmitt circuit.

NG: There is a problem in the Trig. Coup.

NG: There is a problem in the trigger selector.

TROUBLESHOOTING

i: Trace is not displayed.

Short-circuit the bases of Q107 and Q108 on X80-1370 and check if a trace is displayed on or near the center.

OK: Short-circuit the bases of Q1 and Q2 on X80-1370 and check if a trace is displayed on or near the center.

OK: There is a problem in X73-2120. Check the defective point by shorting each signal line.

NG: There is a problem in the T.SEP amp or R/O SW on X80-1370.

NG: There is a problem in V. FINAL.

j: TV synchronization is impossible.

Check the waveforms of the video amp on X74-1590.

OK: There is a problem in the Schmitt circuit.

NG: There is a problem in the circuitry before the video amp.

Check the defective position following the signal flow.

Be sure to check both TV-LINE and TV-FRAME.

k: The channels are not displayed properly.

Check the outputs from V-MODE LOGIC on X73-2120.

OK: There is a problem in the circuitry before the POS1 amp of one of the channels. Check the waveforms.

NG: Check the V-CLK waveform.

OK: There is a problem in the V-MODE LOGIC.

NG: There is a problem in the H-MODE LOGIC on X74-1590.

l: ADD is not possible.

There is a problem in channel selector on X73-2120.

m: CHOP sweep is not possible.

Check the waveform at the collector of Q118 on X74-1590.

OK: There is a problem in the H-MODE LOGIC.

NG: There is problem in the CHOP generator.

n: Auto free-run is not possible.

Check +5V at pin 1 of IC106 on X74-1590.

OK: There is a problem in the A sweep gate.

NG: There is a problem in the free-run circuit.

o: Characters and STO waveform are not displayed on the CRT.

- Check the CURSOR MODE SW and R/O INTEN.

- Check the blanking signals at CN527-1, 2, 4 and 5 on the X79-1300.

OK: Check the signals at R/O X at CN527-7 and R/O Y at CN527-5.

If NG, go to the next check item. If OK, check V FINAL or H FINAL.

NG: There is a problem in the display control.

p: Character and STO waveform are not displayed properly on the CRT.

- Check if the CPU IC26 on X79-1300 is operates normally.

(Check the conditions of X3, 12 Mhz, IC26 data bus and

- Trace R/O X from the input to output to find if there is any abnormal position. Also check R/O Y from the input to output. (D/A circuit check)

OK: There is a problem in V FINAL or H FINAL.

NG: There is a problem in the display control of the D/A circuitry on X79-1300.

q: Character data is not displayed properly on the CRT.



- Trace the Panel control circuit on X79-1300 and its surroundings to find if there is any abnormal position.

OK: There is a problem in the Panel unit.

NG: There is a problem in the panel control.

r: The cursor and DTP do not function properly.

- Check if the cursor and DTP voltages are output properly.

			CHECK POINT
Δ	0V	4V	IC2-1
Δ REF	0V	4V	IC2-2
DTP	4V	0V	IC2-5

OK: There is a problem in the panel control D/A circuitry on X79-1300.

NG: There is a problem in the Panel unit.

s: The trace separation does not function properly.

- Check the operations of IC31, 32 and 36 on X79-1300.

OK: There is a problem in the sweep unit or final unit.

Trace signals and identify the abnormal position.

NG: There is a problem in the panel unit or panel control.

t: Only the STO waveform is abnormal.

Check if the CPU and the surrounding circuitry are operating, then check the following points.

- Checking pin 29 (Vin) of IC100 (IC200) on X79-1300

OK: Go to the next check.

NG: There is a problem in the A/D preamp or the preamp unit.

- Checking pin 2 (CLK) of C100 (IC200) on X79-1300

OK: Go to the next check.

NG: There is a problem in the 80 MHz OSC or AD CLK OSC.

- Checking the clock signals output from IC45 on X79-1300

OK: There is a problem in one of the devices connected to IC45 or in the surroundings.

NG: There is a problem in IC45.

u: Abnormality occurs with other function than above.

Trace the signal path of the defective function referring to the block diagram to locate the defective position.

When all of the troubles have been repaired above, start re-adjustments following the adjustment procedures.

PARTS LIST

DCS-7020

Y70-2070-01

















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	A63-0201-03	PANEL ASS'Y
	B41-0710-14	CAUTION LABEL;HIGH VOLTAGE
	B41-2079-14	CAUTION LABEL
	B41-2083-04	CAUTION LABEL;PL GND
	B42-3819-05	SERIAL NO. PLATE
	B42-3820-05	LABEL;CARTON BOX
	B42-6094-04	CAUTION LABEL;INPUT/OUTPUT
	B63-0252-00	INSTRUCTION MANUAL;JAPANESE
	B63-0253-10	INSTRUCTION MANUAL;ENGLISH
	E30-1950-05	JIS POWER CORD
	E30-1951-05	UL/CSA POWER CORD
	E30-1952-05	CEE POWER CORD
	E30-1953-05	SAA POWER CORD
	E30-1963-05	BS POWER CORD
	F05-4016-05	FUSE(5X20MM) T400MA/250V
	F06-1022-05	FUSE(5X20MM) T1A/250V
	G16-0618-04	SHEET
	H10-2888-02	FOAMED STYREN PAD;FRONT
	H10-2889-02	FOAMED STYREN PAD;REAR
	H20-1727-04	VINYL COVER
	H53-0218-13	CARTON BOX
	W01-0406-14	ADJUSTMENT ROD
1	A01-4046-02	CASE;BOTTOM
2	A01-4047-02	CASE;TOP
3	A13-2219-12	FRAME;RIGHT
4	A13-2220-02	FRAME;CENTER
5	A13-2229-02	FRAME;LEFT
6	A21-2448-03	DECORATIVE PANEL
7	A21-2449-04	DECORATIVE PANEL
8	A22-1307-02	SUB PANEL
9	A63-0110-01	MOLD PANEL;LARGE
10	A63-0200-12	MOLD PANEL;SMALL
11	A83-0079-02	REAR PANEL
12	B11-0518-04	FILTER
13	B73-0157-04	MODEL NO. PLATE
14	D21-0935-04	EXTENSION SHAFT
15	E21-0686-04	TERMINAL;CAL
16	E23-0552-04	EARTH TERMINAL
17	E38-0979-25	WIRE ASS'Y
18	E38-1007-15	WIRE ASS'Y
19	E38-1167-05	WIRE ASS'Y
20	E68-0619-05	AC SELECTOR
21	F10-1698-03	SHIELD PLATE
22	F11-1206-13	SHIELD CASE;CRT
23	F11-1284-03	SHIELD CASE
24	F11-1285-03	SHIELD CASE
25	F15-0733-04	FELT (CRT SHIELD)
26	F15-0769-04	BLIND PLATE
27	F20-3013-03	INSULATOR;LARGE
28	F20-3014-04	INSULATOR;SMALL
29	F29-0528-05	INSULATOR TUBE
30	J02-0540-05	LEG
31	J19-1653-23	HOLDER FOR CRT
32	J21-4853-04	BRACKET
33	J21-4854-04	BRACKET
34	J21-4855-14	BRACKET
35	J42-0558-05	BUSHING
36	K01-0561-02	HANDLE
37	K21-0920-04	KNOB;VARI
38	K23-0818-04	KNOB;V/DIV
39	K24-3005-04	PUSH SW;POWER
40	K27-0590-04	PUSH BUTTON;GRAYWHITE
41	K27-3618-14	LEVER
42	K29-0877-04	KNOB
43	K29-0894-03	KNOB
44	LN222RP	LED;RED
45	LN322GP	LED;GREEN
46	L07-1534-05	POWER TRANSFORMER
47	L39-0531-05	ROTATION COIL
48	S40-2532-05	POWER SWITCH
49	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
50	X66-1470-00	PANEL UNIT
51	X73-2120-00	PRE AMP UNIT
52	X74-1590-00	SWEEP UNIT
53	X79-1300-00	DSP UNIT
54	X80-1370-04	FINAL UNIT
55	150VTM31A	CRT

DCS-7040

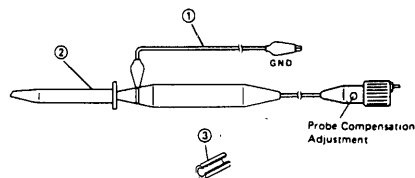
Y70-2070-02

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	A63-0202-03	PANEL ASS'Y
	B41-0710-14	CAUTION LABEL;HIGH VOLTAGE
	B41-2081-14	CAUTION LABEL
	B41-2083-04	CAUTION LABEL;PL GND
	B42-3819-05	SERIAL NO. PLATE
	B42-3820-05	LABEL;CARTON BOX
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	B63-0253-10	INSTRUCTION MANUAL;ENGLISH
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	E30-1951-05	UL/CSA POWER CORD
	E30-1952-05	CEE POWER CORD
	E30-1953-05	SAA POWER CORD
	E30-1963-05	BS POWER CORD
	F05-4016-05	FUSE(5X20MM) T400MA/250V
	F06-1022-05	FUSE(5X20MM) T1A/250V
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	H10-2889-02	FOAMED STYREN PAD;REAR
	H20-1727-04	VINYL COVER
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3	A13-2219-12	FRAME;RIGHT
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5	A13-2229-02	FRAME;LEFT
6	A21-2448-03	DECORATIVE PANEL
7	A21-2449-04	DECORATIVE PANEL
8	A22-1307-02	SUB PANEL
9	A63-0110-01	MOLD PANEL;LARGE
10	A63-0200-12	MOLD PANEL;SMALL
11	A83-0079-02	REAR PANEL
12	B11-0518-04	FILTER
13	B73-0158-04	MODEL NO. PLATE
14	D21-0935-04	EXTENSION SHAFT
15	E21-0686-04	TERMINAL;CAL
16	E23-0552-04	EARTH TERMINAL
17	E38-0979-25	WIRE ASS'Y
18	E38-1007-15	WIRE ASS'Y
19	E38-1167-05	WIRE ASS'Y
20	E68-0619-05	AC SELECTOR
21	F10-1698-03	SHIELD PLATE
22	F11-1206-13	SHIELD CASE;CRT
23	F11-1284-03	SHIELD CASE
24	F11-1285-03	SHIELD CASE
25	F15-0733-04	FELT (CRT SHIELD)
26	F15-0769-04	BLIND PLATE
27	F20-3013-03	INSULATOR;LARGE
28	F20-3014-04	INSULATOR;SMALL
29	F29-0528-05	INSULATOR TUBE
30	J02-0540-05	LEG
31	J19-1653-23	HOLDER FOR CRT
32	J21-4853-04	BRACKET
33	J21-4854-04	BRACKET
34	J21-4855-14	BRACKET
35	J42-0558-05	BUSHING
36	K01-0561-02	HANDLE
37	K21-0920-04	KNOB;VARI
38	K23-0818-04	KNOB;V/DIV
39	K24-3005-04	PUSH SW;POWER
40	K27-0590-04	PUSH BUTTON;GRAYWHITE
41	K27-3618-14	LEVER
42	K29-0877-04	KNOB
43	K29-0894-03	KNOB
44	LN222RP	LED;RED
45	LN322GP	LED;GREEN
46	L07-1534-05	POWER TRANSFORMER
47	L39-0531-05	ROTATION COIL
48	S40-2532-05	POWER SWITCH
49	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
50	X66-1470-00	PANEL UNIT
51	X73-2120-00	PRE AMP UNIT
52	X74-1590-00	SWEEP UNIT
53	X79-1300-01	DSP UNIT
54	X80-1370-04	FINAL UNIT
55	150VTM31A	CRT

SCREWS

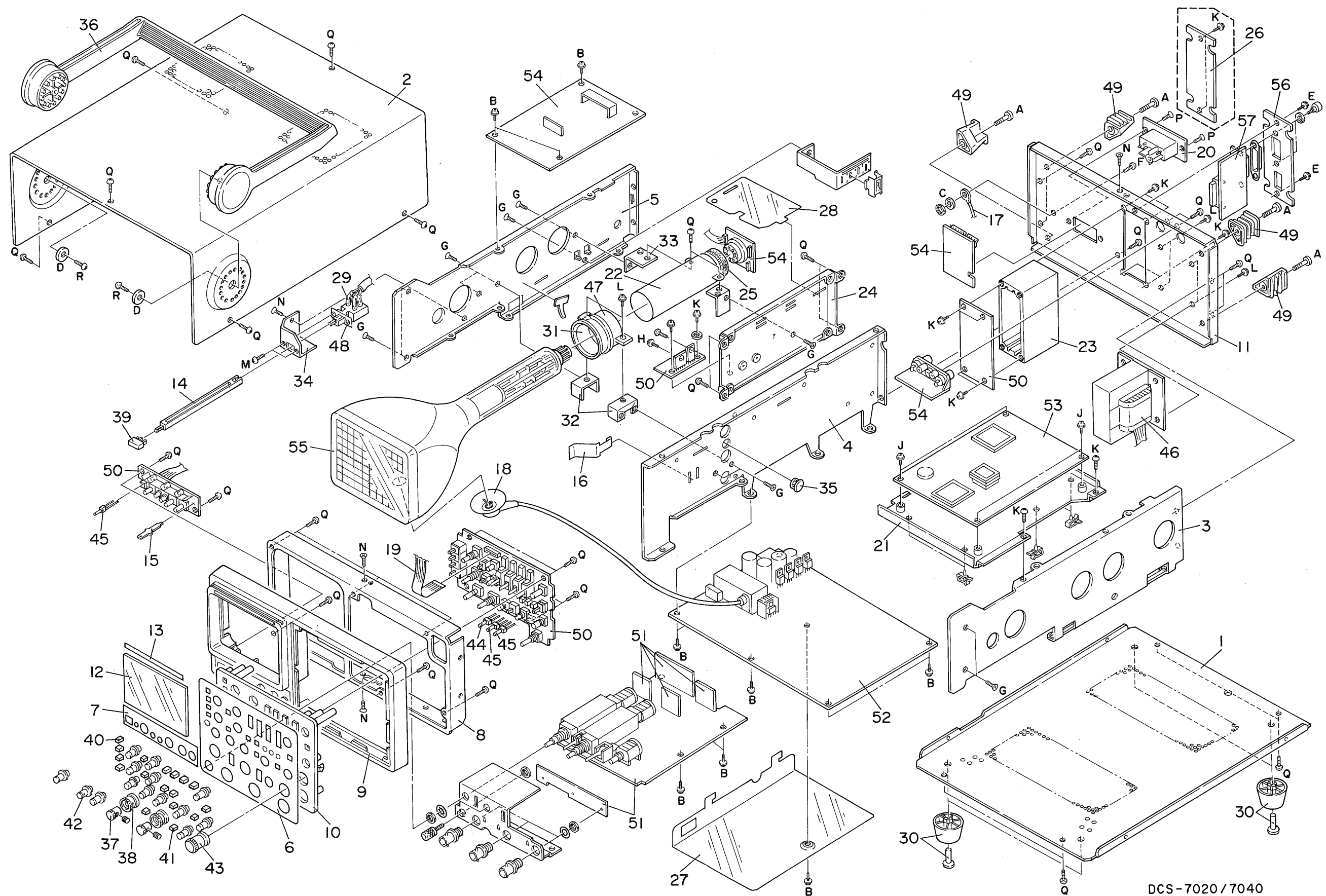
	Parts No.	Parts Name	Figure
A	N08-0611-04	SCREW (FOR CORD WRAP)	
B	N09-0739-05	SCREW, SEMS BINDING TAPTITE (3 x 8)	
C	N14-0622-05	NUT, WITH TOOTH (M4)	
D	N19-0748-05	WASHER	
E	N30-3008-41	SCREW, PAN HD (M3 x 8)	
F	N30-4010-41	SCREW, PAN HD (M4 x 10)	
G	N32-3008-41	SCREW, FLAT HD (M3 x 8)	
H	N66-2612-41	SCREW, SEMS PAN HD (M2.6 x 12)	
J	N66-3006-41	SCREW, SEMS PAN HD (M3 x 6)	
K	N66-3008-41	SCREW, SEMS PAN HD (M3 x 8)	
L	N66-4012-41	SCREW, SEMS PAN HD (M4 x 12)	
M	N67-3008-41	SCREW, SEMS PAN HD (M3 x 8)	
N	N88-3006-41	SCREW, FLAT HD TAPTITE (3 x 6)	
P	N88-3008-41	SCREW, FLAT HD TAPTITE (3 x 8)	
Q	N89-3008-41	SCREW, BINDING TAPTITE (3 x 8)	
R	N89-3012-41	SCREW, BINDING TAPTITE (3 x 12)	

MODEL PC-33 (LOW CAPACITY PROBE)



ITEM	DESCRIPTION	PARTS NO.
①	Ground Wire Assembly	E30-1883-08
②	Retractable Hook Tip	E29-0540-08
③	Marker (Orange)	B42-1950-08

DISASSEMBLY



DCS-7020/7040

PARTS LIST

PANEL UNIT

X66-1470-00

REF. NO	PARTS NO	NAME & DESCRIPTION			
	A33-0505-04	REFLECTOR			
	E40-0218-05	PIN CONNECTOR 2P			
	J73-0389-02	PCB (UNMOUNTED)			
C1	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C2	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C3	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C4	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C101	C90-3228-05	CAP. ELECTRO	47	20%	16V
C102	C90-3228-05	CAP. ELECTRO	47	20%	16V
C103	CF92FV1H103J	CAP. POLYESTER	0.01	5%	50V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	C90-3228-05	CAP. ELECTRO	47	20%	16V
CN511	E40-7518-05	PIN CONNECTOR	6P		
CN523	E40-7532-05	PIN CONNECTOR	23P		
CN524	E40-7520-05	PIN CONNECTOR	30P		
CN528	E40-7521-05	PIN CONNECTOR	30P		
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D404	D3SB20	DIODE, BRIDGE			
IC1	NJM4558L	IC, DUAL OP AMP			
IC101	NJM4558L	IC, DUAL OP AMP			
PL101	B30-3016-05	LAMP			
PL102	B30-3016-05	LAMP			
PL103	B30-3016-05	LAMP			
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SA933S(R,S)	TR. SI, PNP			
Q101	2SC1740S(R,S)	TR. SI, NPN			
Q102	2SC1740S(R,S)	TR. SI, NPN			
Q103	2SC1318A(R)	TR. SI, NPN			
Q104	2SA720A(R)	TR. SI, PNP			
Q407	2SB1015(Y)	TR. SI, PNP			
Q408	2SA933S(R,S)	TR. SI, PNP			
R1	R90-1182-05	RES. NETWORK			
R2	R90-1182-05	RES. NETWORK			
R3	R90-1182-05	RES. NETWORK			
R4	R90-1182-05	RES. NETWORK			
R5	NO USE				
R6	RN14BK2C2002D	RES. METAL FILM 20K	0.5%	1/6W	
R7	RN14BK2C1002D	RES. METAL FILM 10K	0.5%	1/6W	
R8	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R9	RN14BK2C2203F	RES. METAL FILM 220K	1%	1/6W	
R10	RN14BK2C2202F	RES. METAL FILM 22K	1%	1/6W	
R11	RN14BK2C2002D	RES. METAL FILM 20K	0.5%	1/6W	
R12	RN14BK2C2002D	RES. METAL FILM 20K	0.5%	1/6W	
R13	RN14BK2C1902D	RES. METAL FILM 19.6K	0.5%	1/6W	
R14	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R15	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R16	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R17	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R18	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R19	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R20	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R21	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R22	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R23	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R24	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R25	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R26	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R27	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R28	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R29	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R30	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R31	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R32	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R33	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R34	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R35	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R36	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R37	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R38	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R39	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R40	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R41	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R42	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R43	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R44	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R45	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R46	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R47	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R48	RD14BB2C361J	RES. CARBON	360	5%	1/6W

REF. NO	PARTS NO	NAME & DESCRIPTION			
R49	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R50	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R51	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R52	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R53	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R54	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R55	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R56	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R57	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R58	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R59	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R60	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R61	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R62	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R101	RN14BK2C5102F	RES. METAL FILM 51K	1%	1/6W	
R102	RN14BK2C3902F	RES. METAL FILM 39K	1%	1/6W	
R103	RN14BK2C3902F	RES. METAL FILM 39K	1%	1/6W	
R104	RN14BK2C4702F	RES. METAL FILM 47K	1%	1/6W	
R105	RN14BK2C4702F	RES. METAL FILM 47K	1%	1/6W	
R106	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R107	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R108	NO USE				
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RN14BK2C6801F	RES. METAL FILM 6.8K	1%	1/6W	
R111	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R112	RN14BK2C6800F	RES. METAL FILM 680	1%	1/6W	
R113	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R114	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R115	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R116	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R117	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R118	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R119	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R120	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R420	R92-1664-05	RES. FIXED	18	5%	2W
R421	R92-1664-05	RES. FIXED	18	5%	2W
S1	S40-1532-05	PUSH SWITCH			
S2	S40-7411-05	PUSH SWITCH			
S3	S40-7411-05	PUSH SWITCH			
S4	S40-7411-05	PUSH SWITCH			
S5	S40-7411-05	PUSH SWITCH			
S6	S40-1532-05	PUSH SWITCH			
S7	S64-0610-05	LEVER SWITCH			
S8	S64-0610-05	LEVER SWITCH			
S9	S64-0611-05	LEVER SWITCH			
S10	S64-0609-05	LEVER SWITCH			
S11	S40-1532-05	PUSH SWITCH			
S12	S40-1532-05	PUSH SWITCH			
S13	S40-1532-05	PUSH SWITCH			
S14	S40-1532-05	PUSH SWITCH			
S15	S40-7411-05	PUSH SWITCH			
S16	W02-2310-05	ROTARY ENCODER			
S17	W02-0497-05	ROTARY ENCODER			
S18	S60-0620-05	ROTARY SWITCH			
S19	S60-0621-05	ROTARY SWITCH			
VR1	R05-3521-05	V. R.			20KB
VR2	R05-3521-05	V. R.			20KB
VR3	R05-3521-05	V. R.			20KB
VR4	R05-3521-05	V. R.			20KB
VR5	R05-3527-05	V. R.			20KB
VR6	R05-3527-05	V. R.			20KB
VR7	R05-3527-05	V. R.			20KB
VR8	R12-0679-05	RES. SEMI FIXED	22KB		
VR101	R05-3521-05	V. R.			20KB
VR102	R05-3521-05	V. R.			20KB
VR103	R12-5540-05	RES. SEMI FIXED	100KB		
VR104	R12-5540-05	RES. SEMI FIXED	100KB		
VR105	R05-3521-05	V. R.			20KB
W512	E38-1165-05	WIRE ASS'Y			
W515	E38-1166-05	WIRE ASS'Y			
W516	E38-1207-05	WIRE ASS'Y			
W517	E38-0996-15	WIRE ASS'Y			
W901	E38-1412-05	WIRE ASS'Y			

PARTS LIST

PRE AMP UNIT

X73-2120-00

REF. NO	PARTS NO	NAME & DESCRIPTION			
	A22-1315-03	SUB PANEL			
	E21-0667-05	METAL TERMINAL			
	E23-0149-05	GND TERMINAL			
	E23-1520-05	EARTH TERMINAL			
	E38-0983-25	WIRE ASS'Y			
	E38-1266-05	WIRE ASS'Y			
	E38-1267-05	WIRE ASS'Y			
	F01-2318-04	HEAT SINK;Q1,2			
	F10-1590-14	SHIELD PLATE;ATT			
	F10-1668-04	SHIELD PLATE			
	F10-2505-04	SHIELD PLATE			
	J30-0623-04	SPACER			
	J73-0393-02	PCB (UNMOUNTED)			
	N11-0030-41	FLANGE NUT M3			
	N32-3008-41	SCREW, FLAT HD M3X8			
C7	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C34	CE04LW0J331N	CAP. ELECTRO	330	20%	6.3V
C35	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C36	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C37	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C38	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C39	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C40	CE04LW1A470M	CAP. ELECTRO	47	20%	10V
C51	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C52	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C53	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C54	CE04LW1C330N	CAP. ELECTRO	33	20%	16V
C57	CE04HW1C220M	CAP. ELECTRO	22	20%	16V
C58	CC45FCH1H180J	CAP. CERAMIC	18P	5%	50V
C59	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C101	C91-2605-05	CAP. CERAMIC	470P	5%	50V
C102	C91-2665-05	CAP. FILM	0.047	10%	630V
C103	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C106	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C110	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C111	NO USE				
C112	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C113	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C114	CK45FF1H103Z	CAP. CERAMIC	0.01	10%	50V
C117	CE04EW1C470M	CAP. ELECTRO	47	20%	16V
C118	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C122	CC45FCH1H820J	CAP. CERAMIC	82P	5%	50V
C125	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C130	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C201	C91-2603-05	CAP. CERAMIC	330P	5%	50V
C202	C91-2665-05	CAP. FILM	0.047	10%	630V
C203	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C210	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C211	NO USE				
C212	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C213	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C217	CE04EW1C470M	CAP. ELECTRO	47	20%	16V
C218	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C221	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C222	CC45FCH1H820J	CAP. CERAMIC	82P	5%	50V
C225	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C226	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C230	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C231	NO USE				
C232	C91-2538-05	CAP. FILM	0.1	10%	63V
C233	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C300	C91-2584-05	CAP. CERAMIC	1000P	10%	400V
C301	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C302	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C303	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C304	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C307	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C308	C91-2538-05	CAP. FILM	0.1	10%	63V
C309	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C310	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C313	C91-0769-05	CAP. CERAMIC	0.01	20%	16V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C314	CF92FV1H103J	CAP. POLYESTER	0.01	5%	50V
C315	NO USE				
C316	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C319	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C323	C91-2538-05	CAP. FILM	0.1	10%	63V
C348	CC45FCH1H080D	CAP. CERAMIC	8P	0.5P	50V
C401	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C402	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C403	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C404	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C405	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C406	NO USE				
C407	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C410	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C418	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C451	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C452	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C501	CC45FCH1H060D	CAP. CERAMIC	6P	0.5P	50V
C502	CC45FCH1H060D	CAP. CERAMIC	6P	0.5P	50V
C521	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C551	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C552	CC93FCH1H301J	CAP. CERAMIC	300P	5%	50V
C553	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C559	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C560	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C561	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C601	CC45FCH1H060D	CAP. CERAMIC	6P	0.5P	50V
C602	CC45FCH1H060D	CAP. CERAMIC	6P	0.5P	50V
C621	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C651	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C652	CC93FCH1H301J	CAP. CERAMIC	300P	5%	50V
C653	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C659	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C660	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C661	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
CN13	E40-7515-05	PIN CONNECTOR			3P
CN509	E40-3242-05	PIN CONNECTOR			7P
CN512	E40-7519-05	PIN CONNECTOR			4P
CN525	E40-3243-05	PIN CONNECTOR			8P
CN531	E40-7519-05	PIN CONNECTOR			4P
CN532	E40-7519-05	PIN CONNECTOR			4P
CN541	E40-7428-05	PIN CONNECTOR			9P
CN542	E40-7423-05	PIN CONNECTOR			4P
CN543	E40-7430-05	PIN CONNECTOR			11P
CN544	E40-7425-05	PIN CONNECTOR			6P
CN545	E40-7425-05	PIN CONNECTOR			6P
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS132	DIODE			
D204	1SS132	DIODE			
D205	1SS132	DIODE			
D206	1SS132	DIODE			
D207	1SS132	DIODE			
D208	1SS132	DIODE			
D307	1SS132	DIODE			
D308	1SS132	DIODE			
D309	NO USE				
D310	1SS132	DIODE			
IC1	KWS01	IC, LINEAR			
IC2	SN74LS158N	IC, QUAD 2-1 DATA SELECTOR/NPX			
IC3	SN74LS112AN	IC, DUAL J-K F.F.			
IC4	SN74LS02N	IC, QUAD 2-INPUT NOR GATE			
IC101	KNC13	IC, LINEAR			
IC102	KNC14	IC, LINEAR			

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION			
IC201	KNC13	IC, LINEAR			
IC202	KNC14	IC, LINEAR			
IC401	NJM072L	IC, J-FET INPUT OP AMP			
IC402	NO USE				
IC403	NJM4558L	IC, DUAL OP AMP			
IC404	TC4053BF	IC, TRIPLE 2-CN MPX/DE-MPX			
IC405	TC4053BF	IC, TRIPLE 2-CN MPX/DE-MPX			
IC406	TC4053BF	IC, TRIPLE 2-CN MPX/DE-MPX			
IC407	TC4053BF	IC, TRIPLE 2-CN MPX/DE-MPX			
IC408	TC74HC595AF	IC, 8-BIT SHIFT REGISTER/LATCH			
IC409	TC74HC595AF	IC, 8-BIT SHIFT REGISTER/LATCH			
IC410	TC74HC595AF	IC, 8-BIT SHIFT REGISTER/LATCH			
IC501	NJM4558D	IC, DUAL OP-AMP			
J1	E04-0260-05	COAXIAL CONNECTOR			
J2	E04-0260-05	COAXIAL CONNECTOR			
J3	E04-0259-05	COAXIAL CONNECTOR			
L1	L79-0553-05	FILTER			
L40	L40-2201-17	FERRI INDUCTOR 22UH	10%		
L51	L40-4791-17	FERRI INDUCTOR 4.7UH	10%		
L52	L40-4791-17	FERRI INDUCTOR 4.7UH	10%		
L301	L40-2201-17	FERRI INDUCTOR 22UH	10%		
L302	L40-2201-17	FERRI INDUCTOR 22UH	10%		
L303	L40-2201-17	FERRI INDUCTOR 22UH	10%		
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SC3779(D)	TR. SI, NPN			
Q3	2SC3779(D)	TR. SI, NPN			
Q31	2SC1740S(R,S)	TR. SI, NPN			
Q51	2SC1923(O)	TR. SI, NPN			
Q101	2SC1923(O)	TR. SI, NPN			
Q102	2SK404(E)	FET, N-CHANNEL			
Q103	2SC1923(O)	TR. SI, NPN			
Q106	2SC3779(D)	TR. SI, NPN			
Q107	2SC3779(D)	TR. SI, NPN			
Q108	2SA1005(K)	TR. SI, PNP			
Q109	2SA1005(K)	TR. SI, PNP			
Q110	2SA1005(K)	TR. SI, PNP			
Q111	2SA1005(K)	TR. SI, PNP			
Q114	2SA1005(K)	TR. SI, PNP			
Q152	2SA1005(K)	TR. SI, PNP			
Q153	2SA1005(K)	TR. SI, PNP			
Q201	2SC1923(O)	TR. SI, NPN			
Q202	2SK404(E)	FET, N-CHANNEL			
Q203	2SC1923(O)	TR. SI, NPN			
Q206	2SC3779(D)	TR. SI, NPN			
Q207	2SC3779(D)	TR. SI, NPN			
Q208	2SA1005(K)	TR. SI, PNP			
Q209	2SA1005(K)	TR. SI, PNP			
Q210	2SA1005(K)	TR. SI, PNP			
Q211	2SA1005(K)	TR. SI, PNP			
Q214	2SA1005(K)	TR. SI, PNP			
Q215	2SC1740S(R,S)	TR. SI, NPN			
Q252	2SA1005(K)	TR. SI, PNP			
Q253	2SA1005(K)	TR. SI, PNP			
Q254	2SC1740S(R,S)	TR. SI, NPN			
Q302	2SC1923(O)	TR. SI, NPN			
Q303	2SK404(E)	FET, N-CHANNEL			
Q304	2SC1923(O)	TR. SI, NPN			
Q312	2SC1923(O)	TR. SI, NPN			
Q313	2SA1005(K)	TR. SI, PNP			
Q314	2SA1005(K)	TR. SI, PNP			
Q315	2SC1923(O)	TR. SI, NPN			
Q501	2SA1005(K)	TR. SI, PNP			
Q502	2SA1005(K)	TR. SI, PNP			
Q601	2SA1005(K)	TR. SI, PNP			
Q602	2SA1005(K)	TR. SI, PNP			
R2	RN14BK2C2001F	RES. METAL FILM 2K	1%	1/6W	
R3	RN14BK2C2001F	RES. METAL FILM 2K	1%	1/6W	
R6	RD14BB2C332J	RES. CARBON 3.3K	5%	1/6W	
R7	NO USE				
R8	RN14BK2C3300F	RES. METAL FILM 330	1%	1/6W	
R9	RN14BK2C3300F	RES. METAL FILM 330	1%	1/6W	
R10	RN14BK2C7500F	RES. METAL FILM 750	1%	1/6W	
R11	RN14BK2C7500F	RES. METAL FILM 750	1%	1/6W	
R12	R92-1553-05	RES. METAL FILM 620	5%	1W	

REF. NO	PARTS NO	NAME & DESCRIPTION			
R17	RN14BK2C6200F	RES. METAL FILM 620	1%	1/6W	
R18	RN14BK2C6200F	RES. METAL FILM 620	1%	1/6W	
R19	RN14BK2C51R0F	RES. METAL FILM 51.0	1%	1/6W	
R20	RN14BK2C51R0F	RES. METAL FILM 51.0	1%	1/6W	
R31	RD14BB2C223J	RES. CARBON 22K	5%	1/6W	
R32	NO USE				
R33	RD14BB2C751J	RES. CARBON 750	5%	1/6W	
R38	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R39	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R43	RD14BB2C100J	RES. CARBON 10	5%	1/6W	
R52	RD14BB2C391J	RES. CARBON 390	5%	1/6W	
R59	RD14BB2C432J	RES. CARBON 4.3K	5%	1/6W	
R62	RD14BB2C301J	RES. CARBON 300	5%	1/6W	
R63	RD14BB2C471J	RES. CARBON 470	5%	1/6W	
R64	RD14BB2C133J	RES. CARBON 13K	5%	1/6W	
R65	RD14BB2C910J	RES. CARBON 91	5%	1/6W	
R66	RD14BB2C910J	RES. CARBON 91	5%	1/6W	
R101	RD14BB2E220J	RES. CARBON 22	5%	1/4W	
R102	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R103	RD14BB2C220J	RES. CARBON 22	5%	1/6W	
R104	RD14BB2C105J	RES. CARBON 1M	5%	1/6W	
R107	RD14BB2C684J	RES. CARBON 680K	5%	1/6W	
R108	RD14BB2C220J	RES. CARBON 22	5%	1/6W	
R109	RD14BB2C132J	RES. CARBON 1.3K	5%	1/6W	
R110	NO USE				
R111	RD14BB2C160J	RES. CARBON 16	5%	1/6W	
R112	RN14BK2C2700F	RES. METAL FILM 270	1%	1/6W	
R113	NO USE				
R114	RD14BB2C220J	RES. CARBON 22	5%	1/6W	
R115	RN14BK2C1301F	RES. METAL FILM 1.3K	1%	1/6W	
R116	RN14BK2C1301F	RES. METAL FILM 1.3K	1%	1/6W	
R117	RN14BK2C3301F	RES. METAL FILM 3.3K	1%	1/6W	
R118	RN14BK2C2401F	RES. METAL FILM 2.4K	1%	1/6W	
R119	RN14BK2C5100F	RES. METAL FILM 510	1%	1/6W	
R120	RD14BB2C301J	RES. CARBON 300	5%	1/6W	
R121	RD14BB2C1004F	RES. METAL FILM 1M	1%	1/6W	
R122	RD14BB2C103J	RES. CARBON 10K	5%	1/6W	
R123	RD14BB2C331J	RES. CARBON 330	5%	1/6W	
R124	RD14BB2C103J	RES. CARBON 10K	5%	1/6W	
R125	RD14BB2C332J	RES. CARBON 3.3K	5%	1/6W	
R126	RD14BB2C273J	RES. CARBON 27K	5%	1/6W	
R127	RD14BB2C163J	RES. CARBON 16K	5%	1/6W	
R128	RD14BB2C682J	RES. CARBON 6.8K	5%	1/6W	
R129	NO USE				
R130	RD14BB2C823J	RES. CARBON 82K	5%	1/6W	
R131	NO USE				
R132	RN14BK2C4701F	RES. METAL FILM 4.7K	1%	1/6W	
R133	RN14BK2C47R0F	RES. METAL FILM 47	1%	1/6W	
R134	RN14BK2C1002F	RES. METAL FILM 10K	1%	1/6W	
R135	RN14BK2C1002F	RES. METAL FILM 10K	1%	1/6W	
R136	RN14BK2C1301F	RES. METAL FILM 1.3K	1%	1/6W	
R137	RN14BK2C1301F	RES. METAL FILM 1.3K	1%	1/6W	
R138	RN14BK2C1801F	RES. METAL FILM 1.8K	1%	1/6W	
R139	RD14BB2C470J	RES. CARBON 47	5%	1/6W	
R140	RD14BB2C470J	RES. CARBON 47	5%	1/6W	
R141	RD14BB2C272J	RES. CARBON 2.7K	5%	1/6W	
R142	RD14BB2C272J	RES. CARBON 2.7K	5%	1/6W	
R143	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
R144	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
R145	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R146	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R147	RN14BK2C1001F	RES. METAL FILM 1K	1%	1/6W	
R148	RD14BB2C273J	RES. CARBON 27K	5%	1/6W	
R149	RD14BB2C621J	RES. CARBON 620	5%	1/6W	
R150	RD14BB2C153J	RES. CARBON 15K	5%	1/6W	
R151	RD14BB2C363J	RES. CARBON 36K	5%	1/6W	
R152	RD14BB2C223J	RES. CARBON 22K	5%	1/6W	
R153	RD14BB2C220J	RES. CARBON 22	5%	1/6W	
R154	RD14BB2C220J	RES. CARBON 22	5%	1/6W	
R155	RD14BB2C752J	RES. CARBON 7.5K	5%	1/6W	
R156	RD14BB2C332J	RES. CARBON 3.3K	5%	1/6W	
R157	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
R158	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
R159	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R160	RD14BB2C102J	RES. CARBON 1K	5%	1/6W	
R161	RD14BB2C431J	RES. CARBON 430	5%	1/6W	
R162	RD14BB2C221J	RES. CARBON 220	5%	1/6W	
R163	RD14BB2C153J	RES. CARBON 15K	5%	1/6W	
R164	RD14BB2C622J	RES. CARBON 6.2K	5%	1/6W	
R165	RD14BB2C362J	RES. CARBON 3.6K	5%	1/6W	
R166	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
R170	R92-1578-05	RES. LINEAR PCT 3.9K	5%	1/6W	
R171	NO USE				
R172	RD14BB2C100J	RES. CARBON 10	5%	1/6W	
R173	NO USE				
R174	RD14BB2E201J	RES. CARBON 200	5%	1/4W	
R175	RD14BB2C470J	RES. CARBON 47	5%	1/6W	
R176	NO USE				

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
R177	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
R178	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R201	RD14BB2E220J	RES. CARBON 22 5% 1/4W
R202	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R203	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R204	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
R207	RD14BB2C684J	RES. CARBON 680K 5% 1/6W
R208	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R209	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R210	NO USE	
R211	RD14BB2C160J	RES. CARBON 16 5% 1/6W
R212	RN14BK2C2200F	RES. METAL FILM 220 1% 1/6W
R213	NO USE	
R214	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R215	RN14BK2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R216	RN14BK2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R217	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R218	RN14BK2C2401F	RES. METAL FILM 2.4K 1% 1/6W
R219	RN14BK2C5100F	RES. METAL FILM 510 1% 1/6W
R220	RD14BB2C301J	RES. CARBON 300 5% 1/6W
R221	RN14BK2C1004F	RES. METAL FILM 1M 1% 1/6W
R222	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R223	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R224	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R225	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R226	RD14BB2C273J	RES. CARBON 27K 5% 1/6W
R227	RD14BB2C163J	RES. CARBON 16K 5% 1/6W
R228	RD14BB2C682J	RES. CARBON 6.8K 5% 1/6W
R229	NO USE	
R230	RD14BB2C823J	RES. CARBON 82K 5% 1/6W
R231	NO USE	
R232	RN14BK2C4701F	RES. METAL FILM 4.7K 1% 1/6W
R233	RN14BK2C4701F	RES. METAL FILM 4.7K 1% 1/6W
R234	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R235	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R236	RN14BK2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R237	RN14BK2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R238	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R239	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R240	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R241	RD14BB2C272J	RES. CARBON 2.7K 5% 1/6W
R242	RD14BB2C272J	RES. CARBON 2.7K 5% 1/6W
R243	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R244	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R245	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R246	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R247	RN14BK2C1001F	RES. METAL FILM 1K 1% 1/6W
R248	RD14BB2C273J	RES. CARBON 27K 5% 1/6W
R249	RD14BB2C621J	RES. CARBON 620 5% 1/6W
R250	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R251	RD14BB2C363J	RES. CARBON 36K 5% 1/6W
R252	RD14BB2C223J	RES. CARBON 22K 5% 1/6W
R253	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R254	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R255	RD14BB2C752J	RES. CARBON 7.5K 5% 1/6W
R256	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R257	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R258	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R259	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R260	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R261	RD14BB2C431J	RES. CARBON 430 5% 1/6W
R262	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R263	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R264	RD14BB2C622J	RES. CARBON 6.2K 5% 1/6W
R265	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R266	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R267	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R268	RD14BB2C361J	RES. CARBON 360 5% 1/6W
R269	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R270	R92-1578-05	RES. LINEAR PCT 3.9K 5% 1/6W
R271	RD14BB2C121J	RES. CARBON 120 5% 1/6W
R272	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R273	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R274	RD14BB2E201J	RES. CARBON 200 5% 1/4W
R275	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R276	NO USE	
R277	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
R278	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R300	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R301	RN14BK2C8003F	RES. METAL FILM 800K 1% 1/6W
R302	RN14BK2C2003F	RES. METAL FILM 200K 1% 1/6W
R303	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R304	RD14BB2C684J	RES. CARBON 680K 5% 1/6W
R305	RD14BB2C331J	RES. CARBON 330 5% 1/6W
R306	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R307	RD14BB2C822J	RES. CARBON 8.2K 5% 1/6W
R308	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R332	RD14BB2C113J	RES. CARBON 11K 5% 1/6W
R333	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R334	RD14BB2C122J	RES. CARBON 1.2K 5% 1/6W
R335	RD14BB2C821J	RES. CARBON 820 5% 1/6W
R336	RD14BB2C471J	RES. CARBON 470 5% 1/6W
R337	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R338	R92-1577-05	RES. LINEAR PCT 1K 5% 1/6W

REF. NO	PARTS NO	NAME & DESCRIPTION
R344	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R345	R92-1579-05	RES. LINEAR PCT 220 5% 1/6W
R346	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R347	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R348	RD14BB2C911J	RES. CARBON 910 5% 1/6W
R349	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R350	NO USE	
R351	RN14BK2C5600F	RES. METAL FILM 560 1% 1/6W
R352	RN14BK2C3002F	RES. METAL FILM 30K 1% 1/6W
R353	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R354	RD14BB2C681J	RES. CARBON 680 5% 1/6W
R355	RD14BB2C131J	RES. CARBON 130 5% 1/6W
R356	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R360	RD14BB2E681J	RES. CARBON 680 5% 1/4W
R361	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R401	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R407	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R429	RN14BK2C5101F	RES. METAL FILM 5.1K 1% 1/6W
R430	RN14BK2C1003D	RES. METAL FILM 100K 0.5% 1/6W
R431	RN14BK2C5002D	RES. METAL FILM 50K 0.5% 1/6W
R432	RN14BK2C3002D	RES. METAL FILM 30K 0.5% 1/6W
R433	RN14BK2C2002D	RES. METAL FILM 20K 0.5% 1/6W
R434	NO USE	
R435	RN14BK2C1502F	RES. METAL FILM 15K 1% 1/6W
R436	RN14BK2C1003D	RES. METAL FILM 100K 0.5% 1/6W
R437	RN14BK2C5002D	RES. METAL FILM 50K 0.5% 1/6W
R438	RN14BK2C3002D	RES. METAL FILM 30K 0.5% 1/6W
R439	RN14BK2C2002D	RES. METAL FILM 20K 0.5% 1/6W
R440	RN14BK2C2101F	RES. METAL FILM 2.1K 1% 1/6W
R441	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R442	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R443	RN14BK2C2002F	RES. METAL FILM 20K 1% 1/6W
R444	RN14BK2C4022F	RES. METAL FILM 40.2K 1% 1/6W
R445	RN14BK2C8062F	RES. METAL FILM 80.6K 1% 1/6W
R446	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R447	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R450	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R501	RN14BK2C4300F	RES. METAL FILM 430 1% 1/6W
R502	RN14BK2C4300F	RES. METAL FILM 430 1% 1/6W
R503	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R504	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R505	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R506	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R507	RN14BK2C6200F	RES. METAL FILM 620 1% 1/6W
R508	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R509	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R512	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R513	RD14BB2C123J	RES. CARBON 12K 5% 1/6W
R521	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R522	RD14BB2C752J	RES. CARBON 7.5K 5% 1/6W
R523	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R524	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R551	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R552	RN14BK2E9003D	RES. METAL FILM 900K 0.5% 1/4W
R553	RN14BK2C1113D	RES. METAL FILM 111K 0.5% 1/6W
R554	RD14BB2C510J	RES. CARBON 51 5% 1/6W
R555	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R556	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R557	RN14BK2E9903D	RES. METAL FILM 990K 0.5% 1/4W
R558	RN14BK2C1012D	RES. METAL FILM 10.1K 0.5% 1/6W
R559	RD14BB2C130J	RES. CARBON 13 5% 1/6W
R560	RD14BB2C121J	RES. CARBON 120 5% 1/6W
R561	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R562	RN14BK2C2000D	RES. METAL FILM 200 0.5% 1/6W
R563	RN14BK2C1000D	RES. METAL FILM 100 0.5% 1/6W
R564	RD14BB2C240J	RES. CARBON 24 5% 1/6W
R565	RN14BK2C60R0D	RES. METAL FILM 60.0 0.5% 1/6W
R566	RD14BB2C620J	RES. CARBON 62 5% 1/6W
R567	R92-1667-05	RES. METAL FILM 40 5% 1/6W
R571	RN14BK2C8062F	RES. METAL FILM 80.6K 1% 1/6W
R572	RN14BK2C4022F	RES. METAL FILM 40.2K 1% 1/6W
R573	RN14BK2C2002F	RES. METAL FILM 20K 1% 1/6W
R574	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R601	RN14BK2C4300F	RES. METAL FILM 430 1% 1/6W
R602	RN14BK2C4300F	RES. METAL FILM 430 1% 1/6W
R603	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R604	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R605	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R606	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R607	RN14BK2C6200F	RES. METAL FILM 620 1% 1/6W
R608	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R609	RN14BK2C2201F	RES. METAL FILM 2.2K 1% 1/6W
R612	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R613	RD14BB2C123J	RES. CARBON 12K 5% 1/6W

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
R621	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R622	RD14BB2C752J	RES. CARBON 7.5K 5% 1/6W
R623	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R624	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R651	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R652	RN14BK2E9003D	RES. METAL FILM 900K 0.5% 1/4W
R653	RN14BK2C1113D	RES. METAL FILM 111K 0.5% 1/6W
R654	RD14BB2C510J	RES. CARBON 51 5% 1/6W
R655	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R656	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R657	RN14BK2E9903D	RES. METAL FILM 990K 0.5% 1/4W
R658	RN14BK2C1012D	RES. METAL FILM 10.1K 0.5% 1/6W
R659	RD14BB2C130J	RES. CARBON 13 5% 1/6W
R660	RD14BB2C121J	RES. CARBON 120 5% 1/6W
R661	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R662	RN14BK2C2000D	RES. METAL FILM 200 0.5% 1/6W
R663	RN14BK2C1000D	RES. METAL FILM 100 0.5% 1/6W
R664	RD14BB2C240J	RES. CARBON 24 5% 1/6W
R665	RN14BK2C60R0D	RES. METAL FILM 60.0 0.5% 1/6W
R666	RD14BB2C620J	RES. CARBON 62 5% 1/6W
R667	R92-1667-05	RES. METAL FILM 40 5% 1/6W
R671	RN14BK2C8062F	RES. METAL FILM 80.6K 1% 1/6W
R672	RN14BK2C4022F	RES. METAL FILM 40.2K 1% 1/6W
R673	RN14BK2C2002F	RES. METAL FILM 20K 1% 1/6W
R674	RN14BK2C1002F	RES. METAL FILM 10K 1% 1/6W
R901	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
R902	RD14BB2C912J	RES. CARBON 9.1K 5% 1/6W
R903	RD14BB2C912J	RES. CARBON 9.1K 5% 1/6W
R904	R92-0150-05	JUMPING RES. ZERO OHM (10MM)
S101	S64-0603-15	LEVER SWITCH
S102	S60-0619-05	ROTARY SWITCH
S201	S64-0603-15	LEVER SWITCH
S202	S60-0619-05	ROTARY SWITCH
TC101	C05-0404-05	CAP. TRIMMER 10P
TC102	C05-0403-05	CAP. TRIMMER 6P
TC103	C05-0404-05	CAP. TRIMMER 10P
TC104	C05-0403-05	CAP. TRIMMER 6P
TC105	NO USE	
TC106	C05-0469-05	CAP. TRIMMER 10P
TC201	C05-0404-05	CAP. TRIMMER 10P
TC202	C05-0403-05	CAP. TRIMMER 6P
TC203	C05-0404-05	CAP. TRIMMER 10P
TC204	C05-0403-05	CAP. TRIMMER 6P
TC205	C05-0470-05	CAP. TRIMMER 20P
TC206	C05-0469-05	CAP. TRIMMER 10P
TH101	112-102-2	THERMISTOR
TH102	112-201-2FM	THERMISTOR
TH201	112-102-2	THERMISTOR
TH202	112-201-2FM	THERMISTOR
VR1	R12-0882-05	RES. SEMI FIXED 100 B
VR31	R12-0880-05	RES. SEMI FIXED 220
VR102	R12-0885-05	RES. SEMI FIXED 100
VR103	R12-0680-05	RES. SEMI FIXED 47K
VR104	R12-0885-05	RES. SEMI FIXED 100
VR105	R12-0679-05	RES. SEMI FIXED 22KB
VR106	R12-0679-05	RES. SEMI FIXED 22KB
VR202	R12-0885-05	RES. SEMI FIXED 100
VR203	R12-0680-05	RES. SEMI FIXED 47K
VR204	R12-0885-05	RES. SEMI FIXED 100
VR205	R12-0679-05	RES. SEMI FIXED 22KB
VR206	R12-0679-05	RES. SEMI FIXED 22KB
VR207	R12-0885-05	RES. SEMI FIXED 100
VR208	R12-0885-05	RES. SEMI FIXED 100
VR303	R12-0679-05	RES. SEMI FIXED 22KB
VR401	R05-2515-05	V. R. 10K
VR402	R12-3599-05	RES. SEMI FIXED 22K
VR403	R12-3599-05	RES. SEMI FIXED 22K
VR501	R12-3595-05	RES. SEMI FIXED 10KB
VR502	R12-3596-05	RES. SEMI FIXED 22KB
VR601	R12-3595-05	RES. SEMI FIXED 10KB
VR602	R12-3596-05	RES. SEMI FIXED 22KB
W4	E38-1169-05	WIRE ASS'Y:3P
W301	E38-0987-15	WIRE ASS'Y:2P
W401	E38-0984-15	WIRE ASS'Y:2P
W502	E38-1205-05	WIRE ASS'Y:2P
W506	E38-0985-05	WIRE ASS'Y:2P
W510	E38-1168-15	WIRE ASS'Y:12P

SWEEP UNIT

X74-1590-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	E23-0149-05	GND TERMINAL
	E23-0557-14	EARTH LUG, THERMAL FUSE
	E23-1520-05	EARTH TERMINAL
	E31-2170-05	JUMPING WIRE
	F01-0867-05	HEAT SINK, HIGH VOLTAGE
	F01-2337-05	HEAT SINK
	J73-0395-02	PCB (UNMOUNTED)
	N09-0623-04	SCREW, SENS PAN HD M3X8
	W02-2256-05	HIGH VOLTAGE BLOCK
A201		
C1	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C2	C91-2538-05	CAP. FILM 0.1 10% 63V
C3	C91-2595-05	CAP. CERAMIC 68P 5% 50V
C4	CF92FV1H223J	CAP. POLYESTER 0.022 5% 50V
C5	C91-2596-05	CAP. CERAMIC 82P 5% 50V
C6	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C7	CC45FCH1H010C	CAP. CERAMIC 1P 0.25P 50V
C8	CC45FCH1H040C	CAP. CERAMIC 4P 0.25P 50V
C9	C91-2538-05	CAP. FILM 0.1 10% 63V
C10	CK45FB1H222K	CAP. CERAMIC 2200P 10% 50V
C11	C91-0757-05	CAP. CERAMIC 1000P 10% 50V
C12	C91-2538-05	CAP. FILM 0.1 10% 63V
C13	CK45FF1H103Z	CAP. CERAMIC 0.01 10% 50V
C14	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C15	NO USE	
C16	CE04LW1E100M	CAP. ELECTRO 10 20% 25V
C17	CE04LW1H010M	CAP. ELECTRO 1 20% 50V
C18	CE04LW1H010M	CAP. ELECTRO 1 20% 50V
C19	CF92FV1H682J	CAP. POLYESTER 6800P 5% 50V
C20	CF92FV1H222J	CAP. POLYESTER 2200P 5% 50V
C21	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C22	CE04HW1H010M	CAP. ELECTRO 1 20% 50V
C23	CE04HW1H010M	CAP. ELECTRO 1 20% 50V
C24	NO USE	
C25	CE04LW1E100M	CAP. ELECTRO 10 20% 25V
C26	CE04HW1H2R2M	CAP. ELECTRO 2.2 20% 50V
C27	CE04HW1H2R2M	CAP. ELECTRO 2.2 20% 50V
C28	CE04HW1E220M	CAP. ELECTRO 22 20% 25V
C29	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C30	C91-2538-05	CAP. FILM 0.1 10% 63V
C31	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C32	CE04EW1A101M	CAP. ELECTRO 100 20% 10V
C33	CC45FCH1H020C	CAP. CERAMIC 2P 0.25P 50V
C34	CE04LW1C331M	CAP. ELECTRO 330 20% 16V
C35	CE04LW1C100M	CAP. ELECTRO 10 20% 16V
C36	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C37	CC45FSL1H221J	CAP. CERAMIC 220P 5% 50V
C38	C91-0745-05	CAP. CERAMIC 100P 10% 50V
C39	C91-0745-05	CAP. CERAMIC 100P 10% 50V
C101	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C102	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C103	CF92FV1H332J	CAP. POLYESTER 3300P 5% 50V
C104	C91-2582-05	CAP. POLYESTER 0.47 5% 100V
C105	CC45FCH1H330J	CAP. CERAMIC 33P 5% 50V
C106	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C107	CE04HW1H2R2M	CAP. ELECTRO 2.2 20% 50V
C108	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C109	C91-2538-05	CAP. FILM 0.1 10% 63V
C110	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C111	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C112	CC45FCH1H330J	CAP. CERAMIC 33P 5% 50V
C113	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C114	CE04LW1A220M	CAP. ELECTRO 22 20% 10V
C115	C91-2604-05	CAP. CERAMIC 390P 5% 50V
C116	C91-2598-05	CAP. CERAMIC 120P 5% 50V
C117	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C118	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C119	NO USE	
C120	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C121	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C122	CC45FCH1H390J	CAP. CERAMIC 39P 5% 50V
C123	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C124	C91-2582-05	CAP. POLYESTER 0.47 5% 100V
C125	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C126	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C127	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C128	C91-2538-05	CAP. FILM 0.1 10% 63V
C129	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C132	CC45FCH1H030C	CAP. CERAMIC 3P 0.25P 50V
C133	CE04LW1C470M	CAP. ELECTRO 47 20% 16V
C134	NO USE	
C135	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C136	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C137	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C138	CE04LW1C101M	CAP. ELECTRO 100 20% 16V
C139	CC45FSL1H331J	CAP. CERAMIC 330P 5% 50V
C140	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C141	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C142	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C143	NO USE	
C144	C91-0737-05	CAP. CERAMIC 47P 5% 50V

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION			
C145	CE04LW1C100M	CAP. ELECTRO	10	20%	16V
C146	CC45FSL1H030C	CAP. CERAMIC	3P	0.25P	50V
C150	CE04LW1A470M	CAP. ELECTRO	47	20%	10V
C158	C91-2538-05	CAP. FILM	0.1	10%	63V
C179	CK45FB1H152K	CAP. CERAMIC	1500P	10%	50V
C201	CC45FCH1H070D	CAP. CERAMIC	7P	0.5P	50V
C202	NO USE				
C203	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C206	NO USE				
C207	CK45FB2H472K	CAP. CERAMIC	4700P	10%	500V
C208	CE04EW2E010M	CAP. ELECTRO	1	20%	250V
C209	CC45FCH2H020C	CAP. CERAMIC	2P	0.25P	500V
C210	CK45FB2H472K	CAP. CERAMIC	4700P	10%	500V
C211	CE04EW2E010M	CAP. ELECTRO	1	20%	250V
C212	CE04EW2E010M	CAP. ELECTRO	1	20%	250V
C213	CK45FB2H102K	CAP. CERAMIC	1000P	10%	500V
C214	CK45FB2H102K	CAP. CERAMIC	1000P	10%	500V
C215	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C216	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C217	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C218	CE04EW2E010M	CAP. ELECTRO	1	20%	250V
C219	NO USE				
C220	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C221	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C222	CE04LW1E221M	CAP. ELECTRO	220	20%	25V
C223	CE04LW1H101M	CAP. ELECTRO	100	20%	50V
C224	CK45FB1H472K	CAP. CERAMIC	4700P	10%	50V
C227	CC45FCH2H101J	CAP. CERAMIC	100P	5%	500V
C228	CK45FB1H222K	CAP. CERAMIC	2200P	10%	50V
C229	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C230	CK45E3D102P	CAP. CERAMIC	1000P		2KV
C231	C91-2581-05	CAP. CERAMIC	0.01	5%	2KV
C232	CE04EW2E010M	CAP. ELECTRO	1	20%	250V
C233	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C234	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C271	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C301	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C302	CC45FSL1H331J	CAP. CERAMIC	330P	5%	50V
C306	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C307	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C308	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C309	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C310	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C311	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C312	C91-2538-05	CAP. FILM	0.1	10%	63V
C313	NO USE				
C314	CK45FB2H152K	CAP. CERAMIC	1500P	10%	500V
C315	NO USE				
C316	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C317	NO USE				
C318	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C319	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C320	NO USE				
C321	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C322	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C323	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C324	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C325	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C359	C91-2538-05	CAP. FILM	0.1	10%	63V
C401	CE04EW2E470M	CAP. ELECTRO	47	20%	250V
C402	CE04EW2E100M	CAP. ELECTRO	10	20%	250V
C403	CE04LW1E220M	CAP. ELECTRO	22	20%	25V
C404	CE04EW2A471M	CAP. ELECTRO	470	20%	100V
C405	CE04LW2A220M	CAP. ELECTRO	22	20%	100V
C406	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C407	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C408	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C409	CE04EW1A103M	CAP. ELECTRO	1000	20%	10V
C410	CE04LW0J471M	CAP. ELECTRO	470	20%	6.3V
C411	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C412	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C413	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C414	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C415	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C416	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C417	C91-0761-05	CAP. CERAMIC	2200P	20%	50V
C418	C91-0757-05	CAP. CERAMIC	1000P	10%	50V
C501	CK45FB1H152K	CAP. CERAMIC	1500P	10%	50V
C504	CE04HW1A470M	CAP. ELECTRO	47	20%	10V
C505	CE04HW1A221M	CAP. ELECTRO	220	20%	10V
C801	C91-1229-05	CAP. CERAMIC	3.3P	10%	50V
C802	C91-1230-05	CAP. CERAMIC	3.9P	10%	50V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C901	C91-2538-05	CAP. FILM	0.1	10%	63V
C902	C91-2538-05	CAP. FILM	0.1	10%	63V
CN7	E40-7519-05	PIN CONNECTOR			4P
CN20	E40-3299-05	PIN CONNECTOR			2P
CN506	E40-7515-05	PIN CONNECTOR			3P
CN507	NO USE				
CN508	E40-7040-05	PIN CONNECTOR			13P
CN509	NO USE				
CN510	E40-5069-05	PIN CONNECTOR			12P
CN515	E40-7518-05	PIN CONNECTOR			6P
CN516	E40-5067-05	PIN CONNECTOR			10P
CN517	E40-3306-05	PIN CONNECTOR			9P
CN527	E40-5069-05	PIN CONNECTOR			12P
CP1	R90-0660-05	RES. NETWORK			4X1K
D1	MA700	DIODE			
D2	MA700	DIODE			
D3	MA700	DIODE			
D4	MA700	DIODE			
D5	MA700	DIODE			
D6	1SS132	DIODE			
D7	1SS132	DIODE			
D8	1SS132	DIODE			
D9	1SS132	DIODE			
D10	1SS132	DIODE			
D11	1SS132	DIODE			
D12	MA700	DIODE			
D13	1SS132	DIODE			
D14	1SS132	DIODE			
D15	MA700	DIODE			
D16	1SS132	DIODE			
D17	1SS132	DIODE			
D18	1SS132	DIODE			
D19	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D109	MA700	DIODE			
D110	1SS132	DIODE			
D111	1SS132	DIODE			
D112	1SS132	DIODE			
D113	1SS132	DIODE			
D114	MA700	DIODE			
D115	1SS132	DIODE			
D116	1SS132	DIODE			
D117	1SS132	DIODE			
D118	1SS132	DIODE			
D119	1SS132	DIODE			
D120	1SS132	DIODE			
D121	1SS132	DIODE			
D122	1SS132	DIODE			
D123	1SS132	DIODE			
D124	1SS132	DIODE			
D125	1SS132	DIODE			
D126	1SS132	DIODE			
D127	1SS132	DIODE			
D128	1SS132	DIODE			
D129	1SS132	DIODE			
D130	MA700	DIODE			
D131	1SS132	DIODE			
D132	MA700	DIODE			
D133	MA700	DIODE			
D150	MA700	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS83	DIODE			
D204	1SS83	DIODE			
D205	1SS83	DIODE			
D206	1SS83	DIODE			
D207	1SS83	DIODE			
D208	1SS83	DIODE			
D209	1SS83	DIODE			
D210	1SS83	DIODE			
D211	1SS132	DIODE			
D212	1SS132	DIODE			
D213	1SS132	DIODE			
D220	1SS132	DIODE			
D221	1SS132	DIODE			
D301	MA700	DIODE			
D302	1SS132	DIODE			

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION	REF. NO	PARTS NO	NAME & DESCRIPTION
D303	MTZ3.0JA	DIODE,ZENER	Q108	2SC1923(O)	TR. SI, NPN
D304	1SS132	DIODE	Q109	2SC3381(GR)	TR. SI, NPN
D305	1SS132	DIODE	Q110	2SA1459(K)	TR. SI, PNP
D306	MA700	DIODE	Q111	2SA933S(R,S)	TR. SI, PNP
D307	MA700	DIODE	Q112	2SA933S(R,S)	TR. SI, PNP
D308	TLR112	LED,RED	Q113	2SA1005(K)	TR. SI, PNP
D309	TLR112	LED,RED	Q114	2SA1005(K)	TR. SI, PNP
D310	1SS132	DIODE	Q115	2SA1005(K)	TR. SI, PNP
D311	NO USE		Q116	2SA1005(K)	TR. SI, PNP
D312	MTZ5.1JB	DIODE,ZENER	Q117	2SC1923(O)	TR. SI, NPN
D313	1SS132	DIODE	Q118	2SC1923(O)	TR. SI, NPN
D314	NO USE		Q119	2SA933S(R,S)	TR. SI, PNP
D315	1SS132	DIODE	Q120	2SA1459(K)	TR. SI, PNP
D316	MTZ3.0JA	DIODE,ZENER	Q121	2SC1923(O)	TR. SI, NPN
D401	S1VB60	DIODE,BRIDGE	Q122	2SC1740S(R,S)	TR. SI, NPN
D402	S1VB60	DIODE,BRIDGE	Q123	2SC1740S(R,S)	TR. SI, NPN
D403	S4VB20F	DIODE,BRIDGE	Q124	2SC1740S(R,S)	TR. SI, NPN
D404	NO USE		Q125	2SC1740S(R,S)	TR. SI, NPN
D405	1SS132	DIODE	Q126	2SC1740S(R,S)	TR. SI, NPN
D406	1SS132	DIODE	Q127	2SA1005(K)	TR. SI, PNP
D407	MTZ13JC	DIODE,ZENER	Q130	2SA933S(R,S)	TR. SI, PNP
D408	MTZ13JC	DIODE,ZENER	Q151	2SA1459(K)	TR. SI, PNP
D409	MTZ7.5JA	DIODE,ZENER	Q152	2SA1459(K)	TR. SI, PNP
F201	F53-0107-05	THERMAL FUSE	Q158	2SA1459(K)	TR. SI, PNP
IC1	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX	Q162	2SA933S(R,S)	TR. SI, PNP
IC2	NJM072BD	IC,JFET INPUT OP AMP	Q201	2SA933S(R,S)	TR. SI, PNP
IC3	MC10102L	IC,QUAD 2-INPUT NOR GATE	Q202	2SA933S(R,S)	TR. SI, PNP
IC4	KMS01	IC,LINEAR	Q203	2SC1923(O)	TR. SI, NPN
IC101	MC10131L	IC,DUAL D-FLIP FLOP	Q204	2SC1740S(R,S)	TR. SI, NPN
IC102	KMD05	IC,LINEAR	Q205	2SA933S(R,S)	TR. SI, PNP
IC103	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)	Q206	2SC2910(S)	TR. SI, NPN
IC104	KMS01	IC,LINEAR	Q207	2SA1208(S)	TR. SI, PNP
IC105	KMD05	IC,LINEAR	Q208	2SC2910(S)	TR. SI, NPN
IC106	SN74ALS02N	IC,QUAD 2 INPUT NOR	Q209	2SA1208(S)	TR. SI, PNP
IC107	KMS01	IC,LINEAR	Q210	2SC2551(O)	TR. SI, NPN
IC108	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)	Q211	2SC2551(O)	TR. SI, NPN
IC109	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX	Q212	2SA933S(R,S)	TR. SI, PNP
IC201	NJM4558D	IC,DUAL OP-AMP	Q213	2SD613(E)	TR. SI, NPN
IC301	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX	Q220	2SA1005(K)	TR. SI, PNP
IC302	KMG01	IC,LINEAR	Q221	2SA1005(K)	TR. SI, PNP
IC401	KMA02	IC,LINEAR	Q301	2SC1740S(R,S)	TR. SI, NPN
K301	S76-0627-05	RELAY	Q302	2SC1740S(R,S)	TR. SI, NPN
L101	L79-0553-05	NOISE FILTER	Q303	2SC1740S(R,S)	TR. SI, NPN
L201	L33-0842-05	FERRI INDUCTOR 150MH	Q304	2SC1740S(R,S)	TR. SI, NPN
L202	L40-1011-50	FERRI INDUCTOR 100UH	Q305	2SA933S(R,S)	TR. SI, PNP
L203	L40-1011-50	FERRI INDUCTOR 100UH	Q306	2SA1005(K)	TR. SI, PNP
L204	L40-3925-51	FERRI INDUCTOR 3900UH	Q307	2SA1005(K)	TR. SI, PNP
NL201	NE-38B	NEON LAMP	Q308	2SC1740S(R,S)	TR. SI, NPN
NL202	NE-38B	NEON LAMP	Q309	2SC1740S(R,S)	TR. SI, NPN
NL203	NE-38B	NEON LAMP	Q310	2SA933S(R,S)	TR. SI, PNP
NL204	NE-38B	NEON LAMP	Q311	2SA933S(R,S)	TR. SI, PNP
Q3	2SC1740S(R,S)	TR. SI, NPN	Q312	2SC1740S(R,S)	TR. SI, NPN
Q4	2SC1923(O)	TR. SI, NPN	Q313	2SC1740S(R,S)	TR. SI, NPN
Q5	2SC1923(O)	TR. SI, NPN	Q314	2SC1907	TR. SI, NPN
Q6	2SC3779(D)	TR. SI, NPN	Q315	2SC1907	TR. SI, NPN
Q7	2SC3779(D)	TR. SI, NPN	Q316	2SA1459(K)	TR. SI, PNP
Q8	NO USE		Q317	2SA1459(K)	TR. SI, PNP
Q9	2SA1459(K)	TR. SI, PNP	Q318	2SC1907	TR. SI, NPN
Q10	2SC1740S(R,S)	TR. SI, NPN	Q319	2SC1907	TR. SI, NPN
Q11	2SC1740S(R,S)	TR. SI, NPN	Q320	2SC4732(E)	TR. SI, NPN
Q12	2SA1005(K)	TR. SI, PNP	Q321	2SC4732(E)	TR. SI, NPN
Q13	2SC1740S(R,S)	TR. SI, NPN	Q322	2SA1828(E)	TR. SI, PNP
Q14	2SC1740S(R,S)	TR. SI, NPN	Q323	2SA1828(E)	TR. SI, PNP
Q15	2SA1005(K)	TR. SI, PNP	Q324	2SA933S(R,S)	TR. SI, PNP
Q16	2SA1005(K)	TR. SI, PNP	Q401	2SA1499(O,P)	TR. SI, PNP
Q17	2SA933S(R,S)	TR. SI, PNP	Q402	2SC2551(O)	TR. SI, NPN
Q18	2SA933S(R,S)	TR. SI, PNP	Q403	2SA1304	TR. SI, PNP
Q19	2SC1740S(R,S)	TR. SI, NPN	Q404	2SC2551(O)	TR. SI, NPN
Q20	2SA933S(R,S)	TR. SI, PNP	Q405	2SB1015(Y)	TR. SI, PNP
Q21	2SC1907	TR. SI, NPN	Q406	2SD1406(Y)	TR. SI, NPN
Q28	2SA1459(K)	TR. SI, PNP	Q501	2SA933S(R,S)	TR. SI, PNP
Q29	NO USE		R1	RD14BB2C220J	RES. CARBON 22 5% 1/6W
Q30	2SC1740S(R,S)	TR. SI, NPN	R2	RD14BB2C101J	RES. CARBON 100 5% 1/6W
Q31	2SC1740S(R,S)	TR. SI, NPN	R3	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
Q32	2SC1740S(R,S)	TR. SI, NPN	R4	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
Q101	2SK170(V)	FET, N-CHANNEL	R5	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
Q102	2SC1923(O)	TR. SI, NPN	R6	RD14BB2C822J	RES. CARBON 8.2K 5% 1/6W
Q103	2SA933S(R,S)	TR. SI, PNP	R7	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
Q104	2SC1740S(R,S)	TR. SI, NPN	R8	RD14BB2C181J	RES. CARBON 180 5% 1/6W
Q105	2SC1740S(R,S)	TR. SI, NPN	R9	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
Q106	2SC1740S(R,S)	TR. SI, NPN	R10	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
Q107	2SK170(V)	FET, N-CHANNEL	R11	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
			R12	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
			R13	RD14BB2C101J	RES. CARBON 100 5% 1/6W
			R14	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
			R15	RD14BB2C220J	RES. CARBON 22 5% 1/6W
			R16	RD14BB2C751J	RES. CARBON 750 5% 1/6W
			R17	RD14BB2C821J	RES. CARBON 820 5% 1/6W

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION			
R18	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R19	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R20	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R21	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R22	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R23	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R24	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R25	RD14BB2C512J	RES. CARBON	5.1K	5%	1/6W
R26	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R27	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R28	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R29	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R30	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R31	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R32	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R33	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R34	NO USE				
R35	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R36	NO USE				
R37	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R38	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R39	NO USE				
R40	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R41	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R42	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R43	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R44	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R45	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R46	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R47	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R48	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R49	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R50	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R51	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R52	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R53	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R54	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R55	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R56	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R57	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R58	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R59	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R60	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R61	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R62	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R63	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R64	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R65	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R66	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R67	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R68	NO USE				
R69	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R70	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R71	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R72	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R73	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R74	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R75	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R76	NO USE				
R77	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R78	NO USE				
R79	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R80	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R81	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R82	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R83	RD14BB2E223J	RES. CARBON	22K	5%	1/4W
R84	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R85	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R86	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R87	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R88	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R89	NO USE				
R90	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R91	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R92	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R93	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R94	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R95	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R96	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R101	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R102	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R103	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R104	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R105	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R106	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R107	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R108	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R111	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R112	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R113	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R114	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R115	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R116	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R117	RD14BB2C473J	RES. CARBON	47K	5%	1/6W

REF. NO	PARTS NO	NAME & DESCRIPTION			
R118	RD14BB2C162J	RES. CARBON	1.6K	5%	1/6W
R119	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R120	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R121	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R122	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R123	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R124	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R125	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R126	RD14BB2C120J	RES. CARBON	12	5%	1/6W
R127	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R128	RD14BB2E471J	RES. CARBON	470	5%	1/4W
R129	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R130	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R131	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R132	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R133	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R134	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R135	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R136	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R137	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R138	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R139	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R140	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R141	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R142	NO USE				
R143	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R144	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R145	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R146	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R147	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R148	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R149	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R150	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R151	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R152	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R153	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R154	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R155	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R156	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R157	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R158	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R159	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R160	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R161	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R162	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R163	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R164	RD14BB2C111J	RES. CARBON	110	5%	1/6W
R165	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R166	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R167	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R168	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R169	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R170	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R171	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R172	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R173	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R174	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R175	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R176	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R177	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R178	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R179	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R180	NO USE				
R181	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R182	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R183	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R184	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R185	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R186	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R187	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R188	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R189	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R190	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R191	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R192	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R193	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R194	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R195	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R196	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R197	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R198	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R199	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R202	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R203	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R204	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R205	NO USE				
R206	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R207	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R208	RD14BB2C512J	RES. CARBON	5.1K	5%	1/6W
R209	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R210	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R214	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R215	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R216	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R217	NO USE				
R218	RD14BB2C103J	RES. CARBON	10K	5%	1/6W

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
R219	RD14BB2C134J	RES. CARBON 130K 5% 1/6W
R220	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R221	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R222	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R223	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R224	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R225	RD14BB2C134J	RES. CARBON 130K 5% 1/6W
R226	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R227	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R228	RD14BB2C753J	RES. CARBON 75K 5% 1/6W
R229	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R230	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R231	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R232	RD14BB2C134J	RES. CARBON 130K 5% 1/6W
R233	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R234	RD14BB2C474J	RES. CARBON 470K 5% 1/6W
R235	RD14BB2C474J	RES. CARBON 470K 5% 1/6W
R236	R92-1563-05	RES. METAL FILM 10N 5% 1/4W
R237	R92-1563-05	RES. METAL FILM 10N 5% 1/4W
R238	R92-1562-05	RES. METAL FILM 8.2M 5% 1/4W
R239	R92-1561-05	RES. METAL FILM 3.9M 5% 1/4W
R240	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R241	RD14BB2C474J	RES. CARBON 470K 5% 1/6W
R242	RD14BB2C683J	RES. CARBON 68K 5% 1/6W
R243	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R244	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R245	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R246	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R247	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R248	RN14BK2C1203F	RES. METAL FILM 120K 1% 1/6W
R249	R92-1564-05	RES. METAL FILM 15M 1% 1/2W
R250	RD14BB2C124J	RES. CARBON 120K 5% 1/6W
R251	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R252	RD14BB2C392J	RES. CARBON 3.9K 5% 1/6W
R253	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R254	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R255	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R256	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R257	RD14BB2C151J	RES. CARBON 150 5% 1/6W
R258	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R259	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R260	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R261	RN14BK2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R262	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R263	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R264	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
R265	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R266	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R267	RD14BB2C224J	RES. CARBON 220K 5% 1/6W
R268	RD14BB2C433J	RES. CARBON 43K 5% 1/6W
R269	R92-1573-05	RES. LINEAR PCT 2.7K
R270	RD14BB2C681J	RES. CARBON 680 5% 1/6W
R271	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R272	RD14BB2C151J	RES. CARBON 150 5% 1/6W
R273	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R274	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R275	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R280	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R281	RD14BB2C622J	RES. CARBON 6.2K 5% 1/6W
R282	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R283	RD14BB2C471J	RES. CARBON 470 5% 1/6W
R300	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R301	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R302	RD14BB2C821J	RES. CARBON 820 5% 1/6W
R303	RD14BB2C821J	RES. CARBON 820 5% 1/6W
R304	RD14BB2C122J	RES. CARBON 1.2K 5% 1/6W
R305	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R306	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R307	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R308	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R309	RD14BB2C242J	RES. CARBON 2.4K 5% 1/6W
R310	RD14BB2C242J	RES. CARBON 2.4K 5% 1/6W
R311	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R312	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R313	RD14BB2C182J	RES. CARBON 1.8K 5% 1/6W
R314	RD14BB2C432J	RES. CARBON 4.3K 5% 1/6W
R315	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R316	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R317	RD14BB2C682J	RES. CARBON 6.8K 5% 1/6W
R318	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R319	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R320	RD14BB2C682J	RES. CARBON 6.8K 5% 1/6W
R321	RD14BB2C183J	RES. CARBON 18K 5% 1/6W
R322	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R323	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R324	RD14BB2C242J	RES. CARBON 2.4K 5% 1/6W
R325	RD14BB2C912J	RES. CARBON 0.1K 5% 1/6W
R326	RD14BB2C301J	RES. CARBON 300 5% 1/6W
R327	RD14BB2C391J	RES. CARBON 390 5% 1/6W
R328	RD14BB2C391J	RES. CARBON 390 5% 1/6W
R329	RD14BB2C390J	RES. CARBON 39 5% 1/6W
R330	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R331	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R332	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R333	RD14BB2C432J	RES. CARBON 4.3K 5% 1/6W
R334	RD14BB2C432J	RES. CARBON 4.3K 5% 1/6W

REF. NO	PARTS NO	NAME & DESCRIPTION
R335	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R336	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R337	RD14BB2C241J	RES. CARBON 240 5% 1/6W
R338	RD14BB2C241J	RES. CARBON 240 5% 1/6W
R339	NO USE	
R340	RN14BK2C8200F	RES. METAL FILM 820 1% 1/6W
R341	RN14BK2C8200F	RES. METAL FILM 820 1% 1/6W
R342	RD14BB2C912J	RES. CARBON 9.1K 5% 1/6W
R343	RD14BB2C332J	RES. CARBON 3.3K 5% 1/6W
R344	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R345	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R346	RD14BB2C561J	RES. CARBON 560 5% 1/6W
R347	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R348	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R349	R92-1552-05	RES. LINEAR PCT 180
R350	RD14BB2C163J	RES. CARBON 16K 5% 1/6W
R351	NO USE	
R352	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R353	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R354	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R355	RD14BB2C391J	RES. CARBON 390 5% 1/6W
R356	NO USE	
R357	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R358	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R359	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R360	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R361	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R362	RD14BB2C122J	RES. CARBON 1.2K 5% 1/6W
R363	RD14BB2C122J	RES. CARBON 1.2K 5% 1/6W
R364	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
R365	RN14BK2C6201F	RES. METAL FILM 6.2K 1% 1/6W
R366	R92-1560-05	RES. LINEAR PCT 2K
R367	RD14BB2C393J	RES. CARBON 39K 5% 1/6W
R368	RD14BB2C622J	RES. CARBON 6.2K 5% 1/6W
R369	RD14BB2C394J	RES. CARBON 390K 5% 1/6W
R370	R92-1199-05	RES. LINEAR PCT 3K
R371	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R372	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R373	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R374	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R375	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R376	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R377	R92-1558-05	RES. METAL FILM 39K 5% 1W
R378	R92-1558-05	RES. METAL FILM 39K 5% 1W
R381	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R382	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R383	RD14BB2C751J	RES. CARBON 750 5% 1/6W
R384	RD14BB2C751J	RES. CARBON 750 5% 1/6W
R385	RN14BK2C6801F	RES. METAL FILM 6.8K 1% 1/6W
R386	RN14BK2C1303F	RES. METAL FILM 130K 1% 1/6W
R387	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R388	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R389	NO USE	
R390	RD14BB2C913J	RES. CARBON 91K 5% 1/6W
R391	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R392	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R393	NO USE	
R394	R92-1559-05	RES. METAL FILM 47K 5% 1W
R395	R92-1559-05	RES. METAL FILM 47K 5% 1W
R396	RD14BB2C431J	RES. CARBON 430 5% 1/6W
R397	RN14BK2C1501F	RES. METAL FILM 1.5K 1% 1/6W
R398	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R399	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R400	NO USE	
R401	R92-1557-05	RES. METAL FILM 6.8K 5% 2W
R402	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R403	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R404	R92-1556-05	RES. METAL FILM 1K 5% 2W
R405	R92-1556-05	RES. METAL FILM 1K 5% 2W
R406	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R407	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R408	R92-1555-05	RES. METAL FILM 56 5% 2W
R409	R92-1555-05	RES. METAL FILM 56 5% 2W
R410	R92-1555-05	RES. METAL FILM 56 5% 2W
R411	R92-1555-05	RES. METAL FILM 56 5% 2W
R412	R92-1555-05	RES. METAL FILM 56 5% 2W
R413	R92-1555-05	RES. METAL FILM 56 5% 2W
R414	NO USE	
R415	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R416	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R417	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R501	RN14BK2C1501F	RES. METAL FILM 1.5K 1% 1/6W
R502	RN14BK2C4701F	RES. METAL FILM 4.7K 1% 1/6W
R503	RD14BB2C821J	RES. CARBON 820 5% 1/6W
R504	RD14BB2C563J	RES. CARBON 56K 5% 1/6W
R505	RD14BB2C753J	RES. CARBON 75K 5% 1/6W
TC101	C05-0470-05	CAP. TRIMMER 20P
TC102	C05-0470-05	CAP. TRIMMER 20P
TC303	C05-0490-05	CAP. TRIMMER 20P
TH301	112-103-2FM	THERMISTOR
VR1	R12-3597-05	RES. SEMI FIXED 47K
VR2	R12-0680-05	RES. SEMI FIXED 47K

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
VR102	R12-0694-05	RES. SEMI FIXED 4.7K
VR103	R12-0680-05	RES. SEMI FIXED 47K
VR104	R12-1860-05	RES. SEMI FIXED 1K
VR201	R12-5545-05	RES. SEMI FIXED 2.2MB
VR202	R12-5565-05	RES. SEMI FIXED 100KB
VR301	R12-0680-05	RES. SEMI FIXED 47K
VR302	R12-0882-05	RES. SEMI FIXED 100 B
VR303	R12-0678-05	RES. SEMI FIXED 10KB
VR304	R12-0694-05	RES. SEMI FIXED 4.7KB
VR305	R12-6501-05	RES. SEMI FIXED 470KB
VR306	R12-3042-05	RES. SEMI FIXED 47KB
VR307	R12-0680-05	RES. SEMI FIXED 47K
VR308	R12-0890-05	RES. SEMI FIXED 470 B
VR309	R12-0883-05	RES. SEMI FIXED 220 B
W1	E38-1005-05	WIRE ASS'Y;3P
W2	E38-1177-05	WIRE ASS'Y
W3	E38-1259-05	WIRE ASS'Y;1P
W14	E38-1317-05	WIRE ASS'Y;9P
W18	E38-0990-05	WIRE ASS'Y;6P
W19	E38-1176-05	WIRE ASS'Y;2P
W509	E38-1256-05	WIRE ASS'Y;7P
W510	NO USE	
W511	E38-1206-05	WIRE ASS'Y;6P
W528	E38-1172-05	WIRE ASS'Y;7P

DCS-7020 DSP UNIT

X79-1300-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	F15-0744-05	BLIND PLATE
	J73-0394-02	PCB (UNMOUNTED)
BA1	W09-2381-05	BATTERY
C1	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C2	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C3	C91-2538-05	CAP. FILM 0.1 10% 63V
C4	C91-2538-05	CAP. FILM 0.1 10% 63V
C5	CK45B1H102KTA	CAP. CERAMIC 1000P 10% 50V
C6	CK45B1H102KTA	CAP. CERAMIC 1000P 10% 50V
C7	C91-2538-05	CAP. FILM 0.1 10% 63V
C8	C91-2538-05	CAP. FILM 0.1 10% 63V
C9	CC45FCH1H040C	CAP. CERAMIC 4P 0.25P 50V
C10	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C11	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C12	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C13	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C14	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C15	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C16	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C17	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C18	CC45CH1H220JTA	CAP. CERAMIC 22P 5% 50V
C19	CC45CH1H220JTA	CAP. CERAMIC 22P 5% 50V
C20	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C21	CC45FSL1H471J	CAP. CERAMIC 470P 5% 50V
C22	NO USE	
C23	CE04LW1A221M	CAP. ELECTRO 220 20% 10V
C24	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C25	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C26	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C27	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C28	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C29	CE04LW1A221M	CAP. ELECTRO 220 20% 10V
C30	CE04LW1C221M	CAP. ELECTRO 220 20% 16V
C31	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C32	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C33	C91-2538-05	CAP. FILM 0.1 10% 63V
C34	C91-2538-05	CAP. FILM 0.1 10% 63V
C35	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C36	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C37	C91-2538-05	CAP. FILM 0.1 10% 63V
C38	C91-2538-05	CAP. FILM 0.1 10% 63V
C39	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C40	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C41	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C42	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C43	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C44	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C45	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C46	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C47	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C48	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C49	CK45B1H102KTA	CAP. CERAMIC 1000P 10% 50V
C50	C91-0769-05	CAP. CERAMIC 0.01 20% 16V

REF. NO	PARTS NO	NAME & DESCRIPTION
C77	C91-2538-05	CAP. FILM 0.1 10% 63V
C78	CC45FCH1H181J	CAP. CERAMIC 180P 5% 50V
C79	NO USE	
C80	CC45FSL1H391J	CAP. CERAMIC 390P 5% 50V
C81	CC45FCH1H271J	CAP. CERAMIC 270P 5% 50V
C82	CC45FCH1H220J	CAP. CERAMIC 22P 5% 50V
C83	NO USE	
C84	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C85	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C86	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C87	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C88	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C89	CC45FSL1H471J	CAP. CERAMIC 470P 5% 50V
C101	CC45FCH1H151J	CAP. CERAMIC 150P 5% 50V
C102	NO USE	
C103	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C104	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C105	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C106	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C107	NO USE	
C108	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C109	CE04LW1C221M	CAP. ELECTRO 220 20% 16V
C110	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C111	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C112	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C115	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C124	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C125	CC45FCH1H150J	CAP. CERAMIC 15P 5% 50V
C126	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C127	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C128	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C201	CC45FCH1H151J	CAP. CERAMIC 150P 5% 50V
C202	NO USE	
C203	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C204	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C205	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C206	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C207	NO USE	
C208	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C209	CE04LW1C221M	CAP. ELECTRO 220 20% 16V
C210	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C211	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C212	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C215	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C224	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C225	CC45FCH1H150J	CAP. CERAMIC 15P 5% 50V
C226	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C227	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C228	CE04LW1A101M	CAP. ELECTRO 100 20% 10V
C301	CC45FCH1H220J	CAP. CERAMIC 22P 5% 50V
C302	CC45FCH1H050C	CAP. CERAMIC 5P 0.25P 50V
C303	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C304	CC45FCH1H050C	CAP. CERAMIC 5P 0.25P 50V
C305	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C306	CC45FCH1H050C	CAP. CERAMIC 5P 0.25P 50V
C307	CE04LW1A471M	CAP. ELECTRO 470 20% 10V
C801	CF92V1H102J	CAP. POLYESTER 1000P 5% 50V
CN502	E40-7515-05	PIN CONNECTOR 3P
CN523	E40-7532-05	PIN CONNECTOR 23P
CN524	E40-7520-05	PIN CONNECTOR 30P
CN525	E40-3243-05	PIN CONNECTOR 8P
CN526	NO USE	
CN527	E40-5069-05	PIN CONNECTOR 12P
CN528	E40-3242-05	PIN CONNECTOR 7P
CN531	E40-7519-05	PIN CONNECTOR 4P
CN532	E40-7519-05	PIN CONNECTOR 4P
D1	MA700	DIODE
D2	MA700	DIODE
D3	1SS132	DIODE
D4	1SS132	DIODE
D39	1SS132	DIODE
D100	MA700	DIODE
D200	MA700	DIODE
D301	MA700	DIODE
IC1	PST7045	IC, RESET
IC2	MB88101APFV-GB	IC, 4-CH 12-BIT A/D CONVERTER
IC3	NO USE	
IC4	HD14066BFP	IC, QUAD BILATERAL SWITCH
IC5	T93-0893-05	PROGRAM ROM

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION	REF. NO	PARTS NO	NAME & DESCRIPTION
IC6	T93-0894-05	PROGRAM ROM	R20	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W
IC7	HD74LS32FP	IC, QUAD 2-INPUT OR GATE	R21	RN14BK2C1201F	RES. METAL FILM 1.2K 1% 1/6W
IC8	HD74LS32FP	IC, QUAD 2-INPUT OR GATE	R22	RN14BK2C2001F	RES. METAL FILM 2K 1% 1/6W
IC9	HD74LS74FP	IC, DUAL D-F.F. (WITH PR&CLR)	R23	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W
IC10	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R24	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W
IC11	HD74HC86FP	IC, QUAD EXCLUSIVE OR GATE	R25	RD14BB2C330J	RES. CARBON 33 5% 1/6W
IC12	HD74HC08FP	IC, QUAD 2-INPUT AND GATE	R26	RN14BK2C1201F	RES. METAL FILM 1.2K 1% 1/6W
IC13	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER	R27	RD14BB2C330J	RES. CARBON 33 5% 1/6W
IC14	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER	R28	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
IC15	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R29	RN14BK2C1001F	RES. METAL FILM 1K 1% 1/6W
IC16	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER	R30	RN14BK2C1501F	RES. METAL FILM 1.5K 1% 1/6W
IC17	CTM5290	IC, GATE ARRAY	R31	RN14BK2C3001F	RES. METAL FILM 3K 1% 1/6W
IC18	HD64610FP	IC, CALENDER CLOCK	R32	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC19	G2256BLFP7SL	IC, SRAM 256K	R33	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC20	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R34	RD14BB2C134J	RES. CARBON 130K 5% 1/6W
IC21	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R35	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC22	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R36	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC23	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R37	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC24	G2256BLFP7SL	IC, SRAM 256K	R38	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
IC25	G2256BLFP7SL	IC, SRAM 256K	R39	RD14BB2C474J	RES. CARBON 470K 5% 1/6W
IC26	HD6433040A00F	IC, 16-BIT MICROPROCESSOR	R40	RD14BB2C752J	RES. CARBON 7.5K 5% 1/6W
IC27	HD74HC245FP	IC, OCTAL BUS TRANSCEIVERS	R41	RD14BB2C220J	RES. CARBON 22 5% 1/6W
IC28	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R42	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
IC29	HD74HC244FP	IC, OCTAL BUS BUFFER	R43	RD14BB2C681J	RES. CARBON 680 5% 1/6W
IC30	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R44	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC31	HD74LS374FP	IC, OCTAL 3-STATE D-FF	R45	NO USE	
IC32	DAC0808LCM	IC, 8-BIT D/A CONVERTER	R46	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC33	HA17012PB	IC, 12-BIT D/A CONVERTER	R47	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC34	HA17012PB	IC, 12-BIT D/A CONVERTER	R48	NO USE	
IC35	UPC814C	IC, JFET INPUT OP-AMP	R49	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC36	NJM072BD	IC, JFET INPUT OP AMP	R50	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC37	SN74AS74NS	IC, DUAL D-F.F. (WITH PR & CLR)	R51	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC38	SN74AS151NS	IC, 8 TO 1 DATA SELECTOR/MPX	R52	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC39	HD74HC123FP	IC, DUAL MONOSTABLE MULTIB.	R53	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC40	SN74AS153NS	IC, 4 TO 1 DATA SELECTOR/MPX	R54	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC41	HB86001PF-GBND	IC, PLL FREQUENCY SYNTHESIZER	R55	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC42	SN74F161ANS	IC, SYNC. 4-BIT BINARY COUNTER	R56	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC43	SN74AS00NS	IC, 2-INPUT NAND GATE	R57	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC44	SN74AS74NS	IC, DUAL D-F.F. (WITH PR & CLR)	R58	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC45	CTM5300	IC, GATE ARRAY	R59	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC46	HD74LS374FP	IC, OCTAL 3-STATE D-FF	R60	RD14BB2C471J	RES. CARBON 470 5% 1/6W
IC47	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER	R61	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC100	AN8122FAP	IC, 8-BIT A/D CONVERTER	R62	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC101	NO USE		R63	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC102	DTM6010	IC, GATE ARRAY	R64	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
IC103	HM63021FP-34	IC, CMOS STATIC RAM	R65	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
IC104	HM63021FP-34	IC, CMOS STATIC RAM	R66	RD14BB2C512J	RES. CARBON 5.1K 5% 1/6W
IC200	AN8122FAP	IC, 8-BIT A/D CONVERTER	R67	RD14BB2C512J	RES. CARBON 5.1K 5% 1/6W
IC201	NO USE		R68	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC202	DTM6010	IC, GATE ARRAY	R73	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC203	HM63021FP-34	IC, CMOS STATIC RAM	R74	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC204	HM63021FP-34	IC, CMOS STATIC RAM	R75	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L3	L79-0553-05	FILTER	R76	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L4	L79-0553-05	FILTER	R77	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L5	L40-2281-17	FERRI INDUCTOR 0.22UH	R78	RD14BB2C273J	RES. CARBON 27K 5% 1/6W
L6	NO USE		R79	RD14BB2C390J	RES. CARBON 39 5% 1/6W
L7	L79-0553-05	FILTER	R100	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
L301	L40-2281-17	FERRI INDUCTOR 0.22UH	R103	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L302	L79-0553-05	FILTER	R104	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L303	L79-0553-05	FILTER	R105	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
Q1	2SC4049	TR. SI, NPN	R106	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
Q2	2SA933S(R,S)	TR. SI, PNP	R107	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
Q101	2SC1923(0)	TR. SI, NPN	R108	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
Q102	2SC1923(0)	TR. SI, NPN	R109	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
Q103	2SC1740S(R,S)	TR. SI, NPN	R110	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
Q201	2SC1923(0)	TR. SI, NPN	R111	RD14BB2C271J	RES. CARBON 270 5% 1/6W
Q202	2SC1923(0)	TR. SI, NPN	R112	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
Q203	2SC1740S(R,S)	TR. SI, NPN	R113	NO USE	
Q301	2SC3354(S)	TR. SI, NPN	R114	RD14BB2C220J	RES. CARBON 22 5% 1/6W
Q302	2SC3354(S)	TR. SI, NPN	R115	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R1	RD14BB2C103J	RES. CARBON 10K 5% 1/6W	R116	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R2	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R119	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R3	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R120	RD14BB2C510J	RES. CARBON 51 5% 1/6W
R4	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R203	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R5	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R204	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R6	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R205	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
R7	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R206	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
R8	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R207	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
R9	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R208	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
R10	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R209	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R11	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R210	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R12	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R211	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R13	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R212	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R14	RD14BB2C473J	RES. CARBON 47K 5% 1/6W	R213	NO USE	
R15	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R214	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R16	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R215	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R17	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R216	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R18	RN14BK2C1001F	RES. METAL FILM 1K 1% 1/6W	R219	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R19	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W	R220	RD14BB2C510J	RES. CARBON 51 5% 1/6W
			R301	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
			R302	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION			
R303	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R304		NO USE			
R305	RN14BK2C3602F	RES. METAL FILM	36K	1%	1/6W
R306	RN14BK2C7501F	RES. METAL FILM	7.5K	1%	1/6W
R307	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R801	R92-0150-05	JUMPING RES.	ZERO OHM(10MM)		
R802	R92-0150-05	JUMPING RES.	ZERO OHM(10MM)		
VR101	R12-0889-05	RES. SEMI FIXED	220 B		
VR102	R12-0889-05	RES. SEMI FIXED	220 B		
VR201	R12-0889-05	RES. SEMI FIXED	220 B		
VR202	R12-0889-05	RES. SEMI FIXED	220 B		
X1	L77-2505-05	CRYSTAL RESONATOR			
X2	L77-1229-05	CRYSTAL RESONATOR			
X3	L78-0134-05	CERAMIC RESONATOR			

REF. NO	PARTS NO	NAME & DESCRIPTION			
C101	CC45FCH1H151J	CAP. CERAMIC	150P	5%	50V
C102		NO USE			
C103	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C106	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C107		NO USE			
C108	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C109	CE04LW1C221M	CAP. ELECTRO	220	20%	16V
C110	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C111	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C112	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C115	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C124	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C125	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C126	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C127	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C128	CE04LW1A101M	CAP. ELECTRO	100	20%	10V

DCS-7040 DSP UNIT

X79-1300-01

REF. NO	PARTS NO	NAME & DESCRIPTION			
	F15-0744-05	BLIND PLATE			
	J73-0394-02	PCB (UNMOUNTED)			
BA1	W09-2381-05	BATTERY			
C1	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C2	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C3	C91-2538-05	CAP. FILM	0.1	10%	63V
C4	C91-2538-05	CAP. FILM	0.1	10%	63V
C5	CK45B1H102KTA	CAP. CERAMIC	1000P	10%	50V
C6	CK45B1H102KTA	CAP. CERAMIC	1000P	10%	50V
C7	C91-2538-05	CAP. FILM	0.1	10%	63V
C8	C91-2538-05	CAP. FILM	0.1	10%	63V
C9	CC45FCH1H040C	CAP. CERAMIC	4P	0.25P	50V
C10	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C11	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C12	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C13	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C14	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C15	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C16	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C17	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C18	CC45CH1H220JTA	CAP. CERAMIC	22P	5%	50V
C19	CC45CH1H220JTA	CAP. CERAMIC	22P	5%	50V
C20	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C21	CC45FSL1H471J	CAP. CERAMIC	470P	5%	50V
C22		NO USE			
C23	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C24	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C25	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C26	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C27	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C28	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C29	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C30	CE04LW1C221M	CAP. ELECTRO	220	20%	16V
C31	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C32	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C33	C91-2538-05	CAP. FILM	0.1	10%	63V
C34	C91-2538-05	CAP. FILM	0.1	10%	63V
C35	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C36	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C37	C91-2538-05	CAP. FILM	0.1	10%	63V
C38	C91-2538-05	CAP. FILM	0.1	10%	63V
C39	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C40	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C41	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C42	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C43	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C44	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C45	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C46	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C47	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C48	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C49	CK45B1H102KTA	CAP. CERAMIC	1000P	10%	50V
C50	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C77	C91-2538-05	CAP. FILM	0.1	10%	63V
C78	CC45FCH1H181J	CAP. CERAMIC	180P	5%	50V
C79		NO USE			
C80	CC45FSL1H391J	CAP. CERAMIC	390P	5%	50V
C81	CC45FCH1H271J	CAP. CERAMIC	270P	5%	50V
C82	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C83		NO USE			
C84	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C85	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C86	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C87	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C88	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C89	CC45FSL1H471J	CAP. CERAMIC	470P	5%	50V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C201	CC45FCH1H151J	CAP. CERAMIC	150P	5%	50V
C202		NO USE			
C203	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C206	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C207		NO USE			
C208	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C209	CE04LW1C221M	CAP. ELECTRO	220	20%	16V
C210	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C211	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C212	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C215	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C224	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C225	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C226	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C227	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C228	CE04LW1A101M	CAP. ELECTRO	100	20%	10V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C301	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C302	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C303	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C304	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C305	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C306	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C307	CE04LW1A471M	CAP. ELECTRO	470	20%	10V

REF. NO	PARTS NO	NAME & DESCRIPTION			
C801	CF92V1H102J	CAP. POLYESTER	1000P	5%	50V
CN502	E40-7515-05	PIN CONNECTOR	3P		
CN523	E40-7532-05	PIN CONNECTOR*	23P		
CN524	E40-7520-05	PIN CONNECTOR	30P		
CN525	E40-3243-05	PIN CONNECTOR	8P		
CN526		NO USE			
CN527	E40-5069-05	PIN CONNECTOR	12P		
CN528	E40-3242-05	PIN CONNECTOR	7P		
CN531	E40-7519-05	PIN CONNECTOR	4P		
CN532	E40-7519-05	PIN CONNECTOR	4P		

REF. NO	PARTS NO	NAME & DESCRIPTION			
D1	MA700	DIODE			
D2	MA700	DIODE			
D3	1SS132	DIODE			
D4	1SS132	DIODE			

REF. NO	PARTS NO	NAME & DESCRIPTION			
D39	1SS132	DIODE			

REF. NO	PARTS NO	NAME & DESCRIPTION			
D100	MA700	DIODE			

REF. NO	PARTS NO	NAME & DESCRIPTION			
D200	MA700	DIODE			

REF. NO	PARTS NO	NAME & DESCRIPTION			
D301	MA700	DIODE			

REF. NO	PARTS NO	NAME & DESCRIPTION			
IC1	PST7045	IC, RESET			
IC2	MB88101APFV-GB	IC, 4-CH 12-BIT A/D CONVERTER			
IC3		NO USE			
IC4	HD14066BFP	IC, QUAD BILATERAL SWITCH			
IC5	T93-0893-05	PROGRAM ROM			
IC6	T93-0894-05	PROGRAM ROM			
IC7	HD74LS32FP	IC, QUAD 2-INPUT OR GATE			
IC8	HD74LS32FP	IC, QUAD 2-INPUT OR GATE			
IC9	HD74LS74FP	IC, DUAL D-F.F. (WITH PR&CLR)			
IC10	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER			
IC11	HD74HC86FP	IC, QUAD EXCLUSIVE OR GATE			
IC12	HD74HC08FP	IC, QUAD 2-INPUT AND GATE			
IC13	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER			
IC14	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER			
IC15	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER			
IC16	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER			
IC17	CTM5290	IC, GATE ARRAY			
IC18	HD64610FP	IC, CALENDAR CLOCK			
IC19	62256BLFP7SL	IC, SRAM 256K			
IC20	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX			

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION	REF. NO	PARTS NO	NAME & DESCRIPTION
IC21	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R35	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC22	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R36	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC23	HD74LS157FP	IC, 2 TO 1 DATA SELECT./MPX	R37	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC24	62256BLFP7SL	IC, SRAM 256K	R38	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
IC25	62256BLFP7SL	IC, SRAM 256K	R39	RD14BB2C474J	RES. CARBON 470K 5% 1/6W
IC26	HD6433040A00F	IC, 16-BIT MICROPROCESSOR	R40	RD14BB2C752J	RES. CARBON 7.5K 5% 1/6W
IC27	HD74HC245FP	IC, OCTAL BUS TRANSCEIVERS	R41	RD14BB2C220J	RES. CARBON 22 5% 1/6W
IC28	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R42	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
IC29	HD74HC244FP	IC, OCTAL BUS BUFFER	R43	RD14BB2C681J	RES. CARBON 680 5% 1/6W
IC30	HD74LS244FP	IC, OCTAL 3-STATE BUS BUFFER	R44	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC31	HD74LS374FP	IC, OCTAL 3-STATE D-FF	R45	NO USE	
IC32	DAC0808LCM	IC, 8-BIT D/A CONVERTER	R46	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC33	HA17012PB	IC, 12-BIT D/A CONVERTER	R47	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC34	HA17012PB	IC, 12-BIT D/A CONVERTER	R48	NO USE	
IC35	UPC814C	IC, JFET INPUT OP-AMP	R49	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC36	NJM072BD	IC, JFET INPUT OP AMP	R50	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC37	SN74AS74NS	IC, DUAL D-F.F. (WITH PR & CLR)	R51	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC38	SN74AS151NS	IC, 8 TO 1 DATA SELECTOR/MPX	R52	RD14BB2C513J	RES. CARBON 51K 5% 1/6W
IC39	HD74HC123FP	IC, DUAL MONOSTABLE MULTIB.	R53	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC40	SN74AS153NS	IC, 4 TO 1 DATA SELECTOR/MPX	R54	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC41	MB86001PF-GBND	IC, PLL FREQUENCY SYNTHESIZER	R55	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC42	SN74F161ANS	IC, SYNC. 4-BIT BINARY COUNTER	R56	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
IC43	SN74AS00NS	IC, 2-INPUT NAND GATE	R57	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC44	SN74AS74NS	IC, DUAL D-F.F. (WITH PR & CLR)	R58	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
IC45	CTM5300	IC, GATE ARRAY	R59	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC46	HD74LS374FP	IC, OCTAL 3-STATE D-FF	R60	RD14BB2C471J	RES. CARBON 470 5% 1/6W
IC47	HD74LS138FP	IC, 3-TO-8 DEMULTIPLEXER	R61	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC100	AN8122FAP	IC, 8-BIT A/D CONVERTER	R62	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC101	NO USE		R63	NO USE	
IC102	DTM6010	IC, GATE ARRAY	R64	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
IC103	HM63021FP-34	IC, CMOS STATIC RAM	R65	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
IC104	HM63021FP-34	IC, CMOS STATIC RAM	R66	RD14BB2C512J	RES. CARBON 5.1K 5% 1/6W
IC200	AN8122FAP	IC, 8-BIT A/D CONVERTER	R67	RD14BB2C512J	RES. CARBON 5.1K 5% 1/6W
IC201	NO USE		R68	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
IC202	DTM6010	IC, GATE ARRAY	R73	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC203	HM63021FP-34	IC, CMOS STATIC RAM	R74	RD14BB2C101J	RES. CARBON 100 5% 1/6W
IC204	HM63021FP-34	IC, CMOS STATIC RAM	R75	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L3	L79-0553-05	FILTER	R76	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L4	L79-0553-05	FILTER	R77	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L5	L40-2281-17	FERRI INDUCTOR 0.22UH	R78	RD14BB2C273J	RES. CARBON 27K 5% 1/6W
L6	NO USE		R79	RD14BB2C390J	RES. CARBON 39 5% 1/6W
L7	L79-0553-05	FILTER	R100	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
L301	L40-2281-17	FERRI INDUCTOR 0.22UH	R103	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L302	L79-0553-05	FILTER	R104	RD14BB2C101J	RES. CARBON 100 5% 1/6W
L303	L79-0553-05	FILTER	R105	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
Q1	2SC4049	TR. SI, NPN	R106	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
Q2	2SA933S(R,S)	TR. SI, PNP	R107	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
Q101	2SC1923(0)	TR. SI, NPN	R108	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
Q102	2SC1923(0)	TR. SI, NPN	R109	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
Q103	2SC1740S(R,S)	TR. SI, NPN	R110	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
Q201	2SC1923(0)	TR. SI, NPN	R111	RD14BB2C271J	RES. CARBON 270 5% 1/6W
Q202	2SC1923(0)	TR. SI, NPN	R112	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
Q203	2SC1740S(R,S)	TR. SI, NPN	R113	NO USE	
Q301	2SC3354(S)	TR. SI, NPN	R114	RD14BB2C220J	RES. CARBON 22 5% 1/6W
Q302	2SC3354(S)	TR. SI, NPN	R115	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R1	RD14BB2C103J	RES. CARBON 10K 5% 1/6W	R116	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R2	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R119	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R3	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R120	RD14BB2C510J	RES. CARBON 51 5% 1/6W
R4	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R203	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R5	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R204	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R6	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R205	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
R7	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R206	RN14BK2C3901F	RES. METAL FILM 3.9K 1% 1/6W
R8	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R207	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
R9	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R208	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
R10	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R209	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R11	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R210	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R12	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R211	RD14BB2C271J	RES. CARBON 270 5% 1/6W
R13	RD14BB2C471J	RES. CARBON 470 5% 1/6W	R212	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R14	RD14BB2C473J	RES. CARBON 47K 5% 1/6W	R213	NO USE	
R15	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R214	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R16	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R215	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R17	RD14BB2C101J	RES. CARBON 100 5% 1/6W	R216	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R18	RN14BK2C1001F	RES. METAL FILM 1K 1% 1/6W	R219	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R19	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W	R220	RD14BB2C510J	RES. CARBON 51 5% 1/6W
R20	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W	R301	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R21	RN14BK2C1201F	RES. METAL FILM 1.2K 1% 1/6W	R302	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R22	RN14BK2C2001F	RES. METAL FILM 2K 1% 1/6W	R303	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R23	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W	R304	NO USE	
R24	RN14BK2C1202F	RES. METAL FILM 12K 1% 1/6W	R305	RN14BK2C3602F	RES. METAL FILM 36K 1% 1/6W
R25	RD14BB2C330J	RES. CARBON 33 5% 1/6W	R306	RN14BK2C7501F	RES. METAL FILM 7.5K 1% 1/6W
R26	RN14BK2C1201F	RES. METAL FILM 1.2K 1% 1/6W	R307	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R27	RD14BB2C330J	RES. CARBON 33 5% 1/6W	R801	R92-0150-05	JUMPING RES. ZERO OHM (10MM)
R28	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W	R802	R92-0150-05	JUMPING RES. ZERO OHM (10MM)
R29	RN14BK2C1001F	RES. METAL FILM 1K 1% 1/6W	VR101	R12-0889-05	RES. SEMI FIXED 220 B
R30	RN14BK2C1501F	RES. METAL FILM 1.5K 1% 1/6W	VR102	R12-0889-05	RES. SEMI FIXED 220 B
R31	RN14BK2C3001F	RES. METAL FILM 3K 1% 1/6W	VR201	R12-0889-05	RES. SEMI FIXED 220 B
R32	RD14BB2C103J	RES. CARBON 10K 5% 1/6W	VR202	R12-0889-05	RES. SEMI FIXED 220 B
R33	RD14BB2C103J	RES. CARBON 10K 5% 1/6W			
R34	RD14BB2C134J	RES. CARBON 130K 5% 1/6W			

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
X1	L77-2505-05	CRYSTAL RESONATOR
X2	L77-1229-05	CRYSTAL RESONATOR
X3	L78-0134-05	CERAMIC RESONATOR

FINAL UNIT

X80-1370-00

REF. NO	PARTS NO	NAME & DESCRIPTION
C1	CK45FB1H152K	CAP. CERAMIC 1500P 10% 50V
C2	NO USE	
C3	C90-3178-05	CAP. METAL FILM 0.047 5.5V
C4	C90-3178-05	CAP. METAL FILM 0.047 5.5V
C5	NO USE	
C6	CF92FV1H102J	CAP. POLYESTER 1000P 5% 50V
C7	CC45FCH1H820J	CAP. CERAMIC 82P 5% 50V
C8	CF92FV1H102J	CAP. POLYESTER 1000P 5% 50V
C9	CF92FV1H102J	CAP. POLYESTER 1000P 5% 50V
C10	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C11	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C12	CC45FCH1H020C	CAP. CERAMIC 2P 0.25P 50V
C13	CC45FCH1H180J	CAP. CERAMIC 18P 5% 50V
C14	CC45FCH1H151J	CAP. CERAMIC 150P 5% 50V
C15	CC45FCH1H030C	CAP. CERAMIC 3P 0.25P 50V
C16	CC45FCH1H030C	CAP. CERAMIC 3P 0.25P 50V
C101	CE04LW1E101M	CAP. ELECTRO 100 20% 25V
C102	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C103	CE04LW1E101M	CAP. ELECTRO 100 20% 25V
C104	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C105	NO USE	
C106	C91-1357-05	CAP. POLYESTER 0.1 10% 100V
C107	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C108	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C109	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C201	C91-2583-05	CAP. CERAMIC 0.1 20% 250V
C202	C91-2584-05	CAP. CERAMIC 1000P 10% 400V
C203	C91-2584-05	CAP. CERAMIC 1000P 10% 400V
C207	CE04LW1E220M	CAP. ELECTRO 22 20% 25V
C208	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C209	CE04LW0J101M	CAP. ELECTRO 100 20% 6.3V
JW5	E38-0997-05	WIRE ASS'Y; CRT TO FINAL
JW6	NO USE	
JW7	E38-0998-05	WIRE ASS'Y; CRT TO H
JW13	E38-0999-05	WIRE ASS'Y; BNC TO V
L1	L40-2201-17	FERRI INDUCTOR 22UH 10%
L2	L40-1001-17	FERRI INDUCTOR 10UH 10%
L61	L40-1291-17	FERRI INDUCTOR 1.2UH 10%
L62	L40-2791-17	FERRI INDUCTOR 2.7UH 10%
L63	L40-1291-17	FERRI INDUCTOR 1.2UH 10%
L64	L40-2791-17	FERRI INDUCTOR 2.7UH 10%
L201	L33-0808-05	CHOKO COIL 1000UH
L202	L40-1291-17	FERRI INDUCTOR 1.2UH 10%
L203	L40-1291-17	FERRI INDUCTOR 1.2UH 10%
P4	E40-7515-05	PIN CONNECTOR 3P
P5	E40-3300-05	PIN CONNECTOR 3P
P14	E40-5066-05	PIN CONNECTOR 9P
P18	E40-7518-05	PIN CONNECTOR 6P
P19	E40-7515-05	PIN CONNECTOR 3P
P20	NO USE	
P21	E40-7412-05	PIN CONNECTOR 2P
P22	E40-7413-05	PIN CONNECTOR 6P
P105	E40-7515-05	PIN CONNECTOR 3P
P114	E40-7517-05	PIN CONNECTOR 5P
P201	E04-0277-05	BNC CONNECTOR
Q1	2SA1161	TR. SI, PNP
Q2	2SA1161	TR. SI, PNP
Q3	2SC3779(D)	TR. SI, NPN
Q4	2SC3779(D)	TR. SI, NPN
Q9	2SC2644	TR. SI, NPN
Q10	2SC2644	TR. SI, NPN
Q11	2SC2644	TR. SI, NPN

REF. NO	PARTS NO	NAME & DESCRIPTION
Q12	2SC2644	TR. SI, NPN
Q105	2SC1907	TR. SI, NPN
Q106	2SC1907	TR. SI, NPN
Q107	2SC1907	TR. SI, NPN
Q108	2SC1907	TR. SI, NPN
Q113	2SC3952(D)	TR. SI, NPN
Q114	2SC3952(D)	TR. SI, NPN
Q201	2SC3779(D)	TR. SI, NPN
Q202	2SC3779(D)	TR. SI, NPN
R1	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R2	RD14BB2C182J	RES. CARBON 1.8K 5% 1/6W
R3	RD14BB2E822J	RES. CARBON 8.2K 5% 1/4W
R4	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R5	RD14BB2C131J	RES. CARBON 130 5% 1/6W
R6	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R7	RD14BB2C751J	RES. CARBON 750 5% 1/6W
R8	RD14BB2C911J	RES. CARBON 910 5% 1/6W
R9	RD14BB2C911J	RES. CARBON 910 5% 1/6W
R10	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R11	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R12	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R13	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R14	RD14BB2E273J	RES. CARBON 27K 5% 1/4W
R15	R92-1575-05	RES. LINEAR PCT 100 5% 1/6W
R16	R92-1575-05	RES. LINEAR PCT 100 5% 1/6W
R17	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R18	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R19	RD14BB2C113J	RES. CARBON 11K 5% 1/6W
R20	RD14BB2C681J	RES. CARBON 680 5% 1/6W
R21	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R22	RN14BK2C5600F	RES. METAL FILM 560 1% 1/6W
R23	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R24	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
R25	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R26	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R27	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R28	RD14BB2C132J	RES. CARBON 1.3K 5% 1/6W
R29	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R30	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R34	RD14BB2C473J	RES. CARBON 47K 5% 1/6W
R35	RD14BB2C623J	RES. CARBON 62K 5% 1/6W
R36	RD14BB2C203J	RES. CARBON 20K 5% 1/6W
R37	RD14BB2E752J	RES. CARBON 7.5K 5% 1/4W
R38	NO USE	
R39	RD14BB2C182J	RES. CARBON 1.8K 5% 1/6W
R40	NO USE	
R41	RD14BB2C680J	RES. CARBON 68 5% 1/6W
R42	RD14BB2C621J	RES. CARBON 620 5% 1/6W
R43	RD14BB2C621J	RES. CARBON 620 5% 1/6W
R44	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R45	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R46	RD14BB2C911J	RES. CARBON 910 5% 1/6W
R47	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R48	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R49	RD14BB2C151J	RES. CARBON 150 5% 1/6W
R50	RD14BB2C151J	RES. CARBON 150 5% 1/6W
R51	RD14BB2E220J	RES. CARBON 22 5% 1/4W
R52	RD14BB2E220J	RES. CARBON 22 5% 1/4W
R53	RD14BB2C1R0J	RES. CARBON 1 5% 1/6W
R54	RD14BB2C1R0J	RES. CARBON 1 5% 1/6W
R59	RD14BB2C242J	RES. CARBON 2.4K 5% 1/6W
R60	NO USE	
R61	RD14BB2C431J	RES. CARBON 430 5% 1/6W
R62	RD14BB2C431J	RES. CARBON 430 5% 1/6W
R63	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R64	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R65	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R66	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R67	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R68	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R69	RD14BB2C223J	RES. CARBON 22K 5% 1/6W
R70	RD14BB2C391J	RES. CARBON 390 5% 1/6W
R71	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R72	RN14BK2C62R0F	RES. METAL FILM 62.0 1% 1/6W
R73	R92-1568-05	RES. SPECIAL POWER 200 5% 1W
R74	R92-1568-05	RES. SPECIAL POWER 200 5% 1W
R75	R92-1571-05	RES. SPECIAL POWER 110 5% 1W
R76	R92-1571-05	RES. SPECIAL POWER 110 5% 1W
R77	R92-1571-05	RES. SPECIAL POWER 110 5% 1W
R78	R92-1571-05	RES. SPECIAL POWER 110 5% 1W
R79	RD14BB2E2R2J	RES. CARBON 2.2 5% 1/4W
R80	RD14BB2E2R2J	RES. CARBON 2.2 5% 1/4W
R81	RD14BB2C391J	RES. CARBON 390 5% 1/6W
R85	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R86	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R87	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R88	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R89	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R90	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R91	R92-1570-05	RES. SPECIAL POWER 750 5% 2W

PARTS LIST

REF. NO	PARTS NO	NAME & DESCRIPTION
R92	R92-1570-05	RES. SPECIAL POWER 750 5% 2W
R93	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R94	NO USE	
R95	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R96	NO USE	
R97	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R98	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R201	R92-0173-05	RES. FIXED 2.2M 20% 350V
R202	NO USE	
R203	RD14BB2C471J	RES. CARBON 470 5% 1/6W
R204	RD14BB2C471J	RES. CARBON 470 5% 1/6W
R205	RD14BB2C272J	RES. CARBON 2.7K 5% 1/6W
R206	NO USE	
R207	RD14BB2C201J	RES. CARBON 200 5% 1/6W
R208	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R209	RD14BB2C151J	RES. CARBON 150 5% 1/6W
R210	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R211	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R212	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R213	RD14BB2E223J	RES. CARBON 22K 5% 1/4W
R214	RD14BB2E223J	RES. CARBON 22K 5% 1/4W
R215	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R216	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R217	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
TC1	C05-0472-05	CAP. TRIMMER 50P
TC62	C05-0472-05	CAP. TRIMMER 50P
TH1	112-103-2FM	THERMISTOR
TH2	112-103-2FM	THERMISTOR
U1	KMG01	IC, LINEAR
VR1	R12-1857-05	RES. SEMI FIXED 1K
VR2	R12-0679-05	RES. SEMI FIXED 22KB
VR3	R12-1860-05	RES. SEMI FIXED 1KB
VR4	R12-0679-05	RES. SEMI FIXED 22KB

Option IF-10 GP-IB

X87-3240-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	B42-1933-04	LABEL, MODEL NO., FOR CARTON BOX
	B42-3819-05	SERIAL NO. PLATE
	B42-3820-05	LABEL; CARTON BOX
	B63-0263-00	INSTRUCTION MANUAL; ENG./JAP.
	H25-0835-04	VINYL COVER
	H53-0183-04	CARTON BOX
56	A63-0208-04	PANEL
57	X72-1270-00	INTERFACE UNIT

INTERFACE UNIT

X72-1270-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	J73-0391-03	PCB (UNMOUNTED)
	N10-2026-41	NUT, HEX M2
	N30-2612-41	SCREW, PAN HD M2.6X12
	N67-3010-41	SCREW, SEMS PAN HD M3X10
C1	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C2	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C3	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C4	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C5	CE04FW1A470M	CAP. ELECTRO 47 20% 10V
CN529	E40-7531-05	PIN CONNECTOR 30P
CP1	R90-0612-05	RES. NETWORK 8X4.7K
IC1	TMS99C14ANL	IC, GP-IB ADAPTER
IC2	SN75160AN	IC, INTERFACE BUS TRANSCEIVER
IC3	SN75161AN	IC, INTERFACE BUS TRANSCEIVER
IC4	TC74HC244AP	IC, OCTAL BUS BUFFER (3-STATE)
IC5	TC74HC138AP	IC, 3 TO 8 LINE DECODER
J305	E58-0613-05	PIN CONNECTOR 24P
R1	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
S1	S79-0613-05	DIP SWITCH

Option IF-20 RS-232C

X87-3250-00

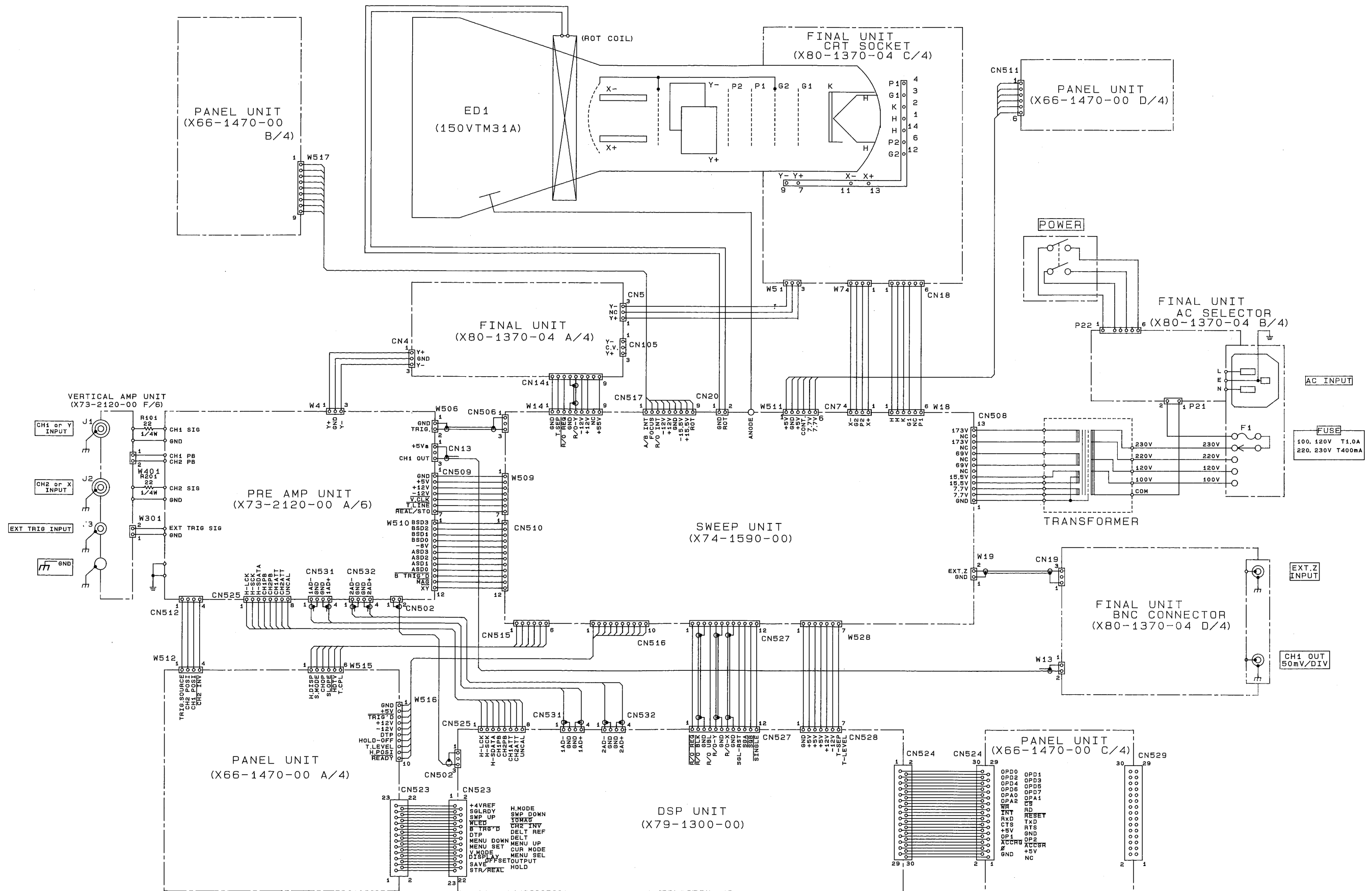
REF. NO	PARTS NO	NAME & DESCRIPTION
	B42-1933-04	LABEL, MODEL NO., FOR CARTON BOX
	B42-3819-05	SERIAL NO. PLATE
	B42-3820-05	LABEL; CARTON BOX
	B63-0264-00	INSTRUCTION MANUAL; ENG./JAP.
	H25-0835-04	VINYL COVER
	H53-0183-04	CARTON BOX
56	A63-0209-04	PANEL
57	X72-1280-00	INTERFACE UNIT

INTERFACE UNIT

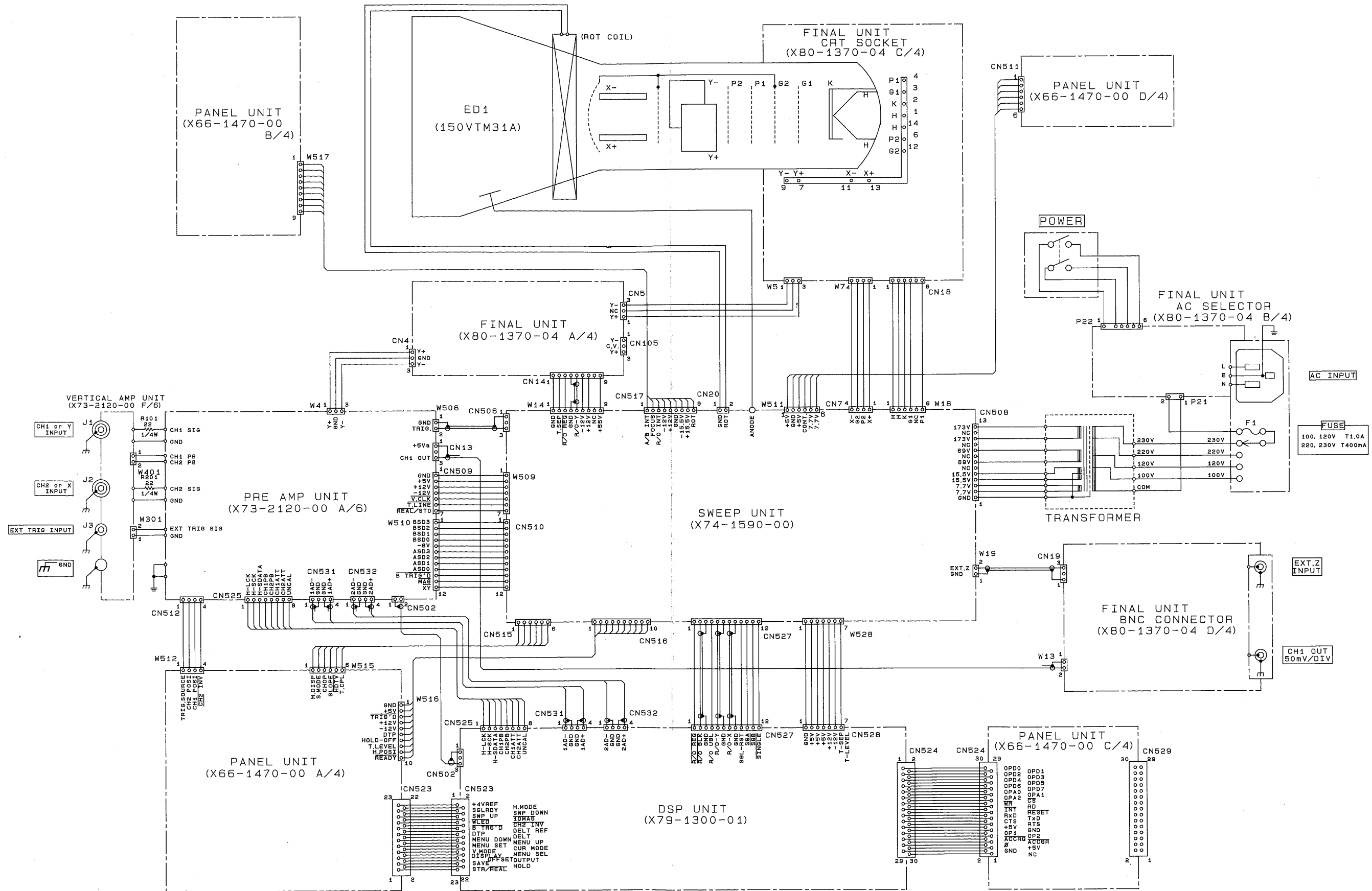
X72-1280-00

REF. NO	PARTS NO	NAME & DESCRIPTION
	J73-0392-03	PCB (UNMOUNTED)
	N10-2026-41	NUT, HEX M2
	N30-2612-41	SCREW, PAN HD M2.6X12
	N67-3010-41	SCREW, SEMS PAN HD M3X10
C1	CE04EW1C220M	CAP. ELECTRO 22 20% 16V
C2	CE04EW1C220M	CAP. ELECTRO 22 20% 16V
C3	CE04EW1C220M	CAP. ELECTRO 22 20% 16V
C4	CE04EW1C220M	CAP. ELECTRO 22 20% 16V
C5	CE04EW1C100M	CAP. ELECTRO 10 20% 16V
C6	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C7	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
CN529	E40-7531-05	PIN CONNECTOR 30P
CP1	R90-0612-05	RES. NETWORK 8X4.7K
IC1	MAX232CPE	IC, RS-232C DRIVERS/RECEIVERS
IC2	TC74HC244AP	IC, OCTAL BUS BUFFER (3-STATE)
IC3	TC74HC138AP	IC, 3 TO 8 LINE DECODER
J306	E40-7231-05	PIN CONNECTOR 25P
S1	S79-0613-05	DIP SWITCH

DCS-7020 SCHEMATIC DIAGRAM

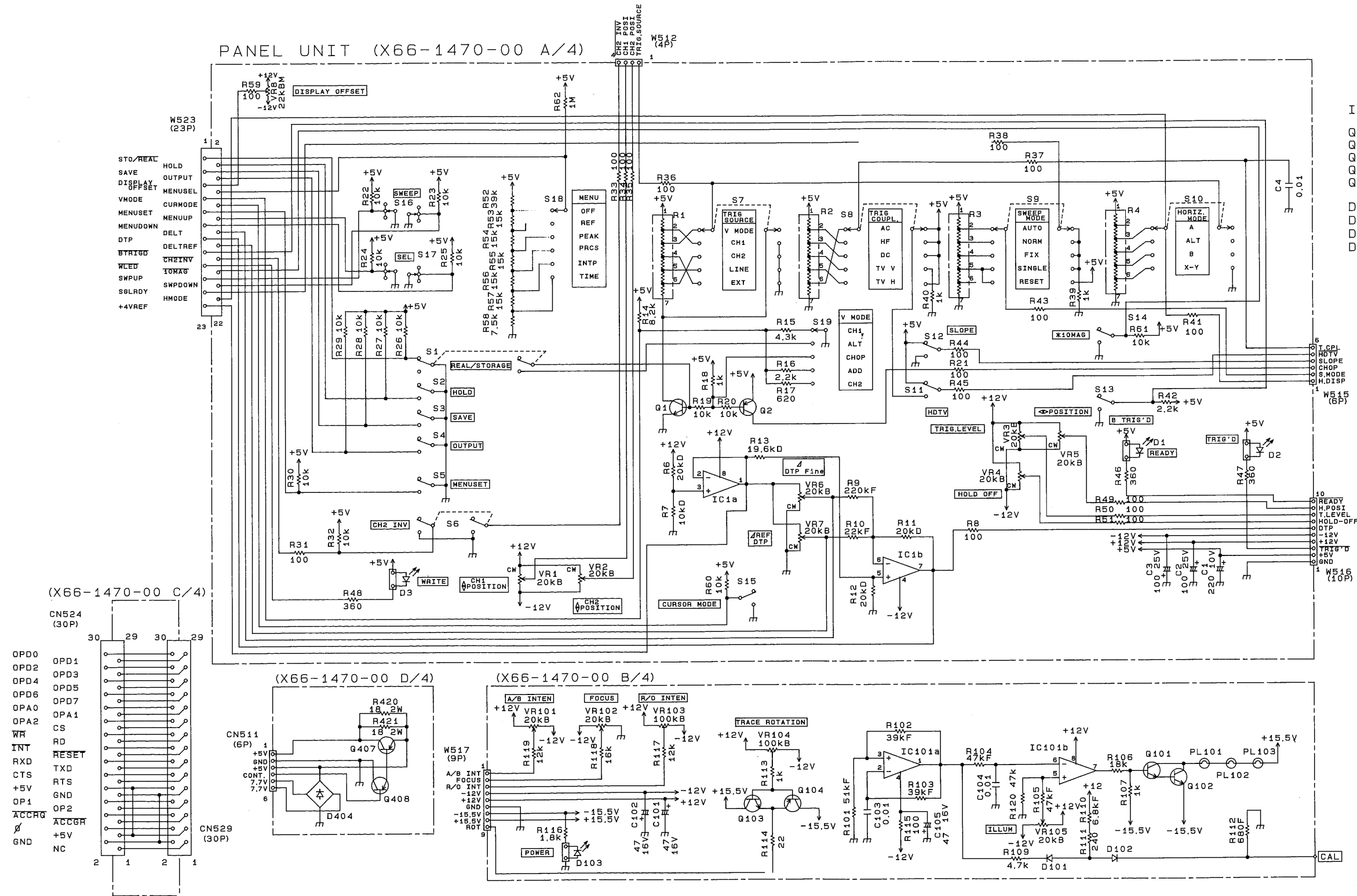


DCS-7040 SCHEMATIC DIAGRAM

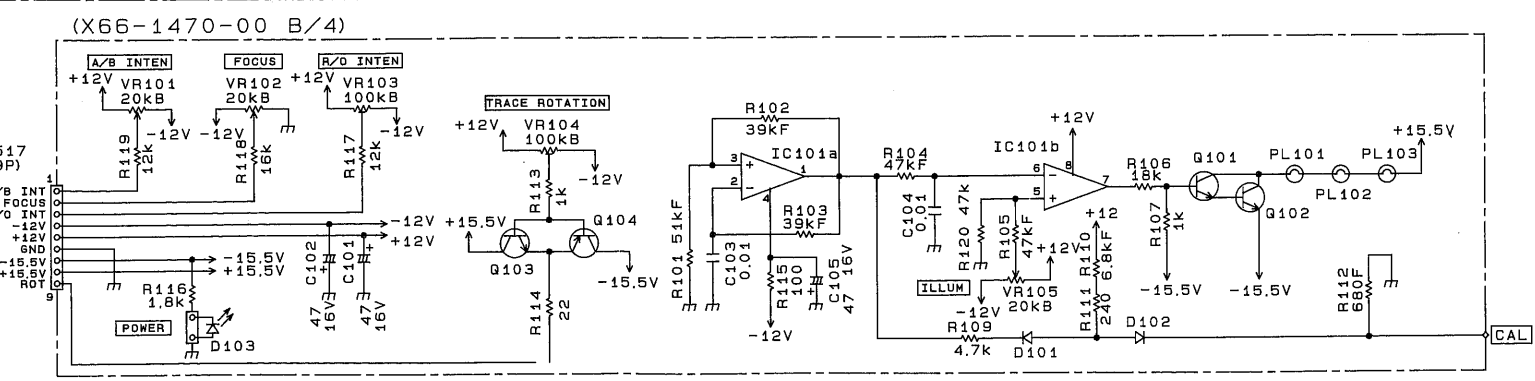
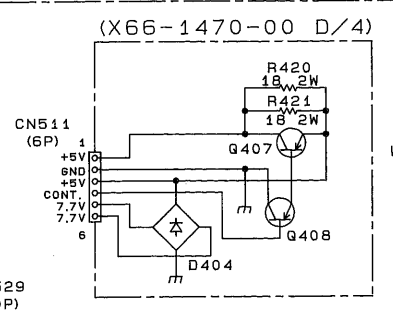
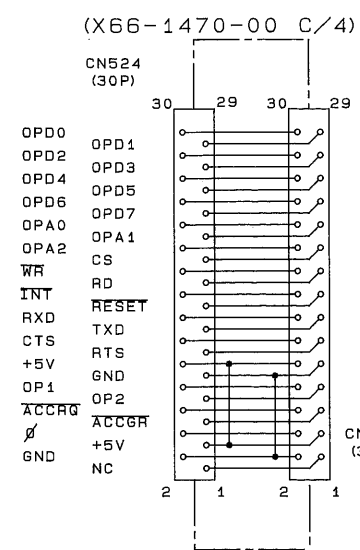


SCHEMATIC DIAGRAM

PANEL UNIT (X66-1470-00)



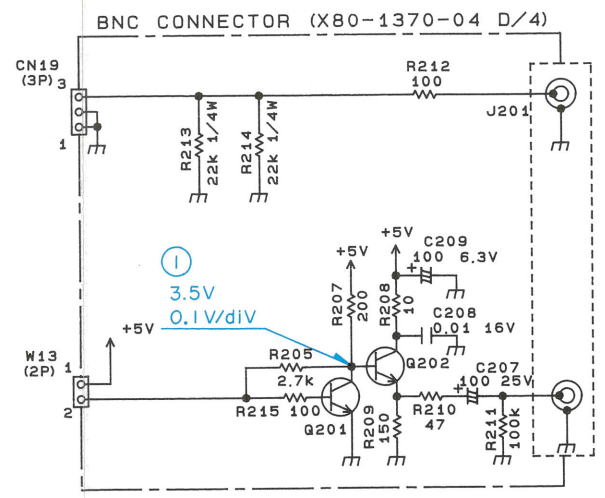
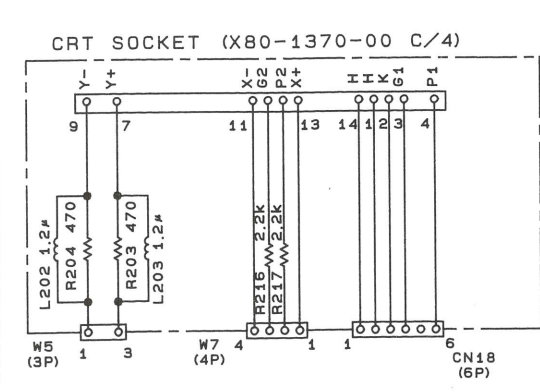
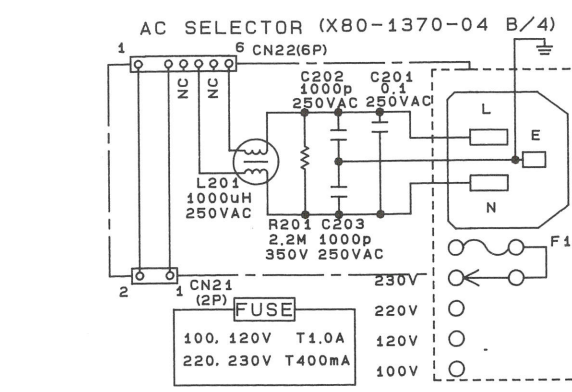
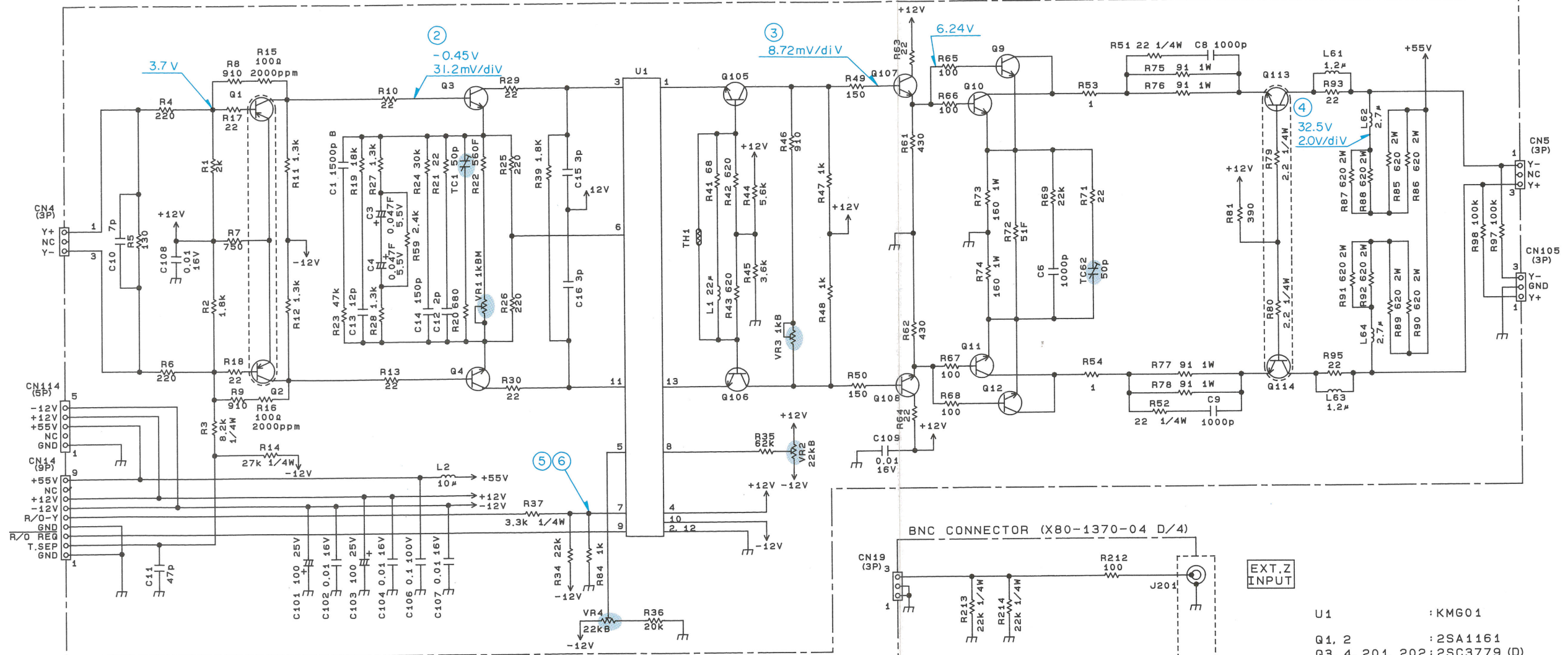
- IC1, 101 : MJMM4558L
- Q1, 101, 102 : 2SC1740S (R, S)
- Q2, 408 : 2SA933S (R, S)
- Q103 : 2SC1318A (R)
- Q104 : 2SA720A (R)
- Q407 : 2SB1015 (Y)
- D1 : LN222RP
- D2, 3 : LN322GP
- D101, 102 : 1SS132
- D404 : D3SB20



SCHEMATIC DIAGRAM

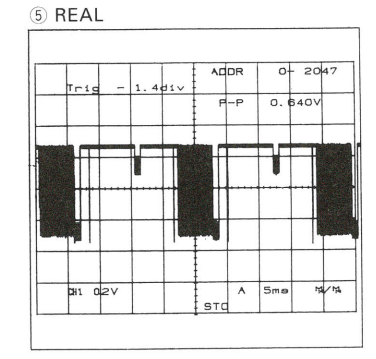
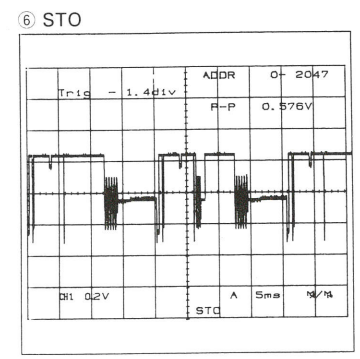
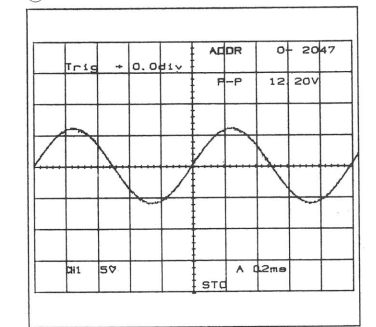
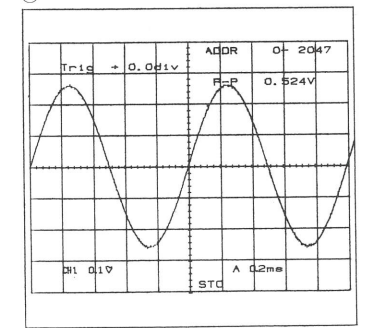
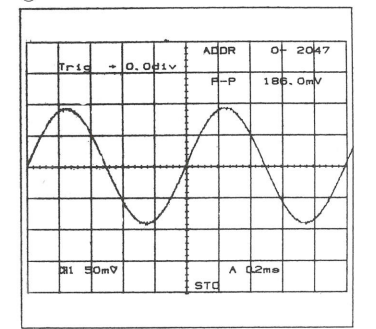
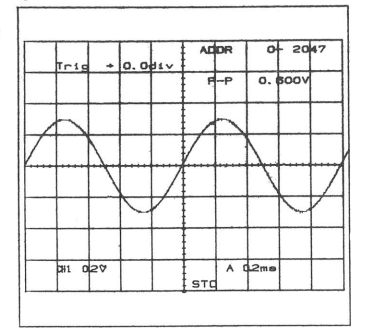
FINAL UNIT (X80-1370-00)

FINAL UNIT (X80-1370-04 A/4)



- U1 : KMG01
- Q1, 2 : 2SA1161
- Q3, 4, 201, 202 : 2SC3779 (D)
- Q9~12 : 2SC2644
- Q105~108 : 2SC1907
- Q113, 114 : 2SC3952 (D)
- TH1 : 112-103-2FM

①~④
5mV/div
1kHz 6div



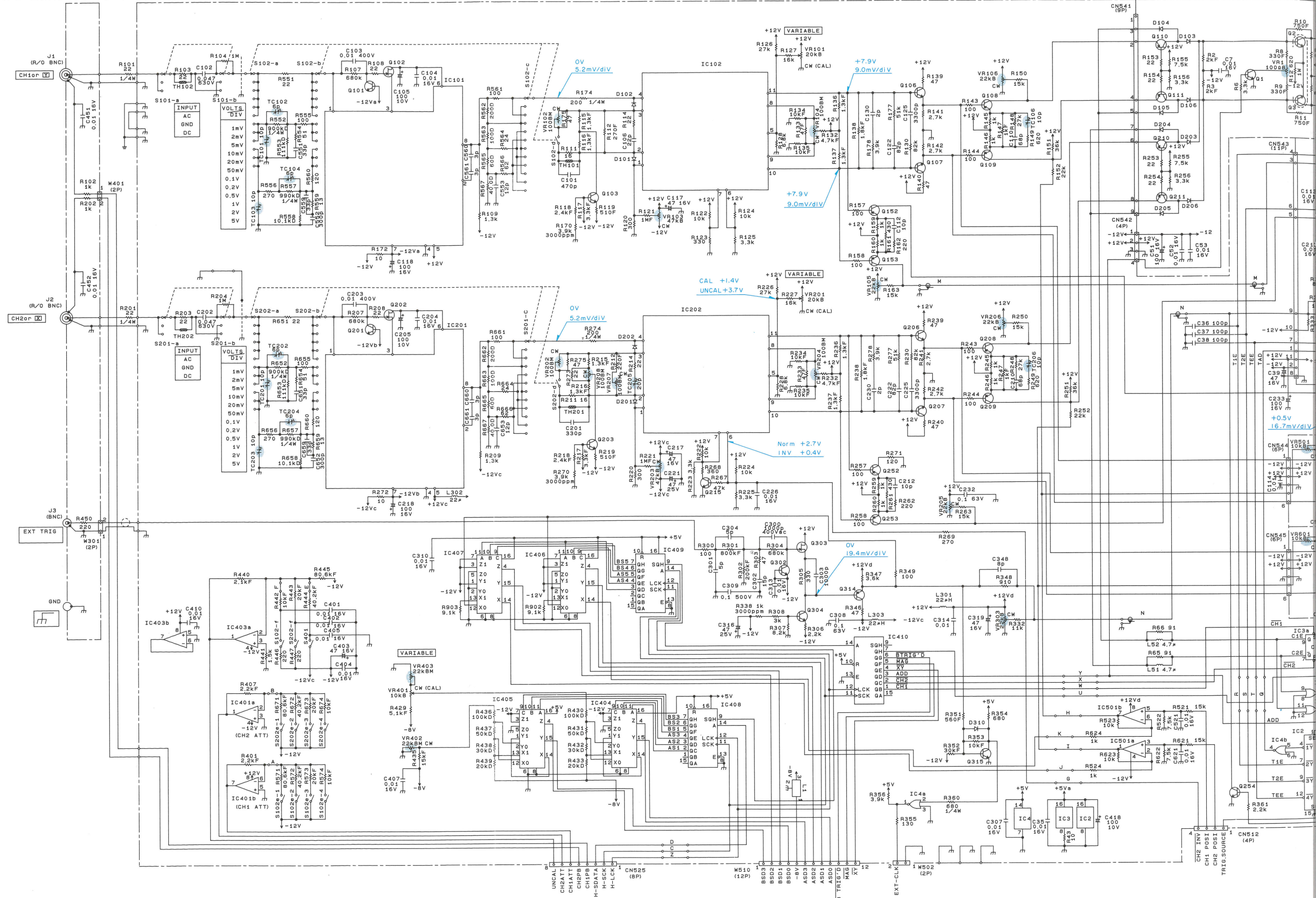
PRE AMP UNIT (X73-2120-00)

(X73-2120-00 F/6)

PRE AMP UNIT (X73-2120-00 A/6)

SCHEMATIC DIAGRAM

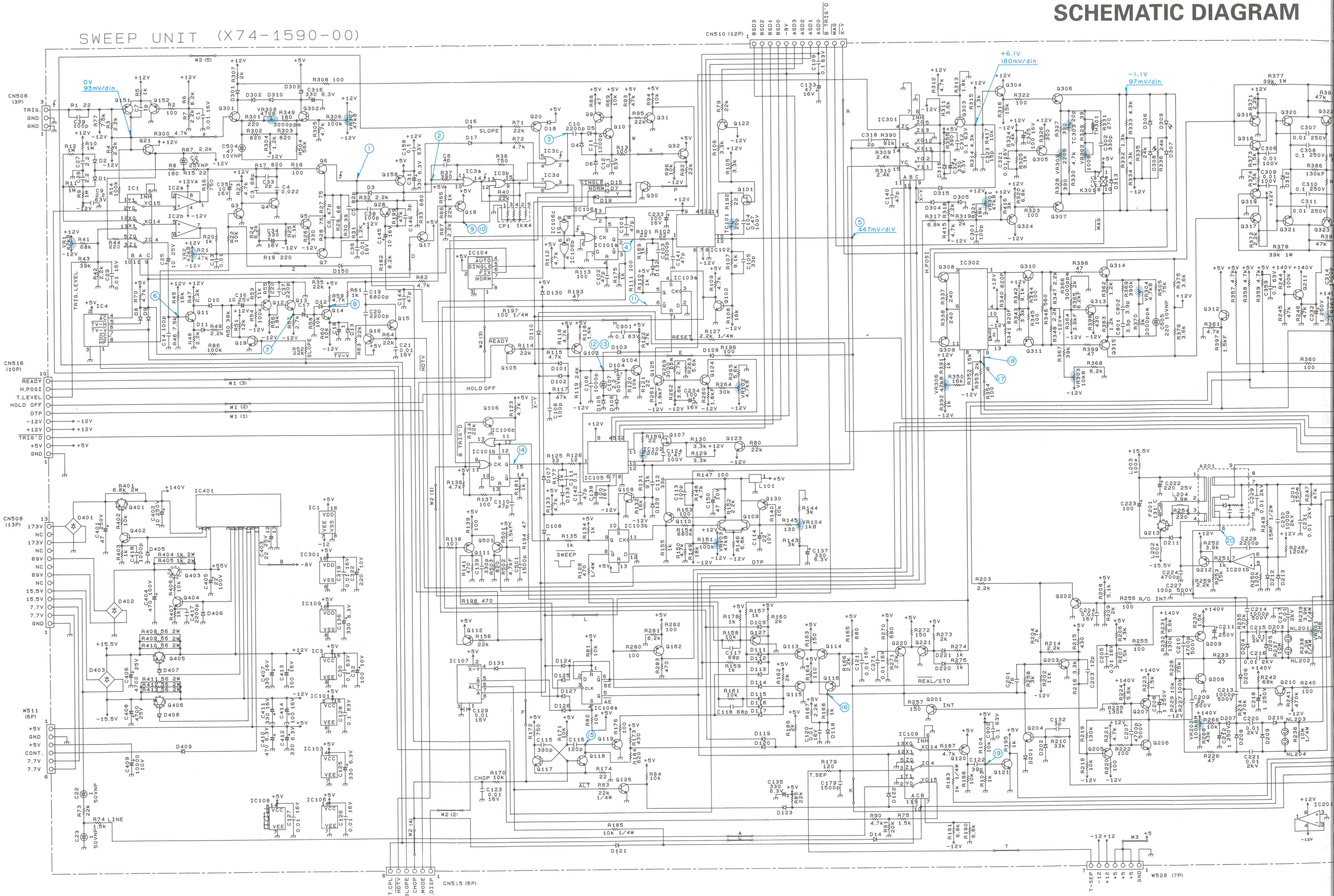
(X73-2120-00 B/6)



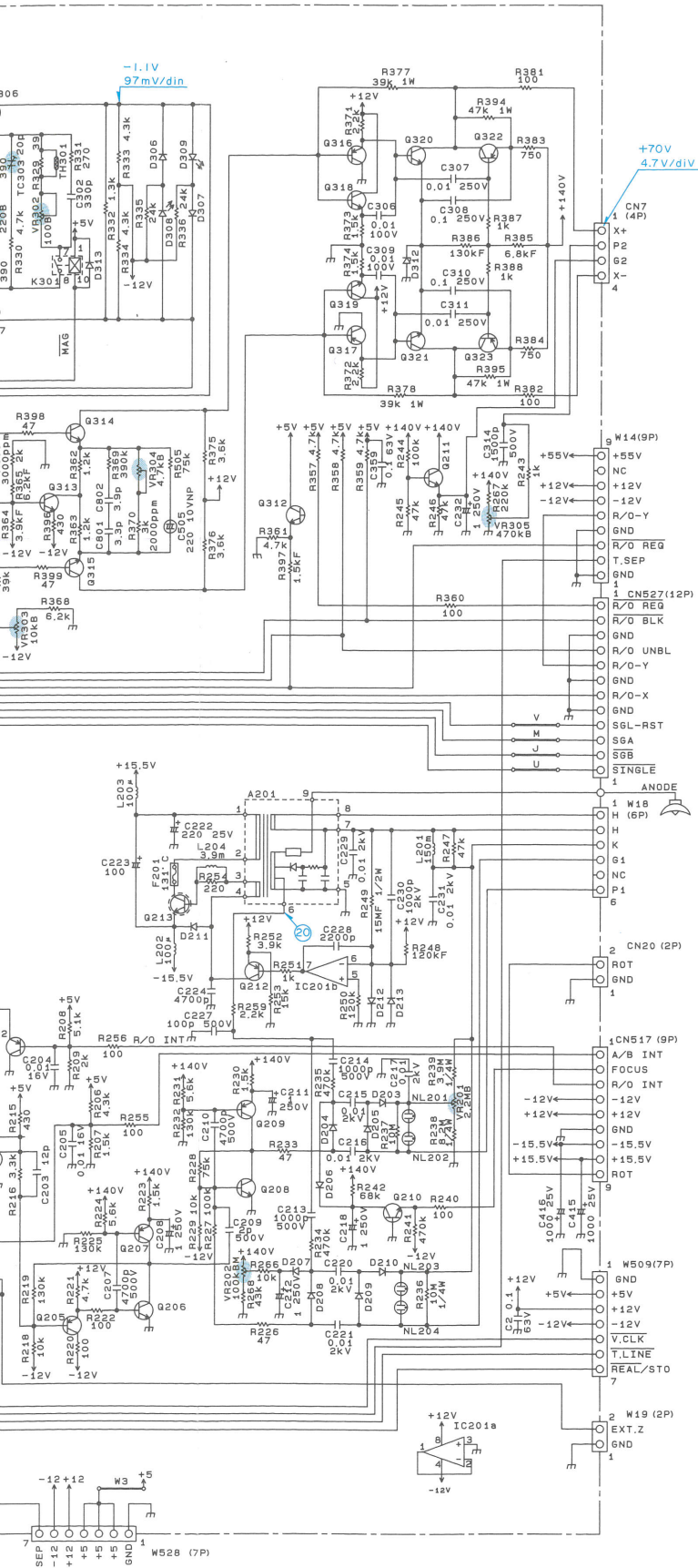
SWEEP UNIT (X74-1590-00)

SWEEP UNIT (X74-1590-00)

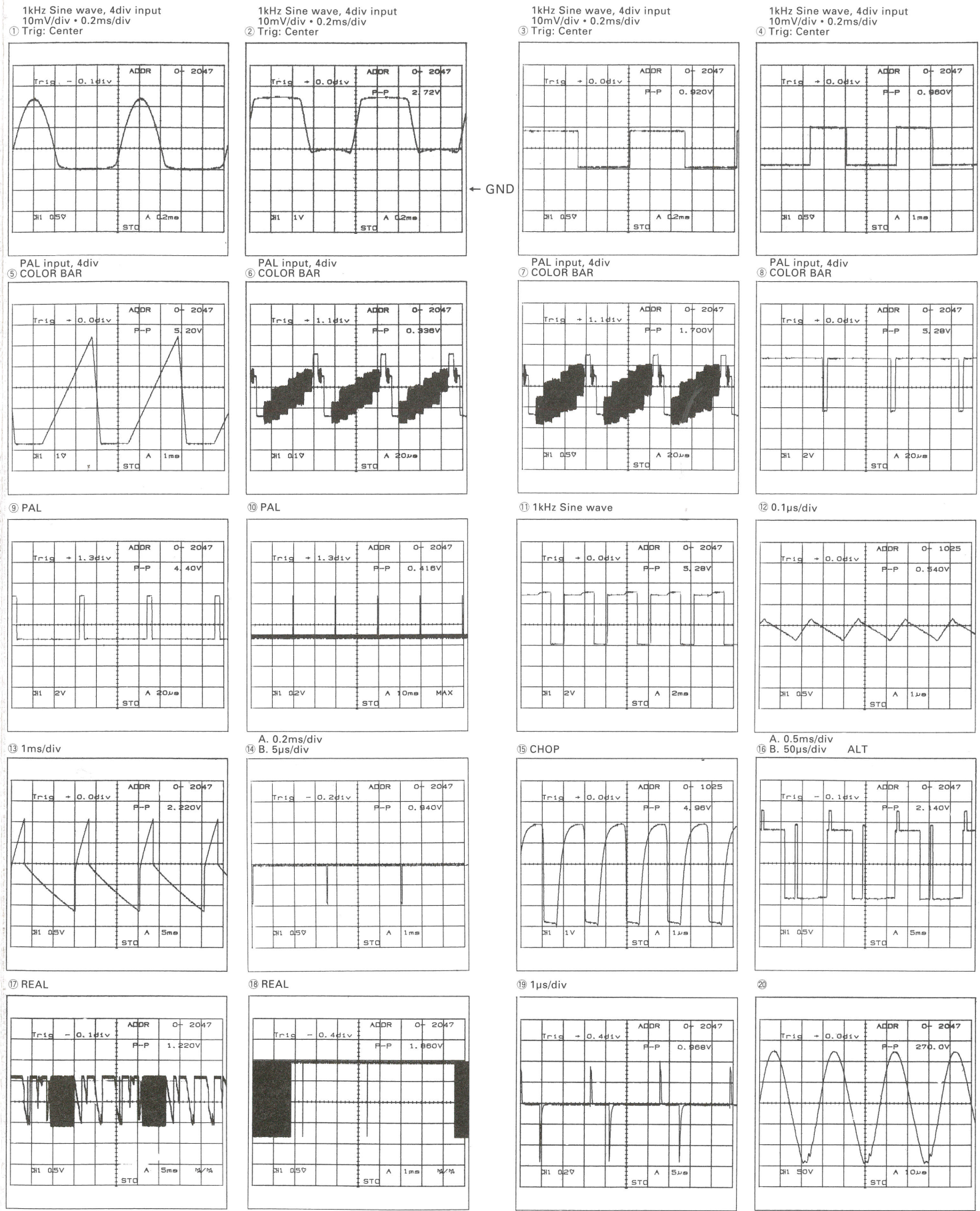
SCHEMATIC DIAGRAM



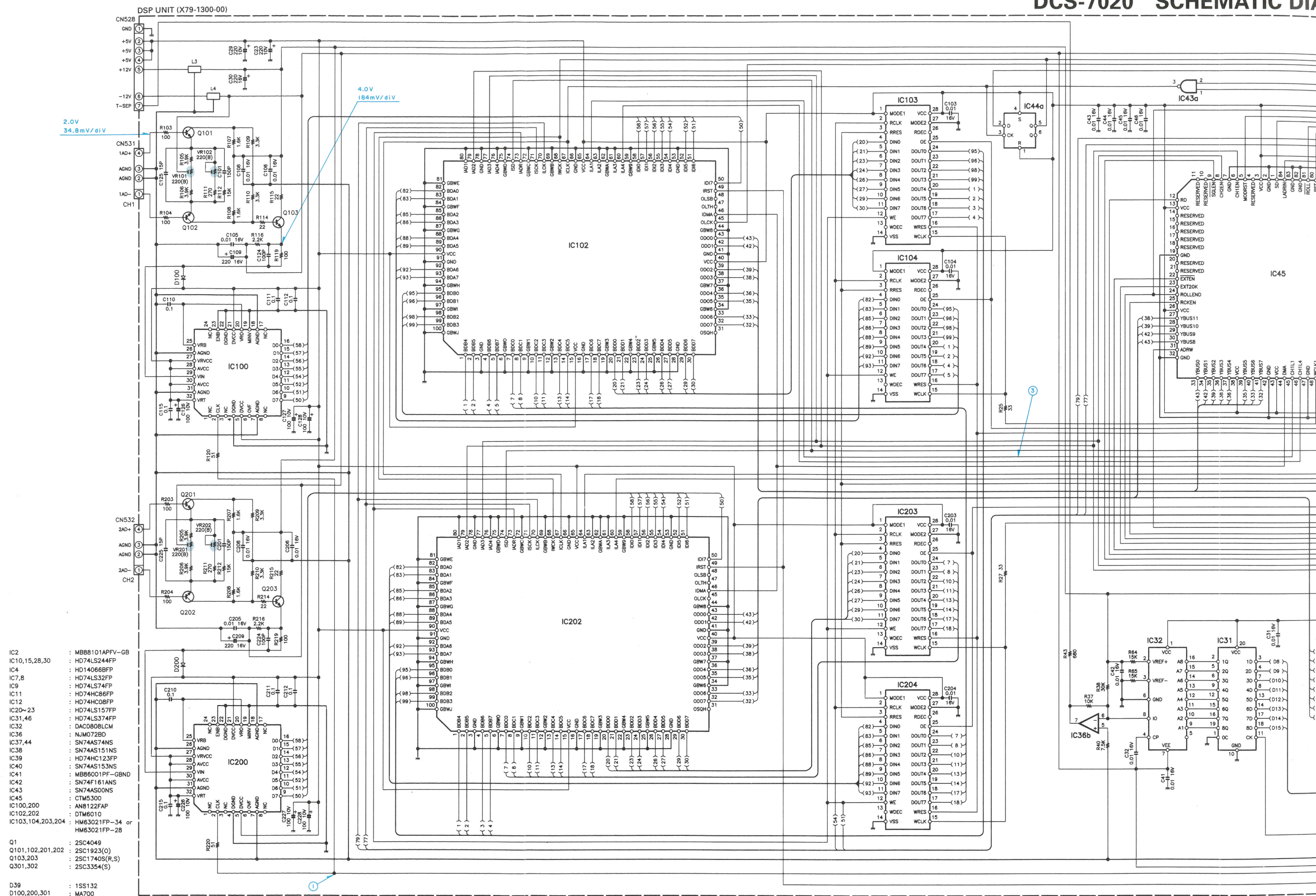
SCHEMATIC DIAGRAM



- | | |
|---------------|----------------|
| IC1 | : TC4053BP |
| IC2 | : NJM072BD |
| IC3 | : MC10102L |
| IC4, 104, 107 | : KMS01 |
| IC101 | : MC10131L |
| IC102, 105 | : KMD05 |
| IC103, 108 | : SN74ALS74AN |
| IC106 | : SN74ALS02N |
| IC109, 301 | : TC74HC4053AP |
| IC201 | : NJM4558D |
| IC302 | : KMG01 |
| IC401 | : KMA02 |
-
- | | |
|-------------------------------------|------------------|
| Q3, 10, 11, 13, 14, 19, 30~32 | : 2N4301 (R, S) |
| 104, 100, 102, 204, 301~304 | : 2SC1929 (D) |
| 308, 309, 310, 317 | : 2SA1459 (K) |
| Q4, 5, 102, 108, 117, 118, 121, 203 | : 2SC1929 (D) |
| Q6, 7 | : 2SC3779 (D) |
| Q9, 102, 110, 120, 151, 152, 158 | : 2SA1459 (K) |
| 316, 317 | : 2SA1005 (K) |
| Q10, 15, 16, 113, 116, 117, 220 | : 2N4301 (R, S) |
| Q17, 18, 19, 20, 103, 111, 112, 119 | : 2N4301 (R, S) |
| 300, 301, 302, 303, 304, 305, 306 | : 2N4301 (R, S) |
| Q21, 314, 315, 318, 319 | : 2N4301 (R, S) |
| Q101, 107 | : 2SK170 (V) |
| Q109 | : 2SC3381 (GR) |
| Q206, 208 | : 2SC2910 (S) |
| Q207, 209 | : 2SA1208 (S) |
| Q210, 211, 402, 404 | : 2SC2551 (D) |
| Q213 | : 2SD613 (E) |
| Q320, 321 | : 2SC4732 (E) |
| Q322, 323 | : 2SA1828 (E) |
| Q401 | : 2SA1499 (D, P) |
| Q403 | : 2SA1304 |
| Q405 | : 2SB1015 (Y) |
| Q406 | : 2SD1406 (Y) |
-
- | | |
|---|------------|
| D1~5, 12, 15, 109, 114, 130, 132 | : MA7000 |
| 133, 134, 135, 136, 137, 138, 139 | : MA7000 |
| D6~11, 14, 16, 18, 19, 101, 108 | : MA7000 |
| 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200 | : MA7000 |
| D203~210 | : 1SS83 |
| D303, 316 | : MTZ3.0JA |
| D308, 309 | : TLR112 |
| D312 | : MTZ5.1JB |
| D401, 402 | : S1VB60 |
| D403 | : S4VB20F |
| D407, 408 | : MTZ13JC |
| D409 | : MTZ7.5JA |



DSP UNIT (X79-1300-00)



- IC2 : MB88101APFV-GB
- IC10,15,28,30 : HD74LS244FP
- IC4 : HD14066BFP
- IC7,8 : HD74LS32FP
- IC9 : HD74LS74FP
- IC11 : HD74HC86FP
- IC12 : HD74HC08FP
- IC20~23 : HD74LS157FP
- IC31,46 : HD74LS374FP
- IC32 : DAC0808LCM
- IC36 : NJM072BD
- IC37,44 : SN74AS74NS
- IC38 : SN74AS151NS
- IC39 : HD74HC123FP
- IC40 : SN74AS153NS
- IC41 : MB86001PF-GBND
- IC42 : SN74F161ANS
- IC43 : SN74AS00NS
- IC45 : CTM5300
- IC100,200 : AN8122FAP
- IC102,202 : DTM6010
- IC103,104,203,204 : HM63021FP-34 or HM63021FP-28

- Q1 : 2SC4049
- Q101,102,201,202 : 2SC1923(O)
- Q103,203 : 2SC1740S(R,S)
- Q301,302 : 2SC3354(S)

- D39 : 1S5132
- D100,200,301 : MA700

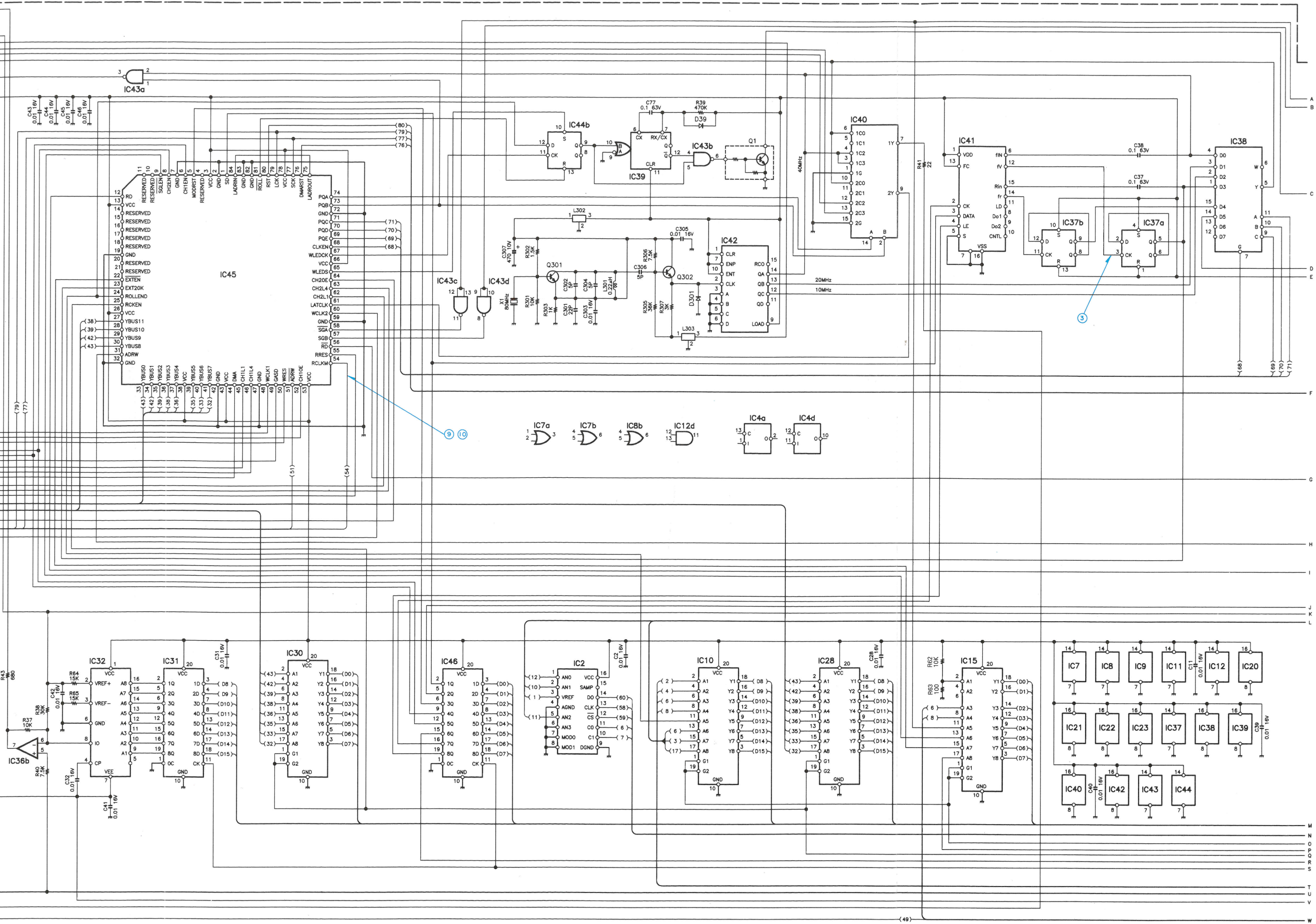
2.0V
34.8mV/div

4.0V
184mV/div

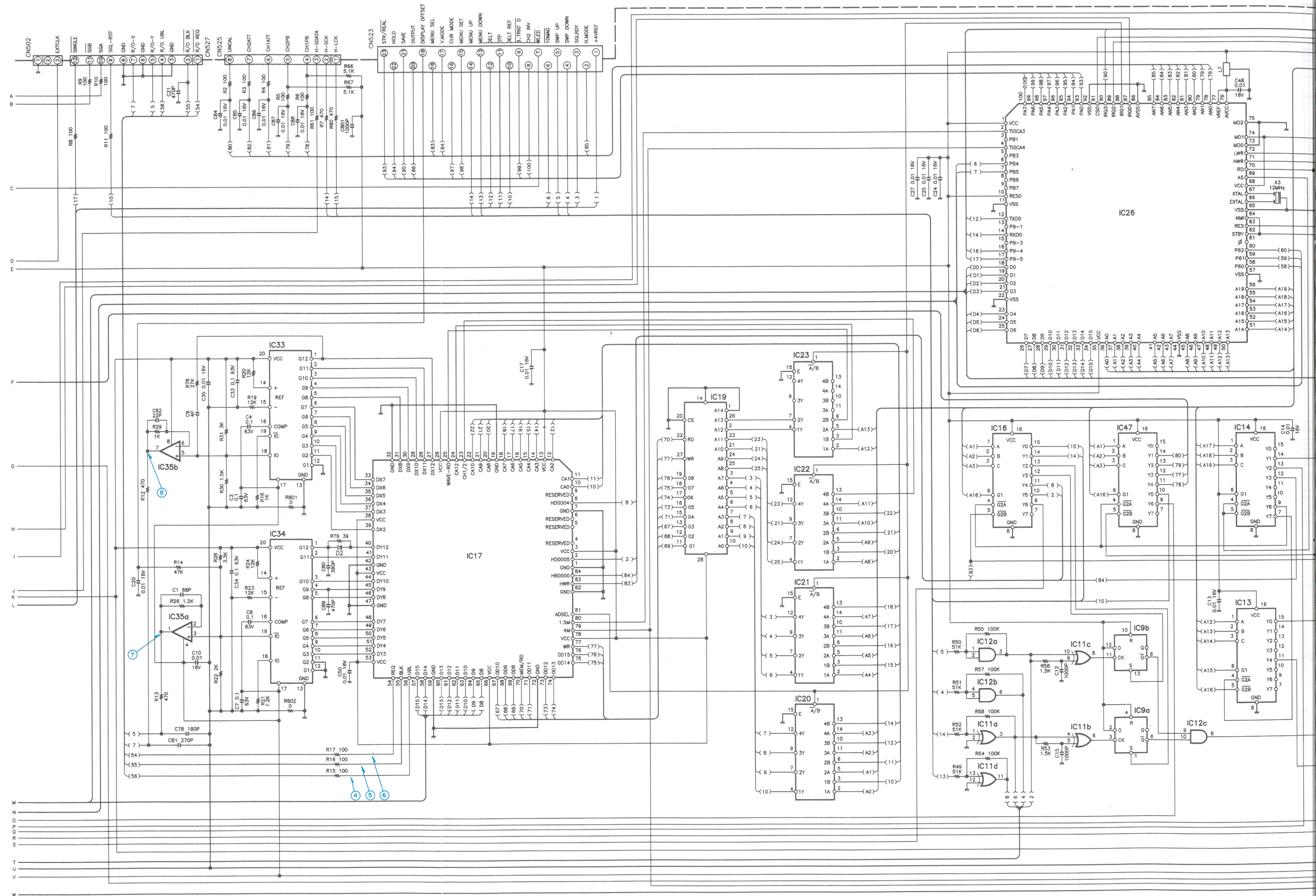
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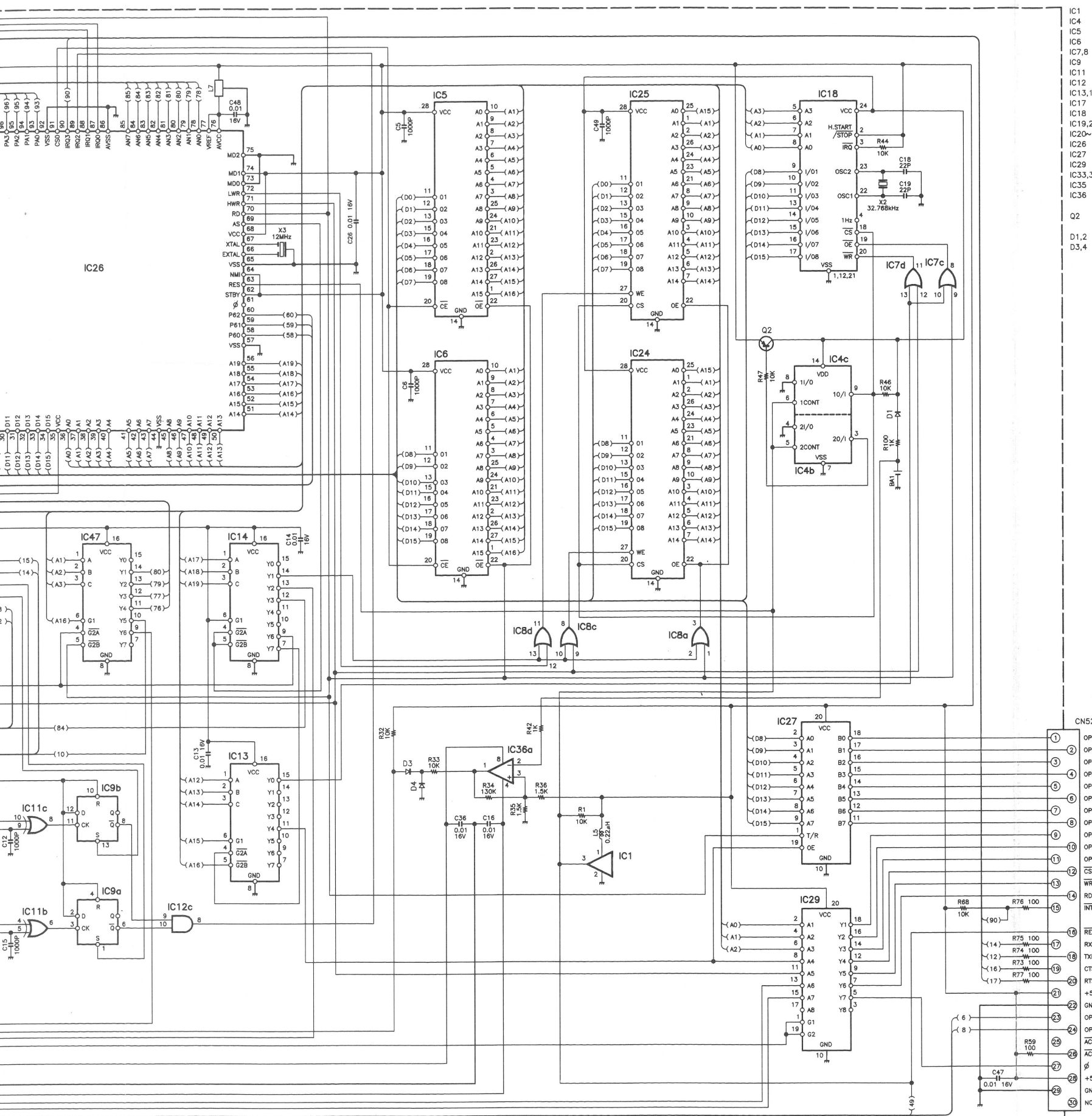
DCS-7020 SCHEMATIC DIAGRAM



DSP UNIT (X79-1300-00)

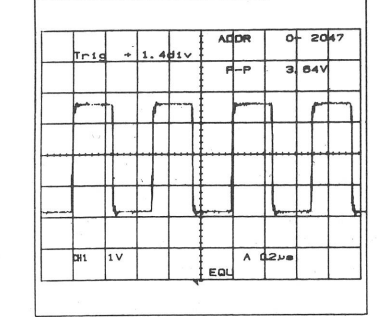


20 SCHEMATIC DIAGRAM

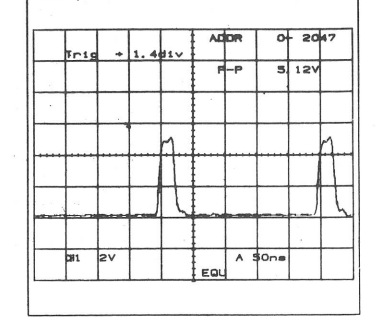


- IC1 : PST7045
 - IC4 : HD14068BFP
 - IC5 : T93-0893-05
 - IC6 : T93-0894-05
 - IC7,8 : HD74LS32FP
 - IC9 : HD74LS74FP
 - IC11 : HD74HC86FP
 - IC12 : HD74HC08FP
 - IC13,14,16,47 : HD74LS138FP
 - IC17 : CTM5290
 - IC18 : HD64610FP
 - IC19,24,25 : 62256BLFP75L
 - IC20~23 : HD74LS157FP
 - IC26 : HD6433040A00F
 - IC27 : HD74HC245FP
 - IC29 : HD74HC244FP
 - IC33,34 : HA17012PB
 - IC35 : μPC814C
 - IC36 : NJM072BD
- Q2 : 2SA933S(R,S)
- D1,2 : MA700
- D3,4 : 1SS132

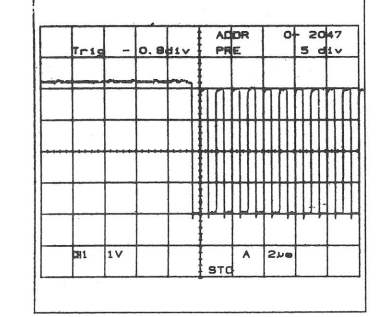
① 0.1ms/div



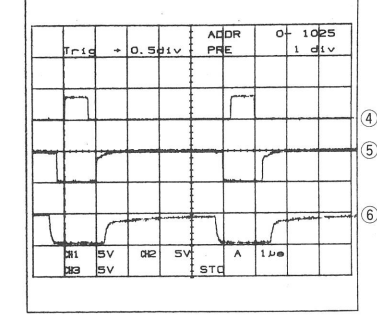
② 0.1ms/div



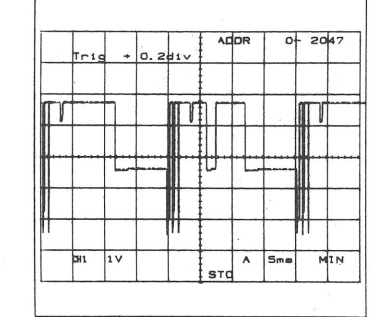
③ STO 0.1ms/div



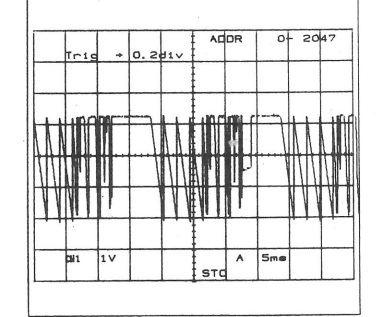
④, ⑤, ⑥ REAL



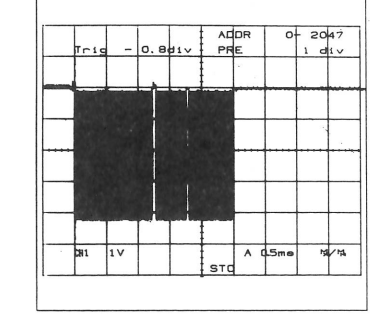
⑦ STO R/O Y



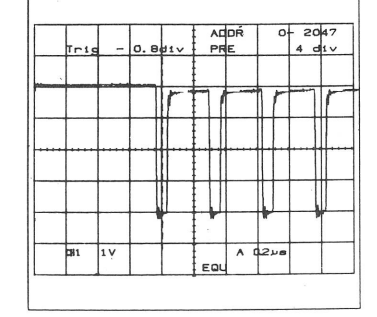
⑧ STO R/O X



⑨

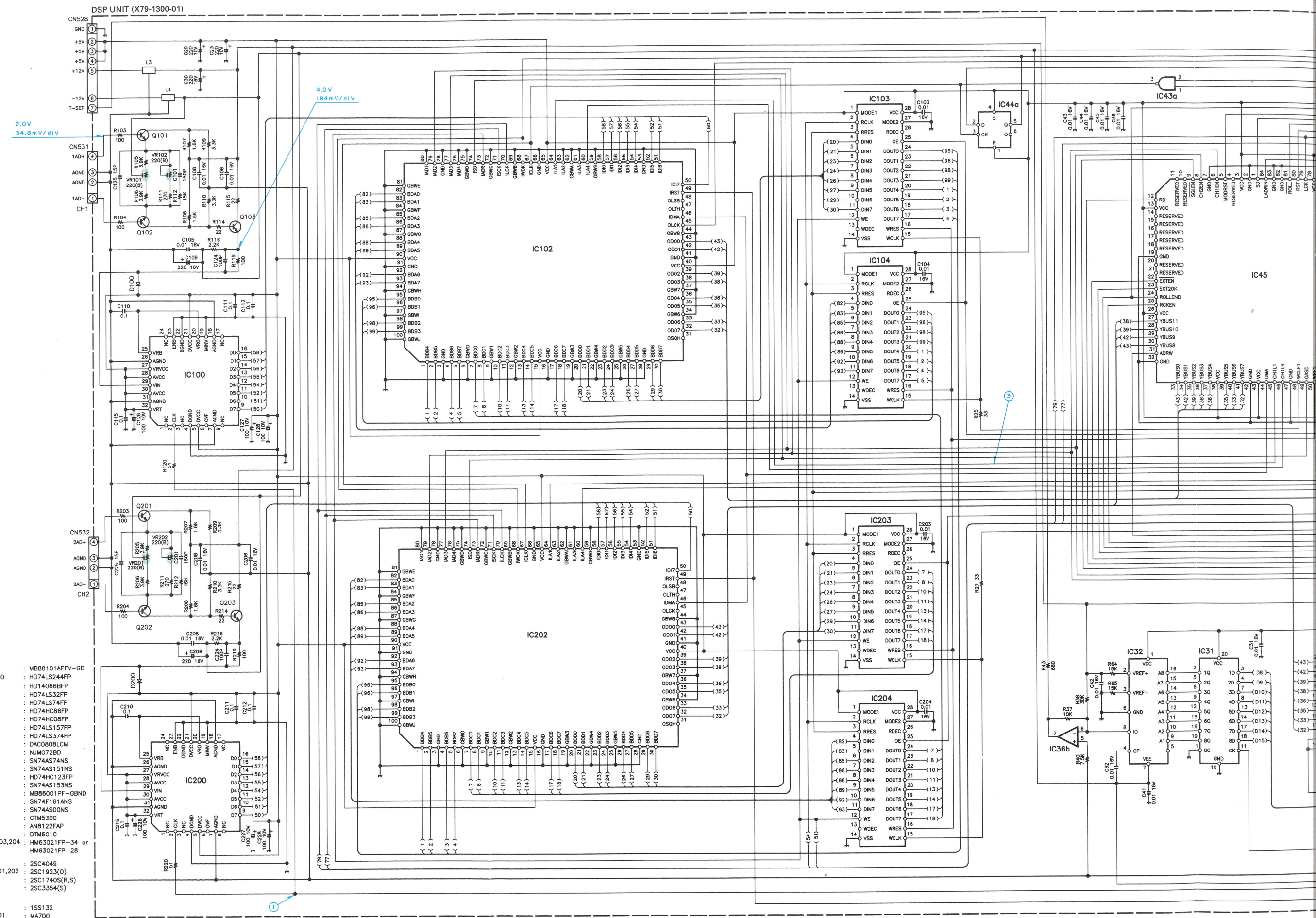


⑩

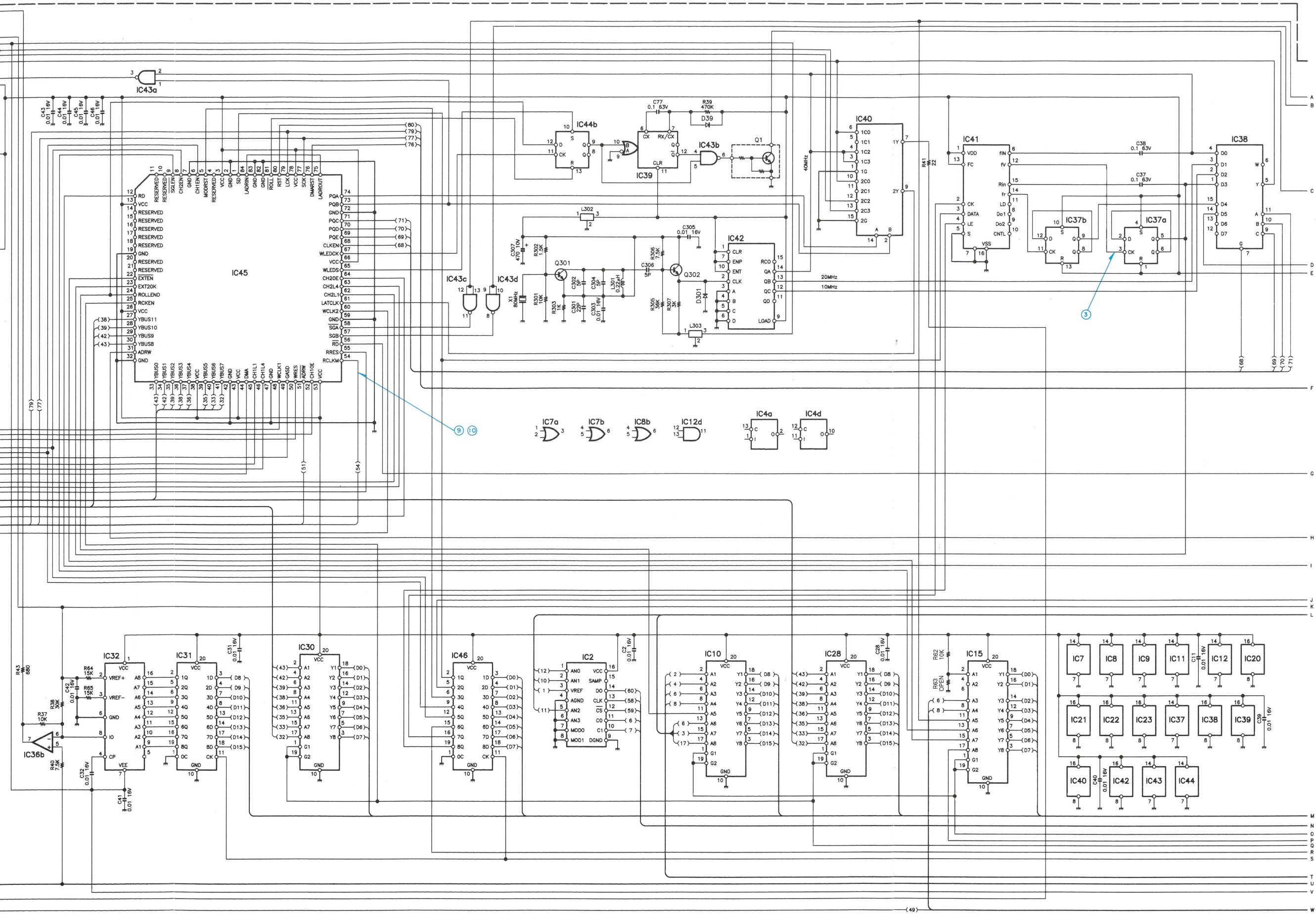


DSP UNIT (X79-1300-01)

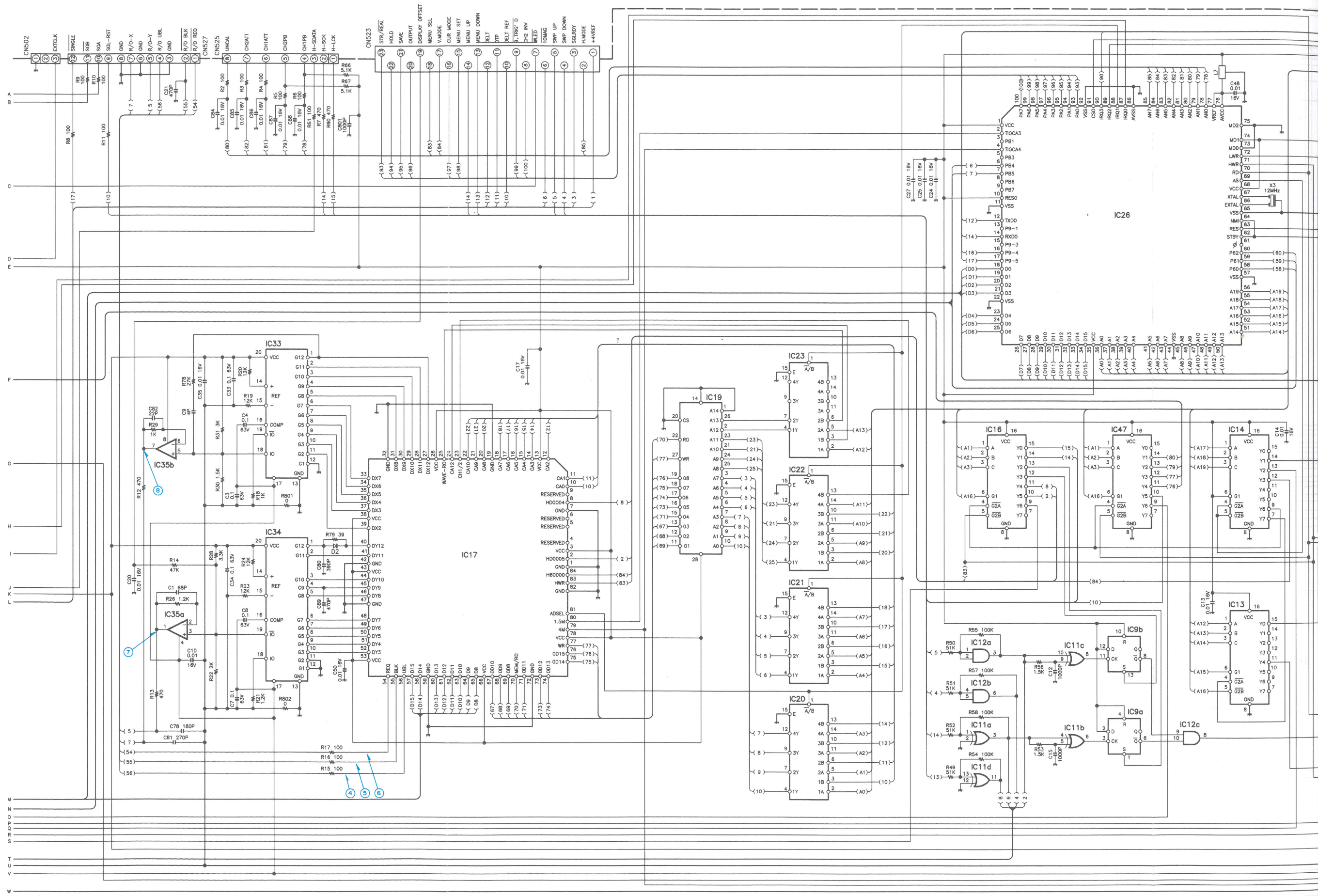
- IC2 : MB88101APFV-GB
- IC10,15,28,30 : HD74LS244FP
- IC4 : HD14066BFP
- IC7,8 : HD74LS32FP
- IC9 : HD74LS74FP
- IC11 : HD74HC86FP
- IC12 : HD74HC08FP
- IC20~23 : HD74LS157FP
- IC31,46 : HD74LS374FP
- IC32 : DAC0808LCM
- IC36 : NUM072BD
- IC37,44 : SN74AS74NS
- IC38 : SN74AS151NS
- IC39 : HD74HC123FP
- IC40 : SN74AS153NS
- IC41 : MB88001PF-GBND
- IC42 : SN74F161ANS
- IC43 : SN74AS00NS
- IC45 : CTM5300
- IC100,200 : AN8122FAP
- IC102,202 : DM6010
- IC103,104,203,204 : HM63021FP-34 or HM63021FP-28
- Q1 : 2SC4048
- Q101,102,201,202 : 2SC1923(O)
- Q103,203 : 2SC1740S(R,S)
- Q301,302 : 2SC3354(S)
- D39 : 1SS132
- D100,200,301 : MA700



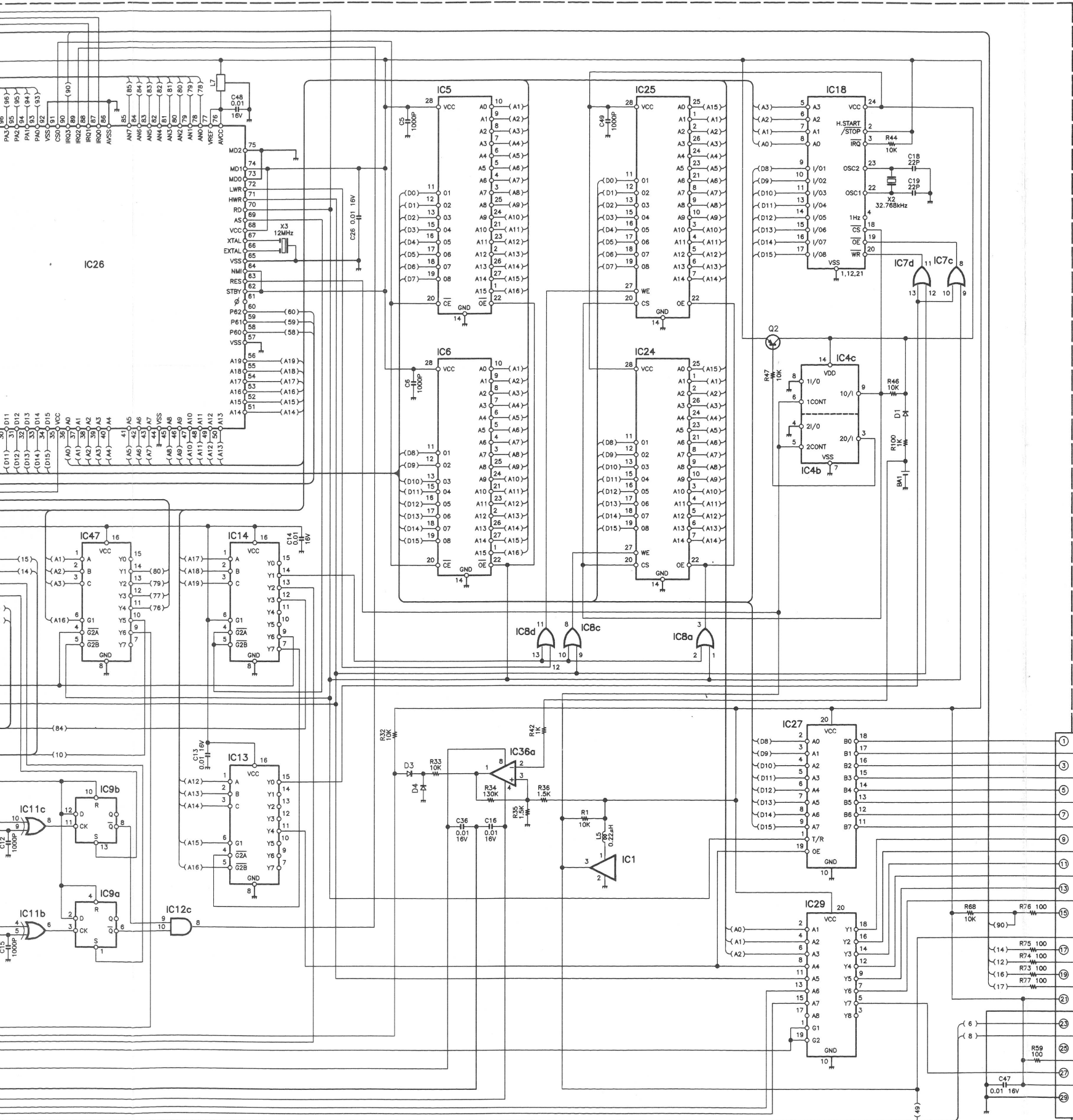
DCS-7040 SCHEMATIC DIAGRAM



DSP UNIT (X79-1300-01)

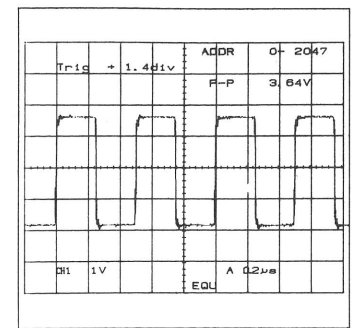


040 SCHEMATIC DIAGRAM

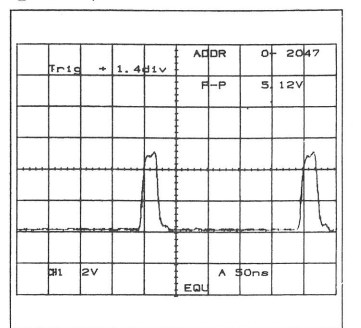


- IC1 : PST7045
 - IC4 : HD14066BFP
 - IC5 : T93-0893-05
 - IC6 : T93-0894-05
 - IC7,8 : HD74LS32FP
 - IC9 : HD74LS74FP
 - IC11 : HD74HC86FP
 - IC12 : HD74HC08FP
 - IC13,14,16,47 : HD74LS138FP
 - IC17 : CTM5290
 - IC18 : HD64610FP
 - IC19,24,25 : 62256BLFP75L
 - IC20~23 : HD74LS157FP
 - IC26 : HD6433040A00F
 - IC27 : HD74HC245FP
 - IC29 : HD74HC244FP
 - IC33,34 : HA17012PB
 - IC35 : μPC814C
 - IC36 : NJM072BD
- Q2 : 2SA933S(R,S)
- D1,2 : MA700
 - D3,4 : 1SS132

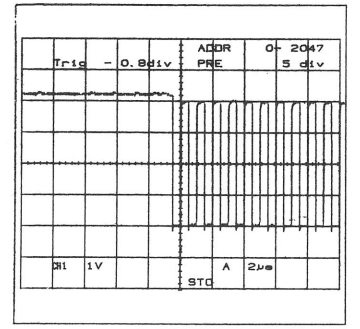
① 0.1ms/div



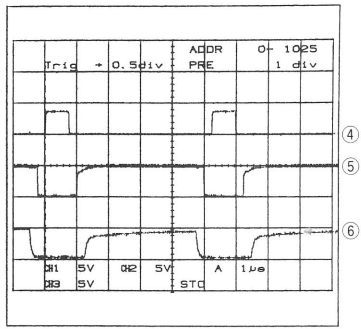
② 0.1ms/div



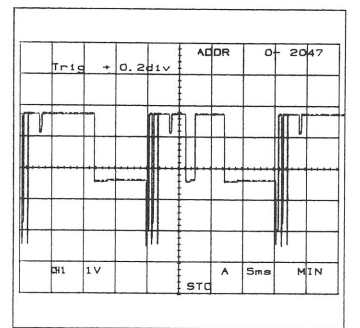
③ STO 0.1ms/div



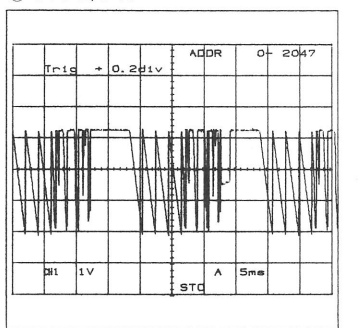
④, ⑤, ⑥ REAL



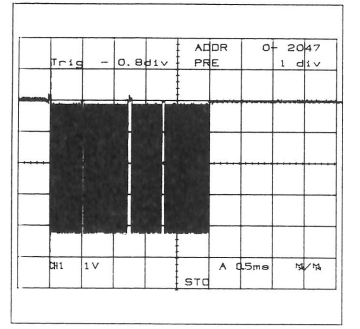
⑦ STO R/O Y



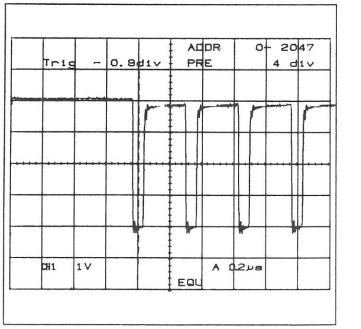
⑧ STO R/O X



⑨

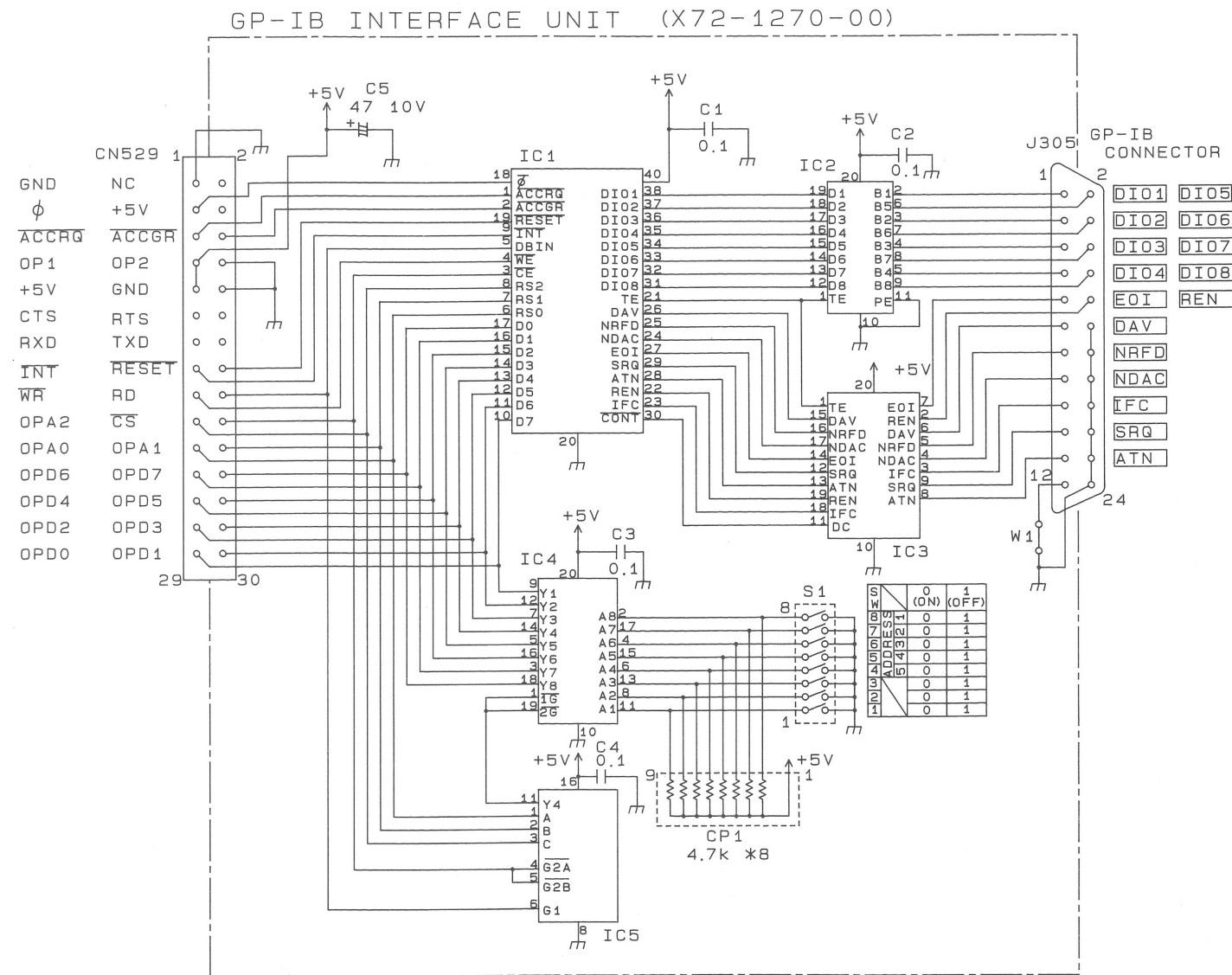


⑩



SCHEMATIC DIAGRAM

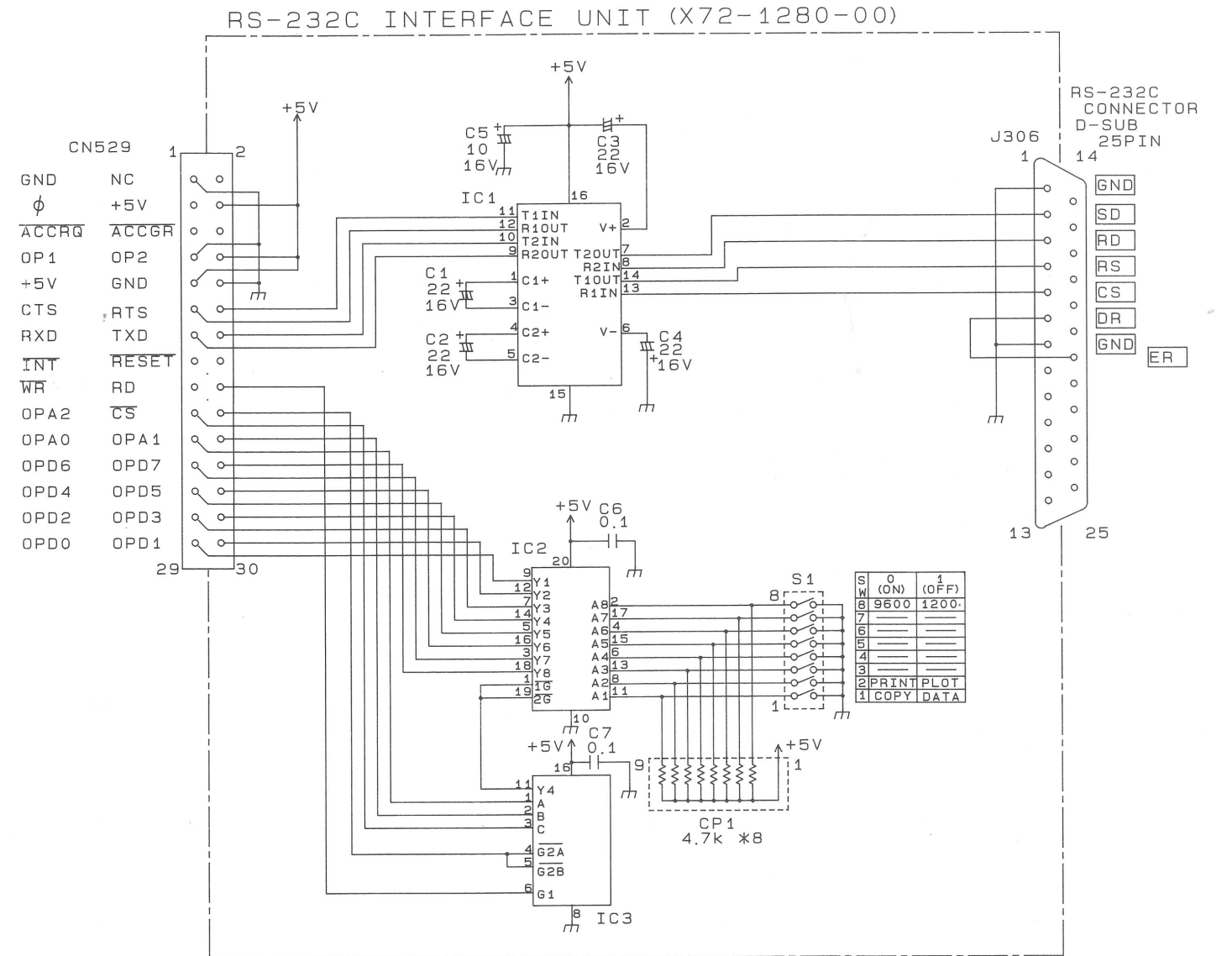
Option
GP-IB INTERFACE UNIT (X72-1270-00)



IC1 : TMS9914ANL
 IC2 : SN75160AN
 IC3 : SN75161AN
 IC4 : TC74HC244AP
 IC5 : TC74HC138AP

SCHEMATIC DIAGRAM

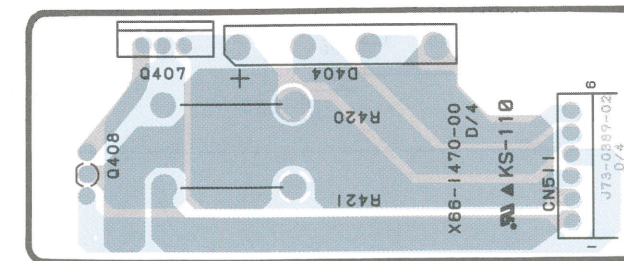
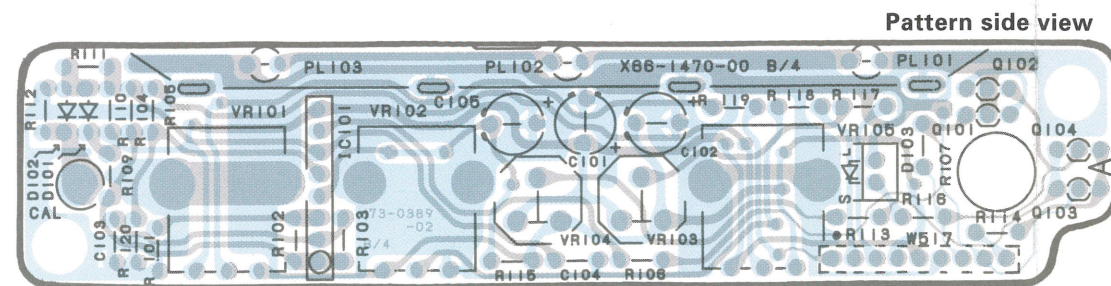
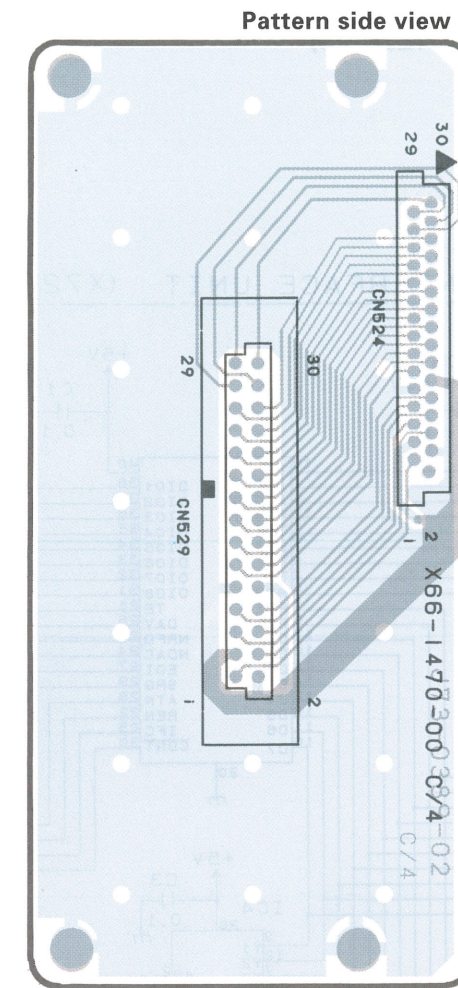
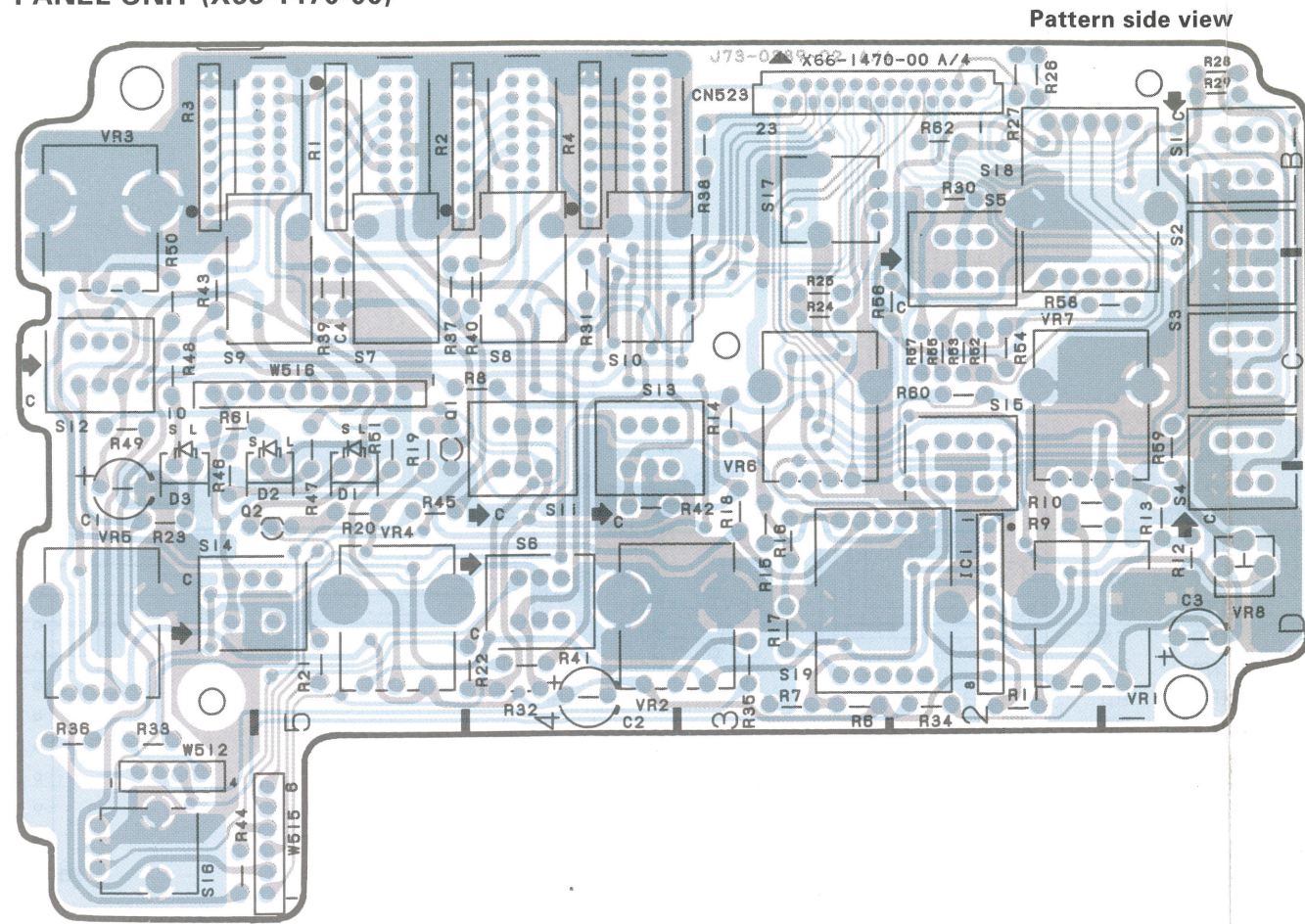
Option
RS-232C INTERFACE UNIT (X72-1280-00)



IC1 : MAX232CPE
 IC2 : TC74HC244AP
 IC3 : TC74HC138AP

P. C. BOARD

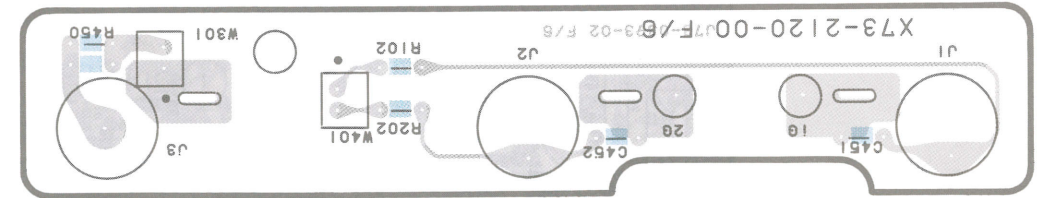
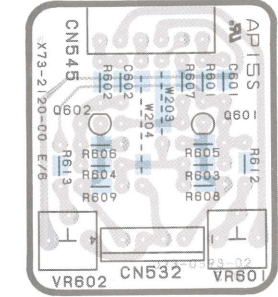
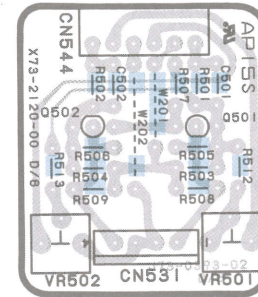
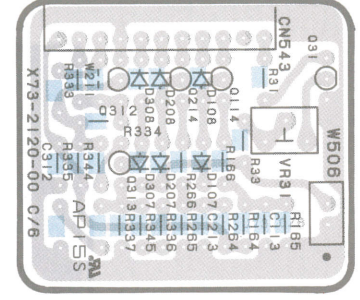
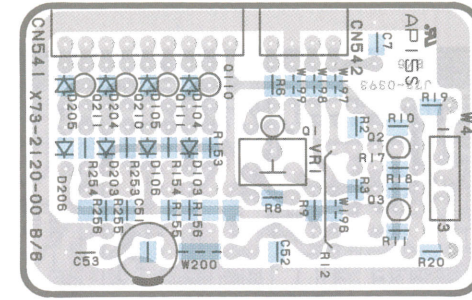
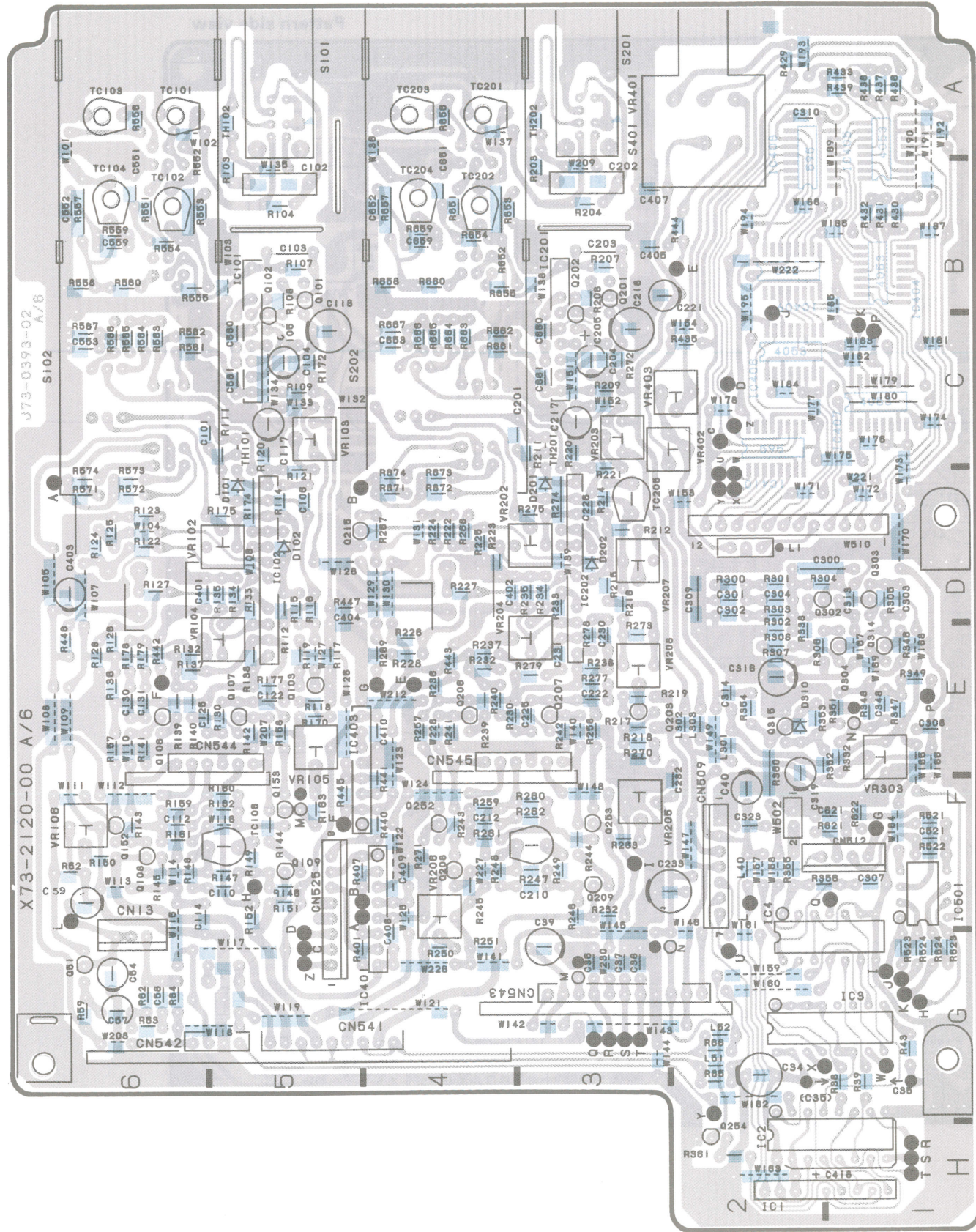
PANEL UNIT (X66-1470-00)



P. C. BOARD

PRE AMP UNIT (X73-2120-00)

Pattern side view

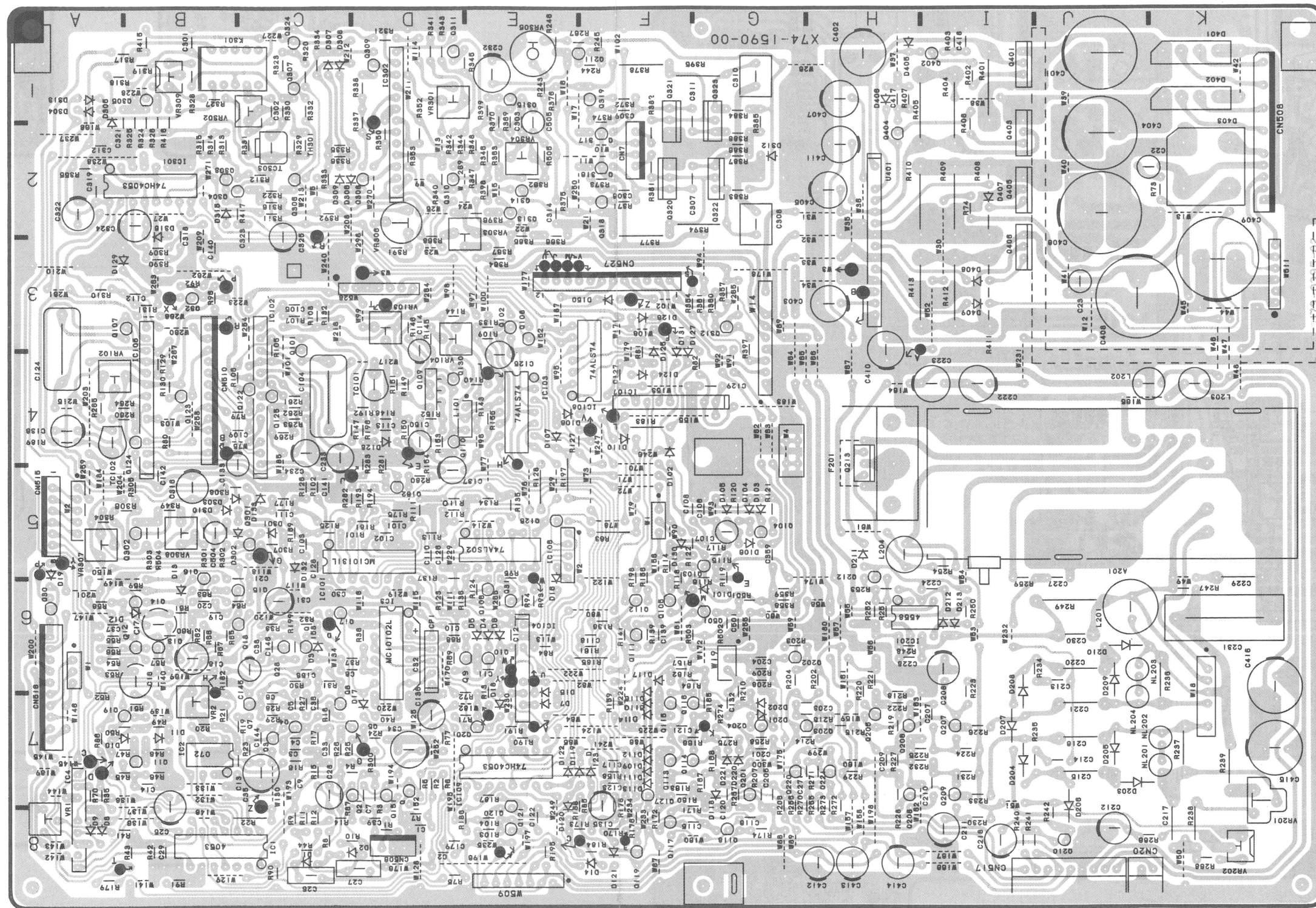


Pattern side view

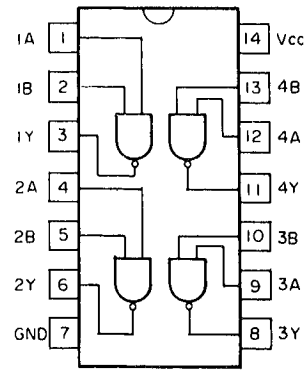
P. C. BOARD

SWEEP UNIT (X74-1590-00)

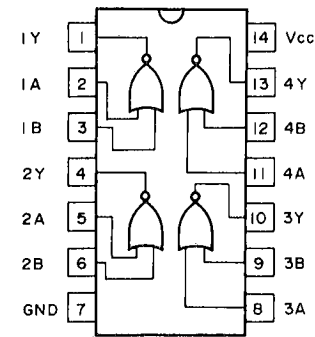
Pattern side view



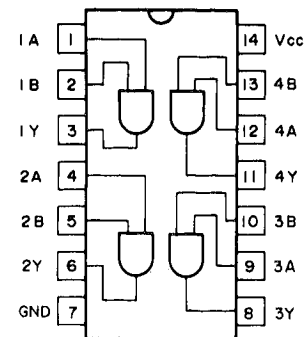
SEMICONDUCTORS



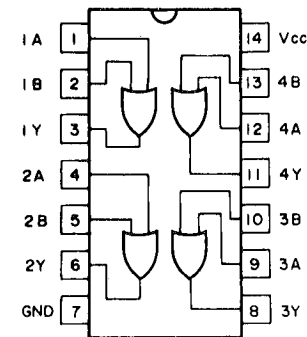
SN74AS00NS



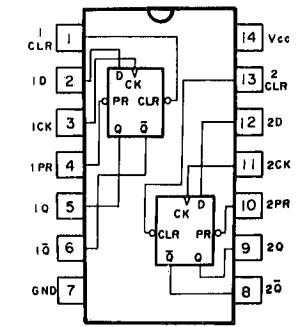
SN74ALS02N
SN74LS02N



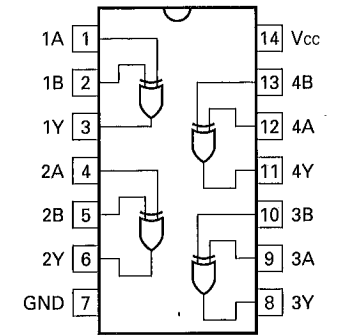
HD74HC08FP



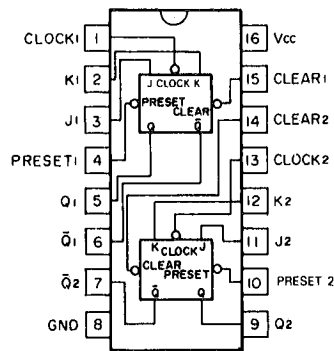
HD74LS32FP



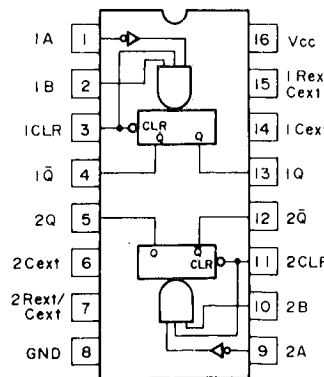
HD74LS74FP
SN74ALS74AN
SN74AS74NS



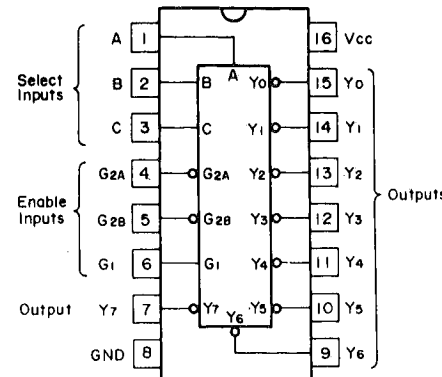
HD74HC86FP



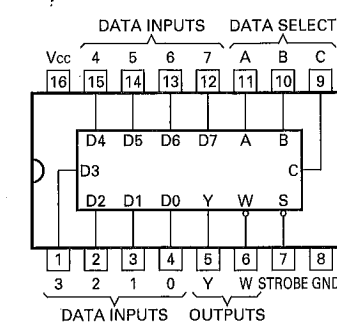
SN74LS112AN



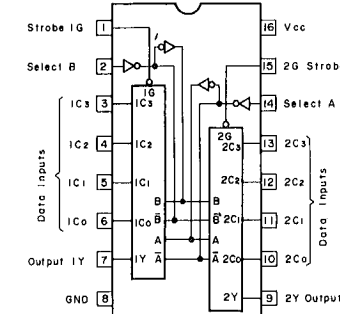
HD74HC123FP



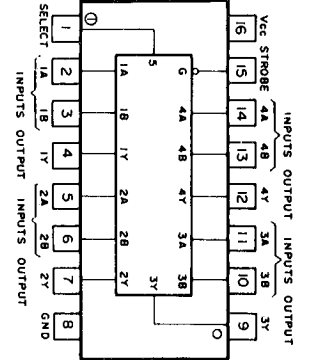
HD74HC138FP
TC74HC138AP



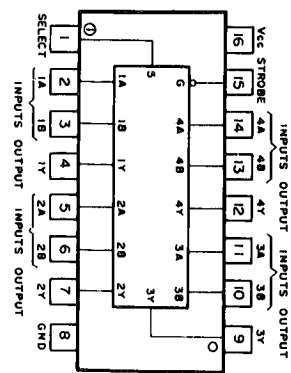
SN74AS151NS



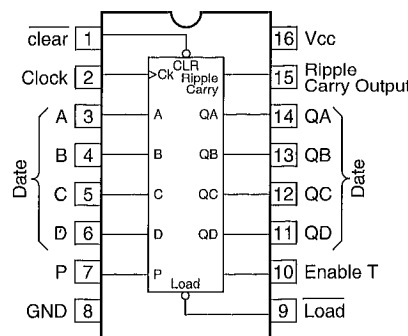
SN74AS153NS



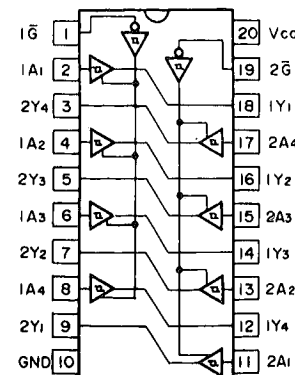
HD74LS157FP



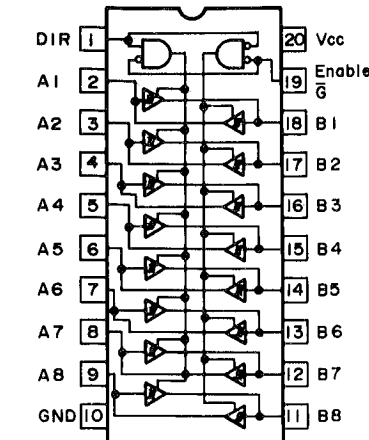
SN74LS158N



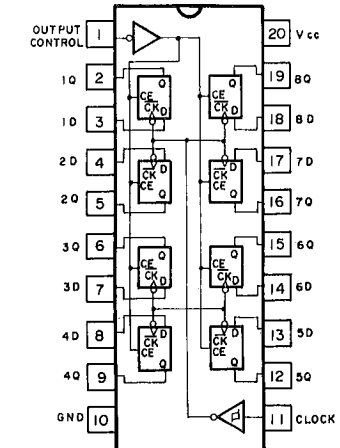
SN74F161ANS



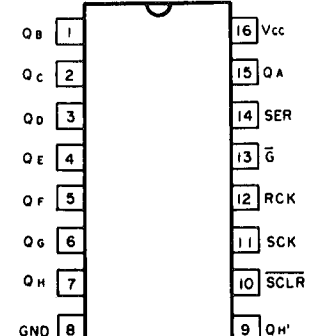
HD74HC244FP
HD74LS244FP
TC74HC244AP



HD74HC245FP

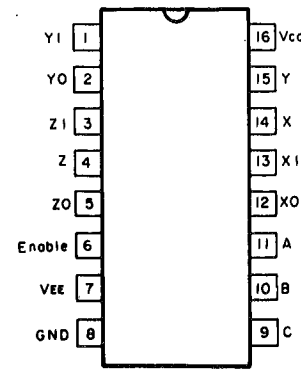


HD74HC374FP

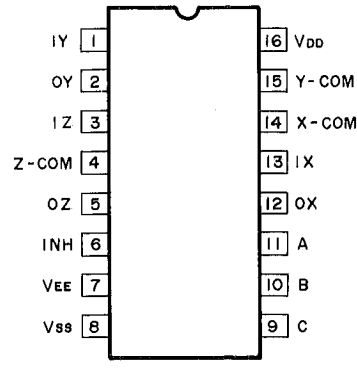


TC74HC595AF

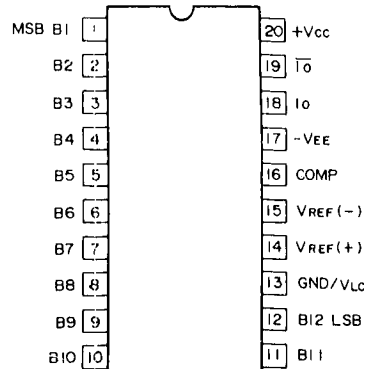
SEMICONDUCTORS



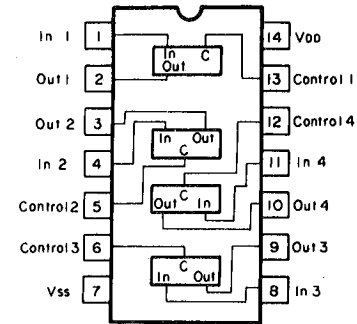
TC74HC4053AP



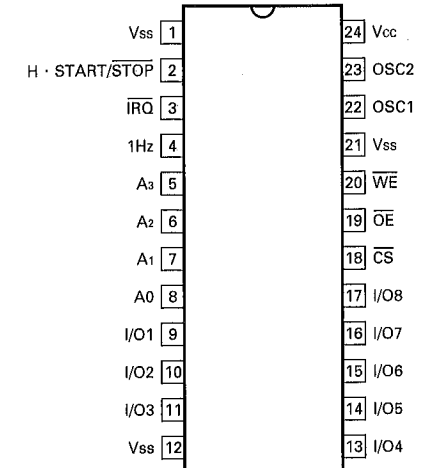
TC4053BF
TC4053BP



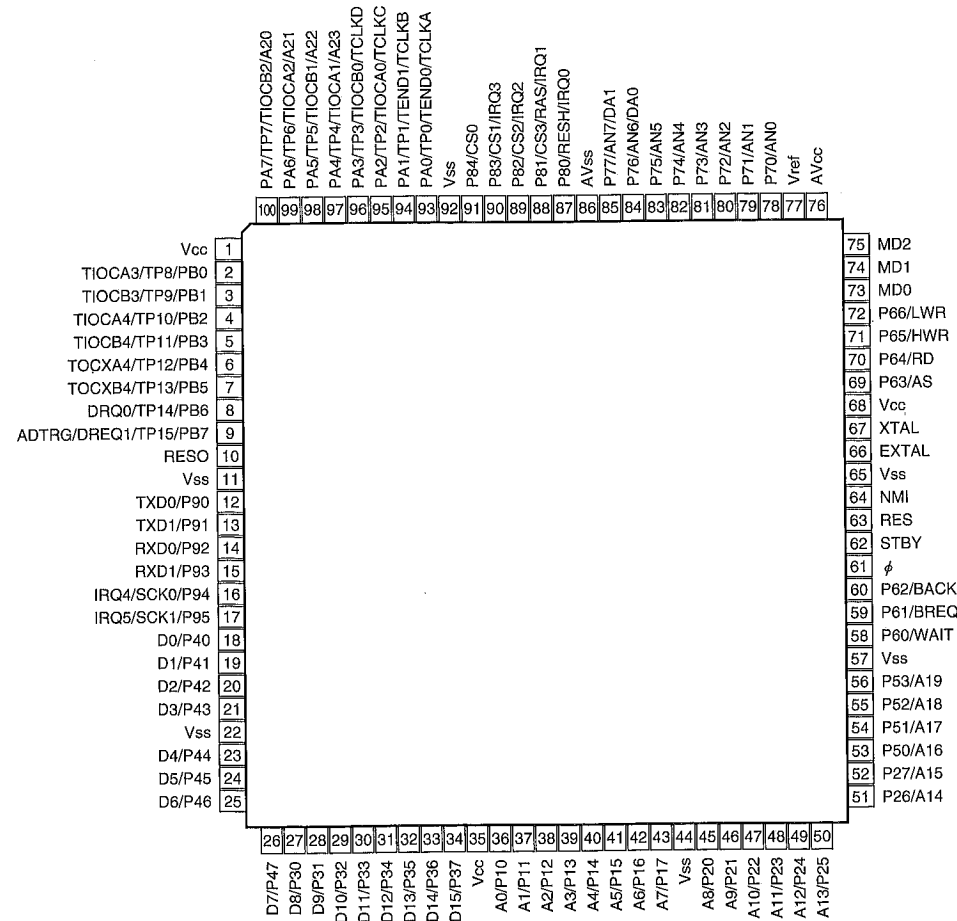
HA17012PB



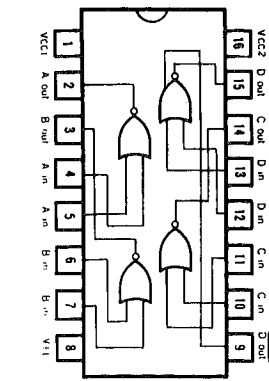
HD14066BFP



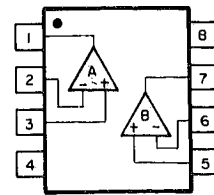
HD64610FP



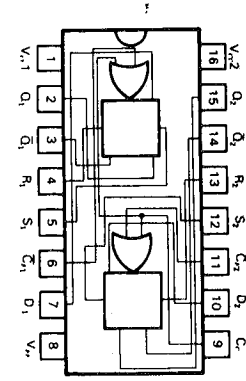
HD6433040A00F



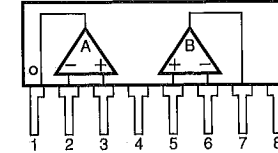
MC10102L



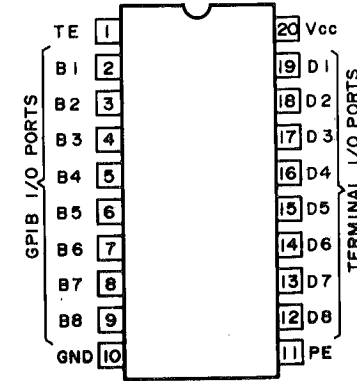
NJM072BD
NJM4558D



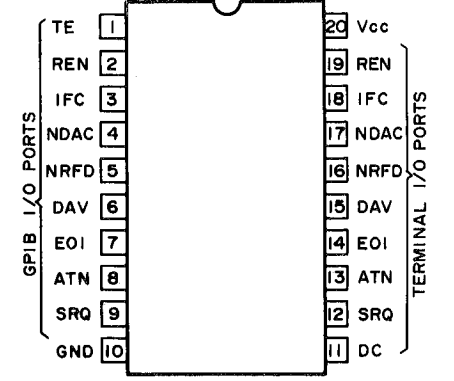
MC10131L



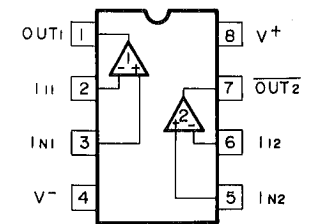
NJM072L
NJM4558L



SN75160AN

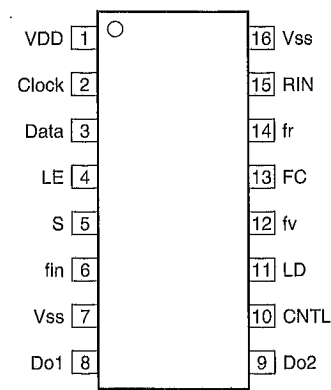


SN75161AN

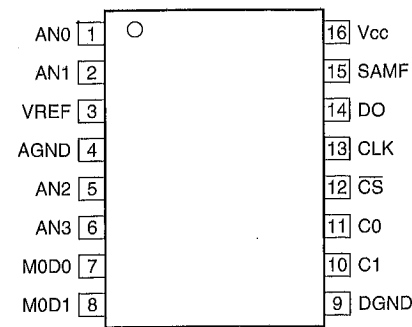


μPC814C

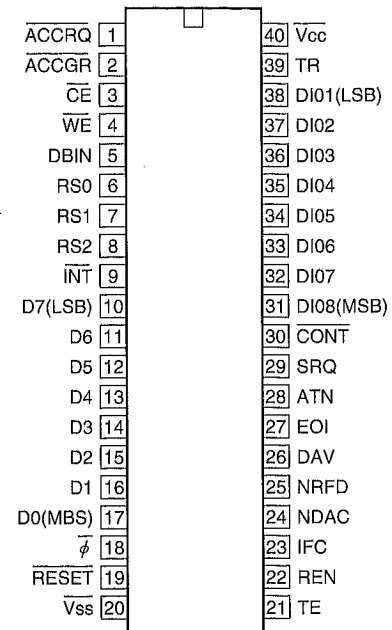
SEMICONDUCTORS



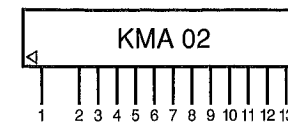
MB86001PF-GBND



MB88101APFV-GB

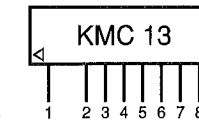


TMS99C14ANL



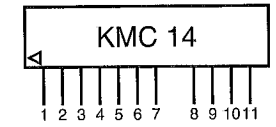
- +140 V output
- +140 V control
- +55 V control
- +55 V output
- +12 V control
- +12 V output
- 12 V control
- 12 V output
- +5 V control
- +5 V output
- Sweep time reference voltage output
- External capacitor connection
- GND

KMA02



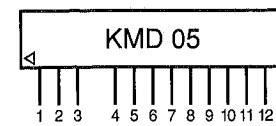
- Signal input
- Compensation
- FET (source) connection
- GND
- + power
- FET (drain) connection
- power
- Signal output

KMC13

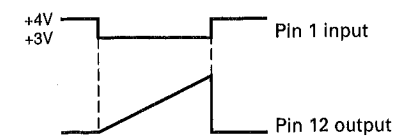


- IN1
- E1
- E2
- IN2
- VAR
- INV-
- INV+
- BAS2
- BAS1
- OUT1
- OUT2

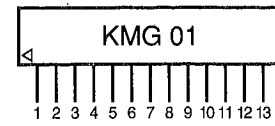
KMC14



- Sweep gate input
- Sweep range input A
- Sweep range input B
- Sweep reference voltage input
- Sweep range input C
- Offset input
- power
- GND
- + power
- External capacitor connection
- External FET connection
- Sweep signal output

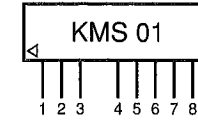


KMD05



- MIX signal output A
- GND
- Signal input A
- + power supply
- Bias setting
- External control
- R/O character signal input
- R/O character position input
- R/O switching signal
- power
- Signal input B
- GND
- MIX signal output B

KMG01



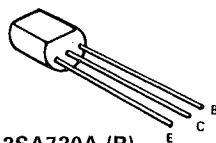
- Analog signal input
- + power
- GND
- Digital signal output A
- Digital signal output B
- Digital signal output C
- Digital signal output D
- Digital signal output E

Analog signal input [V]	Output				
	A	B	C	D	E
0.25 ~ 0.45	L	H	H	H	H
0.95 ~ 1.15	H	L	H	H	H
1.65 ~ 1.85	H	H	L	H	H
2.35 ~ 2.55	H	H	H	L	H
3.05 ~ 3.25	H	H	H	H	L

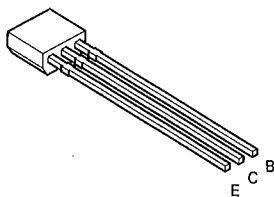
L : 1.0 [V] max
H : 4.5 [V] min

KMS01

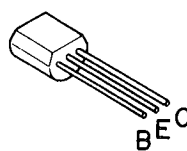
SEMICONDUCTORS



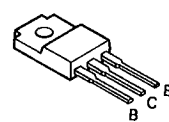
2SA720A (R)
 2SA1005 (K)
 2SA1208 (S)
 2SC1318A (R)
 2SC1907
 2SC1923 (O)
 2SC2551 (O)
 2SC2910 (S)



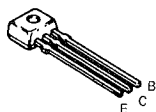
2SA933S (R,S)
 2SC1740S (R,S)



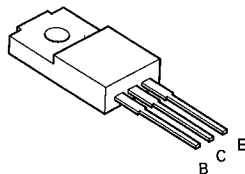
2SA1161
 2SC2644
 2SC3779 (D)



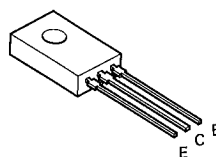
2SA1304
 2SB1015 (Y)
 2SD1406 (Y)



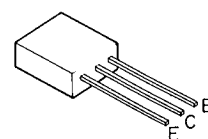
2SA1459 (K)



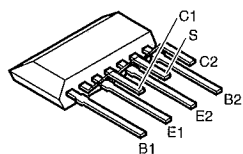
2SA1499 (O,P)



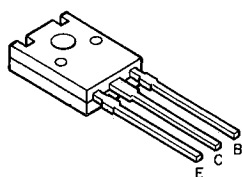
2SA1828 (E)
 2SC4732 (E)



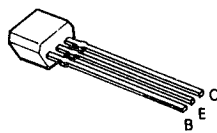
2SC3354 (S)



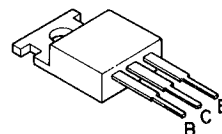
2SC3381 (GR)



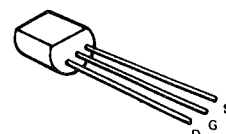
2SC3952 (D)



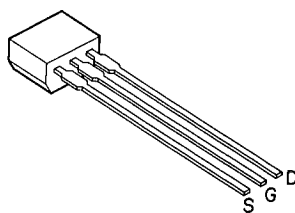
2SC4049



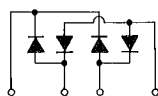
2SD613 (E)



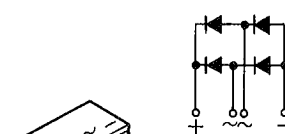
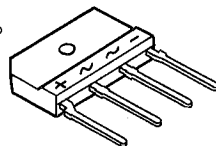
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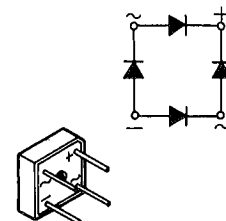
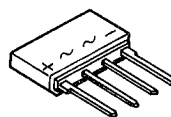
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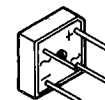
D3SB20



S1VB60



S4VB20F



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