Service Manual

Oscilloscope

LA314/314H

LeCroy

Innovators in Instrumentation

Introduction

- ◇ Thank you for purchasing of LeCroy instrumentation.
- ◇ Please use your instrument after thoroughly reading this service manual and understanding its contents.
- ◇ This Oscilloscope meets CE requirements per the Council Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/ECC for Product Safety.
- ◇ This Oscilloscope conforms to product safety requirements per UL3111 (as Pollution Degree 2 and Installation Category II) under file E183826.

Cautions for safe use

Matters that must be observed for safe operation of this instrument and for prevention of injury to humans and damage to property are described as "⚠warnings" and "⚠cautions" in this manual. The symbol to invoke caution is marked on the panel.

Explanation of "⚠warnings" and "⚠cautions" columns in this manual

⚠Warning	Incorrect operation or failure to heed warnings may result in death or serious injury.
⚠Caution	Incorrect operation or failure to heed cautions may result in injury or damage to equipment.

Explanation of the symbols on the panel

Symbol	Meaning
⚠	This a symbol used in reference with the statements in the manual to protect the user against injury and protect this instrument against damage.
⏚	Frame or chassis Terminal
⚡	Risk of electric shock
⏚	Protective Conductor Terminal

Cautions

- ◇ Parts of the contents of this manual may be modified without notice to accommodate improvements in performance and function.
- ◇ Reproduction of the contents of this manual without previous consent is prohibited.

History

- ◇ July 1998 : Issue of the 1st edition

⚠ Warnings

- **Disconnect the power cord from the receptacle, before installing or removing the cover and the panel.**
  Power is applied to the instrument, if the power switch is set to STBY. To avoid electrical shock, disconnect the power cord from the receptacle.
- **Use Care When Servicing With Power On.**
  Dangerous voltages exit at several points in the instrument and the CRT circuit is a high-voltage power supply. To avoid electrical shock, do not touch exposed connections or component while power is on.
- **Use the instrument with the rated AC power supply.**
  To avoid electrical shock, fire or power failure. Use the voltage range 90 to 250 VAC.

⚠ Cautions

- **Never place a heavy substance on the power cord:**
  It may cause electric shock or fire.
- **Prior to connecting or disconnecting the power cord, set the power supply to STBY:**
  Its negligence may cause electric shock or trouble.
- **Use the specified AC power to operate the instrument:**
  Use of non-specified power may cause electric shock, fire, or trouble. The available AC power voltage is 90 to 250V AC.
- **Use a 3-core power cord suitable to the supply voltage:**
  Use of other type cord may cause electric shock or fire.
- **Do not place any substance near the air ventilation hole or fan:**
  It may cause a fire or trouble.
- **Use the instrument under the specified operating range:**
  Otherwise, it may cause a trouble. An available temperature range is as follows:
  - Operation : Indoor use only
  - Temperature : 0 to 40 ℃
  - Relative humidity : 90 % RH (40 ℃)
- **Do not apply an over voltage to the input terminal:**
  It may cause a trouble. A maximum allowable input voltage is as follows:
  - CH1, CH2, CH3, CH4:
    Direct
    At 1 MΩ : ±400V (DC+ACpeak)
    At 50Ω (CH1, CH2) : 5Vrms
    With PP005 (10:1) or equivalent : ±600V (DC+ACpeak)
  - Z AXIS IN : ±40V (DC+ACpeak)

Table of Contents

Section 1 Specifications

LA314

CRT

Type	6 inch, diagonal rectangular flat face, internal graticule, meshless CRT with graticule illumination
Display area	8 div x 10 div (1 div=10 mm)
Acceleration voltage	Approx. 20 kV

Vertical deflection system (Y axis)

Vertical mode	CH1, CH2, CH3, CH4, ADD (CH1+CH2), ALT/CHOP
CH1, CH2	CHOP mode switching rate 555 kHz ± 1 %.
Deflection factor	
Range	2 mV/div to 5 V/div, 1-2-5 sequence, 11 steps
Variable control range	2 mV/div to 12.5 V/div continuously variable
Accuracy	± 2%
Frequency characteristics	
Bandwidth	DC to 400 MHz –3 dB
Bandwidth limiter	DC to approx. 20 MHz or DC to approx. 100 MHz can be selected [Note] AC coupled low cutoff frequency (–3 dB) is 10 Hz.
Rise time	Approx. 875 ps [Note] Rise time Tr is calculate from: $Tr = \frac{350}{\text{Bandwidth [MHz]}}$ [ns]
Step response	at 10 mV/div, with internal 50 Ω termination
Overshoot	5 %
Sag (at 1 kHz)	1 %
Signal delay	At least 20 ns of the sweep is displayed before the triggering event.
Input coupling	AC, DC, GND
Input RC	1 MΩ ± 1.5 % // 16 pF ± 2 pF, 50 Ω ± 1 %
⚠ Maximum input voltage	
1 MΩ	± 400 V (DC+ACpeak)
50 Ω	5 V rms
VSWR	1.35 MAX (50 Ω : DC to 400 MHz)
Offset voltage control range	

Vertical deflection range	Offset voltage
2 mV/div to 50 mV/div	± 1 V
0.1 V/div to 0.5 V/div	± 10 V
1 V/div to 5 V/div	± 100 V

Position control range	Approx. ± 10 div from the center line of the screen
Invert	Available on CH2
ADD	
Accuracy of sum (at 1 kHz)	± 3 %
Frequency characteristics	DC to 400 MHz – 3 dB at 10 mV/div, CH2 inverted
Common-mode rejection ratio	
1 kHz sine wave	50 : 1
20 MHz sine wave	15 : 1
Dynamic range	8 div or more 400 MHz input signal at 10 mV/div full bandwidth
Probe sense	10 : 1, 100 : 1 detection

CH3, CH4

Deflection factor	
Range	100 mV/div, 500 mV/div
Accuracy	± 3 %
Bandwidth	DC to 400 MHz –3dB
	[Note] AC coupled low cutoff frequency (–3 dB) is 10 Hz
Input RC	1 MΩ ± 1.5 % // 16 pF ± 3 pF
⚠ Maximum input voltage	± 400 V (DC+ACpeak)
Position control range	Approx. ± 10 div from the center line of the screen
Dynamic range	8 div or more 400 MHz input signal full bandwidth
Probe sense	10:1, 100:1 detection

Triggering

A triggering

Trigger sensitivity

Frequency	P. P signal amplitude
DC to 10 MHz	0.4 div
10 MHz to 100 MHz	1.0 div
10 MHz to 400 MHz	2.0 div

[Note] TV : The ratio between the composite video signal and synchronization signal is 7:3 and synchronization signal amplitude is 1.5 div or more.
HF-REJ : Attenuates at 10 kHz or more
LF-REJ : Attenuates at 10 kHz or less

Signal source	CH1, CH2, CH3, CH4, LINE
Coupling	AC, DC, HF-REJ, LF-REJ
Slope	+, –

B triggering

Trigger sensitivity

Frequency	P. P signal amplitude
DC to 10 MHz	0.4 div
10 MHz to 100 MHz	1.0 div
10 MHz to 250 MHz	2.0 div

[Note] HF-REJ : Attenuates at 10 kHz or more
LF-REJ : Attenuates at 10 kHz or less

Signal source	CH1, CH2, CH3, CH4
Coupling	AC, DC, HF-REJ, LF-REJ
Slope	+, –

TV triggering

Mode	ODD, EVEN, BOTH, TR-H
Formats	NTSC, PAL (SECAM), HDTV
Field and line selection	ODD, EVEN, or BOTH can be selected
NTSC	1 H to 525 H
PAL (SECAM)	1 H to 625 H
HDTV	1 H to 1125 H

TV clamp

Clamp position	Back porch level
Back porch reference	± 1 div or less from ground reference
Signal amplitude range	1.5 to 8 div

Event trigger	
Count mode	
Event count range	1 to 65535
Maximum frequency	50 MHz
Burst mode	
Burst signal interval time	0.15 µs to 9.99 s
AUTO SETUP	
Channels	Available CH1 and CH2
Frequency	50 Hz to 100 MHz
Horizontal deflection system (X axis)	
Horiz display	A, ALT, B, X-Y
A sweep	
Sweep mode	AUTO, NORMAL, SINGLE
Sweep rates	
Maximum sweep	500 ps/div
Range	5 ns to 500 ms/div 1-2-5 sequence, 25 steps
Variable range	5 ns to 1.5 s/div
Accuracy I	± 2 %*1 over center 8 div
Accuracy II	± 5 %*1 over any 2 div within center 8 div
	*1 Add 1 % in case of VARIABLE ON
Hold-off time	Continuously variable
B sweep	
Delay	Triggered delay or continuous delay (RUNS AFTER)
Sweep rates	
Maximum sweep	500 ps/div
Range	5 ns to 20 ms/div 1-2-5 sequence, 21 steps
Accuracy I	± 2 % over center 8 div
Accuracy II	± 5 % over any 2 div within center 8 div
Delay time	
Position control range	0.2 to 10.2 div
Accuracy	± [(set value x 0.005) + (sweep rate x 0.1)] –55ns within the range of 1 µs/div to 500 ms/div
Delay pick off jitter	1/20000, at 1 ms/div of A sweep:, at 500 ns/div of B sweep
Sweep magnification	
Magnifying ratio	10 times
Accuracy I *2	over center 8 div
10 ns/div, 50 ns/div	± 5 %
100 ns/div to 500 ms/div	± 3 %
Accuracy II *1*2	over any 2 div within center 8 div
5 ns/div, 50 ns/div	± 10 %
100 ns/div to 500 ms/div	± 5 %
	*1 20 ns or 1 div at the beginning of sweep and 20 ns at the end of sweep are excluded.
	*2 Add 1 % in case of VARIABLE ON
X-Y operation	
X axis (CH1)	
Deflection factor	Same as CH1.
Accuracy	± 2 %
Bandwidth	DC to 2 MHz, –3 dB
Y axis	CH1, CH2, CH3, CH4, ADD
Phase difference	3° or less (DC to 200 kHz)

LA314

CAL (Probe calibration signal)	
Waveform	Square wave
Frequency	1 kHz ± 0.1 %
Duty ratio	49 % to 51 %
Output voltage	0.6 V ± 1 %
CH2 OUT	
Output voltage	20 mV/div ± 30 % (into 50 Ω)
Output dynamic range	± 100 mV (50 Ω)
Output coupling	DC coupling
Frequency band width	200 MHz –3dB (into 50 Ω)
Output resistance	50 Ω ± 20 %
Z AXIS IN	
Sensitivity	0.5 Vp-p or more Positive-going input decreases intensity.
Frequency range	DC to 5 MHz
Input resistance	5 kΩ ± 20 %
Maximum input voltage	± 40 V (DC+ACpeak)
Measurement with cursors and counter	
Measurement with cursors	
Type of measurement	Time difference (Δt), voltage difference (ΔV)
Cursor position control range	
X axis	± (5 ± 0.2) div from the center line of the screen
Y axis	± (4 ± 0.2) div from the center line of the screen
Accuracy	
Voltage difference (ΔV)	± [(2 % of reading) + (0.3 % of full scale)]
Time difference (Δt)	
MAG OFF	± [(2 % of reading) + (0.3 % of full scale)]
MAG ON (MAG x 10)	
500 ms to 100 ns/div	± [(3 % of reading) + (0.3 % of full scale)]
50 ns, 5 ns/div	± [(5 % of reading) + (0.3 % of full scale)]
	[Note] Full scale : Voltage 8 div, Time 10 div
Counter	
Number of digits displayed	5 digits
Accuracy	± 0.01%
Frequency measurement range	2 Hz to 400 MHz
Saving data	Backup by built-in battery
Type of data to be saved	Panel setup conditions immediately before turning power off *1 Storing of panel setup conditions
Data retention time	Approx. 30,000 H (at approx. 25℃) [Note] The state where the power cord is disconnected.
Power source	
Voltage range	100 to 240 VAC
Frequency range	50/60 Hz
Power consumption	110VA
Mass and Dimension	
Mass	Approx. 8.5 kg (without accessories)
Dimension	320 ± 2W x 160 ± 2H x 406 ± 2D [mm] [Note] Without accessories, and projections.

Environmental conditions

Specification assurance temperature	10 to 35 ℃
Operating	
Temperature	0 to 40 ℃
Humidity	90 % RH or less (at 40 ℃)
Storage	
Temperature	−20 to 70 ℃
Humidity	80 % RH or less (at 70 ℃)
Altitude	
Operating	2,000 m, atmospheric pressure : Approx. 79 kPa
Nonoperating	15,000 m, atmospheric pressure : Approx. 12 kPa
Vibration	15 minutes along each of three axes at a total displacement of 0.67 mm p.p with frequency varied from 10 Hz to 55 Hz in 1 minute sweep.
Shock	Lifting a side to height of 10 cm and dropping it naturally onto hard wood; 4 times on each side.
Dropping packaged	Dropping an instrument packaged for transportation from a height of 90 cm.
Warm up time	The specifications for this instrument are the assured values after more than 30 min of power on.
CE Declaration of Conformity	The Oscilloscope meets requirements of the Council Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/ECC for Product Safety.
Electromagnetic Emission	
EN55011:1991	
EN55011:1991	Class B Radiated and Conducted Emissions
EN61000-3-2:1995	AC Power Line Harmonic Current Emissions
EN61000-3-3:1995	Voltage Fluctuations and Flicker
Electromagnetic Susceptibility	
EN50082-2:1995	
EN61000-4-2:1995	Electrostatic Discharge Immunity
ENV50140:1993	RF Field Strength Susceptibility (Amplitude Modulation)
ENV50204:1995	RF Field Strength Susceptibility (Pulse Modulation)
EN61000-4-4:1995	Electrical Fast Transient/Burst Immunity
ENV50141:1993	Conducted Susceptibility
Low Voltage Directive	
EN61010-1:1993+Amd.2:1995	Safety requirement for electrical equipment for measurement, control, and laboratory use.

The oscilloscope has been qualified to the following EN61010-1 category:

Installation (Overvoltage) Category II	Pollution Degree 2
Pollution Degree 2	Do not operate in environments where conductive pollutants may be present.
Installation (Overvoltage) Category II	Local Level mains, appliances, portable equipment.

LA314H

CRT

Type	6 inch, diagonal rectangular flat face, internal graticule, meshless CRT with graticule illumination
Display area	8 div x 10 div (1 div=10 mm)
Acceleration voltage	Approx. 20 kV

Vertical deflection system (Y axis)

Vertical mode	CH1, CH2, CH3, CH4, ADD (CH1+CH2), ALT/CHOP
CH1, CH2	CHOP mode switching rate 555 kHz ± 1 %.
Deflection factor	
Range	2 mV/div to 5 V/div, 1-2-5 sequence, 11 steps
Variable control range	2 mV/div to 12.5 V/div continuously variable
Accuracy	± 2 %
Frequency characteristics	
Bandwidth	
5 mV/div to 50 mV/div	DC to 470 MHz –3 dB
2 mV/div, 100 mV/div to 5 V/div	DC to 440 MHz –3 dB
Bandwidth limiter	DC to approx. 20 MHz or DC to approx. 100 MHz can be selected [Note] AC coupled low cutoff frequency (–3 dB) is 10 Hz.
Rise time	Approx. 745 ps (5 mV/div to 50 mV/div) [Note] Rise time Tr is calculate from: $Tr = \frac{350}{\text{Bandwidth [MHz]}}$ [ns]
Signal delay	At least 20 ns of the sweep is displayed before the triggering event.
Input coupling	AC, DC, GND
Input RC	1 MΩ ± 1.5 % // 16 pF ± 2 pF, 50 Ω ± 1 %
⚠ Maximum input voltage	
1 MΩ	± 400 V (DC+ACpeak)
50 Ω	5 V rms
VSWR	1.35 MAX (50 Ω : DC to 400 MHz)
Offset voltage control range	

Vertical deflection range	Offset voltage
2 mV/div to 50 mV/div	± 1 V
0.1 V/div to 0.5 V/div	± 10 V
1 V/div to 5 V/div	± 100 V

Position control range	Approx. ± 10 div from the center line of the screen
Invert	Available on CH2
ADD	
Accuracy of sum (at 1 kHz)	± 3 %
Frequency characteristics	DC to 400 MHz –3 dB
Common-mode rejection ratio	at 10 mV/div, CH2 inverted
20 MHz sine wave	15 : 1
Dynamic range	8 div or more 400 MHz input signal at 10 mV/div full bandwidth
Probe sense	10 : 1, 100 : 1 detection

LA314H

CH3, CH4

Deflection factor	
Range	100 mV/div, 500 mV/div
Accuracy	± 3 %
Bandwidth	DC to 400 MHz –3dB
	[Note] AC coupled low cutoff frequency (–3 dB) is 10 Hz
Input RC	1 MΩ ± 1.5 % // 16 pF ± 3 pF
⚠ Maximum input voltage	± 400 V (DC+ACpeak)
Position control range	Approx. ± 10 div from the center line of the screen
Dynamic range	8 div or more 400 MHz input signal full bandwidth
Probe sense	10:1, 100:1 detection

Triggering

A triggering

Trigger sensitivity

Frequency	P. P signal amplitude
DC to 10 MHz	0.4 div
10 MHz to 100 MHz	1.0 div
100 MHz to 400 MHz	2.0 div

[Note] TV : The ratio between the composite video signal and synchronization signal is 7:3 and synchronization signal amplitude is 1.5 div or more.
HF-REJ : Attenuates at 10 kHz or more
LF-REJ : Attenuates at 10 kHz or less

Signal source	CH1, CH2, CH3, CH4, LINE
Coupling	AC, DC, HF-REJ, LF-REJ
Slope	+, –

B triggering

Trigger sensitivity

Frequency	P. P signal amplitude
DC to 10 MHz	0.4 div
10 MHz to 100 MHz	1.0 div
100 MHz to 250 MHz	2.0 div

[Note] HF-REJ : Attenuates at 10 kHz or more
LF-REJ : Attenuates at 10 kHz or less

Signal source	CH1, CH2, CH3, CH4
Coupling	AC, DC, HF-REJ, LF-REJ
Slope	+, –

TV triggering

Mode	ODD, EVEN, BOTH, TR-H
Formats	NTSC, PAL (SECAM), HDTV
Field and line selection	ODD, EVEN, or BOTH can be selected
NTSC	1 H to 525 H
PAL (SECAM)	1 H to 625 H
HDTV	1 H to 1125 H

TV clamp

Clamp position	Back porch level
Back porch reference	± 1 div or less from ground reference
Signal amplitude range	1.5 to 8 div

LA314H

Event trigger	
Count mode	
Event count range	1 to 65535
Maximum frequency	50 MHz
Burst mode	
Burst signal interval time	0.15 µs to 9.99 s
AUTO SETUP	
Channels	Available CH1 and CH2
Frequency	50 Hz to 100 MHz
Horizontal deflection system (X axis)	
Horiz display	A, ALT, B, X-Y
A sweep	
Sweep mode	AUTO, NORMAL, SINGLE
Sweep rates	
Maximum sweep	500 ps/div
Range	5 ns to 500 ms/div 1-2-5 sequence, 25 steps
Variable range	5 ns to 1.5 s/div
Accuracy I	± 2 %*1 over center 8 div
Accuracy II	± 5 %*1 over any 2 div within center 8 div
	*1 Add 1 % in case of VARIABLE ON
Hold-off time	Continuously variable
B sweep	
Delay	Triggered delay or continuous delay (RUNS AFTER)
Sweep rates	
Maximum sweep	500 ps/div
Range	5 ns to 20 ms/div 1-2-5 sequence, 21 steps
Accuracy I	± 2 % over center 8 div
Accuracy II	± 5 % over any 2 div within center 8 div
Delay time	
Position control range	0.2 to 10.2 div
Accuracy	± [(set value x 0.005) + (sweep rate x 0.1)]–55 ns within the range of 1 µs/div to 500 ms/div
Delay pick off jitter	1/20000, at 1 ms/div of A sweep:, at 500 ns/div of B sweep
Sweep magnification	
Magnifying ratio	10 times
Accuracy I *2	over center 8 div
10 ns/div, 50 ns/div	± 5 %
100 ns/div to 500 ms/div	± 3 %
Accuracy II *1*2	over any 2 div within center 8 div
5 ns/div, 50 ns/div	± 10 %
100 ns/div to 500 ms/div	± 5 %
	*1 20 ns or 1 div at the beginning of sweep and 20 ns at the end of sweep are excluded.
	*2 Add 1 % in case of VARIABLE ON
X-Y operation	
X axis (CH1)	
Deflection factor	Same as CH1.
Accuracy	± 2 %
Bandwidth	DC to 2 MHz, –3 dB
Y axis	CH1, CH2, CH3, CH4, ADD
Phase difference	3° or less (DC to 200 kHz)

LA314H

CAL (Probe calibration signal)	
Waveform	Square wave
Frequency	1 kHz ± 0.1 %
Duty ratio	49 to 51 %
Output voltage	0.6 V ± 1 %
CH2 OUT	
Output voltage	20 mV/div ± 30 % (into 50 Ω)
Output dynamic range	± 100 mV (50 Ω)
Output coupling	DC coupling
Frequency band width	200 MHz -3dB (into 50 Ω)
Output resistance	50 Ω ± 20 %
Z AXIS IN	
Sensitivity	0.5 Vp-p or more Positive-going input decreases intensity.
Frequency range	DC to 5 MHz
Input resistance	5 kΩ ± 20 %
Maximum input voltage	± 40 V (DC+ACpeak)
Measurement with cursors and counter	
Measurement with cursors	
Type of measurement	Time difference (Δt), voltage difference (ΔV)
Cursor position control range	
X axis	± (5 ± 0.2) div from the center line of the screen
Y axis	± (4 ± 0.2) div from the center line of the screen
Accuracy	
Voltage difference (ΔV)	± [(2 % of reading) + (0.3 % of full scale)]
Time difference (Δt)	
MAG OFF	± [(2 % of reading) + (0.3 % of full scale)]
MAG ON (MAG x 10)	
500 ms to 100 ns/div	± [(3 % of reading) + (0.3 % of full scale)]
50 ns, 5 ns/div	± [(5 % of reading) + (0.3 % of full scale)]
	[Note] Full scale : Voltage 8 div, Time 10 div
Counter	
Number of digits displayed	5 digits
Accuracy	± 0.01%
Frequency measurement range	2 Hz to 400 MHz
Saving data	Backup by built-in battery
Type of data to be saved	Panel setup conditions immediately before turning power off *1 Storing of panel setup conditions
Data retention time	Approx. 30,000 H (at approx. 25℃) [Note] The state where the power cord is disconnected.
Power source	
Voltage range	100 to 240 VAC
Frequency range	50/60 Hz
Power consumption	110VA
Mass and Dimension	
Mass	Approx. 8.5 kg (without accessories)
Dimension	320 ± 2W x 160 ± 2H x 406 ± 2D [mm] [Note] Without accessories, and projections.

Environmental conditions

Specification assurance temperature	10 to 35 ℃
Operating	
Temperature	0 to 40 ℃
Humidity	90 % RH or less (at 40 ℃)
Storage	
Temperature	-20 to 70 ℃
Humidity	80 % RH or less (at 70 ℃)
Altitude	
Operating	2,000 m, atmospheric pressure : Approx. 79 kPa
Nonoperating	15,000 m, atmospheric pressure : Approx. 12 kPa
Vibration	15 minutes along each of three axes at a total displacement of 0.67 mm p.p with frequency varied from 10 Hz to 55 Hz in 1 minute sweep.
Shock	Lifting a side to height of 10 cm and dropping it naturally onto hard wood; 4 times on each side.
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EN61000-3-3:1995	Voltage Fluctuations and Flicker
Electromagnetic Susceptibility	
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EN61000-4-2:1995	Electrostatic Discharge Immunity
ENV50140:1993	RF Field Strength Susceptibility (Amplitude Modulation)
ENV50204:1995	RF Field Strength Susceptibility (Pulse Modulation)
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Pollution Degree 2	Do not operate in environments where conductive pollutants may be present.
Installation (Overvoltage) Category II	Local Level mains, appliances, portable equipment.

PP005 PROBE

INSTRUCTION MANUAL

General

The PP005 is a passive probe to use with the LA314/LA314H oscilloscope which has frequency response from DC to 400 MHz.

Composition

The probe PP005 is composed of a probe body and accessories.

Probe body

Accessories

- Ground lead 11 cm 1
- Ground lead short on probe tip 1
- IC insulation tip (black) 2
- Spring tip 0.8 mm 1
- Straight tip 1
- BNC adapter 1
- Sprung hook (black) 1
- Trimmer tool 1
- Probe 1
- Color rings 10

Specification (combined PP005 and LA314/LA314H)

Input RC	10 MΩ ± 3 %//11 pF ± 2 pF[Δ]
Attenuation ratio	10:1 within ± 2 %[Δ]
Frequency response	DC to 400 MHz –3 dB[Δ] • LA314/LA314H 10mV/div • at the tip of probe
Input capacitance of applicable oscilloscope	10 to 20 pF
Maximum safety input voltage	500V (DC + peak AC)
Probe length	Approximately 1.2 m
Connector type	BNC type
Read-out compensating function	Probe Scale Identifies at BNC ring

[Δ] For LA314/LA314H oscilloscope.
The specification of the probe only describes the attached PP005 manual.

Cautions

- Figure 1 shows maximum input voltage. Do not apply excessive voltage.

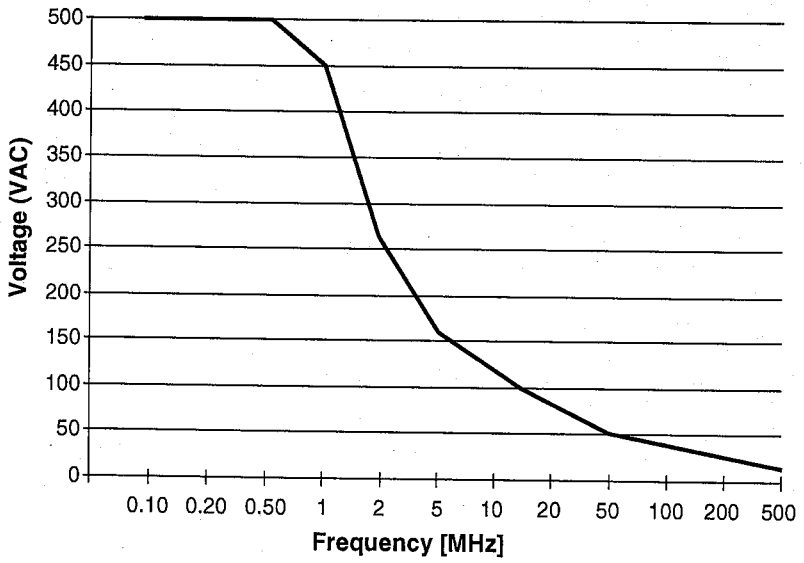


Figure 1

Memo

2

Section 2 Check and Adjustment

Table of Contents

2.1 Knowledge Required before Starting Adjustment

2.1.1 Introduction

Periodic check and adjustment maintains reliable performance of this instrument for a long time.

2.1.2 Check and Adjustment Intervals

To measure signals accurately, it is necessary to periodically check and adjust the measuring instrument. Recommended check and adjustment intervals for this instrument are approx. 1 year.

2.1.3 Menu Screen

For this instrument, there are three of menu screens for check and adjustment.

◇ Manual Adjustment Menu Screen

- Adjust 116 items manually on the adjust menu screen.
  For further details, refer to "2.1.8 Manual Adjustment Items".

◇ Automatic Adjustment Menu Screen

- Adjust the instrument automatically with the jig IE-1066.
  For further details, refer to "2.13 Automatic Adjustment".

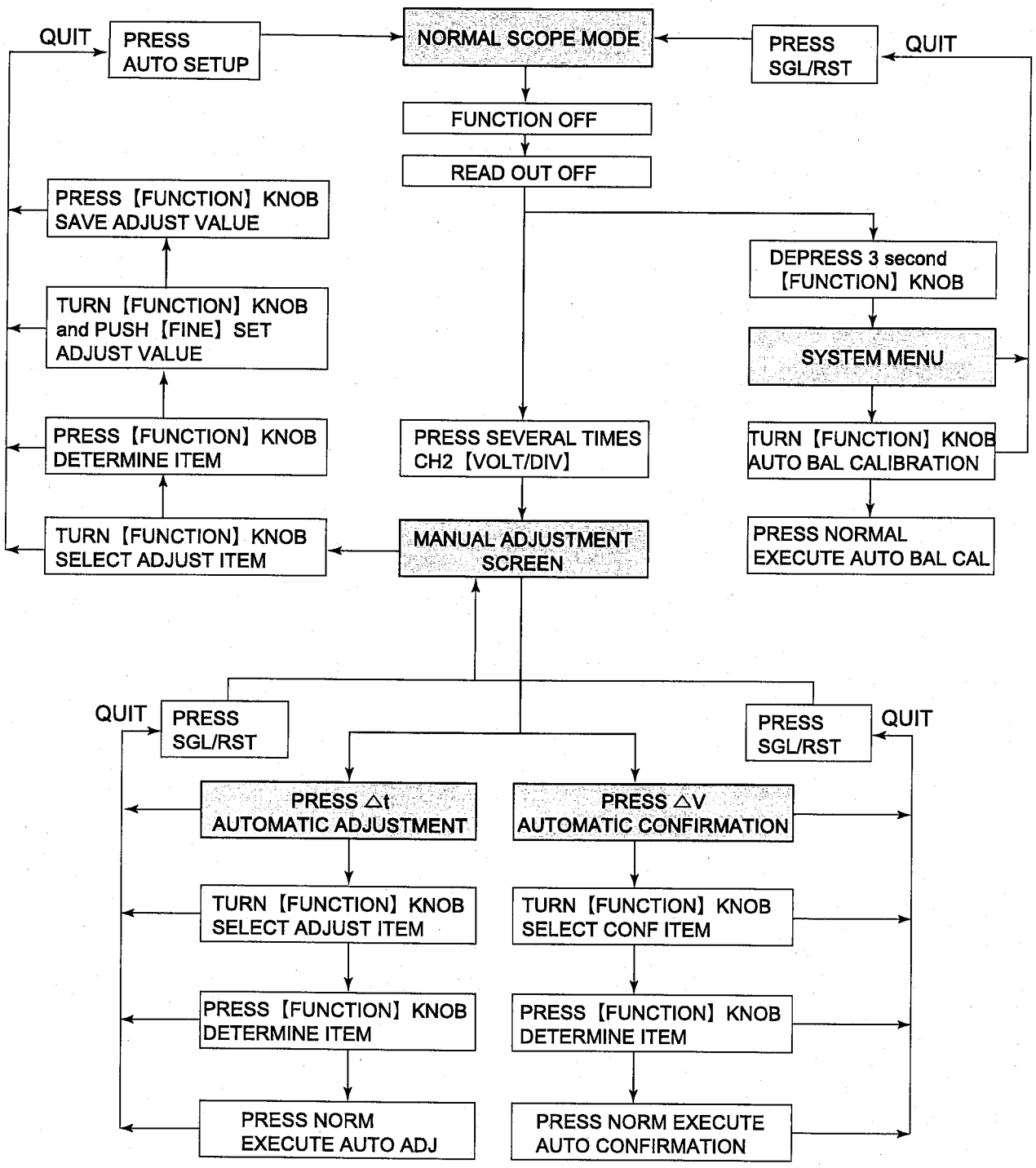
◇ Automatic Confirmation Menu Screen

- Confirm and check the instrument functions and performances automatically with the jig IE-1066.
  For further details, refer to "2.14 Automatic Confirmation".
- For KEY confirmation, refer to "2.4 KEY".

Use IE-1066 when carrying out Automatic Adjustment or/and Automatic Confirmation.

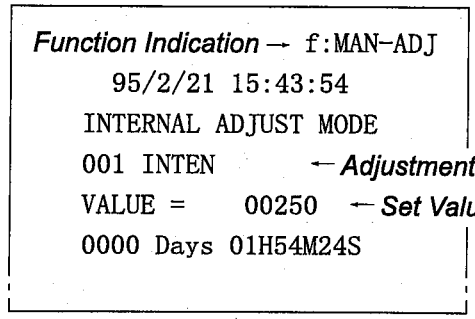
- For connections, refer to "2.1.9 Connection the Adjustment Jig IE-1066.
- For calibration of IE-1066, refer to "2.16 Adjustment Jig IE-1066.

[1] Menu Tree


NORMAL SCOPE MODE
QUIT
PRESS AUTO SETUP
PRESS SGL/RST
QUIT
FUNCTION OFF
READ OUT OFF
PRESS 【FUNCTION】 KNOB SAVE ADJUST VALUE
TURN 【FUNCTION】 KNOB and PUSH 【FINE】 SET ADJUST VALUE
PRESS 【FUNCTION】 KNOB DETERMINE ITEM
TURN 【FUNCTION】 KNOB SELECT ADJUST ITEM
DEPRESS 3 second 【FUNCTION】 KNOB
SYSTEM MENU
TURN 【FUNCTION】 KNOB AUTO BAL CALIBRATION
PRESS NORMAL EXECUTE AUTO BAL CAL
PRESS SEVERAL TIMES CH2 【VOLT/DIV】
MANUAL ADJUSTMENT SCREEN
QUIT
PRESS SGL/RST
PRESS SGL/RST
QUIT
PRESS △t AUTOMATIC ADJUSTMENT
PRESS △V AUTOMATIC CONFIRMATION
TURN 【FUNCTION】 KNOB SELECT ADJUST ITEM
TURN 【FUNCTION】 KNOB SELECT CONF ITEM
PRESS 【FUNCTION】 KNOB DETERMINE ITEM
PRESS 【FUNCTION】 KNOB DETERMINE ITEM
PRESS NORM EXECUTE AUTO ADJ
PRESS NORM EXECUTE AUTO CONFIRMATION

[2] Manual Adjustment Menu

The following describes how to enter the manual adjustment screen.



Procedure

— Enter to Manual Adjustment Menu Screen —

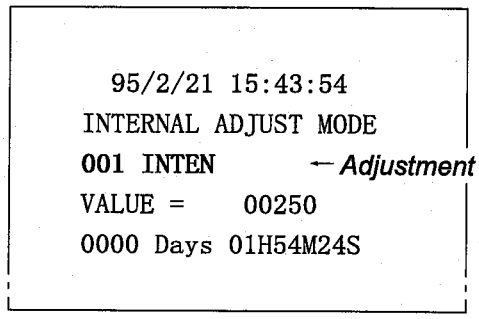
① Turn off all the functions to disable **【FUNCTION】**. *1

*1 Condition that f:XXXX is not being displayed at the upper right of the screen (the delay time, number of TV lines, etc.)

② Press **READOUT** to set the characters to OFF (non-display).

③ Press **【VOLTS/DIV】** of CH2 several times quickly.

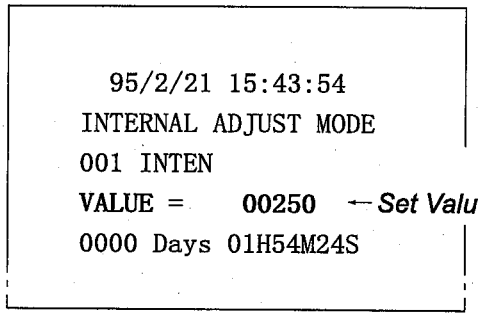
- Manual adjustment menu is displayed.
- The function indication turns to f:MAN-ADJ.
- Select the adjustment item by turning **【FUNCTION】**. The steps below describes an example when INTEN is to be selected.



— Selecting the Adjustment Item —

④ Turn **【FUNCTION】** to select INTEN.

- For details of the adjustment menu items, refer to the "2.1.8 Manual Adjustment Items".



— Setting the VALUE —

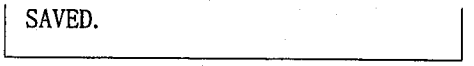
⑤ Press **【FUNCTION】**.

- The adjustment item is determined.

⑥ Turn **【FUNCTION】** to set the VALUE.

- Press **FINE**, the **【FUNCTION】** is switched FINE or COARSE.

◇The setting VALUE is changed every one step in **FINE** condition.



— Saving the VALUE —

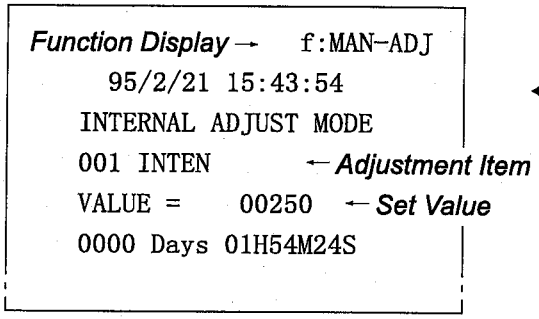
⑦ Press **【FUNCTION】**.

- The set value is saved and "SAVED" appears at the lower left of the screen.

— Canceling the Adjustment Menu Screen —

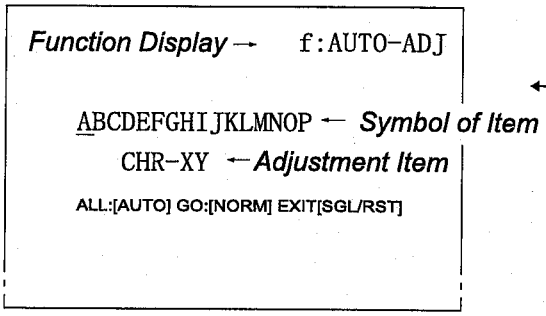
⑧ To cancel the adjustment menu screen, press **AUTOSETUP**.

[3] Menu Screen (f:MAN-ADJ, AUTO-ADJ, AUTO-CONF)



◇ Procedure ① to ③, refer to "2.1.3 ② Adjustment Menu".
- Display the adjustment menu screen.

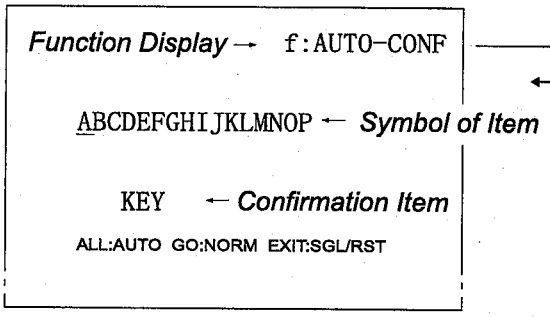
Automatic Adjustment Menu Screen



◇ Press [Δt] in the manual adjustment screen.
- Display the automatic adjustment menu screen. For the automatic adjustment menu, see "2.13 Automatic Adjustment".

— ***Return to Manual Adjustment Menu Screen*** —
- To cancel the auto adjustment menu screen, press [SGL/RST].

Automatic Confirmation Menu Screen



◇ Press [Δt] in the adjustment menu screen.
- Display the automatic confirmation menu screen.
- For the "KEY", see "2.4 KEY on automatic confirmation". For the items except "KEY", see "2.14 Automatic Confirmation".
- Some unit will display "AUTO-ADJ"

— ***Return to Manual Adjustment Menu Screen*** —
- To cancel the auto confirmation menu screen, press [SGL/RST].

[4] Key Function/Movement in Adjustment Menu

MANUAL ADJUSTMENT MENU

A. Selecting the Adjust Item	Turn FUNCTION key
B. Determine the Adjust Item	Press FUNCTION key
C. Vary the Adjust Value	Turn FUNCTION key
D. Save the Adjust Value	Press FUNCTION key
QUIT	Press AUTOSETUP or POWER OFF

AUTO ADJUSTMENT MENU

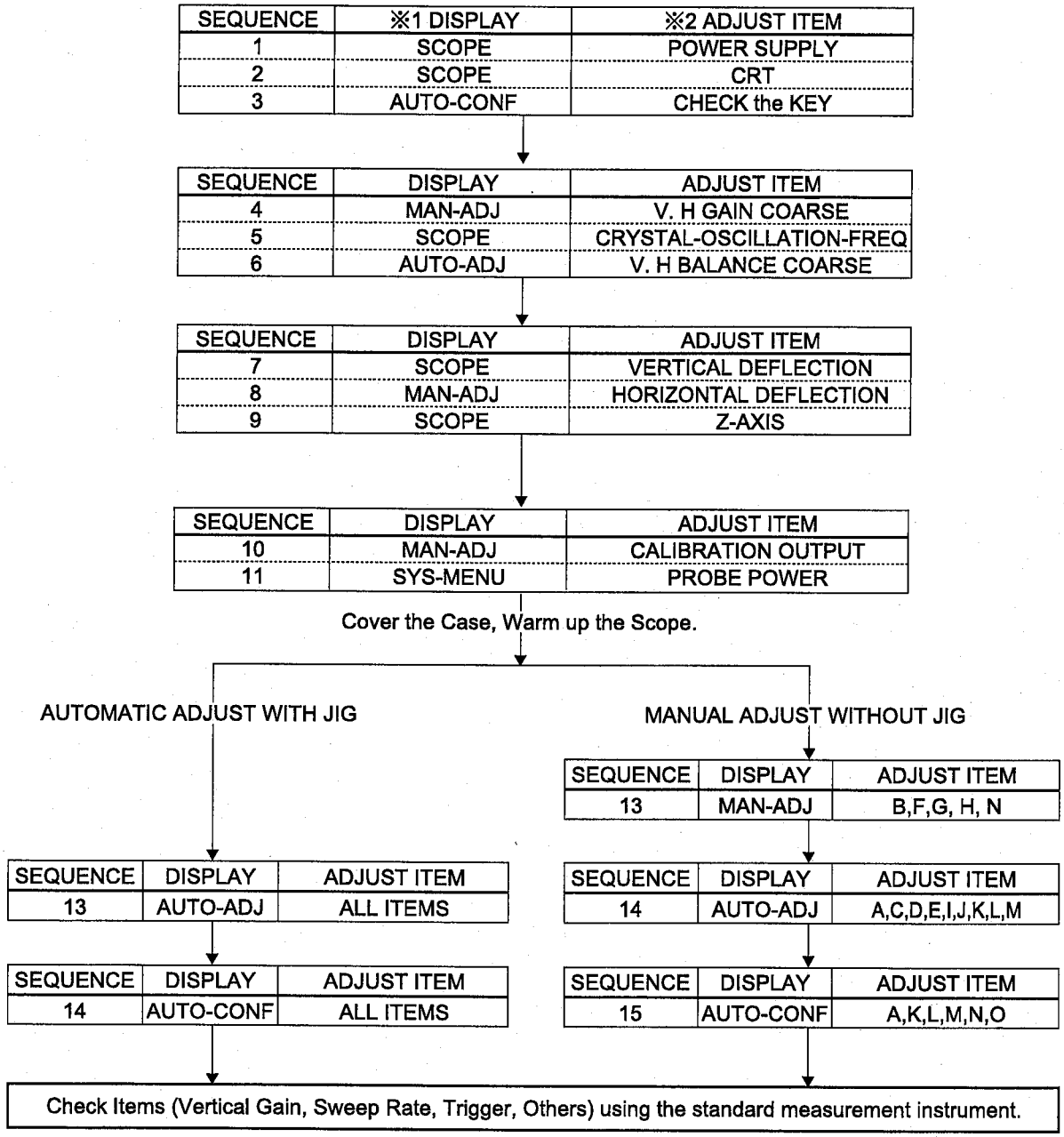
A. Selecting All Adjust Item	Press AUTO key
A'. Selecting Individual Adjust Item	Turn FUNCTION key
B. Determine the Adjust Item	Press FUNCTION key
C. Start AUTO ADJUSTMENT	Press NORM
RETURN TO ADJUSTMENT MENU	Press SGL/RST
QUIT	Press AUTOSETUP or POWER OFF

AUTO CONFIRMATION MENU

A. Selecting All Confirmation Item	Press AUTO key
A'. Selecting Individual Confirmation Item	Turn FUNCTION key
B. Determine the Confirmation Item	Press FUNCTION key
C. Start AUTO CONFIRMATION	Press NORM
RETURN TO ADJUSTMENT MENU	Press SGL/RST
QUIT	Press AUTOSETUP or POWER OFF

2.1.4 Check and Adjustment Method

[1] Check/Adjustment Procedure Flow Chart



※1 DISPLAY

SCOPE	:	NORMAL OSCILLOSCOPE MODE
MAN-ADJ	:	MANUAL ADJUSTMENT SCREEN
AUTO-ADJ	:	AUTOMATIC ADJUSTMENT
AUTO-CONF	:	AUTOMATIC CONFIRMATION
SYS-MENU	:	SYSTEM MENU

※2 ADJUST ITEM

A, B, C, ～O※ : refer to "2.1.4 ② ADJUSTMENT ITEM" next page.

[2] Adjust Item

Table 2.1.1 Automatic Adjustment Items

Item	Description	Page
A. CHR-XY	Cursor gain position	2-56
B. V-GAIN *1	Vertical gain (CH1 to CH4)	2-56
C. V-BAL	Variable balance, step balance, ground balance (CH1, CH2)	2-57
D. V-ADD	Add balance	2-57
E. V-POS	Vertical position center and gain (CH1 to CH4)	2-58
F. V-OFST *1	OFFSET center and gain (CH1, CH2)	2-58
G. CLAMP *1	TV CLAMP level and gain	2-59
H. TRIG *1	Trigger level and trigger sensitivity	2-59
I. H-RNG	Sweep rate (A, B)	2-60
J. LENGTH	Sweep length (A, B)	2-60
K. H-MAG	Magnification center and gain	2-61
L. H-POS	Horizontal position	2-61
M. DELAY	Delay time	2-62
N. X-Y *1	X-Y gain and position	2-62
O. ― ― ―	NA	――
P. ― ― ―	NA	――

*1 Use an adjustment jig IE-1066

Table 2.1.2 Automatic Confirmation Items

Item	Description	Page
A. KEY	The keys, controls and pulse switches	2-65
B. DCSHIFT *1	DC shift	2-65
C. POS VAR *1	The variable range of the 【▲POSITION▼】 control	2-65
D. ADDGAIN*1	The gain at ADD mode	2-65
E. CH2 POL *1	The gain at CH2 polarity	2-65
F. AC/DC *1	AC and DC of input coupling	2-66
G. V SENSE *1	Vertical gain of 500 mV/div at CH3 and CH4	2-66
H. OVER LD *1	Detection of the excessive input	2-66
I. TRG LVL *1	The range of the 【TRIG LEVEL】	2-66
J. VAR RNG*1	The variable range and variable balance	2-66
K. H POSI	The range of the 【◀ POSITION ▶】 control	2-67
L. TR-SEP	The range of the trace separation	2-67
M. LINE TG	Line trigger	2-67
N. H START	Shift between A and B sweep start points	2-67
O. H 1-2-5	1-2-5 sequence of sweep rate (TIME/DIV)	2-67
P. ― ― ―	NA	――

*1 Use an adjustment jig IE-1066

[3] The Check/Adjustment Items and Sequence

Table 2.1.3 The Common Check List

SEQ *1	Adjust Item	Function Display	Condition Adjust/Check	See Page	Remarks
1	DC Power Supply	SCOPE	ADJ-VR *2	26, 27	37VR1, 37VR2
2	**CRT Display**				
	Cathode Voltage	SCOPE	ADJ-VR	28	27R13 HV ADJ
	Heater Voltage			28	27R25 HEATER
	Focus			29	27R47(HV Q123+), 27R68(HV Q2−) 26R134 (HZ IS2), 26R133(HZ P1)
	Intensity			29	27R28 SINGE, MAG ON 500ps/div
	Trace Rotation			30	TRACE ROTATION
	Orthogonality	MAN-ADJ	ADJ-VALUE *3	31	MENU "003 ORTHOGO"
3	KEY-Switch	AUTO-CONF	Check	32, 33	MENU "A. KEY"
4	**Gain Coarse**				
	Vertical Gain	MAN-ADJ	ADJ-VALUE	34	6R58 "013" VALUE 45000
	Horizontal Gain	and SCOPE	ADJ-VR	35	24R84 "077" VALUE 45000
	ΔV readout Gain			35	20R87
	Attenuator Unit Flatness			36	R100
5	Crystal Oscillation 20MHz	SCOPE	Check	37	11IC12#1 with the counter
6	V, H BAL Coarse	AUTO-ADJ	Check	38	MENU "C, K"
	Magnification Sweep Reference	MAN-ADJ	ADJ-VALUE	39	MENU "089 A MAG SWEEP GAIN" MENU "090 MAG CENTER"
7	**Vertical Deflection System**				
	① Attenuator Compensation	SCOPE	ADJ-VR, C *4	40	CH1, CH2:2C35, 2C36, etc 6 point.
				41	CH3, CH4:7C4, 8C4, etc 6 point.
	② High-Freq Compensation			42, 43	CH1/CH2 V Main, Channel SW
	③ Attenuator High-Freq Compensation			45	2R101, CH1/CH2/CH3/CH4
	④ Bandwidth, CH2 OUT			47	5C24, 6C25, etc 9 point.
8	**Horizontal Deflection System**				
	High-speed Sweep Rate	MAN-ADJ	ADJ-VALUE	48	MENU A "085, 086":A Sweep Time
	Sweep Linearity at High -Speed Sweep Rate	and SCOPE			MENU B "096, 097":B Sweep Time
			ADJ-C	49	25C22, 25C62
9	Z-Axis Response	SCOPE	ADJ-C	50	26C57
10	Calibration Output	MAN-ADJ	ADJ-VALUE	51	MENU "002 CAL LEVEL"
11	Probe Power Check	SYS-MENU	Check	52	Power Voltage: ±12V±5% Control Voltage: >±1.6V
12	**Cover the Case. Warm up the Scope.**				

Next SEQ is different depending on with or without jig IE-1066.

Automatic Adjust

With Jig IE-1066

13	Automatic Adjustment. Connection the Jig IE-1066 to the LA314/LA314H.	53 to 62	A,B,C,D,E,F,G,H,I,J,K,L,M,N
14	Automatic Confirmation. Connection the Jig IE-1066 to the LA314/LA314H.	63 to 67	A,B,C,D,E,F,G,H,I,J,K,M,N,O
15	**Check Items (Vertical Gain, Sweep Rate, Trigger, Others) using the standard measurement instrument.**		

Manual Adjust

Without Jig IE-1066

* The following items are different from the method of with Jig IE-1066.

13	Manual Adjustment : B V-GAIN, FV-OFSET, G CLAMP H TRIG, N X-Y	68 to 73	B,F,G,H,N
14	Automatic Adjustment	53 to 62	A,C,D,E,I,J,K,L,M
15	AUTOMATIC CONFIRMATION	53 to 67	A,K,L,M,N,O
16	**Check Items (Vertical Gain, Sweep Rate, Trigger, Others) using the standard measurement instrument.**		

*1 SEQ : The Check/Adjustment Sequence number
*2 ADJ-VR : Adjust variable resistor
*3 ADJ-VALUE : Set Value on Manual Adjustment Screen
*4 ADJ-C : Adjust variable capacitor

2.1.5 Check and Adjustment Affected Item

Table 2.1.5 shows the check/adjustment items and sequence.

a. When replaced CRT, adjust/check all the items start from top of the next flow chart.
b. When checking/adjusting only the limited items:
   Check/adjust the items listed in the right "Affected Item" column of the table below.

Table 2.1.5 Check and Adjustment Items

Seq	Item	Page	Affected Item
1	**1. DC Power Supply**		
	1.1 Preregulator Adjustment	2-26	All items
	1.2 Secondary Voltage Adjustment	2-27	All items
2	**2. CRT Display**		
	2.1 CRT Cathode Voltage	2-28	2.2 to 2.6, 4, 7.2 to 7.5, 8, 13, 14
	2.2 CRT Heater Voltage	2-28	2.2 to 2.6, 4, 7.2 to 7.5, 8, 13, 14
	2.3 Focus	2-29	2.4
	2.4 Intensity	2-29	
	2.5 Trace Rotation	2-30	
	2.6 Orthogonality	2-31	
3	**3. Check the Key Function in Automatic** Confirmation Mode	2-32	
4	**4. Gain Coarse**		
	4.1 Vertical Gain	2-34	7.2 to 7.5, 13, 14
	4.2 Horizontal Gain	2-35	8, 13, 14
	4.3 ΔV Readout Gain	2-35	13, 14
	4.4 Attenuator Gain	2-36	13, 14
5	**5. Crystal Oscillation Frequency**	2-37	
6	**6. Balance Coarse**		
	6.1 Balance Coarse (AUTO-ADJ "C, K")	2-38	13, 14
	6.2 Magnification Gain and Center	2-39	14
7	**7. Vertical Deflection System**		
	7.1 Attenuator Compensation CH1/CH2	2-40	7.2 to 7.5
	CH3/CH4	2-41	
	7.2 High-frequency Compensation	2-42	7.3, 7.4, 7.5
	7.3 Attenuator Fast Rise CH1/CH2/CH3/CH4	2-45	7.4
	7.4 Bandwidth	2-47	
	7.5 CH2 OUT	2-47	
8	**8. Horizontal Deflection System**		
	8.1 High-speed Sweep Rate	2-48	8.2, 14
	8.2 Sweep Linearity at High-speed Sweep Rate	2-49	
9	**9. Z-Axis Response**	2-50	
10	**10. Calibrator Output**	2-51	
11	**11. Check Probe Power Supply**	2-52	
12	**12. Cover the Case, Warm up the Scope**		
13	**13. Manual Adjustment**		
	13.1 B:Vertical Gain	2-68	15
	13.2 F:Vertical Offset	2-69	15
	13.3 G:TVClamp	2-71	15
	13.4 H:Trigger	2-72	15
	13.5 N:X-Y	2-73	15
14	**14. Automatic Adjustment**	2-53	15
15	**15. Automatic Confirmation**	2-63	

2.1.6 Test Equipment Required

a. When checking or adjusting this instrument, the measuring instruments, etc. listed in Table 2.1.6 are required.
   - Adjustment jig IE-1066 for the LA314/314H are required.
   - The performance of the measuring instruments should be equivalent or higher than that described below.

b. The signal input connector for this instrument is a BNC type. When the terminator or signal output terminal used for the measuring instrument is not a BNC type, prepare a proper adaptor.

Table 2.1.6 Test Equipment Required I (1/2)

Equipment/Minimum Specification	Purpose	Recommended Model
1. Adjustment Jig IE-1066 for LA314/LA314H	Vertical, horizontal, triggering check and adjustment	
2. Oscilloscope I Minimum deflection factor : 1mV/div Bandwidth : DC to 1MHz	Power supply check and adjustment	
3. Oscilloscope II Deflection factor : 10mV to 5V/div Bandwidth : DC to 350MHz	General signal check	LeCroy LA314
4. Digital multimeter Range : DC to 300V Accuracy : 0.2%+1dgt Bandwidth : 100kHz TRUE RMS	Power supply check and adjustment	Iwatsu VOAC7411 with SC-306 Battery Unit
5. Frequency counter Range : 20MHz or more Reference oscillator accuracy : $\pm 3 \times 10^{-5}$ or more	Crystal oscillator frequency and calibrator frequency check	Iwatsu SC-7201
6. Function generator Repetition rate : DC to 10MHz Signal level : 1Vp-p or more	Vertical, horizontal, triggering check and adjustment	Iwatsu FG-350
7. Scope calibrator • Calibration voltage Output voltage : 12mV to 60V Accuracy : 0.5% or less • Time marker Repetition rate : 10ns to 2s Accuracy : 0.5% or less • Square wave Repetition rate : 50Hz to 200kHz Rise time : 5ns or less • Sine wave Repetition rate : 1kHz Accuracy : 20% or less	Display, Vertical, horizontal, triggering check and adjustment	Iwatsu SC-340

Table 2.1.7 Test Equipment Required Ⅱ (2/2)

Equipment/Minimum Specification	Purpose	Recommended Model
8. Constant amplitude sinal generator Frequency : 50kHz to 250MHz 250MHz to 1GHz Signal level*1 : 60mV or more	Bandwidth check	TEK SG-503 TEK SG-504
9. Pulse generator Repetition rate : 50kHz to 100kHz Rise time : 100ps or less Waveform distortion : Should be less Signal level : 60mVp-p or more	Step response check and adjustment	PSPL MODEL 4050B
10. Time mark generator	Sweep linearity at high-speed sweep rate	TEK TG501
11. Probe for oscilloscope Attenuation ratio : 10:1, 1:1	Signal probe PP005 : LA314's accessory SS-0001 (1:1) : Option	
12. NTSC test signal generator	TV clamp check and adjustment	TEK TSG-100
13. DC voltage generator Accuracy : 0.1% or less	Vertical offset check and adjustment	
14. High-voltage probe for digital multimeter Attenuation ratio : 1000:1 Range : DC to 30kV DC Accuracy : ±0.5%+1digit	High-voltage check and adjustment	Calibrate high-voltage probe within ±5%
15. BNC coaxial cable (5 pieces) Impedance : 50Ω Length : 50cm, 1.2m	Signal interconnection	Iwatsu BB-500 Iwatsu BB-120C
16. 50Ω termination (2 pieces) Impedance : 50Ω Connector : BNC	Signal termination	Iwatsu BB-50M1
17. Attenuator Ratio : 0 to 50dB Bandwidth : DC to 2GHz	Signal Attenuation	Iwatsu AA-03B, AA-06B AA-10B, AA-20B
18. Screwdriver (Low capacitance)	Adjustment of variable resistors and capacitors	Probe's accessory
19. 2mm hexagonal-head screw driver		

*1 Should be calibrated to a constant level if the frequency is changed.

2.1.7 Preparation for Check and Adjustment

Prior to starting a check or Adjustment, prepare the following:

a. Set an ambient temperature to 23℃±5℃.
b. Adjust INTEN, READOUT, FOCUS, and SCALE to ensure a clear display.
c. Warm up the instrument for approx. 30 minutes.
d. Set the keys and controls as shown in Table 2.1.8.

Table 2.1.8 Key and Control Setting

Key and Control	Setting
CRT Display	
INTEN	Midrange
READOUT	Midrange
FOCUS	Midrange
Vertical Deflection System	
CH1, CH2	ON (Display)
VOLTS/DIV (CH1, CH2)	10mV
VARIABLE (CH1, CH2)	OFF (CAL)
DC/AC (CH1, CH2)	DC
GND (CH1, CH2)	OFF (GND release)
CH2 INV	OFF (INV release)
Triggering	
A/B	A
LEVEL	Midrange
SOURCE	CH1
COUPL	DC
SLOPE:+	
Horizontal Deflection System	
HORIZ DISPLAY	A
SWEEP MODE	AUTO
TIME/DIV	1ms/div
VARIABLE	OFF
MAG	OFF (×1)

2.1.8 Manual Adjustment Items

- Table 2.1.9 lists the items which is adjustable in the manual adjustment menu screen except items numbers 109 through 116.
- *2 marked items are duplicated in automatic adjustment. The duplicate items should be adjusted in "2.1.3 Automatic Adjustment" with jig IE-1066.

Table 2.1.9 Manual Adjustment Item I (1/3)

No.	Item		Description
000	SYSTEM ID		SYSTEM ID NUMBER
001	INTEN		See "2.3.4 Intensity"
002	CAL GAIN		See "2.11 Calibrator Output"
003	ORTHOGO		See "2.3.6 Orthogonality"
004	CH2 OUT LEVEL		See "2.8.5 CH2 OUT"
005	X CHR OFFSET	*2	See "2.13 A. CHAR-XY"
006	X CHR GAIN	*2	
007	Y CHR OFFSET	*2	
008	Y CHR GAIN	*2	
009	CH1 PRE LEVEL	*2	See "2.13 B. V-GAIN"
010	CH2 PRE LEVEL	*2	
011	CH1 2mV GAIN	*2	
012	CH1 5mV GAIN	*2	
013	CH1 10mV GAIN	*2	
014	CH1 20mV GAIN	*2	
015	CH1 50mV GAIN	*2	
016	CH1 100mV GAIN OFFSET	*2	
017	CH1 1V GAIN OFFSET	*2	
018	CH2 2mV GAIN	*2	
019	CH2 5mV GAIN	*2	
020	CH2 10mV GAIN	*2	
021	CH2 20mV GAIN	*2	
022	CH2 50mV GAIN	*2	
023	CH2 100mV GAIN OFFSET	*2	
024	CH2 1V GAIN OFFSET	*2	
025	CH3 GAIN	*2	
026	CH4 GAIN	*2	
027	CH1 2mV BAL	*2	See "2.13 C. V-BAL"
028	CH1 5mV BAL	*2	
029	CH1 10mV BAL	*2	
030	CH1 20mV BAL	*2	
031	CH1 50mV BAL	*2	
032	CH2 2mV BAL	*2	
033	CH2 5mV BAL	*2	
034	CH2 10mV BAL	*2	
035	CH2 20mV BAL	*2	
036	CH2 50mV BAL	*2	

*2 Items are adjustable in automatic adjustment mode

Table 2.1.9 Manual Adjustment Item Ⅱ (2/3)

No.	Item		Description
037	CH1 POSITION OFFSET	*2	See "2.13 E. V-POS"
038	CH1 POSITION GAIN	*2	
039	CH2 POSITION OFFSET	*2	
040	CH2 POSITION GAIN	*2	
041	CH3 POSITION OFFSET	*2	
042	CH3 POSITION GAIN	*2	
043	CH4 POSITION OFFSET	*2	
044	CH4 POSITION GAIN	*2	
045	CH1 GND BAL	*2	See "2.13 C. V-BAL"
046	CH2 GND BAL	*2	
047	CH2 POLA BAL	*2	
048	ADD BAL	*2	See "2.13 D. V-ADD"
049	CH1 OFFSET 10mV	*2	See "2.13 F. V-OFST"
050	CH1 OFFSET 100mV	*2	
051	CH1 OFFSET 1V	*2	
052	CH2 OFFSET 10mV	*2	
053	CH2 OFFSET 100mV	*2	
054	CH2 OFFSET 1V	*2	
055	CH1 OFFSET BAL	*2	
056	CH2 OFFSET BAL	*2	
057	A TRIG AC CENTER	*2	See "2.13 H. TRIG"
058	A TRIG −SLOPE	*2	
059	A TRIG CH1 CENTER	*2	
060	A TRIG CH1 GAIN	*2	
061	A TRIG CH2 CENTER	*2	
062	A TRIG CH2 GAIN	*2	
063	A TRIG CH3 CENTER	*2	
064	A TRIG CH3 GAIN	*2	
065	A TRIG CH4 CENTER	*2	
066	A TRIG CH4 GAIN	*2	
067	B TRIG AC CENTER	*2	
068	B TRIG −SLOPE	*2	
069	B TRIG CH1 CENTER	*2	
070	B TRIG CH1 GAIN	*2	
071	B TRIG CH2 CENTER	*2	
072	B TRIG CH2 GAIN	*2	
073	B TRIG CH3 CENTER	*2	
074	B TRIG CH3 GAIN	*2	
075	B TRIG CH4 CENTER	*2	
076	B TRIG CH4 GAIN	*2	

*2 Items are adjustable in automatic adjustment mode

Table 2.1.9 Manual Adjustment Item Ⅲ (3/3)

No.	Item		Description
077	A SWEEP GAIN	*2	See "2.13 I. H-RNG"
078	A 500ms	*2	
079	A 50ms-200ms	*2	
080	A 5ms-20ms	*2	
081	A 500 μ s-2ms	*2	
082	A 50 μ s-200 μ s	*2	
083	A 5 μ s-20 μ s	*2	
084	A 500 μ s-2 μ s	*2	
085	A 50 μ s-200 μ s		
086	A 5 μ s-20 μ s		
087	A LENGTH	*2	See "2.13 J. LENGTH"
088	A POSITION	*2	See "2.13 L. H-POS"
089	A MAG SWEEP GAIN	*2	See "2.13 K.H-MAG"
090	MAG CENTER	*2	
091	B 5ms-20ms	*2	See "2.13 I. H-RNG"
092	B 500 μ s-2ms	*2	
093	B 50 μ s-200 μ s	*2	
094	B 5 μ s-20 μ s	*2	
095	B 500 μ s-2 μ s	*2	
096	B 50 μ s-200 μ s		
097	B 5 μ s-20 μ s		
098	B MAG SWEEP GAIN	*2	See "2.13 K. H-MAG"
099	DELAY GAIN	*2	See "2.13 M. DELAY"
100	DELAY OFFSET	*2	
101	B LENGTH	*2	See "2.13 J. LENGTH"
102	B START POSITION	*2	See "2.13 L. H-POS"
103	X-Y GAIN	*2	See "2.13 N. X-Y"
104	X-Y POSITION	*2	
105	CH1 PEDESTAL GAIN	*2	See "2.13 G. CLAMP"
106	CH1 PEDESTAL OFFSET	*2	
107	CH2 PEDESTAL GAIN	*2	
108	CH2 PEDESTAL OFFSET	*2	
109	CH1 +PEAK GAIN	*2	Not used
110	CH1 +PEAK OFFSET	*2	
111	CH2 +PEAK GAIN	*2	
112	CH2 +PEAK OFFSET	*2	
113	CH1 −PEAK GAIN	*2	
114	CH1 −PEAK OFFSET	*2	
115	CH2 −PEAK GAIN	*2	
116	CH2 − PEAK OFFSET	*2	

*2 Items are adjustable in automatic adjustment mode

2.1.9 Connection the Adjustment Jig IE-1066 to the LA314

How to use Adjustment Jig IE-1066 is described as below.

- Preparation
  Remove the rear panel of the LA314 to connect an exclusive I/F cable.
  Procedure
  ① Remove the four screws in the foot.
  ② Remove the four feet.
  ③ Remove the rear panel.
  - There is a I/F connector on the rear sub pane.

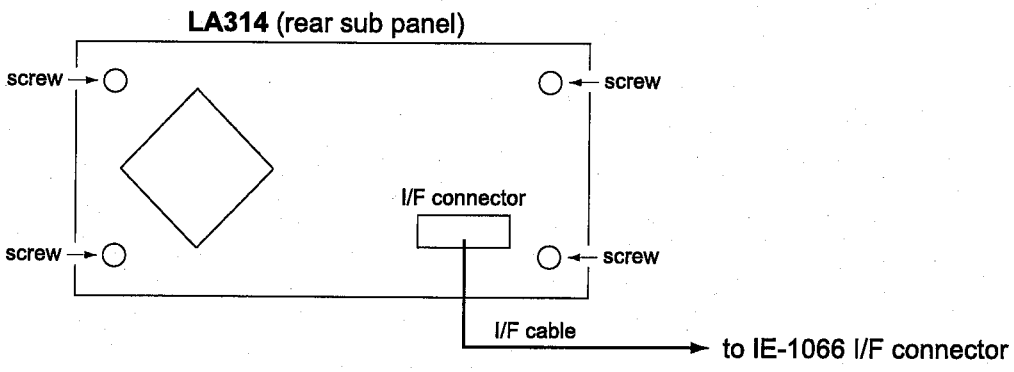


Figure 2.1 Rear sub Panel of LA314

- Connection
  Procedure
  ① Connect between the IE-1600 I/F connector and LA314 I/F connector with the exclusive I/F cable (See Figure 2.1 and Figure 2.2).
  ② Connect between the IE-1066 OUTPUT connectors and the LA314 INPUT connector with the BNC coaxial cables (See Figure 2.2).

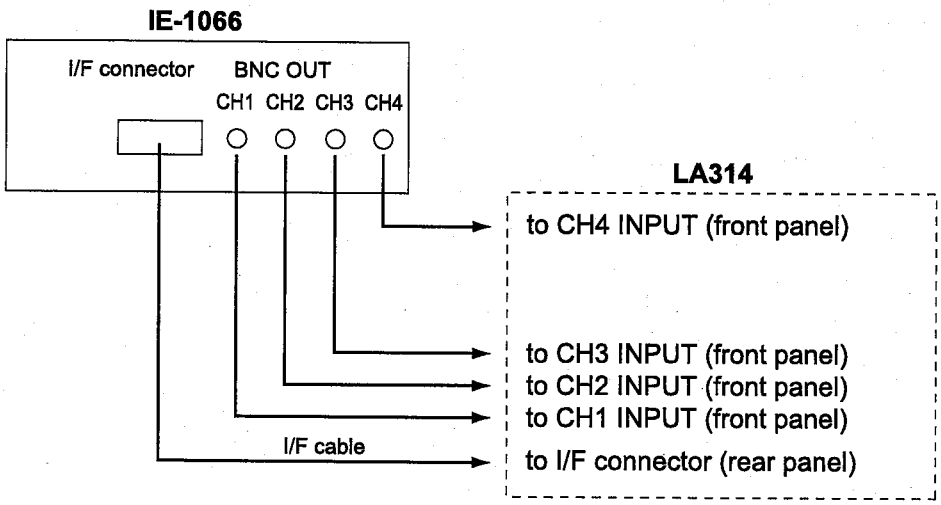


Figure 2.2 Connection IE-1066 to LA314

Calibrating IE-1066
See "2.16 Adjustment Jig IE-1066",

2.1.10 Check and Adjustment Locations

See Figure 2.1 to Figure 2.9.

[1] POWER BOARD

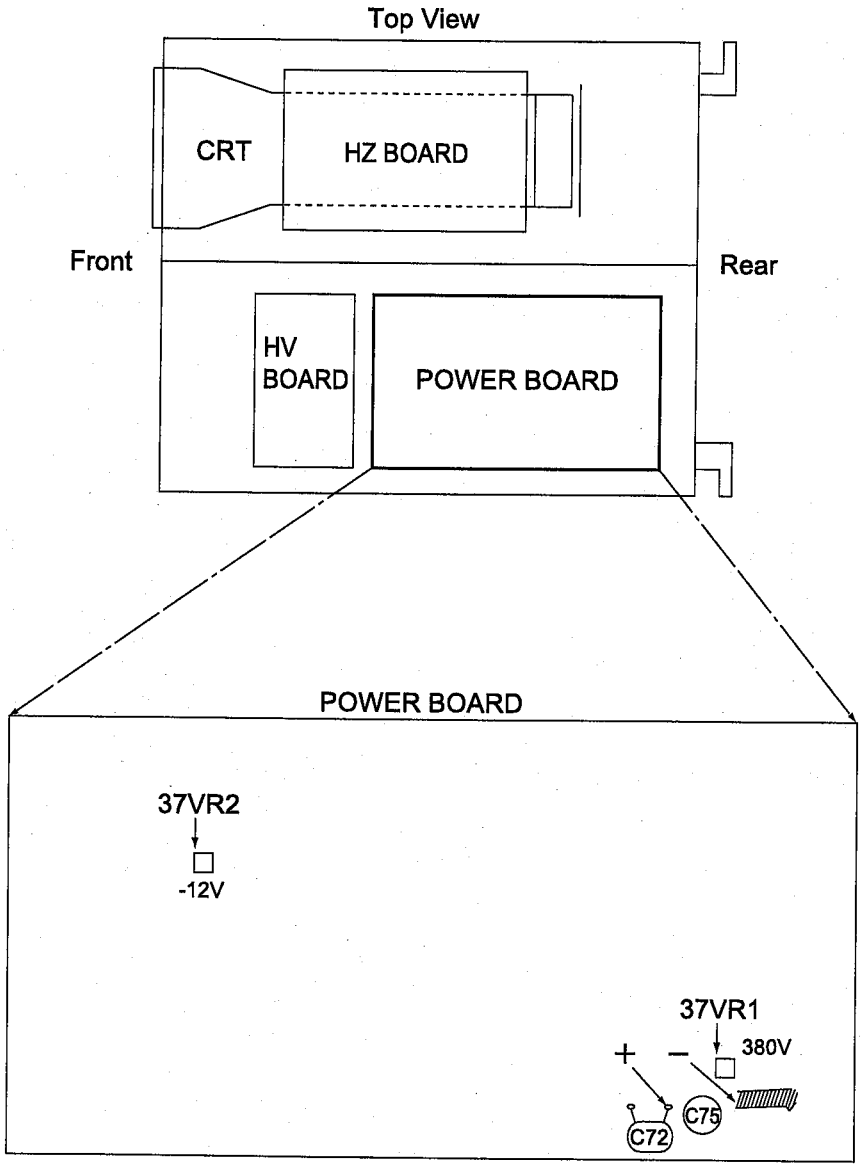


Figure 2.3 POWER BOARD

[2] HV BOARD

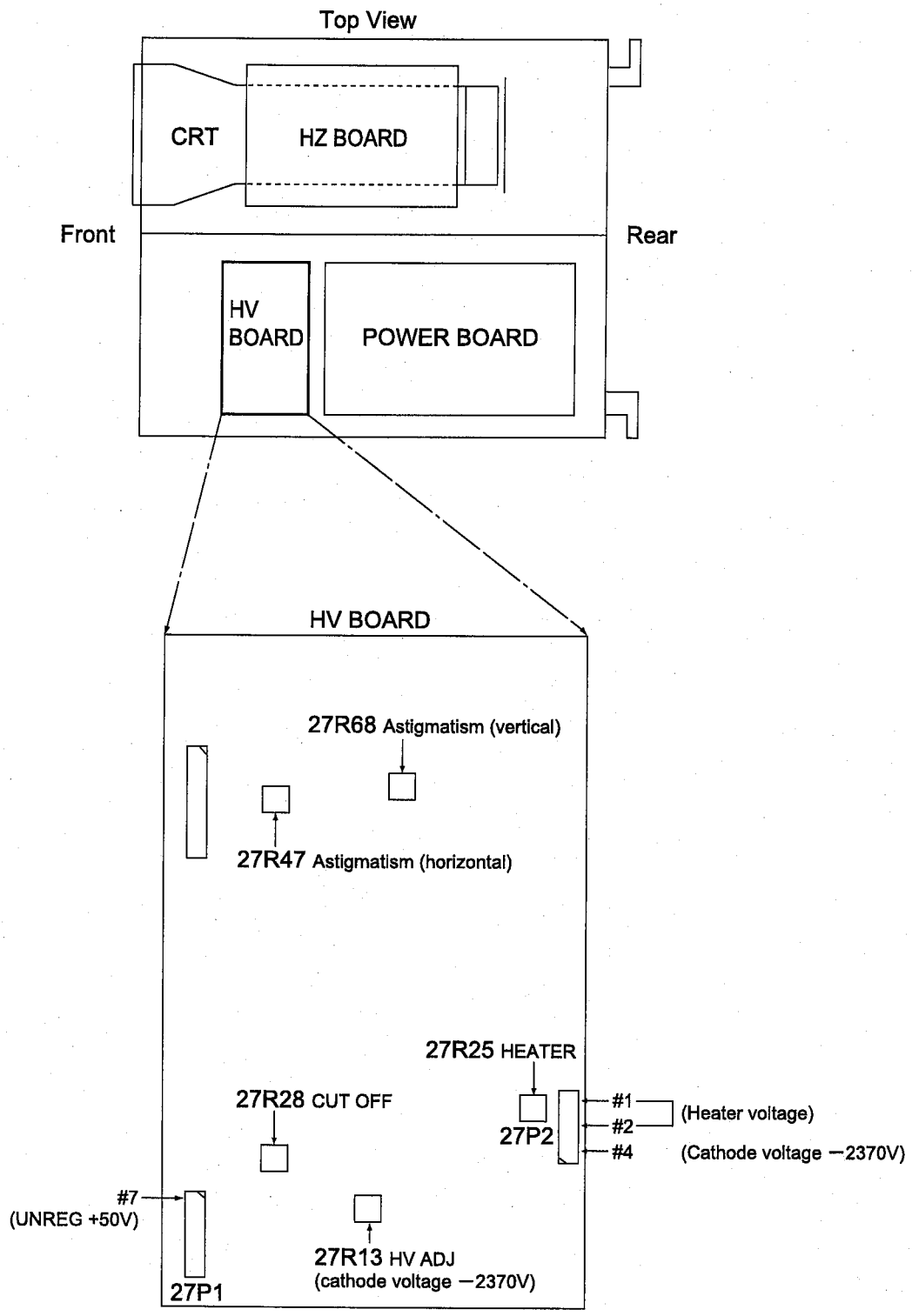


Figure 2.4 HV BOARD

[3] HZ BOARD

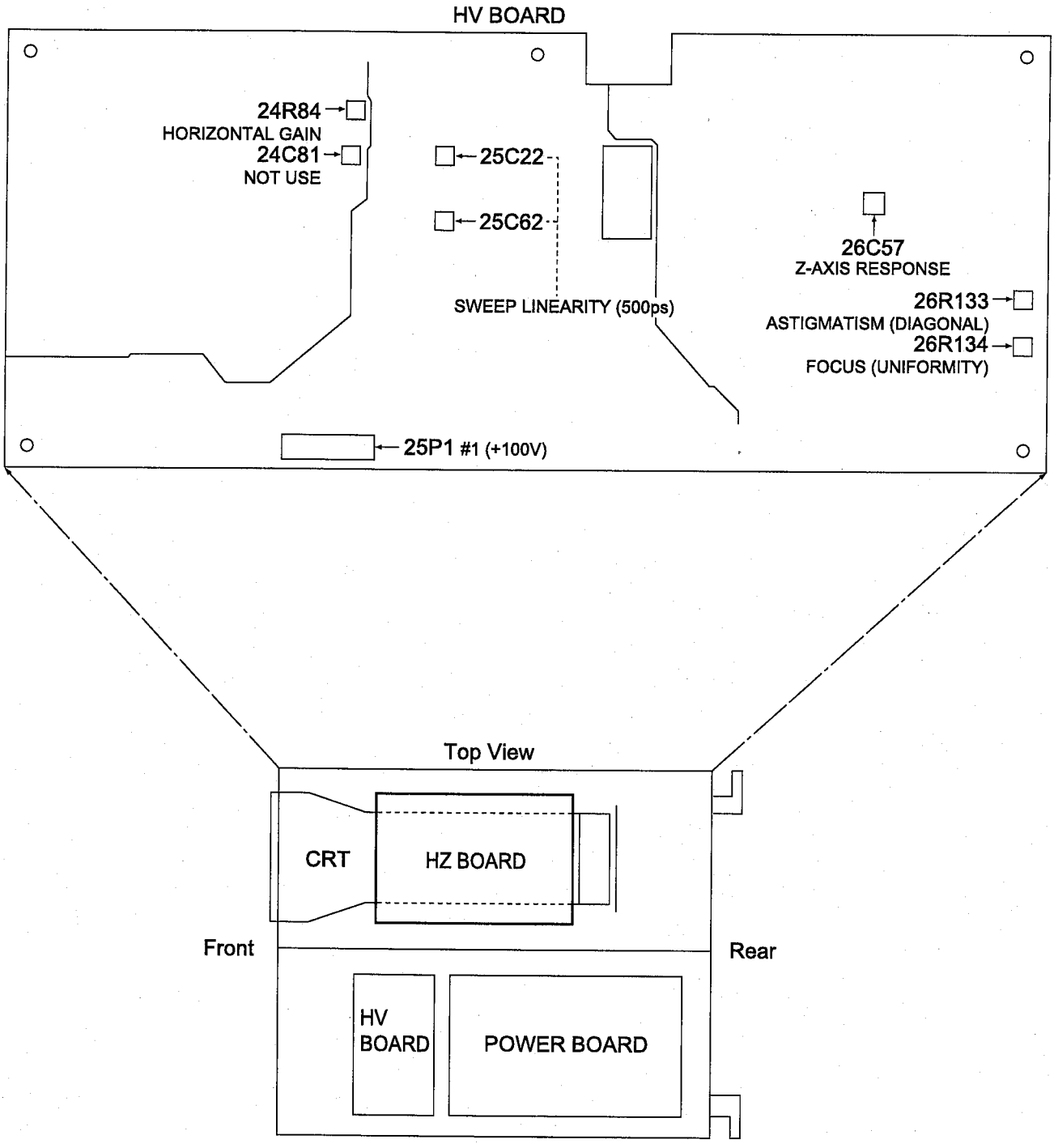


Figure 2.5 HZ BOARD

[4] ANA MAIN BOARD I

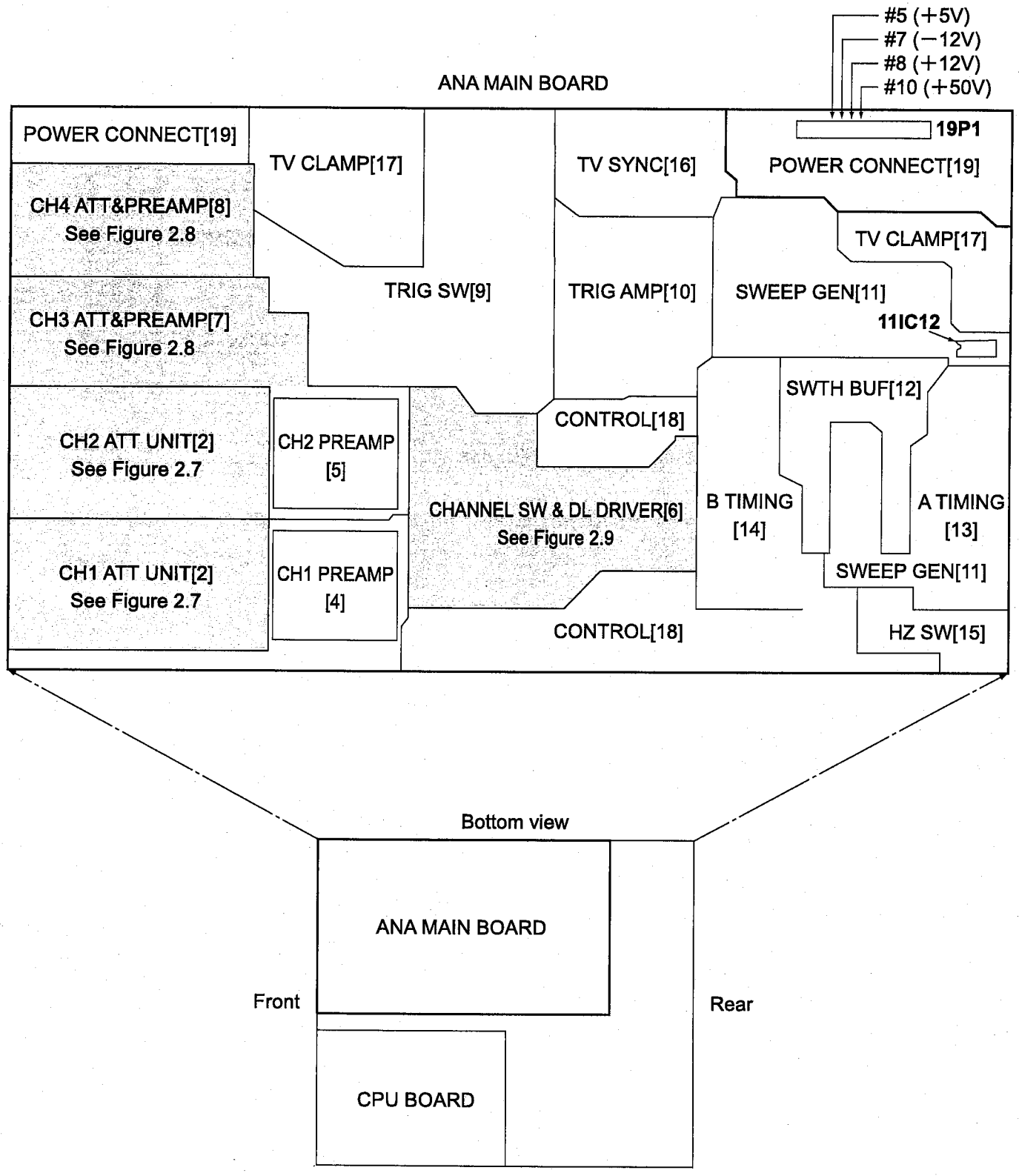


Figure 2.6 ANA MAIN BOARD I (Over All)

[5] ANA MAIN BOARD II , III

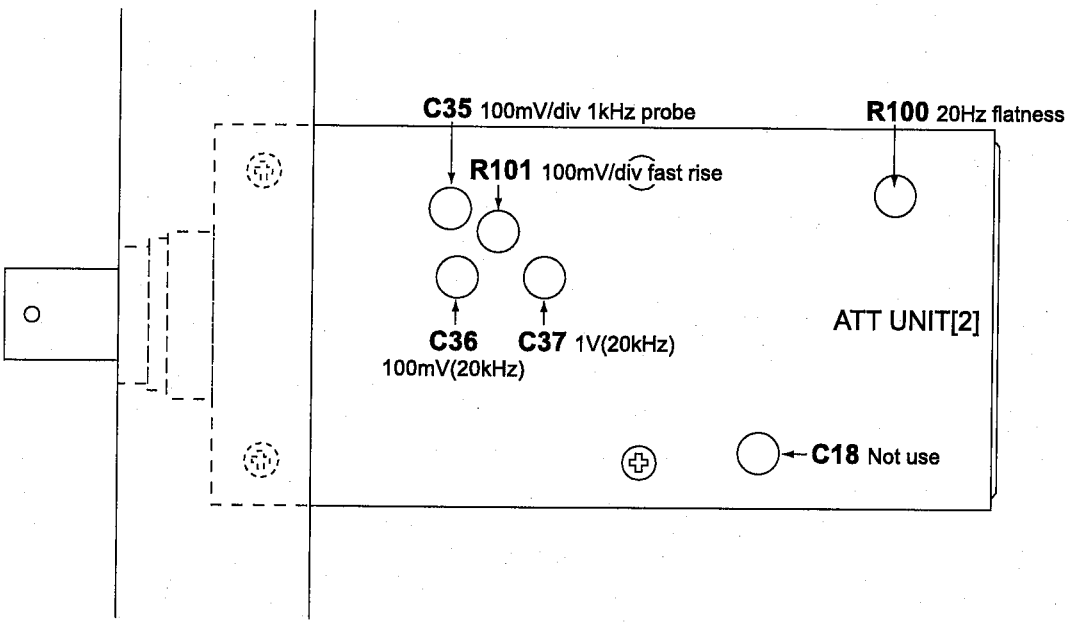


Figure 2.7 ANA MAIN BOARD II (CH1/CH2 ATT UNIT)

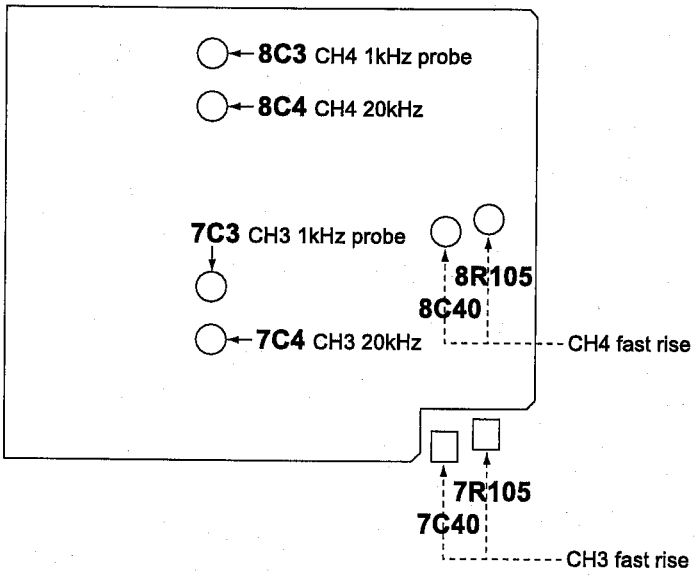


Figure 2.8 ANA MAIN BOARD III (CH3/CH4 ATT UNIT)

[6] ANA MAIN BOARD Ⅳ

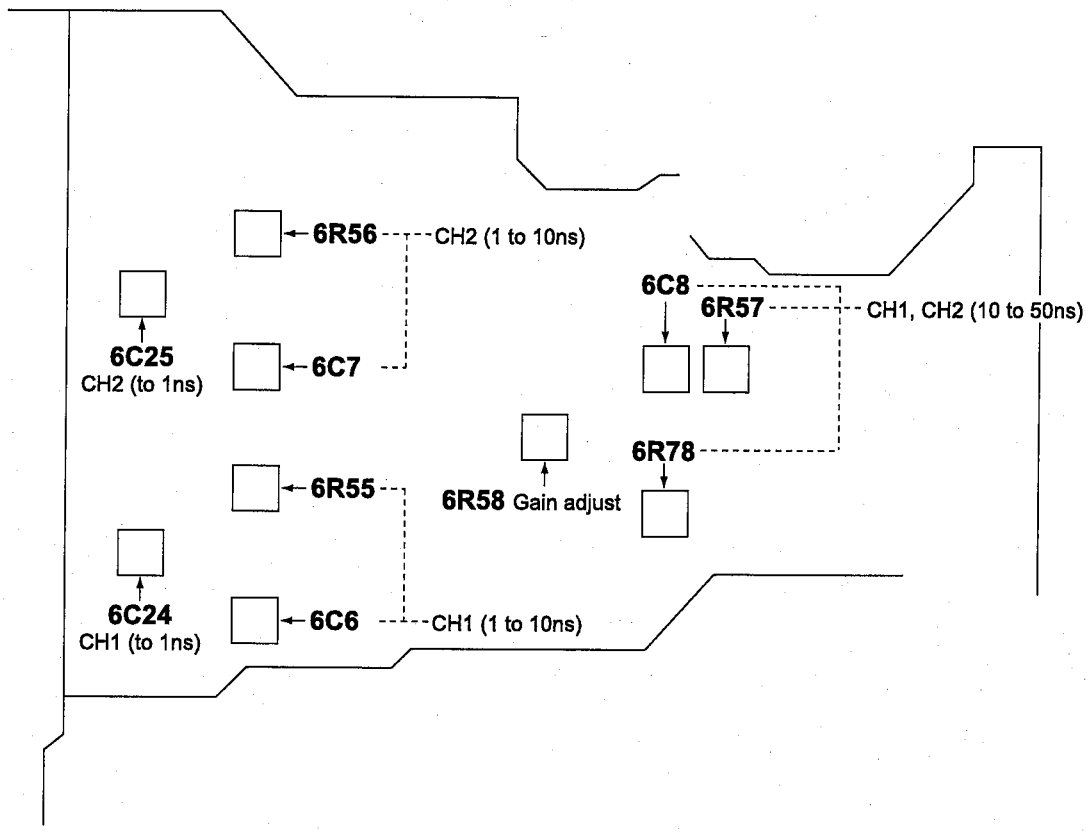


Figure 2.9 ANA MAIN BOARD Ⅳ (CHANNEL SW & DL DRIVER)

[7] V MAIN BOARD

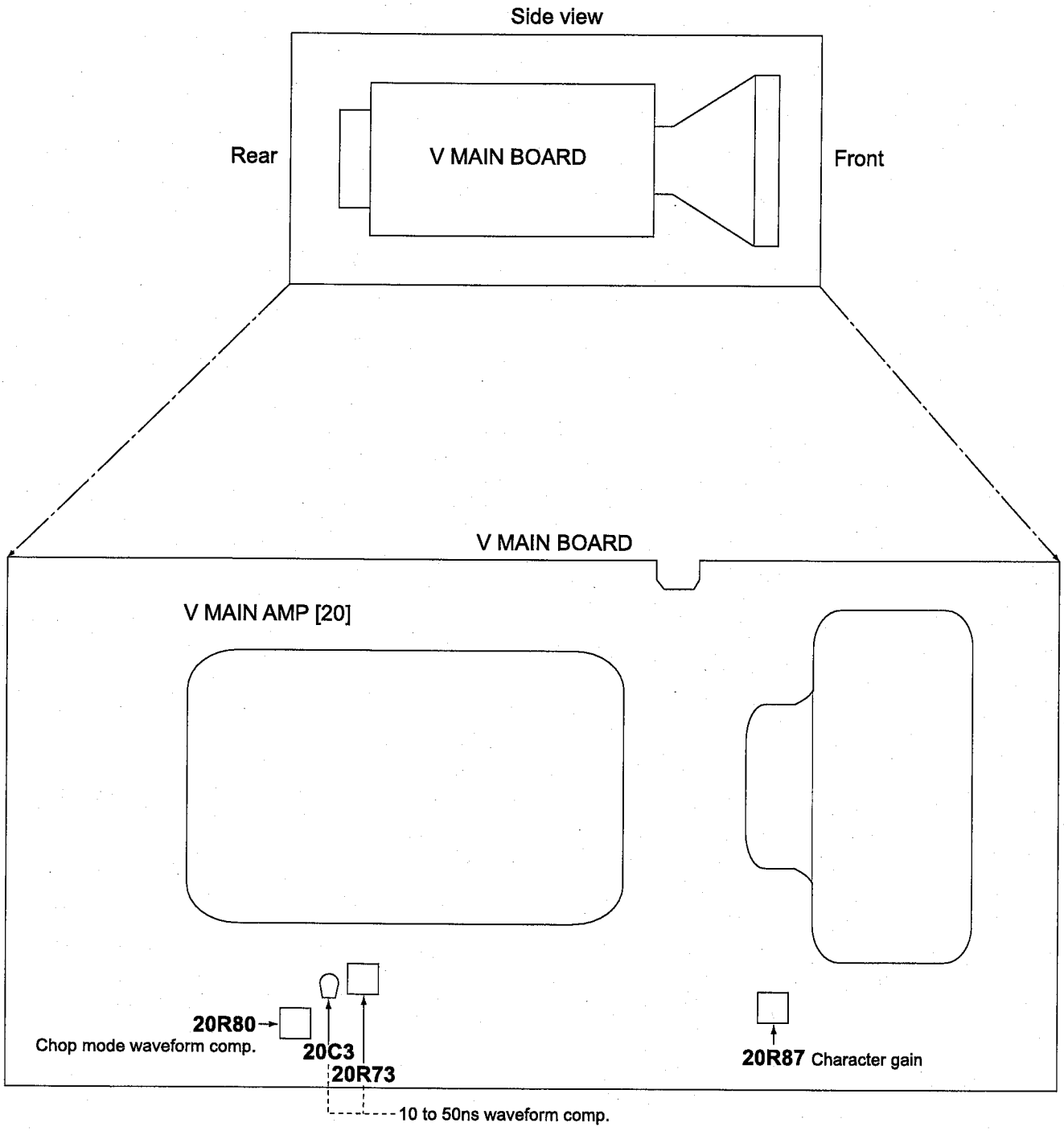


Figure 2.10 V MAIN BOARD

[8] CPU BOARD

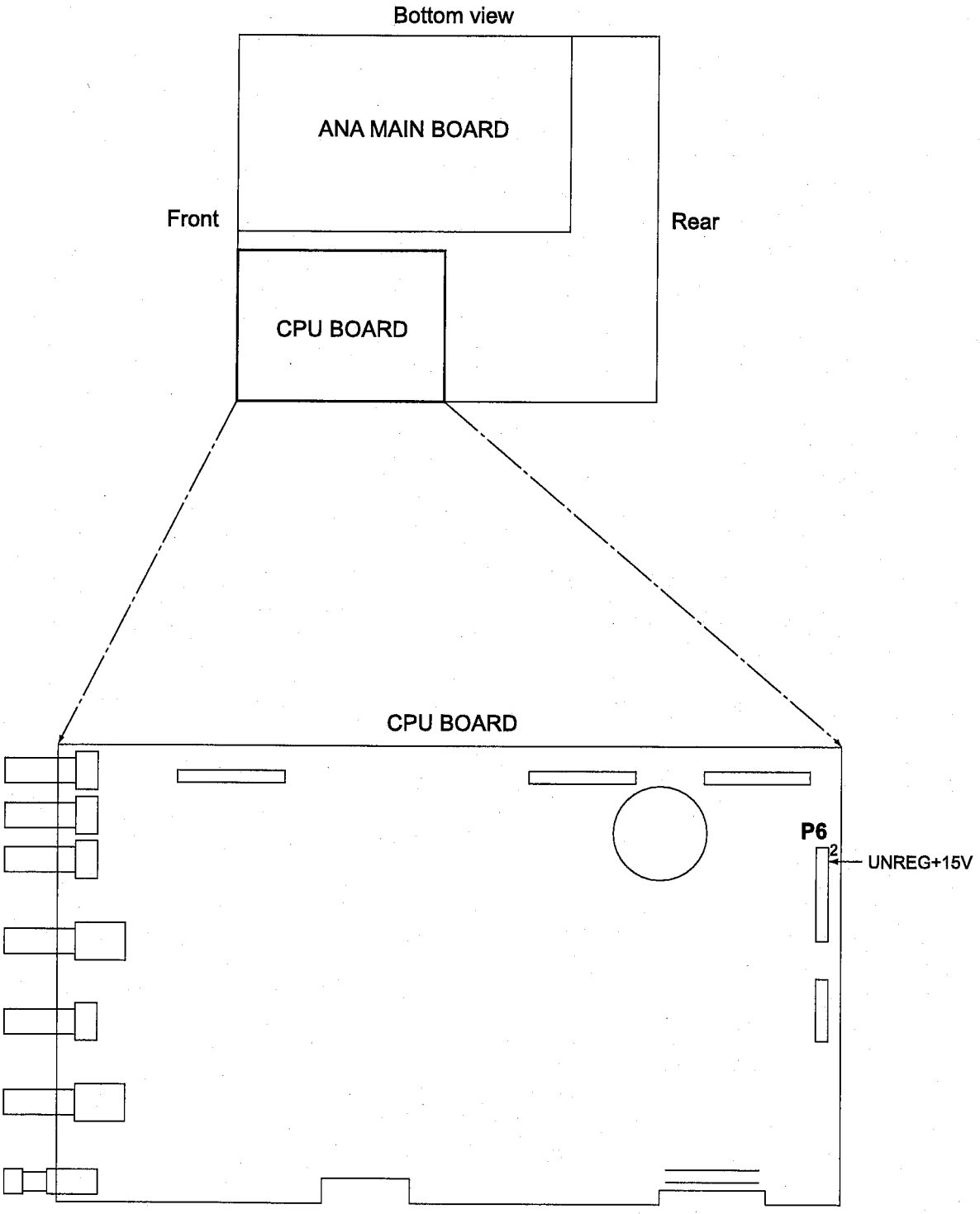
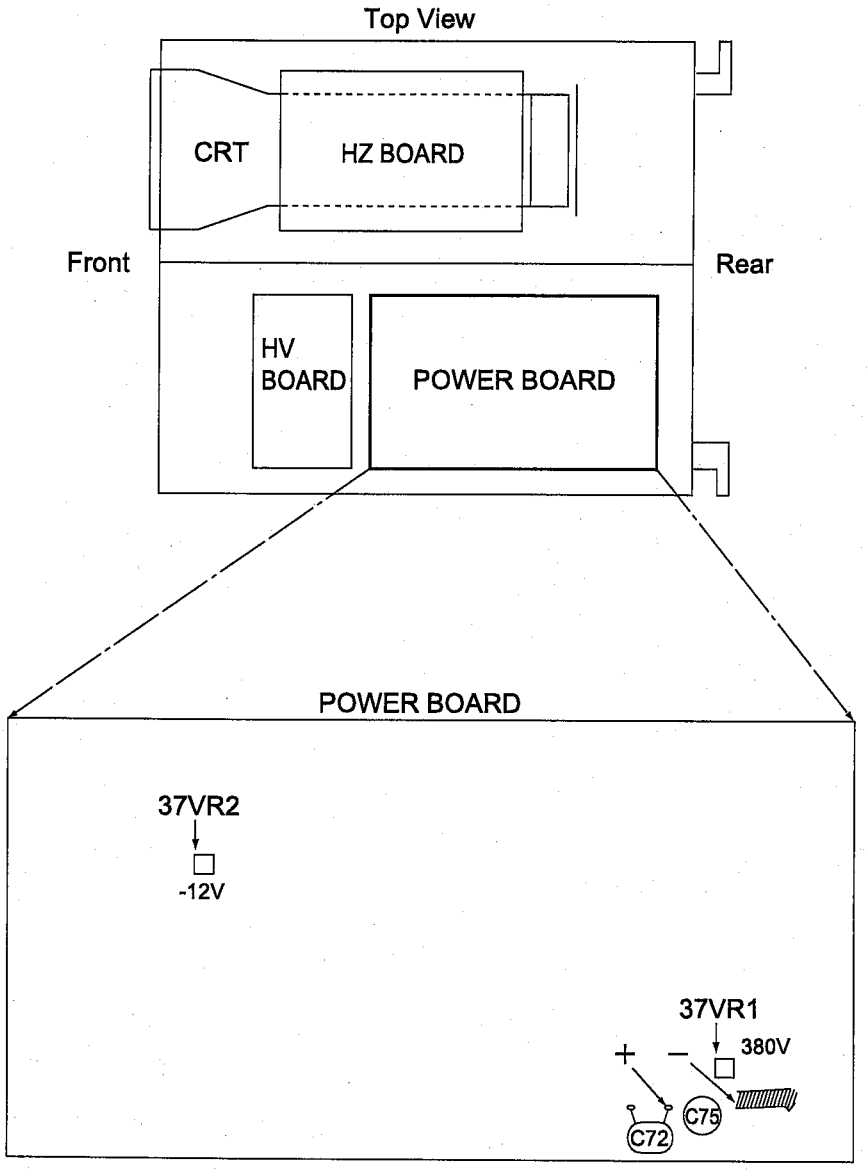


Figure 2.11 CPU BOARD

2.2 DC Power Supply

2.2.1 Preregulator Adjustment

<table>
<tr><td>Item</td><td>Description</td></tr>
<tr><td>Rating and test point</td><td>
<table>
<tr><th></th><th>DC voltage</th><th>Accuracy</th><th>Ripple voltage</th><th>Test point</th><th>Adjuster</th></tr>
<tr><td>Others</td><td>+380V</td><td>±2%</td><td>3mVp-p or less</td><td>37C75+/-</td><td>37VR1</td></tr>
<tr><td>UL</td><td>+235V</td><td>±2%</td><td>3mVp-p or less</td><td>37C75+/-</td><td>37VR1</td></tr>
</table>
</td></tr>
<tr><td>Equipment</td><td>・ Digital multimeter : VOAC7411 or equivalent</td></tr>
<tr><td>Procedure</td><td>① Check a voltage between the test points with a digital multimeter.
② Adjust it from 372.4 to 387.6V with VR1.</td></tr>
<tr><td>Test/ Adjustment Location</td><td>


</td></tr>
</table>

2.2.2 Secondary Voltage Adjustment

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Rating and test point</td><td>
<table>
<tr><th>DC voltage</th><th>Accuracy</th><th>Ripple voltage</th><th>Test point</th><th>Adjuster</th></tr>
<tr><td>-12V</td><td>±0.5%</td><td>3mVp-p or less</td><td>ANA BOARD 19P1 #7</td><td>37VR2</td></tr>
<tr><td>+50V</td><td>±2.0%</td><td>5mVp-p or less</td><td>ANA BOARD 19P1 #10</td><td>—</td></tr>
<tr><td>+12V</td><td>±1.5%</td><td>3mVp-p or less</td><td>ANA BOARD 19P1 #8</td><td>—</td></tr>
<tr><td>+5V</td><td>±3.0%</td><td>40mVp-p or less</td><td>ANA BOARD 19P1 #5</td><td>—</td></tr>
<tr><td>+100V</td><td>±3.0%</td><td>20mVp-p or less</td><td>HZ BOARD 25P1 #1</td><td>—</td></tr>
<tr><td>UNREG +50V</td><td>±10.0%</td><td>——</td><td>HV BOARD 27P1 #7</td><td>—</td></tr>
<tr><td>UNREG +15V</td><td>±10.0%</td><td>——</td><td>CPU BOARD P6 #2</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>Equipment</td><td>• Digital multimeter : VOAC7411 or equivalent
• 1mv/div oscilloscope with a probe of 1:1 attenuation ratio</td></tr>
<tr><td>Procedure</td><td>— DC Voltage —
① Check a voltage between the 19P1#7 and ground with a digital multimeter.
② Adjust —12V with 37VR2 within 11.94 to 12.06V.
— Ripple Voltage —
③ Set SWEEP MODE to SINGLE.
④ Check the ripple voltage of each power supply with a 1mV/div oscilloscope (use a probe of 1:1 attenuation ratio).</td></tr>
<tr><td>Reference</td><td>If —12V is adjusted, the other power supplies should be meet to the specification.</td></tr>
<tr><td>Test/ Adjustment Location</td><td>• Test point
19P1 : See “Figure 2.6 ANA MAIN BOARD I (Over All)”
25P1 : See “Figure 2.5 HZ BOARD”
27P1 : See “Figure 2.4 HV BOARD”
P6 : See “Figure 2.11 CPU BOARD”
• Adjustment
VR2 : See “Figure 2.3 POWER BOARD”</td></tr>
</table>

2.3 CRT Display

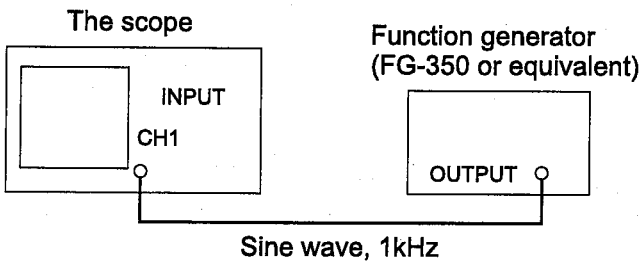
2.3.1 CRT Cathode Voltage

Item	Description
Rating	−2370V ± 20V (−2350 to −2390V)
Equipment	• Digital multimeter : VOAC7411 or equivalent • High-voltage probe (adjusted one)
Note	• Adjustment of the CRT cathode voltage affects most of other adjustment items. When it is within the specification, do not adjust it. • When the CRT cathode voltage is adjusted, check and adjust the affected items in accordance with Table 2.1.9.
Procedure	① Use the digital multimeter **(high-voltage probe used)** to check a voltage between **27P2#4** and **GND**. ② Adjust it to **−2370V** with **27R13 GV ADJ**.
Check/ Adjustment Location	27P2 #4, 27R13 : See "Figure 2.4 HV BOARD"

2.3.2 CRT Heater Voltage

Item	Description
Rating	5.6 to 6.1 Vrms
Equipment	Digital multimeter with TRUE RMS function : VOAC7411 with Battery Unit SC-306 or equivalent [Note : Use more than 100kHz bandwidth multimeter]
WARNING	Since a DC voltage of -2400V is superimposed upon the CRT heater, use the digital multimeter with batteries to prevent danger.
Procedure	① At MIN load, check a voltage between **27P2#1** and **27P2#2** with the digital multimeter. • The MIN load is as follows : INTEN : Fully counterclockwise READ OUT : OFF (not displayed) FOCUS : Fully clockwise ② Adjust it to **5.80Vrms** with **27R25 HEATER**. ③ At MAX load, confirm a heater voltage within **5.6 to 6.1Vrms**. • The MAX load is as follows : READOUT : ON TIME/DIV : 500μs/div FOCUS : Fully counterclockwise SWEEP MODE : AUTO INTEN : Fully clockwise
Check/ Adjustment Location	27P2, 27R25 : See "Figure 2.4 HV BOARD"

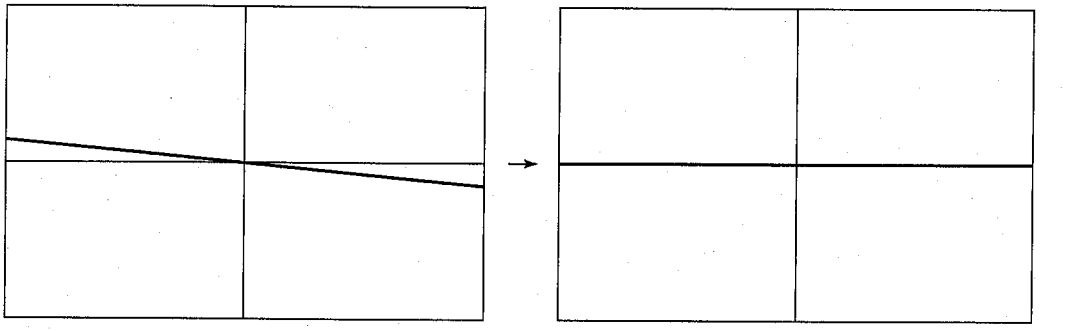
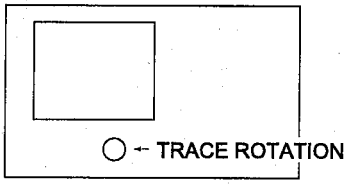
2.3.3 Focus

Item	Description
Rating	The trace should be focused when the **【FOCUS】** control is positioned between plus minus 45° from the midrange.
Connection	
Procedure	① Set the scope as follows : TIME/DIV : 200μs/div INTEN : The trace can be scarcely visible READ OUT : The characters can be scarcely visible FOCUS : Midrange ② Input 1kHz 4div amplitude sine wave. ③ Adjust **26R134** to get the same focus at any point of the screen. ④ Adjust horizontal astigmatism with **27R47**, the vertical with **27R68**, and the diagonal with **26R133**. ⑤ Repeat the above ③ and ④ to get the best focus.
Check/ Adjustment Location	26R134, 26R133 : See "Figure 2.5 HV BOARD" 27R47, 27R68 : See "Figure 2.4 HV BOARD"

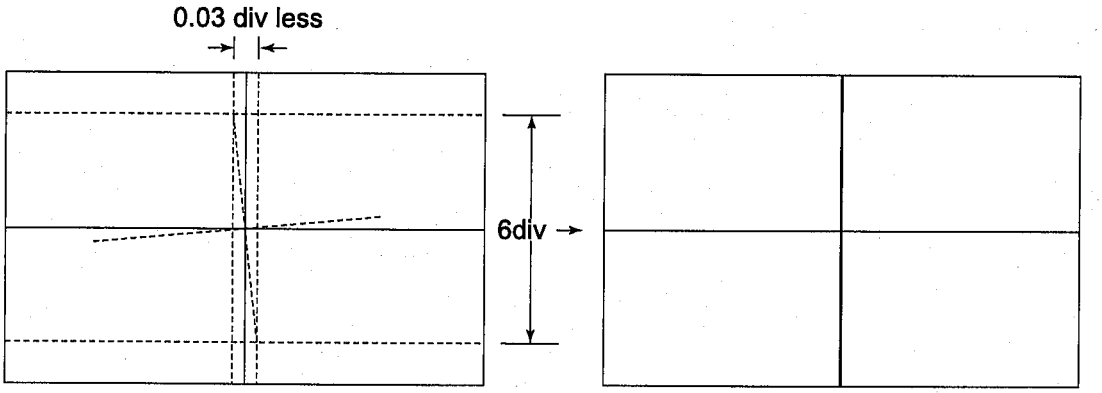
2.3.4 Intensity

Item	Description
Rating	• The trace should disappear when the **【INTEN】** control is turned fully counterclockwise. • The characters should disappear when the **【READOUT】** control is turned fully counter-clockwise.
Procedure	① Check to **001 INTEN** VALUE in the manual adjustment menu. If VALUE is not 00128 then set to **000128**. [To enter the manual adjustment menu, refer to "2.1.3 Menu Screen"] Push AUTOSET to quit manual adjustment menu. ② Set the scope as follow so that a spot is displayed. INTEN : Fully counterclockwise READ OUT : OFF (not displayed) HORIZ DISPLAY : X-Y ③ Adjust **27R28 CUT OFF** so that the spot disappear thoroughly.
Check/ Adjustment Location	27R28 : See "Figure 2.4 HV BOARD"

2.3.5 Trace Rotation

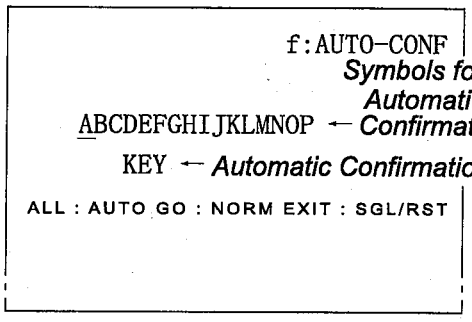
Item	Description
Rating	The horizontal trace should be aligned with the horizontal graticule.
Procedure	① Set the scope as follows : HORIZ DISPLAY : A SWEEP MODE : AUTO TIME/DIV : 1ms/div ② Adjust with **TRACE ROTATION** and align the horizontal trace.
Waveform on Screen	 Dislocation of horizontal trace from horizontal graticule ②Align horizontal trace with horizontal graticule
Adjustment Location	

2.3.6 Orthogonality

Item	Description
Rating	±0.03/6div or less
Procedure	① In the adjustment menu, select the **"003 ORTHOG"** manual adjustment menu. ② Press a function key. A crosshairs cursor will appear. ③ Adjust the value and align the vertical cursor with the vertical graticule. ④ Save the value. [Note : When the adjustment is completed cursor box will be display on the CRT]
Check/ Adjustment Location	 Dislocation of Vertical Trace from Vertical Graticule ③Align Vertical Trace with Vertical Graticule

2.4 Check the Key Function in Automatic Confirmation Mode

Check the function of the keys, controls, and pulse switches on the front panel. In this section, check only the functions of those keys. For the other items, refer to "2.14 Automatic Confirmation".



Procedure

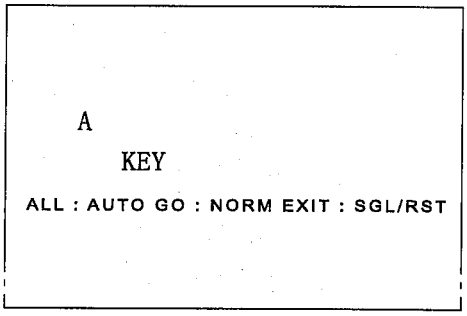
— ***Entering the Automatic Confirmation Menu*** —

① Press [Δ V] in "the manual adjustment menu screen".

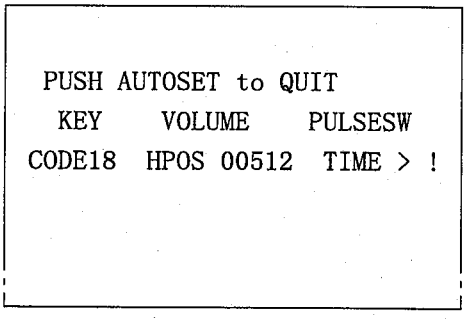
← • The automatic confirmation menu is displayed.

— ***Selecting the Automatic Confirmation Item A*** —

② Select an item A for automatic confirmation.



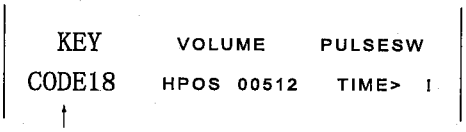
← ◇Only **A** (KEY) is displayed.



— ***Execute the Confirmation Menu*** —

③ Press [NORM].

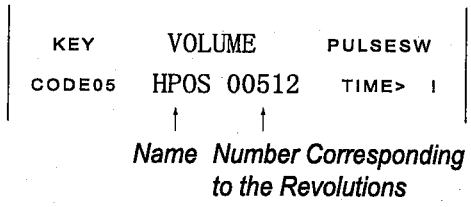
← • The Key SW confirmation menu is displayed.



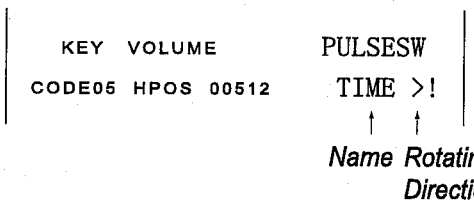
Code No.

— ***Checking the Key Function*** —

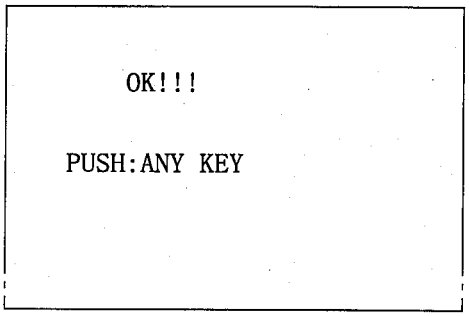
← ④ Check that the code of the pressed key is displayed under "KEY" by pressing the key.
See Table 2.4.1.



← ⑤ Check that the name of the volume and the number corresponding to the revolutions, "**00000 to 65535**", are displayed under the "VOLUME" by turning a volume.
See Table 2.4.2.



← ⑥ Check that the name of the pulse switch and "> !" are displayed by turning the pulse switch to the clockwise, and that the name and "<!" are displayed by turning the switch to the counterclockwise.
See Table 2.4.3.



— ***End of Confirmation*** —

⑦ Press **AUTOSET**.

⑧ Press **【FUNCTION】**.

← • "OK!!!" is displayed.

⑨ Cancelling automatic confirmation by pressing **SGL/RST**.

Table 2.4.1

KEY	No.
READOUT	2C
CH1	1C
ADD(CH1+CH2)	2A
50Ω/1MΩ	1F
DC/AC	1D
GND	1E
CH2	20
INV	2B
50Ω/1MΩ	23
DC/AC	21
GND	22
CH3	24
DC/AC	25
100mV/500mV	26
CH4	27
DC/AC	28
100mV/500mV	29

KEY	No.
ΔV	03
Δt	02
TCK/INDEP	04
SAVE/RECALL	05
ATTACH	09
OFFSET	08
AUTO	17
NORM	18
SGL/RST	19
FINE	0A
A B*	0E
SLOPE+/-	0F
HOLDOFF	06
MAG ×10	0B
SOURCE	10
COUPL	11
TV	0C
EVENT/TV CLAMP	12
A	13
B	14
DELAY/TRACE SEP	07
X-Y	16
ALT CHOP	1A
BWL	1B

Table 2.4.2

VOLUME VARIABLE RESISTOR	Name	Number☆1	
		CCW	CW
A INTEN	AINT	00000	65535
B INTEN	BINT	00000	65535
READ OUT	R/O	00000	65535
CH1 POSITION	1POS	00000	65535
CH2 POSITION	2POS	00000	65535
CH3 POSITION	3POS	00000	65535
CH4 POSITION	4POS	00000	65535
H POSITION	HPOS	00000	65535
TRIG LEVEL	TRIG	00000	65535

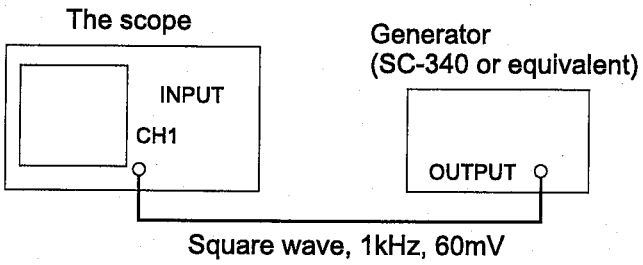
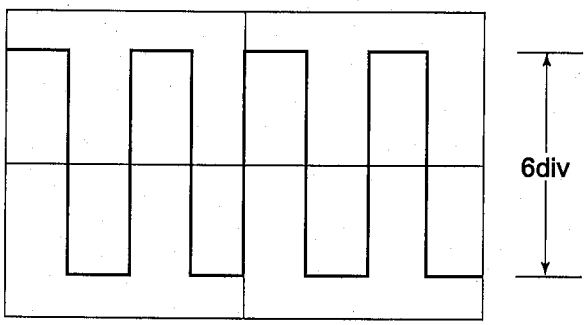
☆1:Some times value will be changed.

Table 2.4.3

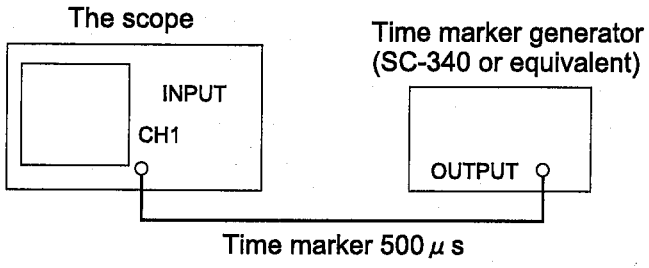
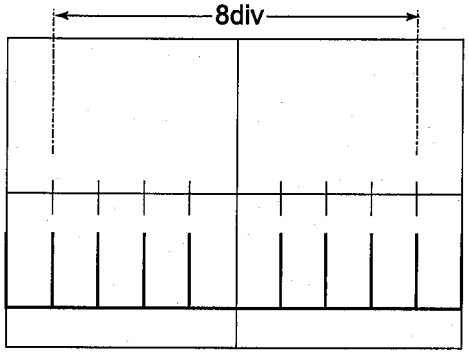
PULSE SW	Name	Direction	
		CCW	CW
CH1 VOLTS/DIC	CH1	<!	<!
CH2 VOLTS/DIV	CH2	<!	<!
FUNCTION	FUNC	<!	<!
TIME/DIV	TIME	<!	<!

2.5 Gain (Coarse)

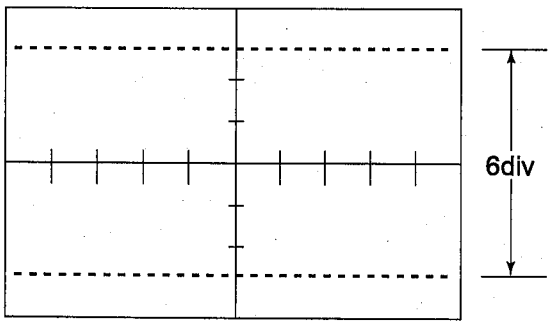
2.5.1 Vertical Gain

Item	Description
Rating	± 2% or less
Connection	
Procedure	① Set VOLTS/DIV of CH1 to **10 mV/div**. ② Input a square wave (1kHz, 60mV) to CH1. ③ "**013V CHIGAIN**" in the manual adjustment menu to set VALUE 45000 and save. ④ Adjust **6R58** to **6div** amplitude. • To enter the manual adjustment menu, refer to "2.1.3 Menu Screen".
Check/ Adjustment Location	 ③Adjust the amplitude to 6div.
Adjustment Location	6R58 : See "Figure 2.9 ANA MAIN BOARD Ⅳ (CHANNEL SW & DL DRIVER)"

2.5.2 Horizontal Gain

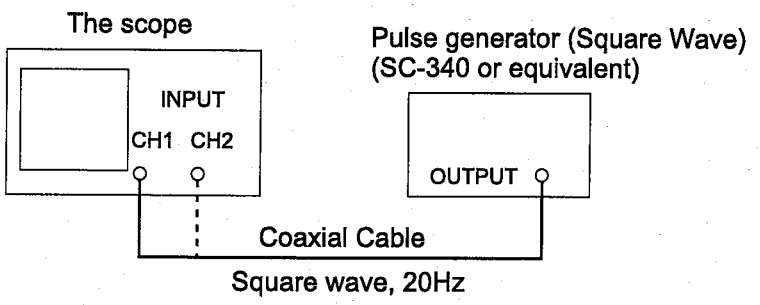
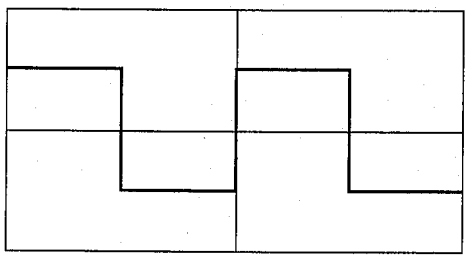
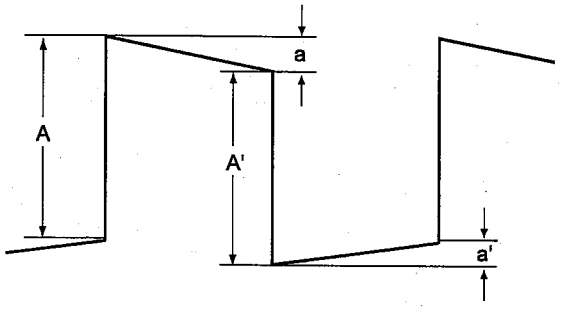
Item	Description
Connection	
Procedure	① Set A TIME/DIV to 500μs/div. ② Input a time marker 500μs to CH1. ③ **"077 A SWEEP GAIN"** in the manual adjustment menu to set VALUE 45000 and save. ④ Adjust **24R84** so that the pulse meet to graticule over ±4div. from the screen center.
Waveform on Screen	
Adjustment Location	24R84 : See "Figure 2.5 HZ BOARD"

2.5.3 Δ V Readout Gain

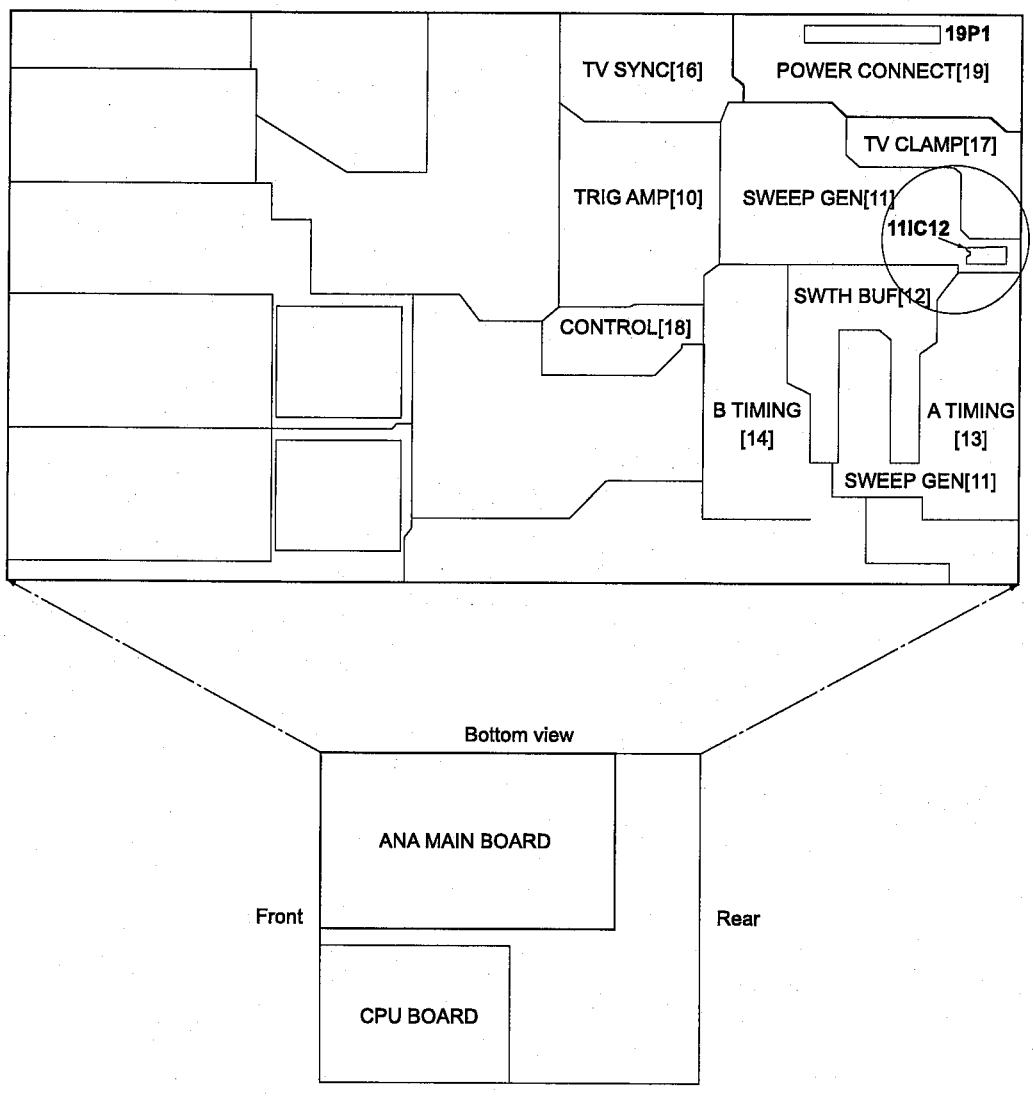
Item	Description
Procedure	① Select Δ V with [Δ V] and display the Δ V cursor at normal scope mode. ② Set VOLTS/DIV to **10 mV/div.** ③ Adjust **20R87** so that an inter cursor distance will be **6 div** at Δ V=60mV.
Waveform on Screen	
Adjustment Location	20R87 : See "Figure 2.10 V MAIN BOARD"

2.5.4 Attenuator Unit Flatness

a. CH1, CH2

Item	Description
Rating	± 2.0% or less
Connection	
Setting	① INPUT COUPLING : DC ② INPUT RC : 1M Ω ③ VOLTS/DIV : 10mV ④ SWEEP : NORM
Procedure	— *CH1 (CH1 ATT UNIT)* — ① Input 20Hz 60mV Pulse. ② Adjust the Waveform flatness with R100 in the Attenuator unit. — *CH2 (CH2 ATT UNIT)* — ③ Same as CH1, adjust CH2.
Waveform on Screen	 ← Correctly Adjusted Waveform
Adjustment Location	See "2.7 ATT UNIT BOARD II (CH1/CH2 ATT UNIT)"
Reference	 Sag= $\frac{a}{A}$ (or $\frac{a'}{A'}$) × 100% The larger of $\frac{a}{A}$ or $\frac{a'}{A'}$ is taken. (Electronic Machinery Industry Association MEA-27)

2.6 Crystal Oscillation Frequency

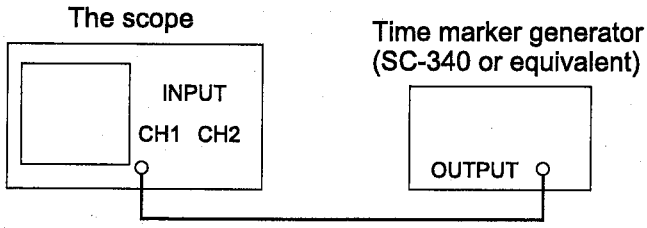
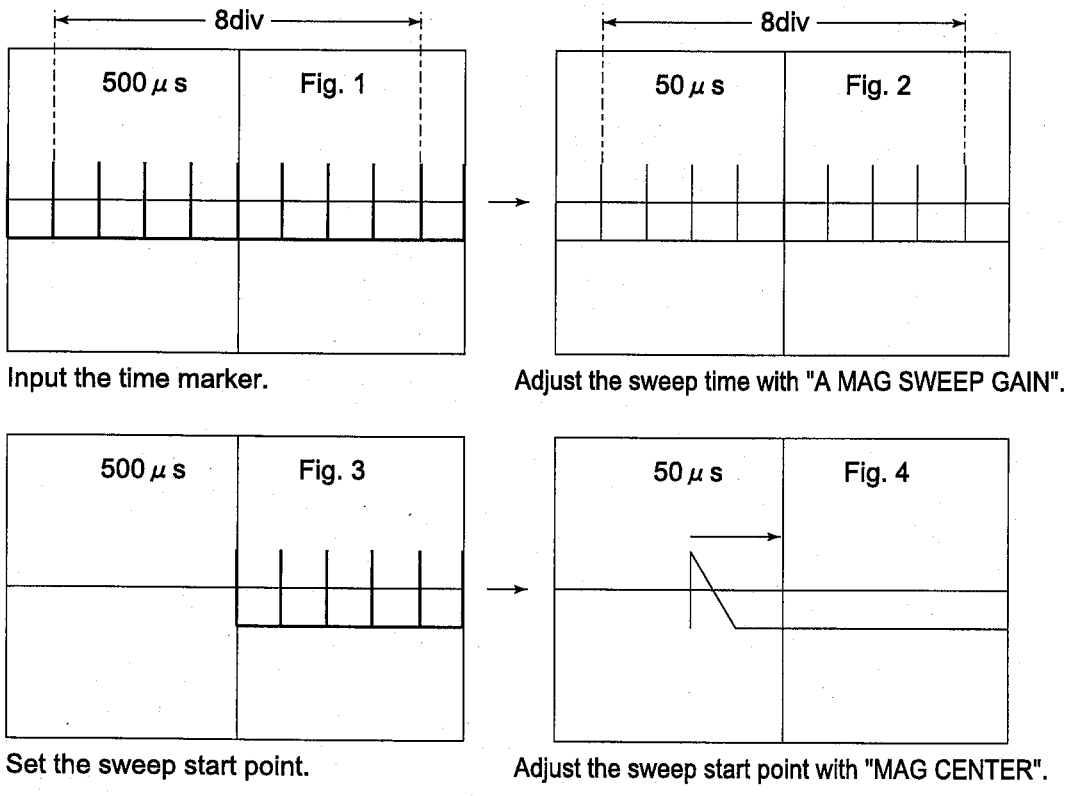
Item	Description
Rating	20MHz ± 100ppm (± 0.01% : 19,998 to 20,002MHz)
Equipment	Frequency Counter
Procedure	①Check **11IC12#1** with the counter.
Check Location	

2.7 Balance Coarse

2.7.1 Balance Coarse (Automatic Adjustment Menu "C, K")

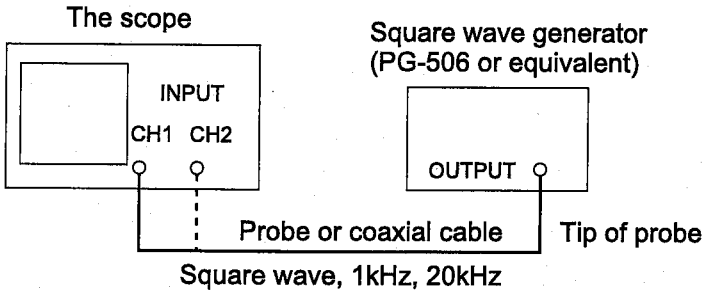
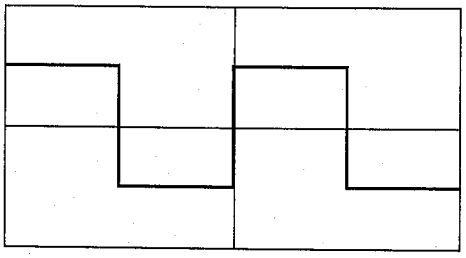
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Procedure</td><td>① Enter the Adjustment Menu Screen.
(refer to "2.1.3 Menu Screen")
② Press [Δt] in the adjustment menu screen.
• Display the automatic adjustment menu screen.
③ Select item "C, K" for automatic adjustment.
Display the symbol for the automatic adjustment item.
(refer to "2.1.3 Automatic Adjustment")
④ Press [NORM] twice to execute the automatic adjustment items (C, K)</td></tr>
<tr><td>Waveform on Screen</td><td>function display → f:AUTO-ADJ
C K ← Symbol of item
V-BAL ← Adjustment item
ALL : [AUTO] GO : [NORM] EXIT [SGL / RST]
C : V-BAL
K : H-MAG</td></tr>
<tr><td>Adjustment Symbol C:V-BAL</td><td>• VAR BAL (Variable Balance) : 10mV at CH1 and CH2
• STEP BAL (Step Balance) : 2mV, 5mV, 10mV, 20mV and 50mV at CH1 and CH2
• GND BAL (Ground Balance) : 2mV at CH1 and CH2</td></tr>
<tr><td>Rating</td><td>• VAR BAL : 0.2div
• STEP BAL : 0.2div
• GND BAL : 0.2div</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>027</td><td>CH1 2mV BAL</td><td>033</td><td>CH2 5mV BAL</td></tr>
<tr><td>028</td><td>CH1 5mV BAL</td><td>034</td><td>CH2 10mV BAL</td></tr>
<tr><td>029</td><td>CH1 10mV BAL</td><td>035</td><td>CH2 20mV BAL</td></tr>
<tr><td>030</td><td>CH1 20mV BAL</td><td>034</td><td>CH2 50mV BAL</td></tr>
<tr><td>035</td><td>CH1 50mV BAL</td><td>036</td><td>CH1 GND BAL</td></tr>
<tr><td>045</td><td>CH2 2mV BAL</td><td>046</td><td>CH2 GND BAL</td></tr>
</table>
</td></tr>
<tr><td>Adjustment Symbol K:H-MAG</td><td>• Magnification center</td></tr>
<tr><td>Rating</td><td>• Magnification center : ±3.0div or less</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>090</td><td>MAG CENTER</td><td>—</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>Jig</td><td>Unnecessary</td></tr>
</table>

2.7.2 Magnification Gain and Center

Item	Description
Connection	
Procedure	① Set the scope as follows : A TIME/DIV : 500μs, MAG × 10:OFF ② Input the 500μs time marker to CH1. [See Fig. 1] ③ Set MAG × 10 to ON and input 50μs time marker. [See Fig. 2] ④ Adjust with "**089 A MAG SWEEP GAIN**" in the adjustment menu so that the pulse meet to graticule, over ±4div, from the screen center. ⑤ Set MAG × 10 of the scope to OFF. ⑥ With the horizontal POSITION, set the sweep start point (rise of the time marker signal) to the vertical center line of graticule. [See Fig. 3] ⑦ Set MAG × 10 to ON. ⑧ Adjust with "**090 MAG CENTER**" in the adjustment menu so that the sweep start point meet to the vertical center line of graticule. [See Fig. 4] ⑨ Repeat ⑤ to ⑦, until there is no start point movement when switching MAG from ON to OFF. ⑩ Save the setting value.
Waveform on Screen	

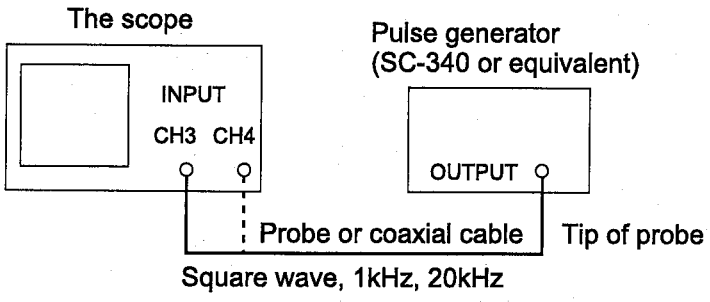
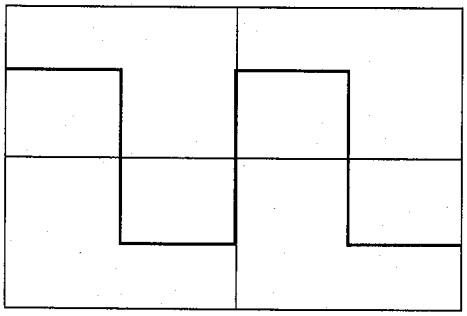
2.8 Vertical Deflection System

2.8.1 Attenuator Compensation CH1/CH2

Item	Description
Rating	±2.0% or less
Connection	
Procedure	— *CH1 (CH1 ATT UNIT)* — ① Connect CH1 INPUT to the output of the square wave generator (20kHz) with coaxial cable. [Note : Set the signal amplitude to 6 division for following adjustments.] ② Set VOLTS/DIV to 100 mV/div, and adjust the waveform to flat with **2C36**, and that of 1 V/div with **2C37**. (refer to the following table). ③ Set VOLTS/div to 10mV. ④ Connect CH1 INPUT to the output of the square wave generator (1kHz) with a probe. [Note : Displayed VOLTS/DIV will be changed to 100mV/DIV when connecting the 10:1 probe.] ⑤ Adjust the waveform to flat with the Variable Capacitor on the probe. ⑥ Set the VOLTS/div to 100mV, and adjust the waveform with **2C35**. [Note : Displayed VOLTS/DIV will be changed to 1V/DIV when connecting the 10:1 probe.] — *CH2 (CH2 ATT UNIT)* — ⑦ Adjust 2C36, 2C37 of CH2 as same as ①, ②. ⑧ CONNECT the probe used for CH1 to CH2, adjust 2C35 as same as ⑥.
Waveform on Screen	 ← Correctly Adjusted Waveform
Adjustment Location	See "2.7 ATT UNIT BOARD II (CH1/CH2 ATT UNIT)"

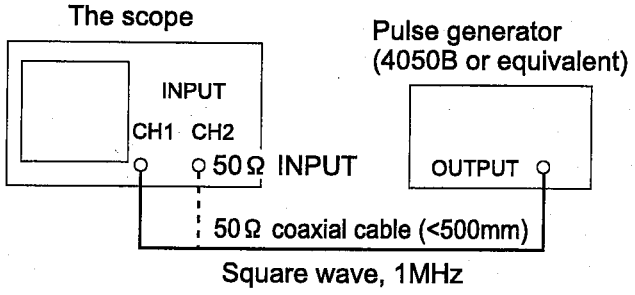
CH	Connection	Frequency	VOLTS/DIV ( ) : Procedure number		
			10mV/div	100mV/div	1V/div
CH1	Coaxial cable	20kHz	—	(1) 2C36	(2) 2C37
	Probe	1kHz	(3) variable capacitor on the probe	(4) 2C35	—
CH2	Coaxial cable	20kHz	—	(5) 2C36	(6) 2C37
	Probe	1kHz	—	(7) 2C35	—

b. CH3, CH4

Item	Description
Rating	±2.0% or less
Connection	
Procedure	— *CH3* — ① Connect CH3 INPUT to the output of the pulse generator (20kHz) with coaxial cable. ② Set VOLTS/DIV to 100mV/div, and adjust the waveform to flat with CH3 **7C4**. ③ Connect CH3 INPUT to the output of the pulse generator (1kHz) with a probe. ④ Adjust the waveform to flat with **7C3**. — *CH4* — ⑤ Adjust 8C4 of CH4 attenuator unit as same as ①, ②. ⑥ CONNECT the probe from CH3 to CH4, and adjust 8C3 of CH4 attenuator unit as same as ③, ④.
Waveform on Screen	 ← Correctly Adjusted Waveform
Adjustment Location	See "Figure 2.8 ANA MAIN BOARD III (CH3/CH4 ATT UNIT)"

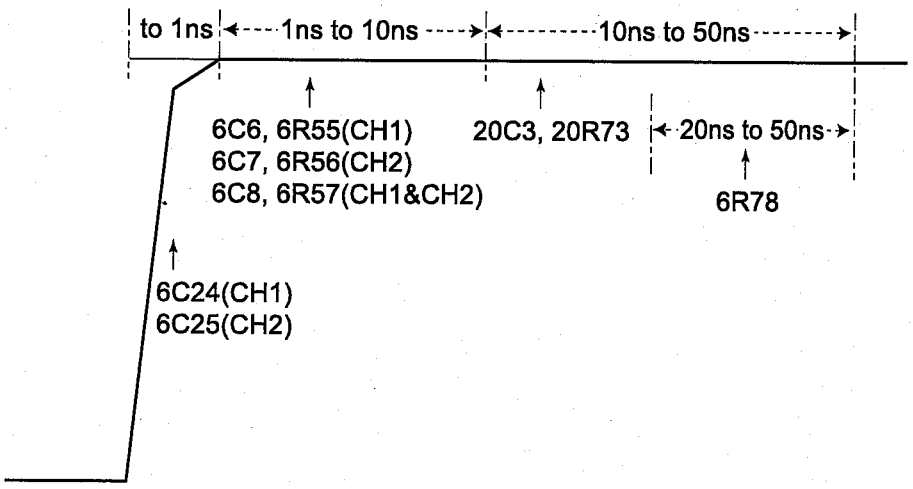
CH	Connection	Frequency	VOLTS/DIV ( ) : Procedure number	
			100mV	500mV
CH3	Coaxial cable	20kHz	(1) 7C4	—
	Probe	1kHz	(2) 7C3	—
CH4	Coaxial cable	20kHz	(3) 8C4	—
	Probe	1kHz	(4) 8C3	—

2.8.2 High-frequency Compensation (CH1/CH2)

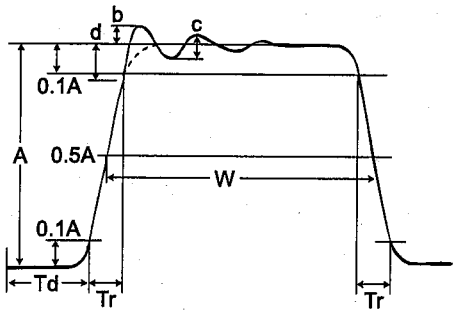
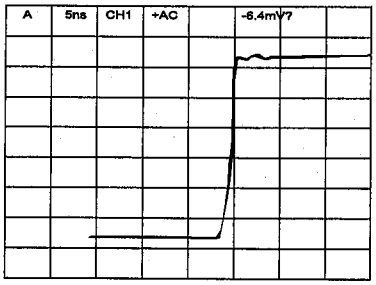
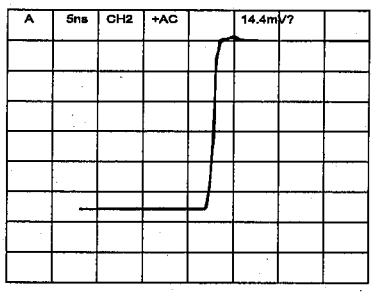
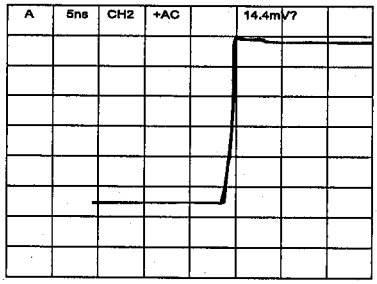
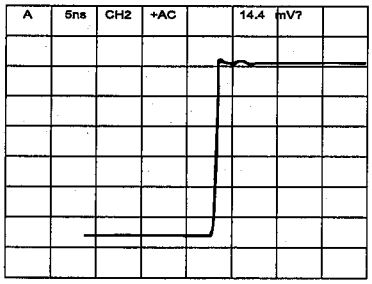
Item	Description
Rating	Overshoot : 5% at 10mV/div, 50 Ω termination
Connection	
Procedure	① Set VOLTS/DIV of CH1 and CH2 to **10mV**. 50 Ω input resistance. ② Input a square wave (1 MHz) from the 4050B and adjust the amplitude to **6 div**. ③ Adjust the waveform with the following variable capacitors and resistors.

	CH1	CH2	Common
ANA BOARD	6C24, 6C6, 6R55	6C25, 6C7, 6R56	6C8, 6R57, 6R78
V MAIN BOARD	—	—	20C3, 20R73

- Adjustment range by Variable Capacitors and Resisters in following figure.

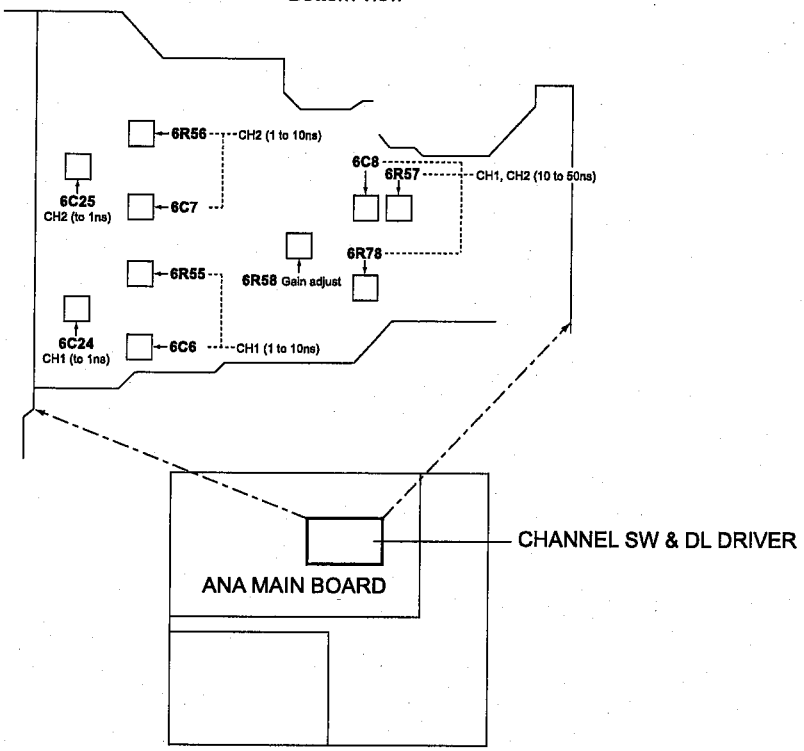


[Note] Adjust to set an overshoot and frequency characteristic. For the frequency characteristic checking method, refer to "2.8.4 Frequency Bandwidth".

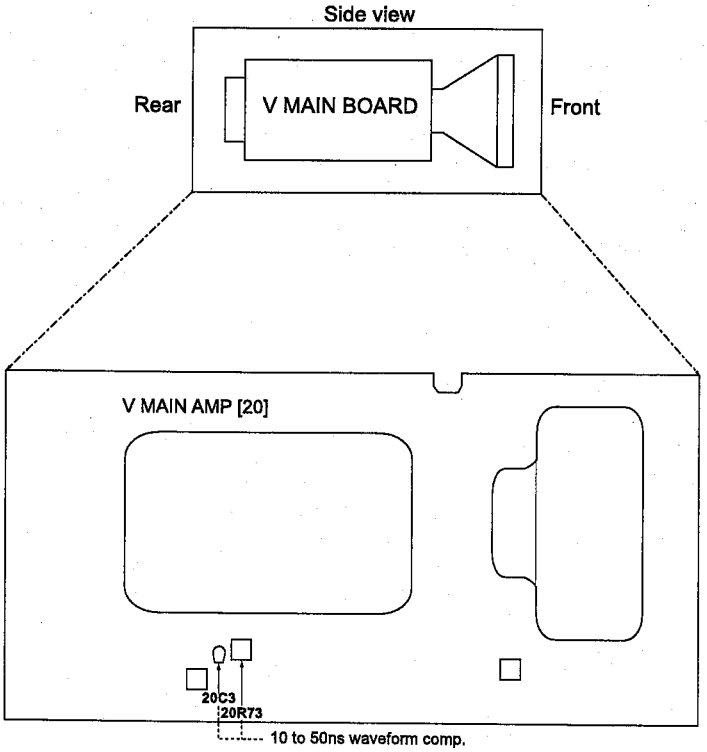
Item	Description
Reference	 A : Standard Amplitude Tr : Rise Time $\frac{b}{A}$: Overshoot Tf : Fall Time $\frac{c}{A}$: Ringing $\frac{d}{A}$: Roundness W : Pulse Width Td : Signal Delay Time
Sample Waveform	LA314 CH1 10mV/div  LA314 CH2 10mV/div  LA314H CH1 10mV/div  LA314H CH2 10mV/div 

Item	Description
Adjustment Location	6C24, 6C6, 6R55, 6C25, 6C7, 6R56, 6C8, 6R57, 6R78 : See "Figure 2.9 ANA MAIN BOARD Ⅳ (CHANNEL SW & DL DRIVER)"
	20C3-20R73 : See "Figure 2.10 V MAIN BOARD"

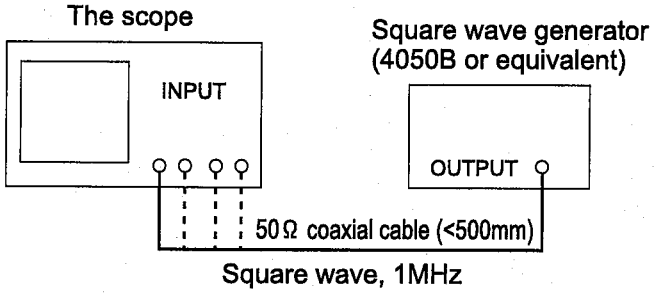
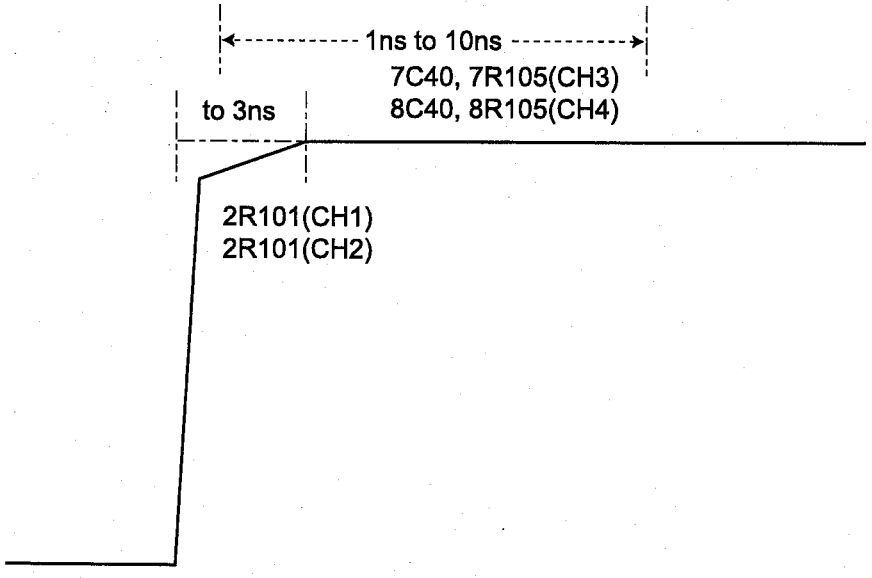
Bottom view



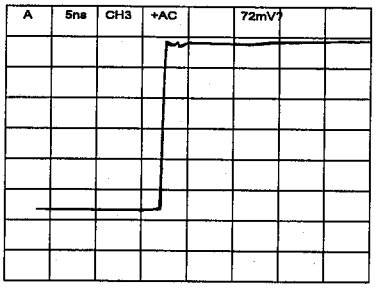
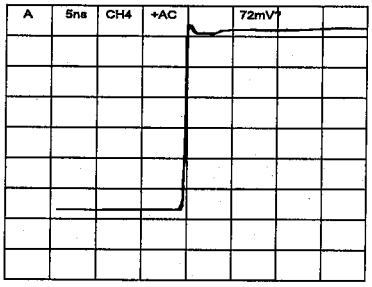
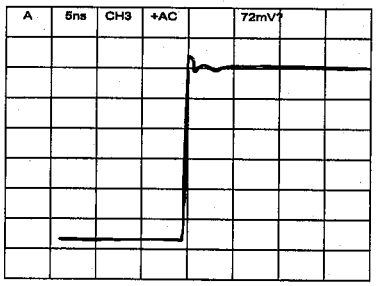
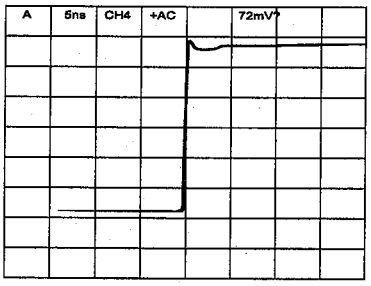
Side view



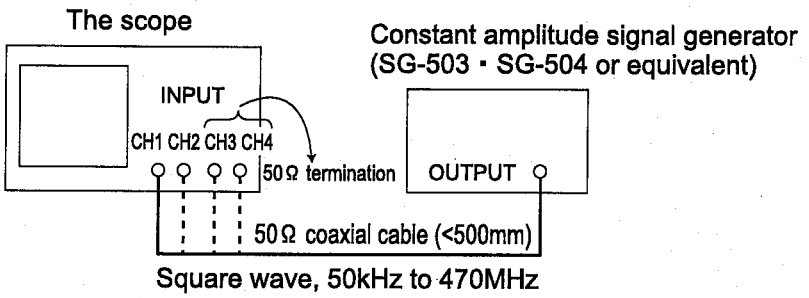
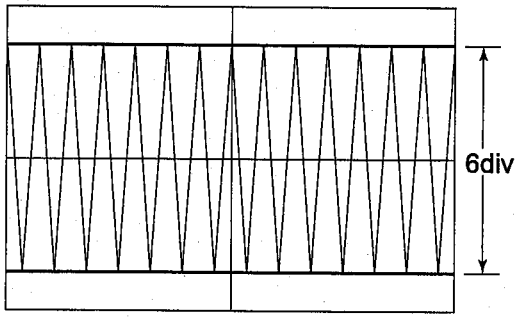
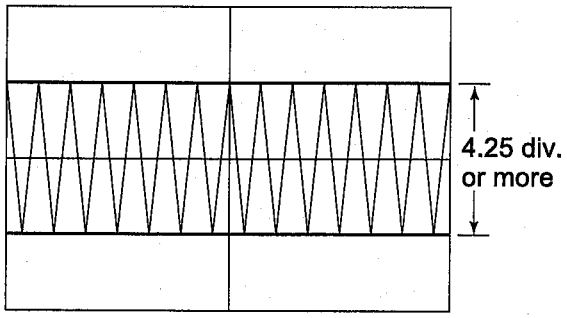
2.8.3 Attenuator High-frequency Compensation CH1/CH2/CH3/CH4

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Rating</td><td>Overshoot
<table>
<tr><td>Channel</td><td>100 to 500mV/div</td><td>1 to 5V/div</td></tr>
<tr><td>CH1/CH2</td><td>7%</td><td>9%</td></tr>
<tr><td>Channel</td><td>100m, 500mV/div</td><td></td></tr>
<tr><td>CH3/CH4</td><td>12%</td><td></td></tr>
</table></td></tr>
<tr><td>Connection</td><td> 
</td></tr>
<tr><td>Setting</td><td>① INPUT COUPLING : DC
② INPUT RC : CH1/CH2, 50 Ω
CH3/CH4, 1M Ω Use 50 Ω termination
③ VOLTS/DIV : 100mV</td></tr>
<tr><td>Procedure</td><td>— ATT UNIT —
① Input a square wave (1 MHz) from the 4050B and adjust the amplitude to 6div.
② Adjust the waveform with the following variable capacitors and resistors.
<table>
<tr><td>Channel</td><td>CH1</td><td>CH2</td><td>CH3</td><td>CH4</td></tr>
<tr><td>Adjustment</td><td>2R101</td><td>2R101</td><td>7C40, 7R105</td><td>8C40, 8R105</td></tr>
</table>


[Note] Adjust to set an overshoot and frequency characteristic. For the frequency characteristic checking method, refer to “2.8.4 Frequency Bandwidth”.</td></tr>
<tr><td>Adjustment Location</td><td>See “2.7 ATT UNIT BOARD II (CH1/CH2 ATT UNIT)”
See “2.8 CH3/CH4 ATT UNIT”</td></tr>
</table>

Item	Description
Sample Waveform	LA314 CH3 100mV/div  LA314 CH4 100mV/div  LA314H CH3 100mV/div  LA314H CH4 100mV/div 

2.8.4 Bandwidth

Item	Description
Rating	LA314H : DC to 470MHz, LA314 : DC to 400MHz (CH3, CH4 DC to 400MHz)
Connection	
Procedure	— *CH1, CH2* — ① Set VOLTS/DIV of CH1 [CH2] to **10mV**, 50Ω input resistance. ② Input a sine wave (50kHz 6 div) from the signal generator. ③ Read the amplitude when the frequency of the signal generator is changed to the respective specified frequencies. • Use SG503 for frequencies up to 250Mhz, and SG504 for those higher than 250MHz. ④ Repeat step ① through ③ for CH2. — *CH3, CH4* — ⑤ Set VOLTS/DIV of CH3 [CH4] to **100mV**, and terminate the input with 50Ω termination (BB50M1). ⑥ Check the frequency bandwidth in the same as CH1 and CH2. ⑦ Repeat step ⑤, ⑥ for CH4.
Waveform on Screen	 ②Amplitude for Reference Frequency (50kHz) : 6div  ③Amplitude for Specified Frequency : 4.25div or more
Reference	The following is a decibel conversion table to be applied when the reference amplitude is set to 6 div.

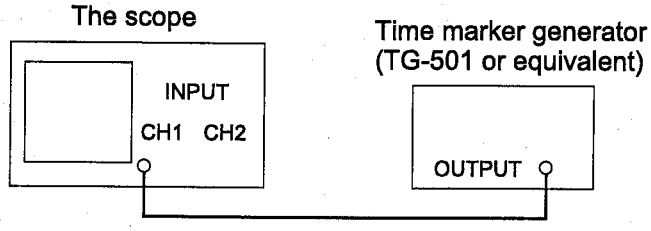
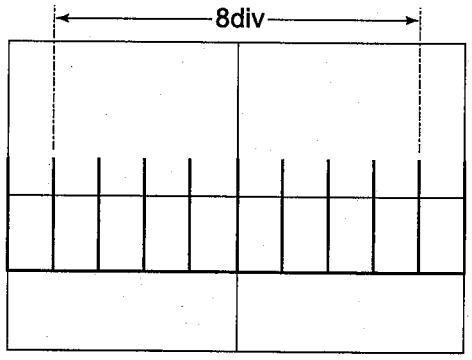
Amplitude (div)	6.0	4.4	4.3	4.25	4.2	4.1	4.0
Decibel (dB)	0.0	-2.7	-2.9	-3.0	-3.1	-3.3	-3.5

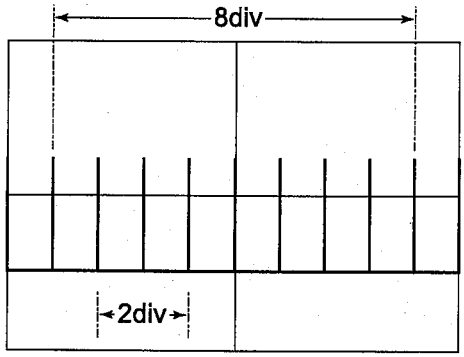
2.8.5 CH2 OUT

Item	Description
Procedure	① Adjust "004 CH2 OUT LEVEL" so that the DC level of CH2 OUT is ±10mV. • For the adjustment menu, refer to "2.1.3 Menu Screen".

2.9 Horizontal Deflection System

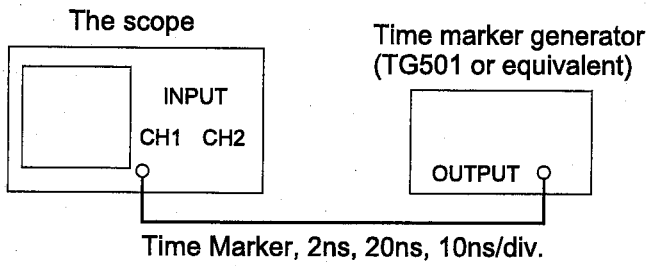
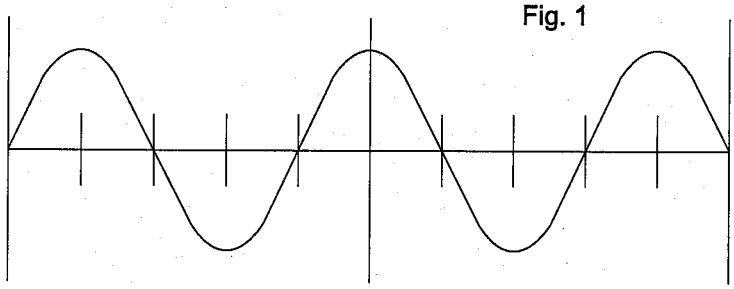
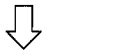
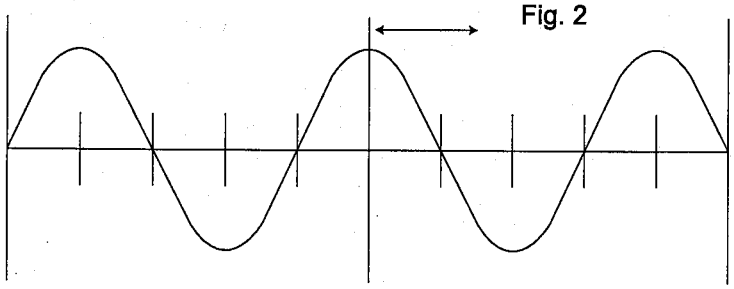
2.9.1 High-speed Sweep Rate

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Rating</td><td>±2% (over the center 8div)
±5% (over any 2div within the center 8 div)</td></tr>
<tr><td>Connection</td><td> 
</td></tr>
<tr><td>Procedure</td><td>① Adjust 50ns/div and 5ns/div in the adjustment menu, (Refer to the table below).
• For the adjustment menu, refer to "2.1.3 Menu Screen".
<table>
<tr><th>TIME/DIV</th><th>Adjustment Menu</th><th>Time marker</th></tr>
<tr><td>A 50ns/div</td><td>085 A 50ns-200ns</td><td>50ns (20MHz)</td></tr>
<tr><td>A 20ns/div</td><td>086 A 5ns-20ns</td><td>20ns (50MHz)</td></tr>
<tr><td>B 50ns/div</td><td>096 B 50ns-200ns</td><td>50ns (20MHz)</td></tr>
<tr><td>B 20ns/div</td><td>097 B 5ns-20ns</td><td>20ns (50MHz)</td></tr>
</table></td></tr>
<tr><td>Waveform on Screen</td><td> 

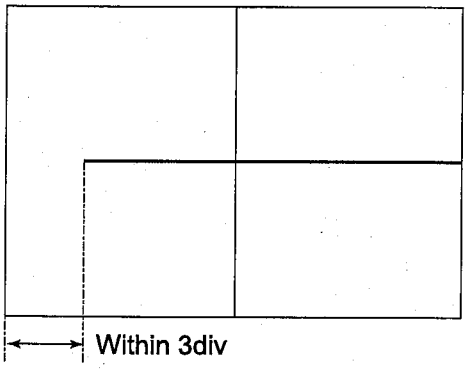
Central 8div of screen


Optional 2div of central 8div of screen</td></tr>
</table>

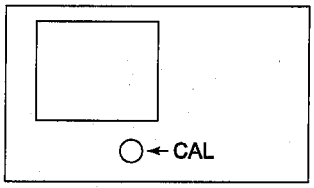
2.9.2 Sweep Linearity at High-speed Sweep Rate

Item	Description
Connection	
Procedure	① Prior to adjusting this item, confirm the sweep rate for A TIME/DIV 20ns, 10ns, and 5ns (LA314/LA314H). If the accuracy is not met, adjust as described in 2.9.1 High-speed Sweep Rate. ② Set TIME/DIV to the scope to 5ns/div and the time mark generator to 2ns. ③ Set MAG × 10 to ON. See Fig. 1. ④ Adjust sweep linearity (left and right side symmetry distortions of the screen) with **25C22** and **25C62**. See Fig. 2. ⑤ Check 1ns/div.
Adjustment Location	Fig. 1   Fig. 2 

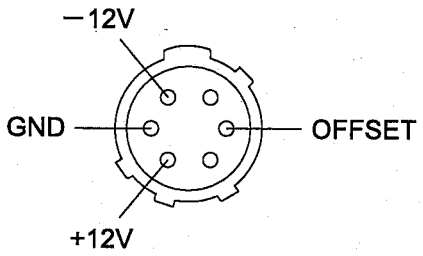
2.10 Z-Axis Response

Item	Description
Rating	Trace Appearing with 3div.
Procedure	① Set the scope as follows. HORIZ DISPLAY : A SWEEP MODE : AUTO TIME/DIV : 1ms/div MAG × 10 : OFF INTENSITY : Midrange ② Set the trace start point to the left side graticule line. ③ Set TIME/DIV to 5 ns/div. ④ Adjust the front of trace intensity with **26C57** for appearing within 3.0 div.
Waveform on Screen	
Adjustment Location	See "Figure 2.5 HZ BOARD"

2.11 Calibrator Output

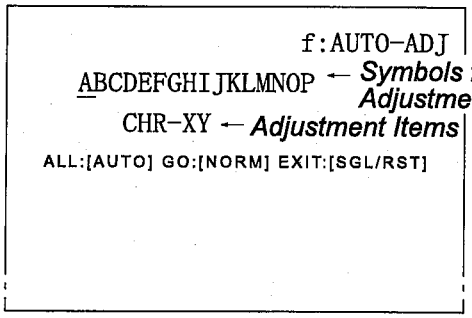
Item	Description
Rating	0.6V ± 0.8%
Equipment	Digital multimeter (DCV) : VOAC7411 or equivalent.
Procedure	① Check a voltage between the **CAL** terminal and **ground** with digital multimeter. ② Adjust it to **+0.599 to + 0.601** with "**002 CAL GAIN**" in manual adjustment menu. ③ Save the setting value. • "The manual adjustment menu" refer to "2.1.3 Menu Screen".
Check Location	Front panel 

2.12 Check Probe Power Supply

Item	Description
Rating	DC Voltage : ± 12V ± 5% Control Voltage : Variable − 1.6V to +1.6V more.
Procedure	① Enter the system menu (refer to "2.1.3 ① Menu Tree"). ② Select PROBE OFFSET by turning **【FUNCTION】**. ③ Select ENABLE by pressing **NORM**. ④ CHECK-Digital multimeter reading is ± 12V ± 5% at the +12V, − 12V terminal of probe power connector. ⑤ Select OFFSET P1/P2 by pressing **OFFSET** twice. ⑥ Set the P1 percentage 100% by turning **【FUNCTION】**. ⑦ CHECK-Digital multimeter reading is −1.6V more at the OFFSET terminal of P1 PROBE POWER connector. ⑧ Set the P1 percentage − 100% by turning **【FUNCTION】**. ⑨ CHECK Digital multimeter reading is +16V more at the OFFSET terminal of P1 PROBE POWER connector. ⑩ Press **ATTACH**, Check P2 PROBE POWER by the procedure ⑥ to ⑨. [For quitting from PROBE OFFSET MODE] ① Press **OFFSET** once or twice to set Function display to SYS-MENU. ② Press **SGL/RST**.
Waveform on Screen	*Function display* → f:SYS-MENU PROBE OFFSET DISABLE ENABLE:[NORM] EXIT:[SGL/RST] Select PROBE OFFSET by turning **【FUNCTION】**. *Function display* → f:OFFSET P1 *Percent display* *Percent display* P1:100.0% P2:−100.0% OFFSET Check Control Voltage Variable − 1.6V (+100%) more.
Adjustment Location	PROBE POWER Connector 

2.13 Automatic Adjustment

The following describes the automatic adjustment method.



Procedure

— ***Connection*** —

① Connect the adjustment jig IE-1066 to the LA314.
- See 2.1.9 about connection.

— ***Displaying the Automatic Adjustment Screen*** —

← ② Press [Δ t] in the adjustment menu screen change to the automatic adjustment menu screen.
- To enter the adjustment menu screen, refer to "2.1.3 Menu Screen".

— ***Selecting the Automatic Adjustment Item*** —

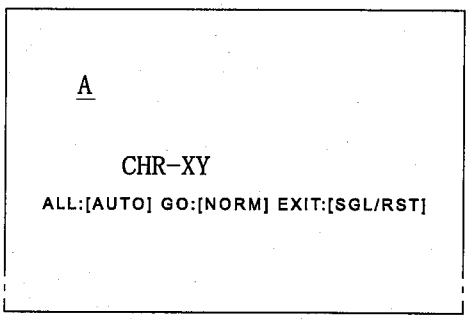
③ Select some adjust items for automatic adjustment.

I. Press **[AUTO]** to display all the items (A to P).
- Every time **[AUTO]** is pressed, the all symbols are displayed/undisplayed alternately.

II. Turn **【FUNCTION】** to select the relevant symbol with a "_" mark.

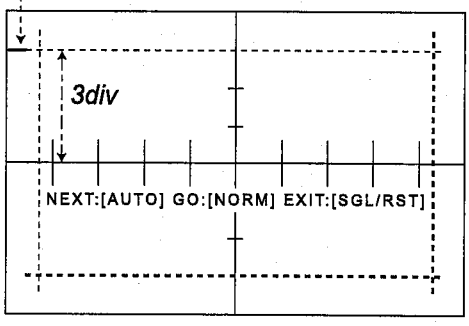
III. Press **【FUNCTION】** to determine the adjust item.

IV. * mark, use the jig.



← ◇The following shows an example of adjusting A automatically.

UPPER indicator (Adjust the cursor to 3div above the center line)

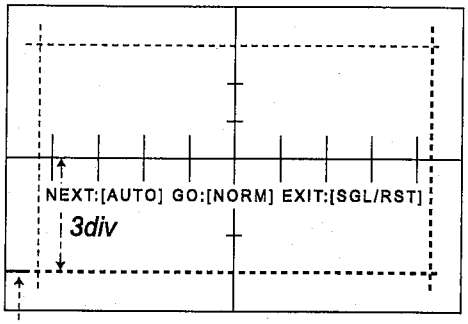


— ***Setting the Screen Reference Position*** —

④ Press **[NORM]** in the SWEEP MODE.

← - Four cursor lines are displayed, and the indicator "_" which shows that the upper cursor can be set is displayed.

⑤ Turn or press **【FUNCTION】** to set the cursor to the position 3 div above the horizontal center line.

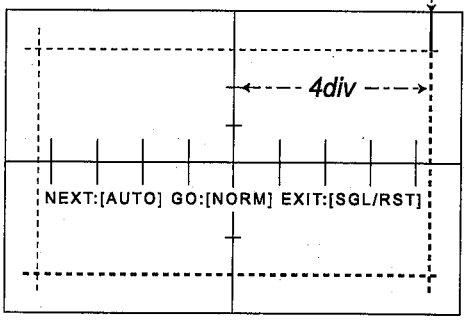


LOWER indicator (Adjust the cursor to 3div below the center line)

⑥ Press **AUTO** in the SWEEP MODE.
- The lower indicator " — " is displayed at the left end of the other horizontal cursor.

⑦ Turn or press **【FUNCTION】** to set the cursor to the position 3 div. below the horizontal center line.

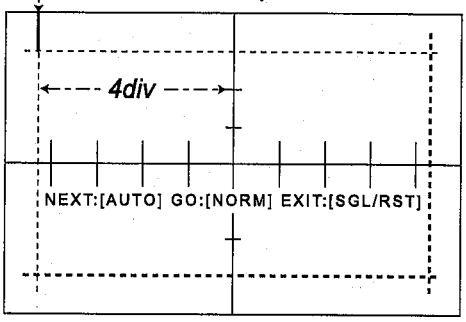
RIGHT indicator (Adjust the cursor to 4div to the right of the center line)



⑧ Press **AUTO** .
- The right indicator " | " is displayed at the upper end of one vertical cursor.

⑨ Turn or press **【FUNCTION】** to set the cursor to the position 4 div to the right of the vertical center line.

LEFT indicator (Adjust the cursor to 4div to the left of the center line)



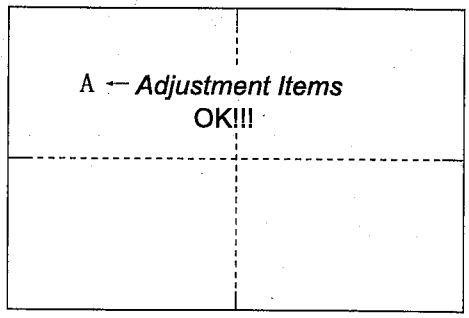
⑩ Press **AUTO** .
- The left indicator " | " is displayed at the upper end of the other vertical cursor.

⑪ Turn or press **【FUNCTION】** to set the cursor to the position 4 div to the left of the vertical center line.
- Every time **AUTO** is pressed, the indicator position is changed as follows.

UPPER → LOWER → RIGHT → LEFT

— Performing Automatic Adjustment —

⑫ Press **NORM** .



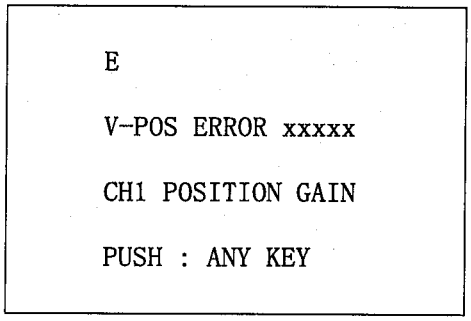
◇When automatic adjustment is completed, "OK!!!" is displayed.
- The symbol for the automatically adjusted item is displayed at the upper left of the screen.
- The left figure shows that automatic adjustment of A is completed.

— Cancelling Automatic Adjustment —

⑬ To cancel the automatic adjustment menu screen, press **【SGL/RST】** .

Error message I

When automatic adjustment is not performed, an error message is displayed as below.



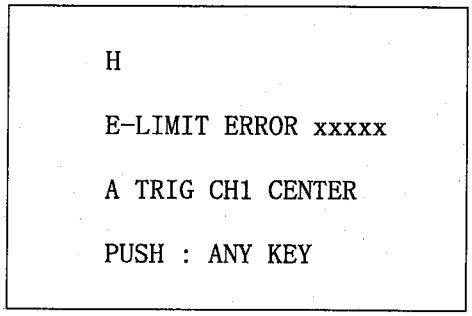
← Symbol (A to N) of Item

← Name of item and error value

← Detail of error

Error message II

When adjusted value reached to the upper-or lower-limit of the adjusting range, an error message is displayed as below.



← Symbol (A to N) of Item

← Error message

← Name of item [Note] Menu number is undisplayed

If error message is displayed, re-adjust the error item by manual or jig IE-1066, or check hardware.
Ex. A TRIG CH1 CENTER
Re-adjust item 059 Table 2.1.4 or item H Table 2.13.1.

Table 2.13.1 Automatic Adjustment Items

Item	Description	Page
A. CHR-XY	Cursor gain position	2-56
B. V-GAIN *1	Vertical gain (CH1 to CH4)	2-56
C. V-BAL	Variable balance, step balance, ground balance (CH1, CH2)	2-57
D. V-ADD	Add balance	2-57
E. V-POS	Vertical position center and gain (CH1 to CH4)	2-58
F. V-OFST *1	OFFSET center and gain (CH1, CH2)	2-58
G. CLAMP *1	TV CLAMP level and gain	2-59
H. TRIG *1	Trigger level and trigger sensitivity	2-59
I. H-RNG	Sweep rate (A, B)	2-60
J. LENGTH	Sweep length (A, B)	2-60
K. H-MAG	Magnification center and gain	2-61
L. H-POS	Horizontal position	2-61
M. DELAY	Delay time	2-62
N. X-Y *1	X-Y gain and position	2-62
O. ———	NA	——
P. ———	NA	——

*1 Use an adjustment jig IE-1066

A. CHR-XY

Item	Description
Adjustment	• Cursor gain position
Rating	• Maximum cursor control range at CH1 and CH2 Δ V cursor : ± (4.0 ± 0.2) div form the center of the screen Δ t cursor : ± (5.0 ± 0.2) div form the center of the screen • Accuracy between cursors Δ V cursor : ± [(2% of reading) + (0.3% of full scale)] Δ t cursor at MAG OFF : ± [(2% of reading) + (0.3% of full scale)]
Error Display	
Jig	Unnecessity

Menu No.	Detail	Menu No.	Detail
005	X CHR OFFSET	007	Y CHR OFFSET
006	X CHR GAIN	008	Y CHR GAIN

B. V-GAIN (Vertical Gain)

Item	Description
Adjustment	• Gain 2mV, 5mV, 10mV and 1V at CH1 and CH2 100mV at CH3 and CH4
Rating	• Gain Accuracy : 6div ± 2%
Error Display	
Jig	Necessity

Menu No.	Detail	Menu No.	Detail
009	CH1 PRE LEVEL	018	CH2 2mV GAIN
010	CH2 PRE LEVEL	019	CH2 5mV GAIN
011	CH1 2mV GAIN	020	CH2 10mV GAIN
012	CH1 5mV GAIN	021	CH2 20mV GAIN
013	CH1 10mV GAIN	022	CH2 50mV GAIN
014	CH1 20mV GAIN	023	CH2 100mV GAIN OFFSET
015	CH1 50mV GAIN	024	CH2 1V GAIN OFFSET
016	CH1 100mV GAIN OFFSET	025	CH3 GAIN
017	CH1 1V GAIN OFFSET	026	CH4 GAIN

C. V-BAL (Vertical Balance)

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Adjustment</td><td>• VAR BAL (Variable Balance) : 10mV at CH1 and CH2
• STEP BAL (Step Balance) : 2mV, 5mV, 10mV, 20mV and 50mV at CH1 and CH2
• GND BAL (Ground Balance) : 2mV at CH1 and CH2</td></tr>
<tr><td>Rating</td><td>• VAR BAL : 0.2div or less at VAR MIN to CAL
• STEP BAL : 0.2div or less at 2mV to 50mV
• GND BAL : 0.2div or less between 0V and GND at 2mV/div</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>027</td><td>CH1 2mV BAL</td><td>033</td><td>CH2 5mV BAL</td></tr>
<tr><td>028</td><td>CH1 5mV BAL</td><td>034</td><td>CH2 10mV BAL</td></tr>
<tr><td>029</td><td>CH1 10mV BAL</td><td>035</td><td>CH2 20mV BAL</td></tr>
<tr><td>030</td><td>CH1 20mV BAL</td><td>036</td><td>CH2 50mV BAL</td></tr>
<tr><td>031</td><td>CH1 50mV BAL</td><td>045</td><td>CH1 GND BAL</td></tr>
<tr><td>032</td><td>CH2 2mV BAL</td><td>046</td><td>CH2 GND BAL</td></tr>
</table>
</td></tr>
<tr><td>Jig</td><td>Unnecessity</td></tr>
</table>

D. V-ADD (Add Balance)

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Adjustment</td><td>ADD BAL (Add Balance)</td></tr>
<tr><td>Rating</td><td>0.5 div or less when 【ADD】 ON while both CH1, CH2 trace is at center of the screen.</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>048</td><td>ADD BAL</td><td>—</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>Jig</td><td>Unnecessity</td></tr>
</table>

E. V-POS (Vertical Position)

<table>
<tr><td>Item</td><td>Description</td></tr>
<tr><td>Adjustment</td><td>• The center position at CH1 to CH4
• CH2 polarity balance</td></tr>
<tr><td>Rating</td><td>• Center position : ± 1 div or less from the horizontal center line when the 【▲POSITION▼】 control is set to the midrange.
• CH2 polarity balance : ± 0.5 div or less from the horizontal center line when the CH2 【INV】 is pressed.</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>037</td><td>CH1 POSITION OFFSET</td><td>042</td><td>CH3 POSITION GAIN</td></tr>
<tr><td>038</td><td>CH1 POSITION GAIN</td><td>043</td><td>CH4 POSITION OFFSET</td></tr>
<tr><td>039</td><td>CH2 POSITION OFFSET</td><td>044</td><td>CH4 POSITION GAIN</td></tr>
<tr><td>040</td><td>CH2 POSITION GAIN</td><td>047</td><td>CH2 POLA BAL</td></tr>
<tr><td>041</td><td>CH3 POSITION OFFSET</td><td>—</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>Jig</td><td>Unnecessity</td></tr>
</table>

F. V-OFST (Vertical Offset)

<table>
<tr><td>Item</td><td>Description</td></tr>
<tr><td>Adjustment</td><td>Offset at CH1 and CH2</td></tr>
<tr><td>Rating</td><td>Accuracy : ± [1.5% of set value +2mV]
<table>
<tr><th>Vertical deflection range</th><th>OFFSET voltage [V]</th></tr>
<tr><td>2mV/div to 50mV/div</td><td>±1V</td></tr>
<tr><td>0.1V/div to 0.5V/div</td><td>±10V</td></tr>
<tr><td>1V/div to 5V/div</td><td>±100V</td></tr>
</table>
</td></tr>
<tr><td>Error Display</td><td>
<table>
<tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr>
<tr><td>049</td><td>CH1 OFFSET 10mV</td><td>053</td><td>CH2 OFFSET 100mV</td></tr>
<tr><td>050</td><td>CH1 OFFSET 100mV</td><td>054</td><td>CH2 OFFSET 1V</td></tr>
<tr><td>051</td><td>CH1 OFFSET 1V</td><td>055</td><td>CH1 OFFSET BAL</td></tr>
<tr><td>052</td><td>CH2 OFFSET 10mV</td><td>056</td><td>CH2 OFFSET BAL</td></tr>
</table>
</td></tr>
<tr><td>Jig</td><td>Necessity</td></tr>
</table>

G. CLAMP (TV Clamp)

Item	Description
Adjustment	Back-porch clamping level and range
Rating	• Back-porch reference : ± 1.0 div or less from the GND reference level
Error Display	

Menu No.	Detail	Menu No.	Detail
105	CH1 PEDESTAL GAIN	107	CH2 PEDESTAL GAIN
106	CH2 PEDESTAL OFFSET	108	CH2 PEDESTAL OFFSET

Jig	Necessity

H. TRIG (Trigger Level)

Item	Description
Adjustment	• A and B trigger level control range
Rating	• Trigger level control read out accuracy : ± (5% of set value + 0.5 div + 1mV)
Error Display	

Menu No.	Detail	Menu No.	Detail
057	A TRIG AC CENTER	068	B TRIG −SLOPE
058	A TRIG −SLOPE	069	B TRIG CH1 CENTER
059	A TRIG CH1 CENTER	070	B TRIG CH1 GAIN
060	A TRIG CH1 GAIN	071	B TRIG CH2 CENTER
061	A TRIG CH2 CENTER	072	B TRIG CH2 GAIN
062	A TRIG CH2 GAIN	073	B TRIG CH3 CENTER
063	A TRIG CH3 CENTER	074	B TRIG CH3 GAIN
064	A TRIG CH3 GAIN	075	B TRIG CH4 CENTER
065	A TRIG CH4 CENTER	076	B TRIG CH4 GAIN
066	A TRIG CH4 GAIN	—	—
067	B TRIG AC CENTER	—	—

Jig	Necessity

I. H-RNG (Horizontal Range)

Item	Description
Adjustment	• Sweep rate A TIME/DIV : 50ms, 5ms, 2ms, 1ms, 200μs, 20μs, 2μs B TIME/DIV : 5ms, 2ms, 200μs, 20μs, 2μs • Gain of A sweep variable
Rating	• Sweep rate Accuracy : ±2% over center 8div
Error Display	
Jig	Unnecessity

Menu No.	Detail	Menu No.	Detail
078	A 500ms	089	B MAG SWEEP GAIN
079	A 50ms to 200ms	091	B 5ms to 20ms
080	A 5ms to 20ms	092	B 500μs to 2ms
081	A 500μs to 2ms	093	B 50μs to 200μs
082	A 50μs to 200μs	094	B 5μs to 20μs
083	A 5μs to 20μs	095	B 500μs to 2μs
084	A 500μs to 2μs	098	B MAG SWEEP GAIN
077	A SWEEP GAIN	—	—
088	A POSITION	—	—

J. LENGTH (Sweep Length)

Item	Description
Adjustment	A and B sweep length at 1 ms/div
Rating	1 ms/div : 11.0 div to 11.6 div Other ranges : 10.5 div or more
Error Display	
Jig	Unnecessity

Menu No.	Detail	Menu No.	Detail
087	A LENGTH	101	B LENGTH

K. H-MAG (Horizontal Magnification)

Item	Description
Adjustment	• Magnification gain and magnification center
Rating	• Magnification gain Accuracy : ± 3% • Magnification center : ± 3.0div or less
Error Display	<table><tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr><tr><td>090</td><td>MAG CENTER</td><td>—</td><td>—</td></tr></table>
Jig	Unnecessity

L. H-POS (Horizontal Position)

Item	Description
Adjustment	• Center position • Variable range of the horizontal position • Adjusting the B sweep start to meet the A sweep start
Rating	• Center position : Sweep start ± 1 div or less from the left side graticule line when the **[◀POSITION ▶]** control is set to the midrange at 1ms/div • Control range : Should overlap the vertical center line • Time lag of the B sweep rate : 1 div or less at × 10 MAG ON
Error Display	<table><tr><th>Menu No.</th><th>Detail</th><th>Menu No.</th><th>Detail</th></tr><tr><td>102</td><td>B START POSITION</td><td>—</td><td>—</td></tr></table>
Jig	Unnecessity

M. DELAY

Item	Description
Adjustment	Accuracy of the Delay time
Rating	± (0.5% of the set value +10% of the sweep rate) — 55ns at 1μs to 500ms/div
Error Display	

Menu No.	Detail	Menu No.	Detail
099	DELAY GAIN	100	DELAY OFFSET

Jig	Unnecessity

N. X-Y

Item	Description
Adjustment	The gain and position at X-Y mode
Rating	• Gain Accuracy : ± 6div ± 2.5% • Position : ± 1div from the center
Error Display	

Menu No.	Detail	Menu No.	Detail
103	X-Y GAIN	104	X-Y POSITION

Jig	Necessity

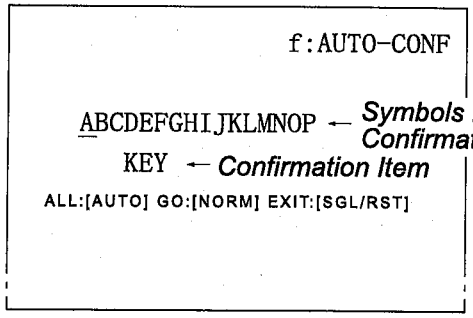
2.14 Automatic Confirmation

Confirm and check the functions and performances automatically.
The following describes the automatic confirmation method.

Procedure

— ***Connection*** —

① Connect the adjustment jig IE-1066 to the LA314.
- See 2.1.9 about connection.



— ***Displaying the Automatic Adjustment Screen*** —

← ② Press [Δ V] in the adjustment menu screen to display the automatic confirmation menu screen.
- For the adjustment menu screen, refer to "2.1.3 Menu Screen".

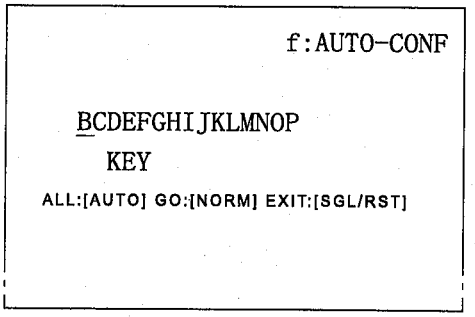
— ***Selecting the Automatic Confirmation Item*** —

③ Select some check items for automatic confirmation.

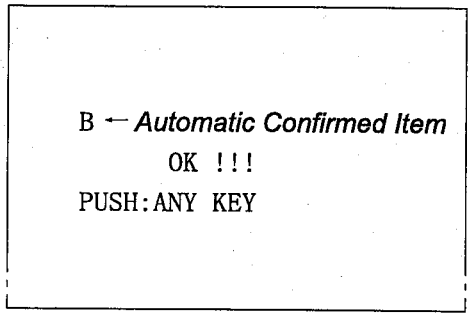
I. Press [AUTO] to display all the items (A to P).
- Every time [AUTO] is pressed, the symbols are displayed/undisplayed alternately.

II. Turn 【FUNCTION】 to select the relevant symbol with a "_" mark.

III. Press 【FUNCTION】 to determine the adjust item.



← ◇In this example, undisplay "A" (operation check for KEY) and select an automatic confirmation item "B".



— ***Performing Automatic Confirmation*** —

④ Press [NORM].

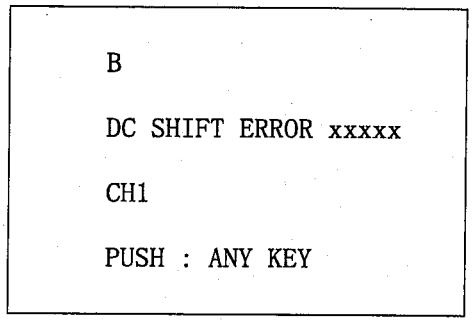
← • Perform automatic confirmation on the displayed items in an alphabetic order.
- When automatic confirmation is properly performed, "OK!!!" is displayed. The symbol for the automatically confirmed item appears at the upper left of the screen.
- When automatic confirmation is not performed, "Error message" is displayed.

— ***Cancelling Automatic Confirmation*** —

⑤ To cancel the automatic confirmation screen, press 【SGL/RST】.

Error message

When automatic confirmation can not be performed, an error message is displayed.



← Symbol (A to N) of Item

← Name of item and error value

← Detail of error

If error message is displayed, check hardware of the scope.

Table 2.15.1 Automatic Confirmation Items

Item	Description	Page
A. KEY	The keys, controls and pulse switches	2-65
B. DCSHIFT *1	DC shift	2-65
C. POS VAR *1	The variable range of the 【▲POSITION▼】 control	2-65
D. ADDGAIN*1	The gain at ADD mode	2-65
E. CH2 POL *1	The gain at CH2 polarity	2-65
F. AC/DC *1	AC and DC of input coupling	2-66
G. V SENSE *1	Vertical gain of 500 mV/div at CH3 and CH4	2-66
H. OVER LD *1	Detection of the excessive input	2-66
I. TRG LVL *1	The range of the 【TRIG LEVEL】	2-66
J. VAR RNG*1	The variable range and variable balance	2-66
K. H POSI	The range of the 【◀ POSITION ▶】 control	2-67
L. TR-SEP	The range of the trace separation	2-67
M. LINE TG *2	Line trigger	2-67
N. H START	Shift between A and B sweep start points	2-67
O. H 1-2-5	1-2-5 sequence of sweep rate (TIME/DIV)	2-67
P. ———	NA	——

*1 Use an adjustment jig IE-1066

*2 When AC LINE is 60Hz, some set may occur the error

A. KEY

Item	Description
Confirmation	The function check of the keys, controls and pulse switches
Rating	———
Error Display	———
Jig	Unnecessity

B. DCSHIFT

Item	Description
Confirmation	A shift for 10sec after DC 6div signal input at CH1 and CH2
Rating	0.06/6div or less
Error Display	CH1 or CH2
Jig	Necessity

C. POS VAR (V Position Range)

Item	Description
Confirmation	The control range of the 【▲ **POSITION** ▼】 control at CH1 to CH4
Rating	± 10.0div or more
Error Display	CH1, CH2, CH3 or CH4
Jig	Necessity

D. ADDGAIN (Add Gain)

Item	Description
Confirmation	Both 3div signal for CH1 and CH2 is turned to 6div at ADD mode
Rating	3.0%
Error Display	CH2
Jig	Necessity

E. CH2 POL (Polarity Gain)

Item	Description
Confirmation	Gain of CH2 polarity
Rating	1.5%
Error Display	CH2
Jig	Necessity

F. AC/DC

Item	Description
Confirmation	AC and DC of the input coupling at CH1 to CH4
Rating	——
Error Display	CH1, CH2, CH3 or CH4
Jig	Necessity

G. V SENSE (Vertical Gain)

Item	Description
Confirmation	Gain of 50mV/div at CH3 and CH4
Rating	± 1.5%
Error Display	CH3 or CH4
Jig	Necessity

H. OVER LD (Overload)

Item	Description
Confirmation	Operation of the overload detecting circuit
Rating	Detecting overload at DC ± 9V to 11V
Error Display	CH1, CH2, CH3 or CH4
Jig	Necessity

I. TRG LVL (Trigger Level)

Item	Description
Confirmation	The range of the **【TRIG LEVEL】**
Rating	± 10div ± 0.5div
Error Display	A or B
Jig	Necessity

J. VAR RNG (Variable Range)

Item	Description
Confirmation	Variable range and variable balance
Rating	• Variable range : 2.5 times or more • Variable balance 20mV to 5V/div : 0.5div or less 2mV to 10mV/div : 5mV or less
Error Display	CH1 or CH2
Jig	Necessity

K. H POSI (Horizontal Position)

Item	Description
Confirmation	The range of the 【◀ POSITION ▶】 control
Rating	± 6.5div or more
Error Display	——
Jig	Unnecessity

L. TR-SEP (Trace Separation)

Item	Description
Confirmation	The range of the trace separation
Rating	± 4.0div or more
Error Display	——
Jig	Unnecessity

M. LINETRG (Line Trigger)

Item	Description
Rating	Triggering at ± 10% trig level Untriggering at ± 100% trig level
Error Display	——
Jig	Unnecessity

N. H START (Horizontal Start Point)

Item	Description
Confirmation	Shift between the A and B sweep start points by switching 【TIME/DIV】 in 500μs, 50μs and 0.5μs
Rating	2div or less at × 10 MAG ON
Error Display	A or B
Jig	Unnecessity

O. H 1-2-5 (1-2-5 Sequence of Sweep Rate)

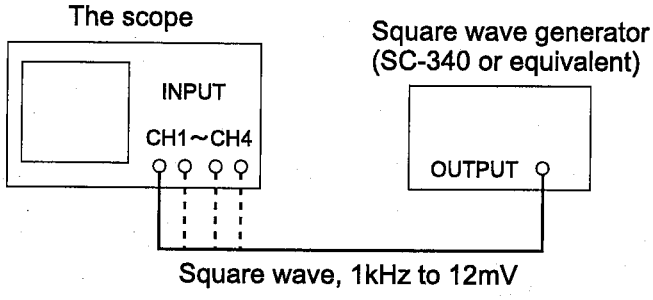
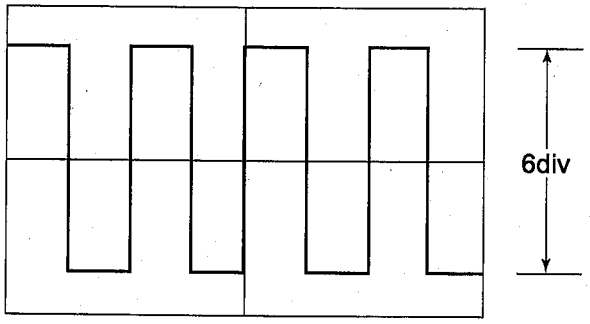
Item	Description
Confirmation	500μs, 1ms, 2ms/div at A and B sweep
Rating	1% or less over center 8div
Error Display	A or B
Jig	Unnecessity

2.15 Manual Adjustment

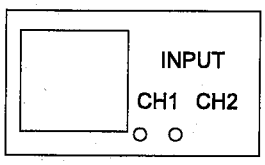
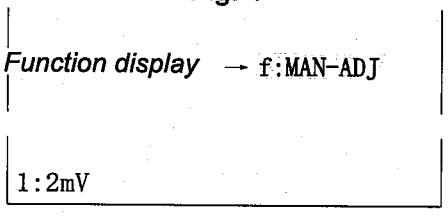
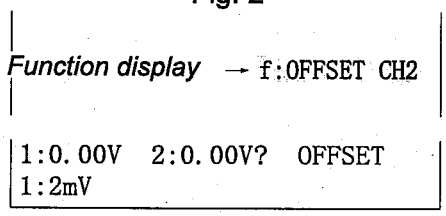
◇ Manual adjustment procedure is useful when the adjustment jig IE-1066 is not available.
◇ For the VALUE adjustment method in the Manual Adjustment Screen, refer to "2.1.3 Menu Screen".
◇ Manual Adjustment Item

B : V-GAIN F : V-OFST 1/2 OFFSET BALANCE F : V-OFST 2/2 OFFSET 10mV, 100mV, 1V
G : CLAMP H : TRIG N : X-Y

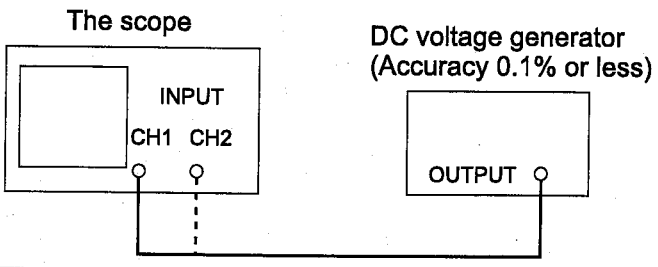
2.15.1 B : Vertical Gain

Item	Description
Rating	± 2% or less
Connection	
Setting	① INPUT COUPLING : DC ② INPUT RC : 1 M Ω ③ VOLTS/DIV (CH1) : 2mV
Procedure	① Input a square wave (1kHz, 12mV) to CH1. ② Adjust with "**011 CH1 2mV GAIN**" in the adjustment menu to set the amplitude to **6div**. ③ Save the setting VALUE. ④ Adjust following other items by repeating ① through ③ by applying 6div amplitude signal. ◇ 100mV/DIV, 1V/DIV GAIN is affected by adjusting 10mV/div.
Waveform on Screen	
Other Items	012 CH1 5mV GAIN 013 CH1 10mV GAIN 014 CH1 20mV GAIN 015 CH1 50mV GAIN 018 CH2 2mV GAIN 019 CH2 5mV GAIN 020 CH2 10mV GAIN 021 CH2 20mV GAIN 022 CH2 50mV GAIN 025 CH3 GAIN 026 CH4 GAIN

2.15.2 F : Vertical Offset 1/2 (CH1/CH2 OFFSET BALANCE)

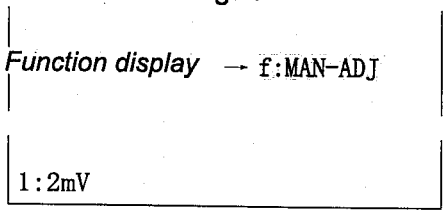
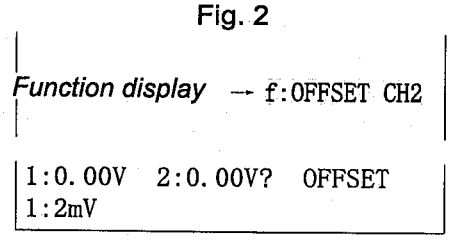
Item	Description
Rating	Center and gain : ± [1.5% of set value +0.05div+3mV]
Connection	The scope 
Setting	① VOLTS/DIV : 50mV ② INPUT COUPLING : DC ③ Disconnect signal
Procedure	— *055 CH1 OFFSET BAL* — ① Check the FUNCTION OFFSET OFF mode. ② Set the trace to the center horizontal graticule line using the CH1 **【POSITION】**. ③ Enter "**055 CH1 OFFSET BAL**" in the manual adjustment menu. • For the manual adjustment menu refer to "2.1.3 Menu Screen". ④ Press **OFFSET** to select OFFSET ON ; turn **【FUNCTION】** to set the offset voltage to 0.00V. See Fig. 2. ⑤ Press **HOLDOFF** twice ; FUNCTION DISPLAY switch MAN-ADJ. See Fig. 1. ⑥ Adjust "**055 CH1 OFFSET BAL**" VALUE so that the trace position will be at the center of the CRT screen. [Note : Press FINE Key, VALUE is varied in small step.] ⑦ Save the setting VALUE. ⑧ Vary the VOLTS/DIV up to 2mV/div and check the trace position does not move. • Return to Normal Scope Mode, press **AUTOSET** after press **OFFSET** three times. When succeedingly adjust CH2, press **OFFSET** once and press **ATACH** to change the FUNCTION to CH2. — *056 CH2 OFFSET BAL* — ① Adjusts by the procedure which is the same as the above.
Screen	Fig. 1  Fig. 2 

2.15.2 F : Vertical Offset 2/2 (CH1/CH2 OFFSET 10mV, 100mV, 1V)

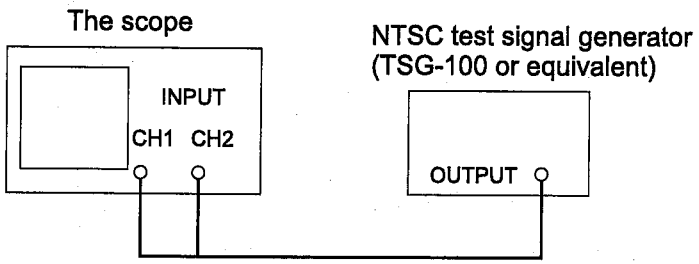
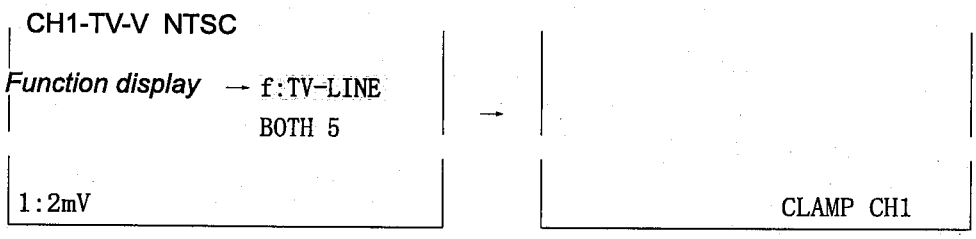
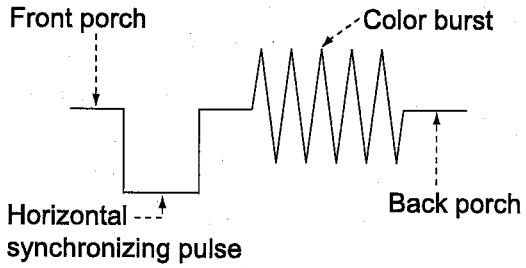
Item	Description
Rating	Center and gain : ± [1.5% of set value +0.05div+3mV]
Connection	
Setting	① INPUT COUPLING : DC
Procedure	— *049 CH1 OFFSET 10mV* — ① Set CH1 VOLTS/DIV to 10mV, and disconnect signal. ② Check the FUNCTION OFFSET OFF mode. ③ Set the trace to the center horizontal graticule line using the CH1 **【POSITION】**. ④ Input the standard DC voltage 1V. ⑤ Enter "**049 CH1 OFFSET 10mV**" in the manual adjustment menu. • For the manual adjustment menu refer to "2.1.3 Menu Screen". ⑥ Press **OFFSET** to select OFFSET ON ; turn **【FUNCTION】** to set the offset voltage to 1.00V. [Note : Pres **【FUNCTION】**, VALUE is changed in coarse.] See Fig. 2. ⑦ Press **HOLDOFF** twice ; FUNCTION DISPLAY switches MAN-ADJ. See Fig. 1. ⑧ Adjust "**049 CH1 OFFSET 10mV**" VALUE with **【FUNCTION】** so that the trace position is at the center of the CRT screen. ⑨ Save the setting VALUE. ⑩ Vary the VOLTS/DIV (from 50 mV/div to 2 mV/div) and check the trace position does not move. — *050 CH1 OFFSET 100mV, 051 CH1 OFFSET 1V* — ① Set the standard DC voltage and OFFSET as follows.

Manual adjustment menu	(VOLTS/DIV)	The standard DC voltage	OFFSET
049 CH1 OFFSET 10mV	50mV to 2mV	1V	1V
050 CH1 OFFSET 100mV	500mV to 100mV	10V	10V
051 CH1 OFFSET 1V	5V to 1V	100V	100V

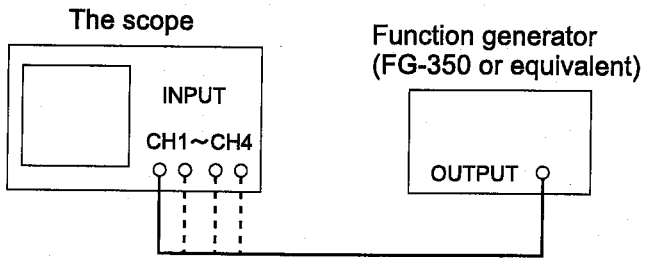
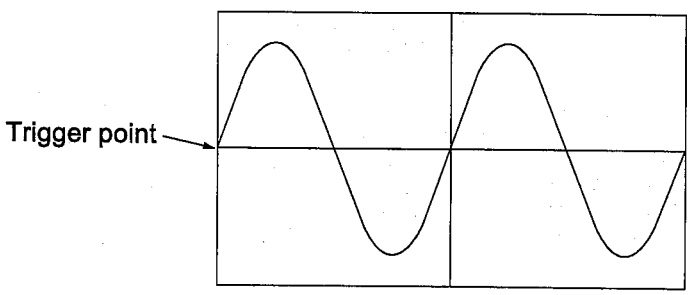
② Other than the standard DC voltage input and OFFSET setting, adjust in the same manner as "**049 CH1 OFFSET 10mV**".
◇ VOLTS/DIV should be set at 100 mV/div for "050" and 1 V/div for "051", respectively.
③ Return to Normal Scope Mode, press **AUTOSET** after press **OFFSET** three times. When succeedingly adjust CH2, press **OFFSET** once and press **ATTACH** to change the FUNCTION to CH2.
— *052 CH2 OFFSET 10mV, 053 CH2 OFFSET 10mV, 054 CH2 OFFSET 1V* —
① Adjust in the same manner as CH1 above.

Screen	Fig. 1  Fig. 2 

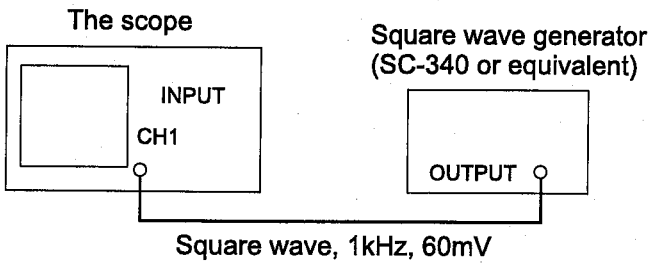
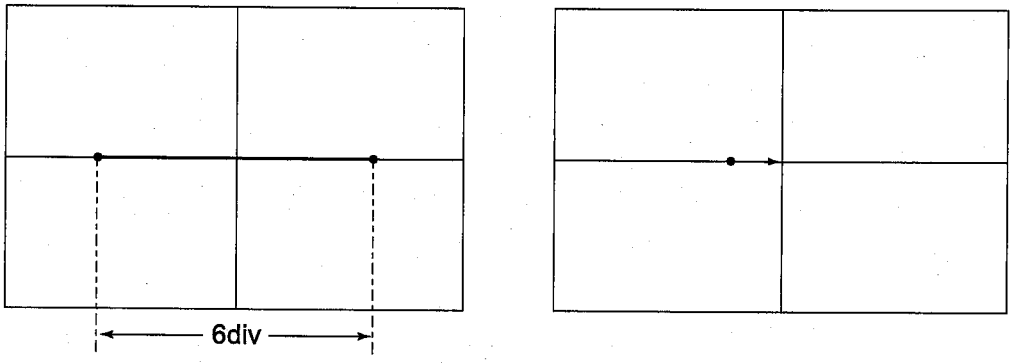
2.15.3 G : CLAMP (TV Clamp)

Item	Description
Rating	Back-porch reference : 1.0div or less from the GND reference level.
Connection	
Procedure	① Press **GND** to set CH1 Coupling to GND. ② Set the trace to the center horizontal graticule line using the CH1 **【POSITION】**. ③ Enter "105 CH1 PEDESTAL GAIN" in the manual adjustment menu. • For the adjustment menu refer to "2.1.3 Menu Screen". ④ Check input coupling to DC. ⑤ Input NTSC signal to CH1, then press **TV** and set TRIG Coupling to "TV-LINE". ⑥ Select the CLAMP CH1 by pressing **EVENT/TV CLAMP**. ⑦ Press **HOLDOFF** twice ; FUNCTION DISPLAY switches to MAN-ADJ. ⑧ Adjust "105 CH1 PEDESTAL GAIN" VALUE so that the pedestal level (Back porch level) does not shift when the TV signal amplitude on the screen is switched from 2div to 8div with VOLTS/DIV. ⑨ Save the setting VALUE. ⑩ Adjust "106 CH1 PEDESTAL OFFSET" VALUE so that the pedestal level is at the center of the screen. ⑪ Save the setting VALUE. ⑫ Adjust CLAMP CH2 in the same manner as CH1 above. 107 CH2 PEDESTAL GAIN 108 CH2 PEDESTAL OFFSET
Waveform on Screen	 Back porch (pedestal level) The position of the back porch is shown in the figure on the below. Because the waveform is displayed with its back porch clamped to the ground level, a stable observation of fluctuating signals can be obtained. 

2.15.4 H : Trigger

Item	Description
Rating	Trigger level control readout accuracy : ± [5% of set value + 0.5div + 1mV]
Connection	
Setting	① VOLTS/DIV : 100mV ③ TRIG COUPL : AC ② INPUT COUPLING : AC ④ TIME/DIV : 200μs ⑤ TRIG LEVEL : 0mV
Procedure	— *A Trigger Level* — ① Disconnect signal. ② Set the trace to the center horizontal graticule line using the CH1 **【POSITION】**. Set the start point to the left side graticule line using the horizontal POSITION. ③ Input a sine wave (about 1kHz, 1.5Vp-p) to CH1. ④ Enter "**057 A TRIG AC CENTER**" in the manual adjustment menu. • For the adjustment menu refer to "2.1.3 Menu Screen". ⑤ Adjust "**057 A TRIG AC CENTER**" VALUE so that the trigger point is at the center of the screen. ⑥ Save the setting VALUE. ⑦ Change the SLOPE to (-) and adjust "**058 A TRIG - SLOPE**" VALUE so that the trigger point is at the center of the screen. ⑧ Save the setting VALUE. ⑨ Change the SLOPE to (+), TRIG Coupling to DC and adjust "**059 A TRIG CH1 CENTER**" VALUE so that the trigger point is at the center of the screen. ⑩ Save the setting VALUE. ⑪ Move the trigger point with CH1 POSITION so that it is at 3.00div below from the center of the screen. ⑫ Set the TRIG level to 600mV and adjust "**060 A TRIG CH1 GAIN**" VALUE so that the trigger point is at 3.00div above from the center of the screen. ⑬ For CH2 through CH4, adjust the item below in Steps ⑨ through ⑫ above. 061 A TRIG CH2 CENTER 063 A TRIG CH3 CENTER 065 A TRIG CH4 CENTER 062 A TRIG CH2 GAIN 064 A TRIG CH3 GAIN 066 A TRIG CH4 GAIN — *B Trigger Level* — Adjust in the same manner as A Trigger Level above. 067 B TRIG AC CENTER 068 B TRIG - SLOPE 069 B TRIG CH1 CENTER 070 B TRIG CH1 GAIN 071 B TRIG CH2 CENTER 072 B TRIG CH2 GAIN 073 B TRIG CH3 CENTER 074 B TRIG CH3 GAIN 075 B TRIG CH4 CENTER 076 B TRIG CH4 GAIN
Waveform on Screen	

2.15.5 N : X-Y Gain and Position

Item	Description
Rating	± 2% or less
Connection	
Setting	① INPUT COUPLING : DC ② INPUT RC : 1M Ω ③ VOLTS/DIV (CH1) : 10mV ④ VERT MODE : CH2 ⑤ HORIZ DISPLAY : X-Y
Procedure	① Input a square wave (1 kHz, 60mV) to CH1. ② Adjust with "103 X-Y GAIN" in the manual adjustment menu to set the amplitude to 6 div. ③ Save the setting VALUE. ④ Disconnect CH1 signal. ⑤ Set HORIZ DISPLAY to A. ⑥ Set the sweep start point to the left side graticule line with the horizontal POSITION. ⑦ Set HORIZ DISPLAY to X-Y. ⑧ Adjust with "104 X-Y POSITION" in the adjustment menu so that the spot meet to the center of graticule. ⑨ Save the setting VALUE. ◇ This item should be adjusted after Vertical GAIN, BALANCE adjustment.
Waveform on Screen	 Adjust the amplitude to 6div. Adjust the spot to the center of graticule.

2.16 Adjustment Jig IE-1066

How to calibrate Adjustment Jig IE-1066 is described as below.

2.16.1 Specifications

a. Power supply

Voltage range	100V/125V/225/250V ± 10% (By changing the internal wiring)
Frequency range	50Hz or 60 Hz
Power consumption	5W MAX
Dimensions	Approx. 160W × 65H × 180L (mm)

b. Environmental conditions

- Performance assurance temperature : 20 to 25℃
- Operating temperature : 0 to 40℃
- Preheating time : 30 minutes or more

2.16.2 Preparation

a. Required equipment

- Oscilloscope LA314
- Exclusive I/F cable
- Digital multimeter (5 1/2 digits)
  Recommended model : IWATSU VOAC7513
- BNC coaxial cable (3 pieces)
- Screw driver (Low capacitance)
- BNC terminal adapter — BNC-banana adapter

b. LA314 I/F connector

Remove the rear panel of the LA314 to connect the exclusive I/F cable.

Procedure

① Remove the four screws in the foot.
② Remove the four feet.
③ Remove the panel.
- There is the I/F connector on the rear sub panel.

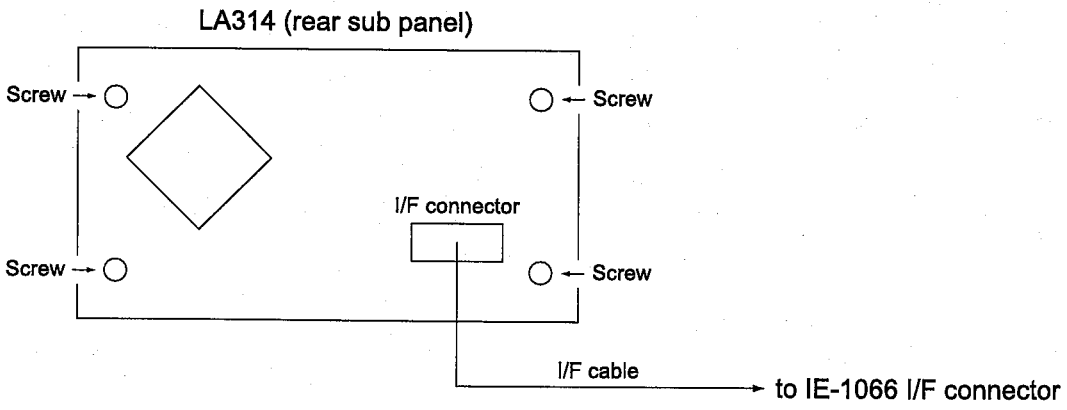


Figure 2.12 Rear Sub Panel of LA314

2.16.3 Adjustment of IE-1066

a. Connection

Procedure

① Connect between the IE-1066 I/F DSUB 9 PIN connector and the LA314 I/F 6 PIN connector with the I/F cable (See Figure 2.12 and 2.13).

② Connect between the IE-1066 OUTPUT connectors and the LA314 INPUT connectors with the BNC coaxial cables (See Figure 2.13).

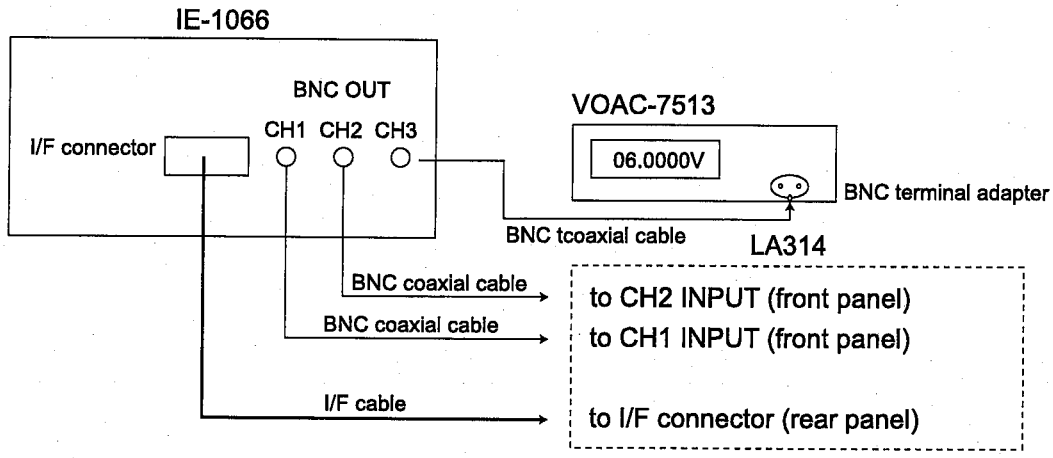


Figure 2.13 Connection IE-1066 to LA314

b. Adjustment

⚠ CAUTION

In order to cancel the offset voltage of the digital multimeter, use its REL computation to measure.

Procedure

① At an ambient temperature of 21 to 24℃, turn on the IE-1066 and warm it up for 30 minutes or more.

② Display the "Automatic Adjustment Menu" screen.

- For the Automatic Adjustment Menu, see "2.14 Automatic Adjustment".

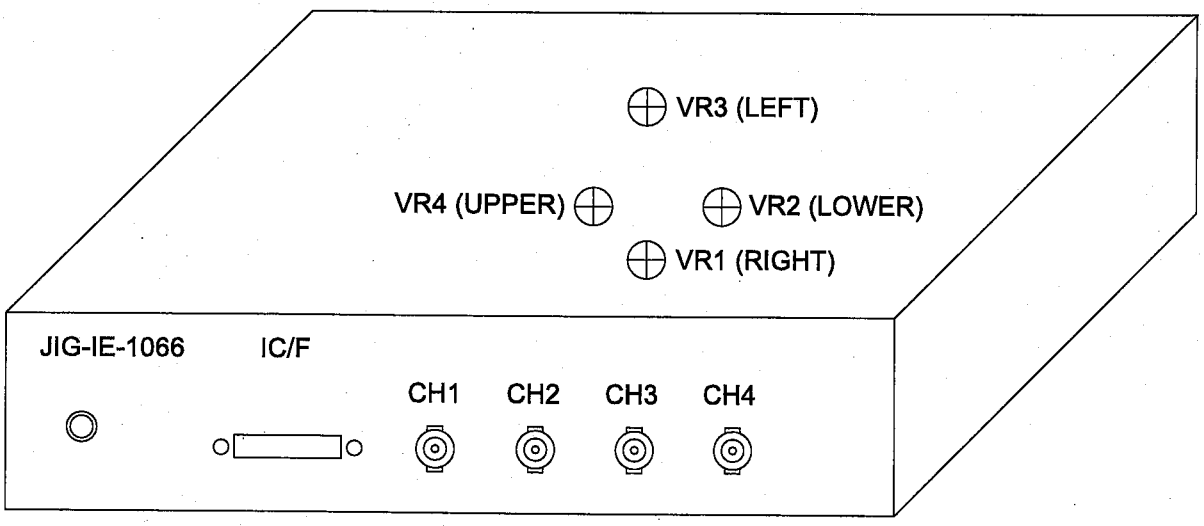
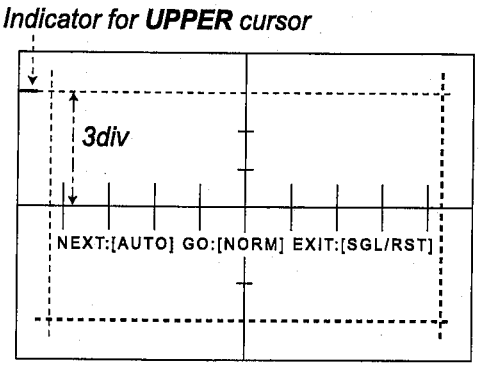


Figure 2.14 IE-1066

— *Displaying "Cursor position setting" screen* —



③ Press **AUTO** to select the automatic adjustment items (A through P are not displayed).
Press **NORM** to enter the cursor position adjustment mode.

— *Calibrating "UPPER, LOWER, RIGHT and LEFT"* —

④ Press **AUTO**. With "SET : UPPER" displayed, adjust CH3 output voltage within 0 ± 30.0 μ V with VR4.

⑤ Press **AUTO**. With "SET : LOWER" displayed, adjust CH3 output voltage within 0 ± 0.30 mV with VR2.

⑥ Press **AUTO**. With "SET : RIGHT" display, adjust CH3 output voltage to within 6.00V ± 1.50 mV with VR1.

⑦ Press **AUTO**. With "SET : LEFT" displayed, adjust CH3 output voltage to within 300mV ± 0.15mV with VR3.

⑧ For UPPER ④, LOWER ⑤, RIGHT ⑥ and LEFT ⑦ adjust to within this rating.

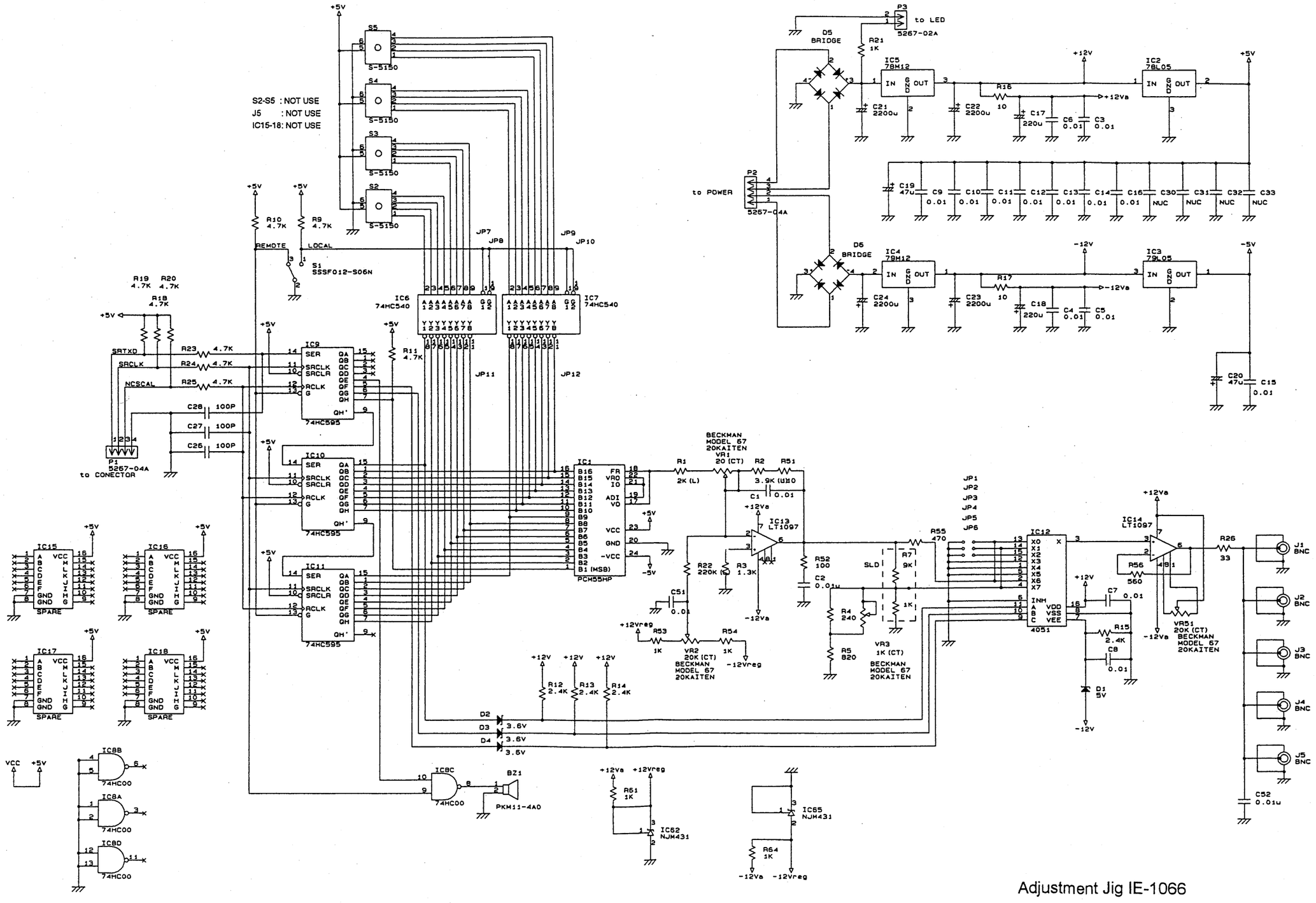
◇ Every time **AUTO** is pressed, the voltages corresponding to the respective cursors are output from the IE-1066 in the following order.
UPPER → LOWER → RIGHT → LEFT → UPPER

Table 2.16.1 Calibration of IE-1066 (Ambient Temperature 21 to 24℃)

Type of cursor	CH3 output	Rating		Adjuster
		I (21 to 24 ℃)	II (20 to 25 ℃)	
UPPER	0 mV (1/20)	0±30.0 μV	0±120.0 μV	VR4
LOWER	0 mV (1/1)	0±0.30 mV	0±1.20 mV	VR2
RIGHT	6.00 V	6.00 V±1.50 mV	6.00 V±6. 00 mV	VR1
LEFT	300 mV	300 mV±0.15 mV	300 mV±0.60 mV	VR3

◇ Rating I : Calibration Specification for IE-1066.
◇ Rating II : Calibration Specification for LA314/314H scope with IE-1066.

2.16.4 Schematic Diagram



Adjustment Jig IE-1066
Schematic Diagram

Section 3 Board Removal

3

Table of Contents

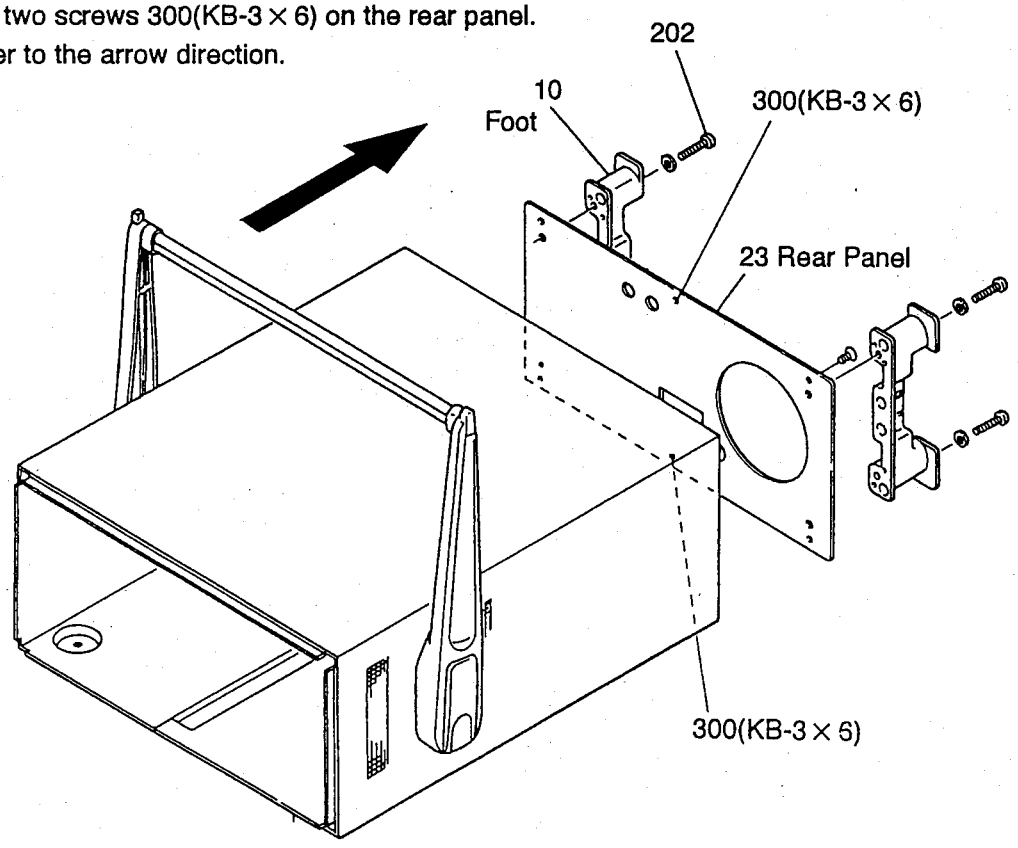
⚠ WARNING

Disconnect the power cord from the receptacle, before removing any board.

Cover Removal

Procedure

① Remove the four screws 202(KP-4 × 25) in the foot.
② Remove the two screws 300(KB-3 × 6) on the rear panel.
③ Detach Cover to the arrow direction.



Memo

Printed Circuit Board Location

Indicates the printed circuit board Location to Figure 3.1 to 3.3.

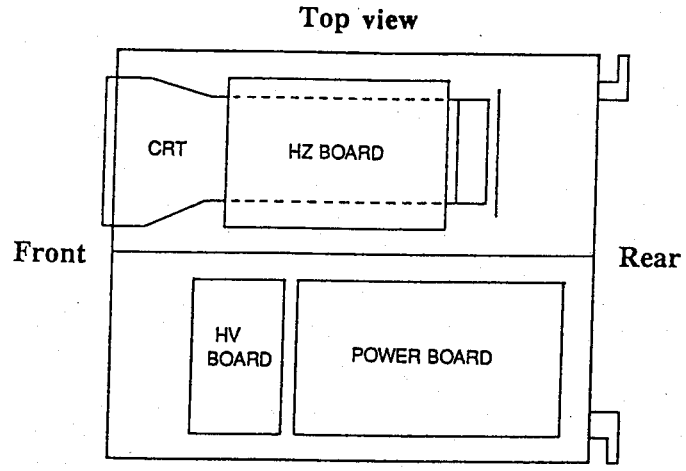


Figure 3.1 BOARD Locations I (Top view)

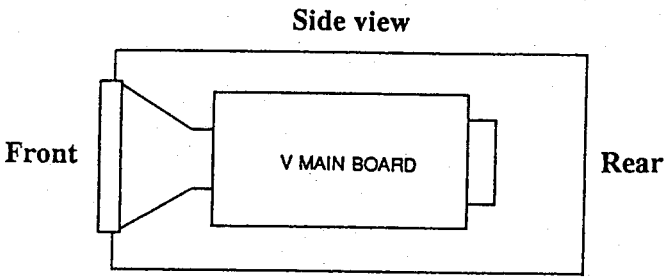


Figure 3.2 BOARD Locations II (Side view)

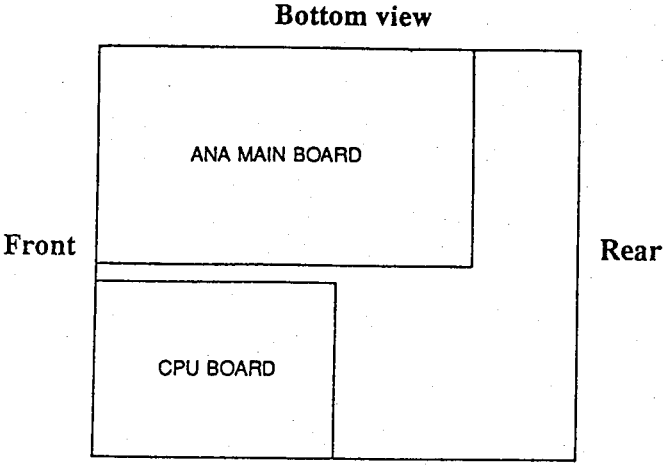


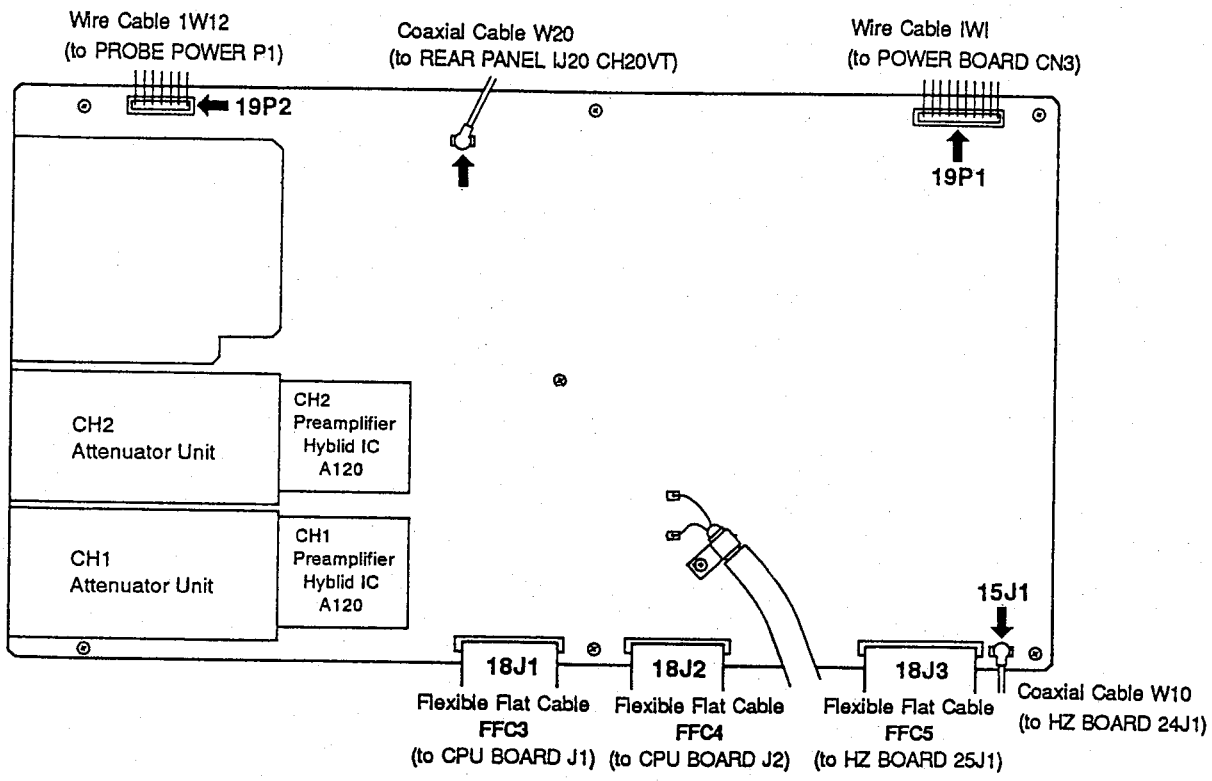
Figure 3.3 BOARD Locations III (Bottom view)

3.1 ANA MAIN BOARD Removal

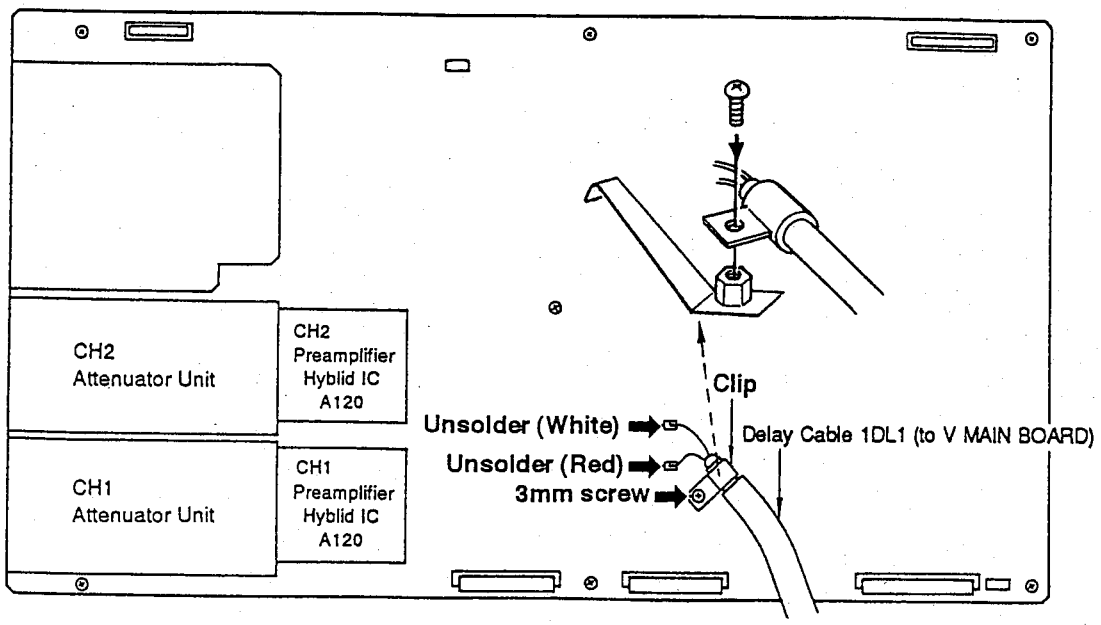
Remove the ANA MAIN BOARD (see Figure 3.3) on the bottom.

Procedure

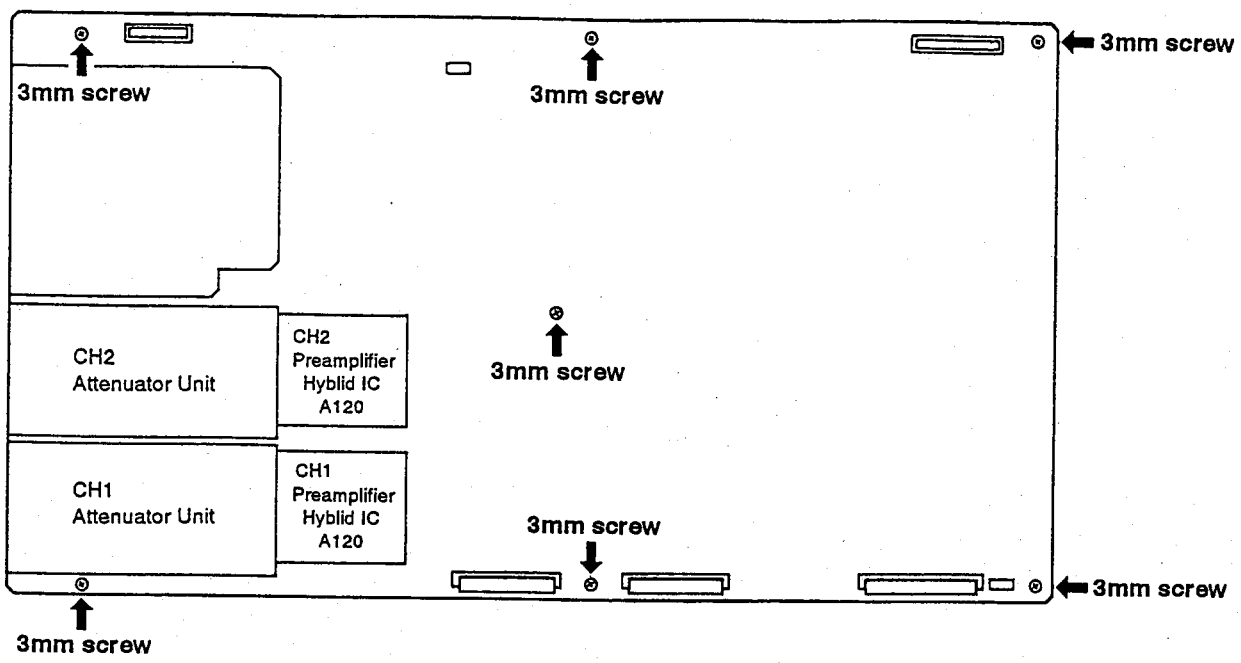
① Disconnect the two coaxial cables (9J1, 15J1), the three flexible flat cables (18J1, 18J2, 18J3), and the two wire cables (19P1, 19P2).



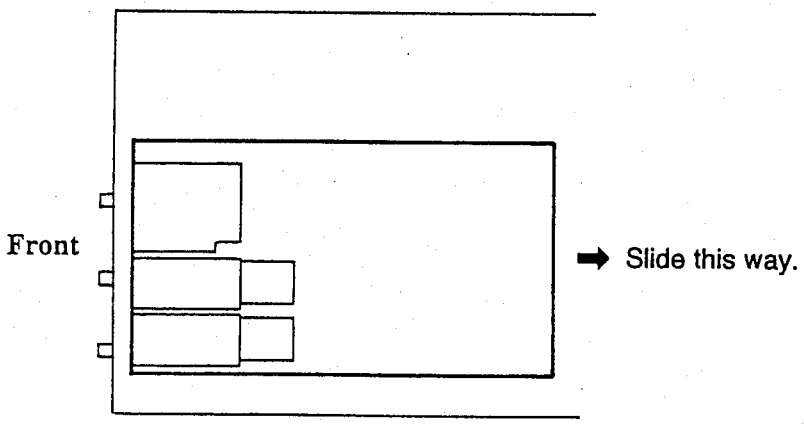
② Unsolder the two delay cable wires (white, red), and remove the screw securing the delay cable (1DL1) to the ANA MAIN BOARD.



③ Remove the seven screws that hold the ANA MAIN BOARD to the chassis.



④ Slide the ANA MAIN BOARD back away from the front panel to completely remove the board from the instrument.



3.2 Attenuator Unit and Board Removal

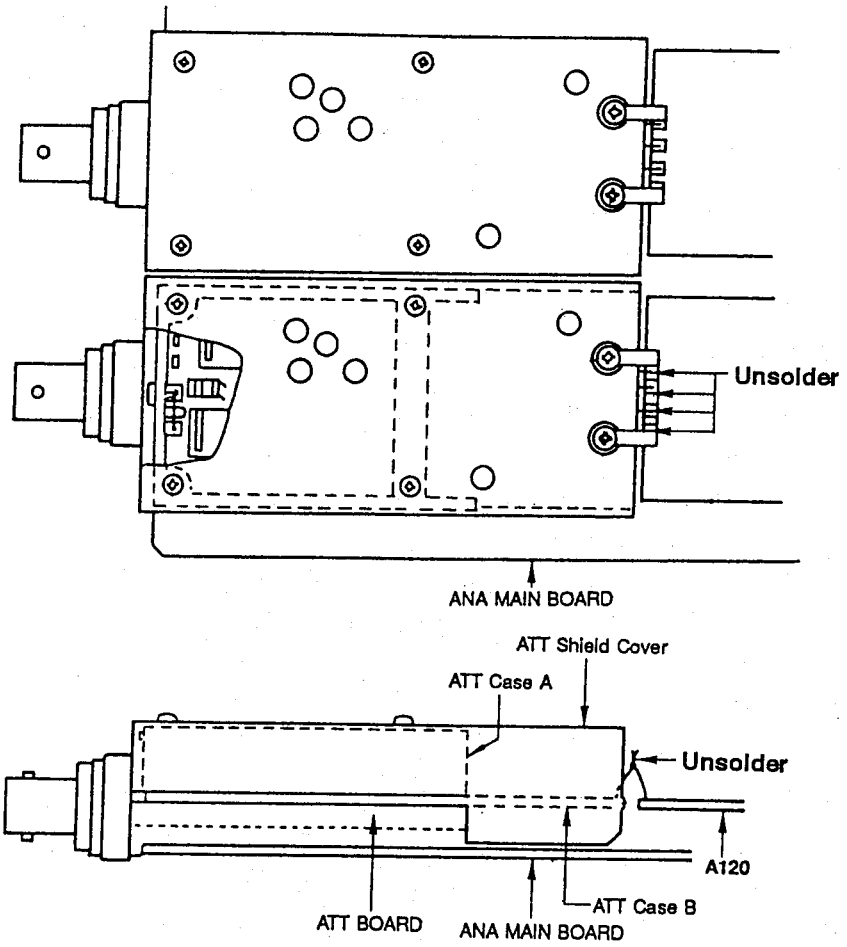
Remove the Attenuator Unit on the bottom.

Procedure

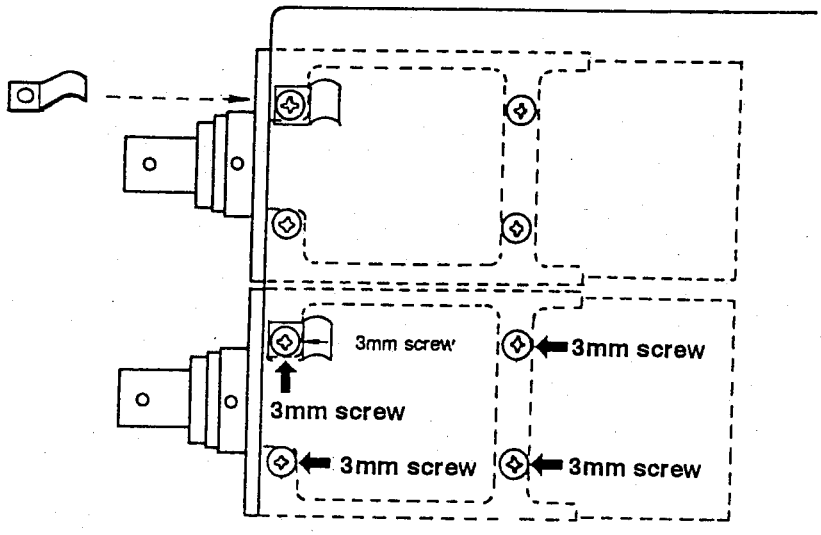
① Remove the ANA MAIN BOARD.

- See "3.1 ANA MAIN BOARD Removal".

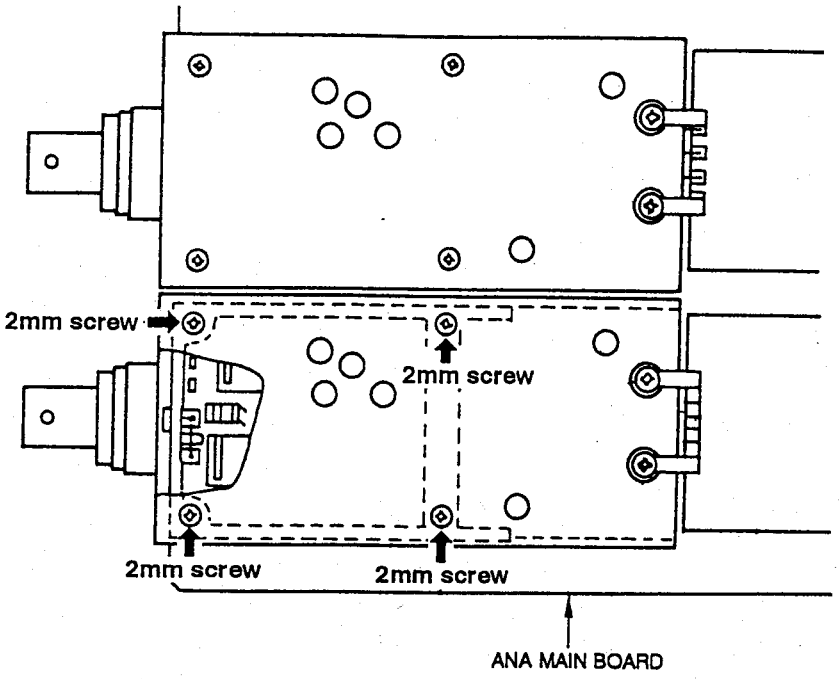
② Unsolder the four contact pins that connect to the preamplifier hyblid IC (HIC A120).



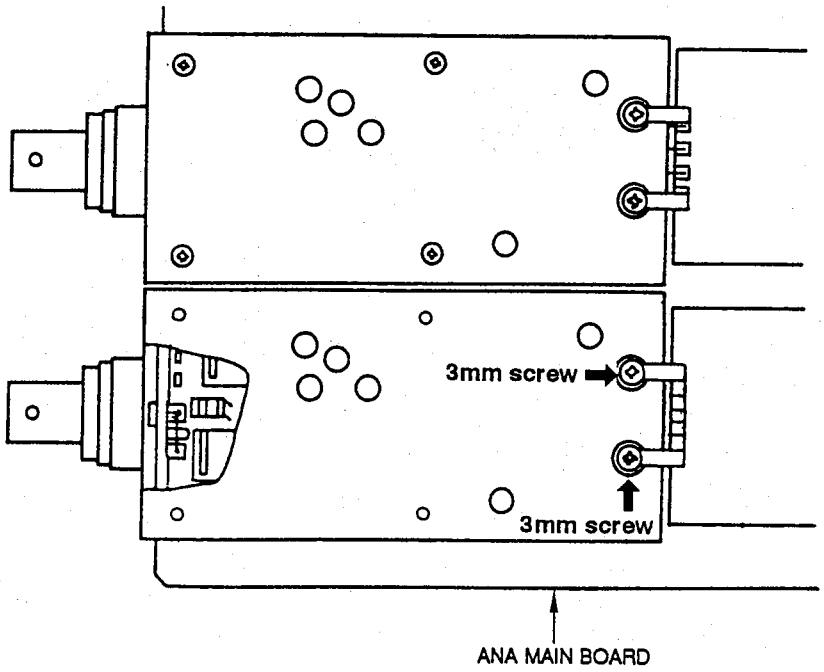
③ Remove the four 3mm screws on the reverse side of ANA MAIN BOARD.



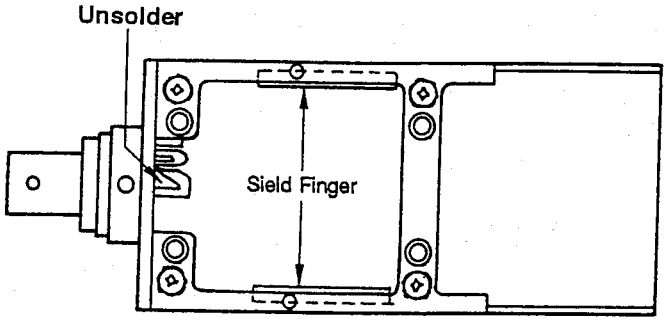
④ Remove the four 2mm screws that fix the attenuator shield cover to the ATT case A.



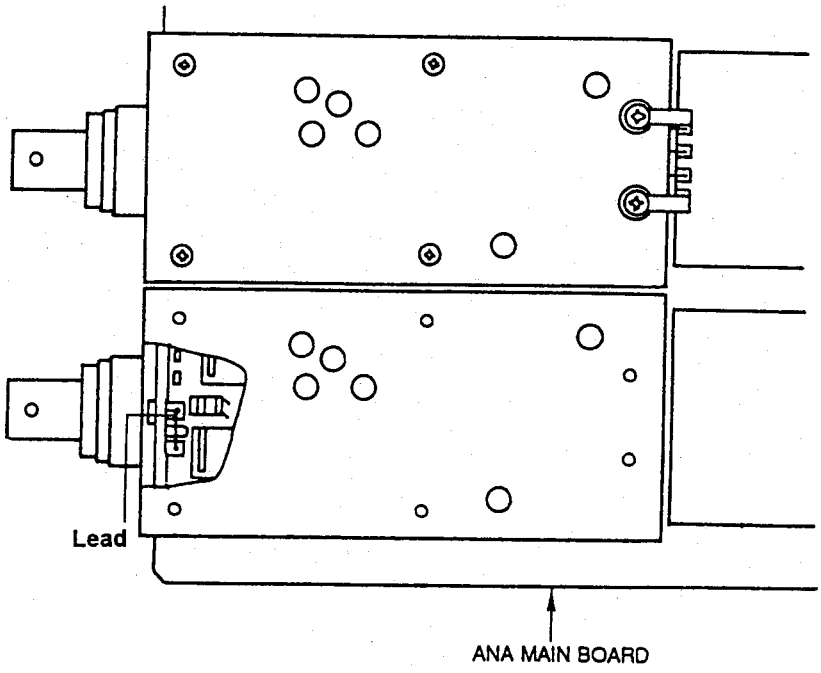
⑤ Remove the two 3mm screws that hold the ribbon from the preamplifier hyblid IC.



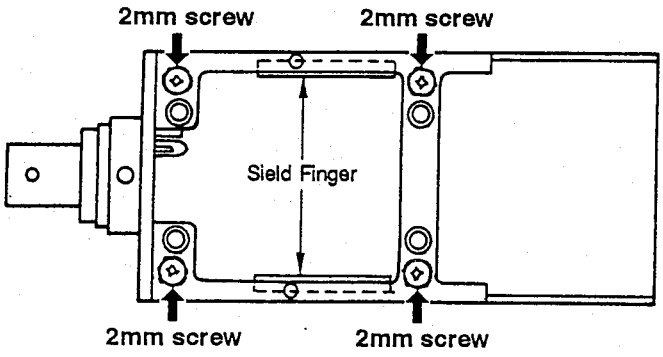
⑥ Unsolder the BNC contact to the attenuator board.



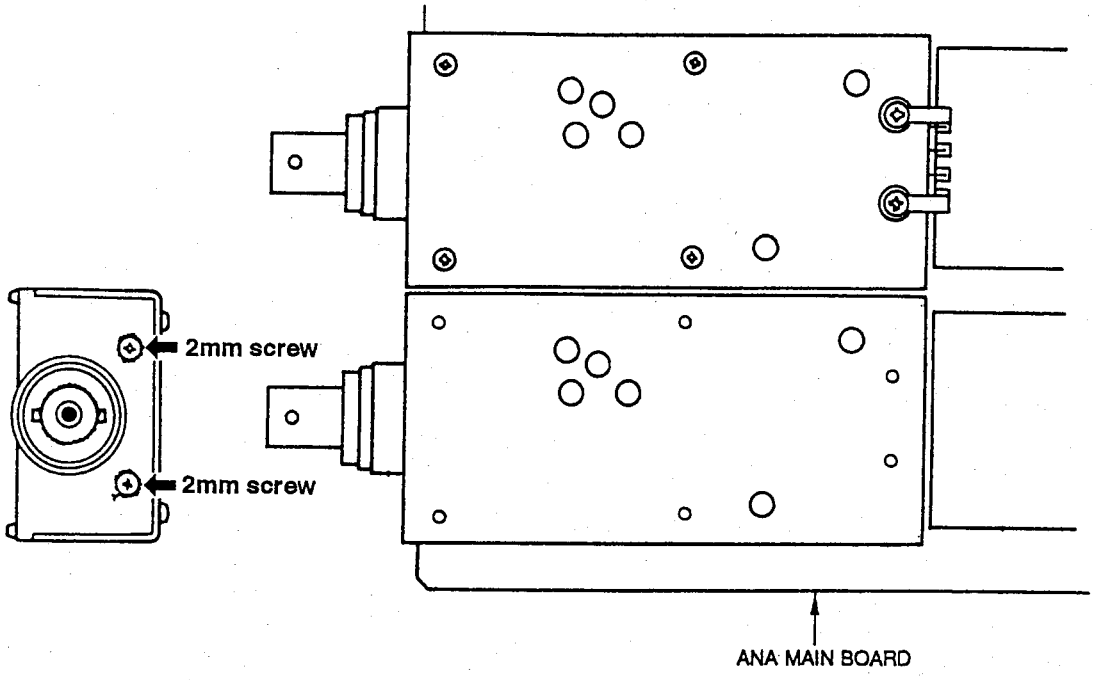
⑦ Unsolder the lead from BNC to the attenuator board.



⑧ Remove the four 2mm screws on the reverse side of ATT case B.



⑨ Remove the two 2mm screws on the front side of ATT case B.



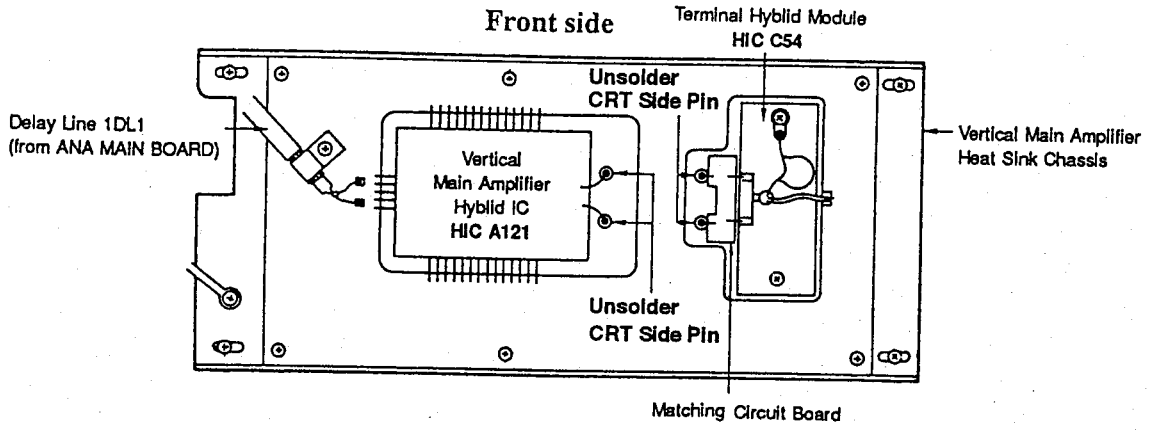
◇same as channel 1 and channel 2.

3.3 V MAIN BOARD Removal

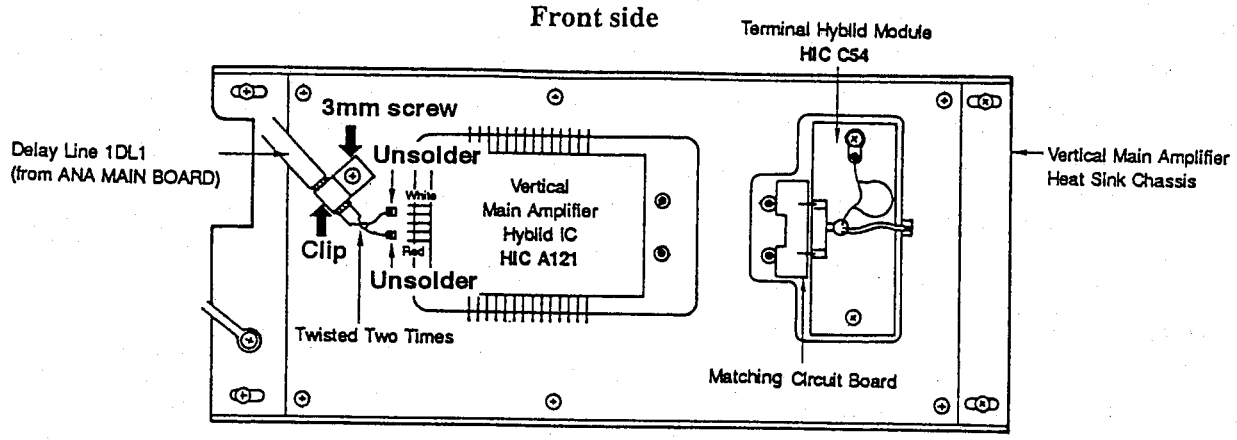
Remove the V MAIN BOARD (see Figure 3.2) on the side.

Procedure

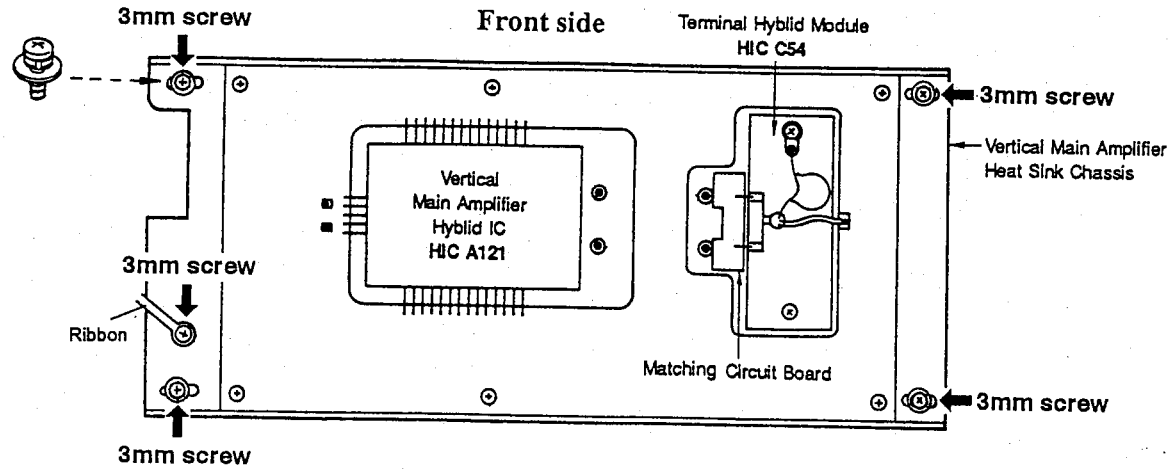
① Unsolder the four wires that connect to the CRT side pin connectors.



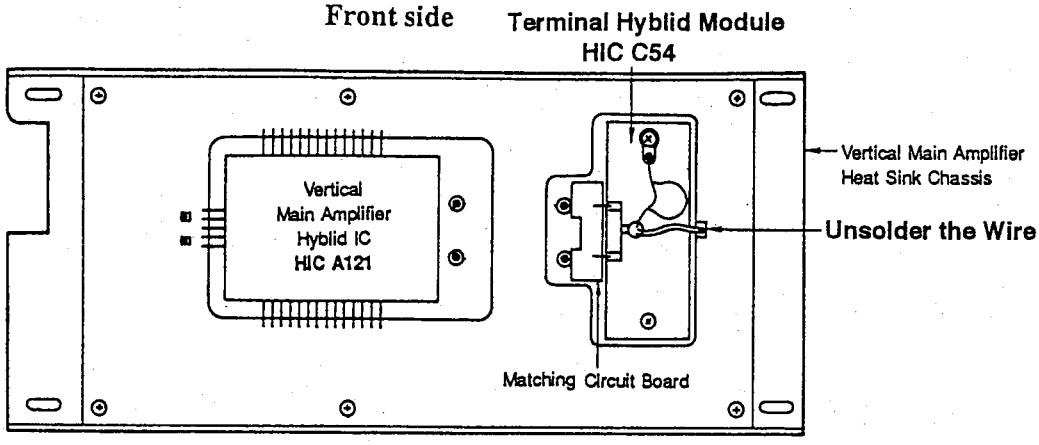
② Unsolder the two delay line wires (white, red), and remove the 3mm screw securing the delay line (1DL1) to the V MAIN BOARD.



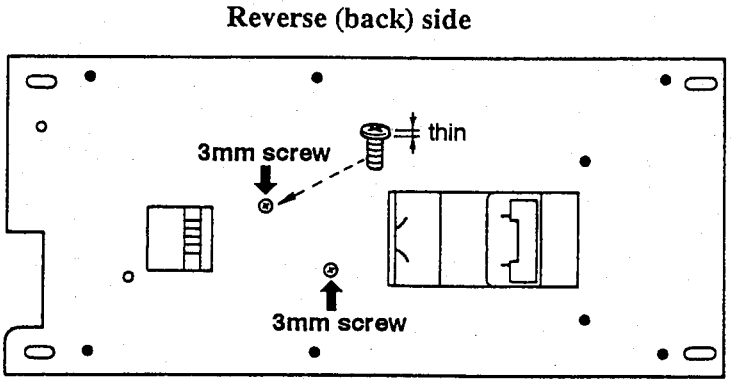
③ Remove the four 3mm screws that hold the V MAIN heat sink subchassis to the main chassis and remove a screw that fix the ribbon.



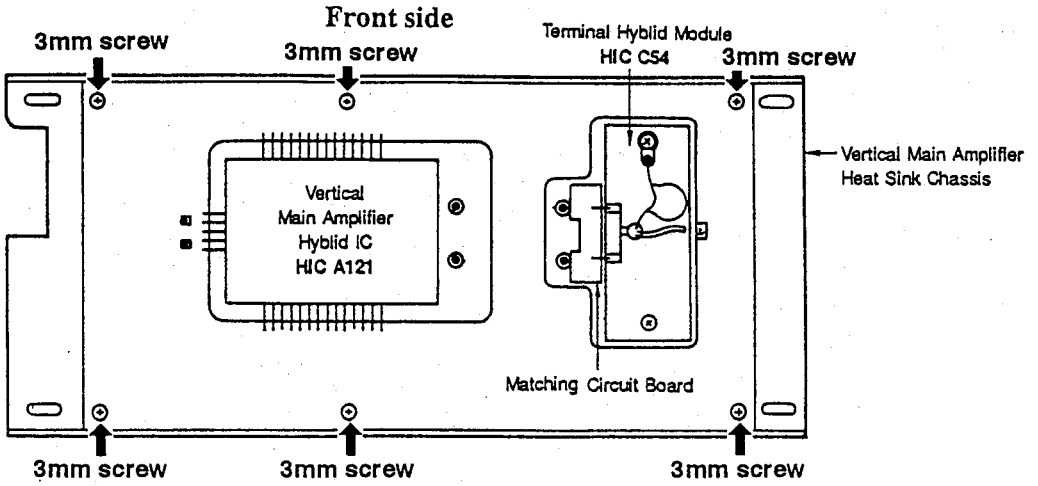
④ Unsolder the wire of the termination hyblid module (HIC C54).



⑤ Remove the two 3mm screws on the reverse side of the V MAIN heat sink sub-chassis.



⑥ Remove the six 3mm screw securing the board to the V MAIN heat sink.

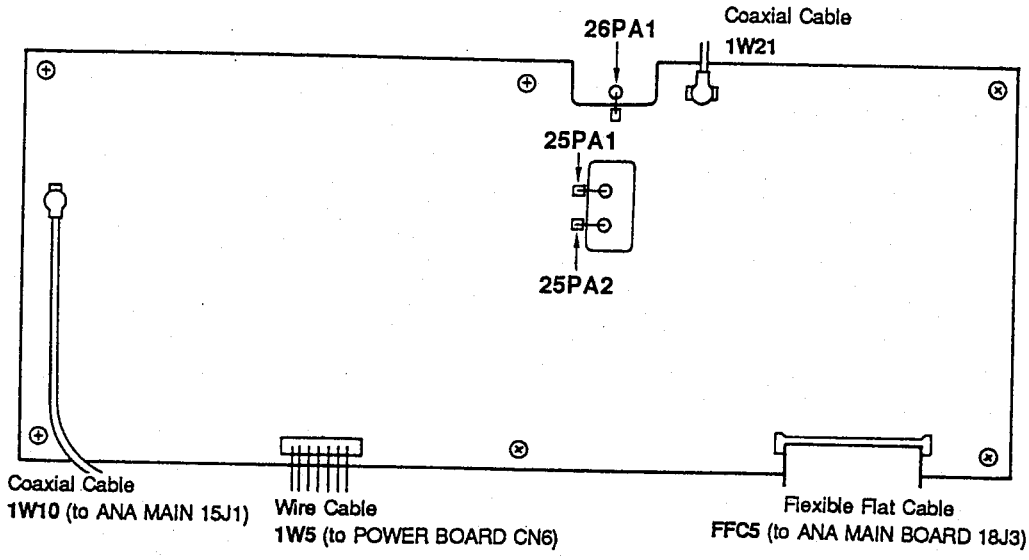


3.4 HZ BOARD Removal

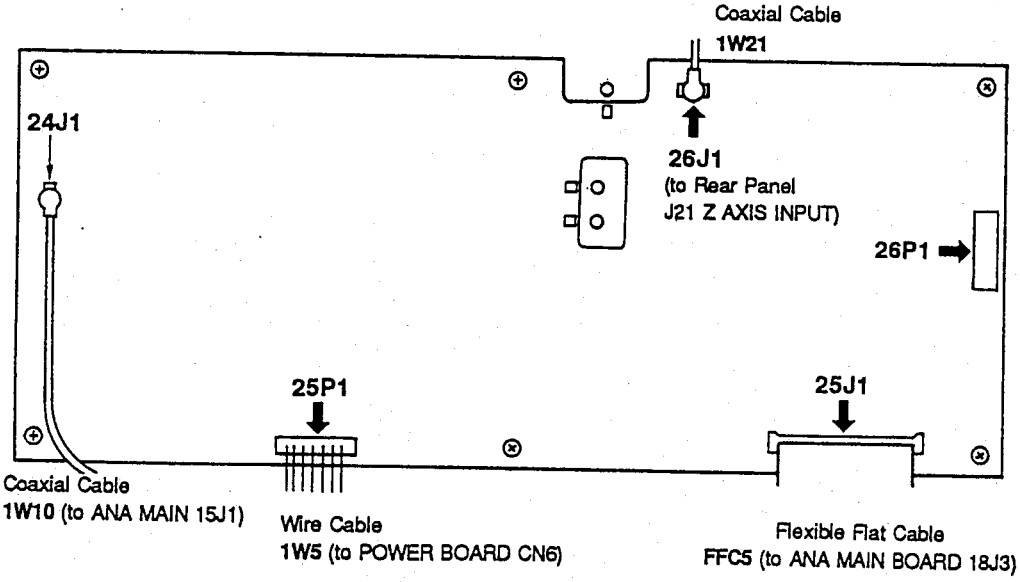
Remove the HZ BOARD (see Figure 3.1) on the upper part.

Procedure

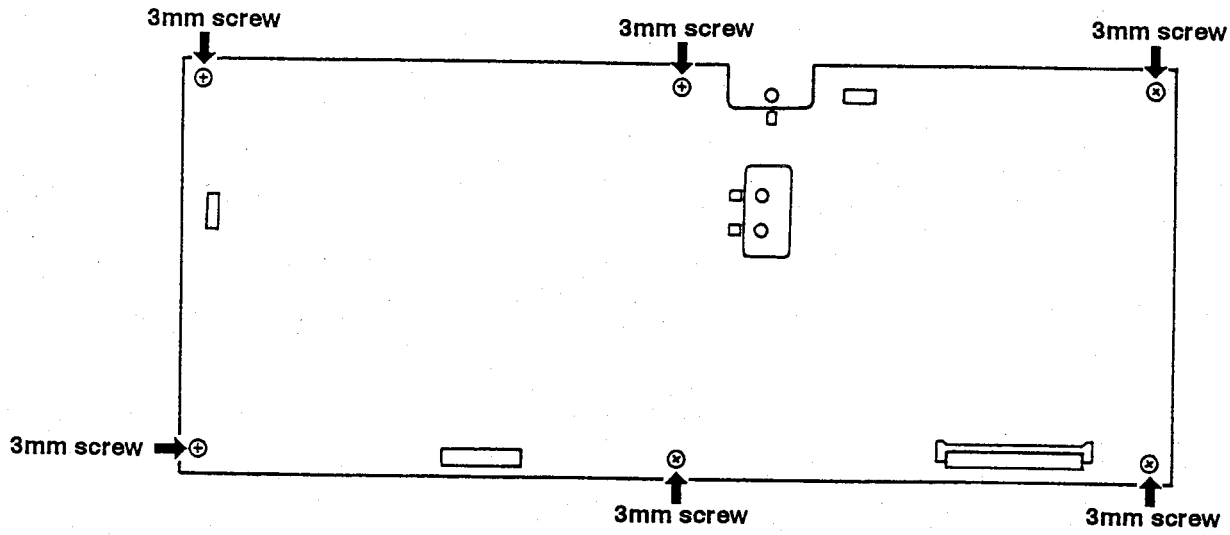
① Unsolder the three wires that connect to the CRT side pin connectors (25PA1, 25PA2, 26PA1).



② Disconnect the two coaxial cables (24J1, 26J1), the flexible flat cable (25J1), and the wire cable (25P1).



③ Remove the six 3mm screws that hold the board to the chassis.

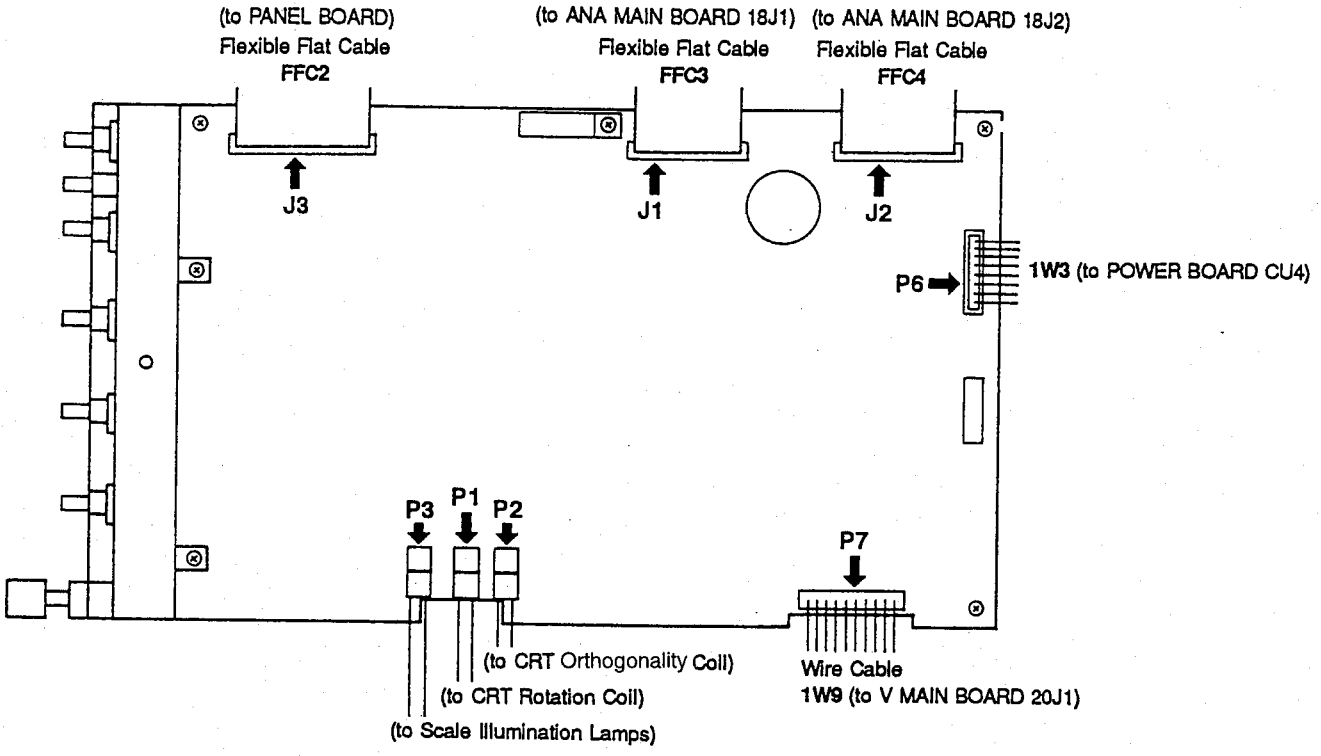


3.5 CPU BOARD Removal

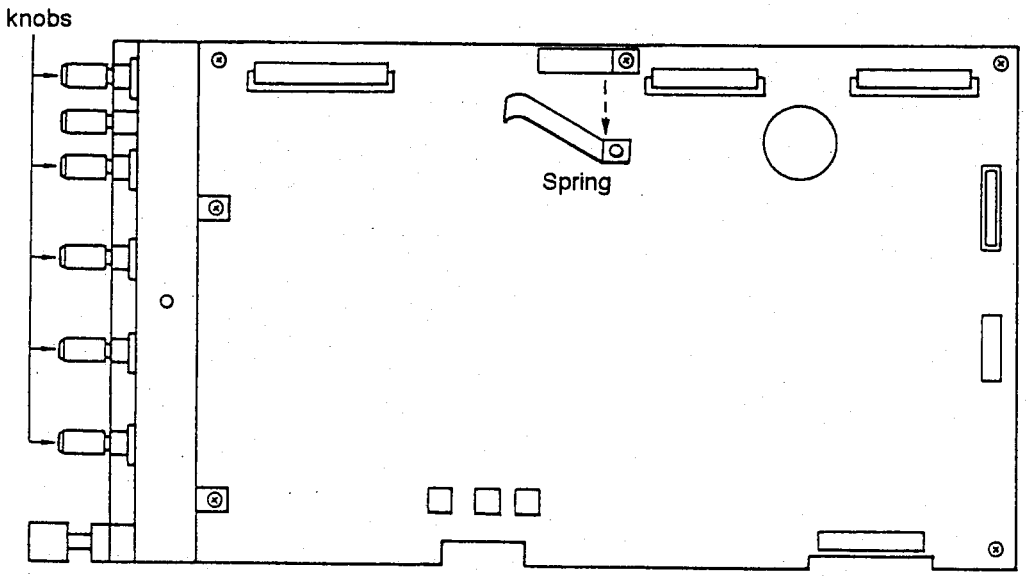
Remove the CPU BOARD (see Figure 3.3) on the bottom.

Procedure

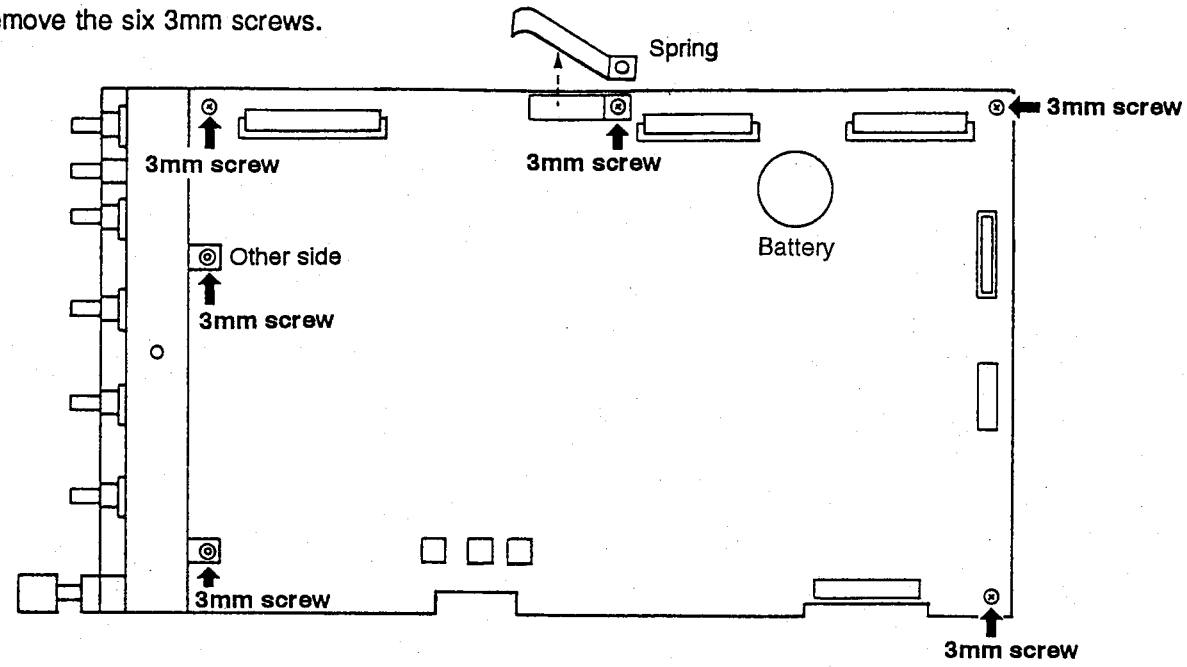
① Disconnect the tree flexible flat cables (J1, J2, J3), and the five wire cable (P1, P2, P3, P6, P7).



② Pull out and remove the five front panel knobs (A INTEN, B INTEN, READOUT, FOCUS, and SCALE).



③ Remove the six 3mm screws.



④ Slide the CPU MAIN BOARD back away from the front panel, remove the board from the instrument.

⚠ CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

3.6 CRT Removal

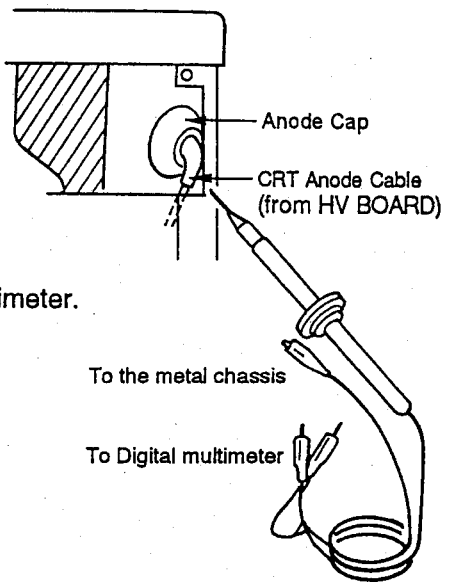
⚠ WARNING

Disconnect the power cord from the receptacle before removing CRT.

The CRT terminals, especially anode terminal, are charged high voltage for a long time even after the power off.

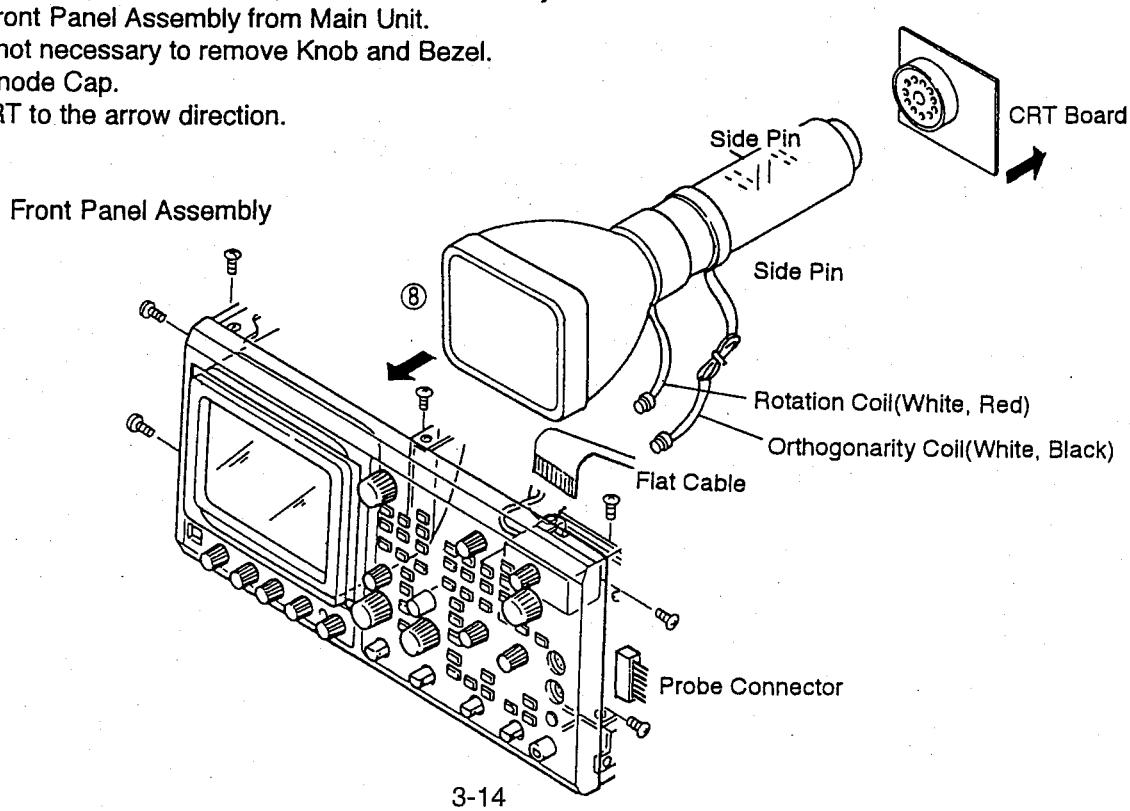
To avoid electrical shock, carefully discharge the CRT anode terminal in the anode cap directly to the metal chassis.

[Note] For safety discharge, use High-voltage prove with Diigital multimeter.

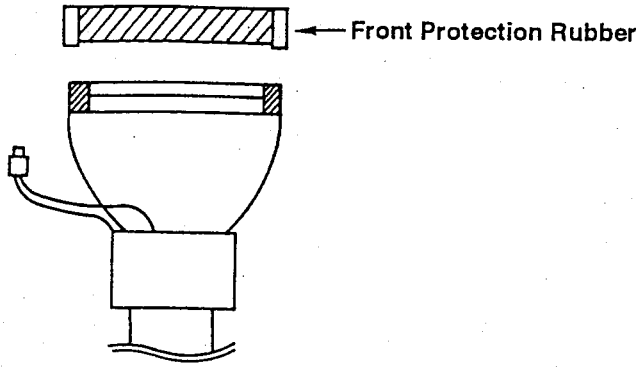


Procedure

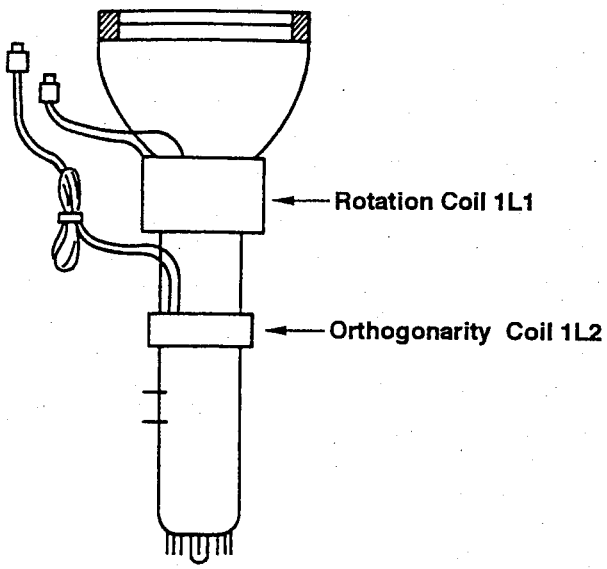
① Remove 4 point solder of Side Pin according to Page 3-8 ①.
② Pull out connector removed 4 point solder.
③ Pull out connector from CRT Side Pin of showed Page 3-10 ① Fig. 25PA1, 25PA2, 26PA1.
[Note] It is not necessary to remove solder.
④ Pull out the CRT Board. (Pull CRT socket straight behind.)
⑤ Remove flat cable from Panel Board.
⑥ Remove connector cable from Probe Power Board.
⑦ Disconnect the two wire cables of the rotation and orthogonarity coils from the CPU Board.
⑧ Remove seven screws which fixed Front Panel Assembly to Main Unit.
⑨ Remove Front Panel Assembly from Main Unit.
[Note] It is not necessary to remove Knob and Bezel.
⑩ Remove Anode Cap.
⑪ Pull out CRT to the arrow direction.



⑥ Remove the front protection rubber.



⑦ Remove the shading black paper tape from the CRT.
⑧ Slide the trace rotation and orthogonarity coils back away, and remove the coils from the CRT.



3.7 HV BOARD Removal

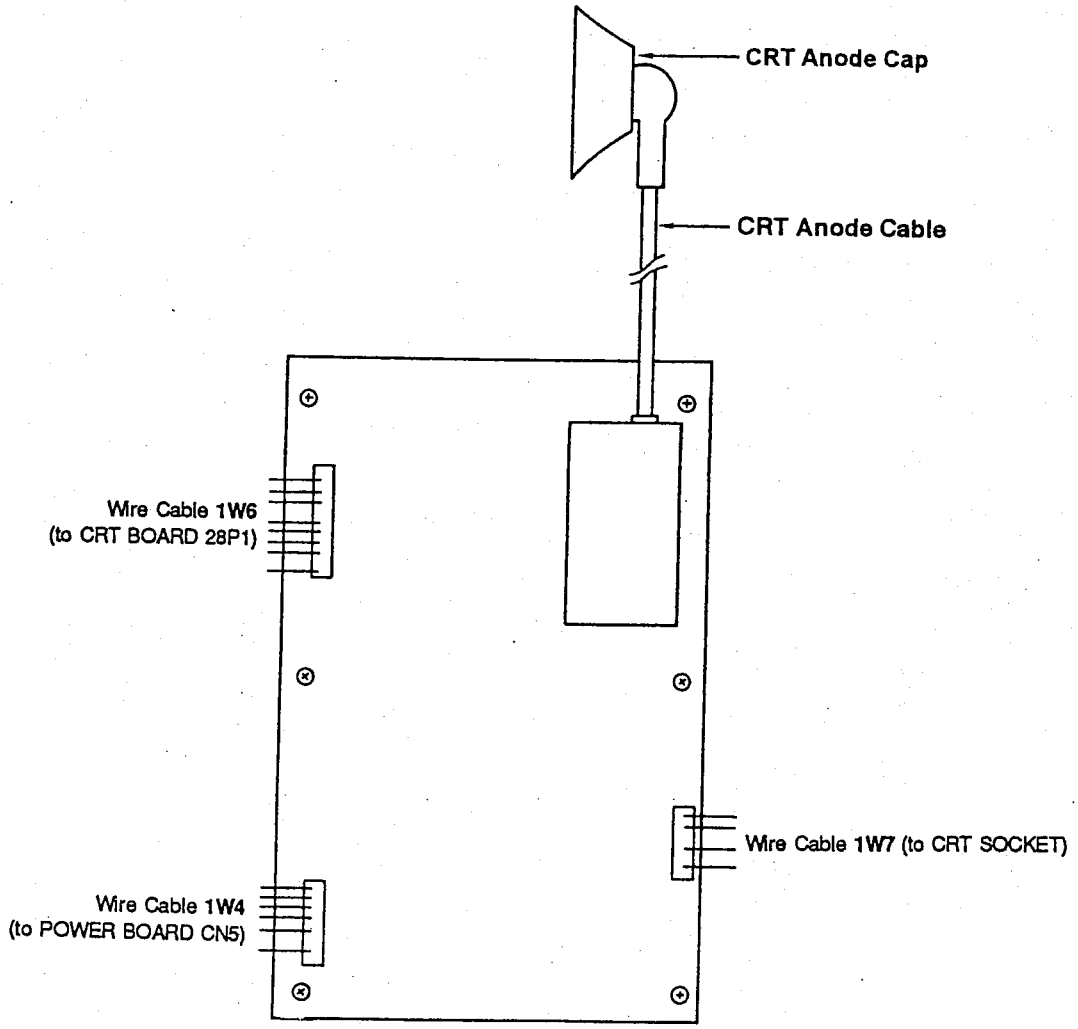
⚠ WARNING

Disconnect the power cord from receptacle, before removing the HV BOARD.

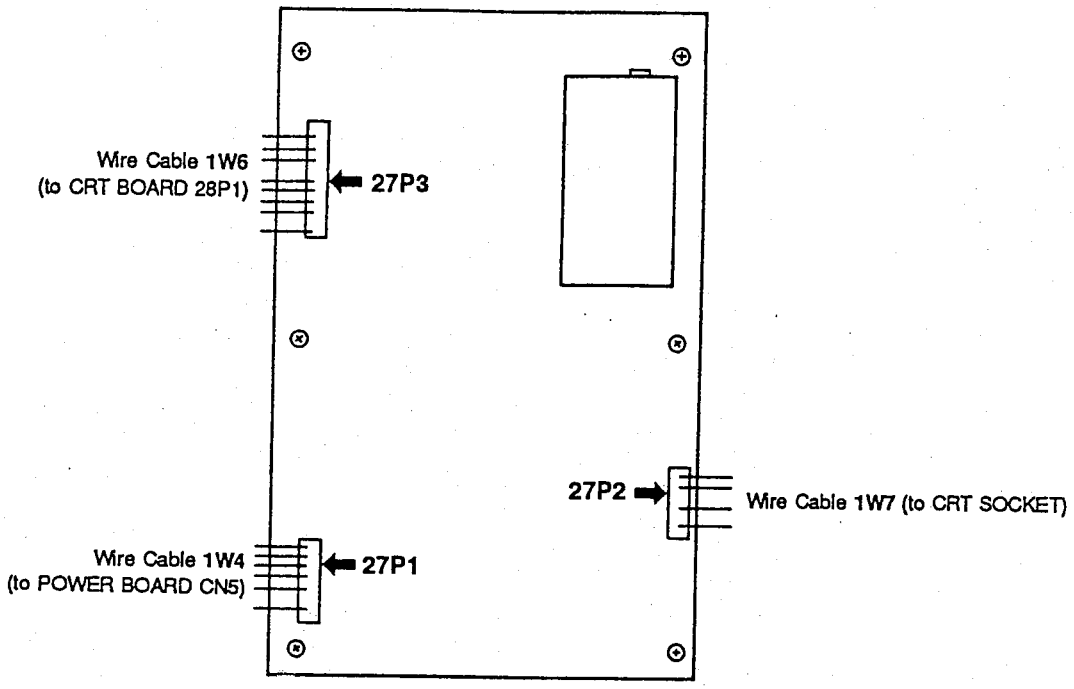
To avoid electrical shock, carefully discharge the CRT anode terminal in the anode cap directly to the metal chassis.

Procedure

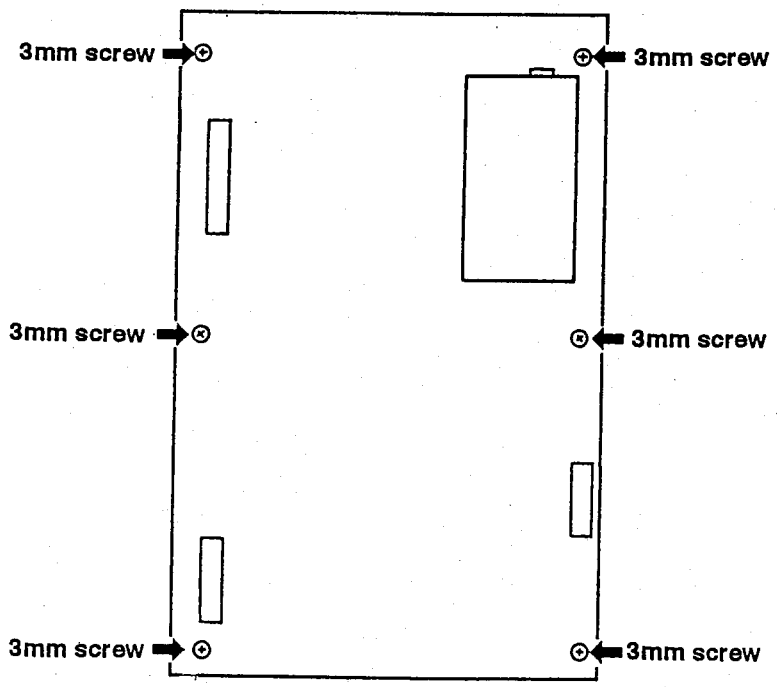
① Remove the CRT anode cable.



② Disconnect the three wire cables (P1, P2, P3).



③ Remove the six 3mm screws.



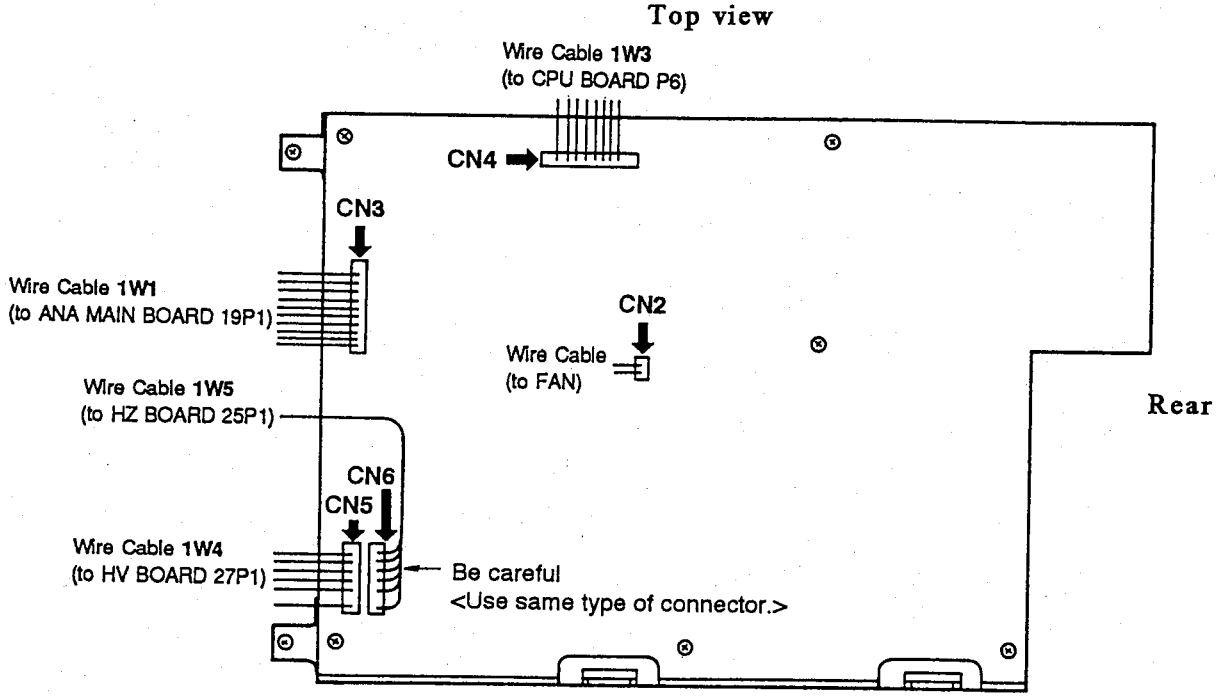
3.8 POWER BOARD Removal

⚠ WARNING

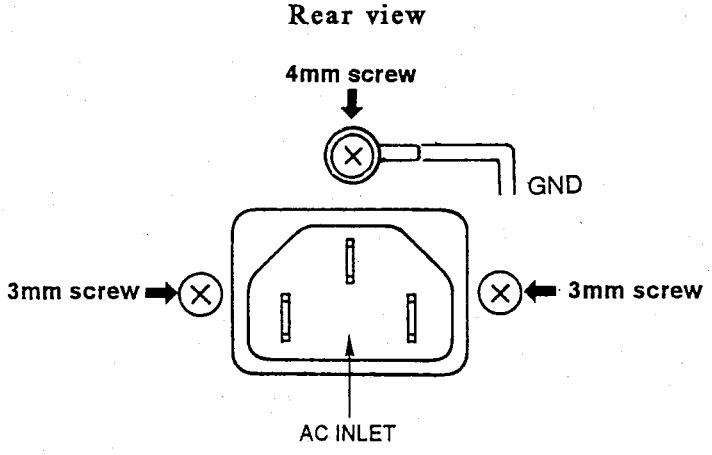
Disconnect the power cord from receptacle, before removing the POWER BOARD.
The preregulator circuit of power board is live (400 V DC), even if the POWER switch is set to STBY.

Procedure

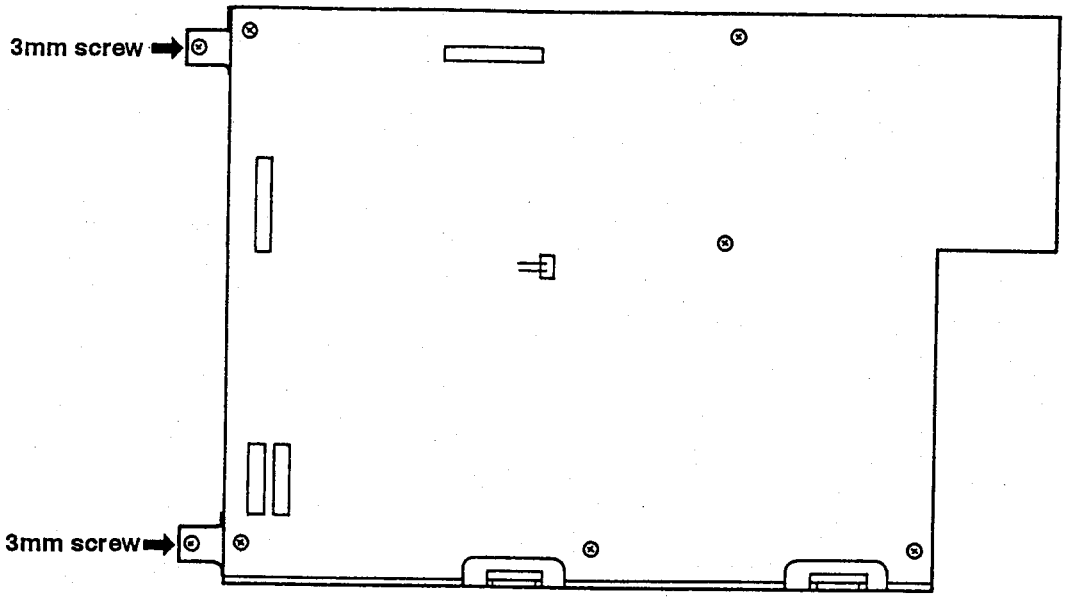
① Disconnect the five wire cables (CN2, CN3, CN4, CN5, CN6).

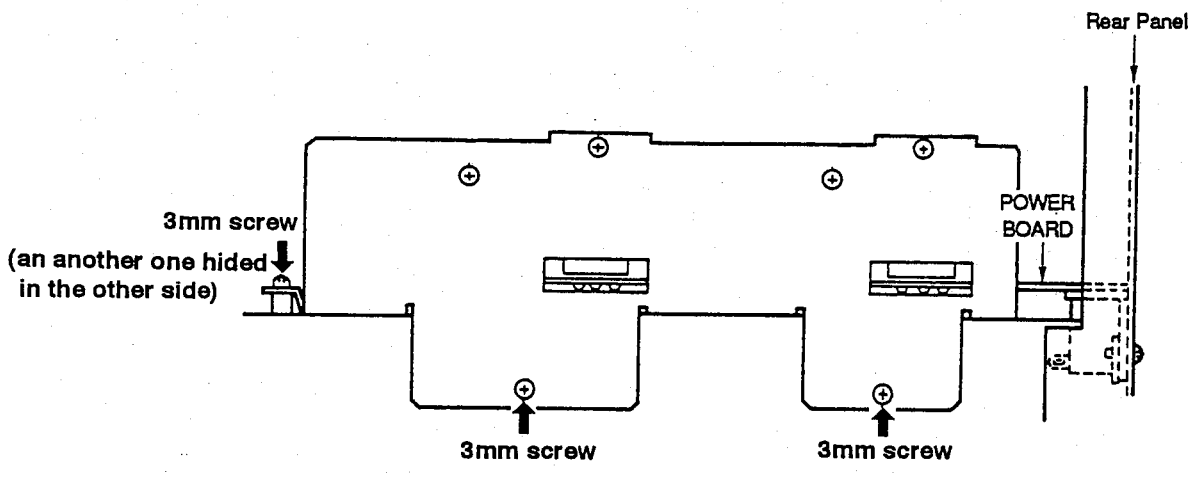


② Remove the two 3mm and 4mm screws beside the AC INLET on the rear panel.

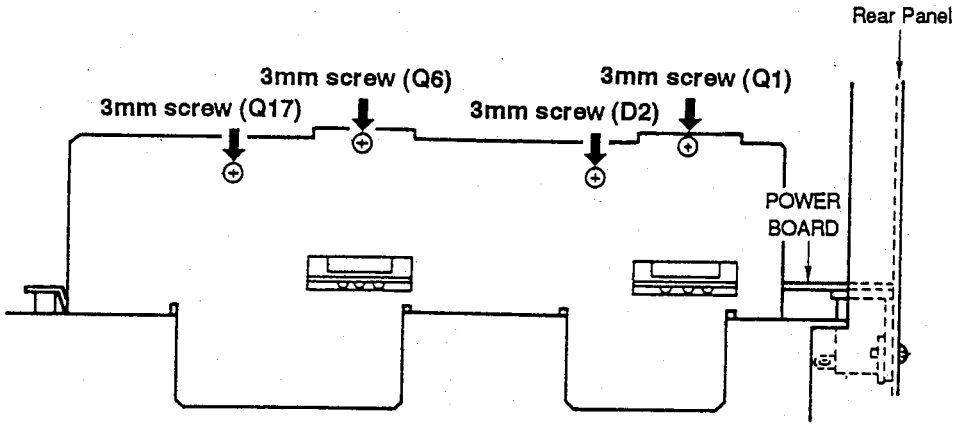


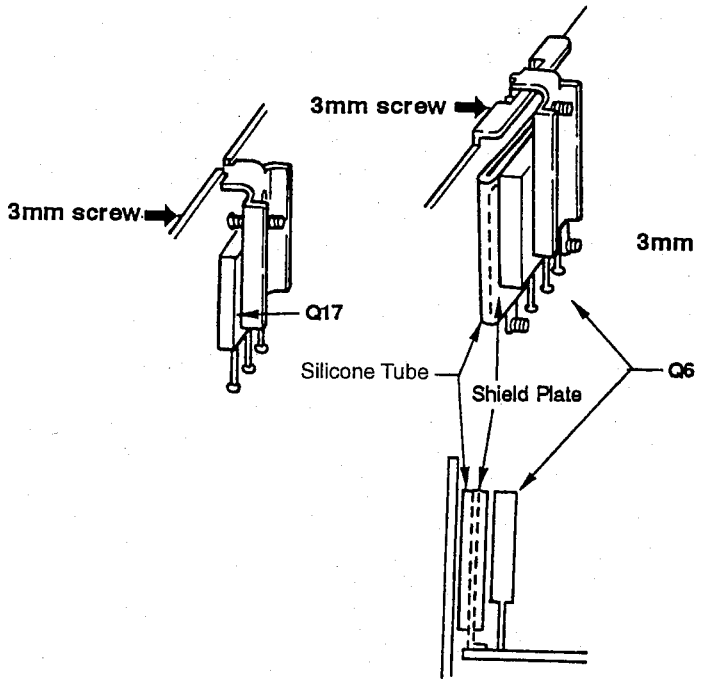
③ Remove the four 3mm screws that hold the power subchassis to the main chassis.

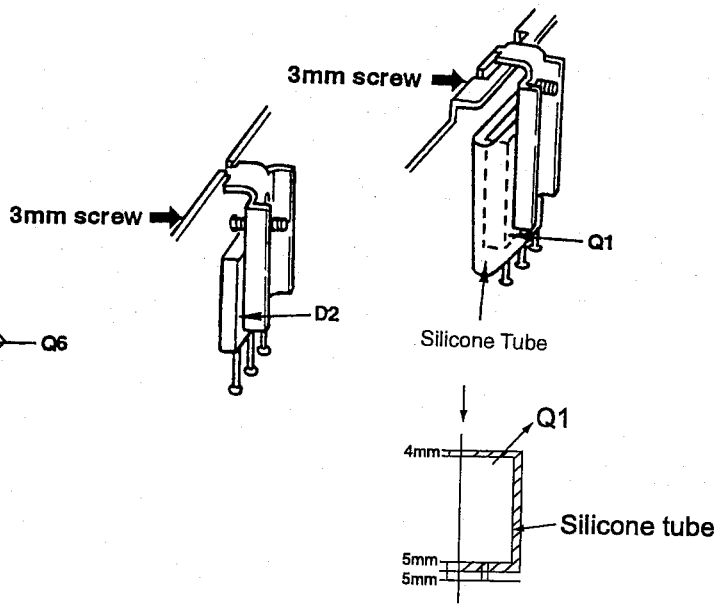




④ Remove the four 3mm screws securing the four power semiconductor devices (Q1, Q6, D1, D17) to the power board subchassis.



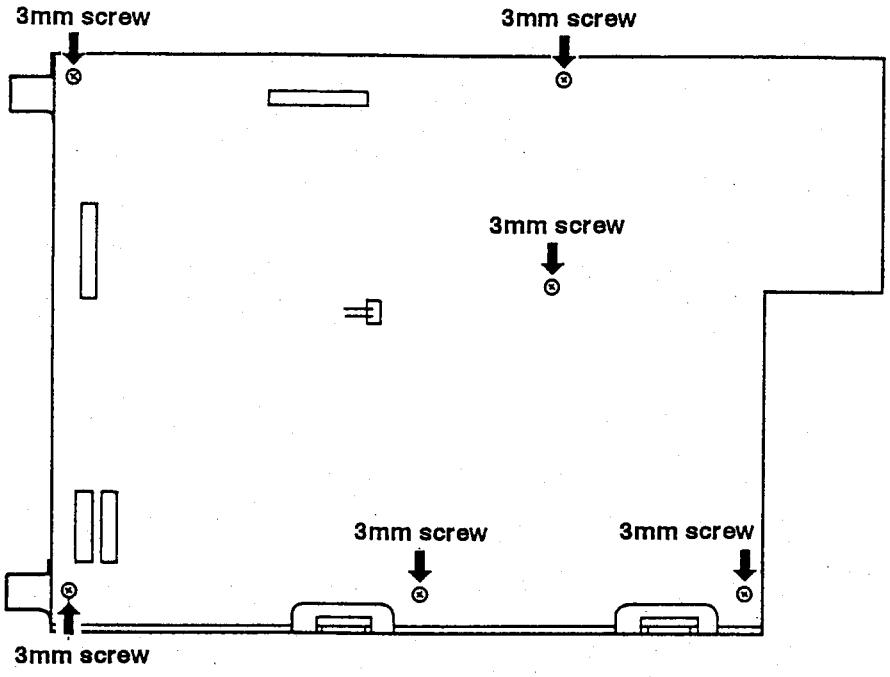




Separate the top of the silicone and the top of the transistor by 4mm or more.

Caution: When tighten these screws, use the torque screwdriver(3mm/10kgf × cm by 5kgf × cm ± 0.5kgf).
Q1, Q6, D1, D17 are covered with a silicone tube.

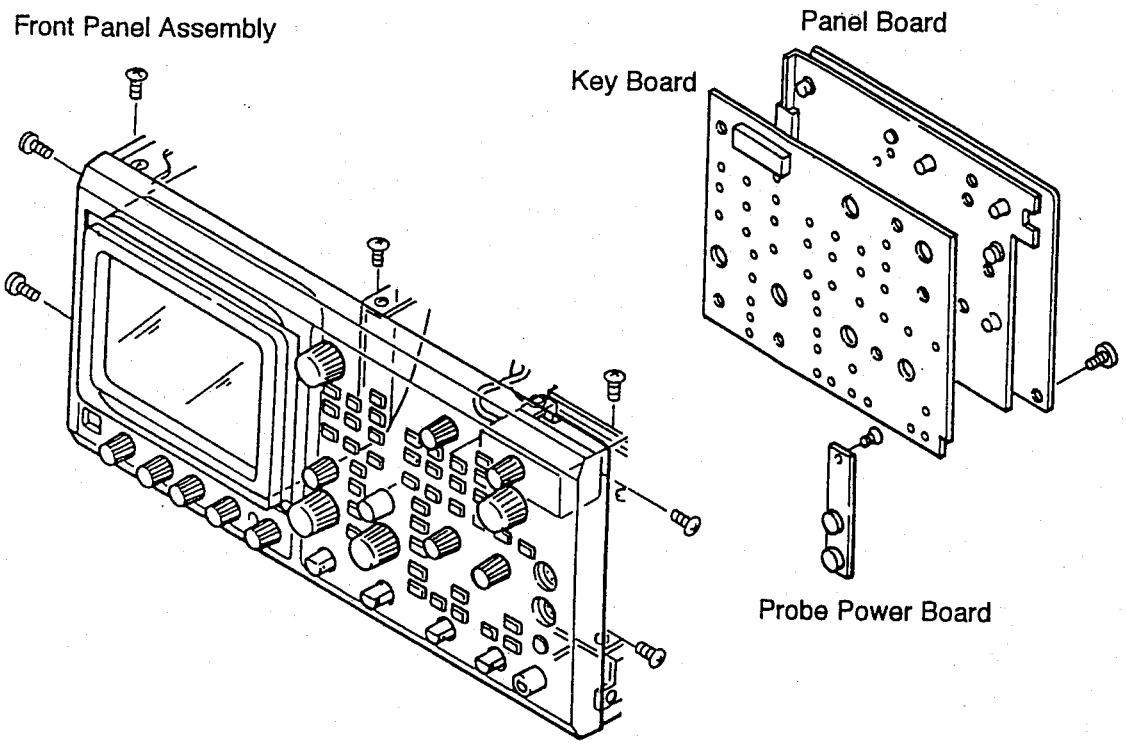
⑤Remove the six 3mm screws that fix the board to the power board sub-chassis.



3.9 Key/Panel Board Removal

Procedure

① Remove flat cable from Panel Board.
② Remove connector cable from Probe Power Board.
③ Remove all knobs.
④ Remove seven screws which fixed Front Panel Assembly to Main Unit.
⑤ Remove Front Panel Assembly from Main Unit.
⑥ Remove screws of fixing Panel Board and Key Board.



Section 4 Block Diagram

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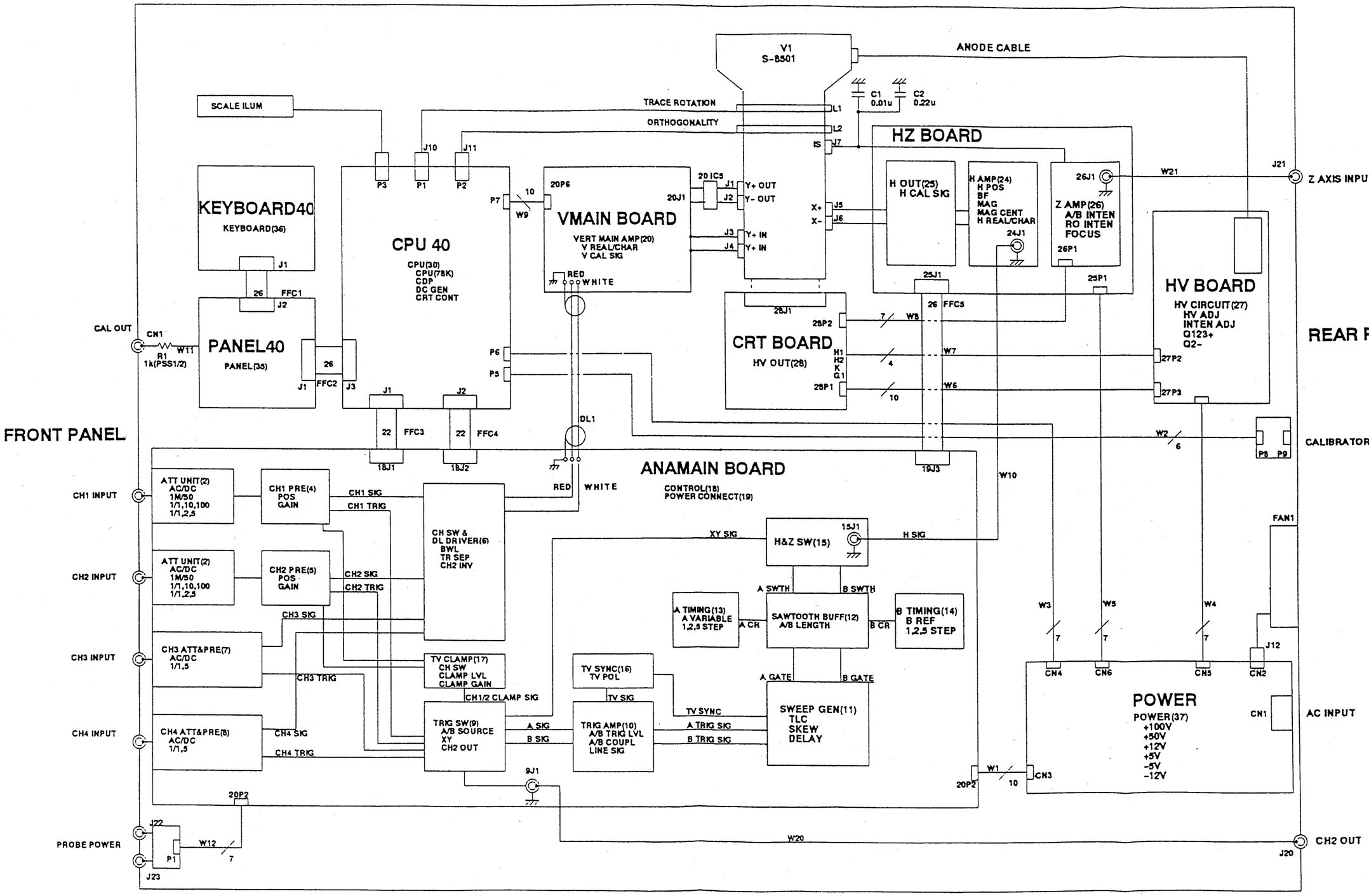


Fig. 4.1 Block Diagram

Summary of LA314 Block Functions

( ) : Circuit Number

No.	Block name	Summary of block functions
1	ATT unit(2)	① Attenuation ratio control : Input sensitivity is switched to 10 mV~ 5V/div by combining attenuation ratios of 1:1, 10:1, 100:1 and 1:1, 2:1, 5:1. ② Input coupling selector AC/DC/GND. ③ Input resistance selector 1MΩ/50Ω. ④ DC offset voltage control. ⑤ Probe ratio sensing. ⑥ Over load sensing for 50Ω protection. ⑦ DC balance adjust control.
2	CH1 PREAMP(4) CH2 PREAMP(5)	① Converts attenuator output (single end) to differential output. ② x5, x10, x25 gain switching. ③ Controls ±5div V POSITION of CH1, CH2. ④ Controls variable gain. ⑤ Gain adjusts. ⑥ Trigger signal picks off and outputs as differential signal. ⑦ Position control for TV signal clamp. ⑧ Controls differential output of preamp level to 0 volts.
3	CH SW & DL DRIVER	① Switches CH1, CH2, CH3, CH4 output of preamp to delay cable by V MODE setting. ② Controls additional ±5div V POSITION control of CH1, CH2, total ±10div V POSITION control. ③ Inverts CH2 signal polarity. ④ Adds signals of CH1, CH2. ⑤ Bandwidth limitation 100MHz, 20MHz. ⑥ Controls Trace separation position.
4	CH3 ATT & pre(7) CH4 ATT & pre(8)	① Attenuates input signal to 1/4. ② Switches gain ratio of 1:1 and 5:1 and output differential signal. ③ Controls ±10div V POSITION of CH3, CH4. ④ Input coupling switching AC/DC. ⑤ Probe sensing. ⑥ Gain adjusts. ⑦ Trigger signal pick-off and output as differential signal.
5	TRIG SW(9)	① Selects A trigger signal of CH1, CH2, CH3, CH4 and outputs to A TRIG AMP as single end signal. ② Selects B trigger signal of CH1, CH2, CH3, CH4 and outputs to B TRIG AMP as single end signal. ③ Outputs the CH1 trigger signal as X signal of X-Y after gain adjustment and differential to single ended signal conversion. ④ Outputs the CH2 trigger signal as CH2 OUT signal after offset adjustment and differential to single ended signal conversion. ⑤ Outputs the monitor signal for TV signal clamp.
6	TRIG AMP(10)	① Adds trigger level to trigger signal, then compares and outputs in ECL level. ② Selects trigger coupling (DC, AC, HF-REJ, LF-REJ). ③ Selects trigger slope. ④ Selects LINE trigger. ⑤ Trigger picks off for TV trigger.

No.	Block name	Summary of block functions
7	SWEEP GEN(11)	① Converts the output of TRIG AMP(10) in TTL signal after passing through jitter less circuit. ② Trigger control by trigger logic LSI(TLC IC) CD107BPF. ③ CH1 and CH2 skew control for compensation of displayed delay time.
8	SAWTOOTH BUFF(12)	① Buffers and amplifies a sawtooth signal from A TIMING(13) and output to H & Z SW(15). ② Buffers and amplifies a sawtooth signal from B TIMING(14) and output to H & Z SW(15).
9	A TIMING(13)	① Generates a sweep signal (sawtooth) correspond to A sweep rate. ② Selects capacitor charging current by changing the voltage between timing resistor and selecting the resistor ③ Varies charging current VARIABLE sweep rate.
10	B TIMING(14)	① Generates a sweep signal (sawtooth) correspond to B sweep rate. ② Selects capacitor charging current by changing the voltage between timing resistor and selecting the resistor. ② Adjusts B sweep time.
11	H & Z SW(15)	① Switches sweep signals (A sweep signal, X signal of X-Y). ② Z signal switch.
12	TV SYNC SEPARATOR (16)	① Separates TV sync components from trigger signal, and outputs in TTL level. ② Controls video signal amplitude to a fixed amplitude by AGC.
13	TV CLAMP(17)	① Detects back porch level of TV composite signal by swapping method. ② Generates sample hold pulse timing depends on TV system (HDTV, NTSC, PAL/SECAM).
14	VERT MAIN AMP(20)	① Amplifies output signal of delay cable and Y character signal. ② Controls gain for BEAM FIND. ③ Adjusts ADD balance. ④ Switches real/character output. ⑤ Outputs V OUT signal for vertical axis calibration.
15	H AMP(24)	① Switches sweep/character. ② Reduces bias current of the amplifier to limit dynamic range for BEAM FIND. ③ Controls H POSITION. ④ Controls MAG. ⑤ Adjusts MAG center.
16	H OUT AMP(25)	① Amplifies sweep signal and outputs to CRT. ② Outputs H CAL SIG for sweep time calibration.
17	Z AMP(26)	① Switches A or B INTEN and READOUT INTEN. ② Generates adequate focus voltage of A and B sweep. ③ Adds Z AXIS INPUT signal to unblanking signal.
18	HV CIRCUIT(27)	① Generates high voltage to CRT from unregulated +50V DC. ② Adjusts INTEN voltage. ③ Adjusts FOCUS voltage.
19	HV OUTPUT(28)	① This is CRT socket circuit.

No.	Block name	Summary of block functions
20	CPU(30)	① Controls power ON/OFF according to state of power supply and power SW. ② Stores adjustment data in EEPROM. ③ Controls DC voltage generation. ④ Controls PANEL BOARD. ⑤ Controls KEY BOARD. ⑥ Controls ANALOG BOARD. ⑦ Controls character display.
21	PANEL(35)	① Scans key matrix. ② Drives LEDs. ③ Scans volume. ④ CAL out.
22	KEY BOARD(36)	① Front panel key switches and LEDs.
23	POWER SUPPLY(37)	① Generates +5V, +12V, +50V, +100V, -5V, -12V, unregulated +50V, +15V, +5V for CPU from AC power supply.
24	PROBE POWER	① Supplies DC power for FET probes.
25	CALIBRATOR I/F	① Interfaces to the adjustment jig IE-1066.

Memo

Circuit Description

Contents

Overview

This scope is configured as normal analog oscilloscope.

This section describes the signal flows in their vertical axis, synchronizing and horizontal axis systems, and the high/low voltage power supplied to them and their control unit with CPU.

For information on circuit diagrams numbers, printed circuit boards and major signal flows, refer to Fig. 4 in the Service Manual.

The circuit blocks on the PCBs are marked off by silk-screen printing.

The circuit block numbers printed on the boards refer to the circuit diagram numbers.

In the oscilloscope circuit diagrams, the first part of a circuit code indicates the block number and the latter half the individual circuit code.

For example, 6IC5 indicates IC5 in Channel SW & DL Driver [6] of the circuit block.

Unless otherwise stated in the manual, a circuit code such as Q1 represents the relevant circuit block described in that part.

Chapter 1 Vertical input circuits

1-1 CH1 and CH2 attenuators

CH1ATTUNIT [2]

Since the CH2 attenuator has the same circuit configuration as the CH1 attenuator, only CH1 will be described.

(Configuration)

This circuit consists of a printed circuit board incorporated into a shield case and is mounted as the ANA MAIN PCB. The input is directly connected to a BNC connector and the output to a preamplifier IC.

This section is composed of an input coupled selective circuit, 1/10 and 1/100 attenuators, a buffer amplifier and a low-impedance attenuator.

(Input coupled circuit)

- Relay RL1 switches AC and DC.
  In AC coupling, the input signal goes through capacitor C15 to enter the 1/10 and 1/100 attenuators.
  Relay RL2 switches the input impedance and when RL2A is connected between #3 and #4, the input is 50 Ω .
  When the impedance is 50 Ω , relay RL1 is only DC-coupled.
- The signal detected over voltages in a 50 Ω is outputted to the outside of the attenuator via R171.
- GND coupling is made by its low impedance attenuator.
  The probe SENSE signal to read the attenuation ratio of the connected probe is outputted from the sensor of BNC input connector to 18IC17 via R46 to R48 .

(High impedance attenuator)

- The high-impedance attenuator sets x1/10 and x1/100 attenuator.
  In the 100 mV/div to 500 mV/div range, RL3 is connected between #8 and #7, and #3 and #4 and attenuats the input signal to 1/10.
  In the 1 V/div to 5 V/div range, RL4 is connected between #8 and #7, and #3 and #4 while RL3 is kept connected as above, so that the 1/100 attenuator becomes effective.

VOLTS/DIV	RL3	RL4
2mV/div to 50mV/div	OFF	OFF
100mv/div to 500mv/div	ON	OFF
1 V/div to 5 V/div	ON	ON

(Buffer)

- The buffer amplifier is an amplifier with a gain of approximately 1 located between the high-impedance attenuator and the low-impedance attenuator. It is a combined amplifier of a high frequency buffer amplifier composed of a Q4 FET follower and a Q5/Q6 emitter follower and of a low frequency amplifier using an OP amplifier IC1.
  The high-frequency signals are applied to Q4 via capacitor C14 while the low frequency signals are attenuated to 1/5 by R9 to R13 before being amplified about 5 times by the OP amplifier IC1.
  DC voltage is applied to the reverse input side of OP amplifier IC1 under the control from the CPU, allowing the input offset to be variable.

(Low-impedance attenuator)

- The low-impedance attenuator sets x1, 1/2, x1/5.
- The low impedance attenuator is switched using the Q1, Q2 and Q3 FET switches.
  The attenuator is set to GND by turning the Q1 to Q3 switches to OFF and the Q10 switch to ON. The 2 mV/div, 5 mV/div settings are performed by the preamplifier.
  The 2 mV/div, 5 mV/div settings are performed by the preamplifier.
- The output of the low impedance attenuator is connected to the input of the preamplifier 4IC1.
  The DC balanced voltage to the preamplifier is applied to the preamplifier via the attenuator unit.

1-2 CH1 and CH2 preamplifiers

CH1 ATT&PREAMP [4] CH2 ATT&PREAMP [5]

Since the CH2 preamplifier has the same circuit configuration as the CH1 preamplifier, only CH1 will be described.

(Configuration)

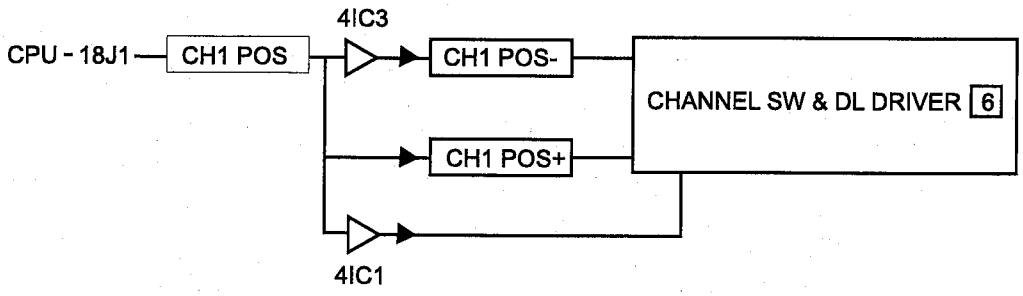
- The preamplifier consists of a preamplifier module and its control circuit, of an attenuator unit control circuit and of a 50 Ω over voltage detection circuit. It amplifies the output signal from the attenuator unit and inputs it to the CH switch. It also outputs a trigger signal.

(Preamplifier IC1)

- The output signal from the low impedance attenuator is amplified by a hybrid module 4IC1/5IC1.
  Preamplifier IC is a bipolar monolithic IC in 1.5 GHz bandwidth on a ceramic PCB.
  This preamplifier IC amplifies the output signal from the attenuator unit.
  This IC, having a gain switching function, can switch the differential gain from x5 (for 10 mV/div through range), x10 (for 5 mV range), x25 (for 2 mV/div) and to x50 (not used for this oscilloscope).
  Controls a variable gain from x1 to x1/2.5 times.
  Provides a position adjustment function to obtain a differential output voltage offset of ± 300mV.

(Preamplifier IC control circuit)

- Controls the x5, x10 and x25 gain by CH1 GAIN1 and CH2 GAIN2 signals from 18IC4.
  Vertical position control is performed by CH1 POS/CH2 POS signal from 18J1 (CPU).
  Outputs IC1 and CHANNEL SW & DL DRIVER [6]
  OP amplifier IC3 A inverts CH1 POS/CH2 POS.
  OP amplifier IC3 B controls voltage of the position and the pedestal clamping.



(Attenuator control circuit)

- The relay of the high impedance attenuator is switched by +12V with transistors Q1 to Q4.
  The FET switch in the low impedance attenuator is switched by -12V with transistors Q5 to Q8 to obtain the attenuator relay driving voltage.
- The DC offset voltage of CH1 and CH2 is controlled through CMOS analog switch IC6 by applying ± 4V DC voltage to it via the OP amplifier IC2A as a buffer.
- When the FET probe is used to add offset voltage, the above mentioned IC6 must be connected to ground to set to zero the offset voltage.
- A signal (CH1/CH2 OVER) detected input over voltage at 50 Ω is applied to the control unit 18IC17 after its level is converted and limited by the OP amplifier IC4.

1-3 CH3 and CH4 preamplifiers

CH3 ATT&PREAMP [7] CH4 ATT&PREAMP [8]

Since the CH3 preamplifier has the same circuit configuration as the CH4 preamplifier, only CH3 will be described.

(Input coupling circuits and low impedance attenuator)

- Relay RL1 switches AC and DC coupling.
  The input buffer amplifier is a combined whose high frequency path is composed of a Q1 source follower and a Q2 emitter follower and the low frequency path consists of an OP amplifier IC1.
- The low impedance attenuator consists of a FET Q6 and Q7 that attenuate the input signal to x1 and x1/5.
  The FET is switched to ON or OFF by the Q9 and Q10 transistor switches.

(Preamplifier)

- The preamplifier consists of a vertical signal amplifier based on an IC2 transistor array and of an IC3 for triggering.
  Q12 controls vertical position and transistor array Q11 and IC2 adjusts vertical gain.

1-4 CH switch and delay line drivers

CHSW&DL Driver [6]

- This circuit are preamplifiers in CH1 to CH4 and switches and IC3 drivers delay line.
  The step waveform response is mainly adjusted by this circuit block.

(CH switch)

- This channel selection circuit uses the differential output signals of CH1 to CH4 preamplifier to turn on and off each of the D1A/B to D4A/B diodes.
  Transistor arrays IC4 and IC5(differential amplifier current source) controls the vertical positions of CH1 and CH2.

(CH2 polarity)

The polarity switches #7 and #8 of the transistor array IC5 by CH2 INV.

(CH1, CH2 ADD)

In ADD mode, CH1 and CH2 are turned to ON, the Q17 transistor turns to OFF.

(Trace separation circuit)

- To separate vertical position of the trace B from trace A by suppling the current from Q24 current source to the output side of Q14.
  When this trace separation is not used, Q25 is turned to ON to stop the current supply.

(Delay line drive amplifier)

- This amplifier is a transistor array IC3 cascade amplifier to drive the delay line via the bandwidth control circuit described later.
- A high frequency peaking element between the emitters of the differential amplifier adjusts the waveform.
  The variable capacity diodes D13 and D14 and thermistor R153 is thermal compensation.
- A matching circuit consisting of an RLC is inserted at the sending end of the delay line.

(Bandwidth limiting circuit)

- Each differential output from the delay line amplifier obtains a bandwidth limit of 20 MHz by configuring C36 and R48 or C37 and R49 RC into filter and grounding them.
  Similarly, a 100 MHz bandwidth limit is obtained using C38 and R46 or C39 and R47.

1-5 Vertical axis main amplifier

V MAIN AMP [20]

- Amplifies the input waveform signals and read-out data such as character cursors.
  The signals from the delay line are amplified by the hybrid module IC5 and inputting them to the CRT Y axis. The signals go through the CRT deflection plate are terminated at 150 Ω by the resistors R44 and R45 on the ceramic circuit board.
- The character amplifier converts the DA converter single end output signal from the CPU character generator into differential signals while the waveforms input to IC5 and the character signals are switched inside IC5.
- Vertical axis calibration signals are extracted differentially from IC5 and converted to single end signals by IC3 before going out.
  In the beam find operation mode, the gain of IC5 is controlled to reduce only the vertical signal waveform.

1-6 XY modes and CH2 signal output

TRIG SW [9]

(XY mode circuit)

- The X axis signal is extracted from R63 and R64 of the CH1 differential input of the trigger switch and converted to single end signal by the Q29 to Q33 amplifiers.
  The gain obtained by these amplifiers are adjusted by varying the base voltage of Q32B and Q33A.

(CH2 OUT circuit)

CH2 OUT signal from trigger switch Q7 is applied to the Q35 emitter follower for high frequency signal and the OP amplifier IC6A for low frequency signal. IC6A is adjustable the output offset level.

CH 2 OUT signal is outputted to the BNC terminal on the rear panel via the Q37 and Q38 emitter followers.

Chapter 2 Triggering circuits

2-1 Trigger switch circuit

TRIG SW [9]

- This circuit selects trigger signals from the CH1 to CH4.
  The A and B trigger signals are extracted as a single end output.
  After CH1 and CH2 have been amplified by the transistor array IC1 and IC2, they are outputted via the common base amplifier (Q1,Q2) and emitter follower (Q5,Q6).
  Since this amplifier uses single end outputs, the OP amplifier (IC3A/B) is used from the midpoint of the output to feed it back, thus reducing a drift in it.
- The A trigger is used reverse differential output while the B trigger is used non-reverse output.
  Non-reverse output is also used for the pedestal clamp signal and CH2 output signals.
  CH3 and CH4 are also common base and emitter follower amplifiers.
  The A and B trigger is select CH1 to CH4 by using FET switches (Q21 to Q24/Q25 to Q28).

2-2 Trigger amplifier circuit

TRIG AMP [10]

- Receives the signals from the trigger switch and sets A and B trigger coupling and polarity and level.
  The A and B trigger amplifiers have basically the same configuration, so only the A trigger amplifier is described below.
  The high frequency component goes through the Q1 emitter follower and C10 and is then combined with the output from OP amplifier IC2A of the low frequency component having a superimposed trigger level set voltage.
  The signals separated into low frequency component is selected by the switch IC3 into AC/DC, LF-REJ and LINE trigger signal from the power supply unit.
- HF-REJ control signal turns Q2 to ON and the above mentioned Q1 emitter follower turns to OFF, select only the low frequency signal.
  The output of the trigger polarity is reversed by the transistor IC1.
- A hysteresis is given to the trigger amplifier output by feeding back the ECL differential buffer output to the input.
- Except for the line trigger input, the B trigger amplifier system is identical to the A trigger amplifier system.
- The signals to the TV trigger circuit are applied to the Q101 emitter follower in the B trigger amplifier input section.

2-3 TV trigger circuit

TV SYNC SEPARATOR [15]

- Separates the TV synchronization components to stabilize the amplitude of the video signal in the AGC circuit.
  The TV fields are separated by an LSI in the sweep generator (see below).
  The TV trigger signal from the B trigger is inputted to video amplifier IC1 via the Q1 emitter follower and capacitor C5.
  The IC1 signal is applied to the analog switch IC2 used for polarity selection.
  The OP amplifier IC3 uses this output signal to control the resistance of FET Q8 connected in parallel with resistor R8 at the gain adjustment terminals of the video amplifier. Thus it operates as an ACG amplifier.
  The output signal of the ACG amplifier is outputted by the comparator IC4 to the sweep generator and TV clamp circuit as a TTL level.

2-4 Pedestal clamp circuit

CH1/CH2 TV CLMP [17]

- Selects CH1 or CH2 from the trigger switch circuit to detect the back porch level in the composite video signal. This level is used to control the preamplifier position of CH1 and CH2 to maintain a fixed vertical position on the oscilloscope.
- The CH of the input signal is selected by the FET switch of Q31/Q32.
  The pedestal level of the signal amplified by the IC1 is sampled/held (S/H) by IC2.
  The signal sampled/held in this way is adjusted in gain and level by IC3 and IC4 and supplied from the analog switch IC6 to the position of the preamplifier (CH1/CH2 CLAMP POS).
- IC41 to IC45 detect the pedestal level and generate a S/H pulse.

Chapter 3 Horizontal and Z-axis circuits

3-1 Sweep control

Sweep Generator [11]

- This circuit consists of a circuit that starts the sweep after receiving the trigger signal and a delay sweep pick off circuit.
- The trigger system and sweep time are controlled as a whole by IC1, a TLC (Trigger-Logic-Control) LSI (TLC). The TLC requires almost no external circuits in a 100 MHz class oscilloscope, however, to enable the A and B triggers in this oscilloscope to cope with 480 MHz and 250 MHz signals respectively, a high-speed ECL trigger F/F (flip-flop) IC has been added to it externally.
- The A trigger is applied to the IC3A and 3 B F/F jitter-less circuit and converted to an ECL-TTL level before being inputted to the TLC.
  The B trigger is converted to a TTL level in the IC7A F/F circuit before being inputted to the TLC.
  The TLC generates A GATE and B GATE signals from these signals and outputs them to sawtooth wave generator circuit.
  The TLCIC1 controls setting the charge time of the timing generation circuit.

(Delay sweep pick off)

- The transistor array Q61 compares the sawtooth wave (as described below) and the delay time setting DC voltage in the OP amplifier IC10A and generates the delay sweep. This signal is inputted to TLCIC1 at TTL level.

3-2 Sawtooth wave generator circuit

A SAWTOOTH BUFF [12]

- Since the A and B units have the same configuration, only the A unit will be described.
- The A GATE signal from TLC turns Q6 to ON and Q3 to OFF, starts the charging on the A timing circuit side.
- This voltage goes through FET Q10, PNP Q9 and NPN Q11 buffer amplifiers to be outputted as a sawtooth wave A.
- When no sweep duration is made, Q3 is turned to ON while the voltage (Q3 collector) is clamped by R7, D8 and D9, preventing the fluctuation of reference level.
- The sweep end signal is made by compositing the DC voltage of the sweep length setting and the output of Q13 emitter follower is applied to TLC via the inverter IC1D.

3-3 Timing circuit

A Timing [13] B Timing [14]

- Except for the lack of the relevant low speed sweep time constant, the B timing is same to A. So, only the A timing is described below.
  By settings made from TLC, Q36 to Q39 are switched to be set the voltage by the OP amplifier IC2B, thus setting the current value of the current source composed of R41 to R45, OP amplifier IC1B and Q50.
  The timing capacitors C42 and C43 are also set by TLC. (For information on CR combinations, see circuit drawing [13] and [14])
- The time settings in step 1-2-5 are made by switching R11 to R13.
  The sweep time variable is set by changing the DC voltage of the OP amplifier IC1A output.

(CAL is used to set the voltage to +5 V)

- A 0.3 V to 11.5 V sawtooth wave is generated by the timing circuit and applied to the buffer (12Q10).

3-4 Horizontal axis mode switching

H&ZSW [15]

- Selects the horizontal axis signal lines and switches the unblanking component of the Z-axis signal. This switching is performed by a diode switch and TLC (11IC1 Trigger logic controller) controls the switching sequence.
- The horizontal signals make a switching among A sawtooth ramp signal, B sweep ramp signal and XY signal. The Z-axis makes a switching between the A/B unblanking mode and the XY mode.

3-5 Horizontal amplifier

HAMP [24] HOUTAMP [25]

(H amplifier)

- This amplifier converts the single-end sweep ramp signal into differential signal and switches the character XY axis signal.
- The gain of the amplifiers, which consist of Q8/Q18 and Q9/Q19, is switched to perform the beam find and the sweep magnification.
  MAG CENTER control signal from Q51 adjusts the balance of the current source Q9 and Q19.
- After the waveform signal has been processed as above, the character X-axis signal is inputted at the collectors of Q65/66 and converted into differential signal.

(H output amplifier)

- Each of the differential signal of the Horizontal amplifier is applied to the +/- X-axis CRT signal input pin. The horizontal axis output signal is converted from differential signal to single end signal by the OP amplifier IC1.
- Its level is held as the calibration signal for horizontal deflection by the sample holding IC2.

3-6 Z-axis amplifier

ZAMP [26]

- This circuit controls the CRT beam intensity along the Z-axis and supplies the output signal to the CRT and the high-voltage power supply. It also controls the focus.
- This amplifier receives and amplifies the waveform Z axis signal and the external brightness modulation signal by the Q23 common base.
  The adjusting DC voltage of A/B brightness is inputted to the Q23 emitter.
- The readout brightness adjusting DC voltage is inputted to the Q24 common base.
- The Z OUT is outputted via the Q42 to Q50 feed back amplifiers and the Q51 and Q52 NPN/PNP emitter followers.

Chapter 4 Power supply circuit

Power Supply 37

(Overview)

- A switching power supply is used as the low voltage power supply. Since the power consumption of this oscilloscope is about is 100 Ω , a power factor improving circuit is used as measures against power supply harmonic waves.
- The input AC voltage is in a continuous range of 90 V to 250 V. The power switch does not directly turn to ON or OFF the AC main switch.
- When the power cord is connected with it and the AC power supply is turned to ON, its auxiliary power supply section starts operating to set it in standby mode, putting the CPU in it into operation.
- When the power supply button on the front panel is turned to ON, the main power supply is put into operation while the power is supplied to the entire system.

(AC power supply input and rectifier circuit)

- The power is supplied through a filter composed of inductors L1 to L4 and capacitors.
  The photocoupler IC1 extracts the line trigger.
  The power thermistor TH1 is used to prevent a rush current from entering it.
  The input AC voltage is rectified by diode bridge D1 and applied to the power-factor improving circuit.

(Power-factor improving circuit)

- An active smoothing filter method is used to improve the power factor by a booster chopper composed of choke coil L5, switching MOSFET Q1 and rectifier diode D2.
  Switches the AC voltage bridge-rectified by the controlling circuit HIC1 so that the input current may be in sine wave form at about 100 kHz, rectifying and pre-regulating the voltage.
  Regulates the output voltage about at 380V DC irrespective of the input AC voltage.
  The power required to operate this power-factor improving circuit is supplied by an auto-exciting converter composed of the transformer T1 and MOSFET Q2.

(Auxiliary power supply) CPU 5V

When the power-factor improving circuit outputs the voltage, an auto-exciting auxiliary power supply of transformer T2 and transistor Q4 starts operating.

This causes the regulator IC4 on the secondary side of T2 to output +5 V and sets the CPU circuit into standby mode.

When the power switch on the front panel is turned to ON, the main power supply starts operating via photocoupler IC2.

(Main power supply circuit)

- This circuit is a separately excited DC-DC converter consisting of transformer T3 and MOSFET Q6.
  This circuit is controlled by IC3, a dedicated control IC.
  The switching frequency for this circuit is approximately 130 kHz. An over current is detected by R40. IC3 turns off the main power supply when it detects the divided voltage at R25 and R24.
- The secondary output voltages of +100 V, +50 V, ± 12V and ± 5V are outputted by regulators in series.
- A MOSFET regulator with a low drop voltage is used for the ± 12 V regulator consuming much current.
- The UN +50 V (high voltage power supply) and the fan motor power supply are outputted without series regulators.

Chapter 5 High voltage circuit

HV Circuit 27

- Supplies the CRT cathode voltage with a power at -2370 V and the post-acceleration anode with a power at +16.8 V.

(High voltage oscillation circuit)

- This is a tuned oscillation circuit consisting of transistor Q1 and transformer T1 at an oscillation frequency of about 35 kHz.
  A DC voltage of approximately 55 V (UN + 50 V) from the low voltage power supply section is supplied to the primary coil of T1 and is connected to the Q1 collector via the coil wires #10 to #9 (number of turns : 10).
- The primary coil wire #11 to #12 (number of turns : 1) is connected with the Q1 base.
  The terminal #11 is connected with the output signal fed back by the OP amplifier IC1B after the cathode DC voltage rectified by the secondary side diode D21 has been divided by resistor 16 (15 M Ω) and R13 to R15.

(Heater)

- The CRT heater voltage is supplied by superimposing the approximately 6 V AC voltage from the secondary coil #1 to #2 terminals of T1 onto the cathode voltage via the resistor R24.
  The resistor R25 is a variable resistor to adjust the heater voltage.

(Anode voltage)

- The AC voltage from the secondary #6 terminal of transformer T1 is amplified six-fold by a high voltage rectifying block U1 to supply the CRT anode with a power of 16.8 kV.

Chapter 6 System control

6-1 CPU

CPU BOARD 30 -1/5

- IC5 is a one-chip CPU incorporating a one-time programmable ROM.
- A power of +5V is supplied to IC5 while this oscilloscope is in standby mode of power supply.
- While the power supplying cord is pulled out, a backup power from a lithium battery BT1 is supplied to IC5 through a switching circuit composed of Q1, Q2 and D1.
- The backup power is supplied to IC5 and to a static RAM with an external bus at 8 x 32 bit in CDP (described later).
- This RAM receives maximum 256 items of panel setting data and character related data.
- IC1 is an EEPROM receiving the adjustment data for each analog part. The data are saved onto the EEPROM at the end of an adjustment mode.
- The control data are transferred from the serial port of IC5 to each analog part.
- D/A conversion data are outputted at 16 bit by adding an IC6 register having a 8 bit parallel port to the DC voltage generating part used for analog voltage setting.

6-2 Character display control

CPU BOARD 30 -2/5

- Operation of CDPIC10
  - It is a character display control (CDP) IC used for an analog oscilloscope.
  - It has a 12 bit parallel output port for D/A conversion on each of X/Y axis.
  - It controls the timing of the unblanking signals to display characters.
  - The setting data are given to it from CPU in serial mode.
  - The serial data from CPU are converted into parallel ones by this IC having an external bus connected with a 8 x 32 RAM.
- On X-axis, the output current from D/A converter IC7 is converted into output voltage by OP amplifier IC11A before being outputted to a horizontal axis amplifier. On Y-axis, same as X-axis, the converted signal is applied to a vertical amplifier through IC8 and IC11B.

6-3 Control DC voltage generator (CPU BOARD)

CPU BOARD 30 -3/5

- A 16 bit D/A converter IC20 sets the Items of analog part controlling DC voltage adjustment (vertical axis positions of CH1 to CH4, CH1/CH2 offsetting voltage, delayed sweep time setting voltage, horizontal position) for which a high resolution is required.
- The output from the D/A converter IC20 is converted into voltage by an OP amplifier IC14A. It is switched by an analog switch IC26 to retain the voltage required for each of C45 to C53 and buffered by an OP amplifier IC15 to IC18 before being outputted.

6-4 Analog control (ANALOG MAIN BOARD)

CONTROL [18]

- The data from CPU sets and generates the DC voltage required for each analog part.

(Control DC voltage generating part)

- The control serial data from CPU are decoded by IC14 and converted from D/A by IC11/IC12 (12 bit) to output A/B trigger level, A VARIABLE, CH1/CH2 VARAIBLE and DC balance.
- The 12 output type D/A converter with serial data input, IC9/IC10 (8 bit), is outputted adjustment voltages for SK EW and A/B sweep length.

(Setting of each part and detection of its status)

- The control serial data from CPU are decoded by IC14/IC15 and converted from serial into parallel by IC1 to IC8.
- An analog switch IC16/IC17 select the channel of the probe sense and detect the channel of an overvoltage at 50 Ω internal termination the calibration signal.

6-5 Panel circuit

PANEL1 [35]

- Sets and detects the switches and volumes on the front panel.
- IC1 decodes the signals KEYSND 0 to 2 from CPU, detects the output from pulse switches S1 to S4 (KEYRCV0 to 7).
- Analog switch IC3 decodes the signals KEYSND 0 to 2 from CPU, selects the voltage of volumes VR1 to VR6 and buffered by an OP amplifier IC2B before being outputted.

6-6 Keyboard matrix and LED

KEYBOARD [36]

- The key switches on the front panel are composed of 8 x 6 matrixes.
- The KEYSND0 to 2 signals from CPU are decoded by 35IC1 on the panel board to generate the key matrix signals (KMTRX0 to 5).
- By entering these signals into the key matrix line, the sense signals (KEYRCV0 to 7) on key line side can be detected when any of the switches S1 to S48 is pressed down.

6-7 LED lighting

PANEL [35] KEYBOARD [36]

- The LEDs TRG'D and TRIGE RADY of the ten LEDs on the front panel are lit by the signal from the trigger. The other eight LEDs are controlled by the serial-parallel decoder of 35IC4.

Memo

Section 5 Electrical Parts List

Table of Contents

Memo

* When you order the Parts, use this form.

CHECK BOX ☐ **INQUIRY** (for REPAIR PARTS)
☐ **ORDER**

No. _____

DATE:

from

Organization

Address

TEL FAX

to

Address

TEL FAX

No.	MODEL NAME	(SERIAL No.)	CIRCUIT REF	IWATSU PART No.	NAME & DESCRIPTION	QUANTITY		TOTAL
						URGENT	STOCK	
Ex	S S - 5 7 1 1	1 2 5 6 8 9 9 9	1Q11	D T R 2 5 0 0 1 1	F E T , 2 N 5 9 1 2 – 1	2	18	20
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Section 5 Electrical Parts List

Ordering Information

Replacement parts may be ordered through an LeCroy representative or directly from the factory. To be certain of receiving the proper parts, a ways include the following information with the order :

a. Model Number and serial number of the instrument on the which the parts will be installed.
b. Circuit reference number and subassembly name, if applicable, for which the part is intended. If the part does not have a circuit reference, the description from the parts list should be used.
c. Part number.

For factory repair, contact the LeCroy agent and include the following information.

a. Model number and serial number of the instrument on which the work is to be performed.
b. Details concerning the nature of the malfunction, or type of repair desired.
Shipping instructions will be sent to you promptly.

How to Use This Parts List

The parts list is divided into subsections corresponding to the schematic diagrams. Component locations can be determined from the schematic diagrams, each component appears only once in the parts list. At the beginning of each subsection are listed part number of any complete subassemblies in that category that are available replacement parts. These subassemblies may include individually-listed components ; care should be taken to pin point malfunctions to the exact replacement parts actually needed and thus avoid the time and cost involved in "over-repair".

PRINTED CIRCUIT BOARD FOR REPAIR

CIRCUIT NAME	PART NO.
LA314 ATT BOARD	21302-3550
LA314 ANA MAIN BOARD	21302-3551
LA314 V MAIN BOARD	21302-3552
LA314 HZ BOARD	21302-3553
LA314 CRT BOARD	21302-3554
LA314 CPU BOARD	21302-3555
LA314 PANEL BOARD	21302-3556
LA314 KEY BOARD	21302-3557
LA314 POWER BOARD UL	21302-3558
LA314 HV BOARD	21302-3531

OVER ALL [1]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
1C1	DCC139501	CK45F 1H 103ZYR TC04N
1C2	DCF121761	MF-3S 1H 223J TC04N
1CN1	DTA010871	TERMINAL CAL
1DL1	KHB185111	CD-4A ASSY 1.4M UL-I
1FFC1	AHB201411	FFC-26P-L125-P1.25
1FFC2	AHB201611	FFC-26P-L250-P1.25
1FFC3,1FFC4	AHB201311	FFC-22P-L040-P1.25
1FFC5	AHB201511	FFC-26P-L200-P1.25
1J1 to 1J7	KSN040711	SIDE PIN JACK
1J10 to 1J13	DCN034601	CONNECTOR M36M87-02
1J20,1J21	DCN040801	BNC RECEPTACLE (WITH SMALL PIN JACK)
1J22,1J23	DCN010751	CONNECTOR HR10A-7R-6SB
1L1	DCL140502	ROTATION COIL FS-44778 UL-I
1L2	DCL140432	ORTHOGONALITY COIL FS-44775 UL-I
1R1	DRD147641	PSS1/2S 1.0KΩJ TA21N
1V1	DET016221	CRT S-8501
1W1	KHB184231	ANAMAIN-POWER CABLE UL-I
1W2	KHB184021	CPU-EXT I/F CABLE UL-I
1W3	KHB184131	CPU-POWER CABLE UL-I
1W4	KHB184421	HV-POWER CABLE UL-I
1W5	KHB184521	HZ-POWER CABLE UL-I
1W6	KHB184721	HV-CRT CABLE UL-I
1W8	KHB184921	HZ-CRT CABLE UL-I
1W9	KHB184621	VMAIN-CPU CABLE UL-I
1W10	AHB100911	COAXIAL CABLE 75HH-0350-6
1W12	KHB184321	ANAMAIN-PROBE POWER UL-I
1W20	AHB101111	COAXIAL CABLE 50HH-0550-8
1W21	AHB101011	COAXIAL CABLE 75HH-0250-6
	DLP016093	ILUMI LAMP BQ064-22012B-ST UL-I
	DMT121211	MOTOR MMF-09B 120DM-R

CH1 ATT UNIT [2]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
2C1	DCC816491	C2012CH 1H 100D A TD84N
2C2	DCC816401	C2012CH 1H 030C A TD84N
2C4 to 2C9	DCC810511	C2012F 1H 103Z A TD84N
2C5	DCC810571	C2012F 1E 104Z A TD84N
2C10	DCC850061	GRM42-6CH 470J500PT TE0804N
2C11,2C12	DCC810511	C2012F 1H 103Z A TD84N
2C13	DCC816541	C2012CH 1H 330J A TD84N
2C14	DCC850011	GRM42-6 W5R 222K500 TE0804N
2C15	DCC850041	GHM1535B 223K630 TE0804N
2C16 to 2C19	DCC810511	C2012F 1H 103Z A TD84N
2C20	DCC816541	C2012CH 1H 330J A TD84N
2C23	DCC816381	C2012CH 1H 020C A TD84N
2C24 to 2C26	DCC810571	C2012F 1E 104Z A TD84N
2C27	DCC811731	C1608B 1H 102K A TD0804N
2C28 to 2C30	DCC810511	C2012F 1H 103Z A TD84N
2C32	DCC817621	C1608CH 1H 010C A TD0804N
2C33	DCC816401	C2012CH 1H 030C A TD84N
2C34	DCC817651	C1608CH 1H 030C A TD0804N
2C35 to 2C37	DCV019612	ECV-1ZW 06X53T
2C40 to 2C43	DCC810511	C2012F 1H 103Z A TD84N
2C44	DCC816571	C2012CH 1H 560J A TD84N
2C50	DCC816381	C2012CH 1H 020C A TD84N
2C52,2C53	DCC816471	C2012CH 1H 080D A TD84N
2C54	DCC816401	C2012CH 1H 030C A TD84N
2C55	DCC817621	C1608CH 1H 010C A TD0804N
2C56	DCC816381	C2012CH 1H 020C A TD84N
2C62	DCC816401	C2012CH 1H 030C A TD84N
2C63	DCC816361	C2012CH 1H 010C A TD84N
2D1	DDD810241	1SS 272 TE0804R
2D2,2D3	DDD810461	HSM 124S-JTL TE0804L
2D4	DDD810261	HSM 88AS TL
2D5	DDD830121	RD6.8M-T1B B
2D6 to 2D8	DDD810241	1SS 272 TE0804R
2D9,2D10	DDD830041	RD3.3M-T1B B
2IC1	DIC614741	LT 1097CN8 (LINEAR TEC.)
2J1	DCN040991	BNC 315 UL-I
2J2	DCN124401	MDF7-16D-2.54DSA(59)
2L1 to 2L10	DCL810651	BLM11A221SPT TD0804N
2L11	DCL810831	HK1608 18NJ-T TD0804N
2L12	DCL810651	BLM11A221S TD0804N
2Q1 to 2Q3	DTR860191	2SK 2113YY-TL TE0804F
2Q4	DTR860161	2SK 508 K51 TE0804L
2Q5 to 2Q7	DTR830521	2SC 3583-T1B TE0804L
2Q8,2Q9	DTR810041	2SA 1162Y TE85L
2Q10	DTR860191	2SK 2113YY-TL TE0804F

CH1 ATT UNIT [2]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
2Q11	DTR838661	2SC 2712LG TE85L
2R1	DRZ850641	RGC1/10C 110KΩD TD0804N
2R2,2R3	DRZ850601	RGC1/10C 240KΩD TD0804N
2R4,2R5	DRZ850591	RGC1/10C 200KΩD TD0804N
2R6	DRZ850621	RGC1/10C 470KΩD TD0804N
2R7	DRZ850611	RGC1/10C 430KΩD TD0804N
2R8	DRZ850641	RGC1/10C 110KΩD TD0804N
2R9 to 2R13	DRZ850591	RGC1/10C 200KΩD TD0804N
2R14	DRZ832221	RK73H 2A 750ΩF TD0804N
2R15	DRZ832251	RK73H 2A 1.0KΩF TD0804N
2R16	DRZ832051	RK73H 2A 150ΩF TD0804N
2R17	DRZ832221	RK73H 2A 750ΩF TD0804N
2R18	DRZ832081	RK73H 2A 200ΩF TD0804N
2R19	DRZ820971	RN73G 2A 20ΩD TD0804N
2R20,2R21	DRZ832251	RK73H 2A 1.0KΩF TD0804N
2R20A1	DRZ831431	MCR10J 335E TD0804N
2R22	DRZ820971	RN73G 2A 20ΩD TD0804N
2R23 to 2R25	DRZ832121	RK73H 2A 300ΩF TD0804N
2R26	DRZ832491	RK73H 2A 10KΩF TD0804N
2R27	DRZ832251	RK73H 2A 1.0KΩF TD0804N
2R28	DRZ821731	RK73K 1J 10KΩJ TD0804N
2R29	DRZ832601	RK73H 2A 30KΩF TD0804N
2R30	DRZ821731	RK73K 1J 10KΩJ TD0804N
2R31	DRZ832601	RK73H 2A 30KΩF TD0804N
2R32	DRZ821731	RK73K 1J 10KΩJ TD0804N
2R33	DRZ832601	RK73H 2A 30KΩF TD0804N
2R34	DRZ821181	RK73K 1J 51ΩJ TD0804N
2R35	DRZ833031	RK73H 2A 56ΩF TD0804N
2R36 to 2R45	DRZ820971	RN73G 2A 20ΩD TD0804N
2R46 to 2R48	DRZ832121	RK73H 2A 300ΩF TD0804N
2R49,2R50	DRZ850591	RGC1/10C 200KΩD TD0804N
2R51,2R52	DRZ820041	RN73G 2A 39ΩD TD0804N
2R53	DRZ833071	RK73H 2A 82ΩF TD0804N
2R54	DRZ833031	RK73H 2A 56ΩF TD0804N
2R55	DRZ832441	RK73H 2A 6.2KΩF TD0804N
2R56	DRZ832531	RK73H 2A 15KΩF TD0804N
2R57	DRZ832441	RK73H 2A 6.2KΩF TD0804N
2R58	DRZ832531	RK73H 2A 15KΩF TD0804N
2R59	DRZ832011	RK73H 2A 100ΩF TD0804N
2R60,2R61	DRZ832261	RK73H 2A 1.1KΩF TD0804N
2R62	DRZ832251	RK73H 2A 1.0KΩF TD0804N
2R63	DRZ850591	RGC1/10C 200KΩD TD0804N
2R64	DRZ832051	RK73H 2A 150ΩF TD0804N
2R65	DRZ820041	RN73G 2A 39ΩD TD0804N
2R66	DRZ832071	RK73H 2A 180ΩF TD0804N

CH1 ATT UNIT [2]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
2R67	DRZ850591	RGC1/10C 200KΩD TD0804N
2R71	DRZ832221	RK73H 2A 750ΩF TD0804N
2R72	DRZ833511	RK73H 2A 22ΩF TD0804N
2R73	DRZ833031	RK73H 2A 56ΩF TD0804N
2R74	DRZ833441	RK73H 2A 10ΩF TD0804N
2R75	DRZ831431	MCR10J 335E TD0804N
2R76	DRZ832491	RK73H 2A 10KΩF TD0804N
2R77	DRZ832601	RK73H 2A 30KΩF TD0804N
2R78	DRZ820041	RN73G 2A 39ΩD TD0804N
2R79	DRZ833031	RK73H 2A 56ΩF TD0804N
2R80	DRZ832051	RK73H 2A 150ΩF TD0804N
2R81	DRZ833011	RK73H 2A 47ΩF TD0804N
2R82	DRZ820041	RN73G 2A 39ΩD TD0804N
2R83	DRZ832011	MCR10J 300E TD0804N
2R84	DRZ833501	RK73H 2A 20ΩF TD0804N
2R85,2R86	DRZ821121	RK73K 1J 30ΩJ TD0804N
2R87	DRZ821171	RK73K 1J 47ΩJ TD0804N
2R88	DRZ832171	RK73H 2A 470ΩF TD0804N
2R89	DRZ832601	RK73H 2A 30KΩF TD0804N
2R90	DRZ832201	RK73H 2A 620ΩF TD0804N
2R93	DRZ832251	RK73H 2A 1.0KΩF TD0804N
2R100	DRV810271	G4AT/ST-4TA 20Ω TE1208L
2R101	DRV810221	G4AT/ST-4TA 500Ω TE1208L
2R120	DRZ820971	RN73G 2A 20ΩD TD0804N
2R121	DRZ832081	RK73H 2A 200ΩF TD0804N
2R122	DRZ832331	RK73H 2A 2.2KΩF TD0804N
2R125	DRZ832561	RK73H 2A 20KΩF TD0804N
2R150	DRZ832321	RK73H 2A 2.0KΩF TD0804N
2R151	DRZ832331	RK73H 2A 2.2KΩF TD0804N
2R152	DRZ821361	RK73K 1J 300ΩJ TD0804N
2R155	DRZ850591	RGC1/10C 200KΩD TD0804N
2R156	DRZ832011	RK73H 2A 100ΩF TD0804N
2R160	DRZ832291	RK73H 2A 1.5KΩF TD0804N
2R161	DRZ832471	RK73H 2A 8.2KΩF TD0804N
2R171	DRZ832491	RK73H 2A 10KΩF TD0804N
2RL1 to 2RL4	DKD028361	RELAY A12W-K

CH1 ATT & PREAMP [4]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
4C1 to 4C10	DCC810511	C2012F 1H 103Z A TD84N
4C12,4C13	DCC810511	C2012F 1H 103Z A TD84N
4C14	DCC816801	C2012CH 1H 102J A TD84N
4C15 to 4C19	DCC810511	C2012F 1H 103Z A TD84N
4C20	DCC810571	C2012F 1E 104Z A TD84N
4C21,4C22	DCC810511	C2012F 1H 103Z A TD84N
4C23	DCC816801	C2012CH 1H 102J A TD84N
4C24,4C25	DCC810511	C2012F 1H 103Z A TD84N
4C26 to 4C28	DCC810571	C2012F 1E 104Z A TD84N
4C30	DCC810511	C2012F 1H 103Z A TD84N
4C34 to 4C36	DCC810511	C2012F 1H 103Z A TD84N
4C38	DCC816801	C2012CH 1H 102J A TD84N
4C39	DCC810511	C2012F 1H 103Z A TD84N
4C41,4C42	DCC820021	C2012F 1C 105Z A TD84N
4D1	DDD810241	1SS 272 TE0804R
4D2,4D3	DDD830071	RD4.3M-T1B B
4D4,4D5	DDD810241	1SS 272 TE0804R
4IC1	DIC811131	HIC A120
4IC2,4IC3	DIC619101	OP AMP 4558F TE1208B
4IC4	DIC619191	NJM 082M(TE3) TE1208B
4IC5,4IC6	DIC889161	TC 4W53F(TE12L) TE1208R
4IC7	DIC619101	OP AMP 4558F TE1208B
4J1 to 4J3	DSK045141	IC SOCKET IC26-2010-GS4 UL-I
4P1	DCN124411	MDF7P-16DP-2.54DSA(01)
4Q1 to 4Q8	DTR890791	IMD3 TE0804R
4Q9	DTR890861	IMZ1 TE0804R
4Q10	DTR810231	2SA 1575-TD TE1208L
4R3	DRZ832011	RK73H 2A 100ΩF TD0804N
4R4,4R5	DRZ832491	RK73H 2A 10KΩF TD0804N
4R6	DRZ832421	RK73H 2A 5.1KΩF TD0804N
4R7	DRZ832381	RK73H 2A 3.6KΩF TD0804N
4R8,4R9	DRZ832311	RK73H 2A 1.8KΩF TD0804N
4R10	DRZ832431	RK73H 2A 5.6KΩF TD0804N
4R11,4R12	DRZ832491	RK73H 2A 10KΩF TD0804N
4R14	DRZ832561	RK73H 2A 20KΩF TD0804N
4R14R2	DRZ832491	RK73H 2A 10KΩF TD0804N
4R15	DRZ832491	RK73H 2A 10KΩF TD0804N
4R16	DRZ832421	RK73H 2A 5.1KΩF TD0804N
4R17	DRZ832561	RK73H 2A 20KΩF TD0804N
4R18	DRZ832501	RK73H 2A 11KΩF TD0804N
4R19	DRZ832531	RK73H 2A 15KΩF TD0804N
4R20	DRZ832181	RK73H 2A 510ΩF TD0804N
4R22	DRZ820861	RN73F 2A 100KΩD TD0804N
4R23	DRZ832011	RK73H 2A 100ΩF TD0804N
4R24	DRZ820861	RN73F 2A 100KΩD TD0804N

CH1 ATT & PREAMP [4]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
4R25 to 4R28	DRZ832251	RK73H 2A 1.0KΩF TD0804N
4R29	DRZ832491	RK73H 2A 10KΩF TD0804N
4R30	DRZ832011	RK73H 2A 100ΩF TD0804N
4R31	DRZ832661	RK73H 2A 51KΩF TD0804N
4R32	DRZ820861	RN73F 2A 100KΩD TD0804N
4R33	DRZ850641	RGC1/10C 110KΩD TD0804N
4R34	DRZ820861	RN73F 2A 100KΩD TD0804N
4R35	DRZ850641	RGC1/10C 110KΩD TD0804N
4R36	DRZ820861	RN73F 2A 100KΩD TD0804N
4R37	DRZ850591	RGC1/10C 200KΩD TD0804N
4R38	DRZ832661	RK73H 2A 51KΩF TD0804N
4R39 to 4R44	DRZ832121	RK73H 2A 300ΩF TD0804N
4R45	DRZ832561	RK73H 2A 20KΩF TD0804N
4R46	DRZ832491	RK73H 2A 10KΩF TD0804N
4R47	DRZ832251	RK73H 2A 1.0KΩF TD0804N
4R49	DRZ832491	RK73H 2A 10KΩF TD0804N
4R51 to 4R56	DRZ832191	RK73H 2A 560ΩF TD0804N
4R58	DRZ832561	RK73H 2A 20KΩF TD0804N
4R59	DRZ832311	RK73H 2A 1.8KΩF TD0804N
4R60	DRZ832561	RK73H 2A 20KΩF TD0804N
4R63	DRZ832391	RK73H 2A 3.9KΩF TD0804N
4R64	DRZ832561	RK73H 2A 20KΩF TD0804N
4R65	DRZ832581	RK73H 2A 24KΩF TD0804N
4R66	DRZ832511	RK73H 2A 12KΩF TD0804N

CH2 ATT & PREAMP [5]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
5C1 to 5C9	DCC810511	C2012F 1H 103Z A TD84N
5C10	DCC810511	C2012F 1H 103Z A TD84N
5C12,5C13	DCC810511	C2012F 1H 103Z A TD84N
5C14	DCC816801	C2012CH 1H 102J A TD84N
5C15 to 5C19	DCC810511	C2012F 1H 103Z A TD84N
5C20	DCC810571	C2012F 1E 104Z A TD84N
5C21,5C22	DCC810511	C2012F 1H 103Z A TD84N
5C23	DCC816801	C2012CH 1H 102J A TD84N
5C24,5C25	DCC810511	C2012F 1H 103Z A TD84N
5C26 to 5C28	DCC810571	C2012F 1E 104Z A TD84N
5C30	DCC810511	C2012F 1H 103Z A TD84N
5C34 to 5C36	DCC810511	C2012F 1H 103Z A TD84N
5C38	DCC816801	C2012CH 1H 102J A TD84N
5C39	DCC810511	C2012F 1H 103Z A TD84N
5C41,5C42	DCC820021	C2012F 1C 105Z A TD84N
5D1	DDD810241	1SS 272 TE0804R
5D2,5D3	DDD830071	RD4.3M-T1B B
5D4,5D5	DDD810241	1SS 272 TE0804R
5IC1	DIC811131	HIC A120
5IC2,5IC3	DIC619101	OP AMP 4558F TE1208B
5IC4	DIC619191	NJM 082M(TE3) TE1208L
5IC5,5IC6	DIC889161	TC 4W53F(TE12L) TE1208R
5IC7	DIC619101	OP AMP 4558F TE1208B
5J1 to 5J3	DSK045141	IC SOCKET IC26-2010-GS4 UL-I
5P1	DCN124411	MDF7P-16DP-2.54DSA(01)
5Q1 to 5Q8	DTR890791	IMD3 TE0804R
5Q9	DTR890861	IMZ1 TE0804R
5Q10	DTR810231	2SA 1575-TD TE1208L
5R1,5R2	DRZ832491	RK73H 2A 10KΩF TD0804N
5R3	DRZ832011	RK73H 2A 100ΩF TD0804N
5R4, 5R5	DRZ832491	RK73H 2A 10KΩF TD0804N
5R6	DRZ832421	RK73H 2A 5.1KΩF TD0804N
5R7	DRZ832381	RK73H 2A 3.6KΩF TD0804N
5R8,5R9	DRZ832311	RK73H 2A 1.8KΩF TD0804N
5R10	DRZ832431	RK73H 2A 5.6KΩF TD0804N
5R11,5R12	DRZ832491	RK73H 2A 10KΩF TD0804N
5R14	DRZ832561	RK73H 2A 20KΩF TD0804N
5R15	DRZ832491	RK73H 2A 10KΩF TD0804N
5R16	DRZ832421	RK73H 2A 5.1KΩF TD0804N
5R17	DRZ832561	RK73H 2A 20KΩF TD0804N
5R18	DRZ832501	RK73H 2A 11KΩF TD0804N
5R19	DRZ832531	RK73H 2A 15KΩF TD0804N
5R20	DRZ832181	RK73H 2A 510ΩF TD0804N
5R22	DRZ820861	RN73F 2A 100KΩD TD0804N
5R23	DRZ832011	RK73H 2A 100ΩF TD0804N

CH2 ATT & PREAMP [5]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
5R24	DRZ820861	RN73F 2A 100KΩD TD0804N
5R25 to 5R28	DRZ832251	RK73H 2A 1.0KΩF TD0804N
5R29	DRZ832491	RK73H 2A 10KΩF TD0804N
5R30	DRZ832011	RK73H 2A 100ΩF TD0804N
5R31	DRZ832661	RK73H 2A 51KΩF TD0804N
5R32	DRZ820861	RN73F 2A 100KΩD TD0804N
5R33	DRZ850641	RGC1/10C 110KΩD TD0804N
5R34	DRZ820861	RN73F 2A 100KΩD TD0804N
5R35	DRZ850641	RGC1/10C 110KΩD TD0804N
5R36	DRZ820861	RN73F 2A 100KΩD TD0804N
5R37	DRZ850591	RGC1/10C 200KΩD TD0804N
5R38	DRZ832661	RK73H 2A 51KΩF TD0804N
5R39 to 5R44	DRZ832121	RK73H 2A 300ΩF TD0804N
5R45	DRZ832561	RK73H 2A 20KΩF TD0804N
5R46	DRZ832491	RK73H 2A 10KΩF TD0804N
5R47	DRZ832251	RK73H 2A 1.0KΩF TD0804N
5R49	DRZ832491	RK73H 2A 10KΩF TD0804N
5R51 to 5R56	DRZ832191	RK73H 2A 560ΩF TD0804N
5R58	DRZ832561	RK73H 2A 20KΩF TD0804N
5R59	DRZ832311	RK73H 2A 1.8KΩF TD0804N
5R60	DRZ832561	RK73H 2A 20KΩF TD0804N
5R63	DRZ832391	RK73H 2A 3.9KΩF TD0804N
5R64	DRZ832531	RK73H 2A 20KΩF TD0804N
5R65	DRZ832581	RK73H 2A 24KΩF TD0804N
5R66	DRZ832511	RK73H 2A 12KΩF TD0804N

CHANNEL SW & DL DRIVER [6]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
6C1	DCC810511	C2012F 1H 103Z A TD84N
6C5	DCC816541	C2012CH 1H 330J A TD84N
6C6,6C7	DCV819061	TZBX4 Z060BA110 TE1208R
6C8	DCV819071	TZBX4 N100BA110 TE1208R
6C9	DCC816771	C2012CH 1H 152J A TD84N
6C10	DCC810821	C2012B 1H 681K A TD84N
6C11	DCC816771	C2012CH 1H 152J A TD84N
6C12	DCC810821	C2012B 1H 681K A TD84N
6C15	DCC816801	C2012CH 1H 102J A TD84N
6C17	DCC816801	C2012CH 1H 102J A TD84N
6C18	DCC816561	C2012CH 1H 470J A TD84N
6C2,6C3,6C4	DCC810511	C2012F 1H 103Z A TD84N
6C20	DCC810511	C2012F 1H 103Z A TD84N
6C23	DCC810511	C2012F 1H 103Z A TD84N
6C24,6C25	DCV819061	TZBX4 Z060BA110 TE1208R
6C26,6C27	DCC816381	C2012CH 1H 020C A TD84N
6C30	DCC816401	C2012CH 1H 030C A TD84N
(LA314H)		
6C30	DCC816401	C2012CH 1H 030C A TD048N
6C35	DCC810511	C2012F 1H 103Z A TD84N
6C36	DCC816591	C2012CH 1H 820J A TD84N
6C38	DCC815891	C2012CH 1H 150J A TD84N
6C39	DCC816451	C2012CH 1H 060D ATD84N
6C40,6C41	DCC816401	C2012CH 1H 030C A TD84N
6C42,6C43	DCC816771	C2012CH 1H 152J A TD84N
6C45,6C46	DCC816421	C2012CH 1H 040C A TD84N
6C47, 6C48	DCC816521	C2012CH 1H 220J A TD84N
6C50	DCC816551	C2012CH 1H 390J A TD84N
6C51 to 6C58	DCC810511	C2012F 1H 103Z A TD84N
6C60,6C61	DCC816581	C2012CH 1H 680J A TD84N
6C70	DCC817621	C1608CH 1H 010C A TD0804N
6D1 to 6D4	DDD810141	MA 159-(TX) TE0804L
6D5,6D6	DDD830031	RD3.0M-T1B B
6D7	DDD810131	1SS 269 TE0804L
6D8	DDD810241	1SS 272 TE0804R
6D9	DDD810131	1SS 269 TE0804L
6D10	DDD810241	1SS 272 TE0804R
6D11,6D12	DDD810141	MA 159-(TX) TE0804L
6D13,6D14	DDD810401	HVU 202A3 TE0804R
6IC1,6IC2	DIC889161	TC 4W53F(TE12L) TE1208R
6IC3 to 6IC5	DTR199861	HFA3101B96 TE1208B
6L2,6L3	DRZ833431	RK73Z 1J TD0804N
6L6,6L7	DRZ833431	RK73Z 1J TD0804N
6L9 to 6L12	DCL810811	HK1608 10NJ-T TD0804N

CHANNEL SW & DL DRIVER [6]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
6Q1 to 6Q10	DTR830071	2SC 3356-T1B
6Q11	DTR838661	2SC 2712LG TE85L
6Q12,6Q13	DTR810041	2SA 1162Y TE85L
6Q14,6Q15	DTR810401	2SA 1424-T1B
6Q16	DTR890791	IMD3 TE0804R
6Q17	DTR830371	2SC 3735B34/B35-T1B
6Q18	DTR890791	IMD3 TE0804R
6Q19,6Q20	DTR890861	IMZ1 TE0804R
6Q21	DTR890851	IMH1 TE0804N
6Q22, 6Q23	DTR890861	IMZ1 TE0804R
6Q24	DTR890821	IMT2 TE0804R
6Q25	DTR830371	2SC 3735B34/B35-T1B
6Q27 to 6Q30	DTR830071	2SC 3356-T1B
6R1,6R2	DRZ832311	RK73H 2A 1.8KΩF TD0804N
6R3 to 6R6	DRZ832361	RK73H 2A 3.0KΩF TD0804N
6R7,6R8	DRZ832411	RK73H 2A 4.7KΩF TD0804N
6R9	DRZ832441	RK73H 2A 6.2KΩF TD0804N
6R10	DRZ832321	RK73H 2A 2.0KΩF TD0804N
6R11 to 6R14	DRZ832361	RK73H 2A 3.0KΩF TD0804N
6R15,6R16	DRZ833061	RK73H 2A 75ΩF TD0804N
6R19	DRZ832411	RK73H 2A 4.7KΩF TD0804N
6R20	DRZ832201	RK73H 2A 620ΩF TD0804N
6R21	DRZ832211	RK73H 2A 680ΩF TD0804N
6R22	DRZ832281	RK73H 2A 1.3KΩF TD0804N
6R23 to 6R26	DRZ832101	RK73H 2A 240ΩF TD0804N
6R27	DRZ832221	RK73H 2A 750ΩF TD0804N
6R28	DRZ832441	RK73H 2A 6.2KΩF TD0804N
6R29	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R30	DRZ832321	RK73H 2A 2.0KΩF TD0804N
6R31	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R32	DRZ832321	RK73H 2A 2.0KΩF TD0804N
6R33 to 6R38	DRZ832031	RK73H 2A 120ΩF TD0804N
6R39	DRZ832051	RK73H 2A 150ΩF TD0804N
6R40	DRZ832431	RK73H 2A 5.6KΩF TD0804N
6R41,6R42	DRZ832451	RK73H 2A 6.8KΩF TD0804N
6R43,6R44	DRZ832251	RK73H 2A 1.0KΩF TD0804N
6R45	DRZ832431	RK73H 2A 5.6KΩF TD0804N
6R46 to 6R49	DRZ832491	RK73H 2A 10KΩF TD0804N
6R50,6R51	DRZ832561	RK73H 2A 20KΩF TD0804N
6R52	DRZ833031	RK73H 2A 56ΩF TD0804N
6R53,6R54	DRZ832251	RK73H 2A 1.0KΩF TD0804N
6R55 to 6R58	DRV810221	G4AT/ST-4TA 500Ω TE1208L
6R59,6R60	DRZ832021	RK73H 2A 110ΩF TD0804N
6R61	DRZ833061	RK73H 2A 75ΩF TD0804N
6R63	DRZ832411	RK73H 2A 4.7KΩF TD0804N

CHANNEL SW & DL DRIVER [6]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
6R64 to 6R67	DRZ832281	RK73H 2A 1.3KΩF TD0804N
6R68	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R69	DRZ832451	RK73H 2A 6.8KΩF TD0804N
6R70	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R71	DRZ832451	RK73H 2A 6.8KΩF TD0804N
6R72	DRZ833531	RK73H 2A 27ΩF TD0804N
6R73	DRZ832471	RK73H 2A 8.2KΩF TD0804N
6R75	DRZ832471	RK73H 2A 8.2KΩF TD0804N
6R77	DRZ832361	RK73H 2A 3.0KΩF TD0804N
6R78	DRV810241	G4AT/ST-4TA 2KΩ TE1208L
6R79	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R80	DRZ832291	RK73H 2A 1.5KΩF TD0804N
6R81	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R82,6R83	DRZ821171	RK73K 1J 47ΩJ TD0804N
6R84	DRZ832311	RK73H 2A 1.8KΩF TD0804N
6R85	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R86,6R87	DRZ821171	RK73K 1J 47ΩJ TD0804N
6R88 to 6R91	DRZ821081	RK73K 1J 20ΩJ TD0804N
6R92,6R93 (LA314H)	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R92,6R93	DRZ821051	RK73K 1J 15ΩJ TD0804N
6R94 to 6R96	DRZ821051	RK73K 1J 15ΩJ TD0804N
6R97,6R98 (LA314H)	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R96,6R97	DRZ821051	RK73K 1J 15ΩJ TD0804N
6R99	DRZ821051	RK73K 1J 15ΩJ TD0804N
6R100,6R101	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R102	DRZ832011	RK73H 2A 100ΩF TD0804N
6R103,6R104	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R105,6R106	DRZ833041	RK73H 2A 62ΩF TD0804N
6R107,6R108	DRZ833511	RK73H 2A 22ΩF TD0804N
6R109	DRZ832411	RK73H 2A 4.7KΩF TD0804N
6R110	DRZ832431	RK73H 2A 5.6KΩF TD0804N
6R111,6R112	DRZ821051	RK73K 1J 15ΩJ TD0804N
6R113 to 6R116	DRZ821081	RK73K 1J 20ΩJ TD0804N
6R117,6R118	DRZ833481	RK73H 2A 15ΩF TD0804N
6R119	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R120	DRZ832321	RK73H 2A 2.0KΩF TD0804N
6R121	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R122	DRZ832321	RK73H 2A 2.0KΩF TD0804N
6R123,6R124	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R125,6R126	DRZ832121	RK73H 2A 300ΩF TD0804N
6R127	DRZ832341	RK73H 2A 2.4KΩF TD0804N
6R128,6R129	DRZ833061	RK73H 2A 75ΩF TD0804N
6R130	DRZ832341	RK73H 2A 2.4KΩF TD0804N

CHANNEL SW & DL DRIVER [6]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
6R131	DRZ832051	RK73H 2A 150ΩF TD0804N
6R132,6R133	DRZ833061	RK73H 2A 75ΩF TD0804N
6R135	DRZ820041	RK73G 2A 39ΩD TD0804N
6R139	DRZ832011	RK73H 2A 100ΩF TD0804N
6R140	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R141	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R142,6R143	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R144	DRZ832401	RK73H 2A 4.3KΩF TD0804N
6R145	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R149	DRZ832011	RK73H 2A 100ΩF TD0804N
6R150 (LA314H)	DRZ831501	MCR10 000E TD0804N
6R150	DRZ833481	RK73H 2A 15ΩF TD0804N
6R151,6R152	DRZ832561	RK73H 2A 20KΩF TD0804N
6R153	DDD880081	DTN-T203K 103KS TD0804N
6R155	DRZ832021	RK73H 2A 110ΩF TD0804N
6R156	DRZ820011	RN73G 2A 30ΩD TD0804N
6R158,6R159	DRZ820011	RN73G 2A 30ΩD TD0804N
6R160	DRZ832011	RK73H 2A 100ΩF TD0804N
6R161 to 6R164	DRZ832361	RK73H 2A 3.0KΩF TD0804N
6R165,6R166	DRZ821121	RK73K 1J 30ΩJ TD0804N
6R170,6R171	DRZ832251	RK73H 2A 1.0KΩF TD0804N
6R172,6R173	DRZ832121	RK73H 2A 300ΩF TD0804N
6R176,6R177	DRZ832251	RK73H 2A 1.0KΩF TD0804N
6R178,6R179	DRZ832121	RK73H 2A 300ΩF TD0804N
6R181,6R182	DRZ833531	RK73H 2A 27ΩF TD0804N
6R184,6R185	DRZ833531	RK73H 2A 27ΩF TD0804N
6R188,6R189	DRZ832051	RK73H 2A 150ΩF TD0804N
6R201	DRE137951	EF1/4S 2.0KΩF TA21N

CH3 ATT & PREAMP [7]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
7C1	DCC816421	C2012CH 1H 040C A TD84N
7C2	DCC850041	GHM1535B 223K630 TE0804N
7C3,7C4	DCV019612	ECV-1ZW 06X53T
7C5	DCC850051	GHM1530B 682K630 TE0804N
7C6	DCC816491	C2012CH 1H 100D A TD84N
7C7	DCC816491	C2012CH 1H 100D A TD84N
7C8	DCC816801	C2012CH 1H 102J A TD84N
7C9	DCC810571	C2012F 1E 104Z A TD84N
7C10	DCC811111	C2012B 1E 104K A TD84N
7C12 to 7C14	DCC810511	C2012F 1H 103Z A TD84N
7C15	DCC810571	C2012F 1E 104Z A TD84N
7C16,7C17	DCC810511	C2012F 1H 103Z A TD84N
7C19 to 7C22	DCC810511	C2012F 1H 103Z A TD84N
7C30	DCC810511	C2012F 1H 103Z A TD84N
7C31	DCC816441	C2012CH 1H 050C A TD84N
7C32 to 7C36	DCC810511	C2012F 1H 103Z A TD84N
7C38	DCC810511	C2012F 1H 103Z A TD84N
7C40	DCV819061	TZBX4 Z060BA110 TE1208R
7C42	DCC816421	C2012CH 1H 040C A TD84N
7C43	DCC816491	C2012CH 1H 100D A TD84N
7C44	DCC816361	C2012CH 1H 010C A TD84N
7C46	DCC816451	C2012CH 1H 060D A TD84N
7C47	DCC816421	C2012CH 1H 040C A TD84N
7C50	DCC810511	C2012F 1H 103Z A TD84N
7C51,7C52	DCC816421	C2012CH 1H 040C A TD84N
7D1,7D2	DDD810461	HSM 124S-JTL TE0804L
7D3,7D4	DDD810241	1SS 272 TE0804R
7D5	DDD810261	HSM 88AS TL
7D6	DDD830121	RD6.8M-T1B B
7D7	DDD830031	RD3.0M-T1B B
7IC1	DIC614741	LT 1097CN8 (LINEAR TEC.)
7IC2	DTR191221	μPA101G
7IC3	DTR199861	HFA3101B96 TE1208B
7J1	DCN041171	CONNECTOR L235
7L1,7L2	DCL810651	BLM11A221SPT TD0804N
7Q1	DTR860161	2SK 508 K51 TE0804L
7Q2,7Q3	DTR830071	2SC 3356-T1B
7Q4,7Q5	DTR810041	2SA 1162Y TE85L
7Q6,7Q7	DTR860191	2SK 2113YY-TL TE0804F
7Q8 to 7Q10	DTR890791	IMD3 TE0804R
7Q11	DTR191241	μPA103G
7Q12	DTR890841	IMX3 TE0804R
7Q13	DTR890861	IMZ1 TE0804R
7Q14	DTR838661	2SC 2712LG TE85L
7R1	DRZ832251	RK73H 2A 1.0KΩF TD0804N

CH3 ATT & PREAMP [7]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
7R2 to 7R4	DRZ832221	RK73H 2A 750ΩF TD0804N
7R5	DRZ820861	RN73F 2A 100KΩD TD0804N
7R6 to 7R8	DRZ850601	RGC1/10C 240KΩD TD0804N
7R9	DRZ832601	RK73H 2A 30KΩF TD0804N
7R10 to 7R15	DRZ820861	RN73F 2A 100KΩD TD0804N
7R16	DRZ832411	RK73H 2A 4.7KΩF TD0804N
7R21	DRZ831501	MCR10 000E TD0804N
7R22,7R23	DRZ832121	RK73H 2A 300ΩF TD0804N
7R24	DRZ820011	RN73G 2A 30ΩD TD0804N
7R26	DRZ832051	RK73H 2A 150ΩF TD0804N
7R27,7R28	DRZ831431	MCR10J 335E TD0804N
7R29	DRZ833031	RK73H 2A 56ΩF TD0804N
7R30	DRZ832081	RK73H 2A 200ΩF TD0804N
7R31	DRZ821081	RK73K 1J 20ΩJ TD0804N
7R32	DRZ832441	RK73H 2A 6.2KΩF TD0804N
7R33	DRZ832531	RK73H 2A 15KΩF TD0804N
7R34	DRZ832171	RK73H 2A 470ΩF TD0804N
7R35	DRZ832531	RK73H 2A 15KΩF TD0804N
7R36	DRZ832491	RK73H 2A 10KΩF TD0804N
7R37,7R38	DRZ832221	RK73H 2A 750ΩF TD0804N
7R40	DRZ833041	RK73H 2A 62ΩF TD0804N
7R41	DRZ820251	RN73F 2A 300ΩD TD0804N
7R42	DRZ820181	RN73F 2A 150ΩD TD0804N
7R43	DRZ832491	RK73H 2A 10KΩF TD0804N
7R44	DRZ832601	RK73H 2A 30KΩF TD0804N
7R45	DRZ832491	RK73H 2A 10KΩF TD0804N
7R46	DRZ832601	RK73H 2A 30KΩF TD0804N
7R47	DRZ820861	RN73F 2A 100KΩD TD0804N
7R48	DRZ833031	RK73H 2A 56ΩF TD0804N
7R50	DRZ833031	RK73H 2A 56ΩF TD0804N
7R51,7R52	DRZ821081	RK73K 1J 20ΩJ TD0804N
7R53	DRZ833041	RK73H 2A 62ΩF TD0804N
7R54	DRZ833431	RK73Z 1J TD0804N
7R56 to 7R59	DRZ832251	RK73H 2A 1.0KΩF TD0804N
7R60,7R61	DRZ833511	RK73H 2A 22ΩF TD0804N
7R62,7R63	DRZ832361	RK73H 2A 3.0KΩF TD0804N
7R64	DRZ832051	RK73H 2A 150ΩF TD0804N
7R65	DRZ832231	RK73H 2A 820ΩF TD0804N
7R66	DRZ832601	RK73H 2A 30KΩF TD0804N
7R67	DRZ832251	RK73H 2A 1.0KΩF TD0804N
7R68	DRZ832431	RK73H 2A 5.6KΩF TD0804N
7R69	DRZ832291	RK73H 2A 1.5KΩF TD0804N
7R70	DRZ832411	RK73H 2A 4.7KΩF TD0804N
7R71,7R72	DRZ832011	RK73H 2A 100ΩF TD0804N
7R73	DRZ832121	RK73H 2A 300ΩF TD0804N

CH3 ATT & PREAMP [7]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
7R74, 7R75	DRZ832361	RK73H 2A 3.0KΩF TD0804N
7R76,7R77	DRZ832441	RK73H 2A 6.2KΩF TD0804N
7R79	DRZ832321	RK73H 2A 2.0KΩF TD0804N
7R80	DRZ832441	RK73H 2A 6.2KΩF TD0804N
7R82	DRZ832361	RK73H 2A 3.0KΩF TD0804N
7R85,7R86	DRZ821081	RK73K 1J 20ΩJ TD0804N
7R87	DRZ832411	RK73H 2A 4.7KΩF TD0804N
7R88	DRZ832211	RK73H 2A 680ΩF TD0804N
7R89	DRZ832201	RK73H 2A 620ΩF TD0804N
7R90	DRZ833031	RK73H 2A 56ΩF TD0804N
7R91	DRZ830861	MCR10J 300E TD0804N
7R93,7R94	DRZ832121	RK73H 2A 300ΩF TD0804N
7R96,7R97	DRZ832491	RK73H 2A 10KΩF TD0804N
7R98	DRZ832461	RK73H 2A 7.5KΩF TD0804N
7R99	DRZ833041	RK73H 2A 62ΩF TD0804N
7R100	DRZ821081	RK73K 1J 20ΩJ TD0804N
7R101	DRZ832291	RK73H 2A 1.5KΩF TD0804N
7R102	DRZ832221	RK73H 2A 750ΩF TD0804N
7R103	DRZ821081	RK73K 1J 20ΩJ TD0804N
7R104	DRZ832561	RK73H 2A 20KΩF TD0804N
7R105	DRV810221	G4AT/ST-4TA 500Ω TE1208L
7R106,7R107	DRZ832181	RK73H 2A 510ΩF TD0804N
7R108	DRZ833011	RK73H 2A 47ΩF TD0804N
7R110	DRZ833041	RK73H 2A 62ΩF TD0804N
7R115	DRZ832581	RK73H 2A 24KΩF TD0804N
7R116	DRZ832511	RK73H 2A 12KΩF TD0804N
7R120,7R121	DRZ832051	RK73H 2A 150ΩF TD0804N
7R150	DRZ820181	RN73F 2A 150ΩD TD0804N
7RL1	DKD028361	RELAY A12W-K

CH4 ATT & PREAMP [8]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
8C1	DCC816421	C2012CH 1H 040C A TD84N
8C2	DCC850041	GHM1535B 223K630 TE0804N
8C3,8C4	DCV019612	ECV-1ZW 06X53T
8C5	DCC850051	GHM1530B 682K630 TE0804N
8C6	DCC816491	C2012CH 1H 100D A TD84N
8C7	DCC816491	C2012CH 1H 100D A TD84N
8C8	DCC816801	C2012CH 1H 102J A TD84N
8C9	DCC810571	C2012F 1E 104Z A TD84N
8C10	DCC811111	C2012B 1E 104K A TD84N
8C12 to 8C14	DCC810511	C2012F 1H 103Z A TD84N
8C15	DCC810571	C2012F 1E 104Z A TD84N
8C16,8C17	DCC810511	C2012F 1H 103Z A TD84N
8C19 to 8C22	DCC810511	C2012F 1H 103Z A TD84N
8C30	DCC810511	C2012F 1H 103Z A TD84N
8C31	DCC816441	C2012CH 1H 050C A TD84N
8C32 to 8C36	DCC810511	C2012F 1H 103Z A TD84N
8C38	DCC810511	C2012F 1H 103Z A TD84N
8C40	DCV819061	TZBX4 Z060BA110 TE1208R
8C42	DCC816421	C2012CH 1H 040C A TD84N
8C43	DCC816491	C2012CH 1H 100D A TD84N
8C44	DCC816361	C2012CH 1H 010C A TD84N
8C46	DCC816451	C2012CH 1H 060D A TD84N
8C47	DCC816421	C2012CH 1H 040C A TD84N
8C50	DCC810511	C2012F 1H 103Z A TD84N
8C51,8C52	DCC816421	C2012CH 1H 040C A TD84N
8D1,8D2	DDD810461	HSM 124S-JTL TE0804L
8D3,8D4	DDD810241	1SS 272 TE0804R
8D5	DDD810261	HSM 88AS TL
8D6	DDD830121	RD6.8M-T1B B
8D7	DDD830031	RD3.0M-T1B B
8IC1	DIC614741	LT 1097CN8 (LINEAR TEC.)
8IC2	DTR191221	μPA101G
8IC3	DTR199861	HFA3101B96 TE1208B
8J1	DCN041171	CONNECTOR L235
8L1,8L2	DCL810651	BLM11A221SPT TD0804N
8Q1	DTR860161	2SK 508 K51 TE0804L
8Q2,8Q3	DTR830071	2SC 3356-T1B
8Q4,8Q5	DTR810041	2SA 1162Y TE85L
8Q6,8Q7	DTR860191	2SK 2113YY-TL TE0804F
8Q8 to 8Q10	DTR890791	IMD3 TE0804R
8Q11	DTR191241	μPA103G
8Q12	DTR890841	IMX3 TE0804R
8Q13	DTR890861	IMZ1 TE0804R
8Q14	DTR838661	2SC 2712LG TE85L
8R1	DRZ832251	RK73H 2A 1.0KΩF TD0804N

CH4 ATT & PREAMP [8]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
8R2 to 8R4	DRZ832221	RK73H 2A 750ΩF TD0804N
8R5	DRZ820861	RN73F 2A 100KΩD TD0804N
8R6 to 8R8	DRZ850601	RGC1/10C 240KΩD TD0804N
8R9	DRZ832601	RK73H 2A 30KΩF TD0804N
8R10 to 8R15	DRZ820861	RN73F 2A 100KΩD TD0804N
8R16	DRZ832411	RK73H 2A 4.7KΩF TD0804N
8R21	DRZ831501	MCR10 000E TD0804N
8R22,8R23	DRZ832121	RK73H 2A 300ΩF TD0804N
8R24	DRZ820011	RN73G 2A 30ΩD TD0804N
8R26	DRZ832051	RK73H 2A 150ΩF TD0804N
8R27,8R28	DRZ831431	MCR10J 335E TD0804N
8R29	DRZ833031	RK73H 2A 56ΩF TD0804N
8R30	DRZ832081	RK73H 2A 200ΩF TD0804N
8R31	DRZ821081	RK73K 1J 20ΩJ TD0804N
8R32	DRZ832441	RK73H 2A 6.2KΩF TD0804N
8R33	DRZ832531	RK73H 2A 15KΩF TD0804N
8R34	DRZ832171	RK73H 2A 470ΩF TD0804N
8R35	DRZ832531	RK73H 2A 15KΩF TD0804N
8R36	DRZ832491	RK73H 2A 10KΩF TD0804N
8R37,8R38	DRZ832221	RK73H 2A 750ΩF TD0804N
8R40	DRZ833041	RK73H 2A 62ΩF TD0804N
8R41	DRZ820251	RN73F 2A 300ΩD TD0804N
8R42	DRZ820181	RN73F 2A 150ΩD TD0804N
8R43	DRZ832491	RK73H 2A 10KΩF TD0804N
8R44	DRZ832601	RK73H 2A 30KΩF TD0804N
8R45	DRZ832491	RK73H 2A 10KΩF TD0804N
8R46	DRZ832601	RK73H 2A 30KΩF TD0804N
8R47	DRZ820861	RN73F 2A 100KΩD TD0804N
8R48	DRZ833031	RK73H 2A 56ΩF TD0804N
8R50	DRZ833031	RK73H 2A 56ΩF TD0804N
8R51,8R52	DRZ821081	RK73K 1J 20ΩJ TD0804N
8R53	DRZ833041	RK73H 2A 62ΩF TD0804N
8R54	DRZ833431	RK73Z 1J TD0804N
8R56 to 8R59	DRZ832251	RK73H 2A 1.0KΩF TD0804N
8R60,8R61	DRZ833511	RK73H 2A 22ΩF TD0804N
8R62,8R63	DRZ832361	RK73H 2A 3.0KΩF TD0804N
8R64	DRZ832051	RK73H 2A 150ΩF TD0804N
8R65	DRZ832231	RK73H 2A 820ΩF TD0804N
8R66	DRZ832601	RK73H 2A 30KΩF TD0804N
8R67	DRZ832251	RK73H 2A 1.0KΩF TD0804N
8R68	DRZ832431	RK73H 2A 5.6KΩF TD0804N
8R69	DRZ832291	RK73H 2A 1.5KΩF TD0804N
8R70	DRZ832411	RK73H 2A 4.7KΩF TD0804N
8R71, 8R72	DRZ832011	RK73H 2A 100ΩF TD0804N
8R73	DRZ832121	RK73H 2A 300ΩF TD0804N

CH4 ATT & PREAMP [8]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
8R74,8R75	DRZ832361	RK73H 2A 3.0KΩF TD0804N
8R76,8R77	DRZ832441	RK73H 2A 6.2KΩF TD0804N
8R79	DRZ832321	RK73H 2A 2.0KΩF TD0804N
8R80	DRZ832441	RK73H 2A 6.2KΩF TD0804N
8R82	DRZ832361	RK73H 2A 3.0KΩF TD0804N
8R85,8R86	DRZ821081	RK73K 1J 20ΩJ TD0804N
8R87	DRZ832411	RK73H 2A 4.7KΩF TD0804N
8R88	DRZ832211	RK73H 2A 680ΩF TD0804N
8R89	DRZ832201	RK73H 2A 620ΩF TD0804N
8R90	DRZ833031	RK73H 2A 56ΩF TD0804N
8R91	DRZ830861	MCR10J 300E TD0804N
8R93,8R94	DRZ832121	RK73H 2A 300ΩF TD0804N
8R96,8R97	DRZ832491	RK73H 2A 10KΩF TD0804N
8R98	DRZ832461	RK73H 2A 7.5KΩF TD0804N
8R99	DRZ833041	RK73H 2A 62ΩF TD0804N
8R100	DRZ821081	RK73K 1J 20ΩJ TD0804N
8R101	DRZ832291	RK73H 2A 1.5KΩF TD0804N
8R102	DRZ832221	RK73H 2A 750ΩF TD0804N
8R103	DRZ821081	RK73K 1J 20ΩJ TD0804N
8R104	DRZ832561	RK73H 2A 20KΩF TD0804N
8R105	DRV810221	G4AT/ST-4TA 500Ω TE1208L
8R106,8R107	DRZ832181	RK73H 2A 510ΩF TD0804N
8R108	DRZ833011	RK73H 2A 47ΩF TD0804N
8R110	DRZ833041	RK73H 2A 62ΩF TD0804N
8R115	DRZ832581	RK73H 2A 24KΩF TD0804N
8R116	DRZ832511	RK73H 2A 12KΩF TD0804N
8R120,8R121	DRZ832051	RK73H 2A 150ΩF TD0804N
8R150	DRZ820181	RN73F 2A 150ΩD TD0804N
8RL1	DKD028361	RELAY A12W-K

TRIG SW [9]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
9C4	DCC816361	C2012CH 1H 010C A TD84N
9C8	DCC816601	C2012CH 1H 101J A TD84N
9C11 to 9C15	DCC810511	C2012F 1H 103Z A TD84N
9C17	DCC810511	C2012F 1H 103Z A TD84N
9C28	DCC816601	C2012CH 1H 101J A TD84N
9C31 to 9C33	DCC810511	C2012F 1H 103Z A TD84N
9C35	DCC810511	C2012F 1H 103Z A TD84N
9C4	DCC816381	C2012CH 1H 020C A TD84N
9C42	DCC816601	C2012CH 1H 101J A TD84N
9C45 to 9C47	DCC810511	C2012F 1H 103Z A TD84N
9C49	DCC810511	C2012F 1H 103Z A TD84N
9C52	DCC816601	C2012CH 1H 101J A TD84N
9C55	DCC810511	C2012F 1H 103Z A TD84N
9C57	DCC810511	C2012F 1H 103Z A TD84N
9C60 to 9C67	DCC810511	C2012F 1H 103Z A TD84N
9C69	DCC810511	C2012F 1H 103Z A TD84N
9C70 to 9C77	DCC816601	C2012CH 1H 101J A TD84N
9C100	DCC810571	C2012F 1E 104Z A TD84N
9C101 to 9C106	DCC810511	C2012F 1H 103Z A TD84N
9C107	DCC816521	C2012CH 1H 220J A TD84N
9C108	DCC816501	C2012CH 1H 120J A TD84N
9D1 to 9D6	DDD810241	1SS 272 TE0804R
9D7	DDD830101	RD5.6M-T1B B
9IC1,9IC2	DTR199861	HFA3101B96 TE1208B
9IC3 to 9IC6	DIC619101	OP AMP 4558F TE1208B
9J1	KHB095411	SMALL PIN JACK
9L2	DRZ833431	RK73Z 1J TD0804N
9L4	DRZ833431	RK73Z 1J TD0804N
9L6	DRZ833431	RK73Z 1J TD0804N
9L8	DRZ833431	RK73Z 1J TD0804N
9Q1 to 9Q16	DTR830071	2SC 3356-T1B
9Q17 to 9Q20	DTR838661	2SC 2712LG TE85L
9Q21 to 9Q28	DTR860191	2SK 2113YY-TL TE0804F
9Q29,9Q31	DTR890841	IMX3 TE0804R
9Q30	DTR890821	IMT2 TE0804R
9Q32,9Q33	DTR890821	IMT2 TE0804R
9Q35	DTR830071	2SC 3356-T1B
9Q37	DTR810221	2SA 1462-T1B Y34
9Q38	DTR830071	2SC 3356-T1B
9Q39	DTR810041	2SA 1162Y TE85L
9R1,9R2	DRZ832211	RK73H 2A 680ΩF TD0804N
9R3	DRZ832041	RK73H 2A 130ΩF TD0804N
9R4,9R5	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R6,9R7	DRZ832221	RK73H 2A 750ΩF TD0804N
9R8	DRZ832401	RK73H 2A 4.3KΩF TD0804N

TRIG SW [9]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
9R9	DRZ832051	RK73H 2A 150ΩF TD0804N
9R10,9R11	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R12,9R13	DRZ833511	RK73H 2A 22ΩF TD0804N
9R14	DRZ832331	RK73H 2A 2.2KΩF TD0804N
9R15	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R15	DRZ832051	RK73H 2A 150ΩF TD0804N
9R16,9R17	DRZ832051	RK73H 2A 150ΩF TD0804N
9R18,9R19	DRZ832561	RK73H 2A 20KΩF TD0804N
9R20,9R21	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R22	DRZ832491	RK73H 2A 10KΩF TD0804N
9R23	DRZ832071	RK73H 2A 180ΩF TD0804N
9R24	DRZ832561	RK73H 2A 20KΩF TD0804N
9R25,9R26	DRZ833011	RK73H 2A 47ΩF TD0804N
9R27 to 9R30	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R31,9R32	DRZ832211	RK73H 2A 680ΩF TD0804N
9R33	DRZ832041	RK73H 2A 130ΩF TD0804N
9R34,9R35	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R36,9R37	DRZ832221	RK73H 2A 750ΩF TD0804N
9R38	DRZ832401	RK73H 2A 4.3KΩF TD0804N
9R39	DRZ832051	RK73H 2A 150ΩF TD0804N
9R40,9R41	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R42, 9R43	DRZ833511	RK73H 2A 22ΩF TD0804N
9R44	DRZ832331	RK73H 2A 2.2KΩF TD0804N
9R45	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R46,9R47	DRZ832051	RK73H 2A 150ΩF TD0804N
9R48,9R49	DRZ832561	RK73H 2A 20KΩF TD0804N
9R50,9R51	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R52	DRZ832491	RK73H 2A 10KΩF TD0804N
9R53	DRZ832071	RK73H 2A 180ΩF TD0804N
9R54	DRZ832561	RK73H 2A 20KΩF TD0804N
9R55,9R56	DRZ833011	RK73H 2A 47ΩF TD0804N
9R57 to 9R60	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R62	DRZ832051	RK73H 2A 150ΩF TD0804N
9R63 to 9R66	DRZ833061	RK73H 2A 75ΩF TD0804N
9R67,9R98	DRZ832051	RK73H 2A 150ΩF TD0804N
9R70,9R71	DRZ833011	RK73H 2A 47ΩF TD0804N
9R73	DRZ832331	RK73H 2A 2.2KΩF TD0804N
9R74	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R75,9R76	DRZ833511	RK73H 2A 22ΩF TD0804N
9R77,9R78	DRZ832051	RK73H 2A 150ΩF TD0804N
9R79,9R80	DRZ832561	RK73H 2A 20KΩF TD0804N
9R81,9R82	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R83	DRZ832561	RK73H 2A 20KΩF TD0804N
9R84	DRZ832491	RK73H 2A 10KΩF TD0804N
9R85	DRZ832071	RK73H 2A 180ΩF TD0804N

TRIG SW [9]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
9R86,9R87	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R88,9R89	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R90,9R91	DRZ833011	RK73H 2A 47ΩF TD0804N
9R93	DRZ832331	RK73H 2A 2.2KΩF TD0804N
9R94	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R95,9R96	DRZ833511	RK73H 2A 22ΩF TD0804N
9R97	DRZ832051	RK73H 2A 150ΩF TD0804N
9R99,9R100	DRZ832561	RK73H 2A 20KΩF TD0804N
9R101,9R102	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R103	DRZ832561	RK73H 2A 20KΩF TD0804N
9R104	DRZ832491	RK73H 2A 10KΩF TD0804N
9R105	DRZ832071	RK73H 2A 180ΩF TD0804N
9R106 to 9R109	DRZ821081	RK73K 1J 20ΩJ TD0804N
9R110	DRZ832561	RK73H 2A 20KΩF TD0804N
9R111	DRZ832491	RK73H 2A 10KΩF TD0804N
9R112	DRZ832561	RK73H 2A 20KΩF TD0804N
9R113	DRZ832491	RK73H 2A 10KΩF TD0804N
9R114	DRZ832561	RK73H 2A 20KΩF TD0804N
9R115	DRZ832491	RK73H 2A 10KΩF TD0804N
9R116	DRZ832561	RK73H 2A 20KΩF TD0804N
9R117	DRZ832491	RK73H 2A 10KΩF TD0804N
9R118	DRZ832561	RK73H 2A 20KΩF TD0804N
9R119	DRZ832491	RK73H 2A 10KΩF TD0804N
9R120	DRZ832561	RK73H 2A 20KΩF TD0804N
9R121	DRZ832491	RK73H 2A 10KΩF TD0804N
9R122	DRZ832561	RK73H 2A 20KΩF TD0804N
9R123	DRZ832491	RK73H 2A 10KΩF TD0804N
9R124	DRZ832561	RK73H 2A 20KΩF TD0804N
9R125	DRZ832491	RK73H 2A 10KΩF TD0804N
9R126 to 9R129	DRZ833011	RK73H 2A 47ΩF TD0804N
9R130,9R131	DRZ832051	RK73H 2A 150ΩF TD0804N
9R132,9R133	DRZ832431	RK73H 2A 5.6KΩF TD0804N
9R134,9R135	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R136,9R137	DRZ832361	RK73H 2A 3.0KΩF TD0804N
9R138	DRZ832051	RK73H 2A 150ΩF TD0804N
9R139 to 9R142	DRZ833501	RK73H 2A 20ΩF TD0804N
9R143 to 9R146	DRZ833011	RK73H 2A 47ΩF TD0804N
9R147	DRZ832291	RK73H 2A 1.5KΩF TD0804N
9R148	DRZ832461	RK73H 2A 7.5KΩF TD0804N
9R149,9R150	DRZ833011	RK73H 2A 47ΩF TD0804N
9R151	DRZ833061	RK73H 2A 75ΩF TD0804N
9R152	DRZ832051	RK73H 2A 150ΩF TD0804N
9R154,9R155	DRZ833011	RK73H 2A 47ΩF TD0804N
9R156,9R157	DRZ832291	RK73H 2A 1.5KΩF TD0804N
9R158	DRZ832051	RK73H 2A 150ΩF TD0804N

TRIG SW [9]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
9R159,9R160	DRZ832561	RK73H 2A 20KΩF TD0804N
9R161	DRZ832141	RK73H 2A 360ΩF TD0804N
9R162	DRZ832561	RK73H 2A 20KΩF TD0804N
9R163,9R164	DRZ832491	RK73H 2A 10KΩF TD0804N
9R165,9R166	DRZ832561	RK73H 2A 20KΩF TD0804N
9R167	DRZ832491	RK73H 2A 10KΩF TD0804N
9R168	DRZ832501	RK73H 2A 11KΩF TD0804N
9R169	DRZ832731	RK73H 2A 100KΩF TD0804N
9R170	DRZ832361	RK73H 2A 3.0KΩF TD0804N
9R171	DRZ832181	RK73H 2A 510ΩF TD0804N
9R172 to 9R175	DRZ833011	RK73H 2A 47ΩF TD0804N
9R181 to 9R184	DRZ832211	RK73H 2A 680ΩF TD0804N
9R196	DRZ833011	RK73H 2A 47ΩF TD0804N
9R250	DRZ832291	RK73H 2A 1.5KΩF TD0804N
9R251	DRZ832421	RK73H 2A 5.1KΩF TD0804N
9R252	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R253	DRZ832011	RK73H 2A 100ΩF TD0804N
9R254	DRZ832501	RK73H 2A 11KΩF TD0804N
9R255,9R256	DRZ832601	RK73H 2A 30KΩF TD0804N
9R257	DRZ832491	RK73H 2A 10KΩF TD0804N
9R258	DRZ832121	RK73H 2A 300ΩF TD0804N
9R259 to 9R261	DRZ832171	RK73H 2A 470ΩF TD0804N
9R262	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R263	DRZ833061	RK73H 2A 75ΩF TD0804N
9R264	DRZ833011	RK73H 2A 47ΩF TD0804N
9R265	DRZ832431	RK73H 2A 5.6KΩF TD0804N
9R267	DRZ821171	RK73K 1J 47ΩJ TD0804N
9R268	DRZ832121	RK73H 2A 300ΩF TD0804N
9R269,9R270	DRZ832251	RK73H 2A 1.0KΩF TD0804N
9R271	DRZ833031	RK73H 2A 56ΩF TD0804N
9R272	DRZ832091	RK73H 2A 220ΩF TD0804N
9R273,9R274	DRZ832491	RK73H 2A 10KΩF TD0804N
9R275	DRZ832101	RK73H 2A 240ΩF TD0804N

TRIG AMP 10

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
10C1	DCC811111	C2012B 1E 104K A TD84N
10C2	DCC810571	C2012F 1E 104Z A TD84N
10C3	DCC811111	C2012B 1E 104K A TD84N
10C5 to 10C8	DCC810511	C2012F 1H 103Z A TD84N
10C9	DCC816801	C2012CH 1H 102J A TD84N
10C10	DCC811111	C2012B 1E 104K A TD84N
10C13	DCC816801	C2012CH 1H 102J A TD84N
10C14 to 10C16	DCC810511	C2012F 1H 103Z A TD84N
10C18	DCC810511	C2012F 1H 103Z A TD84N
10C20 to 10C22	DCC810511	C2012F 1H 103Z A TD84N
10C25,10C26	DCC816361	C2012CH 1H 010C A TD84N
10C101	DCC811111	C2012B 1E 104K A TD84N
10C105 to 10C108	DCC810511	C2012F 1H 103Z A TD84N
10C109	DCC816801	C2012CH 1H 102J A TD84N
10C110	DCC811111	C2012B 1E 104K A TD84N
10C113	DCC816801	C2012CH 1H 102J A TD84N
10C114 to 10C116	DCC810511	C2012F 1H 103Z A TD84N
10C118	DCC810511	C2012F 1H 103Z A TD84N
10C120 to 10C122	DCC810511	C2012F 1H 103Z A TD84N
10C125,10C126	DCC816361	C2012CH 1H 010C A TD84N
10IC1	DTR199861	HFA3101B96 TE1208B
10IC2	DIC619191	NJM 082M(TE3) TE1208L
10IC3	DIC495081	TC 4052BF (EL) TE1612B
10IC4	DIC322831	MC 10EL11D (MOTOROLLA)
10IC101	DTR199861	HFA3101B96 TE1208B
10IC102	DIC619191	NJM 082M(TE3) TE1208L
10IC103	DIC495081	TC 4052BF (EL) TE1612B
10IC104	DIC322831	MC 10EL11D (MOTOROLLA)
10Q1 to 10Q4	DTR830071	2SC 3356-T1B
10Q5	DTR890861	IMZ1 TE0804R
10Q7,10Q8	DTR890791	IMD3 TE0804R
10Q101 to 10Q104	DTR830071	2SC 3356-T1B
10Q105	DTR890861	IMZ1 TE0804R
10Q107,10Q108	DTR890791	IMD3 TE0804R
10Q120	DTR830071	2SC 3356-T1B
10R1	DRZ832391	RK73H 2A 3.9KΩF TD0804N
10R2	DRZ832491	RK73H 2A 10KΩF TD0804N
10R3	DRZ832511	RK73H 2A 12KΩF TD0804N
10R4	DRZ821081	RK73K 1J 20ΩJ TD0804N
10R5,10R6	DRZ832251	RK73H 2A 1.0KΩF TD0804N
10R7	DRZ821171	RK73K 1J 47ΩJ TD0804N
10R8	DRZ832421	RK73H 2A 5.1KΩF TD0804N
10R9	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R10	DRZ832421	RK73H 2A 5.1KΩF TD0804N
10R11	DRZ820861	RN73F 2A 100KΩD TD0804N

TRIG AMP 10

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
10R12	DRZ832491	RK73H 2A 10KΩF TD0804N
10R14	DRZ850591	RGC1/10C 200KΩD TD0804N
10R15	DRZ832581	RK73H 2A 24KΩF TD0804N
10R16	DRZ832551	RK73H 2A 18KΩF TD0804N
10R17	DRZ832471	RK73H 2A 8.2KΩF TD0804N
10R18	DRZ832051	RK73H 2A 150ΩF TD0804N
10R19	DRZ832181	RK73H 2A 510ΩF TD0804N
10R20,10R21	DRZ821121	RK73K 1J 30ΩJ TD0804N
10R22	DRZ833561	RK73H 2A 36ΩF TD0804N
10R23	DRZ832011	RK73H 2A 100ΩF TD0804N
10R24	DRZ832011	RK73H 2A 100ΩF TD0804N
10R26	DRZ832481	RK73H 2A 9.1KΩF TD0804N
10R27	DRZ832081	RK73H 2A 200ΩF TD0804N
10R28	DRZ832481	RK73H 2A 9.1KΩF TD0804N
10R29	DRZ832361	RK73H 2A 3.0KΩF TD0804N
10R30	DRZ832051	RK73H 2A 150ΩF TD0804N
10R31	DRZ832491	RK73H 2A 10KΩF TD0804N
10R32,10R33	DRZ832561	RK73H 2A 20KΩF TD0804N
10R34	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R35	DRZ832381	RK73H 2A 3.6KΩF TD0804N
10R36	DRZ832431	RK73H 2A 5.6KΩF TD0804N
10R37	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R38	DRZ832381	RK73H 2A 3.6KΩF TD0804N
10R39	DRZ832431	RK73H 2A 5.6KΩF TD0804N
10R40,10R41	DRZ821121	RK73K 1J 30ΩJ TD0804N
10R43,10R44	DRZ833511	RK73H 2A 22ΩF TD0804N
10R45	DRZ832251	RK73H 2A 1.0KΩF TD0804N
10R46	DRZ832411	RK73H 2A 4.7KΩF TD0804N
10R47,10R48	DRZ833441	RK73H 2A 10ΩF TD0804N
10R50	DRZ832601	RK73H 2A 30KΩF TD0804N
10R51,10R52	DRZ833071	RK73H 2A 82ΩF TD0804N
10R53,10R54	DRZ832011	RK73H 2A 100ΩF TD0804N
10R55,10R56	DRZ833071	RK73H 2A 82ΩF TD0804N
10R57,10R58	DRZ832061	RK73H 2A 160ΩF TD0804N
10R60	DRZ832011	RK73H 2A 100ΩF TD0804N
10R101	DRZ832391	RK73H 2A 3.9KΩF TD0804N
10R102	DRZ832491	RK73H 2A 10KΩF TD0804N
10R103	DRZ832511	RK73H 2A 12KΩF TD0804N
10R104	DRZ821081	RK73K 1J 20ΩJ TD0804N
10R105,10R106	DRZ832251	RK73H 2A 1.0KΩF TD0804N
10R107	DRZ821171	RK73K 1J 47ΩJ TD0804N
10R108	DRZ832421	RK73H 2A 5.1KΩF TD0804N
10R109	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R110	DRZ832421	RK73H 2A 5.1KΩF TD0804N
10R114	DRZ850591	RGC1/10C 200KΩD TD0804N

TRIG AMP 10

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
10R115	DRZ832581	RK73H 2A 24KΩF TD0804N
10R116	DRZ832551	RK73H 2A 18KΩF TD0804N
10R117	DRZ832471	RK73H 2A 8.2KΩF TD0804N
10R118	DRZ832051	RK73H 2A 150ΩF TD0804N
10R119	DRZ832181	RK73H 2A 510ΩF TD0804N
10R120,10R121	DRZ821121	RK73K 1J 30ΩJ TD0804N
10R122	DRZ833561	RK73H 2A 36ΩF TD0804N
10R123,10R124	DRZ832011	RK73H 2A 100ΩF TD0804N
10R126	DRZ832481	RK73H 2A 9.1KΩF TD0804N
10R127	DRZ832081	RK73H 2A 200ΩF TD0804N
10R128	DRZ832481	RK73H 2A 9.1KΩF TD0804N
10R129	DRZ832361	RK73H 2A 3.0KΩF TD0804N
10R130	DRZ832051	RK73H 2A 150ΩF TD0804N
10R131	DRZ832491	RK73H 2A 10KΩF TD0804N
10R132,10R133	DRZ832561	RK73H 2A 20KΩF TD0804N
10R134	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R135	DRZ832381	RK73H 2A 3.6KΩF TD0804N
10R136	DRZ832431	RK73H 2A 5.6KΩF TD0804N
10R137	DRZ832321	RK73H 2A 2.0KΩF TD0804N
10R138	DRZ832381	RK73H 2A 3.6KΩF TD0804N
10R139	DRZ832431	RK73H 2A 5.6KΩF TD0804N
10R140,10R141	DRZ821121	RK73K 1J 30ΩJ TD0804N
10R143,10R144	DRZ833511	RK73H 2A 22ΩF TD0804N
10R145	DRZ832251	RK73H 2A 1.0KΩF TD0804N
10R146	DRZ832411	RK73H 2A 4.7KΩF TD0804N
10R147,10R148	DRZ833441	RK73H 2A 10ΩF TD0804N
10R151,10R152	DRZ833071	RK73H 2A 82ΩF TD0804N
10R153,10R154	DRZ832011	RK73H 2A 100ΩF TD0804N
10R155,10R156	DRZ833071	RK73H 2A 82ΩF TD0804N
10R157,10R158	DRZ832061	RK73H 2A 160ΩF TD0804N
10R160	DRZ832011	RK73H 2A 100ΩF TD0804N
10R170,10R171	DRZ832171	RK73H 2A 470ΩF TD0804N
10R172	DRZ821171	RK73K 1J 47ΩJ TD0804N

SWEEP GENERATOR 11

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
11C4,11C5	DCC810511	C2012F 1H 103Z A TD84N
11C6	DCC810511	C2012F 1H 103Z A TD84N
11C7	DCC816801	C2012CH 1H 102J A TD84N
11C13	DCC816601	C2012CH 1H 101J A TD84N
11C14	DCC810511	C2012F 1H 103Z A TD84N
11C17	DCC810511	C2012F 1H 103Z A TD84N
11C19	DCC810511	C2012F 1H 103Z A TD84N
11C21	DCC810511	C2012F 1H 103Z A TD84N
11C22	DCC815891	C2012CH 1H 150J A TD84N
11C25	DCC815891	C2012CH 1H 150J A TD84N
11C27	DCC815891	C2012CH 1H 150J A TD84N
11C33	DCC816601	C2012CH 1H 101J A TD84N
11C34	DCC810511	C2012F 1H 103Z A TD84N
11C40,11C41	DCC810511	C2012F 1H 103Z A TD84N
11C42	DCC815891	C2012CH 1H 150J A TD84N
11C47	DCC815891	C2012CH 1H 150J A TD84N
11C51	DCC810511	C2012F 1H 103Z A TD84N
11C54	DCC820021	C2012F 1C 105Z A TD84N
11C55	DCC810511	C2012F 1H 103Z A TD84N
11C58	DCF139011	MF-3 2A 103K TC04N
11C59	DCC810511	C2012F 1H 103Z A TD84N
11C66	DCC810511	C2012F 1H 103Z A TD84N
11C85,11C86	DCC816601	C2012CH 1H 101J A TD84N
11C91	DCC816641	C2012CH 1H 221J A TD84N
11C93,11C94	DCC816601	C2012CH 1H 101J A TD84N
11C97, 11C98	DCC816601	C2012CH 1H 101J A TD84N
11C101 to 11C103	DCC810571	C2012F 1E 104Z A TD84N
11C104	DCE229201	SME-CE04W 1E 470M TC04R
11C105 to 11C109	DCC810571	C2012F 1E 104Z A TD84N
11C112 to 11C114	DCC810511	C2012F 1H 103Z A TD84N
11C122 to 11C124	DCC810511	C2012F 1H 103Z A TD84N
11C131	DCE229201	SME-CE04W 1E 470M TC04R
11D54	DDD830261	RD30M-T1B B
11D60	DDD810261	HSM 88AS TL
11D121	DDD029411	D1NS4 TA21R
11FL1	DCL119361	BL02RN2-R62 TD04N
11IC1	DIC470081	CD107BPF (NEC)
11IC3	DIC322901	SY 100S331JC
11IC4	DIC322911	MB 10HL125PF-G-BND
11IC5	DIC322861	MC 10EL33D (MOTOROLLA)
11IC7	DIC322901	SY 100S331JC
11IC8	DIC322741	MC 10H125M (MOTOROLLA)
11IC10	DIC619101	OP AMP 4558F TE1208B
11IC12	DHF012991	EXO-3C 20.000MHZ
11IC13	DIC889161	TC 4W53F(TE12L) TE1208R

SWEEP GENERATOR [11]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
11Q60	DTR890821	IMT2 TE0804R
11Q61	DTR191241	μPA 103G
11R1	DRZ832501	RK73H 2A 11KΩF TD0804N
11R2	DRZ832491	RK73H 2A 10KΩF TD0804N
11R3	DRZ832231	RK73H 2A 820ΩF TD0804N
11R4	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R5,11R6	DRZ832011	RK73H 2A 100ΩF TD0804N
11R7	DRZ833071	RK73H 2A 82ΩF TD0804N
11R10	DRZ832011	RK73H 2A 100ΩF TD0804N
11R11	DRZ832041	RK73H 2A 130ΩF TD0804N
11R12	DRZ833071	RK73H 2A 82ΩF TD0804N
11R13	DRZ832051	RK73H 2A 150ΩF TD0804N
11R14	DRZ832171	RK73H 2A 470ΩF TD0804N
11R15	DRZ832041	RK73H 2A 130ΩF TD0804N
11R16	DRZ833071	RK73H 2A 82ΩF TD0804N
11R17	DRZ832171	RK73H 2A 470ΩF TD0804N
11R18,11R19	DRZ832331	RK73H 2A 2.2KΩF TD0804N
11R20	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R21	DRZ832171	RK73H 2A 470ΩF TD0804N
11R22A,11R22B	DRZ833071	RK73H 2A 82ΩF TD0804N
11R23	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R25	DRZ832351	RK73H 2A 2.7KΩF TD0804N
11R26	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R27	DRZ832351	RK73H 2A 2.7KΩF TD0804N
11R28	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R31	DRZ832041	RK73H 2A 130ΩF TD0804N
11R32	DRZ833071	RK73H 2A 82ΩF TD0804N
11R33	DRZ832051	RK73H 2A 150ΩF TD0804N
11R34	DRZ832171	RK73H 2A 470ΩF TD0804N
11R35	DRZ832041	RK73H 2A 130ΩF TD0804N
11R36	DRZ833071	RK73H 2A 82ΩF TD0804N
11R38	DRZ832331	RK73H 2A 2.2KΩF TD0804N
11R41	DRZ832171	RK73H 2A 470ΩF TD0804N
11R42A,11R42B	DRZ833071	RK73H 2A 82ΩF TD0804N
11R43	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R44	DRZ832331	RK73H 2A 2.2KΩF TD0804N
11R45	DRZ832351	RK73H 2A 2.7KΩF TD0804N
11R46	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R47	DRZ832351	RK73H 2A 2.7KΩF TD0804N
11R48	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R51	DRZ832491	RK73H 2A 10KΩF TD0804N
11R52	DRZ832601	RK73H 2A 30KΩF TD0804N
11R54	DRZ832531	RK73H 2A 15KΩF TD0804N
11R55	DRZ832421	RK73H 2A 5.1KΩF TD0804N
11R56	DRZ831501	MCR10 000E TD0804N

SWEEP GENERATOR [11]

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
11R57	DRZ832011	RK73H 2A 100ΩF TD0804N
11R60 to 11R62	DRZ832601	RK73H 2A 30KΩF TD0804N
11R63	DRZ832601	RK73H 2A 30KΩF TD0804N
11R64,11R65	DRZ832401	RK73H 2A 4.3KΩF TD0804N
11R66,11R67	DRZ832491	RK73H 2A 10KΩF TD0804N
11R68	DRZ832321	RK73H 2A 2.0KΩF TD0804N
11R69	DRZ832011	RK73H 2A 100ΩF TD0804N
11R70	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R71	DRZ831501	MCR10 000E TD0804N
11R72	DRZ832131	RK73H 2A 330ΩF TD0804N
11R80 to 11R82	DRZ832011	RK73H 2A 100ΩF TD0804N
11R84	DRZ832411	RK73H 2A 4.7KΩF TD0804N
11R85,11R86	DRZ832251	RK73H 2A 1.0KΩF TD0804N
11R87	DRZ832131	RK73H 2A 330ΩF TD0804N
11R91 to 11R94	DRZ832011	RK73H 2A 100ΩF TD0804N
11R95 to 11R98	DRZ832011	RK73H 2A 100ΩF TD0804N

A SAWTOOTH BUFF 12

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
12C2	DCC810511	C2012F 1H 103Z A TD84N
12C5	DCC816441	C2012CH 1H 050C A TD84N
12C11	DCC816801	C2012CH 1H 102J A TD84N
12C15	DCC816441	C2012CH 1H 050C A TD84N
12C17	DCC810571	C2012F 1E 104Z A TD84N
12C22	DCC810511	C2012F 1H 103Z A TD84N
12C25	DCC816441	C2012CH 1H 050C A TD84N
12C31	DCC816801	C2012CH 1H 102J A TD84N
12C35	DCC816441	C2012CH 1H 050C A TD84N
12C37	DCC810571	C2012F 1E 104Z A TD84N
12C51	DCC810511	C2012F 1H 103Z A TD84N
12D2	DDD810141	MA 159-(TX) TE0804L
12D8	DDD810341	HSM 88WK TE0804L
12D9	DDD810521	1SS 307 TE0804L
12D10,12D11	DDD830201	RD15M-T1B B
12D12	DDD830101	RD5.6M-T1B B
12D16	DDD810341	HSM 88WK TE0804L
12D22	DDD810141	MA 159-(TX) TE0804L
12D28	DDD810341	HSM 88WK TE0804L
12D29	DDD810521	1SS 307 TE0804L
12D30,12D31	DDD830201	RD15M-T1B B
12D32	DDD830101	RD5.6M-T1B B
12D36	DDD810341	HSM 88WK TE0804L
12IC1	DIC499681	74HC14F TE1612B
12IC2	DIC499301	74HC00F/AF TJ3212F
12Q3	DTR139351	2SC 2901-T
12Q6	DTR830371	2SC 3735B34/B35-T1B
12Q9	DTR810221	2SA 1462-T1B Y34
12Q10	DTR860171	FC13 TE0804R
12Q11	DTR830371	2SC 3735B34/B35-T1B
12Q12,12Q13	DTR838661	2SC 2712LG TE85L
12Q22	DTR139351	2SC 2901-T
12Q26	DTR830371	2SC 3735B34/B35-T1B
12Q29	DTR810221	2SA 1462-T1B Y34
12Q30	DTR860171	FC13 TE0804R
12Q31	DTR830371	2SC 3735B34/B35-T1B
12Q32,12Q33	DTR838661	2SC 2712LG TE85L
12R3	DRZ832171	RK73H 2A 470ΩF TD0804N
12R4	DRZ832411	RK73H 2A 4.7KΩF TD0804N
12R5,12R6	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R7	DRZ832341	RK73H 2A 2.4KΩF TD0804N
12R9,12R10	DRZ832321	RK73H 2A 2.0KΩF TD0804N
12R11	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R12	DRZ832351	RK73H 2A 2.7KΩF TD0804N
12R13	DRZ832591	RK73H 2A 27KΩF TD0804N

A SAWTOOTH BUFF 12

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
12R14	DRZ832011	RK73H 2A 100ΩF TD0804N
12R15	DRZ832491	RK73H 2A 10KΩF TD0804N
12R16	DRZ832511	RK73H 2A 12KΩF TD0804N
12R17	DRZ832491	RK73H 2A 10KΩF TD0804N
12R19	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R23	DRZ832171	RK73H 2A 470ΩF TD0804N
12R24	DRZ832411	RK73H 2A 4.7KΩF TD0804N
12R25,12R26	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R27	DRZ832341	RK73H 2A 2.4KΩF TD0804N
12R29, 12R30	DRZ832321	RK73H 2A 2.0KΩF TD0804N
12R31	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R32	DRZ832351	RK73H 2A 2.7KΩF TD0804N
12R33	DRZ832591	RK73H 2A 27KΩF TD0804N
12R34	DRZ832011	RK73H 2A 100ΩF TD0804N
12R35	DRZ832491	RK73H 2A 10KΩF TD0804N
12R36	DRZ832511	RK73H 2A 12KΩF TD0804N
12R37	DRZ832491	RK73H 2A 10KΩF TD0804N
12R39	DRZ832251	RK73H 2A 1.0KΩF TD0804N
12R54	DRZ831501	MCR10 000E TD0804N
12R61 to 12R63	DRZ831501	MCR10 000E TD0804N

A TIMING 13

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
13C1	DCC810511	C2012F 1H 103Z A TD84N
13C2	DCC810571	C2012F 1E 104Z A TD84N
13C3	DCC830161	GRM43-2F 105Z 50PT TE1208N
13C9	DCC816601	C2012CH 1H 101J A TD84N
13C5 to 13C7	DCC810511	C2012F 1H 103Z A TD84N
13C10	DCC816601	C2012CH 1H 101J A TD84N
13C20	DCC810571	C2012F 1E 104Z A TD84N
13C21	DCC830161	GRM43-2F 105Z 50PT TE1208N
13C23,13C24	DCC810571	C2012F 1E 104Z A TD84N
13C25,13C26	DCC810511	C2012F 1H 103Z A TD84N
13C31,13C32	DCC816601	C2012CH 1H 101J A TD84N
13C34,13C35	DCC816601	C2012CH 1H 101J A TD84N
13C42	DCF128401	MS18 1H 1004G
13C43	DCF125791	NQS6 1H 9901C
13C44	DCC816591	C2012CH 1H 820J A TD84N
13C45	DCC816381	C2012CH 1H 020C A TD84N
13C51	DCC810571	C2012F 1E 104Z A TD84N
13C52,13C53	DCC816801	C2012CH 1H 102J A TD84N
13D25	DDD830041	RD3.3M-T1B B
13D26	DDD830201	RD15M-T1B B
13D52	DDD810241	1SS 272 TE0804R
13D6	DDD830271	RD24M-T1B B3 TE0804L
13D7	DDD830121	RD6.8M-T1B B
13IC1	DIC619171	NJM 353M(TE3) TE1208L
13IC2	DIC619101	OP AMP 4558F TE1208B
13Q2	DTR890851	IMH1 TE0804N
13Q23	DTR139011	2SC 1815GR TPER1
13Q3	DTR890851	IMH1 TE0804N
13Q30	DTR818021	2SA 811A-T1B C17/C18
13Q34	DTR890851	IMH1 TE0804N
13Q36 to 13Q38	DTR818021	2SA 811A-T1B C17/C18
13Q39	DTR818021	2SA 811A-T1B C17/C18
13Q4	DTR890851	IMH1 TE0804N
13Q50	DTR119051	2SA 988EA/FA TRB
13Q52,13Q53	DTR830081	2SC 2714 TE85L
13Q9	DTR890851	IMH1 TE0804N
13R1	DRZ832451	RK73H 2A 6.8KΩF TD0804N
13R2	DRZ832591	RK73H 2A 27KΩF TD0804N
13R3	DRZ832651	RK73H 2A 47KΩF TD0804N
13R4	DRZ832621	RK73H 2A 36KΩF TD0804N
13R5	DRZ832251	RK73H 2A 1.0KΩF TD0804N
13R6	DRZ832541	RK73H 2A 16KΩF TD0804N
13R7	DRZ832411	RK73H 2A 4.7KΩF TD0804N
13R8,13R9	DRZ832651	RK73H 2A 47KΩF TD0804N
13R10	DRZ832651	RK73H 2A 47KΩF TD0804N

A TIMING 13

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
13R11	DRE938701	CRB25CZ 36KΩ T-29E TA21N
13R12,13R13	DRE938711	CRB25CZ 18KΩ T-29E TA21N
13R20	DRZ832601	RK73H 2A 30KΩF TD0804N
13R21	DRZ832561	RK73H 2A 20KΩF TD0804N
13R22	DRZ832511	RK73H 2A 12KΩF TD0804N
13R23	DRZ832581	RK73H 2A 24KΩF TD0804N
13R24	DRZ832681	RK73H 2A 62KΩF TD0804N
13R30 to 13R35	DRZ832591	RK73H 2A 27KΩF TD0804N
13R36 to 13R39	DRZ832491	RK73H 2A 10KΩF TD0804N
13R40	DRZ832511	RK73H 2A 12KΩF TD0804N
13R41,13R42	DRE997211	CRB20 2KΩDY T-29E TA21N
13R43	DRE997221	CRB20 10KΩDY T-29E TA21N
13R44	DRE997091	CRB20 100KΩDY T-29E TA21N
13R45	DRE997231	CRB20 1MΩDY T-29E TA21N
13R50	DRZ832251	RK73H 2A 1.0KΩF TD0804N
13R51	DRZ832011	RK73H 2A 100ΩF TD0804N
13R52,13R53	DRZ832171	RK73H 2A 470ΩF TD0804N

B TIMING 14

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
14C1	DCC810511	C2012F 1H 103Z A TD84N
14C2	DCC810571	C2012F 1E 104Z A TD84N
14C5 to 14C7	DCC810511	C2012F 1H 103Z A TD84N
14C9,14C10	DCC816601	C2012CH 1H 101J A TD84N
14C20	DCC810571	C2012F 1E 104Z A TD84N
14C21	DCC830161	GRM43-2F 105Z 50PT TE1208I
14C23,14C24	DCC810571	C2012F 1E 104Z A TD84N
14C25,14C26	DCC810511	C2012F 1H 103Z A TD84N
14C31,14C32	DCC816601	C2012CH 1H 101J A TD84N
14C34,14C35	DCC816601	C2012CH 1H 101J A TD84N
14C42	DCF132661	MS13 2A 1003G
14C43	DCF125791	NQS6 1H 9901C
14C44	DCC816591	C2012CH 1H 820J A TD84N
14C45	DCC816441	C2012CH 1H 050C A TD84N
14C51	DCC810571	C2012F 1E 104Z A TD84N
14C52,14C53	DCC816801	C2012CH 1H 102J A TD84N
14D6	DDD830271	RD24M-T1B B3 TE0804L
14D7	DDD830121	RD6.8M-T1B B
14D25	DDD830041	RD3.3M-T1B B
14D26	DDD830201	RD15M-T1B B
14D52	DDD810241	1SS 272 TE0804R
14IC1	DIC619171	NJM 353M(TE3) TE1208B
14IC2	DIC619101	OP AMP 4558F TE1208B
14Q2	DTR890851	IMH1 TE0804N
14Q4	DTR890851	IMH1 TE0804N
14Q23	DTR139011	2SC 1815GR TPER1
14Q30	DTR818021	2SA 811A-T1B C17/C18
14Q31	DTR890851	IMH1 TE0804N
14Q34	DTR890851	IMH1 TE0804N
14Q36 to 14Q39	DTR818021	2SA 811A-T1B C17/C18
14Q50	DTR119051	2SA 988EA/FA TRB
14Q52,14Q53	DTR830081	2SC 2714 TE85L
14Q9	DTR890851	IMH1 TE0804N
14R1	DRZ832651	RK73H 2A 47KΩF TD0804N
14R2	DRZ832591	RK73H 2A 27KΩF TD0804N
14R3	DRZ832651	RK73H 2A 47KΩF TD0804N
14R4	DRZ832621	RK73H 2A 36KΩF TD0804N
14R5	DRZ832661	RK73H 2A 51KΩF TD0804N
14R6	DRZ832421	RK73H 2A 5.1KΩF TD0804N
14R7	DRZ832521	RK73H 2A 13KΩF TD0804N
14R8 to 14R10	DRZ832651	RK73H 2A 47KΩF TD0804N
14R11	DRE938701	CRB25CZ 36KΩ T-29E TA21N
14R12,14R13	DRE938711	CRB25CZ 18KΩ T-29E TA21N
14R20	DRZ832601	RK73H 2A 30KΩF TD0804N
14R21	DRZ832561	RK73H 2A 20KΩF TD0804N

B TIMING 14

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
14R22	DRZ832511	RK73H 2A 12KΩF TD0804N
14R23	DRZ832581	RK73H 2A 24KΩF TD0804N
14R24	DRZ832681	RK73H 2A 62KΩF TD0804N
14R30 to 14R35	DRZ832591	RK73H 2A 27KΩF TD0804N
14R36 to 14R39	DRZ832491	RK73H 2A 10KΩF TD0804N
14R40	DRZ832511	RK73H 2A 12KΩF TD0804N
14R41,14R42	DRE997211	CRB20 2KΩDY T-29E TA21N
14R43	DRE997221	CRB20 10KΩDY T-29E TA21N
14R44	DRE997091	CRB20 100KΩDY T-29E TA21N
14R45	DRE997231	CRB20 1MΩDY T-29E TA21N
14R50	DRZ832251	RK73H 2A 1.0KΩF TD0804N
14R51	DRZ832011	RK73H 2A 100ΩF TD0804N
14R52,14R53	DRZ832171	RK73H 2A 470ΩF TD0804N

H&Z SW 15

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
15C1	DCC810511	C2012F 1H 103Z A TD84N
15C4	DCC810511	C2012F 1H 103Z A TD84N
15C6	DCC810511	C2012F 1H 103Z A TD84N
15C7	DCC816601	C2012CH 1H 101J A TD84N
15C10	DCC816601	C2012CH 1H 101J A TD84N
15C13	DCC816801	C2012CH 1H 102J A TD84N
15C21	DCC816461	C2012CH 1H 070D A TD84N
15C22	DCC810571	C2012F 1E 104Z A TD84N
15D3	DDD810141	MA 159-(TX) TE0804L
15D6	DDD810141	MA 159-(TX) TE0804L
15D20 to 15D22	DDD810241	1SS 272 TE0804R
15D23,15D24	DDD810341	HSM 88WK TE0804L
15J1	KHB095411	SMALL PIN JACK
15Q1,15Q2	DTR830371	2SC 3735B34/B35-T1B
15Q13	DTR890851	IMH1 TE0804N
15R1	DRZ832491	RK73H 2A 10KΩF TD0804N
15R2	DRZ832371	RK73H 2A 3.3KΩF TD0804N
15R3	DRZ832391	RK73H 2A 3.9KΩF TD0804N
15R4	DRZ832371	RK73H 2A 3.3KΩF TD0804N
15R5	DRZ832391	RK73H 2A 3.9KΩF TD0804N
15R6	DRZ832011	RK73H 2A 100ΩF TD0804N
15R7	DRZ832131	RK73H 2A 330ΩF TD0804N
15R8	DRZ832361	RK73H 2A 3.0KΩF TD0804N
15R9	DRZ832251	RK73H 2A 1.0KΩF TD0804N
15R10	DRZ832131	RK73H 2A 330ΩF TD0804N
15R11	DRZ832361	RK73H 2A 3.0KΩF TD0804N
15R12	DRZ832251	RK73H 2A 1.0KΩF TD0804N
15R13,15R14	DRZ832201	RK73H 2A 620ΩF TD0804N
15R20	DRZ832351	RK73H 2A 2.7KΩF TD0804N
15R21	DRZ832581	RK73H 2A 24KΩF TD0804N
15R22	DRZ832351	RK73H 2A 2.7KΩF TD0804N

TV SYNC GENERATOR 16

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
16C1	DCC816801	C2012CH 1H 102J A TD84N
16C2	DCC810511	C2012F 1H 103Z A TD84N
16C3	DCC810511	C2012F 1H 103Z A TD84N
16C5	DCE919461	SME 10VB-100(M)BP TC04N
16C7,16C8	DCC810511	C2012F 1H 103Z A TD84N
16C11	DCC810511	C2012F 1H 103Z A TD84N
16C15	DCC816601	C2012CH 1H 101J A TD84N
16C16	DCE249351	SME-CE04W 1H 100M TC04R
16C17	DCF139011	MF-3 2A 103K TC04N
16C21,16C22	DCC810511	C2012F 1H 103Z A TD84N
16C25,16C26	DCC810511	C2012F 1H 103Z A TD84N
16D1	DDD810241	1SS 272 TE0804R
16D4	DDD810241	1SS 272 TE0804R
16D7	DDD830121	RD6.8M-T1B B
16D8	DDD830101	RD5.6M-T1B B
16IC1	DIC623501	μPC 1663G (NEC)
16IC2	DIC889161	TC 4W53F(TE12L) TE1208R
16IC3	DIC619191	NJM 082M(TE3) TE1208L
16IC4	DIC639041	μPC 311G2-E1 TE1208F
16Q1	DTR838661	2SC 2712LG TE85L
16Q3	DTR890791	IMD3 TE0804R
16Q8	DTR870031	3SK 241 TE0804L
16Q17	DTR890841	IMX3 TE0804R
16R1	DRZ832171	RK73H 2A 470ΩF TD0804N
16R2	DRZ832011	RK73H 2A 100ΩF TD0804N
16R3	DRZ832431	RK73H 2A 5.6KΩF TD0804N
16R4	DRZ832561	RK73H 2A 20KΩF TD0804N
16R5	DRZ832171	RK73H 2A 470ΩF TD0804N
16R6	DRZ832251	RK73H 2A 1.0KΩF TD0804N
16R7	DRZ832291	RK73H 2A 1.5KΩF TD0804N
16R8	DRZ832491	RK73H 2A 10KΩF TD0804N
16R9,16R10	DRZ832251	RK73H 2A 1.0KΩF TD0804N
16R11,16R12	DRZ832011	RK73H 2A 100ΩF TD0804N
16R13	DRZ832491	RK73H 2A 10KΩF TD0804N
16R14	DRZ832731	RK73H 2A 100KΩF TD0804N
16R15	DRZ832501	RK73H 2A 11KΩF TD0804N
16R16,16R17	DRZ832731	RK73H 2A 100KΩF TD0804N
16R21	DRZ832971	RK73H 2A 1.0MΩF TD0804N
16R22	DRZ832541	RK73H 2A 16KΩF TD0804N
16R23	DRZ832121	RK73H 2A 300ΩF TD0804N
16R24	DRZ832251	RK73H 2A 1.0KΩF TD0804N
16R25	DRZ832011	RK73H 2A 100ΩF TD0804N
16R26	DRZ832011	RK73H 2A 100ΩF TD0804N
D2	DDD135082	RD2.0MB TE0804L

CH1/CH2 TV CLAMP 17

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
17C1	DCC810511	C2012F 1H 103Z A TD84N
17C11	DCC810511	C2012F 1H 103Z A TD84N
17C11A	DCC816601	C2012CH 1H 101J A TD84N
17C12	DCC810921	C2012B 1H 472K A TD84N
17C13	DCC810511	C2012F 1H 103Z A TD84N
17C15	DCC810511	C2012F 1H 103Z A TD84N
17C20,17C21	DCC810511	C2012F 1H 103Z A TD84N
17C22	DCC810921	C2012B 1H 472K A TD84N
17C24,17C25	DCC810511	C2012F 1H 103Z A TD84N
17C33,17C34	DCC816801	C2012CH 1H 102J A TD84N
17C37	DCC810511	C2012F 1H 103Z A TD84N
17C61,17C62	DCC816601	C2012CH 1H 101J A TD84N
17C64 to 17C68	DCC810511	C2012F 1H 103Z A TD84N
17C71	DCC816601	C2012CH 1H 101J A TD84N
17C77	DCC816601	C2012CH 1H 101J A TD84N
17D1	DDD830141	RD8.2M-T1B B
17D2	DDD810341	HSM 88WK TE0804L
17D31	DDD810241	1SS 272 TE0804R
17D71	DDD810521	1SS 307 TE0804L
17D72	DDD810341	HSM 88WK TE0804L
17D77	DDD810521	1SS 307 TE0804L
17IC1	DIC623501	μPC 1663G (NEC)
17IC2	DIC690021	μPC 398C (NEC)
17IC3	DIC690911	NJM 4200M(TE3) TE1208L
17IC4	DIC619101	OP AMP 4558F TE1208B
17IC5	DIC495081	TC 4052BF (EL) TE1612B
17IC6	DIC889161	TC 4W53F(TE12L) TE1208R
17IC41	DIC499301	74HC00F/AF TE1612B
17IC42	DIC499371	74HC74F/AF TE1612B
17IC43,17IC44	DIC499511	74HC161F TE1612B
17IC45	DIC495721	74HC123AF TE1612B
17Q31,17Q32	DTR860191	2SK 2113YY-TL TE0804F
17Q71	DTR890861	IMZ1 TE0804R
17Q74	DTR860171	FC13 TE0804R
17Q75	DTR890861	IMZ1 TE0804R
17Q77	DTR890861	IMZ1 TE0804R
17Q79	DTR860171	FC13 TE0804R
17Q80	DTR890861	IMZ1 TE0804R
17Q91	DTR830371	2SC 3735B34/B35-T1B
17Q93	DTR810221	2SA 1462-T1B Y34
17R1	DRZ832011	RK73H 2A 100ΩF TD0804N
17R2	DRZ832391	RK73H 2A 3.9KΩF TD0804N
17R3	DRZ832011	RK73H 2A 100ΩF TD0804N
17R4	DRZ832321	RK73H 2A 2.0KΩF TD0804N
17R6	DRZ832391	RK73H 2A 3.9KΩF TD0804N

CH1/CH2 TV CLAMP 17

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
17R7	DRZ832321	RK73H 2A 2.0KΩF TD0804N
17R10	DRZ832491	RK73H 2A 10KΩF TD0804N
17R11	DRZ832171	RK73H 2A 470ΩF TD0804N
17R12	DRZ831501	MCR10 000E TD0804N
17R13	DRZ832651	RK73H 2A 47KΩF TD0804N
17R14,17R15	DRZ832561	RK73H 2A 20KΩF TD0804N
17R16	DRZ832651	RK73H 2A 47KΩF TD0804N
17R17	DRZ831501	MCR10 000E TD0804N
17R19	DRZ832651	RK73H 2A 47KΩF TD0804N
17R20	DRZ832701	RK73H 2A 75KΩF TD0804N
17R21	DRZ832811	RK73H 2A 220KΩF TD0804N
17R22	DRZ832541	RK73H 2A 16KΩF TD0804N
17R24	DRZ832531	RK73H 2A 15KΩF TD0804N
17R25	DRZ832811	RK73H 2A 220KΩF TD0804N
17R26,17R27	DRZ832011	RK73H 2A 100ΩF TD0804N
17R31	DRZ832561	RK73H 2A 20KΩF TD0804N
17R32 to 17R34	DRZ832561	RK73H 2A 20KΩF TD0804N
17R35,17R36	DRZ832011	RK73H 2A 100ΩF TD0804N
17R61	DRZ832411	RK73H 2A 4.7KΩF TD0804N
17R62	DRZ832431	RK73H 2A 5.6KΩF TD0804N
17R63	DRZ831501	MCR10 000E TD0804N
17R71,17R72	DRZ832391	RK73H 2A 3.9KΩF TD0804N
17R73	DRZ832251	RK73H 2A 1.0KΩF TD0804N
17R74	DRZ832391	RK73H 2A 3.9KΩF TD0804N
17R75 to 17R77	DRZ832391	RK73H 2A 3.9KΩF TD0804N
17R78	DRZ832251	RK73H 2A 1.0KΩF TD0804N
17R79,17R80	DRZ832391	RK73H 2A 3.9KΩF TD0804N
17R91,17R92	DRZ832411	RK73H 2A 4.7KΩF TD0804N

CONTROL 18

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
18C1	DCC810511	C2012F 1H 103Z A TD84N
18C2	DCE229201	SME-CE04W 1E 470M TC04R
18C3	DCC810511	C2012F 1H 103Z A TD84N
18C10A,18C10B	DCC810511	C2012F 1H 103Z A TD84N
18C11,18C12	DCC810571	C2012F 1E 104Z A TD84N
18C22	DCC810511	C2012F 1H 103Z A TD84N
18C30	DCC810511	C2012F 1H 103Z A TD84N
18C31 to 18C33	DCC810571	C2012F 1E 104Z A TD84N
18C34 to 18C37	DCC810511	C2012F 1H 103Z A TD84N
18IC1 to 18IC8	DIC483321	74HC 595F/AF TE1612B
18IC9,18IC10	DIC642201	MB88346BPF-G-BND-ER TE2412B
18IC11,18IC12	DIC642281	MB 88351PF-G-BND-EF TE1612F
18IC14,18IC15	DIC499381	74HC138F/AF TE1612B
18IC16,18IC17	DIC495081	TC 4052BF (EL) TE1612B
18IC18	DIC889131	TC 7W32F(TE12L) TE1208R
18IC19	DIC659371	NJM 431U-TE1 (JRC)
18IC20	DIC499321	74HC04F/AF TE1612B
18IC21	DIC499301	74HC00F/AF TE1612B
18IC22	DIC499371	74HC74F/AF TE1612B
18J1,18J2	DCN124501	FF3-22-S55
18J3	DCN124741	FF3-26-S55
18R1	DRZ832101	RK73H 2A 240ΩF TD0804N
18R2	DRZ832271	RK73H 2A 1.2KΩF TD0804N
18R3	DRZ832321	RK73H 2A 2.0KΩF TD0804N
18R4 to 18R17	DRZ832121	RK73H 2A 300ΩF TD0804N
18R20 to 18R23	DRZ832121	RK73H 2A 300ΩF TD0804N
18R30	DRZ831501	MCR10 000E TD0804N

POWER CONNECT 19

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
19C1 to 19C4	DCC810571	C2012F 1E 104Z A TD84N
19C5,19C6	DCE229201	SME-CE04W 1E 470M TC04R
19C7 to 19C10	DCC810571	C2012F 1E 104Z A TD84N
19C11 to 19C14	DCE229201	SME-CE04W 1E 470M TC04R
19C15	DCF139011	MF-3 2A 103K TC04N
19C16 to 19C19	DCC810571	C2012F 1E 104Z A TD84N
19C20	DCE259121	SME-CE04W 2A 100M TC04R
19C21 to 19C24	DCE229201	SME-CE04W 1E 470M TC04R
19C25,19C26	DCC810511	C2012F 1H 103Z A TD84N
19C30,19C31	DCC810511	C2012F 1H 103Z A TD84N
19C40 to 19C44	DCC810511	C2012F 1H 103Z A TD84N
19D1,19D2	DDD810241	1SS 272 TE0804R
19FL1 to 19FL11	DCL119361	BL02RN2-R62 TD04N
19IC1	DIC495081	TC 4052BF (EL) TE1612B
19IC2,19IC3	DIC619101	OP AMP 4558F TE1208B
19L1 to 19L6	DCL152581	LHB0812-303
19P1	DCN994771	CONNECTOR 5267-10A
19P2	DCN990911	CONNECTOR 5267-07A
19R1,19R2	DRZ832011	RK73H 2A 100ΩF TD0804N
19R7,19R8	DRZ832491	RK73H 2A 10KΩF TD0804N
19R21 to 19R29	DRZ831501	MCR10 000E TD0804N
19R3,19R6	DRZ832561	RK73H 2A 20KΩF TD0804N
19R4,19R5	DRZ832431	RK73H 2A 5.6KΩF TD0804N
19R40 to 19R47	DRZ832491	RK73H 2A 10KΩF TD0804N
19R48	DRZ831501	MCR10 000E TD0804N

V MAIN AMP 20

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
20C1	DCE259121	SME-CE04W 2A 100M TC04R
20C3	DCV019592	ECV-1ZW 20X53T
20C4	DCC810511	C2012F 1H 103Z A TD84N
20C6,20C7	DCC810511	C2012F 1H 103Z A TD84N
20C8	DCF121761	MF-3S 1H 223J TC04N
20C9	DCC810921	C2012B 1H 472K A TD84N
20C10	DCC810511	C2012F 1H 103Z A TD84N
20C13	DCC810511	C2012F 1H 103Z A TD84N
20C14	DCF139011	MF-3 2A 103K TC04N
20C15 to 20C18	DCC810511	C2012F 1H 103Z A TD84N
20C19	DCE919451	SME 10VB-47(M)BP TC04N
20C20	DCF121861	MF-3S 1H 154J TC04N
20C21	DCC810511	C2012F 1H 103Z A TD84N
20C22 to 20C25	DCC816591	C2012CH 1H 820J A TD84N
20C26	DCC810511	C2012F 1H 103Z A TD84N
20C28	DCE949461	SME 50VB-4.7(M)BP TC04N
20C29	DCC810511	C2012F 1H 103Z A TD84N
20C30	DCC816801	C2012CH 1H 102J A TD84N
20C31 to 20C33	DCE229201	SME-CE04W 1E 470M TC04R
20C34 to 20C36	DCC810511	C2012F 1H 103Z A TD84N
20C37 to 20C39	DCF139011	MF-3 2A 103K TC04N
20C40	DCC152901	CK45B 2H 472K
20C41,20C42	DCC810511	C2012F 1H 103Z A TD84N
20C46	DCC810511	C2012F 1H 103Z A TD84N
20C49	DCC816491	C2012CH 1H 100D A TD84N
20D1	DDD810241	1SS 272 TE0804R
20D3,20D4	DDD810241	1SS 272 TE0804R
20D5	DDD830031	RD3.0M-T1B B
20D6	DDD810241	1SS 272 TE0804R
20D7	DDD830031	RD3.0M-T1B B
20FL1 to 20FL4	DCL119361	BL02RN2-R62 TD04N
20IC1	DIC499441	74HC4053F/AF TE1612B
20IC2,20IC3	DIC619101	OP AMP 4558F TE1208B
20IC4	DIC889171	TC 7W04F(TE12L) TE1208R
20IC5	DIC811141	HIC A121
20L1,20L2	DCL810831	HK1608 18NJ-T TD0804N
20L3,20L4	DCL152581	LHB0812-303
20P6	DCN994771	CONNECTOR 5267-10A
20Q1	DTR139011	2SC 1815GR TPER1
20Q2 to 20Q4	DTR830371	2SC 3735B34/B35-T1B
20Q5 to 20Q11	DTR139011	2SC 1815GR TPER1
20Q12	DTR830371	2SC 3735B34/B35-T1B
20Q13	DTR890791	IMD3 TE0804R
20Q14,20Q15	DTR838661	2SC 2712LG TE85L
20R1,20R2	DRZ832051	RK73H 2A 150Ω F TD0804N

V MAIN AMP 20

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
20R3	DRZ832011	RK73H 2A 100Ω F TD0804N
20R4	DRZ833551	RK73H 2A 33Ω F TD0804N
20R5	DRZ832441	RK73H 2A 6.2KΩ F TD0804N
20R6 to 20R13	DRE137461	EF1/4S 18Ω F TA21N
20R14 to 20R16	DRZ832011	RK73H 2A 100Ω F TD0804N
20R17,20R18	DRZ832051	RK73H 2A 150Ω F TD0804N
20R19 to 20R26	DRE137541	EF1/4S 39Ω F TA21N
20R27 to 20R34	DRE137541	EF1/4S 39Ω F TA21N
20R35,20R36	DRE137651	EF1/4S 110Ω F TA21N
20R37	DRZ832311	RK73H 2A 1.8KΩ F TD0804N
20R38	DRZ832351	RK73H 2A 2.7KΩ F TD0804N
20R39	DRZ832511	RK73H 2A 12KΩ F TD0804N
20R40	DRZ832481	RK73H 2A 9.1KΩ F TD0804N
20R41	DRZ832101	RK73H 2A 240Ω F TD0804N
20R42	DRZ832441	RK73H 2A 6.2KΩ F TD0804N
20R43	DRZ832101	RK73H 2A 240Ω F TD0804N
20R44	DIC830541	HIC C54
20R45	DRZ832481	RK73H 2A 9.1KΩ F TD0804N
20R46,20R47	DRZ832581	RK73H 2A 24KΩ F TD0804N
20R48	DRZ832251	RK73H 2A 1.0KΩ F TD0804N
20R49,20R50	DRZ832361	RK73H 2A 3.0KΩ F TD0804N
20R51	DRZ832251	RK73H 2A 1.0KΩ F TD0804N
20R52	DRZ832301	RK73H 2A 1.6KΩ F TD0804N
20R53 to 20R55	DRZ832251	RK73H 2A 1.0KΩ F TD0804N
20R56	DRZ832341	RK73H 2A 2.4KΩ F TD0804N
20R57	DRZ832461	RK73H 2A 7.5KΩ F TD0804N
20R58	DRZ832301	RK73H 2A 1.6KΩ F TD0804N
20R59	DRZ832421	RK73H 2A 5.1KΩ F TD0804N
20R61	DRZ832421	RK73H 2A 5.1KΩ F TD0804N
20R62	DRZ832431	RK73H 2A 5.6KΩ F TD0804N
20R63	DRZ832441	RK73H 2A 6.2KΩ F TD0804N
20R64	DRZ832351	RK73H 2A 2.7KΩ F TD0804N
20R65,20R66	DRZ832671	RK73H 2A 56KΩ F TD0804N
20R67,20R68	DRZ832561	RK73H 2A 20KΩ F TD0804N
20R69	DRZ832661	RK73H 2A 51KΩ F TD0804N
20R70	DRZ832431	RK73H 2A 5.6KΩ F TD0804N
20R71	DRZ832321	RK73H 2A 2.0KΩ F TD0804N
20R72	DRZ832361	RK73H 2A 3.0KΩ F TD0804N
20R73	DRV419191	GF06UT2/CT-6TV00 2KΩ TE04B
20R74,20R75	DRZ832431	RK73H 2A 5.6KΩ F TD0804N
20R76 to 20R79	DRZ832181	RK73H 2A 510Ω F TD0804N
20R80	DRV419211	GF06UT2/CT-6TV00 10KΩ (T)
20R81	DRZ832601	RK73H 2A 30KΩ F TD0804N
20R82	DRZ832531	RK73H 2A 15KΩ F TD0804N
20R83	DRZ832441	RK73H 2A 6.2KΩ F TD0804N

V MAIN AMP 20

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
20R85,20R86	DRZ832461	RK73H 2A 7.5KΩF TD0804N
20R87	DRV419191	GF06UT2/CT-6TV00 2KΩTE04B
20R88,20R89	DRZ831501	MCR10 000E TD0804N
20R90,20R91	DRZ833551	RK73H 2A 33ΩF TD0804N
20R95	DRZ832121	RK73H 2A 300ΩF TD0804N
20R96,20R97	DRZ832581	RK73H 2A 24KΩF TD0804N

H AMP 24

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
24C9	DCC816361	C2012CH 1H 010C A TD84N
24C10	DCC810571	C2012F 1E 104Z A TD84N
24C23	DCC816361	C2012CH 1H 010C A TD84N
24C28	DCC816761	C2012CH 1H 471J A TD84N
24C31	DCC810511	C2012F 1H 103Z A TD84N
24C45	DCC816601	C2012CH 1H 101J A TD84N
24C53	DCC810511	C2012F 1H 103Z A TD84N
24C62	DCC810511	C2012F 1H 103Z A TD84N
24C71	DCC810511	C2012F 1H 103Z A TD84N
24C72	DCE229201	SME-CE04W 1E 470M TC04R
24C82	DCC816421	C2012CH 1H 040C A TD84N
24C102	DCC810921	C2012B 1H 472K A TD84N
24C122	DCC810511	C2012F 1H 103Z A TD84N
24D61	DDD810341	HSM 88WK TE0804L
24D71	DDD830151	RD9.1M-T1B B
24D121	DDD810341	HSM 88WK TE0804L
24J1	KHB095411	SMALL PIN JACK
24Q1	DTR890761	IMX5 TE0804R
24Q8,24Q9	DTR810221	2SA 1462-T1B Y34
24Q18,24Q19	DTR810221	2SA 1462-T1B Y34
24Q31	DTR890791	IMD3 TE0804R
24Q33	DTR890821	IMT2 TE0804R
24Q34	DTR890841	IMX3 TE0804R
24Q37	DTR890841	IMX3 TE0804R
24Q41	DTR890861	IMZ1 TE0804R
24Q46	DTR810041	2SA 1162Y TE85L
24Q51	DTR890841	IMX3 TE0804R
24Q59	DTR838661	2SC 2712LG TE85L
24Q65,24Q66	DTR810221	2SA 1462-T1B Y34
24Q73	DTR890761	IMX5 TE0804R
24Q87	DTR890841	IMX3 TE0804R
24Q101	DTR890841	IMX3 TE0804R
24Q108	DTR890841	IMX3 TE0804R
24Q125,24Q126	DTR810221	2SA 1462-T1B Y34
24R1	DRZ833551	RK73H 2A 33ΩF TD0804N
24R2	DRE137911	EF1/4S 1.3KΩF TA21N
24R3	DRE137901	EF1/4S 1.2KΩF TA21N
24R4,24R5	DRE138161	EF1/4S 15KΩF TA21N
24R6,24R7	DRE138171	EF1/4S 16KΩF TA21N
24R8	DRZ833551	RK73H 2A 33ΩF TD0804N
24R9	DRZ832011	RK73H 2A 100ΩF TD0804N
24R10,24R11	DRZ832281	RK73H 2A 1.3KΩF TD0804N
24R12	DRE137991	EF1/4S 3.0KΩF TA21N
24R13	DRE137921	EF1/4S 1.5KΩF TA21N
24R14,24R15	DRE138161	EF1/4S 15KΩF TA21N

H AMP 24

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
24R16,24R17	DRE138171	EF1/4S 16KΩF TA21N
24R18	DRZ833551	RK73H 2A 33ΩF TD0804N
24R20,24R21	DRZ832361	RK73H 2A 3.0KΩF TD0804N
24R22	DRZ832301	RK73H 2A 1.6KΩF TD0804N
24R23	DRZ832571	RK73H 2A 22KΩF TD0804N
24R25,24R26	DRZ832151	RK73H 2A 390ΩF TD0804N
24R27	DRZ832031	RK73H 2A 120ΩF TD0804N
24R27A	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R27B	DDD880081	DTN-T203K 103KS TD0804N
24R28	DRZ832491	RK73H 2A 10KΩF TD0804N
24R30	DRZ832491	RK73H 2A 10KΩF TD0804N
24R31	DRZ832541	RK73H 2A 16KΩF TD0804N
24R32A to 24R32C	DRZ832281	RK73H 2A 1.3KΩF TD0804N
24R33,24R34	DRZ832321	RK73H 2A 2.0KΩF TD0804N
24R35	DRZ832491	RK73H 2A 10KΩF TD0804N
24R36	DRZ832341	RK73H 2A 2.4KΩF TD0804N
24R37	DRZ832471	RK73H 2A 8.2KΩF TD0804N
24R38	DRZ832561	RK73H 2A 20KΩF TD0804N
24R39	DRZ832611	RK73H 2A 33KΩF TD0804N
24R40	DRZ832481	RK73H 2A 9.1KΩF TD0804N
24R41	DRZ832491	RK73H 2A 10KΩF TD0804N
24R42	DRZ832481	RK73H 2A 9.1KΩF TD0804N
24R43	DRZ832491	RK73H 2A 10KΩF TD0804N
24R44	DRZ832341	RK73H 2A 2.4KΩF TD0804N
24R45	DRZ832421	RK73H 2A 5.1KΩF TD0804N
24R46	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R47	DRZ832451	RK73H 2A 6.8KΩF TD0804N
24R48,24R49	DRZ832581	RK73H 2A 24KΩF TD0804N
24R51	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R52	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R53	DRZ832391	RK73H 2A 3.9KΩF TD0804N
24R54	DRZ832581	RK73H 2A 24KΩF TD0804N
24R55,24R56	DRZ832181	RK73H 2A 510ΩF TD0804N
24R57,24R58	DRZ832491	RK73H 2A 10KΩF TD0804N
24R59	DRZ832291	RK73H 2A 1.5KΩF TD0804N
24R60	DRZ832371	RK73H 2A 3.3KΩF TD0804N
24R61	DRZ832421	RK73H 2A 5.1KΩF TD0804N
24R62,24R63	DRZ831501	MCR10 000E TD0804N
24R64	DRZ832421	RK73H 2A 5.1KΩF TD0804N
24R65,24R66	DRZ833551	RK73H 2A 33ΩF TD0804N
24R67	DRZ832421	RK73H 2A 5.1KΩF TD0804N
24R68	DRZ832271	RK73H 2A 1.2KΩF TD0804N
24R71,24R72	DRZ832101	RK73H 2A 240ΩF TD0804N
24R73,24R74	DRZ833551	RK73H 2A 33ΩF TD0804N
24R82	DRZ832951	RK73H 2A 820KΩF TD0804N

H AMP 24

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
24R83	DRZ832181	RK73H 2A 510ΩF TD0804N
24R84	DRV810231	G4AT/ST-4TA 1KΩ TE1208L
24R85,24R86	DRZ832101	RK73H 2A 240ΩF TD0804N
24R87	DRZ832011	RK73H 2A 100ΩF TD0804N
24R88	DRZ832051	RK73H 2A 150ΩF TD0804N
24R89	DRZ832361	RK73H 2A 3.0KΩF TD0804N
24R90	DRZ832221	RK73H 2A 750ΩF TD0804N
24R101	DRZ832081	RK73H 2A 200ΩF TD0804N
24R102	DRZ832011	RK73H 2A 100ΩF TD0804N
24R103	DRZ832171	RK73H 2A 470ΩF TD0804N
24R104	DRZ831501	MCR10 000E TD0804N
24R106,24R107	DRZ832291	RK73H 2A 1.5KΩF TD0804N
24R108	DRZ832011	RK73H 2A 100ΩF TD0804N
24R109	DRZ832231	RK73H 2A 820ΩF TD0804N
24R110	DRZ832371	RK73H 2A 3.3KΩF TD0804N
24R111	DRZ832341	RK73H 2A 2.4KΩF TD0804N
24R112	DRZ832051	RK73H 2A 150ΩF TD0804N
24R113,24R114	DRZ832131	RK73H 2A 330ΩF TD0804N
24R121	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R122,24R123	DRZ832081	RK73H 2A 200ΩF TD0804N
24R124	DRZ832251	RK73H 2A 1.0KΩF TD0804N
24R125,24R126	DRZ833551	RK73H 2A 33ΩF TD0804N
24R127	DRZ832491	RK73H 2A 10KΩF TD0804N
24R128	DRZ832341	RK73H 2A 2.4KΩF TD0804N
24R131,24R132	DRZ832011	RK73H 2A 100ΩF TD0804N
24R141,24R142	DRZ832011	RK73H 2A 100ΩF TD0804N

H OUT AMP 25

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
25C1	DCC810511	C2012F 1H 103Z A TD84N
25C4	DCC810511	C2012F 1H 103Z A TD84N
25C5,25C6	DCC816801	C2012CH 1H 102J A TD84N
25C8	DCC152901	CK45B 2H 472K
25C16	DCF169151	ECQ-E2 104KF3 TC04N
25C17	DCC152901	CK45B 2H 472K
25C21	DCC259111	CC45SL 2H 020C TC04N
25C22,25C62	DCV819061	TZBX4 Z060BA110 TE1208R
25C41	DCC810511	C2012F 1H 103Z A TD84N
25C44	DCC810511	C2012F 1H 103Z A TD84N
25C45,25C46	DCC816801	C2012CH 1H 102J A TD84N
25C48	DCC152901	CK45B 2H 472K
25C56	DCF169151	ECQ-E2 104KF3 TC04N
25C57	DCC152901	CK45B 2H 472K
25C61	DCC259111	CC45SL 2H 020C TC04N
25C82	DCC816491	C2012CH 1H 100D A TD84N
25C83,25C84	DCC810511	C2012F 1H 103Z A TD84N
25C85	DCC816491	C2012CH 1H 100D A TD84N
25C87	DCC816601	C2012CH 1H 101J A TD84N
25C96	DCC816801	C2012CH 1H 102J A TD84N
25C98,25C99	DCC810511	C2012F 1H 103Z A TD84N
25C100	DCE269101	SME-CE04W 2D 2R2M TC04R
25C101,25C102	DCE259121	SME-CE04W 2A 100M TC04R
25C103 to 25C107	DCE229201	SME-CE04W 1E 470M TC04R
25C110	DCF169151	ECQ-E2 104KF3 TC04N
25C111,25C112	DCF139011	MF-3 2A 103K TC04N
25C113 to 25C117	DCC810511	C2012F 1H 103Z A TD84N
25C122	DCE259121	SME-CE04W 2A 100M TC04R
25C123,25C124	DCE229201	SME-CE04W 1E 470M TC04R
25C126,25C127	DCE229201	SME-CE04W 1E 470M TC04R
25D81	DDD810241	1SS 272 TE0804R
25D91	DDD810341	HSM 88WK TE0804L
25FL100 to 25FL107	DCL119361	BL02RN2-R62 TD04N
25IC1	DIC619101	OP AMP 4558F TE1208B
25IC2	DIC690021	μPC 398C (NEC)
25J1	DCN124741	FF3-26-S55
25L1 to 25L3	DCL152581	LHB0812-303
25L6	DCL152581	LHB0812-303
25L12	DCL810651	BLM11A221SPT TD0804N
25L14	DCL810651	BLM11A221SPT TD0804N
25L52	DCL810651	BLM11A221SPT TD0804N
25L54	DCL810651	BLM11A221SPT TD0804N
25P1	DCN990911	CONNECTOR 5267-07A
25Q1	DTR830071	2SC 3356-T1B
25Q2	DTR810221	2SA 1462-T1B Y34

H OUT AMP 25

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
25Q12	DTR810231	2SA 1575-TD TE1208L
25Q14	DTR830511	2SC 4080-TD TE1208L
25Q41	DTR830071	2SC 3356-T1B
25Q42	DTR810221	2SA 1462-T1B Y34
25Q52	DTR810231	2SA 1575-TD TE1208L
25Q54	DTR830511	2SC 4080-TD TE1208L
25R1	DRZ832061	RK73H 2A 160ΩF TD0804N
25R2	DRZ832411	RK73H 2A 4.7KΩF TD0804N
25R3,25R4	DRZ832341	RK73H 2A 2.4KΩF TD0804N
25R5,25R6	DRZ832011	RK73H 2A 100ΩF TD0804N
25R7,25R8	DRZ832361	RK73H 2A 3.0KΩF TD0804N
25R11	DRZ832311	RK73H 2A 1.8KΩF TD0804N
25R12	DRZ833441	RK73H 2A 10ΩF TD0804N
25R13	DRZ832541	RK73H 2A 16KΩF TD0804N
25R14	DRZ833441	RK73H 2A 10ΩF TD0804N
25R16	DRZ832111	RK73H 2A 270ΩF TD0804N
25R17 to 25R20	DRE138041	EF1/4S 4.7KΩF TA21N
25R21 to 25R24	DRE137901	EF1/4S 1.2KΩF TA21N
25R31	DRZ833531	RK73H 2A 27ΩF TD0804N
25R36	DRZ831501	MCR10 000E TD0804N
25R41	DRZ832061	RK73H 2A 160ΩF TD0804N
25R42	DRZ832411	RK73H 2A 4.7KΩF TD0804N
25R43,25R44	DRZ832341	RK73H 2A 2.4KΩF TD0804N
25R45,25R46	DRZ832011	RK73H 2A 100ΩF TD0804N
25R47,25R48	DRZ832361	RK73H 2A 3.0KΩF TD0804N
25R51	DRZ832311	RK73H 2A 1.8KΩF TD0804N
25R52	DRZ833441	RK73H 2A 10ΩF TD0804N
25R53	DRZ832541	RK73H 2A 16KΩF TD0804N
25R54	DRZ833441	RK73H 2A 10ΩF TD0804N
25R56	DRZ832111	RK73H 2A 270ΩF TD0804N
25R57 to 25R60	DRE138041	EF1/4S 4.7KΩF TA21N
25R61 to 25R64	DRE137901	EF1/4S 1.2KΩF TA21N
25R71	DRZ833531	RK73H 2A 27ΩF TD0804N
25R76	DRZ831501	MCR10 000E TD0804N
25R81	DRZ832731	RK73H 2A 100KΩF TD0804N
25R82	DRZ832561	RK73H 2A 20KΩF TD0804N
25R83	DRZ832541	RK73H 2A 16KΩF TD0804N
25R84	DRZ832731	RK73H 2A 100KΩF TD0804N
25R85	DRZ832571	RK73H 2A 22KΩF TD0804N
25R86	DRZ832491	RK73H 2A 10KΩF TD0804N
25R87	DRZ832011	RK73H 2A 100ΩF TD0804N
25R88	DRZ832561	RK73H 2A 20KΩF TD0804N
25R91	DRZ832171	RK73H 2A 470ΩF TD0804N
25R92	DRZ831501	MCR10 000E TD0804N
25R97	DRZ831501	MCR10 000E TD0804N

Z AMP 26

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
26C2	DCC810511	C2012F 1H 103Z A TD84N
26C8	DCC810511	C2012F 1H 103Z A TD84N
26C12 to 26C17	DCC810511	C2012F 1H 103Z A TD84N
26C19	DCC810511	C2012F 1H 103Z A TD84N
26C27	DCC810511	C2012F 1H 103Z A TD84N
26C42	DCC810511	C2012F 1H 103Z A TD84N
26C45	DCC810511	C2012F 1H 103Z A TD84N
26C46	DCC152901	CK45B 2H 472K
26C50	DCC810511	C2012F 1H 103Z A TD84N
26C53,26C54	DCF169151	ECQ-E2 104KF3 TC04N
26C56	DCC259101	CC45SL 2H 010C TC04N
26C57	DCV819061	TZBX4 Z060BA110 TE1208R
26C58	DCC815891	C2012CH 1H 150J A TD84N
26C64	DCC810511	C2012F 1H 103Z A TD84N
26C85	DCC810511	C2012F 1H 103Z A TD84N
26C93 to 26C95	DCC810511	C2012F 1H 103Z A TD84N
26C102	DCC810511	C2012F 1H 103Z A TD84N
26C105	DCC810511	C2012F 1H 103Z A TD84N
26C106	DCC152901	CK45B 2H 472K
26C113,26C114	DCF169151	ECQ-E2 104KF3 TC04N
26C116	DCC259111	CC45SL 2H 020C TC04N
26C135	DCC810511	C2012F 1H 103Z A TD84N
26C201	DCC810511	C2012F 1H 103Z A TD84N
26C202,26C203	DCC810511	C2012F 1H 103Z A TD84N
26D1	DDD810241	1SS 272 TE0804R
26D33	DDD810141	MA 159-(TX) TE0804L
26D35	DDD810141	MA 159-(TX) TE0804L
26D42	DDD830361	RD5.1M-T1B B2 TE0804L
26D47	DDD019291	1SS 83 TA21R
26D50	DDD830011	RD2.4M-T1B B
26D61	DDD019291	1SS 83 TA21R
26D62	DDD810241	1SS 272 TE0804R
26D73	DDD810341	HSM 88WK TE0804L
26D77	DDD810341	HSM 88WK TE0804L
26D81	DDD810241	1SS 272 TE0804R
26D83	DDD810241	1SS 272 TE0804R
26D85	DDD810241	1SS 272 TE0804R
26D102	DDD830361	RD5.1M-T1B B2 TE0804L
26D114	DDD019291	1SS 83 TA21R
26D135	DDD810241	1SS 272 TE0804R
26IC1,26IC2	DIC619101	OP AMP 4558F TE1208B
26IC3	DIC499321	74HC04F/AF TE1612B
26IC4	DIC499361	74HC32F/AF TE1612B
26IC5	DIC889131	TC 7W32F(TE12L) TE1208R
26IC6	DIC619101	OP AMP 4558F TE1208B

Z AMP 26

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
26J1	KHB095411	SMALL PIN JACK
26P1	DCN990911	CONNECTOR 5267-07A
26Q23,26Q24	DTR830071	2SC 3356-T1B
26Q25	DTR810041	2SA 1162Y TE85L
26Q45	DTR830071	2SC 3356-T1B
26Q50	DTR830511	2SC 4080-TD TE1208L
26Q61	DTR830511	2SC 4080-TD TE1208L
26Q73	DTR838661	2SC 2712LG TE85L
26Q77	DTR838661	2SC 2712LG TE85L
26Q91	DTR838661	2SC 2712LG TE85L
26Q92	DTR810041	2SA 1162Y TE85L
26Q102	DTR810041	2SA 1162Y TE85L
26Q105	DTR838661	2SC 2712LG TE85L
26Q107	DTR830511	2SC 4080-TD TE1208L
26Q135	DTR890841	IMX3 TE0804R
26Q144	DTR139011	2SC 1815GR TPER1
26Q146	DTR139011	2SC 1815GR TPER1
26R1	DRZ833551	RK73H 2A 33ΩF TD0804N
26R2	DRD138001	PSS1/4S 33KΩJ TA21N
26R3	DRD137741	PSS1/4S 2.7KΩJ TA21N
26R4	DRD137731	PSS1/4S 2.4KΩJ TA21N
26R5	DRZ832391	RK73H 2A 3.9KΩF TD0804N
26R6	DRZ832401	RK73H 2A 4.3KΩF TD0804N
26R7	DRZ832791	RK73H 2A 180KΩF TD0804N
26R8	DRZ832561	RK73H 2A 20KΩF TD0804N
26R9	DRZ832491	RK73H 2A 10KΩF TD0804N
26R10	DRZ832451	RK73H 2A 6.8KΩF TD0804N
26R11	DRZ832361	RK73H 2A 3.0KΩF TD0804N
26R12	DRZ832491	RK73H 2A 10KΩF TD0804N
26R13	DRZ832451	RK73H 2A 6.8KΩF TD0804N
26R14	DRZ832561	RK73H 2A 20KΩF TD0804N
26R15	DRZ832361	RK73H 2A 3.0KΩF TD0804N
26R16	DRZ832601	RK73H 2A 30KΩF TD0804N
26R17	DRZ832491	RK73H 2A 10KΩF TD0804N
26R18	DRZ832401	RK73H 2A 4.3KΩF TD0804N
26R19	DRZ832491	RK73H 2A 10KΩF TD0804N
26R21,26R22	DRZ832371	RK73H 2A 3.3KΩF TD0804N
26R23,26R24	DRZ833551	RK73H 2A 33ΩF TD0804N
26R25	DRZ832371	RK73H 2A 3.3KΩF TD0804N
26R26	DRZ832491	RK73H 2A 10KΩF TD0804N
26R27	DRZ832321	RK73H 2A 2.0KΩF TD0804N
26R28	DRZ832461	RK73H 2A 7.5KΩF TD0804N
26R29	DRZ832451	RK73H 2A 6.8KΩF TD0804N
26R31,26R32	DRZ832281	RK73H 2A 1.3KΩF TD0804N
26R33 to 26R36	DRZ832491	RK73H 2A 10KΩF TD0804N

Z AMP 26

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
26R37	DRZ832281	RK73H 2A 1.3KΩF TD0804N
26R41	DRZ832691	RK73H 2A 68KΩF TD0804N
26R42	DRZ832221	RK73H 2A 750ΩF TD0804N
26R43,26R44	DRZ832011	RK73H 2A 100ΩF TD0804N
26R45	DRZ832181	RK73H 2A 510ΩF TD0804N
26R46	DRZ832421	RK73H 2A 5.1KΩF TD0804N
26R48,26R49	DRZ832631	RK73H 2A 39KΩF TD0804N
26R52	DRZ832181	RK73H 2A 510ΩF TD0804N
26R53	DRZ832211	RK73H 2A 680ΩF TD0804N
26R54,26R55	DRE138091	EF1/4S 7.5KΩF TA21N
26R56,26R57	DRE138141	EF1/4S 12KΩF TA21N
26R58	DRZ832011	RK73H 2A 100ΩF TD0804N
26R61,26R62	DRZ833551	RK73H 2A 33ΩF TD0804N
26R63	DRZ832011	RK73H 2A 100ΩF TD0804N
26R64	DRZ832121	RK73H 2A 300ΩF TD0804N
26R65	DRZ832011	RK73H 2A 100ΩF TD0804N
26R66	DRZ833511	RK73H 2A 22ΩF TD0804N
26R71	DRZ832371	RK73H 2A 3.3KΩF TD0804N
26R72	DRZ832321	RK73H 2A 2.0KΩF TD0804N
26R73	DRZ832411	RK73H 2A 4.7KΩF TD0804N
26R74	DRZ832461	RK73H 2A 7.5KΩF TD0804N
26R75	DRZ832371	RK73H 2A 3.3KΩF TD0804N
26R76	DRZ832321	RK73H 2A 2.0KΩF TD0804N
26R77	DRZ832411	RK73H 2A 4.7KΩF TD0804N
26R78	DRZ832461	RK73H 2A 7.5KΩF TD0804N
26R81	DRZ832481	RK73H 2A 9.1KΩF TD0804N
26R83	DRZ832481	RK73H 2A 9.1KΩF TD0804N
26R84	DRZ832511	RK73H 2A 12KΩF TD0804N
26R85	DRZ832561	RK73H 2A 20KΩF TD0804N
26R86	DRZ832491	RK73H 2A 10KΩF TD0804N
26R87	DRZ832451	RK73H 2A 6.8KΩF TD0804N
26R90	DRZ832441	RK73H 2A 6.2KΩF TD0804N
26R91	DRZ833551	RK73H 2A 33ΩF TD0804N
26R92	DRZ832371	RK73H 2A 3.3KΩF TD0804N
26R93	DRZ832491	RK73H 2A 10KΩF TD0804N
26R94	DRZ832321	RK73H 2A 2.0KΩF TD0804N
26R95	DRZ832561	RK73H 2A 20KΩF TD0804N
26R96	DRZ832491	RK73H 2A 10KΩF TD0804N
26R97	DRZ832451	RK73H 2A 6.8KΩF TD0804N
26R102	DRZ832271	RK73H 2A 1.2KΩF TD0804N
26R103,26R104	DRZ832011	RK73H 2A 100ΩF TD0804N
26R105	DRZ832251	RK73H 2A 1.0KΩF TD0804N
26R106	DRZ832471	RK73H 2A 8.2KΩF TD0804N
26R107,26R108	DRZ832641	RK73H 2A 43KΩF TD0804N
26R112	DRZ832181	RK73H 2A 510ΩF TD0804N

Z AMP 26

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
26R113	DRZ832251	RK73H 2A 1.0KΩF TD0804N
26R114,26R115	DRE138121	EF1/4S 10KΩF TA21N
26R116,26R117	DRE138161	EF1/4S 15KΩF TA21N
26R119	DRZ833531	RK73H 2A 27ΩF TD0804N
26R121	DRZ833441	RK73H 2A 10ΩF TD0804N
26R131	DRE138081	EF1/4S 6.8KΩF TA21N
26R133,26R134	DRV810281	G4AT/ST-4TA 50KΩ TE1208L
26R135	DRZ832011	RK73H 2A 100ΩF TD0804N
26R136	DRZ832561	RK73H 2A 20KΩF TD0804N
26R137	DRZ832491	RK73H 2A 10KΩF TD0804N
26R138	DRZ832561	RK73H 2A 20KΩF TD0804N
26R139	DRZ832521	RK73H 2A 13KΩF TD0804N
26R141A,26R141B	DRZ832621	RK73H 2A 36KΩF TD0804N
26R142	DRZ832541	RK73H 2A 16KΩF TD0804N
26R143	DRZ832441	RK73H 2A 6.2KΩF TD0804N
26R144,26R145	DRE138121	EF1/4S 10KΩF TA21N
26R146	DRZ832171	RK73H 2A 470ΩF TD0804N
26R147	DRE138001	EF1/4S 3.3KΩF TA21N

HV CIRCUIT 27

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
27C1	DCE259121	SME-CE04W 2A 100M TC04R
27C2,27C3	DCE229201	SME-CE04W 1E 470M TC04R
27C4	DCF169151	ECQ-E2 104KF3 TC04N
27C5,27C6	DCF121841	MF-3S 1H 104J TC04N
27C8,27C9	DCC139501	CK45F 1H 103ZYR TC04N
27C10	DCC239761	USD05CH 560J TC04N
27C11	DCC139501	CK45F 1H 103ZYR TC04N
27C12	DCF121801	MF-3S 1H 473J TC04N
27C16	DCC171911	DE1010B 102K 3K
27C21 to 27C24	DCC171931	DE1710F 103Z 3K
27C26	DCC171931	DE1710F 103Z 3K
27C30	DCE259101	SME-CE04W 2A 4R7M TC04R
27C31	DCC163171	DE0707B 221K 2K
27C33	DCC163171	DE0707B 221K 2K
27C34	DCC163141	DE1510E 103Z 1K
27C41	DCC163141	DE1510E 103Z 1K
27C44	DCC159011	CK45B 2H 102K TC04N
27C47	DCC139501	CK45F 1H 103ZYR TC04N
27C53	DCC163141	DE1510E 103Z 1K
27C61,27C62	DCC171931	DE1710F 103Z 3K
27C63	DCC171911	DE1010B 102K 3K
27C73	DCC171931	DE1710F 103Z 3K
27C76	DCC139501	CK45F 1H 103ZYR TC04N
27C78,27C79	DCC139501	CK45F 1H 103ZYR TC04N
27C84,27C85	DCC163141	DE1510E 103Z 1K
27C91	DCC163171	DE0707B 221K 2K
27D1	DDD019071	1SS 120 TA21R
27D21	DDD021451	SHV-06
27D26,27D27	DDD021541	SHV-02
27D28 to 27D30	DDD019291	1SS 83 TA21R
27D33,27D34	DDD019291	1SS 83 TA21R
27D41	DDD021541	SHV-02
27D47,27D48	DDD019071	1SS 120 TA21R
27D51	DDD019071	1SS 120 TA21R
27D53	DDD019291	1SS 83 TA21R
27D54	DDD019291	1SS 83 TA21R
27D61,27D62	DDD021451	SHV-06
27D73	DDD019071	1SS 120 TA21R
27D76,27D77	DDD019071	1SS 120 TA21R
27D80	DDD019071	1SS 120 TA21R
27D82 to 27D85	DDD019291	1SS 83 TA21R
27FL2,27FL3	DCL119361	BL02RN2-R62 TD04N
27IC1,27IC2	DIC613771	4558
27L1	DCL152581	LHB0812-303
27NE1	DLP025171	NEO LAMP NL-235D

HV CIRCUIT 27

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
27P1	DCN990911	CONNECTOR 5267-07A
27P2	DCN990901	CONNECTOR 5267-06A
27P3	DCN994771	CONNECTOR 5267-10A
27Q1	DTR136301	2SC 3570L
27Q2	DTR139011	2SC 1815GR TPER1
27Q6	DTR139011	2SC 1815GR TPER1
27Q28	DTR136181	2SC 2551
27Q51	DTR135231	2SC 2752
27Q73	DTR116371	2SA 1486
27Q80	DTR116371	2SA 1486
27R1	DRE137801	EF1/4S 470ΩF TA21N
27R2	DRE138321	EF1/4S 68KΩF TA21N
27R3	DRE138121	EF1/4S 10KΩF TA21N
27R5	DZB999011	JPW 01 TA21N
27R6	DRE137961	EF1/4S 2.2KΩF TA21N
27R7	DRE138201	EF1/4S 22KΩF TA21N
27R8	DRE138121	EF1/4S 10KΩF TA21N
27R9,27R10	DRE138441	EF1/4S 220KΩF TA21N
27R11	DRE138021	EF1/4S 3.9KΩF TA21N
27R12	DRE138241	EF1/4S 33KΩF TA21N
27R13	DRV419211	GF06UT2/CT-6TV00 10KΩ (T)
27R14	DRE136331	AF1/4S 68KΩF T2 TA21N
27R15	DRE137981	EF1/4S 2.7KΩF TA21N
27R16	DRG152001	RH1HVD 15MΩF
27R21 to 27R23	DRD137761	PSS1/4S 3.3KΩJ TA21N
27R24	DRE138361	EF1/4S 100KΩF TA21N
27R25	DRV419451	GF06VT2/CT-6TH00 10ΩTE04B
27R26	DRG940651	VR37 18MΩF
27R27	DRE138121	EF1/4S 10KΩF TA21N
27R28	DRV419231	GF06UT2/CT-6TV00 50KΩ (T)
27R29	DRE138261	EF1/4S 39KΩF TA21N
27R30	DRE138331	EF1/4S 75KΩF TA21N
27R31 to 27R34	DRE138481	EF1/4S 330KΩF TA21N
27R41 to 27R43	DRE138271	EF1/4S 43KΩF TA21N
27R44	DRE138121	EF1/4S 10KΩF TA21N
27R45,27R46	DRE137021	AF1/4S 300KΩF T2 TA21N
27R47	DRV419211	GF06UT2/CT-6TV00 10KΩ (T)
27R48	DRE136341	AF1/4S 20KΩF T2 TA21N
27R49	DRE138211	EF1/4S 24KΩF TA21N
27R50	DRE137961	EF1/4S 2.2KΩF TA21N
27R51	DRE137881	EF1/4S 1.0KΩF TA21N
27R52	DRE137641	EF1/4S 100ΩF TA21N
27R53	DRG940651	VR37 18MΩF
27R61,27R62	DRE138181	EF1/4S 18KΩF TA21N
27R63	DRE138121	EF1/4S 10KΩF TA21N

HV CIRCUIT 27

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
27R65,27R66	DRE138501	EF1/4S 390KΩF TA21N
27R67	DRE138421	EF1/4S 180KΩF TA21N
27R68	DRV419251	GF06UT2/CT-6TV00 200KΩ(T)
27R69 to 27R73	DRE138501	EF1/4S 390KΩF TA21N
27R74,27R75	DRE138601	EF1/4S 1.0MΩF TA21N
27R76	DRE138131	EF1/4S 11KΩF TA21N
27R77	DRE137841	EF1/4S 680ΩF TA21N
27R78	DRE138131	EF1/4S 11KΩF TA21N
27R79	DRE137961	EF1/4S 2.2KΩF TA21N
27R80	DRE137881	EF1/4S 1.0KΩF TA21N
27R81	DRE137641	EF1/4S 100ΩF TA21N
27R84	DRG940651	VR37 18MΩF
27R91,27R92	DRE138481	EF1/4S 330KΩF TA21N
27T1	DCL220441	HIGH VOLTAGE TRANS HVT-E5001
27U1	DES050762	HIGH VOLTAGE TRANS MSL3587Q UL-I

HV OUT 28

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
28C1 to 28C3	DCC259141	CC45SL 2H 101J TC04N
28C4	DCC163141	DE1510E 103Z 1K
28C5	DCC171931	DE1710F 103Z 3K
28C6	DCC163141	DE1510E 103Z 1K
28C7	DCC159011	CK45B 2H 102K TC04N
28C8	DCC139501	CK45F 1H 103ZYR TC04N
28C9	DCC171931	DE1710F 103Z 3K
28C10	DCC159011	CK45B 2H 102K TC04N
28C11	DCC171911	DE1010B 102K 3K
28C12	DCC171931	DE1710F 103Z 3K
28J1	DSK010251	CRT SOCKET E-2025 UL-I
28JP1 to 28JP3	DZB999011	JPW 01 TA21N
28P1	DCN994771	CONNECTOR 5267-10A
28P2	DCN990841	CONNECTOR 5268-07A
28R1	DRE138121	EF1/4S 10KΩF TA21N
28R2 to 28R4	DRE137881	EF1/4S 1.0KΩF TA21N
28R5	DRE138361	EF1/4S 100KΩF TA21N
28R6	DRE137881	EF1/4S 1.0KΩF TA21N
28R7 to 28R14	DRD147401	PSS1/2S 100ΩJ TA21N
28W7	KHB184831	CRT CABLE UL-I

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CIRCUIT REFERENCE	PART NO.	DESCRIPTION
⚠30BT1	DES011201	CR2354-1HF
30C1,30C2	DCC816521	C2012CH 1H 220J A TD84N
30C3 to 30C6	DCC810571	C2012F 1E 104Z A TD84N
30C7,30C8	DCE249331	SME-CE04W 1H 3R3M TC04R
30C9 to 30C13	DCC810511	C2012F 1H 103Z A TD84N
30C14 to 30C19	DCC810571	C2012F 1E 104Z A TD84N
30C20,30C21	DCE229201	SME-CE04W 1E 470M TC04R
30C22,30C23	DCC816521	C2012CH 1H 220J A TD84N
30C24,30C25	DCC816491	C2012CH 1H 100D A TD84N
30C26,30C27	DCC816581	C2012CH 1H 680J A TD84N
30C28,30C29	DCC810571	C2012F 1E 104Z A TD84N
30C33	DCC810571	C2012F 1E 104Z A TD84N
30C35 to 30C37	DCC810571	C2012F 1E 104Z A TD84N
30C38 to 30C41	DCC816601	C2012CH 1H 101J A TD84N
30C42 to 30C58	DCC810571	C2012F 1E 104Z A TD84N
30C60	DCC816601	C2012CH 1H 101J A TD84N
30C61 to 30C63	DCC810571	C2012F 1E 104Z A TD84N
30C64,30C65	DCC810511	C2012F 1H 103Z A TD84N
30C66	DCC816601	C2012CH 1H 101J A TD84N
30C67 to 30C75	DCC810511	C2012F 1H 103Z A TD84N
30C77 to 30C81	DCC810511	C2012F 1H 103Z A TD84N
30C82	DCC810571	C2012F 1E 104Z A TD84N
30C83	DCC816601	C2012CH 1H 101J A TD84N
30C85	DCE229221	SME-CE04W 1E 221M TC04R
30C86	DCE229201	SME-CE04W 1E 470M TC04R
30C87 to 30C94	DCC810571	C2012F 1E 104Z A TD84N
30C95 to 30C98	DCE229201	SME-CE04W 1E 470M TC04R
30C99	DCC810571	C2012F 1E 104Z A TD84N
30C100,30C101	DCC810511	C2012F 1H 103Z A TD84N
30C104,30C105	DCE229201	SME-CE04W 1E 470M TC04R
30C110	DCC816601	C2012CH 1H 101J A TD84N
30D1,30D2	DDD810241	1SS 272 TE0804R
30D3	DDD830141	RD8.2M-T1B B
30D4 to 30D7	DDD810241	1SS 272 TE0804R
30FL1 to 30FL3	DCL119361	BL02RN2-R62 TD04N
30IC1	DIC529072	CAT35C102K/AT93C57 TE1612F
30IC2,30IC3	DIC699231	M51957BFP TE1208F
30IC4	DIC483041	74HC03F/AF TE1612B
30IC5	DIC554551	μPD 78P014GC-AB8 (NEC)
30IC6	DIC483711	74HC374F/AF TE2412B
30IC7,30IC8	DIC641111	BA 9221F (ROHM)
30IC9	DIC619101	OP AMP 4558F TE1208B
30IC10	DIC470091	CD108BPF (NEC)
30IC11	DIC619191	NJM 082M(TE3) TE1208L
30IC12	DIC517811	SRAM 32KX8(M100)LLF TE2416B

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CIRCUIT REFERENCE	PART NO.	DESCRIPTION
30IC13	DIC639031	NJM 2903M(TE3) TE1208L
30IC14 to 30IC18	DIC619191	NJM 082M(TE3) TE1208L
30IC20	DIC641922	PCM 55HP-3 (BB)
30IC21	DIC642201	MB88346BPF-G-BND-ER TE2412B
30IC22,30IC23	DIC619101	OP AMP 4558F TE1208B
30IC24	DIC659111	TA 79L005P TPE5
30IC25	DIC659011	TA 78L005AP TPE5
30IC26	DIC483021	TC 4051BF (EL) TE1612B
30IC27	DIC499311	74HC02F/AF TJ3212F
30IC28	DIC499371	74HC74F/AF TE1612B
30IC29,30IC30	DIC889041	TC 7S08F TE0804F
30IC31	DIC499831	TC 7S32F/SC7S32F TE0804L
30J1,30J2	DCN124501	FF3-22-S55
30J3	DCN124741	FF3-26-S55
30P1 to 30P3	DCN034901	CONNECTOR M36-02-30-134P
30P5	DCN990901	CONNECTOR 5267-06A
30P6,30P7	DCN994771	CONNECTOR 5267-10A
30P8	DCN990901	CONNECTOR 5267-06A
30P9	DCN121511	CONNECTOR 5268-06A
30Q1	DTR810041	2SA 1162Y TE85L
30Q2	DTR838661	2SC 2712LG TE85L
30Q3,30Q4	DTR890431	DTA114EK/RN2402 TE0804L
30Q5,30Q6	DTR810041	2SA 1162Y TE85L
30Q7	DTR890861	IMZ1 TE0804R
30Q8	DTR139011	2SC 1815GR TPER1
30Q9	DTR119011	2SA 1015Y TPER1
30Q10	DTR838661	2SC 2712LG TE85L
30Q11 to 30Q13	DTR139011	2SC 1815GR TPER1
30Q14	DTR890551	DTC114EK/RN1402 TE0804L
30Q15,30Q16	DTR890431	DTA114EK/RN2402 TE0804L
30Q17	DTR838661	2SC 2712LG TE85L
30Q18	DTR810041	2SA 1162Y TE85L
30R1	DRZ832651	RK73H 2A 47KΩF TD0804N
30R2	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R3	DRZ832491	RK73H 2A 10KΩF TD0804N
30R4,30R5	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R6	DRZ832631	RK73H 2A 39KΩF TD0804N
30R7	DRZ832431	RK73H 2A 5.6KΩF TD0804N
30R8	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R10	DRZ832391	RK73H 2A 3.9KΩF TD0804N
30R11	DRZ832291	RK73H 2A 1.5KΩF TD0804N
30R12	DRZ832131	RK73H 2A 330ΩF TD0804N
30R13	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R14	DRZ832191	RK73H 2A 560ΩF TD0804N
30R15	DRZ832231	RK73H 2A 820ΩF TD0804N

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CIRCUIT REFERENCE	PART NO.	DESCRIPTION
30R16	DRZ832191	RK73H 2A 560ΩF TD0804N
30R17	DRZ832231	RK73H 2A 820ΩF TD0804N
30R18 to 30R21	DRZ832011	RK73H 2A 100ΩF TD0804N
30R22	DRZ832651	RK73H 2A 47KΩF TD0804N
30R23	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R24	DRZ832511	RK73H 2A 12KΩF TD0804N
30R25,30R26	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R27	DRZ832511	RK73H 2A 12KΩF TD0804N
30R28,30R29	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R30 to 30R35	DRZ832271	RK73H 2A 1.2KΩF TD0804N
30R36	DRZ832631	RK73H 2A 39KΩF TD0804N
30R37	DRZ832371	RK73H 2A 3.3KΩF TD0804N
30R38	DRZ832631	RK73H 2A 39KΩF TD0804N
30R39	DRZ832291	RK73H 2A 1.5KΩF TD0804N
30R40	DRZ832431	RK73H 2A 5.6KΩF TD0804N
30R41	DRZ832451	RK73H 2A 6.8KΩF TD0804N
30R42,30R43	DRZ832351	RK73H 2A 2.7KΩF TD0804N
30R44	DRZ832391	RK73H 2A 3.9KΩF TD0804N
30R45	DRZ832291	RK73H 2A 1.5KΩF TD0804N
30R46	DRZ832391	RK73H 2A 3.9KΩF TD0804N
30R47	DRZ832131	RK73H 2A 330ΩF TD0804N
30R48	DRZ832391	RK73H 2A 3.9KΩF TD0804N
30R49	DRZ832351	RK73H 2A 2.7KΩF TD0804N
30R50	DRZ832171	RK73H 2A 470ΩF TD0804N
30R51	DRZ832431	RK73H 2A 5.6KΩF TD0804N
30R52	DRZ832491	RK73H 2A 10KΩF TD0804N
30R53	DRZ832431	RK73H 2A 5.6KΩF TD0804N
30R54	DRZ832011	RK73H 2A 100ΩF TD0804N
30R55	DRZ831501	MCR10 000E TD0804N
30R56	DRZ832131	RK73H 2A 330ΩF TD0804N
30R57	DRZ832971	RK73H 2A 1.0MΩF TD0804N
30R58	DRZ832131	RK73H 2A 330ΩF TD0804N
30R59	DRZ832971	RK73H 2A 1.0MΩF TD0804N
30R60	DRZ832131	RK73H 2A 330ΩF TD0804N
30R61	DRZ832971	RK73H 2A 1.0MΩF TD0804N
30R62	DRZ832131	RK73H 2A 330ΩF TD0804N
30R63	DRZ832971	RK73H 2A 1.0MΩF TD0804N
30R64	DRZ831501	MCR10 000E TD0804N
30R65 to 30R67	DRZ832011	RK73H 2A 100ΩF TD0804N
30R68 to 30R71	DRZ832011	RK73H 2A 100ΩF TD0804N
30R72	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R73	DRZ832451	RK73H 2A 6.8KΩF TD0804N
30R74	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R75	DRZ832451	RK73H 2A 6.8KΩF TD0804N
30R76 to 30R82	DRZ831501	MCR10 000E TD0804N

CPU BOARD 30

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
30R83,30R84	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R85	DRZ832311	RK73H 2A 1.8KΩF TD0804N
30R86	DRZ832341	RK73H 2A 2.4KΩF TD0804N
30R87	DRZ832251	RK73H 2A 1.0KΩF TD0804N
30R88	DRZ832491	RK73H 2A 10KΩF TD0804N
30R89	DRZ832561	RK73H 2A 20KΩF TD0804N
30R90	DRZ833441	RK73H 2A 10ΩF TD0804N
30R92	DRZ833441	RK73H 2A 10ΩF TD0804N
30R93	DRZ832671	RK73H 2A 56KΩF TD0804N
30R94	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R95	DRZ832491	RK73H 2A 10KΩF TD0804N
30R96	DRZ832691	RK73H 2A 68KΩF TD0804N
30R97	DRZ832521	RK73H 2A 13KΩF TD0804N
30R98	DRZ832411	RK73H 2A 4.7KΩF TD0804N
30R103	DRZ832541	RK73H 2A 16KΩF TD0804N
30R104	DRZ832331	RK73H 2A 2.2KΩF TD0804N
30R105	DRZ832421	RK73H 2A 5.1KΩF TD0804N
30R106	DRZ832441	RK73H 2A 6.2KΩF TD0804N
30R107	DRZ832491	RK73H 2A 10KΩF TD0804N
30R108	DRZ832321	RK73H 2A 2.0KΩF TD0804N
30R109,30R110	DRZ832011	RK73H 2A 100ΩF TD0804N
30R111	DRZ832431	RK73H 2A 5.6KΩF TD0804N
30R112	DRZ832531	RK73H 2A 15KΩF TD0804N
30R113	DRZ832491	RK73H 2A 10KΩF TD0804N
30R114,30R115	DRZ832551	RK73H 2A 18KΩF TD0804N
30R116	DRZ832491	RK73H 2A 10KΩF TD0804N
30R117	DRZ832451	RK73H 2A 6.8KΩF TD0804N
30R118,30R119	DRZ832131	RK73H 2A 330ΩF TD0804N
30R120 to 30R125	DRZ832131	RK73H 2A 330ΩF TD0804N
30R126 to 30R129	DRZ832011	RK73H 2A 100ΩF TD0804N
30R130 to 30R138	DRZ832491	RK73H 2A 10KΩF TD0804N
30R149	DRZ832491	RK73H 2A 10KΩF TD0804N
30R170,30R171	DRZ832491	RK73H 2A 10KΩF TD0804N
30R139	DRZ831501	MCR10 000E TD0804N
30R140	DRZ832131	RK73H 2A 330ΩF TD0804N
30R143	DRV120731	RK0971114 (S10KB+PS) D CUT
30R144,30R145	DRV120612	RK0971110 20KB D CUT
30R146	DRV120731	RK0971114 (S10KB+PS) D CUT
30R147,30R148	DRV120612	RK0971110 20KB D CUT
30R149	DRZ832491	RK73H 2A 10KΩF TD0804N
30R150	DRZ832391	RK73H 2A 3.9KΩF TD0804N
30R151	DRZ832351	RK73H 2A 2.7KΩF TD0804N
30R152 to 30R163	DRZ832031	RK73H 2A 120ΩF TD0804N
30R164	DRZ831501	MCR10 000E TD0804N
30R165 to 30R168	DRZ832411	RK73H 2A 4.7KΩF TD0804N

CPU BOARD 30

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
30R169	DRZ832561	RK73H 2A 20KΩF TD0804N
30R170,30R171	DRZ832491	RK73H 2A 10KΩF TD0804N
30R172	DRZ832561	RK73H 2A 20KΩF TD0804N
30R180	DRZ832491	RK73H 2A 10KΩF TD0804N
30R181	DRZ832131	RK73H 2A 330ΩF TD0804N
30R182	DRZ832251	RK73H 2A 1.0KΩF TD0804N
30S1	DSW017001	SPUP19
30X1	DHF013521	AT-51 10.00MHZ
30X2	DHF013621	AT-51 20MHZ

⚠ CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

PANEL 35

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
35C1	DCE229201	35SME-CE04W 1E 470M TC04I
35C2,35C3	DCC810571	C2012F 1E 104Z A TD84N
35C4	DCE229201	35SME-CE04W 1E 470M TC04I
35C5	DCC810571	C2012F 1E 104Z A TD84N
35C6	DCE229201	35SME-CE04W 1E 470M TC04I
35C7,35C8	DCC810571	C2012F 1E 104Z A TD84N
35C9	DCE229201	35SME-CE04W 1E 470M TC04I
35C10 to 35C19	DCC810571	C2012F 1E 104Z A TD84N
35C84	DCC816601	C2012CH 1H 101J A TD84N
35C85	DCC810571	C2012F 1E 104Z A TD84N
35C86	DCC816601	C2012CH 1H 101J A TD84N
35C87	DCC810571	C2012F 1E 104Z A TD84N
35C88	DCC810571	C2012F 1E 104Z A TD84N
35D1	DDD810241	135S35S 272 TE0804R
35D2	DDD830121	RD6.8M-T1B B
35D3 to 35D8	DDD810241	135S35S 272 TE0804R
35IC1	DIC499381	74HC138F/AF TE1612B
35IC2	DIC619191	NJM 082M(TE3) TE1208L
35IC3	DIC483021	TC 4051BF (EL) TE1612B
35IC4	DIC483321	74HC595F/AF TE1612B
35J1	DCN125231	FF3-26-R15
35J2	DCN124741	FF3-26-35S55
35P1	DCN990911	CONNECTOR 5267-07A
35Q1,35Q2	DTR890791	IMD3 TE0804R
35R2	DRZ832561	RK73H 2A 20KΩF TD0804N
35R3	DRZ832491	RK73H 2A 10KΩF TD0804N
35R4	DRZ832561	RK73H 2A 20KΩF TD0804N
35R5	DRZ832491	RK73H 2A 10KΩF TD0804N
35R6	DRZ832561	RK73H 2A 20KΩF TD0804N
35R7	DRZ832491	RK73H 2A 10KΩF TD0804N
35R8	DRZ832561	RK73H 2A 20KΩF TD0804N
35R9	DRZ832491	RK73H 2A 10KΩF TD0804N
35R10	DRZ832561	RK73H 2A 20KΩF TD0804N
35R11	DRZ832491	RK73H 2A 10KΩF TD0804N
35R12	DRZ832561	RK73H 2A 20KΩF TD0804N
35R13	DRZ832211	RK73H 2A 680ΩF TD0804N
35R14 to 35R21	DRZ832151	RK73H 2A 390ΩF TD0804N
35R98	DRZ832251	RK73H 2A 1.0KΩF TD0804N
35R99	DRZ832031	RK73H 2A 120ΩF TD0804N
35R100	DRZ832561	RK73H 2A 20KΩF TD0804N
35R101	DRZ832491	RK73H 2A 10KΩF TD0804N
35R102	DRZ832411	RK73H 2A 4.7KΩF TD0804N
35R103,35R104	DRZ832151	RK73H 2A 390ΩF TD0804N
35S1 to 35S4	D35SW035561	PUL35SE 35SWITCH RK09710WL
35VR1 to 35VR6	DRV131991	RD11K1140 (20KB)

KEY BOARD 36

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
36D1 to 36D10	DDD073911	GL8EG21
36J1	DCN125231	FF3-26-R15
36S1 to 36S7	DSW019161	SWITCH SKQNAB TD04N
36S17 to 36S28	DSW019161	SWITCH SKQNAB TD04N
36S31 to 36S35	DSW019161	SWITCH SKQNAB TD04N
36S37 to 36S39	DSW019161	SWITCH SKQNAB TD04N
36S41 to 36S48	DSW019161	SWITCH SKQNAB TD04N
36S9 ro 36S14	DSW019161	SWITCH SKQNAB TD04N

POWER SUPPLY 37

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
37C2	DCF160371	XE 224/-Z
37C3	DCF160361	XE 104/-Z
37C4	DCC140131	DE7100F 222M VA1-KC
37C5	DCC140161	DE7150F 472M VA1-KC
37C6,37C7	DCF261511	MM-10 2E 225K
37C9	DCC164041	DE0707B 101K 2K
37C11	DCC163171	DE0707B 221K 2K
37C12	DCE940931	KME 50VB-R47(M)
37C13	DCF121601	MF-3S 1H 102J TC04N
37C14	DCC239051	USD05SL 101J TC04N
37C15	DCE949761	KME 50VB-1(M) TC04R
37C16	DCC239051	USD05SL 101J TC04N
37C17	DCF121021	MM-3C 1J 224K TC04N
37C18	DCF121721	MF-3S 1H 103J TC04N
37C19	DCF121761	MF-3S 1H 223J TC04N
37C20	DCC239281	USD08SL 271J TC04N
37C21	DCE940941	KME 50VB-1(M)
37C22	DCE925241	KME 25VB-100(M)
37C23	DCF168661	MMH 2G 683K
37C24	DCF121681	MF-3S 1H 472J TC04N
37C25	DCC140131	DE7100F 222M VA1-KC
37C26,37C27	DCE939341	SXE 35VB-220 TC04R
37C28	DCF168661	MMH 2G 683K
37C29	DCF121021	MM-3C 1J 224K TC04N
37C30	DCF121801	MF-3S 1H 473J TC04N
37C31	DCE925241	KME 25VB-100(M)
37C32	DCE925481	KME 25VB-220(M)
37C33	DCE919911	KME 10VB-220(M) TC04R
37C34	DCE919661	KME 10VB-100(M) TC04R
37C35	DCF121721	MF-3S 1H 103J TC04N
37C36,37C37	DCC163251	DE0705R 221K 1K
37C38	DCE919441	SXE 10VB-330 TC04R
37C39	DCE915971	SXE 10VB-270
37C40	DCE919881	SXE 10VB-270 TC04R
37C41	DCE919441	SXE 10VB-330 TC04R
37C42	DCE919881	SXE 10VB-270 TC04R
37C43	DCC163251	DE0705R 221K 1K
37C44 to 37C46	DCE921361	SXE 16VB-2200(12.5X30)
37C47	DCC163251	DE0705R 221K 1K
37C48,37C49	DCE921361	SXE 16VB-2200(12.5X30)
37C50	DCC163251	DE0705R 221K 1K
37C51 to 37C53	DCE945321	SXE 63VB-150(10X25)
37C54	DCC163251	DE0705R 221K 1K
37C55,37C56	DCE950231	KME 100VB-47(M)
37C57	DCE965121	KME 200VB-22(M)

POWER SUPPLY 37

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
37C58	DCC163201	DE0707B 471K 2K
37C59	DCF121721	MF-3S 1H 103J TC04N
37C60	DCF121841	MF-3S 1H 104J TC04N
37C61	DCF120741	MF-3S 1H 104J
37C62	DCE945321	SXE 63VB-150(10X25)
37C63	DCE921361	SXE 16VB-2200(12.5X30)
37C64	DCE945321	SXE 63VB-150(10X25)
37C65,37C66	DCE921351	SXE 16VB-680(10X20)
37C67	DCF168661	MMH 2G 683K
37C68	DCF121011	MM-3C 1J 104K TC04N
37C69 to 37C71	DCF121021	MM-3C 1J 224K TC04N
37C72	DCC140131	DE7100F 222M VA1-KC
37C74	DCE280611	KMF 400VB-47M
37C75	DCE985251	KMH400VNSN 180M25D
37C76	DCC140131	DE7100F 222M VA1-KC
37C77	DCC140161	DE7150F 472M VA1-KC
37C78	DCF121021	MM-3C 1J 224K TC04N
37C100	DCC171961	DE1210E 222M-KX
37CN1	DCN013161	INLET AP-320(V) BLACK
37CN2	DCN034851	CONNECTOR M36-02-30-114P
37CN3,37CN4	DCN994771	CONNECTOR 5267-10A
37CN5,37CN6	DCN990911	CONNECTOR 5267-07A
37D1	DDD024051	LN4SB60
37D2	DDD024041	D5L60
37D3	DDD021481	RG1C
37D4	DDD029551	D1NL20U TA21R
37D5	DDD038841	RD20ESB/HZS20NB TA21R
37D6	DDD038831	RD18ESB/HZS18NB TA21R
37D7	DDD029471	D1NL40 TA21R
37D8	DDD038771	RD10ESB/HZS10NB TA21R
37D9	DDD029551	D1NL20U TA21R
37D10	DDD021481	RG1C
37D11,37D12	DDD019071	1SS 120 TA21R
37D13,37D14	DDD029551	D1NL20U TA21R
37D15	DDD019071	1SS 120 TA21R
37D16	DDD029411	D1NS4 TA21R
37D17	DDD021481	RG1C
37D18,37D19	DDD029551	D1NL20U TA21R
37D20,37D21	DDD019071	1SS 120 TA21R
37D22,37D23	DDD024031	D5LC20U
37D24	DDD024021	D3L60
37D25	DDD024011	S2L60
37D26	DDD038731	RD6.8ESB/HZS6.8NB TA21R
37D27	DDD035052	HZT7B2
37D28	DDD029091	EM01 TA21R

POWER SUPPLY 37

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
37D29	DDD038731	RD6.8ESB/HZS6.8NB TA21R
37D30	DDD033241	RD47EB TA21R
37D32	DDD033241	RD47EB TA21R
37D33,37D34	DDD029091	EM01 TA21R
37D35	DDD029551	D1NL20U TA21R
37D36	DDD038741	RD7.5ESB/HZS7.5NB TA21R
37D51	DDD029551	D1NL20U TA21R
37D90, 37D91	DDD029551	D1NL20U TA21R
37F1	DFU016631	FUSE MT-4 5A 250V UL-L
37HIC1	DIC890321	HIC FS44635
37IC1	DFB031571	TLP721F
37IC2A, B	DFB031571	TLP721F
37IC3	DIC653611	M 51995AP (MITSUBISHI)
37IC4	DIC659011	TA 78L005AP TPE5
37IC5,37IC6	DIC653791	μ PC 24A05HF (NEC)
37IC7,37IC8	DIC613771	4558
37IC9	DIC653771	NJM 431L TE04F
37L1,37L2	DCL113741	CHOKE COIL AX10-400
37L3	DCL170251	COMMON CHOKE COIL ET3542-052
37L4	DCL170241	COMMON CHOKE COIL ET2835-040
37L5	DCL214152	TRANS FS44634-21 UL-I
37L6	DCL113751	CHOKE COIL FS-44696
37L7 to 37L11	DCL113731	CHOKE COIL FS44697
37L13 to 37L16	DCL321111	FERRITE BEADS HF70BB3.5X5X1.3
37L18	DCL321111	FERRITE BEADS HF70BB3.5X5X1.3
37L20 to 37L27	DCL321111	FERRITE BEADS HF70BB3.5X5X1.3
37Q1	DTR215761	2SK 2194
37Q2	DTR215771	2SK 1535
37Q3	DTR139011	2SC 1815GR TPER1
37Q4	DTR139601	2SC 4311
37Q5	DTR139011	2SC 1815GR TPER1
37Q6	DTR215671	IRFPE50
37Q7	DTR199511	DTC 114ES TP
37Q8	DTR139011	2SC 1815GR TPER1
37Q9	DTR215501	2SK 591
37Q10	DTR119011	2SA 1015Y TPER1
37Q11	DTR225011	2SJ 143
37Q12	DTR136181	2SC 2551
37Q13	DTR219051	2SK 373-GR TPE2
37Q14	DTR149071	2SD 1407O/Y
37Q15	DTR219051	2SK 373-GR TPE2
37Q16	DTR119291	2SA 1091-O TPE2
37Q17	DTR116571	2SA 1668
37Q18	DTR136181	2SC 2551
37R1	DRS331261	RSS2 68KΩJ L15

POWER SUPPLY 37

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
37R2,37R3	DRS331051	RSS2 820ΩJ L15
37R4	DRS320371	RSS1 220ΩJ TA21N
37R5	DRE137611	EF1/4S 75ΩF TA21N
37R6	DRS331051	RSS2 820ΩJ L15
37R7	DRS330441	RSS2 820ΩJ TA21N
37R8	DRE960191	BPR 26 0.1ΩK
37R9	DRE137921	EF1/4S 1.5KΩF TA21N
37R10	DRE137971	EF1/4S 2.4KΩF TA21N
37R12	DRS331271	RSS2 100KΩJ L15
37R13,37R14	DRE138601	EF1/4S 1.0MΩF TA21N
37R15	DRE137401	EF1/4S 10ΩF TA21N
37R16	DRE137641	EF1/4S 100ΩF TA21N
37R17	DRE137881	EF1/4S 1.0KΩF TA21N
37R18	DRE137761	EF1/4S 330ΩF TA21N
37R19	DRE138471	EF1/4S 300KΩF TA21N
37R20	DRE138511	EF1/4S 430KΩF TA21N
37R21,37R22	DRE138161	EF1/4S 15KΩF TA21N
37R23	DRE137881	EF1/4S 1.0KΩF TA21N
37R24	DRE137571	EF1/4S 51ΩF TA21N
37R25	DRE137681	EF1/4S 150ΩF TA21N
37R26	DRE138211	EF1/4S 24KΩF TA21N
37R27	DRE138181	EF1/4S 18KΩF TA21N
37R28	DRS331271	RSS2 100KΩJ L15
37R29	DRD148281	PSS1/2S 470KΩJ TA21N
37R30	DRE137681	EF1/4S 150ΩF TA21N
37R31	DRE137721	EF1/4S 220ΩF TA21N
37R32	DRS320091	RSS1 1.0ΩJ TA21N
37R33	DRE137881	EF1/4S 1.0KΩF TA21N
37R35	DRS320451	RSS1 1.0KΩJ TA21N
37R36	DRE137851	EF1/4S 750ΩF TA21N
37R37,37R38	DRS321151	RSS1 6.8KΩJ L12.5
37R39	DRS331181	RSS2 47KΩJ L15
37R40	DRZ019241	RF1S 0.68ΩJ TA21N
37R41	DRE137561	EF1/4S 47ΩF TA21N
37R42	DRE137401	EF1/4S 10ΩF TA21N
37R43,37R44	DRS321141	RSS1 2.2KΩJ L12.5
37R45	DRS321341	RSS1 470ΩJ L12.5
37R46	DRS321061	RSS1 150ΩJ L12.5
37R47	DRE137561	EF1/4S 47ΩF TA21N
37R48	DRS320331	RSS1 100ΩJ TA21N
37R49	DRE137881	EF1/4S 1.0KΩF TA21N
37R50	DRE138121	EF1/4S 10KΩF TA21N
37R51	DRE137841	EF1/4S 680ΩF TA21N
37R52	DRE138121	EF1/4S 10KΩF TA21N
37R53	DRE137971	EF1/4S 2.4KΩF TA21N

POWER SUPPLY 37

CIRCUIT REFERENCE	PART NO.	DESCRIPTION
37R54	DRE138051	EF1/4S 5.1KΩF TA21N
37R55	DRE137881	EF1/4S 1.0KΩF TA21N
37R56	DRS320331	RSS1 100ΩJ TA21N
37R57	DRE137561	EF1/4S 47ΩF TA21N
37R58	DRE138081	EF1/4S 6.8KΩF TA21N
37R59	DRE138141	EF1/4S 12KΩF TA21N
37R60	DRE138041	EF1/4S 4.7KΩF TA21N
37R61	DRE138081	EF1/4S 6.8KΩF TA21N
37R62	DRE137881	EF1/4S 1.0KΩF TA21N
37R63	DRE138141	EF1/4S 12KΩF TA21N
37R64	DRE138081	EF1/4S 6.8KΩF TA21N
37R65	DRE138141	EF1/4S 12KΩF TA21N
37R66	DRE138131	EF1/4S 11KΩF TA21N
37R67	DRE138261	EF1/4S 39KΩF TA21N
37R68	DRE137881	EF1/4S 1.0KΩF TA21N
37R69	DRE138081	EF1/4S 6.8KΩF TA21N
37R70	DRE138141	EF1/4S 12KΩF TA21N
37R71	DRE137881	EF1/4S 1.0KΩF TA21N
37R72	DRS320151	RSS1 3.3ΩJ TA21N
37R73	DRE137911	EF1/4S 1.3KΩF TA21N
37R74	DRE138281	EF1/4S 47KΩF TA21N
37R75	DRE138361	EF1/4S 100KΩF TA21N
37R76	DRE137441	EF1/4S 15ΩF TA21N
37R77	DRE138141	EF1/4S 12KΩF TA21N
37R78	DRE138171	EF1/4S 16KΩF TA21N
37R79	DRE137881	EF1/4S 1.0KΩF TA21N
37R81	DRE138481	EF1/4S 330KΩF TA21N
37R90, 37R91	DRS339031	RSS20 6.8 Ω J
37T1	DCL241352	TRANS FS44633-21 UL-I
37T2	DCL214173	TRANS FS44694-41 UL-I
37T3	DCL214163	TRANS FS44690-41 UL-I
37TH1,37TH2	DDD080391	8D13
37VR1	DRV419231	GF06UT2/CT-6TV00 50KΩ (T)
37VR2	DRV419181	GF06UT2/CT-6TV00 1KΩ TE04B

Memo

Section 6 Schematic Diagrams

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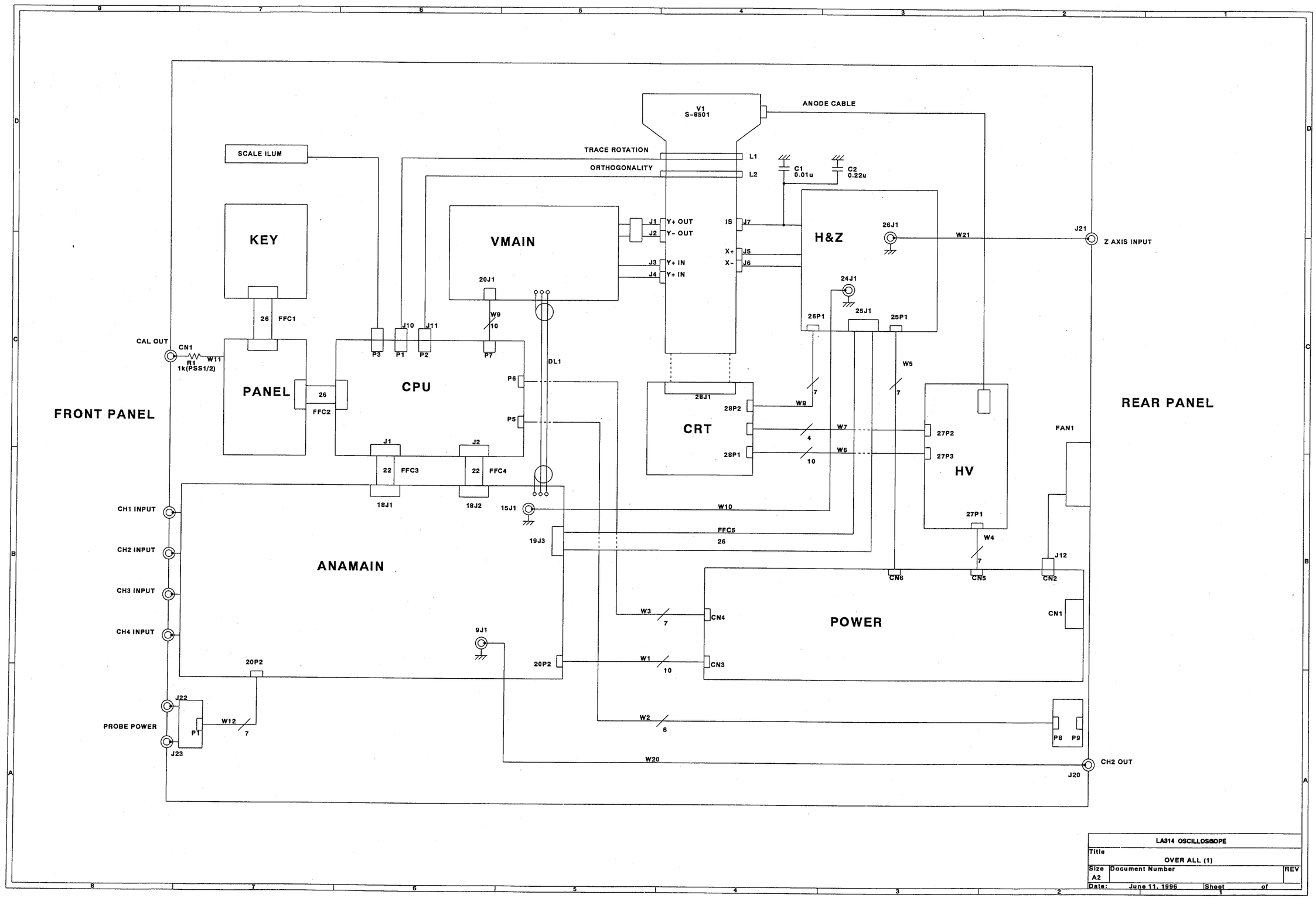
Memo



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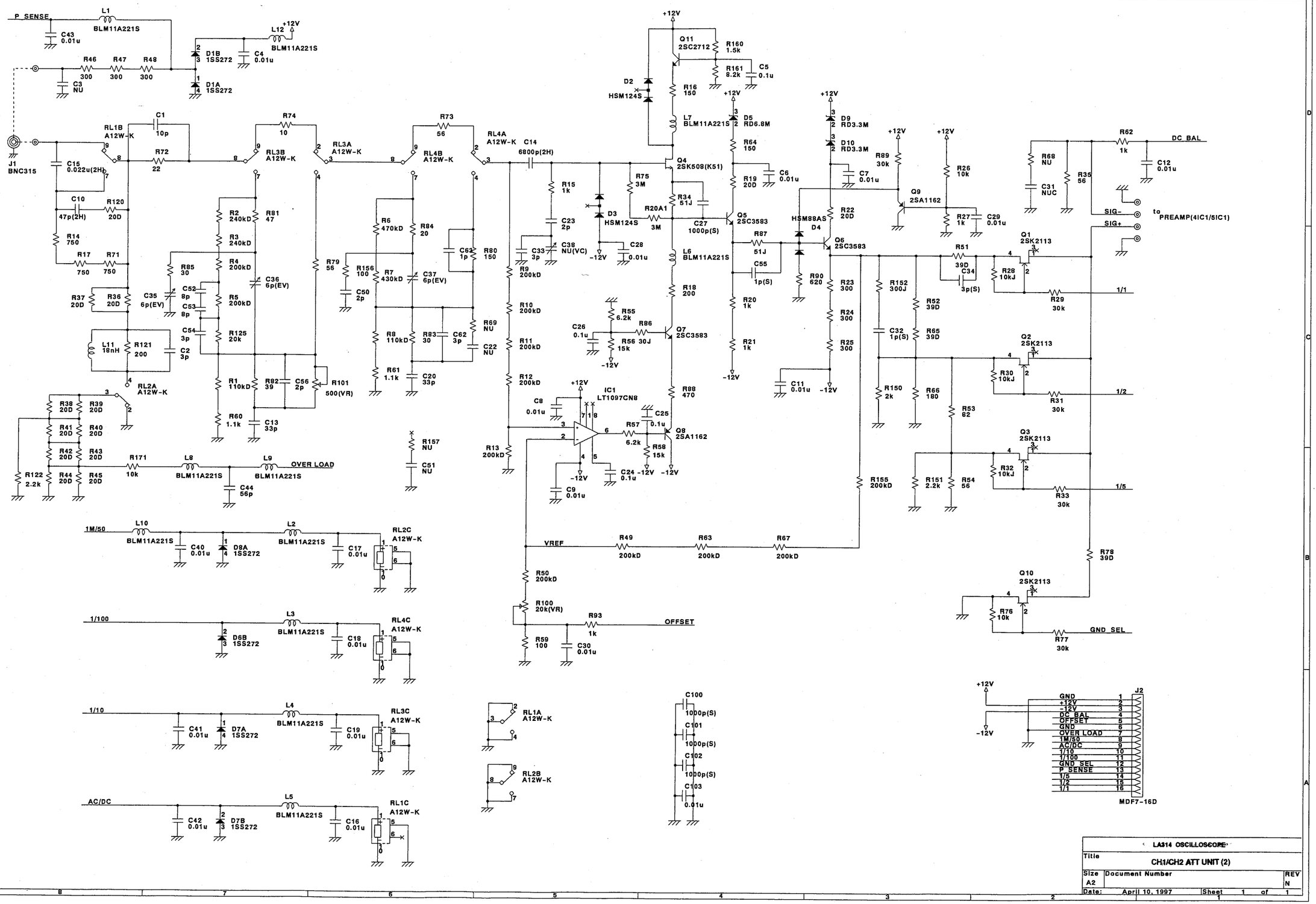
P SENSE
L1
BLM11A221S
C43 0.01u
L12 +12V
BLM11A221S
D1B 1SS272
C4 0.01u
R46 300
R47 300
R48 300
C3 NU
D1A 1SS272
J1 BNC315
RL1B A12W-K
C1 10p
R74 10
R73 56
RL3A A12W-K
RL4A A12W-K
C14 6800p(2H)
R72 22
RL3B A12W-K
RL4B A12W-K
C15 0.022u(2H)
C10 47p(2H)
R120 20D
R14 750
R17 750
R71 750
R37 20D
R36 20D
C35 6p(EV)
R2 240kD
R3 240kD
R4 200kD
R5 200kD
R81 47
R85 30
C52 8p
C53 8p
C54 3p
C36 6p(EV)
R125 20k
L11 18nH
R121 200
C2 3p
RL2A A12W-K
R1 110kD
R82 39
C56 2p
R101 500(VR)
R60 1.1k
C13 33p
R6 470kD
R84 20
R156 100
R7 430kD
C37 6p(EV)
C62 1p
R80 150
C50 2p
R8 110kD
R83 30
C62 3p
R69 NU
C22 NU
R61 1.1k
C20 33p
R79 56
R157 NU
C51 NU
R15 1k
C23 2p
C33 3p
C38 NU(VC)
R9 200kD
R10 200kD
R11 200kD
R12 200kD
R13 200kD
C8 0.01u
C9 0.01u
IC1 LT1097CN8
C25 0.1u
R57 6.2k
R58 15k
C24 0.1u
Q8 2SA1162
-12V
D3 HSM124S
R75 3M
R20A1 3M
C28 0.01u
C27 1000p(S)
Q4 2SK508(K51)
R34 51J
Q5 2SC3583
L6 BLM11A221S
R18 200
R87 51J
C55 1p(S)
R20 1k
R21 1k
R55 6.2k
C26 0.1u
R86
R56 30J 15k
Q7 2SC3583
R88 470
+12V
Q11 2SC2712
R160 1.5k
R161 8.2k
C5 0.1u
D2 HSM124S
R16 150
L7 BLM11A221S
D5 RD6.8M
R64 150
R19 20D
C6 0.01u
D9 RD3.3M
D10 RD3.3M
C7 0.01u
HSM88AS D4
R22 20D
R90 620
Q6 2SC3583
C11 0.01u
R23 300
R24 300
R25 300
R89 30k
Q9 2SA1162
R26 10k
R27 1k
C29 0.01u
R62 1k
DC BAL
R68 NU
C31 NUC
R35 56
C12 0.01u
SIG-
SIG+
to PREAMP(4IC1/5IC1)
Q1 2SK2113
R51 39D
C34 3p(S)
R28 10kJ
R29 30k
1/1
R152 300J
R52 39D
C32 1p(S)
R65 39D
Q2 2SK2113
R30 10kJ
R31 30k
1/2
R150 2k
R66 180
R53 82
Q3 2SK2113
R32 10kJ
R33 30k
1/5
R155 200kD
R151 2.2k
R54 56
R78 39D
Q10 2SK2113
R76 10k
GND SEL
R77 30k
R39 20D
R41 20D
R40 20D
R42 20D
R43 20D
R122 2.2k
R44 20D
R45 20D
R171 10k
L8 BLM11A221S
L9 BLM11A221S
OVER LOAD
C44 56p
L10 BLM11A221S
1M/50
C40 0.01u
D8A 1SS272
L2 BLM11A221S
C17 0.01u
RL2C A12W-K
L3 BLM11A221S
1/100
D6B 1SS272
C18 0.01u
RL4C A12W-K
L4 BLM11A221S
1/10
C41 0.01u
D7A 1SS272
C19 0.01u
RL3C A12W-K
L5 BLM11A221S
AC/DC
C42 0.01u
D7B 1SS272
C16 0.01u
RL1C A12W-K
VREF
R49 200kD
R63 200kD
R67 200kD
R50 200kD
R100 20k(VR)
R93 1k
OFFSET
R59 100
C30 0.01u
RL1A A12W-K
RL2B A12W-K
C100 1000p(S)
C101 1000p(S)
C102 1000p(S)
C103 0.01u
+12V
-12V
GND 1
+12V 2
-12V 3
DC BAL 4
OFFSET 5
GND 6
OVER LOAD 7
1M/50 8
AC/DC 9
1/10 10
1/100 11
GND SEL 12
P SENSE 13
1/5 14
1/2 15
1/1 16
J2
MDF7-16D
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Document Number
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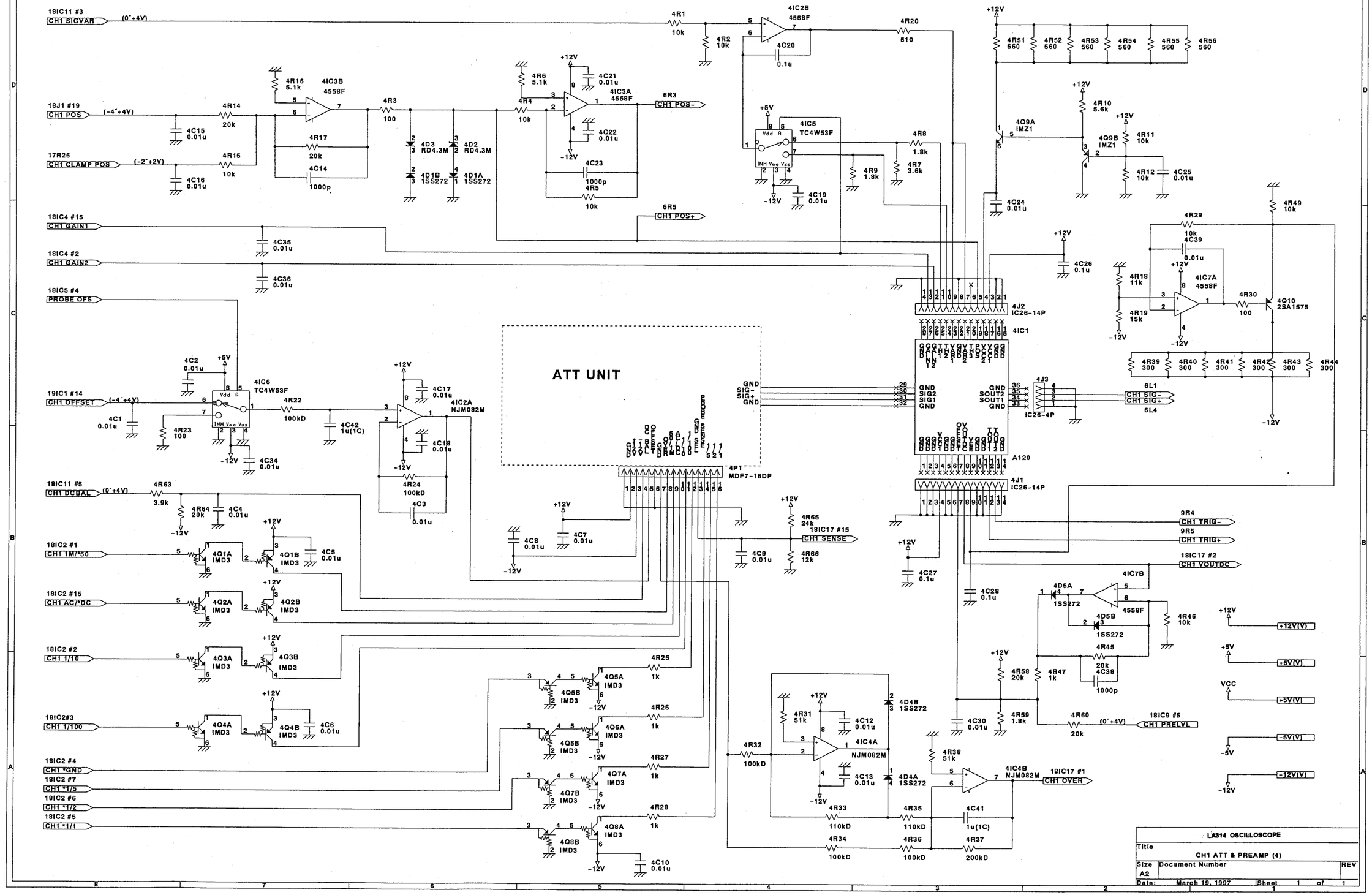
18IC11 #3
CH1 SIGVAR
(0~+4V)
4R1
10k
4R2
10k
4IC2B
4558F
4C20
0.1u
4R20
510
18J1 #19
CH1 POS
(-4~+4V)
4R14
20k
4C15
0.01u
17R26
CH1 CLAMP POS
(-2~+2V)
4R15
10k
4C16
0.01u
4R16
5.1k
4IC3B
4558F
4R17
20k
4C14
1000p
4R3
100
4D3 RD4.3M
4D2 RD4.3M
4D1B 1SS272
4D1A 1SS272
4R6
5.1k
4R4
10k
4C21
0.01u
4IC3A
4558F
4C22
0.01u
4C23
1000p
4R5
10k
6R3
CH1 POS-
6R5
CH1 POS+
+12V
-12V
+5V
4IC5
TC4W53F
4R8
1.8k
4R9
1.8k
4R7
3.6k
4C19
0.01u
4R51 560
4R52 560
4R53 560
4R54 560
4R55 560
4R56 560
4Q9A IMZ1
4Q9B IMZ1
4R10
5.6k
4R11
10k
4R12
10k
4C25
0.01u
4C24
0.01u
18IC4 #15
CH1 GAIN1
18IC4 #2
CH1 GAIN2
4C35
0.01u
4C36
0.01u
4C26
0.1u
4J2
IC26-14P
4IC1
A120
4R29
10k
4C39
0.01u
4R49
10k
4IC7A
4558F
4R18
11k
4R19
15k
4R30
100
4Q10
2SA1575
4R39 300
4R40 300
4R41 300
4R42 300
4R43 300
4R44 300
6L1
6L4
CH1 SIG-
CH1 SIG+
4J3
IC26-4P
18IC5 #4
PROBE OFS
4C2
0.01u
4IC6
TC4W53F
19IC1 #14
CH1 OFFSET
(-4~+4V)
4C1
0.01u
4R23
100
4R22
100kD
4C42
1u(1C)
4C34
0.01u
4IC2A
NJM082M
4C17
0.01u
4C18
0.01u
4R24
100kD
4C3
0.01u
ATT UNIT
4P1
MDF7-16DP
GND
SIG-
SIG+
GND
4C8
0.01u
4C7
0.01u
4R65
24k
18IC17 #15
CH1 SENSE
4C9
0.01u
4R66
12k
4C27
0.1u
4C28
0.1u
9R4
CH1 TRIG-
9R5
CH1 TRIG+
18IC17 #2
CH1 VOUTDC
4IC7B
4D5A 1SS272
4D5B 1SS272
4558F
4R46
10k
+12V(V)
+5V(V)
VCC
+5V(V)
-5V(V)
-5V
-12V(V)
18IC11 #5
CH1 DCBAL
(0~+4V)
4R63
3.9k
4R64
20k
4C4
0.01u
18IC2 #1
CH1 1M/*50
18IC2 #15
CH1 AC/*DC
18IC2 #2
CH1 1/10
18IC2#3
CH1 1/100
18IC2 #4
CH1 *GND
18IC2 #7
CH1 *1/5
18IC2 #6
CH1 *1/2
18IC2 #5
CH1 *1/1
4Q1A IMD3
4Q1B IMD3
4Q2A IMD3
4Q2B IMD3
4Q3A IMD3
4Q3B IMD3
4Q4A IMD3
4Q4B IMD3
4C5
0.01u
4C6
0.01u
4Q5A IMD3
4Q5B IMD3
4Q6A IMD3
4Q6B IMD3
4Q7A IMD3
4Q7B IMD3
4Q8A IMD3
4Q8B IMD3
4R25
1k
4R26
1k
4R27
1k
4R28
1k
4C10
0.01u
4R32
100kD
4R31
51k
4C12
0.01u
4IC4A
NJM082M
4C13
0.01u
4D4B 1SS272
4D4A 1SS272
4R33
110kD
4R35
110kD
4C41
1u(1C)
4R34
100kD
4R36
100kD
4R37
200kD
4R38
51k
4IC4B
NJM082M
18IC17 #1
CH1 OVER
4R58
20k
4R47
1k
4R45
20k
4C38
1000p
4C30
0.01u
4R59
1.8k
4R60
20k
(0~+4V)
18IC9 #5
CH1 PRELVL
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Title
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Size
A2
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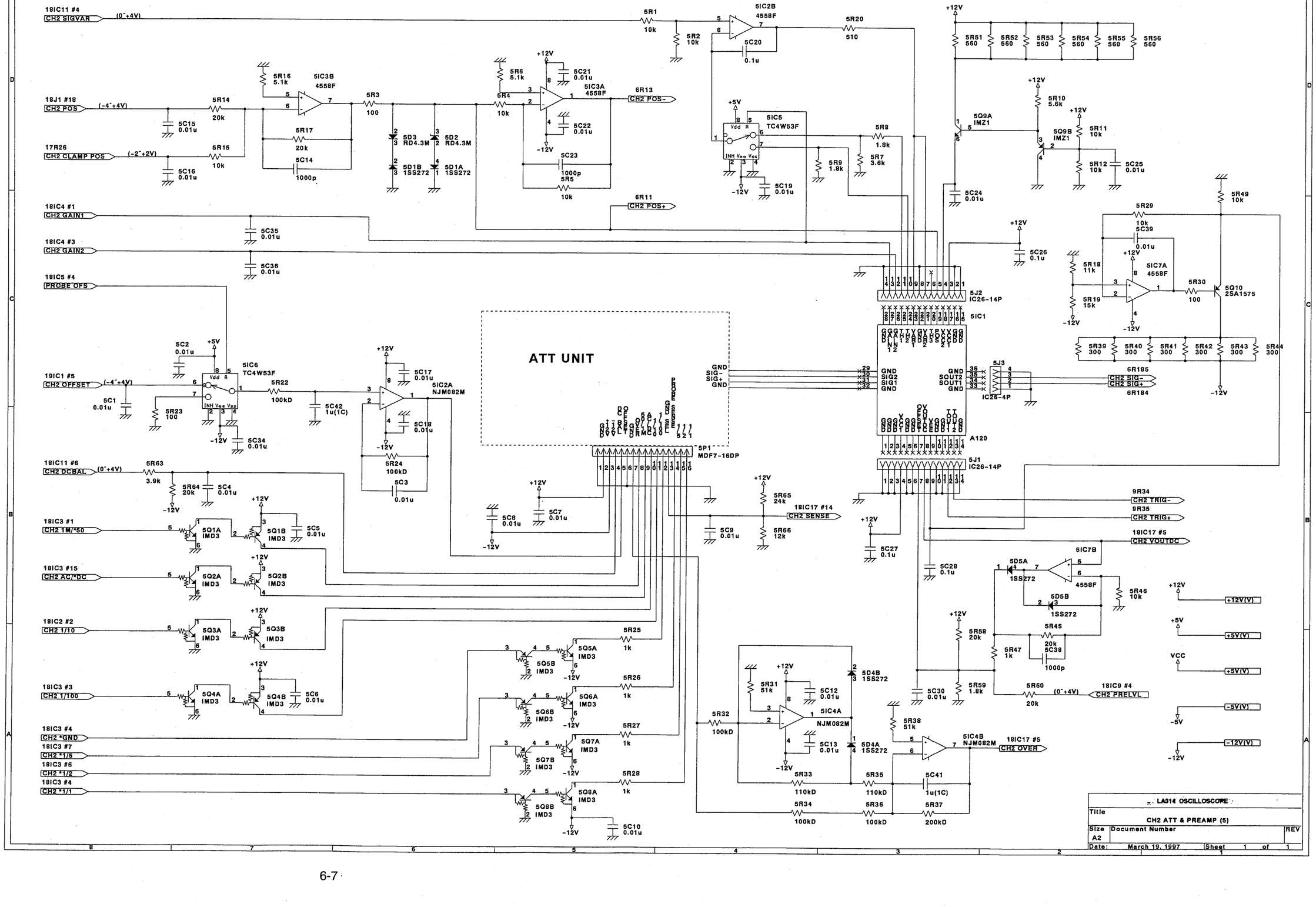
REV
Date: March 19, 1997
Sheet 1 of 1


18IC11 #4
CH2 SIGVAR
(0~+4V)
5R1
10k
5R2
10k
5IC2B
4558F
5R20
510
5C20
0.1u
18J1 #18
CH2 POS
(-4~+4V)
5R14
20k
5C15
0.01u
17R26
CH2 CLAMP POS
(-2~+2V)
5R15
10k
5C16
0.01u
5R16
5.1k
5IC3B
4558F
5R17
20k
5C14
1000p
5R3
100
5D3
RD4.3M
5D2
RD4.3M
5D1B
1SS272
5D1A
1SS272
5R6
5.1k
5R4
10k
5C21
0.01u
5IC3A
4558F
5C22
0.01u
5C23
1000p
5R5
10k
6R13
CH2 POS-
6R11
CH2 POS+
+12V
-12V
+5V
5IC5
TC4W53F
5R8
1.8k
5R9
1.8k
5R7
3.6k
5C19
0.01u
5C24
0.01u
5R51
560
5R52
560
5R53
560
5R54
560
5R55
560
5R56
560
5Q9A
IMZ1
5Q9B
IMZ1
5R10
5.6k
5R11
10k
5R12
10k
5C25
0.01u
18IC4 #1
CH2 GAIN1
18IC4 #3
CH2 GAIN2
5C35
0.01u
5C36
0.01u
5C26
0.1u
5J2
IC26-14P
5IC1
5R29
10k
5C39
0.01u
5R18
11k
5R19
15k
5IC7A
4558F
5R30
100
5Q10
2SA1575
5R49
10k
5R39
300
5R40
300
5R41
300
5R42
300
5R43
300
5R44
300
6R185
CH2 SIG-
CH2 SIG+
6R184
5J3
IC26-4P
18IC5 #4
PROBE OFS
5C2
0.01u
5IC6
TC4W53F
5R22
100kD
5C42
1u(1C)
5R23
100
5C34
0.01u
5C17
0.01u
5IC2A
NJM082M
5C18
0.01u
5R24
100kD
5C3
0.01u
19IC1 #5
CH2 OFFSET
(-4~+4V)
5C1
0.01u
ATT UNIT
GND
SIG-
SIG+
GND
5P1
MDF7-16DP
GND
SIG2
SIG1
GND
GND
SOUT2
SOUT1
GND
A120
5J1
IC26-14P
18IC11 #6
CH2 DCBAL
(0~+4V)
5R63
3.9k
5R64
20k
5C4
0.01u
18IC3 #1
CH2 1M/*50
5Q1A
IMD3
5Q1B
IMD3
5C5
0.01u
18IC3 #15
CH2 AC/*DC
5Q2A
IMD3
5Q2B
IMD3
18IC2 #2
CH2 1/10
5Q3A
IMD3
5Q3B
IMD3
18IC3 #3
CH2 1/100
5Q4A
IMD3
5Q4B
IMD3
5C6
0.01u
18IC3 #4
CH2 *GND
18IC3 #7
CH2 *1/5
18IC3 #6
CH2 *1/2
18IC3 #4
CH2 *1/1
5Q5A
IMD3
5Q5B
IMD3
5R25
1k
5Q6A
IMD3
5Q6B
IMD3
5R26
1k
5Q7A
IMD3
5Q7B
IMD3
5R27
1k
5Q8A
IMD3
5Q8B
IMD3
5R28
1k
5C10
0.01u
5C8
0.01u
5C7
0.01u
5R65
24k
5R66
12k
18IC17 #14
CH2 SENSE
5C9
0.01u
9R34
CH2 TRIG-
9R35
CH2 TRIG+
18IC17 #5
CH2 VOUTDC
5C27
0.1u
5C28
0.1u
5IC7B
5D5A
1SS272
5D5B
1SS272
4558F
5R46
10k
+12V(V)
+5V(V)
VCC
+5V(V)
-5V(V)
-5V
-12V(V)
5R58
20k
5R47
1k
5R45
20k
5C38
1000p
5C30
0.01u
5R59
1.8k
5R60
20k
(0~+4V)
18IC9 #4
CH2 PRELVL
5R32
100kD
5R31
51k
5C12
0.01u
5IC4A
NJM082M
5C13
0.01u
5D4B
1SS272
5D4A
1SS272
5R38
51k
5IC4B
NJM082M
18IC17 #5
CH2 OVER
5R33
110kD
5R35
110kD
5C41
1u(1C)
5R34
100kD
5R36
100kD
5R37
200kD
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March 19, 1997
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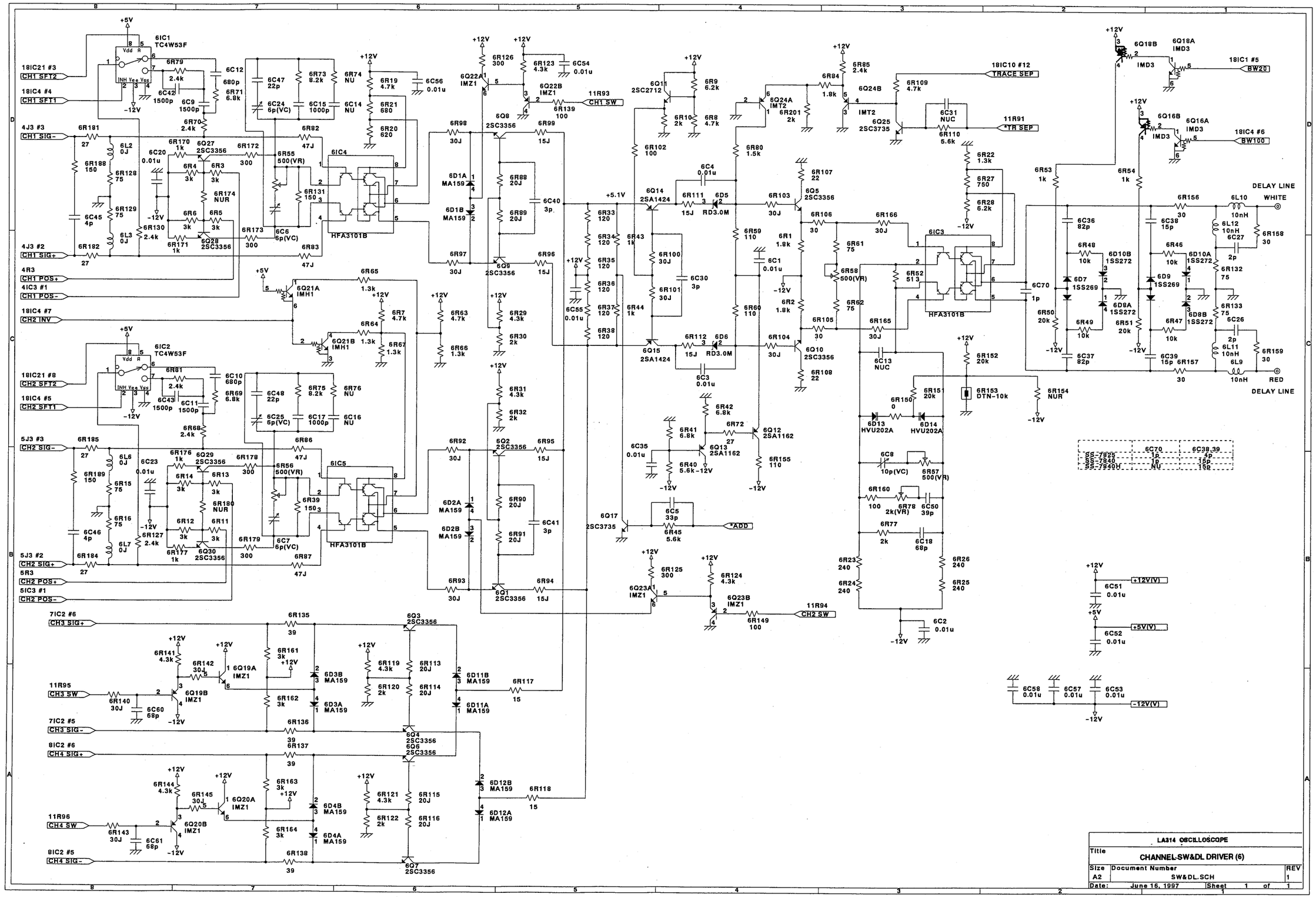
+5V
6IC1 TC4W53F
18IC21 #3
CH1 SFT2
18IC4 #4
CH1 SFT1
-12V
4J3 #3
CH1 SIG-
4J3 #2
CH1 SIG+
4R3
CH1 POS+
4IC3 #1
CH1 POS-
6IC4
HFA3101B
+12V
6Q22A IMZ1
6Q22B IMZ1
11R93
CH1 SW
6Q9 2SC3356
6Q1 2SC3356
6Q11 2SC2712
6Q24A IMT2
6Q24B IMT2
6Q25 2SC3735
18IC10 #12
TRACE SEP
11R91
*TR SEP
6Q14 2SA1424
6Q15 2SA1424
+5.1V
6Q10 2SC3356
6Q5 2SC3356
6IC3
HFA3101B
6Q18B IMD3
6Q18A IMD3
18IC1 #5
BW20
6Q16B IMD3
6Q16A IMD3
18IC4 #6
BW100
DELAY LINE
WHITE
RED
6Q21A IMH1
6Q21B IMH1
6IC2 TC4W53F
18IC21 #8
CH2 SFT2
18IC4 #5
CH2 SFT1
5J3 #3
CH2 SIG-
5J3 #2
CH2 SIG+
5R3
CH2 POS+
5IC3 #1
CH2 POS-
6IC5
HFA3101B
6Q2 2SC3356
6Q12 2SA1162
6Q13 2SA1162
6Q17 2SC3735
*ADD
6Q23A IMZ1
6Q23B IMZ1
11R94
CH2 SW
6D13 HVU202A
6D14 HVU202A
7IC2 #6
CH3 SIG+
7IC2 #5
CH3 SIG-
6Q3 2SC3356
6Q4 2SC3356
6Q19A IMZ1
6Q19B IMZ1
11R95
CH3 SW
8IC2 #6
CH4 SIG+
8IC2 #5
CH4 SIG-
6Q6 2SC3356
6Q7 2SC3356
6Q20A IMZ1
6Q20B IMZ1
11R96
CH4 SW
6D1A MA159
6D1B MA159
6D2A MA159
6D2B MA159
6D3A MA159
6D3B MA159
6D4A MA159
6D4B MA159
6D11A MA159
6D11B MA159
6D12A MA159
6D12B MA159
6D7 1SS269
6D8A 1SS272
6D8B 1SS272
6D9 1SS269
6D10A 1SS272
6D10B 1SS272
+12V(V)
+5V(V)
-12V(V)
SS-7623 1p 4p
SS-7840 1p 15p
SS-7840H NU 15p
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Size A2
Document Number SW&DL.SCH
REV 1
Date: June 16, 1997
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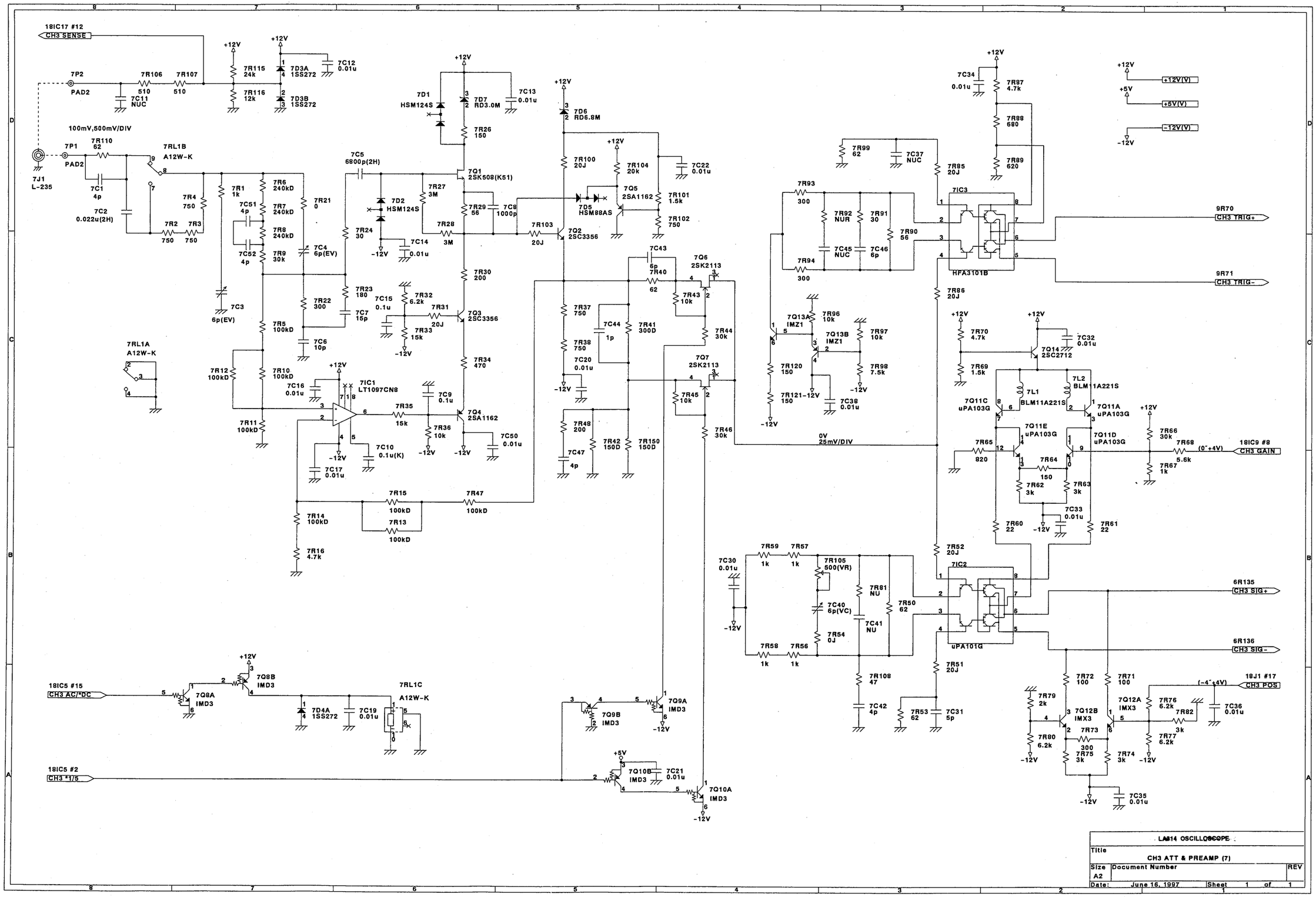
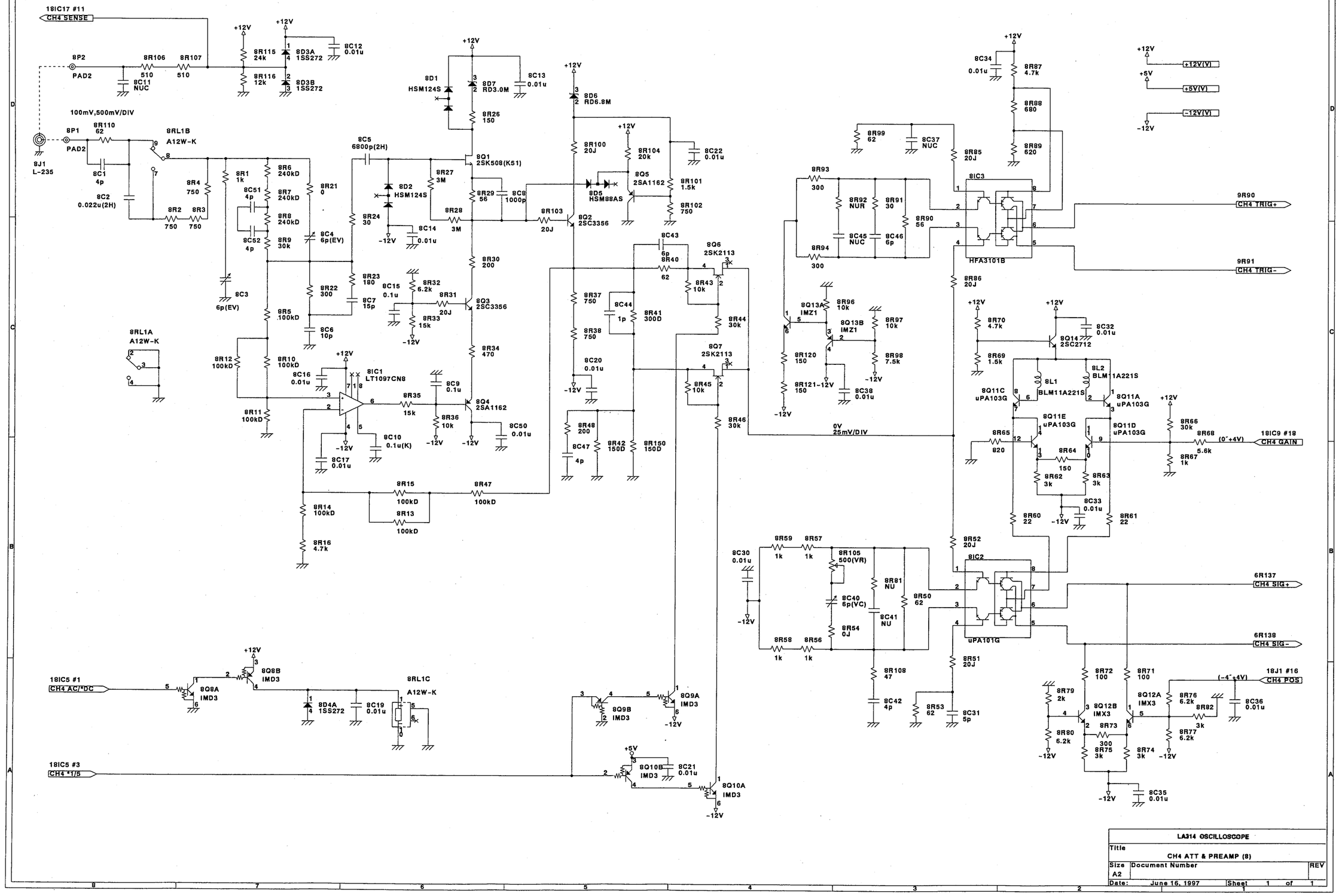

18IC17 #12
CH3 SENSE
7P2
PAD2
7R106 510
7R107 510
7C11 NUC
+12V
7R115 24k
7R116 12k
7D3A 1SS272
7D3B 1SS272
7C12 0.01u
100mV,500mV/DIV
7P1
PAD2
7J1 L-235
7R110 62
7C1 4p
7C2 0.022u(2H)
7RL1B A12W-K
7R1 1k
7R2 750
7R3 750
7R4 750
7C51 4p
7C52 4p
7R6 240kD
7R7 240kD
7R8 240kD
7R9 30k
7R21 0
7C3 6p(EV)
7C4 6p(EV)
7R5 100kD
7R22 300
7C6 10p
7R23 180
7C7 15p
7RL1A A12W-K
7R12 100kD
7R10 100kD
7R11 100kD
7C16 0.01u
7IC1 LT1097CN8
7C10 0.1u(K)
7C17 0.01u
7R35 15k
7R36 10k
7C9 0.1u
7C50 0.01u
7R15 100kD
7R13 100kD
7R47 100kD
7R14 100kD
7R16 4.7k
7D1 HSM124S
7D7 RD3.0M
7C13 0.01u
7R26 150
7C5 6800p(2H)
7D2 HSM124S
7R24 30
7C14 0.01u
7R27 3M
7R28 3M
7Q1 2SK508(K51)
7R29 56
7C8 1000p
7R103 20J
7Q2 2SC3356
7R30 200
7C15 0.1u
7R32 6.2k
7R31 20J
7R33 15k
7Q3 2SC3356
7R34 470
7Q4 2SA1162
7D6 RD6.8M
7R100 20J
7R104 20k
7Q5 2SA1162
7D5 HSM88AS
7C22 0.01u
7R101 1.5k
7R102 750
7C43 6p
7R40 62
7Q6 2SK2113
7R43 10k
7R44 30k
7Q7 2SK2113
7R45 10k
7R46 30k
7R37 750
7R38 750
7C20 0.01u
7C44 1p
7R41 300D
7R48 200
7C47 4p
7R42 150D
7R150 150D
0V
25mV/DIV
7C34 0.01u
7R97 4.7k
7R88 680
7R89 620
7R99 62
7C37 NUC
7R85 20J
7R93 300
7R92 NUR
7R91 30
7R90 56
7C45 NUC
7C46 6p
7R94 300
7IC3
HFA3101B
9R70
CH3 TRIG+
9R71
CH3 TRIG-
7R86 20J
7Q13A IMZ1
7Q13B IMZ1
7R96 10k
7R97 10k
7R120 150
7R121-12V 150
7R98 7.5k
7C38 0.01u
+12V(V)
+5V(V)
-12V(V)
7R70 4.7k
7R69 1.5k
7Q14 2SC2712
7C32 0.01u
7L2 BLM11A221S
7L1 BLM11A221S
7Q11C uPA103G
7Q11A uPA103G
7Q11E uPA103G
7Q11D uPA103G
7R65 820
7R64 150
7R62 3k
7R63 3k
7C33 0.01u
7R60 22
7R61 22
7R66 30k
7R68 5.6k
(0~+4V)
18IC9 #8
CH3 GAIN
7R67 1k
7R52 20J
7IC2
uPA101G
7R59 1k
7R57 1k
7R58 1k
7R56 1k
7C30 0.01u
7R105 500(VR)
7C40 6p(VC)
7C41 NU
7R81 NU
7R54 0J
7R50 62
7R108 47
7C42 4p
7R51 20J
7R53 62
7C31 5p
6R135
CH3 SIG+
6R136
CH3 SIG-
7R72 100
7R71 100
7R79 2k
7R80 6.2k
7Q12B IMX3
7Q12A IMX3
7R73 300
7R75 3k
7R74 3k
7R76 6.2k
7R82 3k
7R77 6.2k
7C36 0.01u
18J1 #17
CH3 POS
(-4~+4V)
7C35 0.01u
18IC5 #15
CH3 AC/*DC
7Q8A IMD3
7Q8B IMD3
7D4A 1SS272
7C19 0.01u
7RL1C A12W-K
7Q9B IMD3
7Q9A IMD3
18IC5 #2
CH3 *1/5
7Q10B IMD3
7C21 0.01u
7Q10A IMD3
LA814 OSCILLOSCOPE
Title
CH3 ATT & PREAMP (7)
Size A2
Document Number
REV
Date: June 16, 1997
Sheet 1 of 1


18IC17 #11
CH4 SENSE
8P2
PAD2
8R106 510
8R107 510
8C11 NUC
+12V
8R115 24k
8R116 12k
8D3A 1SS272
8D3B 1SS272
8C12 0.01u
100mV,500mV/DIV
8P1
PAD2
8J1 L-235
8R110 62
8C1 4p
8C2 0.022u(2H)
8RL1B A12W-K
8R4 750
8R2 750
8R3 750
8R1 1k
8C51 4p
8C52 4p
8R6 240kD
8R7 240kD
8R8 240kD
8R9 30k
8R21 0
8C3 6p(EV)
8C4 6p(EV)
8R23 180
8R22 300
8C7 15p
8C6 10p
8R5 100kD
8RL1A A12W-K
8R12 100kD
8R10 100kD
8R11 100kD
8C16 0.01u
8IC1 LT1097CN8
8C10 0.1u(K)
8R35 15k
8C9 0.1u
8R36 10k
8Q4 2SA1162
8C50 0.01u
8C17 0.01u
8R15 100kD
8R47 100kD
8R14 100kD
8R13 100kD
8R16 4.7k
8D1 HSM124S
8D7 RD3.0M
8C13 0.01u
8R26 150
8C5 6800p(2H)
8D2 HSM124S
8R27 3M
8R24 30
8C14 0.01u
8R29 56
8C8 1000p
8R28 3M
8R103 20J
8Q1 2SK508(K51)
8Q2 2SC3356
8R30 200
8Q3 2SC3356
8R34 470
8R32 6.2k
8R31 20J
8R33 15k
8C15 0.1u
8D6 RD6.8M
8R100 20J
8R104 20k
8Q5 2SA1162
8R101 1.5k
8R102 750
8C22 0.01u
8D5 HSM88AS
8C43 6p
8R40 62
8Q6 2SK2113
8R43 10k
8R44 30k
8Q7 2SK2113
8R45 10k
8R46 30k
8R37 750
8R38 750
8C20 0.01u
8C44 1p
8R41 300D
8R48 200
8C47 4p
8R42 150D
8R150 150D
8C34 0.01u
8R87 4.7k
8R88 680
8R89 620
8R99 62
8C37 NUC
8R85 20J
8R93 300
8R92 NUR
8R91 30
8R90 56
8R94 300
8C45 NUC
8C46 6p
8IC3 HFA3101B
8R86 20J
8Q13A IMZ1
8Q13B IMZ1
8R96 10k
8R97 10k
8R120 150
8R98 7.5k
8R121-12V 150
8C38 0.01u
0V 25mV/DIV
+12V(V)
+5V(V)
-12V(V)
9R90 CH4 TRIG+
9R91 CH4 TRIG-
8R70 4.7k
8R69 1.5k
8Q14 2SC2712
8C32 0.01u
8L2 BLM11A221S
8L1 BLM11A221S
8Q11C uPA103G
8Q11A uPA103G
8Q11E uPA103G
8Q11D uPA103G
8R65 820
8R64 150
8R62 3k
8R63 3k
8C33 0.01u
8R60 22
8R61 22
8R66 30k
8R68 5.6k (0~+4V)
8R67 1k
18IC9 #18 CH4 GAIN
8R59 1k
8R57 1k
8R58 1k
8R56 1k
8C30 0.01u
8R105 500(VR)
8C40 6p(VC)
8R54 0J
8R81 NU
8C41 NU
8R50 62
8R108 47
8C42 4p
8R53 62
8C31 5p
8R52 20J
8IC2 uPA101G
8R51 20J
6R137 CH4 SIG+
6R139 CH4 SIG-
8R72 100
8R71 100
8R79 2k
8R80 6.2k
8Q12B IMX3
8Q12A IMX3
8R76 6.2k
8R82 3k
8R73 300
8R75 3k
8R74 3k
8R77 6.2k
8C36 0.01u
8C35 0.01u
18J1 #16 CH4 POS (-4~+4V)
18IC5 #1
CH4 AC/*DC
8Q8A IMD3
8Q8B IMD3
8D4A 1SS272
8C19 0.01u
8RL1C A12W-K
8Q9B IMD3
8Q9A IMD3
18IC5 #3
CH4 *1/5
8Q10B IMD3
8C21 0.01u
8Q10A IMD3
LA314 OSCILLOSCOPE
Title
CH4 ATT & PREAMP (8)
Size A2
Document Number
REV
Date: June 16, 1997
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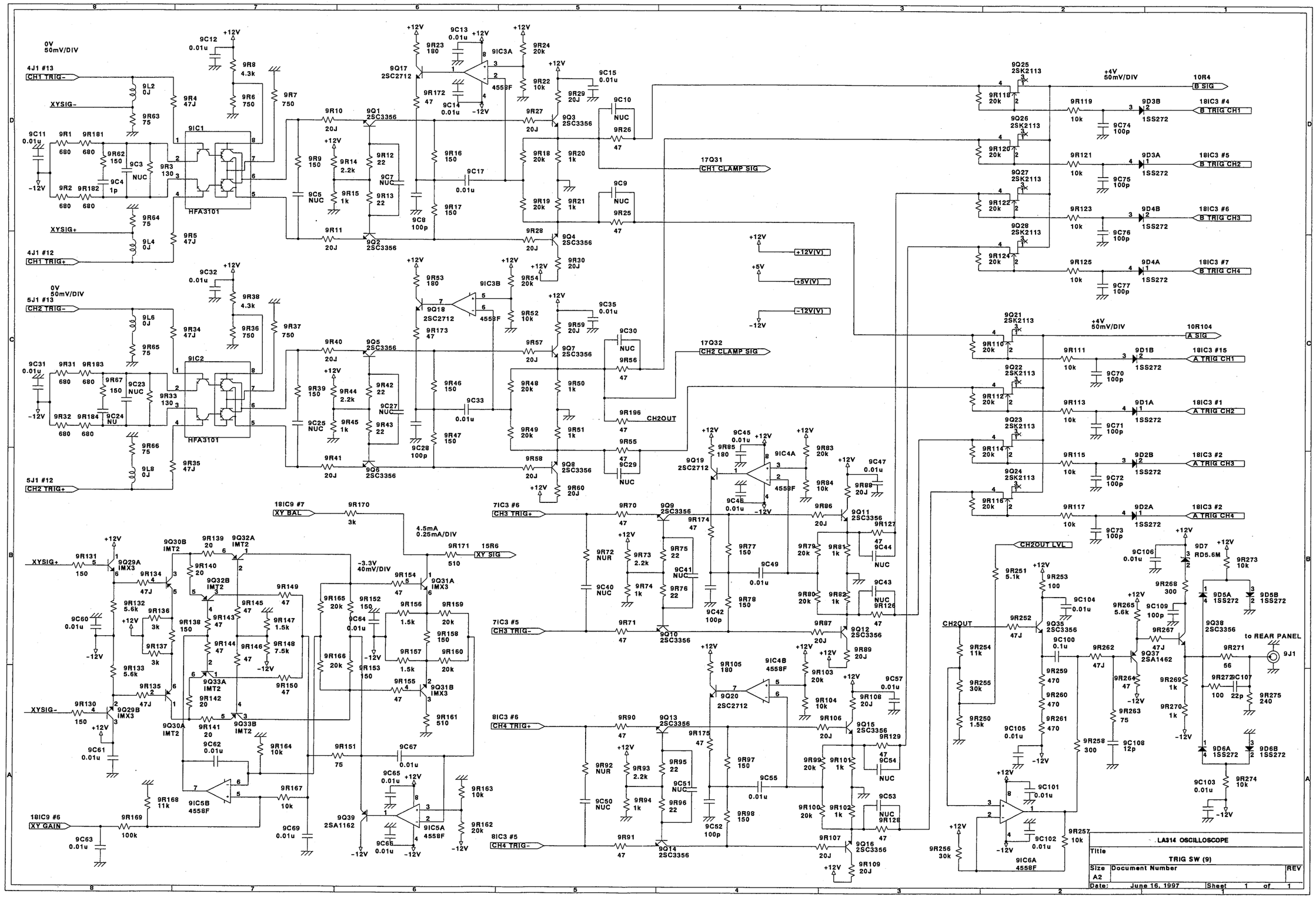
0V
50mV/DIV
4J1 #13
CH1 TRIG-
XYSIG-
XYSIG+
4J1 #12
CH1 TRIG+
HFA3101
17Q31
CH1 CLAMP SIG
5J1 #13
CH2 TRIG-
5J1 #12
CH2 TRIG+
17Q32
CH2 CLAMP SIG
CH2OUT
+12V(V)
+5V(V)
-12V(V)
+4V
50mV/DIV
10R4
B SIG
10R104
A SIG
18IC3 #4
B TRIG CH1
18IC3 #5
B TRIG CH2
18IC3 #6
B TRIG CH3
18IC3 #7
B TRIG CH4
18IC3 #15
A TRIG CH1
18IC3 #1
A TRIG CH2
18IC3 #2
A TRIG CH3
18IC3 #2
A TRIG CH4
18IC9 #7
XY BAL
18IC9 #6
XY GAIN
4.5mA
0.25mA/DIV
-3.3V
40mV/DIV
15R6
XY SIG
7IC3 #6
CH3 TRIG+
7IC3 #5
CH3 TRIG-
8IC3 #6
CH4 TRIG+
8IC3 #5
CH4 TRIG-
CH2OUT LVL
to REAR PANEL
9J1
LA314 OSCILLOSCOPE
TRIG SW (9)
Size A2
Document Number
REV
Date: June 16, 1997
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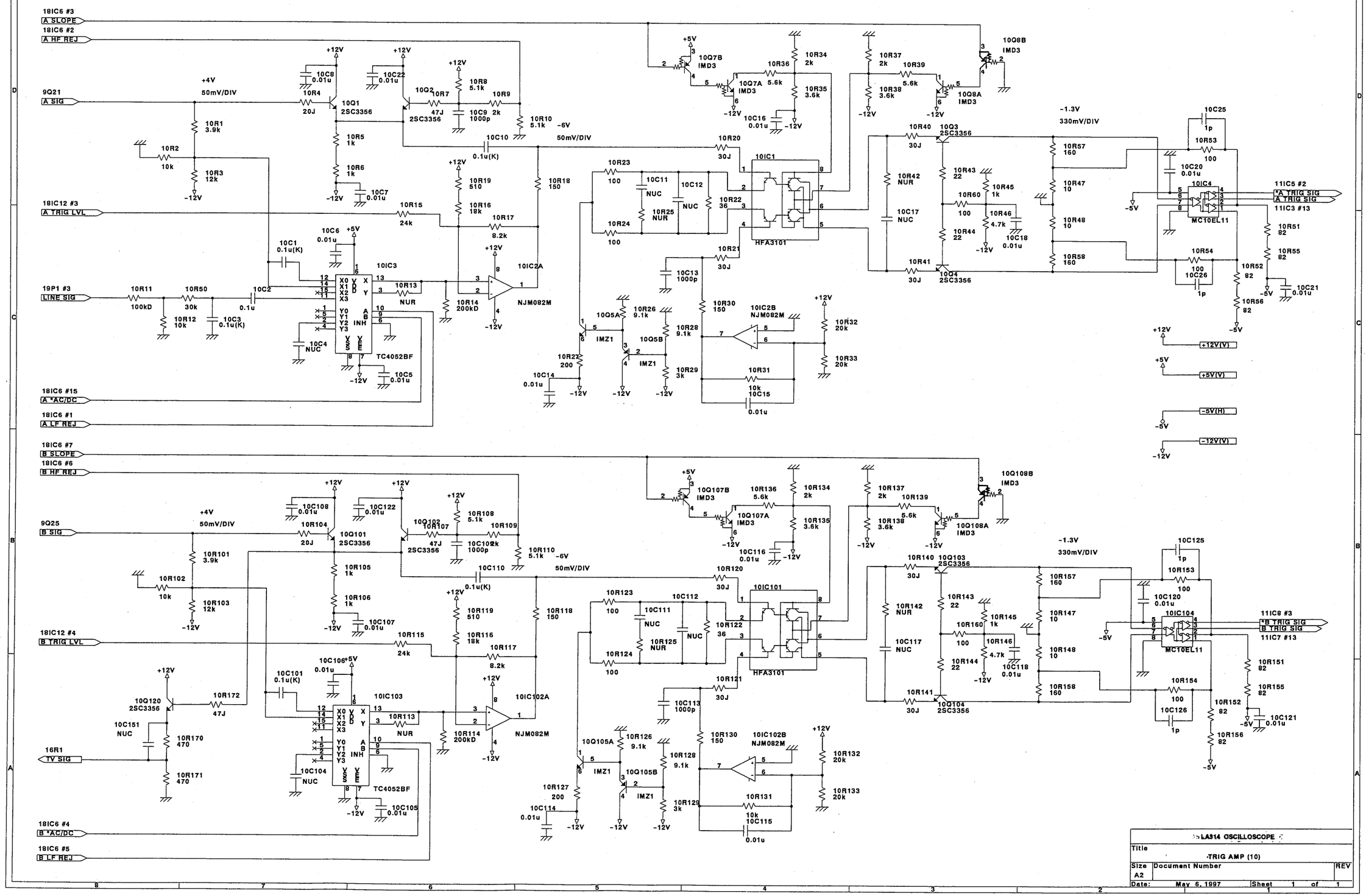
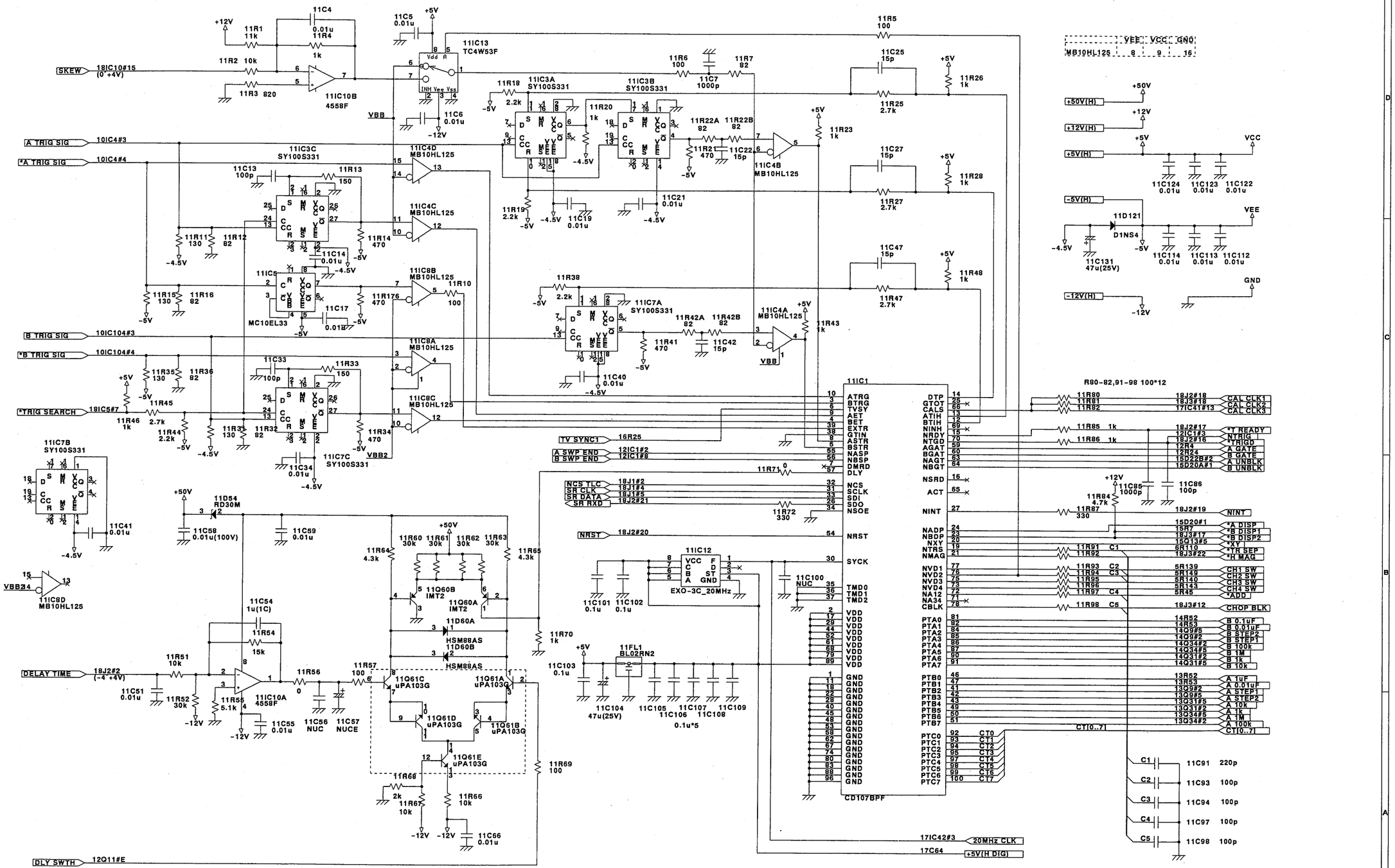

18IC6 #3
A SLOPE
18IC6 #2
A HF REJ
9Q21
A SIG
+4V
50mV/DIV
10C8 0.01u
10C22 0.01u
10Q1 2SC3356
10Q2
10R4 20J
10R7 47J
10R8 5.1k
10R9 2k
10C9 1000p
10R10 5.1k
-6V
10R1 3.9k
10R2 10k
10R3 12k
10R5 1k
10R6 1k
10C7 0.01u
10C10 0.1u(K)
50mV/DIV
18IC12 #3
A TRIG LVL
10R15 24k
10R16 18k
10R17 8.2k
10R18 150
10R19 510
10C6 0.01u
10C1 0.1u(K)
10IC3
10IC2A
19P1 #3
LINE SIG
10R11 100kD
10R50 30k
10C2 0.1u
10R12 10k
10C3 0.1u(K)
10R13 NUR
10R14 200kD
NJM082M
TC4052BF
10C4 NUC
10C5 0.01u
18IC6 #15
A *AC/DC
18IC6 #1
A LF REJ
10Q7B IMD3
10Q7A IMD3
10R34 2k
10R36 5.6k
10R35 3.6k
10C16 0.01u
10R37 2k
10R39 5.6k
10R38 3.6k
10Q8B IMD3
10Q8A IMD3
-1.3V
330mV/DIV
10R40 30J
10Q3 2SC3356
10R42 NUR
10C17 NUC
10R43 22
10R45 1k
10R60 100
10R46 4.7k
10C18 0.01u
10R44 22
10R41 30J
10Q4 2SC3356
10R57 160
10R47 10
10R48 10
10R58 160
10C25 1p
10R53 100
10C20 0.01u
10IC4
MC10EL11
11IC5 #2
*A TRIG SIG
A TRIG SIG
11IC3 #13
10R51 82
10R55 82
10C21 0.01u
10R54 100
10C26 1p
10R52 82
10R56 82
10R23 100
10C11 NUC
10C12 NUC
10R25 NUR
10R22 36
10R24 100
10IC1
HFA3101
10R21 30J
10C13 1000p
10R30 150
10IC2B NJM082M
10Q5A
10Q5B
IMZ1
10R26 9.1k
10R28 9.1k
10R27 200
10R29 3k
10C14 0.01u
10R31 10k
10C15 0.01u
10R32 20k
10R33 20k
+12V(V)
+5V(V)
-5V(H)
-12V(V)
18IC6 #7
B SLOPE
18IC6 #6
B HF REJ
9Q25
B SIG
10R101 3.9k
10R102 10k
10R103 12k
10R105 1k
10R106 1k
10C107 0.01u
10C110 0.1u(K)
18IC12 #4
B TRIG LVL
10R115 24k
10R116 18k
10R117 8.2k
10R118 150
10R119 510
10C106 0.01u
10C101 0.1u(K)
10IC103
10IC102A
10Q120 2SC3356
10R172 47J
10C151 NUC
10R170 470
16R1
TV SIG
10R171 470
10R113 NUR
10R114 200kD
NJM082M
TC4052BF
10C104 NUC
10C105 0.01u
18IC6 #4
B *AC/DC
18IC6 #5
B LF REJ
10Q107B IMD3
10Q107A IMD3
10R134 2k
10R136 5.6k
10R135 3.6k
10C116 0.01u
10R137 2k
10R139 5.6k
10R138 3.6k
10Q108B IMD3
10Q108A IMD3
-1.3V
330mV/DIV
10R140 30J
10Q103 2SC3356
10R142 NUR
10C117 NUC
10R143 22
10R145 1k
10R160 100
10R146 4.7k
10C118 0.01u
10R144 22
10R141 30J
10Q104 2SC3356
10R157 160
10R147 10
10R148 10
10R158 160
10C125 1p
10R153 100
10C120 0.01u
10IC104
MC10EL11
11IC8 #3
*B TRIG SIG
B TRIG SIG
11IC7 #13
10R151 82
10R155 82
10C121 0.01u
10R154 100
10C126 1p
10R152 82
10R156 82
10R123 100
10C111 NUC
10C112 NUC
10R125 NUR
10R122 36
10R124 100
10IC101
HFA3101
10R121 30J
10C113 1000p
10R130 150
10IC102B NJM082M
10Q105A
10Q105B
IMZ1
10R126 9.1k
10R128 9.1k
10R127 200
10R129 3k
10C114 0.01u
10R131 10k
10C115 0.01u
10R132 20k
10R133 20k
+12V
+5V
-5V
-12V
LA314 OSCILLOSCOPE
Title
TRIG AMP (10)
Size
A2
Document Number
REV
Date: May 6, 1997
Sheet 1 of 1


SKEW
18IC10#15 (0 +4V)
11IC10B 4558F
VBB
A TRIG SIG
10IC4#3
*A TRIG SIG
10IC4#4
B TRIG SIG
10IC104#3
*B TRIG SIG
10IC104#4
*TRIG SEARCH
18IC5#7
MC10EL33
11IC3A SY100S331
11IC3B SY100S331
11IC3C SY100S331
11IC7A SY100S331
11IC7B SY100S331
11IC7C SY100S331
11IC4A MB10HL125
11IC4B MB10HL125
11IC4C MB10HL125
11IC4D MB10HL125
11IC8A MB10HL125
11IC8B MB10HL125
11IC8C MB10HL125
11IC8D MB10HL125
11IC13 TC4W53F
VBB2
TV SYNC1
16R25
A SWP END
B SWP END
12IC1#2
12IC1#8
11IC1
CD107BPF
NCS TLC
SR CLK
SR DATA
SR RXD
18J1#2
18J1#4
18J1#5
18J2#21
NCS
SCLK
SDI
SDO
NSOE
NRST
18J2#20
11IC12
EXO-3C_20MHz
SYCK
TMD0
TMD1
TMD2
17IC42#3
20MHz CLK
17C64
+5V(H DIG)
DELAY TIME
18J2#2 (-4 +4V)
11IC10A 4558F
11D54 RD30M
HSM88AS
11D60A
11D60B
11Q60A IMT2
11Q60B IMT2
11Q61A uPA103G
11Q61B uPA103G
11Q61C uPA103G
11Q61D uPA103G
11Q61E uPA103G
DLY SWTH
12Q11#E
11FL1 BL02RN2
11D121 D1NS4
VEE VCC GND
MB10HL125 8 9 16
+50V(H)
+12V(H)
+5V(H)
-5V(H)
-12V(H)
VCC
VEE
GND
DTP
GTOT
CALS
ATIH
BTIH
NINH
NRDY
NTGD
AGAT
BGAT
NAGT
NBGT
NSRD
ACT
NINT
NADP
NBDP
NXY
NTRS
NMAG
NVD1
NVD2
NVD3
NVD4
NA12
NA34
CBLK
PTA0
PTA1
PTA2
PTA3
PTA4
PTA5
PTA6
PTA7
PTB0
PTB1
PTB2
PTB3
PTB4
PTB5
PTB6
PTB7
PTC0
PTC1
PTC2
PTC3
PTC4
PTC5
PTC6
PTC7
CT[0..7]
R80-82,91-98 100*12
18J2#18
18J3#18
17IC41#13
CAL CLK1
CAL CLK2
CAL CLK3
18J2#17
12IC1#3
18J2#16
12R3
12R4
15D22B#2
15D20A#1
*T READY
NTRIG
*TRIGD
A GATE
B GATE
A UNBLK
B UNBLK
18J2#19
NINT
15D20#1
15R7
18J3#17
15Q13#5
6R110
18J3#22
*A DISP
*B DISP1
*B DISP2
*XY
*TH SEP
*H MAG
5R139
5R149
5R140
5R143
5R45
CH1 SW
CH2 SW
CH3 SW
CH4 SW
ADD
18J3#12
CHOP BLK
14R52
14R53
14Q9#5
14Q9#2
14Q34#2
14Q34#5
14Q31#2
14Q31#5
13R52
13R53
13Q9#2
13Q9#5
13Q31#5
13Q31#2
13Q34#5
13Q34#2
B 0.1uF
B 0.01uF
B STEP2
B STEP1
B 100k
B 1M
B 1K
B 10K
A 1uF
A 0.01uF
A STEP1
A STEP2
A 10K
A 1K
A 1M
A 100k
CT[0..7]
C1 11C91 220p
C2 11C93 100p
C3 11C94 100p
C4 11C97 100p
C5 11C98 100p
LA314 OSCILLOSCOPE
Title
SWEEP GENERATOR (11)
Size A2
Document Number WSS20155105
REV
Date: April 1, 1997
Sheet of

IC	NAME	VCC	VCC1	GND
IC1	74HC14	14		7
IC2	74HC00		14	7

A LENGTH 18IC10#19 (0 +4V)
A CR 13Q50#C
A GUARD
A GATE 11IC1#59
SEL A/B 18IC1#7
NTRIG 11R86
B LENGTH 18IC10#2 (0 +4V)
B CR 14Q50#C
B GUARD
B GATE 11IC1#60

+50V(H) +50V
+12V(H) +12V
+5V(H) VCC
+5V(V) VCC1 12C51 0.01u +5V(V) 12C52 0.01u
-12V(H) -12V

12C17 0.1u
12R13 27k 12R14 100 12R17 10k
12C15 5p 12R15 10k
12Q13 2SC2712
12D16A HSM88WK
12D16B HSM88WK
12R16 12k
12IC1D 74HC14
11IC1#55 A SWP END

12D11 RD15M
12D10 RD15M
12R7 2.4k
12D8A HSM88WK
12D9 1SS307
12D8B HSM88WK
12Q10B FC13
12R9 2k
12R10 2k
12R11 1k
12C11 1000p
12D12 RD5.6M
12Q11 2SC3735
12Q9 2SA1462
12Q10A FC13
12Q12 2SC2712
12R12 2.7k
15R3 1V/div (+0.3~+11.5V)
A SWTH
11R69 DLY SWTH
12R18 NUR 12R19 1k
12C18 NUC
A GUARD

12R4 4.7k 12C5 5p 12R5 1k
12Q6 2SC3735
12C6 NUC 12R6 1k
12D2A MA159
12D2B MA159
12R3 470
12C2 0.01u 12C3 NUC

12IC1F 12IC1E 74HC14
12R61 0
12C61 NUC
12IC2A 12IC2B 12IC2D 12IC2C 74HC00
12R54 0
18J1#1 A/B GATE
12IC1B 12R62 0 12C62 NUC
12IC1A 12R63 0 12C63 NUC

12C37 0.1u
12R33 27k 12R34 100 12R37 10k
12C35 5p 12R35 10k
12Q33 2SC2712
12D36A HSM88WK
12D36B HSM88WK
12R36 12k
12IC1C 74HC14
11IC1#56 B SWP END

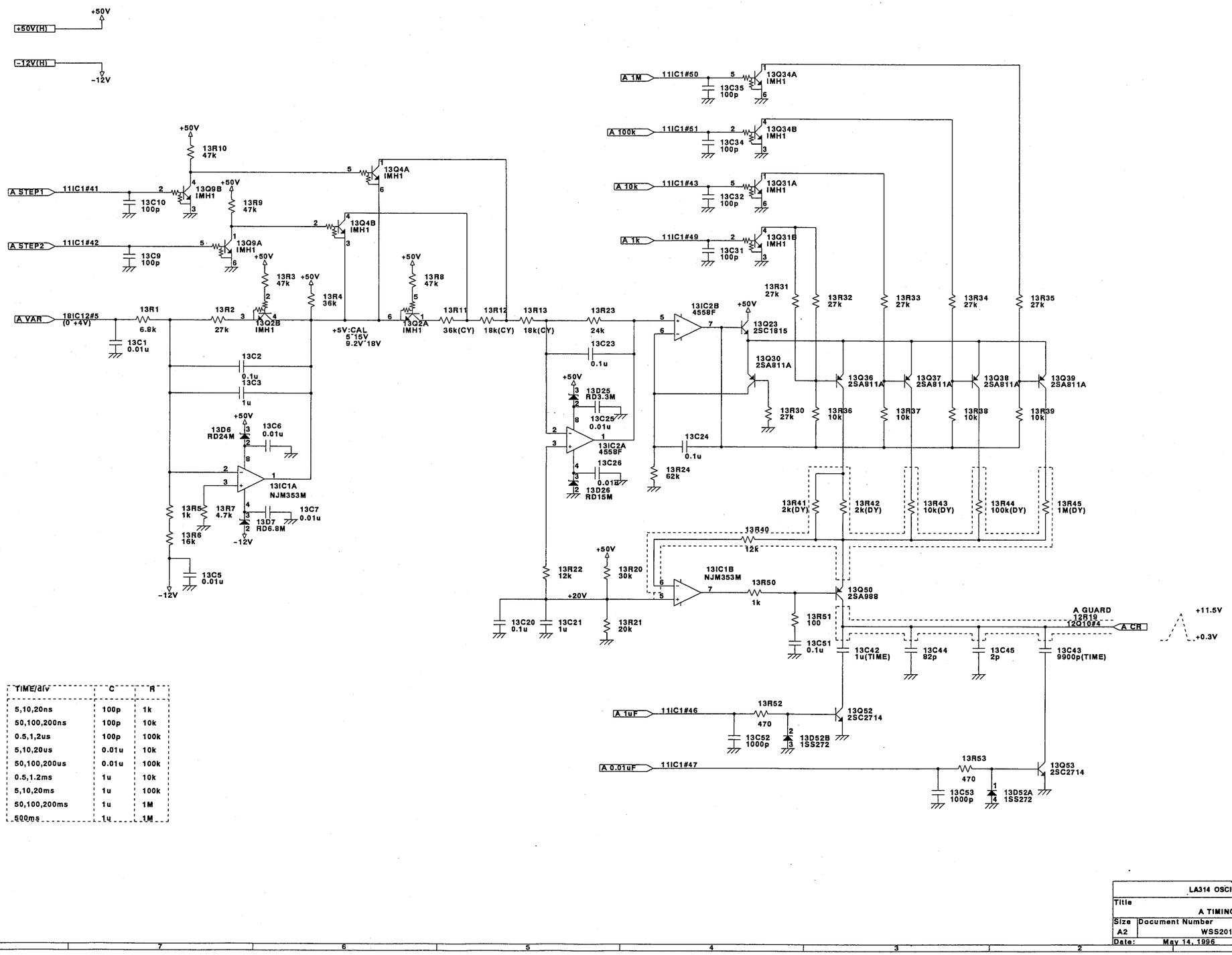
12D31 RD15M
12D30 RD15M
12R27 2.4k
12D28A HSM88WK
12D29 1SS307
12D28B HSM88WK
12Q30B FC13
12R29 2k
12R30 2k
12R31 1k
12C31 1000p
12D32 RD5.6M
12Q31 2SC3735
12Q29 2SA1462
12Q30A FC13
12Q32 2SC2712
12R32 2.7k
15R5 1V/div (+0.3~+11.5V)
B SWTH
12R39 1k
B GUARD

12R24 4.7k 12C25 5p 12R25 1k
12Q26 2SC3735
12C26 NUC 12R26 1k
12D22B MA159
12D22A MA159
12R23 470
12C22 0.01u 12C23 NUC

12C75 NUC 12R75 NUR
12Q76 NUQ
12R77 NUR 12D76B NUD 12R78
12C77 NUR NUC
12D76A NUD
12C76 NUC 12R76 NUR

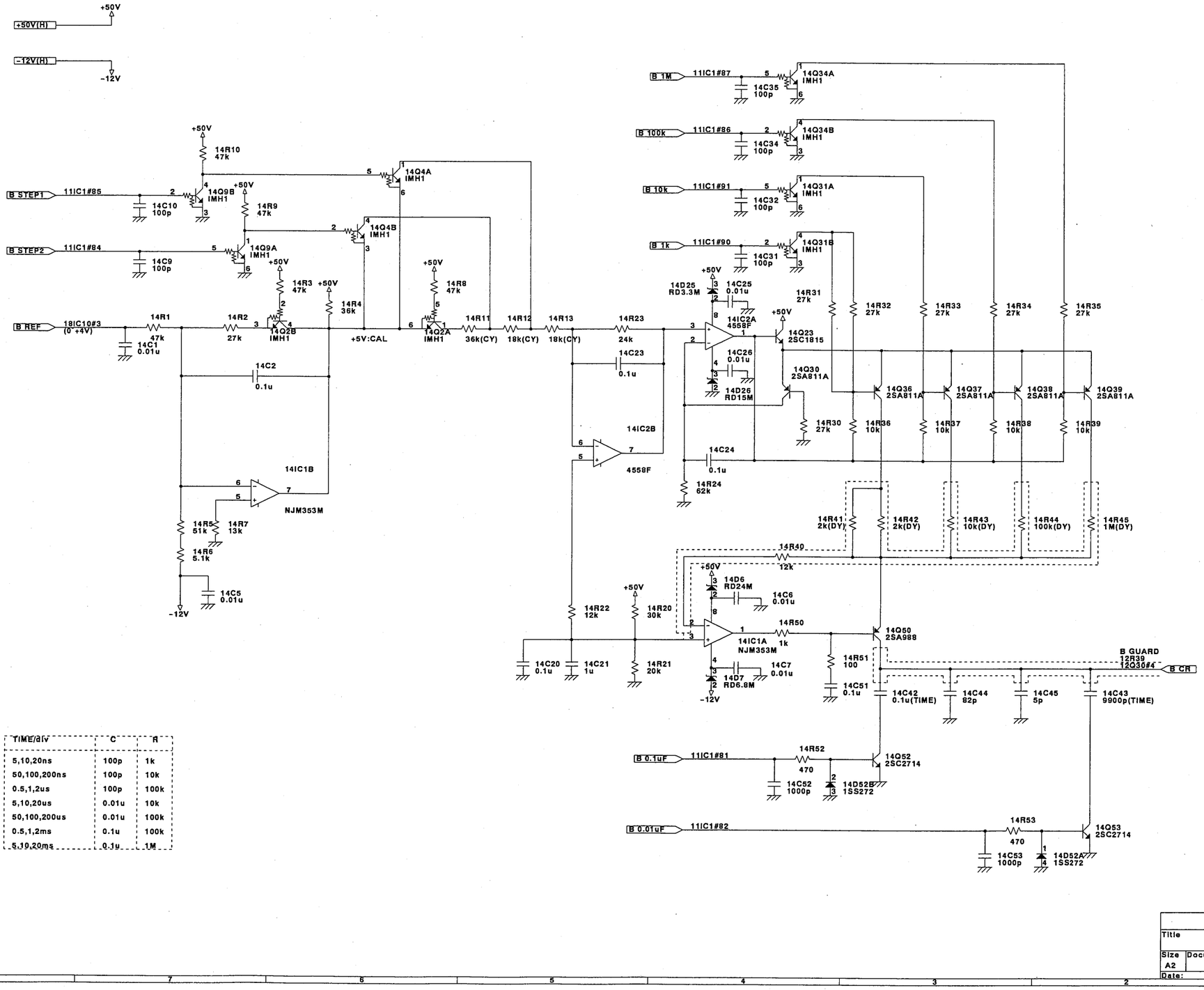
12C85 NUC 12R85 NUR
12Q86 NUQ
12R87 NUR 12D86B NUD 12R88
12C87 NUR NUC
12D86A NUD
12C86 NUC 12R86 NUR

	LA314 OSCILLOSCOPE	
Title	A SAWTOOTH BUFF (12)	
Size A2	Document Number WSS20156105	REV
Date: August 28, 1997	Sheet of	



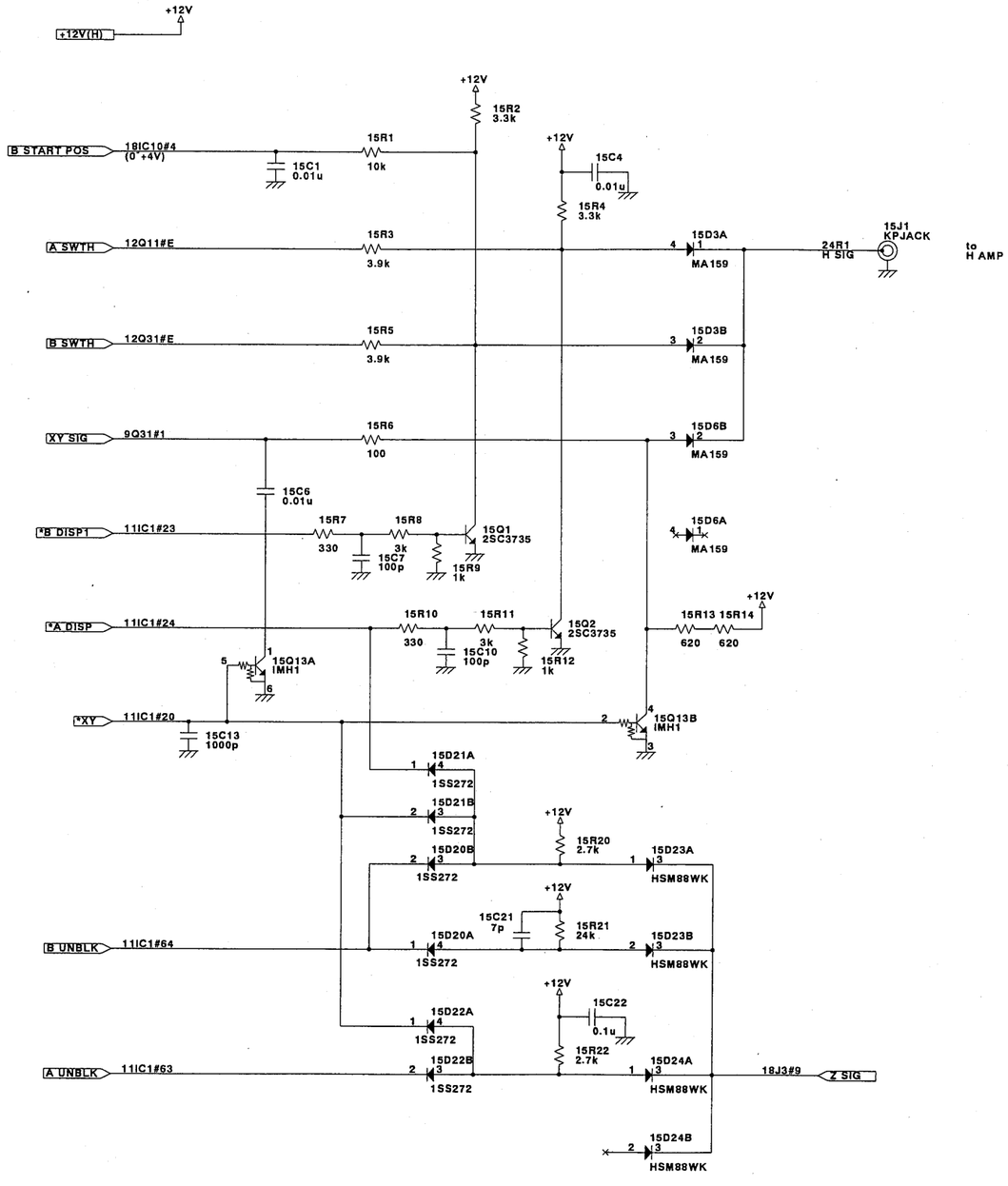
TIME/div	C	R
5,10,20ns	100p	1k
50,100,200ns	100p	10k
0.5,1,2us	100p	100k
5,10,20us	0.01u	10k
50,100,200us	0.01u	100k
0.5,1.2ms	1u	10k
5,10,20ms	1u	100k
50,100,200ms	1u	1M
500ms	1u	1M

LA314 OSCILLOSCOPE		
Title: A TIMING (13)		
Size: A2	Document Number: WSS20157105	REV
Date: May 14, 1996	Sheet	of

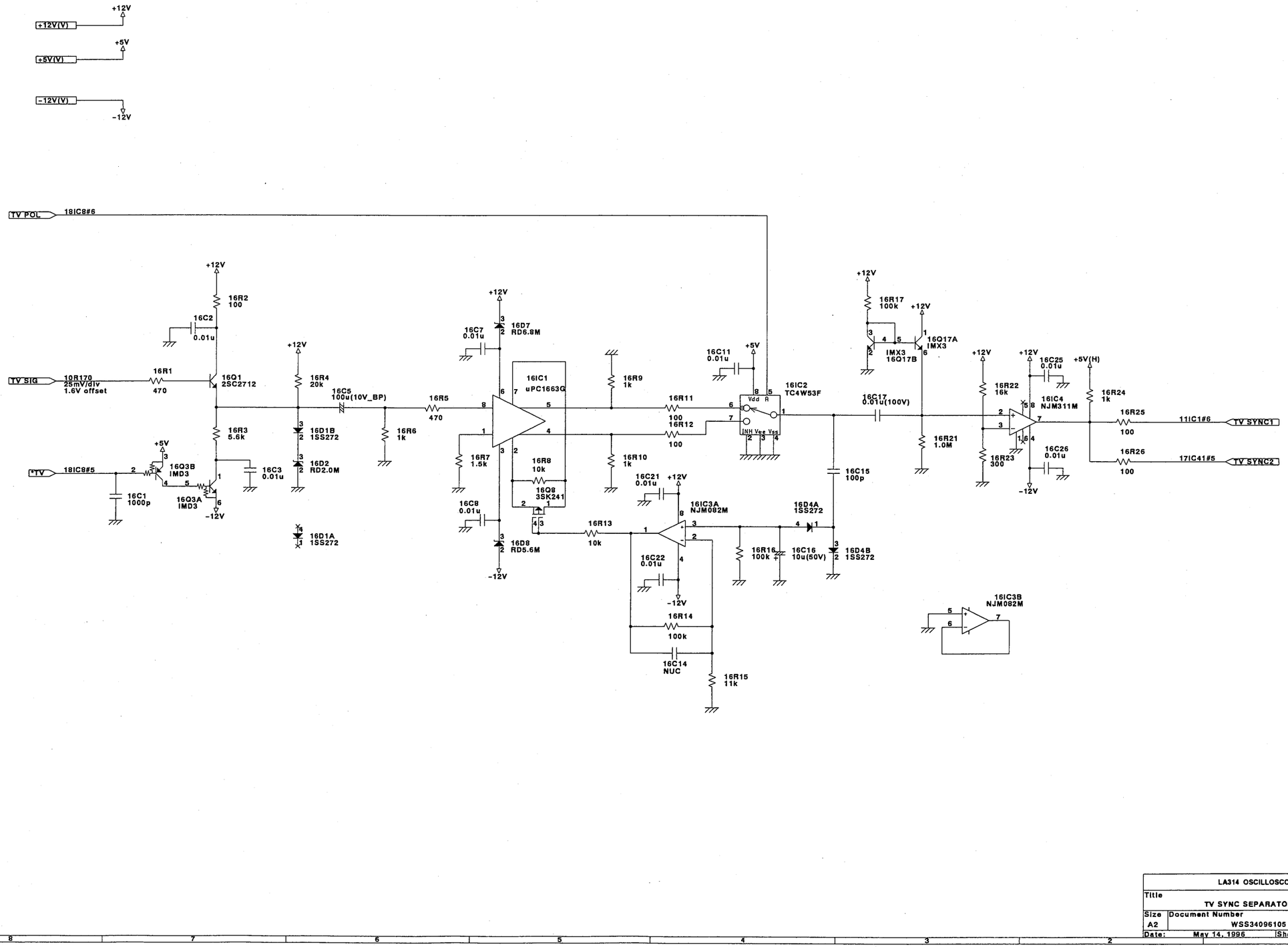


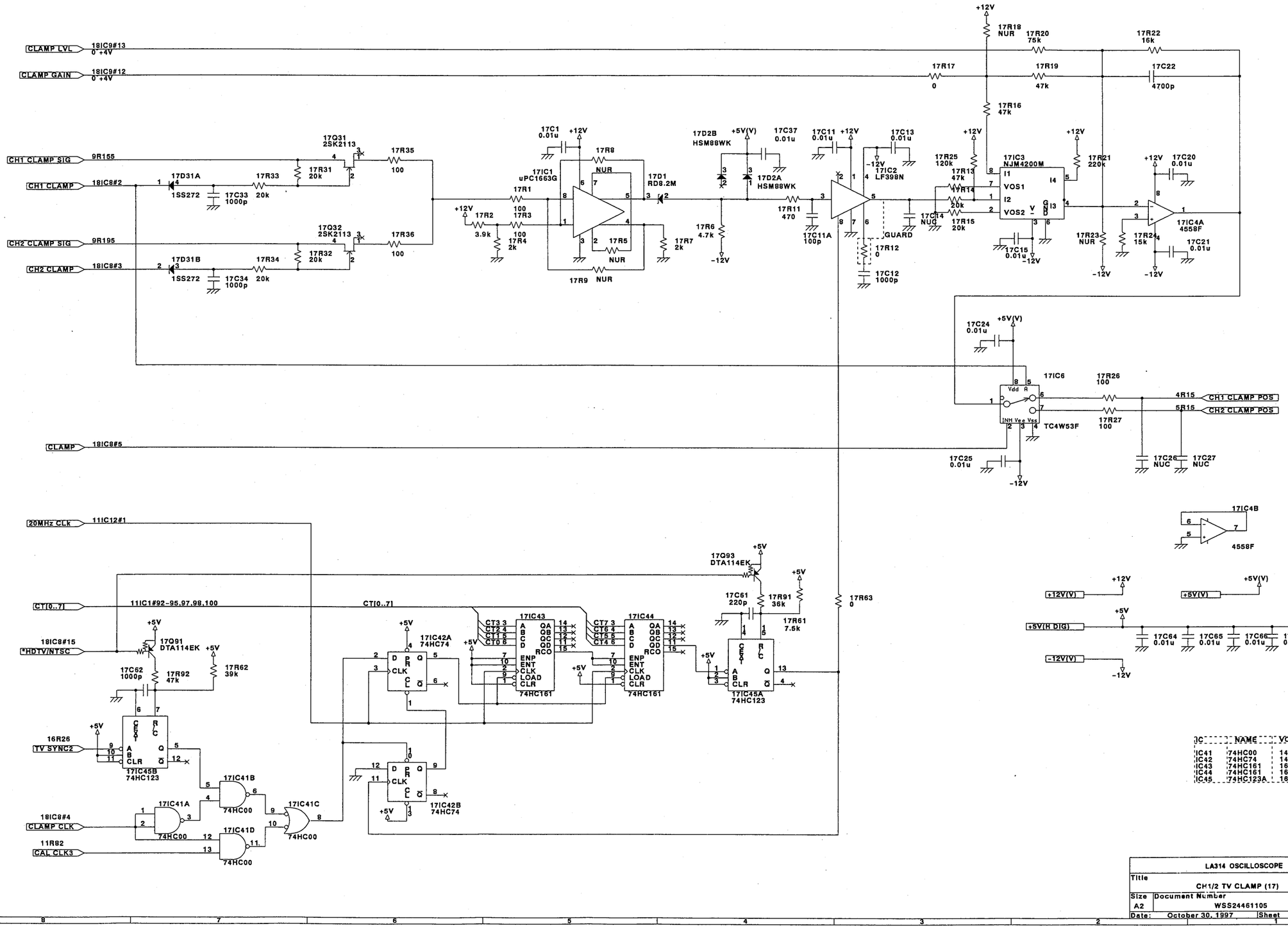
TIME/div	C	R
5,10,20ns	100p	1k
50,100,200ns	100p	10k
0.5,1,2us	100p	100k
5,10,20us	0.01u	10k
50,100,200us	0.01u	100k
0.5,1,2ms	0.1u	100k
5,10,20ms	0.1u	1M

LA314 OSCILLOSCOPE		
Title: B TIMING (14)		
Size: A2	Document Number: WSS20158105	REV
Date: May 14, 1996	Sheet	of

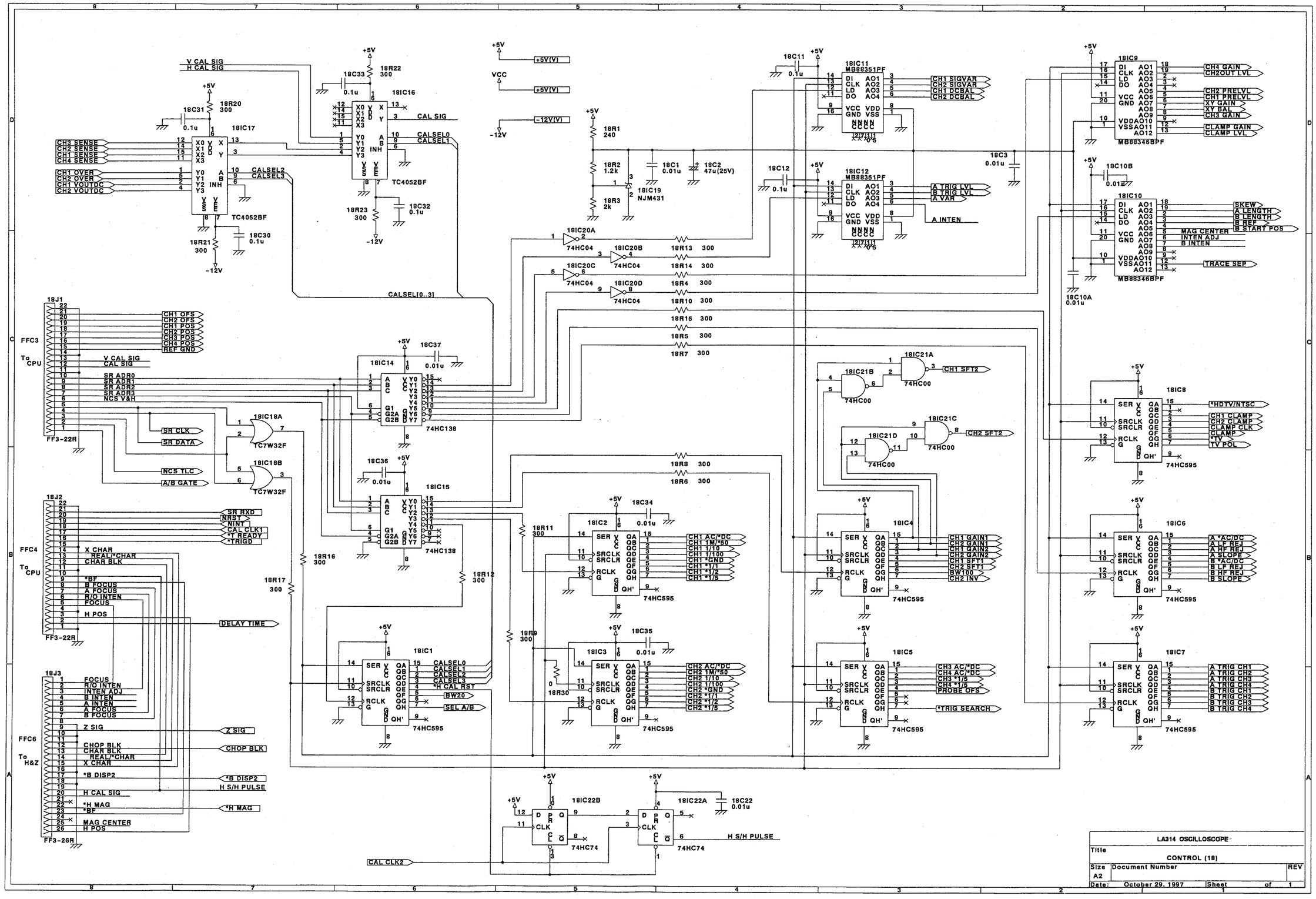


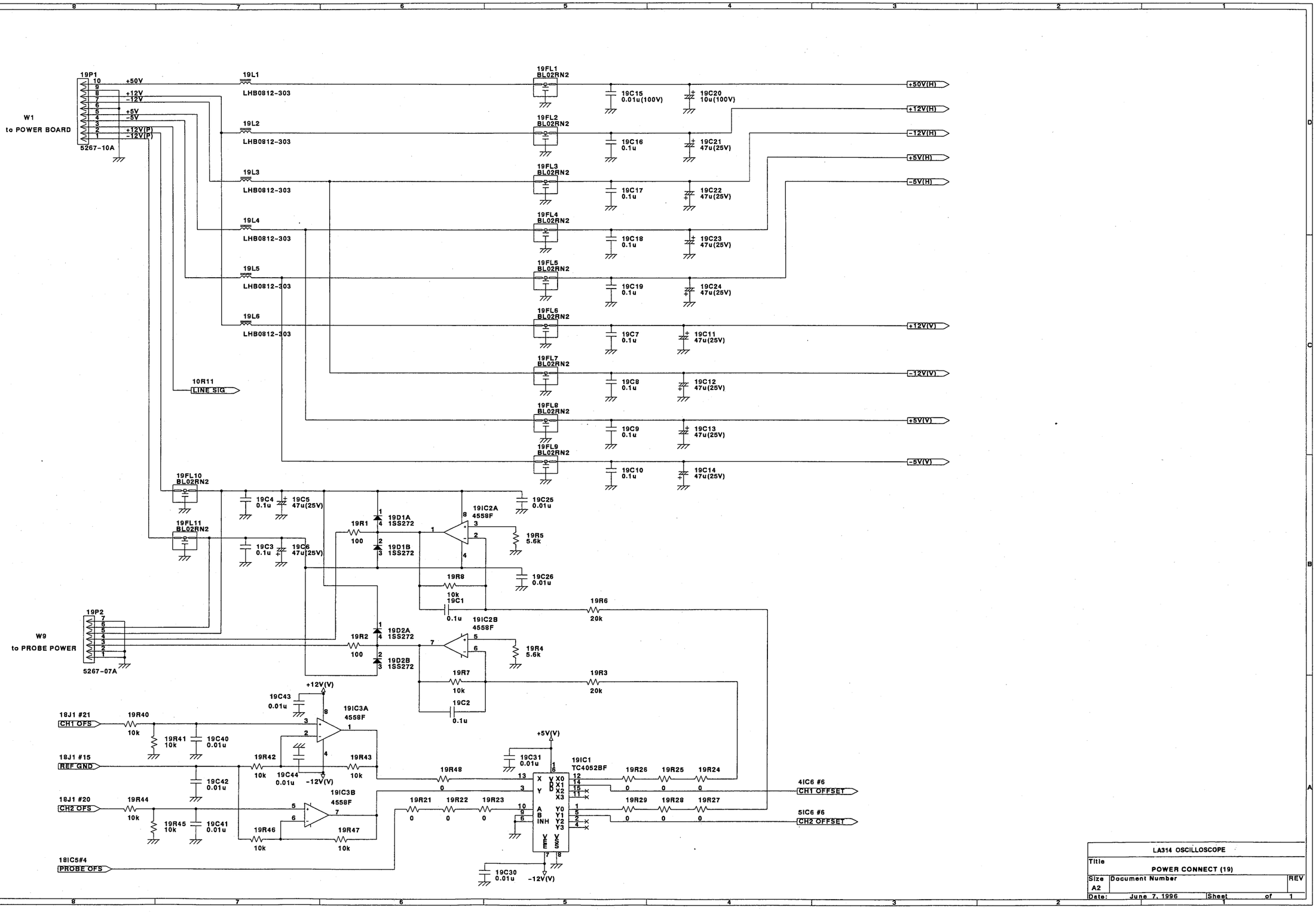
LA314 OSCILLOSCOPE		
Title: H&Z SW (15)		
Size: A2	Document Number: WSS24460105	REV
Date: May 14, 1996	Sheet of	


+12V(V)
+5V(V)
-12V(V)
TV POL
18IC8#6
TV SIG
10R170
25mV/div
1.6V offset
16R1
470
16Q1
2SC2712
16R2
100
16C2
0.01u
16R3
5.6k
16C3
0.01u
16R4
20k
16C5
100u(10V_BP)
16D1B
1SS272
16D2
RD2.0M
16R5
470
16R6
1k
*TV
18IC8#5
16Q3B
IMD3
16Q3A
IMD3
16C1
1000p
16D1A
1SS272
16C7
0.01u
16D7
RD6.8M
16IC1
uPC1663G
16R7
1.5k
16R8
10k
16Q8
3SK241
16C8
0.01u
16D8
RD5.6M
16R9
1k
16R10
1k
16R11
100
16R12
100
16C11
0.01u
16IC2
TC4W53F
Vdd R
INH Vee Vss
16C17
0.01u(100V)
16C15
100p
16R17
100k
16Q17A
IMX3
16Q17B
IMX3
16R21
1.0M
16R22
16k
16R23
300
16C25
0.01u
16C26
0.01u
16IC4
NJM311M
+5V(H)
16R24
1k
16R25
100
16R26
100
11IC1#6
TV SYNC1
17IC41#5
TV SYNC2
16C21
0.01u
16IC3A
NJM082M
16R13
10k
16C22
0.01u
16R14
100k
16C14
NUC
16R15
11k
16D4A
1SS272
16R16
100k
16C16
10u(50V)
16D4B
1SS272
16IC3B
NJM082M
LA314 OSCILLOSCOPE
Title
TV SYNC SEPARATOR (16)
Size
A2
Document Number
WSS34096105
REV
Date:
May 14, 1996
Sheet
of

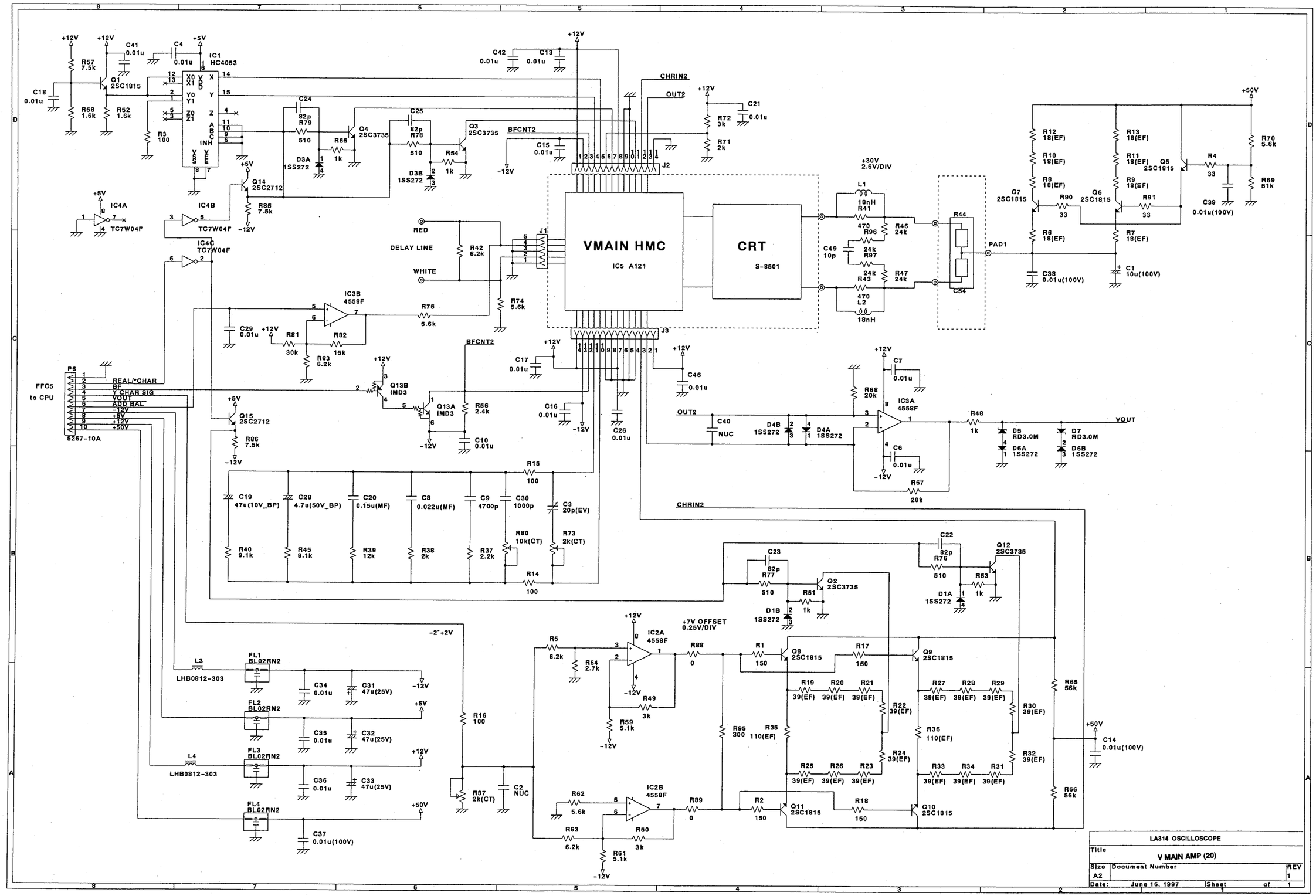


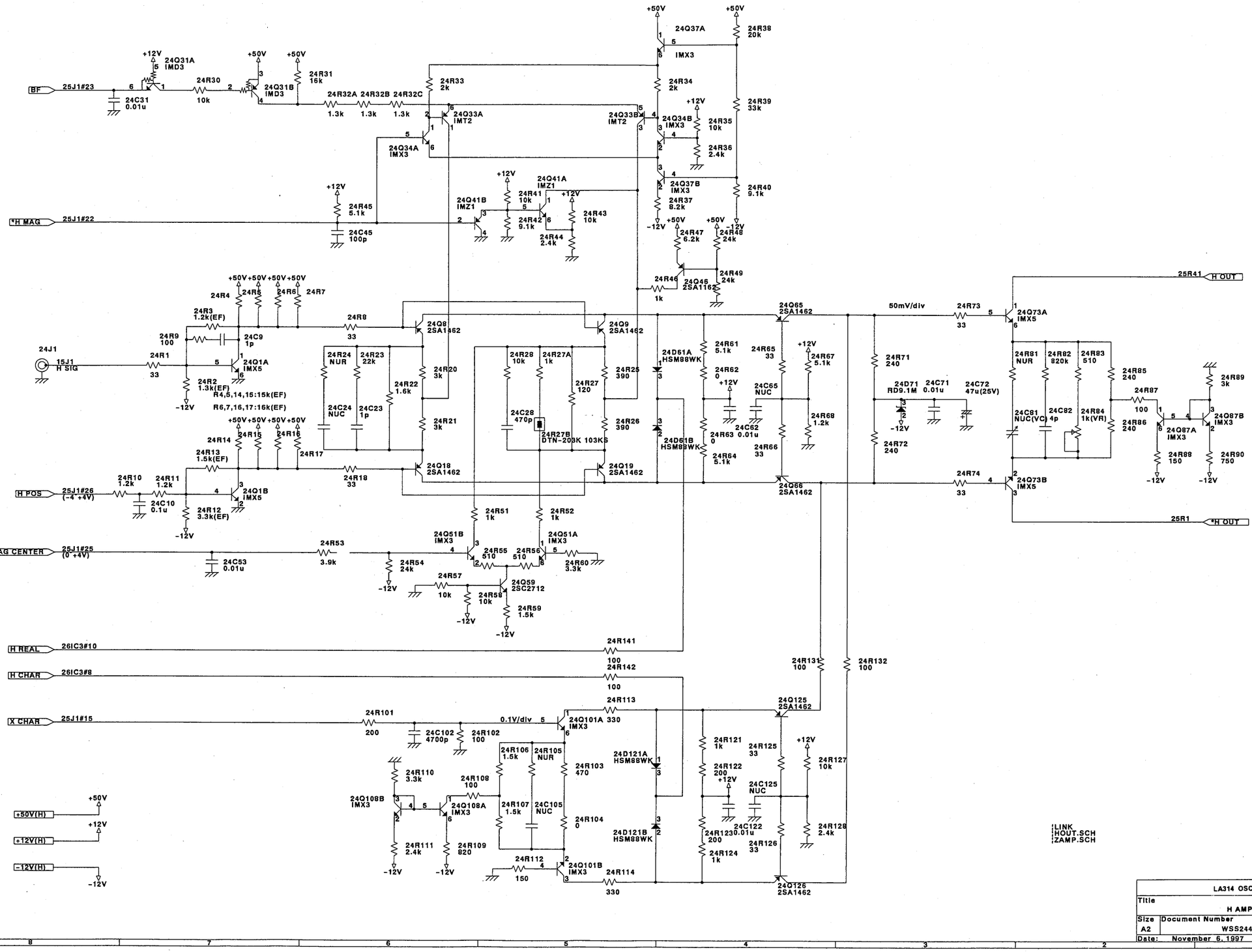
IC	NAME	VCC	GND
IC41	74HC00	14	7
IC42	74HC74	14	7
IC43	74HC161	16	8
IC44	74HC161	16	8
IC45	74HC123A	16	8

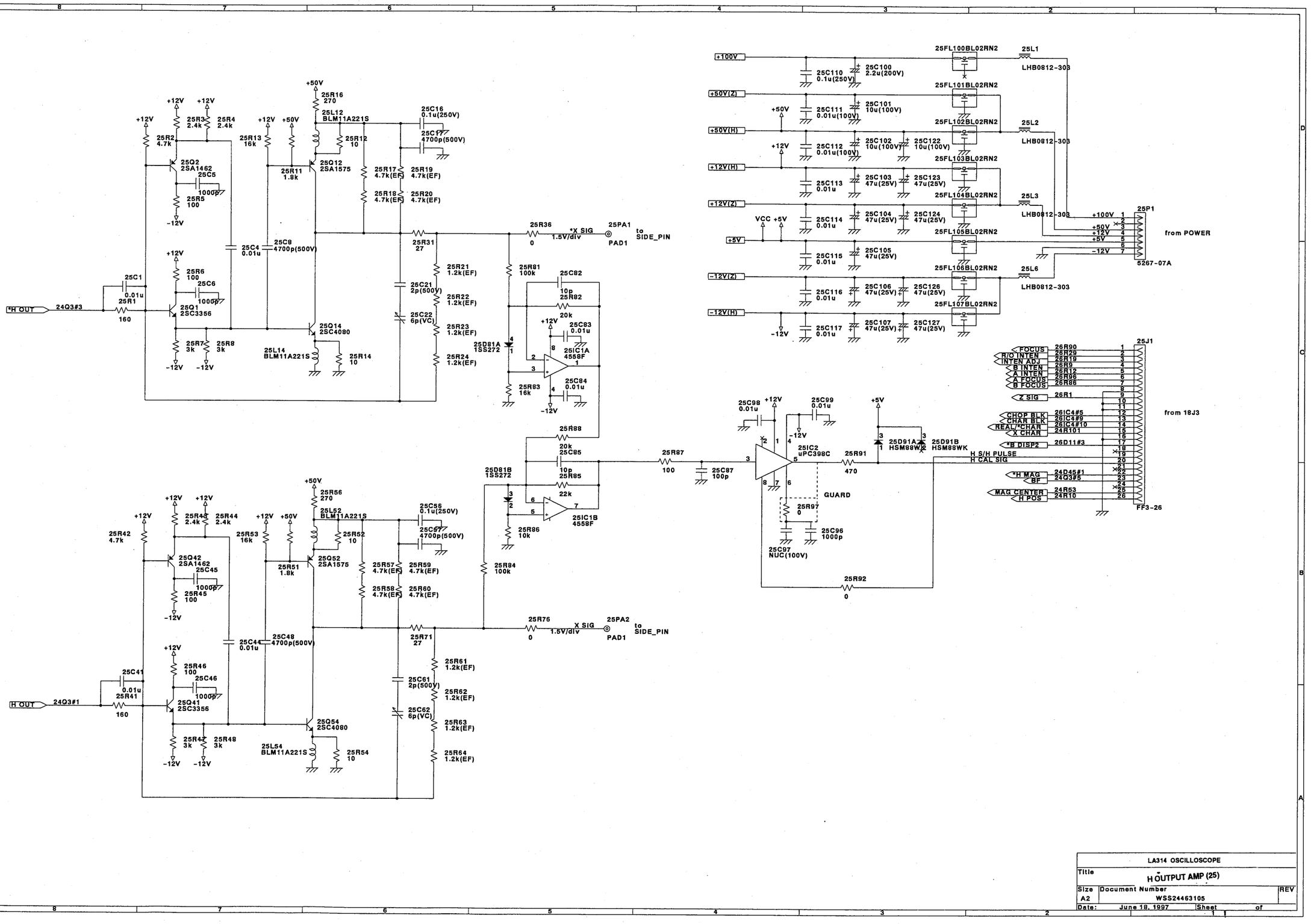

V CAL SIG
H CAL SIG
18R22 300
18C33 0.1u
18IC16
CAL SIG
CALSEL0
CALSEL1
TC4052BF
18C32 0.1u
18R23 300
-12V
18C31 0.1u
18R20 300
18IC17
CH3 SENSE
CH2 SENSE
CH1 SENSE
CH4 SENSE
CH1 OVER
CH2 OVER
CH1 VOUTDC
CH2 VOUTDC
CALSEL2
CALSEL3
18R21 300
18C30 0.1u
+5V(V)
VCC
-12V(V)
18R1 240
18R2 1.2k
18R3 2k
18C1 0.01u
18C2 47u(25V)
18IC19 NJM431
18C11 0.1u
18IC11 MB88351PF
CH1 SIGVAR
CH2 SIGVAR
CH1 DCBAL
CH2 DCBAL
18C12 0.1u
18IC12 MB88351PF
A TRIG LVL
B TRIG LVL
A VAR
A INTEN
18C3 0.01u
18IC9
CH4 GAIN
CH2OUT LVL
CH2 PRELVL
CH1 PRELVL
XY GAIN
XY BAL
CH3 GAIN
CLAMP GAIN
CLAMP LVL
MB88346BPF
18C10B 0.01u
18IC10
SKEW
A LENGTH
B LENGTH
B REF
B START POS
MAG CENTER
INTEN ADJ
B INTEN
TRACE SEP
18C10A 0.01u
CALSEL[0..3]
18J1
FFC3
To CPU
CH1 OFS
CH2 OFS
CH1 POS
CH2 POS
CH3 POS
CH4 POS
REF GND
V CAL SIG
CAL SIG
SR ADR0
SR ADR1
SR ADR2
SR ADR3
NCS V&H
FF3-22R
SR CLK
SR DATA
NCS TLC
A/B GATE
18IC18A
18IC18B
TC7W32F
18IC14
18C37 0.01u
74HC138
18C36 0.01u
18IC15
74HC138
18R16 300
18R17 300
18R8 300
18R6 300
18R11 300
18R12 300
18R9 300
18R30
18IC20A
18IC20B
18IC20C
18IC20D
74HC04
18R13 300
18R14 300
18R4 300
18R10 300
18R15 300
18R5 300
18R7 300
18IC21A
18IC21B
18IC21C
18IC21D
74HC00
CH1 SFT2
CH2 SFT2
18IC8
*HDTV/NTSC
CH1 CLAMP
CH2 CLAMP
CLAMP CLK
CLAMP
*TV
TV POL
74HC595
18J2
FFC4
To CPU
SR RXD
NRST
NINT
CAL CLK1
*T READY
*TRIGD
X CHAR
REAL/*CHAR
CHAR BLK
*BF
B FOCUS
A FOCUS
R/O INTEN
FOCUS
H POS
DELAY TIME
FF3-22R
18IC2
18IC4
18IC6
CH1 AC/*DC
CH1 1M/*50
CH1 1/10
CH1 1/100
CH1 *GND
CH1 *1/1
CH1 *1/2
CH1 *1/5
CH1 GAIN1
CH2 GAIN1
CH1 GAIN2
CH2 GAIN2
CH1 SFT1
CH2 SFT1
BW100
CH2 INV
A *AC/DC
A LF REJ
A HF REJ
A SLOPE
B *AC/DC
B LF REJ
B HF REJ
B SLOPE
18J3
FFC6
To H&Z
FOCUS
R/O INTEN
INTEN ADJ
B INTEN
A INTEN
A FOCUS
B FOCUS
Z SIG
CHOP BLK
CHAR BLK
REAL/*CHAR
X CHAR
*B DISP2
H CAL SIG
*H MAG
*BF
MAG CENTER
H POS
FF3-26R
H S/H PULSE
18IC1
18IC3
18IC5
18IC7
CALSEL0
CALSEL1
CALSEL2
CALSEL3
*H CAL RST
BW20
SEL A/B
CH2 AC/*DC
CH2 1M/*50
CH2 1/10
CH2 1/100
CH2 *GND
CH2 *1/1
CH2 *1/2
CH2 *1/5
CH3 AC/*DC
CH4 AC/*DC
CH3 *1/5
CH4 *1/5
PROBE OFS
*TRIG SEARCH
A TRIG CH1
A TRIG CH2
A TRIG CH3
A TRIG CH4
B TRIG CH1
B TRIG CH2
B TRIG CH3
B TRIG CH4
18IC22B
18IC22A
18C22 0.01u
74HC74
CAL CLK2
LA314 OSCILLOSCOPE
Title
CONTROL (18)
Size A2
Document Number
REV
Date: October 29, 1997
Sheet of 1



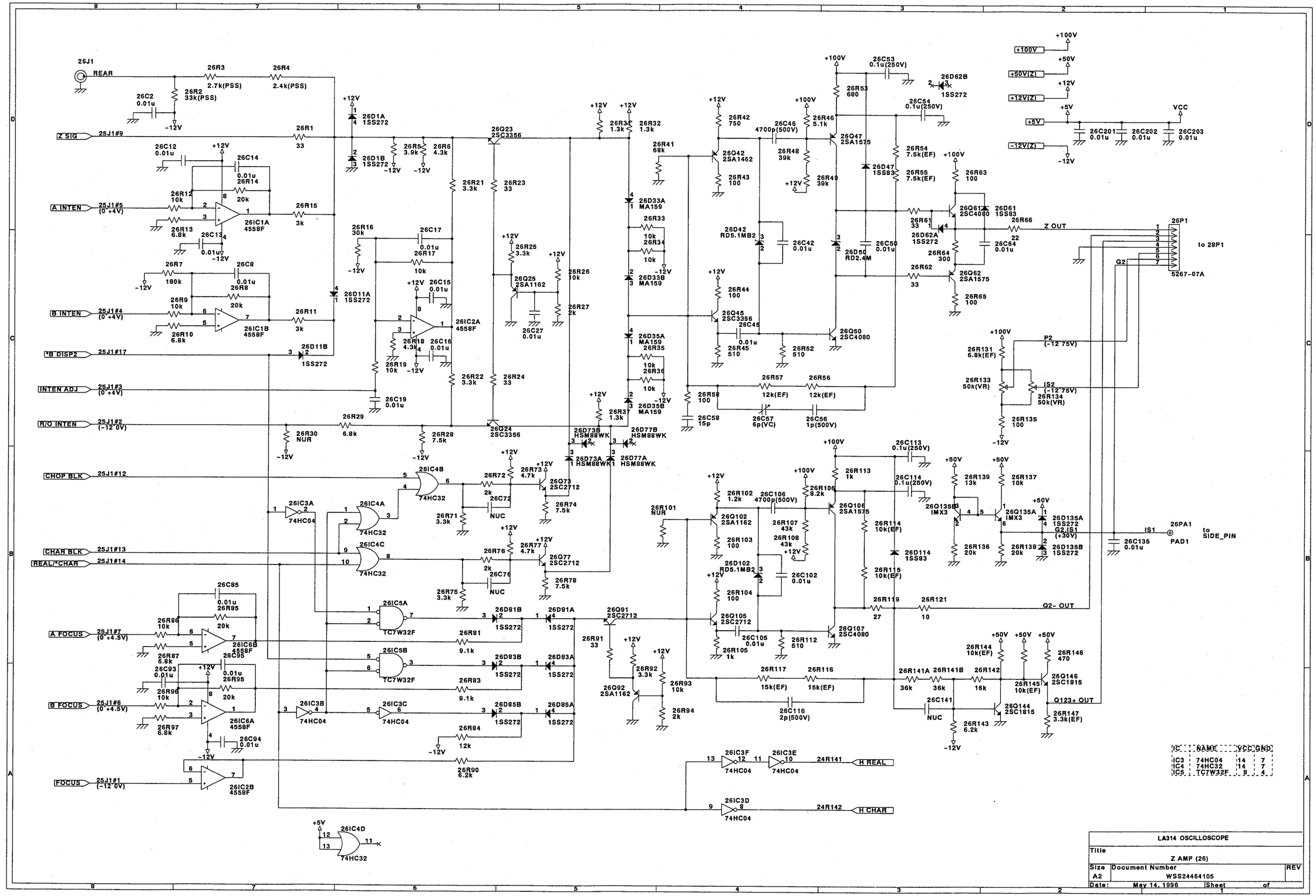
LA314 OSCILLOSCOPE		
Title: POWER CONNECT (19)		
Size: A2	Document Number:	REV:
Date: June 7, 1996	Sheet: of 1	


VMAIN HMC
IC5 A121
CRT
S-8501
IC1 HC4053
Q1 2SC1815
Q3 2SC3735
Q4 2SC3735
Q14 2SC2712
Q15 2SC2712
Q13A IMD3
Q13B IMD3
IC4A TC7W04F
IC4B TC7W04F
IC4C TC7W04F
IC3A 4558F
IC3B 4558F
IC2A 4558F
IC2B 4558F
Q2 2SC3735
Q12 2SC3735
Q5 2SC1815
Q6 2SC1815
Q7 2SC1815
Q8 2SC1815
Q9 2SC1815
Q10 2SC1815
Q11 2SC1815
D3A 1SS272
D3B 1SS272
D4A 1SS272
D4B 1SS272
D5 RD3.0M
D6A 1SS272
D6B 1SS272
D7 RD3.0M
D1A 1SS272
D1B 1SS272
J1
J2
J3
P6
5267-10A
FFC5 to CPU
REAL/*CHAR
BF
Y CHAR SIG
VOUT
ADD BAL
-12V
+5V
+12V
+50V
CHRIN2
OUT2
BFCNT2
RED
WHITE
DELAY LINE
+30V 2.6V/DIV
+7V OFFSET 0.25V/DIV
-2~+2V
PAD1
VOUT
FL1 BL02RN2
FL2 BL02RN2
FL3 BL02RN2
FL4 BL02RN2
L3 LHB0812-303
L4 LHB0812-303
LA314 OSCILLOSCOPE
V MAIN AMP (20)
Size A2
Document Number
REV 1
Date: June 16, 1997
Sheet of 1


BF
25J1#23
24C31 0.01u
24Q31A IMD3
24R30 10k
24Q31B IMD3
24R31 16k
24R32A 24R32B 24R32C 1.3k 1.3k 1.3k
24R33 2k
24Q33A IMT2
24Q33B IMT2
24Q34A IMX3
24Q34B IMX3
24R34 2k
24R35 10k
24R36 2.4k
24Q37A IMX3
24Q37B IMX3
24R37 8.2k
24R38 20k
24R39 33k
24R40 9.1k
*H MAG
25J1#22
24R45 5.1k
24C45 100p
24Q41A IMZ1
24Q41B IMZ1
24R41 10k
24R42 9.1k
24R43 10k
24R44 2.4k
24R46 1k
24Q46 2SA1162
24R47 6.2k
24R48 24k
24R49 24k
24J1
15J1 H SIG
24R1 33
24Q1A IMX5
24R2 1.3k(EF)
R4,5,14,15:15k(EF)
R6,7,16,17:16k(EF)
24R3 1.2k(EF)
24R4
24R5
24R6
24R7
24R8 33
24R9 100
24C9 1p
24R20 3k
24R21 3k
24R22 1.6k
24R23 22k
24C23 1p
24R24 NUR
24C24 NUC
24Q8 2SA1462
24Q9 2SA1462
24R25 390
24R26 390
24R27 120
24R27A 1k
24R27B DTN-203K 103K5
24R28 10k
24C28 470p
24Q18 2SA1462
24Q19 2SA1462
24R17
24R18 33
24R13 1.5k(EF)
24R14
24R15
24R16
H POS
25J1#26 (-4 +4V)
24R10 1.2k
24R11 1.2k
24C10 0.1u
24Q1B IMX5
24R12 3.3k(EF)
24R51 1k
24R52 1k
MAG CENTER
25J1#25 (0 +4V)
24C53 0.01u
24R53 3.9k
24Q51B IMX3
24Q51A IMX3
24R54 24k
24R55 510
24R56 510
24R57 10k
24R58 10k
24R59 1.5k
24Q59 2SC2712
24R60 3.3k
H REAL
26IC3#10
24R141 100
H CHAR
26IC3#8
24R142 100
X CHAR
25J1#15
24R101 200
24C102 4700p
24R102 100
0.1V/div
24Q101A IMX3
24Q101B IMX3
24R112 150
24R114 330
24R113 330
24R103 470
24R104 0
24R105 NUR
24R106 1.5k
24R107 1.5k
24C105 NUC
24R108 100
24R109 820
24R110 3.3k
24R111 2.4k
24Q108A IMX3
24Q108B IMX3
24D121A HSM88WK
24D121B HSM88WK
24R121 1k
24R122 200
24C122 0.01u
24R123 200
24R124 1k
24R125 33
24C125 NUC
24R126 33
24R127 10k
24R128 2.4k
24Q125 2SA1462
24Q126 2SA1462
24R131 100
24R132 100
24D61A HSM88WK
24D61B HSM88WK
24R61 5.1k
24R62 0
24R63 0
24R64 5.1k
24C62 0.01u
24R65 33
24C65 NUC
24R66 33
24R67 5.1k
24R68 1.2k
24Q65 2SA1462
24Q66 2SA1462
50mV/div
24R71 240
24R72 240
24R73 33
24R74 33
24D71 RD9.1M
24C71 0.01u
24C72 47u(25V)
24Q73A IMX5
24Q73B IMX5
24R81 NUR
24R82 820k
24R83 510
24C81 NUC(VC)
24C82 4p
24R84 1k(VR)
24R85 240
24R86 240
24R87 100
24Q87A IMX3
24Q87B IMX3
24R88 150
24R89 3k
24R90 750
25R41
H OUT
25R1
*H OUT
+50V
+12V
-12V
+50V(H)
+12V(H)
-12V(H)
LINK
HOUT.SCH
ZAMP.SCH
LA314 OSCILLOSCOPE
Title
H AMP (24)
Size
A2
Document Number
WSS24462105
REV
Date: November 6, 1997
Sheet
of

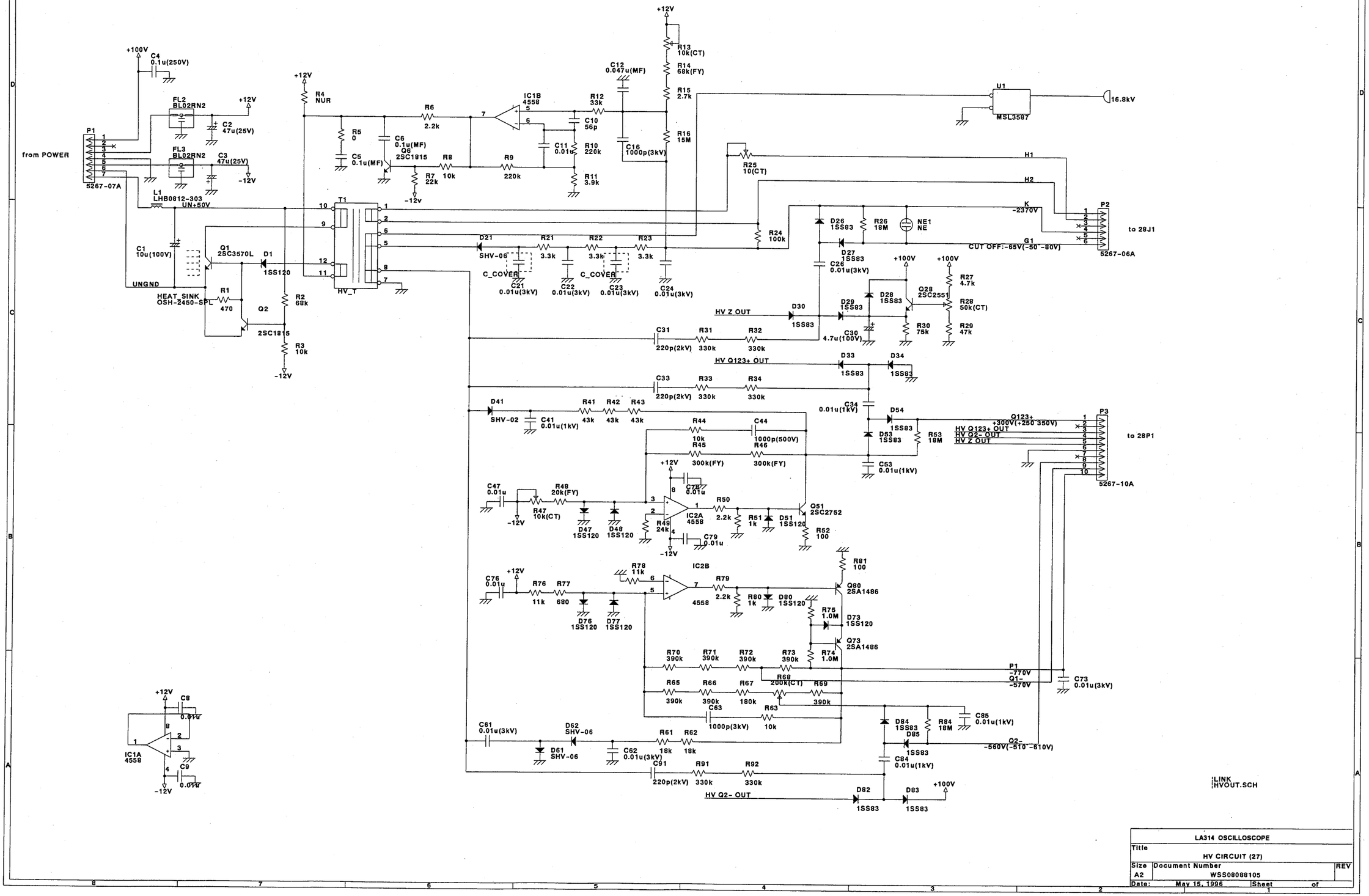


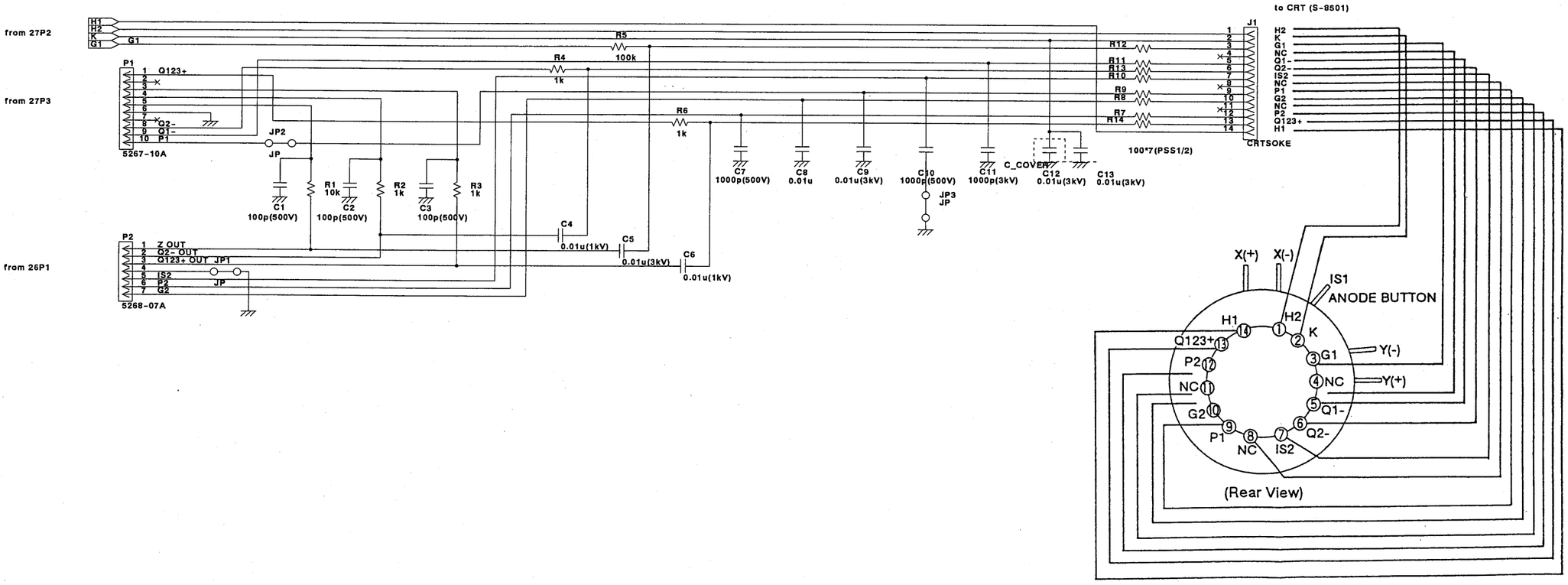
LA314 OSCILLOSCOPE		
Title	H OUTPUT AMP (25)	
Size A2	Document Number WSS24463105	REV
Date: June 18, 1997	Sheet 1 of 1	



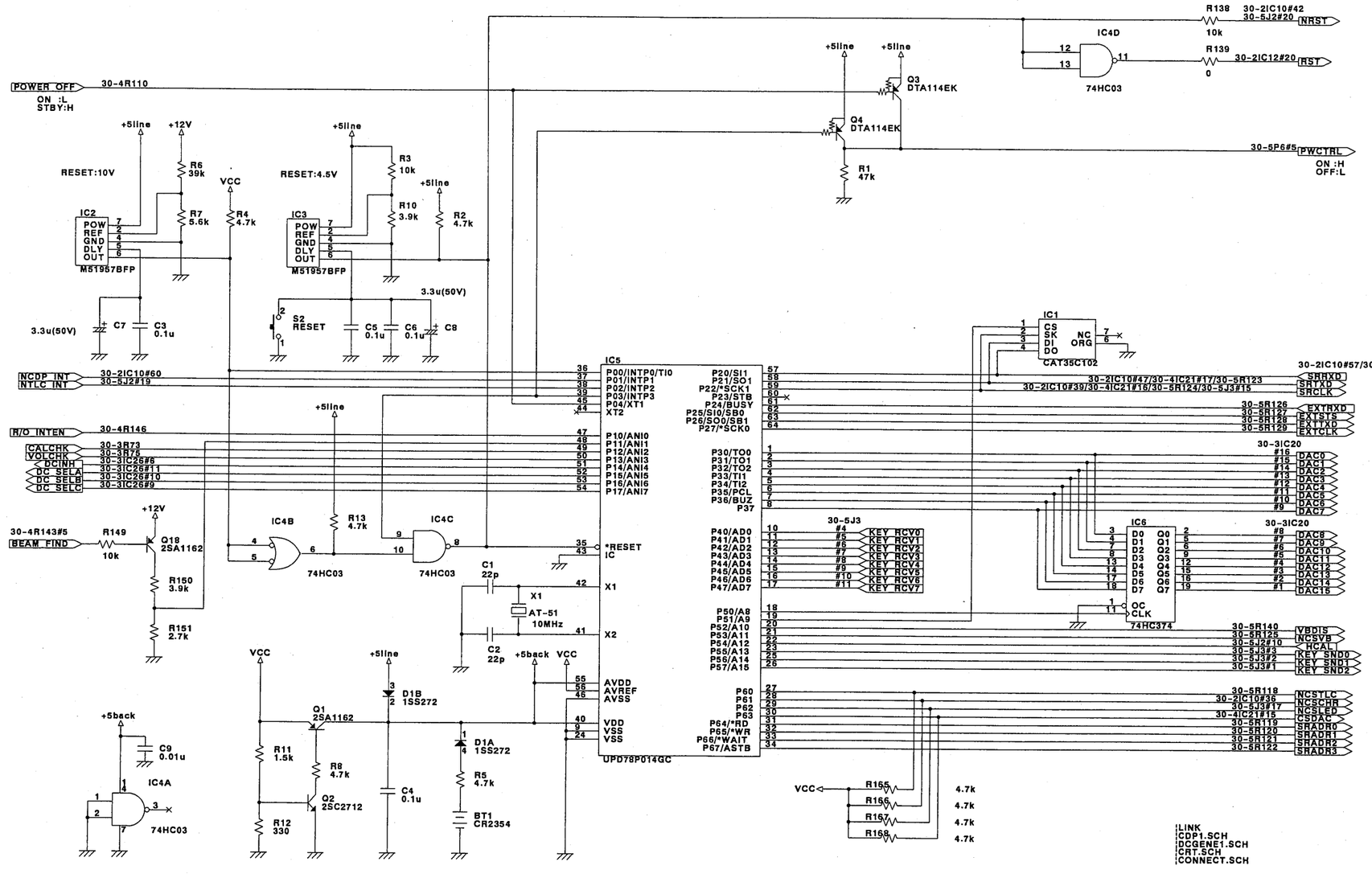
IC	NAME	VCC	GND
IC3	74HC04	14	7
IC4	74HC32	14	7
IC5	TC7W32F	8	4

LA314 OSCILLOSCOPE		
Title	Z AMP (26)	
Size: A2	Document Number: WSS24464105	REV
Date: May 14, 1996	Sheet	of

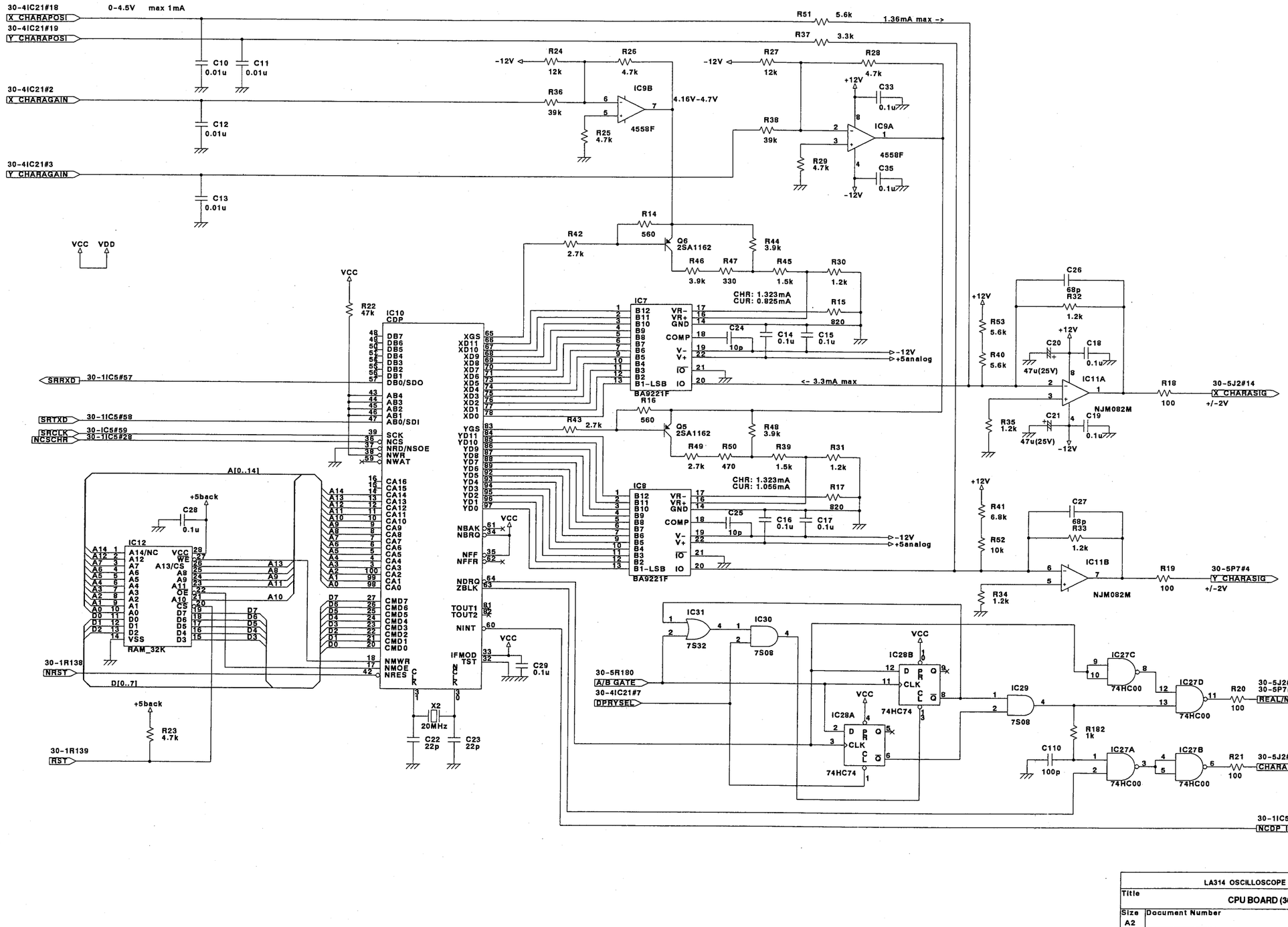

+100V
C4 0.1u(250V)
FL2 BL02RN2
+12V
C2 47u(25V)
P1
from POWER
FL3 BL02RN2
C3 47u(25V)
-12V
5267-07A
L1 LHB0812-303 UN+50V
UNGND
C1 10u(100V)
Q1 2SC3570L
D1 1SS120
HEAT SINK OSH-2450-SPL
R1 470
Q2 2SC1815
R2 68k
R3 10k
-12V
R4 NUR
R5 0
C5 0.1u(MF)
C6 0.1u(MF)
Q6 2SC1815
R6 2.2k
R7 22k
R8 10k
R9 220k
-12v
IC1B 4558
R12 33k
C10 56p
C11 0.01u
R10 220k
R11 3.9k
C12 0.047u(MF)
C16 1000p(3kV)
R13 10k(CT)
R14 68k(FY)
R15 2.7k
R16 15M
T1
HV_T
D21 SHV-06
C_COVER
C21 0.01u(3kV)
R21 3.3k
R22 3.3k
R23 3.3k
C22 0.01u(3kV)
C23 0.01u(3kV)
C24 0.01u(3kV)
U1
MSL3587
16.8kV
R25 10(CT)
H1
H2
K -2370V
G1 CUT OFF:-65V(-50~-80V)
R24 100k
D26 1SS83
R26 18M
NE1 NE
D27 1SS83
C26 0.01u(3kV)
P2
5267-06A
to 28J1
+100V
R27 4.7k
Q28 2SC2551
R28 50k(CT)
R29 47k
R30 75k
D28 1SS83
D29 1SS83
D30 1SS83
HV Z OUT
C30 4.7u(100V)
C31 220p(2kV)
R31 330k
R32 330k
HV Q123+ OUT
D33 1SS83
D34 1SS83
C33 220p(2kV)
R33 330k
R34 330k
C34 0.01u(1kV)
D41 SHV-02
C41 0.01u(1kV)
R41 43k
R42 43k
R43 43k
R44 10k
C44 1000p(500V)
R45
R46 300k(FY)
D54 1SS83
D53 1SS83
R53 18M
C53 0.01u(1kV)
Q123+ +300V(+250~350V)
HV Q123+ OUT
HV Q2- OUT
HV Z OUT
P3
to 28P1
5267-10A
C47 0.01u
R48 20k(FY)
R47 10k(CT)
D47 1SS120
D48 1SS120
IC2A 4558
R49 24k
C78 0.01u
C79 0.01u
R50 2.2k
R51 1k
D51 1SS120
Q51 2SC2752
R52 100
R81 100
IC2B
R78 11k
C76 0.01u
R76 11k
R77 680
D76 1SS120
D77 1SS120
R79 2.2k
R80 1k
D80 1SS120
Q80 2SA1486
R75 1.0M
D73 1SS120
Q73 2SA1486
R74 1.0M
R70 390k
R71 390k
R72 390k
R73 390k
R65 390k
R66 390k
R67 180k
R68 200K(CT)
R69 390k
R63
C63 1000p(3kV)
R64 10k
P1 -770V Q1- -570V
C73 0.01u(3kV)
C61 0.01u(3kV)
D52 SHV-06
D61 SHV-06
C62 0.01u(3kV)
R61 18k
R62 18k
C91 220p(2kV)
R91 330k
R92 330k
HV Q2- OUT
D82 1SS83
D83 1SS83
+100V
D84 1SS83
D85 1SS83
R84 18M
C85 0.01u(1kV)
C84 0.01u(1kV)
Q2- -560V(-510~-610V)
LINK HVOUT.SCH
IC1A 4558
C8 0.01u
C9 0.01u
LA314 OSCILLOSCOPE
Title
HV CIRCUIT (27)
Size A2
Document Number WSS08088105
REV
Date: May 15, 1996
Sheet of



LA314 OSCILLOSCOPE		
Title	HV OUT (2B)	
Size A2	Document Number WSS08089105	REV
Date: June 11, 1996	Sheet 1 of 1	



	LA314 OSCILLOSCOPE	
Title	CPU BOARD (30)	
Size A2	Document Number	REV 1.1
Date: September 24, 1996	Sheet 1 of 5	



LA314 OSCILLOSCOPE		
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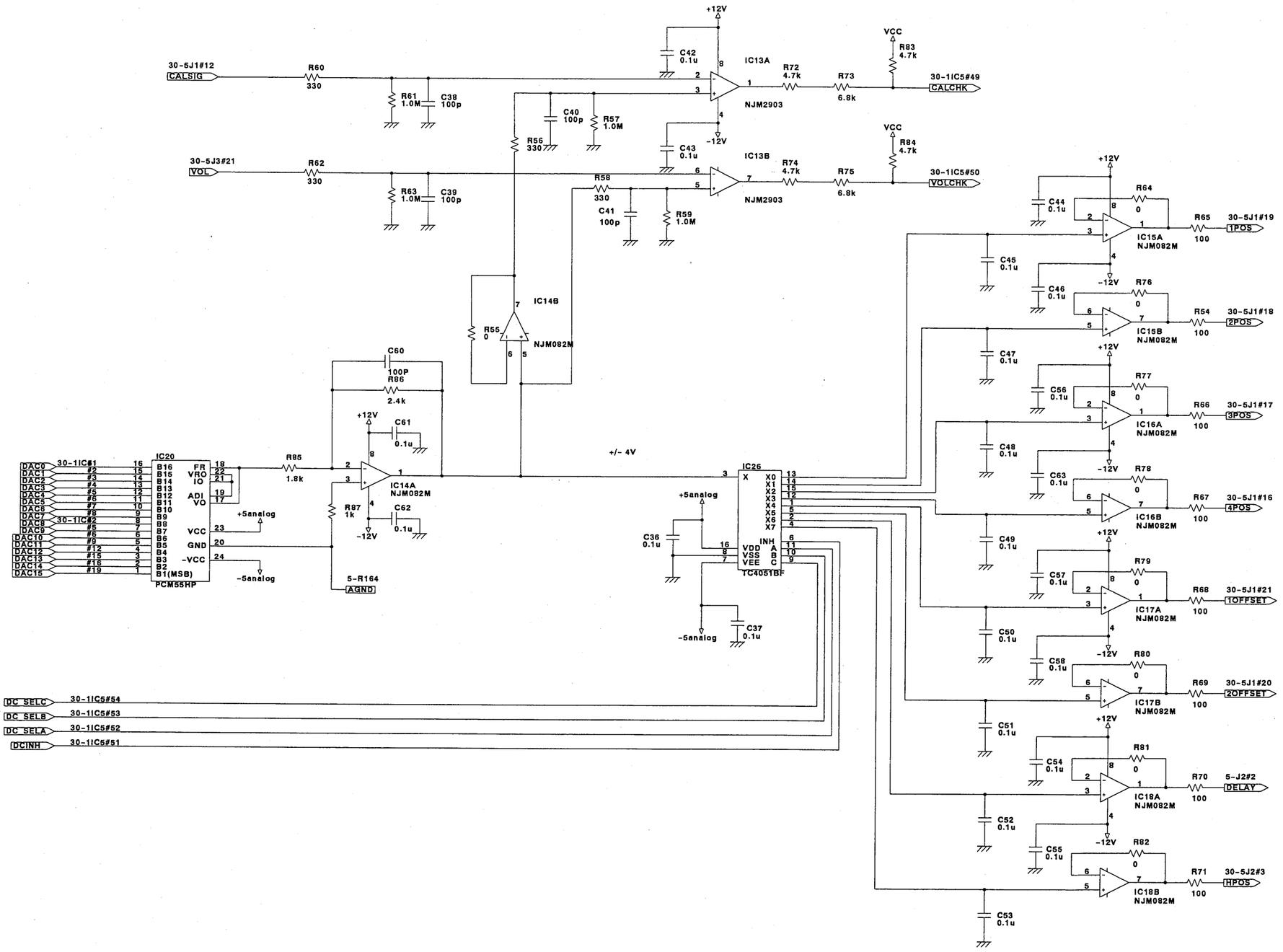
Size: A2	Document Number	REV
Date: March 24, 1997	Sheet 2 of 5	



LA314 OSCILLOSCOPE		
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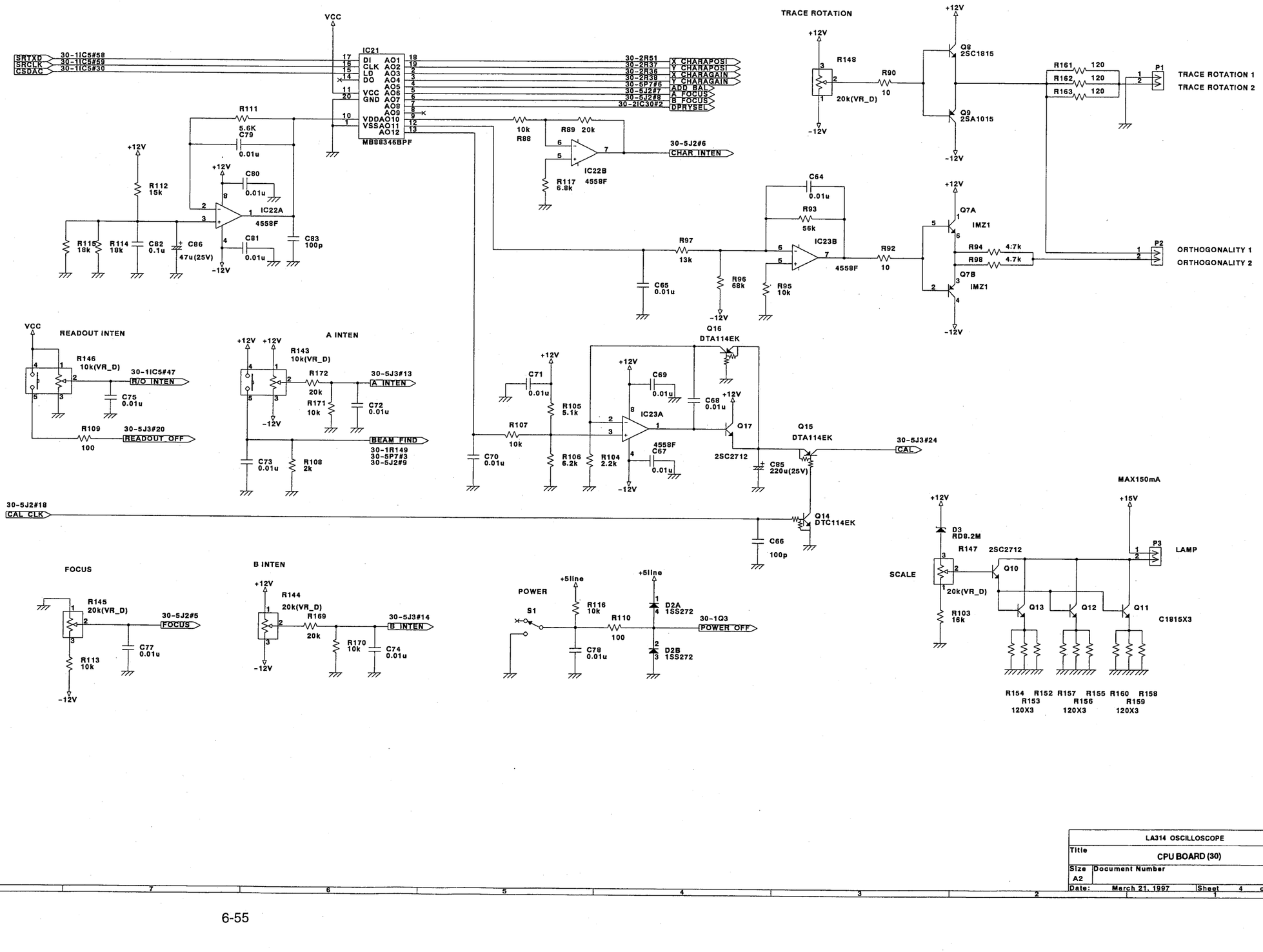
Size A2	Document Number	REV 1.1
Date: July 25, 1996	Sheet 3 of 5	



LA314 OSCILLOSCOPE

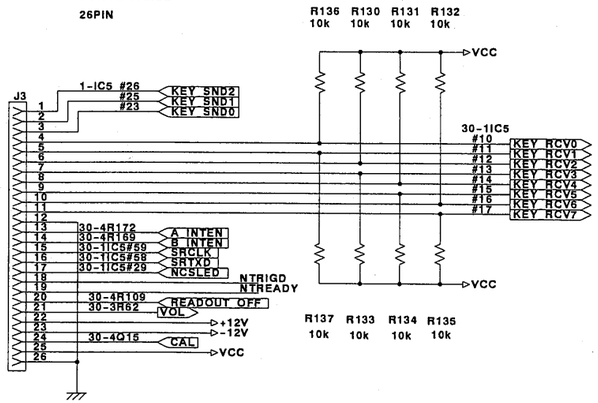
Title: CPU BOARD (30)

Size: A2 | Document Number | REV

Date: March 21, 1997 | Sheet 4 of 5

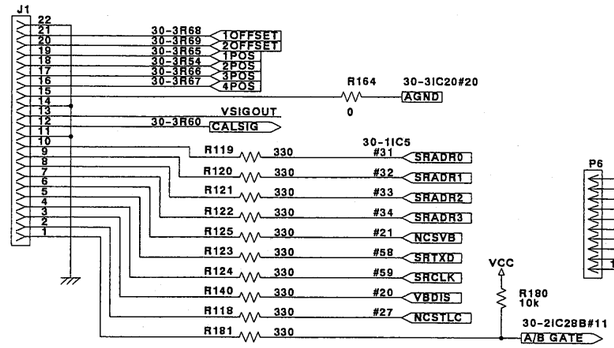
TO FROM PANEL

26PIN



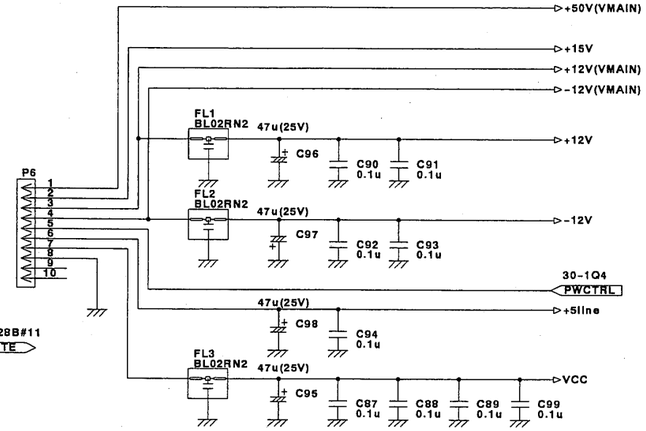
TO FROM ANALOG

22PIN X2



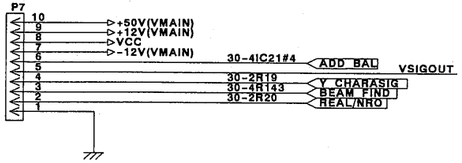
TO FROM POWER

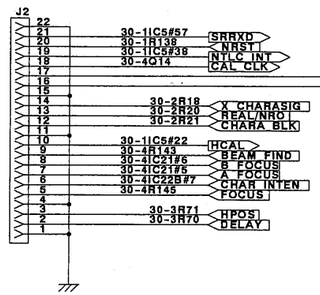
10PIN

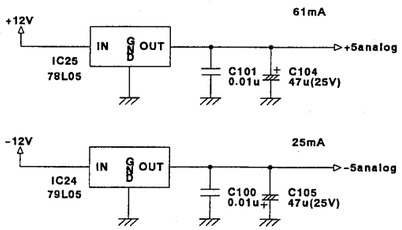


TO FROM VMAIN

10Pin

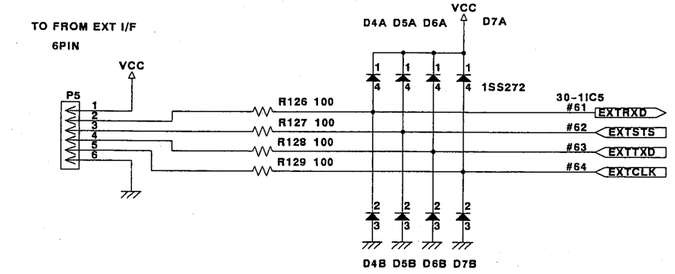






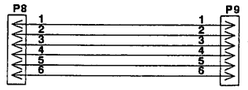
TO FROM EXT I/F

6PIN

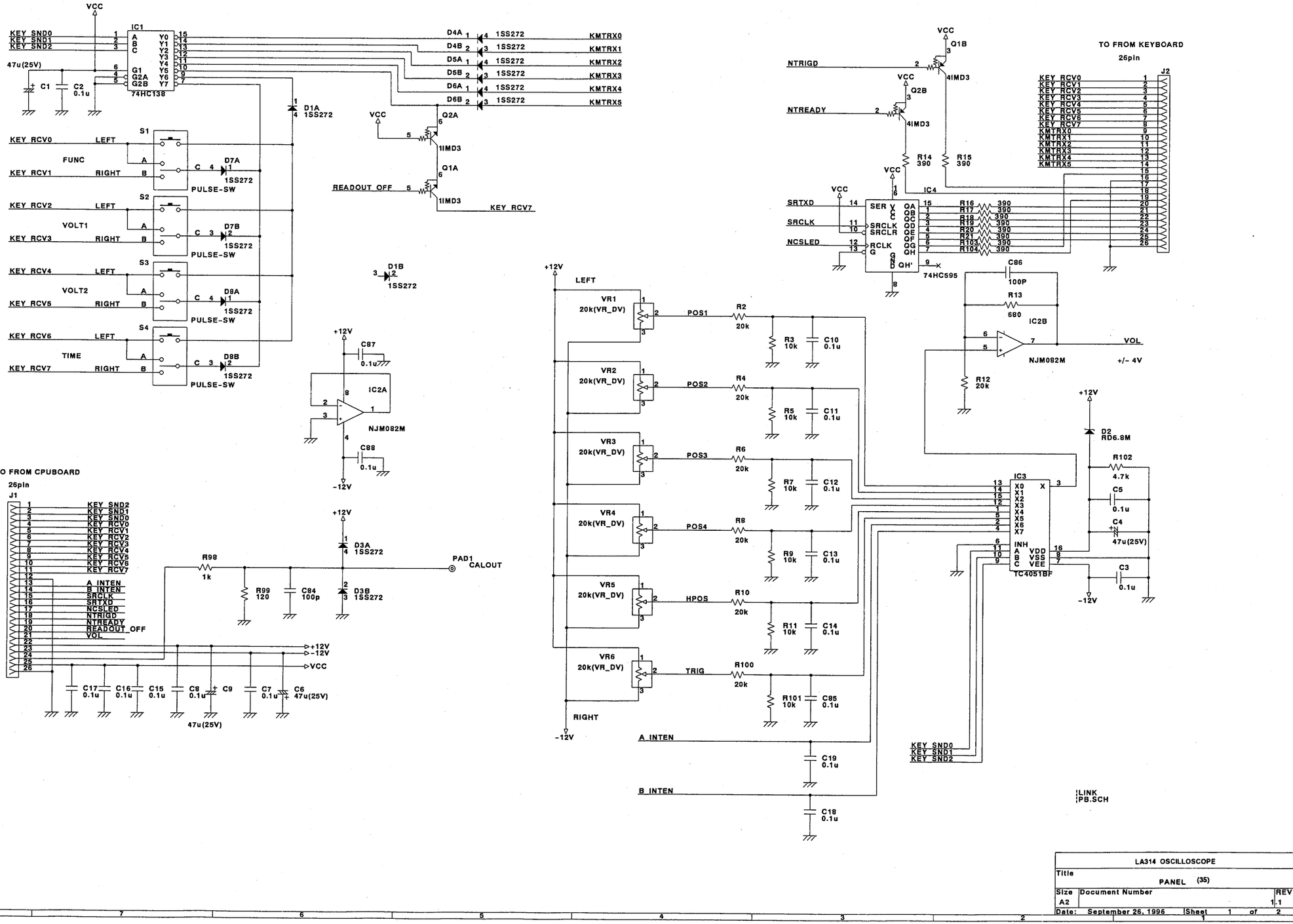


TO FROM REAR PANEL

6PIN



LA314 OSCILLOSCOPE		
Title: CPU BOARD (30)		
Size: A2	Document Number	REV
Date: March 21, 1997	Sheet 5 of 5	



LA314 OSCILLOSCOPE		
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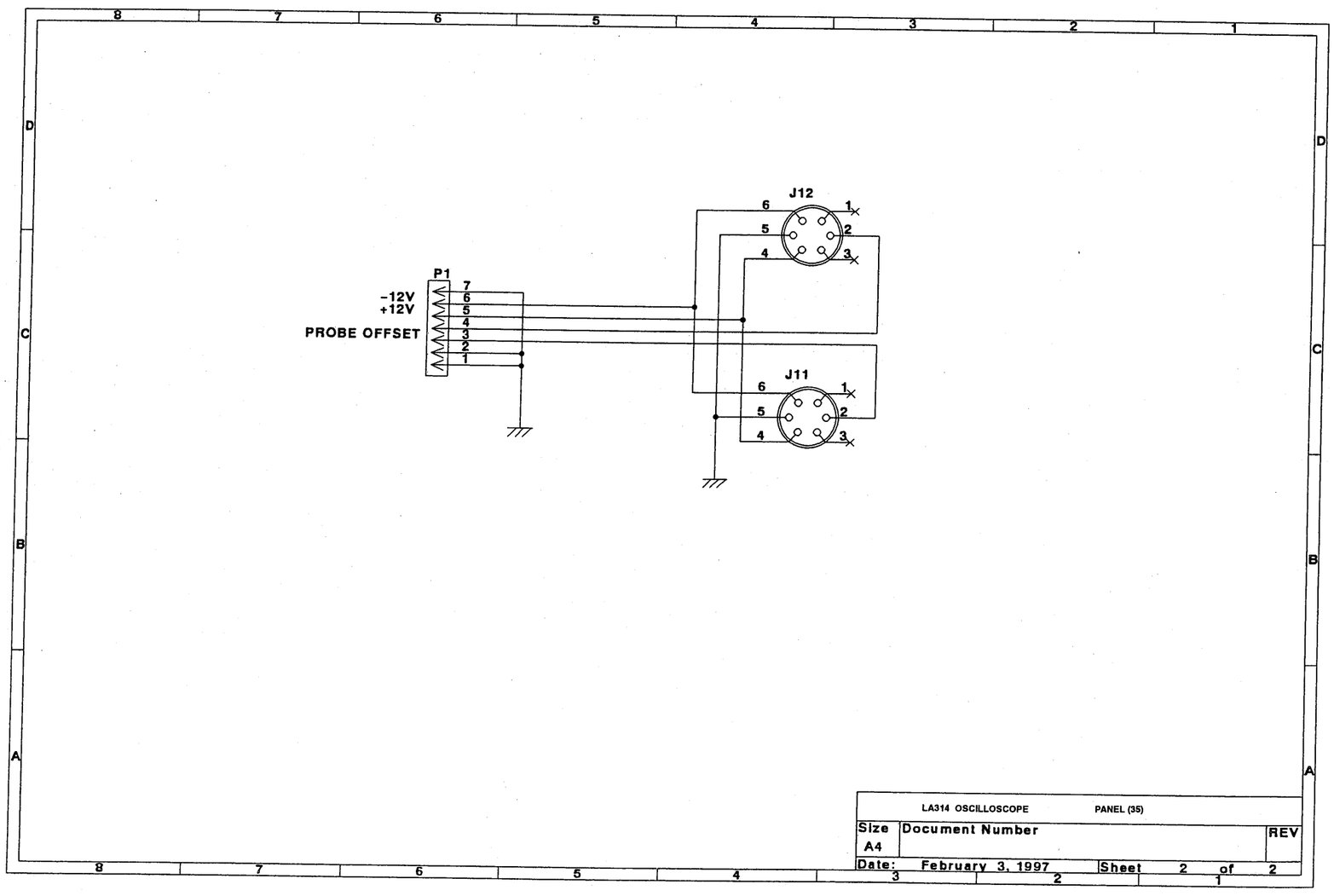
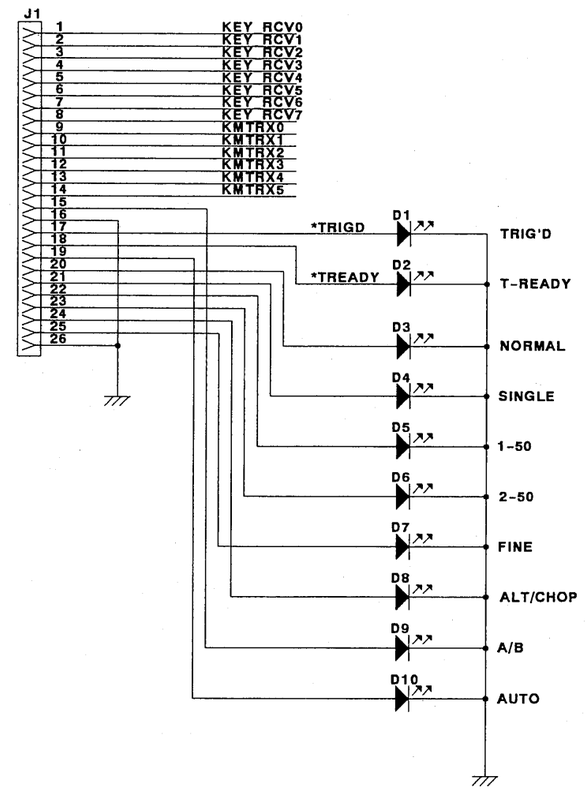
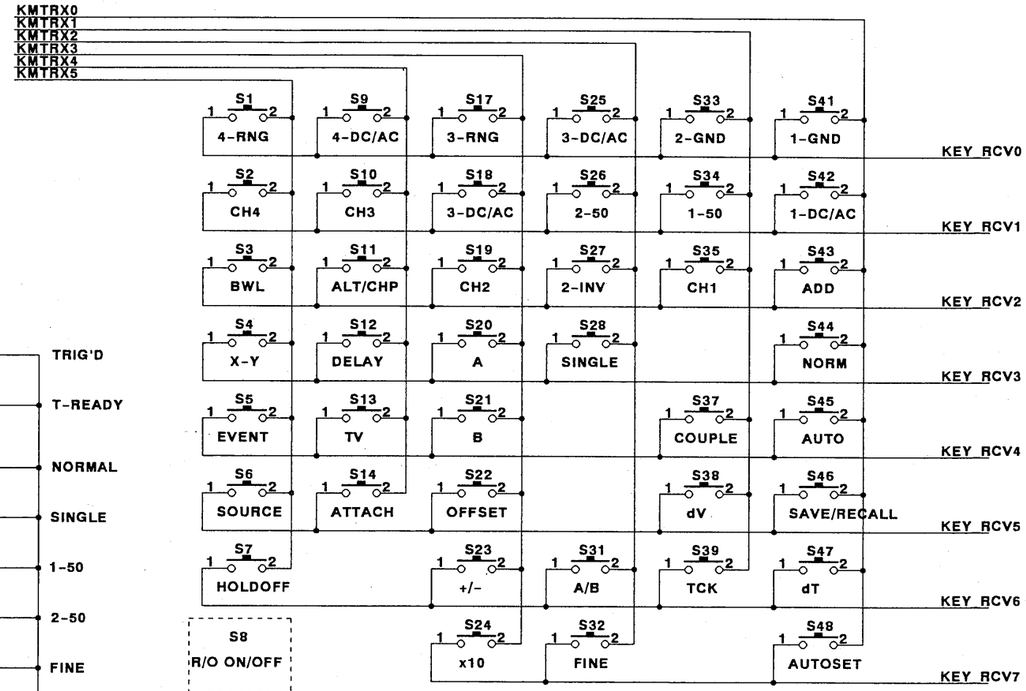
Size A2	Document Number	REV 1.1
Date: September 26, 1996	Sheet 1 of 2	


8
7
6
5
4
3
2
1
D
C
B
A
J12
6
5
4
1
2
3
P1
7
6
5
4
3
2
1
-12V
+12V
PROBE OFFSET
J11
6
5
4
1
2
3
LA314 OSCILLOSCOPE
PANEL (35)
Size
A4
Document Number
REV
Date: February 3, 1997
Sheet 2 of 2

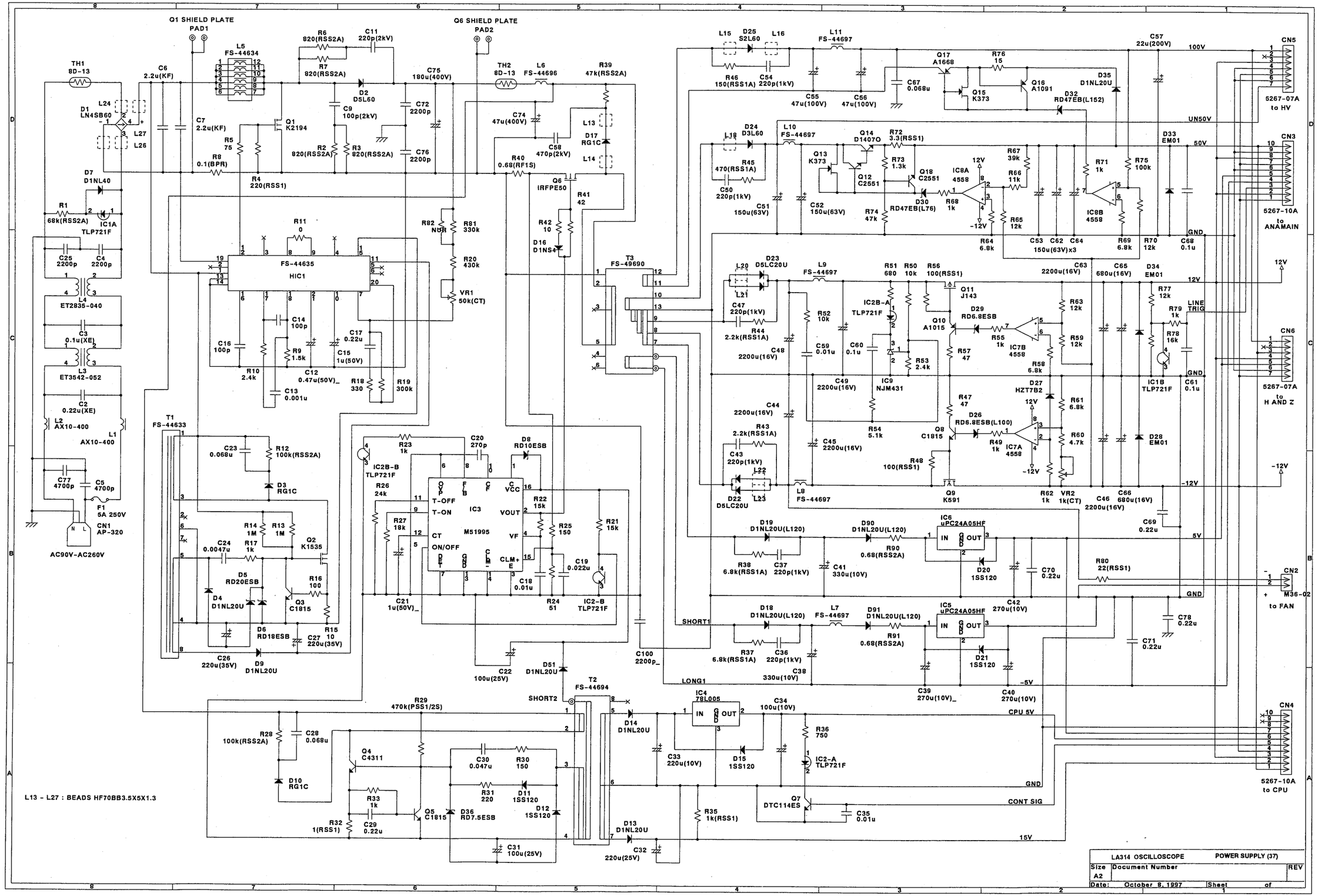
TO FROM PANEL

26pin



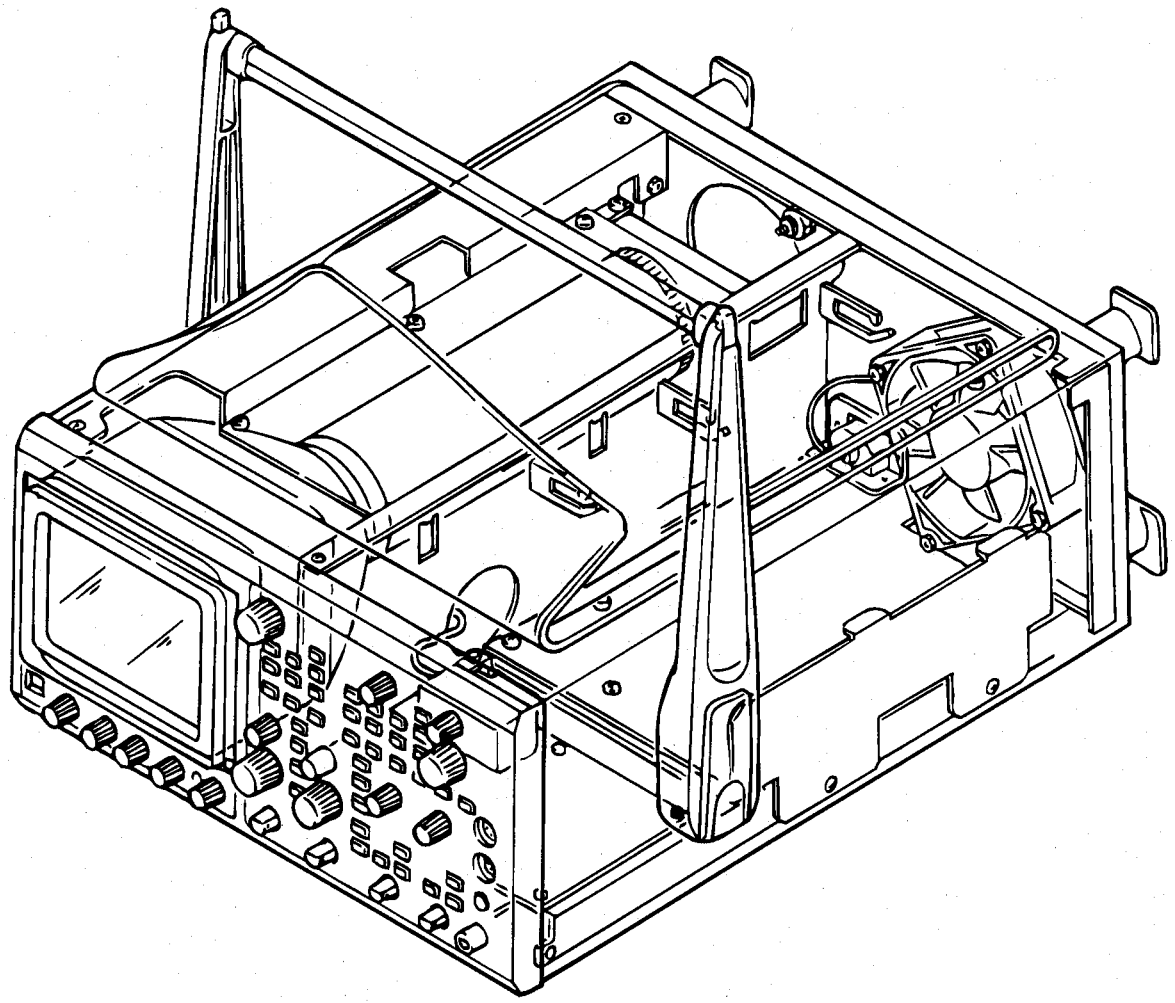


LA314 OSCILLOSCOPE		
Title: KEYBOARD (36)		
Size: A3	Document Number:	REV: 1.1
Date: May 20, 1996	Sheet 1 of 1	


Q1 SHIELD PLATE
Q6 SHIELD PLATE
PAD1
PAD2
TH1 8D-13
TH2 8D-13
L5 FS-44634
L6 FS-44696
T1 FS-44633
T2 FS-44694
T3 FS-49690
HIC1 FS-44635
IC3 M51995
IC4 78L005
IC5 uPC24A05HF
IC6 uPC24A05HF
IC7B 4558
IC8A 4558
IC8B 4558
IC9 NJM431
IC1A TLP721F
IC1B TLP721F
IC2-A TLP721F
IC2-B TLP721F
IC2B-A TLP721F
IC2B-B TLP721F
Q1 K2194
Q2 K1535
Q3 C1815
Q4 C4311
Q5 C1815
Q6 IRFPE50
Q7 DTC114ES
Q8 C1815
Q9 K591
Q10 A1015
Q11 J143
Q12 C2551
Q13 K373
Q14 D1407O
Q15 K373
Q16 A1091
Q17 A1668
Q18 C2551
F1 5A 250V
CN1 AP-320
AC90V-AC260V
CN5 5267-07A to HV
CN3 5267-10A to ANAMAIN
CN6 5267-07A to H AND Z
CN2 M36-02 to FAN
CN4 5267-10A to CPU
100V
UN50V
50V
GND
12V
-12V
5V
-5V
LINE TRIG
CPU 5V
CONT SIG
15V
SHORT1
SHORT2
LONG1
L13 - L27 : BEADS HF70BB3.5X5X1.3
LA314 OSCILLOSCOPE
POWER SUPPLY (37)
Size A2
Document Number
REV
Date: October 8, 1997
Sheet of

Section 7 Mechanical Parts List and Illustration

General View



Parts List I

INDEX NO.	NAME & DESCRIPTION	Q'TY	PART NO.
1	PANEL COVER	1	KCM140411
2	FRONT PANEL ASSY (INCLUDE 8, 9)	1	21302-3270
3	POWER KEY TOP	1	KCM1398**
4	FILTER	1	KPL1413**
5	KNOB	4	KCM1322**
6	COMPRESSION RING	4	M0060**
7	KNOB	11	KCM1378**
8	KEY TOP (GRAY)	40	KCM1395**
9	KEY TOP (YELLOW)	1	KCM1396**
101	LAMP	2	DLP016093
102	FUN MOTOR	1	DMT121211
201	SCREW KD-3 × 30S	4	MKD130301
204	SCREW KB(+) 3 × 12S (NIP)	2	MKB130122
206	BEZEL (ABS)	1	MCM138121

Illustration of Assembly or Disassembly I

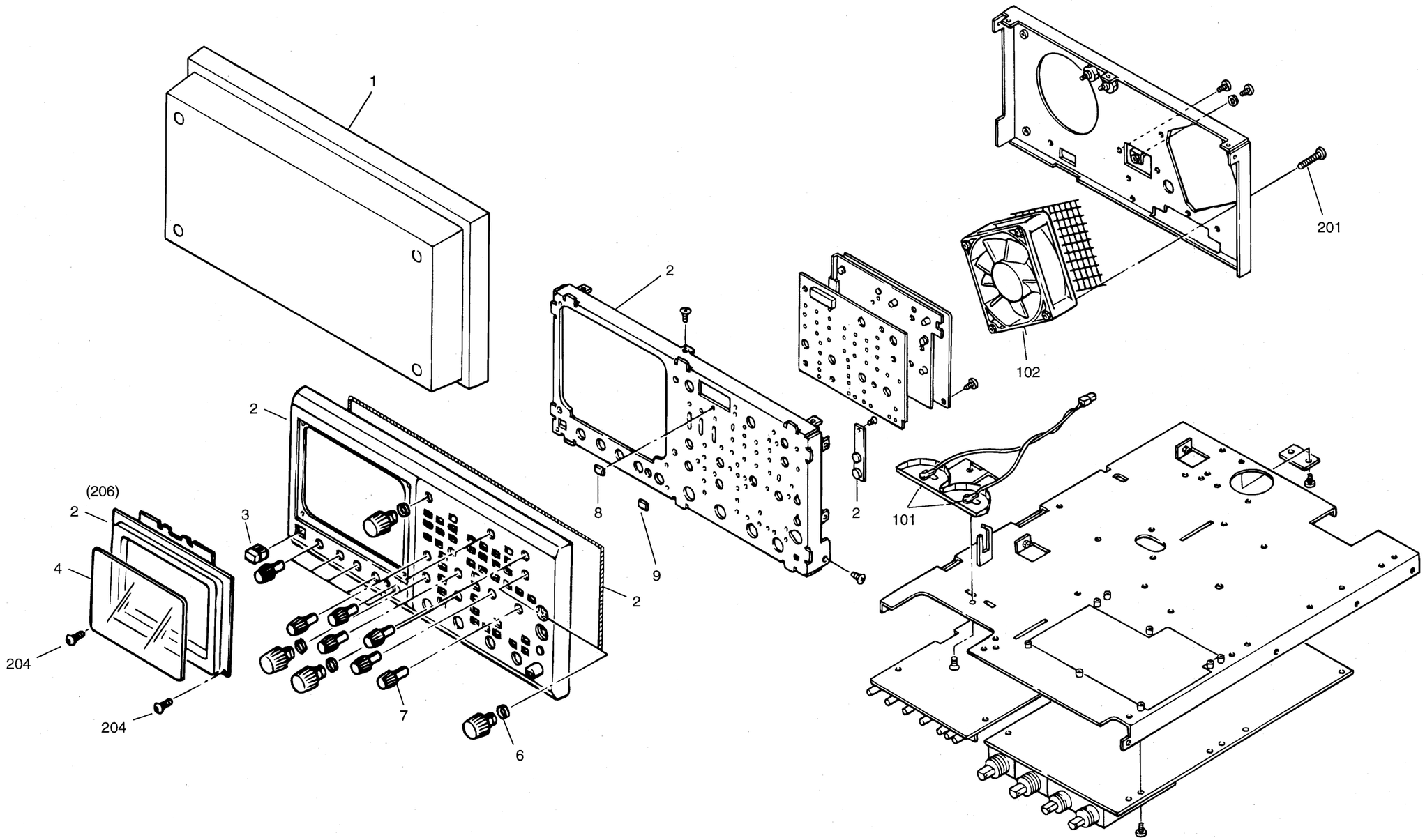
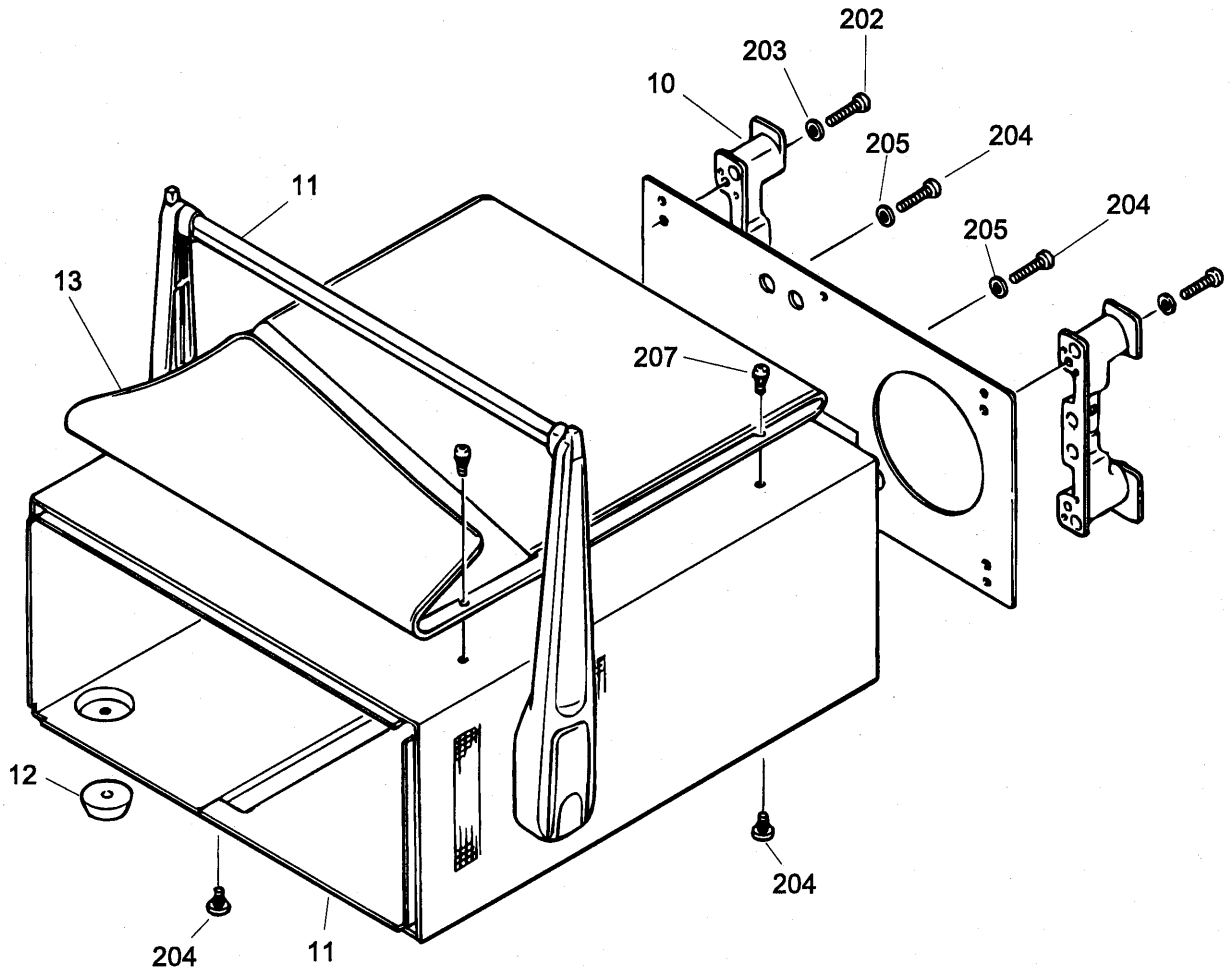


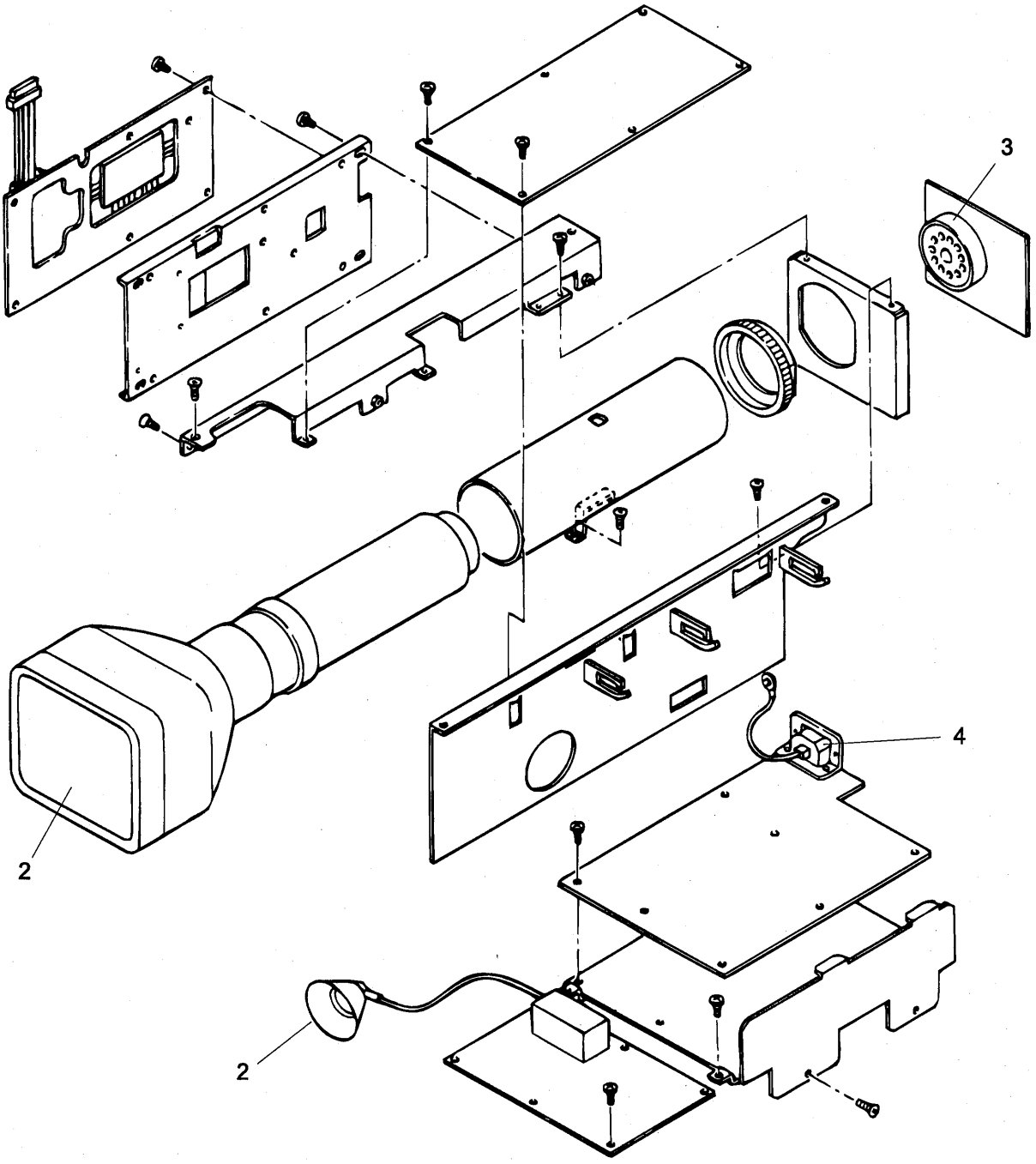
Illustration of Assembly or Disassembly II



Parts List Ⅲ

INDEX NO.	NAME & DESCRIPTION	Q'TY	PART NO.
1	CRT S-8501	1	DET016221
2	MSL35870	1	DES050762
3	CRT SOCKET E-2025	1	DSK010251
4	INLET AP-320 (V) BLACK	1	DCN013161

Illustration of Assembly or Disassembly Ⅲ



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1 777 4000
Australia: Philips Test and Measurement
2 9888 8222
Austria: Dewetron GmbH
0316 3070
Benelux: LeCroy UK, Ltd.
UU 1235 52y 288
Brazil:ATP/Hi-Tek Electronica Ltda
11 725 5822
Canada: Allan Crawford Assoc. Ltd.
Mississauga:905 890 2010
N. Vancouver:604 878 1002
Chile: Sistemas de Instrumentaction Ltda
2 6951137
Denmark: Lutronic ApS
43 42 9764
Eastern Europe: Elsinco GmbH, Vienna
1 815 04 00
Finland: Orbis OY, 0478 830
France: LeCroy Sarl,
1 69 18 83 20
Germany: LeCroy Europe GmbH,
6221 82700
Greece:IFIPCO, 1 67 25 970
Israel: Ammo, 3 547 2747
Italy: LeCroy S.r.l., Venice
41 456 9700
Mexico: Electroingenieria de Precision SA
559 7677
New Zealand: Philips Test and Measurement
649 8494 160
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22 76 38 70
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21 493 9593/5171
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1 803 1767
Sweden:MSS AB
8 544 107 00
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North:62 885 8050
West:22 719 2228
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