

HITACHI

**MODELS VC-6025A/6045A
DIGITAL STORAGE OSCILLOSCOPE**

SERVICE MANUAL



Hitachi Denshi, Ltd.

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1.GENERAL

This service manual is for the VC-6025A/6045A, and does not include the description contained in the service manual for the VC-6025/6045. Therefore, use the service manual for the VC-6025/6045 (F No. 6673) with this manual.

The differences of main functions between the VC-6025A/6045A and the VC-6025/6045 are shown in Table 1-1.

Table 1-1

Functions		VC-6025A/6045A	VC-6025/6045
Simul- taneity of sampling	Equivalent	Not provided (Alternate sampling)	Not provided (Alternate sampling)
	40Msps		
	NORMAL	Up to 20Msps: Provided (Real 2-channel simultaneous sampling)	Up to 20Msps: Not provided (Alternate sampling)
ROLL	Up to 100Ksps: Provided (Chop sampling)		
Number of average		2, 4, 16, 64, 256	4, 16
Frequency counter		Provided	Not provided
Battery backup		<ul style="list-style-type: none"> o Panel setting (only RTO section) o Save waveform 	o Only save wave- form
Number of data transferred through external I/F		1024W, 2048W, 4096W	1000W, 2000W, 4000W

2. SPECIFICATIONS

The following specifications are applicable to the VC-6025A, and VC-6045A oscilloscopes unless otherwise noted.

o CRT

Graticule: 6-inch screen, with internal graticule
0%, 10%, 90% and 100% markers
8 x 10 DIV (1 DIV = 1cm)

Phosphor: P31

Accelerating potential: 17kV approx.
(12kV approx. for the VC-6025A)

External intensity modulation: Coupling: DC coupling (dark at positive voltage)
Voltage: 5Vp-p or more
Maximum input voltage: 30V (DC+AC peak)
or 30Vp-p AC at 1kHz or less
Bandwidth: DC to 5MHz

o VERTICAL DEFLECTION SYSTEM

Sensitivity: 2mV/DIV to 5V/DIV $\pm 3\%$ (switchable in 11 steps) Continuously variable by fine control

Bandwidth: DC to 100MHz -3dB
(DC to 50MHz -3dB for the VC-6025A)
2mV/DIV: DC to 20MHz -3dB
(DC to 10MHz -3dB for the VC-6025A)
AC low pass: 10Hz -3dB

Rise time: 3.5ns approx.
(7ns approx. for the VC-6025A)
2mV/DIV: 17.5ns approx.
(35ns approx. for the VC-6025A)

Delay time: Leading edge can be monitored
(only in real-time mode).

Maximum input voltage: 400V (DC+AC peak at 1kHz or less)
Input coupling: AC, DC, GND
Input impedance: $1M\Omega \pm 1.5\%$, $23pF \pm 3pF$
Display modes: CH1, CH2, DUAL, CHOP (250kHz approx.),
and ADD (DIFF mode can be established
when the CH2 is in the INVERT mode.)

Bandwidth limiting
function: 20MHz (10MHz for the VC-6025A)
Polarity selection: \pm (CH2 only)
Common-mode rejection
ratio (CMRR): 20dB minimum at 20MHz
(20dB minimum at 10MHz for the
VC-6025A)

X-Y operation

Input: X axis: Channel selectable from CH1,
CH2, EXT and EXT \div 10
(CH1 only in storage mode)
Y axis: Channel selectable from CH1,
CH2, and CH1&CH2
(CH2 only in storage mode)

Sensitivity: CH1, CH2: 2mV to 5V/DIV $\pm 5\%$
EXT: 0.1V/DIV $\pm 5\%$
EXT \div 10: 1V/DIV $\pm 5\%$

Phase error: 3° or less from DC to 50kHz
(only in real-time mode)

X axis bandwidth: DC to 500kHz (-3dB)
(by time range in storage mode)

o HORIZONTAL DEFLECTION SYSTEM

Sweep mode: Main sweep, continuous delay sweep,
alternate sweep (only in real-time
mode), single sweep

Sweep time

REAL TIME mode: A(main) sweep: 50ns/DIV to 0.5s/DIV
Continuously variable
(UNCAL)

STORAGE mode:

B(delay) sweep: 50ns/DIV to 50ms/DIV
Refer to the item "DIGITAL STORAGE
FUNCTIONS.")

Accuracy:

	10 to 35°C	0 to 50°C
x1	±3%	±4%
x10 MAG	±4%	±6%

Holdoff time: Variable
 Delay time: 1µs to 5s
 Delay jitter: 1/20,000 or less
 Sweep magnification: X10
 Maximum sweep rate: 5ns/DIV
 Alternate separation: Variable (only in real-time mode)
 Trigger lock function: Provided
 Auto range function: Provided

o TRIGGERING

Trigger mode: AUTO, NORM, TV-H, TV-V, and SINGLE
 Trigger source: A: CH1, CH2, EXT (AC,DC,DC÷10),
 and LINE

B: Automatically corresponds to A
 TV mode: Exclusive sync separator circuit
 provided
 Sensitivity: SYNC section
 INT: 1 DIV or more
 EXT: 200mVp-p or more
 SYNC polarity: -

Trigger level
 variable range: AUTO: Automatically corresponds to
 the trigger signal
 NORM: INT: ±4 DIV or more
 EXT: ±0.4V or more
 EXT÷10: ±4V or more

Trigger sensitivity:

NORM mode:

VC-6045A	DC to 20MHz	20MHz to 100MHz
VC-6025A	DC to 10MHz	10MHz to 50MHz
INT(CH1,CH2)	0.35 DIV	1.5 DIV
EXT	50mV	.150mV

AUTO mode:

VC-6045A	30Hz to 100Hz	100Hz to 20MHz	20MHz to 100MHz
VC-6025A	30Hz to 100Hz	100Hz to 10MHz	10MHz to 50MHz
INT(CH1,CH2)	1.5 DIV	1.0 DIV	1.5 DIV
EXT	150mV	100mV	150mV

Trigger coupling:

INT: DC

EXT: AC, DC, and DC \div 10

Trigger polarity:

\pm

External input:

Impedance: $1M\Omega\pm 5\%$, $25pF\pm 6pF$

Voltage: 400V (DC+AC peak at 1kHz)

AUTO low frequency band:30Hz

o READOUT FUNCTION

<Panel setting display>

Vertical axis:

V/DIV (CH1, CH2), UNCAL,
probe conversion, ADD (+)

Sweep speed:

S/DIV, UNCAL, MAG (converted value)

Others:

Delay time, X-Y, trigger, number of
average, aliasing error display,
smoothing display, sampling mode display,
interpolation system, hold-off

<Cursor readout function>

Voltage difference: ΔV : Δ -REF (CH1 and CH2 waveforms)

Time difference: ΔT : Δ -REF

Frequency: $1/\Delta T$: Δ -REF

o FREQUENCY COUNTER

Measurement source: A trigger signal selected by SOURCE
OR X switch

Measuring range: 20Hz to 100MHz
(20Hz to 50MHz for the VC-6025A)

Time base error: $\pm 100\text{ppm}$ (15 to 35°C)

VC-6045A display format

Ranges	Display format	Resolution	Accuracy
$20\text{Hz} \leq f < 100\text{Hz}$	99.99Hz	0.01Hz	± 1 LSD (time base error + resolution)
$100\text{Hz} \leq f < 1\text{kHz}$	999.9Hz	1.0Hz max	
$1\text{kHz} \leq f < 10\text{kHz}$	9.999kHz	0.002kHz max	
$10\text{kHz} \leq f < 100\text{kHz}$	99.99kHz	0.04kHz max	
$100\text{kHz} \leq f < 1\text{MHz}$	999.9kHz	0.1kHz	
$1\text{MHz} \leq f < 10\text{MHz}$	9.999MHz	0.002MHz max	
$10\text{MHz} \leq f < 100\text{MHz}$	99.99MHz	0.01MHz	
$100\text{MHz} \leq f$	(100.0MHz)	Not specified	

VC-6025A display format

Ranges	Display format	Resolution	Accuracy
$20\text{Hz} \leq f < 100\text{Hz}$	99.99Hz	0.01Hz	± 1 LSD (time base error + resolution)
$100\text{Hz} \leq f < 1\text{kHz}$	999.9Hz	1.0Hz max	
$1\text{kHz} \leq f < 10\text{kHz}$	9.999kHz	0.002kHz max	
$10\text{kHz} \leq f < 100\text{kHz}$	99.99kHz	0.04kHz max	
$100\text{kHz} \leq f < 1\text{MHz}$	999.9kHz	0.1kHz	
$1\text{MHz} \leq f < 10\text{MHz}$	9.999MHz	0.002MHz max	
$10\text{MHz} \leq f < 50\text{MHz}$	49.99MHz	0.01MHz	
$50\text{MHz} \leq f$	(50.0MHz)	Not specified	

o MEMORY BACKUP FUNCTION: The panel conditions and the contents of save memory can be retained for 48 hours after power off.

o EXTERNAL OUTPUT

TRIGGER SIGNAL OUT: Output voltage: 25mV/DIV approx.
(Full scale on the CRT)
50-ohm termination

Frequency response: DC to 10MHz -3dB

Output impedance: 50Ω approx.

o CALIBRATOR

Waveform: 1kHz ±20%, square wave

Voltage: 0.5V ±1%

DIGITAL STORAGE FUNCTION

o MAXIMUM SAMPLING RATE

VC-6045A: 40Msps (2.5μs/DIV): 2-channel
alternate sampling

20Msps (5μs/DIV): 2-channel simultaneous
sampling

VC-6025A: 20Msps (5μs/DIV): 2-channel simultaneous
sampling

o MEMORY CAPACITY

Acquisition memory: 4000 words: 1 channel and 2.5μs/DIV to
50s/DIV
(only in the VC-6045A)

2000 words/channel:
2 channels and 2.5μs/DIV to
50s/DIV (5μs/DIV to 50s/DIV
for the VC-6025A)

1000 words/channel:
1 channel or 2 channels
and 2μs/DIV to 50ns/DIV

Display memory: 1000 words x 4 waveforms

Save memory: 1000 words x 2 waveforms (Back up)

- VERTICAL RESOLUTION: 250 points/10 DIV
- HORIZONTAL RESOLUTION: 100 points/DIV
- MAXIMUM STORAGE FREQUENCY
 - Single shot signal: 5MHz
(Maximum amplitude error: 30% or less)
 - Repetition signal:
 - VC-6045A: 100MHz, -3dB (20MHz, -3dB at 2mV/DIV)
 - VC-6025A: 50MHz, -3dB (10MHz, -3dB at 2mV/DIV)

○ SWEEP TIME

Sampling system	Sweep time
Equivalent sampling (Repetitive trace, and only A sweep)	50ns/DIV to 2 μ s/DIV
A sweep realtime sampling (single shot trace)	2.5 μ s/DIV to 0.1s/DIV (5 μ s/DIV to 0.1s/DIV for the VC-6025A)
B sweep realtime sampling (single shot trace)	2.5 μ s/DIV to 50ms/DIV (5 μ s/DIV to 50ms/DIV for the VC-6025A)
Roll (A sweep only)	0.2s/DIV to 50s/DIV

- Alternate sampling for the range of 50ns/DIV to 2.5 μ s/DIV (50ns/DIV to 2 μ s/DIV for the VC-6025A) in 2-channel mode.
- 2-channel simultaneous sampling for the range of 5 μ s/DIV to 50s/DIV.

- INTERPOLATION FUNCTION: Linear interpolation or sine interpolation selectable (effective only in magnified display mode)

- SMOOTHING DISPLAY: ON/OFF possible

- PRETRIGGER
 - VC-6045A: Maximum 0 to 20 DIV
(1 channel and 2.5 μ s/DIV to 0.1s/DIV)
(in 0.1 DIV steps)
 - VC-6025A: Maximum 0 to 10 DIV (in 0.1 DIV steps)

- POSTTRIGGER: Maximum 0 to 20 DIV
(1 channel and 2.5 μ s/DIV to 0.1s/DIV)
(in 0.1 DIV steps)
(only in the VC-6045A)

- DATA ACQUISITION
 - NORM storage mode: Updates a data on the CRT at each triggering.
 - AVG mode: Averages input signals by the selected number of sweeps and displays the result after the averaging has reached the selected number.
(Number of average: 2, 4, 16, 64 and 256)
 - ROLL mode: Writes new data at the right edge of the CRT and shifts waveform from right to left continuously on the CRT.
(The updating point is the right end.)
 - HOLD mode: Holds the waveform displayed on the CRT.
 - SINGLE sweep: Performs an operation of the NORM storage, or AVG mode once at each pressing of the SINGLE RESET switch in the HOLD mode, and updates the data on the CRT.

- DATA SAVE: Up to two waveforms on the CRT can be saved.
The stored waveforms can be displayed on the CRT with the two sampling waveforms.

- PLOTTER OUTPUT: A hard copy can be produced by the plotter by using the HP-GL through RS-232C. 6 colors available.
- EXTERNAL OUTPUT: The RS-232C interface is provided as a standard.
- MAGNIFYING DISPLAY: A storage waveform can be magnified ten times in the horizontal direction. (A save waveform cannot be magnified.)
- POWER SUPPLY
 - Voltage: 90V to 250V AC
 - Frequency: 48 to 440Hz
 - Power consumption: 50W approx.
- ENVIRONMENT
 - Operating temperature: 0 to 40°C
 - Operating humidity: 45 to 85%
 - Specification guaranteed temperature: 10 to 35°C
 - Safe storage temperature: -20 to +70°C
 - Safe storage humidity: 35 to 85% (70% or less in the ambient temperature of 50°C)
- DIMENSIONS and WEIGHT
 - Dimensions: 275(W) x 130(H) x 360(D)mm approx. (10.8 x 5.1 x 14.2 in. approx.)
 - Weight: 6.5kg approx. (14.3 lb. approx.)
- OTHER
 - EMI Conforms with VDE0871, Category B

3. ACCESSORIES

The VC-6025A/6045A Digital Storage Oscilloscopes are shipped with the following standard accessories:

Probes, AT-10AS1.5
(AT-10AR1.5 for the VC-6025A) 2 pcs.
Fuse, 2A (A spare fuse is provided
in the fuse holder of the instrument) 1 pc.
Operation manual 1 copy
AC power cord, 3-conductor 1 pc.

4. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the reliability of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding recalibration of the instrument.

Disassembly

Remove the top cover and the bottom cover of the instrument. Most of the internal parts of the instrument are now accessible. If access to the front of the circuit boards are necessary, remove the knobs from the external control shafts on the board.

Cleaning

The instrument should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause component breakdown.

The covers provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used. Cleaning the interior should only be occasionally necessary. The best way to clean the interior is to blow off the dust with a dray, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning more delicate components.

Visual Inspection

The instrument should be inspected occasionally for such defects as broken connections, improperly seated transistors, damaged circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is apparent; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent recurrence of the damage.

5. CALIBRATION

Hitachi Denshi provides complete instrument repair and calibration. Contact your local Hitachi Denshi office or representative.

5.1 Calibration interval

To maintain instrument accuracy, perform the calibration of the VC-6025A/6045A at least every 1000 hours of operation or every six months if used infrequently.

5.2 Test equipment required

The test equipment and accessories listed in Table 5-1 or equivalent are required to perform the calibration of the VC-6025A/6045A. The minimum specifications required for accurate calibration are also listed. All the test equipment is assumed to be correctly calibrated and operate properly within the listed specifications. It is recommended to use the test equipment which exceeds the listed specifications. Operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment for more information.

5.3 Preliminary procedure

This instrument should be calibrated at an ambient temperature of $+20^{\circ}\text{C}$ ($\pm 5^{\circ}\text{C}$) for the best overall accuracy.

- (1) Connect the instrument to AC line voltage, 50Hz to 400Hz line source.
- (2) Set the instrument controls as given in the Preliminary Control Settings. Allow at least fifteen minutes of warmup before proceeding.
- (3) See the Adjustment Locations in Section 7.

5.4 Preliminary control settings

Set the instrument controls as follows, when starting the calibration procedures.

Controls	Setting
POWER	OFF
FOCUS	Midrange
TRACE ROTATION	Any position
INTEN	CCW
READOUT INTEN	CCW
V. POSITION CH1 CH2	Midrange Midrange
V. VAR CH1 CH2	CW (CAL) CW (CAL)

Controls	Setting
AC-DC CH1 CH2	Any position Any position
GND CH1 CH2	GND GND
SELECTOR	Any position
VARIABLES	Any position
TIME/DIV	Any position
H MODE	A
V MODE	CH1

Note:

CW: Clockwise H MODE: Horizontal mode
CCW: Counterclockwise V MODE: Vertical mode

After completion of the above settings, turn the POWER control to ON, and set the INTEN and READOUT INTEN controls to any position.

5.5 Initial starting procedure

- (1) Turn instrument POWER on.
- (2) Allow a few seconds for the cathode ray tube (CRT) to warm up. A trace will appear on the display of the CRT.
- (3) If trace does not appear, increase the intensity by the INTEN control clockwise rotation until the trace is easily observed.
- (4) Adjust FOCUS control for optimum focus.
- (5) Adjust POSITION controls to center the trace if necessary.

Table 5-1

TEST EQUIPMENT AND ACCESSORIES REQUIRED

Description		Specifications	Applications	Examples of Applicable Test Equipment
1	Constant Amplitude Signal Generator	Reference frequency: 50 kHz, Maximum frequency: 150 MHz, Amplitude: variable	Check horizontal, vertical and trigger bandwidths.	TEKTRONIX R SG503
2	Standard amplitude Calibrator	Amplitude accuracy: 0.25%, Variable amplitude: 5 mV to 40 V, Frequency: 1 kHz square wave	Check horizontal and vertical gains.	TEKTRONIX PG506
3	Square-wave Generator	Variable frequency: 10 Hz to 1 MHz, Output amplitude: 10 mV to 100 V	Check probe and vertical compensation.	TEKTRONIX PG506
4	Digital Multimeter	Accuracy: 0.1%	Check power supply.	TEKTRONIX DM501A
5	Digital Frequency Counter	Accuracy: 0.1%	Check CAL frequency.	
6	Time Mark Generator	Accuracy: 0.1%	Check sweep time.	TEKTRONIX TG501
7	Cable	Impedance: 50 ohms, Type: RG-58/U, Length: 42 inches, Connectors: BNC	This cable is used for almost all adjustment.	Hitachi Part No. 4202
8	Termination	Impedance: 50 ohms, Connectors: BNC Feed through	Check vertical amplifier compensation.	
9	Attenuator	Ratio: 10X, Connectors: BNC, Impedance: 50 ohms	Check vertical amplifier bandwidth.	
10	T-Connector	Connectors: BNC	Check X-Y operation.	Hitachi Part No.1301

5.6 Adjustment

Note: Before you begin, see Adjustment locations in Section 7. The following specifications are applicable to the VC-6025A, and VC-6045A oscilloscopes unless otherwise noted.

STORAGE

- ④⑨ V CENT (STORAGE Y CENT) RV5501 (PEF-967 B side)
- a. Set:
- STORAGE: ON
- MEASURE: ΔV cursor
- b. Adjust RV5501 so that the two cursors are positioned symmetrically with respect to the horizontal center line on the CRT.
- ⑤⑩ V GAIN (STORAGE Y GAIN) RV5502 (PEF-967 B side)
- a. Set: Same as ④⑨ .
- b. Adjust RV5502 so that the distance between the two cursors is 6 divisions.
- c. Perform the adjustment mentioned under ④⑨ again.
- ⑤⑪ H CENT (STORAGE X CENT) RV5503 (PEF-967 B side)
- a. Set:
- STORAGE: ON
- MEASURE: ΔT cursor
- b. Adjust RV5503 so that the two cursors are positioned symmetrically with respect to the vertical center line on the CRT.
- ⑤⑫ H GAIN (STORAGE X GAIN) RV5504 (PEF-967 B side)
- a. Set: Same as ⑤⑪ .
- b. Adjust RV5504 so that the distance between the cursors is 8 divisions.
- c. Perform the adjustment mentioned under ⑤⑪ again.

53 S/H ADJ (S/H BALANCE) RV8060 (PEF-967 B side)

a. Set:

STORAGE: OFF

V MODE: CH1

A TIME: 0.5ms/DIV

CH1 VOLTS/DIV: 10mV/DIV

CH1 INPUT COUPLING: GND(The GND switch is pushed in.)

b. Align the trace with the center graticule on the CRT by the CH1 V POSITION control. (Don't rotate this control hereafter.)

c. Set the STORAGE switch to ON.

d. Measure the voltage difference between DC LEVEL 1 and DC LEVEL 2 on the PEF-978 through the two guide holes (DC LEVEL 1 and DC LEVEL 2 are silk-screened) on the PEF-967, using the digital voltmeter.

e. Adjust RV8060 so that the measured voltage difference is less than $0 \pm 10\text{mV}$.

54 -1 AD1 GAIN (VC-6045A CH1 A/D GAIN) RV5201 (PEF-967 B side)
AD2 GAIN (VC-6045A CH2 A/D GAIN) RV5251 (PEF-967 B side)

a. Set:

STORAGE: OFF

SOURCE OR X: CH1 (The trigger source is CH1.)

V MODE: CH1

CH1 VOLTS/DIV: 10mV/DIV

A TIME: 0.5ms/DIV

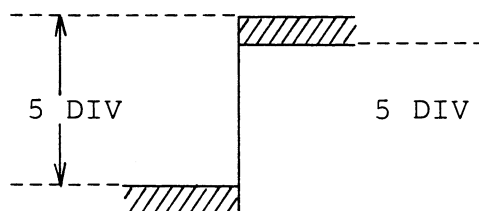
CH1 INPUT COUPLING: DC (The AC/DC switch is pushed in.)

CH1 input: Calibration square wave (1kHz, 50mV)

SMOOTH: OFF (Display "SMOOTH" by the MENU switch and "SMOOTH OFF" by the VARIABLES control.)

b. Verify that the amplitude is 5 divisions.

c. When the STORAGE switch is set to ON, the following waveform is displayed.



d. Adjust RV5201 and RV5251 so that the above two amplitudes are 5 divisions.

⑤4 -2-1 AD1 GAIN (VC-6025A CH1 A/D GAIN) RV5201 (PEF-967 B side)

a. Set: Same as ⑤4 -1.

b. Verify that the amplitude is 5 divisions.

c. Set the STORAGE switch to ON and adjust RV5201 so that the amplitude is 5 divisions.

⑤4 -2-2 AD2 GAIN (VC-6025A CH2 A/D GAIN) RV5251 (PEF-967 B side)

a. Set:

V MODE: DUAL

Others: Same as ⑤4 -1.

b. Verify that the amplitude is 5 divisions.

c. Set the STORAGE switch to ON and adjust RV5251 so that the amplitude is 5 divisions.

⑤5 -1 AD1 NORM OFFSET (VC-6045A CH1 A/D OFFSET)

RV5202 (PEF-967 B side)

AD2 OFFSET (VC-6045A CH2 A/D OFFSET) RV5252 (PEF-967 B side)

a. Set:

STORAGE: OFF

SOURCE OR X: CH1

TRIGGER MODE: AUTO

V MODE: CH1

CH1 VOLTS/DIV: 10mV/DIV

A TIME: 0.5ms/DIV

CH1 INPUT COUPLING: GND (The GND switch is pushed in.)

SMOOTH: OFF (Display "SMOOTH" by the MENU switch and "SMOOTH OFF" by the VARIABLES control.)

b. Align the trace with the center graticule on the CRT by the CH1 V POSITION control. (Do not rotate this control hereafter).

c. Set the STORAGE switch to ON.

d. Adjust RV5202 and RV5252 so that the trace is aligned with the center graticule on the CRT and the width of the trace is less than 0.15 divisions.

⑤⑤ -2-1 AD1 NORM OFFSET (VC-6025A CH1 A/D OFFSET)

RV5202 (PEF-967 B side)

- a. Set: Same as ⑤⑤ -1.
- b. Align the trace with the center graticule on the CRT by the CH1 V POSITION control. (Do not rotate this control hereafter.)
- c. Set the STORAGE switch to ON and adjust RV5202 so that the trace is aligned with the center graticule on the CRT.

⑤⑤ -2-2 AD2 OFFSET (VC-6025A CH2 A/D OFFSET)

RV5252 (PEF-967 B side)

- a. Set:
 - V MODE: DUAL
 - SOURCE OR X: CH2
 - CH2 VOLTS/DIV: 10mV/DIV
 - CH2 INPUT COUPLING: GND (The GND switch is pushed in.)
 - Others: Same as ⑤⑤ -1.
- b. Align the trace with the center graticule on the CRT by the CH2 V POSITION control. (Do not rotate this control hereafter.)
- c. Set the STORAGE switch to ON and adjust RV5252 so that the trace is aligned with the center graticule on the CRT.

⑤⑥ CH1 STR GAIN RV9121 (PEF-968)

- a. Set:
 - STORAGE: OFF
 - V MODE: DUAL
 - CH1 VOLTS/DIV: 10mV/DIV
 - CH1 INPUT COUPLING: DC (The AC/DC switch is pushed in.)
 - A TIME: 0.5ms/DIV
 - SMOOTH: OFF (Display "SMOOTH" by the MENU switch and "SMOOTH OFF" by the VARIABLES control.)
 - CH1 input: Calibration square wave (1kHz, 50mV)
- b. Verify that the amplitude is 5 divisions.
- c. Set the STORAGE switch to ON and adjust RV9121 so that the amplitude is 5 divisions.

⑤7 CH2 STR GAIN (VC-6045A only) RV9221 (PEF-968)

a. Set:

STORAGE: OFF

V MODE: DUAL

CH2 VOLTS/DIV: 10mV/DIV

CH2 INPUT COUPLING: DC (The AC/DC switch is pushed in.)

SMOOTH: OFF

CH2 input: Calibration square wave (1kHz, 50mV)

b. Verify that the amplitude is 5 divisions.

c. Set the STORAGE switch to ON and adjust RV9221 so that the amplitude is 5 divisions.

⑤8 CH1 STR OFFSET RV9130 (PEF-968)

a. Set:

STORAGE: OFF

V MODE: DUAL

CH1 INPUT COUPLING: GND (The GND switch is pushed in.)

A TIME: 0.5ms/DIV

SMOOTH: OFF (Display "SMOOTH" by the MENU switch and "SMOOTH OFF" by the VARIABLES control.)

b. Align the trace with the center graticule on the CRT by the CH1 V POSITION control.

c. Set the STORAGE to ON and adjust RV9130 so that the trace is aligned with the center graticule on the CRT.

⑤9 CH2 STR OFFSET (VC-6045 only) RV9230 (PEF-968)

a. Set:

CH2 INPUT COUPLING: GND (The GND switch is pushed in.)

Others: Same as ⑤8 .

b. Align the trace with the center graticule on the CRT by the CH2 V POSITION control.

c. Set the STORAGE switch to ON and adjust RV9230 so that the trace is aligned with center graticule on the CRT.

⑥0 AD1 EQ OFFSET (equivalent sampling OFFSET)

RV5203 (PEF-967 B side)

a. Set:

STORAGE: OFF

V MODE: CH1

CH1 INPUT COUPLING: GND (The GND switch is pushed in.)

A TIME: 2 μ s/DIV

SMOOTH: OFF (Display "SMOOTH" by the MENU switch and
"SMOOTH OFF" by the VARIABLES control.)

b. Align the trace with the center graticule on the CRT by the CH1 V POSITION control.

c. Set the STORAGE switch to ON and adjust RV5203 so that the trace is aligned with the center graticule on the CRT.

⑥1 EQS CENT (equivalent sampling start point)

RV5301 (PEF-967 B side)

a. Set:

STORAGE: ON

A TIME: 50ns/DIV

V MODE: CH1

CH1 INPUT COUPLING: GND (The GND switch is pushed in.)

TRIGGER MODE: AUTO

b. Check the voltage waveform of R5313 at the IC5302 side by the oscilloscope and adjust RV5301 so that the sweep start voltage is 0.2V.

⑥2 Equivalent sampling gain (not silk-screened)

RV5302 (PEF-967 B side)

a. Set:

CH1 INPUT COUPLING: DC (The AC/DC switch is pushed in.)

Others: Same as ⑥1 .

b. Connect the 50ns marker to CH1 INPUT and trigger the signal by adjusting the TRIGGER LEVEL. (The markers become stationary.)

c. Adjust RV5302 so that the distance between the first and last markers is 9 divisions.

⑥3 Check of the overshoot and the frequency characteristics in the equivalent mode (no controls provided)

(1) Overshoot

a. Set:

STORAGE: ON

V MODE: CH1

CH1 VOLTS/DIV: 10mV/DIV

CH1 INPUT COUPLING: DC (The AC/DC switch is pushed in.)

A TIME: 0.1 μ s/DIV

X10 MAG: ON (10ns/DIV)

SOURCE OR X: CH1 (The trigger source is CH1.)

TRIGGER SLOPE: ⊖

INTERPOLATION: OFF (Display "INTRPL" by the MENU switch and "INTRPL OFF" by the VARIABLES control.

b. Connect the 1MHz square wave ($Tr \leq 1ns$) from the Tektronix PG506 or equivalent to CH1 INPUT.

c. Adjust the TRIGGER LEVEL control so that the square wave is displayed on the CRT, and adjust the PULSE AMPLITUDE control on the PG506 so that the amplitude is 5 divisions on the CRT.

d. Verify that the overshoot is within $\pm 4\%$ (± 0.2 divisions).

(2) Frequency characteristics

a. Set:

X10 MAG: OFF

A TIME: 5 μ s/DIV

Others: Same as ⑥3 (1).

b. Connect the 50kHz sine wave from the Tektronix SG503 or equivalent to CH1 INPUT.

c. Adjust the OUTPUT AMPLITUDE control on the SG503 so that the amplitude is 6 divisions.

d. Change the A TIME control to 50ns/DIV.

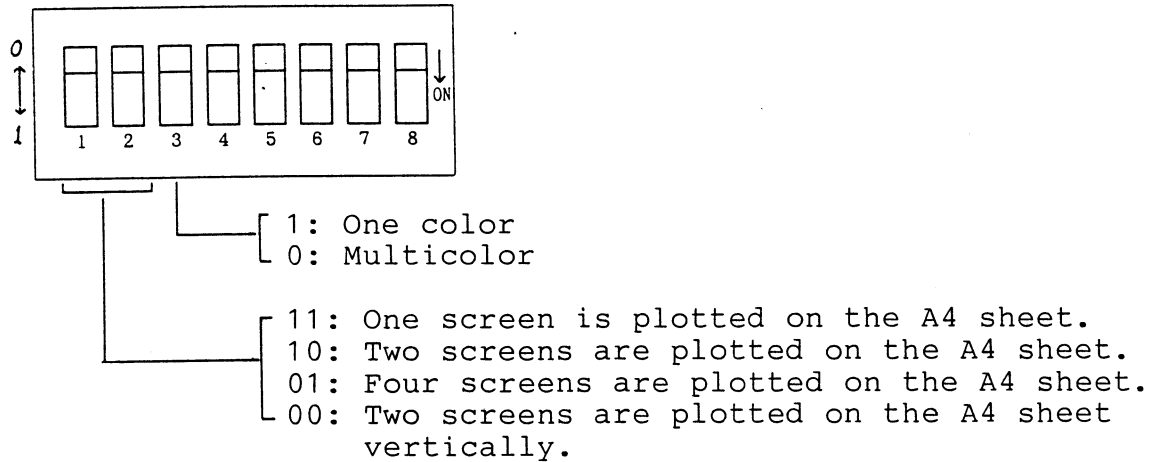
e. Change the frequency of the CH1 input as follows.

VC-6025A: 50MHz

VC-6045A: 100MHz

⑥4 PLOT output

- a. Connect the plotter (681-XA or equivalent) and the instrument with the RS-232C cable (No. 4287).
- b. Switch the DIP switch on the rear panel of the oscilloscope and verify the plot output (pen color, plot size).



⑥5 RS-232C interface

- a. Connect the personal computer (PC-9801 or equivalent) and the instrument with the RS-232C cable (No. 4290).
- b. Set:
 - V MODE: CH1
 - CH1 VOLTS/DIV: 10mV/DIV
 - A TIME: 1ms/DIV
- c. Perform the R0 command and verify that the panel setting information read to the personal computer is valid.

6. CIRCUIT DESCRIPTION

6.1 General

The relationships between the VC-6025/6045 and the VC-6025A/6045A are shown in Fig. 6-1 Block diagram.

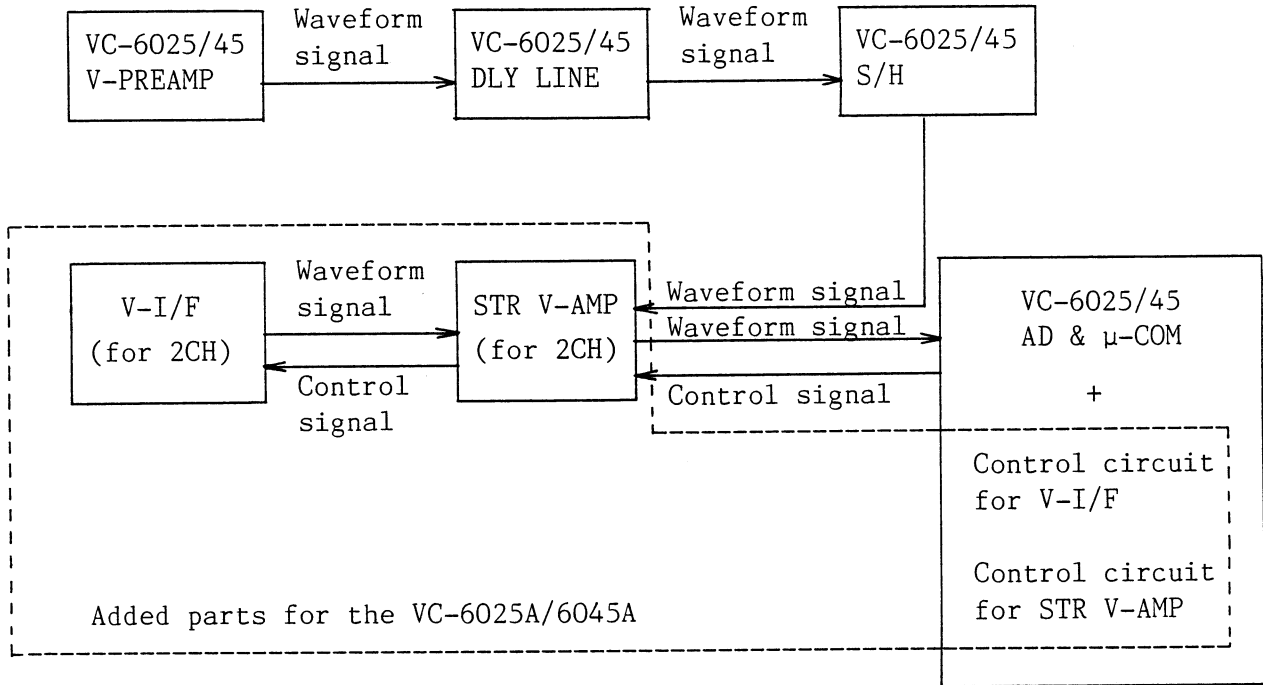


Fig. 6-1 Block diagram of VC-6025A/6045A

Fig. 6-2 shows the relationships among signal flows, switches, control signals, samplings, etc., and Fig. 6-3 shows the schematic diagram of the parts added for the VC-6025A/6045A in Fig. 6-1.

Signal flows and sampling conditions in various cases are shown in item 6.2 and 6.3. Each signal is specified as shown below.

- CH1 signal
- - - - -→ CH2 signal
- - - - -→ (CH1 + CH2) signal

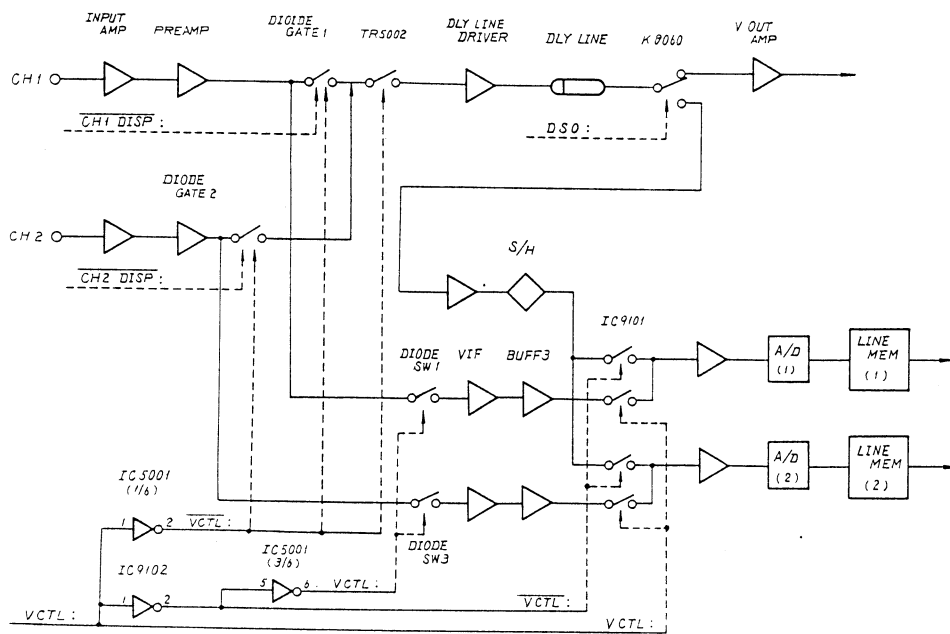


Fig. 6-2

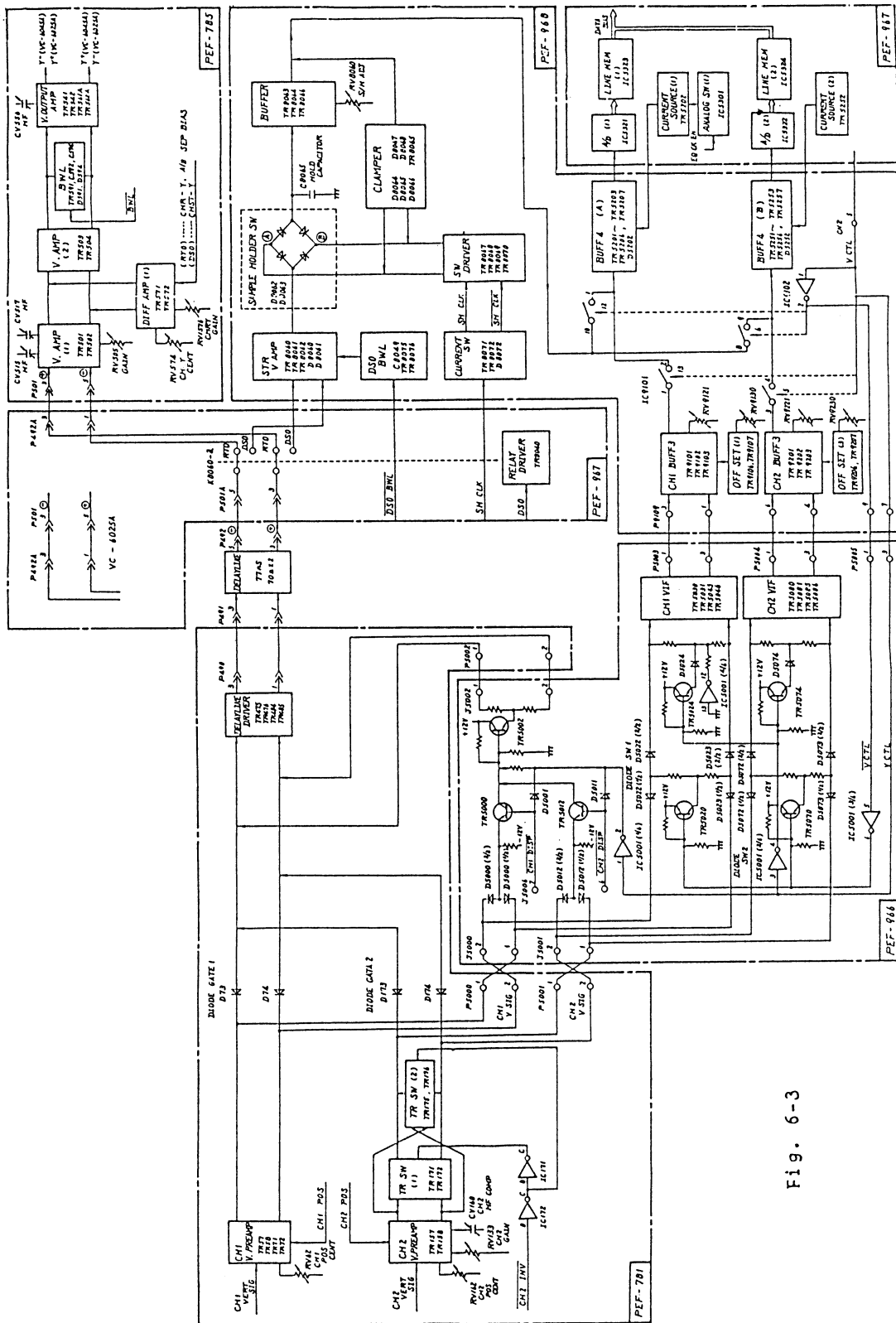


Fig. 6-3

6.2 Signal flows in the VC-6025A

- (1) STORAGE: OFF (RTO mode)
 V MODE: All
 TIME: All (50ns to 0.5s/DIV)

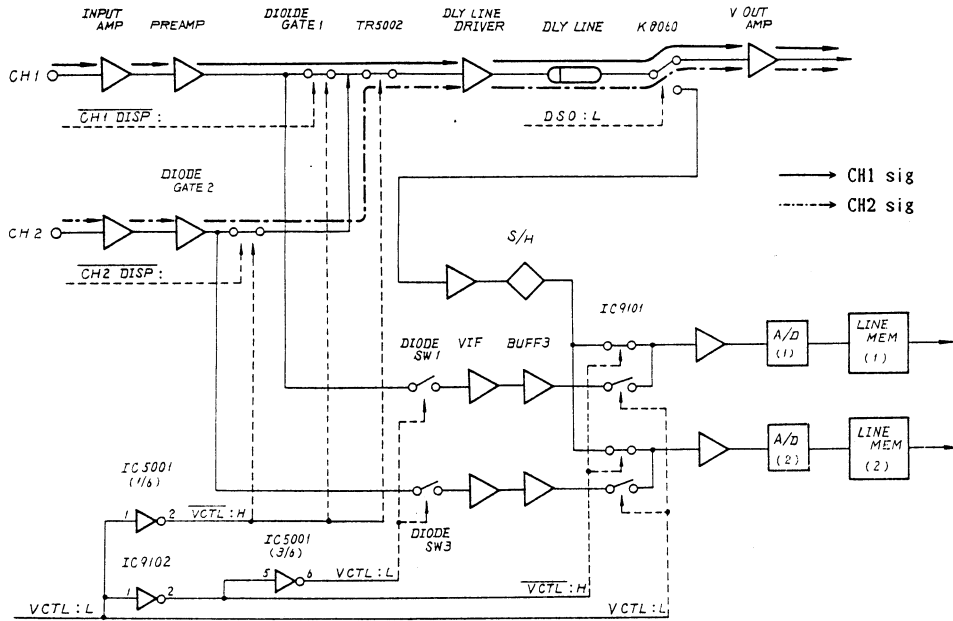


Fig. 6-4

- (2) STORAGE: ON (DSO mode)
 V MODE: CH1 or CH2
 TIME: All (50ns to 50s/DIV)

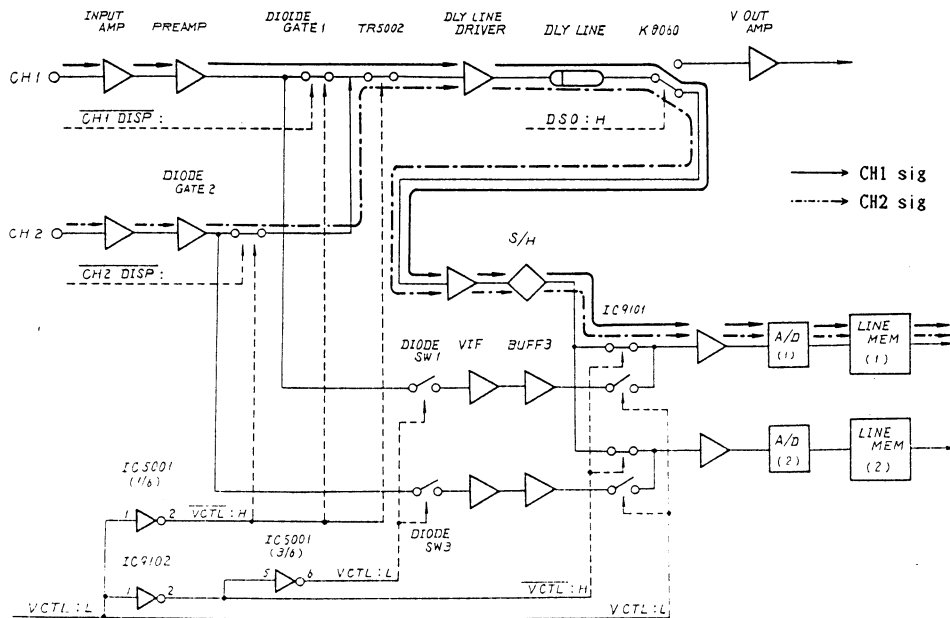


Fig. 6-5

(3) STORAGE: ON (DSO mode)
 V MODE: DUAL
 TIME: 5 μ s to 50s/DIV (realtime sampling)

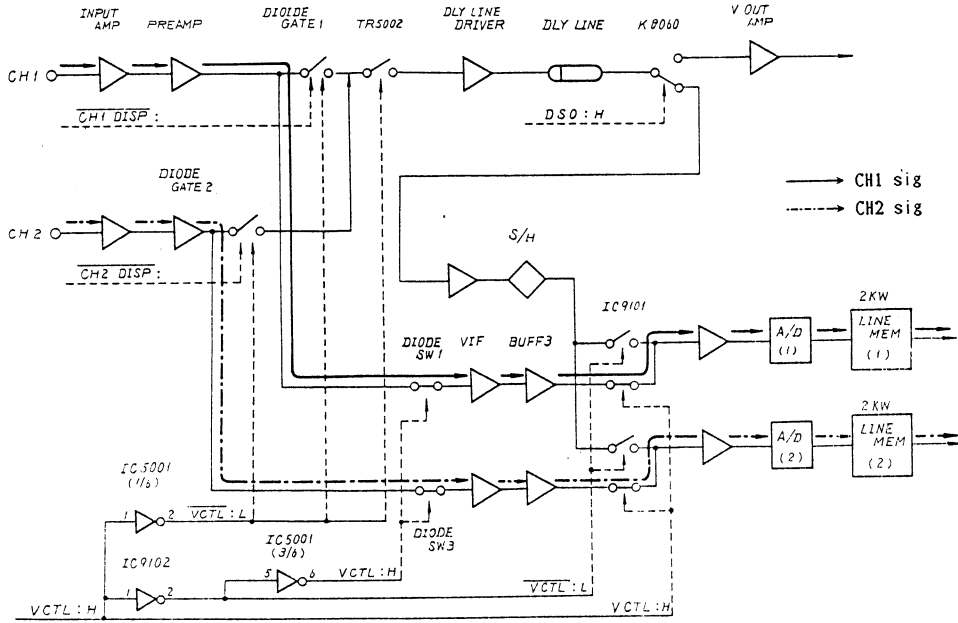


Fig. 6-6

(4) STORAGE: ON (DSO mode)
 V MODE: DUAL
 TIME: 50ns to 2 μ s/DIV (equivalent sampling) CH1 and CH2 are sampled alternately.

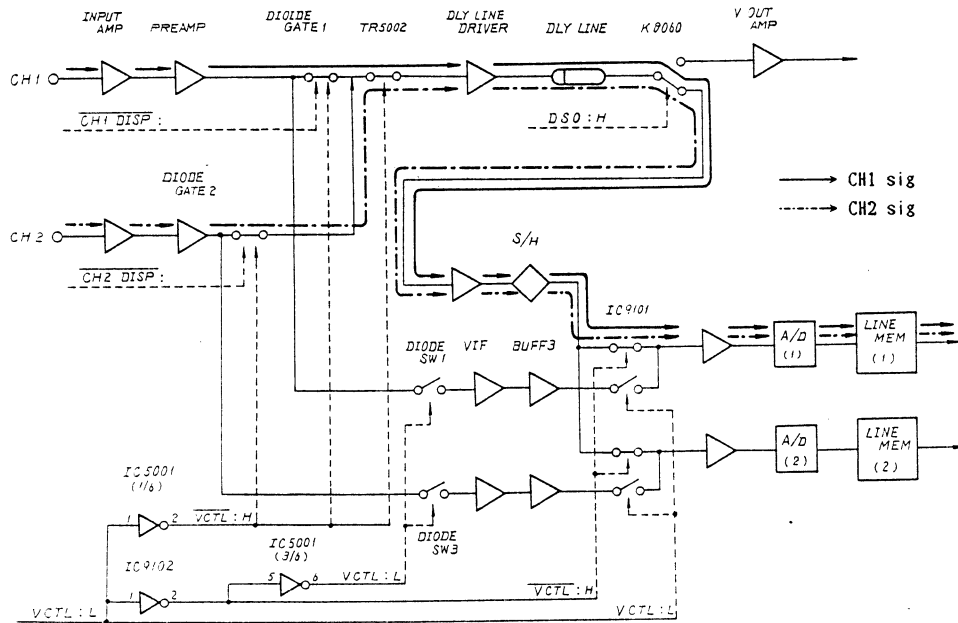


Fig. 6-7

- (5) STORAGE: ON (DSO mode)
 V MODE: ADD
 TIME: All (50ns to 50s/DIV)

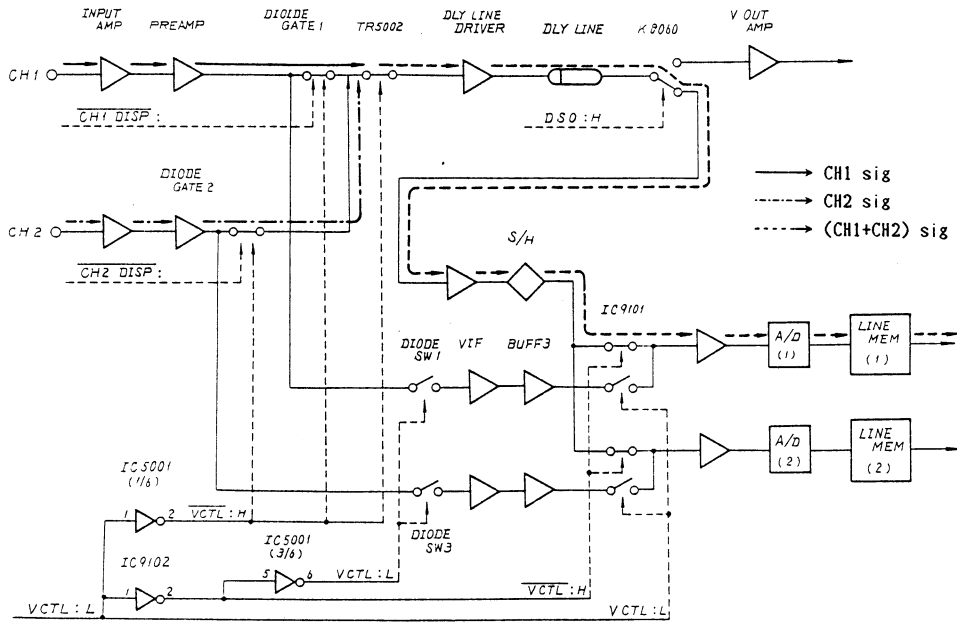


Fig. 6-8

6.3 Signal flows in the VC-6045A

- (1) STORAGE: OFF (RTO mode)
 V MODE: All
 TIME: All (50ns to 0.5s/DIV)

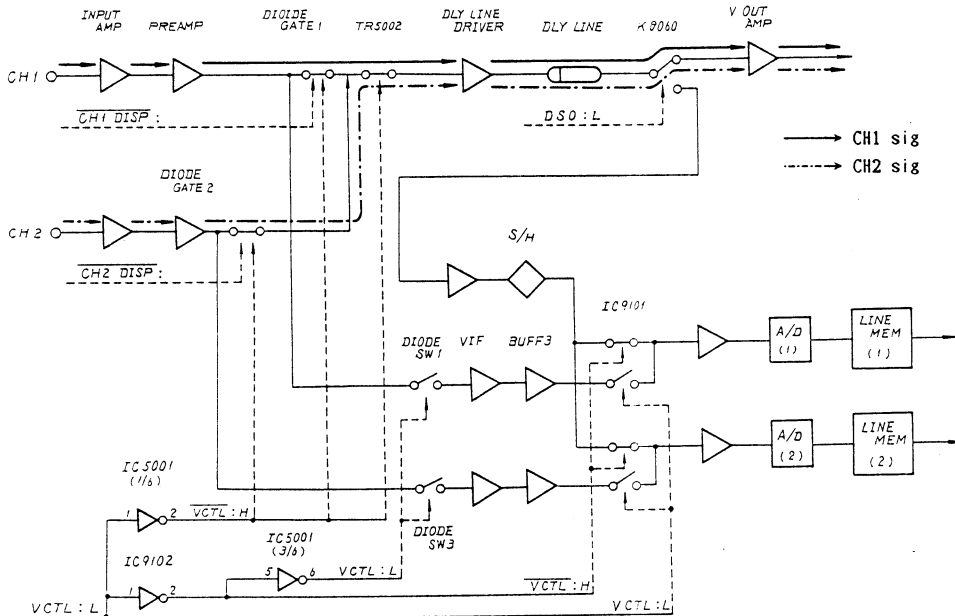


Fig. 6-9

(2) STORAGE: ON (DSO mode)
 V MODE: CH1
 TIME: 2.5 μ s to 50s/DIV (realtime sampling)

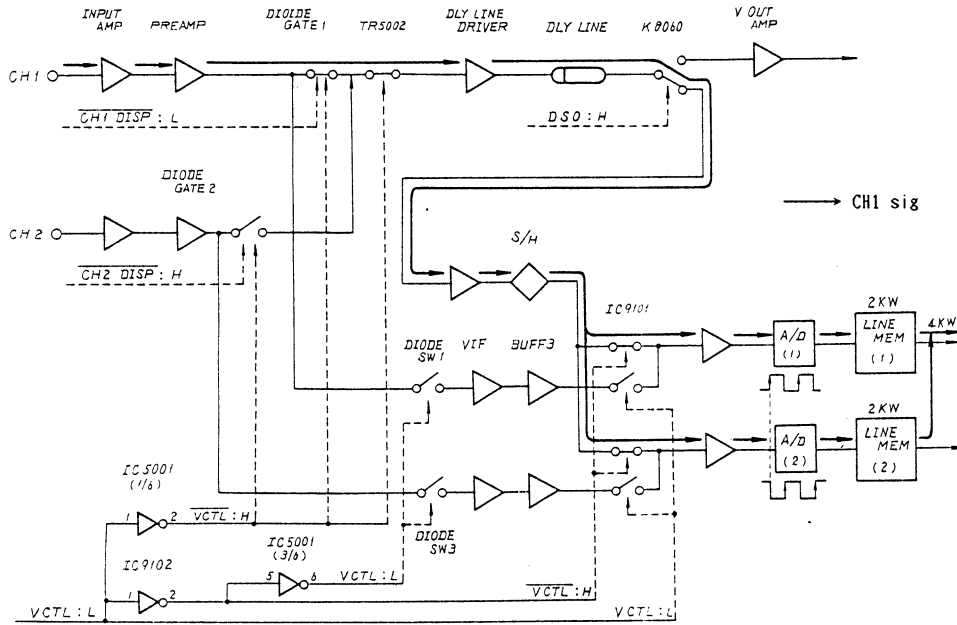


Fig. 6-10

(3) STORAGE: ON (DSO mode)
 V MODE: CH2
 TIME: 2.5 μ s to 50s/DIV (realtime sampling)

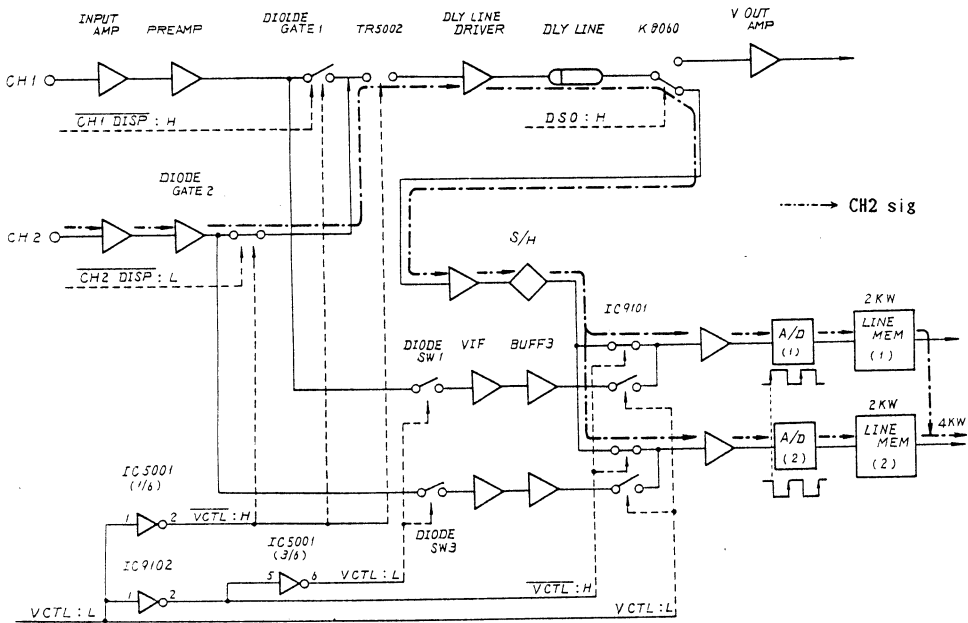


Fig. 6-11

- (4) STORAGE: ON (DSO mode)
 V MODE: CH1 or CH2
 TIME: 50ns to 2μs/DIV (equivalent sampling)

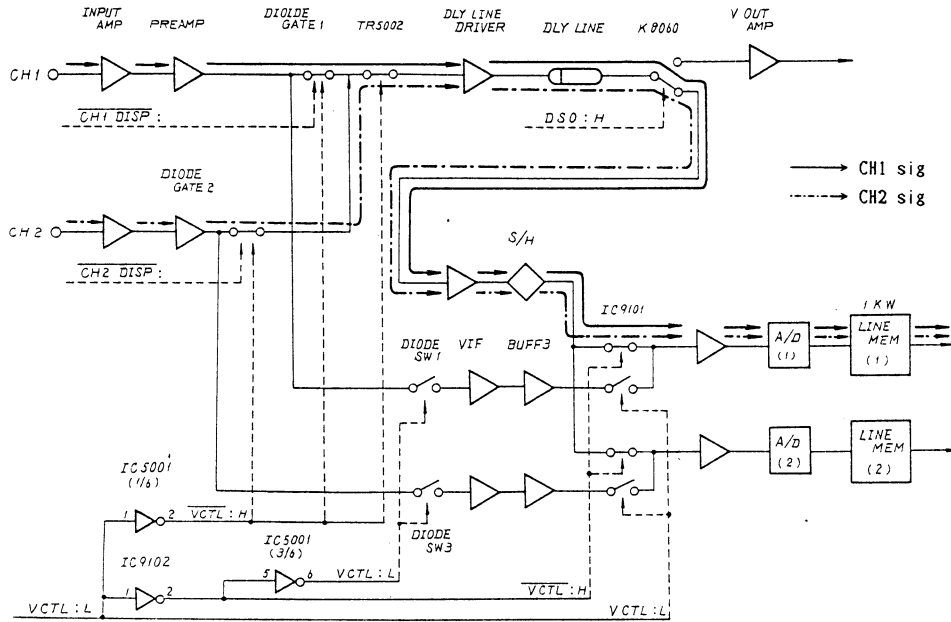


Fig. 6-12

- (5) STORAGE: ON (DSO mode)
 V MODE: DUAL
 TIME: 5μs to 50s/DIV (realtime sampling)

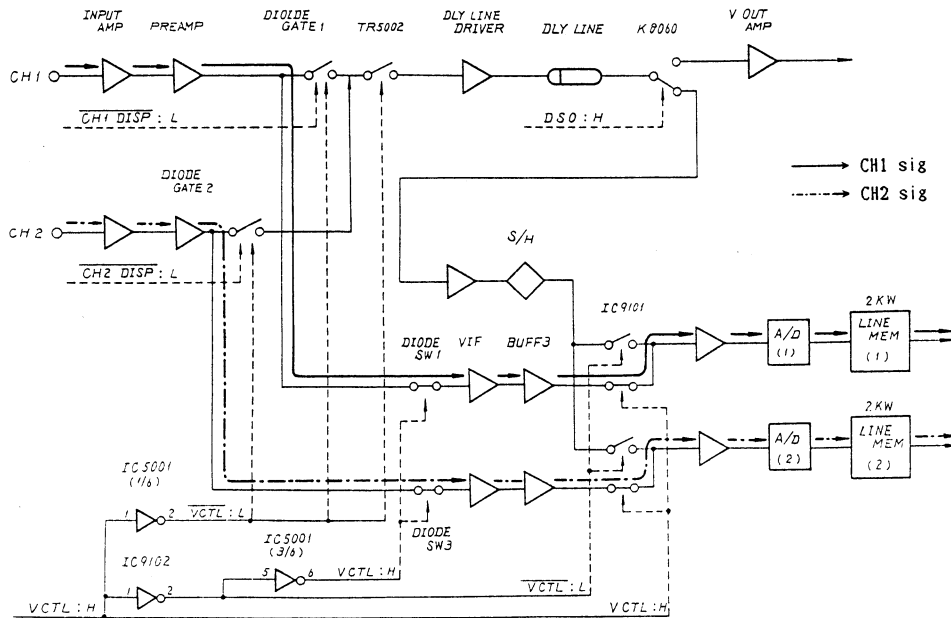
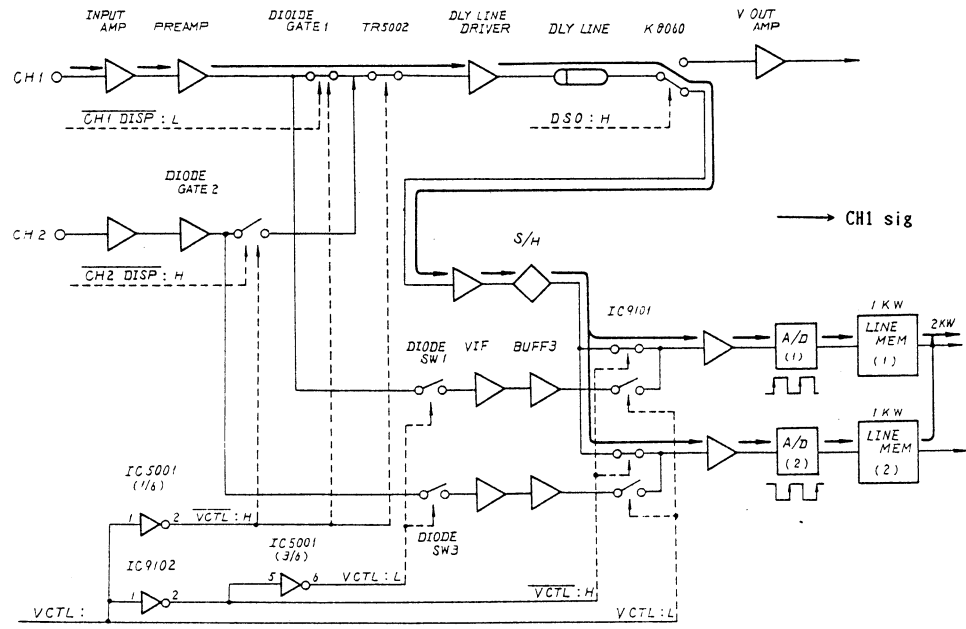


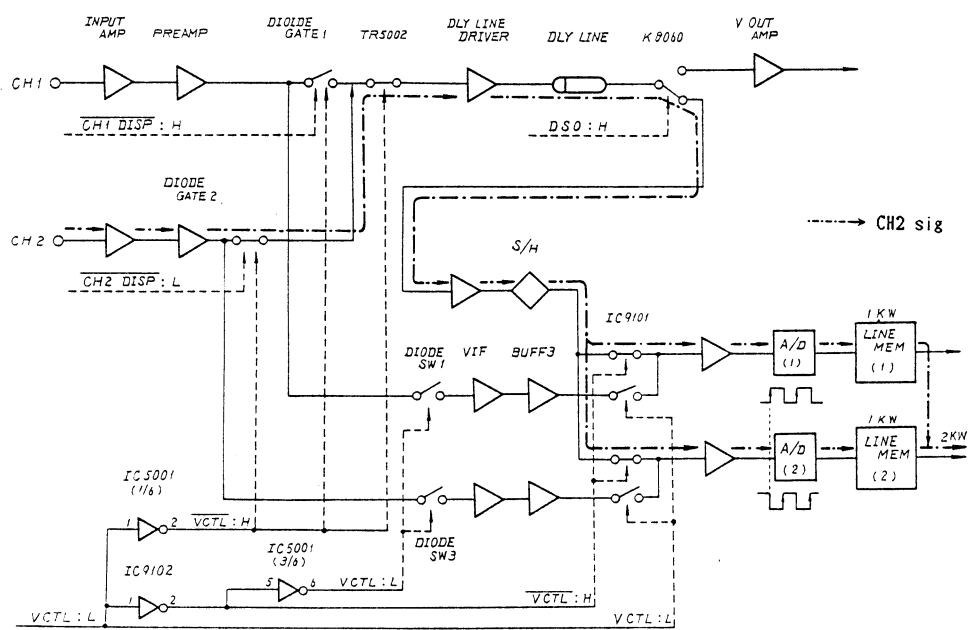
Fig. 6-13

(6) STORAGE: ON (DSO mode)
 V MODE: DUAL
 TIME: 2.5 μ s/DIV (40MSPS)

CH1 and CH2 are sampled alternately as shown in (A) and (B), respectively.



(A)



(B)

Fig. 6-14

(7) STORAGE: ON (DSO mode)
 V MODE: DUAL
 TIME: 50ns to 2 μ s/DIV
 (equivalent sampling)

CH1 and CH2 are sampled alternately.

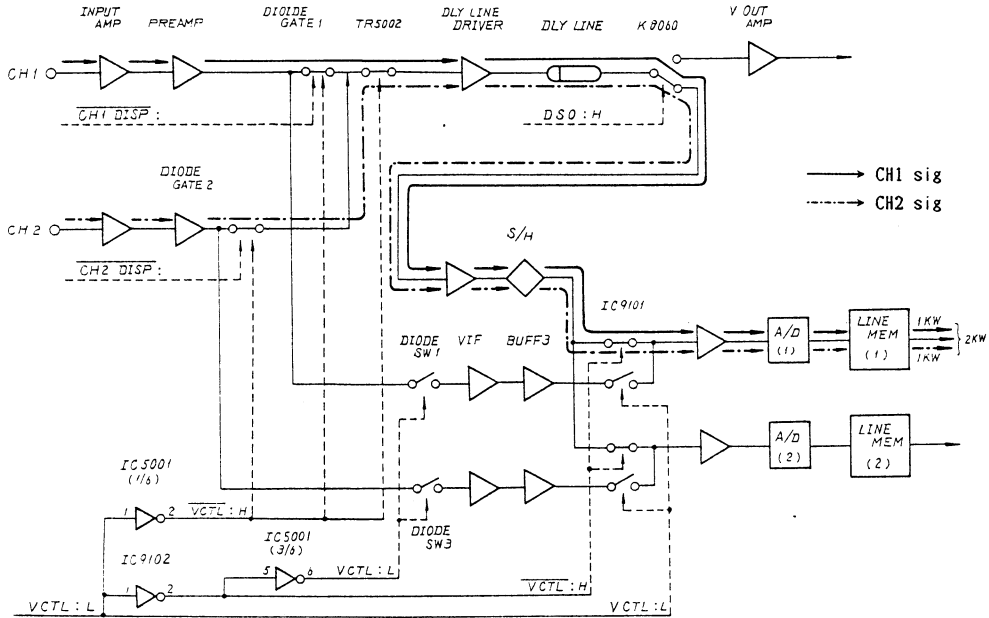


Fig. 6-15

(8) STORAGE: ON (DSO mode)
 V MODE: ADD
 TIME: 2.5 μ s to 50s/DIV

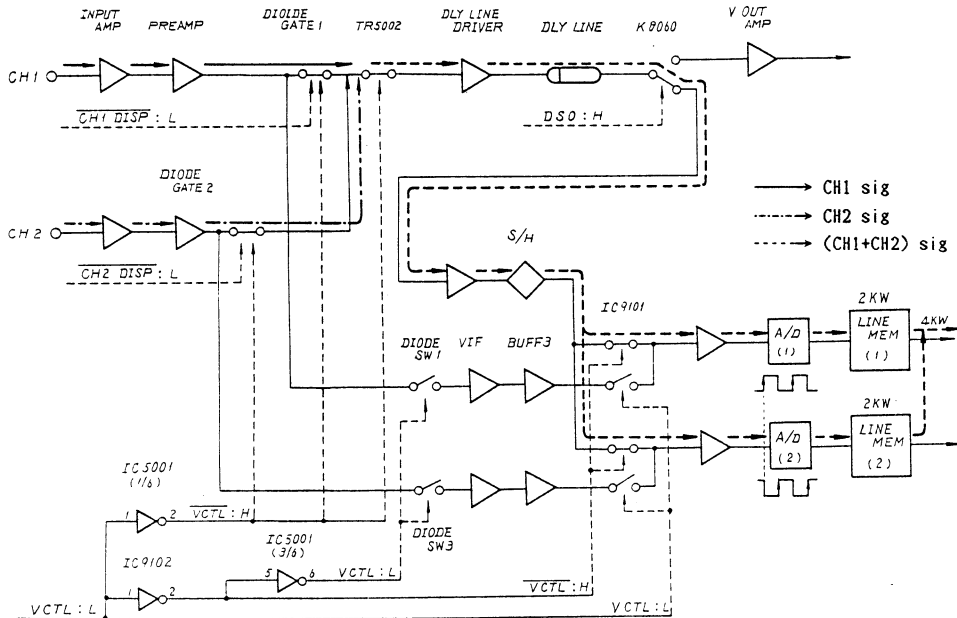
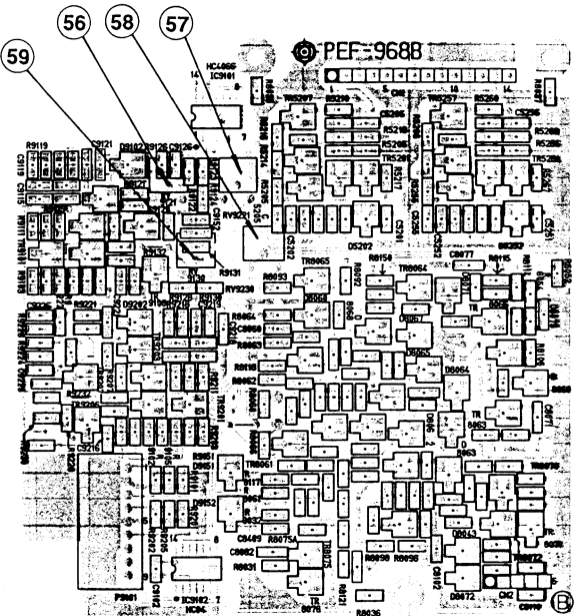
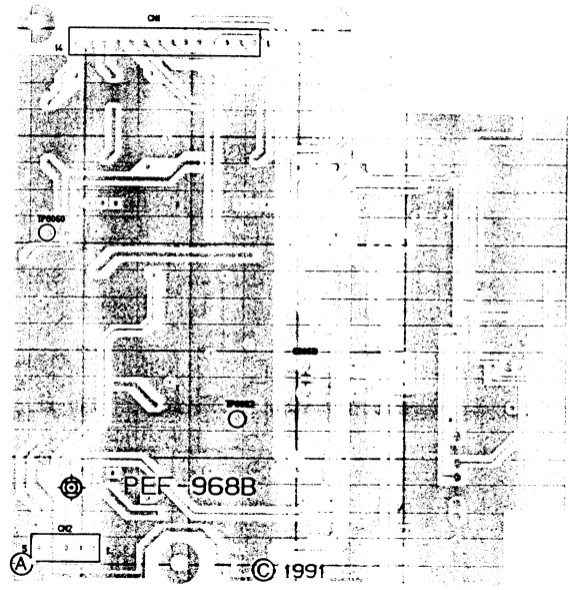


Fig. 6-16



PEF-968 (Soldering side)



PEF-968 (Part side)

PEF-966A

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(B)

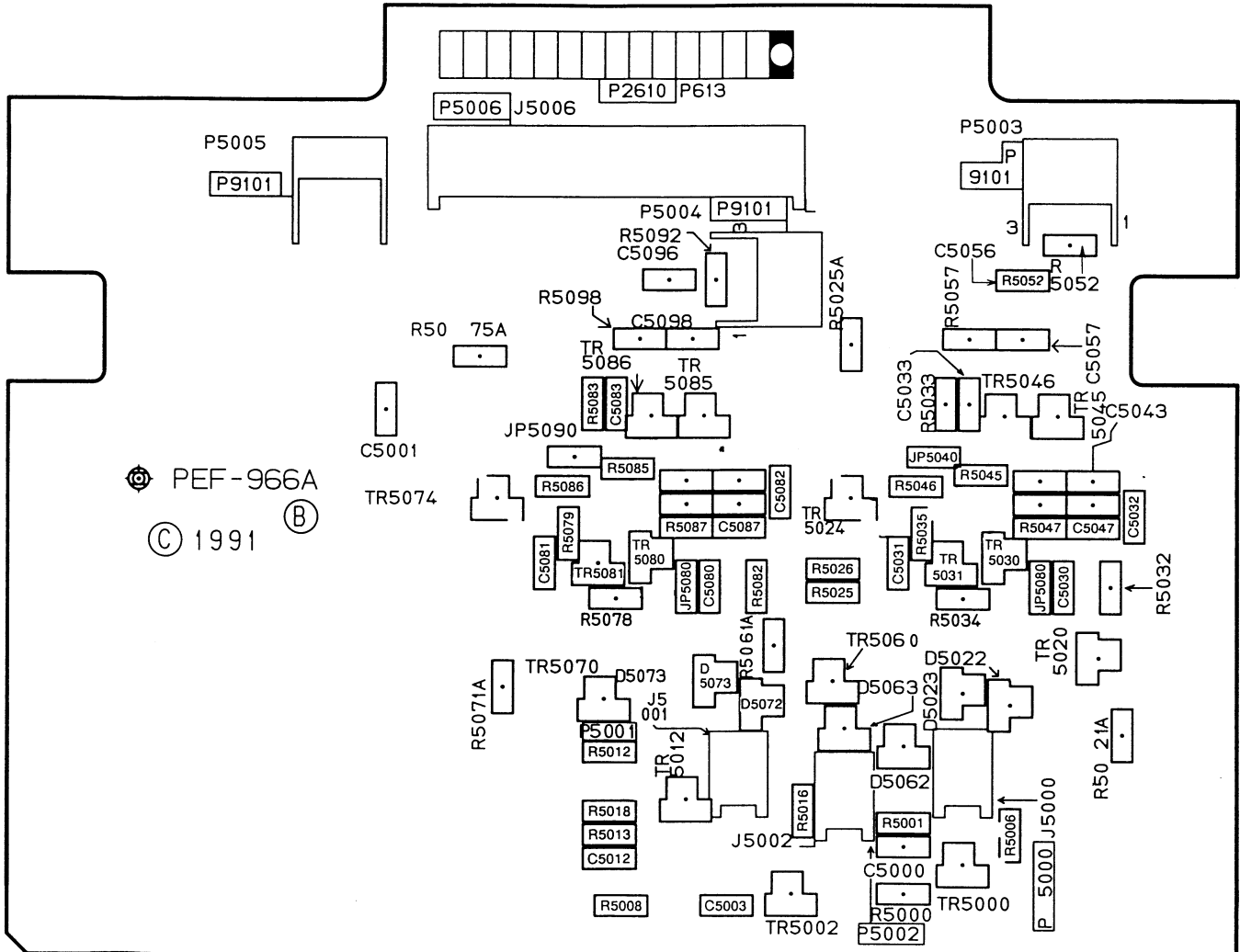


Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Lists various components like C.CERAMIC, CV.5034, D.5000, IC.5001, J.5000, JP.5030, L.5070, P.613.

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Lists various components like R.5080, TR.5000, TR.5002, TR.5012, TR.5020, TR.5024, TR.5030, TR.5031, TR.5045, TR.5046, TR.5070, TR.5074, TR.5080, TR.5081, TR.5085, TR.5086.

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Lists various components like R.5000, R.5001, R.5002, R.5002A, R.5003, R.5004, R.5005, R.5006, R.5007, R.5008, R.5012, R.5013, R.5016, R.5018, R.5020, R.5021, R.5021A, R.5022, R.5023, R.5024, R.5025, R.5025A, R.5028, R.5029, R.5030, R.5031, R.5032, R.5033, R.5034, R.5035, R.5044, R.5045, R.5046, R.5047, R.5049, R.5050, R.5051, R.5052, R.5053, R.5054, R.5055, R.5061A, R.5070, R.5071, R.5071A, R.5072, R.5073, R.5074, R.5075, R.5075A, R.5076, R.5077, R.5078, R.5079.

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Lists various components like IY.T0003, IY.T0041, IY.T0149, C.5-12, C.5-16, C.5-24, C.5004, C.5204, C.5210, C.5253, C.5344, C.5260, C.5330, C.5343, C.5344, C.5345, C.5346, C.5347, C.5348, C.5349, C.5350, C.5351, C.5400, C.5401, C.5402, C.5403, C.5404, C.5405, C.5406, C.5407, C.5408, C.5409, C.5501, C.5502, C.5503, C.5504, C.5505, C.5506, C.5507, C.5508, C.5509, C.5510, C.5511, C.5512, C.5513, C.5514, C.5515, C.5516, C.5517, C.5518, C.5518A, C.5520, C.5521, C.5521A.

A: 6025A B: 6045A

A: 6025A B: 6045A

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Contains parts like C 5522, C 5523, C 5524, etc.

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Contains parts like R 5212, R 5213, R 5216, etc.

A: 6025A B: 6045A

A: 6025A B: 6045A

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Contains parts like IC 5501, IC 5502, IC 5503, etc.

Table with columns: SYMBOL, PART CODE, DESCRIPTION, QTY, A, B. Contains parts like R 5544, R 5515, R 5516, etc.

SYMBOL	..PART CODE.	..DESCRIPTION	QTY	A	B
R 6008	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 6009	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 8116	RME1446	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 8120	RME1454	R.METAL 1/10W 22 KOHM +-5%	1	1	
R 8130	RME1438	R.METAL 1/10W 1 KOHM +-5%	1	1	
R 8140A	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 8140B	RME1422	R.METAL 1/10W 47 OHM +-5%	1	1	
R 8141A	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 8141B	RME1422	R.METAL 1/10W 47 OHM +-5%	1	1	
RM 5301	RZA0332	R.BLOCK EKK-F20Z2075	1	1	
RM 5501	RZA0332	R.BLOCK EKK-F20Z2075	1	1	
RM 5502	RZA0332	R.BLOCK EKK-F20Z2075	1	1	
RV 5201	RNE0070	VR.METAL EVN-39C00YB53 (5K)	1	1	
RV 5202	RNE0058	VR.METAL EVN-39C00YB13 (1K)	1	1	
RV 5203	RNE0058	VR.METAL EVN-39C00YB13 (1K)	1	1	
RV 5251	RNE0070	VR.METAL EVN-39C00YB53 (5K)	1	1	
RV 5252	RNE0058	VR.METAL EVN-39C00YB13 (1K)	1	1	
RV 5301	RNE0054	VR.METAL EVN-39C00YB13 (1K)	1	1	
RV 5302	RNE0058	VR.METAL EVN-39C00YB13 (100K)	1	1	
RV 5501	RNE0047	VR.METAL EVN-39C00YB13 (1K)	1	1	
RV 5502	RNE0047	VR.METAL EVN-39C00YB14 (10K)	1	1	
RV 5503	RNE0047	VR.METAL EVN-39C00YB54 (50K)	1	1	
RV 5504	RNE0042	VR.METAL EVN-39C00YB14 (10K)	1	1	
RV 8060	RNE0047	VR.METAL EVN-39C00YB54 (50K)	1	1	
TR 5202	HT10012	TRANSISTOR IMX3	1	1	
TR 5252	HT10012	TRANSISTOR IMX3	1	1	
TR 5315	HTC0848	TRANSISTOR 2SC2759-U23	1	1	
TR 8040	WDO161	TRANSISTOR DTC124EK	1	1	
X 5301	AAE0018	XTAL EXO-3 20 MHZ	1	1	

SYMBOL	..PART CODE.	..DESCRIPTION	QTY	A	B
C 9215	CCG0259	C.CERAMIC 50 V 120 PF+-5%	1	1	
C 9216	CCG0259	C.CERAMIC 50 V 15 PF+-5%	1	1	
C 9217	CCG0253	C.CERAMIC 50 V 8 PF+-0.5PF	1	1	
C 9218	CCG0275	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9219	CCG0236	C.CERAMIC 50 V 1000 PF+-10X	1	1	
C 9220	CCG0243	C.CERAMIC 50 V 22 PF+-5%	1	1	
C 9221	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9225	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9226	CCG0270	C.CERAMIC 50 V 47 PF+-5%	1	1	
CN 1	J800002	PIN 0Y-003-14P	1	1	
CN 2	J800008	PIN 0Y-003-5P	1	1	
D 5202	HDH0236	DIODE.ZEN HZM7C (24)	1	1	
D 5252	HDH0236	DIODE.ZEN HZM7C (24)	1	1	
D 8043	HDH0224	DIODE HSM88S (C1)	1	1	
D 8040	HDH0236	DIODE.ZEN HZM7C (24)	1	1	
D 8061	HDH0224	DIODE HSM88S (C1)	1	1	
D 8062	HDH0224	DIODE HSM88S (C1)	1	1	
D 8063	HDH0224	DIODE HSM88S (C1)	1	1	
D 8064	HDH0224	DIODE HSM88S (C1)	1	1	
D 8065	HDS0496	DIODE 1S5123	1	1	
D 8067	HDS0538	DIODE 1S5153	1	1	
D 8069	HDH0230	DIODE.ZEN HZM5B (17)	1	1	
D 8070	HDS0538	DIODE 1S5153	1	1	
D 8071	HDH0235	DIODE.ZEN HZM4B (14)	1	1	
D 8072	HDH0232	DIODE.ZEN HZM6A (19)	1	1	
D 9101	HDH0236	DIODE.ZEN HZM7C (24)	1	1	
D 9102	HDH0224	DIODE HSM88S (C1)	1	1	
D 9151	HDH0230	DIODE.ZEN HZM5B (17)	1	1	
D 9152	HDH0230	DIODE.ZEN HZM5B (17)	1	1	
D 9201	HDH0236	DIODE.ZEN HZM7C (24)	1	1	
D 9202	HDH0224	DIODE HSM88S (C1)	1	1	
IC 9101	IDT0280	IC.LOGIC TC74HC0466F	1	1	
IC 9102	IDH1300	IC.LOGIC HD74HC04FP	1	1	
P 9101	JBS0082	CONNECTOR S9B-XH-A	1	1	
R 5201	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	
R 5202	RME1445	R.METAL 1/10W 3.9 KOHM +-5%	1	1	
R 5203	RME1443	R.METAL 1/10W 2.7 KOHM +-5%	1	1	
R 5204	RME1418	R.METAL 1/10W 22 OHM +-5%	1	1	
R 5205	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5206	RCE0771	R.CARBON 1/4W 1.5 KOHM +-5%	1	1	
R 5207	RME1438	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 5210	RME1446	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 5211	RME1446	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 5214	RME1429	R.METAL 1/10W 8.2 KOHM +-5%	1	1	
R 5215	RME1443	R.METAL 1/10W 2.7 KOHM +-5%	1	1	
R 5216	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 5217	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5218	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5251	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	

STR V-AMP & S/H (PEF-968)

SYMBOL	..PART CODE.	..DESCRIPTION	QTY	A	B
C 5201	CCG0286	C.CERAMIC 50 V 1000 PF+-5%	1	1	
C 5202	CCG0257	C.CERAMIC 50 V 12 PF+-5%	1	1	
C 5205	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 5206	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 5207	CCG0261	C.CERAMIC 50 V 1000 PF+-5%	1	1	
C 5251	CCG0286	C.CERAMIC 50 V 1000 PF+-5%	1	1	
C 5252	CCG0257	C.CERAMIC 50 V 12 PF+-5%	1	1	
C 5255	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 5256	CCG0261	C.CERAMIC 50 V 27 PF+-5%	1	1	
C 5257	CCG0261	C.CERAMIC 50 V 18 PF+-5%	1	1	
C 8049	CCG0279	C.CERAMIC 50 V 270 PF+-5%	1	1	
C 8049	CCG0276	C.CERAMIC 50 V 150 PF+-5%	1	1	
C 8060	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 8061	CCG0265	C.CERAMIC 50 V 10 PF+-5%	1	1	
C 8061	CCG0259	C.CERAMIC 50 V 15 PF+-5%	1	1	
C 8062	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 8063	CCC1009	C.CERAMIC 25 V 27 PF+-5%	1	1	
C 8063	CCC1002	C.CERAMIC 50 V 10 PF+-5%	1	1	
C 8064	CCG0254	C.CERAMIC 50 V 9 PF+-0.5PF	1	1	
C 8065	CCG0259	C.CERAMIC 50 V 15 PF+-5%	1	1	
C 8066	CCG0253	C.CERAMIC 50 V 10 PF+-5%	1	1	
C 8067	CCG0292	C.CERAMIC 50 V10000 PF+-0.5PF	1	1	
C 8068	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 8070	CCG0279	C.CERAMIC 50 V 270 PF+-5%	1	1	
C 8071	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8072	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8073	CCG0255	C.CERAMIC 50 V 10 PF+-0.5PF	1	1	
C 8075	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8076	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 8077	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8078	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8079	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8080	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8081	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8082	CCG0292	C.CERAMIC 50 V10000 PF+-10%	1	1	
C 8083	CCG0257	C.CERAMIC 50 V 12 PF+-5%	1	1	
C 8083	CCG0253	C.CERAMIC 50 V 10 PF+-5%	1	1	
C 8100	CCG0295	C.CERAMIC 25 V 8 PF+-0.5PF	1	1	
C 8101	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8102	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8103	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 8104	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9102	CCG0292	C.CERAMIC 50 V10000 PF+-10%	1	1	
C 9108	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 9114	CCG0255	C.CERAMIC 50 V 10 PF+-0.5PF	1	1	
C 9115	CCG0255	C.CERAMIC 50 V 120 PF+-5%	1	1	
C 9116	CCG0259	C.CERAMIC 50 V 15 PF+-5%	1	1	
C 9117	CCG0253	C.CERAMIC 50 V 8 PF+-0.5PF	1	1	
C 9118	CCG0270	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9119	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 9120	CCG0263	C.CERAMIC 50 V 22 PF+-5%	1	1	
C 9121	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9125	CCG0295	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9126	CCG0270	C.CERAMIC 25 V 0.1 UF+-80-20X	1	1	
C 9208	CCG0286	C.CERAMIC 50 V 1000 PF+-10%	1	1	
C 9214	CCG0255	C.CERAMIC 50 V 10 PF+-0.5PF	1	1	

SYMBOL	..PART CODE.	..DESCRIPTION	QTY	A	B
R 5252	RME1445	R.METAL 1/10W 3.9 KOHM +-5%	1	1	
R 5253	RME1443	R.METAL 1/10W 2.7 KOHM +-5%	1	1	
R 5254	RME1418	R.METAL 1/10W 22 OHM +-5%	1	1	
R 5255	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5256	RCE0771	R.CARBON 1/4W 1.5 KOHM +-5%	1	1	
R 5257	RME1446	R.METAL 1/10W 1 KOHM +-5%	1	1	
R 5260	RME1446	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 5261	RME1446	R.METAL 1/10W 4.7 KOHM +-5%	1	1	
R 5264	RME1449	R.METAL 1/10W 8.2 KOHM +-5%	1	1	
R 5265	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 5266	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5268	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 5326	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 5327	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 5328	RME1413	R.METAL 1/10W 0 OHM	1	1	
R 8031	RME1438	R.METAL 1/10W 1 KOHM +-5%	1	1	
R 8032	RME1424	R.METAL 1/10W 68 OHM +-5%	1	1	
R 8040	RME1434	R.METAL 1/10W 470 OHM +-5%	1	1	
R 8041	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 8042	RME1424	R.METAL 1/10W 68 OHM +-5%	1	1	
R 8043	RME1424	R.METAL 1/10W 68 OHM +-5%	1	1	
R 8044	RME1424	R.METAL 1/10W 68 OHM +-5%	1	1	
R 8060	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	
R 8061	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	
R 8062	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	
R 8063	RME1424	R.METAL 1/10W 220 OHM +-5%	1	1	
R 8064	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	
R 8065	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 8066	RME1421	R.METAL 1/10W 39 OHM +-5%	1	1	
R 8067	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	
R 8067	RME1469	R.METAL 1/10W 0 OHM +-10X	1	1	
R 8068	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 8069	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 8070	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	
R 8071	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	
R 8072	RME1434	R.METAL 1/10W 470 OHM +-5%	1	1	
R 8073	RME1424	R.METAL 1/10W 270 OHM +-5%	1	1	
R 8074	RME1438	R.METAL 1/10W 1 KOHM +-5%	1	1	
R 8074	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	
R 8075	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	
R 8076	RME1428	R.METAL 1/10W 30 OHM +-5%	1	1	
R 8077	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	
R 8078	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	
R 8078	RME1418	R.METAL 1/10W 22 OHM +-5%	1	1	
R 8079	RME1420	R.METAL 1/10W 33 OHM +-5%	1	1	
R 8080	RME1419	R.METAL 1/10W 27 OHM +-5%	1	1	
R 8080	RME1056	R.METAL 1/4W 47.5 OHM +-1X	1	1	
R 8081	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	
R 8082	RME1435	R.METAL 1/10W 560 OHM +-5%	1	1	
R 8083	RME1432	R.METAL 1/10W 330 OHM +-5%	1	1	
R 8084	RME1432	R.METAL 1/10W 330 OHM +-5%	1	1	
R 8085	RME1435	R.METAL 1/10W 560 OHM +-5%	1	1	
R 8086	RME1450	R.METAL 1/10W 10 KOHM +-5%	1	1	
R 8087	RME1450	R.METAL 1/10W 10 KOHM +-5%	1	1	

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A: 6025A B: 6045A

SYMBOL	PART CODE	DESCRIPTION	A	B	QTY
R 8088	RME1420	R.METAL 1/10W 33 OHM +-5%	1	1	1
R 8089	RME1447	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 8090	RME1445	R.METAL 1/10W 9 KOHM +-5%	1	1	1
R 8091	RME1413	R.METAL 1/10W 0 OHM +-5%	1	1	1
R 8092	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 8093	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8094	RME1434	R.METAL 1/10W 470 OHM +-5%	1	1	1
R 8095	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8096	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8098	RME1418	R.METAL 1/10W 22 OHM +-5%	1	1	1
R 8099	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 8100	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8101	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 8102	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 8103	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8105	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8106	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8107	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8108	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8109	RME1426	R.METAL 1/10W 100 OHM +-5%	1	1	1
R 8110	RME1434	R.METAL 1/10W 470 OHM +-5%	1	1	1
R 8111	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	1
R 8112	RME1438	R.METAL 1/10W 1 KOHM +-5%	1	1	1
R 8113	RME1438	R.METAL 1/10W 1 KOHM +-5%	1	1	1
R 8114	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 8115	RME1432	R.METAL 1/10W 330 OHM +-5%	1	1	1
R 8117	RME1427	R.METAL 1/10W 5.6 KOHM +-5%	1	1	1
R 8118	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 8119	RME1450	R.METAL 1/10W 10 KOHM +-5%	1	1	1
R 8120	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8121	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 8122	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 8124	RME1413	R.METAL 1/10W 0 OHM +-5%	1	1	1
R 8125	RME1413	R.METAL 1/10W 0 OHM +-5%	1	1	1
R 8150	RME1454	R.METAL 1/10W 22 KOHM +-5%	1	1	1
R 9101	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 9102	RME1431	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9103	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	1
R 9104	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9105	RME1431	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9106	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 9107	RME1431	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9108	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 9109	RME1421	R.METAL 1/10W 220 OHM +-5%	1	1	1
R 9110	RME1469	R.METAL 1/10W 4.7 OHM +-10%	1	1	1
R 9111	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	1
R 9112	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	1
R 9113	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 9114	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 9115	RME1419	R.METAL 1/10W 27 OHM +-5%	1	1	1
R 9116	RME1441	R.METAL 1/10W 1.8 KOHM +-5%	1	1	1
R 9117	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9118	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	1
R 9119	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 9121	RME1421	R.METAL 1/10W 39 OHM +-5%	1	1	1
R 9122	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1

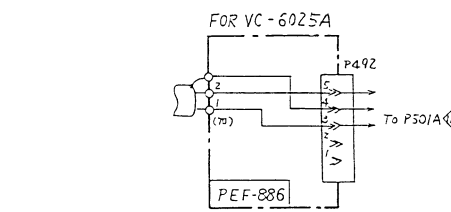
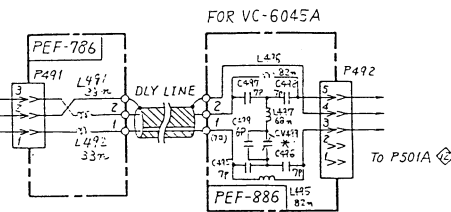
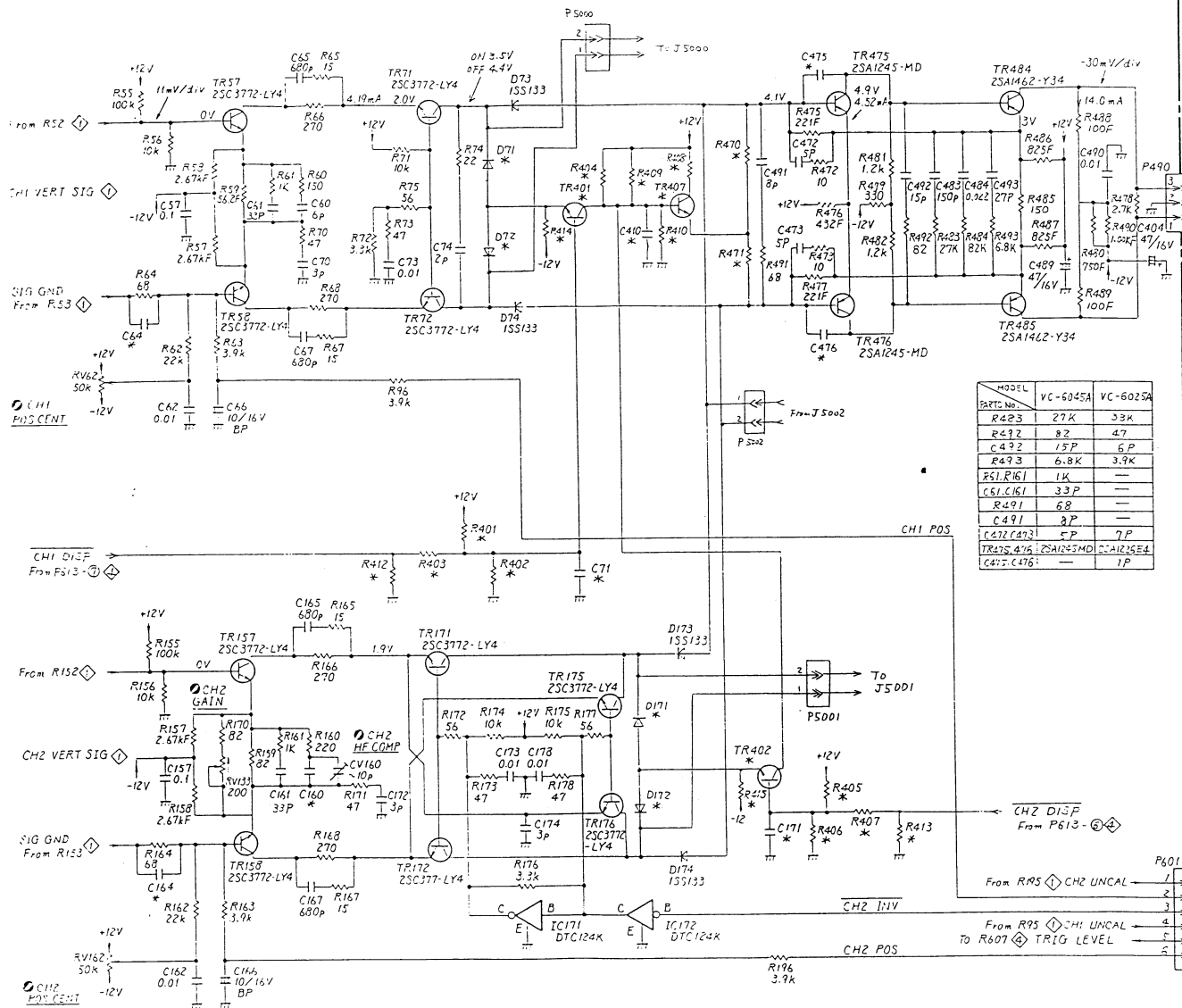
SYMBOL	PART CODE	DESCRIPTION	A	B	QTY
TR 8060	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 8061	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 8062	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 8063	HTK0127	TRANSISTOR 2SK508K52/2SK508K52MV	1	1	1
TR 8064	HTK0127	TRANSISTOR 2SK508K52/2SK508K52MV	1	1	1
TR 8065	HTC0848	TRANSISTOR 2SC2759-U23	1	1	1
TR 8066	HTA0318	TRANSISTOR 2SA1462V34	1	1	1
TR 8067	HTC0848	TRANSISTOR 2SC2759-U23	1	1	1
TR 8068	HTC0848	TRANSISTOR 2SC2759-U23	1	1	1
TR 8069	HTC0848	TRANSISTOR 2SC2759-U23	1	1	1
TR 8070	HTC0848	TRANSISTOR 2SC2759-U23	1	1	1
TR 8071	HTA0318	TRANSISTOR 2SA1462V34	1	1	1
TR 8072	HTA0318	TRANSISTOR 2SA1462V34	1	1	1
TR 8075	HTC0871	TRANSISTOR 2SC3772LV4	1	1	1
TR 8076	HTD0161	TRANSISTOR DTC124EK	1	1	1
TR 9101	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9102	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9103	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9106	HTA0263	TRANSISTOR 2SA1052D (MD)	1	1	1
TR 9107	HTC0886	TRANSISTOR 2SC2462C (LC)	1	1	1
TR 9201	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9202	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9203	HTC0884	TRANSISTOR 2SC3775-0V4	1	1	1
TR 9206	HTA0263	TRANSISTOR 2SA1052D (MD)	1	1	1
TR 9207	HTC0886	TRANSISTOR 2SC2462C (LC)	1	1	1

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SYMBOL	PART CODE	DESCRIPTION	A	B	QTY
R 9123	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9124	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9125	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9126	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9128	RME1437	R.METAL 1/10W 820 OHM +-5%	1	1	1
R 9129	RME1437	R.METAL 1/10W 820 OHM +-5%	1	1	1
R 9130	RME1882	R.METAL 1/10W 2 KOHM +-5%	1	1	1
R 9131	HME14021	R.METAL 1/4W 1.8 KOHM +-5%	1	1	1
R 9132	RCE0777	R.CARBON 1/4W 4.7 KOHM +-5%	1	1	1
R 9151	RME1119	R.METAL 1/4W 1.15KOHM +-1%	1	1	1
R 9201	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 9202	RME1429	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9203	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	1
R 9204	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9205	RME1431	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9206	RME1427	R.METAL 1/10W 120 OHM +-5%	1	1	1
R 9207	RME1431	R.METAL 1/10W 270 OHM +-5%	1	1	1
R 9208	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 9209	RME1430	R.METAL 1/10W 220 OHM +-5%	1	1	1
R 9210	RME1469	R.METAL 1/10W 4.7 OHM +-10%	1	1	1
R 9211	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	1
R 9212	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	1
R 9213	RME1440	R.METAL 1/10W 1.5 KOHM +-5%	1	1	1
R 9214	RME1442	R.METAL 1/10W 2.2 KOHM +-5%	1	1	1
R 9215	RME1419	R.METAL 1/10W 27 OHM +-5%	1	1	1
R 9216	RME1441	R.METAL 1/10W 1.8 KOHM +-5%	1	1	1
R 9217	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9218	RME1429	R.METAL 1/10W 180 OHM +-5%	1	1	1
R 9219	RME1414	R.METAL 1/10W 10 OHM +-5%	1	1	1
R 9221	RME1421	R.METAL 1/10W 39 OHM +-5%	1	1	1
R 9222	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9223	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9224	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9225	RME1428	R.METAL 1/10W 150 OHM +-5%	1	1	1
R 9226	RME1418	R.METAL 1/10W 22 OHM +-5%	1	1	1
R 9228	RME1437	R.METAL 1/10W 820 OHM +-5%	1	1	1
R 9229	RME1437	R.METAL 1/10W 820 OHM +-5%	1	1	1
R 9230	RME1882	R.METAL 1/10W 2 KOHM +-5%	1	1	1
R 9231	RME1441	R.METAL 1/10W 1.8 KOHM +-5%	1	1	1
R 9232	RCE0777	R.CARBON 1/4W 4.7 KOHM +-5%	1	1	1
RV 9121	RNE0067	VR.METAL EVN-49C00YB13 (1K)	1	1	1
RV 9130	RNE0071	VR.METAL EVN-49C00YB52 (500)	1	1	1
RV 9221	RNE0067	VR.METAL EVN-49C00YB13 (1K)	1	1	1
RV 9230	RNE0071	VR.METAL EVN-49C00YB52 (500)	1	1	1
TR 5201	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5202	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5203	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5204	HTA0263	TRANSISTOR 2SA1052D (MD)	1	1	1
TR 5207	HTC0886	TRANSISTOR 2SC2462C (LC)	1	1	1
TR 5251	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5252	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5253	HTD0202	TRANSISTOR 2SD5960V3	1	1	1
TR 5256	HTA0263	TRANSISTOR 2SA1052D (MD)	1	1	1
TR 5257	HTC0886	TRANSISTOR 2SC2462C (LC)	1	1	1

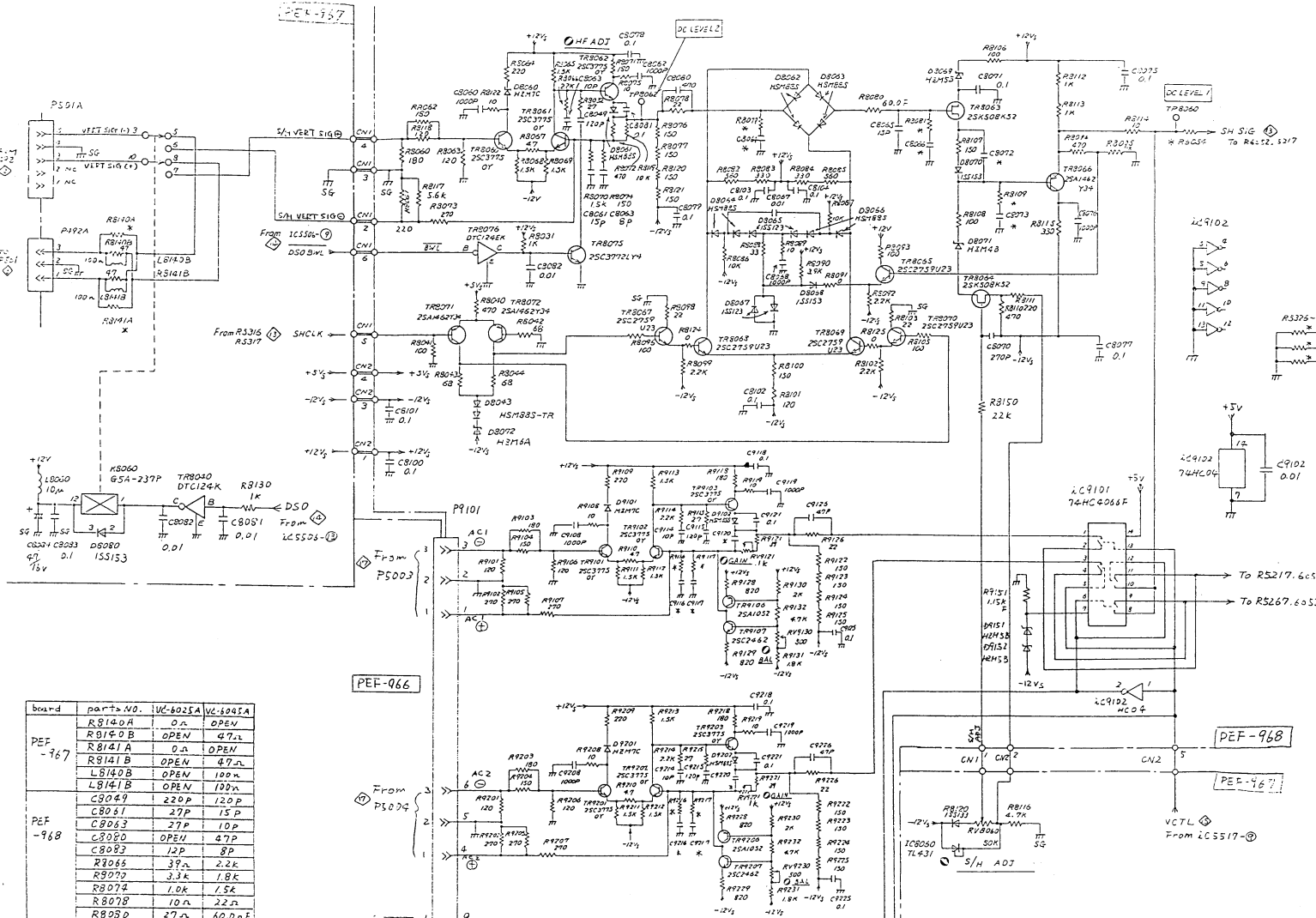
9. SCHEMATIC DIAGRAMS

PEF-781

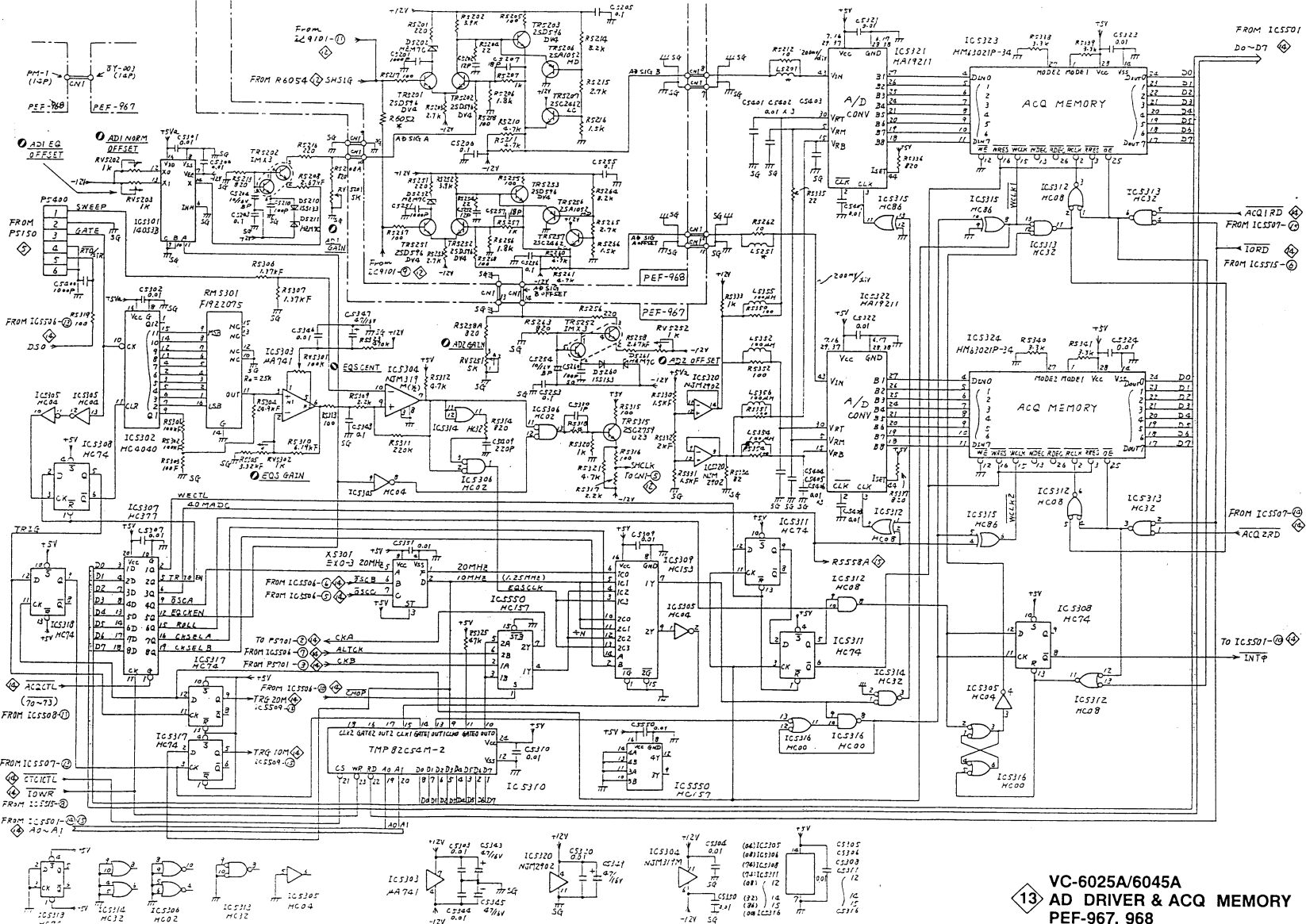


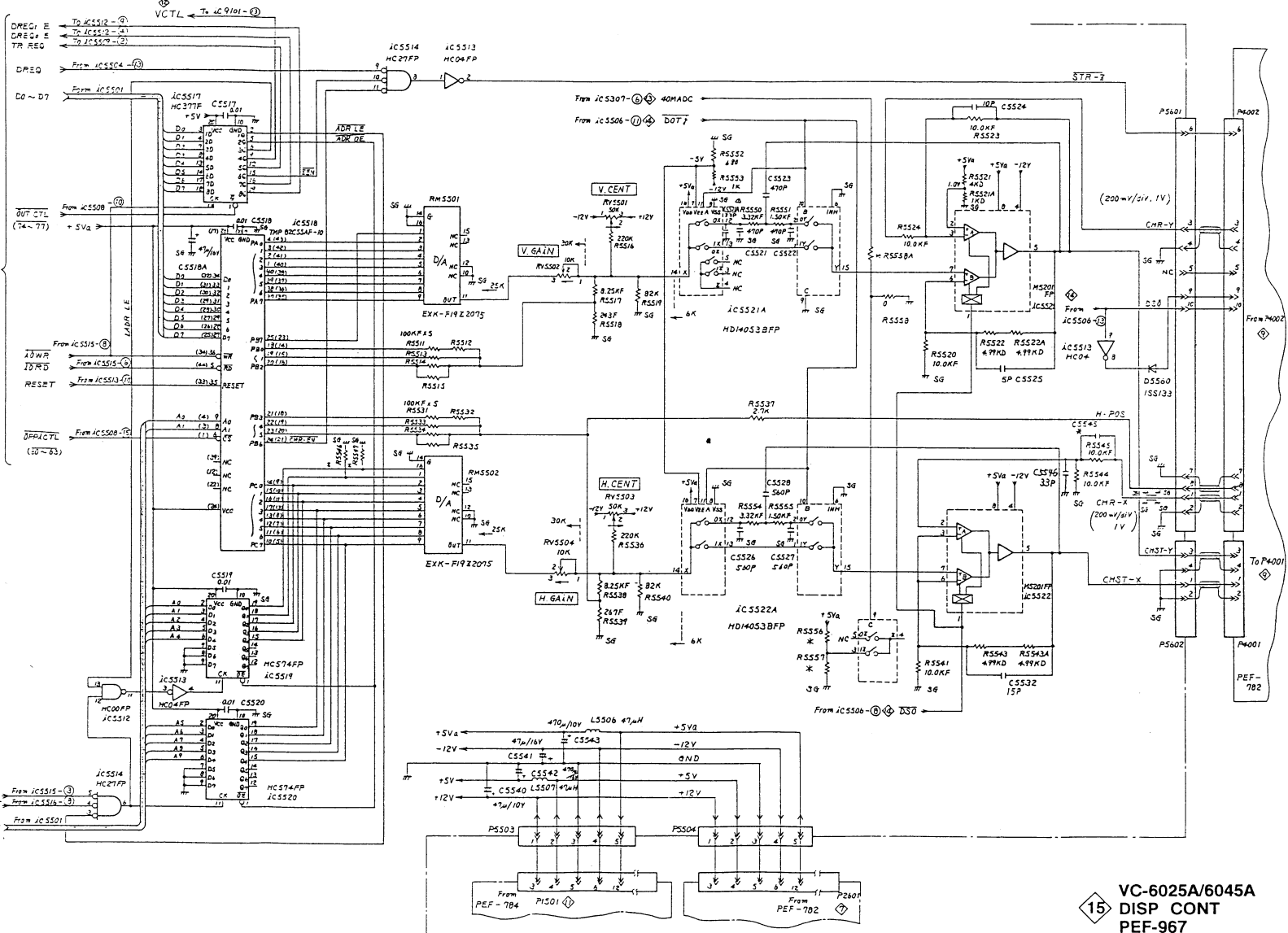
MODEL	VC-6045A	VC-6025A
R423	27K	33K
R472	82	47
C432	15P	6P
R493	6.8K	3.9K
R51,R161	1K	—
C51,C161	33P	—
R491	6.8	—
C491	3P	—
C472,C473	5P	7P
TR475,476	2SA1245MD	2SA1245E4
C475,C476	—	1P

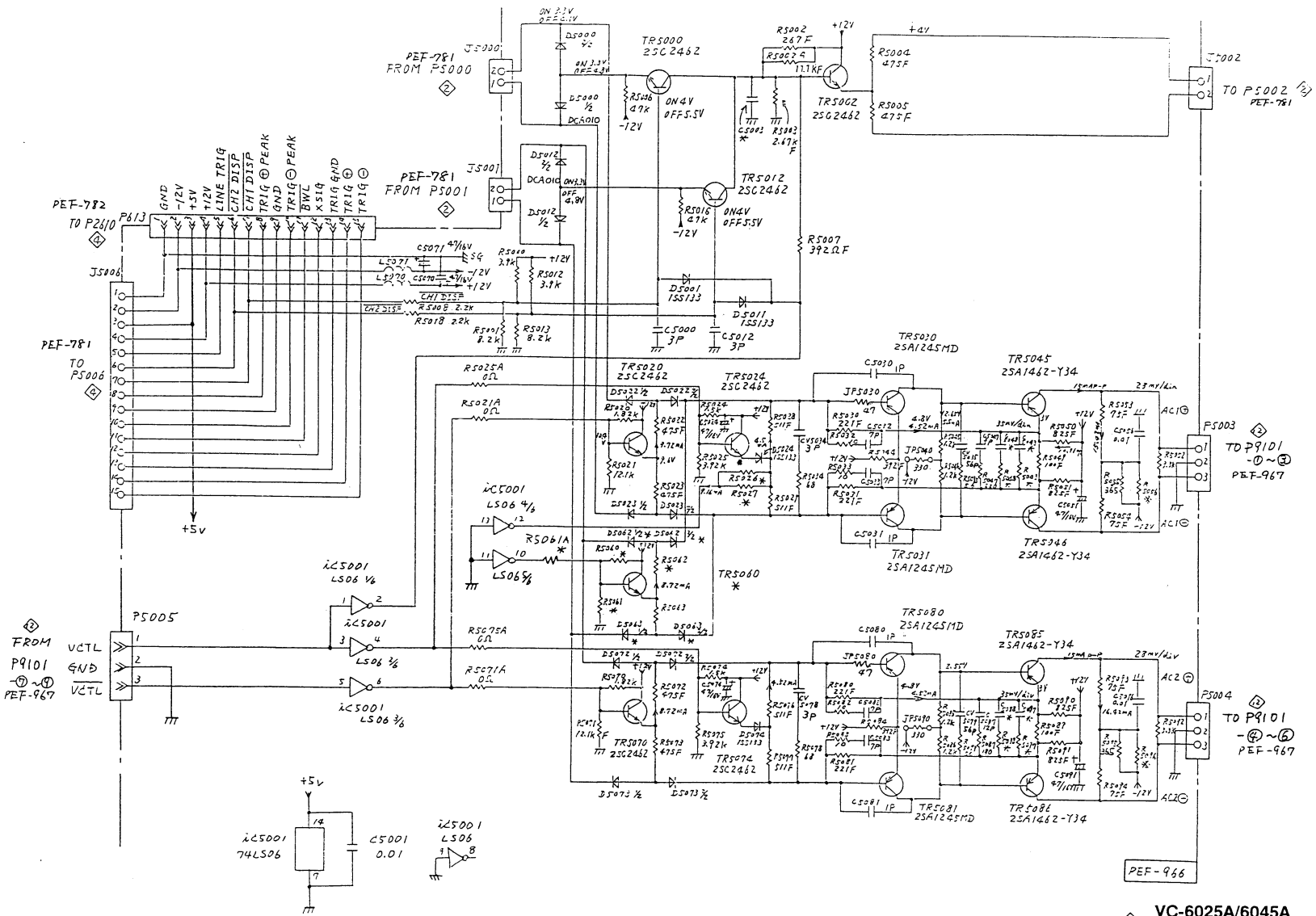
VC-6025A/6045A
CH SWITCH & DLY DRIVE
PEF-781, 786, 886



board	part no.	VC-6025A	VC-6045A
PEF-967	R8140A	0Ω	OPEN
	R8140B	OPEN	47Ω
	R8141A	0Ω	OPEN
	R8141B	OPEN	47Ω
	R8140B	OPEN	100Ω
PEF-968	L8141B	OPEN	100Ω
	C8049	220P	120P
	C8031	27P	15P
	C8063	27P	10P
	C8200	OPEN	47P
	C8093	12P	8P
	R8046	39Ω	2.2K
	R8079	0.3K	1.8K
	R8072	1.0K	1.5K
R8078	10Ω	2.2Ω	
R8050	27Ω	60.0Ω	







8. ELECTRICAL PARTS LIST

8.1 Differences between VC-6025/6045 and VC-6025A/6045A

(1) Changes of electrical parts on V PRE (PEF-781)

No.	Part code	VC-6025/6045	VC-6025A/6045A
1	C71	3pF	Removed
2	C171	3pF	Removed
3	C410	1000pF	Removed
4	D71	1SS133	Removed
5	D72	1SS133	Removed
6	D171	1SS133	Removed
7	D172	1SS133	Removed
8	TR401	2SC2462LC	Removed
9	TR402	2SC2462LC	Removed
10	TR407	2SC2462LC	Removed
11	R401	3.9k Ω	Removed
12	R402	8.2k Ω	Removed
13	R403	2.2k Ω	Removed
14	R404	267 Ω F	Removed
15	R405	3.9k Ω	Removed
16	R406	8.2k Ω	Removed
17	R407	2.2k Ω	Removed
18	R408	10 Ω	Removed
19	R409	11.1k Ω F	Removed
20	R410	2.67k Ω F	Removed
21	R414	47k Ω	Removed
22	R415	47k Ω	Removed
23	R470	475 Ω F	Removed
24	R471	475 Ω F	Removed
25	P613	B15B-XH-A	3022-15B
26	P5000	—	3022-2B
27	P5001	—	3022-2B
28	P5002	—	3022-2B

(2) Mechanical parts changes

No.	Name	VC-6025/6045	VC-6025A/6045A
1	Spacer	—	X8507604-B (To fix PEF-966)
2	Front panel	VC-6025: 3225253A VC-6045: 3225253B	VC-6025A: 3225253C VC-6045A: 3225253D
3	Name plate	VC-6025: 8505146C VC-6045: 8505146D	VC-6025A: 8505146G VC-6045A: 8505146H
4	Center chassis	2127782A (No hole for volume control)	2127782A (Hole for volume control is added.)
5	Insulation sheet	—	84083087A (Insulation between PEF-781 and PEF-966)
6	Spacer	—	8474929A (for shield case of PEF-781)
7	Code band		8542269A

(3) Other changes

No.	Name	VC-6025/6045	VC-6025A/6045A
1	S/H board	PEF-883	PEF-968
2	AD & μ -COM board	PEF-880 CN2: 4 pins	PEF-967 CN2: 5 pins
3	V-I/F board	—	PEF-966
4	Jumpers on panel board PEF-783	RM1602 ⑥ to S1612 ⑥	RM1602 ⑥ to S1612 ⑤ (Note) States of the BWL switch can be read by μ -COM.
5	Cable assembly	—	X8555809AB (Connect between P5003 to P5005 of PEF-966 and P9109 of PEF-968)

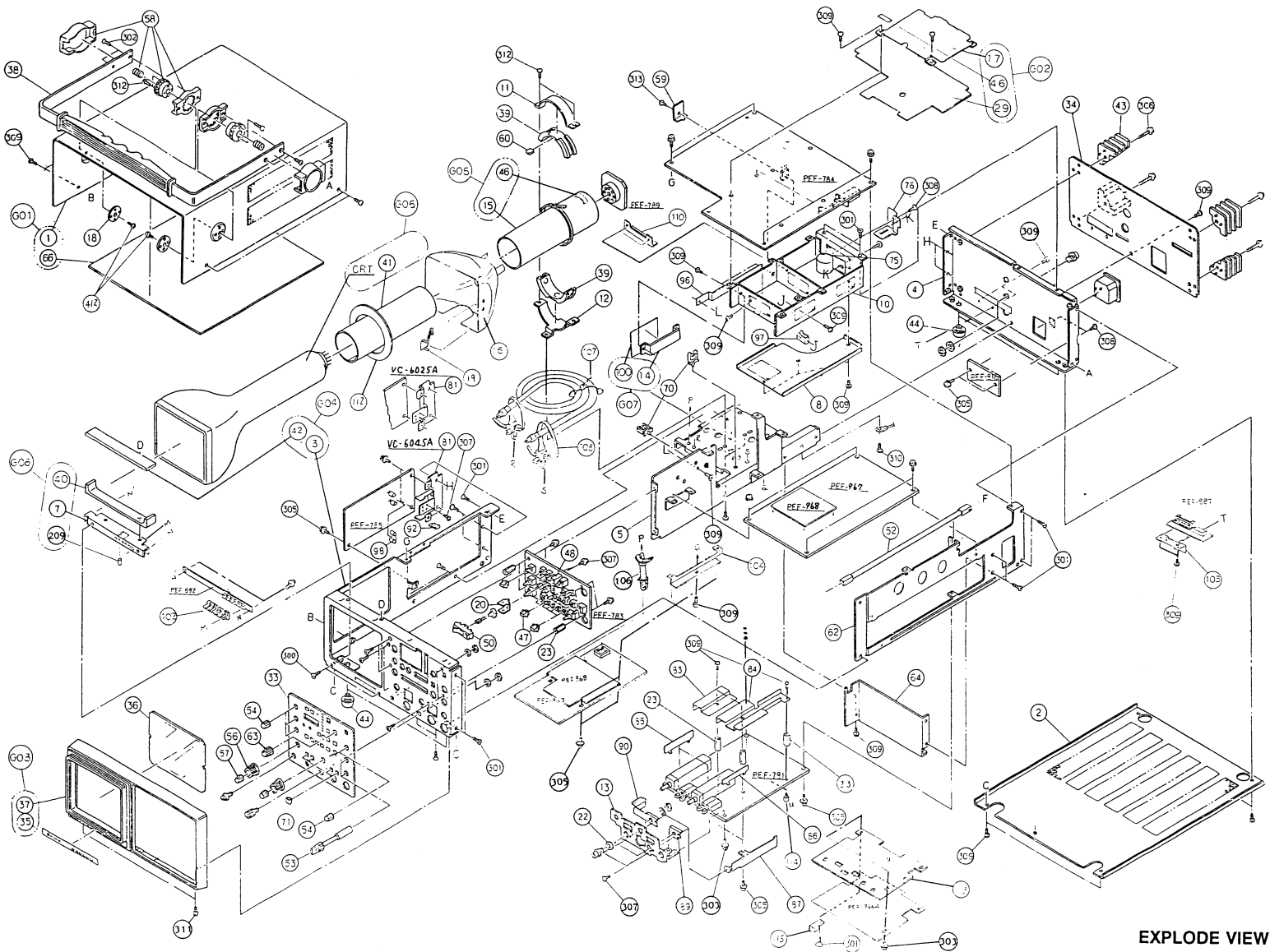
10. MECHANICAL PARTS LIST AND EXPLODED VIEW

A: VC-6025A B: VC-6045A

Symbol	Part code	Description	Q'ty	
			A	B
G01	62M0028	COVER (TOP) ASSY	1	1
1	3208912 A	COVER (TOP)	1	1
66	8480108 A	INSULATOR	1	1
G02	62M0029	CASE (SHIELD) ASSYS	1	1
17	8481953 A	CASE (SHIELD)	1	1
29	8481954 A	INSULATOR	1	1
46	4058852 A	LABEL	1	1
G03	62M0059	FRAME (FRONT) ASSY	1	
37	124512 A	FRAME	1	
35	8505146 G	NAME PLATE (SW)	1	
G03	62M0060	FRAME (FRONT) ASSY		1
37	124512 A	FRAME		1
35	8505146 H	NAME PLATE (SW)		1
G04	62M0031	CHASSIS (F) ASSY	1	1
3	8505150 A	CHASSIS (F)	1	1
42	8411928 E	CUSHION	1	1
G05	62M0024	BAND (SHIELD) ASSYS	1	
15	8316268 D	BAND (SHIELD)	1	
46	4058852 A	LABEL	1	
G05	62M0027	BAND (SHIELD) ASSYS		1
15	8316268 C	BAND (SHIELD)		1
46	4058852 A	LABEL		1
G06	62X0006	CRT ASSY	1	1
41	8396867 C	SHEET	1	1
108	ERL0093	BAND	1	1
G07	62M0025	BRACKET (HIC) ASSY	1	1
14	8472571 A	BRACKET (HIC)	1	1
100	8505126 A	SHEET	1	1
G08	62X0004	BRACKET (CRT HD) ASSY	1	1
7	8505144 A	BRACKET (CRT HD)	1	1
40	8395443 B	RUBBER	1	1
201	ERE0080	TUBE	0.02	0.02
2	3216324 A	COVER (BOTTOM)	1	1
2	3227933 A	COVER (BOTTOM) FOR VC-6025A(C), VC-6045A(C) ONLY	1	1

Symbol	Part code	Description	Q'ty	
			A	B
4	3224311 A	CHASSIS (REAR)	1	1
5	2127782 A	CHASSIS (C)	1	1
8	8483085 A	COVER (HV)	1	1
10	3212569 AA	CASE (SHIELD)	1	1
11	8438037 A	BAND (CRT 1)	1	1
12	8448099 A	BAND (CRT 2)	1	1
13	3209528 A	BRACKET S(W)	1	1
16	2128659 B	CASE (SHIELD)	1	1
18	8398476 A	PLATE (NUT)	2	2
19	8474935 A	PLATE (EARTH)	1	1
20	8474942 A	BRACKET	1	1
22	8398477 A	SPACER (BNC)	3	3
23	8474929 A	SPACER	7	7
33	3225253 C	PANEL (FRONT)	1	
33	3225253 D	PANEL (FRONT)		1
34	3224310 A	PANEL (REAR)	1	1
36	8489075 A	FILTER	1	1
38	3208902 D	HANDLE	1	1
39	3144055 B	RUBBER	2	2
43	3149317 C	FOOT (REAR)	4	4
44	3022087 A	FOOT (BOTTOM)	4	4
47	8473487 A	BUTTON	12	12
48	8474945 A	HOLDER (LED)	1	1
50	3211025 AA	KNOB	1	1
52	8533855 AA	KNOB (POWER)	1	1
53	8473750 AA	KNOB (L)	2	2
54	3149324 H	KNOB (S18B)	5	5
56	3196622 F	KNOB (ATS)	2	2
57	3149324 J	KNOB (S18B)	2	2
58	8377076 A	STOPPER (HANDLE)	2	2
59	8456381 C	BRACKET (IC)	1	1
60	8446132 A	PLATE (EARTH)	1	1
62	2121662 AA	CHASSIS (L)	1	1
63	3196650 D	KNOB (M)	1	1
64	8480105 A	PLATE (FBT SHIELD)	1	1
70	8383455 B	SADDLE	2	2
71	8446145 B	GUIDE (KNOB)	4	4
75	8487187 A	SHORT RING	1	1
76	8487185 A	HEAT SINK	1	1

Symbol	Part code	Description	Q'ty	
			A	B
81	8480112 A	HEAT SINK (V-OUT)	1	
81	8484995 AA	HEAT SINK (V-OUT)		1
83	8485001 A	PLATE (V-PRE SHIELD 1)	1	1
84	8485015 A	PLATE (V-PRE SHIELD 2)	1	1
85	8485003 A	PLATE (V-PRE EARTH 1)	2	2
86	8485004 A	PLATE (V-PRE EARTH 2)	1	1
87	8485005 A	PLATE (V-PRE EARTH 3)	2	2
89	8485006 A	PLATE (BNC EARTH 1)	1	1
90	8485007 A	PLATE (BNC EARTH 2)	1	1
92	8472331 A	CLIP		2
96	8487186 A	HEAT SINK (HIC)	1	1
97	8487166 A	HEAT SINK	1	1
98	8427119 B	CAP (TR)	1	1
102	8505145 A	BUTTON	6	6
103	8505143 A	BRACKET	1	1
104	8505142 A	BRACKET	1	1
105	8507172 A	BAND (SNAP)	2	2
106	8360723 F	SUPPORT	2	2
107	ERL0002	FASTENER	1	1
110	8510743 A	BRACKET	1	1
112	8498217 A	SHEET	1	1
113	8483087 A	INSULATOR	1	1
114	8507604 B	SPECER	2	2
115	8542269 A	BAND (CORD)	1	1
300	XCA7304	SCREW FLAT 3x4	2	2
301	XCA7306	SCREW FLAT 3x6	21	21
302	XCA7410	SCREW FLAT 4x10	4	4
303	8340167 M	SCREW SEMS 3x6	7	7
305	XCA0661	SCREW SEMS 3x8	34	34
306	8340167 C	SCREW SEMS 4x20	4	4
307	XCA6205	SCREW 2x5	6	6
308	XCA6306	SCREW 3x6	1	1
309	XCA6308	SCREW 3x8	31	31
310	8340167 L	SCREW SEMS 4x8	1	1
311	XCA1818	SCREW 3x8	2	2
312	XCA6316	SCREW 3x16	6	6
313	XCA6310	SCREW 3x10	1	1
315	XCA6306	SCREW 3x6	2	2
412	XCA6412	SCREW 4x12	2	2



EXPLODE VIEW