

INSTRUCTION MANUAL
FOR
FREQUENCY RESPONSE TESTER
MODEL 8520

KIKUSUI ELECTRONICS CORPORATION

8.11.87

991766

Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark ☒)

☐ Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

☐ Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

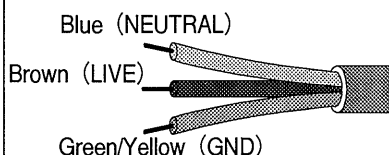
☐ AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

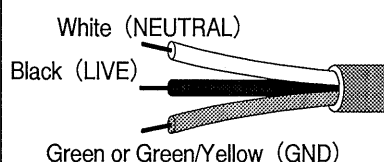
WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.

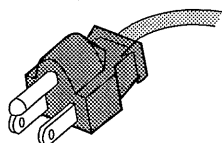
☐ Without a power plug



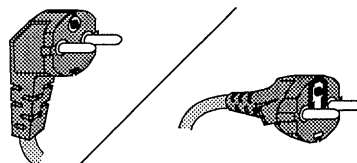
☐ Without a power plug



☐ Plugs for USA



☐ Plugs for Europe



☐ Provided by Kikusui agents

Kikusui agents can provide you with suitable AC power cable.
For further information, contact your Kikusui agent.

☐ Another Cable _____

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1. GENERAL

This instrument is a dual-trace frequency response tester with a 12-inch persistent-image CRT. It measures frequency response of various audio equipment for a range of 20 Hz to 200 kHz and an input level range of +20 dBm to -100 dBm, with dynamic ranges of 30 dB (+5 to -25 dB), 60 dB (+10 to -50 dB), and 6 dB (+1 to -5 dB).

Outstanding features of this instrument are as described in the following.

Two level marker lines and three intensity-modulated frequency check marker dots on each level marker line are displayed.

This instrument is provided with an automatic synchronous sweep circuit (F-V converter circuit) which produces a sweep signal basing on the measured signal. Due to this provision, record/playback frequency response curves of even tape recorders can readily be observed without requiring any external sweep signal.

This instrument has an auto level function. When used in conjunction with Kikusui Model 4600 Sweep Generator, this instrument is capable of such auto level measuring function that the level of the measured signal at a specified frequency is automatically compensated for to a preset level and relative level of the measured signal with respect to the reference frequency is displayed. Furthermore, by using the narrow band sweep mode of the 4600, characteristics of narrow band pass filters also can be readily expanded and displayed.

An output terminal is provided for an X-Y recorder to obtain data in hard copy.

When in the dual-trace operation, the two traces are displayed with different intensities for ease of channel identification.

With these and other advantageous features, this instrument can clearly and directly display frequency response curves of various types of audio equipment (such as amplifiers, filters, speakers, microphones, audio tape recorders, video tape recorders, etc.) and certain types of components of communications equipment such as band pass filters.

2. SPECIFICATIONS

Instrument name: Frequency Response Tester

Model No.: Model 8520

Measuring modes: CH1, CH1 - CH2, CHOP, CH2

Input resistance: 1 M Ω approx.

Measurable input level: -100 dBm to +20 dBm

Measuring frequency ranges: 20 Hz - 20 kHz, 20 Hz - 200 kHz

Dynamic ranges: 30 dB and 60 dB; and 6 dB
(for partial expansion of 60 dB range)

Measuring ranges and response

(with FINE knob set at CAL'D position)

Range dBm	Frequency response (with reference to 1 kHz)	Dynamic range		Linearity (at 1 kHz)
		30 dB	60 dB	
+10	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -25 +10 to -40	1 dB
0	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -50 +10 to -40	1 dB
-10	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -50 +10 to -40	1 dB
-20	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -50 +10 to -40	1 dB
-30	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -50 +10 to -40	1 dB
-40	20 Hz - 200 kHz: 1 dB 50 Hz - 100 kHz: 0.6 dB	+5 to -25	+10 to -50 +10 to -40	1 dB

Range dBm	Frequency response (with reference to 1 kHz)	Dynamic range		Linearity (at 1 kHz)
		30 dB	60 dB	
-50	20 Hz - 100 kHz: 1 dB	+5 to -25	+10 to -50	1.5 dB
	50 Hz - 100 kHz: 0.6 dB		+10 to -40	
-60	20 Hz - 50 kHz: 2 dB	+5 to -25	+10 to -40	1.5 dB
	50 Hz - 20 kHz: 1 dB			

Note: The 6-dB ranges are for partial expansion of the 60-dB ranges.

FINE input adjustment knob: 0 to -10 dB approx.

6-dB offset ranges: +10 dB, 0 dB, -10 dB, -20 dB, -30 dB, -40 dB

Continuously variable offset range: 0 to -10 dB approx.

Auto level: ON/OFF with switch

Level preset: Within full graticule scale range

Trigger: EXT/INT

EXT: TTL level L

INT: On when switch is pressed

Valid scale range

When corrected to level lower than that indicated:

-50 dB to (+10 dB minus correction amount)

When corrected to level higher than that indicated:

+10 dB to (-50 dB plus correction amount)


Response

	Ripple and noise		
	20 Hz	70 Hz	200 Hz
SLOW	4 dB	2 dB	0.5 dB
MID	10 dB	4 dB	1 dB
FAST	16 dB	8 dB	2 dB

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Vertical scales: +5 dB - 0 - -25 dB,
 +10 dB - 0 - -50 dB,
 +1 dB - 0 - -5 dB

Horizontal sweep modes: EXT1, EXT2, and INT

EXT1: Sweep waveform ()

When in WIDE mode: 0 to +8 V

When in DEVIATION mode: -4 to +4 V

EXT2: Oscillation waveform ()

Input level: 500 mVp-p or over

Maximum sweep frequency: 50 kHz

INT: Sweep level: Within scale range, or 100 μ V or over
(INT sweep is possible for CH1 signal only)

Setting accuracy: EXT1: 6% + 5 Hz

EXT2, INT: -6% + 5 Hz

Horizontal ranges: 20 Hz - 20 kHz, 20 Hz - 200 kHz

Blanking: ON-OFF control with switch

EXT1: OFF with TTL level L

EXT2, INT: Automatic

Brightness: EXT1: Activated with TTL level H

EXT2, INT: Automatic

Trace rotation: $\pm 5^\circ$ or over

Level markers: Two level marker lines (can be set at any
 levels within scale).

Three frequency marker dots (can be set at
any positions on each marker line)

Positioning ranges: H: Approx. 1 decade (20 Hz to 200 kHz)

V: Approx. 20 dB (+10 to -50 dB)

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X-Y recorder output

Output resistance: 2 k Ω or less

Y level: +1 to -5 V for +10 to -50 dB

X level: WIDE mode: 0 to +8 V for 20 Hz to 20 kHz
or 200 kHz
DEVIATION mode: -4 to +4 V for -f_d to +f_d

CRT: 12-inch persistent image

Graticule size: 120 (V) \times 186 (H) mm

Graticule illumination: Adjustable

Line voltage: 100 V \pm 10% (convertible), 50/60 Hz AC

Power consumption: Approx. 70 VA

Dimensions: 430 (W) \times 250 (H) \times 370 (D) mm
(16.9 (W) \times 9.84 (H) \times 14.5 (D) in.)

(Maximum dimensions) 430 (W) \times 260 (H) \times 430 (D) mm
(16.9 (W) \times 10.2 (H) \times 16.9 (D) in.)

Operating ambient temperature: 5 to 35°C (41 to 95°F)

Accessories

Instruction manual	1
Hood	1
Graticule (20 Hz - 20 kHz)	1
Graticule (linear)	1
BW-1 (leadwires)	2
Cable with 24-pin connectors, (1 meter long, for connection between 8520 Frequency Response Tester and 4600 Sweep Generator)	1

3. OPERATION METHOD

3.1 Explanation of Front Panel (See Figure 3-1.)

- ① INTEN: Trace intensity control and power switch (the counterlockwise extreme position is for power off). As you turn this knob clockwise, the signal traces become brighter. As you turn it further, the level marker lines and horizontal markers (marker dots) are displayed.

The traces are chopped to protect screen phosphor against burning. Due to this chopping, the traces may be displayed as broken lines at fast sweep speeds, which are not abnormal indications. Intensities of the level marker lines and horizontal marker dots are fixed and not adjustable. When in the EXT2 or INT horizontal sweep mode and the sweep speed has become slower than about one decade (within a range of 20 Hz to 200 kHz) per 10 seconds, intensity modulation is brought into effect and the traces become darker.

- ② ILLUM: Graticule illumination control

- ③ POSITION: Horizontal positioning of trace. As you turn this control clockwise, the trace moves rightward. The positioning range is about one decade.

H ↔

V ↑
↓

Vertical positioning of trace. As you turn this control clockwise, the trace moves upward. The positioning range is about 20 dB (within a range of +10 to -50 dB).



- ④ ROTATE: Trace rotation control. When the trace has become slanted due to terrestrial magnetism, it can be adjusted level by this control. The adjusting range is $\pm 5^\circ$.
- ⑤ LEVEL MARKER: Vertical positioning of each of the two level marker lines within graticule scale range. The level marker lines are used as reference lines, and are helpful to reduce screen distortion errors and parallax errors.
- ⑥ HOR MARKER: Horizontal position of each of three vertical pairs of marker dots on the pair of level marker lines.
- ⑦ DYNAMIC RANGE: Selector buttons of dynamic ranges (graticule scale ranges) for 30, 60, and 6 dB. The 6 dB range is for partial expansion of the 60 dB range.
- ⑧ OFFSET: Double-knob controls for level shift when in the 6 dB range for partial expansion of the 60 dB range. The inner knob is for 10-dB stepwise level offset covering a total range of +10 dB to -40 dB. The outer knob is for continuously variable adjustment of 0 - 10 dB.

The shift point of each range has been adjusted for the 0 dB position. For the partial expansion operation, proceed as follows: Determine the level on the scale with the 60 dB range. Set the read value with the OFFSET controls and change the DYNAMIC RANGE to 6 dB. The level will be offset to near the 0 dB position on the scale.

- ⑨ RESPONSE: Response speed selector buttons for the SLOW, MID, and FAST ranges. When the displayed pattern has large ripples and cannot be easily observed, select an appropriate range with respect to the sweep speed. For your reference, recommended ranges are as follows:
- | | |
|------|---------------|
| SLOW | 20 Hz and up |
| MID | 70 Hz and up |
| FAST | 200 Hz and up |
- ⑩ AUTO: On-off button for AUTO LEVEL function. The depressed and locked state is for function on. If a trigger signal is applied when this function is on, the signal level is automatically compensated for to the level set by the LEVEL PRESET knob. Triggering can be done by pressing the TRIG button ⑪ on the front panel or by applying an external trigger signal.
- ⑪ TRIG: Manual trigger button of each channel when in the AUTO LEVEL mode. The gate is open during the period this button is pressed. This switch circuit is connected with an OR gate in parallel to the external trigger input circuit.
- ⑫ level preset: Setting knob for AUTO LEVEL of each range. When the TRIG switch ⑪ is kept depressed, the level can be set with this button at any point within the graticule scale.
- ⑬ VERT MODE: Vertical channel selector buttons.
- | | |
|------------|-----------------------------------------------------------|
| CH1: | CH1 trace only |
| CH1 - CH2: | The difference of CH1 level minus CH2 level is displayed. |

- CHOP: Both CH1 and CH2 traces are displayed in a chopped mode. The intensity of CH2 is slightly lower than that of CH1.
- CH2: CH2 trace only
- ⑭ RANGE: Dural-knob input level selector for eight ranges in 10-dB steps. The red inner knob is for CH1 and black outer knob for CH2.
- ⑮ Range switch lock button: The black button on the red inner knob. When this button is depressed and clocked, CH1 and CH2 knobs rotates in gang. When unlocked, the two knobs rotates mutually independently.
- ⑯ FINE: Continuously-variable adjustment knob of input level covering a range of 0 to approximately -10 dB to cover each stepwise range change by the RANGE selector switch of each channel. The values of the RANGE selector switch is calibrated with this knob set in the CAL'D position. When the level is adjusted with this knob, the adjusted amount must be subtracted from the range value to obtain the effective dynamic range on the screen.
- ⑰ INPUT Input terminal of each channel for a signal of 20 Hz to 200 kHz, +20 to -100 dBm.

3.2 Explanation of Rear Panel (See Figure 3-2.)

- ⑮ BLANKING: ON/OFF switch of return trace blanking. When in the EXT1 sweep mode, an external TTL level "L" signal is for off. When in the EXT2 or INT sweep mode, the return traces are blanked out by internal circuit.
- ⑯ VERT POLARITY: Polarity selector switch of vertical axis.
"+": Upward for +5/+10/+1 dB scale
"-": Downward for +5/+10/+1 dB scale
- ⑰ HOR RANGE: Horizontal range selector switch between 20 Hz - 20 kHz and 20 Hz - 200 kHz.
- ⑱ HOR MODE: Horizontal sweep mode selector switch for the INT, EXT1, or EXT2 mode.
- INT: Sweep runs being synchronized with the measured signal frequency, without requiring any external sweep signal.
(The CH1 signal is F/V converted and used for the sweep signal. The INT sweep mode is idle when in the operation mode of CH2 only.)
- EXT1: The traces are swept by an external time-base sawtooth signal ().
- EXT2: The traces are swept by an external square wave signal synchronized with the measured signal ().
(This sweep mode may be used when the INT sweep operation is unsatisfactory as the input signal level is lower than 100 μ V rms or the signal is distorted or it involves much noise.)
- ⑳ IN: Input terminal for the external signal for the EXT2 sweep mode.

- ②③ RECODER OUT: Output terminals for X-Y recorder.
The output voltages are as follows.
- X-axis: 0 to +8 V for a range of 20 Hz to 20 kHz or
200 kHz when in WIDE mode or for a range of
 $-f_d$ to $+f_d$ when in DEVIATION mode.
- Y-axis: +1 to -5 V for level ranges corresponding to
dynamic ranges as follows:
- +10 to -50 dB at 60 dB DYNAMIC RANGE
 - +5 to -25 dB at 30 dB DYNAMIC RANGE
 - +1 to -5 dB at 6 dB DYNAMIC RANGE
- ②④ V POSITION: Potentiometer for coarse vertical positioning.
When vertical trace position has been largely
shifted, set the V POSITION control ③ in a
midposition of its adjustment range and turn
this potentiometer with a screwdriver so that
the trace is positioned at an appropriate
vertical position on the screen.
- ②⑤ H POSITION: Potentiometer for coarse horizontal positioning.
The function and adjusting method of this
potentiometer is similar to that of the V
POSITION potentiometer.
- ②⑥ Fuse: AC line fuse (glass tubular, 2 A)
- ②⑦ Line voltage selector receptacle and plug: To set the AC line voltage of the instrument,
insert the plug in the receptacle in the direc-
tion indicated by the arrowhead conforming to
the line voltage on which the instrument is to
be operated.
- ②⑧ AC outlet: The outlet is directly connected to the AC
power cord to provide power for external use.
Its power rating is 100 VA.

②9 AC power AC input power cord
cord:

③0 GND: Ground terminal

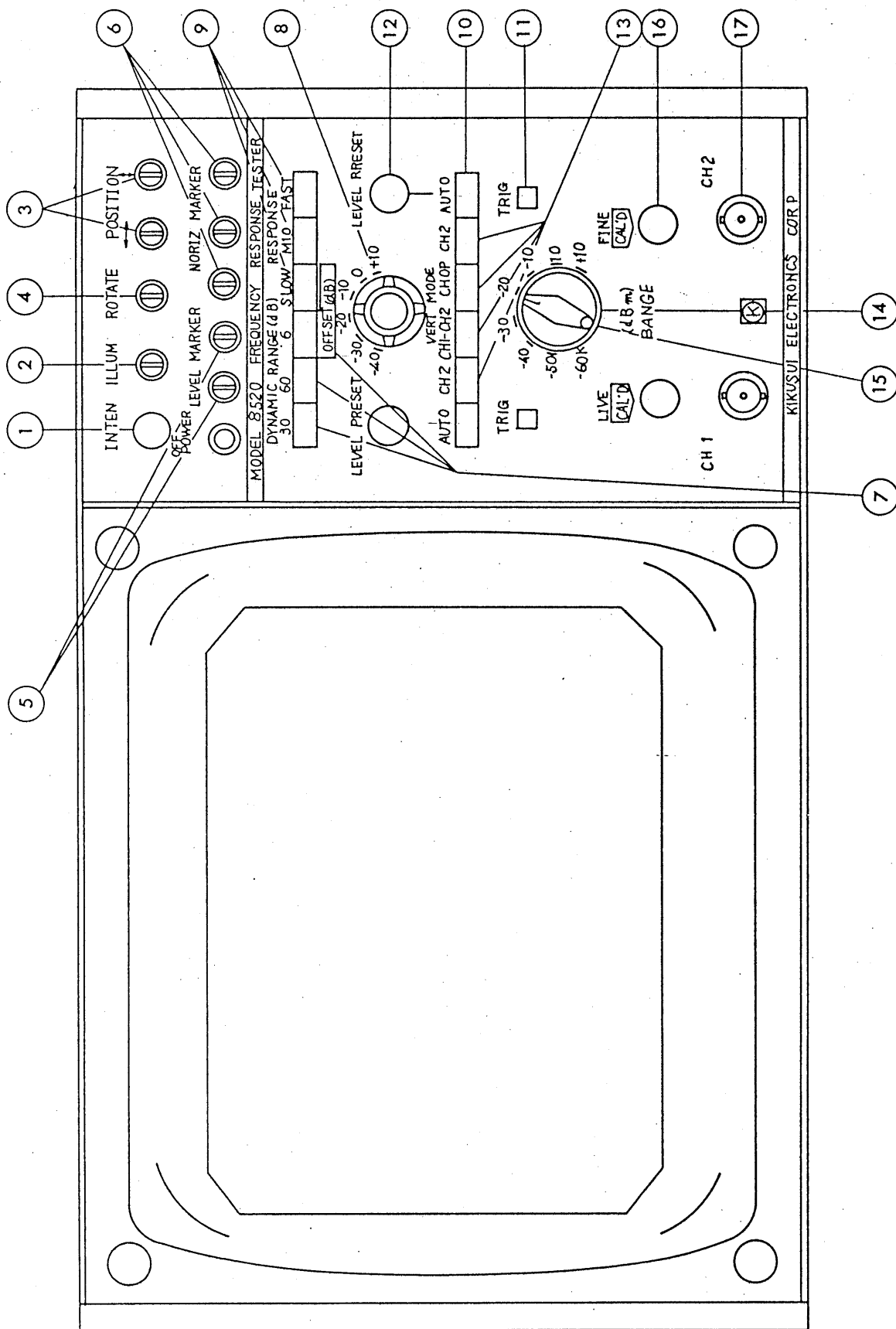


Figure 3-1. Front panel

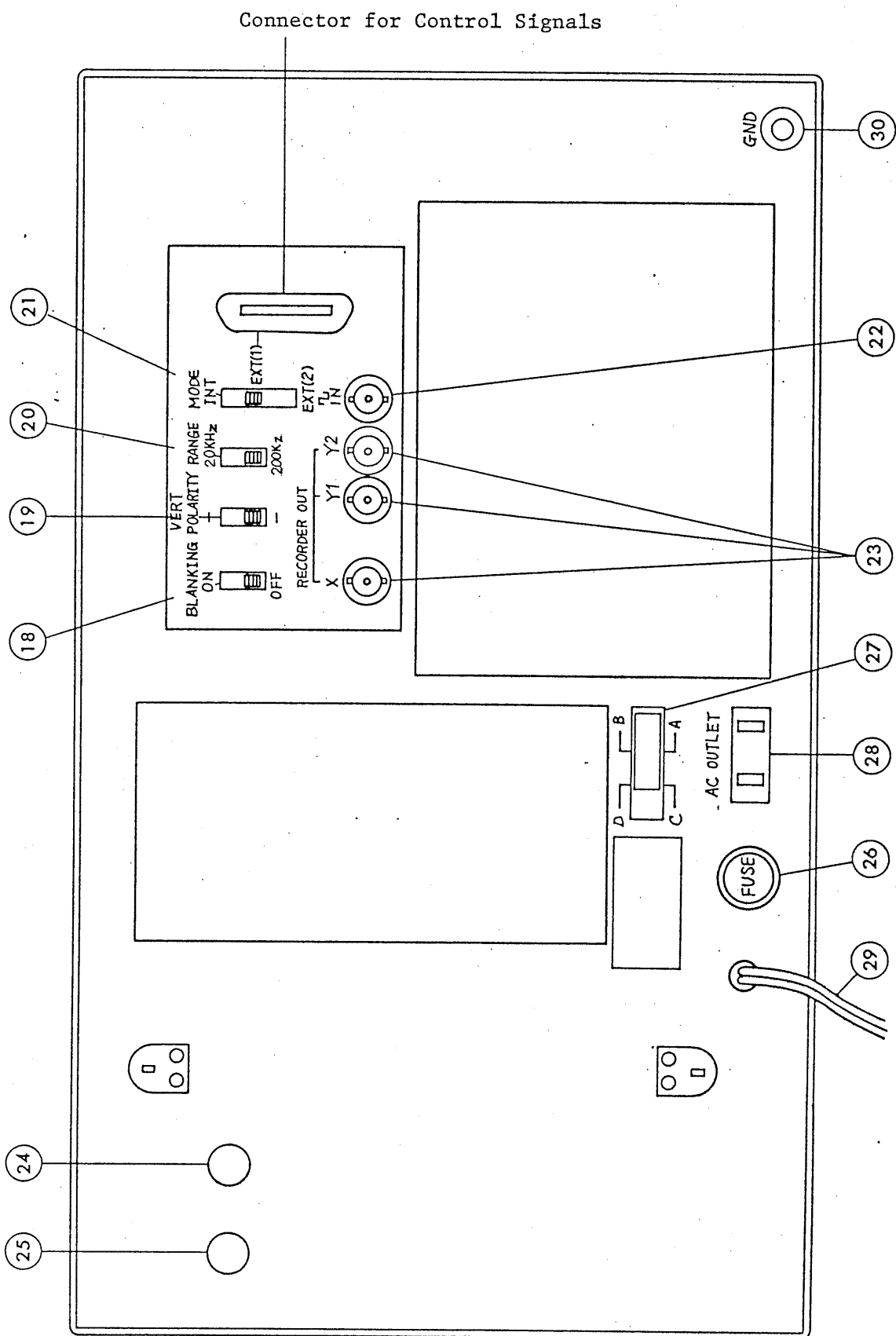


Figure 3-2. Rear panel

3.3 Pins of Connector for Control Signals

	13	1	
	14	2	
	15	3	
	16	4	
BLANKING	17	5	
BRIGHTNESS	18	6	WIDE/DEVI
	19	7	
TIME BASE (H)	20	8	TIME BASE (L)
	21	9	
AUTO LEVEL TRIG	22	10	
F - V	23	11	
CONTROL GND	24	12	AUTO LEVEL SIG OUT

WIDE/DEVI: WIDE/DEVI selector signal input. TTL level "H" for the WIDE mode; TTL level "L" for the DEVIATION mode.

AUTO LEVEL SIG OUT: AUTO LEVEL operation signal output. TTL level "L" for AUTO LEVEL operation state.

AUTO LEVEL TRIG: AUTO LEVEL TRIG signal input. TTL level "L" for gate open. Connected in parallel to the TRIG switch of front panel with an OR gate circuit.

BLANKING: BLANKING ON/OFF signal input. TTL level "L" is for blanking off.

BRIGHTNESS: BRIGHTNESS signal input. TTL level "H" for BRIGHTNESS operation on.

TIME BASE (H), TIME BASE input when in HOR MODE EXT1.

(L):

WIDE mode: Sweep signal of 0 to +8 V

DEVIATION mode: Sweep signal of -4 to +4 V

F - V (INT): HOR MODE-selector signal input. TTL level "L" for the INT mode. Connected in parallel to the HOR MODE switch on the rear panel with an OR gate circuit.

3.4 Replacement of Graticule

Remove the nuts at the four corners of the bezel and detach it from the instrument front. Remove the two screws at centers of the top and bottom arms on the back surface of the bezel. Pull out the graticule and replace it with a desired one.

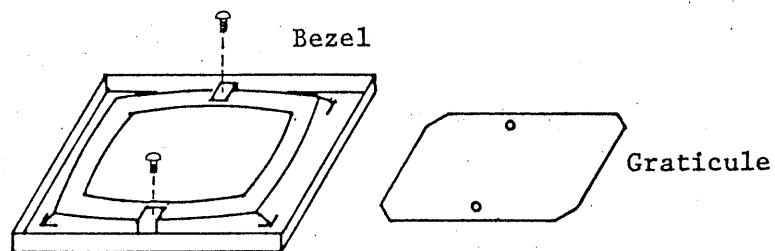


Figure 3-3

3.5 Assembling the Hood

Use the hood when a shade is required. The hood is delivered being knocked down. To install the hood, remove the nuts at the four corners of the bezel and mount the hood together with the bezel on the instrument front. (See Figure 3-4.)

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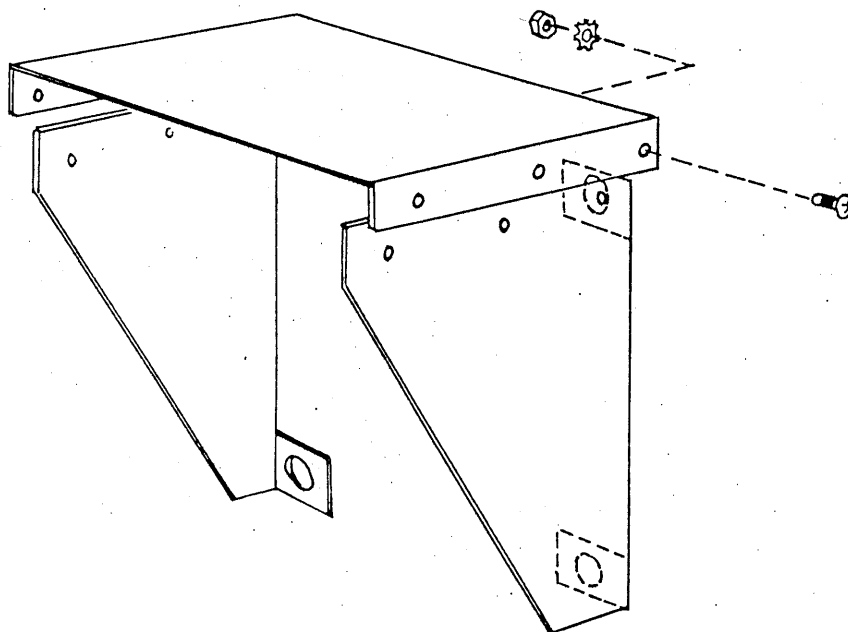


Figure 3-4

4. USE OF SPECIAL FUNCTIONS

4.1 Use of AUTO LEVEL Functions

To measure the response characteristics of an equipment with respect to a certain reference frequency, if the level varies with respect to that at the reference frequency, measurement must be done by adjusting the level each time it has varied or by determining the actual level by calculation. With the AUTO LEVEL function, the level is automatically shifted so that the preset level is crossed at the reference frequency. This AUTO LEVEL function is used for relative level measurement.

Example: To measure response characteristics with respect to reference frequency 1 kHz

Reference level: 0 dB

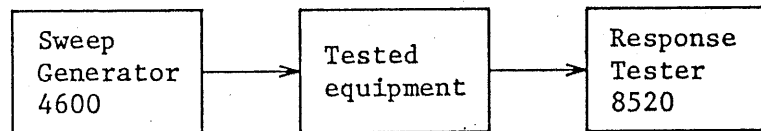


Figure 4-1

- (1) Set Sweep Generator 4600 in the DIAL oscillation mode at oscillating frequency 1 kHz.
- (2) Turn on the AUTO switch (10) to make AUTO LEVEL function effective.
- (3) Keeping depressed the TRIG button (11), adjust the level at 0 dB with the LEVEL PRESET knob (12) and then release the TRIG button (11).
- (4) Set Sweep Generator 4600 in the CONT oscillation mode for continuous sweep.

By the above procedure, the trace is displayed passing the crossing point between 1 kHz frequency line and 0 dB level line.

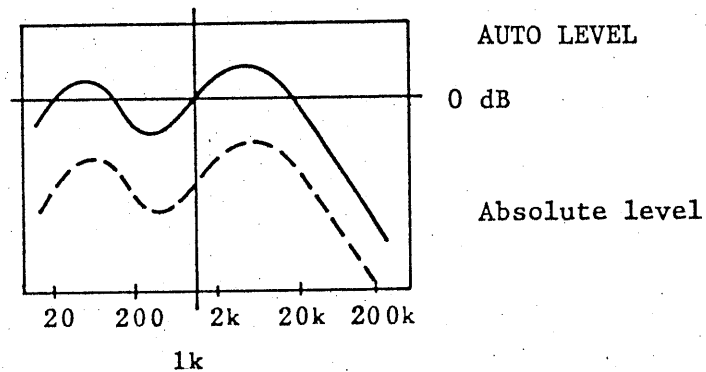


Figure 4-2

4.2 Use of DYNAMIC RANGE 6 dB Function

The DYNAMIC RANGE 6 dB function is used for partial expansion of the wide range (60 dB or 30 dB).

Example: To expand the -10 dB level section shown in Figure 4-3 (a).

- (1) Determine on the scale the level of the section to be expanded. (-10 dB in this example)
- (2) Set the OFFSET switch 8 in either one of the following methods:

Turn the outer RANGE knob of the OFFSET switch 8 to the 0 dB position and the inner VARIABLE knob to the counterclockwise extreme position.

Turn the RANGE knob to the -10 dB position and the VARIABLE knob to the clockwise extreme position.

- (3) Press the DYNAMIC RANGE 6 dB selector button.

By the above procedure, the -10 dB section is displayed being expanded and level shifted to the 0 dB position of the DYNAMIC RANGE 6 dB operation as shown in Figure 4-3 (b).

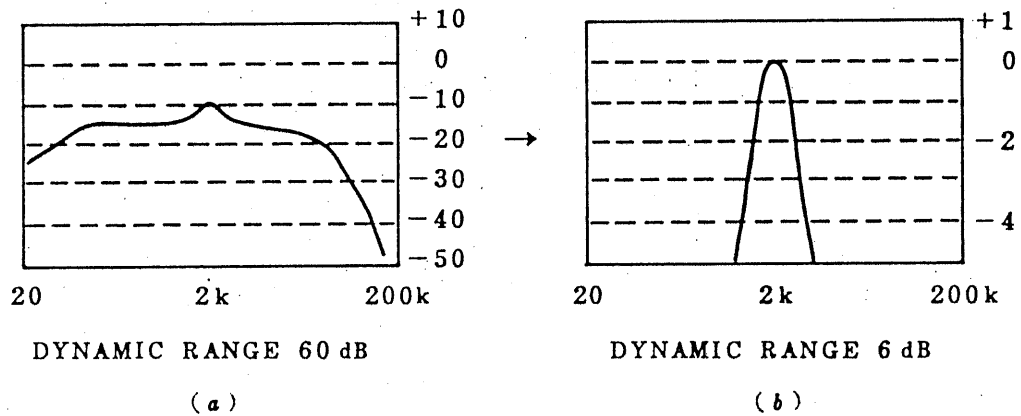


Figure 4-3

- * For more convenient observation, it is recommendable to mark the expanded section with a LEVEL MARKER line and a HOR MARKER dot.

5. PREPARATION FOR OPERATION

5.1 Preparation

- (1) Check that the INTEN knob (1) is set at the POWER OFF position.
- (2) Set the RANGE selector switch (14) at +10 dBm position.
- (3) Press the DYNAMIC RANGE 60 dB button (7).
- (4) Connect the AC power cord to an AC line outlet of the correct voltage.
- (5) Turn clockwise the INTEN knob (1) to turn on the instrument power.
- (6) If high measuring accuracy is required, allow a stabilization time of 30 to 60 minutes at a subdued trace intensity.
- (7) Set the HOR RANGE switch (20) on the rear panel depending on the measured frequency range. For the 20 Hz - 20 kHz range, replace the graticule.
- (8) To blank out the return traces, turn ON the BLANKING switch (18) on the rear panel.
- (9) Select a vertical polarity with the VERT POLARITY switch (19). When the standard or the accessory graticule is used, set the switch for the "+" polarity.
- (10) Select a horizontal sweep mode with the HOR MODE switch (21). When the instrument is operated in conjunction with a sweep generator and a time base signal is available, set the instrument in the EXT1 mode.
- (11) Set the VERT MODE switch (13) as required.
- (12) Set the RANGE switch (14) as required.

- (13) Set the DYNAMIC RANGE selector (7) as required.
- (14) Set the RESPONSE selector (9) depending on the signal frequency and ripple.
- (15) Raise the trace intensity by turning clockwise the INTEN knob (1).
- (16) Set the LEVEL MARKER knobs (5) and HOR MARKER knobs as required.
- (17) Apply the measured signals to the INPUT terminals (17).

When the above procedure is done, the signals will be displayed on the screen.

5.2 Precautions for Operation

- (1) The AC line voltage for this instrument is selectable with the voltage selector plug on the rear panel, as shown in the below table. Before connecting the instrument power cord to an AC line outlet, make it sure that the voltage selector plug is correctly set for the AC line voltage. Note that the instrument may not normally operate or may be damaged if the AC line voltage is incorrect. Replace the power fuse also as required, referring to the below table.

Setting	Nominal voltage	Voltage tolerance-	Fuse
A	100 V	90 - 110 V	2 A
B	115 V	104 - 126 V	
C	215 V	194 - 236 V	1 A
D	230 V	207 - 253 V	

- (2) Do not install the instrument in a position where it may be subjected to direct sunlight or where ambient air is not well ventilated.

- (3) Note that measurement errors may be introduced by an inductive device or a magnetic object placed close to the instrument.
- (4) Note that CRT screen may be burned if a bright beam spot is left stationary at one point for a long time. When not in use, keep the instrument at a subdued beam intensity.
- (5) The maximum allowable input signal level of this instrument is 20 dBm. Do not apply any signal of higher than this level.
- (6) Note that errors may be introduced if an abnormally fast sweep speed is used.
- (7) Note that errors may be introduced if the signal is distorted or has large noise when in the INT mode. Use the instrument in the EXT1 mode whenever possible.
- (8) Note that measurement is for a relative level when the AUTO LEVEL function is on. For measurement of an absolute level, set the AUTO LEVEL function off and the FINE input control at the CAL'D position.
- (9) Note that, if the instrument is set in the INT sweep mode, it operates in the WIDE mode even when the DEVIATION mode is commanded.

6. EXAMPLES OF FREQUENCY RESPONSE MEASUREMENT

Example 1: Measurement of frequency response of tape recorder

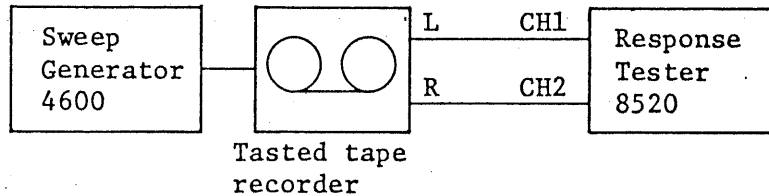


Figure 6-1

Apply to the tested tape recorder a sweep-frequency generator output signal at an appropriate level (a level lower by 10 to 20 dB than the recording level specification of the tested tape recorder, although this value may differ by the type of the tested tape recorder), record and reproduce the signal, and measure the output signal level. For this measurement, set the HOR MODE switch 21 in the INT state.

Example 2: Measurement of front-sensitivity frequency response of microphone

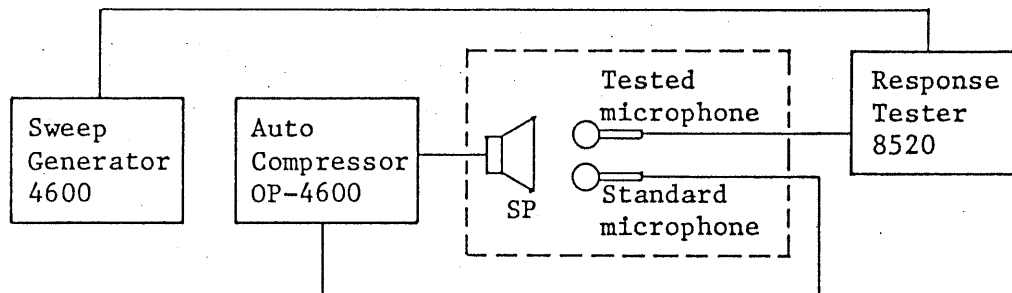


Figure 6-2

Prepare a measuring setup as shown in Figure 6-2.

To measure the frequency response of a microphone, a sound field of a constant sound pressure is needed. However, the frequency response of the speaker is not flat. Therefore, the output sound pressure of the speaker is detected with a standard microphone and

the detected signal is fed back to the AUTO COMPRESSOR in order to make up a closed loop to correct the frequency response of the speaker, thereby obtaining a constant sound pressure level.

Example 3: Measurement of frequency response of amplifier or filter

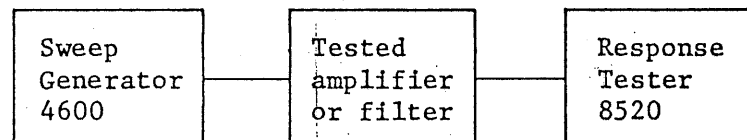
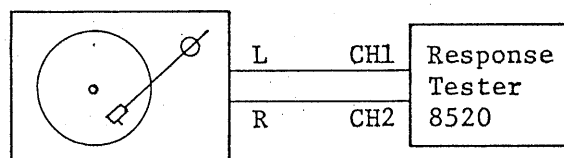


Figure 6-3

Measure the frequency response of the tested amplifier or filter using appropriate sweep-frequency signal.

To measure the bandpass characteristics of a narrow band filter, the DEVIATION mode may be used. The DEVIATION mode of measurement is such that the measuring sweep-frequency signal is linearly swept in the higher and lower frequency directions for a range set by the deviation setting dial from the center frequency set by the SWEEP GENERATOR 4600, thereby easily obtaining an enlarged response curve of the desired narrow frequency bandwidth. (For this type of measurement, use the linear-scale graticule.)

Example 4: Measurement of frequency response of pickup



Note: Use standard disk record.

Figure 6-4

The above are only several typical examples of measurement. Various other types of measurement are possible.

For details of Model 4600 Sweep Generator and Model OP-4600 Auto Compressor, refer to respective instruction manuals.

7. OPERATING PRINCIPLE

A block diagram of this instrument is shown in Figure 7-1.

The CH1 input signal is conditioned to the required level by the attenuator and preamplifiers (1) and (2). Then the signal is converted into a DC voltage signal by the A-D converter. The DC signal is converted into a logarithmic signal by the log amplifier. The logarithmic signal is level-converted by the dynamic range amplifier when in the DYNAMIC RANGE mode or by the auto level circuit when in the AUTO LEVEL mode. Then the signal is fed to the vertical chopping circuit.

The CH2 input signal also is amplified and converted as above and fed to the chopping circuit. The marker signals generated by the marker generator also are fed to the chopping circuit.

The chopped signals are fed to the vertical deflection yoke of CRT via the trace rotation circuit and vertical amplifier.

Regarding the horizontal axis, an external time base signal or the internal time base signal produced by the F-V converter is applied together with the marker signals to the horizontal axis chopping circuit. The chopped signals are fed to the horizontal deflection yoke of CRT via the trace rotation circuit and horizontal amplifier.

Other major circuits of this instrument are the external control signal input circuit, chop pulse generator circuit, CRT bias circuit, HV supply circuit, and power supply circuit.

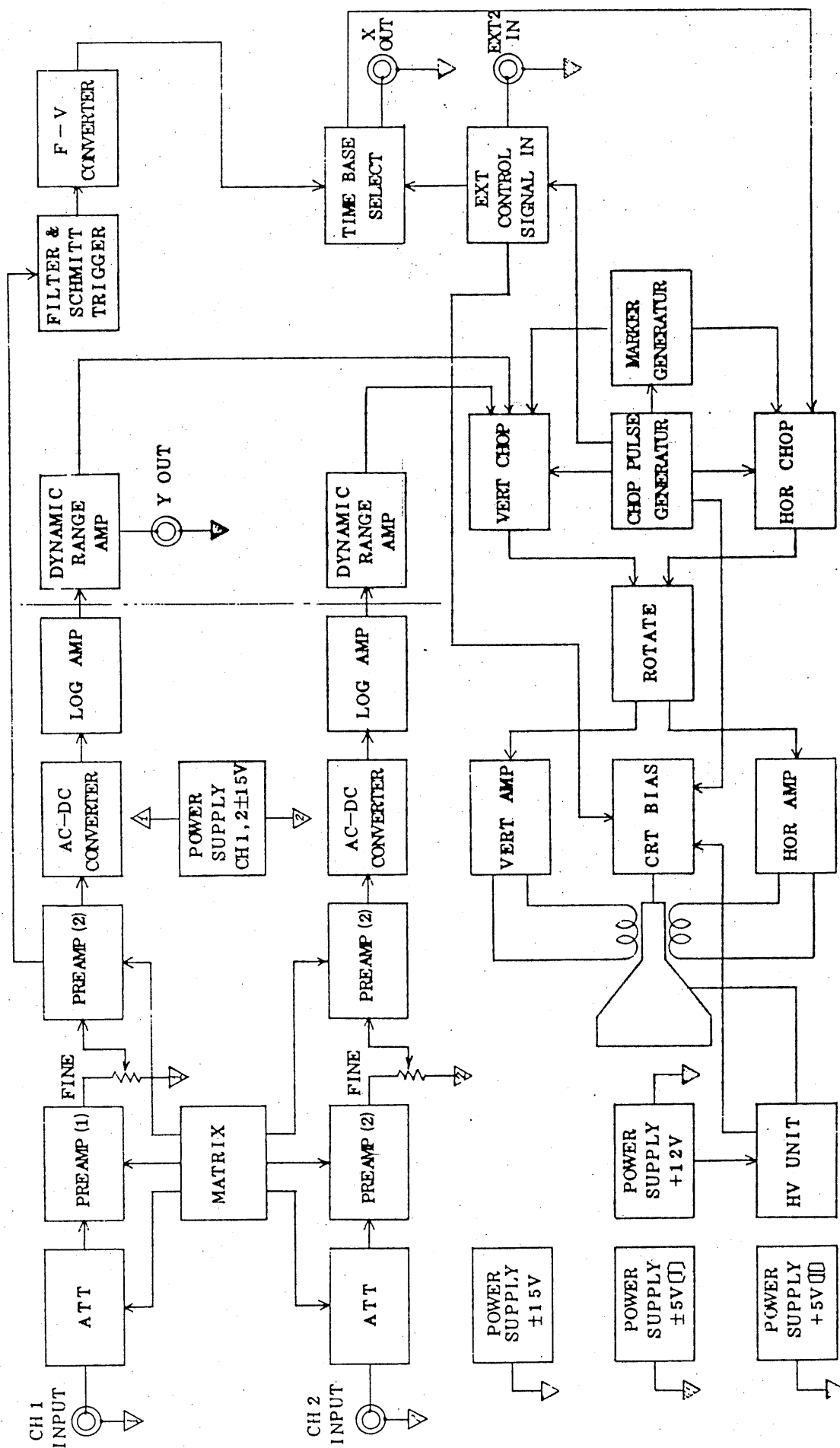


Figure 7-1