

WIDE - BAND DIFFERENTIAL PREAMP TYPE 53G

SERIAL NUMBER _____

INSTRUCTION MANUAL



TEKTRONIX, INC.

MANUFACTURERS OF CATHODE-RAY AND VIDEO TEST INSTRUMENTS

Sunset Highway and Barnes Road • P. O. Box 831 • Portland 7, Oregon, U. S. A.

Phone: CYpress 2-2611 • Cables: Tektronix



INPUT A



VOLTS/CM

2 1 .5

5 .2

10 .1

20 .05

VERTICAL POSITION



TYPE 53G
PLUG-IN UNIT
SERIAL

AC

A

A

A

A-B

-B

DC

VARIABLE VOLTS/CM

CALIBRATED

DC BAL.

INPUT B



VOLTS/CM

2 1 .5

5 .2

10 .1

20 .05

WIDE-BAND
DIFFERENTIAL
CALIBRATED PREAMP

05-20 V/CM DC COUPLED

PREAMP RISE TIME = .015 μSEC

DIFF. BAL.

TEKTRONIX, INC.,
PORTLAND, OREGON, U.S.A.



GENERAL DESCRIPTION

General

The Type 53G adapts Type 530-Series oscilloscopes for work requiring a differential input with a high rejection ratio for in-phase signals, combined with wide bandwidth and excellent transient response.

Characteristics

SENSITIVITY

Calibrated, .05 to 20 v/cm; continuously variable, .05 to 50 v/cm, ac or dc.

FREQUENCY RESPONSE

DC to 10 mc at any sensitivity. With ac coupling, the low-frequency 3-db point is 2 cps. (The low-frequency response is extended somewhat when the probe is used.)

TRANSIENT RESPONSE

Risetime .035 μ sec, 10% to 90%.

DIFFERENTIAL INPUT

100-to-1 rejection ratio at full gain for any in-phase signal within the pass band of the instrument; maximum amplitude handling capability, 2 volts, peak to peak, between the input grids. Independent step attenuators in each input.

PHYSICAL CHARACTERISTICS

Construction, aluminum alloy chassis; Finish, photo-etched, anodized panel; Weight, 4½ lbs.

Front-Panel Controls and Connectors

INPUT A INPUT B	Separate signal inputs to the preamplifier by way of the INPUT-SELECTOR switch.
INPUT- SELECTOR SWITCH	Six-position switch, to select either input separately or the two inputs differentially, with either ac or dc coupling.
VOLTS/CM	Two 9-position switches, one in each input circuit, to select the desired deflection sensitivity.
VARIABLE	Potentiometer to provide continuously variable attenuation between the calibrated sensitivities and to decrease the sensitivity to 50 v/cm.
VERTICAL POSITION	Dual potentiometer to move the trace up or down.
DC BAL	Screwdriver adjustment to set the dc voltage across the VARIABLE VOLTS/CM control to zero so the trace does not shift when the gain is varied.
DIFF. BAL.	Screwdriver adjustment to vary, differentially, the bias on the input-amplifier suppressor grids, to provide a fine differential adjustment of the input-amplifier gain so maximum rejection of the common-mode signal can be obtained.



CIRCUIT DESCRIPTION

General

The Type 53G Plug-in unit has a passband to 10 mc and a maximum sensitivity of .05 volts per centimeter. The amplifier consists of two stages of push-pull amplification, each stage followed by cathode followers.

Input Connectors

The input-selector switch, SW3027, connects the two input connectors to the grids of the input amplifiers. In either the **A** or **—B** positions of the switch, one of the grids is grounded and the other is connected to its associated input connector. In the **A—B** positions, both grids are connected to the signal inputs.

Input Attenuators

The **VOLTS/CM** switches SW3057 and SW3067 insert frequency-compensated attenuators into the input circuits. Four attenuators in each switch are used singly or in tandem pairs to produce nine sensitivities. The attenuators have voltage attenuation ratios of 2X, 4X, 10X and 100X, to produce sensitivities, in volts per centimeter of deflection, of 20, 10, 5, 2, 1, .5, .2, .1 and .05. When properly adjusted, the input resistance and capacitance of the unit remains unchanged as the attenuators are inserted.

Input Amplifier

The input amplifier, V3477 and V3487, is a common-cathode phase-splitter amplifier. R3397 and R3407 are current-limiting resistors to limit grid current in the event an excess voltage is applied to the input. The **DIFFERENTIAL BALANCE** control varies the voltage on the suppressor grids, raising one as it lowers the other. This increases the gain of one tube while decreasing the gain of the other. In this way the amplifier is adjusted for maximum rejection of the common-mode signal.

Cathode Follower

A cathode-follower stage, V3617B and V3627A, follows the input amplifier and provides a low-impedance drive for the output amplifiers. The input capacitance of the output amplifier varies as the gain controls are varied. The cathode-follower stage prevents this change of capacitance from affecting the high-frequency response.

C3557 and C3567 feed back the high-frequency components of the signal from each cathode to the grid of the opposite input amplifier. These capacitors are set to neutralize the grid-to-cathode capacitance of the input amplifiers. This prevents a high-frequency loss when the grid which is not being driven is at a high-impedance level.

Output Amplifier

The output-amplifier stage, V3617A and V3627B, amplifies the signal a second time and provides variable gain and positioning facilities. L3677 and L3687 are high-frequency peaking coils and are adjustable for best transient response.

The **VARIABLE VOLTS/CM** control, R3717, varies the gain over a 2½-to-1 ratio by varying the degeneration in the cathode circuit. Similarly, the **GAIN ADJ.** potentiometer sets the gain so that the sensitivity agrees with the front-panel calibration. The **DC BAL.** potentiometer balances the voltage on the cathodes so there is no vertical shift of the trace as the **VARIABLE VOLTS/CM** control is turned.

A dual potentiometer, R3827, positions the trace vertically. It is connected so that current is increased in one plate load as it is decreased in the other.

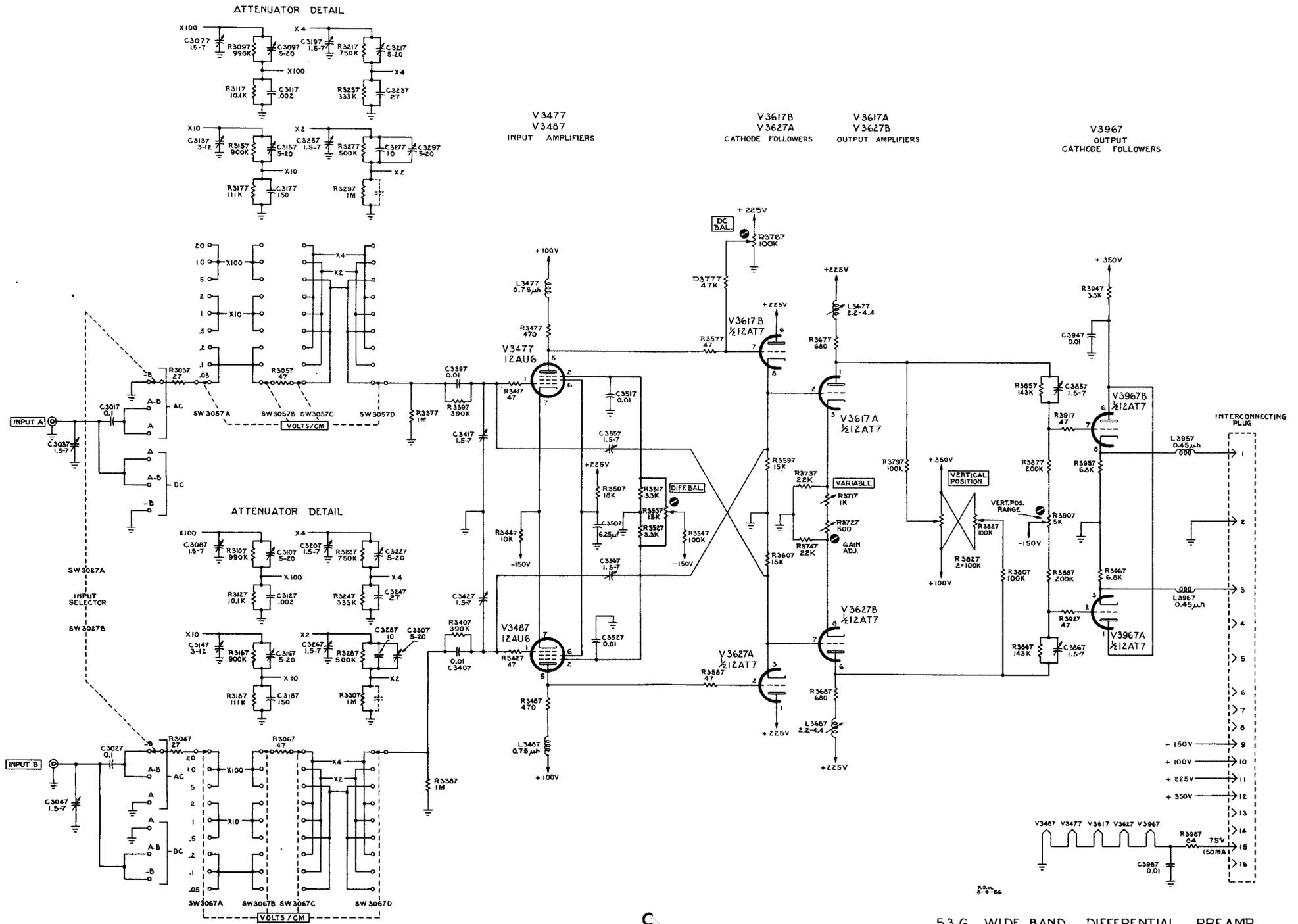
Output Cathode Followers

Frequency-compensated dividers reduce the dc potential applied to the cathode-follower grids to the correct value for the input of the Type 530-Series oscilloscopes. The **VERT. POS. RANGE** potentiometer allows the trace to be centered when the **VERTICAL POSITION** control is centered. The cathode followers, V3967, provide the low impedance necessary to drive the oscilloscope amplifier through the interconnecting plug. L3957 and L3967 are series peaking coils.

DC Heaters

The heaters for all the tubes in the preamp are connected in series to the regulated +100-volt supply through series dropping resistors in the plug-in unit and in the oscilloscope. This provides maximum stability in the presence of line voltage changes.





53 G WIDE BAND DIFFERENTIAL PREAMP