11A33 Checks and Adjustments Procedure

Order of Activities:

- Install the 11A33 in the Center compartment.
- EA cycle after warm-up.
    1. VC Adjust
    2. HF Adjust
- Install the 11A33 on a Flexible Extender.
    3. CMRR Adjust and Check.
- Install the 11A33 in the Center compartment.
- EA cycle after warm-up.
    4. DC Balance Check.
    5. VC Accuracy Check.
    6. Offset Accuracy Check.
    7. Gain Accuracy Check.
    8. Overdrive Recovery Check.
    9. Frequency Response Check.

TABLE 1
Test Equipment Required

Description	Minimum Specifications	Suggested Equipment
1. Oscilloscope Mainframe	Bandwidth, dc-500 MHz.	Tektronix 11401 Digitizing Oscilloscope.
2. Amplifier	Tektronix 11A-series.	Tektronix 11A32, 11A33, 11A34, 11A52, or 11A71.
3. Sine-Wave Generator	Reference, 50 kHz; Maximum frequency, 150 MHz; amplitude 5 V into 50 Ω.	Tektronix SG 503 Leveled Sine Wave Generator with power module.
4. Function Generator	Frequency: 10 Hz-40 MHz; Amplitude: 30 V p-p.	Tektronix FG 504 40 MHz Function Generator with power module.

TABLE 1 (cont)
Test Equipment Required

Description	Minimum Specifications	Suggested Equipment
5. Sine-Wave Calibrator	Frequency: 60 Hz to 250 kHz, 100 V p-p.	Fluke 5200A AC Calibrator.
6. Calibration Generator (for item 7)	Amplitude, 60 V; period, 10 ms.	Tektronix PG 506 Calibration Generator with power module.
7. Overdrive Recovery Tester	Calibration Fixture.	Calibration Fixture Tektronix Part, 067-0608-00, with Tektronix 1101A Accessory Power Supply.
8. Power Supply	Two supplies, continuously variable from 0-20 V; current limit, adjustable from 0-400 mA.	Tektronix PS 503A Dual Power Supply with power module.
9. Digital Multimeter	Make four-wire resistance measurements of 1 MΩ and 50 Ω accuracy, ≤0.1%.	Fluke 8842A Digital Multimeter.
10. Adapter, BNC Female to Dual Banana (two needed)	Connectors: bnc female, 1; male banana, two on 3/4-inch centers.	Tektronix Part 103-0090-00.
11. Adapter, BNC T	Connectors: bnc male, 1; bnc female, 2.	Tektronix Part 103-0030-00.
12. Attenuator, 10X	Impedance: 50 Ω, connectors: bnc female, 1; bnc male, 1.	Tektronix Part 011-0059-02.
13. Cables, Coaxial (three needed)	Impedance: 50 Ω, connectors: bnc male, length: 42-inch (2), 10-inch (1).	Tektronix Parts: 012-0208-00 (10"), 012-0057-01 (42").
14. Dual-Input Coupler	Impedance: 50 Ω; connectors: bnc male, 2; bnc female, 1.	Tektronix Part: 067-0525-02.
15. Patch Cable, BNC to to Banana Plug-Jack	Connectors: bnc male, 1; banana plug-jack, 1.	Tektronix Part: 012-0090-00.
16. Risetime Limiter		Tektronix Part: 067-1341-00.

1. VC Adjust

Equipment Required:

1. Mainframe
9. Digital Multimeter (DMM)

a. Install the 11A33 in the Mainframe's CENTER compartment.

b. Connect the DMM to the VC test point TP1100 and ground test point on the 11A33 Main Board.

c. Select Extended Diagnostic/Test in the Utility menu.

d. Select Center Plugin; Area = Group II; Routine = VC Low. Run.

e. Read the DMM. Note this value.

f. Select Routine = VC high. Run.

g. **ADJUST**—VC ADJ, R1000 so that the DMM reading is +10.000 plus the VC Low reading noted previously.

h. Select Routine = VC Low Run.

i. Read the DMM. If the reading has changed from the value noted in step e, note this value and go to step f. Continue this loop until the VC Low reading does not change. If the reading has not changed from the value noted in step e, exit Diagnostics/Test, and disconnect the DMM.

2. HF Adjust

Equipment Required:

1. Mainframe.
6. Calibration Generator.
12. Attenuator, 10X.
13. Coaxial cable.

a. Install the 11A33 in the Mainframe's CENTER compartment.

b. Set the 11A33 for –Size: 10 mV/div; Offset: –25 mV; bandwidth limit: 150 MHz; coupling: +DC, –DC; impedance: 50 Ω.

c. Set the Calibration Generator for Fast Rise mode, Period 1 μs, and Pulse Amplitude 500 mV. Connect the Fast Rise output to the 11A33 +Input through a coaxial cable and 10X attenuator.

d. Adjust the mainframe for a stable display of the positive-going edge of the waveform at 2 ns/div.

e. Rotate HF ADJ (R1233) throughout its range, while observing the rising edge of the displayed waveform. As HF ADJ is rotated from fully CW to fully CCW, the rise time decreases. Most of the rise time decrease occurs near the CW end of rotation. Very little rise time decrease occurs toward the CCW end. Observe that there is an evident breakpoint between the zone of rapid decrease of rise time and the zone of slight decrease of rise time. (Hint: Watch the horizontal position of the waveform at the 90% amplitude graticule line.)

f. Set HF ADJ fully CW, then slowly rotate counter-clockwise just past the end of the zone of rapid decrease. (This setting provides adequate high frequency gain without adding excessive noise and aberrations.)

3. CMRR Adjust and Check

Equipment required:

4. Function generator.
5. Sine Wave Calibrator; or (6. Calibration Generator).
14. Dual input coupler (067-0525-02).

Miscellaneous cables, etc.
Flexible plugin extender (067-1261-00).

Tools required:

C1,C2,C3,C4:	Allen wrench 0.050 inch; Tek P/N 003-0105-00.
C5,C6:	Square tip driver; Tek P/N 003-1400-00.
R1,R2,R3,R4,R5,R6:	Nonmetallic screwdriver; Tek P/N 003-1364-00.

Adjustment locations:

Figure 1. shows locations of eight adjustments on the Attenuator-Preamplifier Module. Six are accessible from the right-hand side of the instrument, and two are accessible from the left-hand side of the instrument, through an access hole in the A1 Main Board (C5, C6, R5, and R6 are not labeled on the instrument).

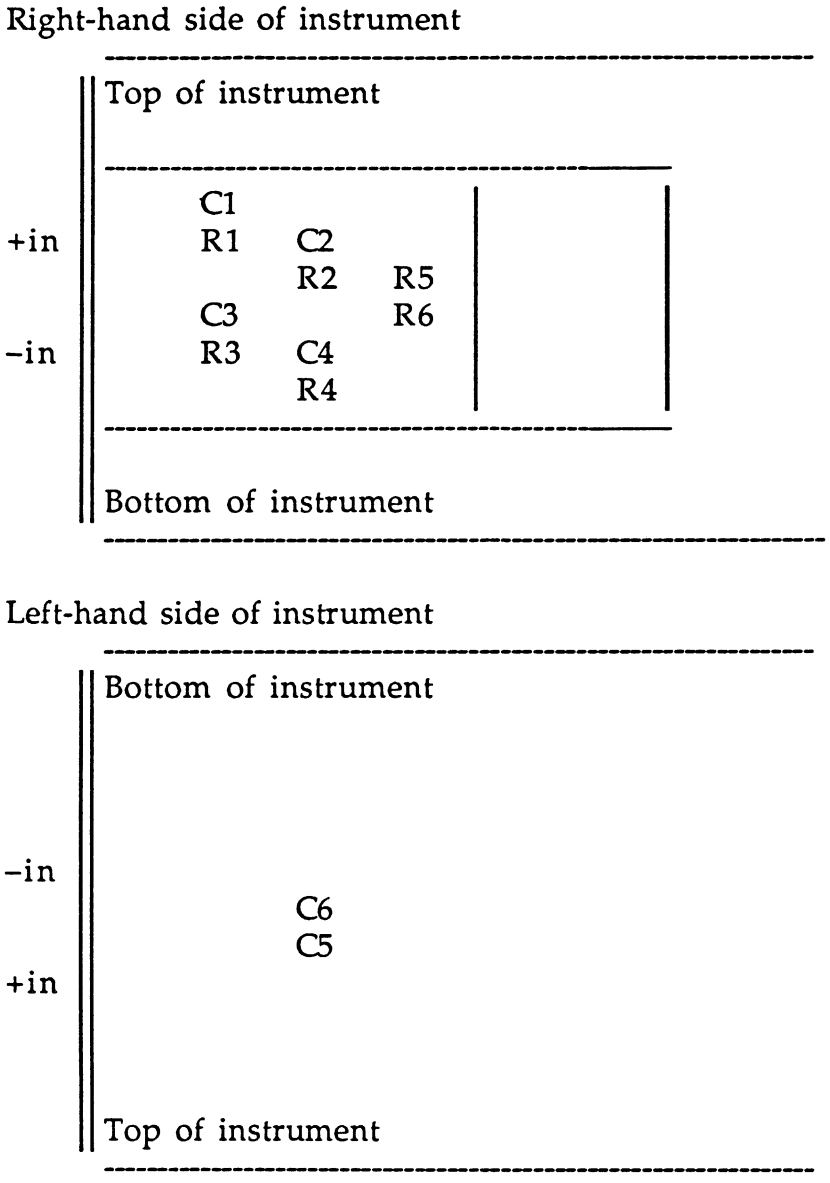


Figure 1. CMRR Adjustment locations.

CMRR Adjustments and Check Procedure

1. Install the Flexible Extender in the Mainframe's CENTER compartment. Install the 11A33 on the Flexible Extender.

2. Connect the signal generator's output to the + and - inputs of the 11A33 using dual input coupler 067-0525-02.

3. Because the residual signals after common mode rejection are small and vary in amplitude as adjustments are made, use of a separate trigger signal is recommended for providing a stable display. Connect the signal generator's trigger output (if available) to the Mainframe's External Trigger input, or the input of another plugin. If the signal generator is not equipped with a trigger output, and test frequencies are 250 kHz or below, the signal output may be connected, by use of a coaxial T-connector and cable, to the trigger input and the dual input coupler.

4. Following the order in Table 2, make the adjustments indicated to reduce the measured residual voltage within the limits shown at the specified test signal amplitudes and frequencies. Within each group of adjustments, it may be necessary to compromise the settings to meet all the specifications in the group.

5. Repeat steps 4.2, 4.4, and 4.6 until effects of interaction are no longer noticeable, and specifications are met at all verification points.

NOTE

These adjustments have been properly set at the factory and normally will require only slight adjustment during the life of the Attenuator-Preamp Module. Only if these adjustments have been radically disturbed will it be helpful to return to the initial settings described later.

CAUTION

Severe damage will occur unless the proper procedure is used in adjusting C1, C2, C3, and C4.

Each of these capacitors is composed of a grounded setscrew and a conductive area on the attenuator ceramic substrate directly below the screw tip. Turning the screw changes the capacitance by changing the distance between the conductive area and the screw tip.

Turning the screw too far clockwise will cause the tip to touch the conductive area, shorting out the signal path. Continued turning of the screw will cause breakage of the ceramic substrate.

TABLE 2
CMRR adjustments and checks.

11A33 S/N _____Date_____/____ /87 Time_____

Size	Test Frequency	CMRR Spec	Test Voltage	Residual Spec Limit	Voltage Measured
Step 4.1: Adjust R5, R6:					
1 mV/div	40 Hz	10,000:1	8 V p-p	0.8 mV p-p	_____
1 mV/div	40 Hz	5,000:1	16 V p-p	3.2 mV p-p	_____
(After adjusting R5 or R6, press ENHANCED ACCURACY on the mainframe before proceeding to Step 4.2.)					
Step 4.2: Adjust C5, C6:					
1 mV/div	20 MHz	500:1	1 V p-p	2 mV p-p	_____
1 mV/div	10 MHz	1,000:1	1 V p-p	1 mV p-p	_____
1 mV/div	1 MHz	10,000:1	8 V p-p	0.8 mV p-p	_____
1 mV/div	1 MHz	5,000:1	16 V p-p	3.2 mV p-p	_____
1 mV/div	2 MHz	2,500:1	16 V p-p	6.4 mV p-p	_____
1 mV/div	5 MHz	2,000:1	8 V p-p	4 mV p-p	_____
Step 4.3: Adjust R2, R4:					
0.1 V/div	40 Hz	1,000:1	30 V p-p	30 mV p-p	_____
Step 4.4: Adjust C2, C4:					
0.1 V/div	1 MHz	1,000:1	30 V p-p	30 mV p-p	_____
0.1 V/div	10 MHz	100:1	30 V p-p	300 mV p-p	_____
0.1 V/div	20 MHz	100:1	30 V p-p	300 mV p-p	_____
Step 4.5: Adjust R1, R3:					
1 V/div	40 Hz	500:1	100 V p-p	200 mV p-p	_____
Step 4.6: Adjust C1, C3:					
1 V/div	250 kHz	500:1	100 V p-p	200 mV p-p	_____

Alternative procedure for steps 4.5 and 4.6 (1V/div)

If the Sine Wave Calibrator (item 5) is not readily available, steps 4.5 and 4.6 adjustments may be made using the 60 volt high amplitude output of the PG506 (Calibration Generator, item 6).

1. Set the Calibration Generator for High Amplitude mode and maximum Pulse Amplitude. Connect the High Amplitude Output to the Dual Input Coupler. The +Trig Out can be used as a triggering signal for a stable display.

2. High and low frequency adjustments are made while examining characteristics of the square wave displayed as a residual signal.

3. Set the Calibration Generator Period to 0.1 ms.

4. Adjust R5 and R6 to minimize the vertical difference between the trailing portions of successive half cycles of the square wave residual signal. Ignore the spikes and tilt at the leading portion of each half cycle.

5. Adjust C5 and C6 to minimize the amplitude of the tilted leading portion of each half cycle of the residual signal. Ignore spikes at the leading edge of each half cycle.

Because the pulse amplitude used in this alternative procedure is approximately 60 V, the residual signal is too small to measure accurately. This procedure can be used to set the adjustments and give good confidence that the instrument is performing properly, but formal proof of performance requires the Sine Wave Calibrator (item 5) to allow sufficient measurement accuracy.

Initial settings:

Use this procedure prior to doing the adjustments only if minor adjustments are not sufficient to achieve specified performance, or if it is known that the previous settings
have been severely disturbed.

R2: Connect a signal, frequency approximately 40 Hz and amplitude approximately 30 V p-p, through the dual input coupler to the + and – inputs of the instrument. Set Size to 100 mV/div, + coupling to DC, and – coupling to DC. Observe the displayed residual signal which is the result of imperfect common mode rejection.

R2 is a continuous rotation device, with no stops. Rotate R2 up to one full turn to locate the point at which resistance changes abruptly from minimum to maximum, as indicated by a radical change in the residual signal amplitude.

Rotate the screwdriver one-half turn. This is the proper initial position (midrange resistance).

R4: Repeat the R2 setting process for R4.

R1: Repeat the R2 setting process, with signal amplitude approximately 100 V p-p and Size set to 1 V/div, for R1.

R3: Repeat the R1 setting process for R3.

R5: Fully CCW.

R6: Fully CW.

C2: Connect a signal, frequency approximately 250 kHz and amplitude approximately 30 V p-p, through the dual input coupler to the + and – inputs of the instrument. Set Size to 100 mV/div, + coupling to DC, and – coupling to DC. Observe the displayed residual signal which is the result of imperfect common mode rejection.

Slowly, carefully, and with as little torque as possible rotate C2 clockwise. The residual signal amplitude will increase as common mode rejection is degraded. As the screw tip approaches the substrate and increases the capacitance, the residual signal amplitude increases radically. When the screw tip touches the substrate, the residual signal amplitude increases to the input signal amplitude, because one amplifier input has been shorted out. Do not turn the screw farther clockwise, or substrate breakage will result.

Rotate the screw 1.6 turns counter clockwise. This is the proper initial position.

C4: Repeat the C2 setting process for C4.

C1: Repeat the C2 setting process, with signal amplitude approximately 100 V p-p and Size set to 1 V/div, for C1.

C3: Repeat the C1 setting process for C3.

C5: Connect a fast rise pulse to the + input of the instrument, and adjust for minimum capacitance by observing fastest rise time. (This is a continuous rotation device, with no stops.)

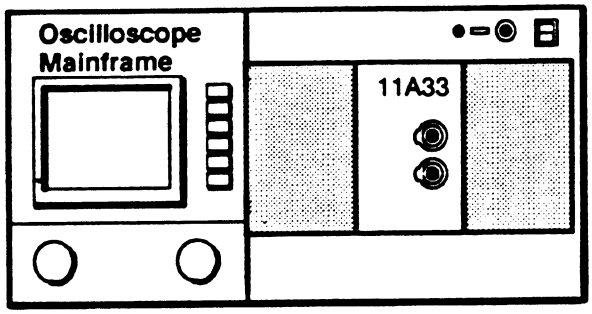
C6: Repeat the C5 setting process, with fast rise pulse to the –input,for C6.

4. DC Balance Check

NOTE

The Mainframe must be in ***Enhanced Accuracy*** *mode to perform the following procedure. Unless otherwise stated, all settings are the* ***Initialize*** *value.*

DC Balance Check Setup Conditions



5791-025

Settings:

Initialize

11A33 Amplifier

Display ..... on/off
Vert Size ..... 10 V/div
BW Limit or Hf Limit ..... 20 MHz

a. Press EA button. When EA cycle is successfully completed go to next step.

b. CHECK—that the displayed trace position is at the center graticule line, within the value listed in Table 3. under Shift for each **Vert Size** setting .

TABLE 3
11A33 DC Balance Table

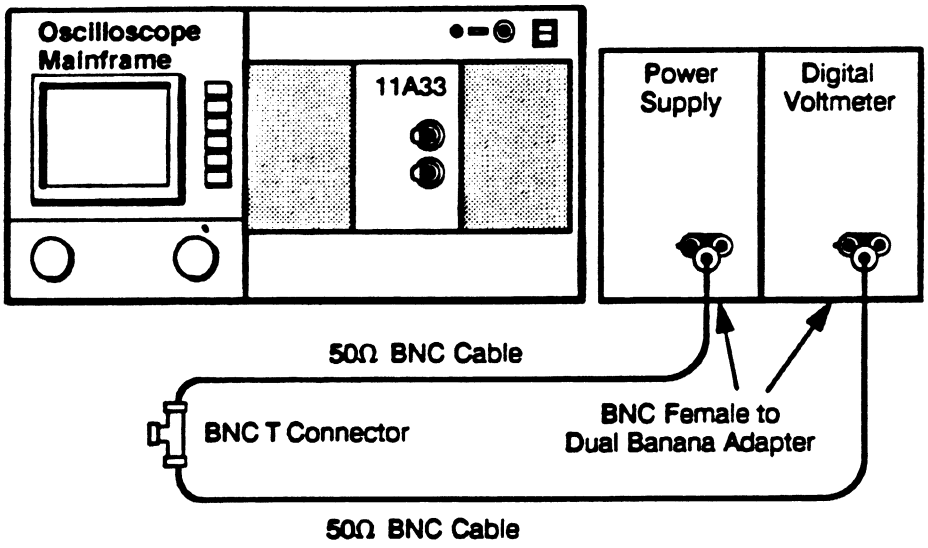
Vert Size	11401, 11402 Shift (± div)	11301, 11302 Shift (± div)
10 V	0.105	0.135
5 V	0.110	0.140
2 V	0.125	0.155
1 V	0.150	0.180
500 mV	0.110	0.140
200 mV	0.125	0.155
100 mV	0.150	0.180
50 mV	0.110	0.140
20 mV	0.125	0.155
10 mV	0.150	0.180
5 mV	0.200	0.230
2 mV	0.350	0.380
1 mV	0.600	0.630

5. VC Accuracy Check

NOTE

The mainframe must be in Enhanced Accuracy mode to perform the following procedure.

VC Accuracy setup conditions



Settings:

Initialize

11A33
- Display on/off ..... CH1 on

Mainframe
- Vert Size ..... 2 mV/div
- Coupling ..... +DC,-Vc
- BW Limit ..... 20 MHz

Power Supply
- Voltage ..... 8 V

Digital Voltmeter
- Mode ..... DC Voltage
- Range ..... 20 V

a. Note the position of the displayed trace (it should be near the center of the graticule).

b. Connect the BNC T to the 11A33 + input connector, with the Digital Voltmeter and the Power Supply connected.

c. Set the Vert Offset to 8V, and adjust the Power Supply so that the displayed trace returns to its original position.

d. **CHECK**—that the difference between the Offset reading and the DVM reading is less than that shown in Table 4.

e. **CHECK**—that offset accuracy is within the limits in Table 4 for each setting given. For each new Vert Size setting disconnect the Power Supply set the Vert Offset to 0, note the position of the trace on the display, and reconnect the Power Supply.

TABLE 4
Offset Accuracy Limits

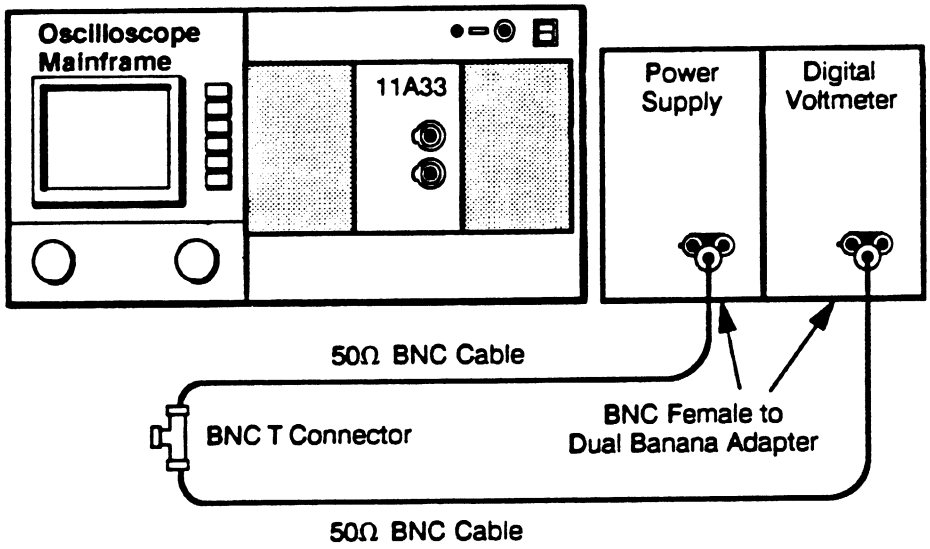
Vertical Size	Vertical Offset	(Vertical Offset –DVM Reading) Limit (±Volts)
1 mV/div	8 V	10.0 mV
1 mV/div	6 V	8.0 mV
1 mV/div	4 V	5.2 mV
1 mV/div	2 V	2.8 mV

6. Offset Accuracy

NOTE

The mainframe must be in Enhanced Accuracy mode to perform the following procedure.

Offset Accuracy Setup Conditions



Settings:

Initialize

11A33
Display on /off CH1
Mainframe
BW Limit ..... 20 MHz
Power Supply
Voltage ..... +20 V
Digital Voltmeter
Mode ..... DC Voltage
Range ..... 20 V

a. Note the position of the displayed trace (it should be near the center of the graticule).

b. Connect the BNC Tee to the 11A33 +input connector, with the Digital Voltmeter and the Power Supply connector.

c. Set the Vert Offset to 20 V, and Adjust the Power Supply so that the displayed trace returns to its original position.

d. **CHECK**—that the difference between the Offset reading and the DVM reading is less than that shown in Table 5.

e. **CHECK**—that offset accuracy is within the limits in Table 5 for each setting given. For each new Vert Size setting disconnect the Power Supply, set the Vert Offset to 0, note the position of the trace on the display, and reconnect the Power Supply.

TABLE 5
11A33 Offset Accuracy

Vertical Size	Test Voltage	(Vertical Offset -DVM Reading) Limit (± Volts)
1 V/div	20 V	320 mV
0.1 V/div	10 V	32 mV
1 mV/div	1 V	2.7 mV
1 mV/div	800 mV	2.3 mV
1 mV/div	600 mV	1.9 mV
1 mV/div	400 mV	1.5 mV
1 mV/div	200 mV	1.1 mV

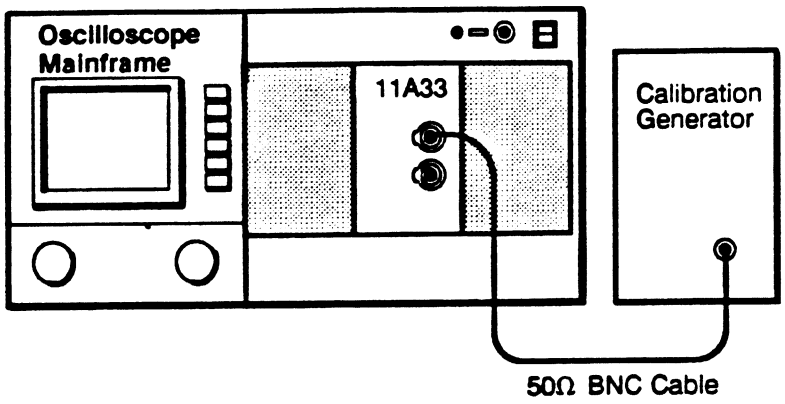
Set the DVM to the 2V scale for the last 5 tests.

7. Gain Accuracy Check

NOTE

The mainframe must be in Enhanced Accuracy mode to perform the following procedure.

Gain Accuracy Setup Conditions



Settings:

Initialize

11A33
- Display on /off ..... CH1 on

Mainframe
- Vert Size ..... 10 V/div
- BW Limit or HF Limit ..... 20 MHz

Calibration Generator
- Output and Mode ..... Standard Amplitude
- Voltage ..... 50 V

a. Use the Vertical Offset (or Vertical Position on 11301 and 11302 only) to display the waveform within the center 6 divisions of the graticule area.

b. Adjust the Variable Amplitude control of the Calibration Generator so the displayed waveform has exactly the amplitude shown in the Divisions column of Table 5.

c. CHECK—that the Deflection Error readout on the Calibration Generator is within the limits indicated in Table 6.

d. Repeat for each setting shown in the Table 6.

e. Repeat for –input.

NOTE

For limits with unequal plus and minus values, plus corresponds to the Calibration Generator "High" indicator, and minus corresponds to the "Low" indicator.

TABLE 6
Gain Accuracy

Vertical Size	Calibration Voltage	Display Divisions	Error Readout % Limit
10 V/div	50 V	5	±0.8%
5 V/div	20 V	4	±0.8%
2 V/div	10 V	5	±0.8%
1 V/div	5 V	5	±0.8%
0.5 V/div	2 V	4	±0.8%
0.2 V/div	1 V	5	±0.8%
0.1 V/div	500 mV	5	±0.8%
50 mV/div	200 mV	4	±0.8%
49.8 mV/div	200 mV	4	–0.4% to +1.2%
21 mV/div	100 mV	5	–0.8% to –4.2%
20 mV/div	100 mV	5	±0.8%
10 mV/div	50 mV	5	±0.8%
5 mV/div	20 mV	4	±0.8%
2 mV/div	10 mV	5	±0.8%
2 mV/div	5 mV	5	±0.8%

8. Overdrive Recovery Check

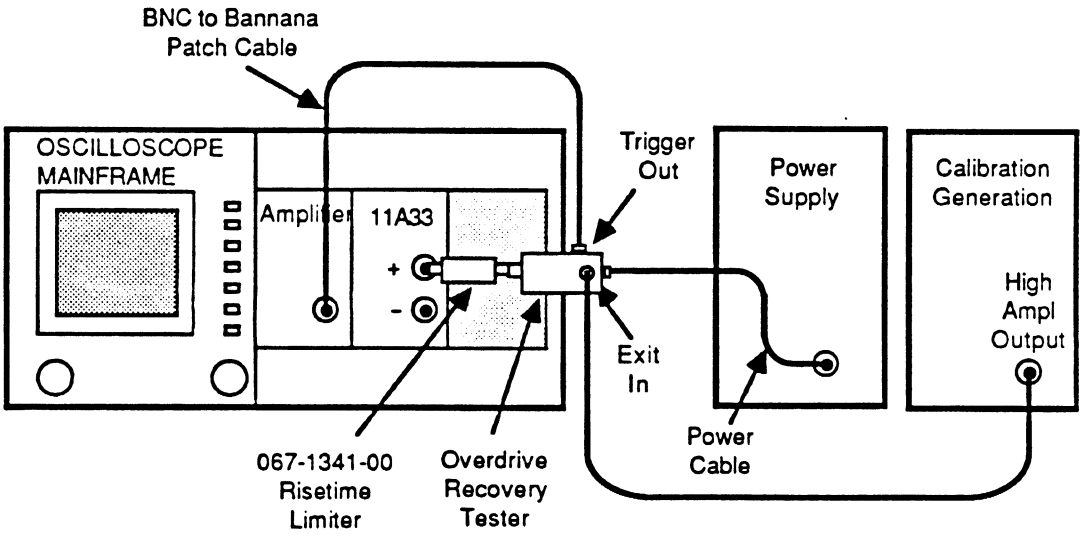
Equipment Needed: (Number corresponds to those listed in Table 5-1)

1. Oscilloscope Mainframe
2. Amplifier
6. Calibration Generator
7. Overdrive Recovery Tester, 067-0608-00
13 Cable, coaxial, 50 Ω
15. Patch Cable, bnc to banana plug
16. Risetime Limiter, 067-1341-00

NOTE

Before you install plug-in units into mainframe compartments set the ON/STANDBY switch to STANDBY.

Overdrive Recovery Setup Conditions



a. Set Oscilloscope Mainframe ON/STANDBY switch to ON.

b. Set Calibration Generator Period to 10 ms, Pulse Amplitude to 20 V (or level needed to operate Overdrive Recovery Tester).

c. Set Level switch on Overdrive Recovery tester to +, and Level control to midrange.

d. Press UTILITY button, and touch **Initialize.**

e. Set **Horizontal Main Size** to **10 ns/div.**

f. On left compartment amplifier press CH 1 display on/off button to on.

g. Set **Vert Size** to **100 mV/div, Impedance** to **50 Ω.**

h. Press TRIGGER MENU button, and set **Source** to **L1, Coupling** to **DC, Slope** to **+, Mode** to **Auto, Level** to about +300 mV (adjust for stable display).

i. On center compartment 11A33 press CH1 display on/off button to on.

j. Set **Vert Size** to **1 V/div, Vert Offset** to **+4 V, Coupling** to **+:DC** and **–:Off, DC.**

k. On the Overdrive Recovery Tester, press and hold Manual button, and adjust Level control to set 11A33 trace to +8 V (4 divisions above center of screen).

l. Set **Main Pos** or Horiz Pos to place 50% level (+4 V, t=0) at left edge of graticule (see Figure 2). Make no changes to Horizontal (Main) Size or Pos during steps m, n and o.

m. Set **Vert Size** to **5 mV,** and **Vert Offset** to **0 mV**

n. **CHECK**—that amplitude of Signal Out at t= 40 ns is less than 20mV (see Figure 3).

o. Set **Vert Size** to **1 mV,** and Vert **Offset** to **0 mV.**

p. Set **Horizontal (Main) Size** to **50 µs/div** and **Horiz Main Pos** to set the edge of the 11A33 displayed waveform to the left edge of the graticule.

q. **CHECK**—that amplitude of Signal Out is less than 2 mV at +100 µs and less than 1 mV at +300 µs (see Figure 4).

r. Repeat steps j. through r. for – input.

s. Change Overdrive Recovery Tester polarity to – and waveform TRIG Slope to – and TRIG level to –300 mV (adjust for stable display). Repeat steps j. through r. for both + and – inputs with –8 V overdrive, using –4 V offset at step j.

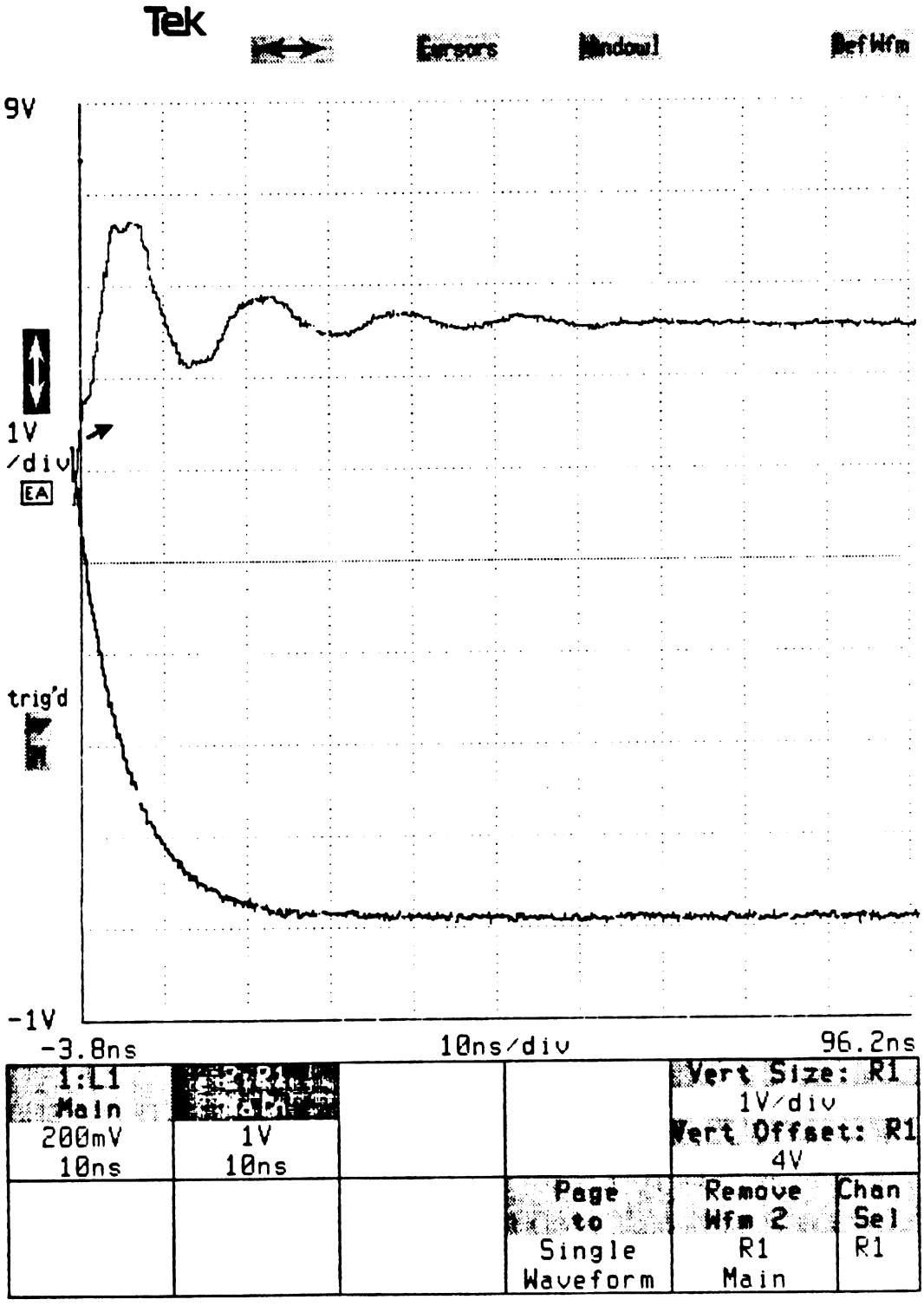

Tek
Cursors
Window
Ref Wfm
9V
1V
/div
EA
trig'd
-1V
-3.8ns
10ns/div
96.2ns
1:L1
Main
200mV
10ns
1V
10ns
Vert Size: R1
1V/div
Vert Offset: R1
4V
Page
to
Single
Waveform
Remove
Wfm 2
R1
Main
Chan
Sel
R1

Figure 2.

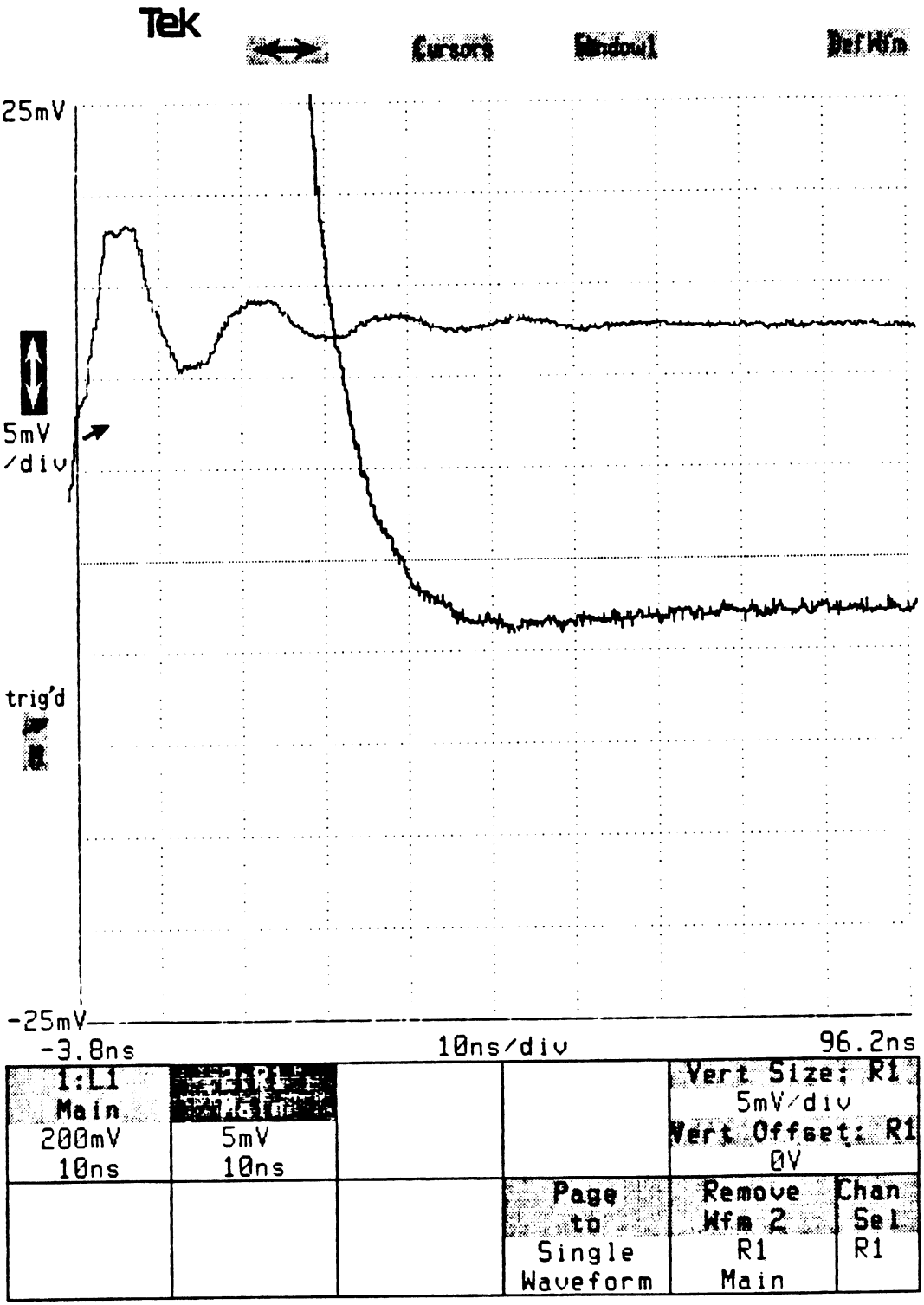

Tek
Cursors
Window
DefWfm
25mV
5mV
/div
trig'd
-25mV
-3.8ns
10ns/div
96.2ns
1:L1
Main
200mV
10ns
5mV
10ns
Vert Size: R1
5mV/div
Vert Offset: R1
0V
Page
to
Single
Waveform
Remove
Wfm 2
R1
Main
Chan
Sel
R1

Figure 3 .

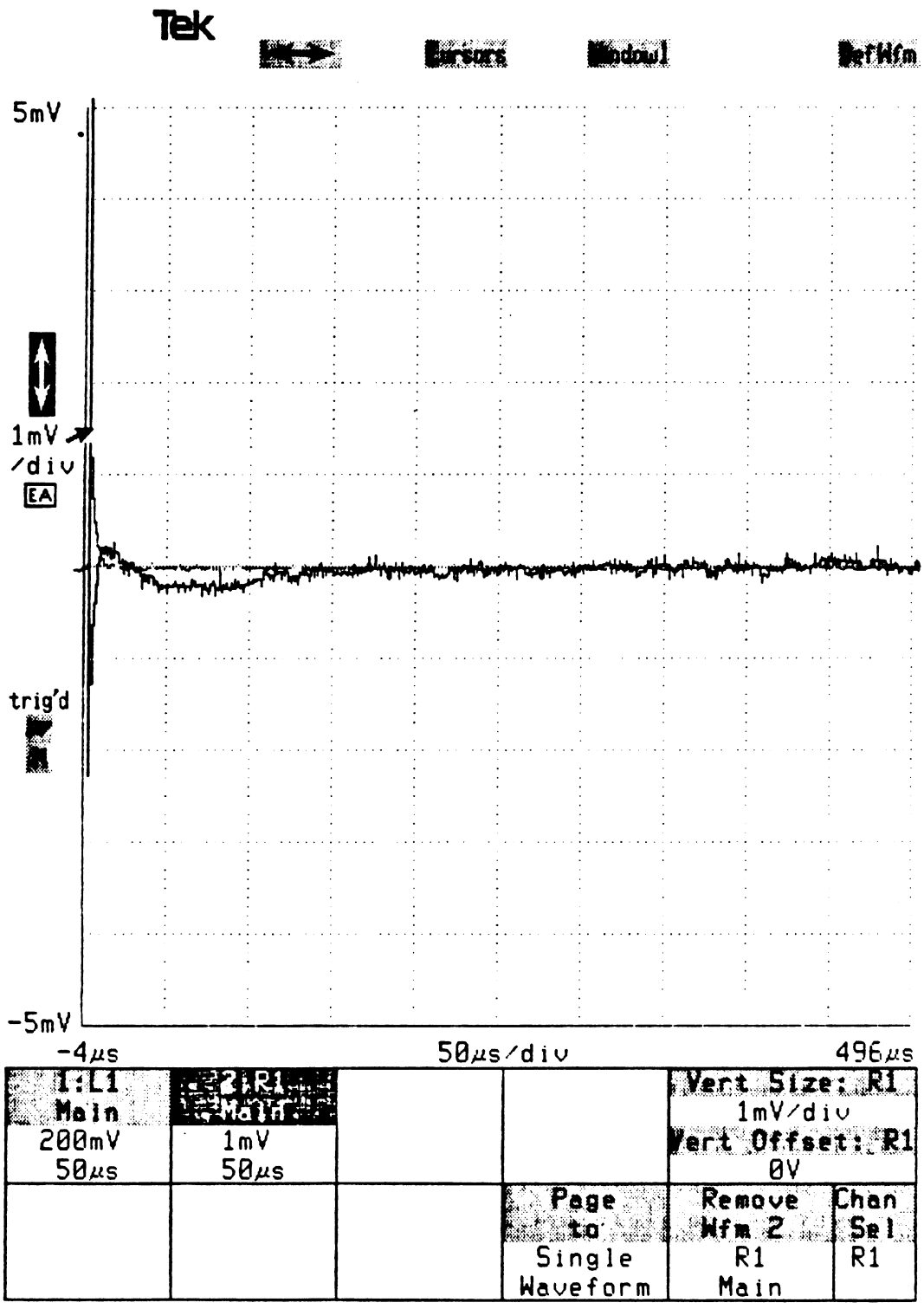

Tek
Cursors
Window
RefWfm
5mV
1mV
/div
EA
trig'd
-5mV
-4µs
50µs/div
496µs
1:L1
Main
200mV
50µs
2:R1
Main
1mV
50µs
Vert Size: R1
1mV/div
Vert Offset: R1
0V
Page
to
Single
Waveform
Remove
Wfm 2
R1
Main
Chan
Sel
R1

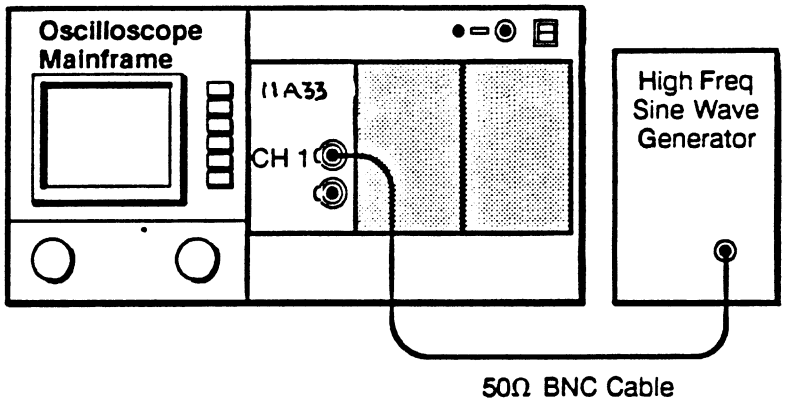
Figure 4.

9. Frequency Response Check

NOTE

The mainframe must be in Enhanced Accuracy mode to perform the following procedure. Unless otherwise stated, all settings are the **Initialize** value.

Frequency Response Setup Conditions



Settings:

Initialize

11A33

Display on/off.....CH 1 on

Mainframe

(Horizontal) Main Size.....1μ/div

Vert Size.....50 mV/div

Impedance.....50 Ω

High Frequency Sine Wave Generator

Amplitude.....Maximum

a. For each Vertical Size in Table 6 set the Generator Amplitude for the reference display.

b. CHECK—system frequency response by setting the Generator Frequency indicated in Table 7. Before checking the frequency response at each **Size** setting, return the Generator to 500 khz and adjust the reference amplitude. Set **Horiz (Main) Size** to 5 ns/div at each Frequency setting in Table 7 and back to 1 μs/div when confirming the Reference level.

TABLE 7
11A33 Frequency Response

500 kHz Reference				Result (≥)	
Vert Size	**Display**	**Measure***	**Frequency**	**Display**	**Measure***
1 V/div	5 div	5 V	150 MHz	3.54 div	3.54 V
500 mV/div	6 div	3 V	150 MHz	4.24 div	2.12 V
50 mV/div	6 div	300 mV	150 MHz	4.24 div	212 mV
5 mV/div	6 div	30 mV	150 MHz	4.24 div	21.2 mV
2 mV/div	6 div	12 mV	150 MHz	4.24 div	8.48 mV
1mV/div	6 div	6 mV	120 MHz	4.24 div	4.24 mV

*** Amplitude may be measured with the aid of cursors (ΔV 11301, 11302) or peak to peak measurement function (11401, 11402) with averaging N at least 32.**

TABLE 8
Field Replaceable Units

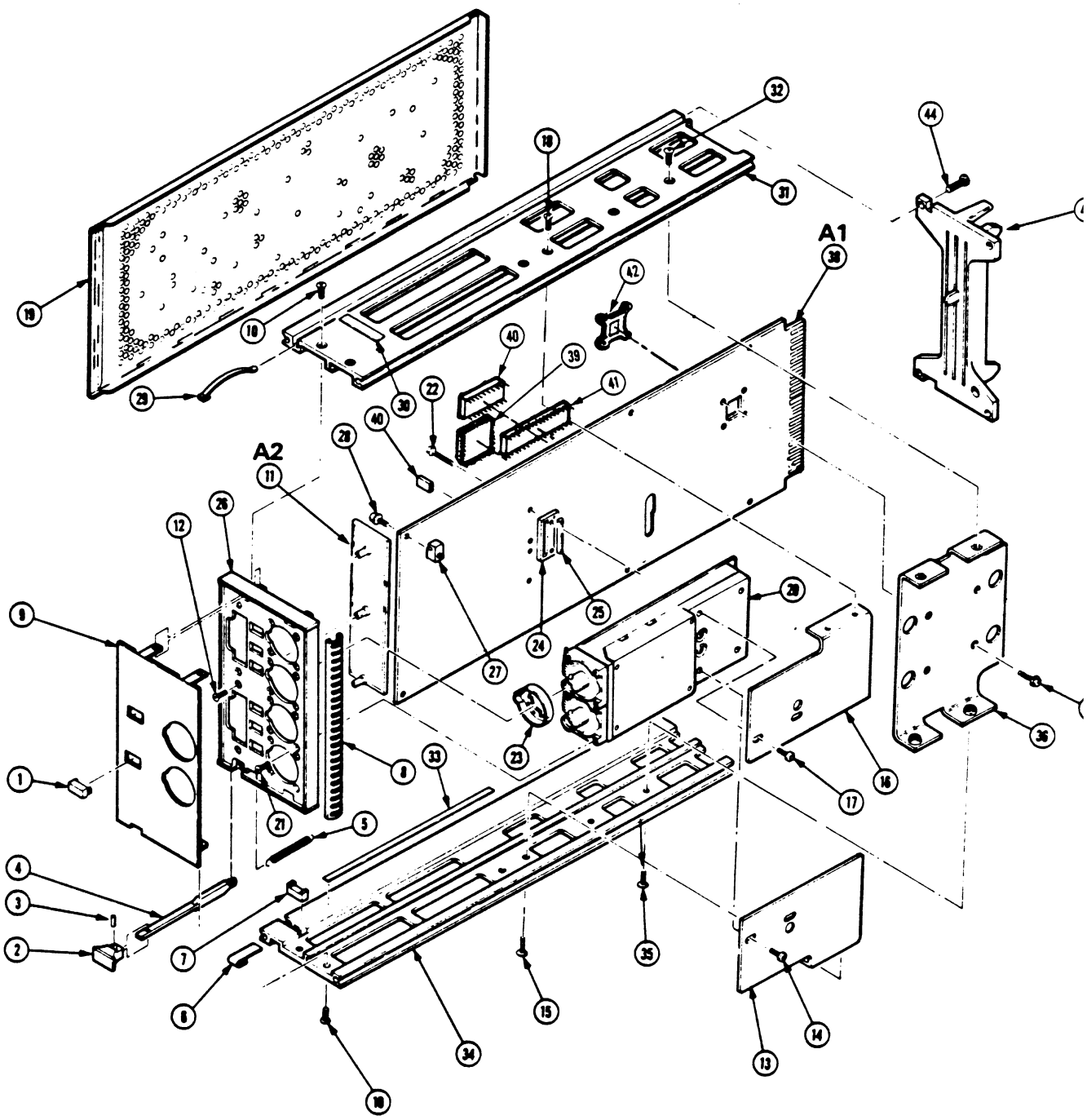
Fig & Index No.	Assembly No.	Description	Tektronix Part No.
1-11	A2	Front Panel Board	670-9698-00
1-20		Attenuator	119-2447-01
1-38	A1	Main Board	670-9697-01
1-41		Main Processor	156-1684-01
1-40		EPROM	160-4227-XX
1-42		Vertical Amplifier IC	165-2089-05
1-39		SDI IC (M382)	156-2625-00

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
22599	AMERACE CORP ESNA DIV	15201 BURBANK BLVD SUITE C	VAN NUYS CA 91411
34649	INTEL CORP	3065 BOWERS AVE	SANTA CLARA CA 95051
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
91260	CONNOR SPRING AND MFG CO	1729 JUNCTION AVE	SAN JOSE CA 95112
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61101
TK1326	NORTHWEST FOURSLIDE INC	5858 WILLOW LANE	LAKE OSWEGO OR 97034
TK1918	SHIN-ETSU POLYMER AMERICA INC	1181 NORTH 4TH ST	SAN JOSE CA 95112

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	366-0600-00			2	PUSH BUTTON:0.269 X 0.409,ABS	80009	366-0600-00
-2	366-1058-00			1	KNOB:GRAY,0.625 X 0.255 X 0.485 (ATTACHING PARTS)	80009	366-1058-00
-3	214-1095-00			1	PIN,SPRING:0.187 L X 0.094 OD,STL,CD PL (END ATTACHING PARTS)	22599	52-022-094-0187
-4	105-0076-04			1	RELEASE BAR,LCH:PLUG-IN UNIT	80009	105-0076-04
-5	214-1280-00			1	SPRING,HLCPS:0.14 OD X 1.126 L,TWIST LOOP	91260	ORDER BY DESCR
-6	214-1054-00			1	SPRING,FLAT:0.825 X 0.322,SST	TK1326	ORDER BY DESCR
-7	105-0075-00			1	BOLT,LATCH:	80009	105-0075-00
-8	348-0235-00			2	SHLD GSKT,ELEK:FINGER TYPE,4.734 L	80009	348-0235-00
-9	333-3398-00			1	PANEL,FRONT:ALUMINUM (ATTACHING PARTS)	80009	333-3398-00
-10	211-0392-00			4	SCREW,MACHINE:4-40 X 0.25,FLH,82 DEG,STL (END ATTACHING PARTS)	80009	211-0392-00
-11	670-9698-00			1	CIRCUIT BD ASSY:FRONT PANEL (ATTACHING PARTS)	80009	670-9698-00
-12	211-0390-00			3	SCREW,MACHINE:2-56 X 0.188,FH,STL CD PL (END ATTACHING PARTS)	80009	211-0390-00
-13	407-3616-00			1	BRKT,HEAT SINK:LEFT,ALUMINUM (ATTACHING PARTS)	80009	407-3616-00
-14	211-0409-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
-15	211-0392-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,82 DEG,STL (END ATTACHING PARTS)	80009	211-0392-00
-16	407-3615-00			1	BRKT,HEAT SINK:RIGHT,ALUMINUM (ATTACHING PARTS)	80009	407-3615-00
-17	211-0409-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL	93907	ORDER BY DESCR
-18	211-0392-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,82 DEG,STL (END ATTACHING PARTS)	80009	211-0392-00
-19	337-1064-12			2	SHIELD,ELEC:SIDE FOR PLUG-IN UNIT	80009	337-1064-12
-20	119-2447-01			1	ATTEN,NOVAR:DIFFERENTIAL ATTEN W/AMP (ATTACHING PARTS)	80009	119-2447-01
-21	211-0390-00			6	SCREW,MACHINE:2-56 X 0.188,FH,STL CD PL	80009	211-0390-00
-22	211-0391-00			4	SCREW,MACHINE:2-56 X 0.437,P4,STL CD PL (END ATTACHING PARTS)	80009	211-0391-00
-23	354-0654-01			2	RING,CONN:BNC	80009	354-0654-01
-24	352-0780-00			2	HOLDER,CNDCT:ELASTOMERIC	80009	352-0780-00
-25	131-3383-01			4	CONN ASSY,ELEC:ELASTOMERIC,3.8MM X 3.0MM X 24.0MM,0.4MM L CONTACT PT	TK1918	.4PX24X3.8X3.0
-26	386-5219-00			1	SUBPANEL,FRONT:	80009	386-5219-00
-27	220-0022-00			6	NUT BLK:0.4 X 0.25 X 0.33,4-40 THRU,NI SIL (ATTACHING PARTS)	80009	220-0022-00
-28	211-0409-00			6	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL (END ATTACHING PARTS)	93907	ORDER BY DESCR
-29	214-1061-00			1	CONTACT,ELEC:GROUNDING,CU BE	80009	214-1061-00
-30	334-3438-00			1	MARKER,IDENT:MARKED TURN OFF POWER	80009	334-3438-00
-31	426-2060-00			1	FR SECT,PLUG-IN:UPPER,ALUMINUMN (ATTACHING PARTS)	80009	426-2060-00
-32	211-0392-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,82 DEG,STL (END ATTACHING PARTS)	80009	211-0392-00
-33	334-3540-00			1	MARKER,IDENT:MARKED WARNING	80009	334-3540-00
-34	426-2061-00			1	FR SECT,PLUG-IN:LOWER,ALUMINUM (ATTACHING PARTS)	80009	426-2061-00
-35	211-0392-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,82 DEG,STL (END ATTACHING PARTS)	80009	211-0392-00
-36	407-3363-00			1	BRACKET,HEAT SK:ALUMINUM (ATTACHING PARTS)	80009	407-3363-00
-37	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX,T15 (END ATTACHING PARTS)	01536	ORDER BY DESCR
-38	670-9697-00	B010100	B020124	1	CIRCUIT BD ASSY:MAIN	80009	670-9697-00
	670-9697-01	B020125		1	CIRCUIT BD ASSY:MAIN	80009	670-9697-01
-39	156-2625-00			1	.MICROCKT,DGTL:NMOS,CUSTOM,SENESCHAL	80009	156-2625-00
-40	160-4227-01			1	.MICROCKT,DGTL:HMOS,16384 X 8 EPROM,PRGM	80009	160-4227-01
-41	156-1684-01			1	.MICROCKT,DGTL:MICROCOMPUTER,8 BIT	34649	P8031AH
-42	165-2089-05			1	.MICROCKT,LINEAR:VERTICAL PREAMP,100 OHM	80009	165-2089-05
-43	386-5296-00			1	PANEL,REAR: (ATTACHING PARTS)	80009	386-5296-00
-44	213-0904-00			4	SCREW,TPG,TR:6-32 X 0.5,PNH,STL (END ATTACHING PARTS)	83385	ORDER BY DESCR

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
1-								
						STANDARD ACCESSORIES		
	070-6119-00			1		MANUAL,TECH:USERS,11A33	80009	070-6119-00
						OPTIONAL ACCESSORIES		
	070-6784-00			1		MANUAL,TECH:SERVICE REF,11A33	80009	070-6784-00


A1
A2