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TEKTRONIX, INC.
Factory Service Center
P.O. Box 500 M S 78-654
Beaverton, OR 97077

Phone: (503) 627-6630
Fax: (503) 627-6576
(TRT) Telex:192825 TEKTRONIX

****

SERVICE CALIBRATION PROCEDURE

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* * * 067-0625-00 * * *

Peak to Peak Detector

All serial numbers.

PROCEDURE NO. 0670625-AB

Originated: Oct. 85 by: L. Brinkly
Revised: Dec. 89 by: L. Brinkly
Approved: 19 FEB 1990 by: Del Knapp

REVISION LEVEL: B

27 Mar. 1991 by: Gene Brox

Approved: (Date) 28 MAR 91 by: Del Knapp

Del Knapp, Svc. Met. Mgr.

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P.O. Box 500 M S 78-654
Beaverton, OR 97077

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Section 4

PERFORMANCE Check

4.0 Equipment Required:

Digital Volt Meter	200 mV/2V Rngs ± 250 ppm	Tek DM 5120*
Calibrator (AC)	10 Hz to 50 kHz 450 mV RMS (1.2 V P-P) ± 500 ppm	Fluke 5100
P-P Detector "Standard"	067-0625-00 Characterized @ Tektronix Primary Electrical Standards Lab. Procedure # 1225	
Leveled Sine wave Generator	500 kHz to 250 MHz up to 5 V P-P (ref. 50 kHz)	SG 503*
	250 to 1050 MHz up to 5 V P-P (ref Freq. not used)	SG 504*
VSWR Checker	0.01 ± 0.1 p2 reflection Coefficient	Wiltron 67B50

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Beaverton, OR 97077

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Section 4

PERFORMANCE Check (cont.)

4.Ø Equipment Required: (cont.)

Test Scope	1 mV/Div vert. sens.	Tek 76Ø3
	5" CRT (VSWR graticule)	7A22
		7B53A
Calibration Aid	Custom Made +/- on/off switcher including a 2.4 MΩ load for the DVM. (No calibration necessary.)	
2Ø dB Attenuator	X1Ø 5Ø Ω BNC.	Tek Ø11-ØØ59-Ø2

* TM 5ØØ/5ØØØ Power Module required for operation.

4.1 General:

Insure thàt the input GR-874 connector is tight. A loose connector may cause any of the following checks to fail.

4.2 D C INPUT RESISTANCE Check:

Connect the Ohm meter, using 4 leads at the GR-874 connector. The DC resistance must be 5Ø Ω ± Ø.5 Ω (± 1%).

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4.3 INPUT VSWR Check:

Measure the input VSWR of the Detector using a VSWR Auto tester at 500 MHz. Measured VSWR should be less than 1.15 or 23 dB return loss.

See page 4-5 for the VSWR check details.

Note:

Failure of the Input Resistance Check (step 4.2), Input VSWR Check (step 4.3), or any repair, requires a complete Calibration (Section 5).

4.4 DC/V P-P Check (Sensitivity):

a. Connect the Input of the 067-0625-00 to the Calibrator, and the outputs (+ & -) thru the special adapter, to the High & Low inputs of the DVM. Do not ground the (-) NEG. (Low) side.

b. Set the Calibrator to 50 kHz at 424.2 mV RMS (1.2 V P-P).

c. Check for 00.0 mV ± 0.1 mV DC from the Detector into the DVM. Adjust the Calibrator if necessary, but do not use the Error Control for setting the output to zero. This is the reference Voltage.

d. Change the output (using the Error Control) to + 1 %.

e. Check DVM for - 10.0 mV ± 1.0 mV DC.

f. Change the output (using the Error Control) to - 1 %.

g. Check DVM for + 10.0 mV ± 1.0 mV DC.

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4.4 DC/V P-P Check (cont.):

h. Change the output (using the Error Control) to - Ø.5 %.

i. Check DVM for + 5.Ø mV ± Ø.5 mV DC.

j. Change the output (using the Error Control) to + Ø.5 %.

k. Check DVM for - 5.Ø mV ± Ø.5 mV DC.

l. Reset the Error Control to Zero and verify as in step c..

m. Set Calibrator to 5Ø Hz and verify Ø mV ± 1 mV, low end check.

n. Return Calibrator to 5Ø kHz and verify Ø mV ± 1 mV, drift check.

o. Disconnect all Equipment.

NOTE:

Batteries must be replaced yearly and before Calibration.

See Section 5.1 for battery replacement

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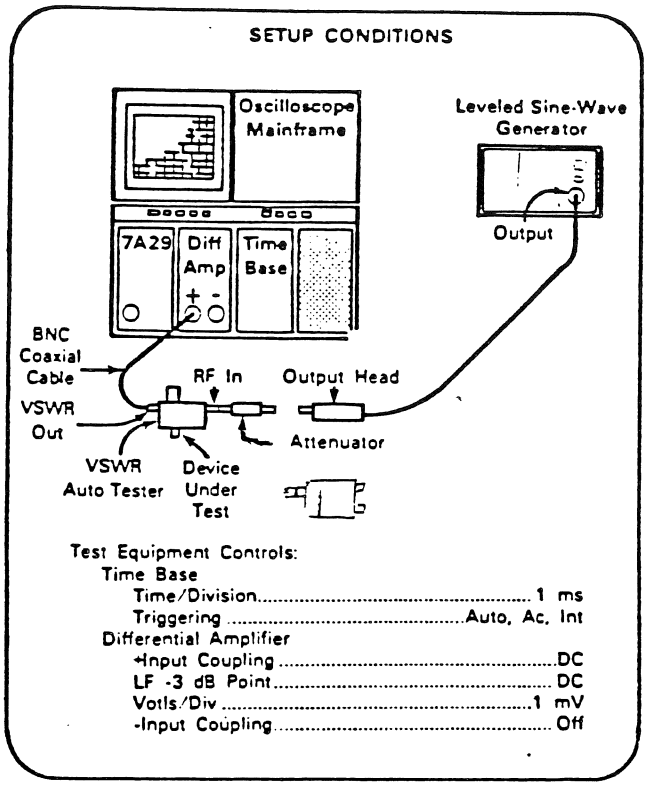
SECTION 4

PERFORMANCE Check (cont.)

VSWR Check.



a. Install the 2Ø dB Return Loss SWR graticule (supplied with the VSWR Autotester) on the Oscilloscope CRT.

b. Align the trace with the 1.Ø6 line (3Ø dB) on the SWR graticule while there is no signal applied.

c. Connect the Leveled Sign wave Generator Output thru the 1Ø X Attenuator, the Autotester, to the Vertical Input and set the level to the 1.22 line (2Ø dB) on the SWR graticule.

d. Reconnect the cable with the 1Ø X Attenuator removed. Connect the VSWR Autotester to the Ø67-Ø625-ØØ Input connector.

e. CHECK the oscilloscope trace remains above the 1.15 line (23 dB or more) on the SWR graticule while the generator frequency is varied up to 5ØØ MHz.

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Factory Service Center
P.O. Box 500 M/S 78-654
Beaverton, OR 97077

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SECTION 5

CALIBRATION

5.Ø Equipment Required:

See Step 4.Ø for Calibration equipment required.

5.1 Battery Replacement:

With the GR-874 connector (R F Head) facing you and oriented at the top, remove only the two screws on the RIGHT side of the front casting. Care must be taken not to loosen more than two head screws at a time. Remove the two screws on the same side at the rear, if necessary, loosen the remaining two rear screws by no more than 1/4 turn. This allows the removal of the side cover.

Verify each installed battery for a minimum of 1.33 V.

WARNING

Disposal of Mercury Cell Batteries must comply with local and EPA Laws.

CAUTION

The P-P Detector is very TEMPERATURE SENSITIVE. Minimize physical contact with the GR-874 connector end. Allow at least 5 minutes for drift before any tests are made.

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5.2 Sensitivity Calibration/Adjustment:

There are two adjustments that will calibrate the sensitivity of the Detector. The required sensitivity is 10 mV ± 1 mV per 1% input change at approximately 1.2 V P-P input signal level. Adjustments may be necessary when new batteries are installed.

a. Perform these steps after new batteries (step 5-1) are installed.

b. Connect the Input of the 067-0625-00 to the Calibrator, and the outputs (+ & -) thru the special adapter, to the High & Low inputs of the DVM. Do not ground the (-) NEG. side.

c. Set the Calibrator to 50 kHz at 424.2 mV RMS (1.2 V P-P).

d. Connect the DVM to the (+) POS. output, and to ground or the shell, with no connection (switch open) to the (-) NEG. output.

e. Adjust R 8 for 00.0 mV ± 0.1 mV DC on the DVM.

f. Connect the DVM to the (-) NEG. output, and to ground or the shell, with no connection (switch open) to the (+) POS. output.

g. Adjust R 9 for 00.0 mV ± 0.1 mV DC on the DVM.

h. Connect the DVM to the (+) POS & (-) NEG outputs of the Detector. Do not connect the ground or shell as this must be a floating measurement.

i. Check the output for 00.0 mV ± 0.1 mV DC on the DVM, reversing the polarity should not effect the reading.

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5.2 Sensitivity Adjustment (cont.):

j. Using the Error Control, induce a + 1 % change, and note the DVM reading of - 10.0 mV ± 1.0 mV DC as in table 1.

k. Repeat step j. by inducing a - 1 % change, and note the DVM reading of + 10.0 mV ± 1.0 mV DC.

l. Repeat steps j. and k. using the remaining points shown in table 1.

TABLE 1

± % CHANGE	± mV DC output	TOLERANCE
0.0 %	0.0 mV	Ref. set
0.5 %	5.0 mV	± 0.5 mV
1.0 %	10.0 mV	± 1.0 mV
3.0 %	30.0 mV	± 3.0 mV
5.0 %	50.0 mV	± 5.0 mV
10.0 %	100.0 mV	± 10.0 mV

m. Reassemble unit and tighten all screws.

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5.3 CORRECTION FLATNESS Verification:

Flatness is a precise measurement and requires standards not normally encountered in most service facilities. A P-P Detector "STD" must be used to determine the errors and the corrections for the source. The Device Under Test errors and Corrections can then be determined.

a. Connect the P-P Detector "STD" input to the SG 503 with a 50Ω coax (012-0482-00). Connect the output thru the test fixture to the DVM.

b. Adjust the SG 503 Output (50 kHz at 1.2 V P-P) level control for 00.0 mV as read on the DVM.

c. Set the Frequency to 10, 20, 30, 50, & 75 MHz and note each DVM reading as a percentage (10 mV = 1 %) on the worksheet pg 5-10, under "STD Rdgs" column. Do not change the Level Control.

d. Return SG 503 to 50 kHz, and verify DVM ± 1 mV as in step b.

e. Set the Frequency to 100, 125, 150, 175, 200, 225, & 250 MHz and note DVM readings in percent as in step c. above.

(Note the 250 MHz reading for use in step h.)

f. Return SG 503 to 50 kHz, and verify the DVM ± 1 mV as in step b.

g. Connect the SG 504 Signal Generator via the leveling head, in place of the SG 503.

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Factory Service Center
P.O. Box 500 M.S 78-654
Beaverton, OR 97077

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Fax: (503) 627-6576
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5.3 CORRECTION FLATNESS (cont.):

h. Set the SG 504 for 250 MHz, and use the Level Control to set the amplitude as noted in step e.

i. Set the SG 504 to 300, 350, 400, 450, & 500 MHz and note each DVM reading in percent as in step c.

j. Return SG 504 to 250 MHz, and verify the reference level ± 2 mV as was noted in step h.

k. Replace the Detector "STD" with the Device Under Test "DUT".

l. Repeat, step a. thru j., only entering the data in column "DUT Rdgs" on the worksheet pg 5-10.

m. Disconnect equipment.

n. Algebraically add the "STD C.F." (Correction Factor) figure to the "STD Rdgs" number. This gives the Source Deviation (error). Change the sign and enter this quantity in the "Source C.F." column. Algebraically add the "Source C.F." to the "DUT Rdgs". This is the DUT Deviation (error). Change the sign and enter the quantity in the "DUT C.F." column as the DUT Correction Factor.

TEKTRONIX, INC.
Factory Service Center
P.O. Box 500 M/S 78-654
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5.4 CORRECTION FLATNESS w/ATTENUATOR:

a. Step 5.3 must be completed before continuing with Attenuators.

b. Connect P-P Detector "STD" input, to the SG 503 with the 50Ω coax to the first X2 Attenuator. Connect the output thru the Test Fixture to the DVM.

c. Adjust the SG 503 Output (50 kHz at 2.4 V P-P) Level Control for 00.0 mV as read on the DVM.

d. Set the Frequency to 10, 20, 30, 50, & 75 MHz and note each DVM reading as a percentage (10 mV = 1 %) on the worksheet pg. 5-11, under "STD Rdgs" column. Do not disturb the Level Control.

e. Return the SG 503 to 50 kHz, and verify the DVM ± 1 mV as in step c.

f. Set the SG 503 to 100, 125, 150, 175, 200, 225, & 250 MHz and note DVM readings in percent as in step d. above.

(Note the 250 MHz reading for use in step i.)

g. Return the SG 503 to 50 kHz, and verify the DVM ± 1 mV as in step c.

h. Connect the SG 504 and Level Head in place of the SG 503 and cable.

i. Set the SG 504 to Frequency to 250 MHz and adjust the amplitude Level Control for the same level at 250 MHz as noted in step f.

j. Set the Frequency to 250, 300, 350, 400, 450, & 500 MHz and note each DVM reading on the worksheet as in step d. above.

Again, be sure as not to disturb the Level Control.

k. Return the SG 504 to 250 MHz, and verify the reference level ± 2 mV as in step i.

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Factory Service Center
P.O. Box 500 M S 78-654
Beaverton, OR 97077

Phone: (503) 627-6630
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5.4 CORRECTIONS (cont.):

l. Replace the Detector "STD" with the Device Under Test "DUT"

m. Repeat step b. thru k., entering the data in the "DUT Rdgs" column on the worksheet pg. 5-11.

n. Disconnect equipment.

o. Algebraically add the "STD C.F." (Correction Factor) figure to the "STD Rdgs" number. This gives the Source Deviation (error). Change the sign and enter this quantity in the "Source C.F." column. Algebraically add the "Source C.F." to the "DUT Rdgs". This is the DUT Deviation (error). Change the sign and enter the quantity in the "DUT C.F." column as the DUT Correction Factor.

TEKTRONIX, INC
Factory Service Center
P.O. Box 500 M.S 78-654
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Fax: (503) 627-6576
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5.5 CORRECTIONS (cont.):

l. Replace the Detector "STD" with the Device Under Test "DUT".

m. Repeat steps b. thru k. entering the data in the column under "DUT Rdgs" on pg. 5-12.

n. Disconnect equipment

o. Algebraically add the "STD C.F." (Correction Factor) figure to the "STD Rdgs" number. This gives the Source Deviation (error). Change the sign and enter this quantity in the "Source C.F." column. Algebraically add the "Source C.F." to the "DUT Rdgs". This is the DUT Deviation (error). Change the sign and enter the quantity in the "DUT C.F." column as the DUT Correction Factor.

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Beaverton, OR 97077

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Fax: (503) 627-6576
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Section 5

CALIBRATION DATA

067 0625 00

Ser. No. _____ I. D. No. _____.

CORRECTION FACTORS (Flatness) @ 1.2 V P-P (direct input)

NOTE: Set .050 MHz Ref. to 0.0 ± 0.1 mV DC and check @ end of each group.

	STD C.F.	STD Rdgs.	Source C.F.	DUT Rdgs.	DUT C.F.
10 MHz					
20 MHz					
30 MHz					
50 MHz					
75 MHz					
100 MHz					
125 MHz					
150 MHz					
175 MHz					
200 MHz					
225 MHz					
250 MHz					
300 MHz					
350 MHz					
400 MHz					
450 MHz					
500 MHz					

For attenuator corrections use next page.

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Fax: (503) 627-6576
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Section 5

CALIBRATION DATA

Ø67 Ø625 ØØ (cont.)

Ser. No. _____ I. D. No. _____.

CORRECTION FACTORS w/ Attenuator @ 2.4 V P-P (w/first X2 Attenuator)

NOTE: Set .Ø5Ø MHz Ref. to Ø.Ø ± Ø.1 mV DC and check @ end of each group.

	STD C.F.	STD Rdgs.	Source C.F.	DUT Rdgs.	DUT C.F.
1Ø MHz					
2Ø MHz					
3Ø MHz					
5Ø MHz					
75 MHz					
1ØØ MHz					
125 MHz					
15Ø MHz					
175 MHz					
2ØØ MHz					
225 MHz					
25Ø MHz					
3ØØ MHz					
35Ø MHz					
4ØØ MHz					
45Ø MHz					
5ØØ MHz					

Second X 2 Attenuator next page.

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Factory Service Center
P.O. Box 500 M.S 78-654
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Section 5

CALIBRATION DATA

Ø67 Ø625 ØØ (cont.)

Ser. No. _____ I. D. No. _____.

CORRECTION FACTORS w/ Attenuator @ 4.8 V P-P (w/ both X2 Attenuators)

NOTE: Set .Ø5Ø MHz Ref. to Ø.Ø ± Ø.1 mV DC and check @ end of each group.

	STD C.F.	STD Rdgs.	Source C.F.	DUT Rdgs.	DUT C.F.
1Ø MHz					
2Ø MHz					
3Ø MHz					
5Ø MHz					
75 MHz					
1ØØ MHz					
125 MHz					
15Ø MHz					
175 MHz					
2ØØ MHz					
225 MHz					
25Ø MHz					
3ØØ MHz					
35Ø MHz					
4ØØ MHz					
45Ø MHz					
5ØØ MHz					

67062500.CAL Attenuator corrections begin on page 5-11

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