



WARNING

THE FOLLOWING SERVICING INSTRUCTIONS
ARE FOR USE BY QUALIFIED PERSONNEL ONLY.
TO AVOID PERSONAL INJURY, DO NOT
PERFORM ANY SERVICING OTHER THAN THAT
CONTAINED IN OPERATING INSTRUCTIONS
UNLESS YOU ARE QUALIFIED TO DO SO.

**PLEASE CHECK FOR CHANGE INFORMATION
AT THE REAR OF THIS MANUAL.**

067-0657-00
CALIBRATION FIXTURE
NORMALIZED
RAMP GENERATOR
SERVICE

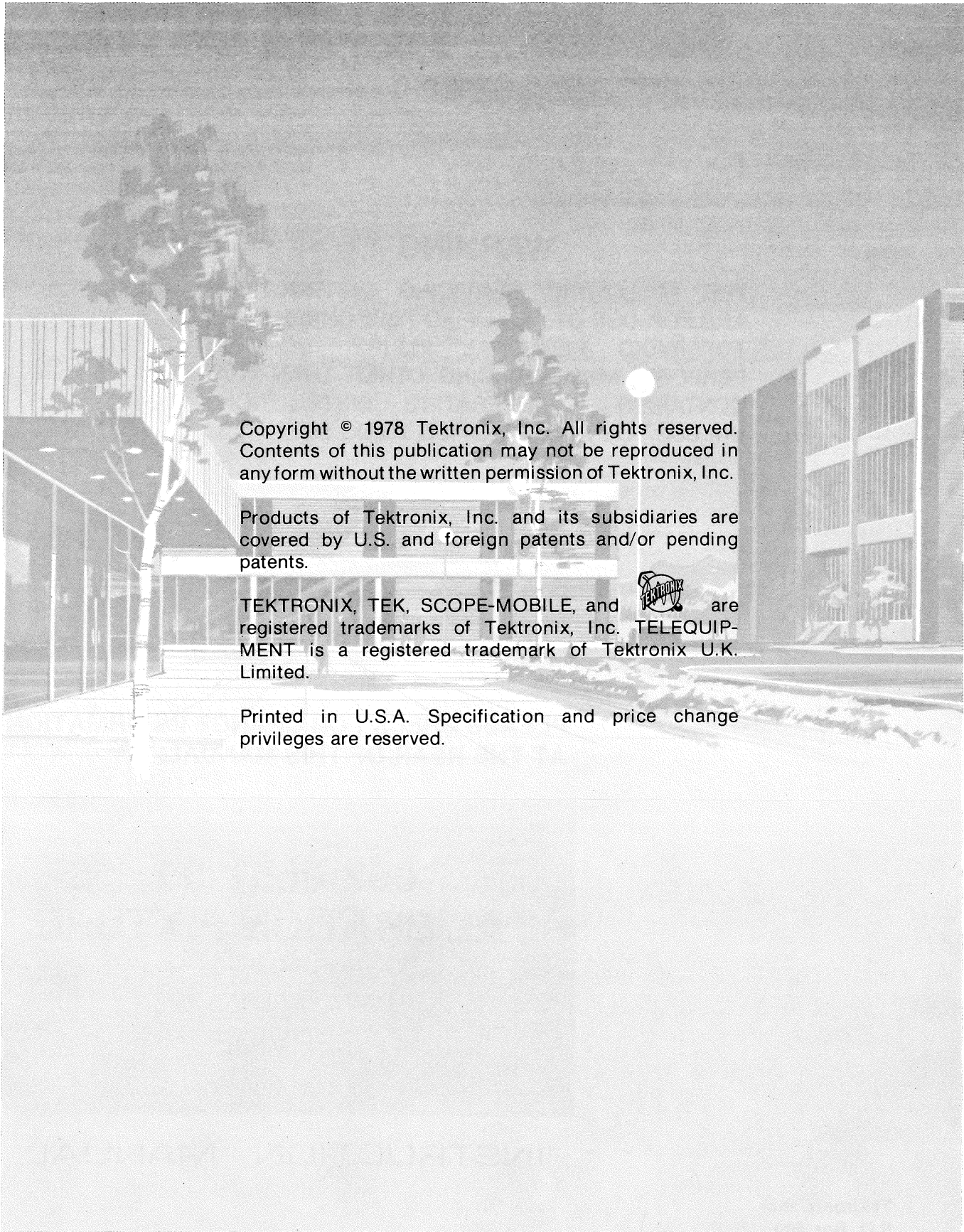
INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

070-2545-00
Product Group 42


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SAFETY INFORMATION

The following safety information applies to all operator and service personnel.

WARNING statements identify conditions or practices which could result in personal injury or loss of life.

CAUTION statements identify conditions or practices which could result in damage to the equipment or other property.

The word **DANGER** on the equipment identifies areas of immediate hazard which could result in personal injury or loss of life.

The following safety symbols may appear on the equipment:



CAUTION—Refer to manual



DANGER—High voltage



Protective ground (earth) terminal

Other warning symbols where they apply.

WARNING

GROUND THE INSTRUMENT

To reduce electrical-shock hazard, the mainframe (power module) chassis must be grounded. Refer to the mainframe manual for grounding information.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERE

Do not operate this instrument in an area where flammable gases or fumes are present. Such operation could cause an explosion.

AVOID LIVE CIRCUITS

Electrical-shock hazards are present in this instrument. The protective instrument covers must not be removed by operating personnel. Component replacement and internal adjustments must be referred to qualified service personnel.

DO NOT SERVICE OR ADJUST ALONE

Do not service or make internal adjustments to this instrument unless another person, capable of giving first aid and resuscitation, is present.



NORMALIZED RAMP GENERATOR

The 067-0657-00 Normalized Ramp Generator Calibration Fixture produces a linear sweep ramp useful for calibration of most 7000-series oscilloscope systems. Calibrated sweep rates from 0.5 ns/Div to 50 ns/Div (in a 1-2-5 sequence) plus 1 μ s/Div and 1 ms/Div are provided. The Calibration Fixture is triggered from an external signal (such as a trigger output from a time-mark generator) applied to the front-panel TRIG IN connector.

Other features include holdoff to the oscilloscope mainframe for proper horizontal mode operation and trigger holdoff to allow stable displays of repetitive complex waveforms. An OFFSET control allows the ramp starting point to be positioned off screen so that the transient response characteristics in the oscilloscope horizontal amplifier will not affect displayed timing. The OFFSET control also allows horizontal positioning of the display for alignment of the time markers with the vertical graticule lines.

OPERATING INSTRUCTIONS

PRELIMINARY INFORMATION

The 067-0657-00 Normalized Ramp Generator (NRG) is a 7000-series horizontal system reference. It is not a standard traceable to the National Bureau of Standards. It is defined as a Tektronix "Normal" (an internally chosen reference). The NRG is calibrated only at the Beaverton factory to produce as near identical units as possible.

The NRG is not an absolute reference in the sense that 50 millivolts of ramp corresponds precisely to 1.0 divisions of sweep. Differences approaching 1% may be observed when comparing the horizontal system gain between the NRG set at 1 ms/Div and the Tektronix 067-0587-01 Signal Standardizer Calibration Fixture. This difference is primarily due to the tolerance of the 50-ohm input impedance at the mainframe interface connector, pins A11 and B11, and the difference of the output impedances between the two types of calibration fixtures. Because of the liberal range of the front-panel sweep calibration adjustment on all 7000-series time-base units, the horizontal system gain may be set by either method. Quoted system timing accuracy specifications apply only after the time-base unit sweep calibration adjustment has been set which will compensate for minor gain differences at the mainframe input pins.

The NRG is accurate in the ratio of a selected sweep rate compared to its 1 ms/Div sweep rate. The timing at a particular sweep rate using the NRG must always be compared to its 1 ms/Div timing. Thus, if the horizontal system gain is adjusted to display 1 ms/Div of the NRG with no timing error, the timing errors at sweep rates of 1 μ s/Div and 50 ns/Div through 0.5 ns/Div may be directly investigated.

In most mainframes the horizontal amplifier exhibits an ultimate slew-rate limit because of the loading capacitance of the crt. Therefore, adjustment of the horizontal amplifier response, using a step generator, may lead to error because the amplifier is being driven into a nonlinear condition (some future instruments may not be limited by slew rate and therefore may specify step response as the preferred method of calibration). Use of the NRG as a reference during mainframe calibration insures compatibility and time-base unit interchangeability by "Normalizing" the mainframe amplifier response to display the various sweep rates with minimum timing ratio error. In a system optimized for only one time-base unit, one may obtain better fast sweep-rate accuracies by adjusting the mainframe response using that specific time base; but, this may result in poorer accuracies when a different time base is then substituted.

All 7000-Series time-base units may be referenced indirectly to the NRG by first normalizing a mainframe and then performing timing adjustments of the time base

with it installed in that mainframe. Choose a mainframe with fast sweep rate capabilities (fastest calibrated sweep rate) compatible with the fastest time/division setting of the time-base unit under calibration. Also choose a mainframe with a "Recommended" remark in Table 1-1. Be sure to adjust the time-base unit Sweep Calibration adjustment at 1 ms/Div before making any other adjustments.

TABLE 1-1
Mainframe Compatibility

Mainframe	Fastest T/Div	Remark
All 7300	¹ 20 ns	² Recommended
All 7400	5 ns	
All 7500	5 ns	
All 7600	5 ns	
All 7700	2 ns	
7844 B010000 - B109999 R7844 B010000 - B099999	1 ns	³ Restricted
7844 B110000 and up R7844 B100000 and up All other 7800	1 ns	² Recommended
7904 B010000 - B081987	0.5 ns	⁴ Limited
7904 B081988 - B219999 R7903 B010000 - B159999 R7912 B010000 - B199999	0.5 ns	³ Restricted
7904 B220000 and up R7903 B160000 and up R7912 B200000 and up	0.5 ns	² Recommended

¹ Maintain a minimum NRG OFFSET setting of 50 at 20 ns/div. Sweep start exclusion may need to be derated beyond 50 ns.

² (Recommended)—The mainframe has no particular compatibility problems. The NRG is recommended to be used as the reference at all sweep rates for optimum compatibility and normalized response. Follow the Normal Adjustment Procedure given later in this section to normalize mainframe response for any timebase.

³ (Restricted)—At sweep rates of 1 ns/div or faster, the mainframe can be compatible with only one of two general types of time-base units (one type has a sweep magnifier, the other type has no sweep magnifier). Follow the Normal Adjustment Procedure given later in this section to normalize mainframe response for timebases with magnifier (e.g. 7B70 or 7B80). To normalize mainframe response for timebases lacking a magnifier (e.g. 7B92 or 7B92A) follow the Special Adjustment Procedure given later in this section. Either method will sufficiently normalize mainframe response to ensure compatibility with any timebase at sweep rates of 2 ns/div or slower.

⁴ (Limited)—The mainframe has very limited compatibility with current production timebases of any type at sweep rates of 1 ns/div or faster. These mainframes include the early 7904, serial numbers B010000 through B081487 which were usually matched with a specific 7B92 timebase. The NRG may be used to normalize mainframe response for any timebase at sweep rates of 2 ns/div or slower by following the Special Adjustment Procedure given later in this section. Operation at sweep rates of 1 ns/div or faster is recommended using only the 7B92 (not 7B92A) timebase unit and mainframe, calibrating the instruments together as a system.

MAINFRAME COMPATIBILITY

There are two general types of 7000-series time-base units, identified by the presence or lack of a sweep magnifier, which possess different sweep start voltage characteristics. The response of the horizontal amplifier of certain 7000-series mainframes manufactured prior to June 1976 may cause differences in displayed timing for fast sweeps because of differences in sweep start voltage even though the sweep rates are identical. Table 1-1 identifies those mainframes where this potential compatibility problem exists and assesses the usefulness of the NRG as the horizontal sweep rate reference. Mainframe compatibility is defined in this case to mean the ability to operate with any calibrated 7000-series time-base unit and meet all published timing and linearity specifications within the fastest calibrated time/division limitation of the mainframe.

NOTE

Table 1-2 lists modification kits available to upgrade the performance of mainframes with "Limited" or "Restricted" remarks (see Table 1-1). The modifications will usually involve replacement of the entire main horizontal circuit board. Installation of the modification is justified only for situations where different types of time-base units may be used in the same mainframe or where complete compatibility is desired for all present and future time-base units. For situations involving systems optimized for one time-base unit, installation of the modification is optional. Mainframes with a "Recommended" remark (see Table 1-1) exhibit no particular compatibility difficulties with any 7000-series time-base unit.

TABLE 1-2
Horizontal Modification Kits

Mainframe Type	Mainframe Serial No.	Modification Kit No.
7844	B010000—B109999	¹ 040-0804-00
R7844	B010000—B099999	² 040-0805-00
R7903	B010000—B159999	040-0801-00
7904	B010000—B081987	050-0636-01
	B081988—B219999	040-0791-00
R7912	B010000—B199999	040-0802-00

¹Updates Beam 1 Horizontal system only.

²Updates Beam 2 Horizontal system only.

CONTROLS, CONNECTORS, AND INDICATORS

All controls, connectors, and indicators necessary for operation of the Normalized Ramp Generator are located on the front panel. Each control, connector, and indicator is shown and briefly described in Figure 1-1

ADJUSTMENT PROCEDURES

This section contains adjustment procedures for normalizing the mainframe horizontal amplifier response to the 067-0657-00 Normalized Ramp Generator (NRG). The procedures are outlined in very general terms and should be attempted only by qualified service personnel. The equipment required includes (1) an amplifier plug-in unit with a bandwidth sufficient to display the fastest time marker required (e.g., 7A19 or 7A26), (2) a source of selectable time markers with an accuracy of 0.1% or better (e.g. TG501 or 184), (3) two 50-ohm BNC cables of sufficient length to connect the time marker output to the amplifier plug-in unit and to connect the trigger output to the trigger input of the NRG, and the necessary adjustment tools.

The technique of normalizing a mainframe basically consists of adjusting the main horizontal amplifier response to display the various sweep rates of the NRG with as little timing error as possible when compared with the timing at 1 ms/div. If the horizontal gain is referenced to the NRG at 1 ms/div, the timing at all faster sweep rates may be observed directly. If the horizontal gain is referenced to the 067-0587-01 Signal Standardizer calibration fixture, the timing at all sweep rates faster than 1 ms/div must be compared to the timing at 1 ms/div (i.e. for precise calibration, the percentage error observed at faster sweep rates equals the percentage error noted at 1 ms/div) Amplifier adjustments that affect long time constants will usually affect timing in the 50 ns/div to 2 ns/div range while adjustments that affect short time constants will influence only the fastest sweep rates.

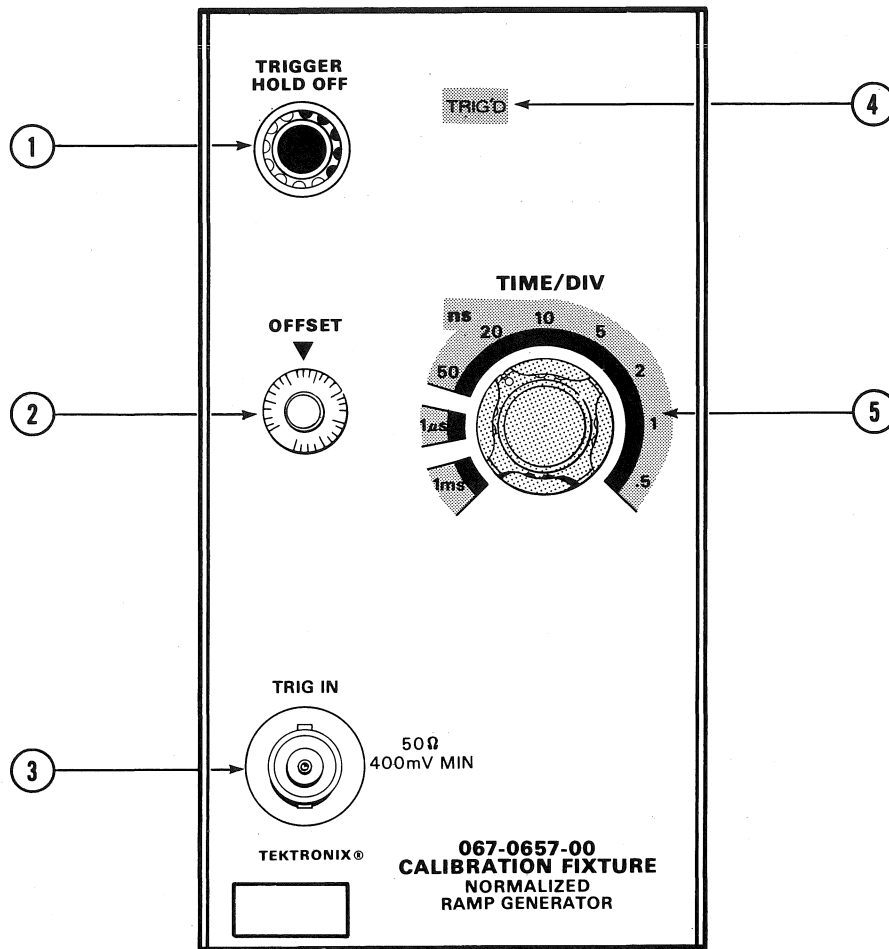
Time-base units lacking a magnifier (e.g. 7B92 or 7B92A) have different sweep start voltages than do time-base units with a magnifier (e.g. 7B70 or 7B80). Because of this difference the horizontal amplifier response of certain mainframe types may cause differences in displayed timing even though the sweep rates are identical. For this reason the setting of the OFFSET control of the NRG is important during the adjustment procedure. The Special Adjustment Procedure specifies different OFFSET levels than the Normal Adjustment Procedure and should be used only when recommended in Table 1-1.

A. NORMAL ADJUSTMENT PROCEDURE

A1. Perform Horizontal System calibration of mainframe as given in respective service manual. (This step may be omitted if only performance check or slight readjustments are to be made.)

A2. Install 067-0657-00 NRG in a horizontal compartment and an amplifier unit in a vertical compartment.

A3. Apply power to oscilloscope mainframe and allow 20 minutes warm-up time.



- ① **TRIGGER HOLDOFF**—Control varies the sweep holdoff duration. Variable holdoff may be used to provide a stable display regardless of the trigger repetition rate.
- ② **OFFSET**—Control changes the dc starting level of sweep ramp. The start of the display can be shifted to view the most linear region of the ramp. The setting of this control affects the accuracy of the displayed sweep. Refer to Adjustment procedures for proper settings.
- ③ **TRIG IN**—BNC connector for external input.
- ④ **TRIG'D**—Indicates that the sweep is triggered and will produce a display with the correct setting of the OFFSET control and the controls of the associated oscilloscope system.
- ⑤ **TIME/DIV**—Selects the sweep rate of the Ramp Generator.

2545-2

Figure 1-1. Front-panel controls, connectors and indicators.

Operating Instructions—067-0657-00

A4. Connect time markers from time-mark generator to amplifier unit input. Connect trigger output to NRG TRIG IN connector to provide triggering.

A5. Set oscilloscope vertical and horizontal mode switches for plug-in compartments used. Set amplifier unit for approximately two divisions of display.

A6. Set time-marker output for 1 ms.

A7. Set NRG TIME/DIV switch to 1 ms and OFFSET dial to approximately 50. Adjust TRIGGER HOLDOFF control for stable display if necessary (TRIG'D light on).

A8. **CHECK**—Horizontal timing at 1 ms/div for use as a reference for comparison with faster sweep rate timing. Use OFFSET control to position trace as necessary, but keep it within the 40-60 range. Mainframe horizontal gain may be adjusted to display no error at 1 ms/div with NRG. This adjustment is optional (see Preliminary Information at the beginning of this section) but note any error (percentage) for later use.

A9. Set time-marker output for 1 μ s.

A10. Set NRG TIME/DIV switch to 1 μ s and OFFSET dial within range of 40-60 to horizontally align display.

A11. **CHECK**—Mainframe horizontal timing error at 1 μ s is less than approximately 0.5% with respect to 1 ms percentage error, if any, noted in part A8. This step is a check for long time constant response degradation of the horizontal amplifier. Usually there is no adjustment that will affect 1 μ s timing significantly.

A12. Set time-mark generator for 50 ns.

A13. Set NRG TIME/DIV switch to 50 ns and OFFSET dial within range of 80-90 to horizontally align display.

A14. **CHECK**—Mainframe horizontal timing error at 50 ns (percentage) compared with 1 ms error, if any, noted in step A8.

A15. **CHECK/ADJUST**—Mainframe high-frequency adjustments for minimum timing ratio error (with respect to 1 ms/div) for all sweep rates up to maximum calibrated sweep rate of the particular mainframe using procedure outlined in steps A12, A13 and A14 (if necessary, favor slower sweep rate accuracies). Select appropriate time-markers and maintain OFFSET dial within 80-90 range. Short time constant adjustments typically affect timing of only fastest sweep rates. In some mainframes adjustments are made at specific sweep rates to minimize interactions.

B. SPECIAL ADJUSTMENT PROCEDURE

B1. Perform Horizontal System calibration of mainframe as given in the respective service manual. (This step may be omitted if only a performance check or slight readjustments are to be made.)

B2. Install 067-0657-00 NRG in a horizontal compartment and an amplifier unit in a vertical compartment.

B3. Apply power to oscilloscope mainframe and allow 20 minutes warm-up time.

B4. Connect time markers from time-mark generator to amplifier unit input. Connect trigger output to NRG TRIG IN connector to provide triggering.

B5. Set oscilloscope vertical and horizontal mode switches for plug-in compartments used. Set amplifier unit for approximately 2 divisions of display.

B6. Set time-marker output for 1 ms.

B7. Set NRG TIME/DIV switch to 1 ms and OFFSET dial to 50. Adjust TRIGGER HOLDOFF control for stable display if necessary (TRIG'D light on).

B8. **CHECK**—Horizontal timing at 1 ms/div for use as reference for comparison with faster sweep rate timing. Use OFFSET control to position trace as necessary, but keep it within 40-60 range. Mainframe horizontal gain may be adjusted to display no error at 1 ms/div with NRG. This adjustment is optional (see Preliminary Information at the beginning of this section) but note any error (percentage) for later use.

B9. Set time-marker output for 1 μ s.

B10. Set NRG TIME/DIV switch to 1 μ s and OFFSET dial within range of 40-60 to horizontally align display.

B11. **CHECK**—Mainframe horizontal timing error (percentage) at 1 μ s is less than 0.5% with respect to 1 ms error, if any noted in part B8. This part is a check for long time constant response degradation of the horizontal amplifier. Usually there is no adjustment that will affect the 1 μ s timing significantly.

B12. Set time-marker output for 50 ns.

B13. Set NRG TIME/DIV switch to 50 ns and OFFSET dial within range of 40-60 to horizontally align display.

B14. **CHECK**—Mainframe horizontal timing error (percentage) at 50 ns with respect to 1 ms.

B15. CHECK/ADJUST—Mainframe high frequency adjustments for minimum possible timing ratio error (percentage error with respect to 1 ms) for all sweep rates up to maximum calibrated sweep rate of particular mainframe using procedure outlined in steps B12, B13, and B14. Select appropriate time-markers and maintain NRG OFFSET dial within ranges given in Table 1-3.

Short time constant adjustments typically affect the timing of only the fastest sweep rates. In some mainframes adjustments are made at specific sweep rates to minimize interactions. Mainframes with linearity adjustments may require some error compromises at a few sweep rates to obtain the best possible linearity.

TABLE 1-3
Offset Dial Ranges

TIME/DIV Setting	OFFSET Range
50 ns through 5 ns	40-60
2 ns	25-30
1 ns	40-50
0.5 ns	75-85

SPECIFICATION AND SERVICING

ELECTRICAL TRACEABILITY

The 067-0657-00 Normalized Ramp Generator is a 7000-series horizontal system reference. It is not a standard traceable to the National Bureau of Standards. It is defined as a Tektronix "Normal", an internally chosen reference.

The Normalized Ramp Generator is calibrated only at the Beaverton, Oregon factory to produce as near identical units as possible.

ENVIRONMENTAL SPECIFICATION

Altitude (non-operating)—To 50,000 feet.

Transportation—Qualified under NTSC Test Procedure IA, Category II (36 inch drop).

PHYSICAL SPECIFICATION

Finish—Front panel is anodized aluminum.

Net Weight—1.55 lbs (0.703 kg).

Dimensions—See Figure 2-1, Dimensional drawing.

SERVICING AND CUSTOMER REPLACEABLE PARTS

The maintaining of close agreement between Normalized Ramp Generators will require that all servicing and calibration be conducted at the Beaverton, Oregon Factory Service Center. This requirement dictates that customer replaceable parts be limited to external mechanical parts. The recalibration interval is 6 months after delivery and once a year thereafter.

Tektronix Inc. assumes no responsibility for compatibility problems which arise from customer servicing of the Normalized Ramp Generator.

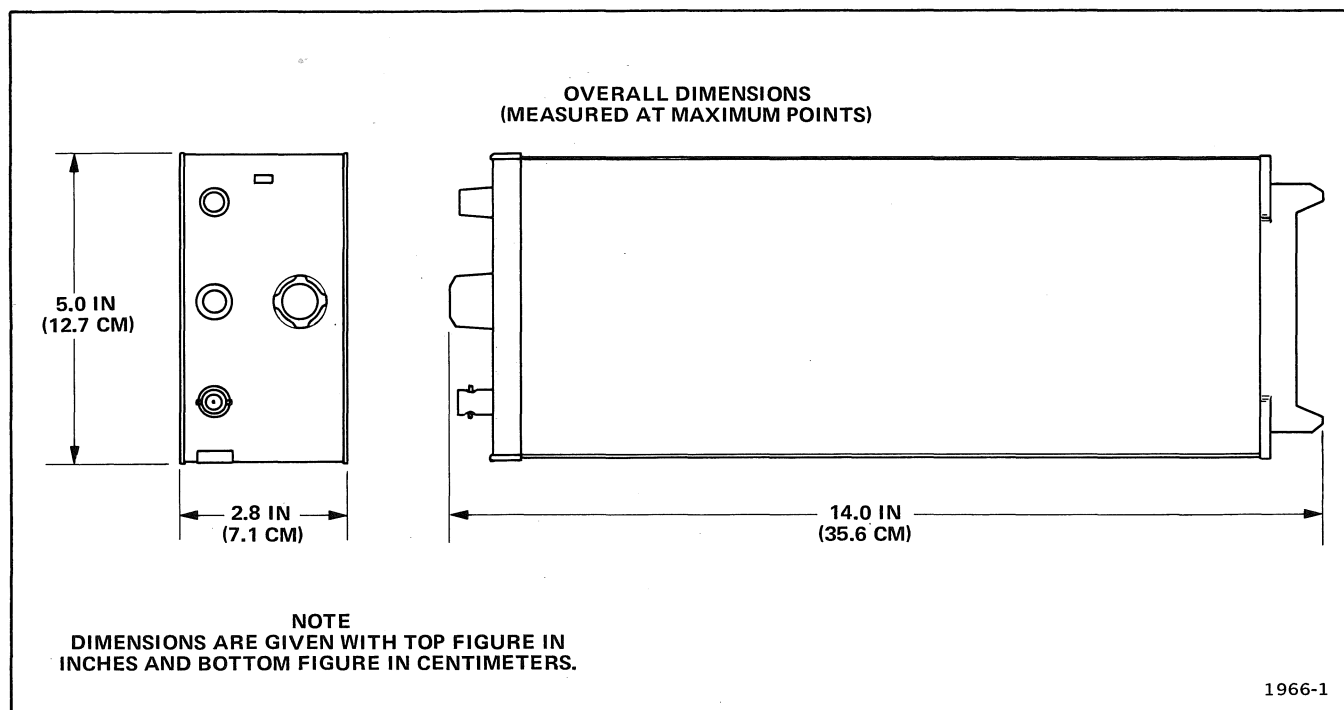


Figure 2-1. Dimensional drawing of the 067-0657-00 Normalized Ramp Generator.

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number
00X Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 Name & Description

Assembly and/or Component

Attaching parts for Assembly and/or Component

---*---

Detail Part of Assembly and/or Component

Attaching parts for Detail Part

---*---

Parts of Detail Part

Attaching parts for Parts of Detail Part

---*---

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol ---*--- indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

"	INCH	ELCTRN	ELECTRON	IN	INCH	SE	SINGLE END
#	NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SECT	SECTION
ACTR	ACTUATOR	ELCTLT	ELECTROLYTIC	INSUL	INSULATOR	SEMICON	SEMICONDUCTOR
ADPTR	ADAPTER	ELEM	ELEMENT	INTL	INTERNAL	SHLD	SHIELD
ALIGN	ALIGNMENT	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMPHOLDER	SHLDR	SHOULDERED
AL	ALUMINUM	EQPT	EQUIPMENT	MACH	MACHINE	SKT	SOCKET
ASSEM	ASSEMBLED	EXT	EXTERNAL	MECH	MECHANICAL	SL	SLIDE
ASSY	ASSEMBLY	FIL	FILLISTER HEAD	MTG	MOUNTING	SLFLKG	SELF-LOCKING
ATTEN	ATTENUATOR	FLEX	FLEXIBLE	NIP	NIPPLE	SLVG	SLEEVING
AWG	AMERICAN WIRE GAGE	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING
BD	BOARD	FLTR	FILTER	OBD	ORDER BY DESCRIPTION	SQ	SQUARE
BRKT	BRACKET	FR	FRAME or FRONT	OD	OUTSIDE DIAMETER	SST	STAINLESS STEEL
BRS	BRASS	FSTNR	FASTENER	OVH	OVERHEAD	STL	STEEL
BRZ	BRONZE	FT	FOOT	PH BRZ	PHOSPHOR BRONZE	SW	SWITCH
BSHG	BUSHING	FXD	FIXED	PL	PLAIN or PLATE	T	TUBE
CAB	CABINET	GSKT	GASKET	PLSTC	PLASTIC	TERM	TERMINAL
CAP	CAPACITOR	HDL	HANDLE	PN	PART NUMBER	THD	THREAD
CER	CERAMIC	HEX	HEXAGON	PNH	PAN HEAD	THK	THICK
CHAS	CHASSIS	HEX HD	HEXAGONAL HEAD	PWR	POWER	TNSN	TENSION
CKT	CIRCUIT	HEX SOC	HEXAGONAL SOCKET	RCPT	RECEPTACLE	TPG	TAPPING
COMP	COMPOSITION	HLCP	HELICAL COMPRESSION	RES	RESISTOR	TRH	TRUSS HEAD
CONN	CONNECTOR	HLEXT	HELICAL EXTENSION	RGD	RIGID	V	VOLTAGE
COV	COVER	HV	HIGH VOLTAGE	RLF	RELIEF	VAR	VARIABLE
CPLG	COUPLING	IC	INTEGRATED CIRCUIT	RTNR	RETAINER	W/	WITH
CRT	CATHODE RAY TUBE	ID	INSIDE DIAMETER	SCH	SOCKET HEAD	WSHR	WASHER
DEG	DEGREE	IDNT	IDENTIFICATION	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER
DWR	DRAWER	IMPLR	IMPELLER	SCR	SCREW	XSTR	TRANSISTOR

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
000CY	NORTHWEST FASTENER SALES, INC.	7923 SW CIRRHUS DRIVE	BEAVERTON, OR 97005
05129	KILO ENGINEERING COMPANY	2015 D	LA VERNE, CA 91750
13511	AMPHENOL CARDRE DIV., BUNKER RAMO CORP.		LOS GATOS, CA 95030
22599	ESNA, DIV. OF AMERACE CORPORATION	16150 STAGG STREET	VAN NUYS, CA 91409
74445	HOLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
87308	N. L. INDUSTRIES, INC., SOUTHERN SCREW DIV.	P. O. BOX 1360	STATESVILLE, NC 28677
93907	TEXTRON INC. CAMCAR DIV	600 18TH AVE	ROCKFORD, IL 61101

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
1-1	366-1207-00		1						KNOB:GRAY	80009	366-1207-00
	213-0153-00		1						. SETSCREW:5-40 X 0.125,STL BK OXD,HEX SKT	000CY	OBD
-2	366-1410-00		1						KNOB:GRAY,MARKED 0-100	05129	871-S-1.
	213-0178-00		1						. SETSCREW:4-40 X 0.125 INCH,HEX,SOC STL	74445	OBD
-3	366-1030-00		1						KNOB:ASSEMBLY	80009	366-1030-00
	213-0153-00		2						. SETSCREW:5-40 X 0.125,STL BK OXD,HEX SKT	000CY	OBD
-4	131-0955-00		1						CONN,RCPT,ELEC:BNC,FEMALE	13511	31-279
-5	366-1058-00		1						KNOB:LATCH	80009	366-1058-00
									(ATTACHING PARTS)		
-6	214-1095-00		1						PIN,SPG,SPLIT:0.094 OD X 0.187 INCH LONG	22599	52-022-094-0187
									- - - * - - -		
-7	105-0076-00		1						REL BAR,LATCH:PLUG-IN UNIT	80009	105-0076-00
-8	214-1280-00		1						SPRING,HLCPS:0.14 OD X 1.126"L,0.16"DIA W	80009	214-1280-00
-9	348-0235-00		1						SHLD GSKT,ELEC:4.734 INCH LONG	80009	348-0235-00
-10	333-1735-00	B010100 B020400	1						PANEL,FRONT:	80009	337-1735-00
	333-1735-01	B020401	1						PANEL,FRONT:	80009	333-1735-01
-11	386-1402-00		1						PANEL,REAR:	80009	386-1402-00
									(ATTACHING PARTS)		
-12	213-0192-00	B010100 B020415	4						SCR,TPG,THD FOR:6-32 X 0.50 INCH,PNH STL	87308	OBD
	213-0793-00		4						SCREW,TPG,TF:6-32 X 0.4375,TAPTITE,FIL	93907	OBD
-13	361-0326-00		1						SPACER,SLEEVE:0.18 ID X 0.25 OD X 0.10"L	80009	361-0326-00
									- - - * - - -		
	334-3448-00	XB020315	2						MARKER,IDENT:MARKED NOTICE	80009	334-3448-00

ACCESSORIES

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
	070-2545-00			1						MANUAL, TECH: INSTRUCTION	80009	070-2545-00

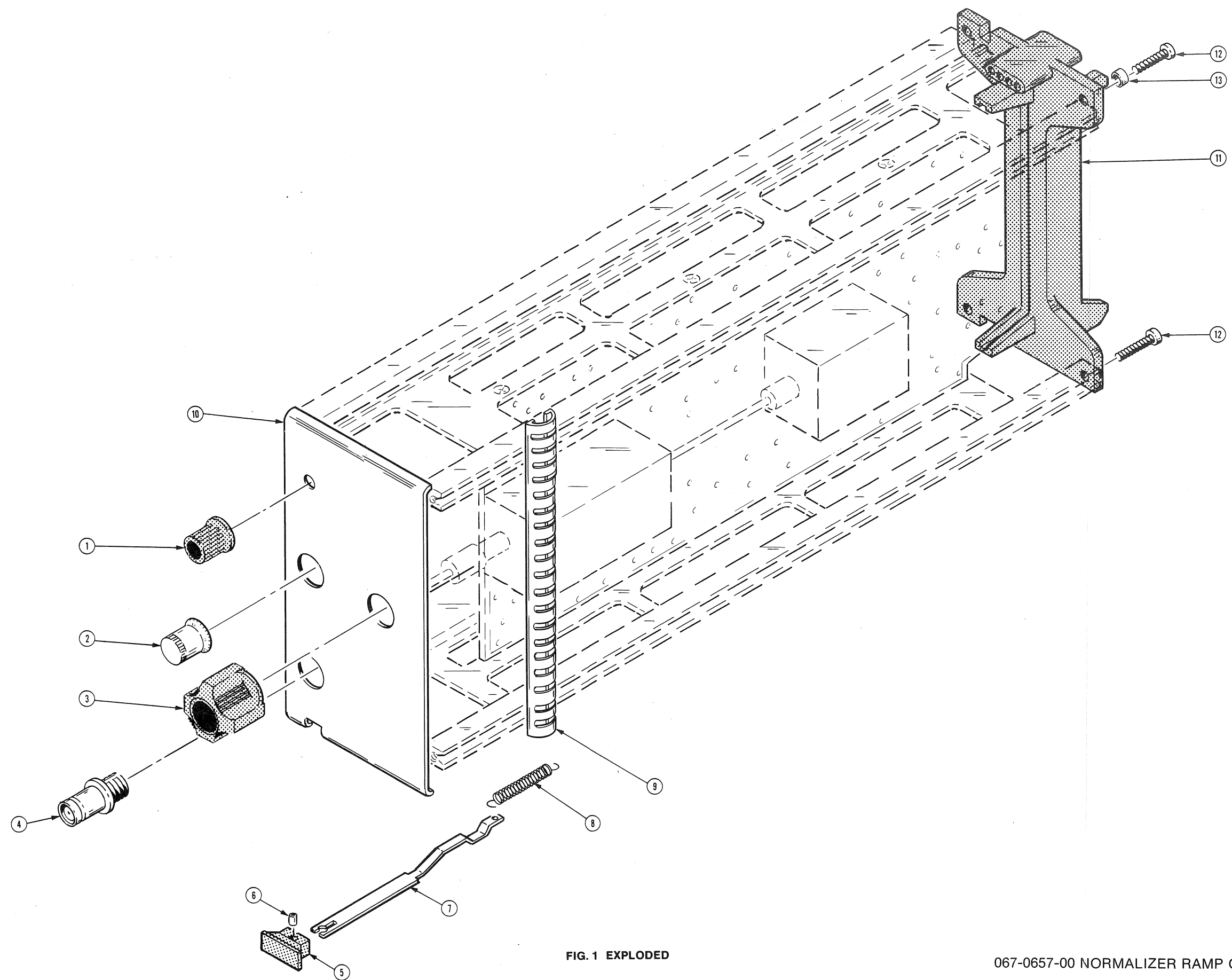


FIG. 1 EXPLODED

067-0657-00 NORMALIZER RAMP GENERATOR

DO NOT REMOVE, NO REPAIRS, NO
nor mark on, nor deface the original
schematics herein. They are legible
compared to any revisions.

Specification 540

March 6, 1975

Bob Sadilek

ENGINEERING INSTRUMENT SPECIFICATION

067-0657-00 NORMALIZED RAMP GENERATOR

with
OPTIONS and ACCESSORIES

FOR INTERNAL USE ONLY
TEKTRONIX, INC.

Specification 540

March 6, 1975

ENGINEERING
INSTRUMENT SPECIFICATION

067-0657-00

NORMALIZED RAMP

GENERATOR

WITH
OPTIONS
and
ACCESSORIES

Approved by:

Project Manager	<u>Bob Wallace</u>	Bob Wallace
Electrical Project Engineer	<u>Bruce Hofer</u>	Bruce Hofer
Electrical Evaluation Engineer	<u>Jack Collins</u>	Jack Collins
Mechanical Project Engineer	<u>Neal Broadbent</u>	Neal Broadbent

Prepared for Product Specifications by:

Manual Writer	<u>Bob Schmitt</u>	Bob Schmitt
---------------	--------------------	-------------

FOR INTERNAL USE ONLY

TEKTRONIX, INC.

PREFACE

This Engineering Instrument Specification (EIS) is the reference document for company activities concerned with the electrical environmental and physical characteristics of the subject product.

The information in this document is generally intended for use in customer-oriented publications such as the Catalog and Instruction Manual. However, performance characteristics in Section 2 are specifically classified for use in the Catalog and in certain sections of the Instruction Manual (see page 2-1 for further information concerning the tabular data).

A copy of this EIS appears in Product Reference Book with additional copies available from Product Specifications in the Manuals department.

Changes to the EIS may be made only via the Change Request form of which 3 are included at the back of this document (contact Product Specifications for additional copies).

Approved changes are issued in the form of replacement pages slit-punched for easy insertion in the EIS. Changed information appears in italicized print with a cross-hatch symbol in the left margin opposite the latest change. The data of the latest change appears at the bottom left corner of the page.

The following publications contain reference information relative to this document:

Tektronix Standard No. A-100, Recommended Short Forms

Tektronix Standard No. A-101, Glossary of Technical Terms

Product Specifications
September 6, 1972

SECTION 1

1.1 Description

The 067-0657-00 Normalized Ramp Generator Calibration Fixture produces a linear sweep ramp for calibration of 7000-Series Oscilloscope systems. Calibrated sweep rates from 0.5 ns/Div to 50 ns/Div (in a 1-2-5 sequence) plus 1 μ s/DIV and 1 ms/DIV are provided. The Calibration Fixture is triggered from an external signal applied to the front-panel TRIG IN connector. Use of the 067-0657-00 Calibration Fixture ensures optimum performance when plug-in units are interchanged.

Other features include holdoff to the oscilloscope mainframe for Horizontal Alternate operation. Variable holdoff is provided to allow stable display of repetitive complex waveforms. An OFFSET control allows the ramp starting point to be positioned off screen so that the transient response characteristics in the oscilloscope horizontal amplifier will not affect displayed timing. The OFFSET control also allows horizontal positioning of the display.

1.2 Functions of Controls and Connectors

TRIGGER HOLDOFF

Control varies the sweep Holdoff duration. Variable holdoff is used to provide a stable display of repetitive complex waveforms.

OFFSET

Control changes the dc starting level of the sweep ramp. The start of display can be shifted to view the most linear region of the ramp.

TIME/DIV

Selects the sweep rate of the Ramp Generator.

TRIG IN

BNC connector for trigger input.

1.3 Traceability

The 067-0657-00 Normalized Ramp Generator is intended to be a 7000-series horizontal system reference. It is not a standard traceable to the National Bureau of Standards because a ramp voltage standard does not exist. It is defined as a Tektronix "Normal", an internally chosen reference.

The Normalized Ramp Generator will be calibrated to be in close agreement with an internal set of selected and controlled Normalized Ramp Generators. The goal is to produce as near identical units as possible.

1.4 Servicing and Customer Replaceable Parts

The maintaining of close agreement between Normalized Ramp Generators will require that all servicing and recalibration be done through the Beaverton manufacturing area. These requirements dictate that the customer replaceable parts be limited essentially to external mechanical parts.

1.5 Instrument Options

There are no catalog options available at this time.

1.6 Standard Accessories Included

1 Instruction Manual

070-1966-00

SECTION 2 CHARACTERISTICS

DEFINITION OF COLUMN HEADINGS

CHARACTERISTIC:

A distinguishing electrical, environmental, or physical feature or property of an instrument that can be described in terms of verifiable qualitative or quantitative limits. These characteristics are considered necessary to qualify an instrument for a particular application(s).

PERFORMANCE REQUIREMENT:

Statements that describe the electrical and environmental characteristics of an instrument in terms of verifiable qualitative or quantitative limits. Generally, these statements can be verified without removing the instrument covers. These statements are a commitment to the customer and are considered essential for minimum instrument performance.

Performance Requirement Not Checked in Manual (X):

An "X" in this column indicates that the PERFORMANCE REQUIREMENT opposite the "X" is not checked in the instruction manual.

MAINTENANCE AND OPERATION INFORMATION:

Qualitative or quantitative information considered necessary to check operation or calibrate the instrument. Also included is Engineering and troubleshooting information. This information is not a commitment to the customer.

Engineering Notes Only (X):

An "X" in this column indicates that the MAINTENANCE AND OPERATION INFORMATION opposite the "X" is for Engineering use only. This information is not to be printed in any publication normally available to the customer, but may be given to a customer under special circumstances.

2.1 PERFORMANCE CONDITIONS

The performance limits in this specification are valid with the following conditions:

All calibration and maintenance must be conducted at the Beaverton manufacturing area.

The instrument must have a warmup period of at least 10 minutes.

The instrument must be operating (fully installed) in a 7000-series mainframe.

Any conditions that are unique to a particular characteristic are expressly stated as part of that characteristic.

SHORT FORM PROCEDURE

1. Inspection
2. Resistance Check

* -15V \approx 68
 +15V \approx 141
 +5V \approx 70
 -50V \approx 3.42K

*When T/D is 50 μ s

3. DC BAL R264
4. Offset Cal R262

184		NORMALIZED RAMP GENERATOR					
STEP	MARKER	TRIG	T/D	OFFSET	TRIG HOLD OFF	ADJ	FOR
3	0.1 μ s	NONE	1 ms	50	ccw	R264	Trace starting ^{AT} ϕ GRATICULE on Left
4	\downarrow	\downarrow	50 μ s	ϕ	\downarrow	R262	\downarrow
5	1 ms	1 ms	1 ms	50	stable trig towards ccw	R102	1 TIME MARK / DIV
6	1 μ s	1 μ s	1 μ s	\downarrow		R150	\downarrow
7	0.1 μ s		5 μ s	ϕ		R385	1 st TIME MARK PEAK TO ϕ GRATICULE from LEFT
8	50 μ s		50 μ s	BETWN 80-100		R151	1 SINE WAVE / DIV
9	20 μ s		20 μ s			R152	
10	10 μ s	\downarrow	10 μ s			R153	
11	5 μ s	50 μ s	5 μ s			R154	
12	2 μ s		2 μ s			R155	
13	\downarrow	\downarrow	1 ms			R156	/ 2 DIV
14	\downarrow	\downarrow	0.5 ms	\downarrow	\downarrow	R157	/ 5 DIV

15 ALTERATE OPERATION

16 HOLD OFF TIME

1 ms \leq 20 ms to \geq 80 ms

1 μ s \leq 20 μ s to \geq 80 μ s

50 μ s \leq 5 μ s to \geq 20 μ s

5 μ s \leq 2 μ s to \geq 8 μ s

(7) (6) (5) (154)

(3) (2) (1) (150)

2.2 ELECTRICAL

NOTE

These specifications are given as operating criteria. The performance requirements are validated at the factory.

2.2.1 SWEEP

CHARACTERISTICS	PERFORMANCE REQUIREMENT	Perf Req Not Chkd in Manual (X)	MAINTENANCE AND OPERATION INFORMATION (Not Published as Manual Specification)	Eng. Notes Only (X)
Sweep Rates	0.5 ns/DIV to 50 ns/DIV (in a 1-2-5 sequence) plus 1 μ s/DIV and 1 ms/DIV. Sweep rates are selected by the TIME/DIV switch in nine calibrated steps	X		
Sweep Accuracy (Over the signal range at interface connector pins A 11 and B 11 corresponding to the center eight divisions of display)		X		
1 ms/DIV, 1 μ s/DIV, and 50 ns/DIV to 2 ns/DIV	Any 2 Normalized Ramp Generators will exhibit less than 0.5% timing difference with identical setup and when compared in the same horizontal plug-in compartment			
1 ns/DIV and 0.5 ns/DIV	Any 2 Normalized Ramp Generators will exhibit less than 1.0% timing difference with identical setup and when compared in the same horizontal plug-in compartment			

2.2 ELECTRICAL

2.2.1 SWEEP (cont)

CHARACTERISTICS	PERFORMANCE REQUIREMENT	Perf Req Not Chkd in Manual (X)	MAINTENANCE AND OPERATION INFORMATION (Not Published as Manual Specification)	Eng. Notes Only (X)
Sweep Linearity (Over the signal range at interface connector pins A 11 and B 11 corresponding to 10 full divisions of display)	Within 2% of any 2 division portion of measurement	X		
Holdoff, Duration		X		
0.5 ns/DIV to 5 ns/DIV	Adjustable from $\leq 2.0 \mu\text{s}$ to $\geq 10 \mu\text{s}$			
10 ns/DIV to 50 ns/DIV	Adjustable from $\leq 5.0 \mu\text{s}$ to $\geq 25 \mu\text{s}$			
1 μs /DIV	Adjustable from $\leq 20 \mu\text{s}$ to $\geq 100 \mu\text{s}$			
1 ms/DIV	Adjustable from $\leq 20 \text{ ms}$ to $\geq 100 \text{ ms}$			
Offset Accuracy		X		
Sweep Start Voltage (Measured differentially at interface connector pins A 11 and B 11 into 50 ohm termination)				
1 ms/DIV and 1 μs /DIV	-250 mV within 25 mV with the OFFSET control is set to 50 (-5.0 div from graticule center)			

2.2 ELECTRICAL				
2.2.1 SWEEP (cont)				
CHARACTERISTICS	PERFORMANCE REQUIREMENT	Perf Req Not Chkd in Manual (X)	MAINTENANCE AND OPERATION INFORMATION (Not Published as Manual Specification)	Eng. Notes Only (X)
Offset Accuracy (cont)		X		
Sweep Start Voltage (cont)				
50 ns/DIV to 0.5 ns/DIV	<p>-250 mV within 25 mV when the OFFSET control is set to 0.0 (-5.0 div from graticule center)</p> <p>-750 mV within 25 mV when the OFFSET control is set to 100 (-15 div from graticule center)</p>			

067-0657-00 EIS 540

2.2 ELECTRICAL

2.2.2 TRIGGERING

CHARACTERISTICS	PERFORMANCE REQUIREMENT		Perf Req Not Chkd in Manual (X)	MAINTENANCE AND OPERATION INFORMATION (Not Published as Manual Specification)	Eng. Notes Only (X)
Trigger Sensitivity	Triggering Frequency Range	Minimum External Triggering Signal Required	X	50 ohms within 10%	
	dc to 50 MHz	400 mV Peak			
Input Resistance					

2.3 ENVIRONMENTAL

2.3.1 PLUG-IN TESTED OUT OF MAINFRAME*

CHARACTERISTICS	DESCRIPTION
Altitude	
Nonoperating	To 50,000 feet and -55°C
Transportation	Qualified under NTSC Test Procedure 1A, Category II, (36 inch drop)
<p>*Other quotable environmental data is mainframe dependent and is expressed as system performance. Refer to Specification 001B(7000-Series Oscilloscope System).</p>	

2.4 PHYSICAL

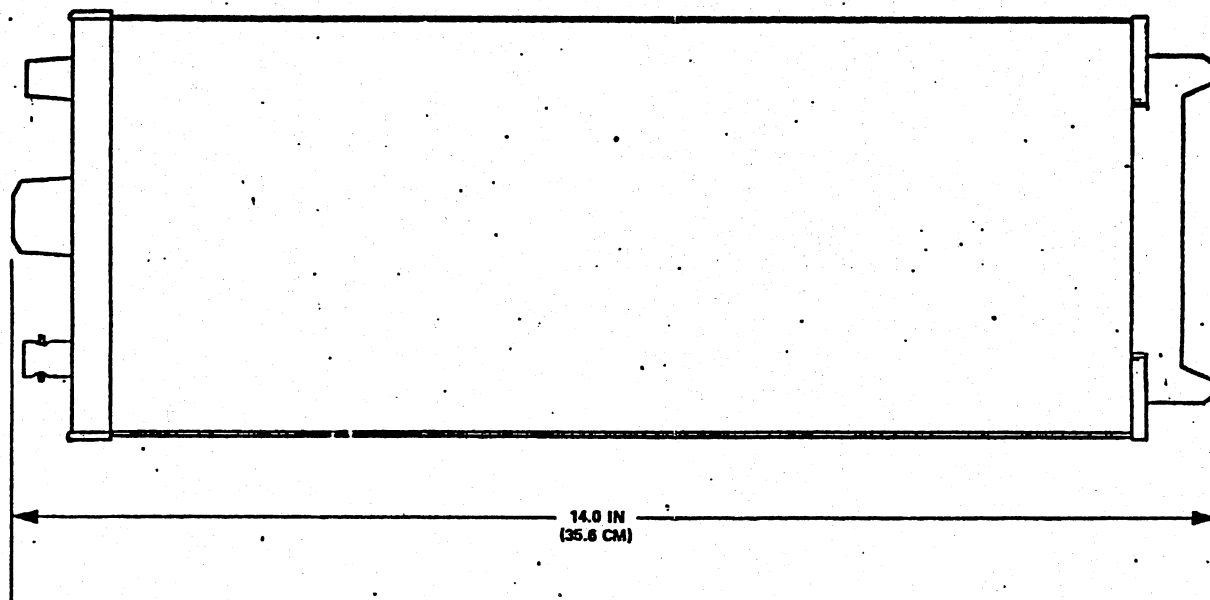
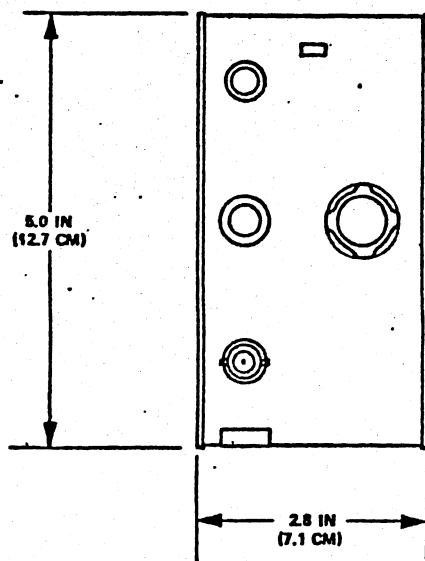
Finish

Front panel is anodized aluminum

Net Weight

1 lbs. 8.8 oz. (0.703 kilogram)

Dimensions:



NOTE: Dimensions are given with top figure in inches and bottom figure in centimeters.

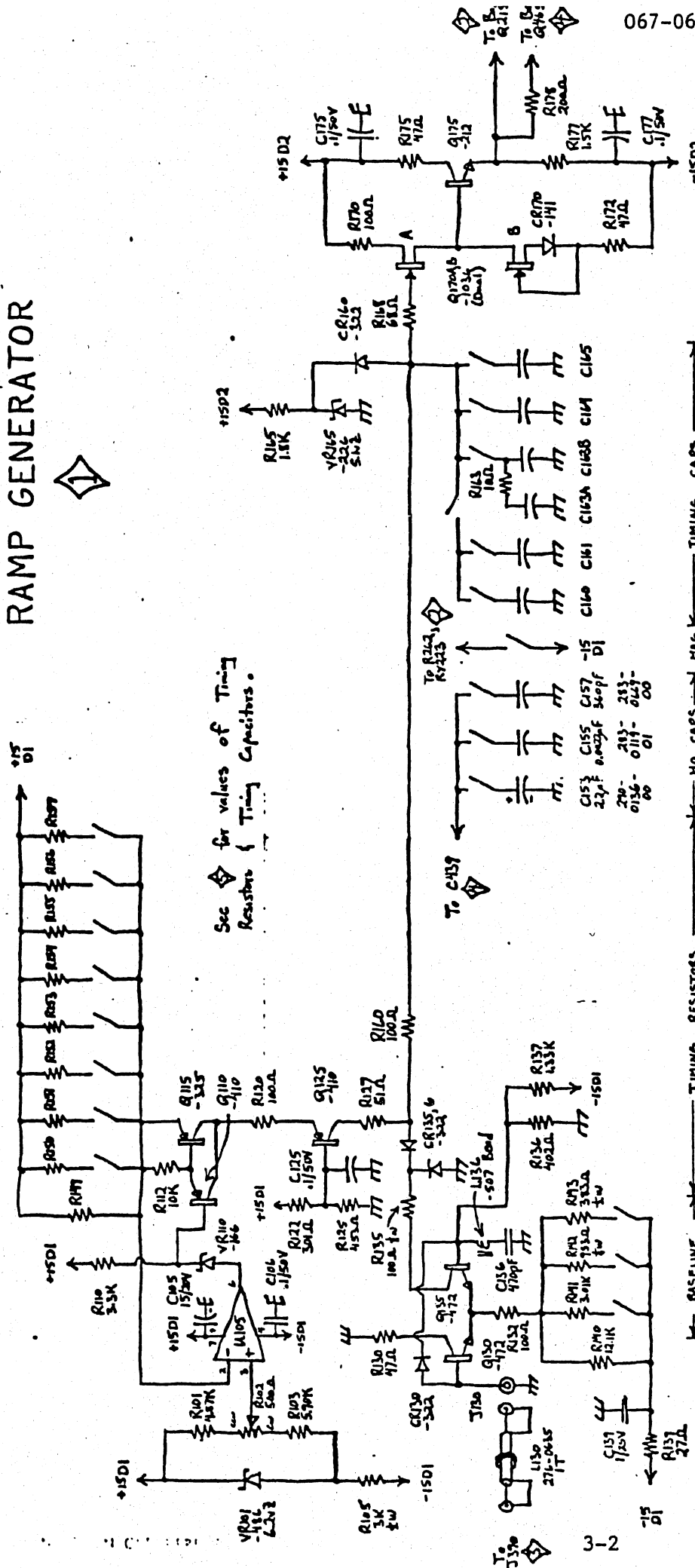
SECTION 3

ENGINEERING NOTES

Section 3 is reserved for Engineering reference information and is not intended for publication in any documents available to the customer.

RAMP GENERATOR

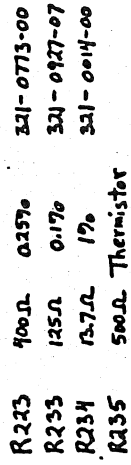
Bruce E. Nafar
10/28/74



TIME/DIV	BASELINE RESISTORS					TIMING RESISTORS					NO CAPS					TIMING CAPS					Rear Drum				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.5nS			X									X			X	X	X								
1nS			X									X			X	X	X								
2nS			X									X			X	X	X								
5nS			X									X			X	X	X								
10nS			X									X			X	X	X								
20nS			X									X			X	X	X								
50nS			X									X			X	X	X								
1uS			X									X			X	X	X								
1mS			X									X			X	X	X								

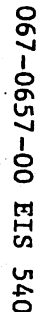
2

10/3/74



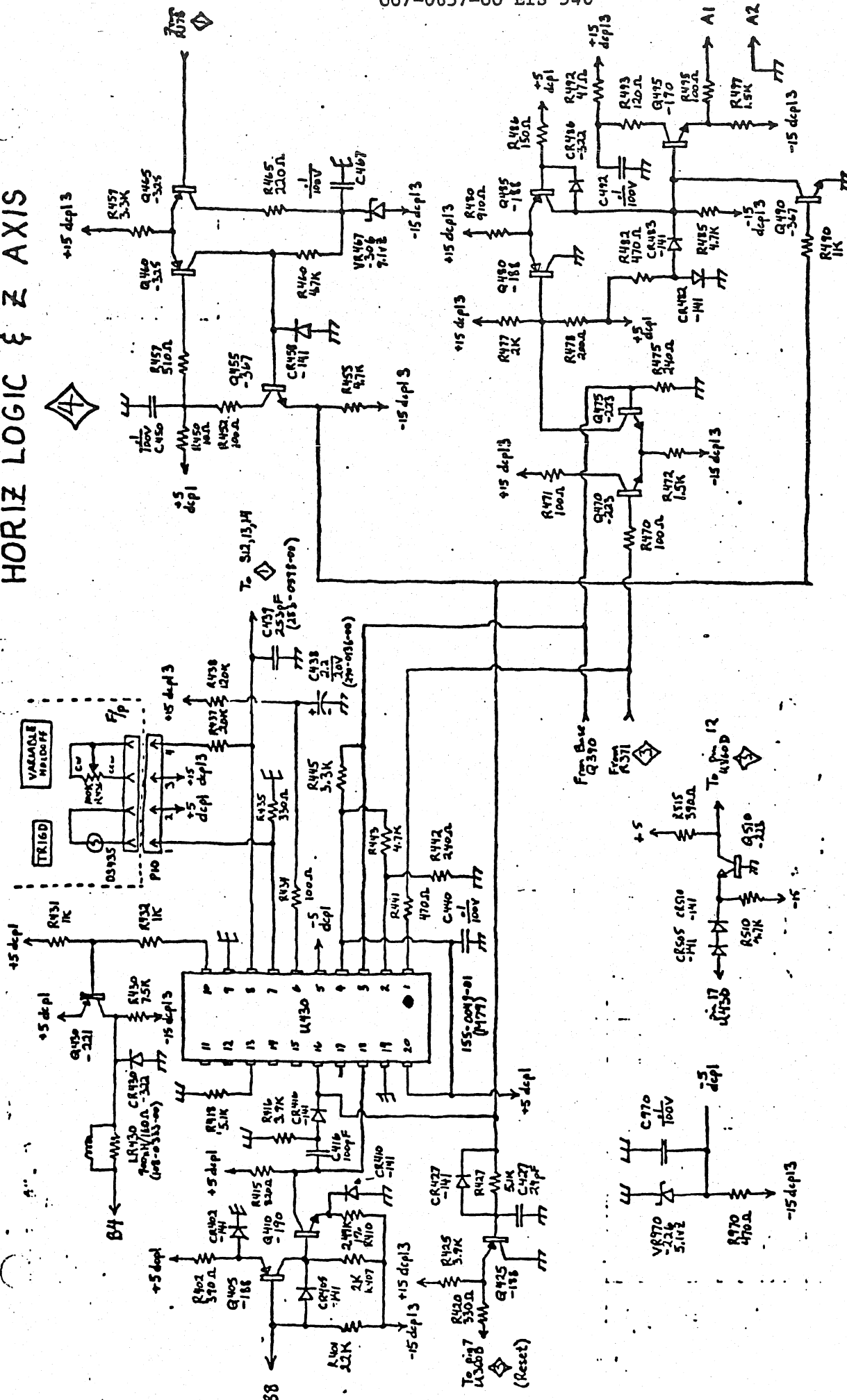
* Note: VR210 & VR215 are matched pair 6.2u2 153-0030-00

3



Bruce E. Hofer

HORIZ LOGIC & Z AXIS



Bruce E. Miller

TIMING ELEMENTS



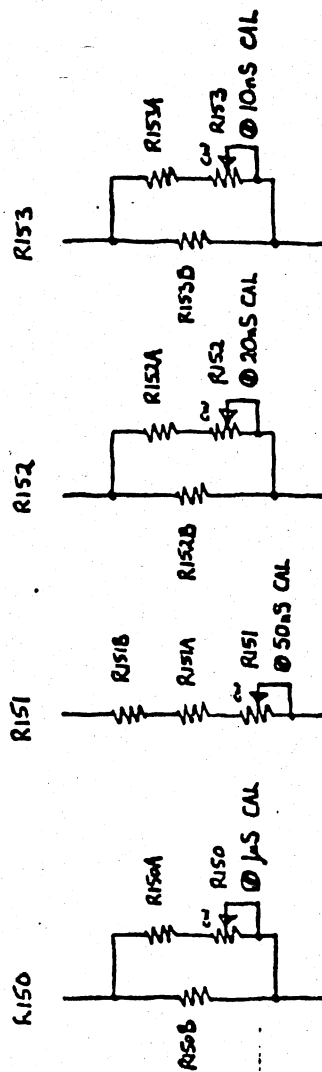
T/DIV	dV/dT	C _{TE1}	I _T	R _T R _{TH}	R _T
0.5ns	2.32EB	46.0pF	10.67mA	272.4Ω	284.0Ω
1	1.16EB	"	5.336	544.6	573.2
2	5.81E7	92.0pF	5.229	555.7	602.4
5	2.32E7	"	2.088	1.392K	1.761K
10	1.16E7	708.0pF	10.53	276.0Ω	218.0Ω
20	5.81E6	"	5.275	550.1	600.7
50	2.32E6	"	2.107	1.379K	1.740K
1μs	4.37E5	0.01F	4.570	665.0Ω	738.7Ω
1ms	4.37E2	1.0μF	0.437	6.65K	—

Assumptions: MAG FACTOR = 3.760
C_{TE1} + C_{devices} = 13.0 pF
R_{TH} = 6.65K 0.1% 321-0372-07

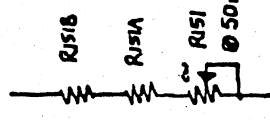
Timing Capacitors

C160	1μF (Grn H-)	285-0752-00	} TER MADE
C161	0.01μF (Grn H-)	285-0753-01	
C163A	345pF mica	283-0752-00	
C163B	550pF mica	283-0689-00	
C164	77pF mica	283-0633-00	
C165	33pF mica	283-0442-00	

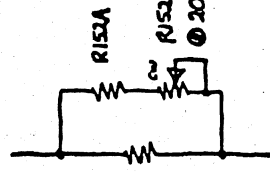
Bruce E. Hahn
10/29/74



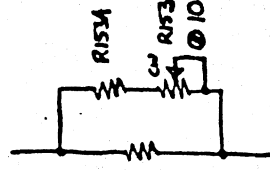
R151



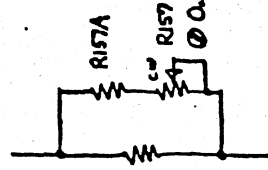
R152



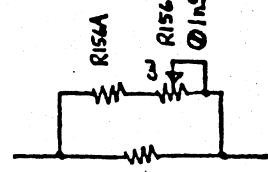
R153



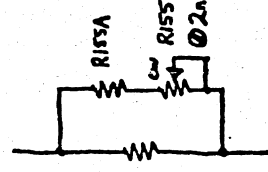
R157



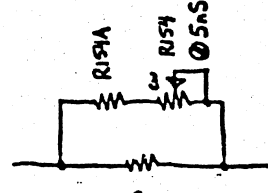
R156



R155



R154



Timing Resistors

R150	50Ω				
R150A	953Ω	1%	321-0191-09		
R150B	3.01K	0.1%	321-0339-07		
R151	100Ω				
R151A	130Ω	1%	321-0108-00		
R151B	1.56K	0.5%	321-0664-00		
R152	100Ω				
R152A	1.07K	1%	321-0196-00		
R152B	1.291K	0.1%	321-0715-07		
R153	50Ω				
R153A	495Ω	0.1%	321-0813-07		
R153B	650.4Ω	0.25%	321-0659-00		
R154	250Ω				
R154A	2.00K	0.1%	321-0222-07		
R154B	10.2K	1%	321-0290-00		
R155	100Ω				
R155A	786Ω	0.25%	321-0727-06		
R155B	2.22K	0.25%	321-0713-03		
R156	250Ω				
R156A	1.01K	0.25%	321-0194-00		
R156B	1.24K	1%	321-0202-09		
R157	100Ω				
R157A	455Ω	0.1%	321-0812-07		
R157B	654.4Ω	0.25%	321-0650-00		

AUG 27 1986

FACTORY - - CALIBRATION

PROCEDURE

* 067-0657-00 *

WITHOUT D.P.O.

SEQUENCE 050

PREPARED BY: KEVIN COSGROVE, 01-02-85

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REVIEWED: XX-XX-XX
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.....UPDATED: 01-05-85

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INSTRUMENT SYSTEMS DIVISION
TEKTRONIX, INC.
BEAVERTON, OREGON

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TABLE OF CONTENTS 86/08/26.

1. 067-0657-00 FACTORY CALIBRATION PROCEDURE	1
EQUIPMENT REQUIRED	1
CALIBRATION PROCEDURE	2
DETAILED TRIGGER SENSITIVITY	5
END OF 067-0657-00 FACTORY CALIBRATION PROCEDURE	5

EQUIPMENT REQUIRED

A. TEKTRONIX EQUIPMENT

QTY ---	DESCRIPTION -----	SPECIFICATION -----	PART NUMBER -----
1	7K OSCILLOSCOPE	SPECIALLY ADJUSTED AND APPROVED BY 7K STAFF ENGINEERING	7104
1	CALIBRATION GENERATOR	CAPABLE OF UP TO 0.5NS SLEWED EDGE, WITH VARIABLE	CG551AP
1	TIME MARK GENERATOR	NO SUBSTITUTE	184
1	VERTICAL AMPLIFIER	1GHZ BANDWIDTH, 50 OHM INPUT	7A29
1	VERTICAL AMPLIFIER	225MHZ BANDWIDTH, 1 MEG-OHM INPUT	7A16A
1	Sine wave Gen.	.5 to 250 mHz to 5.5 P-P	SG503

B. CALIBRATION FIXTURES AND ACCESSORIES

QTY ---	DESCRIPTION -----	PART NUMBER -----
2	PRECISION 50 OHM BNC CABLES	012-0482-00
1	50 OHM 2X ATTENUATOR	011-0069-02
1	BNC "T"	103-0030-00

CALIBRATION PROCEDURE

067-0657-00

INSTALL: ~~THE 7853A~~ IN A MAINFRAME AT THIS POINT AND ALLOW TIME FOR WARM-UP AND STABILIZATION BEFORE MAKING ADJUSTMENTS.

CHARACTERISTIC -----	ADJUSTMENT -----	REQUIREMENT -----	INPUT -----
DC BALANCE	R264	SWEEP START IS 5 DIV TO THE LEFT OF THE 7104 HORIZONTAL CENTER	TIME/DIV 1MS, OFFSET 50.0, HOLD OFF MINIMUM
OFFSET CALIBRATION	R262	SWEEP START IS 5 DIV TO THE LEFT OF THE 7104 HORIZONTAL CENTER	TIME/DIV 0.5NS, OFFSET 0.0, HOLD OFF MINIMUM
TIME POSITION	R385	<i>Center</i> TOP OF FIRST <i>22ns</i> MARKER IS 10NS AFTER SWEEP START	TIME/DIV 5NS, OFFSET NEAR 0.0, 0.1US MARKER FROM 184 T.M.G., 1US TRIGGER FROM 184 T.M.G., HOLD OFF MINIMUM
1MS SWEEP ACCURACY	R102	ERROR MATCHES 7104 10CHZ GAIN ERROR. CHECK FOR NO MEASURABLE NON-LINEARITY	1MS MARKER, TRIGGER INPUT, OFFSET NEAR 50, HOLD OFF MINIMUM
1US SWEEP ACCURACY	R150	NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE NON-LINEARITY.	1US MARKER, TRIGGER INPUT, OFFSET NEAR 50, HOLD OFF MINIMUM
50NS SWEEP ACCURACY	R151	NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE SWEEP NON-LINEARITY	50NS MARKERS, TRIGGER INPUT, OFFSET NEAR 90, HOLD OFF MINIMUM
20NS SWEEP ACCURACY	R152	NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE SWEEP NON-LINEARITY	20NS MARKERS, TRIGGER INPUT, OFFSET NEAR 90, HOLD OFF MINIMUM

10NS SWEEP ACCURACY
R153

NO ON SCREEN ERROR. - CHECK FOR NO MEASURABLE
SWEEP NON-LINEARITY
10NS MARKERS, TRIGGER

5NS SWEEP ACCURACY
R154

NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE
SWEEP NON-LINEARITY
5NS SLEWED EDGE,

2NS SWEEP ACCURACY
R155

NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE
SWEEP NON-LINEARITY
2NS SLEWED EDGE,

1NS SWEEP ACCURACY
R156

NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE
SWEEP NON-LINEARITY
1NS SLEWED EDGE,

0.5NS SWEEP ACCURACY
R157

NO ON SCREEN ERROR. CHECK FOR NO MEASURABLE
SWEEP NON-LINEARITY
0.5NS SLEWED EDGE,

Check Trigger

SG 503 X2 Attenuator

0.5-1.6 50mV

CHARACTERISTIC -----	SETTING -----	REQUIREMENT -----	INPUT -----
HOLDOFF	0.5NS/DIV TO 5NS/DIV	ADJUSTABLE FROM <=2.0US TO >=8.0US	POWER ONLY
	10NS/DIV TO 50NS/DIV	ADJUSTABLE FROM <=5.0US TO >=20US	POWER ONLY
	1US/DIV	ADJUSTABLE FROM <=20US TO >=80US	POWER ONLY
	1MS/DIV	ADJUSTABLE FROM <=20MS TO >=80MS	POWER ONLY
OFFSET ACCURACY	1MS/DIV AND 1US/DIV	SWEEP START IS 4.5 DIV TO 5.5 DIV TO THE LEFT OF THE 7104 HORIZONTAL CENTER.	OFFSET 50.0, HOLDOFF MINIMUM
	50NS/DIV TO 0.5NS/DIV	SWEEP START IS 4.5 DIV TO 5.5 DIV TO THE LEFT OF THE 7104 HORIZONTAL CENTER.	OFFSET 0.0, HOLDOFF MINIMUM
	5NS/DIV	2ND MARKER MOVES 9.5 DIV TO 10.5 DIV TO THE LEFT WHEN THE OFFSET CONTROL IS ROTATED FROM 0.0 TO 100.0	50NS MARKERS. OFFSET 0.0, HOLDOFF MINIMUM
TRIGGER INPUT RESISTANCE	ANY	AVERAGE OF TRIGGER INPUT RESISTANCE MEASURED IN BOTH POLARITIES MUST BE 45 OHMS TO 55 OHMS.	POWER ONLY
TRIGGER SENSITIVITY	REFER TO SETUP DETAILED BELOW	TRIGGERS ON 40JMV-PEAK AT 50MHZ	REFER TO SETUP DETAILED BELOW

DETAILED TRIGGER SENSITIVITY

INSTALL: A 7A16A IN A 7104 VERTICAL COMPARTMENT.

CONNECT: THE SG503 OUTPUT THROUGH A 50 OHM BNC CABLE TO A BNC "T".

CONNECT: THE BNC "T" TO THE 7A16A INPUT.

CONNECT: THE FREE END OF THE BNC "T" THROUGH A 50 OHM BNC CABLE AND A 2X ATTENUATOR TO THE 067-0657-00 TRIGGER INPUT.

SET:	7A16A	VOLTS/DIV	500MV
		BANDWIDTH	FULL
		POLARITY	+UP
		INPUT COUPLING	DC
	067-0657-00	TIME/DIV	1MS
		OFFSET	0.0
		HOLDOFF	MINIMUM
	SG503	FREQUENCY	50KHZ
		AMPLITUDE	1.6VP-P (3.2 DIV)

SET: THE SG503 FREQUENCY CONTRL TO 50MHZ WITHOUT DISTURBING THE AMPLITUDE CONTROLS.

SET: 067-0657-00 TIME/DIV 5NS

CHECK: THAT THE 067-0657-00 TRIGGERS PROPPERLY.

END OF 067-0657-00 FACTORY CALIBRATION PROCEDURE

R262

R264

R385

1ms

R
1
2

.5ns	1ns	2ns	5ns
10ns	20ns	50ns	1μs