

Model 1654 Reference Pulser

User's Manual

9234146B



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The information in this document describes the product as accurately as possible, but is subject to change without notice.

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Notes

1. Introduction

The Canberra Model 1654 Reference Pulser generates stable flat-top pulses to be used as Test Inputs to preamplifiers. The differentiating capacitor in the preamplifier converts this to a charge input. By providing specific charge levels a stable reference peak can then be added to the spectrum. This allows for stabilization and/or Live Time Correction because both the count rate and energy of this added peak is known.

Four independent reference outputs are provided on the rear panel of this single width module. A single INHIBIT output is provided to gate off all of the amplifiers used with the preamplifiers connected to the Model 1654; the Inhibit is required because the trailing edge of the pulse may cause the amplifier to overload during its recovery.

Internal DIP switches and jumpers control the polarity, rate, and amplitude.

A label on the Printed Circuit Board and on the outside of the power connector shield indicates the revision level of the unit. This manual describes the Revision 2-A and 2-B versions of the Pulser.

2. Controls and Connectors

Front/Rear Panels

This is a brief description of the 1654A's front and rear panel controls. For more detailed information, refer to Appendix A, Specifications.

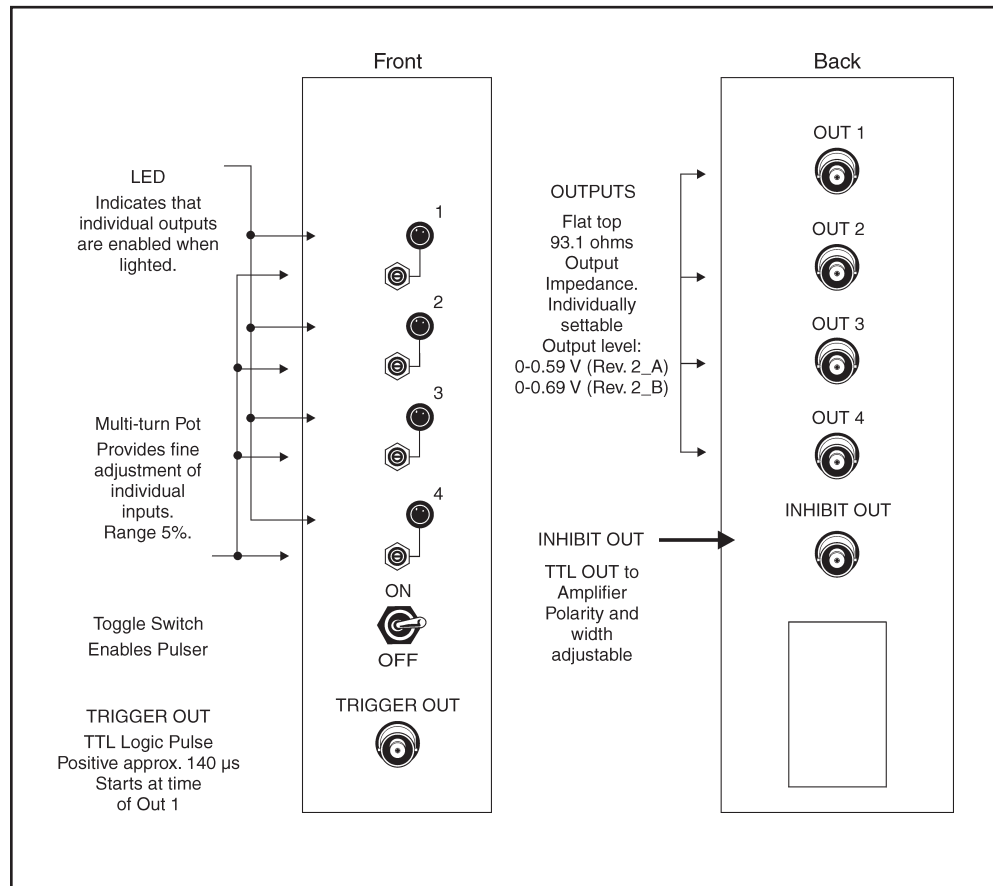


Figure 1 Front/Rear Panel Controls and Connectors

Internal Controls

This is a brief description of the 1654's internal controls. For more detailed information, refer to Appendix A, Specifications.

DIP Switch A

1,2 selects Number of Active Outputs

1	2	Single Pulse	Dual Pulse
ON	ON	1	1
OFF	ON	2	0
ON	OFF	3	0
*OFF	*OFF	4	0

3, 4, 5 selects Rate

3	4	5	Rate
*ON	*ON	*ON	50
OFF	ON	ON	100
ON	OFF	ON	200
OFF	OFF	ON	500
x	x	OFF	1000

6 Selects OUTn Polarity

ON Negative

*OFF Positive

7 Selects INHIBIT OUT Polarity

*ON Positive

OFF Negative

8 Selects Pulse Mode

ON Dual (Special Order)

*OFF SINGLE (Normal)

*Factory Setting

DIP Switch B

Selects Pulse Width of INHIBIT OUT

Each switch has a binary-related weight. The switches that are OFF extend the time. The Total time of the width is found by adding the contribution of each OFF switch:

1	OFF	=	0.50 μ s
2	OFF	=	1.0 μ s
3	OFF	=	2.0 μ s
4	OFF	=	4.0 μ s
5	OFF	=	8.0 μ s
6	OFF	=	16.0 μ s
7	OFF	=	32.0 μ s
8	OFF	=	64.0 μ s

Factory Setting is all OFF = 127.5 μ s

Amplitude

Each Output uses a set of jumper plugs to determine its output. With all jumpers removed the output is at maximum.

Output voltage in millivolts into open circuit ¹ :	200	200	100	50	10	10	10	10	100 ²
OUT1	JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP33
OUT2	JP9	JP10	JP11	JP12	JP13	JP14	JP15	JP16	JP34
OUT3	JP17	JP18	JP19	JP20	JP21	JP22	JP23	JP24	JP35
OUT4	JP25	JP26	JP27	JP28	JP29	JP30	JP31	JP32	JP36
Factory Setting (320 mV)	OUT	IN	OUT	IN	IN	IN	OUT	OUT	IN

1. Output voltage contribution with designated jumper removed. Total output voltage amplitude is the sum of contributions.
 2. REV. 2-B has this additional set of jumpers.

3. Operations

The purpose of this chapter is to verify the Model 1654 Reference Pulse is functioning correctly.

1. Set DIP Switches and Amplitude jumpers to the required positions to select:

Number of Outputs

Rate

Outputs Polarities

Single Pulse

INHIBIT OUT Width

Amplitude

2. Connect OUT1 to Test IN of Preamplifier
3. Power to Bin with Model 1654. Front panel switch ON and should see selected number of input LED's lit.
4. With Trigger Out as Positive trigger to oscilloscope, observe the amplifier's output. The positive going output of the amplifier should coincide with the start of the trigger. If not, you may have to change the polarity (SWA-6).
5. If the amplitude of the pulse needs adjustment, use JP1 through JP8 (JP33) and for fine control the front panel pot.
6. The INHIBIT OUT from the Model 1654 should be connected to the amplifier's INHIBIT IN. A positive polarity is compatible with all Canberra amplifiers.

Note: If a TRP Preamplifier (or equivalent) is being used, the Inhibits from the Pulser and Preamplifier can be "ORed" together using a Model CSERF 5288 INHIBIT OR BOX.

7. The OUTn signal to the preamplifiers can be used to check the pole/zero setting of the amplifier. It is generally best to adjust the amplifiers' gain to put this pulse at approximately 8 volts when setting the P/Z.
8. The width of the INHIBIT OUT should be long enough to include time required for the amplifier to recover from the trailing edge. To verify this, tee-off the INHIBIT signal to the scope and amplifier and observe the amplifier's recovery.

A. Specifications

Outputs

OUT1, OUT2, OUT3, OUT4 – Provides positive or negative going (switch selectable) flat-top pulses, 50, 100, 200, 500 or 1000 Hz (switch selectable); pulse height unterminated:

Rev. 2 A - 0 to 590 mV

Rev. 2 B - 0 to 690 mV

RISE-TIME – $<0.2 \mu\text{s}$; $Z_{\text{out}} = 93\Omega$; Rear Panel BNC's.

INHIBIT OUT – TTL output at trailing edge of OUTn pulses; pulse width 0 to 127.54 μs (switch selectable); polarity switch selectable; Logic High > 3 volt at 2 mA, Logic Low < 0.5 V at 15 mA; Rear Panel BNC.

TRIGGER OUT – TTL Output at leading edge of OUT1; Positive true; Pulse width $\approx 140 \mu\text{s}$; Logic High > 3 V at 3mA, Logic Low $< 0.5\text{V}$ at 3 mA; Front Panel BNC.

Controls

ON/OFF – Front panel toggle switch.

AMPLITUDE – Front panel multi-turn pots for each OUTn fine control; Internal jumper plugs.

CONTROL – Internal DIP switches for selecting number of active outputs polarity, rate and pulse width of INHIBIT OUT.

Performance

OUTPUT DRIFT – $<100\text{ppm}$ (typically $<50\text{ppm}$); $<25\text{ppm}$ over 24 hours after 30 minute warmup

NOISE– <0.006 mV RMS

PULSE REPETITION RATE – Crystal Controlled within 50ppm

Operating Temperature

Operating Temperature

OPERATING TEMPERATURE – 0 to 50 °C.

Connectors

All BNC's, UG-1094/U

Power Requirements

+12 V dc <120 mA

-12 V dc <100 mA

Physical

SIZE – Standard Single-width NIM module, 3.43 x 22.12 cm (1.35 x 8.71 in.) per
DOE/ER -0457 T

NET WEIGHT – 0.8 Kg (1.8 lb)

Notes

Warranty

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If defects in materials or workmanship are discovered within the applicable warranty period as set forth above, we shall, at our option and cost, (A) in the case of defective software or equipment, either repair or replace the software or equipment, or (B) in the case of defective services, reperform such services.

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