Rev. 3 - 26/11/2012

A1423

A1423 - Wideband Amplifier

CAEN
Tools for Discovery

User Manual
UM6764

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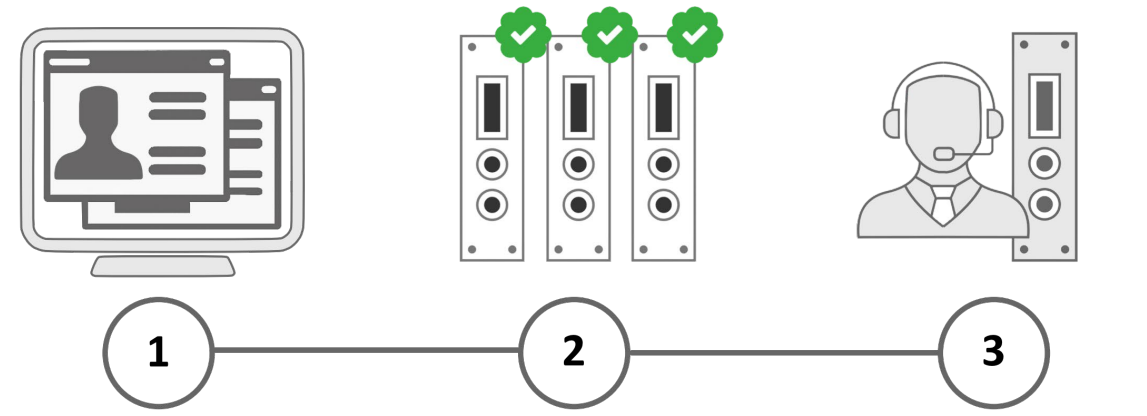

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Purpose of this Guide

This document is the A1423 User's Manual; it contains information about the installation, the configuration and the use of the board.

Change Document Record

Date	Revision	Changes
16 February 2012	00	PRELIMINARY RELEASE
16 July 2012	01	Updated table 3
08 November 2012	02	Updated table 2
26 November 2012	03	Updated “Power requirement” paragraph in §1

Reference Document

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1 Overview

A1423 Wide Band Amplifier

The A1423 is an inverting Wideband Amplifier designed for fast detectors, as SiPMs and Diamonds, having a bandwidth of ~ 1.5 GHz (-3dB). The gain ranges from +15 dB to +50 dB and it is locally controlled through a rotary switch. The amplifier accepts both positive and negative input pulses and can provide an energy output in the ±1V range across a 50 Ohm load. The amplifier is AC decoupled with an input and output impedance of 50 Ohm (SWR < 1.5:1) and can carry a bias voltage for the detector up to ± 750 V. The A1423 is implemented in a shielded box and features SMA connectors for the HV BIAS, IN/ DETECTOR and OUTPUT.

Code	Model	Description
WA1423XAAAAA	A1423	Wide Band Preamplifier

Tab. 1 – Available items

Technical Characteristics Tables

IN	Detector input; maximum absolute rating: 1.4 V
HV	HV BIAS input; range: ±750V; Detector bias voltage
OUT	Amplifier Out; dynamics: ±1 V (2V absolute), 50 Ohm
12V	External power supply (included); consumption: 250mA@+12V
Bandwidth	~ 1.5 GHz (-3dB)
Gain range	from +15 dB to +51 dB; step: 2dB for 15-33dB range, 3dB for 33-51db range
Polarity	Positive or negative input signals
Input and output impedance	50 Ohm, SWR<1.5:1
Noise Figure	5dB @ 1GHz
Packaging	Width 55mm, height 25mm, depth 90mm
Weight	134 g

Tab. 2 – A1423 technical characteristics

Power requirements

The module is powered by the external AC/DC stabilized power supply provided with the digitizer and included in the delivered kit.

The board's typical power consumption is 250mA (@+12V).

Note.: Using a different power supply source, like battery or linear type, it is recommended the source to provide +12V and, at least, 500mA; the power jack is a 2.1mm type, a suitable cable is the RS 656-3816 type (or similar).

Top Panel

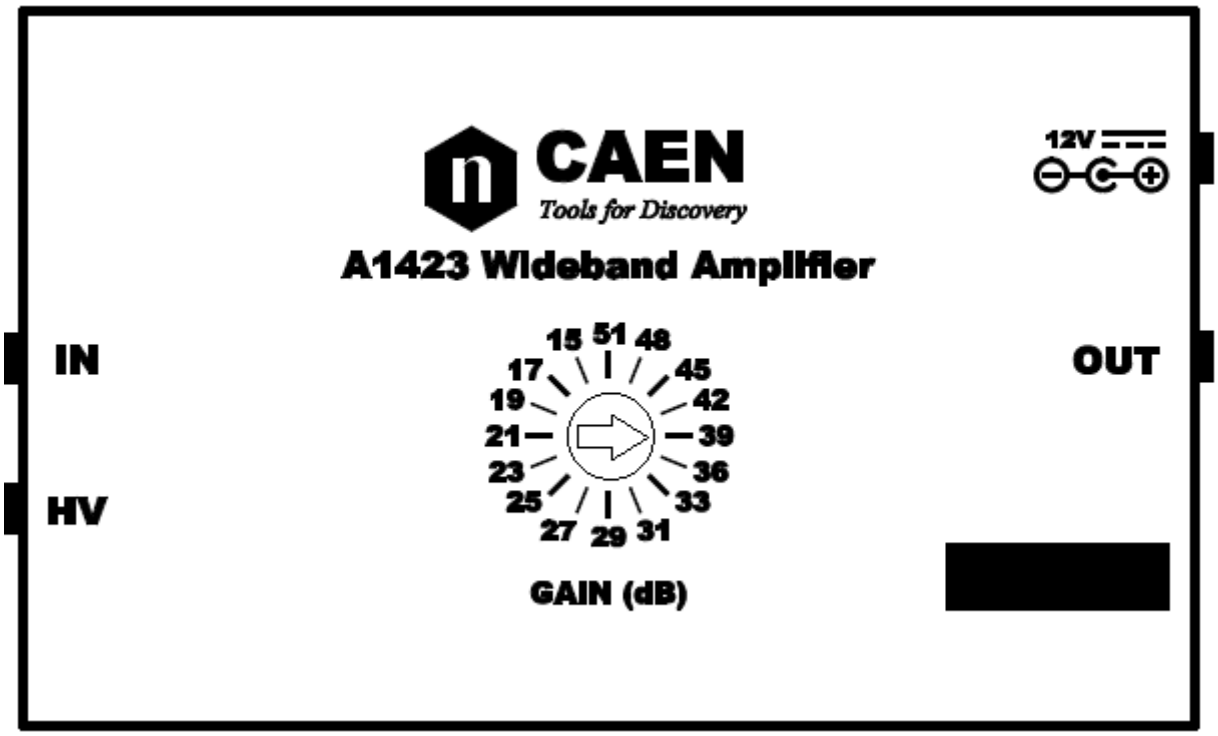

Fig. 1 – A1423 Top panel

Technical Specifications

Packaging

The Mod. A1423 is housed in a “desktop module” (55x25x90 mm).

External Connections

The location of all components is shown in Fig. 1. The function and electro-mechanical specifications of the external connections is as follows:

GAIN	16 position rotary switch	Gain setting; 15-51 dB range
IN	SMA 142-0711-811 Johnson (50 ohm)	Detector input; max rating: TBD
HV	SMA 142-0711-811 Johnson (50 ohm)	HV BIAS input; range: ±750V
OUT	SMA 142-0711-811 Johnson (50 ohm)	Amplifier Out; dynamics: ±1V
+12V	DC 2.1mm Power Socket	External power supply; 12V

Tab. 3 – External Connections

2 Test Results

Noise measurements

The following measurement was performed with no input signal; output level was detected by a 500 MHz oscilloscope set to 100ns resolution.

Gain (dB)	Noise RMS (µV)
15	220
17	234
19	240
21	246
23	253
25	361
27	391
29	426
31	492
33	568
36	1010
39	1330
42	2080
45	2730
48	3750
51	5220

Tab. 4 – Noise vs. Gain

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