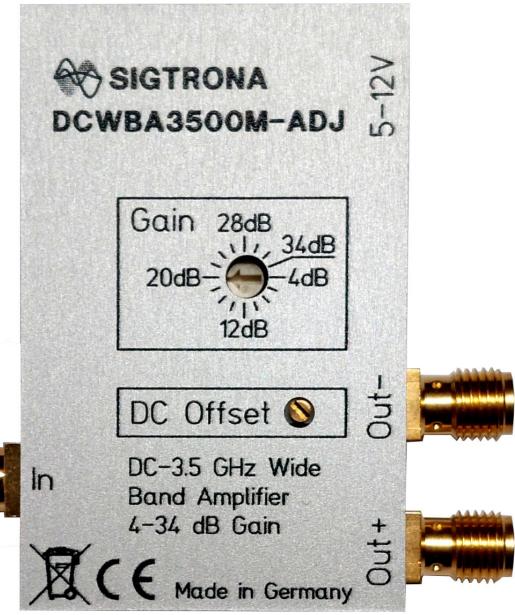


## Digitally Adjustable DC-Coupled Wideband Amplifier

### Features

- Adjustable gain: +4 to +34 dB in 2 dB steps
- DC coupled
- Bandwidth 3.5 GHz
- 5–12 V supply (USB-C plug)
- Adjustable DC output offset ( $\pm 1$  V range)
- Differential output
- $50\Omega$  input and outputs
- Compact size:  $32 \times 50 \times 14$  mm



### Typical Applications

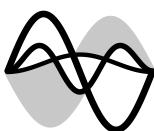
- PMT (photo multiplier tube) pulse amplifier
- General purpose signal amplification
- Automated test equipment (ATE)

### General Description

The Sigtrona DCWBA3500M-ADJ is a wideband, DC-coupled amplifier with digitally adjustable gain. Its wide gain range of +4 to +34 dB, combined with an adjustable DC output offset, makes it suitable for a broad range of applications. The device features differential outputs, providing both inverted and non-inverted versions of the signal. Power is supplied via a USB-C connector, and the amplifier accepts input voltages from 5 to 12 V, enabling straightforward integration into OEM systems.

### Variants and Order Codes

- **DCWBA3500M-ADJ-F:** Female SMA input connector, female SMA output connectors.
- **DCWBA3500M-ADJ-M:** Male SMA input connector, female SMA output connectors.



# Contents

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# 1 Specifications

## 1.1 Electrical and Environmental Characteristics

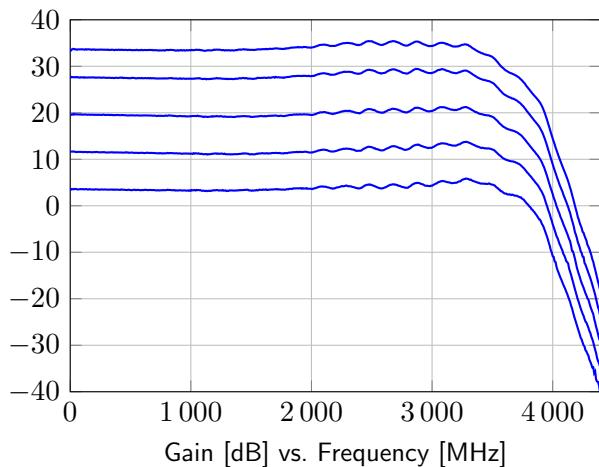
| Parameter                        | Conditions                               | Min  | Typ   | Max  | Units                  |
|----------------------------------|------------------------------------------|------|-------|------|------------------------|
| DC Characteristics               |                                          |      |       |      |                        |
| Supply Voltage ( $V_S$ )         | Via USB-C connector                      | 4.5  | 12    | 14   | V                      |
| Supply Current                   | $V_S = 5\text{ V}$                       |      | ???   |      | mA                     |
|                                  | $V_S = 12\text{ V}$                      |      | ???   |      | mA                     |
| AC Characteristics               |                                          |      |       |      |                        |
| Bandwidth                        | Gain 4 dB, Flatness $\pm 1.5\text{ dB}$  |      | 3 500 |      | MHz                    |
|                                  | Gain 20 dB, Flatness $\pm 1.5\text{ dB}$ |      | 3 500 |      | MHz                    |
|                                  | Gain 34 dB, Flatness $\pm 1.5\text{ dB}$ |      | 3 500 |      | MHz                    |
| Rise Time                        | Gain 20 dB (computed)                    |      | 100   |      | ps                     |
| Signal Gain                      | Gain 4 dB, $f=2\text{ GHz}$              | 3    | 4     | 6    | dB                     |
|                                  | Gain 20 dB, $f=2\text{ GHz}$             | 19   | 20    | 22   | dB                     |
|                                  | Gain 34 dB, $f=2\text{ GHz}$             | 33   | 34    | 36   | dB                     |
| Input Noise Density <sup>1</sup> | Gain 34 dB, DC-1 GHz                     |      | 1.4   |      | nV/ $\sqrt{\text{Hz}}$ |
| Input Characteristics            |                                          |      |       |      |                        |
| Input Impedance                  |                                          |      | 50    |      | $\Omega$               |
| Input Voltage Range              | Absolute maximum                         | -3.5 |       | +3.5 | V                      |
| Output Characteristics           |                                          |      |       |      |                        |
| Output Impedance                 |                                          |      | 50    |      | $\Omega$               |
| Output Voltage Range             |                                          | -800 |       | +800 | mV                     |
| Output Offset Adjustment Range   |                                          | -750 |       | +650 | mV                     |
| Environmental Characteristics    |                                          |      |       |      |                        |
| Thermal dissipation              |                                          |      | ??    | ??   | W                      |
| Operating Ambient Temperature    | non-condensing                           | -20  |       | +40  | $^{\circ}\text{C}$     |
| Storage Temperature              | non-condensing                           | -20  |       | +90  | $^{\circ}\text{C}$     |
| Weight                           |                                          |      | 46    |      | g                      |

Please contact Sigtrona if you need further specs.

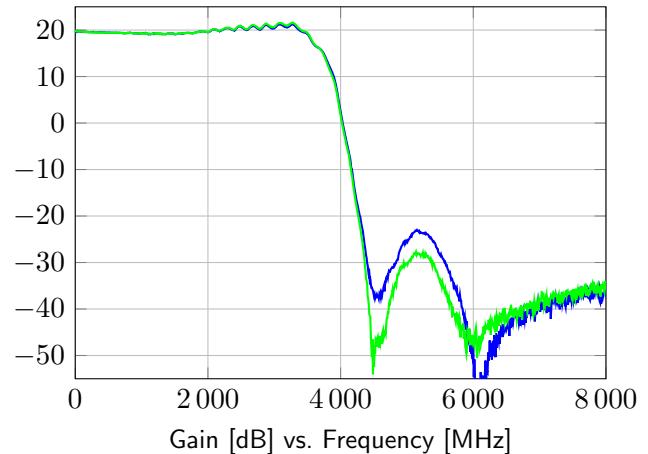
<sup>1</sup>50  $\Omega$  terminated input to Out+ output.

## 1.2 Gain Graphs

Standard test conditions, unless otherwise specified: Output offset is set to 0 V, unused output terminated with  $50\Omega$ .



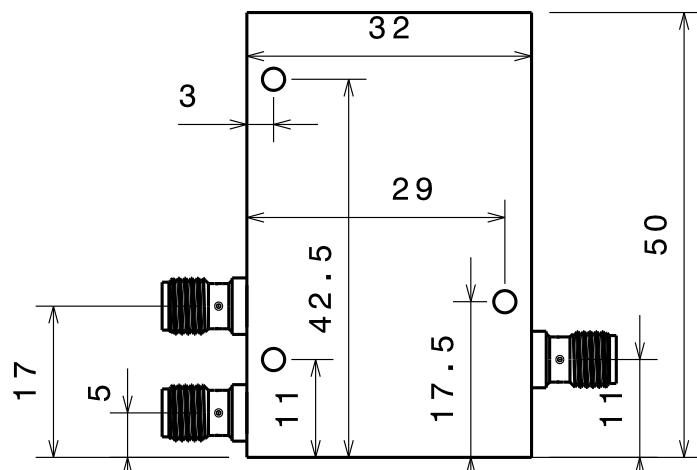
Gain at settings 34 dB, 28 dB, 20 dB, 12 dB, 4 dB (top to bottom)



Gain from DC to 8 GHz at setting 20 dB, Out+ (blue) and Out- (green)

## 1.3 Mechanical Dimensions

Bottom view



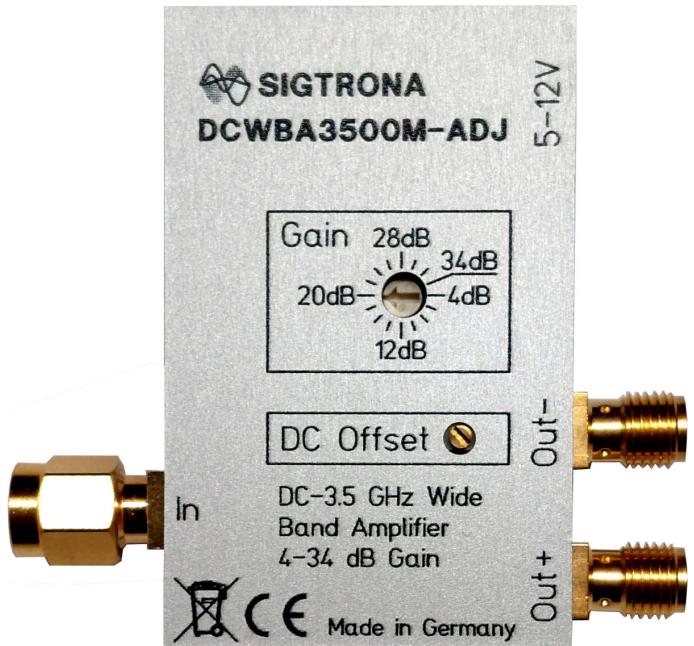
Bottom view with 3 mounting holes. All dimensions in mm. The drawing shows the SMA female input variant.

The DCWBA3500M-ADJ has 3 mount holes on the bottom for metric M 2.5 mm screws. These screws can penetrate 3 mm into the metal case.

## 2 Connections and Operation

The DCWBA3500M-ADJ features the following frontpanel elements:

- SMA male/female input (photo shows the male version; see variants) with internal  $50\ \Omega$  termination.
- Two SMA female outputs, matched to  $50\ \Omega$ . These two outputs are complementary.
- USB-C style power connector. It does not support automatic voltage negotiation but you can supply any voltage from 5 to 12 V via the USB power pins.
- The DC offset can be adjusted by a multi-turn potentiometer over a range of at least  $\pm 1\text{ V}$  (flat screwdriver required for operation).
- The gain adjustment is provided by a 16-step rotary switch (flat screwdriver required for operation).



It is important to understand that the offset adjustment potentiometer changes the *output* offset. It cannot be used to remove a large offset present at the *input* into the amplifier. The total output voltage range given in the spec ( $\pm 800\text{ mV}$ ) refers to the total output voltage, i.e. offset plus amplified signal.