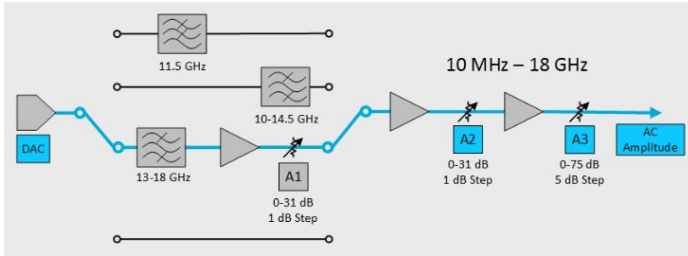


# Arbitrary Waveform Generators

## AWG70001A Option AC Datasheet



The AWG70001A, with Option AC, provides you with an additional high output amplitude connector. Option AC adds a single-ended AC coupled Planar Crown connector to the front panel of the single channel AWG70001A Arbitrary Waveform Generator. User controls are added to allow switching the output path between the standard Direct output connectors or the AC output connector. When switched to the AC path, additional user controlled amplification and attenuation is added to the signal path.

In AC output mode, you can choose one of the four signal filter paths and set the output amplitude, letting the instrument to automatically set the step attenuators in the selected filter path. For greater control, you can manually set the attenuation of the step attenuators for your selected filter path.

### KeyFeatures

- No filter: -70 to +25 dBm at 1 GHz CW calibration frequency
- 11.5 GHz Low Pass: -70 to +25 dBm at 1 GHz CW calibration frequency
- 10 GHz – 14.5 GHz Band Pass: -77 to +18 dBm at 11 GHz CW calibration frequency
- 13 GHz – 18 GHz Band Pass: -90 to +20 dBm at 14 GHz CW calibration frequency

## AWG70001A Option AC output specifications

These specifications apply to the optional AC output connector. Refer to the AWG70000 series datasheet for all other instrument specifications.

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

| Output connector                                              | Aeroflex/Weinschel Planar Crown Universal Connector System with SMA female adapter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-----------|------------------------------------------|-----------------------------------------|----------|------------------------------------------|-----------------------------------------|--------------------------------|-------------------------------------------|------------------------------------------|------------------------------|-------------------------------------------|------------------------------------------|--|
| Number of analog AC outputs                                   | AWG70001A: 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Type of outputs                                               | single ended                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Output impedance                                              | 50 Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Frequency range                                               | <table><tr><th>Filter</th><th>Value</th></tr><tr><td>No filter</td><td>10 MHz to 18 GHz</td></tr><tr><td>Low pass</td><td>10 MHz to 11.5 GHz</td></tr><tr><td>Band pass (10 to 14.5 GHz)</td><td>10 GHz to 14.5 GHz</td></tr><tr><td>Band pass (13 to 18 GHz)</td><td>14 GHz to 18 GHz</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                        |             | Filter      | Value     | No filter                                | 10 MHz to 18 GHz                        | Low pass | 10 MHz to 11.5 GHz                       | Band pass (10 to 14.5 GHz)              | 10 GHz to 14.5 GHz             | Band pass (13 to 18 GHz)                  | 14 GHz to 18 GHz                         |                              |                                           |                                          |  |
| Filter                                                        | Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| No filter                                                     | 10 MHz to 18 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Low pass                                                      | 10 MHz to 11.5 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (10 to 14.5 GHz)                                    | 10 GHz to 14.5 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (13 to 18 GHz)                                      | 14 GHz to 18 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Amplitude                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Range (for a CW signal at specified frequencies in each path) | <table><tr><th>Filter path</th><th>Description</th></tr><tr><td rowspan="2">No filter</td><td>25 dBm to -70 dBm at 1 GHz</td></tr><tr><td>18 dBm to -77 dBm at 13 GHz</td></tr><tr><td>Low pass</td><td>25 dBm to -70 dBm at 1 GHz</td></tr><tr><td>Band pass (10 GHz to 14.5 GHz)</td><td>18 dBm to -77 dBm at 11 GHz</td></tr><tr><td rowspan="2">Band pass (13 GHz to 18 GHz)</td><td>20 dBm to -90 dBm at 14 GHz</td></tr><tr><td>18 dBm to -90 dBm at 18 GHz</td></tr></table>                                                                                                                                                                                                                             | Filter path | Description | No filter | 25 dBm to -70 dBm at 1 GHz               | 18 dBm to -77 dBm at 13 GHz             | Low pass | 25 dBm to -70 dBm at 1 GHz               | Band pass (10 GHz to 14.5 GHz)          | 18 dBm to -77 dBm at 11 GHz    | Band pass (13 GHz to 18 GHz)              | 20 dBm to -90 dBm at 14 GHz              | 18 dBm to -90 dBm at 18 GHz  |                                           |                                          |  |
| Filter path                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| No filter                                                     | 25 dBm to -70 dBm at 1 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | 18 dBm to -77 dBm at 13 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Low pass                                                      | 25 dBm to -70 dBm at 1 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (10 GHz to 14.5 GHz)                                | 18 dBm to -77 dBm at 11 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (13 GHz to 18 GHz)                                  | 20 dBm to -90 dBm at 14 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | 18 dBm to -90 dBm at 18 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Accuracy (at calibration frequency)                           | <table><tr><th>Filter path</th><th>Description</th></tr><tr><td rowspan="2">No filter</td><td>±0.5 dB at 1 GHz, ambient 16 °C to 26 °C</td></tr><tr><td>±1.5 dB at 1 GHz, ambient 0 °C to 50 °C</td></tr><tr><td rowspan="2">Low pass</td><td>±0.5 dB at 1 GHz, ambient 16 °C to 26 °C</td></tr><tr><td>±1.5 dB at 1 GHz, ambient 0 °C to 50 °C</td></tr><tr><td rowspan="2">Band pass (10 GHz to 14.5 GHz)</td><td>±1.5 dB at 11 GHz, ambient 16 °C to 26 °C</td></tr><tr><td>±3.0 dB at 11 GHz, ambient 0 °C to 50 °C</td></tr><tr><td rowspan="2">Band pass (13 GHz to 18 GHz)</td><td>±1.5 dB at 14 GHz, ambient 16 °C to 26 °C</td></tr><tr><td>±3.5 dB at 14 GHz, ambient 0 °C to 50 °C</td></tr></table> | Filter path | Description | No filter | ±0.5 dB at 1 GHz, ambient 16 °C to 26 °C | ±1.5 dB at 1 GHz, ambient 0 °C to 50 °C | Low pass | ±0.5 dB at 1 GHz, ambient 16 °C to 26 °C | ±1.5 dB at 1 GHz, ambient 0 °C to 50 °C | Band pass (10 GHz to 14.5 GHz) | ±1.5 dB at 11 GHz, ambient 16 °C to 26 °C | ±3.0 dB at 11 GHz, ambient 0 °C to 50 °C | Band pass (13 GHz to 18 GHz) | ±1.5 dB at 14 GHz, ambient 16 °C to 26 °C | ±3.5 dB at 14 GHz, ambient 0 °C to 50 °C |  |
| Filter path                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| No filter                                                     | ±0.5 dB at 1 GHz, ambient 16 °C to 26 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | ±1.5 dB at 1 GHz, ambient 0 °C to 50 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Low pass                                                      | ±0.5 dB at 1 GHz, ambient 16 °C to 26 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | ±1.5 dB at 1 GHz, ambient 0 °C to 50 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (10 GHz to 14.5 GHz)                                | ±1.5 dB at 11 GHz, ambient 16 °C to 26 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | ±3.0 dB at 11 GHz, ambient 0 °C to 50 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (13 GHz to 18 GHz)                                  | ±1.5 dB at 14 GHz, ambient 16 °C to 26 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | ±3.5 dB at 14 GHz, ambient 0 °C to 50 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Resolution                                                    | 0.01 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Amplitude flatness                                            | Specifications include the sin(x)/x roll off of the DAC at 50 GS/s.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | <table><tr><th>Filter</th><th>Description</th></tr><tr><td rowspan="2">No filter</td><td>± 3 dB, 10 MHz to 10 GHz</td></tr><tr><td>± 4 dB, 10 MH to 13 GHz</td></tr><tr><td>Low pass</td><td>± 3 dB, 10 MHz to 10 GHz</td></tr><tr><td>Band pass (10 GHz - 14.5 GHz)</td><td>± 3.5 dB, 10 GHz to 14.5 GHz</td></tr><tr><td>Band pass (13 GHz - 18 GHz)</td><td>± 4.5 dB from 13 GHz to 18 GHz</td></tr></table>                                                                                                                                                                                                                                                                                                 | Filter      | Description | No filter | ± 3 dB, 10 MHz to 10 GHz                 | ± 4 dB, 10 MH to 13 GHz                 | Low pass | ± 3 dB, 10 MHz to 10 GHz                 | Band pass (10 GHz - 14.5 GHz)           | ± 3.5 dB, 10 GHz to 14.5 GHz   | Band pass (13 GHz - 18 GHz)               | ± 4.5 dB from 13 GHz to 18 GHz           |                              |                                           |                                          |  |
| Filter                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| No filter                                                     | ± 3 dB, 10 MHz to 10 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
|                                                               | ± 4 dB, 10 MH to 13 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Low pass                                                      | ± 3 dB, 10 MHz to 10 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (10 GHz - 14.5 GHz)                                 | ± 3.5 dB, 10 GHz to 14.5 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |
| Band pass (13 GHz - 18 GHz)                                   | ± 4.5 dB from 13 GHz to 18 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |             |           |                                          |                                         |          |                                          |                                         |                                |                                           |                                          |                              |                                           |                                          |  |

**Harmonic distortion**

AWG70001A operating at 50 GS/s.

**2<sup>nd</sup> Harmonic at output frequency**

| Frequency range | Value     |
|-----------------|-----------|
| < 1 GHz         | < -34 dBc |
| 1 GHz - 4 GHz   | < -30 dBc |
| > 4 GHz         | < -28 dBc |

**3<sup>rd</sup> Harmonic at output frequency**

| Frequency range | Value     |
|-----------------|-----------|
| < 1 GHz         | < -50 dBc |
| 1 GHz - 4 GHz   | < -45 dBc |
| > 4 GHz         | < -33 dBc |

**Amplifier 1 dB compression**

AWG70001A operating at 50 GS/s.

No filter

| Filter                     | Frequency | Value    |
|----------------------------|-----------|----------|
| No filter                  | 1 GHz     | > 25 dBm |
|                            | 13 GHz    | > 22 dBm |
| Low Pass filter            | 1 GHz     | > 25 dBm |
| Band Pass (10 to 14.5 GHz) | 11 GHz    | > 22 dBm |
| Band Pass (13 to 18 GHz)   | 14 GHz    | > 22 dBm |
|                            | 18 GHz    | > 20 dBm |

**Switching time**

The time required for the attenuators and amplifiers to settle to the specified output amplitude after an amplitude change.

20 ms

## Ordering information

### Models

AWG70001A AC

AWG70001A with Option AC

Option AC adds a single-ended AC coupled output connector with additional amplification and attenuation.

ASEAN / Australasia (65) 6356 3900  
Belgium 00800 2255 4835\*  
Central East Europe and the Baltics +41 52 675 3777  
Finland +41 52 675 3777  
Hong Kong 400 820 5835  
Japan 81 (3) 6714 3010  
Middle East, Asia, and North Africa +41 52 675 3777  
People's Republic of China 400 820 5835  
Republic of Korea +822 6917 5084, 822 6917 5080  
Spain 00800 2255 4835\*  
Taiwan 886 (2) 2656 6688

Austria 00800 2255 4835\*  
Brazil +55 (11) 3759 7627  
Central Europe & Greece +41 52 675 3777  
France 00800 2255 4835\*  
India 000 800 650 1835  
Luxembourg +41 52 675 3777  
The Netherlands 00800 2255 4835\*  
Poland +41 52 675 3777  
Russia & CIS +7 (495) 6647564  
Sweden 00800 2255 4835\*  
United Kingdom & Ireland 00800 2255 4835\*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777  
Canada 1 800 833 9200  
Denmark +45 80 88 1401  
Germany 00800 2255 4835\*  
Italy 00800 2255 4835\*  
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90  
Norway 800 16098  
Portugal 80 08 12370  
South Africa +41 52 675 3777  
Switzerland 00800 2255 4835\*  
USA 1 800 833 9200

\* European toll-free number. If not accessible, call: +41 52 675 3777

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[www.tek.com](http://www.tek.com)

**Tektronix®**

**CalPlus GmbH**  
Zentrale Berlin  
Heerstraße 32 • 14052 Berlin  
Tel.: 030 214982-0 • Fax: 030 214982-50  
office@calplus.de • www.calplus.de

**CalPlus GmbH**  
Niederlassung ScopeShop  
Normannenweg 30 • 20537 Hamburg  
Tel.: 040 3039595-0 • Fax: 040 3039595-50  
scopeshop@calplus.de • www.calplus.de