



## Test Adapter for ARCO SS-32 and GR1409 Standard Capacitors and other Two-terminal Capacitors

The AH TTA1 test adapter provides the means to connect ARCO SS-32 and GR1409 style two-terminal standard capacitors to a three-terminal bridge or meter. It also accommodates leaded components and other capacitors having banana plugs with standard spacing. The adapter can be used with Andeen-Hagerling

Capacitance/Loss Bridges or with other commercial test instrumentation using three- or four-terminal connections.

Prior to the introduction of the AH TTA1, the GR1620 capacitance bridge<sup>1</sup> provided the only standardized commercial fixture to measure two-terminal standard capacitors.

### FEATURES

- **Flip of a locking switch** allows GR1409 standard capacitors to be measured in either two- or three-terminal mode
- **Three- or four-terminal BNC jacks** accommodate connection to a bridge or meter
- **5-Way binding posts** provide convenient connections to ordinary leaded components
- **Orientation-dependent labeling** helps to guide the proper insertion of standard capacitors
- **Emulates GR1620 defacto standard connection configuration** for making two-terminal standard capacitor measurements
- **Additivity of capacitance** of stacked GR1409 capacitors is optimized for accuracy.
- **Full three-terminal shielding** of all internal connections
- **Three year warranty**

1. The GR1620 can be configured on its front panel to make two-terminal measurements via a group of three 5-way binding post jacks. These jacks can directly accept GR1409 or Arco SS-32 standard capacitors.

# SPECIFICATIONS

**Connector type to bridge or meter:**

Two pairs of BNC jacks. A three-terminal connection uses one of each pair.

**Connector type to standard capacitor:**

Three 5-way binding post banana jacks with standard spacing (0.75 inch or 19 mm)

**Test Cable:** The AH TTA1 is compatible with the cables supplied with AH bridges.

**Nominal stray High-to-Low capacitance and loss<sup>2</sup>:**

Two-terminal mode: 0.18 pF, D < 0.001 @ 1 kHz

Three-terminal mode: 0.17 pF, D < 0.001 @ 1 kHz

**Stray High-to-Low capacitance and loss with banana jacks fully shielded:**

Two- and three-terminal mode: < 3 aF, < 0.00002 nS @ 1 kHz

**Nominal High terminal capacitance to ground:**

Two-terminal mode: 12 pF @ 1 kHz

Three-terminal mode: 8 pF @ 1 kHz

**Nominal Low terminal capacitance to ground:**

Two- and three-terminal mode: 7 pF @ 1 kHz

**Measurement modes:**

**Two- or three-terminal using a manual switch.** All measurements connect the High and Low terminals of the capacitance bridge to the L and H terminals of the GR1409, respectively.<sup>3</sup> In two-terminal mode, the G terminal of the GR1409 is connected to the High terminal of the bridge. In three-terminal mode, the G terminal of the GR1409 is grounded. For Arco SS-32 standard capacitors, there is little difference between two- and three-terminal modes since these capacitors have only two terminals.

2. All capacitance and loss specifications assume that the banana jacks are screwed down all the way.

**Power requirements:** None

**Temperature range:** -40° to +75°C while operating or in storage

**Humidity:** 0 to 85% operating and storage relative humidity, non-condensing.

**Packaging:** The adapter is 2.5 inches (6.4 cm) high, 4.0 inches (10.2 cm) wide and 6.5 inches (16.5 cm) long.

**Weight:** 1.1 lbs (0.5 kg)

**Safety and EMC conformity:** conforms to EN61326:1998 and EN 61010-1: 1993/A2: 1995

**Warranty:** The AH TTA1 is covered by a three year warranty. Forward and return shipping is covered during the first three months of the warranty.

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3. The High to H and Low to L connections are intentionally reversed in the AH TTA1 to improve the precision of two-terminal measurements. In the early days of electronics, a convention was established that labeled the terminal connected to the outermost (more electrostatically exposed) layer or electrode of a two-terminal capacitor with an "L" or, more commonly, a band around that end of the capacitor. The other, more shielded, electrode was labeled with an "H" or unlabeled.

Capacitance bridges have one terminal that is driven with a low impedance, higher voltage, and another terminal that is a sensitive, high-impedance, low voltage input. Early capacitance bridges labeled these terminals "High" and "Low", respectively. Unfortunately, all these conventions continue to be used today. The result is that connecting H to High and L to Low causes the sensitive bridge input to be connected to the more exposed, less shielded electrode of a capacitor. For precision capacitance measurements, this often exposes the Low input of the bridge to noise. To minimize noise pickup, the AH TTA1 is labeled to connect H to Low and L to High.

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**Website:** [www.andeen-hagerling.com](http://www.andeen-hagerling.com)

**Ordering Information:****Model or Option No.**

Two-terminal to Three-terminal Adapter ..... AH TTA1

**For questions regarding the AH TTA1, possible applications, the location of your nearest sales representative, or ordering information:**

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