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# Analog Output Card and Cable

## Technical Data

**For HP 1000 A-Series Products  
with 24 kHz Power  
Product Number  
12062A and 12062AC**

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### Features

- 4 channels of voltage output/card
- Output range of 10.24 volts
- 12 bit resolution including sign
- Short circuit and overvoltage protection
- One undedicated digital output per channel
- 90 kHz output from memory
- Programmable data rates

### Description

#### HP 12062A Card

The HP 12062A is a plug-in card for the HP 1000 A-Series computers for low-cost, high-performance analog output capability in small distributed measurement and control applications.

The HP 12062A Analog Output Card provides 4 independent bipolar voltage outputs. Remote sensing per channel provides accurate output voltages compensating for long distances of field wiring. Undedicated digital outputs

may be used in pen up/down control, CRT display, or X-Y plotters.

DMA-compatibility provides fast analog updates on a per channel basis or between channels. Programmable time delay between DMA updates provides signal reconstruction capability with a full power bandwidth of 20 kHz.

#### HP 12062AC Cable

The HP 12062AC 4-Channel Analog Output Cable provides for easy connection of your application to the HP 12062A. The HP 12062AC provides a 3-meter cable prewired to the appropriate card-compatible edge-connector/hood assembly. Each channel is an individually shielded twisted pair for optimal analog performance. The "remote" end of the cable is unterminated allowing direct wiring to the application. Alternately, the cable may be wired to the easy-to-use insulation displacement HP 12064A Termination

Accessory providing electrician-compatible heavy-duty screw terminals and built-in wiring tray (see HP 12064A data sheet).

### User Programming

User programming of the HP 12062A card is easily accomplished using the parallel interface I/O driver (ID.50) in the RTE-A Operating System. A simple RTE EXEC call in the following format is used:

Call EXEC (2, LU#, Data Buffer, #readings, control word) D

The control word specifies a time delay between successive DMA word transfers. Each increment (up to 255) in the control word adds a 1.085 microsecond time delay to the 10.85 microsecond base rate.

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## Calibration

The HP 12062A is calibrated at the factory and may require recalibration by the customer upon arrival by using a voltmeter and optional calibration software.

## Functional Specifications

### HP 12062A Card

**Number of Channels:**  
4 bipolar

**Resolution:**  
12 bits, LSB=5mV

**Voltage Output Range:**  
-10.24 to +10.235 V at 20 mA

**Short Circuit and Overvoltage Protection:**  
Protected against short to common or overvoltage up to -15 V dc

### Accuracy

**Linearity error (0°C to 70°C):**  
2.5 mV max

**Monotonicity temperature range:** 0°C to 70°C (32°F to 131°F)

**Gain error:** Adjustable to zero

**Offset error:** Adjustable to zero

### Drift

**Offset drift:** 0.0015% of FSR per C, max

**Gain drift:** 0.0015% of FSR per C, max

**Total error: (0°C to 70°C):**  
0.15% of FSR max

### Output Characteristics

**Slew rate:** 10 V/ms, resistive load

**Setting time for FSR change:**  
5 ms typical with resistive load

**Full power bandwidth:**  
20 kHz with resistive load

**Ripple and output noise:**  
2.5 mV p-p max (dc to 500 kHz, no load)

**Fastest Update Time:**  
10.85 ohms

**Programmable Times:**  
10.85 ohms to 288.61 ohms in increments of 1.085 ohms

### Digital Outputs

**TTL Level per channel:**  
**1 Load per channel:** 10 standard TTL loads

## Physical Characteristics

**Dimensions:** 28.9 cm long by 17.2 cm wide by 1.9 cm high (11.4 in by 6.75 in by 0.75 in)

**Net Weight:** 0.36 kg (12.75 oz)

**Power Requirements:**  
6.0 W at 5 V dc, 7.6 W at 25 kHz ac

## HP 12062AC Cable

### Physical Characteristics

**Cable length:** 3 m (9.84 ft)

**Wire Gauge:** 22

**Overall Diameter:** <1.31 cm (0.515 in)

### Electrical Characteristics

**Configuration:**  
9 shielded twisted pairs plus one drain per pair

**Voltage rating:** 300 V peak

### Environmental Characteristics: (both products)

**Operating Temperature:**  
0°C to 55°C (32°F to 131°F)

**Storage Temperature:**  
-40°C to 75°C (-40°F to 167°F)

**Relative Humidity:**  
5% to 95% at 40°C (104°F) noncondensing

**Operating Altitude:**  
to 4.6 km (15,000 ft)

**Non-operating Altitude:**  
to 15.3 km (50,000 ft)

**System Compatibility:** All HP 1000 A-Series computers with 25 kHz power option. See HP 1000 Ordering Information (P/N 5953-8730).

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## Ordering Information

### The HP 12062A includes:

**12062-60011** 4-channel DAC Card  
**12060-90003** User Information Manual  
**12062-90001** Operating and Service Manual

### HP 12062A Options

- 001** Adds Edge Connector Kit and extra edge connector
- 020** Adds Calibration Program on minicartridge (P/N 12062-13301)
- 041** Adds Calibration Program on 8-inch flexible disk (P/N 12062-13401)
- 044** Adds Calibration Program on 3½-inch microfloppy disk (P/N 12062-13402)

*Note:* Calibration requires A-Series card extender (P/N 12011-60001) and HP 3455A Multimeter (or equivalent).

### The HP 12062AC includes:

A 3-meter unterminated cable with 9 individually shielded twisted pairs.

## Diagnostics

Diagnostics software is supplied with the HP 24612A. This product includes diagnostic manuals, diagnostic software, and test hoods for the A-Series Measurement and Control interfaces including the HP 12060B, HP 12061A, HP 12062A, and the HP 12063A. Must order one of the following media options: 020, 022, 041, 042, 044, or 051.

## Related Product Information

### MAC/1000 Software Library

This product provides a set of high-level call subroutines for the A-Series M&C family. These calls make upgrades to higher point count applications, via Control 1000, straightforward. For more information contact:

Demand Systems, Inc.  
6279 Variel Avenue, Suite D  
Woodland Hills, CA 91367  
Attn: Frank Zuhde  
(213) 710-8851