DDA-06

6-Channel, 12-Bit ISA-Bus Analog Output Board

FEATURES

- 6 analog output channels
- 12-bit resolution
- +5, +10, ±2.5, ±5, ±10V output ranges
- 4–20mA current loop capability (sink)
- 24 bits of parallel digital I/O
- Simultaneous updating on all channels (switch selectable)
- Software included: Windows 3.X/95/98, setup, calibration, programming examples and Windows DLL

APPLICATIONS

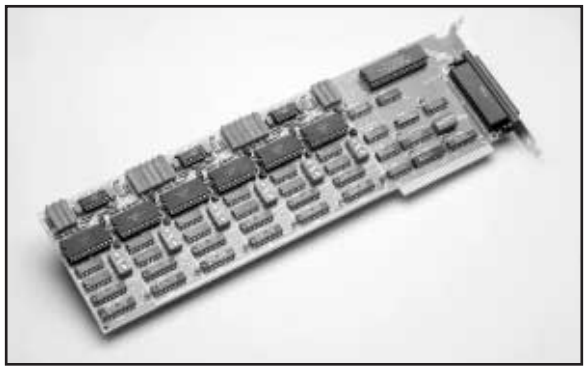
- Servo control
- Programmable voltage source
- Programmable current sink
- Function generator
- Product testing
- Use with Keithley's SSIO-24 and ERB-24 (through STA-U)

Functional Description

Keithley's DDA-06 is an analog output and digital I/O board for ISA-bus based PCs providing 6 channels of 12-bit analog output and 24 lines of digital I/O.

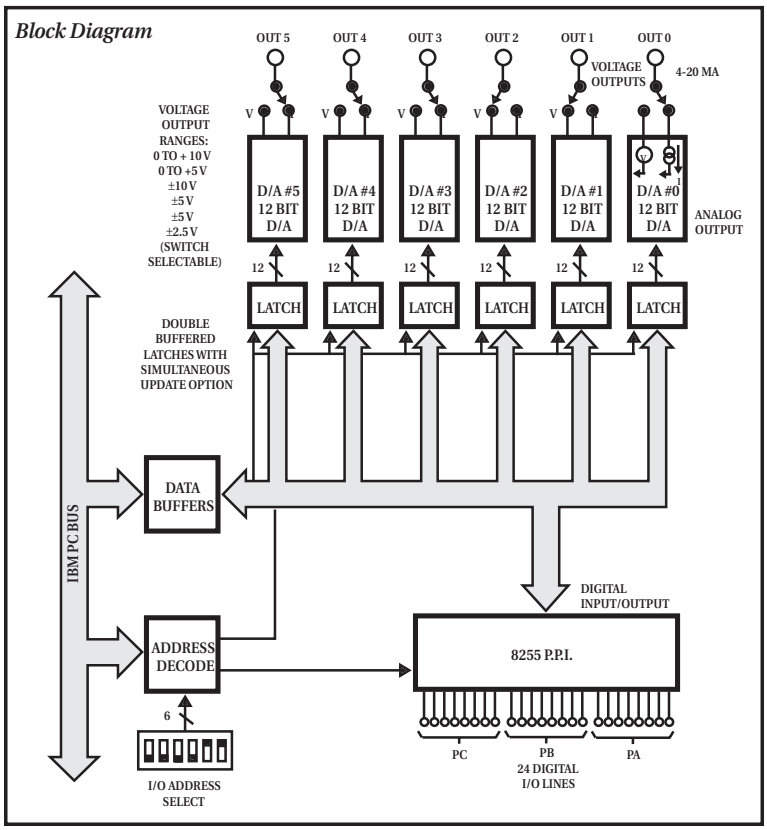
The following functions are implemented on the DDA-06:

- 6 independent 12-bit D/A converters. Each is individually switch selectable to any of the following ranges: 0 to +10V, 0 to +5V , –2.5V to +2.5V, –5V to +5V, –10V to +10V, 4–20mA current loop (sink)



- Each D/A has a double-buffered input for single-step update and occupies its own I/O location. By means of jumper blocks, it is possible to select any or all of the D/As to update simultaneously. Since each D/A output uses one pin of the rear 37-pin D-type connector, the D/As can be operated in either voltage output mode or current output (but not both simultaneously). In voltage mode, output settling time is typically 3 microseconds to 0.01% for a full-scale step.
- 24 bits of digital I/O are provided on the rear connector consisting of 3 ports of 8 bits. Each port can be programmed independently as an input or output and is TTL/CMOS compatible. An 8255 programmable peripheral interface chip is used for digital I/O and can be operated in the 8255 modes 0 – 2 (straight I/O, strobed I/O, and bidirectional I/O).

Block Diagram



Software

The following utility software is included with the DDA-06.

1. Initial setup and installation aids
2. Calibration program
3. Programming examples and demonstration programs
4. A port I/O DLL for operation under Windows and an example program

No driver is supplied with the DDA-06 since programming is simple using I/O instructions in most programming languages (e.g., BASIC, QuickBASIC, C, Turbo-Pascal, etc.). Writing to a D/A converter is a simple two step procedure. The least significant 8 bits of the output word are written to the board, then the most significant four bits are written. The D/A is automatically updated when the MSBs are written. The optional DASDLL-DDA-06 is a full-featured driver for using the DDA-06 in Windows 3.X.

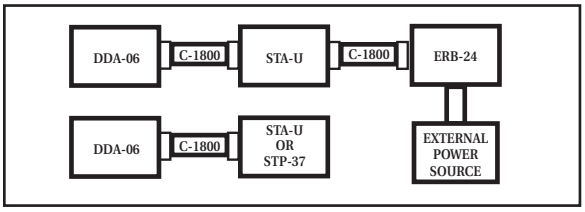
TestPoint

By providing a graphical drag-and-drop interface for acquisition of data from IEEE-488 instruments, data acquisition boards, and RS-232/485 instruments and devices, TestPoint lets you create applications without programming.

A fully featured, integrated application package, TestPoint incorporates many commonly used math, analysis, report generation, and graphics functions. Read about it, beginning on page 307.

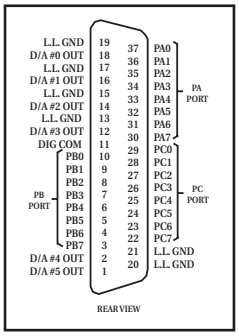
DDA-06

Configuration Guide



Connector Pin Assignments

All I/O is through a standard 37-pin D-type male connector that projects through the rear panel of the computer. For soldered connections, a standard 37-pin D female (ITT/Cannon DC-37S or equivalent) is the correct mating part and can be ordered from Keithley as part number SFC-37.



SPECIFICATIONS

D/A Converters

CHANNELS: 6.
RESOLUTION: 12-bits (1 part in 4095 decimal).
D/A TYPE: DAC-80N (6 used).
LATCHES: Double buffered with optional simultaneous update.
LINEARITY: ±½ bit.
MONOTONICITY: ±½ bit.
TEMPERATURE DRIFT OF UNIPOLAR OFFSET: 1ppm typ 3ppm max of full scale range (per °C).
TEMPERATURE DRIFT OF BIPOLAR OFFSET: 7ppm typ 15ppm max of full scale range (per °C).
TEMPERATURE DRIFT OF GAIN: 15ppm typ/30ppm max .
OUTPUT RANGES: 0 to + 5V, 0 to +10V, –2.5 to +2.5V, –5 to +5V, –10 to +10V, 4–20mA (current sink to ground).

Voltage Output Characteristics

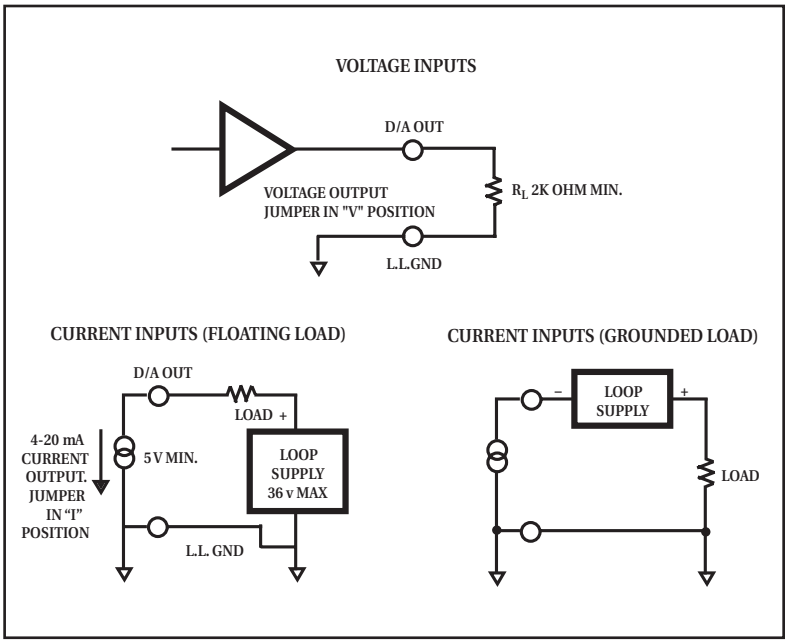
LOAD CURRENT: ±5mA min.
SHORT CIRCUIT CURRENT: 40mA max.
OUTPUT RESISTANCE: <0.1Ω.
SETTLING TIME: 4µs max to 0.01 % for full-scale step.

Digital Inputs/Outputs

TYPE: 8255 PPI, supports all modes.
NUMBER: 24 lines (3 8-bit ports)
CONTROL: Each port software programmable as input or output.
INPUT LOGIC LOW LEVEL: –0.5V min to +0.8V max.
INPUT LOGIC HIGH LEVEL: +2.4V min to +5.0V max.
INPUT CURRENT: +1µA (logic high or low).
OUTPUT LOW SINK CURRENT: 1.7mA at V_{OL} = 0.45V.
OUTPUT HIGH SOURCE CURRENT: –200µA at V_{OH} = 2.4V.
***DARLINGTON DRIVE CURRENT:** –1mA min/–4mA max at 1.5V.

* Available on any 8 pins simultaneously from PB and PC ports.

Typical Output Configurations



Current Loop Characteristics

TYPE: 4–20mA constant current sink to ground.
OUTPUT RESISTANCE: 100MΩ.
MIN LOOP EXCITATION VOLTAGE: +6V.
MAX LOOP EXCITATION VOLTAGE: +36V.

Power Requirements

+5V: 450mA typ/550mA max.
+12V: 60mA typ/100mA max.
–12V: 140mA typ/180mA max.

General Environmental

OPERATING TEMPERATURE RANGE: 0 to 50°C.
STORAGE TEMPERATURE RANGE: –20 to +70°C.
HUMIDITY: 0 to 90% non-condensing.
DIMENSION: 13.3in L × 4.25in H × 0.75in D (33.8cm × 10.8cm × 1.9cm).

ORDER	DESCRIPTION
DDA-06*	6-Channel Analog Output Board

OPTIONS

C1800	STA-U, STP-37 to DDA-06 Cable (18 inches)
DASDLL-DDA-06*	Windows 3.X Driver (can be obtained free from our website)
ERB-24	Electromechanical Relay Board
MS-DDA-06*	Additional Hardware and Software Manual and Software
STA-U	Screw Terminal Accessory Board
STC-37	Screw Terminal Connector
STP-37	Screw Terminal Panel
TESTPOINT	TestPoint Software Package

* Software supplied on 3.5 inch disks

See page 479 for descriptions of all accessories.