

Model 3195-A2A/E2A  
6-Channel 16-Bit D/A Converter

**INSTRUCTION MANUAL**

June, 1989

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**\*\*\*SPECIAL OPTION\*\*\***

Model 3195-S002

6-Channel 16-Bit D/A Converter

May 1987

Model 3195-S002

\*\*\*SPECIAL OPTION\*\*\*

Model 3195-S002

The Model 3195-S002 is the same as Model 3195-A2A except that the outputs are brought to 2-Pin LEMO connectors on the modules' front panel instead of the 50 contact ribbon connector.

The signal output for each channel is brought to the socket portion of the connector and the signal return is tied to the pin portion of the connector.

**\*\*\* SPECIAL OPTION \*\*\***

Model 3195-S003

6-channel 16-bit D/A Converter

December, 1987

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Model 3195

**\*\*\* SPECIAL OPTION \*\*\***

The Model 3195-S003 is the same as the Model 3195-A2A except that the output has been changed to provide a signal in the range of 0 to +10 volts D.C. rather than  $\pm 10$  volts D.C.

MLH:rem(3000 Ser 11)  
December 8, 1987

**\*\*\* SPECIAL OPTION \*\*\***

Model 3195-S004

6-channel 16-bit D/A Converter

September, 1988

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Model 3195-S004

**\*\*\* SPECIAL OPTION \*\*\***

The Model 3195-S004 is the same as the Model 3195-A2A except that the output signals are available via six 2-contact LEMO connectors (shell size 0) on the module's front panel. A single contact LEMO connector (shell size 00) is provided for the External Trigger input.

The pin out for the 2-contact LEMOs is such that the analog signal is available on the socket half of the connector, and the signal return (ground) is available on the pin half of the connector.

MLH:rem(3000 Ser 11)  
September 23, 1988

**\*\*\*SPECIAL OPTION\*\*\***

Model 3195-S005

6-channel 16 bit D/A Converter

February, 1989

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Model 3195-S005

**\*\*\*SPECIAL OPTION\*\*\***

The Model 3195-S005 is the same as a 3195-A2A except that the output signal range is from zero to +10 volts.

The Offset and Gain calibration settings should be adjusted so that writing only the Least Significant Bit (LSB) to a channel yields an output signal value of 152.6 microvolts, and that writing all bits but the LSB yields an output signal value of 9.9998474 volts.

MLH:rem(3000 Ser. 11)  
February, 1989

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### 6-channel, 16-bit D/A Converter

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(Rev. Jun. 87)

#### FEATURES

- Six-channel DAC with 16-bit resolution
- One converter per channel for high speed
- Settles to  $\pm 0.003\%$  FSR in less than ten microseconds (full-scale step)
- Independent or simultaneous conversion
- Simultaneous conversions triggered from Dataway P1 line or front-panel input

#### APPLICATIONS

- Industrial process control
- Laboratory automation
- Drive gauges or indicators
- PID loop control

3195  
DAC  
MODULE

#### GENERAL DESCRIPTION

The Model 3195 D/A Converter module provides an interface between the CAMAC Dataway and devices requiring analog inputs, allowing the computer to control such devices as gauges, indicators, and displays. A single-width CAMAC module, it contains six digital-to-analog channels, each with a separate 16-bit converter. The DAC outputs are connected to a 50-contact connector on the front panel.

The 3195 accepts binary data in two's complement form from the CAMAC Dataway. Setting the module's Mode Control register determines whether this data is passed directly to the selected DAC channel or held for subsequent, simultaneous conversion.

#### OPERATION

Data is written into the Rank 1 register for each channel via F(16) commands. External control of the Rank 2 register (and DAC) update is selected by the Mode register. The Rank 1 data can be copied directly into the Rank 2 register by the F(16) command for independent conversion; for simultaneous conversion, all six channels of data can be copied into the Rank 2 registers by a one microsecond pulse on the P1 or P2 Dataway lines or by a signal at the front-panel LEMO connector. There are five modes of external Rank 1/Rank 2 update control, determined by the contents of the Mode Control register. This register is written by an F(17)-A(0) command using Dataway bits W1-W3 (W1 = LSB). Rank 1 data can be copied into the Rank 2 register by an F(25)-A(0) command regardless of the mode setting.

#### MODE CONTROL REGISTER

Mode	Control of Rank1/Rank2 Transfer
0	Independent channel conversion
1	Rank 1/Rank 2 Transfer on P1 (See Note)
2	Rank 1/Rank 2 Transfer on P2
3	Rank 1/Rank 2 Transfer on P1 or P2 (See Note)
4	Rank 1/Rank 2 Transfer on P2, followed by P1 (See Note)

**Note:** The P1 pulse and the front-panel trigger inputs are strap-selectable.

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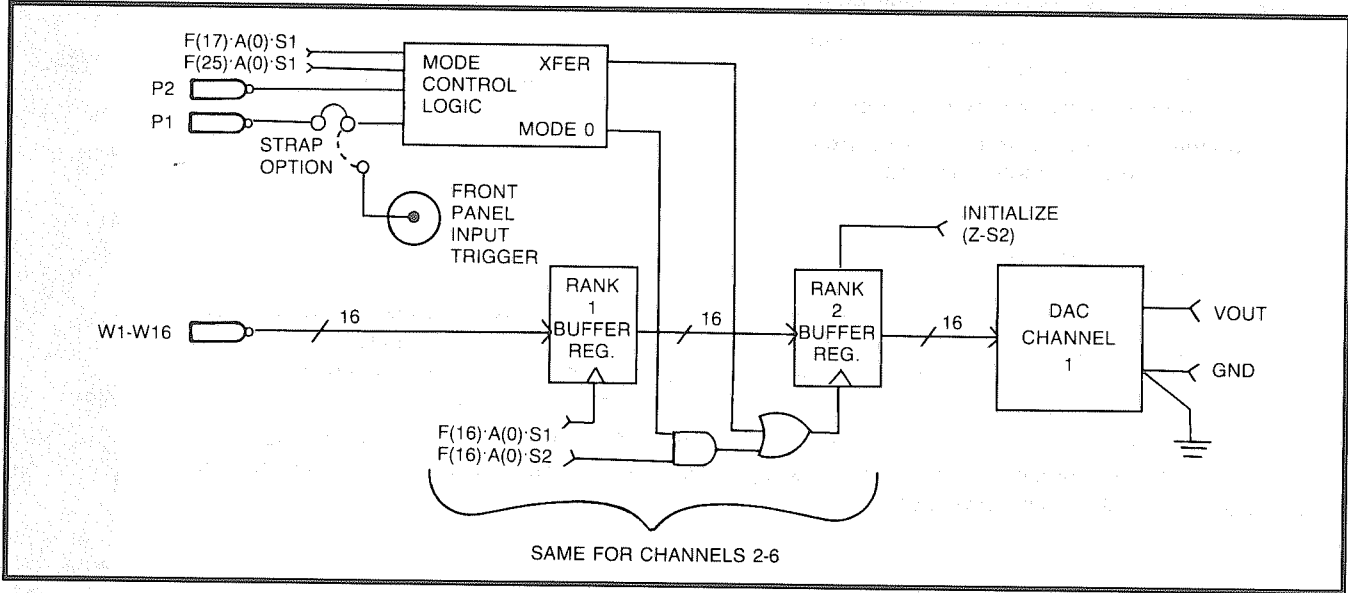
**FUNCTION CODES**

Command	Q	Action	
F(16)·A(i)	WT1	1	Writes Channel i DAC Data registers. (See Notes 1 and 2.)
F(17)·A(0)	WT2	1	Writes Mode Control register.
F(25)·A(0)	XEQ	1	Executes a Rank 1/Rank 2 data transfer.
Z·S2	ZED		Initializes the DAC outputs to zero volts.

**Notes:**

- (i) can range from 0 to 5 to select Channels 1 through 6.
- Writes Rank 2 register if Mode = 0; otherwise, writes Rank 1 register.
- X = 1 for all valid addressed commands.

**SIMPLIFIED BLOCK DIAGRAM (single channel shown)**



**SPECIFICATIONS (for each channel, 25 degrees C, except where noted)**

Full-scale range:	± 10 volts
Performance:	Monotonic to 14 bits, 15 to 35 degrees C
Total error:	± 0.003% FSR, @ 25 degrees C
DAC settling time:	10 microseconds (max) (full-scale step to 0.003%)
Output impedance:	0.2 ohms (max)
Output drive:	± 5 milliamperes (min)
Protection:	From shorted outputs over full-scale range

**POWER REQUIREMENTS**

- + 6 volts — 760 mA
- + 24 volts — 150 mA
- 24 volts — 150 mA

**ORDERING INFORMATION**

Weight: .70 kg. (1 lb. 8 oz.)

- Model 3195-A4A — 6-channel, 16-bit D/A Converter, 50-contact Ribbon
- Model 3195-E2A — 6-channel, 16-bit D/A Converter, 50-pin "D" Connector

An option of this module is available with the data packed in 24 bits. Contact the factory for details.

- Accessories — Model 5950-Z1A Mating Connector
- Model 5935-Z1A Mating Connector
- Model 1850-E1D Rack Termination Panel
- Model 1850-A1D for "A" Connector

## D/A CALIBRATION

The 3195 module is shipped from the factory fully calibrated for an input range of +/-10 volts. If for any reason it becomes necessary to recalibrate the module, the following procedure for D/A offset and gain adjustments is as follows:

### OFFSET Adjustment

Set the channel that needs to be recalibrated to minus full scale (i.e., 8000 Hex.) Adjust that channel's offset potentiometer (see Figure 1) for exactly -10.00000 volts at the output of the Digital to Analog converter.

### GAIN Adjustment

Set the channel that needs to be recalibrated to positive full scale (i.e., 7FFF Hex.) Adjust that channel's gain potentiometer (see Figure 1) for exactly +9.99969 volts at the output of the Digital to Analog converter. Changes in the gain adjustment may affect the offset; therefore, it is advisable to repeat the calibration procedure.

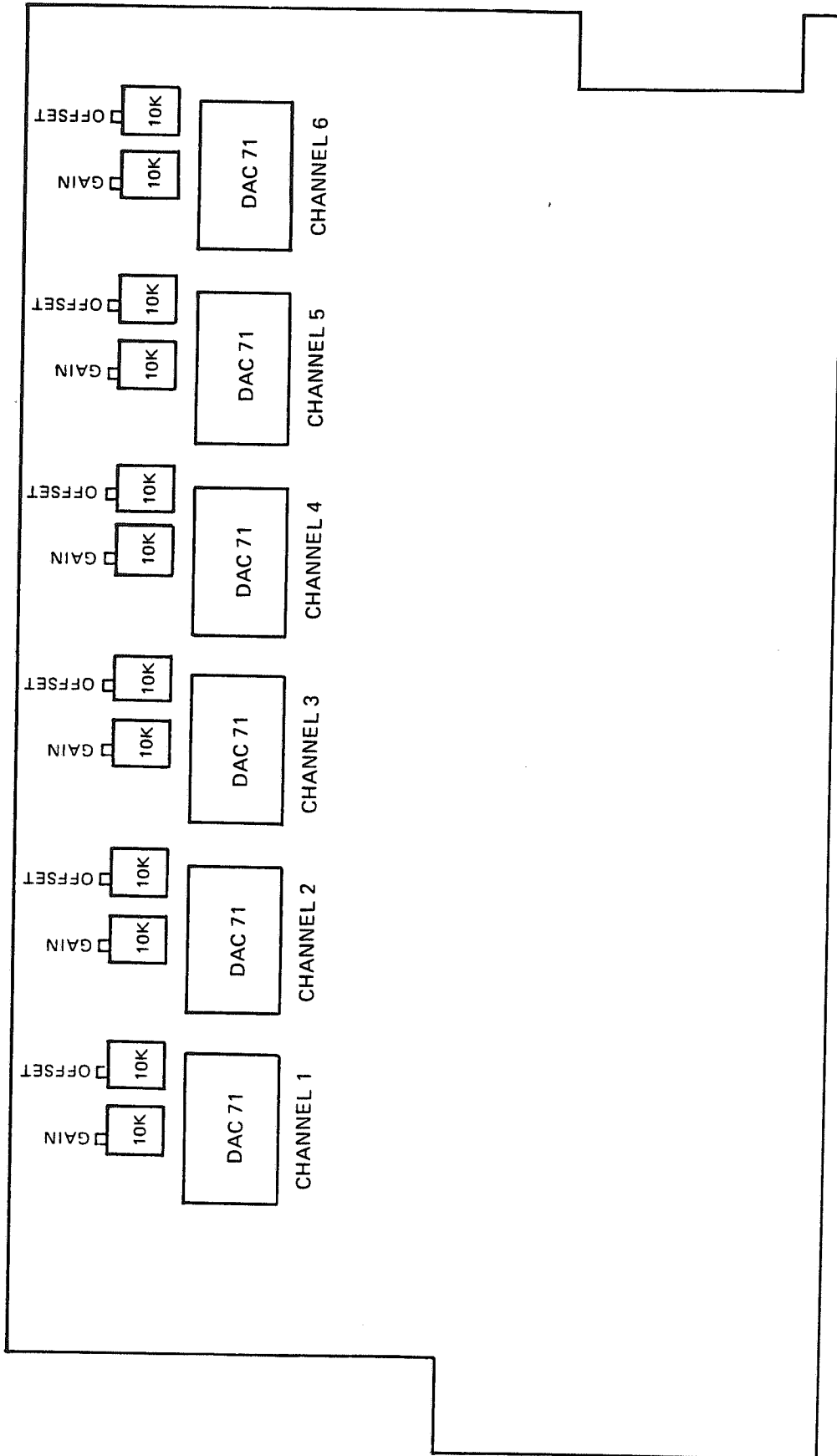


Figure 1: BOARD LAYOUT

## WARRANTY

KineticSystems Company, LLC warrants its standard hardware products to be free of defects in workmanship and materials for a period of one year from the date of shipment to the original end user. Software products manufactured by KineticSystems are warranted to conform to the Software Product Description (SPD) applicable at the time of purchase for a period of ninety days from the date of shipment to the original end user. Products purchased for resale by KineticSystems carry the original equipment manufacturer's warranty.

KineticSystems will, at its option, either repair or replace products that prove to be defective in materials or workmanship during the warranty period.

Transportation charges for shipping products to KineticSystems shall be prepaid by the purchaser, while charges for returning the repaired warranty product to the purchaser, if located in the United States, shall be paid by KineticSystems. Return shipment will be made by UPS, where available, unless the purchaser requests a premium method of shipment at their expense. The selected carrier shall not be construed to be the agent of KineticSystems, nor will KineticSystems assume any liability in connection with the services provided by the carrier.

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1. Contact KineticSystems and discuss the problem with a Technical Service Engineer.
2. Obtain a Return Authorization (RA) Number.
3. Initiate a purchase order for the estimated repair charge if the product is out of warranty.
4. Include a description of the problem and your technical contact person with the product.
5. Ship the product prepaid with the RA Number marked on the outside of the package to:

KineticSystems Company, LLC  
Repair Service Center  
900 North State Street  
Lockport, IL 60441

Telephone: (815) 838-0005  
Facsimile: (815) 838-4424  
Email: tech-serv@kscorp.com