Model 3195-A4A

6-Channel, 16-Bit D/A Converter

USER'S MANUAL

May, 2001

KineticSystems Co

Standardized Data Acquisition and Control Systems

3195

6-channel, 16-bit D/A Converter

FEATURES

- **Six-channel DAC with 16-bit resolution**
- **One converter per channel for high speed**
- **Settles to ±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**

GENERAL DESCRIPTION

(Product specifications and descriptions subject to change without notice.)

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.	

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

SIMPLIFIED BLOCK DIAGRAM (single channel shown)
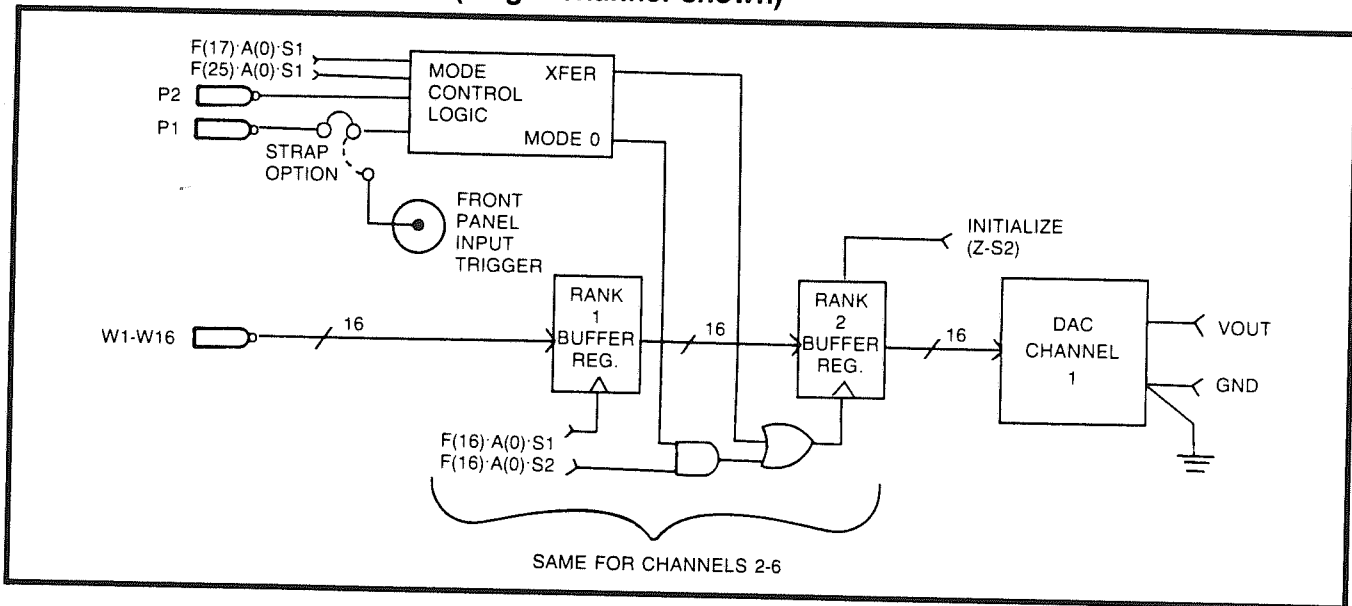
SPECIFICATIONS (for each channel, 25 degrees C, except where noted)

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., 7fff Hex.) Adjust that channel's offset potentiometer for exactly 0.0000 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., 0000 Hex.) Adjust that channel's gain potentiometer 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.
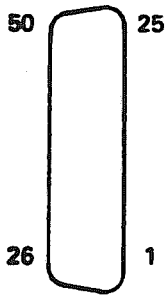
Socket/Wire List

50 SOCKET RIBBON CONN.
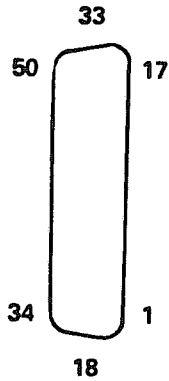
```
     50 ┌──┐ 25
        │  │
        │  │
     26 └──┘ 1
      FACE VIEW
```

SOCKET NO.

50	Digital Ground
49	
48	
47	
46	
45	
44	
43	
42	
41	
40	
39	
38	
37	
36	
35	
34	
33	
32	
31	
30	
29	
28	
27	
26	

SOCKET NO.

25	Digital Ground
24	
23	
22	
21	
20	
19	
18	Channel 6 Signal
17	Channel 6 Return
16	Digital Ground
15	Digital Ground
14	Channel 5 Signal
13	Channel 5 Return
12	Channel 4 Signal
11	Channel 4 Return
10	Digital Ground
9	Digital Ground
8	Channel 3 Signal
7	Channel 3 Return
6	Channel 2 Signal
5	Channel 2 Return
4	Digital Ground
3	Digital Ground
2	Channel 1 Signal
1	Channel 1 Return

PIN/WIRE LIST – Model 3195

```
         33
   50 ┌────┐ 17
      │    │
      │    │
   34 └────┘ 1
         18
     FACE VIEW
```

Socket/Wire List

50 SOCKET 'D'

PIN NO.

PIN	
50	DIGITAL GROUND
49	
48	
47	
46	
45	
44	
43	
42	
41	
40	
39	
38	
37	
36	
35	
34	

PIN NO.

PIN	
33	
32	
31	
30	
29	
28	
27	
26	
25	
24	
23	
22	
21	
20	DIGITAL GROUND
19	CHANNEL 6 SIGNAL
18	CHANNEL 6 RETURN

PIN NO.

PIN	
17	DIGITAL GROUND
16	
15	DIGITAL GROUND
14	CHANNEL 5 SIGNAL
13	CHANNEL 5 RETURN
12	CHANNEL 4 SIGNAL
11	CHANNEL 4 RETURN
10	DIGITAL GROUND
9	DIGITAL GROUND
8	CHANNEL 3 SIGNAL
7	CHANNEL 3 RETURN
6	CHANNEL 2 SIGNAL
5	CHANNEL 2 RETURN
4	DIGITAL GROUND
3	DIGITAL GROUND
2	CHANNEL 1 SIGNAL
1	CHANNEL 1 RETURN