

Model 3512-A1A
Isolated A/D Converter
w/Multiplexer
INSTRUCTION MANUAL

February, 1989

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Model 3512-S001

16-Channel Scanning A/D Converter

March 1981

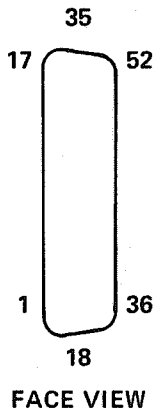
Model 3512-S001

**** SPECIAL OPTION ****

Model 3512-S001

The 3512-S001 is a 3512-A1B with a rear-mounted 52-pin "D" connector.

31 March 81



Pin/Wire List

52 PIN 'DD'

<u>PIN NO.</u>	<u>PIN NO.</u>	<u>PIN NO.</u>
17 Channel 8	35 _____	52 _____
16 Channel 8	34 _____	51 _____
15 Channel 7	33 Channel 16	50 _____
14 Channel 7	32 Channel 16	49 _____
13 Channel 6	31 Channel 15	48 _____
12 Channel 6	30 Channel 15	47 _____
11 Channel 5	29 Channel 14	46 _____
10 Channel 5	28 Channel 14	45 _____
9 Channel 4	27 Channel 13	44 _____
8 Channel 4	26 Channel 13	43 _____
7 Channel 3	25 Channel 12	42 _____
6 Channel 3	24 Channel 12	41 _____
5 Channel 2	23 Channel 11	40 _____
4 Channel 2	22 Channel 11	39 _____
3 Channel 1	21 Channel 10	38 _____
2 Channel 1	20 Channel 10	37 _____
1 Ground	19 Channel 9	36 _____
	18 Channel 9	

Model 3512
(Rev. 4/88)

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16-channel Scanning A/D Converter

Provide 16 channels of A/D conversion with 12-bit resolution

3512,14

Features

- Differential inputs
- 16 channels
- Self-scanning
- Internal buffer memory
- 12-bit resolution (1 part in 4096)
- Protected for 300 volt transient (3512)

Typical Applications

- Temperature measurement
- Pressure measurement
- 4-20 mA loop-control signal sensing
- Potentiometer position sensing
- Power-supply voltage sensing

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

The 3512 and 3514 are single-width CAMAC modules for converting 16 analog voltages into equivalent digital values that can be read via the Dataway. The inputs are continuously scanned and converted, and the results are stored in the module's 16-word memory. The CAMAC read cycles are asynchronous with the conversion process, eliminating any overhead due to testing for converter-busy. The analog voltages are converted using a sample-and-hold amplifier and a successive-approximation converter.

The features of the 3514 make it useful for general-purpose applications. The 3512 provides high transient-voltage protection and optional input filters; it is particularly useful in very high noise environments.

Feature Comparison

Item	3512	3514
Input protection	$\pm 35V$ steady state $\pm 300V$ for 100 μs	$\pm 35V$ steady state
Operating common-mode voltage	$\pm 12V$ max	$\pm 12V$ max
Input voltage ranges	2.5V to 10V unipolar and bipolar	2.5 mV to 10V unipolar and bipolar
Input filters	optional	not available
Scan rate (16 channels)	16 ms	1040 μs to 512 ms
Disable scan (Write/Read single channel)	No	Yes
Resolution	12 bits	12 bits
Input Impedance	$10^9 \Omega$	$10^8 \Omega$

Front Panel

The N-light flashes when the module is addressed. The ACTIVE light is on whenever the module is powered and scanning is activated.

Monitoring 4-20 Milliampere Signals

For monitoring 4-20 milliamperes analog signals, it is standard practice to mount a precision 250 ohm resistor external to the module (at the terminal strip) and use the 0 to 5 volt input range. This allows the input to the 3512 to be disconnected without disrupting the current loop. The loop must not exceed the maximum operating common-mode voltage rating of the module.



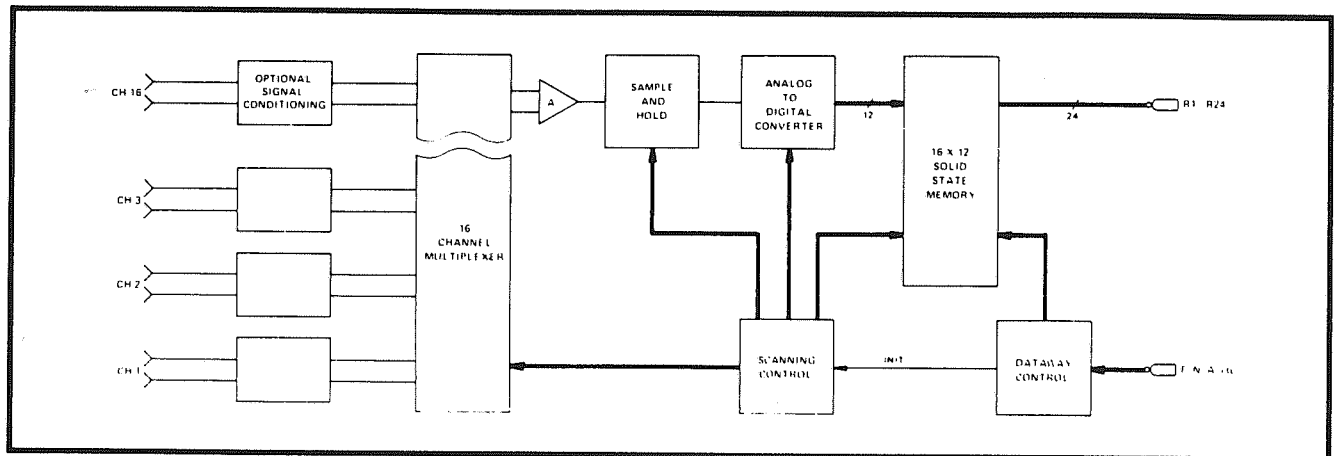
3512,14 (continued)

Function Codes

Command (see Note 1)	Q	Action
F(0):A(i) RD1	1	Reads Data register (i). (See Note 2.)
F(16):A(0) WT1	1	Writes Channel number.
F(24):A(0) DIS	1	Disables the automatic Scan-and-clear Channel Address register.
F(26):A(0) ENB	1	Enables the automatic Scan.
Z CZ	0	Enables the automatic Scan-and-restart sequence controller.

Notes: 1. Only the F(0):A(i) and Z commands are valid for the 3512.
 2. Subaddress (i) ranges from 0 to 15 for Channels 0 to 15, respectively.
 3. X = 1 for all valid addressed commands.

Block Diagram (3514 single-channel control not shown)



Power Requirements

Model	+ 6 volts	+ 24 volts	- 24 volts
3512	600 mA	65 mA	30 mA
3514	850 mA	50 mA	60 mA

Ordering Information (including related products)

Model	Filter	I/O Connector	Mating Connector	Termination Panel (see Note)
3512-A1A	10 Hz/3dB	50-contact Ribbon-socket	5950-Z1A	1850-A1D/1854-A2A
3512-A1B	None	50-contact Ribbon-socket	5950-Z1A	1850-A1D/1854-A2A
3512-E1A	10 Hz/3dB	50-pin "D" Plug	5934-Z1A	1850-E1D
3512-E1B	None	50-pin "D" Plug	5934-Z1A	1850-E1D
3514-A1A	None	50-contact Ribbon-socket	5950-Z1A	1850-A1D/1854-A2A
3514-E1A	None	50-pin "D" Plug	5934-Z1A	1850-E1D
3514-P1A	None	36-contact P.C. (rear)	5960-Z1A or Z1B	1850-P1D

Note: The 1854-A2A Rack Termination Panel provides terminations for two 3512 or 3514 modules on a single panel. Order one 1854-A2A and two each 5853-E30J Module I/O Cables (for 50-contact ribbon connector options only).

SIGNAL REFERENCING

Even though the 3512 has differential input on each channel, it is necessary to provide a ground return for the input amplifier's bias currents. This can be accomplished by either directly connecting one input terminal of each channel to ground, or by connecting all input terminals to ground through a resistance of less than one megohm.

INPUT VOLTAGE RANGES AND CALIBRATION

As shipped from the factory, the module is strapped and calibrated for an input signal range of 0 to +5 volts. Different input signal ranges can be achieved by strapping the module as shown in Figure 1.

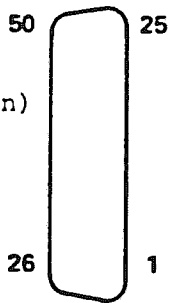
If, for any reason, it becomes necessary to recalibrate the module, the following procedures are recommended:

1. Apply a voltage source to the front panel input connector. The source used should be capable of stable and clear resolution of 1/10 LSB, and should be the common input to all channels.
2. ADC Zero. Set the input voltage to precisely one half LSB above the "all bits off" specified input. Adjust the "OFFSET" potentiometer so that the converter just switches on its LSB (read Bit 1 just goes on). (See Figure 1). Note that one half LSB is $610 \mu\text{v}$ for five volts full scale. This adjustment should be made near the most negative input voltage for bipolar operation.
3. ADC Gain. Set the input voltage to precisely one half LSB less than the "all bits on" input. (Note that this is $1\frac{1}{2}$ LSB's less than the nominal full-scale input. The all ones value for the 0 to +5 volt range is actually 4.99878 volts. Thus, the gain adjustment for the 0 to +5 volt range should be made with an input one half LSB less, or 4.99268 volts). With the input voltage established in this manner, adjust the "GAIN" potentiometer (See Figure 1) until the last bit just comes on.

This module should be recalibrated if a change is made to the input signal range.

These adjustments should be made while monitoring the converter output of one channel only. All channels are calibrated by these common controls. For example, make the adjustments to the module with a computer program looping on an F(0)·A(0) command which reads the output of Channel 1.

Model 3512
(AlZ Option)



Socket/Wire List

50 SOCKET RIBBON CONN.

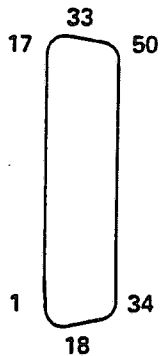
SOCKET NO.

SOCKET NO.

50	GROUND
49	
48	
47	
46	
45	
44	
43	
42	
41	Channel 16 RETURN
40	Channel 15 RETURN
39	Channel 14 RETURN
38	Channel 13 RETURN
37	Channel 12 RETURN
36	Channel 11 RETURN
35	Channel 10 RETURN
34	Channel 9 RETURN
33	Channel 8 RETURN
32	Channel 7 RETURN
31	Channel 6 RETURN
30	Channel 5 RETURN
29	Channel 4 RETURN
28	Channel 3 RETURN
27	Channel 2 RETURN
26	Channel 1 RETURN

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

Model 3512
(ElZ Option)



FACE VIEW

Pin/Wire List

50 PIN 'D'

PIN NO.

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

PIN NO.

33	Channel 16	RETURN
32	Channel 16	SIGNAL
31	Channel 15	RETURN
30	Channel 15	SIGNAL
29	Channel 14	RETURN
28	Channel 14	SIGNAL
27	Channel 13	RETURN
26	Channel 13	SIGNAL
25	Channel 12	RETURN
24	Channel 12	SIGNAL
23	Channel 11	RETURN
22	Channel 11	SIGNAL
21	Channel 10	RETURN
20	Channel 10	SIGNAL
19	Channel 9	RETURN
18	Channel 9	SIGNAL

PIN NO.

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

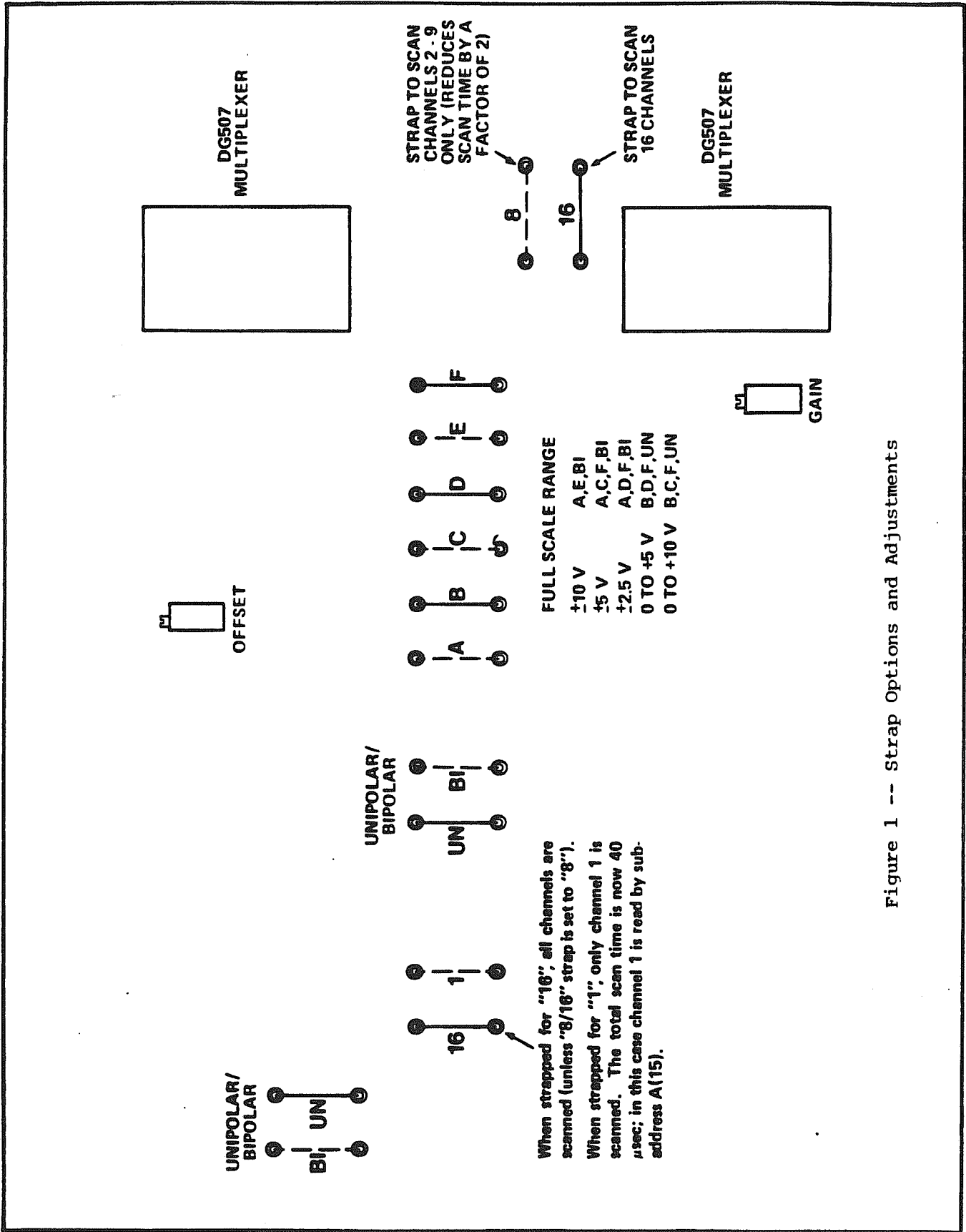


Figure 1 -- Strap Options and Adjustments

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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