MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE 90-30 SERIES PLC

IC693ALG222

16-CHANNEL ANALOG VOLTAGE INPUT MODULE

Used with the applicable Series 90-30 analog I/O configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: GE official manufacturer documentation

The maximum number of 16-Channel Analog Voltage Input modules which may be installed in a system are:

- 4 in a system using CPUs 311, 313, or 323
- 8 in a system using CPU331
- 12 in a system using CPUs 340 or 341
- 51 in a system using CPUs 350 – 364

When planning the module configuration for your application you must also consider the load capacity of the installed power supply and the total load requirements of all modules that are installed in the baseplate.

Refer to the *Series 90-30 Programmable Controller Installation Manual*, GFK-0356 for details on power supplies and module load requirements.

Table 10-3. Specifications for 16-Channel Analog Voltage Input Module, IC693ALG222

Number of Channels	1 to 16 selectable, single-ended 1 to 8 selectable, differential
Input Current Ranges	0V to +10V (unipolar) or –10V to +10V (bipolar); selectable each channel
Calibration	Factory calibrated to: 2.5 mV per count on 0V to +10V (unipolar) range 5 mV per count on –10 to +10V (bipolar) range
Update Rate	6 msec (all 16 single-ended channels) 3 msec (all 8 differential channels)
Resolution at 0V to +10V	2.5 mV (1 LSB = 2.5 mV)
Resolution at –10V to +10V	5 mV (1 LSB = 5 mV)
Absolute Accuracy ‡	± 0.25% of full scale @ 25°C (77°F) ± 0.5% of full scale over specified operating temperature range
Linearity	< 1 LSB
Isolation	1500 volts between field side and logic side
Common Mode Voltage (Differential)	± 11V (bipolar range) †
Cross-Channel Rejection	> 80 db from DC to 1 kHz
Input Impedance	>500K ohms (single-ended mode) >1M ohms (differential mode)
Input Filter Response	41 Hz (single-ended mode) 82 Hz (differential mode)
Internal Power Consumption	112 mA (maximum) from the backplane +5 VDC bus 41 mA (maximum) from the backplane Isolated +24 VDC supply

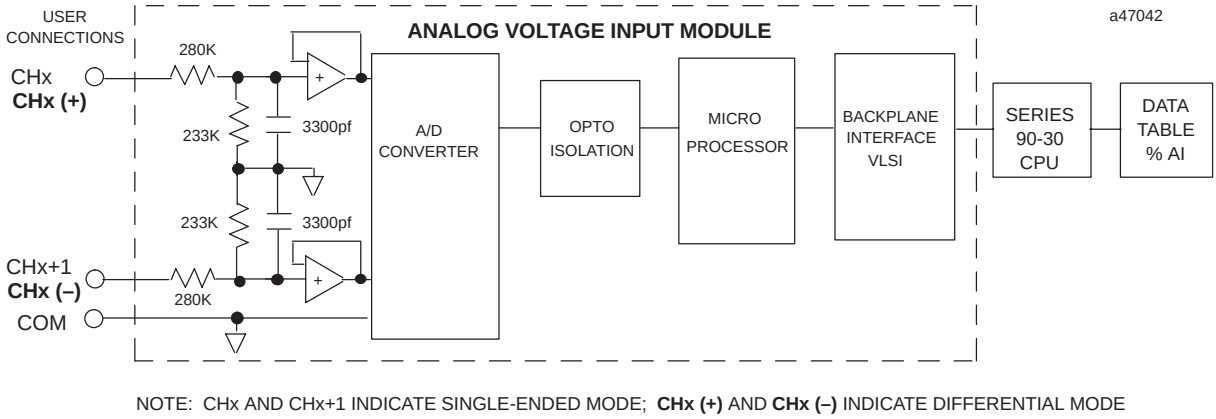
Refer to Appendix B for product standards and general specifications.

† The summation of the differential input, common-mode voltage, and noise must not exceed ±11 volts when referenced to COM.

‡ In the presence of severe RF interference (IEC 801-3, 10V/m), accuracy may be degraded to ±5% FS.

CPU Interface to the IC693ALG 222 Analog Voltage Input Module

The Series 90-30 PLC uses the data within the %AI data table to record analog values for use by the programmable controller. This scheme for the 16-Channel Analog Voltage Input module is shown below. More information on the CPU interface to analog modules can be found at the beginning of this chapter.



NOTE: CHx AND CHx+1 INDICATE SINGLE-ENDED MODE; **CHx (+)** AND **CHx (–)** INDICATE DIFFERENTIAL MODE

Figure 10-9. 16-Channel Analog Voltage Input Module Block Diagram - IC693ALG222

Placement of A/D Bits within the Data Tables

Since converters used in the analog modules are 12-bit converters, not all of the 16 bits in the data tables contain data required for the conversion. A version of the 12 bits is placed within the 16-bit data word corresponding to the analog point (in the %AI table). The Series 90-30 PLC system handles the integration differently for the various analog modules.

The CPU does not manipulate the data from the input modules before placing it within the word in the %AI data table. The bits in the %AI data table which were not used in the conversion by the input module are either forced to 0 (zero) by the analog input module. Placement of the 12 data bits from the A/D converter for an analog current input data word for the 16-Channel Analog Voltage Input module in unipolar range is shown below.

MSB															LSB
X	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	X	X	X

X=not converted bits

Analog values are scaled over the range of the converter. Factory calibration adjusts the analog value per bit (resolution) to a multiple of full scale (that is, 2.5 mV/bit for unipolar; 5 mV/bit for bipolar). This calibration leaves a normal 12-bit converter with 4000 counts (normally 2^{12} = 4096 counts). The data is then scaled with the 4000 counts over the analog range. For example, the data to the A/D converter for the 16-Channel Analog Voltage Input is scaled as shown below.

IC693ALG222 Analog Module Field Wiring Connections

Connections to this module from user devices are made to screw terminals on a removable 20-terminal connector block mounted on the front of the module. The actual terminals used are described in the following table and are shown in the following wiring diagrams.

Terminal Assignments

Pin assignments for the 20 terminal I/O connector on the 16-Channel Analog Voltage Input module are as shown in the following table.

Table 10-4. Terminal Pin Assignments for IC693ALG222

Pin Number	Signal Name	Signal Definition
1	n/a	not used
2	n/a	not used
3	CH1	Single Ended Channel 1, Differential Channel 1 (Positive terminal)
4	CH2	Single Ended Channel 2, Differential Channel 1 (Negative terminal)
5	CH3	Single Ended Channel 3, Differential Channel 2 (Positive terminal)
6	CH4	Single Ended Channel 4, Differential Channel 2 (Negative terminal)
7	CH5	Single Ended Channel 5, Differential Channel 3 (Positive terminal)
8	CH6	Single Ended Channel 6, Differential Channel **3** (Negative terminal)
9	CH7	Single Ended Channel 7, Differential Channel 4 (Positive terminal)
10	CH8	Single Ended Channel 8, Differential Channel 4 (Negative terminal)
11	CH9	Single Ended Channel 9, Differential Channel 5 (Positive terminal)
12	CH10	Single Ended Channel 10, Differential Channel 5 (Negative terminal)
13	CH11	Single Ended Channel 11, Differential Channel 6 (Positive terminal)
14	CH12	Single Ended Channel 12, Differential Channel 6 (Negative terminal)
15	CH13	Single Ended Channel 13, Differential Channel 7 (Positive terminal)
16	CH14	Single Ended Channel 14, Differential Channel 7 (Negative terminal)
17	CH15	Single Ended Channel 15, Differential Channel 8 (Positive terminal)
18	CH16	Single Ended Channel 16, Differential Channel 8 (Negative terminal)
19	COM	Common connection for Single Ended Channels
20	GND	Frame ground connections for cable shields

IC693ALG222 Analog Input Module Field Wiring Diagrams

The following figures provide information for connecting field wiring to the user terminal board on the 16-Channel Analog Voltage Input Module.

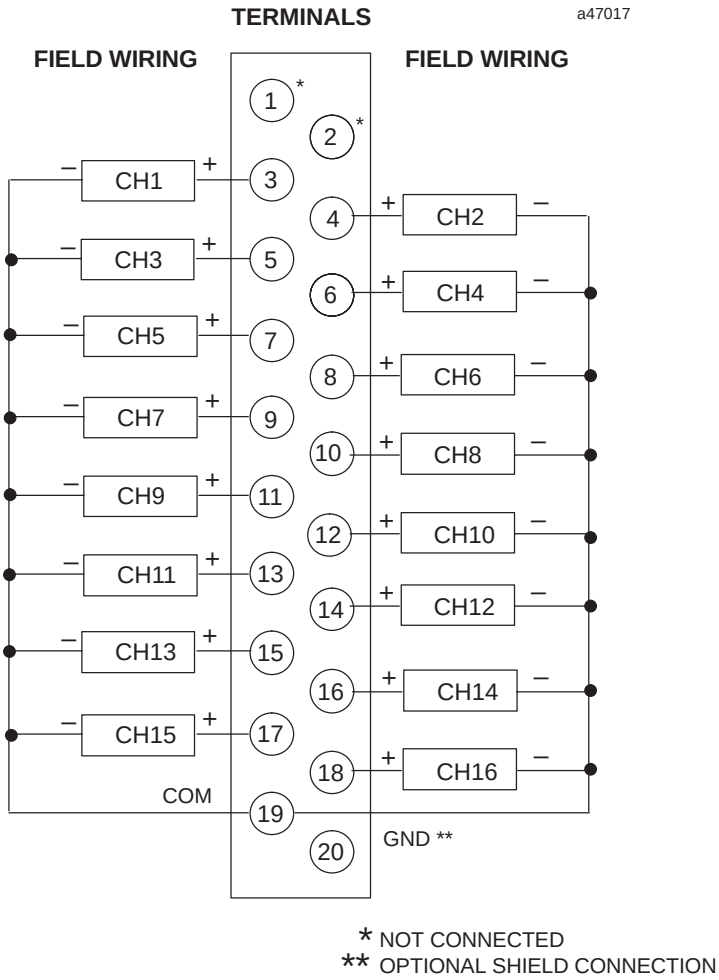


Figure 10-11. Field Wiring for 16-Channel Analog Voltage Input Module - IC693ALG222 (Single-Ended Mode)

Note

Please refer to Chapter 2 for wiring and shield ground connection details.

IC693ALG222 Analog Voltage Input Block Diagram

The following figure is a block diagram of the 16-Channel Analog Voltage Input Module.

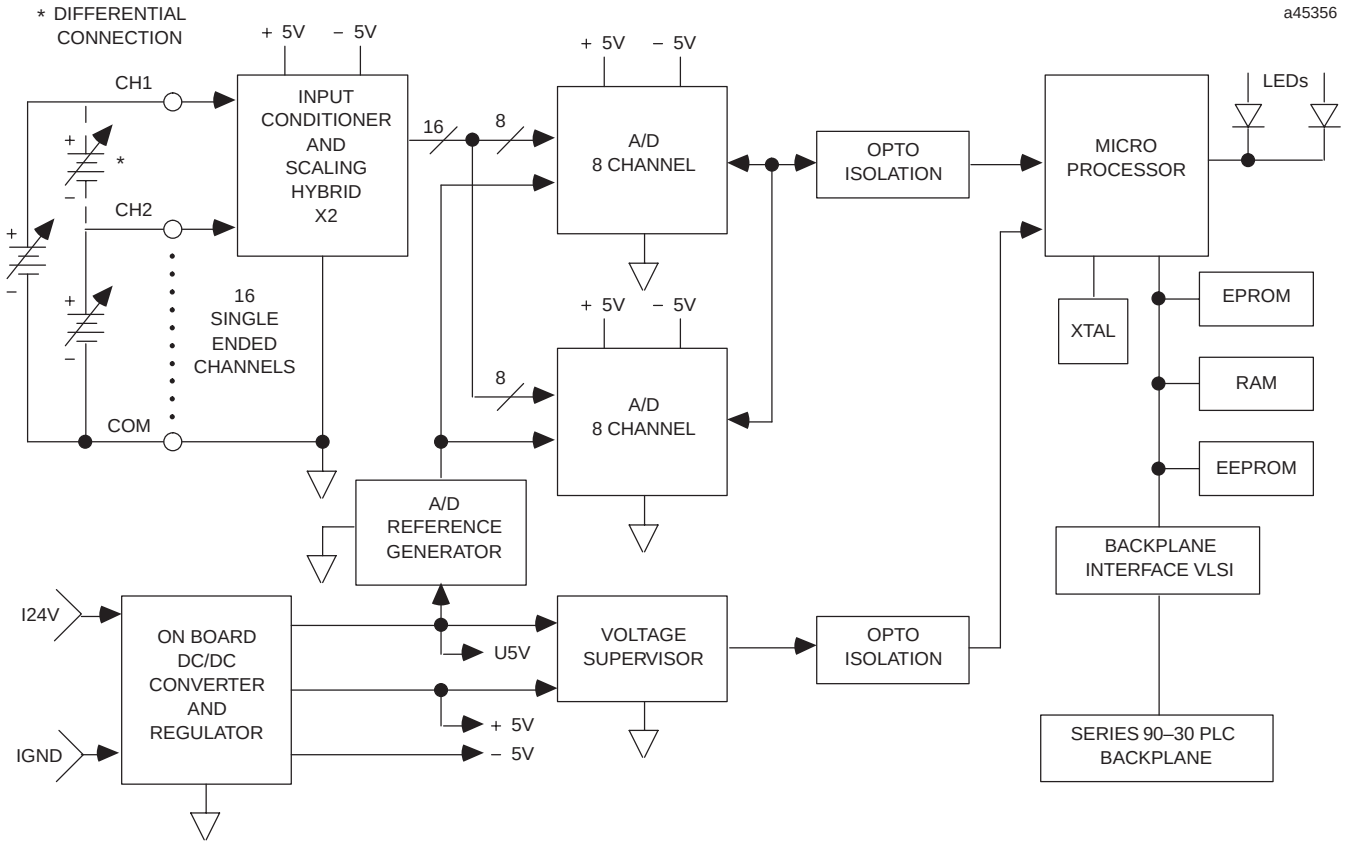


Figure 10-13. 16-Channel Analog Voltage Input Module Block Diagram - IC693ALG222

Configuring IC693ALG222 Using Hand-Held Programmer

You can also configure the 16-Channel Analog Voltage Input module using the Hand-Held Programmer. In addition to the information in this section, refer to GFK-0402, the *Hand-Held Programmer for Series 90-30/20/Micro Programmable Controllers User's Manual* for more information on configuration of Intelligent I/O modules.

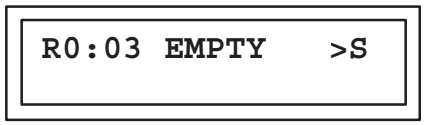
Although you can change the number of actively scanned channels with the Logicmaster 90-30/20/Micro configurator function, the Hand-Held Programmer does not support editing the number of actively scanned channels. If the 16-Channel Analog Voltage Input module is initialized by a Hand-Held Programmer, the number of actively scanned channels is 16.

If a module had been previously configured with Logicmaster 90-30/20/Micro software and the number of actively scanned channels has been changed from 16, that number will be displayed on the bottom line of the Hand-Held Programmer display following the *AI*. You can edit data with the Hand-Held Programmer only for the active channels, but can not change the number of actively scanned channels.

Module Present

If a module is physically present in a system, it can be added to the system's configuration by *reading* the module into it. For example, assume that a 16-Channel Analog Voltage Input module is installed in slot 3 of a Model 311 PLC system. It can be added to the configuration with the following sequence. Use the Up and Down cursor keys or the # key to display the selected slot.

Initial Display



To add the IC693ALG222 module to the configuration, press the **READ/VERIFY** key. The following screen will be displayed:



Selecting %I Reference

At this point the starting %I reference address for the status data returned from the module must be entered. Notice that the length of the status field (**40**) is displayed as the first two digits following the first **I** on the second line of the display.