

IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: IC693 CPU Modules with Firmware Release 9.10
IC693CPU350-BD
IC693CPU360-BD

Introduction

This document contains information that is not available in any other publication; therefore, we recommend you save it for future reference. This document discusses the features of the newly released firmware version 9.10 for CPU modules IC693CPU350 and IC693CPU360. This version resolves the problems listed on page 4.

Feature Highlights

The following features were introduced in release 9.00.

- **Software Floating-Point.** The CPU350 and CPU360 support all of the floating-point function blocks that are currently supported by the CPU352. They are implemented in firmware using floating point emulation. These Floating-Point math function blocks are described in the *IC693 PLC Reference Manual*.
- **CPU360 user memory increased to 240K bytes.** %R, %AI, and %AQ references are configurable up to 16K of %R, 8K of %AI and 8K of %AQ memory using the MS-DOS® PLC programming software, version 9.02. These three references are configurable up to 32K version 2.2 of the Windows® PLC programming software and version 1.0 of the VersaPro programming software. Configuration instructions for this feature are described in the *MS-DOS IC693 Programming Software User's Manual*, and are included in on-line help in both Windows PLC programming software packages. Note that the CPU350 does not support configurable user memory. Its user memory is set at a fixed value of 32K bytes.
- **Sequential Event Recorder.** The Sequential Event Recorder function block can be used to record up to 1024 samples of 32 individual discrete (bit) references. Both of these CPUs support this function block. Instructions on programming the Sequential Event Recorder are found in the *IC693 PLC Reference Manual*.
- **Break-free SNP.** The SNP protocol no longer requires a break to operate. This allows SNP to work over a wider variety of modems.

Hardware Identification

The following table shows the revision level of the circuit boards used in the current version of these CPUs.

CPU Catalog Number	Circuit Board ID	Circuit Board Version
IC693CPU350-BD	CX3A1	44A739579-G01R04 or later
IC693CPU360-BD	CX3A1	44A739579-G01R04 or later

Firmware Upgrade Kits

If you wish to upgrade an existing CPU350 or CPU360 to firmware version 9.10, you may purchase the applicable kit identified in the following table. All previous versions are capable of being upgraded.

Firmware 9.10 Upgrade Kit Catalog Number	
CPU Catalog Number	Firmware Upgrade Kit Catalog Number
IC693CPU350-(all versions)	44A747145-G03
IC693CPU360-(all versions)	44A747148-G03

Firmware Identification

CPU Catalog Number	Motherboard Firmware Version	Daughterboard Firmware Version
IC693CPU350-BD	Main: R9.10 (22A1) Boot: R9.00 (33A1)	N/A
IC693CPU360-BD	Main: R9.10 (22A1) Boot: R9.00 (33A1)	N/A

Functional Compatibility

- The Windows PLC Programming Software version 2.00 or later, or VersaPro software, version 1.0 or later, must be used to take advantage of C programming or Sequential Function Chart (SFC) subroutines.
- Version 4.00 or later of the C toolkit must be used for C programming.
- The MS-DOS PLC Programming Software Version 9.02 or later must be used to take advantage of the new features introduced in firmware release 9.00. These new features are listed in the section “New Features and Functionality of Firmware Release 9.00 Operating Notes.”

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Operating Notes

User Flash Contents

User information, consisting of program, configuration, CPU ID (used for SNP communications), and status tables in RAM memory, will automatically be cleared if the CPU firmware in flash memory is changed. You will need to restore these if upgrading firmware. A recommended procedure is to first back up your user information from RAM memory to Flash memory. Then write your new firmware to Flash memory (firmware is stored in a different location in Flash memory than that used for storing user information such as program, configuration, etc.). Finally, write your user information back out of Flash into RAM memory. As an alternative, your user information (program, configuration, etc.) can be restored from a computer-based backup program folder using your PLC programming software. The SNP ID must be set separately, using the programming software or the Hand-Held Programmer (HHP).

Firmware Upgrade Hardware Requirements

Note: The Model 35x and 36x CPU operating firmware is stored in FLASH memory. The firmware upgrade is provided on a floppy disk and must be serially downloaded from a Personal Computer. An IBM AT personal computer or better PC with a minimum 640K of RAM, one 3.5" floppy drive, MS-DOS version 3.3 or later (or Windows 95 or later), a hard drive, and one RS-232 serial port is required. In addition, a serial cable is required. The following serial cable kit is available from GE Fanuc:

IC690ACC901 Mini Converter Kit with cable (RS-232/RS-485)

Optionally, the cable can be assembled from the following parts:

IC690ACC900 RS-232 to RS-485/422 Converter Unit

IC693CBL303 15 Pin RS-485 Serial Cable

IC690CBL705 25 Pin RS-232 Serial Cable *

IC690CBL702 9 Pin RS-232 Serial Cable *

* Only one of these cables is required. Selection depends on PC Serial Port Connector.

Option Module Revision Requirements

- **Ethernet Interface Module Compatibility.** All IC693 Ethernet Interface (IC693CMM321) modules used with these CPUs should be updated to IC693CMM321 firmware release 1.10 or later. This is also a requirement of the TCP/IP Ethernet version of the MS-DOS programming software. During a Run Mode Store (Alt + S hot key combination) of a large program block (greater than 14 kilobytes), the Ethernet module may time out, causing communications to fail. Changing the Communications Window to Run-to-Completion mode, or storing the program in Stop mode, will allow the store to take place successfully.
- **FBC Compatibility.** FBC version 3 or later is required for these CPUs.

Writing to Flash Using the Windows PLC Programming Software

When writing very large programs to flash memory, it may be necessary to increase the Windows PLC programming software request timeout value to avoid receiving a request timeout message. An upper bound of 25 seconds is typically satisfactory

Problems Resolved in Firmware Version 9.10

AI & AQ Above Default Values

Release 9.00 provided support for configuring %AI and %AQ above their default values. These new references would previously only work as extra program memory, and could not be used as actual inputs or outputs on physical modules in the configuration. This has been corrected in release 9.10 so that these higher references will now work the same as the lower references.

Load File of Size 1528 Bytes

Loads of a user program where the file was of this specific size would fail. This has been corrected in release 9.10.

C Program with Code Area Greater Than 64K Bytes

Before release 9.10, C Program blocks with code areas greater than 64k bytes would not store. In release 9.10 and later, 'C' program blocks code sizes are limited only by available memory.

Problems Resolved in Firmware Version 9.01

SNP Master mode on CPU Ports

With some very large configurations and version 9.00 firmware, after a power-cycle, CPU ports set up for SNP Master would need to have their configuration re-stored for the protocol to accept COMM_REQs. This is corrected in version 9.01.

Online Changes to Reference Tables

Making online changes with the programmer to reference tables could result in a watchdog timeout. This has been corrected in version 9.01.

350 and 360 9.00 Upgrade

After upgrading to version 9.00 on a 350 or 360 PLC, the user flash area would need to be written to or cleared afterwards with an HHP, DOS, or Windows programmer. Otherwise, the RAM contents would be cleared on a power-cycle. This is no longer necessary when upgrading to 9.01.

Read from Flash

In version 9.00, reading a folder from flash memory could result in the PLC going into a faulted state. This is corrected in version 9.01.

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Restrictions and Open Problems

Timing Issue With ALG220/221 Modules May Result in Incorrect %AI Values Read by CPU

A problem was found with the IC693ALG220/221 where the actual %AI values reported by the card may exhibit erratic behavior (catalog module revisions F and earlier may show this problem; revision G has fixed this problem). Certain current or voltage levels within the input range applied to the card could cause the %AI values to report incorrectly. The problem stems from the use of particular optocouplers, which may exhibit timing issues with these CPU35x/36x modules.

CPUs 341, 331, 321, 313, and 311 have not exhibited this timing problem reading %AI values.

Documentation

Instructions for using these two modules can be found in the latest version of the following manuals:

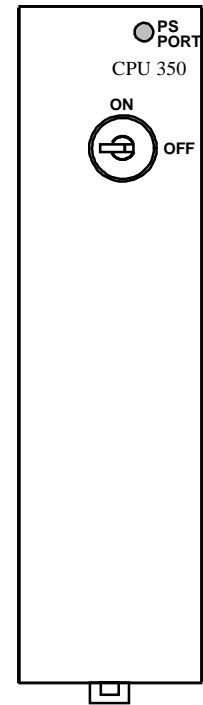
General Configuration Instructions: *IC693 PLC Programming Software User's Manual*

Ladder Logic Programming: *IC693 PLC Reference Manual*

Installation Instructions: *IC693 PLC Installation Manual* (firmware 9.0 features will be added to revision P of this manual)

IC693CPU350-BC Data

CPU Type	Single slot CPU module
Total Baseplates per System	8 (CPU baseplate + 7 expansion and/or remote)
Load Required from Power Supply	670 milliamps from +5 VDC supply
Processor Speed	25 MegaHertz
Processor Type	80386EX
Typical Scan Rate	.22 milliseconds per 1K of logic (Boolean contacts)
User Program Memory (maximum)	32K Bytes (not configurable)
Discrete Input Points - %I	2,048
Discrete Output Points - %Q	2,048
Discrete Global Memory - %G	1,280 bits
Internal Coils - %M	4,096 bits
Output (Temporary) Coils - %T	256 bits
System Status References - %S	128 bits (%S, %SA, %SB, %SC - 32 bits each)
Register Memory - %R	9,999 words
Analog Inputs - %AI	2,048 words
Analog Outputs - %AQ	512 words
System Registers (for reference table viewing only; cannot be referenced in user logic program)	28 words (%SR)
Timers/Counters	>2,000
Shift Registers	Yes
Built-in Serial Port(s)	1 (uses connector on PLC power supply). Supports SNP, SNP-X protocols. Requires CMM module for CCM or RTU protocol support.
Communications	LAN – Supports multidrop. Also supports Ethernet, FIP, Profibus, GBC, GCM, and GCM+ option modules.
Override	Yes
Battery Backed Clock	Yes
Interrupts	Supports the periodic subroutine feature.
Type of Memory Storage	RAM and Flash
PCM/CCM Compatibility	Yes
Floating Point Math Support	Yes, firmware-based in firmware releases 9.0 and later.



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IC693CPU360-BC Data

CPU Type	Single slot CPU module
Total Baseplates per System	8 (CPU baseplate + 7 expansion and/or remote)
Load Required from Power Supply	670 milliamps from +5 VDC supply
Processor Speed	25 MegaHertz
Processor Type	80386EX
Typical Scan Rate	.22 milliseconds per 1K of logic (Boolean contacts)
User Program Memory (maximum)	240K (245,760) Bytes. Note: Actual size of available user program memory depends on the amounts configured for the %R, %AI, and %AQ configurable word memory types (described below).
Discrete Input Points - %I	2,048
Discrete Output Points - %Q	2,048
Discrete Global Memory - %G	1,280 bits
Internal Coils - %M	4,096 bits
Output (Temporary) Coils - %T	256 bits
System Status References - %S	128 bits (%S, %SA, %SB, %SC - 32 bits each)
Register Memory - %R	Configurable in 128 word increments, from 128 to 16,384 words with DOS programmer, and from 128 to 32,640 words with Windows programmer Ver. 2.2 or VersaPro version 1.0.
Analog Inputs - %AI	Configurable in 128 word increments, from 128 to 8,192 words with DOS programmer, and from 128 to 32,640 words with Windows programmer Ver 2.2 or VersaPro version 1.0.
Analog Outputs - %AQ	Configurable in 128 word increments, from 128 to 8,192 words with DOS programmer, and from 128 to 32,640 words with Windows programmer Ver. 2.2 or VersaPro version 1.0.
System Registers (for reference table viewing only; cannot be referenced in user logic program)	28 words (%SR)
Timers/Counters	>2,000
Shift Registers	Yes
Built-in Serial Port(s)	1 (uses connector on PLC power supply). Supports SNP, SNP-X protocols. Requires CMM module for CCM or RTU protocol support.
Communications	LAN – Supports multidrop. Also supports Ethernet, FIP, Profibus, GBC, GCM, and GCM+ option modules.
Override	Yes
Battery Backed Clock	Yes
Interrupts	Supports the periodic subroutine feature.
Type of Memory Storage	RAM and Flash
PCM/CCM Compatibility	Yes
Floating Point Math Support	Yes, firmware-based in firmware release 9.0 and later.

