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# IMPORTANT PRODUCT INFORMATION

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## READ THIS INFORMATION FIRST

**Product: Series 90-30 CPU Module with Firmware Release 9.11  
IC693CPU351-KT**

This hardware revision replaces an obsolete cache RAM with a component that is currently available. At room temperature, the new part reduces the battery life from 6 years to 10 months.

Firmware release 9.11 applies to the model CPU351 only. This release resolves the problem of the write to flash memory failure that occurred during a Store to User Flash operation when flash memory was subjected to temperature cycles. (See "Problems Resolved in Release 9.11" on page 1.)

### ***Upgrades***

No field upgrade is required or available for this hardware revision.

If you wish to upgrade an existing CPU351 to firmware version 9.11, you may purchase the applicable kit or download it at no charge from <http://support.gefanuc.com/>. Firmware upgrades require the IC690ACC901 Miniconverter and Cable Kit. All previous versions are capable of being upgraded.

Upgrade kit: 44A736935-G14

### ***Functional Compatibility***

- With the original cache RAM component, the battery life was 6 years 25°C and 1½ years at 60°C. The data retention current on the currently available part reduces the battery life to 10 months at 25°C and 5½ months at 60°C.
- Machine Edition Logic Developer-PLC software and VersaPro software version 1.10 support all features of this CPU except Sequential Function Chart (SFC).
- Control programming software, version 2.00 or later is required to take advantage of SFC subroutines. C programming requires version 2.00 or later of this software.
- Version 4.00 or later of the C toolkit must be used for C programming.
- If you use Logicmaster Programming Software, version 9.02 is required to take advantage of the features introduced in firmware release 9.00 and later CPU351 releases.

### ***Problems Resolved by this Hardware Revision***

The original cache RAM component is obsolete and no longer available. The new component is the lowest power part currently available.

### ***Problems Resolved in Firmware Version 9.11***

#### **User Flash Write and Erase Failure**

User Flash Write/Erase operations would fail when the Flash Memory was subjected to significant temperature variations. This failure is now detected correctly, an error message is displayed, and you can retry the operation.

## Restrictions and Open Issues

### **ALG220/221 Timing Issue May Result in Incorrect %AI Values Read by CPU**

A problem was found with the IC693ALG220/221 modules 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.

## Operating Notes

### **Replacing an IC693CPU351 with an IC693CPU363**

This topic applies to users wishing to replace an IC693CPU351 module with an IC693CPU363. **The CPU363, functionally, is fully backward compatible with the CPU351.** However, there are a few items to consider when making this replacement:

- **Make sure you have a backup copy of the application program folder.** When the CPU351 is removed from the PLC, the application program in its RAM memory will be lost. You must have a current backup copy available to store to the new CPU363. So before proceeding, ensure that your backup copy is up-to-date. If you do not have a current backup copy, you can load the application program (include ladder logic, configuration, and registers) from the PLC to your computer to create a current backup copy. As an extra margin of safety, you could also write the application program from RAM memory to flash memory in the CPU351 before removing it from the PLC; this would create a non-volatile copy of the program inside the CPU351. See your programming software's user's manual or on-line help for instructions on writing to a CPU's Flash memory.
- CPU351 will not receive feature upgrades beyond firmware release 9.11. Therefore, it does not have the features that were added to the CPU363 in firmware release 10.00 and beyond.
- The front panel serial port connectors, labeled Port 1 and Port 2, are oriented differently between CPU351 and CPU363 (they are rotated 180 degrees). This could impact CPU351 installations that use a right-angle connector to connect to Port 2. In that case, the Port 2 cable may have to be re-routed or the connector orientation may have to be reversed to allow it to connect to the CPU363.
- There is a difference in the location of the module shield ground tab. On the CPU351, it is on the bottom of the module; on the CPU363, it is on the module's front panel. Therefore, in substituting a CPU363, a new ground wire (supplied with the module) will have to be installed if the wire from the CPU351 installation is too short.
- The CPU351, in some installations, uses a ground shield bracket that fastens to the bottom of the module and to the back of the enclosure or mounting panel. This ground shield bracket is not required on the CPU363 since this module has superior noise immunity compared with the CPU351. Therefore, the ground shield bracket should be removed when replacing a CPU351 with a CPU363. Details on CPU module shield grounding can be found in the latest *IC693 Installation and Hardware* manual.
- Before storing the application program folder from your programmer to the CPU363, it is necessary to perform the following steps. (1) Record all configuration settings of the CPU351 (including SNP ID, if used, and communications settings). If a printer is available, you can print the CPU settings. (2) On your configuration screen, replace the CPU351 with the CPU363. (3) Finally, set the CPU363 configuration settings to match those of the CPU351 recorded in step 1.

Also, don't forget to update all backup folders and documentation to reflect this change.

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**Note:** The top LED is labeled “SNP” on the CPU351 and “PS Port” on the CPU363. These both refer to the built-in serial port that is accessed through the 15-pin D-shell connector on the PLC main rack (Rack 0) power supply.

### ***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***

The CPU351 operating firmware is stored in FLASH memory. The firmware upgrade is provided on a floppy disk (see previous page for upgrade kit number) 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 is available:

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

### ***Changing Firmware to an Earlier Version***

If you have a CPU351 with firmware version 9.00 (or later), and you want to install a pre-9.00 version of firmware, a special upgrade disk must be obtained from your distributor. Do not attempt to use a firmware version 8.10 or earlier upgrade disk on a CPU that contains firmware version 9.00.

### ***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 Flash Using a Serial Programmer***

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

When port 1 is being used under a heavy load and a store is simultaneously attempted from the programmer through port 2, it is possible for the store to fail and require a re-try. If this occurs, a fault will be logged in the PLC fault table indicating that the store did not succeed.

## Product Documentation

*Series 90-30 PLC Installation and Hardware Manual*, GFK-0356

*Series 90-30 CPU Reference Manual*, GFK-0467

*TCP/IP Ethernet Communications for the Series 90 PLC User's Manual*, GFK-1541

*TCP/IP Ethernet Communications for the Series 90 PLC Station Manager Manual*, GFK-1186

## Documentation Errata

### Battery Life

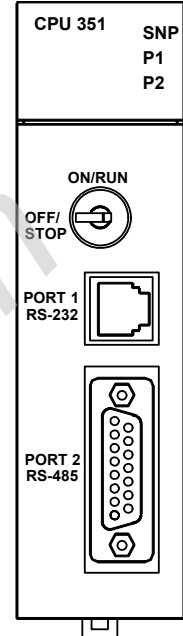
The new cache RAM component reduces the battery life as shown in the following table. This information will be included in the next scheduled update of the *Series 90-30 CPU Reference Manual*.

Hardware Version	Estimated Battery Life	
	at 25°C	at 60°C
IC693CPU351-Hx and earlier	6 years	1½ years
IC693CPU351-Kx and later	10 months	5½ months

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### IC693CPU351 Data

CPU Type	Single slot CPU module
Total Baseplates per System	8 (CPU baseplate + 7 expansion and/or remote)
Load Required from Power Supply	890 milliamps from +5 VDC supply
Processor Speed	25 MegaHertz
Processor Type	80386EX
Typical Scan Rate	0.22 milliseconds per 1K of logic (Boolean contacts)
User Memory (total)	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. Note: Configurable memory requires firmware version 9.00 or later. Previous firmware versions only supported 80K total of fixed user memory.
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 2.2, VersaPro 1.0, or Logic Developer-PLC.
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 2.2, VersaPro 1.0, or Logic Developer-PLC.
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 2.2, VersaPro 1.0, or Logic Developer-PLC.
System Registers (for reference table viewing only; cannot be referenced in user logic program)	28 words (%SR)
Timers/Counters	>2,000 (depends on available user memory)
Shift Registers	Yes
Built-in Serial Ports	Three ports. Supports SNP/SNPX slave (on power supply connector), and RTU slave, SNP, SNPX master/slave, Serial I/O Write (Ports 1 and 2). Requires CMM module for CCM; PCM module for RTU master support.
Communications	LAN – Supports multidrop. Also supports Ethernet, FIP, PROFIBUS, GBC, GCM, and GCM+ option modules.
Override	Yes
Battery Backed Clock	Yes
Interrupt Support	Supports the periodic subroutine feature.
Type of Memory Storage	RAM and Flash
PCM/CCM Compatibility	Yes
Floating Point Math Support	Yes, firmware-based. (Requires firmware 9.00 or later)



Model 351 CPU

## ***Installation in Hazardous Locations***

***The following information is for products bearing the UL marking for Hazardous Locations:***

- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY.