IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: IC693 CPU Modules

IC693CPU352-DJ with Firmware Release 10.00

IC693CPU363-BE with Firmware Release 10.50

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 IC693CPU363 firmware release 10.50, which corrects the problems listed in the section "Problems Resolved in this Release (10.50)." This document also discusses the features of firmware release 10.00, which is currently the latest firmware available for the IC693CPU352 (this CPU is scheduled to be updated to release 10.50 later). Note: A hardware update of the CPU363 module is discussed in the "Operating Notes" section of this document (this hardware update does not apply to the CPU352).

Feature Highlights of Firmware Release 10.50 for CPU363

No new features.

Feature Highlights of Firmware Release 10.00 for CPU352 and CPU363

Note: To use the following CPU features, you must use VersaPro 1.10 PLC software. These features are documented in the VersaPro 1.10 on-line help system.

- Support was added for the **IC693DSM314** servo module.

- Added support for storing **Local Logic Programs**. These programs are stored to the CPU from the programmer. In turn, the CPU automatically stores them to the DSM314 module along with the module's configuration settings. The limit on the size of all Local Logic Programs is 65280 bytes.

- **Reboot after Fatal Fault** – If activated, this feature enables the IC693 PLC system to automatically resume normal operation after a fatal fault has occurred. Following the fatal fault, the PLC will automatically reset and resume execution. If fatal faults are present following the power up, the PLC will still be allowed to transition to run mode. The user can enable this feature through a configuration parameter, and can identify the maximum number of retries and the time period these retries may occur within through new Service Request #48. New Service Request 49 may then be used to determine the number of fatal faults and retries that have occurred.

- Addition of the **Drum Sequencer** function block. This function block operates in the same manner as the drum sequencer implementation on the IC200 CPU.

Feature Highlights of Previous Release 9.00

The following features were introduced in release 9.00.

- **Software Floating-Point**. The CPU363 supports 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*. The CPU352 continues to support Floating-Point math via its built-in math coprocessor. The CPU352 offers a speed advantage for performing math functions when compared with the CPUs (such as CPU363) that use firmware-based floating-point math.

- **User memory totals 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 in 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.

- **Sequential Event Recorder**. The Sequential Event Recorder function block can be used to record up to 1024 samples of 32 individual discrete (bit) references. This function block is described in the *IC693 PLC Reference Manual* and in online help for the Windows programming software.

- **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 versions of these CPUs.

CPU Catalog Number	Circuit Board ID	Circuit Board Version
IC693CPU352-DJ	CV3B2 (Main board)	44A737922-G01R02 or later
	CA3A2 (Daughter board)	44A737909-G01R01 or later
IC693CPU363-BE	CX3A1 (Main board)	44A739579-G01R05 or later
	ES3A1 (Daughter board)	44A739604-G01R04 or later

Firmware Upgrade Kits

If you wish to upgrade an existing CPU352 or CPU 363 to the latest firmware version, you may purchase the applicable kit identified in the following table. All previous versions are capable of being upgraded.

Firmware Upgrade Kits		
CPU Catalog Number	**Firmware Version**	**Firmware Upgrade Kit Catalog Number**
IC693CPU352 - (all versions)	10.00	44A739385-G07
IC693CPU363 - (all versions)	10.50	44A747766-G04

Firmware Identification

CPU Catalog Number	Motherboard Firmware Version	Daughterboard Firmware Version
IC693CPU352-DJ	Main: R10.00 (47A1) Boot: R9.00 (33A1)	Main: R10.00 (49A1) Boot: R1.00 (12A2)
IC693CPU363-BE	Main: R10.50 (35A1) Boot: R9.00 (33A1)	Main: R10.00 (49A1) Boot: R2.00 (30A1)

® MS-DOS and Windows are registered trademarks of Microsoft Corporation

Functional Compatibility

- VersaPro version 1.10 or later is required to utilize the features introduced in release 10.00 firmware.

- The Windows PLC Programming Software version 2.00 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 DOS-based PLC Programming Software Version 9.02 or later must be used to take advantage of the features introduced in firmware release 9.00. These features are listed in the section "Feature Highlights of Previous Release 9.00." Note that the CPU363 can be configured with the MS-DOS PLC Programming Software Version 9.01, but only features prior to firmware release 9.00 are supported in that software version.

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 differences between these modules to consider when making this replacement:

- ❑ CPU351 will not be upgraded beyond firmware release 9.11. Therefore, it does not have the features added to the CPU363 in firmware release 10.00. Release 10.00 features require VersaPro version 1.10 (or later) software.

- ❑ The front panel serial port connectors, labeled Port 1 and Port 2, are oriented differently between the two modules (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 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 shield ground bracket is not required on the CPU363 since this module has superior noise immunity compared with the CPU351. Therefore, the shield ground 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.

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) power supply.

CPU363 Hardware Update (Version BD) to Enhance EMC Performance

This note only applies to the CPU363. A hardware update (from version AD to version BD) was made to the CPU363 to allow it to provide enhanced EMC performance. The update will also allow faster backplane I/O data transfers to be implemented in the future while still meeting all EMC requirements. This update is fully compatible with all existing products. To realize the maximum EMC benefit, this version of the CPU must be used with the latest 90-30 baseplates. Radiated emissions (EN 55011) of the 90-30 system are reduced with this update.

Support for Serial I/O Duplex Mode Parameter in CPU352 and CPU363 Configuration

Starting with version 1.10, VersaPro provides a "Duplex Mode" parameter on both the CPU352 and CPU363 Port 2 configuration screen that allows selection of either 2-Wire or 4-Wire mode when Serial I/O is configured as the port protocol. This parameter is only supported in VersaPro version 1.10 (or later version) PLC software.

User Information Cleared when Upgrading Firmware

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, if required, must be set separately using the programming software or the Hand-Held Programmer (HHP).

Firmware Upgrade Hardware Requirements

The CPU352 and CPU363 operating firmware is stored in FLASH memory. The firmware upgrade is provided on a floppy disk (see page 2 for upgrade kit numbers) and must be serially downloaded from a Personal Computer to Port 1 (RJ-11 connector) of these CPUs. 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:

IC693CBL316   Serial cable, 15-pin D-shell connector (computer end) to 6-pin RJ-11 connector (CPU Port 1 end).

Changing Firmware to an Earlier Version

If you have a CPU352 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 or later. Note that pre-9.00 firmware versions do not support the CPU363.

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.
- **GCM Compatibility**. Fab board R08 or later of the IC693CMM301 should be used with the CPU352.

Writing Flash Using a Serial Programmer

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.

Storing Large Configurations

The IC693 PLC will normally support 20 DSM314 modules in a system. This number may be reduced by other modules in the system, such as APM and GBC modules. It may also be further reduced if using datagrams that read the reference or fault tables. If the configuration and user program are stored at the same time, the presence of either C blocks within the LD program, or a C logic program may also affect the number of DSM314 modules that may be included in a system. If the store fails, it may be possible to work around this problem by first storing the logic program and then storing the configuration on a separate store request. The number of modules supported may be further reduced by the size of CPU user memory.

No Model Number Checking with DOS-based programmer

The No Model Number Checking feature does not support storing a 311, 313, 321, 323 or 331 configuration to a Release 9.0 or later CPU.

Minimum Sweep Time for the CPU 363 Reduced in Release 10.50

The minimum sweep time (while in run mode) for Release 10.50 of the CPU363 has been reduced about 1 ms from that of Release 10.00

Simultaneous Load and Store

When operating with multiple programmers attached, if a store operation is initiated by one programmer, while a load operation is already in progress, the load request will fail.

Transition Tables are not cleared when the reference tables are cleared.

The transition tables are not cleared upon clearing the reference tables through the programmer.

Problems Resolved in this Release (10.50) for CPU363 Only

Rotate Right and Rotate Left functions do not handle error condition correctly

In releases prior to 10.50, the Rotate Right and Rotate Left functions do not correctly handle rotating a string with a rotation request greater than 16 times the length (in words) of the array. These functions should only be used with the rotation request less than 16 times the length (in words) of the array. These function blocks will now treat any request to rotate more than the length of the array as a copy request.

Time of Day clock at powerup may not operate

In releases prior to 10.50, this would result in a Fatal PLC CPU HW FAULT being logged. The supercap had to be shorted to restore the board to normal operation.

Error when run-mode storing, loading, or verifying exactly 50 blocks in run mode.

In releases prior to 10.50, if a programmer attempts to verify with a CPU containing exactly 50 subroutines (not including main), the operation will fail. If the programmer attempts to load from a CPU containing exactly 50 subroutines, the operation may fail, or the programmer may appear to succeed, but incorrectly load the data. If an attempt to do a run-mode store on a CPU with exactly 50 subroutines is attempted, the operation will fail.

Fatal Fault retry does not work correctly for some faults.

In releases prior to 10.50, the fatal fault retry feature will not work correctly for faults which reoccur on powerup (such as system configuration mismatch). The CPU will go into a loop where it consistently powers up, experiences the fault and retries. This will continue indefinitely.

Problems Resolved in Previous Firmware Release 10.00

User Flash Write and Erase Failure

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

IC693 PLC can Automatically go to run Mode.

The IC693 PLC could automatically go to run mode if a configuration enabling the keyswitch is stored to a PLC with the keyswitch in the ON position whose initial configuration had disabled the keyswitch.

Retentive Contact Previous Values Table not Being Cleared

The previous values tables for retentive contacts was not being cleared out on a Stop to Run transition

Problems Resolved in Firmware Release 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.

CPUs 352 and 363 Embedded Serial Ports with Version 9.00 and 9.01 Firmware

The embedded serial ports on the PLC CPU (ports 1 and 2) would not function with release 9.00 or 9.01 if 34 or more rack mounted modules were being used in the system. The problem could also occur if any IC693PCM300, 301, 311, IC693CMM311, or IC693ADC311 modules were used. The serial port on the power supply was not affected. This restriction has been corrected in release 9.10 to allow use of the extra ports with the maximum number and types of modules.

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 Release 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.

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.

Restrictions and Open Issues

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. (NOTE: CPUs 341, 331, 321, 313, and 311 have not exhibited this timing problem when reading %AI values.)

The IC693 PLC will generate a fatal fault if a ladder containing DOIO function block calls to a smart module is repeatedly placed in RUN then STOP mode

A problem was found with the CPU where a ladder containing a call to a DOIO function block would cause the PLC to run out of system memory. This is caused when the PLC transitions to run mode and back to stop mode several times. If the configuration is stored, the system memory will be freed, and the PLC will resume normal operation.

IC693 PLC CPU may Develop Fatal Fault During Store of Folders with Large Configurations

The IC693 PLC CPU may generate a fatal fault during a store of a folder with an especially large configuration. This may be made worse by storing a program and configuration at the same time, or by having datagrams from a programmer present during the store.

PID Integral Contribution

The PID Integral Contribution is not calculated correctly with an integral rate of 0 or 1.

A CPU360 Configuration Stored to CPU352 may Cause Fatal Fault

If a CPU360 configuration file is stored to a CPU352, the PLC may generate a fatal fault when transitioning to run mode.

Reading from an Invalid Flash Part may Cause a Watch Dog Timeout

If a corrupted flash part is read, the Watch Dog Timer on the PLC may be triggered. This can be fixed by completing a valid flash store.

Fatal Fault Occurs when Configuring a Module with the HHP Following a Maximum Size PLC Store

The IC693 PLC CPU may generate a fatal fault while attempting to configure a module with the Hand-Held Programmer following a maximum size store to the PLC.

Firmware Update Fail Following Power-up with Clear M/T and a Write to Flash

Firmware update may fail following a power-up with Clear M/T pressed on the HHP and a write to flash. Cycling power on the PLC will enable the upgrade to proceed.

Changes to Documentation

The *IC69* PLC Serial Communications User's Manual* will be updated to describe the Serial I/O (including the Read function, introduced in firmware release 10.00) and pager enunciation feature in its next revision (rev. D). These features are supported by the 352 and 363 CPUs' embedded serial ports (Ports 1 and 2, located on the module faceplate), but are not supported on the serial port (Port 3) that uses the connector on the PLC power supply. The information in this section applies to the write output function of the Serial I/O feature (which was added in an earlier release).

Sending a COMM_REQ to CPU352 or CPU363 Serial Ports 1 and 2.

When sending a Communications Request (COMM_REQ) to the CPU352 or CPU363 serial ports, the SYSID of the COMM_REQ must be 1 and the TASK ID must be 19 decimal for Port 1 or 20 decimal for Port 2.

RTU

With the exception of the SYSID and TASK ID fields (discussed above), using RTU (slave) on the CPU352 or CPU363 serial ports is similar to using RTU (slave) on a CMM module, which is described in the IC69* PLC Serial Communications User's Manual.

Serial I/O Write

Serial I/O write is selected for Port 1 or Port 2 of the CPU352 or CPU363 CPUs by choosing "CUSTOM" as the mode for the port in the CPU Configuration and storing this to the PLC. Serial I/O Write is accomplished by using the put string COMM_REQ. Using the autodial COMM_REQ with the put string COMM_REQ accomplishes the pager

enunciation feature as described below. **Note: The terms "Generic Output" and "Custom Protocol" used in earlier documentation have been replaced in later documentation by the term "Serial I/O."**

Using Pager Enunciation and Serial I/O Write

This feature allows the 352 and 363 CPUs to automatically dial a pager via modem and send a specified byte string from Serial Port 1 or 2. Pager dialing and message transmission are set up by COMM_REQ functions in the ladder logic.

Note

To implement this feature, Serial Port 2 must be configured as a CUSTOM port as mentioned above in the "Serial I/O Write" item.

Pager enunciation is implemented by three commands, requiring three COMM_REQ command blocks:

Autodial: 04400 (1130H) -Dials the modem. This command works the same way that the SNP Master Autodial command 7400 does.

Put string: 04401 (1131H) - Specifies an ASCII string, from 1 to 250 bytes in length, to send from the serial port.

Autodial: 04400 (1130H) - It is the responsibility of the PLC application program to hang up the phone connection. This is accomplished by reissuing the autodial command and sending the hang-up command string.

Autodial Command Block

The Autodial command automatically transmits an Escape sequence that follows the Hayes convention. If you are using a modem that does not support the Hayes convention, you may be able to use the Put String command to dial the modem.

Examples of commonly used command strings for Hayes-compatible modems are listed below:

Command String	Length	Function
ATDP15035559999<CR>	16 (10H)	Pulse dial the number 1-503-555-9999
ATDT15035559999<CR>	16 (10H)	Tone dial the number 1-503-555-9999
ATDT9,15035559999<CR>	18 (10H)	Tone dial using outside line with pause
ATH0<CR>	5 (05H)	Hang up the phone
ATZ <CR>	4 (04H)	Restore modem configuration to internally saved values

Table 6-1 lists a sample COMM_REQ command block that dials the number 234-5678 using a Hayes-compatible modem.

Table 1-1. Sample Command Block for Serial I/O Autodial Command

Word	Definition	Values
1	0009H	CUSTOM data block length (includes command string)
2	0000H	NOWAIT mode
3	0008H	Status word memory type (%R)
4	0000H	Status word address minus 1 (Register 1)
5	0000H	not used
6	0000H	not used
7	04400 command (1130H)	Autodial command number
8	00030 (0001H)	Modem response timeout (30 seconds)
9	0012 (000CH)	Number of bytes in command string
10	5441H	A (41H), T (54H)
11	5444H	D (44H), T (54H)
12	3332H	Phone number: 2 (32H), 3 (33H)
13	3534H	4 (34H), 5 (35H)
14	3736H	6 (36H), 7 (37H)
15	0D38H	8 (38H) <CR> (0DH)

GFK-1126AC

Put String Command Block

Table 6-2 lists a sample COMM_REQ command block that sends the data string, "hello world" using the Put String command (04401). A maximum transmit timeout of 30 seconds is specified. The string data begins at Word 10. This command is similar to the Autodial command except that Put String does not send the escape sequence for Hayes-compatible modems.

The *Maximum Transmit Timeout* field specifies, in seconds, the maximum time interval the COMM_REQ will wait for the entire string to be sent. If this time is set to 0, a default value of 4 seconds plus the time required to transmit the number of characters is used. If the string is not transmitted during the specified interval or the default interval, an error code is generated.

The *Number of Bytes in Command String* field specifies the length of the command string to be sent. This length includes all characters. A status code indicating successful transmission will be returned when the string has been completely sent out the serial port.

Table 1-2. Sample Command Block for Put String Command

Word	Definition	Values
1	0009H	CUSTOM data block length (includes command string)
2	0000H	NOWAIT mode
3	0008H	Status word memory type (%R)
4	0000H	Status word address minus 1 (Register 1)
5	0000H	not used
6	0000H	not used
7	04401 command (1131H)	Put String command number
8	001EH	Maximum transmit timeout (30 seconds)
9	000BH	Number of bytes in command string
10	6568H	h (68H), e (65H)
11	6C6CH	l (6CH), l (6CH)
12	206FH	o (6F), " " (20H)
13	6F77H	w (77H), o (6FH)
14	6C72H	r (72H), l (6CH)
15	0064H	d (64H)

Status Word for Serial I/O COMM_REQs

A value of 1 will be returned in the COMM_REQ status word upon successful completion of a Serial I/O command. Any other value returned in the COMM_REQ status word is an error code where the low byte is a major error code and the high byte is a minor error code.

Table 1-3. Status Codes for Serial I/O COMM_REQ

Major Status Code	Description
1 (01H)	Successful Completion (this is the expected completion value in the COMM_REQ status word).
12 (0CH)	Local CSTM_PROT error — Port configuration command 65520 (FFF0H). An error occurred while processing a local command. The minor error code identifies the specific error.
2 (02H)	COMM_REQ command is not supported.
13 (0DH)	Remote CSTM_PROT error — Put String command 4401 (1131H). An error occurred while processing a remote command. The minor error code identifies the specific error.
2 (02H)	String length exceeds end of reference memory type.
3 (03H)	COMM_REQ data block length is too small. String data is missing or incomplete.
48 (30H)	Serial output timeout. The serial port was unable to transmit the string. (Could be due to missing CTS signal when the serial port is configured to use hardware flow control.)
50 (32h)	COMM_REQ timeout. The COMM_REQ did not complete within a 20-second time limit.
14 (0EH)	Autodial Error — Autodial command 4400 (1130). An error occurred while attempting to send a command string to an attached external modem. The minor error code identifies the specific error.
1 (01H)	Not used.
2 (02H)	The modem command string length exceeds end of reference memory type.
3 (03H)	COMM_REQ Data Block Length is too small. Output command string data is missing or incomplete.
4 (04H)	Serial output timeout. The serial port was unable to transmit the modem autodial output. (May be due to missing CTS signal when the serial port is configured to use hardware flow control.)
5 (05H)	Response was not received from modem. Check modem and cable.
6 (06H)	Modem responded with BUSY. Modem is unable to complete the requested connection. The remote modem is already in use; retry the connection request at a later time.
7 (07H)	Modem responded with NO CARRIER. Modem is unable to complete the requested connection. Check the local and remote modems and the telephone line.
8 (08H)	Modem responded with NO DIALTONE. Modem is unable to complete the requested connection. Check the modem connections and the telephone line.
9 (09H)	Modem responded with ERROR. Modem is unable to complete the requested command. Check the modem command string and modem.
10 (0AH)	Modem responded with RING, indicating that the modem is being called by another modem. Modem is unable to complete the requested command. Retry the modem command at a later time.
11 (0BH)	An unknown response was received from the modem. Modem is unable to complete the requested command. Check the modem command string and modem. The modem response is expected to be either CONNECT or OK.
50 (32H)	COMM_REQ timeout. The COMM_REQ did not complete within a 20-second time limit.

Documentation

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

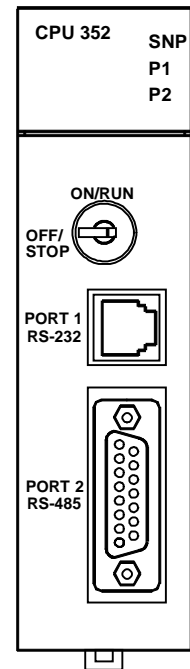**Hardware Description, Installation Instructions:** *IC693 Installation and Hardware Manual*

Ladder Logic Programming: *IC693 PLC Reference Manual*

Serial Communications: *IC69* PLC Serial Communications User's Manual, Rev. D (when available)*

IC693CPU352 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	.22 milliseconds per 1K of logic (Boolean contacts)
User Memory (total)	240K (245,760) bytes, starting with firmware release 9.0. 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). Pre-9.0 firmware supported 80K bytes of fixed 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 Ver. 2.2 or later, or VersaPro version 1.0 or later.
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 later, or VersaPro version 1.0 or later.
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 later, or VersaPro version 1.0 or later.
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	3 (one uses connector on PLC power supply). Supports SNP/SNPX slave (on all three ports) and RTU slave and Serial I/O (on Ports 1 and 2). Requires CMM module for CCM and PCM module for RTU master.
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. Hardware-based (uses built-in math coprocessor)

CPU 352 SNP P1 P2

ON/RUN
OFF/ STOP

PORT 1 RS-232

PORT 2 RS-485

IC693CPU363 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	.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).
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 later, or VersaPro version 1.0 or later.
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 later, or VersaPro version 1.0 or later.
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 later, or VersaPro version 1.0 or later.
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	3 (one uses connector on PLC power supply). Supports SNP/SNPX slave (on all three ports) and RTU slave and Serial I/O (on Ports 1 and 2). Requires CMM module for CCM and PCM module for RTU master.
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