IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: **IC693 CPU Modules**
IC693CPU351-GN
IC693CPU352-DE
Firmware Release 8.10

Introduction

This document contains information about the IC693CPU351 and IC693CPU352 CPU modules that are not available in any other publication. (However, this information will be added to applicable publications when they are next revised.) Therefore, it is suggested that this document be saved and stored with the rest of your PLC documentation.

Demko Labeling

Revision levels have been changed because these modules have been granted Demko Agency approval and will be labeled accordingly. This is the only difference between IC693CPU351–FN and IC693CPU351–GN, and between IC693CPU352–CE and IC693CPU352–DE.

Firmware Release 8.10

New features of firmware release 8.10 are described in *New Features and Functionality*. This firmware version applies to the following catalog numbers:

New Catalog Number	Replaces
IC693CPU351-GN	IC693CPU351-F*
IC693CPU352-DE	IC693CPU352-C*

* Any previous firmware release.

Hardware and software identification for firmware release 8.10 is summarized in the following table.

Catalog Number	Board Identification	Board Revision	EEPROM Location
IC693CPU351-GN	CV3A2	44A737904-G01R02 or later	U105 and U106
IC693CPU351-GN	CA3A2	44A737909-G01R02 or later	U3
IC693CPU352-DE	CV3B2	44A737922-G01R02 or later	U105 and U106
IC693CPU352-DE	CA3A2	44A737909-G01R02 or later	U3

Packaging Note

The user manual is not shipped in the box with every product. User manuals are provided in a library with Software Programming products, are available on CD-ROM, or can be ordered as individual manuals.

Upgrade Information

Upgrades are optional. The procedure is described below in the *Operation Notes* section.

Functional Compatibility

The new hardware is fully compatible with existing IC693 hardware and firmware.

WIndows® programming software Version 2 or later must be used to take advantage of C programming or SFC Subroutines. Additionally, version 4.00 of the C toolkit must be used for C programming.

The MOVE_INT and MOVE_WORD functions do not support overlapping of IN and Q parameters on model 351 and 352 CPUs. If overlapping of IN and Q parameters is desired on a model 351 and 352 CPU, then you may use the ARRAY_MOVE instruction.

Documentation

Applicable documentation for the model 351 and 352 CPUs is listed below. Documentation is also available on CD-ROM, IC690CDR002.

IC693CPU351-FN and IC693CPU352-CE	Programmable Controller Installation Manual Programmable Controller Reference Manual

Operational Notes

UVEPROM Change

The User Program, configuration, CPU ID (used for SNP communications), and status tables will automatically be cleared when the CPU firmware in UVEPROM or flash memory, as applicable, is changed. You will need to restore these if upgrading from a previous CPU version. The user program, configuration, and status tables can be restored from an IC641 programming software folder, or from memory card (except on CPU 351 and 352), EEPROM, or flash memory The SNP ID must be set separately, using IC641 programming software or the Hand-Held Programmer.

CPU 351 and 352 FIRMWARE UPGRADE PROCEDURE

The Model 351 and 352 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 compatible or better PC with a minimum 640K of RAM, one 3.5" or high density 5.25" floppy drive, MS-DOS® version 3.3 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:

® Windows and MS-DOS are registered trademarks of Microsoft Corporation;
    IBM and PS/2 are registered trademarks of International Business Machines Corporation.

- ■ IC690ACC901   Miniconverter 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.*

Ethernet Interface Module Compatibility

All IC693 Ethernet Interface (IC693CMM321) modules used with release 6.5 or later of the IC693 PLC should be updated to release 1.10 or later of the IC693CMM321. MS-DOS TCP/IP Ethernet software requires both CPU release 6.5 or later and IC693CMM321 release 1.10 or later

During a Run Mode (Alt-s) Program Store of a large program block (greater than 14 Kbytes). the Ethernet Interface module may timeout, causing communications to fail. Changing the Communication 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 release 8.00 of the IC693 CPU firmware.

GCM Compatibility

Board revision R08 or later of the IC693CMM301 should be used with the IC693CPU352.

New Features and Functionality (Release 8.10)

Below is a list of the new features supported in this release (8.10). For further information on these features, consult the applicable PLC Installation and Reference manuals, and the *C Programmer's Toolkit for IC69x PLCs User's Manual.*

1. C Programming will be supported on the models 351 and 352. The C programming will work with the C toolkit, version 4.00, and Windows programming software Version 2. For further details, please consult GFK-0646 (version D), the *C Programmer's Toolkit for IC69x PLCs.* (For manual availability, please consult the factory).

2. IC693 SFC programming now supports SFC in subroutines and multiple actions per step (up to 8). These new features are only supported on the model 351 and 352 PLCs. Use of these features requires Windows programming software Version 2. Below is a list of the new SFC features for the models 351 and 352, with an explanation of each feature.

- ■ The SFC in subroutines: Prior to release 8.10 of the IC693 PLC only one SFC Chart is allowed and it must be in the Main block. In release 8.10, each subroutine may have its own SFC Chart.

- ■ Multiple actions per step: Prior to release 8.10 of the IC693 PLC, only one action is allowed per SFC step. In release 8.10, up to eight actions are allowed per step. The order in which the various SFC actions will be executed within a single step is indeterminate.

Issues Resolved by This Release

Loading Default Program with Windows Programming Software

By clearing the PLC memory, the default (empty) program (called *HHP*) may be obtained. Loading this program into a Windows programming software folder will result in a PLC Watchdog Timer Timed Out Fault with release 8.00 PLC firmware. This problem has been corrected in release 8.10.

Restrictions and Open Issues

Keyswitch configured as RUN/STOP switch

When the keyswitch is configured as a RUN/STOP switch, moving the keyswitch to the STOP position will not affect the current PLC state if the PLC is already in either STOP NO/IO or STOP IO SCAN mode.

Changes and Additions to the User's Manual

The *PLC Serial Communications User's Manual* will be updated to describe the Generic Output and pager enunciation feature in its next revision, which will be revision D.

Sending a COMM_REQ to the CPU 351 or 352 serial ports.

When sending a COMM_REQ to the CPU 351 or 352 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 above exception about the SYSID and TASK ID fields, using RTU on the CPU 351 and 352 serial ports is the same as using it on a CCM, which is described in the *PLC Serial Communications User's Manual (revision C).*

Generic Output

Generic Output is selected for port 1 or port 2 of the model 351 or 352 PLC by choosing *CUSTOM* as the mode for the port in the CPU Configuration and storing this to the PLC. Generic Output 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.

Using Pager Enunciation and Generic Output

This feature allows the model 351 and 352 PLC to automatically dial a pager over a 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 under *Generic Output.*

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 hangup 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

The following table lists a sample COMM_REQ command block that dials the number 234-5678 using a Hayes-compatible modem.

Sample Command Block for CUSTOM Protocol 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)

Put String Command Block

The following table 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.

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 Custom Protocol COMM_REQs

A value of 1 will be returned in the COMM_REQ status word upon successful completion of a CUSTOM protocol 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 6-3. Status Codes for Custom Protocol

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.