

GFK-0766D  
August 1997

### 16 MHz, 32-Bit, Expandable Central Processing Unit

## Features

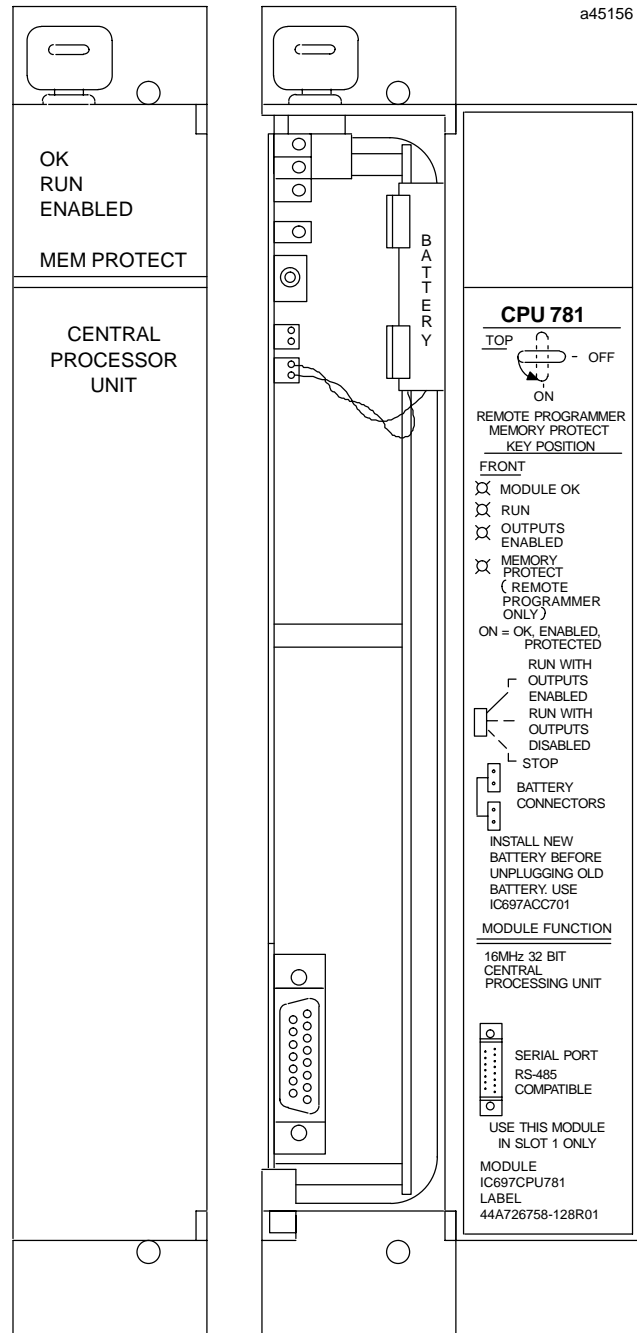
- Single slot CPU.
- 12K inputs and outputs (any mix).
- Up to 8K analog I/O.
- 0.4 microseconds per boolean function.
- 16 MHz, 80386DX microprocessor.
- Supports IC660/IC661 and IC697 I/O products.
- Programmed by MS-DOS® or Windows® software products running on Windows® 95 or Windows NT® over Ethernet TCP/IP or through the SNP port.
- Supports up to 512 Kbytes of battery-backed expansion memory in the same slot.
- Configurable data and program memory.
- Battery-backed calendar clock.
- Three position operation mode switch.
- Password controlled access.
- Keyswitch memory protection
- Four status LEDs.
- Software configuration (No DIP switches or jumpers to set).
- Reference information inside front door.

## Functions

The CPU 781 is a single slot programmable controller CPU which is programmed and configured by MS-DOS or Windows based programming software to perform real time control of machines, processes and material handling systems.

The CPU 781 communicates with I/O and smart option modules over the rack mounted backplane (IC697CHS750, 782, 783, 790, 791) by way of the VME C.1 Standard format.

Supported option modules include all IC697 LAN interface modules, several Coprocessor modules, Bus Controller for IC660/IC661 I/O, Communications modules, and all of the IC697 family of discrete and analog I/O modules (see the applicable *Programmable Controller Installation Manual* for more information on supported modules).



Program and data memory for the CPU 781 is available by the attachment of an expansion memory board with either 128, 256 or 512 KBytes of battery-backed CMOS RAM, or 256 KBytes w/256 KBytes of Non-volatile flash.

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Operation of this module may be controlled by the three position RUN/STOP switch or remotely by an attached programmer and programming software. Program and configuration data can be locked through software passwords or manually by the memory protect keyswitch. When the key is in the *protected* position, program and configuration data can only be changed by a programmer connected parallel only (i.e., via the Bus Transmitter module). The status of the CPU is indicated by the four green LEDs on the front of the module.

detailed information about installation, startup, and proper use of the PLC equipment. The installation manual, shipped with your PLC programming software, describes how to properly install the equipment. If the PLC installation must comply with supported standards, such as FCC or CE Directives, please refer to the *Installation Requirements for Conformance to Standards*, shipped with the PLC programming software, for additional guidelines.

Installation should not be attempted without referring to the applicable hardware installation manual.

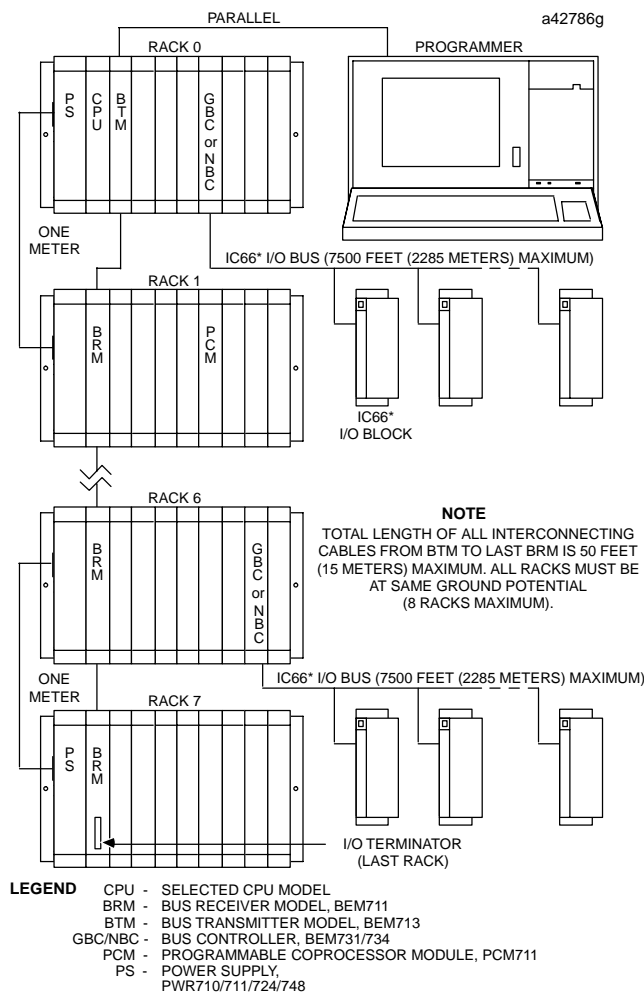


Figure 1. Typical PLC System Diagram

## Installation

It is the responsibility of the OEM, system integrator, or end user to properly install the PLC equipment for safe and reliable operation. Product manuals provide

- Align the expansion memory and CPU connectors.
- Align the captive screws on the memory board with the standoffs already installed on the CPU.
- Push the memory board onto the CPU connector ensuring that the mating screws remain aligned with their respective standoff.
- Screw each memory board screw into the standoffs with a #1 Phillips screwdriver, and tighten.
- Connect the battery to either of the battery connectors on the module.
- Put toggle switch in the STOP position.
- Put keyswitch in Memory Protection OFF position.
- Make sure rack power is off.
- Install in slot 1 of rack 0. (See Figure 1)
- Turn on power.

The module should power up and blink the top LED. When the diagnostics have completed successfully, the top LED stays on and the second and third LEDs are off. The fourth LED is off if the keyswitch is in the OFF position. The CPU is now ready to be programmed. After the program has been verified the toggle switch may be moved to the appropriate operation mode position. The LEDs indicate the position of the toggle switch, memory protection status, and the state of the program.

## Expansion Memory

The CPU 781 must have a CMOS expansion memory board. Expansion memory boards are available with 128 KBytes, 256 KBytes, 512 KBytes, and 256 KBytes with 256 KBytes of non-volatile Flash memory. The battery which supports the CMOS RAM memory is located on the main CPU board. (See Figure 2).

Installation of an expansion memory board on the CPU will require initialization of the CPU with the programmer (See Reference 2).

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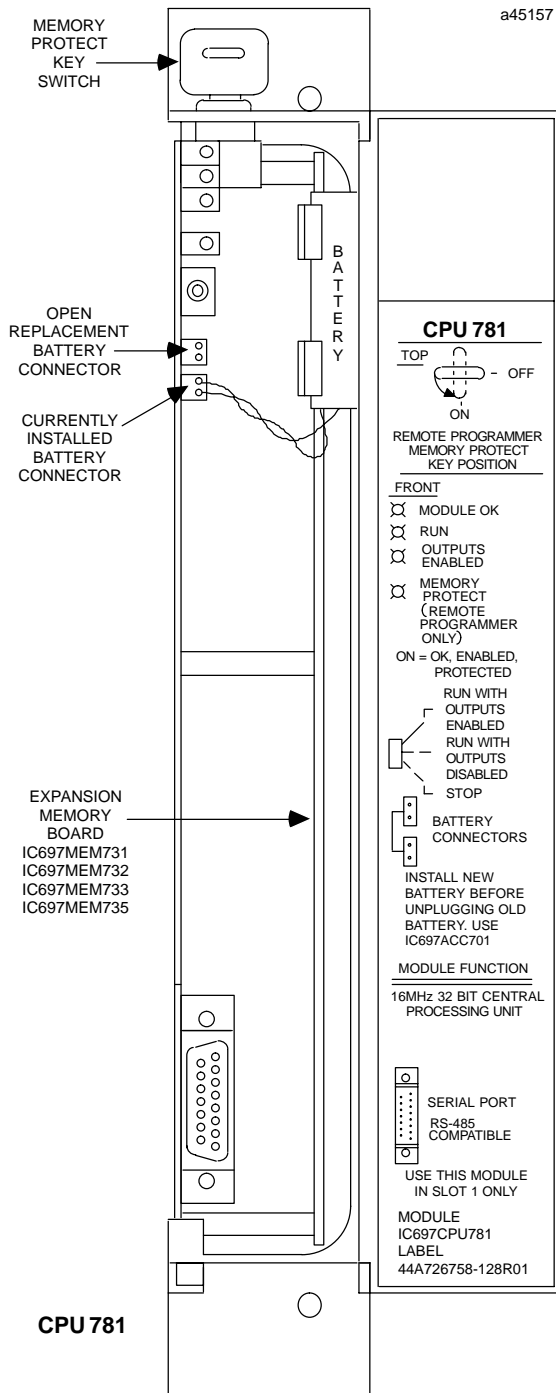


Figure 2. CPU 781 - Location of Major Features

Programmer Connection, Parallel

The programmer connects to the top port on the bus transmitter (IC697BEM713) system interface module for a parallel interface (MS-DOS programmer only), see Figure 1. Consult Reference 2 for a description of programming functions.

Serial Port

The 15-pin D-connector provides the connection to an RS-485 compatible serial port as shown in Figure 3. This port provides a serial connection to an IC647 communications interface board installed in the programming computer.

The serial connection can also be made from the Standard Serial COM port on the CPU to the serial port on the programming computer, or other serial device, through the RS-422/RS-485 to RS-232 Converter (IC690ACC900) or RS-232 to RS-422 Miniconverter (IC690ACC901). This connection can be made with available cables or you may build cables to fit the needs of your particular application. For more information on serial communications, see Reference 3.

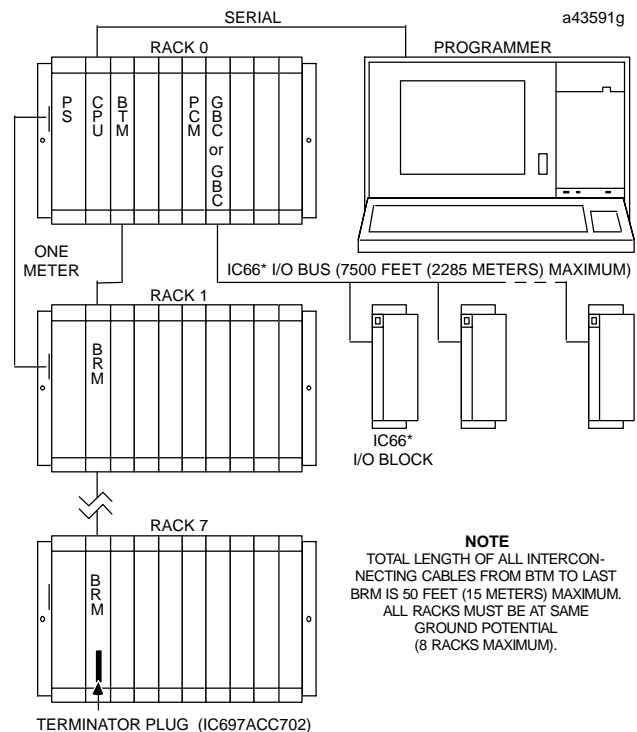


Figure 3. System Configuration, Serial Connection to Programmer

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### Programmer Connection, Ethernet TCP/IP

Connecting your programmer via an Ethernet TCP/IP network requires installation of an Ethernet Interface module in the PLC. This can be either the Ethernet Controller, IC697CMM741, or Ethernet Interface (Type 2), IC697CMM742. Before connecting your programmer and PLC to the Ethernet TCP/IP network you must set the IP address in the Ethernet Interface. After setting the IP address, connect the PLC and the programmer running Windows software to the Ethernet Interface. For more detailed information on Ethernet TCP/IP, refer to the *TCP/IP Ethernet Communications (Type 2) User's Manual*, and the Windows programming manual, GFK-1295.

### Configuration

The IC697 CPU and I/O system is configured with MS-DOS or Windows based programming software. There are no DIP switches or jumpers used to configure the system. The CPU verifies the actual module and rack configuration at power-up and periodically during operation. The actual configuration must be the same as the programmed configuration. Deviations are reported to the CPU alarm processor func-

tion for configured fault response. Consult Reference 1 for a description of configuration functions.

### Batteries

A lithium battery (IC697ACC701) is installed as shown in Figure 2. This battery maintains program and data memory when power is removed and operates the calendar clock. Be sure to install the new battery before removing the old battery. If during power-up diagnostics a low battery is detected the Module OK LED (top) will not stay on. Specific indication of a low battery state is detailed in Reference 2.

### Removing a Module

The following instructions should be followed when removing a module from its slot in a rack.

- Grasp the board firmly at the top and bottom of the board cover with your thumbs on the front of the cover and your fingers on the plastic clips on the back of the cover.
- Squeeze the rack clips on the back of the cover with your fingers to disengage the clip from the rack rail and pull the board firmly to remove it from the backplane connector.
- Slide the board along the card guide and remove it from the rack.

Table 1. Specifications for IC697CPU781 †

Battery ShelfLife	10 years at 20° C (68° F)
Memory Retention	6 months nominal without applied power
Current required from 5V Bus	1.6 Amps (includes expansion memory)
Time of Day Clock (internal timing) Accuracy	±3.5 seconds per day
Elapsed Time Clock	±.01% maximum
Serial Port	RS422/485compatible, Programmer Serial Attachment
VME	System designed to support the VME standard C.1

† Refer to GFK-0867B, or later for product standards and general specifications.

Table 2. References

Reference	Title
1	Programming Software User's Manual
2	Programmable Controller Reference Manual
3	Programmable Controller Installation Manual

**16 MHz, 32-Bit, Expandable Central Processing Unit**GFK-0766D  
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<b>Description</b>	<b>Catalog Number</b>
CPU 781, 16 MHz, 32-Bit, Expandable Memory	IC697CPU781
128 Kbyte, 32-Bit CMOS Expansion Memory	IC697MEM731
256 Kbyte with 256 KByte Non-Volatile Flash Memory, 32-Bit CMOS Expansion Memory	IC697MEM732
256 Kbyte, 32-Bit CMOS Expansion Memory	IC697MEM733
512 Kbyte, 32-Bit CMOS Expansion Memory	IC697MEM735
Lithium Battery	IC697ACC701

Note: For Conformal Coat option, or Low Temperature Testing option please consult the factory for price and availability.

