Hardware Compatibility

Modules that were shipped as IC697PCM711A through IC697PCM711G are based on the PCMA1 hardware platform. These modules have **PCMA1** screened on the component side of the printed wiring board, at the center of the rear edge. A sticker on the top edge of the board identifies the hardware revision level. Revisions R05 through R11 can be upgraded to release 4.03 using the field update kit identified above. These modules ***must*** be labeled as IC697PCM711VX by attaching the corresponding label provided in the upgrade kit.

PCMA1 hardware revisions R04 and earlier may not be upgraded to release 4.03.

PCMA1 hardware revisions R05 (shipped as IC697PCM711B) and R06 (shipped as IC697PCM711C) may be updated to release 4.03, but additional restrictions apply. See *Special Operational Notes* for information on using PCMA1 revision R05 in a rack powered by the IC697 100 watt power supply, IC697PWR711. Also see *Additional Restrictions With PCMA1 Revisions R05 and R06*.

All PCMA2 modules (shipped as IC697PCM711J through IC697PCM711P) may be upgraded to release 4.03 using the field upgrade kit specified above. These modules have **PCMA2** screened on the component side of the printed wiring board, at the center of the rear edge. They must also be labeled as IC697PCM711VX by attaching the corresponding label provided in the upgrade kit.

All PCMA3 modules (shipped as IC697PCM711S and later versions) may be upgraded to release 4.03 using the field update kit specified below. These modules have **PCMA3** screened on the component side of the printed wiring board, at the center of the rear edge. They should be labeled as IC697PCM711V by attaching the corresponding label provided in the update kit.

Functional Compatibility

PCM firmware version 4.03 is compatible with release 1.00 or later of both the IC641SWP063A and IC641SWP023A versions of PCM Support Software (TERMF), and release 2.04 or later of both the IC641SWP061B and IC641SWP021A versions of PCM Development Software (PCOP). To develop MegaBasic applications, you must use either TERMF or PCOP.

PCM firmware version 4.03 is also compatible with release 2.04 or later of IC697 PLC CPUs.

Documentation

*Data Shee*t: GFK-0164F, or later version
Quick Reference Guide: GFK-0260E, or later version.

U*ser Manuals*: There are no changes to these PCM publications: *MegaBasic Programming Language Reference Manual*, GFK-0256D; and *PCM Development Software (PCOP) User's Manual*, GFK-0487C, for this release. The *Programmable Coprocessor Module and Support Software User's Manual*, GFK-0255J, has been revised for this release.

Special Operational Notes

MegaBasic Defaults to Task Seven

When MegaBasic is started from an R (RUN) command in a PCMEXEC.BAT file, and the command does not specify a task number, the PCM operating system assigns MegaBasic to task number 7. This behavior applies to PCMEXEC.BAT files created by the PCM operating system as well as files created by users, and is consistent with PCM firmware version 2.51 and all earlier releases. In PCM release 3.00 only, MegaBasic defaults to task 15.

PCM Serial Ports Are Not Fully Isolated

The PCMA3 serial communication ports provide 200 Volts DC plus instantaneous peak AC isolation between the ports and PLC frame ground, as well as improved electromagnetic noise immunity.

If isolation greater than 200 Volts is required for a particular application, then external optical isolation, such as the RS-422 Isolated Repeater / RS-232 Converter (IC655CCM590), should be installed in the serial line.

PCMA1 and PCMA2 Serial Ports Are Not Isolated

The serial ports in PCMA1 and PCMA2 hardware are *not* isolated from module ground in either RS-232C *or* RS-422 / RS-485 mode. Common-mode input signals *must* be limited to 12 volts or less for RS-422 / RS-485 mode. An external RS-232C / RS-485 converter with common mode isolation is recommended when the serial data path is longer than 50 feet (15 meters) or the PCM and the communicating device(s) are powered from different circuits.

PROM Change

PCM RAM, including the RAM Disk (the RAM: device), is automatically cleared on the first power up after the PCM PROM (U60) is changed. If RAM disk files must be preserved, store them to an attached personal computer (PC), using TERMF or PCOP, before upgrading the PCM firmware. Then, load them back to the PCM after the upgrade.

Power Up Delay

The first COMMREQ sent to a PCM after a power cycle needs to be delayed until the PCM has finished power up initialization. See the *PCM User's Manual*, GFK-0255D or later, for example PLC programs which delay before sending CCM and MegaBasic COMMREQs.

Data Requests to the PLC CPU

Requests for PLC data from a PCM to an IC697 PLC CPU are limited to 2K bytes of data per request. This applies to all IC697 PCM applications, including CCM and custom programs developed in MegaBasic or C.

NOWAIT SYSREAD Frequency

There are system limitations on the number and frequency of MegaBasic SYSREAD requests which can be sent to IC697PLC CPUs. When the PCM application needs to obtain PLC reference data as often as it is updated (once per PLC sweep), the PLC System Communications Window mode should be set to RUN TO COMPLETION (the default). However, if there are too many requests or if there are several PCMs, the CPU watchdog timer may expire, causing the CPU OK LED to Flash. In that case, reduce the number of requests or the number of PCMs in the system, or configure the System Communications Window for LIMITED mode.

64K Bytes of VME Memory Visible to PLC CPU and PCM Services

When release 4.03 firmware is installed in PCMA2 or PCMA3 hardware, both the PLC CPU and PCM services can use 64K bytes of PCM VME memory. In PCMA1 hardware, 32K bytes of VME memory are available.

Direct VMEbus Access Unavailable With PCM In Expansion Rack

IC697 PCMs are unable to access the VMEbus in bus master mode when installed in an expansion rack. PCM applications that use the **`Set_vme_ctl`** function and access memory in the PCM VME window must prevent these operations unless the PCM is in rack zero. Modules that use PCMA1 hardware may lock up when bus master access is attempted in an expansion rack.

Serial Port One Can Support Synchronous Serial Communication

The PCMA3 serial port one hardware provides clock signals to support synchronous serial communication. However, the current PCM711 serial port driver does not provide this capability.

PCMA1 Revision R05 With 100W Power Supply

If PCMA1 hardware revision R05 of the IC697 PCM (shipped as IC697PCM711B) is used in a rack powered by a 100 watt power supply, IC697PWR711, loss of battery backed memory on the PCM can occur. Revision R05 modules must be replaced by R06 (IC697PCM711C) or later modules. Alternatively, R05 modules can be converted in the field to Revision R06.

Modification Instructions for PCMA1 Revision R05 Hardware:

The following instructions describe the modification required to convert a PCMA1 revision R05 IC697 PCM (IC697PCM711B) to hardware revision R06.

1. On the component side of the board cut the conductor that runs between connector 6PL, pin B31, and capacitor C91. The cut must be made near the C91 marking.
2. Place an R06 label on the board in place of the R05 label.

New Features and Functionality

Disabling Time Of Day Clock Synchronization

By default, the PCM synchronizes its time of day clock with the PLC CPU. Some PCM applications do not require the time of day clock and are sensitive to the impact these messages have on PLC sweep time or backplane message rates. Synchronization messages can be disabled from PCM applications in firmware version 4.03 and later.

Masking Serial Port Errors

Parity, framing and overrun errors in characters received at PCM serial ports can be masked in PCM firmware version 4.03 and later. These error types may be masked individually or in any combination. Because serial port errors cause MegaBasic program termination unless the program explicitly handles them, some users may prefer to mask these errors

New and Enhanced VTOS Functions

In version 4.03 and later, the VTOS operating system exports three functions, **`Vme_read,`** **`Vme_test_and_set`** and **`Vme_write`** to support VME bus master operation of IC697 PCMs. These functions are available only in PCMA2 and PCMA3 hardware, from C applications produced with the C Programmer's Toolkit for PCMs, IC641SWP710C (version 1.05) or later.

The function **`Get_board_id`** can now identify the PCM hardware as PCMA1, PCMA2 or PCMA3 in C applications produced with the C Programmer's Toolkit for PCMs, IC641SWP710C (version 1.05) or later.

Problems Resolved by This Upgrade

PCM hangs on CCM ScratchPad memory request from Release 6 or later CPU

1. Release 6 and later CPUs caused previous versions of the PCM module to fail when the CPU attempted to read CCM ScratchPad memory in the PCM. This version responds correctly to read requests for the ScratchPad memory type.

Corruption of data in VME memory

2. In previous PCM versions, corruption of data in PCM VME memory was possible when more than 4K bytes of data were transferred between the PLC CPU and the PCM in a short period of time. This has been corrected.

VMEbus memory not fully tested in PCMA2/3 hardware

3. Previously, only 32K bytes of VMEbus memory was tested and cleared to zero when a PCM using PCMA2 or PCMA3 hardware powered on. In this release, all the VMEbus memory that the module can access is tested and cleared.

Backplane message timeout

4. In previous releases, the PCM would time out when the PLC CPU did not respond to backplane messages within five seconds. However, certain versions of CPU firmware could delay up to eight seconds to respond when busy. The PCM backplane message timeout is now ten seconds.

VTOS time slice task rotation may stop

5. Previously, PCMs running several time slice tasks plus a priority based task, with task synchronization controlled by event flags, would occasionally stop the time slice rotation. This has been corrected.

Restrictions and Open Problems

* - New items for this release

1. *** Erroneous PLC Fault:** When an IC697 PCM is running an application that accesses PLC memory, but the slot where the PCM is installed has not been configured as a PCM by the IC641 programming software, and then a configuration that includes the PCM is stored, the PLC CPU may log an *Option module not responding* PLC fault for the PCM.

2. **CCM Timeout On Large Requests:** CCM requests for 3000 bytes or more of data may occasionally abort with a serial timeout error (Error code 0102H).

3. **Redirection of MegaBasic STDIN:** When MegaBasic is run with STDIN redirected from a file on an attached PC and execution of the MegaBasic program terminates for any reason, MegaBasic is unable to read input characters from the PC file. Redirecting STDIN from a PCM RAM disk file works correctly.

4. **MegaBasic Serial Data Rate:** When both PCM serial ports are configured for software flow control and a data rate higher than 19,200 bps, and a MegaBasic program transmits and receives characters on both ports at the same time, the PCM watchdog timer may expire, halting operation and turning off the OK LED.

5. **WAIT Mode COMMREQ:** Programming a COMMREQ function block for WAIT mode will degrade PLC sweep time and may halt the PLC CPU, turning off its OK LED. Do *not* use WAIT mode COMMREQs

unless you have a compelling reason. If WAIT mode is used, it is *absolutely essential* that no COMMREQs are sent until the PCM is ready to receive them, and that the sum of the worst-case PLC sweep time (without sending a COMMREQ) plus the longer of the two COMMREQ timeout values is less than the PLC CPU watchdog timer setting. If two or more WAIT mode COMMREQs can be sent during the same PLC sweep, the total of the timeouts for all the COMMREQs must be considered. See the *Programmable Coprocessor Module and Support Software User's Manual* for additional information.

6. **Extra Fault:** When a WAIT mode COMMREQ which specifies an invalid PCM TASK ID is executed, two *Bad task id* faults are posted to the PLC fault table.

7. **NOWAIT I/O and Ctrl-C:** If a MegaBasic program performs NOWAIT_READ and NOWAIT_WRITE operations simultaneously on the same serial port, and the program is aborted with Ctrl-C or a MegaBasic STOP statement, The PCM may hang if the program is restarted before the I/O operations complete.

Additional Restrictions With PCMA1 Revisions R05 and R06

CPU78x/9xx

1. IC697 PCMA1 hardware revisions R05 (shipped as IC697PCM711B) and R06 (shipped as IC697PCM711C) can not be used with CPU 781, 782, 914, and 925 modules.

PLC Memory Write Limitation

2. When using IC697 PCMA1 hardware revisions R05 (shipped as IC697PCM711B) and R06 (shipped as IC697PCM711C), application write requests to the PLC must be limited to 128 registers (%R, %AI, %AQ, %P, and %L memory) or 128 bytes of discrete memory (%I, %Q, %M, %T, %G, or %S). This restriction applies to both MegaBasic and CCM applications. Failure to observe this restriction may cause the PCM to hang, although its OK (top) LED may not go out when a hangup occurs.

Changes and Additions to the PCM User's Manual

None