

## Features

- Flexible, upgradeable, Pentium-based (PC) architecture
- Self-contained software loaded from internal diskette or hard disk
- Single chip MODCOMP I/O bus interface
- Rack-mount, desktop, or deskside chassis
- Concurrent DMP/DMA I/O data transfers
- Two remote fill outputs
- Fillable disk and DAT tape devices
- Peripherals supported:
  - Disks (1.06 - 9.1 GB)
  - Redundant disks
  - DAT tape (2 - 8 GB, 4mm)
  - Async communications
  - Ethernet TCP/IP
  - Parallel printer
  - UPS
  - PLCs
- FTP with server security
- Real-time windowed video display, keyboard, and mouse
- 8 to 256 MB memory
- Compatible with:
  - MAX IV, Revs. F - L
  - MAX 32, Revs. B - E
- Minimal Map 0 usage
- User-programmable, real-time OS kernel

# IPC

## Intelligent Peripheral Controller

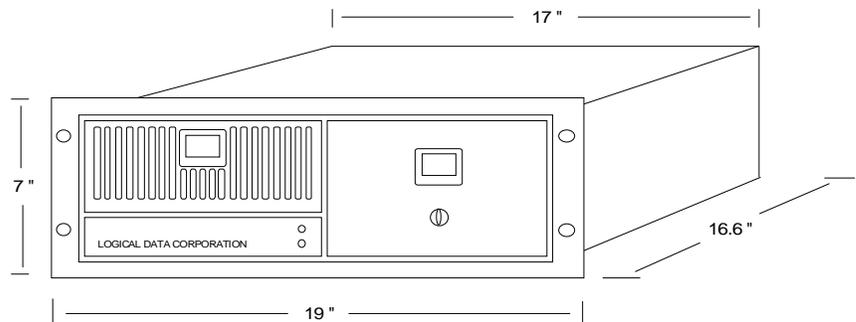


Figure 1: IPC Rack-Mount System Chassis

The Intelligent Peripheral Controller (IPC) is the ultimate peripheral system for MODCOMP computers. Starting with an advanced single-chip bus interface, the IPC's Pentium (PC) architecture supports a wide range of standard peripherals, including disk, DAT tape, printer, async serial, Ethernet, and PLC communications interfaces. The IPC advances a MODCOMP system to the latest technology while preserving your investment in software applications and CPU.

The IPC couples dramatic improvements in capacity and performance with impressive reductions in size and maintenance costs. Imagine a redundant mirror disk system up to 4 GB, an 8 GB DAT tape, 32 async channels, and Ethernet communications in a 7-inch high chassis. And there is still room for a PLC data highway interface and video display. Many

systems can be reduced to a single rack with CPU and peripherals. Dual port and other multi-CPU configurations are supported easily by including additional I/O bus interfaces.

Innovative IPC network software simplifies connectivity for your MODCOMP applications so they can share information with other systems and incorporate the newest graphical environments. With the vast number of PC interfaces available and the IPC's flexibility, the possibilities are endless. The latest technology, improved performance, and reliability with total software compatibility are what the IPC is all about.

### Hardware Components

The IPC combines a high performance, single-board computer, a single-chip MODCOMP I/O bus interface, a 3.5-inch diskette drive, and communications

# SYSTEM ARCHITECTURE

interfaces and peripheral devices with software. It may be housed in a rack-mounted, desk-side, or desktop chassis.

## Central Processing Unit

The heart of the IPC is a single-board, DOS-compatible computer with an upgradeable Pentium 133 MHz processor, 8 MB of RAM (expandable to 256 MB), and 512 KB external cache. Five ISA and four PCI expansion slots accommodate a wealth of peripherals.

## PC Adapter Bus Interface

A single card, called the PC Adapter (PCA), is mounted in the IPC and provides a direct interface from the MODCOMP I/O

bus to the ISA bus. A single chip provides the entire MODCOMP I/O and PC bus interface logic and controls access to the onboard static RAM.

The MODCOMP I/O bus interface supports two device addresses with interrupts, two DMP channels handling both single and dual word data transfers, plus two remote fill outputs. The PC interface is accessed through 32 bytes of I/O memory, uses a single interrupt, and supports concurrent data transfers on two 16-bit DMA channels. The PCA uses two 32 KB static RAMs to store MODCOMP command registers plus parameters and status for PCA interface software. The RAMs also provide storage for two 256-word data FIFOs. The static RAM control arbitrates

accesses to the RAM by the two systems and provides logic for the two data FIFOs.

## Data Transfers

Concurrent data transfers are managed simultaneously between the MODCOMP and IPC CPU by the PCA. Two data FIFOs buffer data in each direction to allow each bus to transfer at maximum rates. Dual-word transfers are used, if enabled, when two or more words of data can be transferred. The PCA uses demand mode DMA channel access to transfer a burst of up to 8 words with a single arbitration of the IPC central processor. This means the full MODCOMP data transfer rate of up to 2 MB per second can be achieved while software in each system continues to process information.

## Additional Features

The PCA provides two remote fill outputs, a programmable watchdog timer to detect failure in software or hardware, and jumper options to enable automatic restart of the IPC when the MODCOMP system is Master Cleared or if the watchdog timer expires.

## Fill Device

The IPC software can detect and respond to MODCOMP I/O instructions presented during execution of the fill macro and provide bootstrap data to satisfy

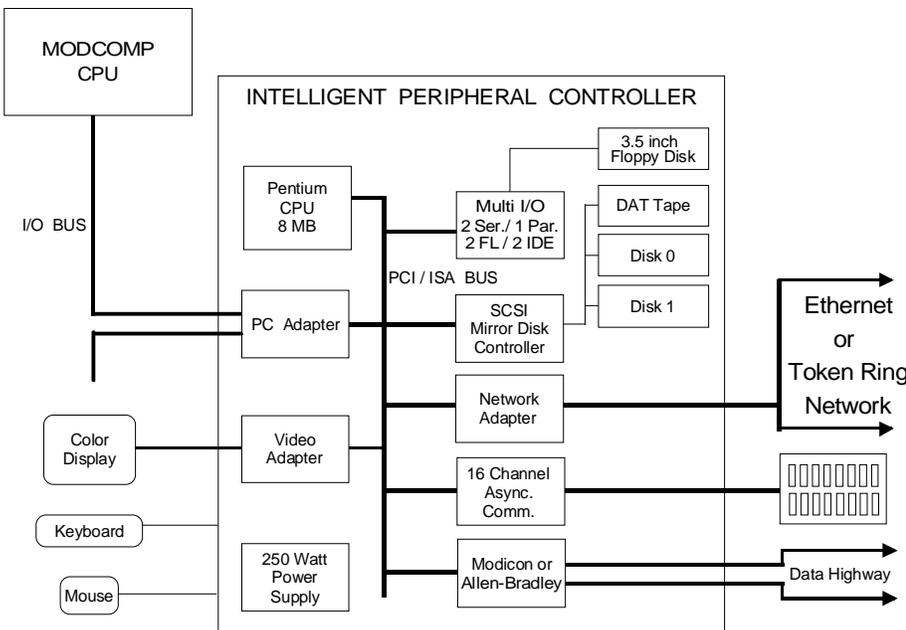


Figure 2: Typical IPC System Architecture

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the fill request. A stand-alone loader (IPCSAL) allows disk and tape to be used for loading the operating system, diagnostics, or other programs.

### Field Upgradeable Logic

The PCA's main logic chip, a 280-pin SRAM-based FPGA using the latest 0.6 micron technology, is loaded when the IPC software begins execution. A second permanently programmed chip supports in-system programming of the main chip from the IPC's CPU. Essentially all of the PCA's logic can be field upgraded by replacing a single file stored on the IPC's disk.

### Mechanical Chassis

The IPC is typically housed in a rugged, rack-mounted chassis only 7 inches high, which fits in most MODCOMP system cabinets. Its depth is less than 17 inches. This unit can be mounted behind a cabinet door. Rack slides accommodate cabinet depths from 24 to 30 inches and allow the unit to slide out for maintenance.

Power and disk indicator lamps are mounted on the front panel. The power and reset switches, speaker volume control, front keyboard connector, and 3.5-inch 1.44 MB floppy disk are mounted behind a lockable front panel door. Additional shock-isolated spaces for three 5 1/4-inch half-height peripheral devices are

also located behind the lockable door. All peripheral interface connections and a keyboard connector are mounted on the rear panel.

### Ventilation

Two filtered 3-inch fans provide 100 CFM filtered air as positive ventilation to insure a clean supply of cooling air to the IPC. A 50 CFM exhaust fan is part of the power supply to insure air-flow. The filter can be maintained from the front panel without special tools or removing the IPC from service.

### Power

A standard 250-watt modular power supply operates from 110 or 250 VAC, switch selectable for international requirements. A rear panel switched outlet is available to power other equipment.

### I/O Bus Cabling

The IPC includes all MODCOMP bus interface cables, attached and ready for use. Each MODCOMP I/O bus interface mounted in the IPC includes four 40-pin ribbon cables extending from the rear panel through a strain-relief clamp. These cables plug into the existing MODCOMP bus at any Classic-style 120-pin bus connector. An external cable set option is available when connections must be easily detachable.

### Interfaces and Peripherals

The basic IPC includes:

- 1 MODCOMP I/O bus interface
- 1 3.5 in. 1.44 MB floppy disk
- 1 parallel port
- 2 serial ports
- 2 IDE disk interfaces

Any of the following standard peripherals and interfaces are available for use by MODCOMP applications:

- SCSI disks (1.06-9.1 GB)
- SCSI mirror disks (1.06-9.1 GB)
- 4 mm. DAT tape
- 16 to 64 async channels
- Ethernet TCP/IP
- Token Ring TCP/IP
- Modicon Modbus Plus
- Allen-Bradley Data Highway Plus

Additional PC adapters may be added to support access by multiple MODCOMP host CPUs.

The IPC's modularity makes it easy to include additional special interfaces for communications, data acquisition, control, and graphics devices.

Uninterruptible power is recommended for systems with disk or tape peripherals. Either of two uninterruptible power supplies (UPS) may be added to allow safe operation of the IPC and even the MODCOMP CPU during loss of AC power. Software is included with either UPS to monitor the UPS and shut the IPC and UPS down safely to protect the batteries if AC power is lost for an extended period of time.

# IPC

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## Operator Interface

Operator interface software is included to operate a standard VGA color display, keyboard, and mouse. This software provides a useful multiple window real-time display to let you analyze the IPC and the operation of peripherals. An optional SVGA color video display, keyboard, mouse, and extension cables in various lengths may be ordered to allow convenient operation up to 100 feet from the IPC.

## Software

The IPC contains software that is loaded at power-up based on the system configuration. The IPC software consists of an efficient, real-time, multitasking micro kernel operating system that loads additional tasks based on a configuration file. Tasks have access to scheduling, timing, threading, and memory allocation services through the operating system. Tasks may register routines that can be shared by other tasks, allowing the system to expand in a modular fashion. The system supports interrupt preemption but not task preemption for fast

context switching (1-3 us.), allowing a large number of tasks to operate efficiently in real time. Tasks have direct access to expanded memory, hardware devices, and operator interface functions.

Each system is shipped with the current revision of MS-DOS for manipulation of IPC software, plus all IPC and MAX software configured and ready to operate for the peripheral configuration ordered. Simply connect the cables, add the necessary MODCOMP software, perform a SYSGEN, and the system is on-line.

## High Reliability and Low Repair Costs

The IPC has been designed to be simple and reliable without compromising performance. Its component architecture makes it easy to isolate a failure and quick to repair. The IPC uses quality mechanical and electrical subsystems standard in personal computers. If a failure ever occurs, these components are readily available, inexpensive, and easily replaced. Site mainte-

nance personnel familiar with personal computers can repair an IPC without specialized training.

## Reusable Technology

The IPC is easily expandable to handle new interfaces. If the need for the IPC is ever discontinued, the IPC can become an excellent general-purpose industrial computer. No matter what your interface needs, the IPC solution has lasting value.

## A Product of Experience

The IPC was designed by both software and hardware personnel with years of experience using MODCOMP systems. The IPC was created to provide maximum flexibility without compromising performance. Of course, you would have expected no less from Logical Data Corporation, known world-wide as a quality supplier of flexible products and applications—built better and backed better. There is no substitute for experience from a company that cares about its customers.

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