

## CPM500 Module Upgrade for EM2000 Control System

The new CPM500 module uses modern components and advanced programming technology compared to the previous modules, offering a much better solution to locomotive customers.

### Features

In addition to increasing reliability, the CPM500 design also allows for numerous technical advantages:

- Increased speed and memory — 400MHz and 32 MB flash memory compared to 25MHz and 2 MB, respectively
- Enhanced programming flexibility via USB thumb drive download medium
- Ethernet interface for convenient data transmission
- QNX operating system interface
- CAN hardware integration within the microprocessor

### Advanced CPU Technology

Using Power PC's latest Microprocessor, the CPM performance increases from 5 MIPS to 750 MIPS, and does so while operating 16 times (16X) faster than previous control modules. It also offers increased Flash and RAM memory for data storage. *(see the table on reverse side for more information.)*

### Display system upgrade

The CPM500 module integrates effectively with FIRE display screens as part of the EM2000 control system, is configured to operate on QNX to offer maximum usability, and offers specific customization of outputs and modular enclosures that can be easily upgraded in the future.



### Ease of Programming

Operating on QNX and incorporating standard flash drive upload options, the CPM lets users quickly and easily upload the newest software in the field and without the challenge or hassle of serial ports. In addition, the CAN software is built in to the control software so no download or manual programming of CAN software is required.

### Data Recording Capability

Records control signals and stores approximately one week's worth of data. Review of data can validate field failures. Prevents working unit from being submitted as an NDF core. Reduces potential down time and cost.

## Benefits

### Reliability

The CPM500 replaces older locomotive control modules with components that are outdated, obsolete and lacking in functionality. Its improved diagnostic capability helps to identify and quickly remedy issues.

This newer design will provide enhanced long-term reliability for locomotives with fewer communication challenges and component obsolescence problems.

### Improved Locomotive Performance

The increased speed, memory and performance metrics of the new CPU will provide a substantial increase in overall locomotive performance.

In addition, the newer software that is programmed via the USB port also increases performance by allowing the most current software to be easily updated in the field through a simple medium.

### Maximized User Flexibility

With front panel RS232 serial ports and dual RS422 ports in the rear, the CPM500 offers the user multiple ways to connect. Simplified front panel hosting allows for much easier programming that can be accomplished with a USB drive.

Roughly 1,000 customization options are available to locomotive users and can be easily selected with a characterization matrix that lets users pick and choose the options that will help them optimize locomotive performance.

## CPM500 vs CPM402 Functional Comparison

	CPM402	CPM500
CPU Type	Motorola MC68020	PowerPC MPC5200B
CPU speed	25 MHz	400 MHz
CPU Performance	5 MIPS	750 MIPS
RAM	256 Kb	128 Mb
Battery Backed RAM	128 Kb	1 Mb
Program Memory(Flash)	2 Mb	32 Mb
Ethernet	No	Yes
Compact Flash For Data Logging	None	2 Gb
Operating System	Nucleus	QNX
CAN Hardware	Implemented on a daughter board and attached to the main board	Integrated Within the Main Processor
CAN Software Programming Method	Automatically via FIRE or Manual Programming on NON-FIRE orders	No separate programming is needed. The CAN program is part of the main EM2000 program
EM2000 Programming Method	Serial (RS232) and MMB	USB drive
Backward/Forward Compatibility with EM2000 control software	Works only with EM2000 control software compiled prior to release version 25.00	Works only with EM2000 control software release version 25.00 and newer
Using MMB for data collection	Supported	Not supported. Uses 500 Kb of the onboard, battery-backed RAM and 8 Mb of volatile RAM
Using MMB for EM2000 Programming	Supported	Not supported. Uses USB.
Archive Download Method	Serial (RS232)	Both USB and Serial (RS232)