



GAI-TRONICS®
A HUBBELL COMPANY

69440-101

Master Control Unit PCBA



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General Information

The 69440-101 Master Control Unit (MCU) is the central component of SmartSeries system operations, processing all operations through its associated system software, as part of an ADVANCE control unit. It is installed in the 10457 Card Rack Assembly and maintains constant communication with all other SmartSeries devices installed in the card rack and the system.

The MCU constantly supervises operations to ensure proper working condition. It is exclusively designed for use in a SmartSeries system; the MCU is not intended for use with other types of equipment.

 **CAUTION**  **Connections to the MCU are reserved for use by authorized factory-trained personnel unless explicitly stated otherwise in your system manual.**

Description of Major Components

MCU Front Panel LEDs

The *LED Array* provides status on internal operation of the MCU. Abbreviated text labels to the right of the LEDs help to locate a particular LED. Both the LEDs and their labels are divided into two columns; the left column of labels corresponds to the left column of LEDs; the right column of labels corresponds to the right column of LEDs.

These LEDs are ON, they have the following meanings:

LED	Description (When ON)
-12V	The card rack is providing -12 volts dc to the MCU.
+12V	The card rack is providing +12 volts dc to the MCU.
+5V	The card rack is providing +5 volts dc to the MCU.
BEEP	This LED simulates the CPU module speaker function. The LED emits light instead of a speaker emitting sound. NOTE: If the CPU Module detects an error during boot-up, this LED will flash more than once. In this error condition, the CPU Module generates, a one-time “beep code” to aid in diagnosing the fault. Momentarily pressing the reset button will cause the beep code to repeat.
LINK	Shows Ethernet network status. The MCU has established a communications link with another Ethernet network device.
ACT	Shows Ethernet network status. The MCU detects activity on the attached Ethernet cable.
BP	The MCU is using the data bus in the card rack. The card rack is sometimes referred to as “back plane,” which gives this LED its abbreviation (BP).
SPD	This LED operates in conjunction with LINK LED to indicate the speed of the Ethernet network connection. LINK (On) SPD (Off) = 10 MB Ethernet connection LINK (On) SPD (On) = 100 MB Ethernet connection LINK (Off) SPD (Off) = no network connection established
SEC	The MCU is accessing the Compact Flash card connected to the secondary IDE controller.
PRI	The MCU is accessing the hard disk drive connected to the primary IDE controller.
B7, B6, B5, B4, B3, B2, B1, or B0	These LEDS are referred to as the <i>Port 80</i> LEDS. They are used to show diagnostic information that can be used by factory trained technicians as a troubleshooting aid.

NOTE: Some of the MCU LEDs are red. While red typically is an error indicator, this is not so here.

MCU Front Panel Connections

The *PS/2 keyboard* and *PS/2 mouse* connectors enable connecting a PS/2 keyboard and a PS/2 mouse, respectively, to the MCU. These connectors are color-coded to match the PC99 standard. In order for the mouse to function properly, it must be connected at power-up. There is no benefit in attaching a mouse at this time.

The *COM2 RS232 port* provides an RS-232 serial connection to the MCU. This connector’s pin-out matches that of a standard PC’s 9-pin serial connector pin-out.

NOTE: The COM2 RS-232 port is logically in parallel with the COM2 RS-485 half-duplex port on the rear of the card rack; therefore, both of the ports may not be used simultaneously.

The *VGA* connector enables connecting a VGA monitor to the MCU. This connector is color coded to match the PC99 standard.

The *USB Port 0* and *USB Port 1* connectors enable connecting USB 1.0 or USB 2.0 devices to the MCU.

The *Reset* button resets the MCU. Momentarily depress the **RESET** button to reset and re-boot the MCU. Holding in the **RESET** button will keep the MCU in reset mode, and it will not re-boot. The button is recessed to prevent accidental depressions.

Card Rack Rear Panel Connections

The *LPT1 parallel port* provides a parallel port connection to the MCU. This is typically used for connecting a printer. This connector's pin-out matches that of a standard PC's 25-pin parallel port connector pin-out.

The *COM1 RS-485 half-duplex port* provides a half-duplex RS-485 connection to the MCU. This connector's pin-out is proprietary. Also, this connection provides a dry contact closure output. If applicable, the operation of this connector is described in your system manual. This port shares the connector with COM2.

The *COM2 RS-485 half-duplex port* provides a half-duplex RS-485 connection to the MCU. This connector's pin-out is proprietary. Also, this connection provides a dry contact closure output. If applicable, the operation of this connector is described in your system manual. This port shares the connector with port 1.

NOTE: The COM2 RS-232 port is logically in parallel with the COM2 RS-485 half-duplex port on the front panel of the MCU; therefore, both of the ports may not be used simultaneously.

MCU Internal Connections

The *CPU Module* holds the microprocessor that controls the system.

The *Ethernet port* provides an Ethernet connection to the CPU Module.

The *battery* allows the CPU Module to keep track of the date and time in the event of a power failure.

NOTE: CMOS settings are stored in EEPROM; their storage does not rely on battery power during a power failure.

A *2.5-inch IDE Hard Drive* connects to the CPU Module. The 2.5-inch IDE hard drive is formatted and proper software is factory installed.

A *CompactFlash Card* connects to the CPU Module. The Compact Flash card is formatted and proper software is factory-installed (when required).

The *Upper VME Connectors* provides the mechanical connection to the card rack's backplane.

The *Lower VME Connector* provides the mechanical connection to the rear panel of the card rack, used for connection of external devices described above under "Card Rack Rear Panel Connections" section.

Operation

After installation and power-up, the MCU starts automatically. It requires no direct user intervention during normal operations.

In general, the MCU maintains data communication with all other cards in the card rack and with SmartSeries devices located throughout the system. Its software configuration file defines the actual operation of the MCU. Your system manual provides specific information how the MCU controls the operation of your specific system.

The connections on the MCU are for use by factory-trained personnel only, unless explicitly stated otherwise in your system manual. Although these connections are the same as those found on a PC, and the MCU functions similarly to a PC, it is to be used strictly for operating the SmartSeries system and should not be used for performing other functions. Failure to follow this advice could result in the failure of your system.

Installation and Maintenance

Direct questions about installation and updating the system software configuration of this product to the GAI-Tronics Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA.

**WARNING****Disconnect power to the card rack before performing any maintenance.**

Warning: Observe precautions for handling electrostatic sensitive devices.

Installation Instructions

Refer to Figure 1 for component location and installation details.

1. Verify that power is disconnected to the card rack prior to installation.
2. Find the slot located on the farthest left side of the card rack.
3. Align the MCU into the upper and lower tracks in the card rack.
4. Connect the Ethernet cable supplied within the card rack.
5. Slide the MCU toward the rear of the card rack until it comes in contact with the connectors on the backplane.
6. Firmly press on the front bezel until the MCU is seated in the back-plane connectors, and tighten the two retaining screws located on the front bezel to secure it to the card rack.

Removing the MCU from the Card Rack

1. Remove power from the card rack.
2. Loosen the two retaining screws on the front bezel that secures the MCU to the card rack.
3. Gently disengage the MCU from the connector on the backplane and slide the MCU out of the card rack.
4. Disconnect the Ethernet cable.

Battery Replacement

1. Lift the retainer clip away from battery and pry the battery out of the holder. See Figure 1 for location.
2. Insert the new battery into the battery holder under the retainer clip.
3. Reinstall the MCU into the card rack per above procedure.
4. Set the date and time as instructed in the system manual.



Troubleshooting

Symptom	Action
The -12V, +12V, or +5V LED on front bezel is not ON.	<ol style="list-style-type: none"> 1. Verify power is applied to the card rack. 2. Disconnect power to the card rack. <ul style="list-style-type: none"> • Verify the MCU is properly inserted into the card rack. • Reconnect power to the card rack. • If at least one of those LEDs is still not ON, call for service for the MCU and the card rack.
The Port 80 LED's light pattern remains constant after applying power.	<ol style="list-style-type: none"> 1. <u>One time only</u>, disconnect and reconnect power to the card rack. 2. Press the RESET button. 3. Call for service of the MCU.
Date and time settings do not stay current after a period of system power interruption.	<ol style="list-style-type: none"> 1. Replace the battery. 2. Call for service of the MCU.
The Port 80 LEDs appear to be changing in a periodic pattern, and the system does not function <i>at all</i> . This problem usually occurs immediately after power-up.	<p>Call for service of the card rack.</p> <p>This situation arises if the +5 volt power provided by the card rack to the MCU is too low. In this circumstance, the reset circuitry on the CPU Module oscillates in and out of reset.</p>

Specifications

Electrical

Power 3 A maximum @ +5 V dc $\pm 5\%$
20 mA maximum @ +12 V dc $\pm 10\%$
20 mA maximum @ -12 V dc $\pm 10\%$

Battery 3 volts
0.03 mA standard load; Lithium Coin Cell/48 mAh capacity

Environmental

Temperature range (operating/storage) +32 °F to +120 °F (0 °C to +49 °C)

Humidity: 10% - 85% non-condensing relative humidity

Mechanical

Unit dimensions 10.3 H \times 1.63 W \times 9.07 D inches (262 \times 41.3 \times 231 mm)

Unit weight 1.55 lbs. nominal

Approval

CE Mark

Replacement Parts

GTC Model No.	Manufacturer/Model No.	Description
40005-005	Panasonic - BR1225 Rayovac - BR1225	Battery, 3V Lithium Coin Cell

Warranty

Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Return Policy

If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.