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Patents

This product is covered by one or more of the following U.S. and foreign Patents:

U.S. Patent No.4,360,798; 4,369,361; 4,387,297; 4,460,120; 4,496,831; 4,593,186; 4,603,262; 4,607,156; 4,652,750; 4,673,805; 4,736,095; 4,758,717; 4,816,660; 4,845,350; 4,896,026; 4,897,532; 4,923,281; 4,933,538; 4,992,717; 5,015,833; 5,017,765; 5,021,641; 5,029,183; 5,047,617; 5,103,461; 5,113,445; 5,130,520; 5,140,144; 5,142,550; 5,149,950; 5,157,687; 5,168,148; 5,168,149; 5,180,904; 5,216,232; 5,229,591; 5,230,088; 5,235,167; 5,243,655; 5,247,162; 5,250,791; 5,250,792; 5,260,553; 5,262,627; 5,262,628; 5,266,787; 5,278,398; 5,280,162; 5,280,163; 5,280,164; 5,280,498; 5,304,786; 5,304,788; 5,306,900; 5,321,246; 5,324,924; 5,337,361; 5,367,151; 5,373,148; 5,378,882; 5,396,053; 5,396,055; 5,399,846; 5,408,081; 5,410,139; 5,410,140; 5,412,198; 5,418,812; 5,420,411; 5,436,440; 5,444,231; 5,449,891; 5,449,893; 5,468,949; 5,471,042; 5,478,998; 5,479,000; 5,479,002; 5,479,441; 5,504,322; 5,519,577; 5,528,621; 5,532,469; 5,543,610; 5,545,889; 5,552,592; 5,557,093; 5,578,810; 5,581,070; 5,589,679; 5,589,680; 5,608,202; 5,612,531; 5,619,028; 5,627,359; 5,637,852; 5,664,229; 5,668,803; 5,675,139; 5,693,929; 5,698,835; 5,705,800; 5,714,746; 5,723,851; 5,734,152; 5,734,153; 5,742,043; 5,745,794; 5,754,587; 5,762,516; 5,763,863; 5,767,500; 5,789,728; 5,789,731; 5,808,287; 5,811,785; 5,811,787; 5,815,811; 5,821,519; 5,821,520; 5,823,812; 5,828,050; 5,850,078; 5,861,615; 5,874,720; 5,875,415; 5,900,617; 5,902,989; 5,907,146; 5,912,450; 5,914,478; 5,917,173; 5,920,059; 5,923,025; 5,929,420; 5,945,658; 5,945,659; 5,946,194; 5,959,285; D305,885; D341,584; D344,501; D359,483; D362,453; D363,700; D363,918; D370,478; D383,124; D391,250; D405,077; D406,581; D414,171; D414,172.

Invention No. 55,358; 62,539; 69,060; 69,187 (Taiwan); No. 1,601,796; 1,907,875; 1,955,269 (Japan).

European Patent 367,299; 414,281; 367,300; 367,298; UK 2,072,832; France 81/03938; Italy 1,138,713.

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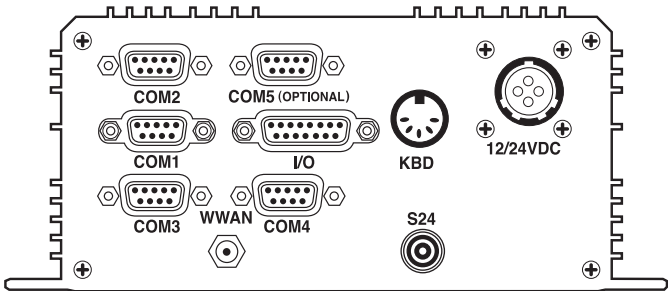
Introduction

The Mobile Gateway Plus 486 (MG+ 486) is a small, rugged computer used as a platform for in-vehicle communications and connectivity by Symbol portable data terminals. It provides wireless network communications and RS-232 flexibility.

The MG+ 486 supports MS-DOS, GS-DOS and Pharlap RTOS operating environments using industry standard protocols. It is available with an 80486 processor.

Input/Output Ports

The MG+ 486 has up to 5 external serial ports and one I/O port on the rear panel of the unit.



COM1

This RS-232 DTE serial port uses a 9-pin male DSUB connector. The COM1 port can be used to interface with devices such as portable terminals and laptop PCs, and connects to an RS-232 port on a host computer using a null modem cable. COM1 also can be connected to a host console adapter that boots the MG+ 486 into a mode which redirects the video and keyboard data to COM1, so an external PC running Procomm or equivalent terminal software can control the MG+ 486.



COM2

COM2 is an RS-232 DTE serial port using a 9-pin female DSUB connector.

I2/24VDC

This connector provides the input power for the MG+ 486. The MG+ 486 operates from 12 or 24 V (9V to 32V) sources.

Options

Several of the following options are also available:

COM3 - Additional RS-232 DTE serial port.

COM4 - Additional RS-232 DTE serial port.

COM5 - DTE serial port that can be configured as either RS-232, SAE J1708 or TTL level.

I/O - This Input/Output port is a 26-pin high density female DSUB connector allowing the MG+ 486 to interface with external devices. Five digital open collector outputs/inputs are provided on this port, and three digital inputs that wake up the MG+ 486. The outputs can be used for external control, while the inputs can be used for monitoring the state of external switches or other sensory devices. Three power sources (unswitched 5V up to 2ma, switched 5V up to 0.5A, filtered/transient protected input voltage up to 1A) and several ground pins are also provided. Optional are two 8-bit analog-to-digital channels set up for 0 to 12.5V (voltage range can be modified). Also optional are two 16-bit frequency/pulse counter channels.

Keyboard - Optional standard XT keyboard connection typically used for development units.

WWAN Antenna - SMA-style connector which provides an interface to external radio antenna.

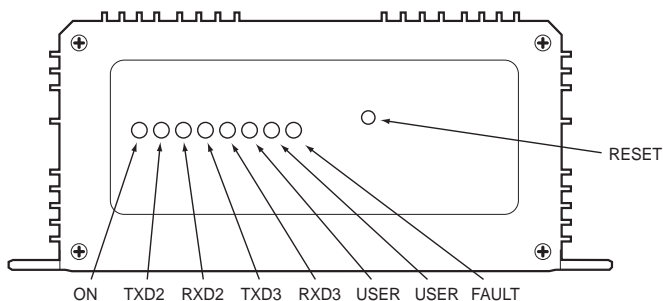
Q u i c k R e f e r e n c e

GPS Antenna - SMB-style connector which provides an interface to an external GPS antenna.

S24 Antenna - Reverse BNC style connector which provides an interface to external S24 radio antenna.

LED Indicators

The MG+ 486 has 8 LED indicators on the front panel providing status to the user.



The LEDs (left to right) are described below:

LED	Description
ON	Power is applied to the CPU of the MG+ 486.
TXD2	The CPU is transmitting information to COM2 (can be factory set for COM4).
RXD2	The CPU is receiving information from COM2 (can be factory set for COM4).
TXD3	The CPU is transmitting information to COM3.
RXD3	The CPU is receiving information from COM3.
USER	Application-specific, can be programmed by the user (can be used for S24 activity).

LED	Description
USER	Application-specific, can be programmed by the user.
FAULT	LED stays on if MG+ 486 does not boot properly. Can be programmed by the user.

Reset Switch

This is a momentary switch located on the front panel, to the right of the LEDs. To ensure a clean reset, hold the button down for more than one second, then release.

Internal Interfaces

Radio Interface

The MG+ 486 can be factory configured for one of the following radios:

- Ericsson M3090 WAN radio
- RIM 902 WAN radio.

Note: Other radio configurations will be available in the future.

The radio is connected to the COM3 port. The optional external COM3 connector will point to the external connector only when the radio is not selected.

GPS Interface

The MG+ 486 can be factory configured for a Rockwell Jupiter GPS receiver. The GPS receiver is connected to the COM4 port. Jumper headers JP8 and JP9 are used to configure the GPS. The optional external COM4 connector is connected to the COM4 port only when the GPS is not selected.

The GPS is backed up by the onboard 3.3V (as long as the main power is available, or the internal backup NiCd battery is charged).

PCI04 Interface

The MG+ 486 accommodates one PC104 16/8 bit card.

PCMCIA Interface

The MG+ 486 accommodates up to two 5V PCMCIA cards (if both slots are used, a type 3 card may be installed in the top slot only). The interface supports hot plug-in.

Backup Battery

The MG+ 486 accommodates an 8.4V 500ma NiCd backup battery (J2). The backup battery provides power during brownout periods and backs up the RTCs when main power is not available. The battery is not user-serviceable.

Installing the MG+ 486

Caution: Improper installation can cause damage to both the vehicle and the MG+ 486. Installation should be performed by an experienced technician.

To install the MG+ 486:

1. Select a mounting location that is flat and provides adequate support and ventilation for the MG+ 486.
Note: The MG+ 486 chassis must be grounded to the vehicle chassis.
2. Secure the MG+ 486 with appropriate nuts and bolts. Self-locking nuts or lock washers must be used.
3. Connect the power cable.
4. Route the power cable to the battery power source.
5. Connect the V+ wire to the battery power source, splicing a fuseholder with a 10 amp fuse in-line with the power source.

Note: Locate the fuse as close as possible to the battery power source.

6. Connect the Vehicle Accessory Power to the vehicle accessory bus, splicing a fuseholder with a 1 amp fuse in-line with the accessory power source.

Note: Locate the fuse as close as possible to the accessory power source.

The accessory bus is the 'switched' power source controlled by the ignition key. Connect the power cable to the power source using appropriate connectors.

7. Place a CAUTION label on each fuseholder.
8. Plug the circular connector into the +12/24 VDC connector on the MG+ 486.

Voltage & Current Requirements

Input Voltage	+12/24 VDC
V+ Input Current	4.5 A Max
Accessory Power Input Current	10 mA

Q u i c k R e f e r e n c e

Service Information

Before you use the unit, it must be configured to operate in your facility's network and run your applications.

If you have a problem running your unit or using your equipment, contact your facility's Technical or Systems Support. If there is a problem with the equipment, they will contact the Symbol Support Center:

United States	1-800-653-5350	Canada	905-629-7226
United Kingdom	0800 328 2424	Asia/Pacific	337-6588
Australia	1-800-672-906	Austria	1-505-5794
Denmark	7020-1718	Finland	9 5407 580
France	01-40-96-52-21	Germany	6074-49020
Italy	2-484441	Mexico	5-520-1835
Netherlands	315-271700	Norway	66810600
South Africa	11-4405668	Spain	9-1-320-39-09
Sweden	84452900		
Latin America Sales Support		1-800-347-0178	Inside US
		+1-561-483-1275	Outside US
Europe/Mid-East Distributor Operations		Contact local distributor or call	
		+44 118 945 7360	

Warranty

Symbol Technologies, Inc. ("Symbol") manufactures its hardware products in accordance with industry-standard practices. Symbol warrants that for a period of twelve (12) months from date of shipment, products will be free from defects in materials and workmanship.

This warranty is provided to the original owner only and is not transferable to any third party. It shall not apply to any product (i) which has been repaired or altered unless done or approved by Symbol, (ii) which has not been maintained in accordance with any operating or handling instructions supplied by Symbol, (iii) which has been subjected to unusual physical or electrical stress, misuse, abuse, power shortage, negligence or accident or (iv) which has been used other than in accordance with the product operating and handling instructions. Preventive maintenance is the responsibility of customer and is not covered under this warranty.

Wear items and accessories having a Symbol serial number, will carry a 90-day limited warranty. Non-serialized items will carry a 30-day limited warranty.



Warranty Coverage and Procedure

During the warranty period, Symbol will repair or replace defective products returned to Symbol's manufacturing plant in the US. For warranty service in North America, call the Symbol Support Center at 1-800-653-5350. International customers should contact the local Symbol office or support center. If warranty service is required, Symbol will issue a Return Material Authorization Number. Products must be shipped in the original or comparable packaging, shipping and insurance charges prepaid. Symbol will ship the repaired or replacement product freight and insurance prepaid in North America. Shipments from the US or other locations will be made F.O.B. Symbol's manufacturing plant.

Symbol will use new or refurbished parts at its discretion and will own all parts removed from repaired products. Customer will pay for the replacement product in case it does not return the replaced product to Symbol within 3 days of receipt of the replacement product. The process for return and customer's charges will be in accordance with Symbol's Exchange Policy in effect at the time of the exchange.

Customer accepts full responsibility for its software and data including the appropriate backup thereof.

Repair or replacement of a product during warranty will not extend the original warranty term.

Symbol's Customer Service organization offers an array of service plans, such as on-site, depot, or phone support, that can be implemented to meet customer's special operational requirements and are available at a substantial discount during warranty period.

General

Except for the warranties stated above, Symbol disclaims all warranties, express or implied, on products furnished hereunder, including without limitation implied warranties of merchantability and fitness for a particular purpose. The stated express warranties are in lieu of all obligations or liabilities on part of Symbol for damages, including without limitation, special, indirect, or consequential damages arising out of or in connection with the use or performance of the product.

Seller's liability for damages to buyer or others resulting from the use of any product, shall in no way exceed the purchase price of said product, except in instances of injury to persons or property.

Some states (or jurisdictions) do not allow the exclusion or limitation of incidental or consequential damages, so the proceeding exclusion or limitation may not apply to you.

Regulatory Information

Radio Frequency Interference Requirements

This device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the Federal Communications Commissions Rules and Regulation. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC Part 15. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio Frequency Interference Requirements - Canada

This device complies with RSS 210 of Industry & Science Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Industry Canada Standard ICES-003. Cet appareil numérique de la classe B est conform à la norme NMB-003 d'Industrie Canada.

CE Marking and European Union Compliance



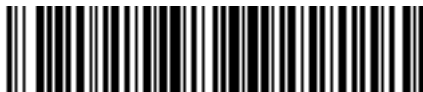
Products intended for sale within the European Union are marked with the CE Mark which indicates compliance to applicable Directives and European Normes (EN), as follows. Amendments to these Directives or ENs are included:

Applicable Directives

- Electromagnetic Compatibility Directive 89/336/EEC
- Low Voltage Directive 73/23/EEC

Applicable Standards

- EN 55022:1998, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
- EN 55024:1998; Information Technology equipment - Immunity characteristics - Limits and methods of measurement
- IEC 1000-4-2:1995; Electromagnetic compatibility (EMC); Part 4: Testing and measurement techniques; Section 4.2: Electrostatic discharge immunity test
- IEC 1000-4-3:1997; Electromagnetic Compatibility (EMC); Part 4: Testing and measurement techniques; Section 3. Radiated, radio frequency, electromagnetic field immunity test.
- IEC 1000-4-4:1995; Electromagnetic compatibility (EMC); Part 4: Testing and measurement techniques; Section 4: Testing electrical fast transient, /Burst immunity.
- IEC 1000-4-5:1995; Electromagnetic compatibility (EMC), Part 4: Testing and measurement techniques; Section 5: Surge Immunity
- IEC 1000-4-6:1996; Electromagnetic compatibility (EMC), Part 4: Testing and measurement techniques; Section 6: Immunity to conducted disturbances, induced by radio frequency fields.
- IEC 1000-4-11:1994; Electromagnetic compatibility (EMC), Part 4: Testing and measurement techniques; Section 11: Voltage Dips, Short Interruptions, and Voltage Variations.
- EN 60 950 + A1+A2+A3+A4+A11 - Safety of Information Technology Equipment Including Electrical Business Equipment
- EN 60 825-1 (EN 60 825) - Safety of Devices Containing Lasers



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