



Opticom™ GPS Priority Control System

Vehicle Equipment

August 2005

Description

The 3M™ Opticom™ GPS Priority Control System assists authorized priority vehicles through signalized intersections by providing temporary right-of-way through the use of common traffic controller functions.

The Opticom GPS system consists of the following matched components:

Vehicle Equipment

- Radio/GPS unit containing a GPS receiver and a 2.4 GHz spread spectrum transceiver
- Radio/GPS antenna
- Vehicle control unit
- Vehicle interface cable
- Installation cable

Intersection Equipment

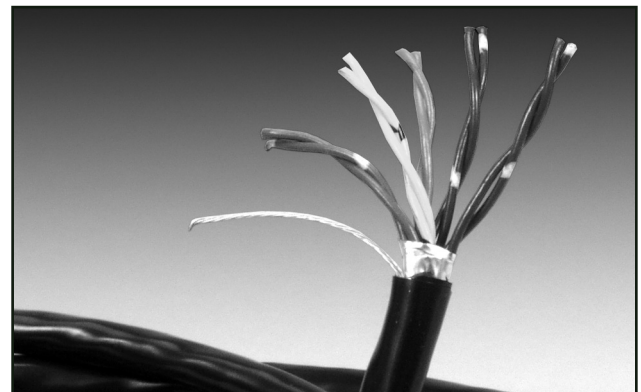
- Radio/GPS unit containing a GPS receiver with antenna and a 2.4 GHz spread spectrum transceiver with antenna
- Phase selector
- Card rack/input file
- Auxiliary interface panel
- Auxiliary harness
- Installation cable

The vehicle equipment is mounted on the priority vehicle. Its GPS receiver accepts position information from the constellation of GPS satellites. This information is used to compute the location, speed, and heading of the vehicle. This information, along with a priority request and the state of the vehicle's turn signal, is broadcast using the 2.4 GHz spread spectrum transceiver.

The intersection equipment receives the radio transmission from the vehicle equipment. The intersection equipment then compares the information being received from the vehicle to the parameters stored in the intersection equipment's memory. If the vehicle is heading toward the intersection in a predefined approach corridor, is requesting preemption and has met all other programmed parameters, the corresponding phase selector output is activated. This output is connected to the traffic controller preemption input.



Vehicle Interface Harness, Control Unit, Radio/GPS Antenna and Radio Unit



Installation Cable

When activated, the controller cycles to grant a green light to the requesting vehicle or holds the green allowing the vehicle to pass through the intersection.

The card rack/input file provides the power and logic wiring for the phase selector, which plugs directly into a slot in the unit. An external power supply may be needed for use in cabinets with pre-wired priority control slots that do not have +24VDC available.

The auxiliary interface panel provides connections for monitoring green phases and also provides additional priority control outputs.

The auxiliary harness can be used to provide additional connection for monitoring green phases when the auxiliary interface panel is not required.

Features

3M™ Opticom™ GPS Priority Control System vehicle equipment is intended for use on priority vehicles. The vehicle equipment kit consists of a compact, RF energy-emitting radio/GPS unit containing a GPS receiver and a 2.4 GHz spread spectrum transceiver, radio/GPS antenna, as well as a control unit, which provides an interface point between the radio/GPS unit antenna and the vehicle wiring. An external computer is used for configuration, set-up and diagnostics.

Opticom GPS system vehicle equipment has the following features:

- More than 38 million vehicle identification code combinations selectable at installation
- Vehicle turn signal status monitoring and transmission
- User-selectable Disable mode; Latching or Non-Latching modes, disable triggering mode and +12VDC to ground or ground to +12VDC
- Diagnostic and status indicators
- Meets FCC part 15 Class A specifications
- License not required
- Easily accessible computer interface
- Easy installation (no coaxial cables required)
- Low power consumption

- Additional GPS output in NEMA format (4800 baud) for other onboard uses
- Available Windows® configuration and maintenance software
- Choice of configurable activation methods
 - Activated by light bar
 - Activated by light bar AND by driver activation
 - Activated by light bar OR by driver activation

The following reference model numbers appear on the shipping boxes and serial plate labels:

High Priority Vehicle Control Unit

Model 1020

Low Priority Vehicle Control Unit

Model 1021

Radio/GPS Unit

Model 1012A

Physical Dimensions

Vehicle Control Unit

Length 5.75 inches (14.6 cm)
Width 5.5 inches (14.0 cm)
Height 1.75 inches (4.4 cm)
Weight 0.8 lb (0.363 kg)

Radio/GPS Unit

Length 8.0 inches (20.3 cm)
Width 4.5 inches (11.4 cm)
Height 2.7 inches (6.9 cm)
Weight 1.9 lbs (0.854 kg)

Radio/GPS Antenna

Cable Length 15.0 feet (4.6 m)
Diameter 2.85 inches (7.2 cm)
Height 1.4 inches (3.5 cm)
Weight with cables 0.6 lbs (0.30 kg)

Electrical

Input voltage 10–16 VDC
Current Less than 2 amps

Environmental

Temperature -30°F to +165°F
(-34°C to +74°C)
Relative Humidity 5–95%

Operating Parameters

- High or low priorities selected by model
- User programmable number which is transmitted to intersection equipment
 - 254 Agency IDs
 - 15 Vehicle Classes
 - 9999 Vehicle IDs
 - Over 38 million combinations per priority level
- A reference vehicle name up to 40 characters may be programmed by the user
- Configurable Disable Operating Mode
 - Latching or Non-Latching
 - Disable Trigger method
 - +12 VDC to Ground
 - Ground to +12 VDC
- Less than 2 amps peak current draw
- Self Diagnostic
- Transmission at least 2,500 feet (762 m) (without obstructions)
- Monitors turn signal operation and transmits to intersection

Interface Harness Connector Pin Index

Pin	Wire Color	Function
1	White/Yellow	J1708 (+) (future use)
2	Blue	Light bar sense or Ignition switch
3	Brown	Low priority
4	Gray	Spare input (future use)
6	White	Disable sense
7	Green	Right turn sense
8	Yellow	Left turn sense
9	Black	Ground
10	Red	+12 VDC
13	White/Orange	GPS TXD (-)
14	White/Brown	GPS TXD (+)
15	White/Blue	J1708 (-) (future use)

Radio/GPS Unit Terminal Block Pin Index

Pin	Wire Color	Function
1	Yellow	Radio transmit (+)
2	Yellow Black	Radio transmit (-)
3	Blue	Radio receive (+)
4	Blue White	Radio receive (-)
5	Orange	Radio clock (+)
6	Orange Green	Radio clock (-)
7	Brown	GPS power
8	Brown White	Common
9	Violet	Radio power
10	Violet White	Common
11	Bare	Shield drain wire

Vehicle Control Unit Indicators

Indicator	Color or Condition	Meaning
POWER	Green	Power applied to unit
ON/OFF	Green	Power applied to unit
	Flashing Green	Vehicle in Disable mode
DISABLE	Off	Vehicle NOT in Disable mode
	Flashing Green	Vehicle in Disable mode
GPS	Amber	Not receiving GPS, radio not transmitting
	Green	GPS has good 3D fix
RADIO	Amber	No communication between radio/GPS unit and vehicle control unit
	Green	Good communication between radio/GPS unit and vehicle control unit

Re-radiator

Re-radiators are installed inside buildings, connected to outside antennas, to “re-radiate” GPS signals in an enclosed area. A re-radiator is needed in each garage and bay where Opticom GPS system-equipped vehicles are parked to retain the GPS satellite position information. This ensures that equipment on vehicles will be ready to transmit within seconds after activation.

Important Notice to the Purchaser

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3M will repair or replace any Opticom™ GPS Priority Control System component found not to meet 3M’s specifications within two (2) years from the date of shipment from 3M. This warranty shall not apply to any system component which has been (1) repaired or modified by persons not authorized by 3M; (2) subjected to incorrect installation, misuse, neglect or accident; or (3) has been damaged by extreme atmospheric or weather-related conditions.

Since the availability of the GPS signal is outside of 3M’s control and is required for system operation. 3M is not liable for Opticom GPS system failure due to the unavailability of the GPS signal for any reason.

IN NO EVENT SHALL 3M BE LIABLE IN CONTRACT OR IN TORT FOR ANY INJURY, LOSS, OR DAMAGE, WHETHER NON-SPECIFIED DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL, ARISING OUT OF THE USE OR INABILITY TO USE THE OPTICOM GPS SYSTEM OR ANY COMPONENT THEREOF, REGARDLESS OF THE LEGAL THEORY ASSERTED.

3M has designed, developed and tested each Opticom GPS priority control system component as part of a matched component system. 3M makes no warranty whatsoever concerning the reliability or safety of Opticom GPS system components when used with non-Opticom GPS system products. 3M shall not be responsible for any Opticom GPS component which 3M determines has been damaged in whole or in part by its use with a non-Opticom GPS system product.

Sale and use of the Opticom GPS priority control system is expressly restricted to authorized agencies of government customers, within their respective jurisdictions. However, because the radio signal generated by the Opticom GPS system is not exclusive, 3M cannot ensure exclusive activation by purchaser. Authorized users who desire to use or coordinate use of the Opticom GPS system with that of other jurisdictions must first obtain the prior written approval of each authorized user in the jurisdiction where use is sought.

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