



Global Traffic  
Technologies

# Opticom™ GPS System Intersection Equipment

**Opticom™ GPS System Matched Component Products**

**October 2007**

## Description

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

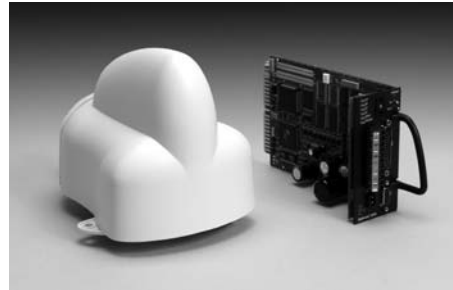
The Opticom GPS system consists of the following matched components:

### Intersection Equipment

- Opticom™ Model 1010 GPS Radio Unit containing a GPS receiver with antenna and a 2.4 GHz spread spectrum transceiver with antenna
- OR–
- Opticom™ Model 1012 GPS Radio Unit containing a GPS receiver and a 2.4 GHz spread spectrum transceiver, with Opticom™ Model 1050 GPS/Radio Antenna and Opticom™ Model 1072 GPS Cable Assembly
- Opticom™ Model 1000 GPS Phase Selector
- Opticom™ Model 1040 GPS Card Rack
- Opticom™ Model 1030 GPS Auxiliary Interface Panel
- Opticom™ Model 1035 GPS Green Sense Harness
- Opticom™ Model 1070 GPS Installation Cable

### Vehicle Equipment

- Opticom model 1012 GPS radio unit containing a GPS receiver and a 2.4 GHz spread spectrum transceiver, with Opticom model 1050 GPS/radio antenna and Opticom model 1072 GPS cable assembly
- Opticom™ Model 1020 GPS Vehicle Control Unit (high priority)
- OR–
- Opticom™ Model 1021 GPS Vehicle Control Unit (low priority)
- Opticom™ Model 1071 GPS Vehicle Interface Cable
- Opticom model 1070 GPS installation cable



Opticom™ Model 1010 GPS Radio Unit and Opticom™ Model 1000 GPS Phase Selector



Opticom™ Model 1012 GPS Radio Unit, Opticom™ Model 1050 GPS/Radio Antenna and Opticom™ Model 1000 GPS Phase Selector



Opticom™ Model 1040 GPS Card Rack or external power supply



Opticom™ Model 1030 GPS Auxiliary Interface Panel

## Opticom™ GPS System Matched Component Products

Opticom™ GPS System vehicle equipment is mounted on the vehicle. The GPS receiver obtains information from global positioning satellites. This information is used to determine the location, speed and heading of the vehicle, along with a preempt or priority request and the state of the vehicle's turn signal. The data is broadcast using the 2.4 GHz spread spectrum transceiver.

Opticom GPS system intersection equipment receives the radio transmission from the vehicle equipment, and compares the information with 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 Opticom™ Model 1000 GPS Phase Selector is activated. This output is connected to the traffic controller preemption input. 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 Opticom™ Model 1040 GPS Card Rack provides the power and logic wiring for the Opticom model 1000 GPS phase selector, which plugs directly into a slot in the unit. An alternate external power supply may be needed for use in cabinets with pre-wired priority control slots that do not have +24 VDC available and do not use the Opticom model 1040 GPS card rack.

The Opticom™ Model 1030 GPS Auxiliary Interface Panel provides connections for monitoring green phases and also provides additional priority control outputs.

The Opticom™ Model 1035 GPS Green Sense Harness provides additional connections for monitoring green phases when the Opticom model 1030 GPS auxiliary interface panel is not required.

### Intersection Equipment Description

Option GPS system intersection equipment consists of either 1) the compact, weather-resistant RF-energy-emitting Opticom™ Model 1010 GPS Radio Unit containing a GPS receiver with antenna and a 2.4 GHz spread spectrum transceiver with antenna or 2) the compact, RF-energy-emitting Opticom™ Model 1012 GPS Radio Unit containing a GPS receiver and a 2.4 GHz spread spectrum transceiver, used with Opticom™ Model 1050 GPS/Radio Antenna and Opticom™ Model 1072 GPS Cable Assembly. The radio unit is connected to an Opticom model 1000 GPS phase selector via an 11-conductor radio/GPS cable.

The Opticom model 1000 GPS phase selector can be installed directly into a Type 170 input file or most NEMA traffic controllers equipped with priority phase selection software, or into virtually any other traffic controller equipped with priority phase selection inputs and related software. An external power supply may be needed to provide the +24 VDC.

When input file space is not available, an Opticom model 1040 GPS card rack is required. The power supply in the card rack, or an external power supply, provides the +24 VDC that is required to operate the Opticom model 1000 GPS phase selector. The phase selector then provides power to the radio unit.

## Phase Selector Indicators

Indicator	Color or Condition	Meaning
<b>POWER</b>	Green	Power applied to phase selector
<b>A</b>	Amber* Green*	Low priority call on channel A High priority call on channel A
<b>B</b>	Amber* Green*	Low priority call on channel B High priority call on channel B
<b>C</b>	Amber* Green*	Low priority call on channel C High priority call on channel C
<b>D</b>	Amber* Green*	Low priority call on channel D High priority call on channel D
<b>GPS</b>	Amber Green	Not receiving GPS, radio not transmitting GPS has a good 3D fix
<b>RADIO</b>	Amber Green	No communication between radio/GPS unit and phase selector Good communication between radio/GPS unit and phase selector

\* Flashing indicator means the call is present, but the output is pending.

## Opticom™ GPS System Matched Component Products

The Opticom™ Model 1000 GPS Phase Selector processes the signal from the Opticom™ Model 1010 or 1012 GPS Radio Unit and activates outputs, which are connected to the preemption inputs on the traffic controller. There are four channel outputs accessible on the rear connector of the Opticom model 1000 GPS phase selector and up to 12 additional channel outputs on the Opticom™ Model 1030 GPS Auxiliary Interface Panel.

Each channel output delivers a constant output for high-priority activation, and a pulsed output for low-priority activation. A high-priority signal received on a channel will override any low-priority activation. In certain modes of operation, outputs may be activated that are dependent on the state of the requesting vehicle's turn signal. Another mode provides separate constant outputs for high priority and low priority. The use of an Opticom model 1030 GPS auxiliary interface panel is required to access these additional modes and outputs.

Opticom™ GPS System intersection equipment has the following features:

- More than 38 million vehicle identification code combinations selectable at installation
- Vehicle turn signal status monitoring and transmission
- Green sensing
- High and low priority
- "First come, first served" priority within each priority level
- Ranges variable by vehicle class
- Direct connection to CA/NY Type 170 input files
- User-settable range setting by ETA and/or distance
- Varied outputs depending on turn signal status of requesting vehicle
- Output modes for NEMA controllers with separate high- and low-priority inputs
- GPS data output in NEMA format
- Multi-function test switches
  - High- and low-priority test call
  - Turn signal dependent test calls
  - Reset to default parameters
- Built-in diagnostics and testing
- Diagnostic and status indicators
- Optically isolated outputs
- FCC Part 15 Class A specifications compliance
- No license requirements
- Easy installation (no coaxial cables required)
- Compatibility with most traffic controllers
- Easily accessible RS232 communication port
- Customizable timing parameters
- Detailed real-time information display
- Available Windows® configuration and maintenance software
- Low power consumption
- History log of most recent activities (10,000 entries)
- Intersection name
- Date and time of the activity
- Vehicle class code of the activating vehicle
- Activating vehicle's ID number
- Agency ID of activating vehicle
- Channel called
- Priority of the activity
- Final green signal indications displayed at the end of the call
- Time spent in the final greens
- Duration of the activation
- No preempt reason

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

Opticom™ **Model 1000** GPS Phase Selector

Opticom™ **Model 1010** GPS Radio Unit

Opticom™ **Model 1012** GPS Radio Unit

Opticom™ **Model 1030** GPS Auxiliary Interface Panel

Opticom™ **Model 1040** GPS Card Rack (with power supply)

Opticom™ **Model 1050** GPS/Radio Antenna

### Physical Dimensions

**Opticom model 1000 GPS phase selector**

**Length:** 8.25 in. (21.0 cm)

**Width :** 2.0 in. (5.1 cm)

**Height:** 4.5 in. (11.4 cm)

**Weight:** 0.5 lb. (0.227 kg)

**Opticom model 1010 GPS radio unit**

**Length:** 9.0 in. (22.9 cm)

**Width:** 6.5 in. (16.5 cm)

**Height:** 6.0 in. (15.2 cm)

**Weight:** 1.8 lbs. (0.816 kg)

**Opticom model 1012 GPS radio unit**

**Length:** 8.0 in. (20.3 cm)

**Width:** 4.5 in. (11.4 cm)

**Height:** 2.7 in. (6.9 cm)

**Weight:** 1.9 lbs. (0.854 kg)

**Opticom model 1030 GPS auxiliary interface panel**

**Length:** 7.25 in. (18.4 cm)

**Width:** 4.5 in. (11.4 cm)

**Height:** 1.0 in. (2.5 cm)

**Weight (w/cable):** 1.42 lbs. (0.644 kg)

**Opticom model 1040 GPS card rack**

**Length:** 8.25 in. (21.0 cm)

**Width:** 5.25 in. (13.3 cm)

**Height:** 5.1 in. (12.9 cm)

**Weight:** 2.3 lbs. (1.043 kg)

**Opticom model 1050 GPS/radio antenna**

**Length:** 15.0 ft. (4.6 m)

**Diameter:** 2.85 in. (7.2 cm)

**Height:** 1.4 in. (3.5 cm)

**Weight with cables:** 0.6 lbs. (0.30 kg)

### Electrical

**Opticom model 1000 GPS phase selector**

**Input voltage:** 24 VDC

**Current:** < 500 mA

### Environmental

**Opticom model 1000 GPS phase selector**

**Temperature:** -30° F to +165° F (-34° C to +74° C)

**Relative Humidity:** 5% to 95%

### 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

### 9-Pin Harness Wiring

Pin	Wire Color	Function
1	Black	115 VAC (AC+)
2	White	AC return (AC-)
3	Green	Chassis ground
4	—	Not used
5	Gray/White	Rear output 1
6	Blue/White	Rear output 2
7	Violet/White	Rear output 3
8	Brown/White	Rear output 4
9	Gray/Black	Logic ground

**Phase Selector Edge Connector Pin Index**

Pin	Function
A	Ground
B	24 VDC input
C	Not used
D	Not used
E	Not used
F	Rear output 1, collector (+)
H	Rear output 1, emitter (-)
J	Not used
K	Not used
L	Earth ground
M	Not used
N	Not used
P	Not used
R	Not used
S	Rear output 3, collector (+)
T	Rear output 3, emitter (-)
U	Not used
V	Not used
W	Rear output 2, collector (+)
X	Rear output 2, emitter (-)
Y	Rear output 4, collector (+)
Z	Rear output 4, emitter (-)
19	Transmit data
21	Receive data

**Phase Selector AIP Pin Index**

Pin	Function
1	Phase 1 green input (AC+)
2	Phase 2 green input (AC+)
3	Phase 3 green input (AC+)
4	Logic ground
5	Logic ground
6	Not used
7	AIP output 2
8	AIP output 8
9	AIP output 6
10	Confirmation light 1 output (future use)
11	Confirmation light 2 output (future use)
12	Not used
13	Disable input
14	Modem RS232 transmit
15	Modem RS232 receive
16	Phase 4 green input (AC+)
17	Phase 5 green input (AC+)
18	Phase 6 green input (AC+)
19	Opticom RS232 transmit
20	Opticom RS332 receive
21	AIP output 4
22	AIP output 3
23	AIP output 1
24	AIP output 7

### Phase Selector AIP Pin Index (continued)

Pin	Function
25	AIP output 5
26	Confirmation light 3 output (future use)
27	Confirmation light 4 output (future use)
28	Not used
29	Not used
30	Not used
31	Phase 7 green input (AC+)
32	Phase 8 green input (AC+)
33	AC common (green sense)
34	Ground
35	Ground
36	Not used
37	Not used
38	Controller +24 VDC
39	AIP output 9
40	AIP output 12
41	AIP output 11
42	AIP output 10
43	Modem RS232 clear to send
44	Modem RS232 ready to send

### Phase Selector 24 VDC Connector Pin Index

Pin	Function
1	Common
2	24 VDC

### Communication Port Pin Assignments

COM Port Pin Number	Signal Name
2	TXD (transmit data)
3	RXD (receive data)
5	GND (ground)

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Since the availability of the GPS signal is out of GTT's control and is required for system operations, GTT does not warrant against Opticom GPS system failures due to the unavailability of the GPS signal for any reason.

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