Opticom™ Infrared System

Model 752 Phase Selector
Model 754 Phase Selector
Model 760 Card Rack
Model 758 Auxiliary Interface Panel
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1 About This Manual

1.1 Purpose of Manual

This manual provides step-by-step instructions for installing and setting-up the Opticom™ Infrared System, Model 752 and 754 Phase Selectors*. It is intended for use by installers, maintenance personnel, and others who are responsible for the installation and maintenance of the system.

1.2 Manual Conventions

The conventions listed in Table 1-1 help to make this manual easier to use by presenting a uniform approach to the descriptions, phrases, and nomenclature.

<table>
<thead>
<tr>
<th>Element</th>
<th>Convention</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronyms</td>
<td>Uppercase</td>
<td>LED</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>Lowercase</td>
<td>ms (milliseconds)</td>
</tr>
<tr>
<td></td>
<td>...except where standard usage is uppercase</td>
<td>Mb (megabits)</td>
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<tr>
<td></td>
<td></td>
<td>MB (megabytes)</td>
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<tr>
<td></td>
<td></td>
<td>dB (decibel)</td>
</tr>
<tr>
<td>Model names</td>
<td>First or formal reference: initial caps</td>
<td>Opticom™ Infrared System Model 752 and 754 Phase Selectors</td>
</tr>
<tr>
<td></td>
<td>Subsequent use or informal reference: Initial caps for Model, lowercase for remainder</td>
<td>Model 752 and 754 phase selectors, or the phase selectors</td>
</tr>
<tr>
<td>Signal name</td>
<td>Initial caps</td>
<td>the Disable signal</td>
</tr>
<tr>
<td>Switch position</td>
<td>Uppercase</td>
<td>select position R</td>
</tr>
</tbody>
</table>

*The method of using the components of the Opticom Infrared system may be covered by US Patent Number 5172113.
1.3 Related Publications

Opticom™ Infrared System Model 711, 721, 722 Detector Installation Instructions.


1.4 Manual Organization

This manual is divided into 10 sections.

Section 1. About This Manual
Contains information about the organization and content of this manual.

Section 2. Safety Information
Contains important information about the safety messages, safety labels, safety precautions, and procedures for installation of this device.

Section 3. Description
Briefly describes the Model 752 and 754 phase selectors and their related Opticom components.

Section 4. Features
Describes important features and characteristics of the phase selectors.

Section 5. Installation
Contains step-by-step installation instructions.

Section 6. Communication Networks
Contains information about serial communication.

Section 7. Setup
Describes the indicators and switches on the phase selectors.

Section 8. Checkout
Contains information and procedures on how to check out and test the installed system.

Section 9. Troubleshooting
Contains tests and problem solutions to troubleshoot the installed system.

Section 10. Maintenance
Contains information and recommendations to ensure reliable system operation.
2 Safety Information

We provide important safety information and warnings to assist you in understanding and avoiding potential harm to yourself, and possible damage to equipment, during the installation of the Opticom™ Infrared system equipment. Although we have included many potential hazards you may encounter during the installation of this equipment, we cannot predict all of the possible hazards and this list should not be a substitute for your judgment and experience.

Please read and observe all safety information and instructions in this manual before installing the system equipment. Also, save this installation manual and keep it near the equipment.

If you are unsure about any part of this installation or of the potential hazards discussed, please contact your supervisor immediately.

2.1 Intended Use

The system is intended to assist authorized priority vehicles through signalized intersections by providing temporary right-of-way through vehicle operator interface to the system and through the use of common traffic controller functions.

2.2 Technical Support

If you have questions about the system, its use, or operation, please call the Global Traffic Technologies Technical Service department at: 1-800-258-4610.

2.3 Safety Messages and Safety Labels

We include safety messages and labels in this manual to help you protect your safety and the safety of others. This section contains important information to help you recognize and understand these safety messages.

Please read these messages before proceeding with the installation.

2.3.1 Safety Message Format

Safety messages are designed to alert you to potential hazards that can cause personal injury to you or others. They can also indicate the possibility of property damage.

Each safety message box contains a safety alert symbol (▲); one of three signal words: DANGER, WARNING, or CAUTION; and a safety message.

The signal words and symbols, and their meanings, are shown below:

⚠️ DANGER
The safety message is in this box.

DANGER means you and/or someone else WILL be KILLED or SERIOUSLY HURT if you do not follow these instructions.

⚠️ WARNING
The safety message is in this box.

WARNING means you and/or someone else MAY be KILLED or SERIOUSLY HURT if you do not follow these instructions.

⚠️ CAUTION
The safety message is in this box.

CAUTION means you and/or someone else MAY be HURT or property damage may result if you do not follow these instructions.

In addition to the symbols and words explained above, each safety message identifies the hazard, describes what you can and should do to avoid the risk of exposure to the hazard, and tells the probable consequences of not avoiding the hazard.
2.3.2 Safety Label Format

We include safety labels on the devices to help you protect your safety and the safety of others. Safety labels are designed to alert you to potential hazards associated with a piece of equipment that can cause personal injury to you or others. They can also indicate the possibility of property damage.

Please read all safety labels.

Each safety label contains a safety alert symbol, (⚠); one of three signal words: DANGER, WARNING, or CAUTION; a pictorial showing the nature of the hazard; and a safety message.

The signal words and symbols, and their meanings, are shown below:

DANGER means you and/or someone else WILL be KILLED or SERIOUSLY HURT if you do not follow these instructions.

WARNING means you and/or someone else MAY be KILLED or SERIOUSLY HURT if you do not follow these instructions.

CAUTION means you and/or someone else MAY be HURT or property damage may result if you do not follow these instructions.

We consider safety labels to be an important part of all devices and they should be replaced immediately if they become hard to read.

If any of the safety labels are missing, or cannot be read, please contact your dealer or GTT Repair department for a replacement.
2.4 Safety Messages Contained in this Manual

The following safety messages appear in this manual:

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution. Electric shock may cause severe injury or death.

**CAUTION**

This procedure must be performed in an Electro-Static Discharge (ESD) free environment. Failure to perform this procedure in the proper environment may damage the equipment.

**WARNING**

Improper or incomplete programming of the traffic controller may cause improper operation of the traffic signals, which may result in accidents and/or injuries. To avoid this problem, verify that the operation of the traffic controller is appropriate for your needs before, during, and after actuation of the priority control inputs. Improper operation of the traffic signals may result in unsafe driver action.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal. Improper operation of the traffic control system may result in unsafe driver action.

**WARNING**

Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. To avoid this problem, connect only one detector signal wire to each detector input terminal. Improper operation of the traffic control system may result in unsafe driver action.

**CAUTION**

Connect Terminal K of the Type 170 controller to earth ground to allow dissipation of static charges on the detector cable. Failure to connect Terminal K to earth ground may damage the equipment. If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.
**CAUTION**

Connect the detector cable power ground connection to earth ground to allow dissipation of static charges on the detector cable. **Failure to make this connection to earth ground may damage the equipment.** If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.

**CAUTION**

Connect Terminals TB1-7 and TB1-8 of the card rack to earth ground to allow dissipation of static charges on the detector cable. **Failure to connect Terminals TB1-7 and TB1-8 to earth ground may damage the equipment.** If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.

**WARNING**

Using the wrong range and timing chart may cause improper system operation, which may result in accidents and/or injuries. **To avoid the risk of accidents and/or injuries that may result from improper system operation, use the range and timing chart that corresponds to the model of detector that is being adjusted.** Improper system operation may result in unsafe driver action.

**WARNING**

A completed installation that is not tested may result in improper system operation, which may result in accidents and/or injuries. **To avoid this problem, test the system to verify proper operation.** Improper system operation may result in unsafe driver action.
2.5 Safety Label Locations

There are three safety labels on the devices included in this manual. If a safety label is missing or cannot be read, please contact your dealer or GTT Service and Repair department for a replacement. See Figures 2-1, 2-2, and 2-3 for the safety label locations.

Figure 2-1. Auxiliary Interface Panel Cable Safety Label Location

Figure 2-2. Model 760 Card Rack AC Terminal Safety Label Location

Figure 2-3. Phase Selector Safety Label Location
2.6 Safety Considerations

Please consider the following safety issues before beginning the installation.

Although we have compiled this list of common safety considerations, it should not be considered as complete. It is not intended to take the place of your good judgment, training, and experience.

2.6.1 Personal Safety Equipment and Clothing

Personal safety equipment and clothing including high visibility vests, hard hats, gloves, electrical shock or electrocution protection clothing and equipment, safety shoes, safety glasses, face shields, goggles, and hearing protection devices are just some of the items available to you.

Choose the right equipment for the job. If you are unsure of which safety equipment is recommended or appropriate for the job, ask your supervisor or foreman.

2.6.2 Work Zone Traffic Control

Proper control of vehicle traffic is important during many procedures. When you switch the traffic controller to and from the flash mode we recommend that you have people trained in manual traffic control, such as police officers, assist you.

When you install devices that require you to position vehicles, equipment, or people in or near the roadway; it is important that you use appropriate work zone traffic control techniques, equipment, and procedures. Sometimes you may have to work on or near the roadway and these same techniques, equipment, and procedures should be used for your protection.

If you are unsure of which procedures are recommended or appropriate for the job, ask your supervisor or foreman.

2.6.3 Electric Shock

The possibility of electrical shock exists when installing the Opticom™ Infrared System equipment, since connections must be made to open terminals within the traffic control cabinet which may have 120 VAC present. Follow proper work procedures and read and understand the safety messages in this manual.

As a trained installer of electrical equipment you are aware of the dangers associated with installation of electrical devices. Always be sure that the power to the equipment, and all associated equipment, is turned off before beginning any procedure. Use the equipment, techniques, and procedures that you learned during your training or apprenticeship or other electrical industry recognized safety procedures.

If you are unsure of which techniques, procedures, and protective equipment are recommended or appropriate for the job, ask your supervisor or foreman.

2.7 Disposal of Device

Please dispose of the device in accordance with all local, state, and federal laws and regulations.
3 Description

This section provides a general description of the Opticom™ Infrared 700 series system and a detailed description of the Model 752 and 754 phase selectors.

3.1 Opticom Infrared 700 Series System

The system assists authorized priority vehicles through signalized intersections by providing temporary right-of-way through the use of common traffic controller functions. The 700 series system records and communicates information (for example, vehicle location, travel direction, user class and identification) and provides traffic flow information by measuring rate of movement of designated Probe vehicles.

The 700 series system consists of the following matched components:

- **Emitter** — Model 196 Emitter or higher.
- **Detector** — Model 711, 721, and 722 Detectors and the Model 138 Detector Cable. Also auxiliary interface panels or Model 757 auxiliary harnesses, if auxiliary detectors are used.
- **Phase Selector** — Model 752 and 754 Phase Selectors.
- **Card Rack/Input File** — Model 760 Card Rack or a California/New York Type 170 Controller Input File.

The emitter, with an appropriate emitter control switch, is mounted on the priority vehicle. It generates a series of pulses in the infrared and visible wavelengths. These pulses are sensed by the detector mounted at the intersection.

The detector converts the infrared energy into electrical signals that are transmitted by the detector cable to the phase selector in the traffic controller cabinet.

The phase selector discriminates between valid emitter signals and other sources of energy received by the detectors, and activates its outputs in response to valid priority emitter signals. The phase selector outputs are connected to the traffic controller’s inputs, to request the traffic controller to deliver the desired green for the priority vehicle.

The card rack/input file provides the power and logic wiring for the phase selector, which plugs directly into a slot in the unit.

3.2 Model 752 and 754 Phase Selectors

The Model 752 phase selector is a plug-in two channel, dual priority, encoded signal device. The Model 754 phase selector is a plug-in four channel, dual priority, encoded signal device. Both phase selectors are designed for use with Model 196 emitters or higher and Model 711, 721, and 722 detectors.

Both phase selectors can be installed directly into the input files of Type 170 traffic controllers equipped with priority phase selection software. They can also be installed directly into virtually any other traffic controller equipped with priority phase selection inputs and related software.

When input file space is not available, the Model 760 card rack is required. The phase selector is powered from AC mains and contains its own internal power supply to support the detectors.
The Opticom™ Infrared System Model 752 and 754 Phase Selectors recognize and discriminate between three distinct emitter frequency rates via detectors. Within each of these three frequency rates they further discriminate among 10 classes of vehicle identification codes, with 1000 individual vehicle codes per class—10,000 total per frequency rate.

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 either channel will override any low priority activation.

The probe frequency does not place a call request, but does log vehicles by ID number when they are in range.

This manual describes the installation of a Model 760 card rack (when required), and installation of a Model 752 and/or Model 754 phase selector into either a Model 760 card rack or a Type 170 input file.

Figure 3-1 shows the phase selector installation components including the phase selectors, card rack, input file, auxiliary interface panel, and the wiring harnesses and cables. The 9-pin harness connects the card rack to the traffic controller. The communication cable connects the phase selector to a modem or computer. The auxiliary interface panel cable connects the phase selector to the auxiliary interface panel. The Model 757 auxiliary harness connects an auxiliary detector to the phase selector. The Model 756 auxiliary harness is used when you are upgrading from a Model 562 phase selector to a Model 752 or 754 phase selector. The Model 755 four-channel adapter card is used when you are updating from a two-channel Model 562 phase selector to a four-channel Model 754 phase selector and you are using either an existing Model 560 system chassis or a NEMA¹ card rack that is wired for a two-channel phase selector.

NOTE
Illustrations and connections to the traffic controller may not be exactly as shown or described in this manual. Refer to the controller wiring diagram for correct terminal connections.

¹ National Electrical Manufacturer’s Association
Figure 3-1. Phase Selector Installation Components
4 Features

The Opticom™ Infrared System Model 752 and 754 Phase Selectors have the following features:

- Compatible with both encoded signal and non-encoded signal systems
- High and Low priority, and Probe vehicle discrimination
- First come, first served priority within each priority level
- Plugs directly into CA/NY Type 170 input files
- Signal intensity threshold (range setting) can be automatically set using an encoded emitter
- User-settable signal intensity threshold for a minimum operating range of 2500 feet.²
- Easily installed
- Compatible with most traffic controllers
- Computer-based user interface
  - RS-232 communication port
  - Customizable signal intensity thresholds (range settings)
  - Customizable ID code validation
  - Customizable timing parameters
  - Detailed current system parameter information
  - History log of most recent activities (1000 entries)
- 30,000 frequency/vehicle class/vehicle code ID combinations
- Front panel switches and diagnostic indicators for testing
- Erasable, write-on pads for phase or movement labeling

² Operating range when used with 700 series detectors and emitters in a matched component system.
Installation

5 Installation

5.1 System Configurations

This section describes two configurations: Type 170 controller installations and NEMA type controller installations. Determine which configuration applies to your system, and then go to the section number shown for the installation instructions.

NOTE
Read through the section for your configuration and perform the applicable installation procedures, then go to Section 8 to check out the installation.

5.1.1 Type 170 Controller Installations

CA/NY Type 170 controller cabinets have input files that will accept up to two Model 752 or one Model 754 phase selector(s). Power and logic wiring is factory installed in the cabinet for the phase selectors.

See Section 5.2 for installation of Model 752 and 754 phase selectors into Type 170 controllers.

5.1.2 NEMA Type Controller Installations

NEMA type controllers with priority control inputs may require a Model 760 card rack. Each phase selector plugs directly into the card rack. The card rack wiring harness provides inputs and outputs to the traffic controller system hardware. Some NEMA type controllers have slots designated for a phase selector.

See Section 5.3 for installation of Model 752 and 754 phase selectors into NEMA type controllers.

5.2 Installation — Type 170 Controllers

These instructions include:

- Minimizing the potential for electrical shock. See Section 5.2.1.
- Installing Model 752 and 754 phase selectors. See Section 5.2.2.
- Upgrading from Model 562 phase selector. See Section 5.2.3.
- Wiring for Model 711, 721, and 722 detectors installed as primary detectors. See Sections 5.2.4 and 5.2.5.
- Installing the auxiliary interface panel. See Section 5.2.6.
- Wiring for auxiliary detectors. See Sections 5.2.7 and 5.2.8.
- Wiring for green sense. See Sections 5.2.9 and 5.2.10.
- Wiring for confirmation lights. See Section 5.2.11.
- Cabling for remote communication. See Section 5.2.12.
5.2.1 Potential for Electrical Shock

A potential exists for a low-current electrical shock (less than 4.5 mA) caused by leakage current in the power supply section of the Opticom™ Infrared System Model 752 and 754 Phase Selectors. You may experience this low-current shock when you touch the front of the phase selector, when you insert the phase selector into its slot in the input file, or when you remove the phase selector from its slot.

You can minimize this shock potential by making sure that pin L of the card edge connector in the 170 type controller input file is grounded properly to earth ground. If pin L is not connected to earth ground, your risk of exposure to this shock potential increases.

Use the following procedure to verify that pin L is connected properly to earth ground.

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Turn off AC power to the input file.

**CAUTION**

This procedure must be performed in an Electro-Static Discharge (ESD) free environment. **Failure to perform this procedure in the proper environment may damage the equipment.**

2. Remove the phase selector from the input file slot and place it in a static-free bag. Do this for all phase selectors in your system.

3. Locate pin L on the 44-pin edge connector of each phase selector slot and verify continuity to earth ground. See Figure 5-1.
   a) Set an ohmmeter to its lowest resistance scale.
   b) Measure the resistance between pin L and earth ground. If the resistance is less than 5 ohms, pin L is grounded properly.

4. If the resistance is greater than 5 ohms, inspect the input file wiring and repair and/or replace as necessary to correct the problem. Then retest the resistance.
5.2.2 Phase Selector Installation

NOTE
A writing area is provided on the front of the phase selector to record the phases or approach called by each channel.

WARNING
Improper or incomplete programming of the traffic controller may cause improper operation of the traffic signals, which may result in accidents and/or injuries. To avoid this problem, verify that the operation of the traffic controller is appropriate for your needs before, during, and after actuation of the priority control inputs. Improper operation of the traffic signals may result in unsafe driver action.

The outputs from the phase selector are connected to the preemption inputs of the traffic controller. Each phase selector output must be connected to a separate controller preemption input. Consult the manual for your controller to determine if the preemption inputs are handled with the same priority. For some traffic controllers, preemption inputs one and two are intended for railroad and draw bridge preemption and are given precedence over the rest of the preemption inputs.

When programming your priority control routines, it is important to use values that will allow the traffic controller to respond to a priority control request as quickly and safely as possible. If the routines are not programmed to respond quickly enough, the requesting vehicle may not receive a green light in time to travel through the intersection safely.

Implementation of a four-channel system requires either one Model 754 phase selector, or two Model 752 phase selectors.

1. Set the power switch on the front panel of the phase selector(s) to OFF.

2. If this is a Model 752 phase selector installation, install the first phase selector into slot J12 of the lower input file, making sure it is fully seated. For a four-channel system, install the second phase selector into slot J13. See Figure 5-2.

3. If this is a Model 754 phase selector installation, install the phase selector into slot J13 of the lower input file, making sure it is fully seated. See Figure 5-3.

Two input file slots are dedicated for use by phase selectors. These slots, usually J12 and J13 in the lower input file, are pre-wired and have a direct association with particular priority control inputs to the traffic controller. Both J12 and J13 supply two priority control inputs to the traffic controller.

Refer to your controller schematic to verify which slots are pre-wired for priority control. These slots are usually designated EVA, EVB, EVC, and EVD.
Figure 5-2. Installation Using Slots J12 and J13

Figure 5-3. Installation Using Slot J13
5.2.3 Upgrading from Model 562 Phase Selector

If you are upgrading from a Opticom™ Infrared System Model 562 Phase Selector to a Model 752 or 754 phase selector and you have an existing wiring harness with green sense and/or auxiliary detectors, you may use a Model 756 auxiliary harness. This wiring harness allows you to use existing connections for green sense and auxiliary detectors.

The Model 756 auxiliary harness consists of two 15-pin connectors wired to a 44-pin connector. See Figure 5-4.

1. Connect the 44-pin connector to J1 of the Model 752 or 754 phase selector.

2. Connect the 15-pin connectors to the Model 562 phase selector wiring harnesses for the green sense and auxiliary detectors. For wiring details, see the Model 756 Auxiliary Harness Pin Index that comes with the auxiliary harness.

![Figure 5-4. Model 756 Auxiliary Harness](Opticom-388A)
5.2.4 Primary Detector Connection for Single Channel

The Opticom™ Infrared System Model 711 or 721 Detector must already be installed at the intersection and the Model 138 detector cable routed into the controller cabinet.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal. Improper operation of the traffic control system may result in unsafe driver action.

1. Route the detector cable to J12 in the lower input file. Allow an extra six inches of cable for making connections.
2. Cut off six inches of outer insulation and foil from the end of the detector cable.
3. Strip 1/4-inch of insulation from the yellow, orange, and blue wires.
4. Twist the blue and bare wires together, and insulate the pair with electrical tape to prevent them from shorting to other wiring. See Figure 5-5.
5. Install a spade lug on each of the following wires: yellow, orange, and blue/bare twisted pair.

![Detector Cable Preparation for Single Channel](Opticom-13A)
6. Connect the yellow wire to J12-D for channel A, or J12-J for channel B. See Figure 5-6.

7. Connect the orange wire to J12-E.

8. Connect the blue/bare twisted pair to J12-K.

9. Connect a wire from J12-K to earth ground.

10. If a second Model 752 phase selector is being installed, or a Model 754 phase selector is being used, repeat the above steps, substituting J13 for J12, and channels C and D for channels A and B, respectively.

11. Some cabinets may have another terminal block that will allow you to terminate the detector wires. Refer to your cabinet schematic to determine this.

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**WARNING**

Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. **To avoid this problem, connect only one detector signal wire to each detector input terminal.** Improper operation of the traffic control system may result in unsafe driver action.

---

**CAUTION**

Connect Terminal K of the Type 170 controller to earth ground to allow dissipation of static charges on the detector cable. **Failure to connect Terminal K to earth ground may damage the equipment.** If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.
5.2.5 Primary Detector Connection for Dual Channel

The Opticom™ Infrared System Model 722 Detector must already be installed at the intersection and the Model 138 detector cable routed into the controller cabinet.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal. Improper operation of the traffic control system may result in unsafe driver action.

1. Route the detector cable to J12 in the lower input file. Allow an extra six inches of cable for making connections.
2. Cut off six inches of outer insulation and foil from the end of the detector cable.
3. Strip 1/4-inch of insulation from the yellow, orange, and blue wires.
4. Install a spade lug on each of the following wires: yellow, orange, blue, and bare.
5. Insulate the bare wire with electrical tape to prevent it from shorting to other wiring. See Figure 5-7.

Figure 5-7. Detector Cable Preparation for Dual Channel
8. Connect the orange wire to J12-E.
9. Connect the bare wire to J12-K.

10. Connect a wire from J12-K to earth ground.
11. If a second Model 752 phase selector is being installed, or a Model 754 phase selector is being used, repeat the above steps, substituting J13 for J12, and channels C and D for channels A and B, respectively.

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**NOTE**

The blue wire is the signal from the detector tube furthest from the detector base, while the yellow wire is the signal from the tube closest to the detector base.

6. Connect the yellow wire to J12-D for channel A, or J12-J for channel B. See Figure 5-8.

7. Connect the blue wire to the channel not being used by the yellow wire (J12-D for channel A or J12-J for channel B).
5.2.6 Auxiliary Interface Panel Installation

The Opticom™ Infrared System Model 758 Auxiliary Interface Panel is a terminal block assembly designed for easy connections between the Model 752 or 754 phase selector and the traffic control cabinet wiring. This assembly is used for installations using auxiliary detectors and green sense connections. This assembly is also required for installations with confirmation lights.

![Image of Auxiliary Interface Panel]

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Install the auxiliary interface panel. See Figure 5-9.
   a) Determine a suitable location for the auxiliary interface panel in the traffic control cabinet.
   b) Use the mounting plate as a template and mark where you want to drill holes.
   c) Drill the holes and fasten the panel to the interior wall using the appropriate fasteners.

2. Connect the auxiliary interface panel cable (P/N 78-8113-4713-3). See Figure 5-9.
   a) Connect one end of the auxiliary interface panel cable P1 to connector J1 on the front panel of the Model 752 or 754 phase selector.
   b) Connect the other end of the auxiliary interface panel cable P1 to connector J1 on the auxiliary interface panel.

The auxiliary interface panel is now ready for wiring connections to the traffic control cabinet.

---

*Figure 5-9. Auxiliary Interface Panel Installation*
5.2.7 Auxiliary Detector Wiring with Auxiliary Interface Panel

The Opticom™ Infrared System Model 711, 721, or 722 Detectors must already be installed at the intersection and the auxiliary detector cables routed into the controller cabinet.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal. Improper operation of the traffic control system may result in unsafe driver action.

1. Strip sufficient outer insulation and foil from the detector cable(s) to allow wires to connect to the terminal block of the auxiliary interface panel.

2. Strip 1/4-inch of insulation from the yellow, orange, and blue wires.

3. Insulate the bare wire with electrical tape to prevent shorting to other wiring. Leave 1/4-inch of bare wire sticking out. See Figure 5-10.

4. Connect the orange wire to the auxiliary interface panel terminal labeled DET. PWR. OUT. Tighten the terminal block screw.

5. For Model 711 or 721 detectors, make the following connections. See Figure 5-11.
   a) Connect both the blue and bare wires to the auxiliary interface panel terminal labeled DET. PWR. GND. Tighten the terminal block screw.
   b) Connect the yellow wire to the desired auxiliary interface panel terminal. (For example, A AUX1 would be channel A auxiliary detector number 1.) Tighten the terminal block screw.

---

**Figure 5-10. Auxiliary Detector Cable Preparation**

---

**WARNING**

Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. To avoid this problem, connect only one detector signal wire to each detector input terminal. Improper operation of the traffic control system may result in unsafe driver action.
Figure 5-11. Auxiliary Detector Connections for Single Channel
6. For Opticom™ Infrared System Model 722 Detectors, make the following connections. See Figure 5-12.

   a) Connect the bare wire to the auxiliary interface panel terminal labeled DET. PWR. GND. Tighten the terminal block screw.

   b) Connect the yellow wire to the desired auxiliary interface panel terminal. (For example, A AUX1 would be channel A auxiliary detector number 1.) Tighten the terminal block screw.

   c) Connect the blue wire to the desired auxiliary interface panel terminal. (For example, B AUX1 would be channel B auxiliary detector number 1.) Tighten the terminal block screw.

7. Check all wiring and connections.

8. Repeat steps 1 through 7 for any additional auxiliary detectors.
Figure 5-12. Auxiliary Detector Connections for Dual Channel
5.2.8 Auxiliary Detector Wiring with Model 757 Auxiliary Harness

The Opticom™ Infrared System Model 711, 721, or 722 Detectors must already be installed at the intersection and the auxiliary detector cables routed into the controller cabinet.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. **To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal.** Improper operation of the traffic control system may result in unsafe driver action.

1. Locate an unused terminal block in the traffic control cabinet. This terminal block will be used to connect the auxiliary detector cable wires to the Model 757 auxiliary harness wires.

2. Connect P1 of the Model 757 auxiliary harness to connector J1 on the front panel of the Model 752 or 754 phase selector. Route the free end of the wiring harness to the terminal block. Remove cable ties from the wiring harness as necessary.

3. Route the detector cable to the terminal block. Allow an extra six inches of cable for making connections.

4. Prepare the auxiliary detector cable.
   a) Cut off six inches of outer insulation and foil from the end of the detector cable.
   b) Strip 1/4-inch of insulation from the yellow, orange, and blue wires.
   c) For Model 711 or 721 detectors, twist the blue and bare wires together, and insulate the pair with electrical tape to prevent them from shorting to other wiring. See Figure 5-13.
   d) For Model 722 detectors, insulate the bare wire with electrical tape to prevent it from shorting to other wiring. See Figure 5-13.
   e) Install spade lugs on the wires, as shown in Figure 5-13.

---

*Figure 5-13. Auxiliary Detector Cable Preparation*
5. Connect the detector cable and the wiring harness to the terminal block.
   a) For Model 711 or 721 detectors, continue with step 6.
   b) For Model 722 detectors, go to step 7.

6. For Model 711 or 721 detectors, make the following connections. See Figure 5-14. See Table 5-1 to select the proper wires from the wiring harness. Strip 1/4-inch of insulation from these wires and install spade lugs on them.
   a) Connect the detector cable orange wire to the terminal block. Locate the detector power source used for the primary detectors (J12-E, J13-E, or the DC+ terminal on the Model 760 card rack) and connect a wire from this power source to the other screw of the same terminal connection where the orange wire is connected. Tighten both screws.
   b) Connect the detector cable blue/bare twisted pair to the terminal block. Locate the detector power ground connection to earth ground to allow dissipation of static charges on the detector cable. Failure to make this connection to earth ground may damage the equipment. If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.
   c) Connect a wire from the Detector Power Ground terminal connection to earth ground. Tighten the screw.
   d) Connect the detector cable yellow wire to the terminal block. Connect the desired wiring harness Auxiliary Detector Input wire (for example, Channel A Aux. Detector 1) to the other screw of the same terminal connection. Tighten both screws.
   e) Go to step 8.

---

**WARNING**

Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. To avoid this problem, connect only one detector signal wire to each detector input terminal. Improper operation of the traffic control system may result in unsafe driver action.

---

**CAUTION**

Connect the detector cable power ground connection to earth ground to allow dissipation of static charges on the detector cable. Failure to make this connection to earth ground may damage the equipment. If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.

---

**Figure 5-14. Auxiliary Detector Connections for Single Channel**
7. For Opticom™ Infrared System Model 722 Detectors, make the following connections. See Figure 5-15. See Table 5-1 to select the proper wires from the Model 757 auxiliary harness. Strip 1/4-inch of insulation from these wires and install spade lugs on them.

   a) Connect the detector cable orange wire to the terminal block. Locate the detector power source used for the primary detectors (J12-E, J13-E, or the DC+ terminal on the Model 760 card rack) and connect a wire from this power source to the other screw of the same terminal connection where the orange wire is connected. Tighten both screws.

   b) Connect the detector cable bare wire to the terminal block. Locate the detector power ground used for the primary detectors (J12-K, J13-K, or the DC– terminal on the Model 760 card rack) and connect a wire from this power source to the other screw of the same terminal connection where the bare wire is connected. Tighten both screws.

   c) Connect a wire from the wiring harness Detector Power Ground terminal connection to earth ground. Tighten the screw.

   d) Connect the detector cable yellow wire to the terminal block. Connect the desired wiring harness Auxiliary Detector Input wire (for example, Channel A Aux. Detector 1) to the other screw of the same terminal connection. Tighten both screws.

   e) Connect the detector cable blue wire to the terminal block. Connect the desired wiring harness Auxiliary Detector Input wire (for example, Channel B Aux. Detector 1) to the other screw of the same terminal connection. Tighten both screws.

8. Check all wiring and connections.

9. Repeat steps 1 through 8 for any additional auxiliary detectors.
Table 5-1. Model 757 Auxiliary Harness Wires

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Wire Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black/Brown</td>
<td>Phase 1 Green (AC+ Input)</td>
</tr>
<tr>
<td>2</td>
<td>Black/Blue</td>
<td>Phase 2 Green (AC+ Input)</td>
</tr>
<tr>
<td>3</td>
<td>Black/White</td>
<td>Phase 3 Green (AC+ Input)</td>
</tr>
<tr>
<td>4</td>
<td>Gray/Black</td>
<td>Logic Ground</td>
</tr>
<tr>
<td>7</td>
<td>Blue</td>
<td>Channel B low output (solid) *</td>
</tr>
<tr>
<td>13</td>
<td>Yellow/Blue</td>
<td>Channel A Aux. Detector 2 (Input)</td>
</tr>
<tr>
<td>14</td>
<td>Yellow/White</td>
<td>Channel B Aux. Detector 2 (Input)</td>
</tr>
<tr>
<td>15</td>
<td>Yellow/Black</td>
<td>Channel B Aux. Detector 1 (Input)</td>
</tr>
<tr>
<td>16</td>
<td>Black/Red</td>
<td>Phase 4 Green (AC+ Input)</td>
</tr>
<tr>
<td>17</td>
<td>Black/Yellow</td>
<td>Phase 5 Green (AC+ Input)</td>
</tr>
<tr>
<td>18</td>
<td>Black/Green</td>
<td>Phase 6 Green (AC+ Input)</td>
</tr>
<tr>
<td>21</td>
<td>Brown</td>
<td>Channel D low output (solid) *</td>
</tr>
<tr>
<td>22</td>
<td>Violet</td>
<td>Channel C low output (solid) *</td>
</tr>
<tr>
<td>23</td>
<td>Gray</td>
<td>Channel A low output (solid) *</td>
</tr>
<tr>
<td>28</td>
<td>Yellow/Brown</td>
<td>Channel A Aux. Detector 1 (Input)</td>
</tr>
<tr>
<td>29</td>
<td>Yellow/Orange</td>
<td>Channel C Aux. Detector 2 (Input)</td>
</tr>
<tr>
<td>30</td>
<td>Yellow/Green</td>
<td>Channel C Aux. Detector 1 (Input)</td>
</tr>
<tr>
<td>31</td>
<td>Black/Violet</td>
<td>Phase 7 Green (AC+ Input)</td>
</tr>
<tr>
<td>32</td>
<td>Black/Orange</td>
<td>Phase 8 Green (AC+ Input)</td>
</tr>
<tr>
<td>33</td>
<td>White</td>
<td>Green Sense Common (AC Common)</td>
</tr>
<tr>
<td>43</td>
<td>Yellow/Violet</td>
<td>Channel D Aux. Detector 2 (Input)</td>
</tr>
<tr>
<td>44</td>
<td>Yellow/Gray</td>
<td>Channel D Aux. Detector 1 (Input)</td>
</tr>
</tbody>
</table>

*This output is only available with a 752N or 754N set to High Only on Back output mode.*
5.2.9 Green Sense Wiring with Auxiliary Interface Panel

**NOTE**
Wire gauges from 22 to 16 AWG may be used with the Opticom™ Infrared System Model 758 Auxiliary Interface Panel. See Section 5.2.6 for information about the auxiliary interface panel installation.

**WARNING**
This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Locate and identify the load bay field wire connections (AC+) for each phase green in the traffic control cabinet.

2. Determine the appropriate length of wire required to connect the auxiliary interface panel to the wiring points in the load bay of the traffic control cabinet.

3. Strip 1/4-inch of insulation from both ends of the wires being used.

4. Insert one end of each wire into the desired terminal of the auxiliary interface panel and tighten the screw. (For example, Phase 1 green is labeled PHASE 1 GRN on the terminal block.)

5. Repeat steps 2 through 4 for all desired phase greens.

6. Route the wires through the traffic control cabinet to the AC side of the load switches in the load bay. Install spade lugs on the wires.

7. Insert one wire at a time into the correct terminal in the load bay and tighten the screws.

8. Locate and identify the AC neutral connection in the traffic control cabinet.

9. Determine the appropriate length of wire required to connect the auxiliary interface panel to the wiring point of the AC neutral connection in the traffic control cabinet.

10. Strip 1/4-inch of insulation from both ends of the wire being used.

11. Insert one end of the wire into the AC neutral terminal (AC NEUT.) of the auxiliary interface panel and tighten the screw.

12. Route the wire through the traffic control cabinet to the AC neutral terminal. Install a spade lug and connect the wire to the AC neutral terminal.

13. Verify that your wiring is correct, and the connections are tight.

14. Using the Desired Greens window in the 750 series configuration software (750-CS), set the desired green phases for each channel. If your system also uses Low priority emitters, set the desired green phases for Low Priority for each channel.
5.2.10 Green Sense Wiring with Model 757 Auxiliary Harness

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Locate and identify the load bay field wire connections (AC+) for each phase green in the traffic control cabinet.

2. Determine the appropriate length of wire required to connect the Model 757 auxiliary harness to the wiring points in the load bay of the traffic control cabinet. See Table 5-1 to select the proper phase green wires from the wiring harness.

3. Route the wires through the traffic control cabinet to the load bay.

4. Remove cable ties from the wiring harness as necessary. Cut the phase green wires to the proper length, strip 1/4-inch of insulation from the ends of the wires being used, and install spade lugs on them.

5. Insert each green sense wire, one at a time, into the correct terminal in the load bay and tighten the screws.

6. Locate and identify the AC neutral connection in the traffic control cabinet.

7. Route the white wire from the Model 757 auxiliary harness through the traffic control cabinet to the AC neutral connection.

8. Strip 1/4-inch of insulation from the end of the white wire, install a spade lug on it, and connect the wire to the AC neutral connection.

9. Verify that your wiring is correct, and the connections are tight.

10. Using the Desired Greens window in the 750 series configuration software (750-CS), set the desired green phases for each channel. If your system also uses Low priority emitters, set the desired green phases for Low Priority for each channel.
5.2.11 Confirmation Light Wiring

The Opticom™ Infrared System Model 758 Auxiliary Interface Panel confirmation light outputs CNFRM 1, CNFRM 2, CNFRM 3, and CNFRM 4 are used to activate customer-provided confirmation lights in response to an approaching high priority vehicle. The behavior of the confirmation lights is programmed using the 750 series configuration software ITS Link/750-CS.

Each confirmation light is directed toward an approach in the intersection. That approach direction corresponds to one of the channels on the Model 752 or 754 phase selector. The installer determines the relationship between approach direction and channel by the detector wiring.

Verify the relationship between the approach directions and channels before starting the installation and then configure the behavior of the confirmation light using the 750 series configuration software (750-CS).

NOTE
Wire gauges from 22 to 16 AWG may be used with the auxiliary interface panel. See Section 5.2.6 for information about the auxiliary interface panel installation.

5.2.11.1 Confirmation Light Wiring with Load Switch Interface

1. Locate and identify the input connections in the traffic control cabinet for each load switch that switches power to the confirmation lights.

2. Determine the appropriate length of wire required to connect the auxiliary interface panel to the wiring points for the load switches.

3. Strip 1/4-inch of insulation from both ends of the wires being used.

4. Insert one end of each wire into the desired terminal of the auxiliary interface panel and tighten the screw. Connect wires to terminals CNFRM 1, CNFRM 2, CNFRM 3, and CNFRM 4. See Figure 5-16.

5. Route the wires through the traffic control cabinet to the load switches in the load bay.

6. Install spade lugs on the wires and insert one wire at a time into the correct terminal in the load bay and tighten the screws.

7. Connect a wire to terminal OPTO COMMON of the auxiliary interface panel. Install a spade lug on the other end of the wire and connect it to the traffic controller logic ground. See Figure 5-16.

8. Connect the controller +24 VDC power source to each of the four confirmation light load switches.

9. Complete the configuration light interface wiring and field wiring as shown in Figure 5-16.

10. Verify that your wiring is correct, and the connections are tight.

11. Select the appropriate confirmation light pattern using the 750 series configuration software (750-CS).

12. Using the Desired Greens window in the 750 series configuration software (750-CS), set the desired green phases for each channel.
Figure 5-16. Confirmation Light Wiring with Load Switch Interface
5.2.11.2 Confirmation Light Wiring with Electromechanical Relay Interface

Recommendations for the electromechanical relays follow:

- Tungsten Load Rated
- 100K Mechanical Operations
- 5 Amp Contact Rated
- 1000 Ohm Coil Resistance
- 1N4004 Diode (or equivalent) Across Input

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Locate and identify the input connections in the traffic control cabinet for each electromechanical relay that switches power to the confirmation lights.

2. Place a diode (1N4004 or equivalent) across the input to each electromechanical relay to prevent damage to the Opticom™ Infrared System Model 752 or 754 Phase Selector. See Figure 5-17.

3. Determine the appropriate length of wire required to connect the Model 758 auxiliary interface panel to the wiring points for the relays.

4. Strip 1/4-inch of insulation from both ends of the wire being used.

5. Insert one end of the wire into the desired terminal of the auxiliary interface panel and tighten the screw. Connect wires to terminals CNFRM 1, CNFRM 2, CNFRM 3, and CNFRM 4. See Figure 5-17.

6. Route the wires through the traffic control cabinet to the electromechanical relays in the load bay.

7. Install spade lugs on the wires and insert one wire at a time into the correct terminal in the load bay and tighten the screws.

8. Connect a wire to terminal OPTO COMMON of the auxiliary interface panel. Install a spade lug on the other end of the wire and connect it to the traffic controller logic ground. See Figure 5-17.

9. Connect the controller +24 VDC power source to each of the four confirmation light relays as shown in Figure 5-17.

10. Complete the configuration light interface wiring and field wiring as shown in Figure 5-17.

11. Verify that your wiring is correct, and the connections are tight.

12. Select the appropriate confirmation light pattern using the 750 series configuration software (750-CS).

13. Using the Desired Greens window in the 750 series configuration software (750-CS), set the desired green phases for each channel.
Figure 5-17. Confirmation Light Wiring with Electromechanical Relay Interface
5.2.12 Communication Cable Installation

NOTE
If the installation includes remote communication cabling, one 700 series communication cable is required for each Opticom™ Infrared System Model 752 or 754 Phase Selector.

1. Plug the 6-pin end of the 700 series communication cable into the communication port on the front panel of the Model 752 or 754 phase selector. See Figure 5-18.

2. Plug the other end of the communication cable into the computer. A 9-pin to 25-pin “null modem” adapter may be required for communication to a modem.

3. Skip to Section 8.1, Installation Checkout.

Figure 5-18. 700 Series Communication Cable Installation
5.3 Installation — NEMA Type Controllers

These instructions include:

- Minimizing the potential for electrical shock.  
  See Section 5.3.1.

- Installing the Model 760 card rack.  
  See Section 5.3.2.

- Installing Model 752 and 754 phase selectors.  
  See Section 5.3.3.

- Upgrading from Model 562 phase selector.  
  See Section 5.3.4.

- Wiring for Model 711, 721, and 722 detectors installed as primary detectors.  
  See Sections 5.3.5 and 5.3.6.

- Installing the auxiliary interface panel.  
  See Section 5.3.7.

- Wiring for auxiliary detectors.  
  See Section 5.3.8.

- Wiring for green sense.  
  See Section 5.3.9.

- Disabling phase selector outputs.  
  See Section 5.3.10.

- Wiring for confirmation lights.  
  See Section 5.3.11.

- Cabling for remote communication.  
  See Section 5.3.12.
5.3.1 Potential for Electrical Shock

A potential exists for a low-current electrical shock (less than 4.5 mA) caused by leakage current in the power supply section of the Opticom™ Infrared System Model 752 and 754 Phase Selectors. You may experience this low-current shock when you touch the front of the phase selector, when you insert the phase selector into its slot in the card rack, or when you remove the phase selector from its slot.

You can minimize this shock potential by making sure that pin L of the card edge connector is grounded properly to earth ground. If pin L is not connected to earth ground, your risk of exposure to this shock potential increases.

Use the following procedure to verify that pin L is connected properly to earth ground. This procedure is not necessary if you are using a Model 760 card rack.

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Turn off AC power to the card rack.

**CAUTION**

This procedure must be performed in an Electro-Static Discharge (ESD) free environment. **Failure to perform this procedure in the proper environment may damage the equipment.**

2. Remove the phase selector from the card rack slot and place it in a static-free bag. Do this for all phase selectors in your system.

3. Locate pin L on the 44-pin edge connector of each card rack slot and verify continuity to earth ground. See Figure 5-19.
   a) Set an ohmmeter to its lowest resistance scale.
   b) Measure the resistance between pin L and earth ground. If the resistance is less than 5 ohms, pin L is grounded properly.

4. If the resistance is greater than 5 ohms, inspect the card rack wiring and repair and/or replace as necessary to correct the problem. Then retest the resistance.

**Figure 5-19. Card Rack Continuity Test**
5.3.2 Model 760 Card Rack Installation

Card slot X1 in the Opticom™ Infrared System Model 760 Card Rack is dedicated to a phase selector. The X1 edge connector is wired to connector J1 on the card rack front panel, which is connected (through the 9-pin harness) to the traffic controller. The phase selector, through X1, supplies two or four outputs to the traffic controller (Model 752 or 754 phase selectors, respectively).

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

1. Place the Model 760 card rack at the desired location in the controller cabinet.

2. Locate the controller terminals for AC+, AC–, chassis ground, logic ground, and the priority control inputs.

3. Route the 9-pin harness wires to their terminals.

4. Strip 1/4-inch of insulation from each wire to be used.

5. Install a spade lug on each wire and connect it to the appropriate terminal. Connect the AC to points in the cabinet after the circuit breaker and any surge protection or lightning protection. See Figure 5-20 and Table 5-2.

The outputs from the phase selector are connected to the preemption inputs of the traffic controller. Each phase selector output must be connected to a separate controller preemption input. Consult the manual for your controller to determine if the preemption inputs are handled with the same priority. For some traffic controllers, preemption inputs one and two are intended for railroad and draw bridge preemption and are given precedence over the rest of the preemption inputs.

When programming your priority control routines, it is important to use values that will allow the traffic controller to respond to a priority control request as quickly and safely as possible. If the routines are not programmed to respond quickly enough, the requesting vehicle may not receive a green light in time to travel through the intersection safely.

6. Tape off and cable tie all unused wires.

7. Connect plug P1 to connector J1 on the Model 760 card rack front panel.

### Table 5-2. 9-Pin Harness Wiring

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Pin Number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>1</td>
<td>115 VAC (AC+)</td>
</tr>
<tr>
<td>White</td>
<td>2</td>
<td>AC return (AC–)</td>
</tr>
<tr>
<td>Green</td>
<td>3</td>
<td>Chassis ground</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Not used</td>
</tr>
<tr>
<td>Gray/White</td>
<td>5</td>
<td>Ch A priority control output</td>
</tr>
<tr>
<td>Blue/White</td>
<td>6</td>
<td>Ch B priority control output</td>
</tr>
<tr>
<td>Violet/White</td>
<td>7</td>
<td>Ch C priority control output</td>
</tr>
<tr>
<td>Brown/White</td>
<td>8</td>
<td>Ch D priority control output</td>
</tr>
<tr>
<td>Gray/Black</td>
<td>9</td>
<td>Logic ground</td>
</tr>
</tbody>
</table>
Figure 5-20. 9-Pin Harness Wiring
5.3.3 Phase Selector Installation

**NOTE**
A writing area is provided on the front of the Opticom™ Infrared System Model 752 and 754 Phase Selectors to record the phases or approach called by each channel.

**WARNING**
Improper or incomplete programming of the traffic controller may cause improper operation of the traffic signals, which may result in accidents and/or injuries. **To avoid this problem, verify that the operation of the traffic controller is appropriate for your needs before, during, and after actuation of the priority control inputs.** Improper operation of the traffic signals may result in unsafe driver action.

1. Set the power switch on the front panel of the phase selector to OFF.
2. Install the phase selector into the Model 760 card rack making sure it is fully seated. See Figure 5-21.

*Figure 5-21. Phase Selector Installation*
5.3.4 Upgrading from Model 562 Phase Selector

If you are upgrading from a Model 562 phase selector to a Model 752 or 754 phase selector, you may need to install a Model 756 auxiliary harness or a Model 755 four-channel adapter card. For the Model 756 auxiliary harness installation, see Section 5.2.3.

If you are upgrading from a Model 562 phase selector to a Model 754 phase selector and you have an existing Model 360 or 560 system chassis or a NEMA type card rack that is wired for a two-channel phase selector, you may use a Model 755 four-channel adapter card which allows you to install a Model 754 phase selector into the existing system chassis or card rack.

The Model 360 and 560 system chassis have slots for two, two-channel phase selectors. The channel 1 and 2 detector inputs are wired to one of these slots, and the channel 3 and 4 detector inputs are wired to the other slot. To use a Model 754 phase selector in a Model 360 or 560 system chassis or a NEMA type card rack wired for a two-channel phase selector, a Model 755 four-channel adapter card is needed to connect the channel 1 and 2 detector inputs to the Model 754 phase selector.

1. Set the power switch on the front of the Model 754 phase selector to OFF.
2. Connect the ribbon cable from the Model 755 four-channel adapter card to the gray rectangular socket on the Model 754 phase selector. See Figure 5-22.
3. Slide the adapter card into the channel 1 / channel 2 slot of the Model 360 or 560 system chassis or the NEMA type card rack, making sure it is fully seated.
4. Slide the Model 754 phase selector into the channel 3 / channel 4 slot of the system chassis or card rack, making sure it is fully seated.

Figure 5-22. Model 755 Four-Channel Adapter Card Installation
5.3.5 Primary Detector Connection for Single Channel

The Opticom™ Infrared System Model 711 or 721 Detector must already be installed at the intersection and the Model 138 detector cable routed into the controller cabinet.

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. **To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal.** Improper operation of the traffic control system may result in unsafe driver action.

1. Route the detector cable to the Model 760 card rack. Allow an extra six inches of cable for making connections.
2. Cut off six inches of outer insulation and foil from the end of the detector cable.
3. Strip 1/4-inch of insulation from the yellow, orange, and blue wires.
4. Twist the blue and bare wires together, and insulate the pair with electrical tape to prevent them from shorting to other wiring. See Figure 5-23.
5. Install a spade lug on each of the following wires: yellow, orange, and blue/bare twisted pair.

![Detector Cable Preparation for Single Channel](Opticom-13A)

**Figure 5-23. Detector Cable Preparation for Single Channel**
6. Connect the yellow wire to one of the channel terminals listed below (see Figure 5-24):
   - Channel A (1) — TB1-1
   - Channel B (2) — TB1-2
   - Channel C (3) — TB1-3
   - Channel D (4) — TB1-4

7. If the yellow wire is connected to channel A or B, connect the orange wire to TB1-5. For channel C or D, connect the orange wire to TB1-6.

8. If the yellow wire is connected to channel A or B, connect the blue/bare twisted pair to TB1-7. For channel C or D, connect the blue/bare twisted pair to TB1-8.

9. Connect a wire from TB1-7 and TB1-8 to earth ground.
5.3.6 Primary Detector Connection for Dual Channel

The Opticom™ Infrared System Model 722 Detector must already be installed at the intersection and the Model 138 detector cable routed into the controller cabinet.

![Diagram of detector cable preparation](Opticom-245A)

**WARNING**

Improper wiring of the detector may cause improper operation of the traffic control system, which may result in accidents and/or injuries. **To avoid the risk of accidents and/or injuries, each detector must be connected to the detector power source and power return of the same phase selector to which it supplies a signal.** Improper operation of the traffic control system may result in unsafe driver action.

1. Route the detector cable to the Model 760 card rack. Allow an extra six inches of cable for making connections.
2. Cut off six inches of outer insulation and foil from the end of the detector cable.
3. Strip 1/4-inch of insulation from the yellow, orange, and blue wires.
4. Install a spade lug on each of the following wires: yellow, orange, blue, and bare. See Figure 5-25.
5. Insulate the bare wire with electrical tape to prevent it from shorting to other wiring.

Figure 5-25. Detector Cable Preparation for Dual Channel
### WARNING

Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. **To avoid this problem, connect only one detector signal wire to each detector input terminal.** Improper operation of the traffic control system may result in unsafe driver action.

### NOTE

The blue wire is the signal from the Model 722 detector tube furthest from the detector base, while the yellow wire is the signal from the tube closest to the detector base.

6. Connect the yellow wire to one of the channel terminals listed below (see Figure 5-26):
   - Channel A (1) — TB1-1
   - Channel B (2) — TB1-2
   - Channel C (3) — TB1-3
   - Channel D (4) — TB1-4

7. Connect the blue wire to the channel not being used by the yellow wire (channel A or B, or channel C or D).

8. For channels A and B, connect the orange wire to TB1-5. For channels C and D, connect the orange wire to TB1-6.

9. For channels A and B, connect the bare wire to TB1-7. For channels C and D, connect the bare wire to TB1-8.

### CAUTION

Connect Terminals TB1-7 and TB1-8 of the card rack to earth ground to allow dissipation of static charges on the detector cable. **Failure to connect Terminals TB1-7 and TB1-8 to earth ground may damage the equipment.** If detectors have been mounted but not connected to the phase selector, strip insulation from each detector cable and connect all the wires to earth ground until the installation can be completed.

10. Connect a wire from TB1-7 and TB1-8 to earth ground.

---

![Figure 5-26. Detector Connections for Dual Channel](image-url)
5.3.7 Auxiliary Interface Panel Installation
Refer to Section 5.2.6, Auxiliary Interface Panel Installation, for details about installing an auxiliary interface panel in the traffic control cabinet.

⚠️ WARNING
This procedure may expose you to AC voltage and the risk of electric shock or electrocution. Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution. Electric shock may cause severe injury or death.

5.3.8 Auxiliary Detector Wiring
Refer to Section 5.2.7, Auxiliary Detector Wiring with Auxiliary Interface Panel, and Section 5.2.8, Auxiliary Detector Wiring with Model 757 Auxiliary Harness, for details about detector cable preparation and wiring connections for both single-channel and dual-channel applications.

⚠️ WARNING
Connecting more than one detector signal wire to a detector input terminal may damage the detectors and may cause improper operation of the input circuitry, which may result in accidents and/or injuries. To avoid this problem, connect only one detector signal wire to each detector input terminal. Improper operation of the traffic control system may result in unsafe driver action.

5.3.9 Green Sense Wiring
Refer to Section 5.2.9, Green Sense Wiring with Auxiliary Interface Panel, and Section 5.2.10, Green Sense Wiring with Model 757 Auxiliary Harness, for details about wire preparation and wiring connections.

⚠️ WARNING
This procedure may expose you to AC voltage and the risk of electric shock or electrocution. Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution. Electric shock may cause severe injury or death.

5.3.10 Disable Outputs
If desired, additional connections may be made to permit an external device such as the traffic controller to disable all of the phase selector outputs. A possible application may be to disable the phase selector outputs during rail or drawbridge preemption. If this feature is used, the phase selector will respond and log the call but none of the outputs will be activated.

The Model 758 auxiliary interface panel is required to use this feature.

Connect a wire from the Disable Input terminal on the auxiliary interface panel to the appropriate terminal on the controller.

Connect a wire from the Controller 24V terminal on the auxiliary interface panel to a +24 VDC terminal on the controller.

Verify this connection by activating the Disable function on the controller at the same time that you place a test call to the controller either with the test switch or with an emitter equipped vehicle.
5.3.11 Confirmation Light Wiring

Refer to Section 5.2.11, Confirmation Light Wiring, for details about wire preparation and wiring connections.

**WARNING**

This procedure may expose you to AC voltage and the risk of electric shock or electrocution. **Turn off the AC mains and use accepted and recognized safety precautions to avoid exposure to the risk of electric shock or electrocution.** Electric shock may cause severe injury or death.

5.3.12 Communication Cable Installation

**NOTE**

If the installation includes remote communication cabling, one 700 series communication cable is required for the Opticom™ Infrared System Model 752 or 754 Phase Selector.

1. Plug the 6-pin end of the 700 series communication cable into the communication port on the front of the Model 752 or 754 phase selector. See Figure 5-27.

2. Plug the other end of the cable into the computer. A 9-pin to 25-pin “null modem” adapter may be required for communication to a modem.

3. Skip to Section 8.1, Installation Checkout.

![Figure 5-27. 700 Series Communication Cable Installation](Opticom-216A)
5.4 Phase Selector Pin Index

Table 5-3 lists the pin index for the edge connector of the Opticom™ Infrared System Model 752 Phase Selector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Detector ground</td>
</tr>
<tr>
<td>B</td>
<td>Not used</td>
</tr>
<tr>
<td>C</td>
<td>Not used</td>
</tr>
<tr>
<td>D</td>
<td>Channel A primary detector input</td>
</tr>
<tr>
<td>E</td>
<td>Detector 24 VDC power output</td>
</tr>
<tr>
<td>F</td>
<td>Channel A output, collector (+)</td>
</tr>
<tr>
<td>H</td>
<td>Channel A output, emitter (–)</td>
</tr>
<tr>
<td>J</td>
<td>Channel B primary detector input</td>
</tr>
<tr>
<td>K</td>
<td>Detector ground</td>
</tr>
<tr>
<td>L</td>
<td>Earth ground</td>
</tr>
<tr>
<td>M</td>
<td>AC–</td>
</tr>
<tr>
<td>N</td>
<td>AC+</td>
</tr>
<tr>
<td>P</td>
<td>Not used</td>
</tr>
<tr>
<td>R</td>
<td>Not used</td>
</tr>
<tr>
<td>S</td>
<td>Not used</td>
</tr>
<tr>
<td>T</td>
<td>Not used</td>
</tr>
<tr>
<td>U</td>
<td>Not used</td>
</tr>
<tr>
<td>V</td>
<td>Detector ground</td>
</tr>
<tr>
<td>W</td>
<td>Channel B output, collector (+)</td>
</tr>
<tr>
<td>X</td>
<td>Channel B output, emitter (–)</td>
</tr>
<tr>
<td>Y</td>
<td>Not used</td>
</tr>
<tr>
<td>Z</td>
<td>Not used</td>
</tr>
<tr>
<td>19</td>
<td>TXD (data out)</td>
</tr>
<tr>
<td>21</td>
<td>RXD (data in)</td>
</tr>
</tbody>
</table>
Table 5-4 lists the pin index for the edge connector of the Model 754 phase selector. Figure 5-28 shows the pin letters and numbers for the edge connector of the phase selector.

Table 5-4. Model 754 Phase Selector Edge Connector Pin Index

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Detector ground</td>
</tr>
<tr>
<td>B</td>
<td>Not used</td>
</tr>
<tr>
<td>C</td>
<td>Not used</td>
</tr>
<tr>
<td>D</td>
<td>Channel A primary detector input</td>
</tr>
<tr>
<td>E</td>
<td>Detector 24 VDC power output</td>
</tr>
<tr>
<td>F</td>
<td>Channel A output, collector (+)</td>
</tr>
<tr>
<td>H</td>
<td>Channel A output, emitter (−)</td>
</tr>
<tr>
<td>J</td>
<td>Channel B primary detector input</td>
</tr>
<tr>
<td>K</td>
<td>Detector ground</td>
</tr>
<tr>
<td>L</td>
<td>Earth ground</td>
</tr>
<tr>
<td>M</td>
<td>AC−</td>
</tr>
<tr>
<td>N</td>
<td>AC+</td>
</tr>
<tr>
<td>P</td>
<td>Channel C primary detector input</td>
</tr>
<tr>
<td>R</td>
<td>Detector 24 VDC power output</td>
</tr>
<tr>
<td>S</td>
<td>Channel C output, collector (+)</td>
</tr>
<tr>
<td>T</td>
<td>Channel C output, emitter (−)</td>
</tr>
<tr>
<td>U</td>
<td>Channel D primary detector input</td>
</tr>
<tr>
<td>V</td>
<td>Detector ground</td>
</tr>
<tr>
<td>W</td>
<td>Channel B output, collector (+)</td>
</tr>
<tr>
<td>X</td>
<td>Channel B output, emitter (−)</td>
</tr>
<tr>
<td>Y</td>
<td>Channel D output, collector (+)</td>
</tr>
<tr>
<td>Z</td>
<td>Channel D output, emitter (−)</td>
</tr>
<tr>
<td>19</td>
<td>TXD (data out)</td>
</tr>
<tr>
<td>21</td>
<td>RXD (data in)</td>
</tr>
</tbody>
</table>

Figure 5-28. Phase Selector Edge Connector Pin Letters and Numbers
Table 5-5 lists the pin index for connector J1 on the front panel of the Model 752 phase selector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Phase 1 green input (AC+)</td>
</tr>
<tr>
<td>2</td>
<td>Phase 2 green input (AC+)</td>
</tr>
<tr>
<td>3</td>
<td>Phase 3 green input (AC+)</td>
</tr>
<tr>
<td>4</td>
<td>Logic ground</td>
</tr>
<tr>
<td>5</td>
<td>Logic ground</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
</tr>
<tr>
<td>10</td>
<td>Confirmation light 1 output (collector, +)</td>
</tr>
<tr>
<td>11</td>
<td>Confirmation light 2 output (collector, +)</td>
</tr>
<tr>
<td>12</td>
<td>* Disable input (DC−)</td>
</tr>
<tr>
<td>13</td>
<td>Channel A aux. detector 2 input</td>
</tr>
<tr>
<td>14</td>
<td>Channel B aux. detector 2 input</td>
</tr>
<tr>
<td>15</td>
<td>Channel B aux. detector 1 input</td>
</tr>
<tr>
<td>16</td>
<td>Phase 4 green input (AC+)</td>
</tr>
<tr>
<td>17</td>
<td>Phase 5 green input (AC+)</td>
</tr>
<tr>
<td>18</td>
<td>Phase 6 green input (AC+)</td>
</tr>
<tr>
<td>19</td>
<td>24 VDC detector power output</td>
</tr>
<tr>
<td>20</td>
<td>24 VDC detector power output</td>
</tr>
<tr>
<td>21</td>
<td>Not used</td>
</tr>
<tr>
<td>22</td>
<td>Not used</td>
</tr>
<tr>
<td>23</td>
<td>Not used</td>
</tr>
<tr>
<td>24</td>
<td>Not used</td>
</tr>
<tr>
<td>25</td>
<td>Not used</td>
</tr>
<tr>
<td>26</td>
<td>Confirmation light 3 output (collector, +)</td>
</tr>
<tr>
<td>27</td>
<td>Confirmation light 4 output (collector, +)</td>
</tr>
<tr>
<td>28</td>
<td>Channel A aux. detector 1 input</td>
</tr>
<tr>
<td>29</td>
<td>Not used</td>
</tr>
<tr>
<td>30</td>
<td>Not used</td>
</tr>
<tr>
<td>31</td>
<td>Phase 7 green input (AC+)</td>
</tr>
<tr>
<td>32</td>
<td>Phase 8 green input (AC+)</td>
</tr>
<tr>
<td>33</td>
<td>AC common (green sense)</td>
</tr>
<tr>
<td>34</td>
<td>Ground</td>
</tr>
<tr>
<td>35</td>
<td>Ground</td>
</tr>
<tr>
<td>36</td>
<td>Not used</td>
</tr>
<tr>
<td>37</td>
<td>Not used</td>
</tr>
<tr>
<td>38</td>
<td>* Controller +24 VDC</td>
</tr>
<tr>
<td>39</td>
<td>Not used</td>
</tr>
<tr>
<td>40</td>
<td>Not used</td>
</tr>
<tr>
<td>41</td>
<td>Not used</td>
</tr>
<tr>
<td>42</td>
<td>Not used</td>
</tr>
<tr>
<td>43</td>
<td>Not used</td>
</tr>
<tr>
<td>44</td>
<td>Not used</td>
</tr>
</tbody>
</table>

* To use a signal from the traffic controller to activate the Disable input, connect Pin 38 to Controller +24 VDC.
Table 5-6 lists the pin index for connector J1 on the front panel of the Model 754 phase selector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Phase 1 green input (AC+)</td>
</tr>
<tr>
<td>2</td>
<td>Phase 2 green input (AC+)</td>
</tr>
<tr>
<td>3</td>
<td>Phase 3 green input (AC+)</td>
</tr>
<tr>
<td>4</td>
<td>Logic ground</td>
</tr>
<tr>
<td>5</td>
<td>Logic ground</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
</tr>
<tr>
<td>10</td>
<td>Confirmation light 1 output (collector, +)</td>
</tr>
<tr>
<td>11</td>
<td>Confirmation light 2 output (collector, +)</td>
</tr>
<tr>
<td>12</td>
<td>* Disable input (DC–)</td>
</tr>
<tr>
<td>13</td>
<td>Channel A aux. detector 2 input</td>
</tr>
<tr>
<td>14</td>
<td>Channel B aux. detector 2 input</td>
</tr>
<tr>
<td>15</td>
<td>Channel B aux. detector 1 input</td>
</tr>
<tr>
<td>16</td>
<td>Phase 4 green input (AC+)</td>
</tr>
<tr>
<td>17</td>
<td>Phase 5 green input (AC+)</td>
</tr>
<tr>
<td>18</td>
<td>Phase 6 green input (AC+)</td>
</tr>
<tr>
<td>19</td>
<td>24 VDC detector power output</td>
</tr>
<tr>
<td>20</td>
<td>24 VDC detector power output</td>
</tr>
<tr>
<td>21</td>
<td>Not used</td>
</tr>
<tr>
<td>22</td>
<td>Not used</td>
</tr>
<tr>
<td>23</td>
<td>Not used</td>
</tr>
<tr>
<td>24</td>
<td>Not used</td>
</tr>
<tr>
<td>25</td>
<td>Not used</td>
</tr>
<tr>
<td>26</td>
<td>Confirmation light 3 output (collector, +)</td>
</tr>
<tr>
<td>27</td>
<td>Confirmation light 4 output (collector, +)</td>
</tr>
<tr>
<td>28</td>
<td>Channel A aux. detector 1 input</td>
</tr>
<tr>
<td>29</td>
<td>Channel C aux. detector 2 input</td>
</tr>
<tr>
<td>30</td>
<td>Channel C aux. detector 1 input</td>
</tr>
<tr>
<td>31</td>
<td>Phase 7 green input (AC+)</td>
</tr>
<tr>
<td>32</td>
<td>Phase 8 green input (AC+)</td>
</tr>
<tr>
<td>33</td>
<td>AC common (green sense)</td>
</tr>
<tr>
<td>34</td>
<td>Ground</td>
</tr>
<tr>
<td>35</td>
<td>Ground</td>
</tr>
<tr>
<td>36</td>
<td>Not used</td>
</tr>
<tr>
<td>37</td>
<td>Not used</td>
</tr>
<tr>
<td>38</td>
<td>* Controller +24 VDC</td>
</tr>
<tr>
<td>39</td>
<td>Not used</td>
</tr>
<tr>
<td>40</td>
<td>Not used</td>
</tr>
<tr>
<td>41</td>
<td>Not used</td>
</tr>
<tr>
<td>42</td>
<td>Not used</td>
</tr>
<tr>
<td>43</td>
<td>Channel D aux. detector 2 input</td>
</tr>
<tr>
<td>44</td>
<td>Channel D aux. detector 1 input</td>
</tr>
</tbody>
</table>

*To use a signal from the traffic controller to activate the Disable input, connect Pin 38 to Controller +24 VDC.*
Table 5-7 lists the pin index for the communication port on the front panel of the Opticom™ Infrared System Model 752 or 754 Phase Selector. The table also lists the pin index for the communication cable.

Table 5-7. Communication Port and Communication Cable Pin Index

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Communication Port</th>
<th>Communication Cable</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RXD (receive data)</td>
<td>P1-1</td>
<td>S1-3</td>
<td>Blue</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
<td>P1-2</td>
<td>S1-5</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>TXD (transmit data)</td>
<td>P1-3</td>
<td>S1-2</td>
<td>Red</td>
</tr>
<tr>
<td>4</td>
<td>* RTS (ready to send)</td>
<td>P1-4</td>
<td>S1-8</td>
<td>Orange</td>
</tr>
<tr>
<td>5</td>
<td>* CTS (clear to send)</td>
<td>P1-5</td>
<td>S1-7</td>
<td>Yellow</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td></td>
<td>S1-Shell</td>
<td>Shield</td>
</tr>
</tbody>
</table>

* RTS and CTS are intended to be used with twisted-pair, leased-line, 2400-baud devices.

Figure 5-29 shows the pin numbers for both ends of the communication cable.

![Figure 5-29. Communication Cable Connector Pin View](image-url)
6 Communication Networks

6.1 EIA/RS-232 Communication Port

The Opticom™ Infrared System Model 752 and 754 Phase Selectors have an EIA/RS-232 communication port on the front panel. This port has a default baud rate of 9600 baud, but may be set to transmission rates of 1200, 2400, 4800, or 9600 bps via the 750 series configuration software (750-CS).

The connector for the front panel communication port is an industry-standard, 6-pin DIN connector. The pin assignments for the connector are listed in Table 6-1. The table also lists the pin assignments for the TXD (transmit data) and RXD (receive data) signals available on the rear edge connector of the phase selectors.

Table 6-1. Communication Port Pin Assignments

<table>
<thead>
<tr>
<th>Front Panel</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin Number</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>RXD (receive data)</td>
</tr>
<tr>
<td>2</td>
<td>GND (ground)</td>
</tr>
<tr>
<td>3</td>
<td>TXD (transmit data)</td>
</tr>
<tr>
<td>4</td>
<td>RTS (ready to send)</td>
</tr>
<tr>
<td>5</td>
<td>CTS (clear to send)</td>
</tr>
<tr>
<td>6</td>
<td>Shield</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rear Edge</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin Number</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>TXD (transmit data)</td>
</tr>
<tr>
<td>21</td>
<td>RXD (receive data)</td>
</tr>
</tbody>
</table>
6.2 Rear Communication Port for Model 752 Phase Selectors

For Model 752 phase selectors, the rear communication port jumper board is intended to connect the front panel communication port in parallel with the card edge communication port on card edge pins 19 and 21. To connect the front panel communication port in parallel with the card edge communication port, remove the jumper board from its top position and install it on the U29 header strip located near the bottom edge of the circuit board. See Figure 6-1.

![Figure 6-1. Communication Port Jumper Board Positions](Opticom-899A)

6.3 Rear Communication Port and Channel Assignment for Model 754 Phase Selectors

For Model 754 phase selectors with firmware of version 1.4 or higher, the rear communication port jumper board serves two purposes. It is used to connect the front panel communication port in parallel with the card edge communication port on card edge pins 19 and 21, and it is used to reassign the channel outputs. Reassigning the channels eliminates the need to rewire the input file in 170 cabinets to obtain the desired channel outputs.

When two Model 752 phase selectors are installed in a 170 cabinet, the channel designations as reported in the phase selector call history log and seen by the controller may be confusing. This happens because of the cross-wiring of the input file. See Figure 6-2.

For example, assume that you assigned channels A and B, from the device in the left slot, to priority control inputs 1 and 2 respectively; and you assigned channels A and B, from the device in the right slot, to inputs 3 and 4 respectively.
When you remove the two 2-channel Opticom™ Infrared System Model 752 Phase Selectors and replace them with one 4-channel Model 754 phase selector which is installed in the right-hand slot, channel A is connected to priority control input 3, channel B is connected to input 4, channel C is connected to input 1, and channel D is connected to input 2.

In this case, you can use the jumper boards to reassign the channel outputs so that channels A, B, C, and D are connected to inputs 1, 2, 3, and 4 respectively.

Table 6-2 lists the various configurations in which you can install jumper boards and shows whether the channels are assigned in their standard order of A, B, C, D or reassigned to C, D, A, B. The table also shows which communication ports are active.

**NOTE**

One rear communication port jumper board is installed in the top position when the phase selector is shipped from the factory. See Figure 6-1. Additional jumper boards (stock number 78-8114-5369-1) are available from GTT. You can order them from your GTT representative.

If your application includes the use of an optional Model 832 communication module installed on a Model 754 phase selector, the channels will be reassigned. To maintain standard channel assignments, GTT recommends that you rewire the input file.

---

### Table 6-2. Jumper Board Configurations

<table>
<thead>
<tr>
<th>Jumper Board(s) Installed</th>
<th>Channel Assignment</th>
<th>Communication Port(s) Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Standard A, B, C, D</td>
<td>Front port only</td>
</tr>
<tr>
<td>Bottom</td>
<td>Reassigned C, D, A, B</td>
<td>Front and rear ports in parallel</td>
</tr>
<tr>
<td>Top and bottom</td>
<td>Standard A, B, C, D</td>
<td>Front and rear ports in parallel</td>
</tr>
<tr>
<td>No jumper boards installed</td>
<td>Reassigned C, D, A, B</td>
<td>Front port only</td>
</tr>
<tr>
<td>Model 832 communication module installed</td>
<td>Reassigned C, D, A, B</td>
<td>Front port and independent rear port</td>
</tr>
</tbody>
</table>
6.4 Enabling Terminator Resistor for Front Communication Port

For installations where more than one terminal device is connected to the phase selector, or where two or more phase selectors share the same RS-232 line, one of the Model 752 or 754 phase selectors must have the terminator resistor enabled.

Model 752 and 754 phase selectors are shipped from the factory with terminator resistor jumper JP1 in place. When multiple phase selectors are connected together, jumper JP1 must be removed from all of the boards except one. Figure 6-1 shows the location of the terminator resistor jumper JP1.

6.5 Communication Module Installation

The optional Model 832 communication module may be added to enhance the communication capabilities of the phase selector. The Model 832 communication module adds separate card edge communication port capabilities to the phase selector, which doubles the number of communication ports from one to two. This addition is convenient for applications where both system communication (through the card edge communication port) and local communication (through the front panel communication port) are desirable concurrently.

To install the Model 832 communication module, remove the rear communication port jumper board(s) and install the module on the U29 header strip and the unlabeled 7-position header strip. (Be careful when inserting the module so you don’t bend the pins.) Secure the module to the phase selector with the screw provided.

Set up the baud rate using the 750 series configuration software (750-CS).

6.5.1 Enabling Terminator Resistor for Rear Communication Port

When using the Model 832 communication module, terminator resistor usage is the same as outlined in Section 6.4 for the front communication port. For the rear communication port, if more than one terminal device is used or if multiple Model 752 or 754 phase selectors share the same RS-232 line, one of the phase selectors must have the terminator resistor enabled.

The Model 832 communication module is shipped from the factory with terminator resistor jumpers JP1 and JP2 in place. In order to connect multiple Model 752 or 754 phase selectors, remove the two jumpers from the module on all but one of the interconnected Model 752 or 754 phase selectors. Figure 6-3 shows the location of the terminator resistor jumpers JP1 and JP2.

![Rear Communication Port Terminator Resistor Jumpers](image)
7 Setup

7.1 Two Channel Phase Selector

Figure 7-1 shows the front panel layout of the Opticom™ Infrared System Model 752 Phase Selector.

7.1.1 Indicators

The Model 752 phase selector has the following five indicators. See Figure 7-1.

- Power On
- Channel A High Priority
- Channel A Low Priority
- Channel B High Priority
- Channel B Low Priority

Figure 7-1. Front Panel for Two Channel Phase Selectors
7.2 Four Channel Phase Selector

Figure 7-2 shows the front panel layout of the Model 754 phase selector.

7.2.1 Indicators

The Model 754 phase selector has the following nine indicators. See Figure 7-2.

- Power On
- Channel A High Priority
- Channel A Low Priority
- Channel B High Priority
- Channel B Low Priority
- Channel C High Priority
- Channel C Low Priority
- Channel D High Priority
- Channel D Low Priority

Figure 7-2. Front Panel for Four Channel Phase Selectors
7.3 Switches

The Opticom™ Priority Control System Model 752 and 754 Phase Selectors have the following three switches:

- Power On/Off
- High/Low Test Initiate Switch
- Function Select Push-Wheel Switch (10-position, push-wheel for Model 754 phase selectors; 8-position, push-wheel for Model 752 phase selectors)

The Function Select push-wheel switch is designed to act in conjunction with the High/Low test initiate switch to provide different operations.

Table 7-1 lists the mnemonics you can select using the push-wheel switch and describes the function the phase selector will perform when the High/Low test initiate switch is activated.

Table 7-1. Model 752/754 Phase Selector Push-Wheel Switch Functions

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C, D</td>
<td><em>Priority Control Output Test</em>—Activates the output for the selected channel and priority. Select the desired channel via the push-wheel switch (A, B, C, or D), then push and hold the test initiate switch to the desired priority (H or L). The selected channel and priority output are active while the test initiate switch is held, and remain active for a minimum of 6 seconds after releasing the switch.</td>
</tr>
<tr>
<td>E</td>
<td><em>Emitter Loopback Test</em>—Verifies the communication link between a phase selector and a Model 792 emitter. Set the push-wheel switch to the E position, then push and hold the test initiate switch to the desired priority (H or L). Activate the test by releasing the test initiate switch. A successful emitter loopback test is indicated by the channel A high priority indicator flashing at a 2 Hz rate for 2 seconds.</td>
</tr>
<tr>
<td>F</td>
<td><em>Detector Function Test</em>—Verifies proper operation of the Model 711, 721, or 722 detector connected to each channel. Set the push-wheel switch to the F position, then push and hold the test initiate switch to the desired priority (H or L). Activate the test by releasing the test initiate switch. Each channel with a detector(s), which passes the test, is indicated by the associated high priority indicator flashing at a 2 Hz rate for 2 seconds.</td>
</tr>
<tr>
<td>P</td>
<td><em>Password Override</em>—Activates password override mode. Set the push-wheel switch to the P position, then push and hold the test initiate switch to the desired priority (H or L). Activate the password override mode by releasing the test initiate switch. The password override mode remains active for 1 hour after releasing the test initiate switch, or until the phase selector is reset.</td>
</tr>
<tr>
<td>R</td>
<td><em>Reset Parameters to Default</em>—Resets all configurable parameters for the phase selector to factory default. Set the push-wheel switch to the R position, then hold the test initiate switch in either the H or L position while cycling the power off then on. The test initiate switch must be held for a minimum of 2 seconds following power up to initiate the reset to default action.</td>
</tr>
<tr>
<td>S</td>
<td><em>Set Channel and Priority Range</em>—Sets the priority range for each channel. This function requires the presence of a valid priority signal on the desired channel(s). Set the push-wheel switch to the S position, then hold the test initiate switch in either the H or L position while cycling the power off then on. The test initiate switch must be held for a minimum of 6 seconds following power up to initiate the range setting function. When you release the test initiate switch, the current signal intensity is the range value stored.</td>
</tr>
<tr>
<td>blank</td>
<td>Not used.</td>
</tr>
</tbody>
</table>
8 Checkout

8.1 Installation Checkout

**WARNING**

Improper or incomplete programming of the traffic controller may cause improper operation of the traffic signals, which may result in accidents and/or injuries. **To avoid this problem, verify that the operation of the traffic controller is appropriate for your needs before, during, and after actuation of the priority control inputs.** Improper operation of the traffic signals may result in unsafe driver action.

Although in most applications your phase selector will be fully operational right out of the box, GTT recommends that additional set up and verification be performed using ITS Link/750-CS as well as the test switches on the phase selector to verify that all connections are correct, that your detectors have been located correctly, and to make use of all of the features available in the 750 series phase selectors.

Contact your local dealer or your local GTT representative to find out more about the set up and verification services as well as the training services that are available.

The following steps are recommended for all installations. See the Help section of the configuration software (750-CS) for more details on the following steps.

1. Check all wiring connections for accuracy.
2. If the Model 760 card rack is used, ensure that controller AC power is present.
3. Set the Model 752 or 754 phase selector power switch to ON.
   
   The Power LED should be on steady if the unit is not performing diagnostic tests. If it flashes continuously, or if all the LEDs remain on, refer to the troubleshooting instructions in Section 9.
4. Reset the unit to factory default.
   a) To reset all configurable parameters to factory default, set the push-wheel switch to the R position.
   b) Hold the test initiate switch to either the high or low position while power is cycled. The test initiate switch must be held for a minimum of 2 seconds following power up to initiate the reset to default action. Performing this function clears user settings.
5. Start ITS Link and select 750-CS
6. Open the Call Status window and press the Start button.
7. Look at the noise level for each channel. Each channel that has a detector connected should display a noise level varying between 10-35.
   a) To perform a detector response test, set the push-wheel switch to the F position.
   b) Hold the test initiate switch to either the high or low position momentarily.
   c) The Model 752 and 754 phase selectors will perform a loopback test on all channels. This test requires approximately 8 seconds to perform. During the test the Power LED will flash. At the conclusion of the test all channels with a correctly wired detector will flash for a few seconds.
   d) If the expected channels for your installation do not flash, verify your detector wiring.

   **NOTE**
   The response test does not place a call to the controller and it does not test the photodiodes in the detector.
9. Verify that green sense has been connected correctly by watching the green status section and comparing this with the readout on either the controller or MMU.
10. Place a test call to the controller.
   a) To place a test call to the controller, set the push-wheel switch to the desired channel. Toggle the test switch to either the high or low position. The phase selector will place a 6-second call of the selected priority to the controller.
   b) If the controller does not recognize the call, verify the wiring between the system and the controller. If the wiring is correct, verify the controller is programmed correctly for priority control.

11. Repeat steps 10a and 10b for all channels. Also repeat for low priority if used.

### 8.2 Phase Selector Configuration

Using the configuration software (750-CS), configure the phase selector as follows:

1. Enter the intersection name.
2. Enter a channel description for each channel.
3. Set the real-time clock.
4. Perform the following steps if you want to activate the Security feature.
   a) Double click the Valid Codes High Priority icon and select the Class 0 tab.
   b) Click the De-select valid codes radio button.
   c) Click on the blue rectangle in the upper left corner and it will turn white. This will make Class 0, ID 0 an invalid code.
   d) Press the Apply button and then the OK button.
   e) This action will prevent uncoded high priority emitters with a 14 Hz frequency from requesting a green light. You can enhance the security further by making only the emitter codes in the coding plan valid in the phase selector and all other codes invalid.
   f) If you want to also disallow uncoded low priority emitters repeat steps 4a through 4d except select the Valid Codes Low Priority icon.

**NOTE**

Once the Security feature is enabled, it will prevent the following emitter types from activating the Opticom system:

- Any new or existing Opticom system emitters that are not coded (including neighboring mutual aid responders, unless coded).
- Older generation Opticom system emitters that do not have security coding capability.
- Competitive brand emitters.
- “Home-made” emitters.

5. Change other default values as needed.

6. Drive each approach with a known good emitter-equipped vehicle.
   a) Monitor the test with the Call Status window.
   b) Move or reposition detectors as needed in order to adequately detect approaching vehicles.

7. Proceed to Section 8.3 for setting the range activation point.
8.3 Range Setting (Signal Intensity Threshold Level Adjustment)

This section includes the instructions for setting the signal intensity threshold level (range). Two procedures are described to account for the different capabilities of the various emitters. Any Opticom™ Infrared System Model 196 Emitter or higher may be used for the signal intensity threshold level setting process.

The procedures use range and timing charts in conjunction with instructions. The range and timing charts show the relationship between the speed of the priority vehicle and the worst case timing of the traffic controller. The charts also give the resultant distance, or range, required to allow adequate time for activation of the system before the priority vehicle reaches the intersection.

Section 8.3.1 describes the steps used to adjust the signal levels when the automated signal intensity threshold level setting feature of the Model 792 or 592 emitter is used.

Section 8.3.2 describes the steps used to adjust the signal levels when either an emitter is used that does not have the automated signal intensity threshold level setting feature; or an emitter is used that has the feature, but the feature is not enabled.

NOTE
Contact GTT Technical Service (1-800-258-4610 ext 1) for details on setting the range activation point for transit applications.

8.3.1 Adjusting Range with Automated Range Setting Feature

The automated range setting feature allows this range setting task to be performed by one person.

NOTE
When the automated range setting feature is used, the signal levels must be adjusted within the first 12 minutes after power is applied to the Model 752 or 754 phase selector. The 12-minute time is the default value set at the factory. This time may be set from 0 to 120 minutes by using the 750 series configuration software (750-CS) for the phase selector.

WARNING
Using the wrong range and timing chart may cause improper system operation, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries that may result from improper system operation, use the range and timing chart that corresponds to the model of detector that is being adjusted. Improper system operation may result in unsafe driver action.

1. Locate a vehicle equipped with a range setting emitter at the desired distance from the Model 711, 721, or 722 detector at the intersection.
2. Verify that the emitter is operating properly in the low or high priority.
3. Wait for the traffic signal to turn yellow, then turn on the emitter.
4. Press and hold the range setting switch for 15 seconds.
5. Release the range setting switch.
6. Verify that the intersection range is set properly by turning on the emitter during a yellow indication. The signal light should cycle to green in a timely manner.
7. If the light does not cycle to green, begin appropriate systematic troubleshooting procedures to correct the malfunction. Refer to Section 9 for troubleshooting procedures.
### Range and Timing Chart for Model 500/700 Series Detectors

<table>
<thead>
<tr>
<th>Vehicle Speed (mph)</th>
<th>5</th>
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<th>15</th>
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</tr>
</tbody>
</table>

2500 feet of range may be obtained with Opticom™ Infrared System Model 500/700 Series Detectors with the adjustment set to maximum.

The shaded area of the chart represents distances where an auxiliary detector can be used.

Values underlined in the chart represent distances beyond the maximum range possible using auxiliary detectors.

3500 feet is the maximum total range possible using one or two Model 500/700 series auxiliary detectors 1000 feet ahead of the intersection with their range set at the maximum permitted 2500 feet.
8.3.2 Adjusting Range without Automated Range Setting Feature

This range setting task requires two people: one person in the priority vehicle equipped with a Model 196 emitter or higher, and another person at the traffic control cabinet.

**WARNING**

Using the wrong range and timing chart may cause improper system operation, which may result in accidents and/or injuries. To avoid the risk of accidents and/or injuries that may result from improper system operation, use the range and timing chart that corresponds to the model of detector that is being adjusted. Improper system operation may result in unsafe driver action.

1. Locate the emitter-equipped vehicle at the desired distance from the Model 711, 721, or 722 detector at the intersection.
2. Turn off the Model 752 or 754 phase selector.
3. Turn on the emitter (select either high or low priority).
4. At the phase selector, set the push-wheel switch to the S position.
5. Hold the test initiate switch up to set high priority range, or down to set low priority range while cycling the power off then on.
6. While holding the test switch, turn on the phase selector and continue to hold the test switch for 30 seconds, then release it.
7. Turn off the emitter.
8. Verify that the intersection range is set properly by turning on the emitter during a yellow indication. The signal light should cycle to green in a timely manner.
9. If the light does not cycle to green, begin appropriate systematic troubleshooting procedures to correct the malfunction. Refer to Section 9 for troubleshooting procedures.
### Range and Timing Chart for Model 100/200 Series Detectors

<table>
<thead>
<tr>
<th>Timing (seconds)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
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</table>

1800 feet is the maximum range adjustment of a primary Opticom™ Infrared System Model 100/200 Series Detector for predictable performance. The shaded area of the chart represents distances where an auxiliary detector can be used. Values underlined in the chart represent distances beyond the maximum range possible using auxiliary detectors. 2800 feet is the maximum total range possible using one or two Model 100/200 series auxiliary detectors 1000 feet ahead of the intersection with their range set at the maximum permitted 1800 feet.
8.4 Performance Tests

⚠️ WARNING

A completed installation that is not tested may result in improper system operation, which may result in accidents and/or injuries. To avoid this problem, test the system to verify proper operation. Improper system operation may result in unsafe driver action.

These installation instructions are the result of tests performed in our laboratory and we believe these tests to be accurate and complete. However, each installation involves variables that cannot be controlled or predicted. These variables may affect the operational characteristics of the system.

To ensure proper system operation, GTT strongly recommends that, when the system is turned on, the installer functionally tests the Opticom Infrared system using an emitter-equipped vehicle.

To test the system, the installer drives the priority vehicle through the intersection to verify that the system is performing in accordance with customer requirements.
9 Troubleshooting

9.1 Power-Up/Reset Self Tests

The following tests are performed at power up/reset. The self test failures for the present power up cycle (as a minimum) are stored in non-volatile memory except where noted. A Reset to Default command will not clear self test results.

Failure to pass any of these tests will result in the Opticom™ Infrared System Model 752 or 754 Phase Selector going into Unit Disabled mode indicated by all channel LEDs glowing solid.

9.2 Diagnostic Mode

A diagnostic operational mode is available to provide system diagnostics and data for performance evaluation and system debugging. All diagnostic tests can be initiated either by software commands or by the front panel switches on the phase selector.

During any diagnostic test the Power LED will flash.

9.2.1 Priority Control Output Test

The priority control output test allows the user to manually activate the output for a given channel and priority.

To initiate the test, select the desired channel via the push-wheel switch (A, B, C, or D), then push and hold the test initiate switch to the desired priority (H or L). The selected channel and priority output are active while the test initiate switch is held, and remain active for a minimum of 6 seconds after releasing the switch.

9.2.2 Detector Response Test

The phase selector can perform a test to verify proper operation and presence of a Model 711, 721, or 722 detector connected to each channel.

To initiate the test, set the push-wheel switch to the F position, then push and hold the test initiate switch to the desired priority (H or L). The test is activated by releasing the test initiate switch.

Each channel with a detector(s), that passes the test, is indicated by the associated high priority indicator flashing at a 2 Hz rate for 2 seconds.

The detector circuit is tested, all except the photocell. This test does not generate a priority control output.

9.3 Fuse Location

Figure 9-1 shows the location of the fuse on the phase selector board.
9.4 Troubleshooting Symptoms, Possible Causes, and Suggested Solutions

Table 9-1 shows the symptoms of Model 752 or 754 phase selector installation problems. The table also shows the possible causes of those problems and suggests solutions to correct them.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>All channel LEDs and Power LED are on solid.</td>
<td>Phase selector failed.</td>
<td>Remove the phase selector and return it to GTT for service.</td>
</tr>
<tr>
<td>Power LED will not light.</td>
<td>Wiring incorrect.</td>
<td>If 120 volts is not present, check wiring and the control cabinet circuit breakers.</td>
</tr>
<tr>
<td></td>
<td>Fuse blown.</td>
<td>Replace with a Littlefuse P/N 0154001 (1 Amp, 125VAC). See Figure 9-1 for fuse location. If fuses continue to fail, return the phase selector to GTT for repair.</td>
</tr>
<tr>
<td>Power LED is lit, but call LEDs do not light when a high priority signal is present.</td>
<td>Phase selector failed.</td>
<td>Place a test call on channel A high priority by setting the push-wheel switch to A and holding the test switch in the up position. The high priority call LED for channel A should light. Wait until the channel A call LED goes out. Set the push-wheel switch to channel B. Hold the test switch in the up position. The high priority LED indicator for channel B should light. For Model 754 phase selectors, continue with the following: Set the push-wheel switch to channel C. Hold the test switch in the up position. The high priority LED indicator for channel C should light. Set the push-wheel switch to channel D. Hold the test switch in the up position. The high priority LED indicator for channel D should light. If any of the call indicator LEDs fail to light, return the unit to GTT for repair.</td>
</tr>
<tr>
<td>Emitter is out of range, or Emitter ID is not valid in the phase selector.</td>
<td>To test this possibility, reset the phase selector to default range settings by setting the push-wheel switch to R and holding the test switch in the high, or up, position for at least 5 seconds while cycling the power off then on. The test switch must be held for a minimum of 2 seconds following power up. This will clear any high priority range settings and ID code restrictions.</td>
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Table 9-1. Troubleshooting Symptoms, Possible Causes, and Solutions (Cont.)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Power LED is lit, but call LEDs do not light when a high priority signal is present. (Cont.)</td>
<td>No DC voltage to detector or bad wiring.</td>
<td>For Type 170 controllers, set a multimeter to read at least 30 VDC. Disconnect the orange wire of the cables from the input file. Measure voltage between pin E and pin K of the card slot connector. Replace the phase selector if the voltage is less than 20 VDC. Reconnect the orange detector wires. For Model 760 card racks, measure the voltage across TB1-5 and TB1-7 with the orange detector wires disconnected. Replace the phase selector if the voltage is less than 20 VDC. Reconnect the orange detector wires. Verify that all detector connections are wired per this installation manual. For a final quick wiring check, remove the Model 754 or 752 phase selector(s) from their slots in the chassis and measure the resistance between all combinations of detector wires. A resistance reading of less than 500 ohms between any two wires indicates a short in either the detector wiring or the detector(s).</td>
</tr>
<tr>
<td>Detector failed.</td>
<td>If all wiring is correct, replace the detector on the failed channel with a known good unit. If there is still a problem, please contact GTT Intelligent Transportation Systems Technical Service at: 1-800-258-4610.</td>
<td></td>
</tr>
<tr>
<td>Power LED is lit, but call LEDs do not light when a low priority signal is present.</td>
<td>Phase selector failed.</td>
<td>Place a test call on channel A low priority by setting the push-wheel switch to A and holding the test switch in the down position. The low priority call LED for channel A should light. Wait until the channel A call LED goes out. Set the push-wheel switch to channel B. Hold the test switch in the down position. The low priority LED indicator for channel B should light. For Model 754 phase selectors, continue with the following:</td>
</tr>
<tr>
<td>Symptom</td>
<td>Possible Cause</td>
<td>Solution</td>
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<tr>
<td>Power LED is lit, but call LEDs do not light when a low priority signal is present. (Cont.)</td>
<td>Phase selector failed. (Cont.)</td>
<td>Set the push-wheel switch to channel C. Hold the test switch in the down position. The low priority LED indicator for channel C should light. Set the push-wheel switch to channel D. Hold the test switch in the down position. The low priority LED indicator for channel D should light. If any of the call indicator LEDs fail to light, return the unit to GTT for repair.</td>
</tr>
<tr>
<td>Emitter is out of range, or Emitter ID is not valid in the phase selector.</td>
<td></td>
<td>To test this possibility, use the 750 series configuration software (750-CS) to set the low priority range setting values to zero and to eliminate any ID code restrictions on the emitter signal.</td>
</tr>
<tr>
<td>No DC voltage to detector or bad wiring.</td>
<td></td>
<td>For Type 170 controllers, set a multimeter to read at least 30 VDC. Disconnect the orange wire of the cables from the input file. Measure voltage between pin E and pin K of the card slot connector. Replace the phase selector if the voltage is less than 20 VDC. Reconnect the orange detector wires. For Model 760 card racks, measure the voltage across TB1-5 and TB1-7 with the orange detector wires disconnected. Replace the phase selector if the voltage is less than 20 VDC. Reconnect the orange detector wires. Verify that all detector connections are wired per this installation manual. For a final quick wiring check, remove the Model 754 or 752 phase selector(s) from their slots in the chassis and measure the resistance between all combinations of detector wires. A resistance reading of less than 500 ohms between any two wires indicates a short in either the detector wiring or the detector(s).</td>
</tr>
<tr>
<td>Detector failed.</td>
<td></td>
<td>If all wiring is correct, replace the detector on the failed channel with a known good unit. If there is still a problem, please contact GTT Technical Service at: 1-800-258-4610.</td>
</tr>
<tr>
<td>Symptom</td>
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<tr>
<td>Phase selector call indicator LEDs light, but intersection will not acknowledge signal.</td>
<td>Incorrect wiring.</td>
<td>Verify that call outputs are wired to correct pins. Refer to Table 5-3 and Table 5-4 for pin assignments.</td>
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<td>Incorrectly programmed controller.</td>
<td>If the outputs are correct, verify that the controller is programmed correctly and that signal lines are wired correctly to the controller’s priority control inputs.</td>
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<td>Green terminates before priority vehicle clears the intersection.</td>
<td>Improper phase selector programming.</td>
<td>Reprogram the phase selector hold time.</td>
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<td>Improper detector alignment.</td>
<td>Align the detector to overcome temporary signal blockages or level the detector to allow a view of the entire vehicle approach path.</td>
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<td>Phase selector failed.</td>
<td>Replace the phase selector. Return the failed unit to GTT for service.</td>
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<tr>
<td>Intersection is slow to respond.</td>
<td>Dirty detector lenses.</td>
<td>Clean detector lenses.</td>
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<td></td>
<td>Emitter misaligned.</td>
<td>Align emitter.</td>
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<td></td>
<td>Range set point is not correct.</td>
<td>Reset the range by adjusting the signal intensity threshold level. See Section 8.3.</td>
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<tr>
<td></td>
<td>Incorrectly programmed controller.</td>
<td>If the outputs are correct, verify that the controller is programmed to respond to a priority control input in a safe and timely manner.</td>
</tr>
<tr>
<td>Call will not drop.</td>
<td>Detector oscillating.</td>
<td>Disconnect the detector from the channel experiencing the problem. The call LED should turn off. If it does, replace the detector.</td>
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<tr>
<td></td>
<td>Phase selector failed.</td>
<td>Disconnect the detector from the channel experiencing the problem. The call LED should turn off. If the call remains, replace the phase selector.</td>
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10 Maintenance

The Opticom™ Infrared System components are designed for reliable operation. Inspect the components at regular intervals to ensure proper system operation.

GTT recommends the following:

- All Model 711, 721, or 722 detectors should be cleaned and inspected at least every twelve months.
- Each intersection and emitter system should be inspected and tested at least every twelve months to ensure that it functions to your specifications and requirements.
- Intersection systems should be tested with known good emitter systems.
- Emitter systems should be tested with known good intersection systems.
- You should develop a test plan that fits your department’s operations and meets the needs of your system.
- You should keep accurate and up-to-date records of system performance and test results.

Test the Model 752 or 754 phase selector as outlined below:

1. Set the push-wheel switch to channel A. Hold the test initiate switch up. The controller should recognize a channel A high priority request (the channel A High LED will light). Release the test switch.

2. If the controller does not recognize the high priority request, substitute a spare unit into the system and re-test. If the problem persists with the spare unit, the problem may be in the wiring from the phase selector/system chassis or the traffic control system.

3. Hold the test initiate switch down. The controller should recognize a channel A low priority request (the channel A Low LED will light). Release the test switch.

4. If the controller does not recognize the low priority request, substitute a spare unit into the system and re-test. If the problem persists with the spare unit, the problem may be in the wiring from the phase selector/system chassis or the traffic control system.

5. Repeat steps 1 through 4 for channel(s) B (C and D on Model 754 phase selectors) setting the push-wheel switch to B (C and D, respectively).

NOTE

More extensive system tests are available by using the 750 series configuration software (750-CS).
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GTT will, at its sole option, repair, replace or refund any amounts paid for any Opticom™ Infrared System component found to be defective in materials or manufacture within five (5) years from the date of shipment from GTT. See “Warranty and Extended Coverage” for details and limitations of the coverage plan. GTT will provide a functioning replacement component at a standard charge per unit for an additional five (5) years.

GTT warrants future system operability coverage as described herein. The warranties set forth in this document shall not apply to (A) incandescent lamps (confirmation lights) or (B) to any Opticom infrared system components which have been (1) repaired or modified by persons not authorized by GTT; (2) subjected to incorrect installation, misuse, neglect or accident; (3) damaged by extreme atmospheric or weather-related conditions; or (4) subjected to events or use outside the normal or anticipated course.

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