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Autoscope Phoenix Installation Guide

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Chapter 1
Autoscope Phoenix Product Description

Introduction

The Autoscope Phoenix two-camera video detection system provides digital image processing using an advanced video processor in a single-channel, rack-mount unit. The Phoenix detector card may be used with cameras that meet certain performance specifications to detect the presence of vehicles at two junction approaches. There are two cameras available for the Phoenix. For information regarding cameras, please contact your Autoscope Specialist.

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Figure 1-1. Autoscope Phoenix

A typical Autoscope Phoenix System has the following components:

- Autoscope Phoenix
- Two cameras.

Autoscope Phoenix

Figure 1-2. Phoenix Front Panel

The Phoenix front panel provides LED status indicators for power, communications, valid video for two cameras, outputs, and processing status. It also has a Local Supervisor connector for communications via a DB9M, RS-232 serial cable connector (9600 to 230 Kbaud) or a serial mouse and a dongle. Finally it provides, switch-selectable, analog Video output.

The Phoenix 64-pin DIN connector Backplane provides power connections, 2 video inputs, 4 signal status inputs, and 16 detector outputs. These 16 outputs are fail-safe, open collector, and active low or high. There is also one status output to indicate that the card is processing and detector I/O is valid. This output is open collector, active low. The Backplane also provides an RS-485 bus that allows you to make four multi-drop connections.

Autoscope Phoenix Parts and Cables

An Autoscope Phoenix ships with the following components in Kit 800620: the Autoscope Phoenix; the Autoscope Phoenix Backplane; 8.33 Software CD, and a BNC-to-SMA, RoHS-compliant cable:

Table 1-1. System Part Numbers and Descriptions

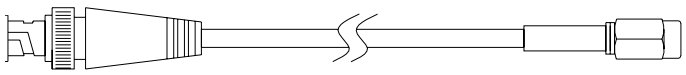
ISS Part Number	System Description
600620	**Autoscope Phoenix**
600661	**Autoscope Phoenix Backplane**
600388	**BNC-to-SMA Cable, 3.8 meters (12.5 feet)** 
100-8.3.2	**8.3.3 Software CD Normal ISS Customer Version**

Table 1-2. Accessory Part Numbers and Descriptions

ISS Part Number	Qty	Cable Description
Call Technical Support	**1**	**Serial Mouse and a dongle.**
Call Technical Support	**1**	**Serial Supervisor Cable for connection to a personal computer.**
700285-*XX*	**1**	**Assy, Top Level, RackVision Backplane Bus Ribbon Cable, 12 Position**

The Phoenix itself has two component parts: the Phoenix (Figure 1-2), and the Phoenix Backplane (Figure 1-3):

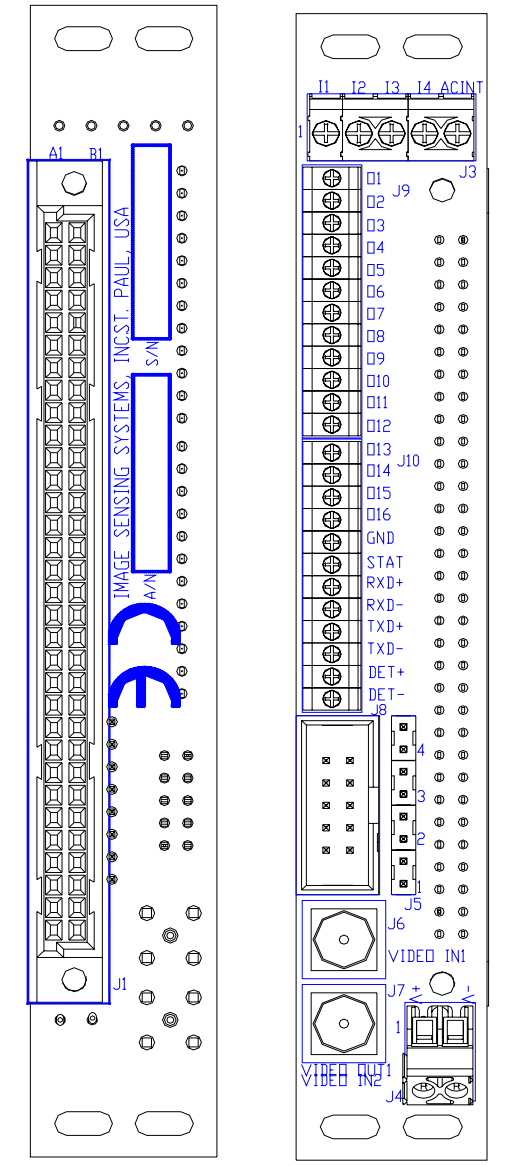


Figure 1-3. Phoenix Backplane

Autoscope Phoenix Configuration

The Autoscope Phoenix:

- Manages detection information, detection outputs, and video signals from up to 2 cameras.
- Accepts phase information from a traffic controller for up to four phases through its backplane.
- Provides an RS-232 port to use with a local laptop computer or mouse as needed for MVP setup or for diagnostics.
- Provides RS-485 multi-drop communications on the backplane.

<table>
<tr><th colspan="2">Specifications</th></tr>
<tr><td>Electrical
Power Supply:
12 to 24 VDC, 11 Watts (maximum)
Power consumption, current draw:
12 VDC: 6W, 500 mA
24 VDC: 7W, 290 mA</td><td>Environmental
–34° C to +74° C (–29° F to +165° F)
0 to 95% relative humidity, non-condensing, over the temperature range</td></tr>
<tr><td>Dimensions
(Height × Width × Length [3U × 160 mm])
130 mm × 20 mm × 207 mm
(5.12in × 0.80 in × 8.15 in)</td><td>Weight
0.16 kg (0.35 lb)</td></tr>
<tr><td rowspan="2">Video
Input:
Two channels, 75Ω 1 Vpp, SMA connector
PAL, CCIR, NTSC, or RS170
Output:
1 Vpp, BNC connector on front
1 Vpp, SMA connector on back
PAL or NTSC</td><td>Communications
RS-232 Supervisor communication via DB9 connector on front panel (9600 to 230K Baud)
Multi-drop, RS-485 Supervisor communication on back</td></tr>
<tr><td>Regulatory:
CE
CE EN 55022, EN 61000-6-1</td></tr>
</table>

Phoenix Front Panel Configuration

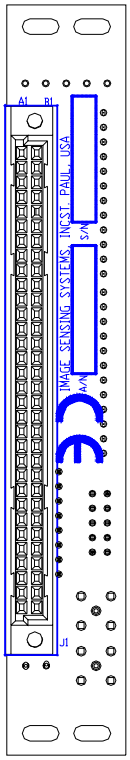
The Phoenix front panel provides:

- LED status indicators for power, communications, valid video for two cameras, processing status, and outputs.
- Local Supervisor communications via a DB9, RS-232 serial cable connector or a serial mouse and dongle.
- Switch-selectable, analog Video output.

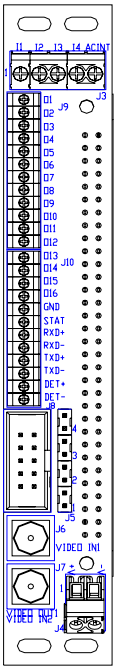
Table 1-3. Indicator Functions

Indicators	Function
POWER	Activates upon power up.
TxD	Indicates Phoenix is transmitting data.
RxD	Indicates Phoenix is receiving data.
VIDEO 1/ VIDEO 2	Indicates presence of good video signal from each of two cameras. Composite video inputs (PAL, CCIR, NTSC, or RS170) enable the Phoenix to process signals in real time from two video cameras.
READY	Indicates the Phoenix processing software is running.
OUTPUTS	Shows current output status. On=Active. Off=Not Active.

Phoenix Back Panel Configuration



600661A Assembly
Top Side



600661A Assembly
Bottom Side

The Phoenix Backplane provides the following connectors or terminations. All pinouts are defined in Chapter 3:

- **J1** is a standard DIN 41612, Type C, 64-pin, male connector. The Phoenix plugs into this connector.
- **J3** consists of 5 screw terminal inputs, **I1**–**I4** and **ACINT**. The **ACINT** is reserved for the AC interrupt signal that is used as a clock synchronization source. All the inputs are read in as active low. These inputs are typically used to provide the RED and GREEN signal states to the processor for intersection control applications. The **ACINT** signal has logic level voltages 0 to +5 VDC.

  IMPORTANT NOTE: AC INT accepts inputs with the voltage range 0 to +5 VDC. Inputs 1 to 4 can accept higher input voltage levels from 0 to 24 VDC. If the user mistakenly applies the higher INPUT voltage to the **AC INT** pin, then the device will be damaged.
- **J4** provides the power supply screw terminals. Supply voltage may range from 12 to 24 VDC. Positive is connected to **V+**, Negative to **V-**. A Logic **GND** connection is provided on **J2-17** and it is recommended that you use this pin for the logic ground connection.
- **J5** is the IDENT.
- **J6** is the **VIDEO IN1** SMA connector. This connector connects to camera 1 using an SMA-to-BNC cable that connects to the coaxial cable that comes from one of two cameras. You use a male-to-male “barrel” connector to connect the SMA-to-BNC adaptor cable to the camera coaxial cable.
- **J7** is the **VIDEO IN2** SMA connector. On the backplane, this is also labeled **VIDEO OUT1** to allow for dual use in the Terra as well as the Phoenix System. This connector connects to the camera using an SMA-to-BNC cable that connects to the coaxial cable that comes from the second of two cameras. You use a male-to-male “barrel” connector to connect the SMA-to-BNC adaptor cable to the camera coaxial cable.
- **J8** is a bus connector for a ribbon cable connector across the backplanes.
- **J9** and **J10** consists of two 12-pin high-density terminals with screw connectors that accommodate up to two wires each from 20 to 26 AWG: **O1**–**O16**, **GND**, **RXD+**, **RXD-**, **TXD+**, **TXD-**, **DET+**, **DET-**, and **STATUS**. If two wires are used, only 22 to 26 AWG should be used. These 24 outputs are fail-safe open collector, and active low. The status output indicates that the card is processing. This output is open collector, active low. The outputs, **O1**–**O16**, can be inverted in software to emulate active high outputs. **Status** output (open collector, active low), when **ON**, indicates the card is operational.

RS-232 NULL Cable (Direct Connection from Autoscope Equipment to Computer running Communications Server Software)

You communicate locally with the Autoscope Phoenix via the RS-232 serial port labeled **SUPERVISOR.** This port can be connected to a PC or a mouse to install software on the MVP, to create and place detector zones, and to verify detector operation.

Use an RS-232 NULL cable to provide a local, RS-232 connection.

Note Using the above NULL cable on the Autoscope Phoenix **SUPERVISOR** port (directly) requires the **Isolate Local Autoscopes from Network** option in the Autoscope Network Browser to be unchecked for normal operation.

To connect the RS-232 NULL Cable:

1. Connect one end of the cable to the connector marked **SUPERVISOR** on the Phoenix (see above note).
2. Connect the other end of the cable to the appropriate computer serial port. Because the Autoscope Phoenix is designed as data terminal equipment (DTE), you must connect to a PC (another DTE device) with a communications cable using one of the two NULL configurations shown below.

   The following NULL communications cable pinout is used by the cable supplied with the Autoscope System (this is recommended):

Note You can use a 9-to-25-pin adapter if the network computer serial port has a 25-pin connector. These adapters are available at most local computer stores.

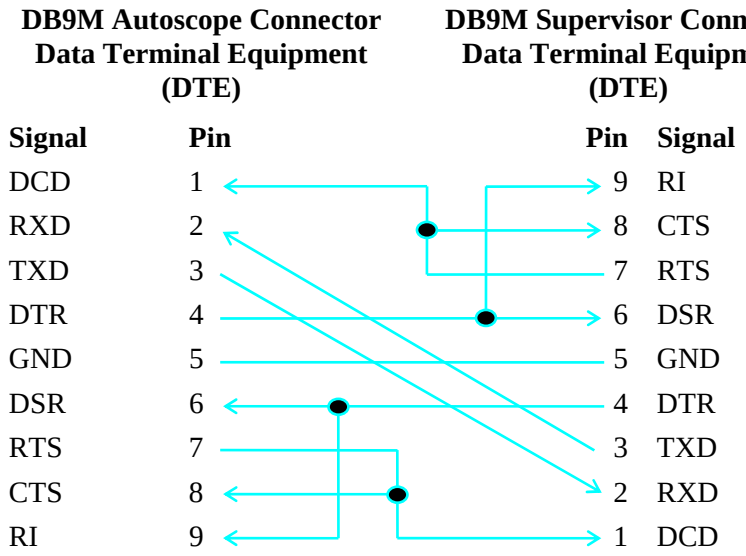


Figure 1-4. Preferred NULL Communications Cable Wiring (This is the same as used on other Autoscope products)

Note The NULL pinout cable shown in the figure below is readily available in most local computer stores.

DB9M Autoscope Connector Data Terminal Equipment (DTE)		DB9M Supervisor Connector Data Terminal Equipment (DTE)	
Signal	**Pin**	**Pin**	**Signal**
DCD	1	1	DCD
RXD	2	2	RXD
TXD	3	3	TXD
DTR	4	4	DTR
GND	5	5	GND
DSR	6	6	DSR
RTS	7	7	RTS
CTS	8	8	CTS
RI	9	9	RI

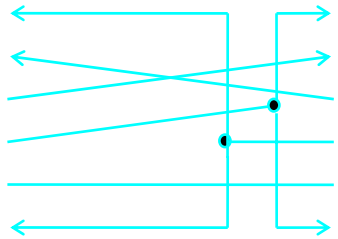


Figure 1-5. Alternate NULL Cable Pinout

Chapter 2
Selecting, Installing, and Testing Power and Coaxial Cables

Introduction

This section is designed to help you select, install, and test cables used to make power and video connections between the cameras and the Phoenix. This section does not tell you how to actually connect your cables to the equipment. Installation information is provided in subsequent chapters.

Camera Cables

Cameras can be mounted some distance from the traffic control enclosure. The power and coaxial cables discussed below usually provide a connection between a camera and some intermediate, aboveground junction point such as a pole-mounted junction box, or the bottom of a hollow luminaire, or a signal pole. Intermediate or branch cables may then be used to connect between the junction box or luminaire to the Phoenix in the traffic cabinet.

Coaxial Cables

You must select coaxial cables and install these cables to make the connection between the BNC connector on the backplane of each camera and the BNC connector on the Phoenix that is located in a protective enclosure such as a controller cabinet or roadside shed.

Recommended branch cables for the Phoenix are as follows:

For Underground (conduit) and aerial runs, use:

Coaxial cable–**Belden 8281**.

120 VAC power–Suitable, 3-conductor, AWG 16 (or larger) cable.

When you make connections:

- At the cabinet, you use the terminal strips provided on the Phoenix backplane for power terminations. You may run power cable all the way from the backplane power connection on the camera to the Phoenix backplane, or you may use an intermediate cable.
- At the bottom of the mounting pole, you may need to splice the coaxial cable coming from the camera to a branch coaxial cable.
- Correctly terminate the coaxial cables and attach them to a third-party surge suppressor as described later in this manual. Use shorter coaxial cables to connect from the top of the video suppressors to the Autoscope Phoenix Video Inputs.

Note For maximum video quality, if you need to run a video cable more than 150 meters (500 feet), then you will need to amplify the video signal.

ISS recommends that you use Belden 9259 to connect between the camera and the junction point.

Note Make sure that the correct connectors and tools are used for terminating coaxial cables. The better the quality of the video that the Autoscope Phoenix has to process, the better job it can do of detection!

The two coaxial cables, tooling and connectors that are recommended for that purpose are shown in the table below:

Table 2-1. Cables and Associated Tool Part Numbers

Coaxial Cable	Belden 8281	Belden 9259
Connector	Amphenol 31-71032	31-71008-1000
Stripping Tool	Cambridge CP-7738	Cambridge CP-7738
Crimping Tool	Amphenol CTL-2	Amphenol CTL-1
Useable Distances	Up to 152.6 meters (500 feet)	Up to 60.96 meters (200 feet)
Suitable for Conduit	Yes	No
Type of Shielding	Double	Single
Nominal Diameter	0.304”	0.242”

Belden 8281 Description

For distances between the junction box and the traffic control cabinet of less than 152.6 meters (500 feet), Belden 8281 coaxial cable is recommended. Belden 8281 is a 75-ohm, coaxial cable with 20-gauge, solid bare copper conductor (9.9 ohms/meter), solid polyethylene insulating dielectric, 96% (minimum) tinned-copper, double-braided shield, and black polyethylene, outer covering. Nominal outside diameter is 0.304 inches.

This cable has excellent weatherability, is moisture resistant, and can be installed in conduit underground or in the air using a strain pole configuration. Using the correct tooling, it should be terminated at both ends with the connector shown in Table 2-1.

Belden 9259 Description

For distances of less than 60.96 meters (200 feet) that do not require conduit, Belden 9259 can be used. This cable is **not** recommended for underground conduit. Belden 9259 is RG-59/U coaxial cable with 22-gauge, stranded, bare copper conductor (15 ohms/meter nominal), cellular polyethylene insulating dielectric, 95% bare, copper-braid shield, and black PVC outer covering. Nominal outside diameter is 0.242 inches.

This cable has good weatherability and flexibility. Using the correct tooling, it should be terminated at both ends with the connector shown in Table 2-1.

Cable Installation Guidelines

You may need to select an additional branch power and branch coaxial cable to install between each camera cable junction point and the traffic control cabinet or other roadside enclosure where the Autoscope Phoenix is located.

If a junction box is used, strain relief cord grips should be used wherever cables enter the box.

Each coaxial cable entering the traffic control cabinet should be labeled with the number of the

camera to which it is connected. If possible, adopt a uniform camera numbering convention for the whole installation.

An example for an 8-phase intersection is shown below.

Approach	Camera	Intersection Controller Phase
SB Snelling Ave	1	2, 5
EB University Ave	2	4, 7
NB Snelling Ave	3	6, 1
WB University Ave	4	8, 3

All branch cables should be installed in a continuous run (no splices) from the junction point to the cabinet to minimize moisture from seeping into connections. Avoid damage to the outer sheathing to ensure ground isolation.

Termination Instructions for Belden 8281 and Belden 9259 Coaxial Cable

List of Materials (Refer to Table 2-1 earlier in this section)

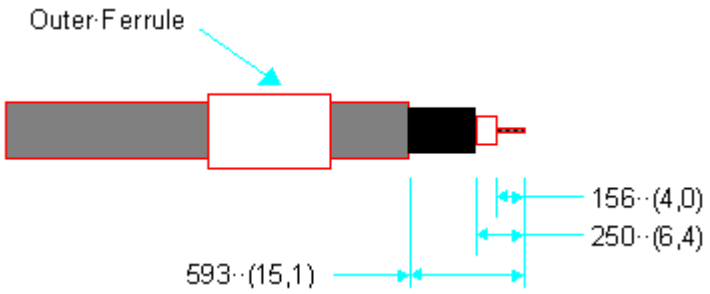
- Coaxial Cable:
- BNC Connector:
- Crimping Tool:
- Stripping Tool:

Procedure

Note

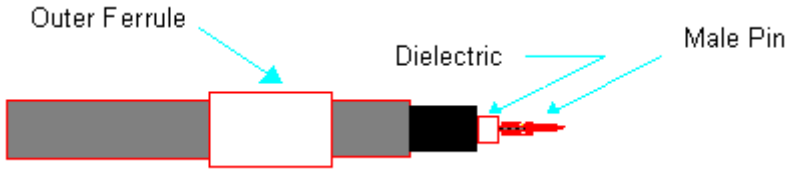
Dimensions listed in inches (millimeters).

1. Trim the end of the cable square.
2. Slide the connector outer ferrule over the coax cable as shown below.

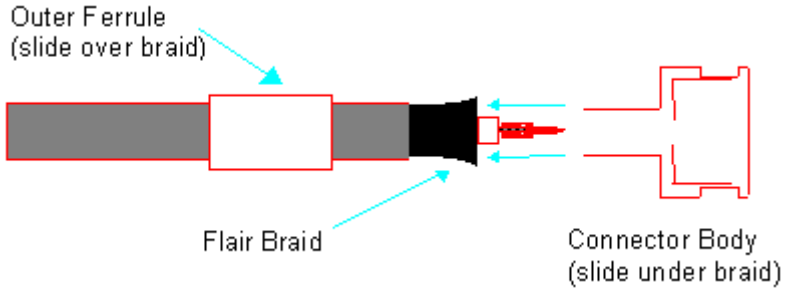


3. Strip the cable as shown above using the correct Stripping Tool from Table 2-1. Make all cuts sharp and square. The cut to the outer sheathing should not sever the braid.

4. Insert the center conductor into the male connector contact until the contact butts up against the center conductor dielectric as shown below. Crimp in place with the correct Crimping Tool from Table 2-1.



5. Flare the coaxial braid slightly and slide the connector body inside the braid until the male contact snaps in place as shown below.



6. Slide outer ferrule over braid and against connector body. Crimp in place with the Crimping Tool from Table 2-1.

7. Pull gently with both hands between the cable and connector to check the connector is properly crimped.

Testing Coaxial Cables

Ensure all coaxial cables are connected at all junction points. All coaxial cables must be checked for ground isolation and shorts between the center conductor and the shield after they have been installed and terminated with BNC connectors. Use the following procedure to test each cable. Steps 1 through 5 test for ground isolation. Step 6 tests for shorts.

1. Ensure that power is turned off at the source.
2. Ensure coaxial cables are connected at all junction points.
3. If connected, disconnect the camera cable from the camera.
4. Disconnect the branch coaxial BNC connection at the Autoscope Phoenix location.
5. Using an ohmmeter, attach one lead to a BNC connector body, and one lead to a good earth ground. The ohmmeter should display a larger resistance than 100,000 ohms. If the value is less than 100,000 ohms, it indicates that the coaxial cable shield is grounded. Examples of common problems are:
   - Coaxial connectors grounded in junction box.
   - Cable outer sheathing is damaged, allowing the braid shield to contact the conduit or signal pole.

Note The Autoscope Phoenix will not operate properly unless the coaxial cable shields are isolated from ground.

6. Using an ohmmeter, attach one lead to a BNC connector body, and one lead to the BNC center pin. The ohmmeter should display a larger resistance than 100,000 ohms. If the value is less than 100,000 ohms, it indicates that the coaxial cable center conductor is shorted to the shield. The most common cause of a short is an improperly crimped connector.
7. If a short is found, disconnect the cables at each junction point to find the shorted cable. Install new connectors on each end if necessary.
8. At the end of the test, reconnect the camera cable to the camera and reconnect any branch coaxial cables to the appropriate terminals.

Chapter 3
Installing the Autoscope Phoenix

Before you Install the Autoscope Phoenix

Use the following procedure to install the Autoscope Phoenix in the traffic control cabinet:

Caution

The Phoenix card has no transient protection for power, communications, or video. Thus all connections should be made on the protected side of the cabinet wiring and if using coaxial cabling, normal transient protection should be installed for the video coming from the camera. For transient device details and installation information, see Providing Video Signal Transient Protection for Coaxial Cable Connections later in this section.

Warning

Hazard of damage to personnel or system components.

Installing or working with any of these devices with power to the cabinet turned ON may cause injury to personnel or severely damage the Autoscope Phoenix, or additional devices connected to it.

Ensure that power is turned **OFF** at the cabinet breaker before you touch any installed devices or try to install devices.

Note

The Status output pin of the Phoenix is **ON** as long as the detection software is running. It is used to tell the controller that the software is running. Therefore, the pin is **ON** during normal operation and also if:

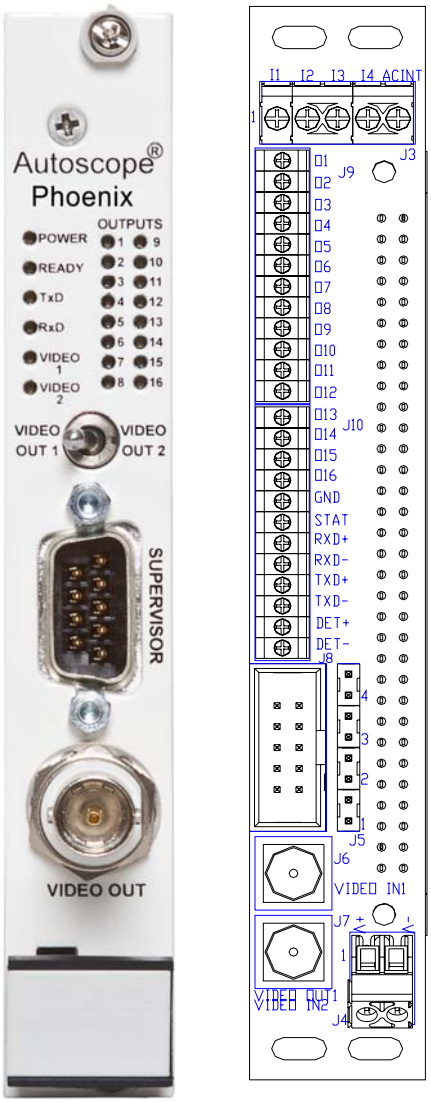
- No detector file is being processed.
- The unit is in surveillance mode.
- The unit is in state block mode to run the System Test application.
- There is no valid video being input to the Phoenix.
- There is a severe error.

The Status output pin of the Phoenix goes **OFF** if only no software or the pre-detection software (Boot Loader) is running. This indicates the Phoenix has failed.

Caution

If the input Video cables experience common mode and differential interference of 150 KHz through 1 MHz, video quality will be substantially degraded and you may lose video detection. The video signal supplied should be free of common mode and differential interference.

Installation Procedure:



Phoenix Front Panel Phoenix Backplane

Figure 3-1. Phoenix Front Panel and Backplane Views

To install the Phoenix:

1. Check that the voltage level to be provided to the Phoenix is correct. Voltage provided may range between 12 and 24 VDC.
2. *Disconnect the mains power to the power supply for the rack* in which the Phoenix will be installed. Check for no voltage.
3. *Install the* Phoenix *Backplane* to the back of the VME rack, using the four screws provided to attach each card to the rack. The standard DIN 41612, Type C, 64-pin connector (**J1**) should face the front of the rack. The SMA connectors and terminal blocks should face outwards from the rear of the rack with the SMA connectors at the bottom (See Figure 3-1, Backplane).
4. *Connect the rack power supply wiring* to the **J4** power screw terminals. Voltage provided may range between 12 and 24 VDC. Positive voltage is connected to **V+**. Supply **GND** is connected to the GND terminal on **J2**. Use the wiring convention in Table 3-1:

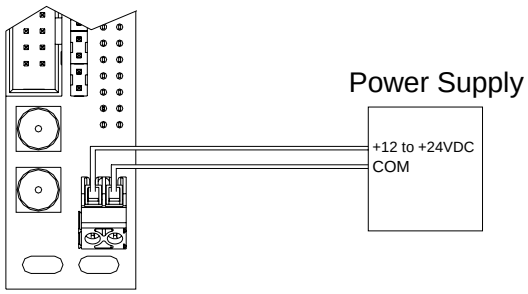
Table 3-1. CEE Wiring Convention

Wire	CEE Standard
Power	Red
Ground	Black

For Phoenix Backplane pinout information, see Table 3-3.

Note The wires connecting the Power Supply to the Phoenix Backplane shall be less than three meters in length.

The following wiring diagram shows how to wire power to the Phoenix Backplane. The first image is the typical wiring for most applications.



Typical Power Wiring for the Phoenix

5. *Video In SMA/BNC Adapter cable.* Connect the SMA end of the SMA-to-BNC adapter cable to the **J6 VIDEO IN1** connector. Connect the BNC end of the adapter cable to the coaxial cable that comes from either the fiber optic transceiver or the transient-protected coaxial cable connected to the CCTV camera. For transient device details and installation information, see Providing Video Signal Transient Protection for Coaxial Cable Connections later in this chapter.

Note The second SMA connector on the backplane is labeled as **VIDEO OUT1** and **VIDEO IN2.** For the Phoenix, it is treated as a second video input.

6. *Video Out SMA/BNC Adapter cable.* Connect the SMA end of the SMA-to-BNC adapter cable to **J7 VIDEO OUT1/ VIDEO IN2** connector. Connect the BNC end of the adapter cable to the coaxial cable that comes from either the fiber optic transceiver or the transient-protected coaxial cable connected to the CCTV camera. For transient device details and installation information, see Providing Video Signal Transient Protection for Coaxial Cable Connections later in this chapter.

Note The signals from the controller should be logical voltages (0 to **V+** VDC). For location of **V+** terminal, see Figure 1-3, **J4** connector.

Caution

Hazard of equipment damage.

J3 Pin 5 (**AC INT**) permissible voltage level is 0 to +5 VDC. Do not connect a controller input signal with higher voltage to this pin.

7. *Connect AC INT to provide clock synchronization signal to Phoenix.* The Phoenix Model does not have on-board circuitry to extract a clock synchronization signal from the AC input voltage. If available, connect an AC interrupt signal from the Traffic Controller to **J3** Pin 5 (**AC INT**), see Table 3-4. This signal has logic level voltages 0 to +5 VDC.
8. You can now apply power to the Phoenix and verify its proper operation.

Applying Power to the Phoenix and Verifying Proper Operation

1. *Connect Power*. When all connections are completed, reconnect mains power to the rack power supply.
2. *Verify connections*. To verify proper wiring, you may observe proper operation once the Phoenix detector file is configured.
3. *Further assistance*. Please contact your local Autoscope technical support specialist or Autoscope Technical Support at support@imagesensing.com if you have any questions or concerns.

How Phoenix Inputs and Outputs Work

Outputs from the Phoenix are transistors and may be treated as contact closures within their operating range, provided that the proper polarity is maintained. Outputs turn **ON** (contacts close) when the corresponding MVP detector is active.

Electrical connection options are shown below:

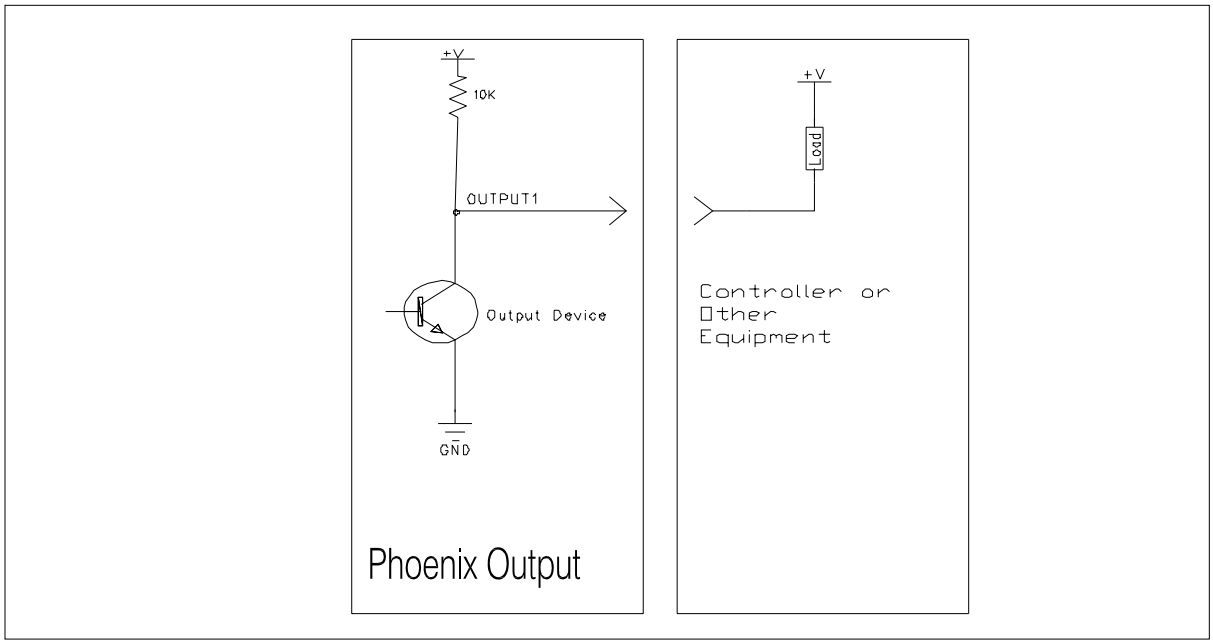


Figure 3-2. Output Connection Options

Inputs to the Phoenix are voltage activated. Applying a voltage of less than ½ of the supply voltage to an input will active that input. Connection examples are shown below.

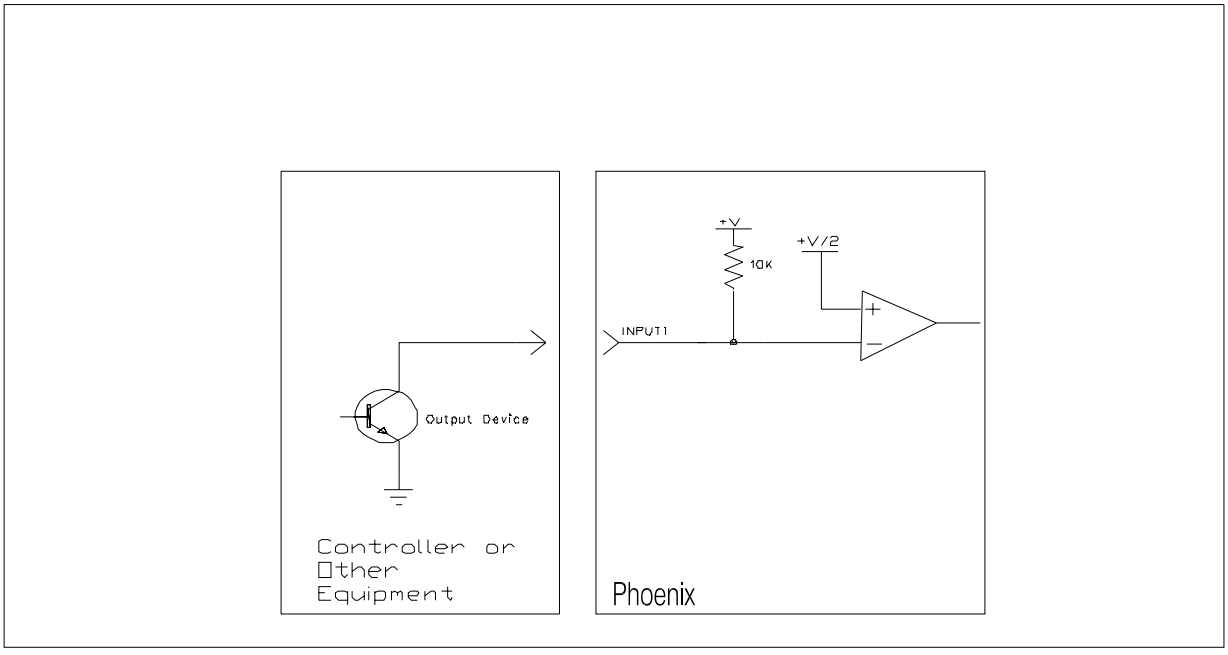


Figure 3-3 Input Connection Options

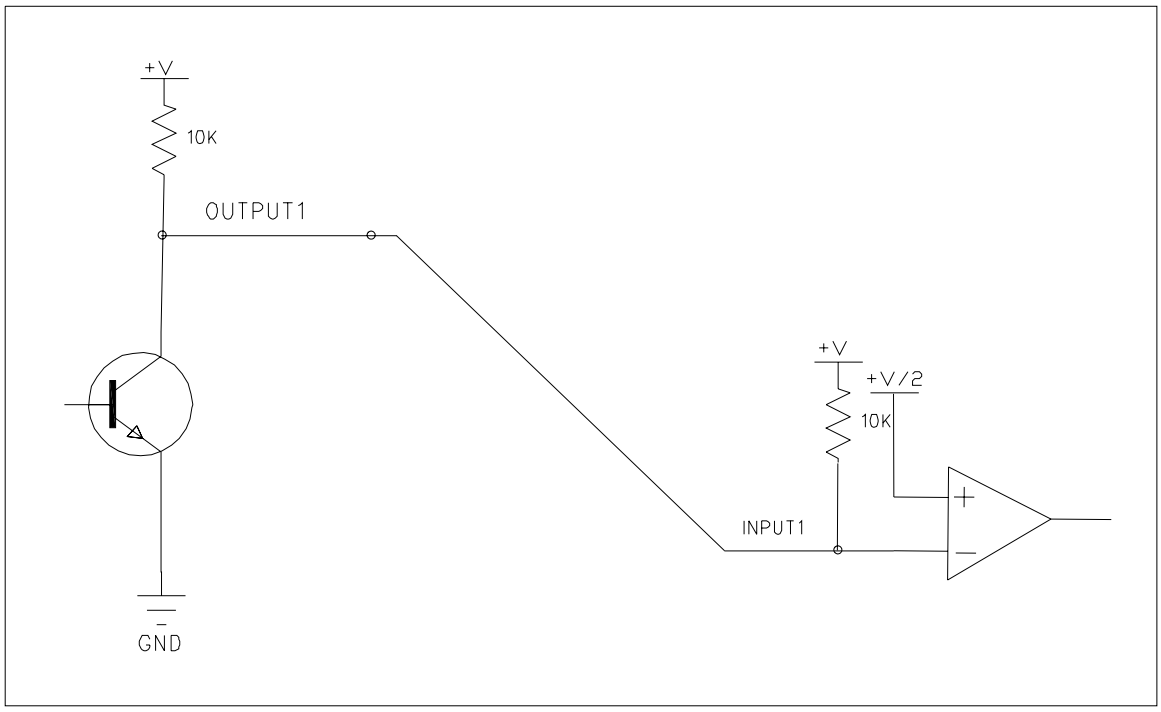


Figure 3-4. Loopback Testing Option

Providing Video Signal Transient Protection for Coaxial Cable Connections

To provide video signal transient protection, the video must first go through an appropriate transient suppression device to avoid damage to equipment from a lightning strike or other transient event. ISS recommends you use the EDCO CX06-BNCY Surge Suppressor or equivalent.

To install:

1. Plug in the connector labeled **CABLE** to the BNC cable going to the Phoenix **J6 VIDEO IN1** connector. You connect the connector labeled **EQUIP** to the BNC cable coming from the camera. Ground the Surge Suppressor to cabinet ground using the grounding point provided on the Suppressor. It is important that the video cables be isolated from ground.

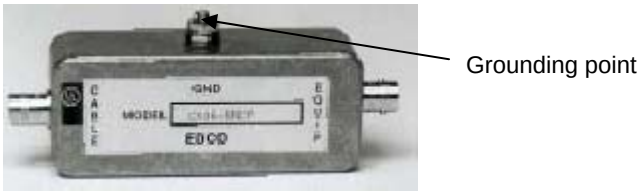


Figure 3-5. Grounding Point

Phoenix Pinouts

Pinouts for the Phoenix DB9M Supervisor Connector are provided in Table 3-2.

Table 3-2. Supervisor Port Pinouts

DB9M Supervisor Port (RS-232)	
1	
2	RXD Input
3	TXD Output
4 tied to 7	DTR Output
5	GND
6	DSR Input
7 tied to 4	RTS Output
8	
9	

Phoenix Backplane Pinouts

Pinouts for the **J1**, **J3**, **J4**, **J6**, **J7**, **J9** and **J10** connectors for the Phoenix Backplane are provided in Tables 3-3 through 3-8. The 64-pin Male Connector **J1** provides the connector for the Phoenix to plug into on the Phoenix Backplane. The Phoenix Backplane is mounted on a Detector Rack. Pinouts are listed below:

Table 3-3. Phoenix Backplane Module Pinouts

64-Pin Header Connector # (J1)	Backplane J1 Label	Backplane Description	64-Pin Header Connector # (J1)	Backplane J1 Label	Backplane Description
1	A1	Not Used	33	A17	OUT3
2	B1	GND	34	B17	OUT12
3	A2	RXD+	35	A18	OUT13
4	B2	GND	36	B18	OUT14
5	A3	OUT1	37	A19	VIDEO IN2+
6	B3	RXD-	38	B19	GND
7	A4	IN1	39	A20	OUT7
8	B4	Not Used	40	B20	VIDEO IN2-
9	A5	TXD+	41	A21	OUT15
10	B5	IN2	42	B21	ID BIT1
11	A6	Not Used	43	A22	OUT16
12	B6	TXD-	44	B22	Not Used
13	A7	STATUS LED	45	A23	GND
14	B7	AC INT	46	B23	Not Used
15	A8	IN3	47	A24	Not Used
16	B8	Not Used	48	B24	OUT4
17	A9	GND	49	A25	DET+
18	B9	IN4	50	B25	Not used
19	A10	Not Used	51	A26	Not Used
20	B10	OUT2	52	B26	Not used
21	A11	GND	53	A27	Not Used
22	B11	GND	54	B27	Not used
23	A12	OUT5	55	A28	Not Used
24	B12	VIDEO IN1--	56	B28	DET-
25	A13	VIDEO IN1+	57	A29	Not Used
26	B13	OUT6	58	B29	ID BIT2
27	A14	GND	59	A30	ID BIT3
28	B14	Chassis GND	60	B30	Supply (10 to 30) VDC (V+)
29	A15	OUT9	61	A31	OUT8
30	B15	OUT10	62	B31	ID BIT4
31	A16	OUT11	63	A32	Not Used
32	B16	GND	64	B32	V-

Terminal Block **J3** provides 4 inputs. These inputs can be used for detector processing which is defined via logic level signals for intersection control. Red or Green signals are used to provide enhanced "smart" detector outputs.

AC INT accepts inputs with the voltage range 0 to +5 VDC. Inputs 1 to 4 can accept higher input voltage levels from 0 to 24 VDC. If the user mistakenly applies the higher INPUT voltage to the **AC INT** pin, then the device will be damaged.

Table 3-4. J3 Inputs/AC Interrupt Terminal Block

4-Pin Output Terminal Block	
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	AC Interrupt

Terminal Block **J4** provides power connections.

Table 3-5. J4 Power Terminal Block

2-Pin Power Terminal Block		
Pin 1	+V	+12 to 24 VDC
Pin 2	-V	Logic Ground

SMA mount **J6** provides the Video Input connector.

Table 3-6. J6 SMA Video Input Connector

2-Pin Video Input Connector	
1	VID IN1+
2	VID IN1-

SMA mount **J7** functions as a Video Input connector. It may also function as a Video Out connector.

Table 3-7. J7 SMA PC Mount Video Input Connector

2-Pin Video Output Connector	
1	VID IN2+
2	VID IN2-

Terminal Blocks **J9/J10** provides 16 outputs, logic ground, 1 status output, RXD+, RXD-, TXD+, TXD, DET+, and DET- connectors. Assignments of detector output to these pins are made via software configuration.

Table 3-8. J9/J10 High-Density Terminal Block

Pin	Signal
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Output 5
6	Output 6
7	Output 7
8	Output 8
9	Output 9
10	Output 10
11	Output 11
12	Output 12

Pin	Signal
1	Output 13
2	Output 14
3	Output 15
4	Output 16
5	Ground
6	Status
7	RXD+
8	RXD-
9	TXD+
10	TXD-
11	DET+
12	DET-

Communications for Bussing Multiple Phoenix Units

To buss multiple Phoenix units:

Note If you need to buss more than 32 Phoenix units together, please contact your local Autoscope technical support specialist or Autoscope Technical Support at support@imagesensing.com, to verify that the approach you are intending to use is optimal.

1. *Disconnect the mains power to the power supply for the rack* in which wiring will be modified. Check for no voltage.
2. *To create a communications buss between multiple Phoenix cards*, connect a ribbon cable (ISS P/N700285-*XX*) to each **J8** 2 × 5 header on the back of each Phoenix Backplane. For **J8** pinout information, see Table 3-8.

Note Pin 1 of **J8** can be identified as the pin that has the square solder pad on the circuit board. Additionally, the side of the connector on the backplane, next to pin 1, has an embossed arrow. The ribbon cable is a straight-through cable.

Note The Supervisor/Network signals on **J10** (**RXD+/-** and **TXD+/--** are supplied via **J8**. In the absence of a ribbon cable, the Supervisor/Network signals of **J10** can also be used to create the bus. If this approach is taken, wire the appropriate twisted-pair wires between Supervisor/Network signals of terminal block on this backplane to those of another backplane, connecting like signals to one-another, e.g. **RXD+** to **RXD+**, until all connections are complete.

For **J10** pinout information, see Table 3-8. For a multiple Phoenix connection using a ribbon cable, see Figure 3-6. For Phoenix-to-Phoenix connections using wiring, see Table 3-9.

Note When using the Supervisor/Network signals on **J10** to connect two Phoenix units together, it is not necessary to twist the wires in each pair together unless the separation between the two units is greater than 60 cm (2 ft). If the separation between two connected units is greater than this distance, twist the wires in each pair at a rate of about 1 full twist per 2.5 cm (1 in).

Note **J10** Pins 11 and 12 are labeled **DET+/-** but the Phoenix does not support a Detector Port Master so these are not applicable.

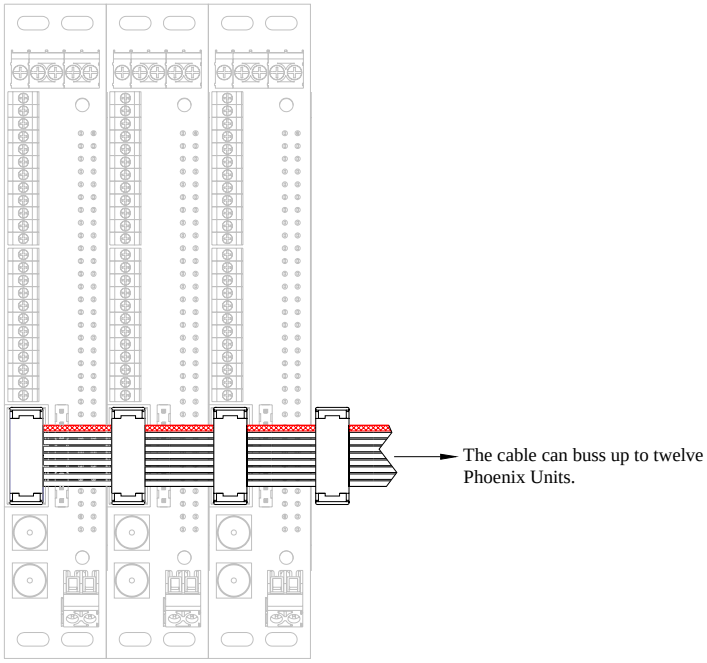


Figure 3-6. Phoenix-to-Phoenix Connections Using Ribbon Cable

Table 3-9. Phoenix-to-Phoenix using twisted pair wire (J10 Terminal Block)

Previous Phoenix J10 Terminal			2 Twisted Wire Pair	Next Phoenix J10 Terminal	
J10 Terminal Block		Terminal Pin #	Wire Color	Signal	Terminal Pin #
1 Twisted Pair:	RXD+	7	Blue	RXD+	7
	RXD-	8	Black	RXD-	8
1 Twisted Pair:	TXD+	9	Red	TXD+	9
	TXD–	10	Black	TXD-	10

Note

If your Supervisor Port bus contains more than 8 Phoenix units, then you must add 120-Ohm termination resistors to the ends of the bus. These resistors would go between **RXD+** and **RXD-** and also between **TXD+** and **TXD-** of the Phoenix units at each end of the bus. (If you are using an ACIP at one end of the bus, then you do not need to add termination resistors at that end of the bus. Termination resistors are already integrated into the ACIP.)

3. *Connect Power*. When all connections are completed, reconnect mains power to the rack power supply.
4. *Verify connections*. To verify proper wiring, you may observe proper operation once the Phoenix detector file is configured.
5. *Further assistance*. Please contact your local Autoscope technical support specialist or Autoscope Technical Support at support@imagesensing.com if you have any questions or concerns.

Table 3-10. J8 Bus Connector Signals

J8 Pin	Signal From
1	J9 pin 7 RXD+
2	J9 pin 8 RXD–
3	J9 pin 9 TXD+
4	J9 pin 10 TXD–
5	GND
6	GND
7	GND
8	J3 PIN 5 AC Interrupt
9	J9 pin 11 DET+. Not supported by Phoenix
10	J9 pin 12 DET. Not supported by Phoenix

Terminal Blocks **J9/J10** (Tables 3-11 and 3-12) provide 16 outputs, logic ground, 1 status output, RXD+, RXD-, TXD+, TXD, DET+, and DET- connectors. Assignments of detector output to these pins are made via software configuration.

Table 3-11. J9 High-Density Terminal Block

J9 Pin	Signal
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Output 5
6	Output 6
7	Output 7
8	Output 8
9	Output 9
10	Output 10
11	Output 11
12	Output 12

Table 3-12. J10 High-Density Terminal Block

Pin	Signal
1	Output 13
2	Output 14
3	Output 15
4	Output 16
5	Ground
6	Status
7	RXD+
8	RXD-
9	TXD+
10	TXD-
11	DET+ Not supported by Phoenix
12	DET- Not supported by Phoenix