5910 Ethernet Gateway Hardware Manual

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1 Overview
The Model 5910 Ethernet Switch is a five port unmanaged switch used to route Ethernet messages. It is easy to install and operate as no configuration is necessary. Once the Ethernet connections are made and the unit is powered up, the 5910 will begin to operate.

The 5910 mounts on a DIN rail and is powered from the 5V available in SCADAPack controllers and other 5000 series systems. The 5910 can also be powered from 11-30Vdc sources such as 12Vdc batteries, 24Vdc power supplies or AC adapters. The 5910 is available with a desktop mounting option.

Applications include in-plant I/O and connectivity between SCADAPacks and operator workstations, other PLC devices and SCADA systems communications that uses 10BaseT (10 Mbps) or 100BaseT (100 Mbps) in an industrial environment.
2 Important Safety Information

Power, input and output (i/o) wiring must be in accordance with Class I, Division 2 wiring methods Article 501-4 (b) of the National Electrical Code, NFPA 70 for installations in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations within Canada and in accordance with the authority having jurisdiction.

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**WARNING**

EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.

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**WARNING**

EXPLOSION HAZARD – WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.

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**WARNING**

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
3 Installation

The 5910 Ethernet Switch is available in two standard versions, the model 5910 and the model 5910SA. The model 59105 is a standard 5000 Series module that connects to the system I/O Bus as an integrated part of a Control Microsystems system. The model 5910SA is a stand-alone version of the 5910 and is used with other devices such as personal computers. Both versions of the modem are identical in every respect except that the 5910SA has rubber feet for desktop mounting.

![Figure 1: 5910 Module Layout](image)

3.1 Field Wiring

The 5910 module has six connectors for field wiring. Refer to Figure 1: 5910 Module Layout for the location of these connectors.

- The five Ethernet connections are terminated at the RJ-45 modular jacks labeled Ports1 through 5. The RJ-45 modular jack pin-out is compatible with straight-through Ethernet cables and cross-over Ethernet cables. See the Ethernet Connection section for more information.
- External power in the range of 11 to 30Vdc in maybe connected to pins 1 and 2 of P8. External power may come from any DC power source such as a 12V battery, 12Vdc AC adapter or
24Vdc power supply. See the Configuration Jumpers section for setting J1 and the Specifications for the current requirements.

**Note:** An AC adapter cannot be used in Hazardous Locations.

### 3.2 Ethernet Connection

The Ethernet network connects to the RJ-45 modular jacks labeled Port1 through Port5. The RJ-45 jack mates with 8-pin connector and cable assemblies common to Ethernet 100Base-T applications. Use data quality twisted pair cable. For best performance use shielded cable.

Pins 1,2,3 and 6 are used. Pins 4,5,7, and 8 are not used. See Figure 2: 5905 Ethernet RJ-45 Connection for pin connections. The Ethernet RJ-45 ports are MDI/MDIX Auto crossover compatible. The allows the use of straight-through or cross-over cables.

![RJ-45 Connection](image)

**Figure 2: 5905 Ethernet RJ-45 Connection**

### 3.3 Power Connections

The 5905 module may be powered in any one of the following ways:

- 5Vdc applied to the 5910 from the I/O Bus.
- 11-30Vdc applied to the 5910 on P8.

**NOTE:** The 5905 module is for use with Class 2 output power supplies only.

### 3.4 I/O Bus Connection

The 5910 module is normally powered through the connection to the system I/O Bus. The 5910 module is connected to the system I/O Bus using a cable connected to P1 or P2. Refer to the System Configuration Guide, at the beginning of this manual, for complete information on the system I/O Bus cabling. A jumper link must be installed in the bottom or “Bus power 5V” position on J1.

### 3.5 External Power Connection using an AC adapter

The 5910 Ethernet Switch can be powered using a 12Vdc AC adapter (Control Microsystems part number: 210056). The AC adapter plugs into a 120Vac supply and provides 12Vdc to the 5910. A jumper link must be installed in the upper or “External Power 11-30V” position on J1.
- Ensure the AC adapter is not connected to the 120Vac supply.
- Locate connector P8 on the 5910 module. Refer to *Figure 1: 5910 Module Layout* for the location of P8.
- The output cable end should be factory installed on a four position removable terminal block. The negative output connects to pin 1 and the positive output connects to pin 2. Pins 3 and 4 are not used.
- Insert the terminal block into connector P8.
- Plug the AC adapter into a 120Vac supply.

**Note:** The 12Vdc adapter connection cannot be used in Hazardous Locations.

### 3.6 External Power Connection using an external power source

The 5910 Ethernet Switch can be powered using 11-30Vdc power source such as a 24Vdc power supply. A jumper link must be installed in the upper or “External Power 11-30V” position on J1.

**Note:** A Class 2 power source must be connected to the External Power 11-30Vdc input on P8.

- Ensure the power source is off.
- Locate connector P8 on the 5910 module. Refer to *Figure 1: 5910 Module Layout* for the location of P8.
- Connect the power source outputs to the terminal block. The negative output connects to pin 1 and the positive output connects to pin 2. Pins 3 and 4 are not used.
- Insert the terminal block into connector P8.
- Turn the power source on.

### 3.7 Configuration Jumpers

The 5910 Ethernet Switch uses a single configuration jumper link for selecting the input power source.

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Description</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>Input power source is from an AC adapter or external power source.</td>
<td>Upper or “External Power 11-30V”</td>
</tr>
<tr>
<td>J1</td>
<td>Input is 5V from the Bus on P1 or P2.</td>
<td>Bottom or “Bus power 5V”</td>
</tr>
</tbody>
</table>

### 3.8 LED Indicators

The 5910 module has 11 LEDs to indicate module operation and status. The SCADAPack controllers cannot disable the power to these LEDs.

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>On when power is applied to the module. Power source can be Bus or External.</td>
</tr>
<tr>
<td>Link/Activity</td>
<td>One LED for each port. On when a link (proper Ethernet</td>
</tr>
<tr>
<td>LED</td>
<td>Function</td>
</tr>
<tr>
<td>-----</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>connection) has been established. Flickers when data is being transmitted or received.</td>
</tr>
<tr>
<td>Speed</td>
<td>Off for 10 Mbps operation. On for 100 Mbps operation.</td>
</tr>
</tbody>
</table>
4 Operation

The 5910 is a layer 2, five port unmanaged switch. No programming or configuration is required to use the 5910. Once the Ethernet connections are made and the 5910 is powered it will begin to operate. Unlike an Ethernet hub that broadcasts all messages to all ports, the 5910 Ethernet Switch will route messages only out of the appropriate port. Both 10BaseT (10 Mbps) and 100BaseTx (100 Mbps) can be used on any of the ports. These ports will auto-sense the speed and accommodate cross-over or straight-through cables.
5  Maintenance

This module requires no routine maintenance. If the module is not functioning correctly, contact Control Microsystems Technical Support for more information and instructions for returning the module for repair.

5.1  Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power LED is not on.</td>
<td>Check power source. If the input is 5V from the Bus on P1 or P2 then the J1 jumper should be in the bottom or “Bus power 5V” position. If the input is 11-30Vdc from P8 then the J1 jumper should be in the upper or “External Power 11-30V” position.</td>
</tr>
</tbody>
</table>
### 6 Specifications

*Disclaimer:* Control Microsystems reserves the right to change product specifications without notice. For more information visit [www.controlmicrosystems.com](http://www.controlmicrosystems.com).

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethernet switch type</strong></td>
<td>5 ports, unmanaged, store &amp; forward, 10/100BaseT</td>
</tr>
<tr>
<td><strong>Ethernet Terminations</strong></td>
<td>RJ45 ports (shielded)</td>
</tr>
<tr>
<td><strong>Protocols</strong></td>
<td>IEEE 802.3, IEEE 802.3u (TBC), IEEE802.3x</td>
</tr>
<tr>
<td><strong>Speed and connection</strong></td>
<td>Auto-detecting 10/100 Mbps operation MDI/MDIX Auto crossover (no need for cross-wired cables)</td>
</tr>
<tr>
<td><strong>Broadcast storm protection</strong></td>
<td>Yes. 1% of bandwidth.</td>
</tr>
<tr>
<td><strong>Memory bandwidth</strong></td>
<td>1.4 Gbps</td>
</tr>
<tr>
<td><strong>Full or half duplex operation</strong></td>
<td>Full duplex IEEE802.3x and half duplex back pressure flow control</td>
</tr>
<tr>
<td><strong>MAC addresses supported</strong></td>
<td>Dedicated lookup engine with 1K MAC addresses. Learning, aging and migration.</td>
</tr>
<tr>
<td><strong>Ethernet isolation</strong></td>
<td>1500Vrms</td>
</tr>
<tr>
<td><strong>Visual Indicators</strong></td>
<td>Each port - ACT/LINK and 10/100 (Speed). Power</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>External Power: 11-30Vdc 1.8W at 12Vdc 2.2W at 30Vdc Bus Power: 5V at 375mA</td>
</tr>
<tr>
<td><strong>Input Power Terminations</strong></td>
<td>4 pole terminal strip and removable terminal block 12 to 22 AWG</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>4.25 inch (144 mm) wide 4.625 inch (118 mm) high 2.00 inch (51 mm) deep</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>desktop, rubber feet or 7.5 x 35 DIN rail</td>
</tr>
<tr>
<td><strong>Packaging</strong></td>
<td>corrosion resistant zinc plated steel with black enamel paint</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>5% RH to 95% RH, non-condensing –40°C to 70°C –40°F to 158°F</td>
</tr>
</tbody>
</table>
### Approvals and Certifications

<table>
<thead>
<tr>
<th>Sport</th>
<th>Non-Incendive Electrical Equipment for Use in Class I, Division 2 Groups A, B, C and D Hazardous Locations.</th>
</tr>
</thead>
</table>
| Digital Emissions | FCC Part 15, Subpart B, Class A Verification  
C-Tick compliance. Registration number N15744. |
| Immunity | EN61000-6-2: 2001 Electromagnetic Compatibility Generic Standards Immunity for Industrial Environments |
| Declaration | This product conforms to the above Emissions and Immunity Standards and therefore conforms with the requirements of Council Directive 89/336/EEC (as amended) relating to electromagnetic compatibility.  
The Low Voltage Directive is not applicable to this product. |