

WTI Part No. 14554  
Rev. A

# **AFS-16-1**

RJ45 fallback Switch

## **Hardware Guide**



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## Warnings and Cautions: Installation Instructions



### Secure Racking

If Secure Racked units are installed in a closed or multi-unit rack assembly, they may require further evaluation by Certification Agencies. The following items must be considered.

1. The ambient within the rack may be greater than room ambient. Installation should be such that the amount of air flow required for safe operation is not compromised. The maximum temperature for the equipment in this environment is 60°C. Consideration should be given to the maximum rated ambient.
2. Installation should be such that a hazardous stability condition is not achieved due to uneven loading.

### Input Supply

Check nameplate ratings to assure there is no overloading of supply circuits that could have an effect on overcurrent protection and supply wiring.

### Grounding

Reliable earthing of this equipment must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than direct connections to the branch circuit.

### No Serviceable Parts Inside; Authorized Service Personnel Only

Do not attempt to repair or service this device yourself. Internal components must be serviced by authorized personnel only.

- **Shock Hazard - Do Not Enter**
- **Lithium Battery**  
**CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**

### Disconnect Power

If any of the following events are noted, immediately disconnect the unit from the outlet and contact qualified service personnel:

1. If the power cord becomes frayed or damaged.
2. If liquid has been spilled into the device or if the device has been exposed to rain or water.

## Two Power Supply Cables



Note that some AFS series units feature two separate power inlets and a separate power supply cable for each power inlet. Make certain to disconnect all power supply cables from their power source before attempting to service or remove the unit.

## Disconnect Power Before Servicing

Before attempting to service or remove this unit, please make certain to disconnect the power supply cable from the power source.

# Agency Approvals

## FCC Part 15 Regulation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

**WARNING:** *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment*

## EMC and Safety Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

- **Council Directive 2014/30/EU of 26 February 2014 on the approximation of the laws of Member States relating to electromagnetic compatibility;**
- and
- **Council Directive 2014/35/EC of 26 February 2014 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.**

## Industry Canada - EMI Information

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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# 1. Introduction

The AFS-16-1 is a versatile switching system, designed for applications that require routing of analog or digital signals between a common RJ45 jack and “A” and “B” RJ45 jacks. The AFS is ideal for switching RS232, RS422/485, Ethernet/UTP or telephone lines.

The system consists of a Card Rack, one Power Supply Module, one Control Module, and up to 16 Circuit Modules. Each Circuit Module is capable of switching all 8 pins of the Common RJ45 jack between Jack “A” or Jack “B”. Each card can be switched by alarm, manually, or by command.

The AFS includes an assortment of alarm features, which allow the unit to monitor temperature, power interruptions, and invalid access attempts and then notify you via Email, text message, Syslog message or SNMP trap when critical conditions are detected. The AFS can also monitor device response to ping commands and then switch A/B paths and provide notification when devices fail to respond.

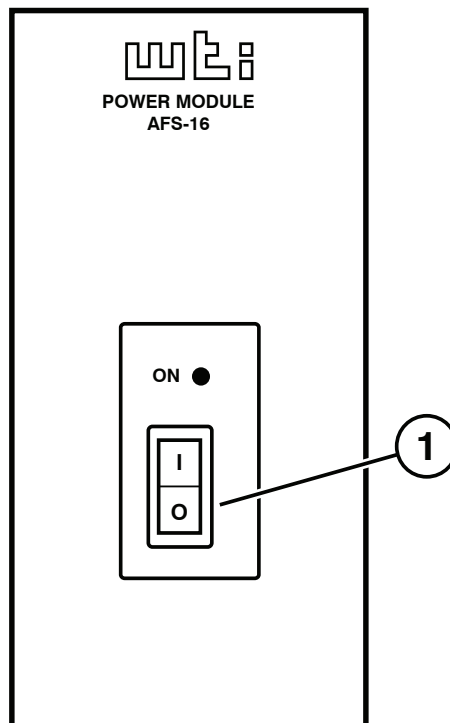
**Note:** *For instructions regarding configuration and operation of the AFS Series Device, please refer to the AFS Firmware Guide*

## 2. Unit Description

The AFS consists of a frame unit, one Dual Power Supply Module, one Control Module, and up to sixteen Circuit Modules.

### 2.1. The Dual Power Supply Module

The Dual Power Supply Module, shown in Figure 2.1, provides AC power used by the Control Module and Circuit Module(s). The AFS will always include one Dual Power Supply Module. Note that the Power Supply Module is not designed to be removed from the AFS Rack Assembly.



**Figure 2.1: The Power Supply Module**

The Power Supply Module faceplate includes the following:

- ① **Power Switch and ON Indicator**
- ② **Power Inlets:** (Not Shown) Two (2) IEC320-C14 AC inlets (located on the back panel of the Dual Power Supply Module) which are used to connect the AFS to an appropriate power source.
- ③ **Power Supply Indicators:** Two LEDs (located on the back panel of the Dual Power Supply Module), which will light when connected to an active power source. Note that there is one LED for Inlet "A" and one LED for Inlet "B".

## 2.2. The Control Module

The Control Module, shown in Figure 2.2, coordinates switching of the individual Circuit Modules. The Control Module includes a Master A/B Gang Switch, status LEDs, a 10/100Base-T Ethernet connector and an RJ-45 RS232 Serial Port for connection to your PC, control device or external modem. An AUX jack is provided to allow connection to a monitored line and optional external alarm. The AFS always includes one Control Module.

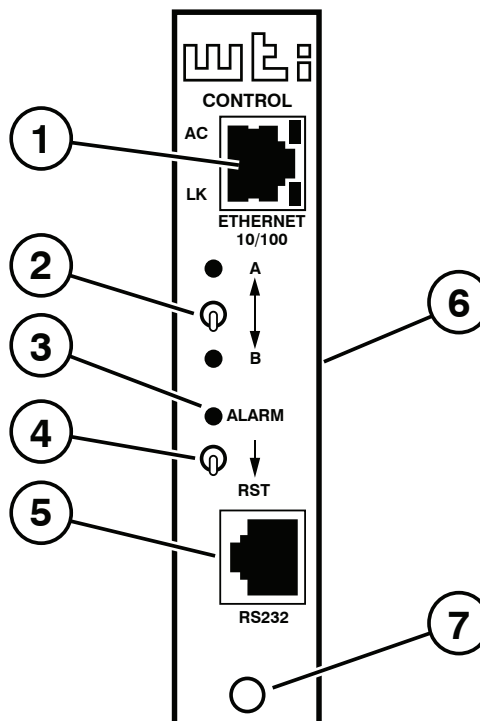


Figure 2.2: The Control Module

The AFS Control Module includes the following components:

- ① **Ethernet Port:** An RJ45 Ethernet port for connection to your TCP/IP network. Note that the AFS features a default IP address (192.168.168.168). This allows you to establish an SSH connection with the unit without first assigning an IP address. Note that the Network Port also includes two, small LED indicators for Link and Data Activity.
- ② **Master A/B Gang Switch:** Allows manual control of A/B switching at up to sixteen Circuit Modules. Note that the Master A/B Gang Switch can be disabled as described in Section 4.5.
- ③ **ALM Indicator:** The ALM Indicator will light when Monitor Input Alarm is triggered.



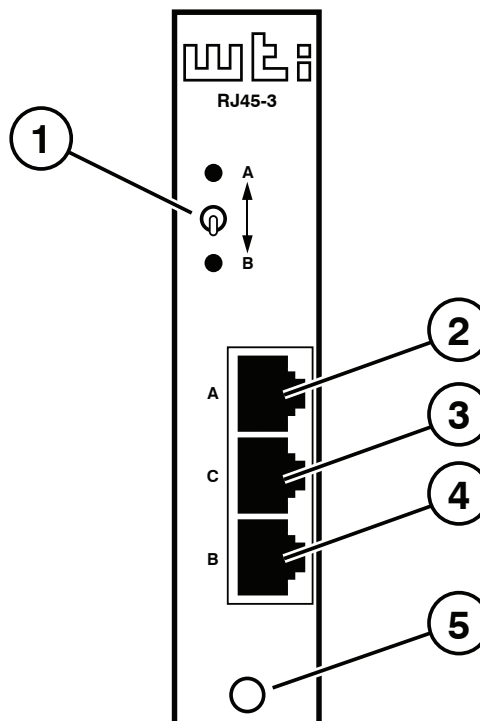
- ④ **Reset Switch:** To reinitialize the AFS, hold the Reset Switch in the "down" position for approximately five seconds. When the AFS is reset, all users will be disconnected from the AFS and the operating system will be reloaded.
- ⑤ **RS232 Connector:** An RJ-45 Serial Port for connection to your PC, control device, or external modem. Please refer to Appendix A for a description of the RS232 interface.
- ⑥ **AUX Connector:** (Not Shown) A five terminal quick connector, located on the back edge of the Control Module board. The AUX Connector can be used in conjunction with the Monitor/Alarm Input feature to generate an alarm when the status of pin 4 changes. In addition, pins 1 through 3 on the AUX Connector can also be used to switch a connected device On or Off in response to signal changes at Pin 4.

**Notes:**

- *The Monitor Input signal (Pin 4) is always measured relative to the signal at the common ground (Pin 5).*
  - *A "Low" signal should be between Zero (0) Volts and -48 Volts and a "High" signal should be between +5 Volts and +48 Volts.*
- ⑦ **Release Pin:** A snap-lock pin that is used to secure the Control Module to the AFS frame.
  - ⑧ **Monitor Input Level Jumper:** (Not Shown) A jumper located on the Control Module board, which is used to configure the AUX Connector for use with the Monitor/Alarm Input feature. The Monitor Input Level Jumper selects the non-active state for the Monitor/Alarm Input feature. When the jumper is set in the "1" position (normally high,) the Monitor/Alarm Input feature can generate an alarm when the Monitor Input signal goes low. When the jumper is set in the "0" position (normally low,) the Monitor/Alarm Input feature can generate an alarm when the Monitor Input signal goes high.

## 2.3. The Circuit Module

The AFS can accept up to sixteen Circuit Modules. Each Circuit Module includes a common jack, jacks for “A” and “B” paths, and a Manual A/B switch as described in Figure 2.3.



**Figure 2.3: The Circuit Module**

The AFS Circuit Module includes the following components:

- ① **A/B Switch:** Each A/B Switch can be manually switched, or activated by commands sent to the Control Module. The A/B Switch can also be operated by the Control Module’s Master A/B Switch.
- ② **“A” Connector:** An RJ45 Port, used for connection to your primary line.
- ③ **“C” Connector:** An RJ45 Port, used for connection to a common line.
- ④ **“B” Connector:** An RJ45 Port, used for connection to your fallback line.
- ⑤ **Release Pin:** Used to secure the Circuit Module to the AFS frame.
- ⑥ **A/B Switch Jumper:** (Not Shown) A jumper, located on the Circuit Module board, which is used to enable/disable the individual Circuit Module’s response to the Master A/B Gang Switch as described in Section 4.5.2.

## 3. Getting Started

This section describes a simplified installation procedure for the AFS hardware, which will allow you to communicate with the unit in order to demonstrate basic features and check for proper operation.

Note that this Quick Start procedure does not provide a detailed description of unit configuration, or discuss advanced operating features in detail. For more information, please refer to the remainder of this User's Guide.

### 3.1. Apply Power to the AFS

Refer to the safety precautions listed at the beginning of this User's Guide, and then connect the unit to a 100 to 240 VAC power source.

**Note:** *The AFS includes two power inlets. You can connect either one or both of these inputs to your power source. If both power inlets are connected, they should be connected to separate power sources in order that the second power source can serve as a redundant back up in the event of failure.*

Connect the power supply cable(s) to the unit's power inlet(s) and then connect the cable(s) to appropriate power supplies.

Set the Power Switch on the AFS Power Module to the ON Position. The ON LED on the Power Module and the A/B indicators on the Control Module should light. After about 90 seconds, the A/B indicators should go out, indicating that the unit is ready to receive commands.

### 3.2. Connect Your PC to the AFS

The AFS can either be controlled by a local PC Serial Port, controlled via modem, or controlled via TCP/IP network. In order to select parameters or control switching functions, commands are issued to the AFS via either the Ethernet Port or RS232 Console Port.

- **Ethernet Port:** Connect your 10Base-T or 100Base-T network interface to the AFS Control Module's 10/100Base-T Network Port.
- **RS232 Port:** Use the supplied Ethernet cable and adapter to connect your PC COM port to the RS232 Console Port on the AFS Control Module as described in Section 4.3. For a description of the RS232 Port Interface, please refer to Appendix A.1.
- **Modem:** If desired, an external modem can also be installed at the RS232 Port. For more information, please refer to Section 4.4.

### 3.3. Communicating with the AFS

When properly installed and configured, the AFS will allow command mode access via Telnet, Web Browser, SSH client, modem, or local PC. However, in order to ensure security, both Telnet and Web Browser access are disabled in the default state.

#### Notes:

- *Default AFS serial port parameters are set as follows: 9600 bps, RTS/CTS Handshaking, 8 Data Bits, One Stop Bit, No Parity. Although these parameters can be easily redefined, for this Quick Start procedure, it is recommended to configure your communications program to accept the default parameters.*
  - *The AFS features a default IP Address (192.168.168.168) and a default Subnet Mask (255.255.255.0.) This allows network access to command mode, providing that you are contacting the AFS from a node on the same subnet. When attempting to access the AFS from a node that is not on the same subnet, please refer to AFS Firmware Guide for further configuration instructions.*
1. **Access Command Mode:** The AFS includes two separate user interfaces; the Text Interface and the Web Browser Interface. The Text Interface is available via Local PC, SSH Client, Telnet, or Modem. The Web Browser interface is only available via TCP/IP network.
    - a) **Via Local PC:** Start your communications program and then press **[Enter]**.
    - b) **Via SSH Client:** Start your SSH client, enter the default IP address (192.168.168.168) for the AFS and then invoke the connect command.
    - c) **Via Web Browser:** Make certain that Web Browser access is enabled. Start your JavaScript enabled Web Browser, enter the default AFS IP address (192.168.168.168) in the Web Browser address bar, and then press **[Enter]**.
    - d) **Via Telnet:** Make certain that Telnet access is enabled. Start your Telnet client, and enter the AFS's default IP address (192.168.168.168).
    - e) **Via Modem:** Use your communications program to dial the number for the external modem (optional) that you have connected to the AFS's RS232 port. For more information on connecting a modem to the AFS, please refer to Section 4.4.

2. **Username / Password Prompt:** A message will be displayed, which prompts you to enter your username (Login) and password. If a valid username and password are entered, the AFS will display either the Circuit Control Screen (Web Browser Interface) or the Circuit Status Screen (Text Interface.)

**Notes:**

- *The default Username is "super".*
  - *The default Password is "super"*
  - *If a Login Banner has been defined, then a banner page will appear before the command interface is displayed. The Login Banner can be used to display legal warnings or other information.*
3. **Review Help Menu:** If you are communicating with the AFS via the text interface (SSH, Telnet or Modem), type `/H` and press **[Enter]** to display the Help Menu, which lists all available AFS commands. Note that the Help Menu is not available via the Web Browser Interface.

### 3.4. Fallback Switching

A/B fallback switching can be controlled via the Text Interface or Web Browser Interface.

#### 3.4.1. Fallback Switching - Text Interface

Access the AFS Text Interface and then proceed as follows:

1. **Review the Help Menu:** At the Text Interface command prompt, type `/H` and press **[Enter]** to display the Help Menu, which provides a basic listing of all available AFS commands.
2. **Manual A/B Switching:** Use the manual circuit switches to change A/B paths. Note that this example assumes that the Master A/B Gang Switch and individual circuit module switches have not been disabled.
  - a) **Master A/B Gang Switch:** Toggle the Master A/B Gang Switch between the "A" and "B" positions. The LED indicators should follow the Master Switch, indicating that each circuit has switched the "A" and "B" paths.
  - b) **Circuit Module A/B Switch:** Choose an individual Circuit Module and toggle the module's A/B Switch between "A" and "B". The LED indicators should indicate that the module has switched the A/B path.
3. **Code Activated Switching:** To control A/B fallback switching using ASCII commands, invoke the following commands at the AFS command prompt:
  - a) Type `/T *,B` and press **[Enter]**. All Circuit Modules should switch to the "B" path.
  - b) Type `/T 1,A` and press **[Enter]**. Circuit Module number 1 should switch to the "A" path.
  - c) Type `/T 2,3,4,A` and press **[Enter]**. Circuit Modules 2, 3, and 4 should switch to the "A" path.

### 3.4.2. Fallback Switching - Web Browser Interface

In the default state, the Web Browser Interface will not be available until you have enabled Web Access. After Web Access has been enabled, access the AFS Web Browser Interface and then proceed as follows:

1. **Access the Circuit Control Menu:** Click on the "Circuit Control" link on the left hand side of the screen to display the Circuit Control menu. The Circuit Control menu includes a series of dropdown menus that are used to select the desired switching action for each Circuit Module.

**Note:** *The Circuit Control menu also lists the number and user-defined name of each Circuit Module present, the name of the currently selected A/B circuit path, the A/B position of the switch, a brief description of the reason for the last switching action and a column that shows if each circuit is controlled by the Monitor/Alarm Input feature.*

2. **Select the Switching Action:** Use the dropdown menu to select an A/B switching operation for the desired Circuit Module. For example, to switch Circuit 1 to the B position, click on the down arrow in the "Action" column for Circuit 1 to display the dropdown menu, select the "B" option from the dropdown menu and then click on the "Confirm Circuit Actions" button.

**Notes:**

- *The dropdown menu for each circuit allows you to select position A, position B or the default position. Normally, the "Default" option will switch the circuit to the user-defined Default position. However, in the case of this Quick Start procedure, the Default circuit positions have not yet been defined.*
  - *The Circuit Control Menu also includes the ability to switch all AFS Circuit Modules. If desired, the dropdown menu in the "All Circuits" row can be used to switch all AFS circuits.*
3. **Confirm Switching Actions:** After you click on the "Confirm Circuit Actions" button, the AFS will display a screen which summarizes the selected switching operation(s) and asks for confirmation before executing the command. To proceed with the selected switching operation, click on the "Execute Circuit Actions" button.
  4. The AFS will execute the switching operation and then display the Circuit Status screen.

This completes the Quick Start procedure for the AFS. Prior to placing the unit into operation, it is recommended to refer to the remainder of this user's guide for important information regarding advanced configuration options and more detailed operation instructions. If you have further questions regarding the AFS unit, please contact WTI Customer Support as described in Appendix C.

## 4. Hardware Installation

### 4.1. Connecting the Power Supply Cable(s)

Refer to the cautions listed below and at the beginning of this User's Guide, and then connect the AFS to an appropriate 100 to 240 VAC power supply.



#### CAUTIONS:



- ***Before attempting to install this unit, please review the warnings and cautions listed at the front of this user's guide.***
- ***This device should only be operated with the type of power source indicated on the instrument nameplate. If you are not sure of the type of power service available, please contact your local power company.***
- ***Reliable earthing (grounding) of this unit must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than directly to the branch circuit.***

**Note:** *The AFS includes two power inlets. You can connect either one or both of these inputs to your power source. If both power inlets are connected, they should be connected to separate power sources in order that the second power source can serve as a redundant back up in the event of failure.*

Set the Power Switch on the AFS Power Module to the ON Position. The ON LED on the Power Module and the A/B indicators on the Control Module should light. After about 90 seconds, the A/B indicators should go out, indicating that the unit is ready to receive commands. Note that if the AFS needs to download SSH keys, it may take longer than 90 seconds for the A/B indicators to switch off.

### 4.2. Connecting the Network Cable

Use the supplied 10/100Base-T Ethernet cable to connect the AFS Ethernet port to your TCP/IP network. Note that the AFS includes a default IP address (192.168.168.168) and a default subnet mask (255.255.255.0.) When installing the AFS in a working network environment, it is recommended to define network parameters as described in AFS Firmware Guide.

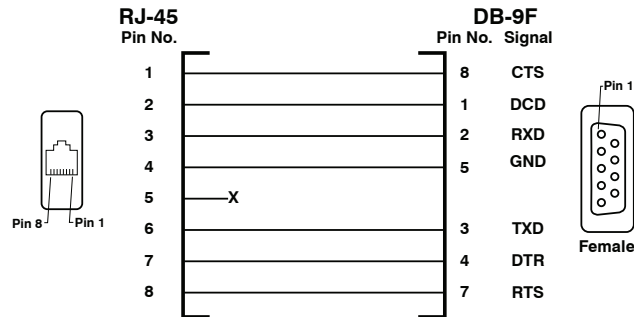


Figure 4.1: DX9F-DTE-RJ Snap Adapter Interface

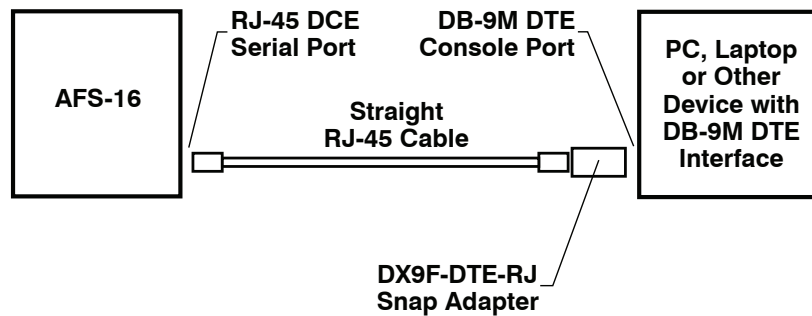


Figure 4.2: Connecting DB-9M DTE Devices to the AFS Control Module's Serial Port

### 4.3. Connecting a Local Control Device

Use the supplied Ethernet cable and adapter to connect your PC COM port to the RS232 Console Port on the AFS Control Module as shown in Figure 4.1 and Figure 4.2.

### 4.4. Connecting an External Modem (Optional)

Access the AFS Command Mode and then use the Port Parameters menu to configure the RS232 Port for Modem Mode. Use an appropriate cable to connect your external modem to the RS232 Port on the AFS's Control Module and then connect your RJ11 phone line to the external modem.



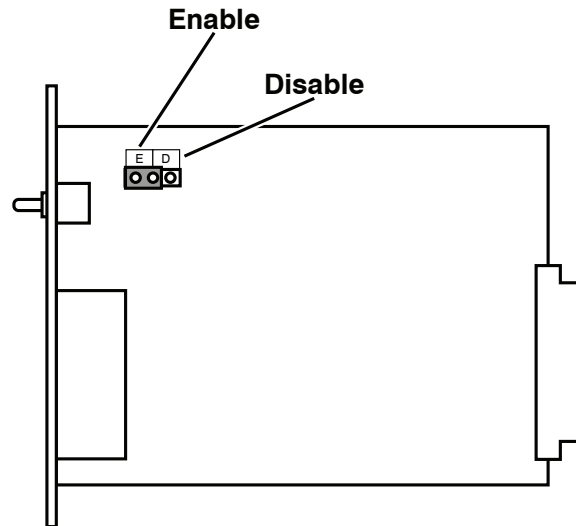


Figure 4.3: Circuit Module Jumper

## 4.5. Module Set Up

### 4.5.1. Circuit Module Set Up

The A/B Switch Jumper on the Circuit Module card (Figure 4.3) enables/disables the individual Circuit Module's A/B Switch. If you wish to disable manual A/B switching control at a specific Module, then the A/B Switch Jumper on that Module must be set in the "Disable" position.

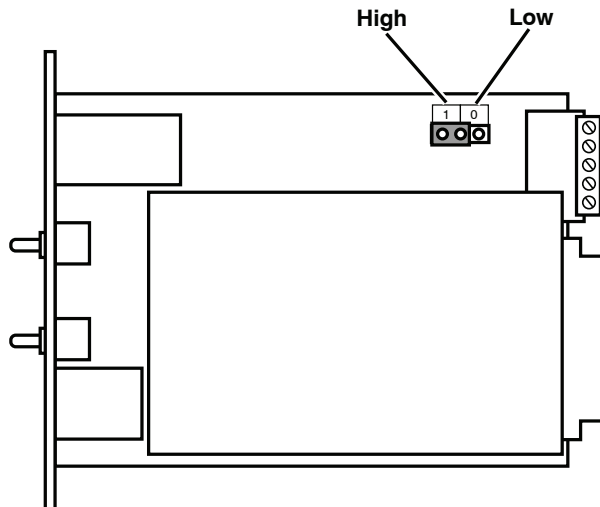


Figure 4.4: Control Module Jumper

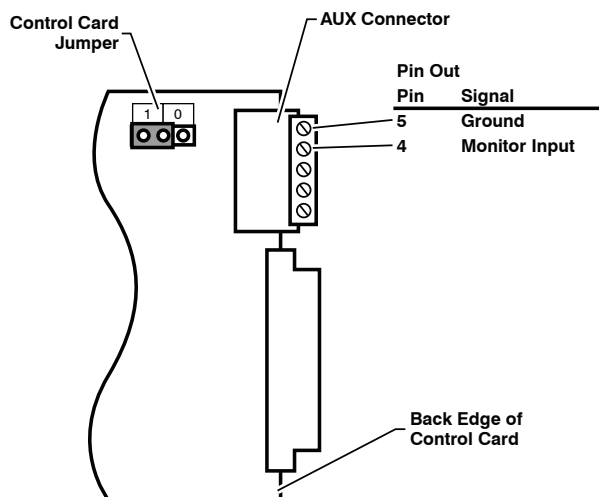


Figure 4.5: Control Module AUX Connector - Monitor Input and Ground

#### 4.5.2. Control Module Setup

The Control Module includes a jumper that can be used to configure the AUX Connector for use with the Monitor/Alarm Input feature. If you intend to use the Input Monitor Alarm, then this jumper should be set as described in the following paragraphs

When the Monitor/Alarm Input feature is properly configured, the AFS can trigger an alarm and/or perform A/B switching operations when the signal at Pin 4 (Monitor Input) on the Control Module AUX connector goes high or low. In set up this feature, you must first use the Control Card Jumper to select the non-active (non-alarm) state, and then use the Monitor/Alarm Input configuration menu to select the active/alarm state (the signal level that will trigger an alarm) as described in the Sections that follow.

**Notes:**

- *The Monitor Input signal (Pin 4) is always measured relative to the signal at the common ground (Pin 5).*
- *A "Low" signal should be between Zero (0) Volts and -48 Volts and a "High" signal should be between +5 Volts and +48 Volts.*

#### 4.5.2.1. Monitor Input Signal - Trigger When Low

To set up the Monitor/Alarm Input feature to trigger an alarm when the signal at AUX connector pin 4 (the Monitor Input) goes Low, configure the AFS as follows:

1. **Control Card Jumper Setting:** Set the Jumper to the "1" position (default.) This will set the non-active, non-alarm signal state to "High".
2. **Monitor/Alarm Input Level:** Use the Monitor/Alarm Input configuration menu to set the Monitor Alarm Input Level to "Low". This will configure the Monitor/Alarm Input feature to generate an alarm when the Monitor Input signal goes Low.
3. **Set the Remaining Parameters:** Use the Monitor/Alarm Input configuration menu to select the remaining parameters.
4. **Connect Monitor Input:** Connect the signal line that you wish to monitor to Pin 4 (Monitor Input) on the Control Module AUX Connector as shown in Figure 4.5.

#### 4.5.2.2. Monitor Input Signal - Trigger When High

To set up the Monitor/Alarm Input feature to trigger an alarm when the signal at AUX Connector pin 4 (the Monitor Input) goes High, configure the AFS as follows:

1. **Control Card Jumper Setting:** Set the Jumper to the "0" position. This will set the non-active, non-alarm signal state to "Low" as shown in Figure 4.4.
2. **Monitor/Alarm Input Level:** Use the Monitor/Alarm Input configuration menu to set the Monitor Alarm Input Level to "High". This will configure the Monitor/Alarm Input feature to generate an alarm when the Monitor Input signal goes High.
3. **Set the Remaining Parameters:** Use the Monitor/Alarm Input configuration menu to select the remaining parameters.
4. **Connect Monitor Input:** Connect the signal line that you wish to monitor to Pin 4 (Monitor Input) on the Control Module AUX Connector as shown in Figure 4.5. Connect your ground line to the Ground Connector (Pin 5).

## **4.6. The A/C/B Connectors**

Each AFS Circuit Module includes three RJ45 connectors: a "C" (Common) connector, an "A" (Primary Fallback) connector and a "B" (Secondary Fallback) connector. Use an RJ45 Ethernet cable to connect devices to the A/C/B ports as required.

## Appendix A. Interface Description

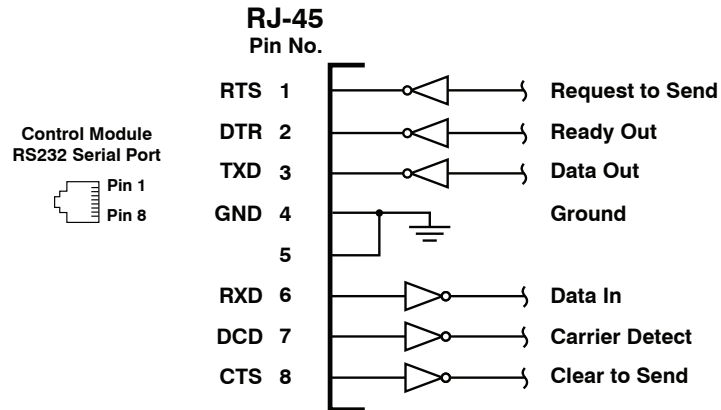


Figure A.1: Serial Port Interface

### A.1. Serial Port (RS232)

DCD and DTR hardware lines function as follows:

1. **When connected:**

- If either port is set for Modem Mode, the DTR output at either port reflects the DCD input at the other end.
- If *neither* port is set for Modem Mode, DTR output is held high (active).

2. **When not connected:**

- If the port is set for Modem Mode, upon disconnect DTR output is pulsed for 0.5 seconds and then held high.
- If the port is *not* set for Modem Mode, DTR output is controlled by the DTR Output option (Serial Port Parameters Menu, Option 23). Upon disconnect, Option 23 allows DTR output to be held low, held high, or pulsed for 0.5 seconds and then held high.

## Appendix B. Specifications

**Switched Circuit Card:** Up to 16 Modules

**Interface:** RJ45-3, Three Jacks, 8 Pins Switched Common Jack to A or B Jack.

**Contacts:** High Reliability, Mechanical Relays, Break-Before-Make Contacts with 1 Amp @ 30 VDC Rating, 100 Million Cycle Life.

**Switching:**

**Manual:** Individual Toggle Switch, Plus Gang Switching from Control Module.

**Code/Browser:** By Slot Number or by Name.

**Card Rack and Control Unit:**

**Ethernet Port:** RJ45, 10/100/1000Base-T

**Serial Console Port:** 1 each, RJ45, RS232C

**AUX Connector:** 5-Pin Quick-Connect Terminal Block for Connection to Alarm Output and Monitor Inputs (Low: 0 to -48V, High: +5 to +48V).

**Coding:** Serial ASCII, 8 Bits No Parity

**Data Rate:** 1200, 2400, 9600, 19.2K bps

**Memory:** Nonvolatile Parameter Storage.

**Break:** Send Break or Inhibit Break

**Username & Passwords:** 32 character usernames; 16 char. passwords, Up to 128 pairs.

**RS232 Port Interface:**

**Connector:** One (1) RJ45 connector (DTE pinout)

**Coding:** 7/8 bits, Even, Odd, No Parity, 1, 2 Stop Bits

**Flow Control:** XON/XOFF, RTS/CTS, Both, or None

**Data Rate:** 300 to 115.2K bps (all standard rates)

**Physical/Environmental:**

**Size:** 5.25" x 19.00" x 6.75" (H x W x D)

**Power:** 100/240 VAC 50/60 Hz, 15 watts, Dual Inputs

**Weight:** Shipping Weight, Fully Loaded, 15 pounds

**Operating Temperature:** 32°F to 122°F (0°C to 50°C)

**Humidity:** 10 - 90% RH

## **Appendix C. Customer Service**

Customer Service hours are from 8:00 AM to 5:00 PM, PST, Monday through Friday. When calling, please be prepared to give the name and make of the unit, its serial number and a description of its symptoms. If the unit should need to be returned for factory repair it must be accompanied by a Return Authorization number from Customer Service.

WTI Customer Service  
5 Sterling  
Irvine, California 92618

Local Phone: (949) 586-9950  
Toll Free Service Line: 1-888-280-7227  
Service Fax: (949) 583-9514

Email: [service@wti.com](mailto:service@wti.com)

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