



Broadcast Devices, Inc.

Technical Reference Manual

PDC-300 SNMP Enabled Three Switch Controller

For Power Divider/Master Antenna Applications

**READ THIS MANUAL IN ITS ENTIRETY BEFORE ATTEMPTING
INSTALLATION AND OPERATION**

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I. Introduction

This technical manual covers the installation and configuration of the Broadcast Devices, Inc. **PDC-300 Motorized Switch Controller Chassis** and various manufacturer motorized RF switches. The PDC-300 is part of a family of controllers designed to simplify the connection and operation of 4 port switches functions specifically for the purpose of using motorized switches to bypass around a power divider in master antenna applications. The unit is designed to provide four modes of operation: Upper + Lower, Lower Only, Upper Only and Test Load. The unit is capable of being connected to a network via the use of SNMP for access via SNMP host remote controls, BDI PDC host application software and third party SNMP host software.

II. Unpacking and Inspection

Carefully inspect the unit after unpacking and make certain that no damage has occurred during shipping. If damage is noted, contact the shipper immediately and file a claim for damages. Each unit is carefully packed and carries full insurance against damage. Inspect the packing list and make sure that the contents of the package match those described on the packing list.

III. Installation and Connections – IMPORTANT!

Before attempting to install the PDC-300 we strongly recommend that the installer first put the unit on the bench and refer to the IP configuration under the Operation of the PDC-300 section of this manual. Make sure that you can access the unit via the LAN connection and that your configuration works properly. For new installations where a system has not been put into service we highly recommend wiring and installation before an RF system is put online. This makes the installation and checkout go more smoothly. If this is not possible BDI offers a complete set of switch simulator PC boards, status/control simulator boards and relay output tester boards. These boards can be connected to the unit for complete test and check out of the unit before it goes into service and/or to troubleshoot a unit that is suspect after installation. These boards can be purchased through the network of BDI authorized distributors.

Wiring Considerations:

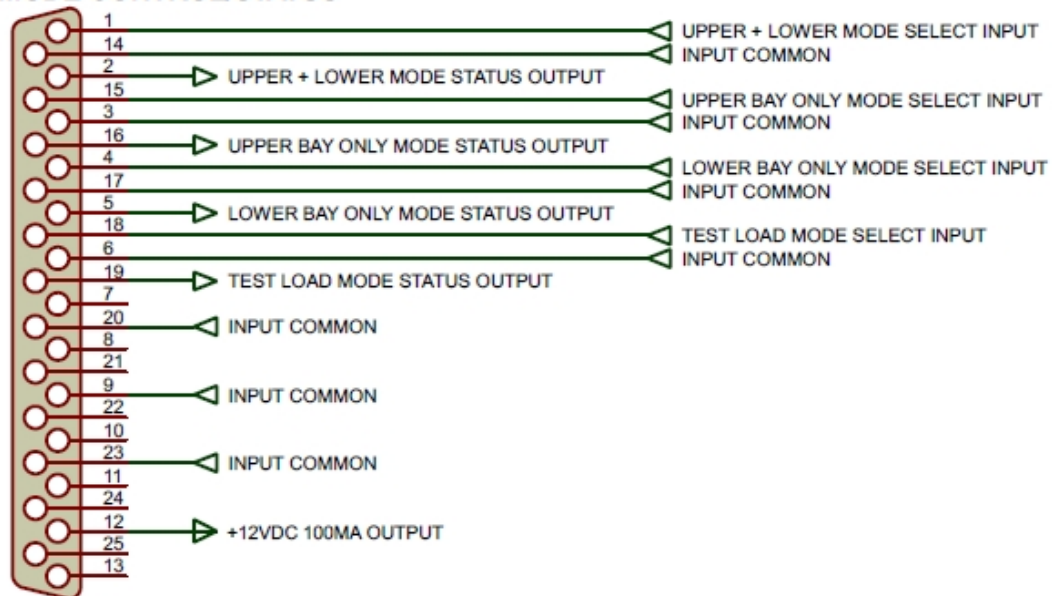
The PDC-300 has the capability to totally automate the switching operations four modes of operation and to provide interlock closures for master antenna

operations. Any time switch movement is actuated the PDC-300 controller will provide interlock interrupts to external equipment. In addition, it provides a half power status output for when “Upper” or “Lower” modes are initiated. This provides a level of safety to prevent high power operations when only one half of an antenna is connected to the combiner system output.

Basic Wiring Methodology

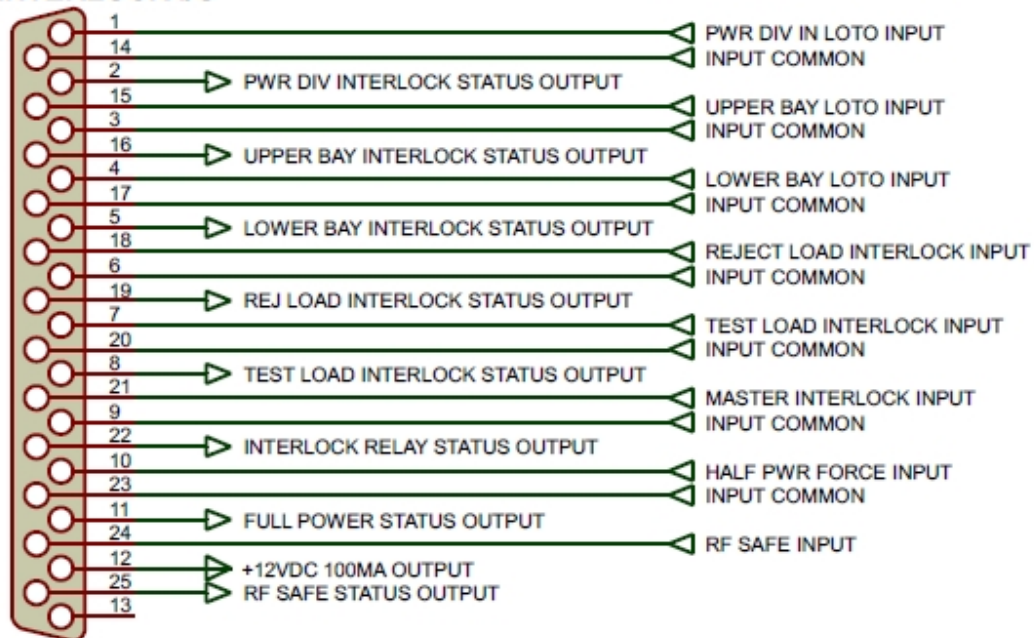
Starting with J1 Mode Control Status – provides local/remote control GPIO for mode command and mode status.

J1 - MODE CONTROL/STATUS



Each mode input select is pulled up to 5 VDC. In order initiate a mode a momentary contact closure to input common. Status outputs are also pulled up to 5 VDC. When a particular mode is selected that status line goes to a low or common.

J2 - INTERLOCK I/O



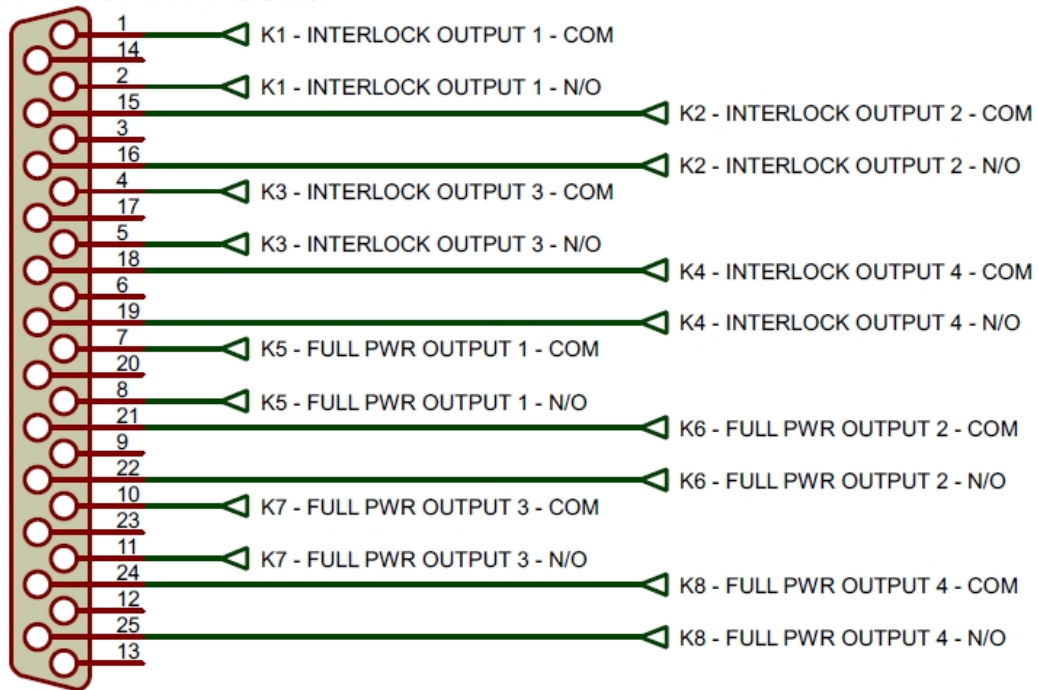
NOTE: ALL UNUSED INTERLOCK & RF SAFETY INPUTS MUST BE CONNECTED TO INPUT COMMON FOR PROPER OPERATION

Interlock inputs for J2 are provided for each load port. For hybrid style power dividers a reject load interlock input is also provided. In addition there is an RF safe input that can be used to connect to external power measurement equipment such as the BDI DPS-100D series power meter to provide an extra level of protection against switch movement with RF power applied. Conventional systems rely on interlock closures only to make sure transmitters are turned off. While this is standard practice all too often interlock connections can be bypassed creating a dangerous and costly situation. Use of this input will prevent the PDC-300 controller from moving switches until the RF is removed from the system. While not mandatory for proper operation its use is strongly recommended. The Half power force input J2-10 is provided so that when in normal operation the Full Power Relays will provide closures for the UPPER + LOWER and TEST LOAD modes. If the HALF POWER FORCE input is connected to INPUT COMMON the PDC-300 will not provide FULL POWER closures in any mode thus forcing all transmitters to half power mode regardless of mode. Pin 21 Master Interlock Input is provided to be used to control all PDC-300 interlocks relays.

J3 - TX CTL/INTERLOCKS

J6 - TX CTL/INTERLOCKS

J7 - TX CTL/INTERLOCKS



J3, 6, 7 TX CTL/Interlocks are provided – some models only have J7 but additional relay boards can be ordered if additional closures are desired. Each board provides 4 Interlock output closures and 4 – Full Power Output closures whose function was described in the previous discussion of J2. Each board functions identically. Connect Interlock closures to external equipment such as transmitters or a T-Bar style relay to provide interlock closures for additional transmitters.

See Section XI. For various manufacturer switch interfaces for SWITCH 1, 2, 3 DSUB15 connectors. BDI offers optional interface cables for all of the manufacturers shown in Section XI. Standard cable length is 25 feet. For different lengths please specify length at time of order of the cables from your BDI authorized distributor.

An important note about connecting switches: Before connecting RF switch cables to the rear panel of the PDC-300 controller observe the diagram shown on page 11 of this manual. Make certain the switch numbers shown in the diagram match the rear panel switch numbers when making connections. It's a good idea to mark BOTH ends of the interface cables so that inadvertent misconnection does not happen. If these connections are not made properly the unit will not function as designed and can create a dangerous situation if RF is applied.

Frequently asked Questions including Interlock Relay Operation:

Question 1: How do the PDC-300 interlock relays function?

Answer 1: The PDC-300 system is designed to be a “failsafe” system. This means that the PDC-300 and/or DPS-100D power sensor provide interlock closures only when the PDC-300 has electrical power and the conditions in answer 2 are met below. This means that the PDC-300 will drop your interlocks if power is removed from the PDC-300 chassis or the PDC-300 fails. Failsafe by definition means that failure of the “system” designed to protect life and/or equipment must fail in a **safe** way. If the PDC-300 fails it can no longer protect your transmission system from damage and therefore will open the interlocks. Consider that a bit of lost air time is a small price to pay compared to a high VSWR condition causing thousands of dollars’ worth of damage to your system. In addition consider the cost of lost air time while you are waiting for a new parts to arrive.

Question 2: Which set of contacts should I use, normally open/common or normally closed/common?

Answer 2: It depends on your transmitter manufacturer specification. Most manufacturers require a closure between their “external interlock” connections for the transmitter to operate. If this is the case with your transmitters then you need to connect the external interlock connection of the transmitter to the **normally open** and **common** connections on PDC-300 J3, J6, and/or J7 – TX. CTL/INTERLOCKS. Here is why. With all connections made to the PDC-300 the PDC-300 will provide interlock closure on the normally open/common (relays energized) connections provided that:

1. Power is applied to the PDC-300 chassis.
2. The motorized switches are properly connected to the Switch 1, Switch 2 and Switch 3 DB-15 connectors on the PDC-300.

External Remote Control Connections to the PDC-300:

There are two remote control methods for operation of the PDC-300 controller. First is making connections to J1 Mode Control/Status connector to a conventional remote control system. It is also possible to connect the PDC-300 to modern SNMP Host type remote controls by use of a single CAT5 cable from the LAN connector on the rear of the unit and a network where a SNMP Host remote control or third party software is connected. BDI provides a SNMP Host software application for the PDC-300 The BDI provided PDC-300 application software can be downloaded free of charge from our website: www.broadcast-devices.com

from the PDC-300 product page found under RF Products or on our Support page.

IV. Rack Equipment Location and Connection of PDC-300 Site Controller

1. In a suitable EIA 19" rack enclosure mount the PDC-300 chassis. ***It is strongly recommended that the PDC-300 be plugged into a personal computer style UPS system if the system is to be used where interlock control of broadcast transmitters is contemplated.***
2. Using the supplied Ethernet cables attach one Ethernet cable to the LAN

To allow remote access to the PDC-300 your router and firewall must be configured to allow requests to **PORT 161** or whatever port was chosen to pass to the IP address configured for the PDC-300. Failure to do so will prevent access to the PDC-300 from outside the local network. Port 161 is the default port and can be changed but the new port must be forwarded as well.

At this point you can use the BDI PDC application software to access the PDC-300 unit.

V. Operation of the PDC-300 Site Controller Chassis

Local Mode:

Front panel operation of the PDC-300 is performed using the front panel buttons. If the unit is equipped with the optional key lock lockout the key must be inserted and turned to the right into the "Enable" position. This will allow front panel access to control.

To move the switches to another mode insert the key and turn it to the enable position. In the lock position the key cannot be removed. Next, select the mode by selecting one of the four function keys:

F1 = Upper + Lower

F2 = Upper

F3 = Lower

F4 = Test load

It is possible to place the unit in the remote mode by pushing the up arrow. To place the unit in local mode push the down arrow. To inspect the configuration of the unit push the red X key. The firmware release and IP information will scroll for inspection.

Front panel display indications:

The front panel display will display the currently selected mode of operation and remote/local status. Remote status is indicated by the > symbol in the upper left hand corner of the display otherwise it is in local mode. If the key lock is in the locked/disable position there will be a padlock character in the upper left hand corner of the display. If a switch is mechanically between positions due to it being stuck a check switch: # will indicate to allow the operator to quickly identify which switch is in between positions. Another reason for a check switch indication could be failure of the connection between the switch and the controller due to a cable being unplugged or a failed position switch indicator within the switch.

Remote Conventional GPIO Mode:

There are two ways to gain remote access to the PDC-300. First is by use of connection to J1 Mode control/status connector to a conventional remote control or remote panel. Refer to J1 diagram for connection information. The unit responds to a momentary closure for command and provides a negative going output for status of mode selected. The GPIO is pulled up to 5 VDC.

Remote SNMP/Network Mode:

The second method is via a network connection using the BDI PDC-300 application software furnished with the unit.

VI. Communications Interface Information

To configure the PDC-300 for LAN operation, connect the LAN interface to a local router with category 5 local area network cable. Next Power cycle the unit to allow browser access. You will have five minutes after the power recycle to open a browser window and enter the default IP address for the PDC-300. After the five minute timeout access is no longer possible until another power recycle is initiated. **The factory default IP address is: 192.168.1.107**

Username: username

Password: password

Once the browser screen allows access the user can change the IP address, subnet mask and default gateway to match local LAN configuration. Contact your network administrator to obtain the correct settings. Click the [OK] Check Mark button after changes are made. **In order for the changes to take effect you must power cycle the PDC-300 unit. Failure to do this will result in the unit remaining on the default settings**

NOTE: Be sure to record the new IP address before power cycling (see below). Failure to record the new settings may cause difficulties in locating the PDC-300.

It is strongly recommended that you record the new IP parameters, username and password:

NEW IP ADDRESS: _____

SUBNET MASK: _____

PORT ASSIGNMENT: _____

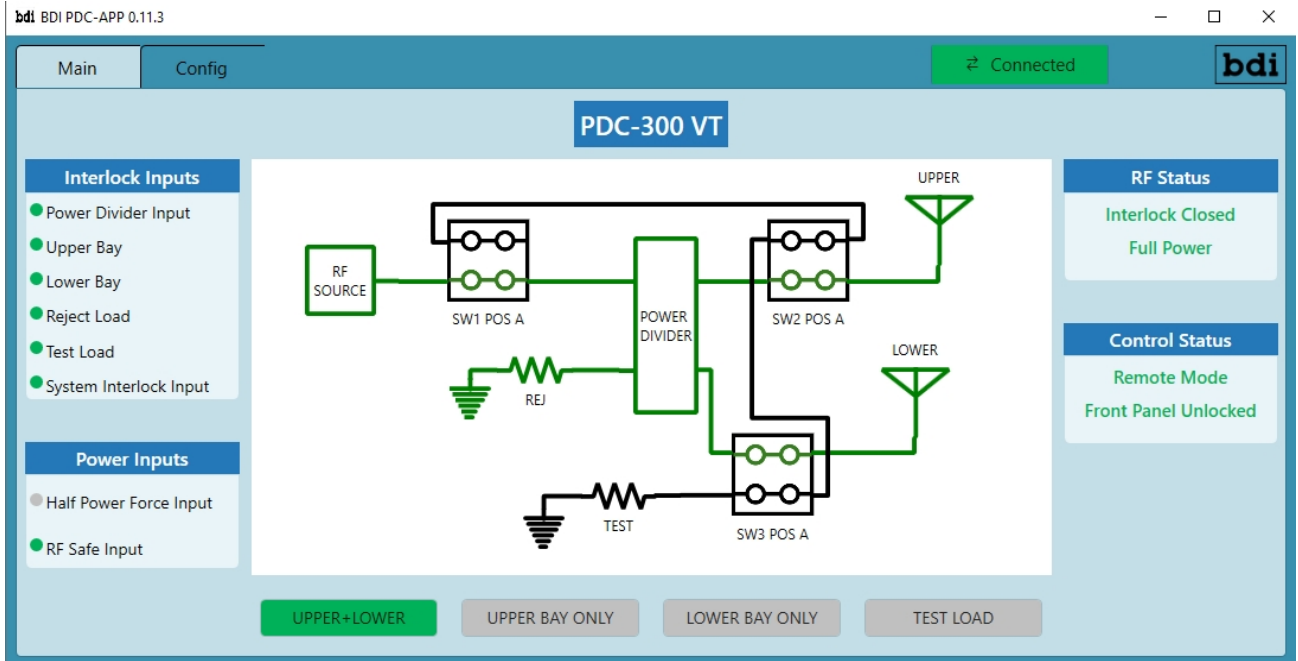
NEW USERNAME: _____

NEW PASSWORD: _____

Use of the BDI PDC-300 Application Host Software

Download and install the PDC-300 application host software from the PDC-300 product page located on the RF Products page of the BDI website: www.broadcast-devices.com The PDC-300 software is compatible with Windows 7/10/11 operating systems.

Once installed start the program and perform the configuration by accessing the configuration tab and entering the IP information for the installed unit. Once entered you should be able to connect to the unit. Properly connected the Connect button on the main page should go green to signify successful access to the unit. When connected the screen below will appear:



To select a mode simply click on the desired mode. Anytime the unit is placed in Upper Bay or Lower Bay mode the half power command closure will open the half power relays located on J3, 6, and 7.

Power Inputs Indicators:

When in half power mode the half power force input status indication will illuminate. The RF Safe Input will illuminate when J2 Interlock I/O pin 24 is at common. This input is used if a device such as a BDI DPS-100D series power meter RF presence relay is connected to this input. Use of this input with a DPS-100D series meter will prevent switching with RF present on the system. While the PDC-300 will open all interlock connections anytime a mode is selected if RF is not removed due to a faulty RF connection the unit will not send switch commands preventing damage to switches or other equipment.

Interlock Inputs Indicators:

The interlock input status is also shown and these indicators will illuminate green whenever the respective interlock input pins on J2 Interlock I/O connector are at common. This connector is provided to provide interlock inputs from various devices such as lock out tag out switches or from BDI DPS-100D series power meters interfaced at various points in the system. This can be a useful troubleshooting tool if interlocks are open the operator can easily locate which interlocks are closed or open. In addition, if a certain interlock is open the RF path will go red that is impacted by that interlock. If all interlocks are closed for the particular mode in question the RF path will illuminate green.

RF Status Input Indicators:

A master interlock status indicator will illuminate green when J2 Interlock I/O pin 21 is at common.

Control Status Inputs:

Remote/Local mode indicates whether the unit is in remote or local mode as configured on the front panel of the unit. The Front Panel Unlocked indicator illuminates green whenever the key is inserted in the front panel lock and rotated to the enable position. Note that the PDC-300 will not respond to remote commands if either in Local mode or if the front panel key is rotated to the disable position and removed. In these modes the PDC-300 can only be used as a remote status monitor.

Switch Indications Indicators:

Each of the three switch positions are shown. If for some reason one or more switches is placed in a position that is not one of the valid modes all J3, 6 and 7 interlock relay connections will open and the switches that are in an invalid mode position will turn red and their respective interlock paths will illuminate red. Another reason for this indication is if a switch is mechanically between positions due to mechanical failure or incomplete manual rotation of a switch.

VII. Specifications

| | |
|--------------------------------------|--|
| Number of switches supported: | 3 |
| Switch Manufacturers supported: | Delta, Dielectric 50000/60000 Series, Dowkey, ERI, Mega/MCI, Myat, Spinner – all series For other switch manufacturer compatibility contact the factory. Readymade factory interface cables available for all of the above switch manufacturers. |
| Remote Control: | GPIO, TCP/IP – SNMPv2 |
| Front Panel Controls and Indicators: | Mode Select, Remote Local and key lock Enable/Disable Indicators include mode selected, Remote/Local status, Key lock status and check switch conditions for switches not in position |
| Physical Size: | 19" W X 10" D X 1.75"H Standard EIA rack holes |
| Electrical Requirement: | 100-240 VAC @1 Ampere 50-60 Hertz |
| Environmental: | 0-50 degrees C. Non condensing atmosphere. |

VIII. Warranty

Broadcast Devices, Inc. products manufactured for Electronics Research, Inc. are warranted against failure due to faulty materials or workmanship for a period of two years from the date of shipment to the ultimate user. The warranty covers repair or replacement of defective parts at the factory, provided the unit has been returned prepaid by the user. All shipments to the factory shall have affixed to the outside of the container an R. A. number obtained from the factory. The above warranty is void if the unit has been modified by the user outside of any recommendations from the factory or if the unit has been abused or operated outside of its electrical or environmental specifications. If customer conducted field tests suggest that the unit may be faulty, whether or not the unit is in warranty, a full report of the difficulty should be sent to Broadcast Devices, Inc. factory at Cortlandt Manor, New York. The office may suggest further tests or authorize return for factory evaluation.

Units sent to the factory should be well packed in the original packing if possible and shipped to Broadcast Devices, Inc. Please go to www.broadcast-devices.com for shipping address. Remember to affix the R.A. number to the outside of the carton. Any packages received without such R.A. number will be refused. Note: freight collect shipments will also be refused. When the unit has been received, inspected and tested, the customer will receive a report of the findings along with a quotation for recommended repairs, which are found falling outside of the standard warranty. Units returned for in-warranty repairs which are found not to be defective will be subject to an evaluation and handling charge. In-warranty units will be repaired at no charge and returned via prepaid freight.

Out-of-warranty units needing repair require a purchase order and will be invoiced for parts, labor, and shipping charges.

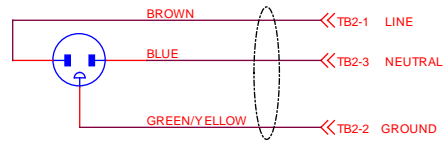
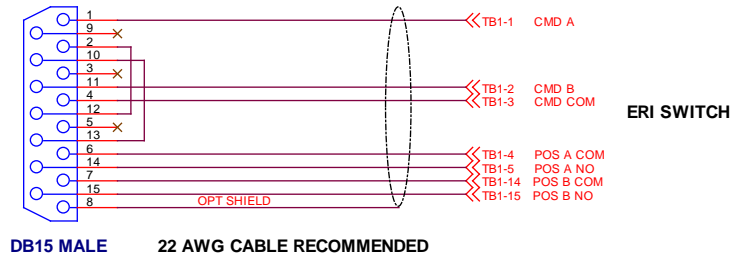
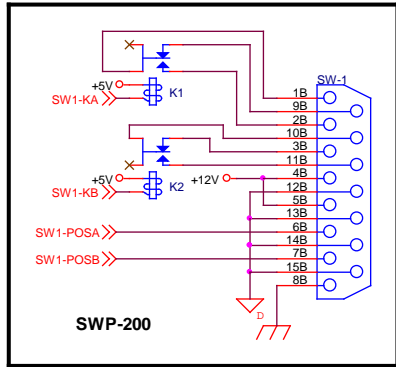
When ordering replacement part, always specify A) Part number or Description, and Quantity; B) Date of Purchase, Where Purchased; C) Any Special Shipping Instructions. Always specify a street address, as shipping companies cannot deliver to a postal box.

Broadcast Devices, Inc. is not responsible for any other manufacturer's warranty on original equipment. Nor are we responsible for any failure, damage, or loss of property that may occur due to the installation or operation of our equipment outside of recommended specifications.

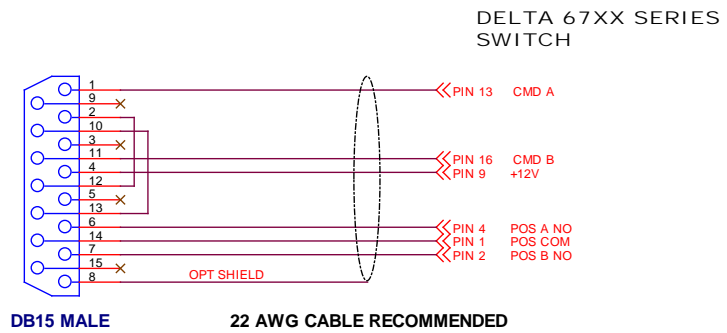
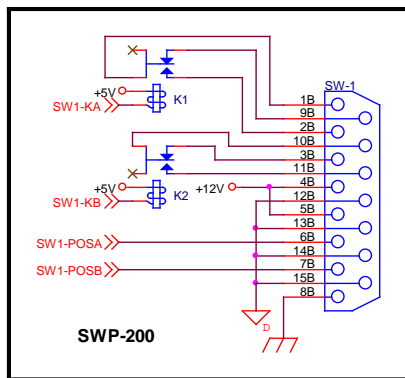
Broadcast Devices, Inc. may from time to time make changes to the materials used in the manufacture of its equipment and reserves the right to do so without further notice.

IX. Typical Switch Connection Diagrams

Electronics Research, Inc. Coaxial and Waveguide Motorized Switches

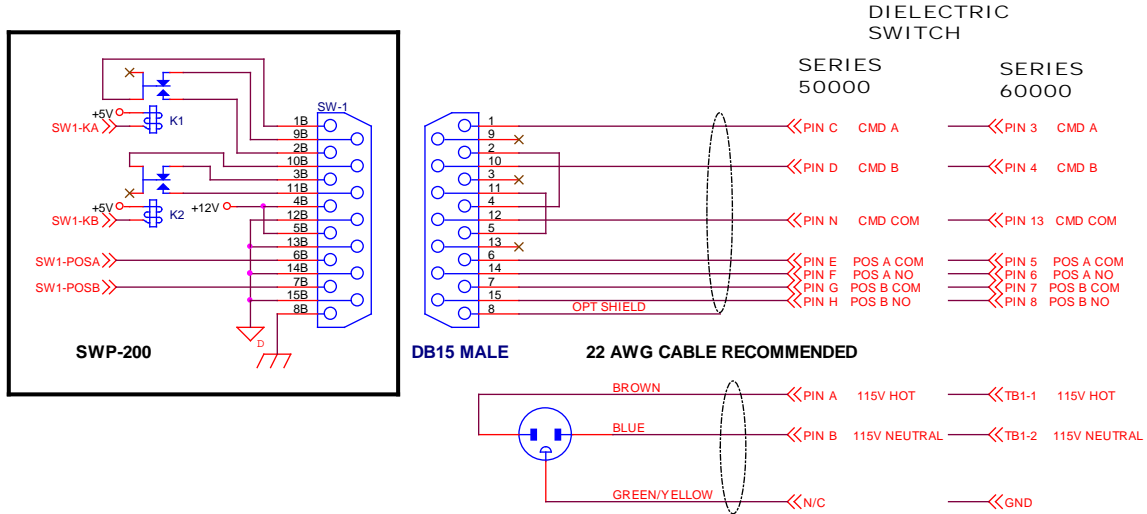


Delta Electronics. Motorized Coaxial Switches

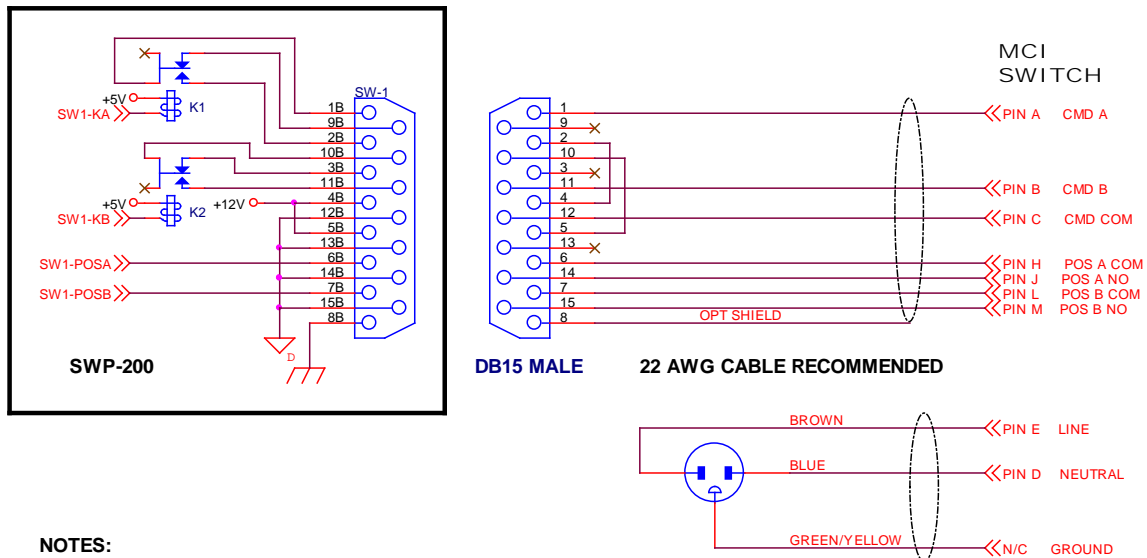


NOTE:
SWITCH MUST HAVE DELTA D42-87-1 12V RELAY
KIT INSTALLED.

Dielectric/SPX 50000/60000 Series Coaxial Switches



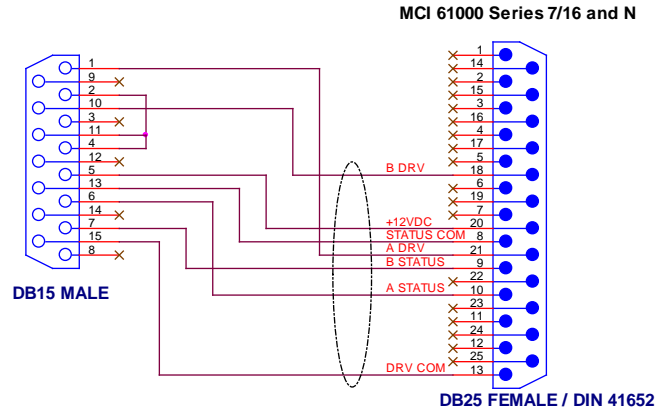
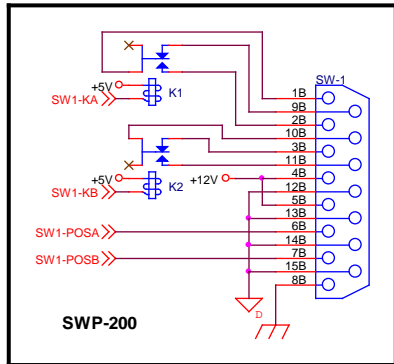
Mega/MCI Coaxial Motorized Switches



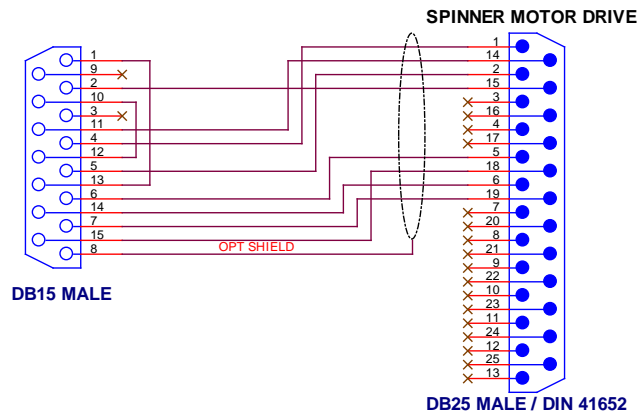
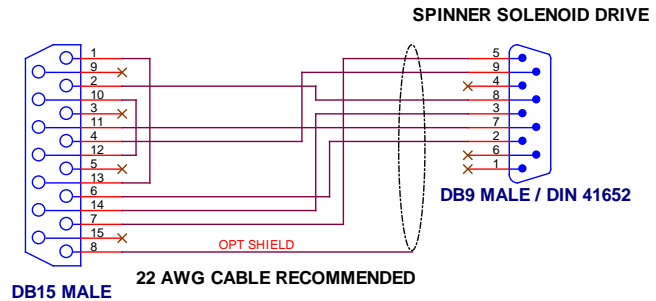
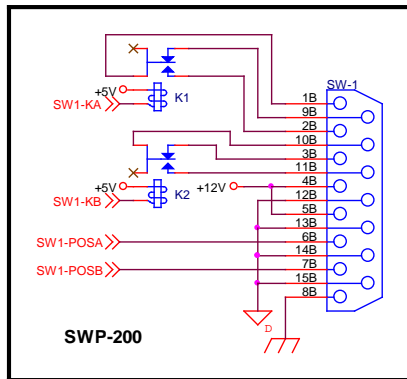
NOTES:

1. CONNECTOR: MIL TYPE MS3102A2214P
2. SWITCH MUST HAVE K1 INSTALLED FOR 12VDC OPERATION.
3. K1 P/N: 7/8" & 3 1/8" SWITCHES: DS2E-ML2-DC12V - ALLIED 788-1057
4. K1 P/N: 4 1/16" & 6 1/8" SWITCHES: KUL11D15D-12 - ALLIED 886-0129

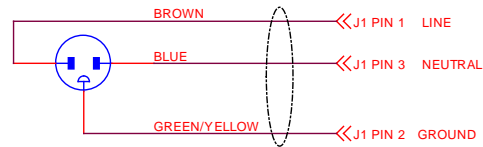
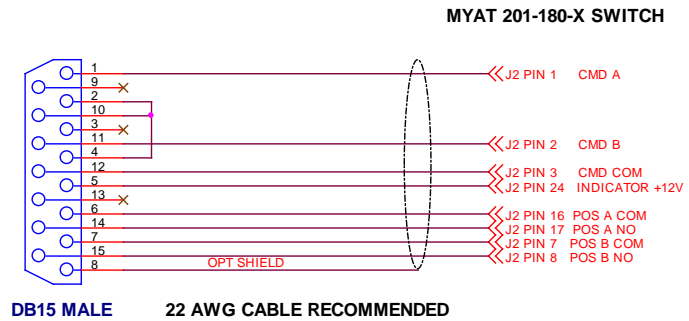
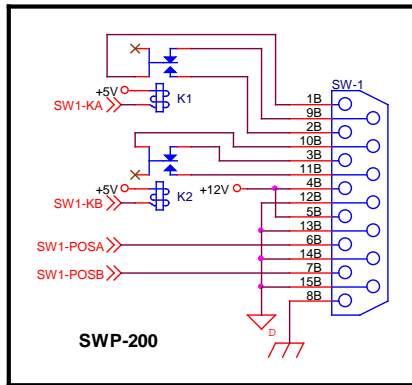
Mega/MCI 61000 7/16 DIN/N Type Switch



Spinner Motorized Switch Series



Myat 201-180-X Motorized Switch Series



NOTES:

1. 24 PIN CONTROL CONNECTOR: MYAT P/N 180-135
2. SWITCH MUST HAVE K1 - MYAT P/N 175-40 INSTALLED FOR 12VDC OPERATION

Dow Key Solenoid Type 412-420132, 412-480132, 412-430132 Switch Series

