
User's Manual



AUTOPOL-40-4T

SP4T 4 Port Programmable Switch - DC-40 GHz

Table of Contents

AUTOPOL 40-4T-M - Introduction.....	5
Switch Overview	6
Switch Operation - Manual.....	7
Switch Operation - DAMS Autopol Mode	8
Switch Operation - +5V TTL	10
Switch Operation - Serial.....	11
Switch Specifications	12
Troubleshooting and Support Info.....	13



Diamond Engineering
Automated Measurement Systems

<http://www.DiamondEng.net> · Support@DiamondEng.net

P.O. Box 2037 Diamond Springs, CA 95619 · 530-626-3857

AUTOPOL 40-4T-M - Introduction

Overview

The AUTOPOL-40-4T-M is a programmable SP4T mechanical switch operating from DC - 40 GHz featuring 2.92mm K Connectors. The unit features both front panel and remote control options. The unit can be remotely controlled via Serial, 5V TTL, or a physical control pendant with position indicator. A proprietary mechanical design cleans the contacts every time it is switched, this provides up to 5 million cycles at .01dB repeatability with a 10million cycle rated lifespan.

Package Contents

- AUTOPOL-40-4T-M Switch Unit
- Remote control pendant (optional)
- 24v Power supply with universal 115/240v input
- Type A to Type B - USB Cable (for virtual COM port access)
- Users Manual



Switch Overview

Front Panel

1. 2.92mm RF Ports
2. Power Indicator
3. Physical Indicator LEDs (driven from mechanical switch)
4. Keypad Selector



Rear Panel

1. DC Power Connector
2. Power Switch
3. USB Connector (for virtual serial port)
4. TTL Input Connector
5. Remote Pendant Connector



Switch Operation - Manual

Manual Control

1. Connect the 24v Power supply to the back of the unit.
2. Turn unit on (the unit will default to Port 1 on power-up)
3. Connect RF cables to desired ports, unused ports are internally terminated
4. Use the front panel (or remote pendant) to change switch positions

Port 3 Selected



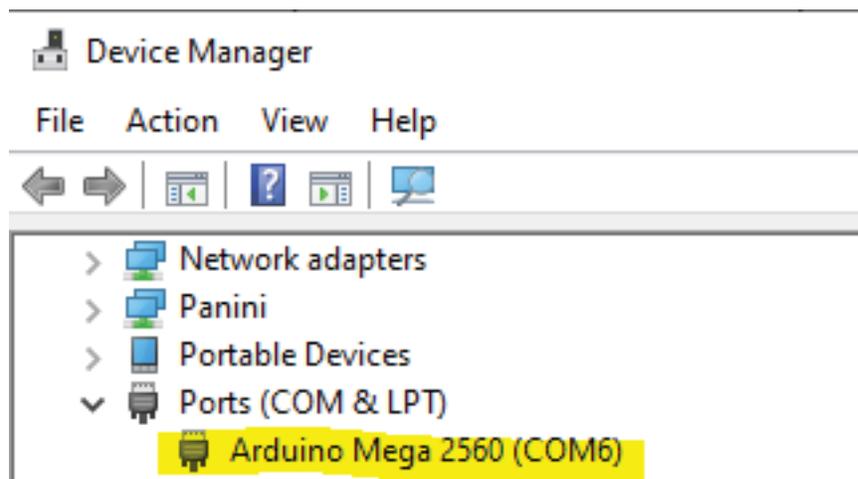
Switch Operation - DAMS Autopol Mode

Controlling via DAMS Software

The controller will interface to the DAMS Measurement software for general purpose polarization switching and automatic dual polarization measurements including the automatic calculation of circular polarization RCHP / LCHP gain

Please setup and configure your switch as instructed below. Once your switch has been configured the software will automatically connect and read the current position every time the software is started.

1. Connect the 24v Power supply to the back of the unit.
2. Turn unit on (the unit will default to Port 1 on power-up)
3. Connect USB from controller to PC
4. Open Device manager and identify it's current port , it should identify itself as an Arduino Mega 2560- verify it is on a port lower than COM9

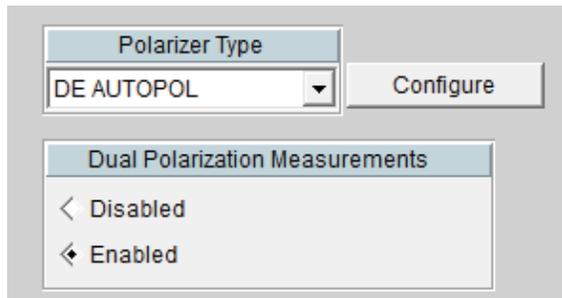
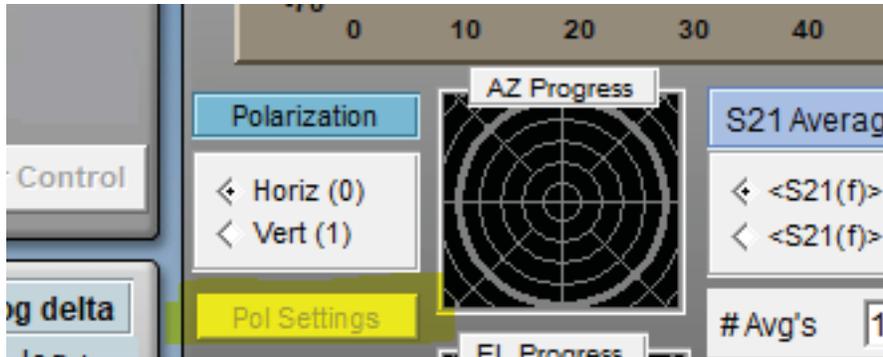


Switch Operation - DAMS Autopol Mode

DAMS Software Setup

With the switch powered on and connected, start the DAMS Software and press "POL SETTINGS"

For detailed information on DAMS Autopol see the software User's manual.



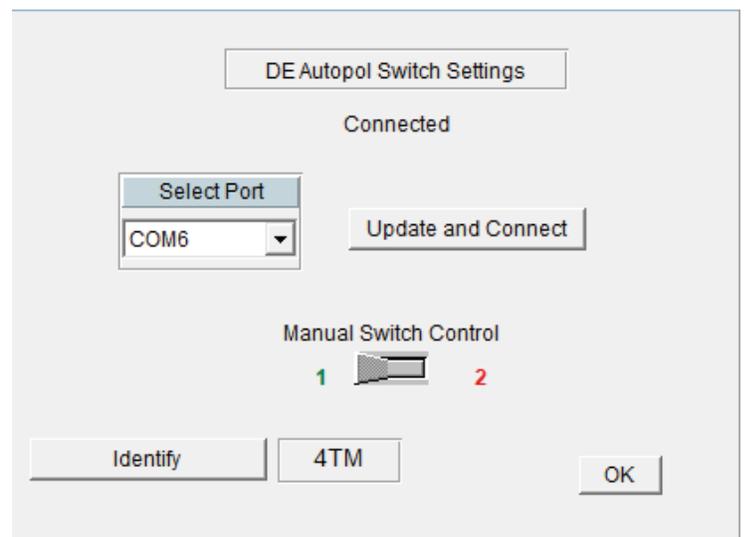
1. Select DAMS Autopol from the pulldown menu
2. Press the Configure button

3. Select the correct COM port from the pulldown

4. Press Update and Connect, the software should now say "Connected"

5. Using the manual control toggle, click between H and V, you should hear the switch clicking and the indicator lights should be changing on the physical switch.

6. The identify button can be used to verify model



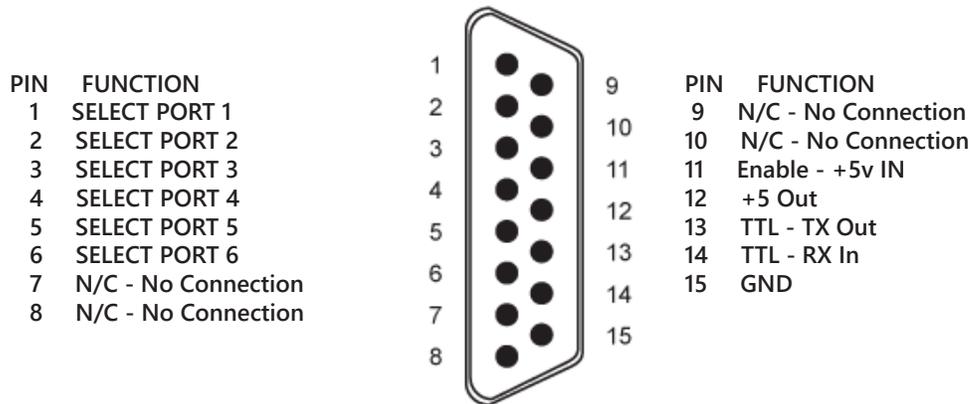
Switch Operation - +5V TTL

Controlling via TTL Signals

The controller accepts direct switch port selection via +5V TTL Signals through a DSUB-15 connector located on the back of the switchbox , a +5 output pin is provided for the purpose of using simple switches to test or activate the ports. TTL Level serial pins are provided for communication via microcontroller or other 5V serial signal.

A complimentary "break out box" has been provided to aid with interfacing

DB15-F - +5V TTL >2V= High - Enable= Pin11 High - Serial 5V TTL



Switch Operation - Serial

Controlling via Serial (TTL or Virtual COM) Port

Any program capable of sending clear text commands to a COM port Eg. COM4 can control the switch unit. The unit also features TTL Level Serial for direct communication from a microcontroller (Arduino etc.) use the settings and instructions below to control your switch unit via serial. The TTL Serial access pins can be found under the TTL control page.

Default Serial Parameters:

Baud: 9600

Bits: 8

Parity: No

Stop Bits: 1

Serial Commands

1<cr> - Selects Port 1

2<cr> - Selects Port 2

3<cr> - Selects Port 3

4<cr> - Selects Port 4

5<cr> - Selects Port 5 (SP6T Models)

6<cr> - Selects Port 6 (SP6T Models)

? - Returns currently selected port

mdl - returns switch model no.

“Invalid Command” - Response to unknown command

Connecting via terminal or user program.

1. Power unit on before connecting USB Cable.
2. Connect the USB Cable to the computer.
4. Open device manager to verify that a new COM port is located under Ports COM&LPT
5. In your terminal program , select the COM port as found above using the default serial parameters

Switch Specifications

Frequency range	DC to 40 GHz
Insertion loss (see Figure 11)	0.3 dB + 0.015 x frequency (GHz), DC to 26.5 GHz 0.030 x frequency (GHz) - 0.1 dB, 26.5 to 40 GHz
Isolation (see Figure 12)	100 dB minimum, DC to 12 GHz 80 dB minimum, 12 to 15 GHz 70 dB minimum, 15 to 20 GHz 65 dB minimum, 20 to 40 GHz
SWR	1.3 maximum, DC to 4 GHz 1.35 maximum, 4 to 12.4 GHz 1.5 maximum, 12.4 to 18 GHz 1.7 maximum, 18 to 26.5 GHz 1.95 maximum, 26.5 to 40 GHz
Repeatability (Up to 5 million cycles measured at 25 °C)	0.03 dB maximum
Connectors	2.92 (f)

Maximum power rating

Into internal termination	1 W CW 50 W peak, 10 μs max pulse width, not to exceed 1 W average
Into thru path	
Hot switching	2 W CW 100 W peak, 10 μs max pulse width, not to exceed 2 W average
Cold switching	See Figure 8

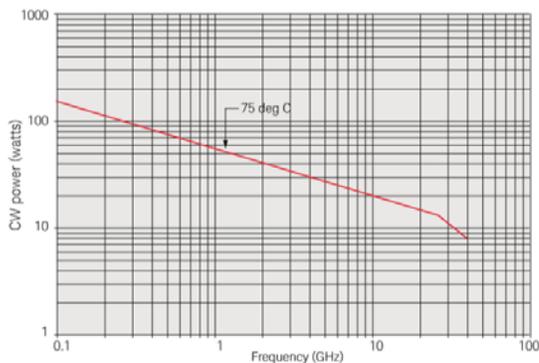


Figure 8. Maximum incident CW power (cold switching) vs. frequency

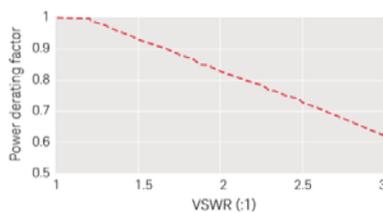
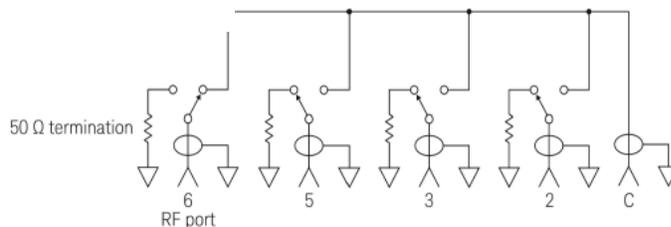
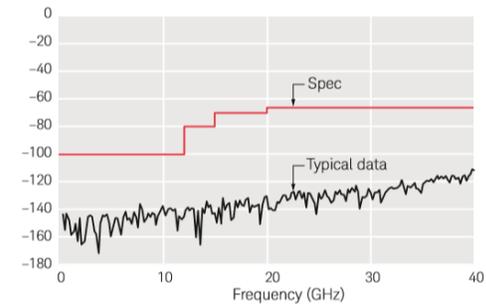
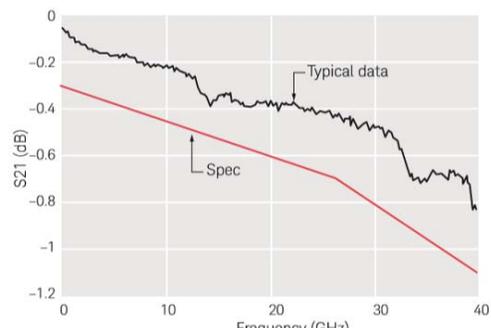


Figure 9. Power derating factor versus VSWR



Troubleshooting and Support Info.

Troubleshooting

1. Check all connections and ensure the controller and power supply are on.
2. Does the front panel indicator match the pendant indicator.
3. If using USB to serial - check device manager to make sure it appears as a COM port
4. Check to see if problem is with one port or all ports

If you still cannot resolve the issue, please contact us.



<http://www.DiamondEng.net> · Support@DiamondEng.net

P.O. Box 2037 Diamond Springs, CA 95619 · 530-626-3857