Xtra Long Life 100 million cycles

USB/Ethernet RF Switch Matrix RC-4SPDT-A18

50Ω   DC to 18 GHz

The Big Deal

- **USB** *or* Ethernet-TCP/IP (**HTTP** and **Telnet** protocols) control
- Capable of 100 million cycles
- 4 SPDT electromechanical, absorptive RF switches (85 dB typ. isolation)
- Programmable to different switch configurations
- Plug-and-Play usable with Windows®, Mac®, and Linux® computers

Case Style: LM1851

Installation CD

30 day **MONEY-BACK GUARANTEE!** *Click Here For More Details*

Product Overview

Mini-Circuits' RC-4SPDT-A18 is a general purpose RF switch matrix controlled via either USB or Ethernet-TCP/IP (supports HTTP and Telnet protocols). The model contains four electromechanical SPDT, absorptive fail-safe RF switch constructed in break-before-make configuration and powered by +24VDC with switching time of 25 ms typical. The four switches can be set as four independent SPDT switches, two SP3T switches, one SP4T switch & a SPDT switch, a single SP5T switch, or other configurations (see pages 6 – 14 for configuration details). The RF switches can be operated remotely using the supplied GUI software or programmed by the user with the included API objects. The RF switches operate over a wide frequency band from DC to 18 GHz, have low insertion loss (0.2 dB typical) and high isolation (85 dB typical) making the switch matrix perfectly suitable for a wide variety of RF applications.

The RC-4SPDT-A18 is constructed in a compact, rugged metal case (4.5" x 6.0" x 2.25") with 12 SMA(F) connectors (COM, 1, and 2) for each switch, a 2.1mm DC socket, USB type B port, and a standard RJ45 network socket. The model is supplied with our easy-to-install, easy-to-use GUI software and API objects for Windows environments with complete programming instructions for 32 and 64 bit Windows® and Linux® operating systems. Also included is a 2.7 ft. USB cable, a 5 ft. Ethernet cable for Ethernet (HTTP and Telnet) control, and a power adaptor suitable for US, EU, and other power systems. See page 15 for list of all accessories included. Longer USB cables and a mounting bracket are available as additional accessories.

Key Features

Feature	Advantages
Ethernet-TCP/IP- **HTTP** and **Telnet** Protocols (Supports DHCP and Static IP)	The RC-4SPDT-A18 switch matrix can be controlled from any Windows®, Mac®, or Linux® computer, or even a mobile device with a network connection and Ethernet-TCP/IP (HTTP or Telnet protocols) support. Using a VPN would allow remote control from anywhere in the world.
USB HID (Human Interface Device)	User may also control the switch matrix via USB connection. Plug-and-Play, no driver required. Compatible with Windows® or Linux® operating systems using 32 and 64 bit architecture.
RF SPDT absorptive electromechanical switches	Wideband (DC to 18 GHz) with low insertion loss (0.2 dB typ.), very high isolation (85 dB typ.), and high power rating (10W cold switching).
24VDC operating voltage	The RC-4SPDT-A18 requires 24V / 1055mA to power the RF switch, supplied from the power adaptor (included).
GUI Software CD, programming instructions, USB & Ethernet cables, and 24VDC power adaptor included	The RC-4SPDT-A18 comes ready to use out of the box with all software, accessories, and instructions needed for immediate operation included.

Xtra Long Life 100 million cycles

USB/Ethernet RF Switch Matrix   RC-4SPDT-A18

50Ω   DC to 18 GHz

Features
- Capable of 100 million cycles
- Four DC to 18 GHz SPDT absorptive fail-safe RF switches in break-before-make configuration
- Electromechanical switching (Isolation 85 dB typ.)
- High power handling, 10W
- Greatly simplifies complex switching and timing setups
- USB HID or Ethernet-TCP/IP **HTTP** and **Telnet**) control
- Easy installation and operation
- Supports a wide range of programming environments (See **AN-49-001** for details)[1]
- Mounting bracket (Optional)
- Protected by US Patents 5,272,458; 6,414,577; 6,650,210; 7,633,361 and 7,843,289

Case Style: LM1851

Installation CD

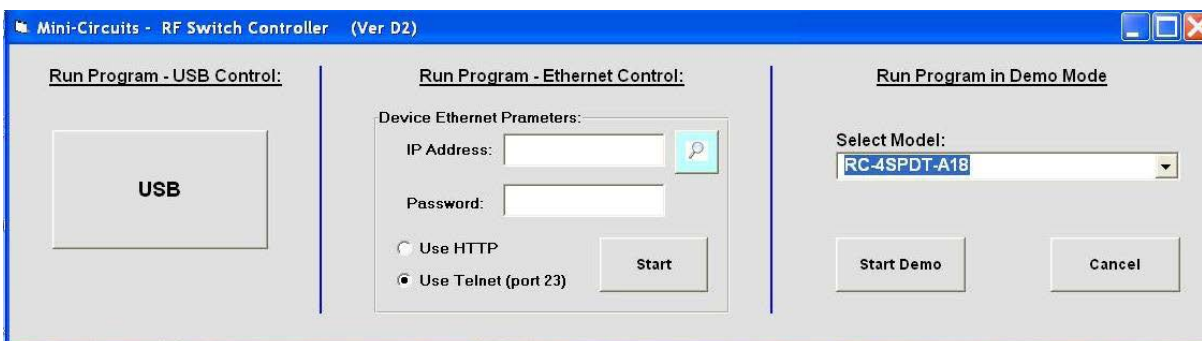| Model No.	Description	Price	Qty.
RC-4SPDT-A18	**USB/Ethernet RF Switch**	$1280.00 ea.	(1-9)
Included Accessories			
AC/DC-24-3W1	AC/DC 24V Adapter *(see Ordering Information)*		1
CBL-3W1-XX	AC Power Cord *(see Ordering Information)*		1
USB-CBL-AB-3+	2.7 ft USB cable		1
CBL-RJ45-MM-5+	5 ft. Ethernet cable		1
RFSW-CD	Installation CD		1

Applications
- R&D
- Automated Test equipment
- Controlling RF signal paths

RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

Mini-Circuits RF Switch Control Program for USB/Ethernet RF Switch Matrix

Mini-Circuits - RF Switch Controller   (Ver D2)

Run Program - USB Control:

USB

Run Program - Ethernet Control:

Device Ethernet Prameters:

IP Address:

Password:

○ Use HTTP
◉ Use Telnet (port 23)

Start

Run Program in Demo Mode

Select Model:

RC-4SPDT-A18

Start Demo   **Cancel**

Steps to start RC-4SPDT-A18 GUI via USB
- Click on USB button.
- If more than one unit is connected select S/N from list and click OK.
- Start working.

Steps to start RC-4SPDT-A18 GUI via Ethernet
- Click on search icon.
- Select unit from list of IP addresses and click select
- The selected IP will appear in the IP Address field.
- Select communication protocol (Telnet or HTTP)
- Click on Start and begin working.

- For Demo mode of any Switch Matrix model select the model name from the drop box and click 'Start Demo' (See **user guide** for details)
- For programming instructions of the switch matrix see **programming guide** and **AN-49-001** on Mini-Circuits' website

[1] Windows is a registered trademarks of Microsoft Corporation in the United States and other countries. Linux is a registered trademark of Linus Torvalds. Mac is a registered trademark of Apple Corporation in the United States and other countries.
Neither Mini-Circuits nor the Mini-Circuits RC-4SPDT-A18 are affiliated with or endorsed by the owners of the above referenced trademarks.

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Electrical Specifications

Parameter	Port	Conditions	Min.	Typ.	Max.	Units
Rated Voltage	24V$_{DC}$ IN	provided via external power adapter	23	24	25	V
	USB Port	–	–	5	–	
Power On Sequence: Connect the 24V power, followed by the USB control and/or Ethernet cable before turning on the Switch Matrix.						
Rated Current	24V$_{DC}$ IN	All switches in COM -> 2 position	–	790	1055	mA
		All switches in COM -> 1 position	–	115	165	
	USB Port	All switches in COM -> 2 position	–	10	20	
		All switches in COM -> 1 position	–	10	20	
Switching Time		–	–	25	–	ms
Life (per switch) [2]		@ 100 mW (hot switching) [3]	10	–	–	million switching cycles
		@ 1 W (hot switching) [3]	–	3	–	
RF Power (cold switching) [4]		–	–	–	10	W
RF Power (hot switching) [4]			–	–	1	
RF VSWR		DC to 1 GHz	–	1.05	1.10	:1
		1 GHz to 8 GHz	–	1.20	1.30	
		8 GHz to 12 GHz	–	1.20	1.35	
		12 GHz to 18 GHz	–	1.25	1.40	
RF Insertion Loss (per switch)		DC to 1 GHz	–	0.10	0.15	dB
		1 GHz to 8 GHz	–	0.15	0.30	
		8 GHz to 12 GHz	–	0.25	0.40	
		12 GHz to 18 GHz	–	0.30	0.50	
RF Isolation (per switch)		DC to 1 GHz	85	100	–	dB
		1 GHz to 8 GHz	75	90	–	
		8 GHz to 12 GHz	70	80	–	
		12 GHz to 18 GHz	60	66	–	

[2] Capable of up to 100 million cycles with proper maintenance, contact Mini-Circuits
[3] Exceeding these limits will result in reduced life.
[4] Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.

Minimum System Requirements

Interface	USB HID or HTTP Get/Post or Telnet protocols
Host operating system - USB Control	**Windowws 32/64 Bit operating system:** Windows 98®, Windows XP®, Windows Vista®, Windows 7®, Windows 8,® **Linux® support:** 32/64 Bit operating system
Host operating system - Ethernet Control	Any Windows®, Mac®, or Linux® computer with a network port and Ethernet-TCP/IP (HTTP or Telnet protocols) support
Hardware	Pentium® II or better [5]

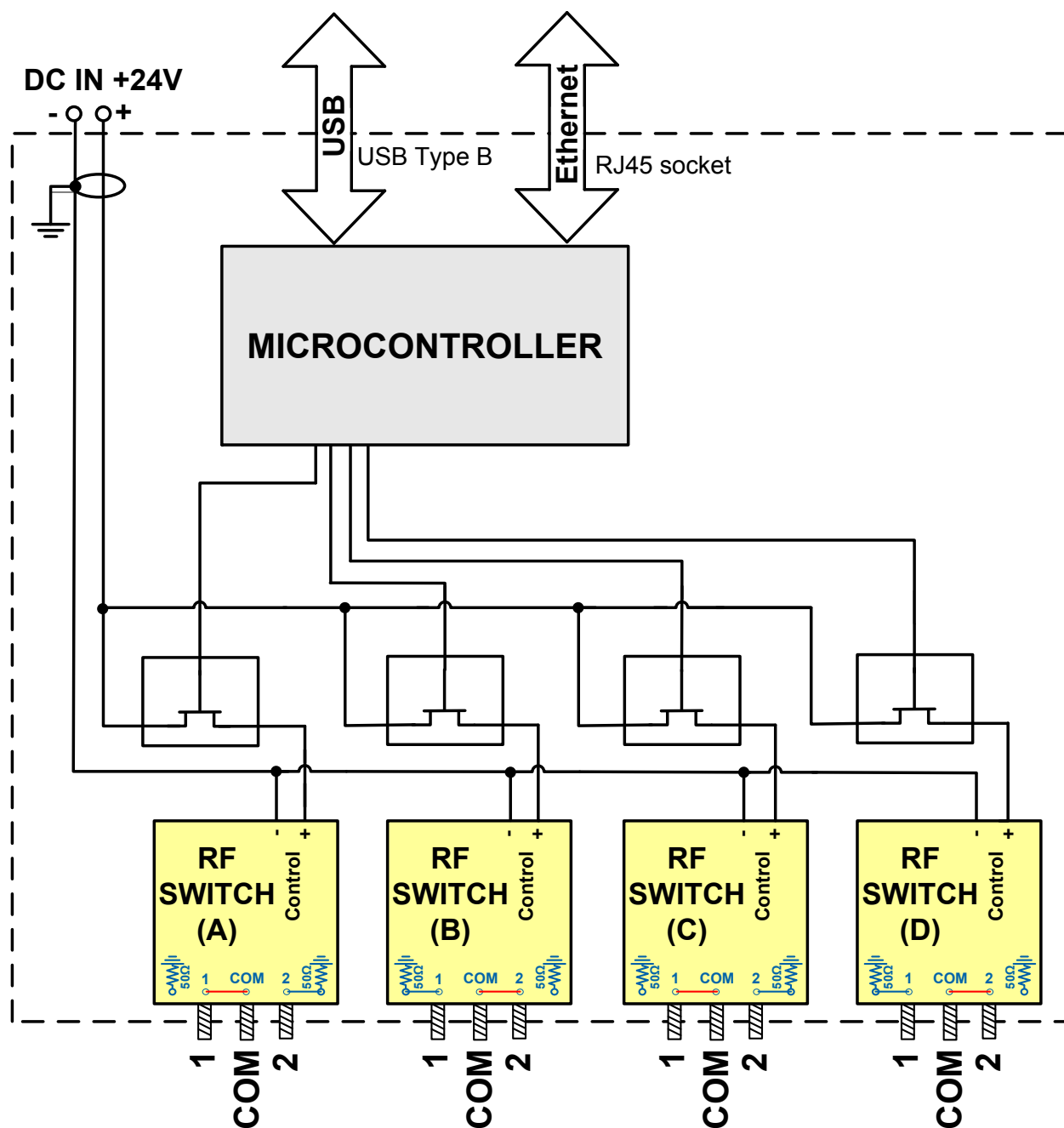[5] Pentium® is a registered trademark of Intel Corporation

Connections

24V$_{DC}$ IN	(2.1 mm center positive DC Socket)
RF Switch A (1, COM, 2)	(SMA female)
RF Switch B (1, COM, 2)	(SMA female)
RF Switch C (1, COM, 2)	(SMA female)
RF Switch D (1, COM, 2)	(SMA female)
USB	(USB type B receptacle)
Network (Ethernet/LAN)	(RJ45 socket)

Absolute Maximum Ratings

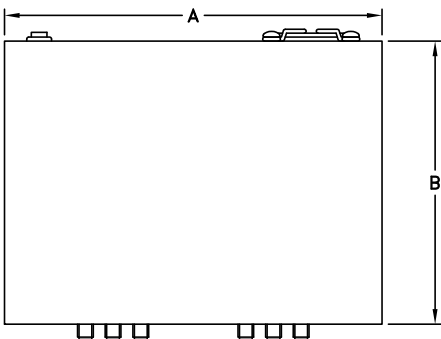|	
Operating Temperature	0°C to 40°C
Storage Temperature	-15°C to 45°C
DC Voltage max.	26V
RF power (at COM port of any switch)	10W
RF power (at 1 and 2 of any switch)	1W

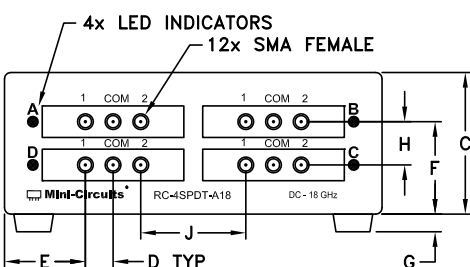Permanent damage may occur if any of these limits are exceeded.

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Block Diagram

Outline Drawing (LM1851)

TOP VIEW

FRONT VIEW

4x LED INDICATORS
12x SMA FEMALE

Mini-Circuits   RC-4SPDT-A18   DC - 18 GHz

REAR VIEW

US Patents: 5 272 458
6 414 577 7 633 361
6 650 210 7 843 289

POWER   ON OFF

USE GROUNDED POWER ADAPTER ONLY   +24VDC   USB   LAN

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BOTTOM VIEW

Shown with Rubber feet removed
and Brackets Installed.
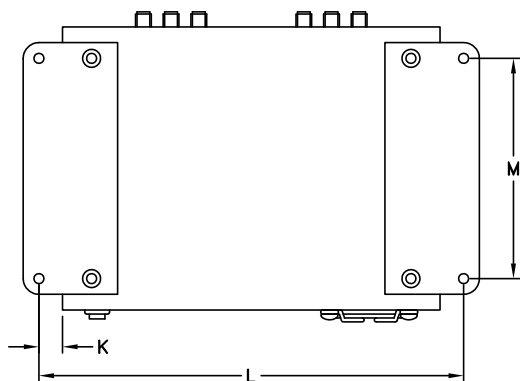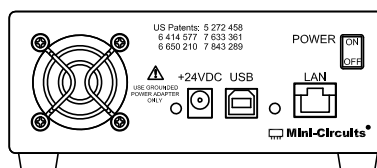
BRACKET OPTION
ONE SET OF 2 EACH.

.25 [6.4]
2x ⌀.158 [⌀4.01]
1.500 [38.10]
4.00 [101.6]
.41 [10.5]
.837 [21.26]
.18 [4.6]
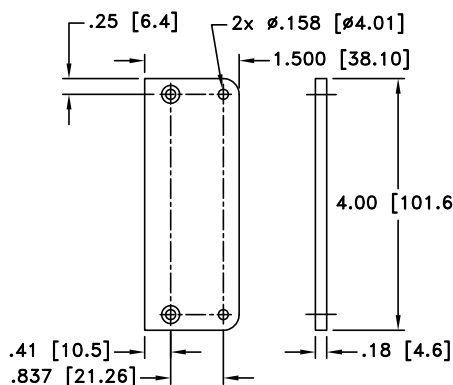
TOLERANCE: ±.005

INSTRUCTION FOR
MOUNTING BRACKETS:
TOOL REQUIRED:
PHILLIPS HEAD SCREW DRIVER

STEP 1: REMOVE RUBBER FEET
FROM THE BOTTOM
OF THE UNIT.
DO NOT DISCARD
THE FASTENERS.

STEP 2: MOUNT THE BRACKETS
WITH THE FASTENERS
REMOVED IN STEP 1,
USING THE COUNTER-
BORE HOLES IN THE
BRACKET.

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAMS
6.00	4.50	2.25	0.440	1.28	1.47	0.28	0.688	1.670	0.375	6.75	3.50	1184
152.4	114.3	57.2	11.18	32.5	37.3	7.11	17.5	42.4	9.52	171.4	88.9	

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Configuration A: 4 SPDT switches

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.
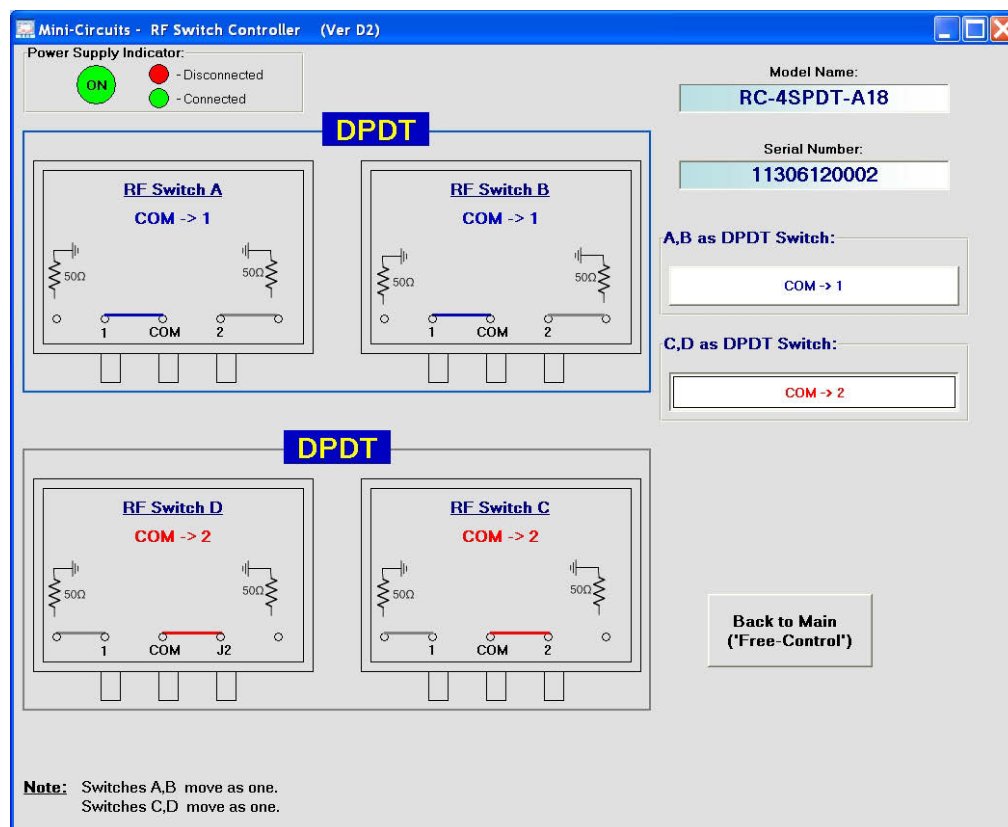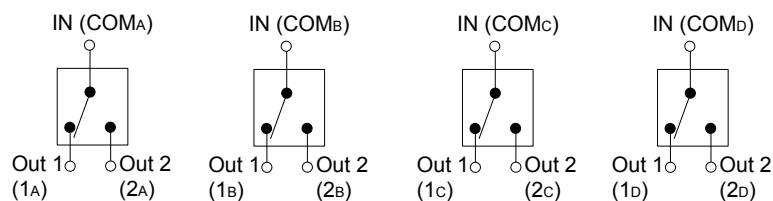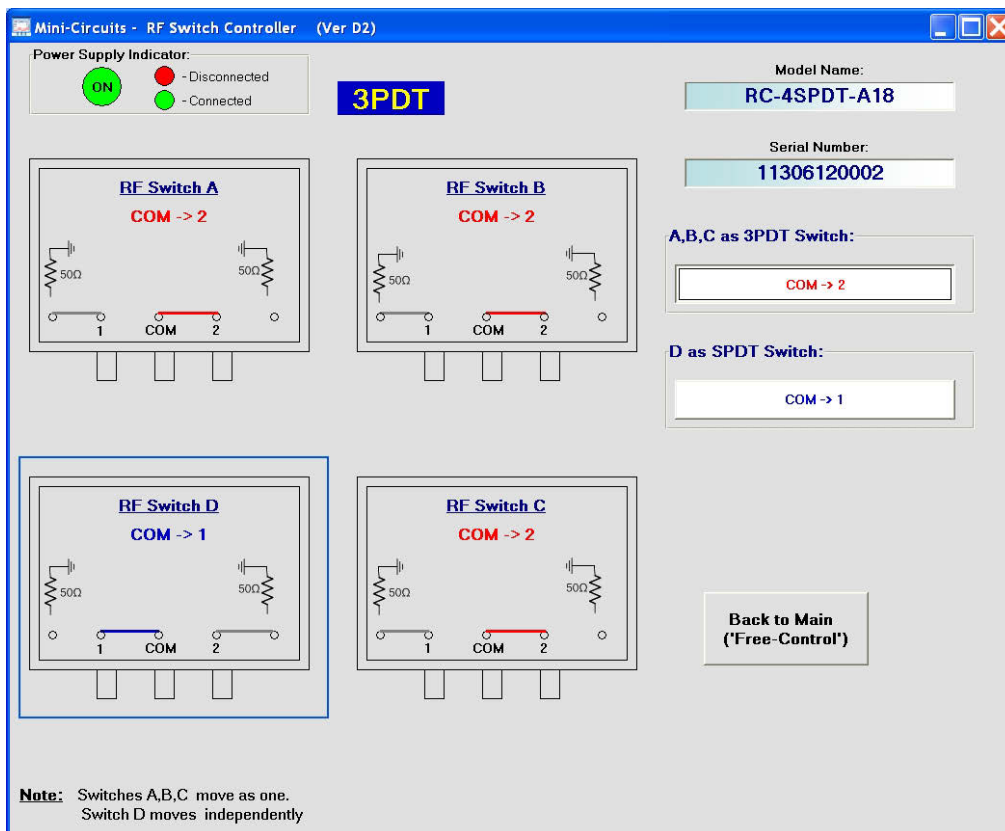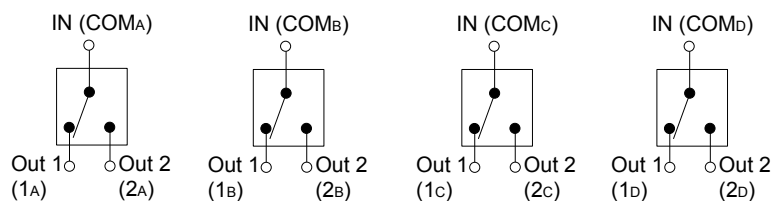

Config. A

IN (COM$_A$) IN (COM$_B$) IN (COM$_C$) IN (COM$_D$)

Out 1 (1$_A$) Out 2 (2$_A$) Out 1 (1$_B$) Out 2 (2$_B$) Out 1 (1$_C$) Out 2 (2$_C$) Out 1 (1$_D$) Out 2 (2$_D$)
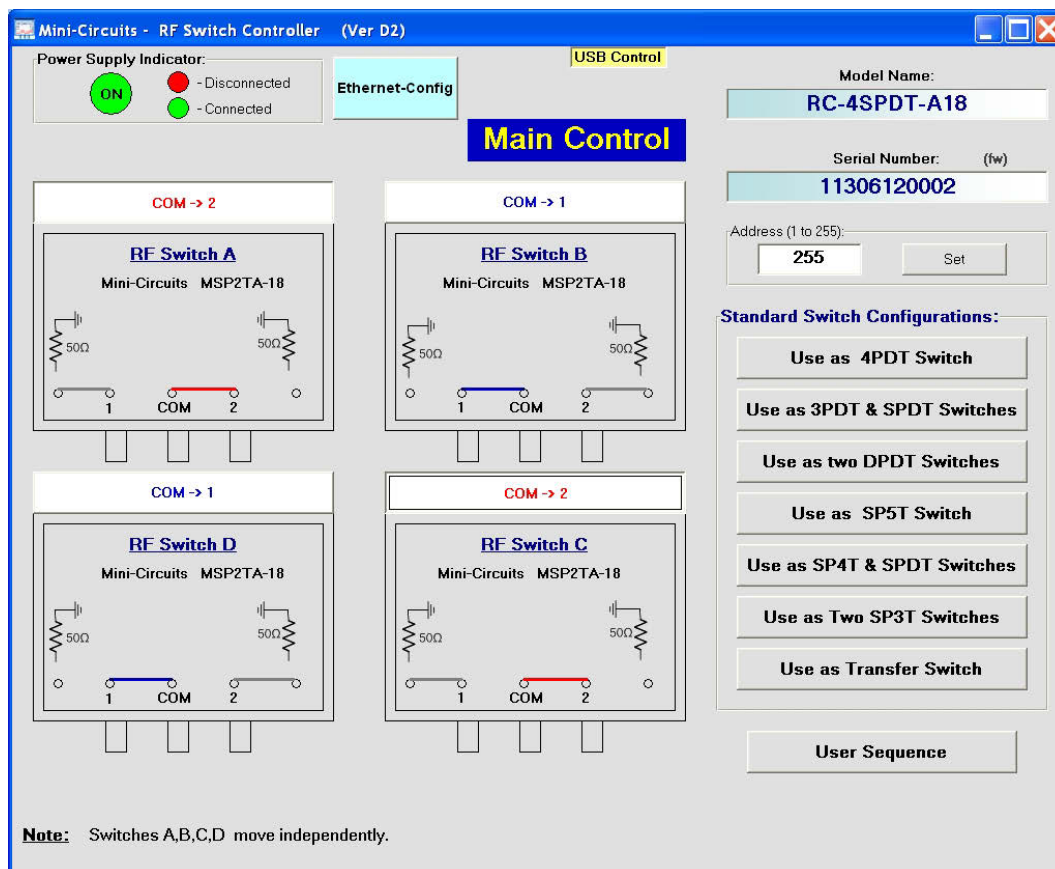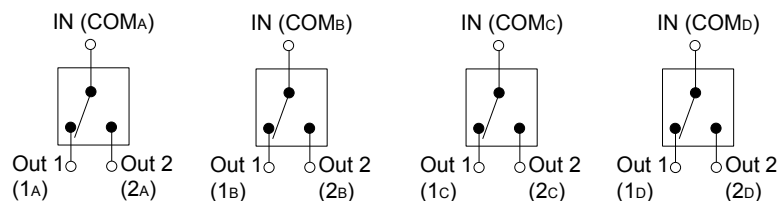
SPDT: Switch A, B, C or D Logic
IN ←→Out1 : 0
IN ←→Out2 : 1
Switches move independently.

Configuration B: 4PDT switch

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. B

IN (COMA)   IN (COMB)   IN (COMC)   IN (COMD)

Out 1 Out 2 (1A) (2A)   Out 1 Out 2 (1B) (2B)   Out 1 Out 2 (1C) (2C)   Out 1 Out 2 (1D) (2D)
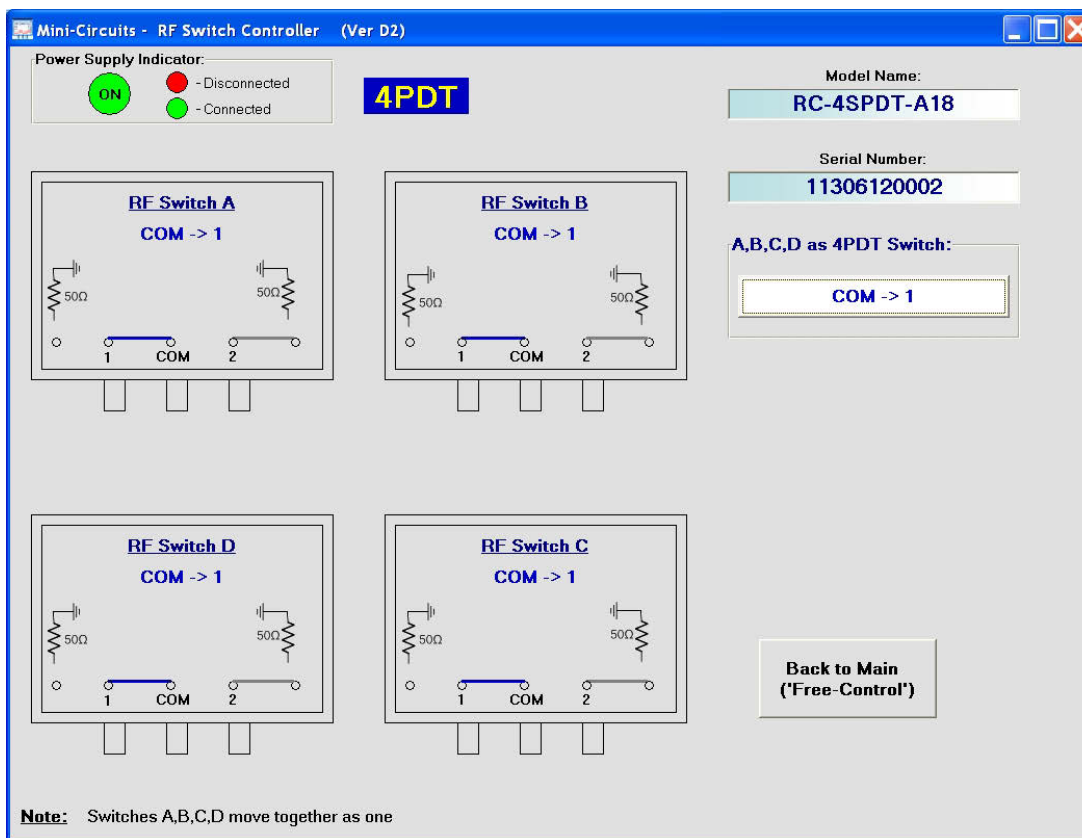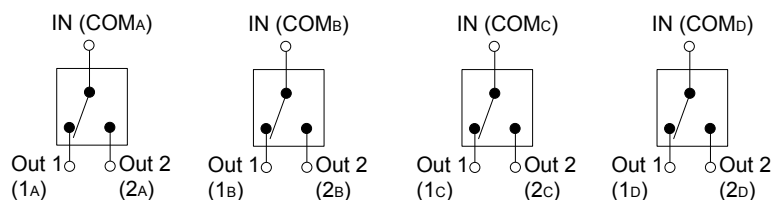
4PDT: Switch A, B ,C & D Logic
IN $\longleftrightarrow$ Out1 : 0, 0, 0, 0
IN $\longleftrightarrow$ Out2 : 1, 1, 1, 1
All four switches move together as one.

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Configuration C: 2 DPDT switches

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.
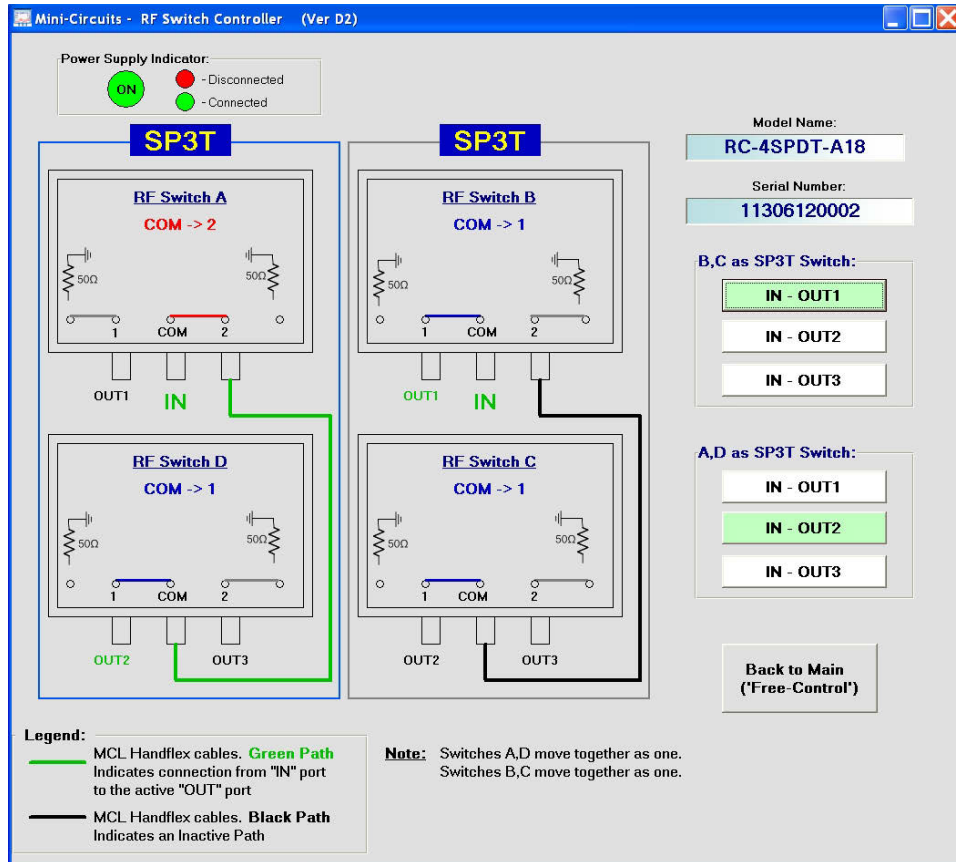

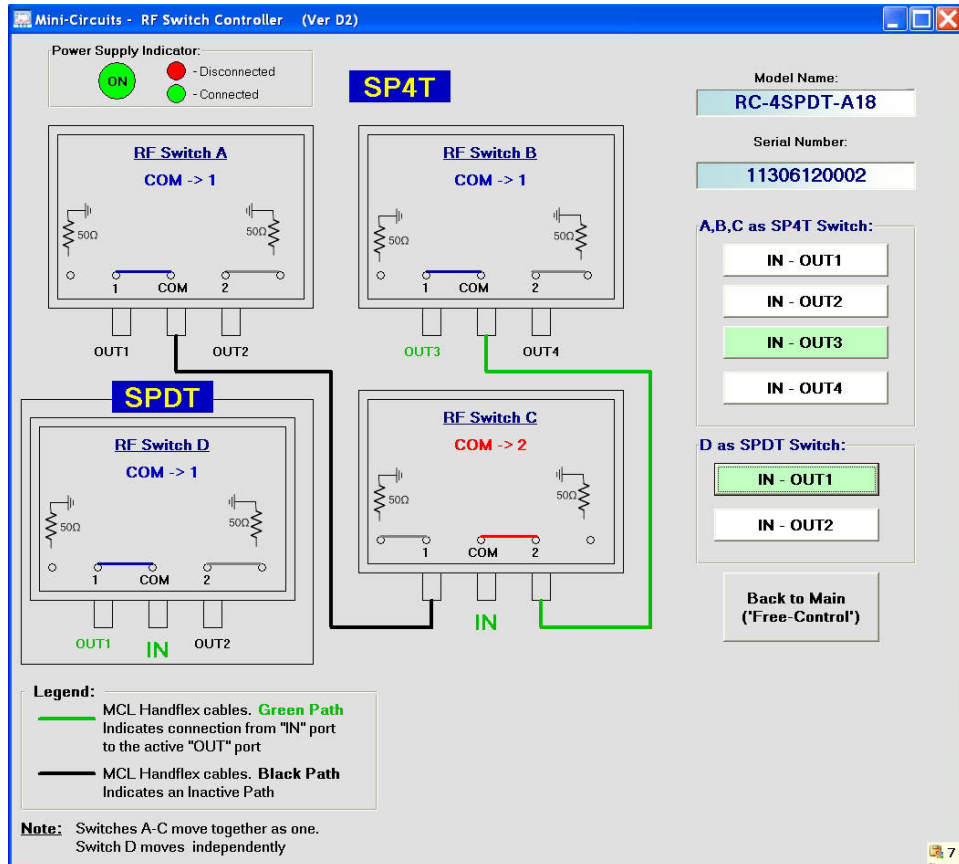**Config. C**

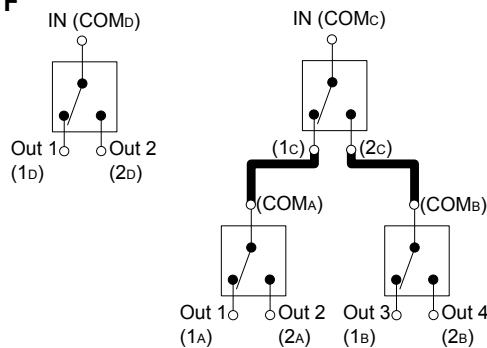**DPDT**:   Switch A & B or C & D Logic
IN ←→Out1 : 0, 0
IN ←→Out2 : 1, 1
Switches A & B move together as one.
Switches C & D move together as one.

Configuration D: 3PDT & SPDT switches

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. D

3PDT: Switch A, B & C Logic
IN ←→Out1 : 0, 0, 0
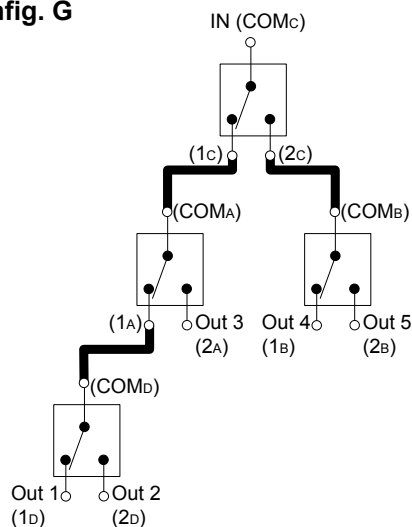IN ←→Out2 : 1, 1, 1
Switches A, B & C move together as one, switch D moves separately.

Configuration E: 2 SP3T switches

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. E
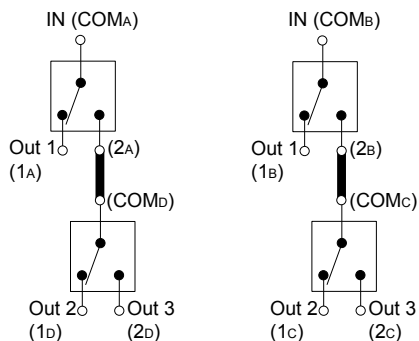
SP3T:
 Switch A & D or B & C Logic
        IN ←→Out1 : 0, Ø
        IN ←→Out2 : 1, 0
        IN ←→Out3 : 1, 1
Switches A & D move together as one. Switches B & C move together as one.

Configuration F: SP4T & SPDT switches

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. F

SPDT: Switch D Logic
IN $\longleftrightarrow$ Out1 : 0
IN $\longleftrightarrow$ Out2 : 1

SP4T:
Switch A, B & C Logic
IN $\longleftrightarrow$ Out1 : 0, Ø, 0
IN $\longleftrightarrow$ Out2 : 1, Ø, 0
IN $\longleftrightarrow$ Out3 : Ø, 0, 1
IN $\longleftrightarrow$ Out4 : Ø, 1, 1
Switches A, B & C move together as one. Switch D moves separately.

Configuration G: SP5T switch

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.

Config. G

IN (COMC)

(1c)   (2c)

(COMA)   (COMB)

(1A)   Out 3   Out 4   Out 5
        (2A)   (1B)   (2B)

(COMD)

Out 1   Out 2
(1D)   (2D)
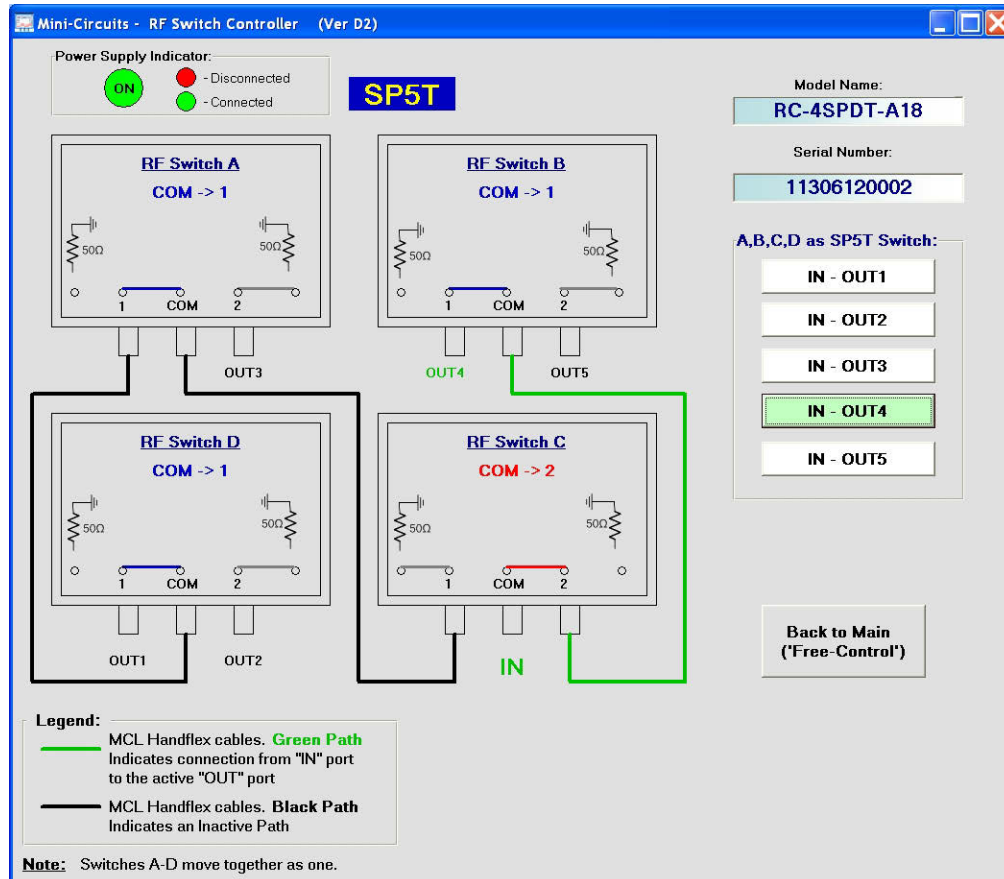
SP5T:
Switch A, B, C & D Logic
IN ←→Out1 : 0, Ø, 0, 0
IN ←→Out2 : 0, Ø, 0, 1
IN ←→Out3 : 1, Ø, 0, Ø
IN ←→Out4 : Ø, 0, 1, Ø
IN ←→Out5 : Ø, 1, 1, Ø
All four switches move together as one.

Configuration H: Transfer switch

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.
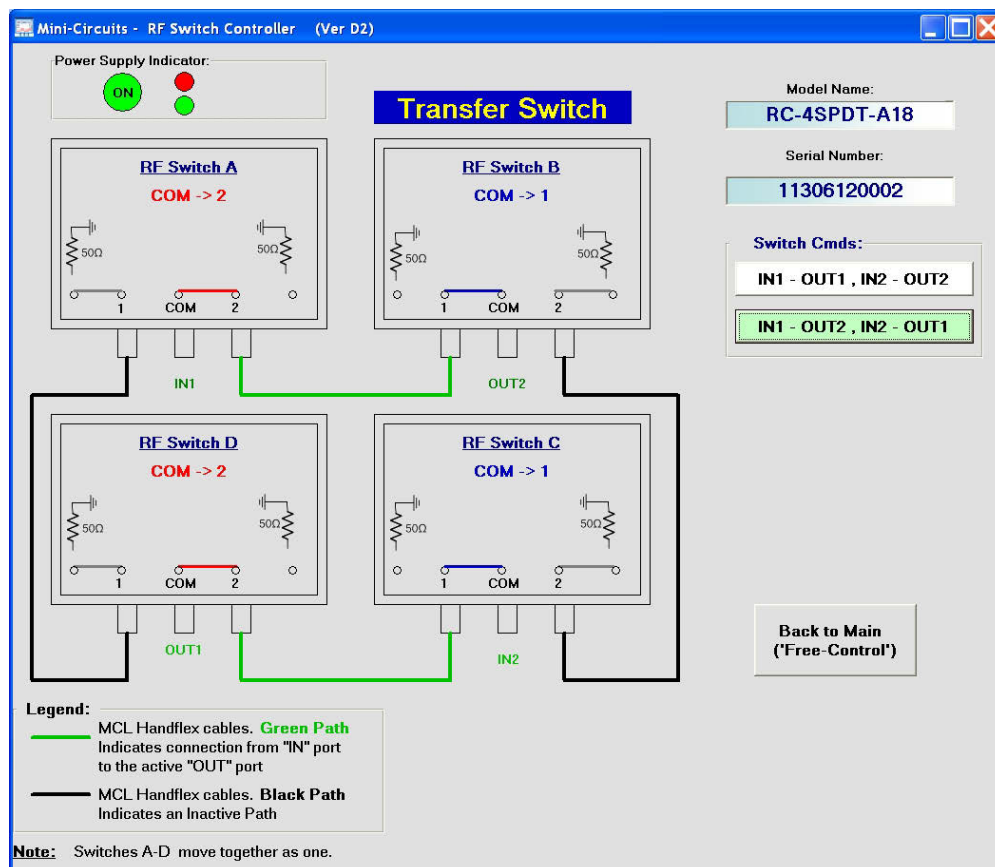

Config. H
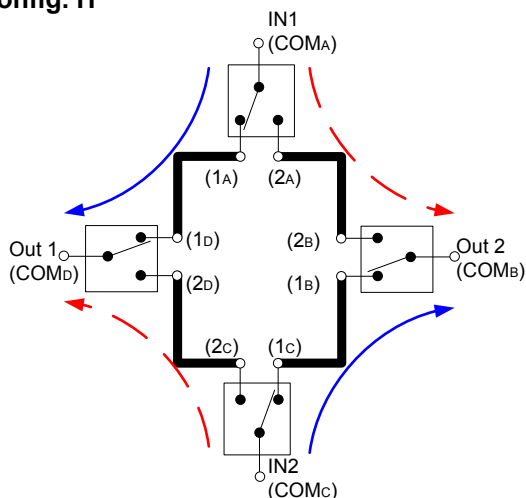
TRANSFER:
Switch A, B, C & D Logic
IN1 ←→Out1, IN2 ←→Out2 0, 1, 1, 0
IN1 ←→Out2, IN2 ←→Out1 1, 0, 0, 1
All four Switches move together as one.

User Switching Sequence - for setting any configuration or sequence needed

• Power handling is specified with RF applied to the COM port and output load connected to either 1 or 2 of the respective switch.
• When connecting a coaxial semi flex cable, tighten connectors alternately using an 8in/lb torque wrench to insure proper contact at each end.
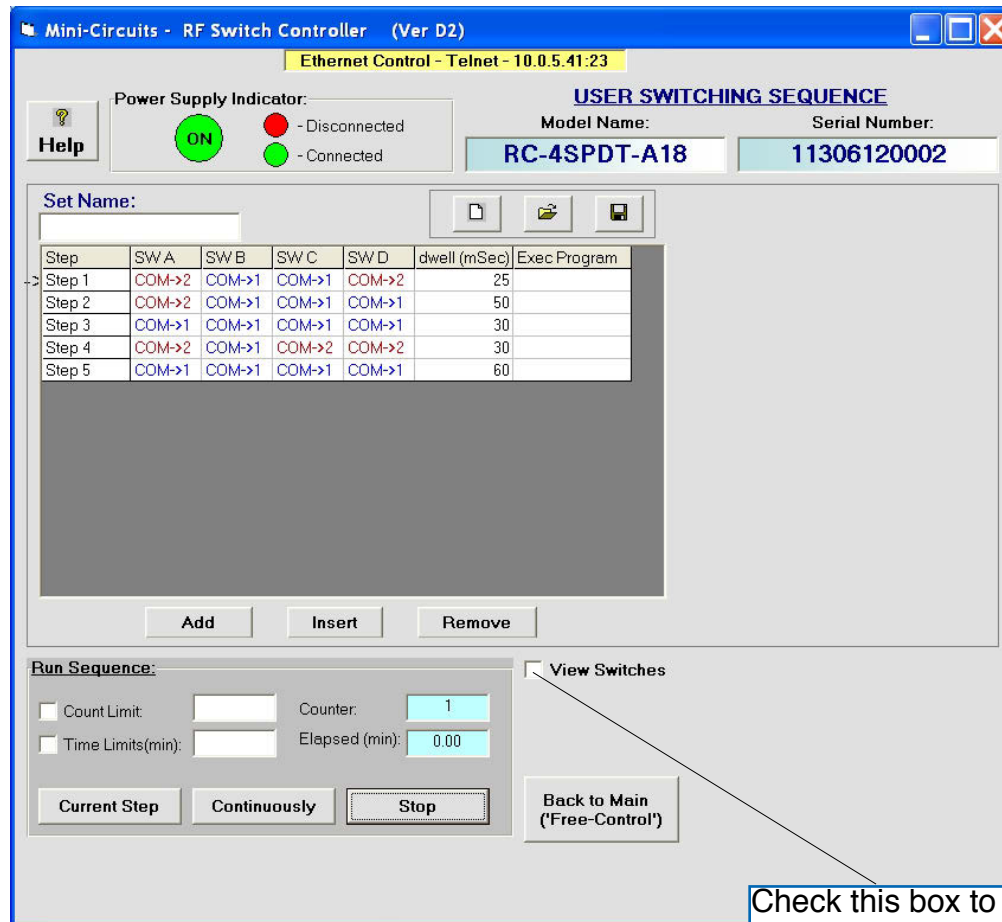
Check this box to show graphical presentation of current switch state(shown below)
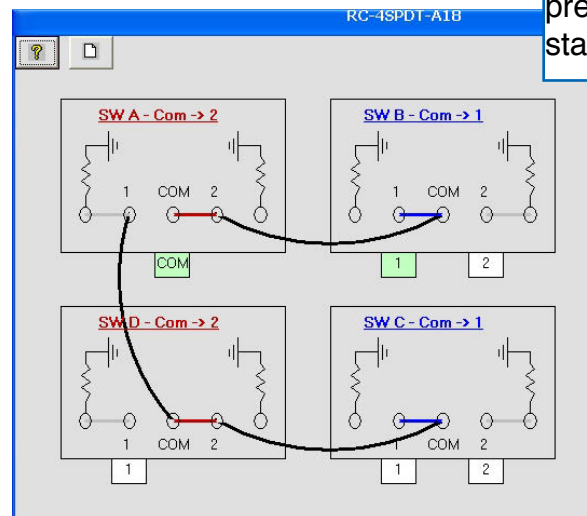
• For instructions on using the GUI See the **user guide** on Mini-Circuits' website

• For programming instructions of the switch matrix see the **programming guide** and **AN-49-001** on Mini-Circuits' website

Ordering, Pricing & Availability Information see our web site

Model	Description
RC-4SPDT-A18	USB/Ethernet RF SPDT Switch Matrix

Included Accessories	Part No.	Description
	AC/DC-24-3W1	AC/DC 24V$_{DC}$ Grounded Power Adaptor. Operating temperature: 0°C to +40°C, I$_{Max}$=2.5A
	CBL-3W1-XX	AC Power Cord (*Select one power cord from below with each Switch Matrix box*)
	RFSW-CD	Software CD
	USB-CBL-AB-3+	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)
	CBL-RJ45-MM-5+	5 ft (1.5 m) Ethernet cable: RJ45(Male) to RJ45(Male) Cat 5E cable

AC Power Cords[6]	Part No.	Description
	CBL-3W1-US	Power Cord for United States
	CBL-3W1-EU	Power Cord for Europe
	CBL-3W1-UK	Power Cord for United Kingdom
	CBL-3W1-AU	Power Cord for Australia and China
	CBL-3W1-IL	Power Cord for Israel

[6.] Power cords for other countries are also available, if you need a power cord for a country not listed in the table please contact apps@minicircuits.com or check http://www.minicircuits.com/contact/offices.html for regional offices e-mail and phone numbers.

Optional Accessories	Description
USB-CBL-3+ (spare)	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)
USB-CBL-7+	6.8 ft (2.1 m) USB Cable: USB type A(Male) to USB type B(Male)
USB-CBL-11+	11 ft (3.4 m) USB Cable: USB type A(Male) to USB type B(Male)
CBL-RJ45-MM-5+ (spare)	5 ft (1.5 m) Ethernet cable: RJ45(Male) to RJ45(Male) Cat 5E cable
BKT-272-08+	Bracket (One set of 2 each)

Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp