

RadiSwitch®

Product Manual



Coaxial Switch Card

Plug-In Card for the RadiCentre®

Models:

RSW1022S	RSW1022K	RSW1022Q	RSW1021N
RSW1024S	RSW1024K	RSW1024Q	RSW1021B
RSW1061S	RSW1061K	RSW1061Q	RSW2002E
RSW1062S	RSW1062K	RSW1062Q	

RadiSwitch® Product Manual

This service and operating manual pertains to the RadiSwitch®.

Models: RSW1022S, RSW1024S, RSW1061S, RSW1062S, RSW1022K, RSW1024K, SW1061K, RSW1062K, RSW1022Q, RSW1024Q, RSW1061Q, RSW1062Q, RSW1021N, RSW1021B and RSW2002E. Made by DARE!! Instruments.

We ask that you read this manual carefully before operating your new product and adhere to any safety instructions it might contain.

A Quick Start Guide has been added to this product for your convenience. This double printed A4 sheet contains the basic start-up steps and the safety warnings for the RadiSwitch®.

Please keep the Quick Start Guide (and this regular manual) close at hand when you operate your new RadiSwitch®.

Please contact DARE!! Instruments or your local reseller if you have any questions.

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WARNINGS & PRECAUTIONS



Read the contents of this manual and become familiar with the safety markings, instructions, operation and handling of the system.



Become familiar with the contents of the RadiCentre® system manual.



Only qualified service personnel is allowed to carry out adjustments, maintenance or repairs on the equipment.



This equipment is designed to be used as a plug-in card for the RadiCentre®. Do not use this card in combination with any other main frame.



To make the RadiSwitch® as safe as possible, this plug-in card has its own safety interlock system that is designed to work with the RadiCentre®.



The RadiSwitch® contains materials that can be recycled and reused to minimize material waste. At the 'end-of-life', specialized companies can dismantle the discarded system to collect the reusable and recyclable materials. If your product is discarded at its 'end-of-life', please return it to your local reseller for recycling.

1 Introduction

1.1 Product Introduction

The RadiSwitch® is a multi-channel, coaxial switch plug-in card designed to switch the path of RF signals within a test system.

Applications for the multi-channel, coaxial switch are:

- Switching the RF path of amplifiers, antenna and signal generators in radiated and conducted immunity test systems.
- Switching the RF path of antenna and receivers in radiated and conducted emission test systems.
- Any other RF switching application.

1.2 Related Products



RadiCentre® system

The RadiCentre® is a modular EMC test system that serves as the user and computer interface for all the RadiCentre® plug-in cards and modules (such as the RadiField® system).



RadiMation® software

RadiMation® is the EMC software package from DARE!! Instruments used for remote control and automated testing of the RadiCentre® plug-in cards and modules (such as the RadiField® system).

2 The RadiSwitch®

2.1 Product Overview

The RadiSwitch® plug-in cards offer a wide range of different connectors and frequency ranges. To meet the requirements of most test setups for EMC or wireless applications, the following cards are available:

Model	Description
RSW1022S	RadiSwitch® RF switch plug-in card 2x SPDT relay, SMA 18GHz
RSW1024S	RadiSwitch® RF switch plug-in card 4x SPDT relay, SMA 18GHz
RSW1062S	RadiSwitch® RF switch plug-in card 2x SP6T relay, SMA 18GHz
RSW1061S	RadiSwitch® RF switch plug-in card 1x SP6T relay, SMA 18GHz
RSW1022K	RadiSwitch® RF switch plug-in card 2x SPDT relay, 2.92mm (k) 40GHz
RSW1024K	RadiSwitch® RF switch plug-in card 4x SPDT relay, 2.92mm (k) 40GHz
RSW1062K	RadiSwitch® RF switch plug-in card 2x SP6T relay, 2.92mm (k) 40GHz
RSW1061K	RadiSwitch® RF switch plug-in card 1x SP6T relay, 2.92mm (k) 40GHz
RSW1022Q	RadiSwitch® RF switch plug-in card 2x SPDT relay, 2.4mm (Q) 50GHz
RSW1024Q	RadiSwitch® RF switch plug-in card 4x SPDT relay, 2.4mm (Q) 50GHz
RSW1061Q	RadiSwitch® RF switch plug-in card 1x SP6T relay, 2.4mm (Q) 50GHz
RSW1062Q	RadiSwitch® RF switch plug-in card 2x SP6T relay, 2.4mm (Q) 50GHz
RSW1021N	RadiSwitch® RF switch plug-in card 1x SPDT relay, N-type 12.4GHz
RSW1021B	RadiSwitch® RF switch plug-in card 1x SPDT relay, BNC 3GHz
RSW2002E	RadiSwitch® RF switch plug-in card 2x external relay driver card 12V/24V/28V

The models RSW1022S/K/Q and RSW1024S/K/Q are equipped with an interlock connection. This interlock can operate any relay of the card, selected by DIP switches.

When one of the relays is used as a safety interlock relay, it can be used to switch of the RF input signal to the RF amplifier. The RF interlock input can, for example, be activated by a switch mounted on the entrance door of the test chamber. This can prevent personnel from being subjected to high RF fields. This interlock input is fully integrated in the hardware, software cannot overwrite this safety system.

2.2 Components

The RadiSwitch® is delivered with the following items:

- RadiSwitch® plug-in card
Model: RSW1022S, RSW1024S, RSW1061S, RSW1062S, RSW1022K, RSW1024K, SW1061K, RSW1062K, RSW1022Q, RSW1024Q, RSW1061Q, RSW1062Q, RSW1021N, RSW1021B or RSW2002E. A multi-channel, coaxial switch plug-in card to be used in the RadiCentre® system.
- Interlock plug (only for models RSW1022S/K/Q and RSW1024S/K/Q)

Supporting documentation consists of:

- User manual (digital)
- Quick Start manual (hardcopy and digital)

2.3 Different Models

The RadiSwitch® is available in 15 models; the S, K, Q, N, B and E types. The differences between these models are the type of connectors that they have and the frequencies they cover. An overview of these models is visible in chapter 2.1 'Product Overview'.

The details of these models will be discussed in the following chapters. Please read the chapter with regards to your RadiSwitch® model.

2.4 Model S - Plug-In Cards with SMA Connectors

There are four models available with relays using SMA connectors. These relays can be used up to 18 GHz. The RSW1022S and RSW1024S models use two and four SPDT relays (resp.) and the RSW1061S and RSW1062S use one and two SP6T relays (resp.), see figure 1. The main specifications of these models are detailed below.



Figure 1: RadiSwitch® plug-in cards with SMA connectors

Specification SMA, 18GHz, SPDT relays

Life time 10.000.000 cycles

Frequency	GHz	0 to 3	3 to 8	8 to 12,4	12,4 to 18
VSWR		1,10	1,20	1,20	1,40
Insertion loss	dB	0,15	0,20	0,25	0,35
Isolation	dB	80	75	65	60
Average power	W	240	150	120	100

Specification SMA, 18GHz, SP6T relays

Life time 5.000.000 cycles

Frequency	GHz	0 to 3	3 to 8	8 to 12,4	12,4 to 18
VSWR		1,20	1,30	1,40	1,50
Insertion loss	dB	0,20	0,30	0,40	0,50
Isolation	dB	80	75	65	60
Average power	W	240	150	120	100

2.5 Model K - Plug-In Cards with 2,92mm Connectors

The same models, with SMA connectors, are also available with 2,92mm (k- type connectors). These relays can be used for frequencies up to 40 GHz. The RSW1022K and RSW1024K use two and four SPDT relays (resp.) and the RSW1061K and RSW1062K use one and two SP6T relays (resp.), see figure 2. The main specifications of these models are detailed below.

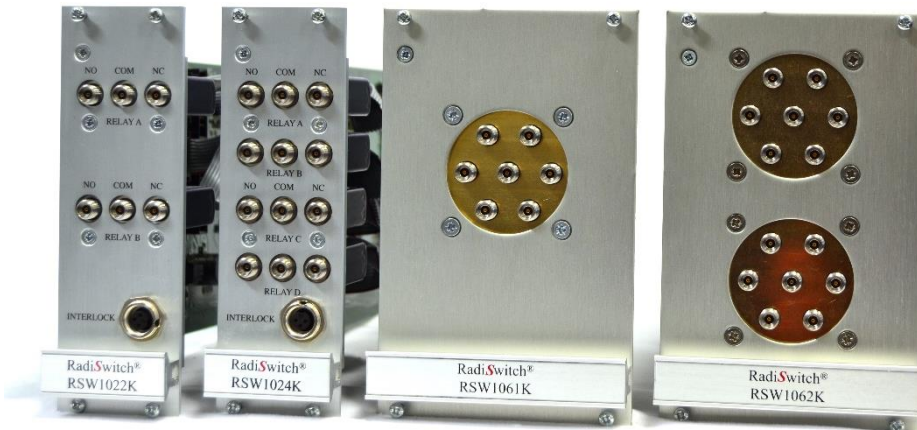


Figure 2: RadiSwitch® plug-in cards with 2,92mm connectors

Specification k 2.92mm, 40GHz, SPDT relays

Life time 10.000.000 cycles

Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40
VSWR		1,30	1,40	1,50	1,70	1.9
Insertion loss	dB	0,30	0,40	0,50	0,70	0.8
Isolation	dB	70	60	60	55	50
Average power	W	80	60	50	20	10

Specification k 2.92mm, 40GHz, SP6T relays

Life time 2.000.000 cycles

Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40
VSWR		1,30	1,40	1,50	1,70	2.2
Insertion loss	dB	0,20	0,40	0,50	0,70	1.1
Isolation	dB	70	60	60	55	50
Average power	W	40	30	25	15	5

2.6 Model Q - Plug-In Cards with 2,4mm Connectors

The same models, with SMA connectors, are also available with 2,4mm (Q- type connectors). These relays can be used for frequencies up to 50 GHz. The RSW1022Q and RSW102QK use two and four SPDT relays (resp.) and the RSW1061Q and RSW1062Q use one and two SP6T relays (resp.), see figure 3. The main specifications of these models are detailed below.



Figure 3: RadiSwitch® plug-in cards with 2,4 mm connectors

Specification Q 2.4mm, 50GHz, SPDT relays

Life time 2.000.000 cycles

Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40	40 to 50
VSWR		1,30	1,40	1,50	1,70	1,90	1,90
Insertion loss	dB	0,30	0,40	0,50	0,70	0,80	1,10
Isolation	dB	70	60	60	55	50	50
Average power	W	80	60	50	20	10	5

Specification Q 2.4mm, 50GHz, SP6T relays

Life time 2.000.000 cycles

Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40	40 to 50
VSWR		1,30	1,40	1,50	1,70	1,90	2,20
Insertion loss	dB	0,20	0,40	0,50	0,70	0,90	1,20
Isolation	dB	70	60	60	55	50	50
Average power	W	40	30	25	15	5	3

2.7 Models B & N - Plug-In Cards with BNC and N-Type Connectors

There are two RadiSwitch® plug-in cards available for RF signals with higher power levels. The RSW1021B with BNC-connectors and the RSW1021N with a N-type connector. Both models use one SPDT relay. The N-type can be used for power levels up to 700 Watt. The main specifications of these models are detailed below.



Figure 4: RadiSwitch® plug-in cards with BNC (left) and N-type (right) connectors

Specification BNC, 3.0GHz, SPDT relays

Life time 1.000.000 cycles

Frequency	GHz	0 to 1	1 to 2	2 to 3
VSWR		1,15	1,20	1,25
Insertion loss	dB	0,15	0,20	0,25
Isolation	dB	85	80	75
Average power	W	400	300	240

Specification N-type, 12.4GHz, SPDT relays

Life time 1.000.000 cycles

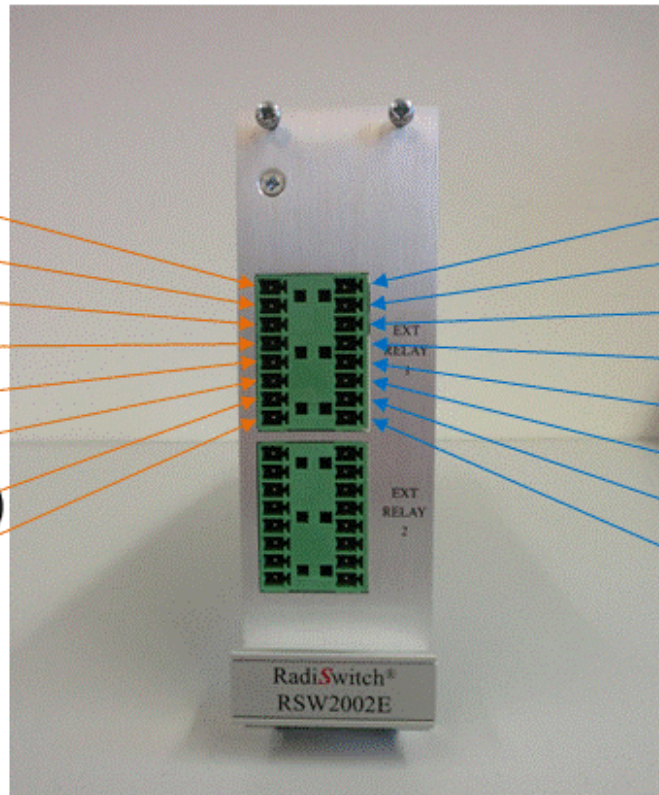
Frequency	GHz	0 to 1	1 to 2	2 to 3	3 to 8	8 to 12.4
VSWR		1,15	1,20	1,25	1,35	1,5
Insertion loss	dB	0,15	0,20	0,25	0,35	0,5
Isolation	dB	85	80	75	70	60
Average power	W	700	500	400	250	200

2.8 Model E - Plug-In Card to Drive External Relays

It is not possible to use the internal relays of the RadiSwitch plug-in cards for applications that require power signals higher than 700 Watt. Dedicated relays are sometimes needed in these test setups to switch high power outputs of RF amplifiers. The RadiSwitch® RSW2002E plug-in card is available for these situations and can drive two external relays.

Outputs for relay coils

Coil 6
Coil 5
Coil 4
Coil 3
Coil 2
Coil 1
V+ (common)
Ground



Indicator Contacts

Input 6
Input 5
Input 4
Input 3
Input 2
Input 1
+3.3V
Ground

Figure 5: RadiSwitch® plug-in card for driving external relays

Any relay with a supply voltage of 12V, 24V or 28V from SPDT to SP6T can be driven. For each relay a driver current of 0,5A is available, or 1A if only one relay is connected.

The type of relay and the usage of indicator contacts can be configured in the software. The connections for relay 1 and relay 2 are identical.

2.9 Connection of the External Relays

A 2x8-way connector is available for each relay. The row on the left side is used to drive the relay coils, the row on the right side is used for indicator contacts of the relays (see Figure 5). The connection of indicator contacts is optional and can be enabled or disabled in the configuration screen of the switch card.

2.9.1 Coil connections

The relay coils need to be connected between the V+ (common) connection and a coil connection. The V+ connection is a 12V, 24V or 28V supply. The voltage can be set in the configuration screen of the RadiSwitch® plug-in card.

The coil connections are open collector outputs which connect to ground when activated.

IMPORTANT! - Make sure that the correct voltage is set before connecting the relay. Wrong settings may result in permanent damage to the relay!

2.9.2 Indicator connections

Relays with indicator contacts have additional contacts to indicate the position of the main (RF) contacts. The indicator contacts usually have the same setup as the main contacts. This means that there would be a common connection and several connections that are connected to the common connection, for each main contact position.

This means that the common contact needs to be connected to the common connection (+3.3V) on the RadiSwitch® and the other contacts to their corresponding indicator inputs.

2.9.3 Connector

Use the Phoenix Contact MC 1,5/ 8ST3,81 connector to connect an external relay to the switch card. In general, four connectors are supplied with the RSW2002E card. Additional connectors are optional.

2.10 Interlock

The interlock connector, on the models with two or more SPDT relays, provides two floating contacts which require shorting to deactivate the interlock. To activate the interlock, these contacts need to be opened.

If the interlock is activated, the selected relays of the plug-in card cannot be energized and will remain in the NC position. Use the supplied connector to wire to the emergency switch on your site.



Figure 6: Connector type: Binder 712 99 0405 00 03

Each relay can be used as a so called 'safety interlock relay'. If the pins of the interlock connector are shortened, for example by an external interlock switch, the selected relays can be activated. However, as soon as the interlock circuit opens, the selected relays will return to the 'normally closed' position (NC). There is a set of DIP switches present on the RadiSwitch® plug-in card that can be used to select which relay can be used as a 'safety interlock'.

By moving the corresponding DIP switch to the left position (see figure 7), the interlock for the corresponding relay is enabled. A table that describes which DIP switch must be used for which relay is printed on the silkscreen (see figure 6). By default, only the interlock for REL 1 (yellow DIP switch) is activated. Please note that the outputs REL 1 to 4 are used for SPDT relays and the outputs REL 5 and 6 are used for SP6T relays.

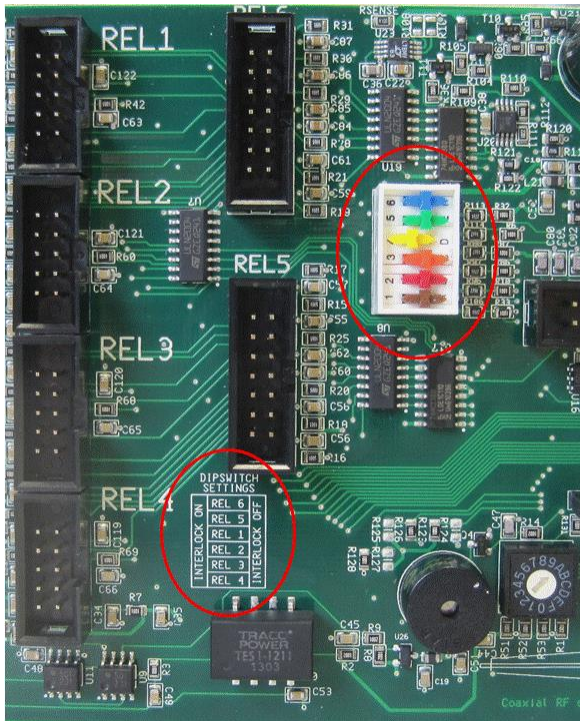


Figure 7: DIP switches on the RadiSwitch® plug-in card

The initial version as described above was equipped with a 6-pole DIP switch. Since this 6-pole DIP switches became obsolete, a 4-pole DIP switch was being placed on all the RadiSwitch® PCB's. This modification does not affect the overall operation of the RadiSwitch® plugin card.

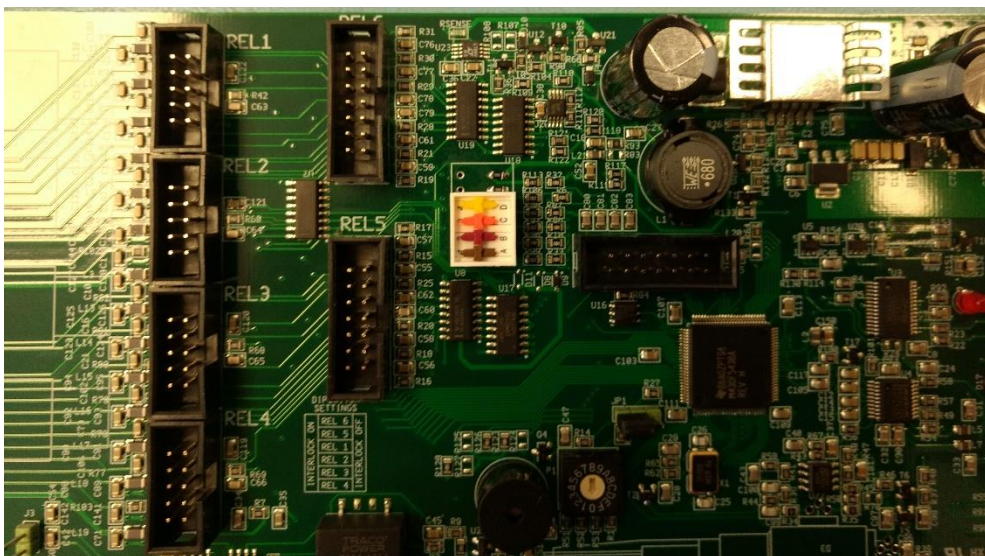


Figure 8: RadiSwitch® plug-in cards with 4-pole dip switch

As seen in the figure 8, the interlock setting of the number 5 & 6 relay connection is no longer configurable. These relay connections are used on the following RadiSwitch® models RSW1061S, RSW1062S, RSW1061K and RSW1062K. Since none of these models have an external interlock connection available, this will not affect the operation of these models. The interlock setting is now fixed at “Interlock off”.

For RadiSwitch® cards with versions 20181004_D the 4-pole dip switch has been replaced by six jumpers on all the RadiSwitch® PCB’s. This does not affect the overall operation of the RadiSwitch® plugin card. The version number can be found in the bottom left corner of the PCB (see figure 9).



Figure 9: RadiSwitch® plug-in cards version number

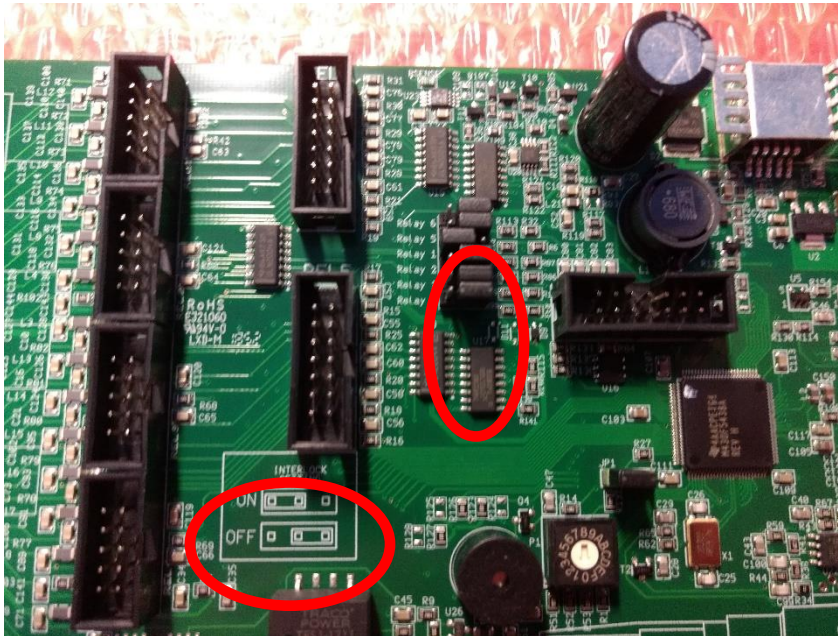


Figure 10: RadiSwitch® plug-in cards with jumpers

As shown in figure 10, the interlock setting is now set using jumpers. A description of the setting is printed on the PCB. When the jumper is set of the “left” position the interlock is on. When the jumper is set to the “right” the interlock is off.

The interlock circuits are implemented in the hardware and do not require any intervention from the software. The RadiCentre® software will detect an interlock status and show a message on the display. For safety reasons, the software is not able to overrule this interlock condition. After the interlock has been closed, the relay will automatically switch to its original condition.

The interlock relay can be used to interrupt the signal path between the signal generator and the power amplifier. An interlock switch mounted on the door of the test chamber can be used to activate the safety relay, preventing exposure to high field strengths when entering the test chamber.

2.11 Connection and Markings of the Relays

The connections of the SPDT (Single Pole Double Throw) relays are marked with “NO”, “COM” and “NC” for respectively Normally Open, Common and Normally Closed. These terms indicate the position of the relay when it is not energized. When not activated, the relay connects the COM to the NC connector. If energized, the relay connects the COM to the NO connector.

The connections of the SP6T (Single Pole 6-Throw) relays are as shown in the next picture.

The center connector is the COM (Common). The other connections are numbered from 1 to 6, this is visible in figure 11 and on the relay itself.

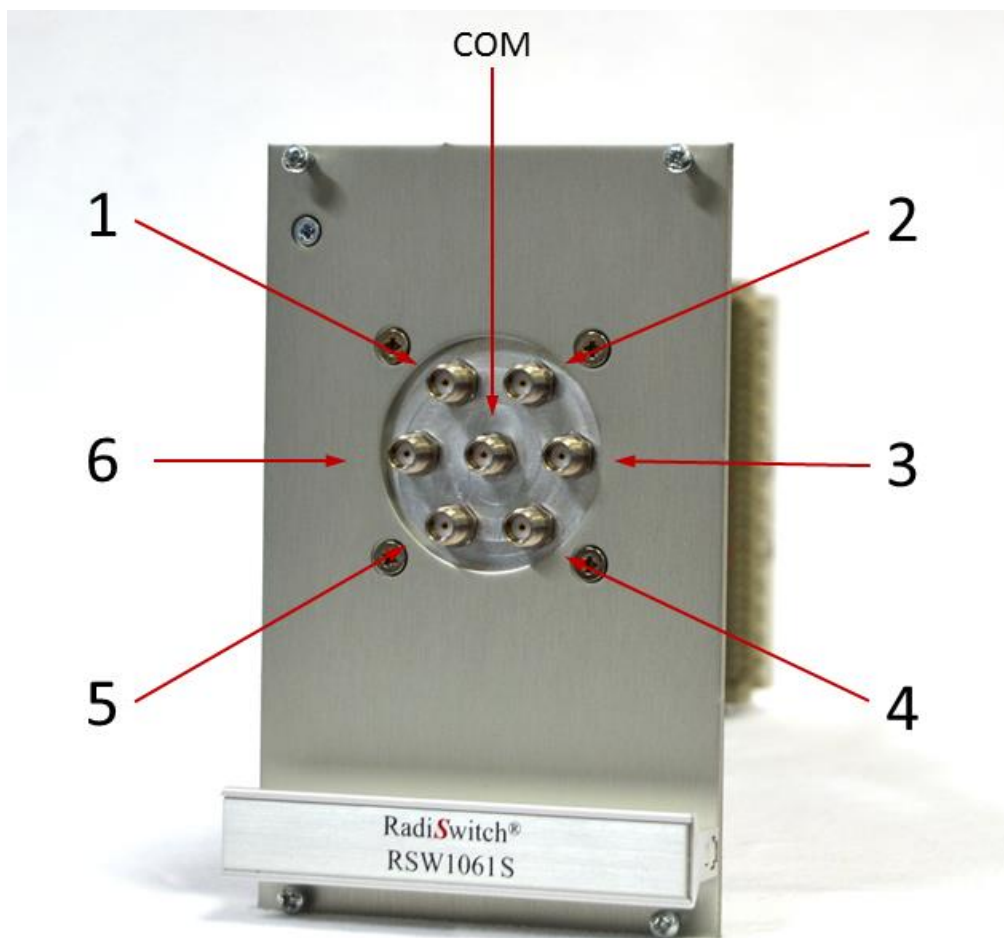


Figure 11: RadiSwitch® RSW1061S with one SP6T relay

3 Installation

All RadiSwitch® plug-in cards are intended to be used in the RadiCentre®. The RadiSwitch® cards using SPDT relays take up 1-slot and can be used in all three RadiCentre® systems. The cards using SP6T relays take up 2-slots and can only be used in the 2- and 7-slot systems.

3.1 Hardware Configuration¹

The hardware configuration is carried out in the following 7 steps:

1. Choose the slot of the RadiCentre® system in which you want to install the plug-in card.
2. Remove the blind panel from this slot by removing the four screws of the panel (two on top and two at the bottom). See Figure .
3. Gently insert the plug-in card into the slot of the RadiCentre® and reinsert the four screws. See Figure 12.

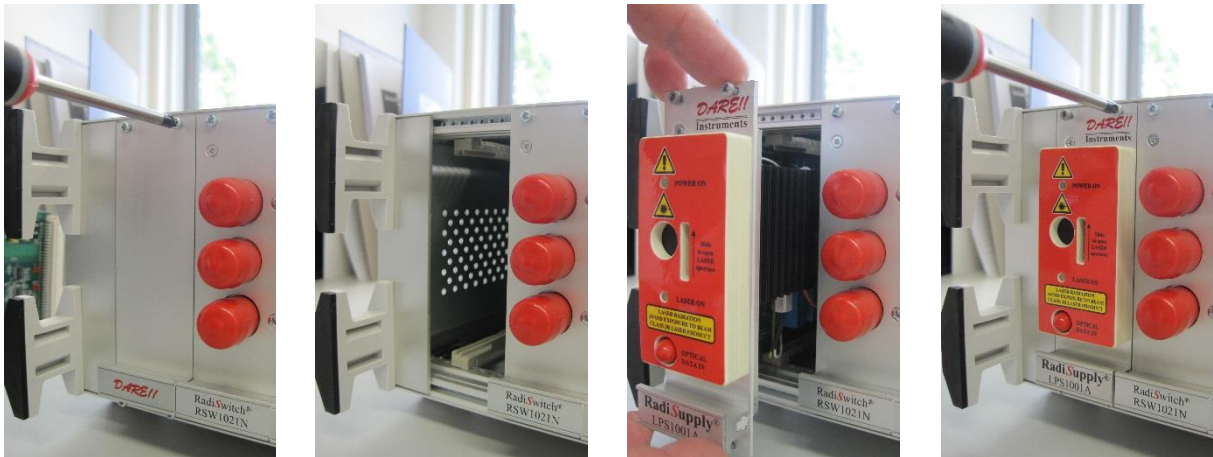


Figure 12: Example of a (RadiSupply® LPS1001A) plug-in card installation

4. Switch on the RadiCentre® system. The new plug-in card will automatically be detected and initialized by the RadiCentre®.

**Steps 5 to 7 of the hardware configuration are visible on the next page.*

¹ These are the basic steps in a plug-in card installation, the exact installation of your plug-in card might vary.

5. Connect the plug-in card to the desired device(s).
6. Connect the RadiCentre® system to your PC using any of the available interfaces of the RadiCentre® system; USB, RS232, Ethernet or IEEE-488 (optional).
7. Place the interlock plug of the plug-in card into the interlock connector of the RadiCentre®.

The hardware installation for the plug-in card is now complete. The user can control the plug-in card either through the touchscreen on the RadiCentre® system (only available for the 2 and 7-slot versions), or by using the control commands in combination with an external software package such as the RadiMation® EMC test software.

3.2 Software Configuration

In order to control the RadiSwitch® from a computer, one can use either custom made software or the RadiMation® EMC software package from DARE!! Instruments (to be purchased separately). If the RadiSwitch® is operated manually, this chapter can be skipped.

If RadiMation® software is used; select the required device driver for the RadiSwitch®.

3.2.1 RadiMation® software

1. Configure the RadiMation® software for a RadiSwitch® / RadiCentre® signal generator. Configure a device driver and select the correct communication port.
2. In the 'equipment list' that you are using, select the 'signal generator' device driver.

RadiMation® is now ready for use with the RadiSwitch® / RadiCentre® signal generator.

The RadiMation® software package verifies the generator at the beginning of each test (if a signal generator is selected).

If you are using the RadiSwitch® / RadiCentre® signal generator system with any other EMC test software package, we refer you to chapter 5 'RadiSwitch® Command Set'.

4 Using the RadiSwitch®

4.1 Manual Control

Once the RadiCentre® is switched on, the RadiSwitch® can be activated from the 'main' screen² on the RadiCentre® touchscreen.

To control the RadiSwitch®, start by pressing the 'status' button of the RadiSwitch® in the 'main' screen. A control screen for the RadiSwitch® will appear in which changes to the positions of the relays can be made. An example of a screen for a 4 x SPDT relay card is shown in Figure 13.

By pressing the 'Switch A' button on the left side of the screen, the relay switch symbol next to it will toggle between the 'NO' and 'NC' position. The same functionality is true for the other three switch buttons (switch B, C and D).

In case of a failure, an error will be displayed in the screen.

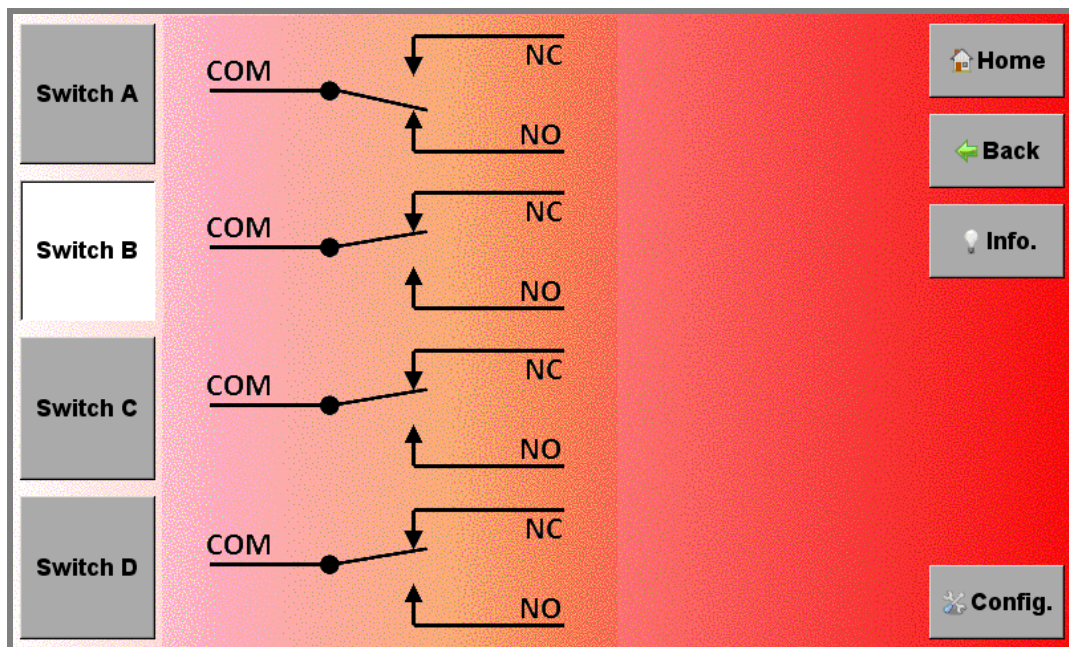


Figure 13: Example of the RadiSwitch® control screen

² Please note that the screenshots shown in this manual are related to RadiCentre® firmware v1.16.0. Other version may look different and support other functions.

Operating a RadiSwitch® plug-in card with SP6T relays is done in a similar way. An example of a screen for a 2 x SP6T relay card is shown in Figure 14.

By pressing the button next to the desired position of the relay, the relay will switch to this specific position. For example, if the button 'position 3' is pressed, the switch symbol and relay will switch to position 3.

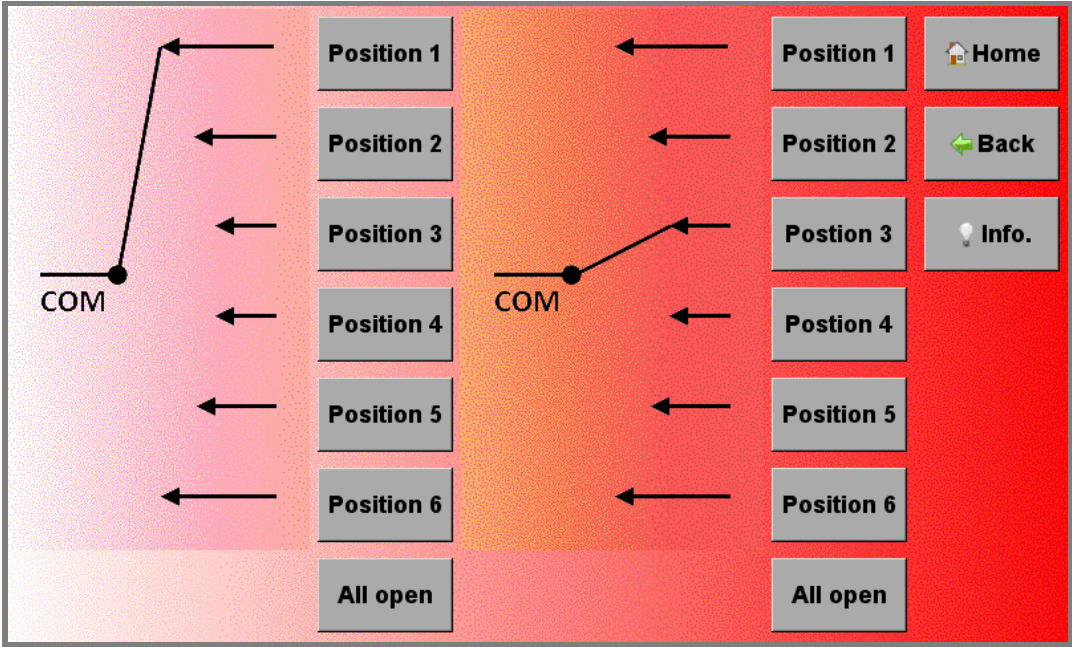


Figure 14: Example of a RadiSwitch® (with 2 SP6T relays) 'configuration' screen

4.1.1 Relay errors

The RadiSwitch® checks the following error conditions of the internal relays:

1. Over temperature

A temperature sensor close to each relay monitors the temperature of each relay for excessive heating. A “High temperature” error will be displayed when the temperature exceeds 60 degrees Celsius.

2. Switching error

Each internal relay has a set of indicator contacts. These are used to check whether a relay has really changed to the set position. A “Switching error” message will appear if no change in position is detected.

3. Interlock open for safety interlock relay

If the interlock of a relay is opened, a “Safety interlock open” error will appear for the corresponding relay.

4.2 Remote Control

The RadiSwitch® can be controlled remotely through the interfaces of the RadiCentre®. The exact communication protocol can be found in the RadiCentre® manual. The specific commands for the RadiSwitch® are shown in chapter 5 ‘RadiSwitch® Command Set’.

5 RadiSwitch® Command Set

The commands listed in the following tables can be used to control the RadiSwitch® plug-in card in the RadiCentre® CTR1001S. For use in a CTR1004B or CTR1009B model, a prefix must be used for each command. This prefix, or device number, corresponds with the slot number of RadiCentre®.

Please refer to the RadiCentre® manual for more information on the 'Device number' of a module.

Please note that every command must be terminated with a carriage return (CR).

5.1 Commands

5.1.1 General commands

Command	Reply	Description
"*IDN?"	"DARE!!, RadiSwitch RSW10XXY, version"	Returns the ID of the RadiSwitch® plug-in card.
"LOCAL"	"OK"	Return to local mode, the local display is used to set items.
"RESET\n"	"OK"	Reset (clear the current error)
"ID_NUMBER?"	"x.x.x.x.x.x.x"	Returns unique identifier number.
"VERSION_SW?"	"x.y.z" or "x.y" or "x"	Returns the software version number.

5.1.2 Commands for SPDT relays

Command	Reply	Description
"INT_RELAY_<R>?"	"NO", "NC" or "ERROR xxx" ³ (See error codes)	Returns the status of internal relay <R>, with: <R> = "A", "B", "C" or "D"
"INT_RELAY_<R> _NO"	"NO" or "ERROR xxx" ¹ (See error codes)	Switches the internal relay <R> to the Normally Open (NO) position, with: <R> = "A", "B", "C" or "D"
"INT_RELAY_<R> _NC"	"NC" or "ERROR xxx" ¹ (See error codes)	Switches the internal relay <R> to the Normally Closed (NC) position, with: <R> = "A", "B", "C" or "D"
"INT_TEMPERATURE_<R>?"	"x" (in Celsius degrees)	Returns the temperature between the internal relays in degrees Celsius * 10, with: <R> = "A", "B", "C" or "D"

5.1.3 Commands for SP6T relays

Command	Reply	Description
"INT_RELAY_<R>?"	"0", "1", "2", "3", "4", "5", "6" or "ERROR xxx" ¹	Returns the status of internal relay <R> with: <R> = "A" or "B"
"INT_RELAY_<R> _n"	"0", "1", "2", "3", "4", "5", "6" or "ERROR xxx" ¹	Switches the internal relay <R> to position <n>, with: <R> = "A" or "B" If 0 is returned, no coil is energized, and all 6 outputs are open.

³ All RadiSwitch cards use relays with indicator contacts. If a card is equipped with relays without these indicator contacts, "OK" will be returned instead of the position.

5.1.4 Commands for external relays

Command	Reply	Description
"EXT_RELAY_<R>?"	"0", "1", "2", "3", "4", "5", "6" or "ERROR xxx"	Returns the status of internal relay <R>, with: <R> = "A" or "B"
"EXT_RELAY_<R>_n"	"0", "1", "2", "3", "4", "5", "6" or "ERROR xxx"	Switches the internal relay <R> to position <n>, with: <R> = "A" or "B" If 0 is returned, none of the outputs are active.
"EXT_CURRENT?"	"xx mA"	Returns the total current consumption of the external relays in mA.
"EXT_VOLTAGE_<V>"	"OK"	Sets the supply voltage for external relays, with: <V> = "12", "24" or "28"
"EXT_VOLTAGE?"	"12V", "24V" or "28V"	Returns the supply voltage for external relays.
"EXT_READBACK_A_ON"	"OK"	Enables the use of indicator contacts of external relay A.
"EXT_READBACK_A_OFF"	"OK"	Disables the use of indicator contacts of external relay A.
"EXT_READBACK_A?"	"ON" of "OFF"	Returns if the indicator contacts of relay A are used.
"EXT_READBACK_B_ON"	"OK"	Enables the use of indicator contacts of the relay B.
"EXT_READBACK_B_OFF"	"OK"	Disables the use of indicator contacts of external relay B.
"EXT_READBACK_B?"	"ON" of "OFF"	Returns if the indicator contacts of relay B are used.

5.2 Error Codes

The following table shows the error codes for the RadiSwitch®.

Error code	Description
"ERROR_1"	Unknown command
"ERROR_201"	Switch error while trying to switch to NC (internal relays only)
"ERROR_202"	Switch error while trying to switch to NO (internal relays only)
"ERROR_203"	Temperature error NC (internal relays only)
"ERROR_204"	Temperature error NO (internal relays only)
"ERROR_205"	Interlock error (internal relays only)
"ERROR_206"	Switch error while trying to switch a SP6T relay
"ERROR_208"	This code is issued when the user wants to switch a relay that is not present on the RadiSwitch® model
"ERROR_209"	Error External Module
"ERROR_210"	Error No external Module connected
"ERROR_211"	Error status unknown
"ERROR_212"	Current limit
"ERROR_213"	28V not present
"ERROR_214"	Interlock open on SPDT relay A
"ERROR_215"	Interlock open on SPDT relay B
"ERROR_216"	Interlock open on SPDT relay C
"ERROR_217"	Interlock open on SPDT relay D
"ERROR_218"	Interlock open on SP6T relay B
"ERROR_219"	Interlock open on SP6T relay A
"ERROR_220"	Temperature to high while switching to NC
"ERROR_221"	Temperature to high while switching to NO

6 RadiSwitch® Specifications

Models	All models
Performance	
Frequency range (internal relays) and connectors	3 GHz for BNC, 12,4 GHz for N-type, 18 GHz for SMA and 40 GHz for 2,92mm (k) connector 50 GHz for 2.4mm (Q) connector
Power handling capacity, internal relays	See paragraph 'Power Handling' in the Appendix
External relays	2 external relays can be driven, max current 0,5A per relay 12V, 24V or 28V supply software selectable.
Models	
RSW1022S	2 coaxial switches SPDT, SMA 18GHz (1 slot)
RSW1024S	4 coaxial switches SPDT, SMA 18GHz (1 slot)
RSW1061S	1 coaxial switch SP6T, SMA 18GHz (2 slots)
RSW1062S	2 coaxial switches SP6T, SMA 18GHz (2 slots)
RSW1022K	2 coaxial switches SPDT, 2.92mm (k) 40 GHz (1 slot)
RSW1024K	4 coaxial switches SPDT, 2.92mm (k) 40 GHz (1 slot)
RSW1061K	1 coaxial switch SP6T, 2.92mm (k) 40 GHz (2 slots)
RSW1062K	2 coaxial switches SP6T, 2.92mm (k) 40 GHz (2 slots)
RSW1022Q	2 coaxial switches SPDT, 2.4mm (Q) 50 GHz (1 slot)
RSW1024Q	4 coaxial switches SPDT, 2.4mm (Q) 50 GHz (1 slot)
RSW1061Q	1 coaxial switch SP6T, 2.4mm (Q) 50 GHz (2 slots)
RSW1062Q	2 coaxial switches SP6T, 2.4mm (Q) 50 GHz (2 slots)
RSW1021N	1 coaxial switch SPDT, N-type 12.4 GHz (1 slot)
RSW1021B	1 coaxial switch SPDT, BNC-type 3 GHz (1 slot)
RSW2002E	2 outputs for SP6T, external relay driver card 12/24/28VDC (1 slot)
Relay lifetime	
SPDT relays, SMA or 2,92mm (k)	10.000.000 cycles
SP6T relay SMA	5.000.000 cycles
SP6T relay 2,92mm (k) or 2.4mm (Q)	2.000.000 cycles
N-type and BNC relay	1.000.000 cycles

**This table continues the next page.*

RadiSwitch® Specifications, part 2

Models	All models
Environmental conditions	
Temperature range	0° C - 40° C
Relative humidity	10 – 90% (non-condensing)
Power consumption	
Supply voltage	Power supplied through RadiCentre back panel
Power consumption	30 W max
Safety	
Interlock * (*RSW1022S/K and RSW1024S/K only)	Each relay of the plug-in card can be used as an interlock safety switch
Warranty	
Warranty	3 years (misuse excluded)

WARRANTY CONDITIONS

DARE!! Instruments offers a standard warranty term of three years on their products, starting from the shipping date. This warranty is applicable to all EMC test & measurement products, such as:

- RadiCentre® modular / multifunctional EMC test systems
- RadiControl® antenna tower/turntable controllers
- RadiField® Triple A field generators
- RadiGen® signal generators
- RadiPower® RF power meters
- RadiSense® laser powered E-field probes
- RadiSwitch® RF coaxial switches

If a defect occurs within the warranty term, a Return Material Authorization (RMA) 'Warranty Repair' request can be issued using the RMA link at <http://rma.dare.eu>. The defective product can then be shipped to DARE!! Instrument for repair by our service department.

There will be no charge for repair services (materials or labor) within the warranty term. The customer will need to cover the costs for returning the product to DARE!!, such as shipping and/or any applicable duties and taxes. DARE!! Instruments will arrange the courier and cover the costs for the return shipment.

These warranty terms are not applicable to:

- Fiber optic cables
- Products that have been improperly used
- Products that have been used outside their specified range
- Products that have been improperly installed and/or maintained
- Products that have been modified without approval of DARE!! Instruments
- Calibration and/or re-calibration of the product
- Consumable products such as batteries, ink etc.

Repair services on products that are not covered by the DARE!! warranty will be charged to the customer. If a defect occurs to our product outside the warranty period, an RMA repair and/or re-calibration request must be issued using the RMA link at <http://rma.dare.eu>.

The repairs (outside the original warranty period) have a warranty limited to six months. Shipping conditions are the same as with repairs within the original warranty period.

EUROPEAN DECLARATION OF CONFORMITY

We, DARE!! Instruments, declare under our sole responsibility that the product;

RadiSwitch®

***Models RSW1022S, RSW1024S, RSW1061S, RSW1062S, RSW1022K,
RSW1024K, RSW1061K, RSW1062K, RSW1022Q, RSW1024Q,
RSW1061Q, RSW1062Q, RSW1021N, RSW1021B and RSW2002E***

to which this declaration relates, is in accordance with the following Directives:

EMC-Directive: 2014/30/EU

RoHS-Directive: 2011/65/EG

Per the provisions of the applicable requirements of the following harmonized standards:

Emission: EN 61326-1:2013, Class B

Electrical equipment for measurement, control and laboratory use.

Immunity: EN 61326-1:2013, Industrial level, performance criteria A

Electrical equipment for measurement, control and laboratory use.

The Technical Construction Files are maintained at;

DARE!! Products B.V.

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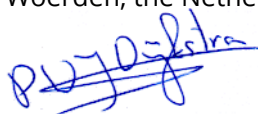
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P.W.J. Dijkstra

Title of authority: Director

