



## Switch Units ZS127x

### RF signal distribution

The Rohde & Schwarz Switch Unit Family ZS127x is a cost-effective and reliable approach to RF and IF signal distribution.

- Suitable for stationary, transportable and mobile applications
- Tried and tested in various systems
- Compact design: 19" rackmount unit with a height of just 2 units for easy integration into system racks
- Standard version with 6 inputs (DC to 3 GHz) covering most of the applications
- Optional versions with up to 12 inputs, frequency range extension up to 26.5 GHz for special applications
- Manual operation and remote control for optimum interworking with hardware and software
- Auxiliary outputs for controlling additional RF, IF or AF switches operated via ZS127x



**ROHDE & SCHWARZ**

## Introduction

Monitoring systems usually comprise several receiving antennas that have to be dynamically switched to the receivers to achieve the optimum system configuration for the tasks in hand.

Rohde & Schwarz Switch Units ZS127x are intelligent, tried and tested devices that are ideal for stationary, transportable and mobile applications.

## Overview

With the ZS127x family, Rohde & Schwarz introduced a series of universal switch units comprising three basic models:

- ZS127
- ZS127A1
- ZS127AT

The standard model **ZS127** is a universal RF switch unit. It can be used to select 1 out of 6 (option: 8 or 12) RF inputs from DC to 3 GHz (option: 26.5 GHz). The unit may be controlled manually from its front panel or remotely from a system controller via an RS232 serial interface.

The **ZS127A1** basically performs the same RF switching function as the ZS127 basic version, but the user has the choice of three different ways to control the switch unit, i.e. manually from its front panel, remotely from a system controller via an RS232 serial interface or remotely from a receiver via a TTL control interface.

The **ZS127AT** basically has the same functionality as the ZS127A1 as far as switching and control modes are concerned. Unlike the other models however, any input which is not in use is connected to 50  $\Omega$ , so providing proper input termination which is often essential for multi-couplers or power dividers.

There is also another member of the switch unit family, namely the External RF Relay **ZS127Z1**. If a system requires additional RF switching at a remote, or even outdoor, position, External RF Relay ZS127Z1 can be connected to one of the auxiliary control outputs of the ZS127x switch units and may then be controlled via the switch unit.



## Switch Unit ZS127

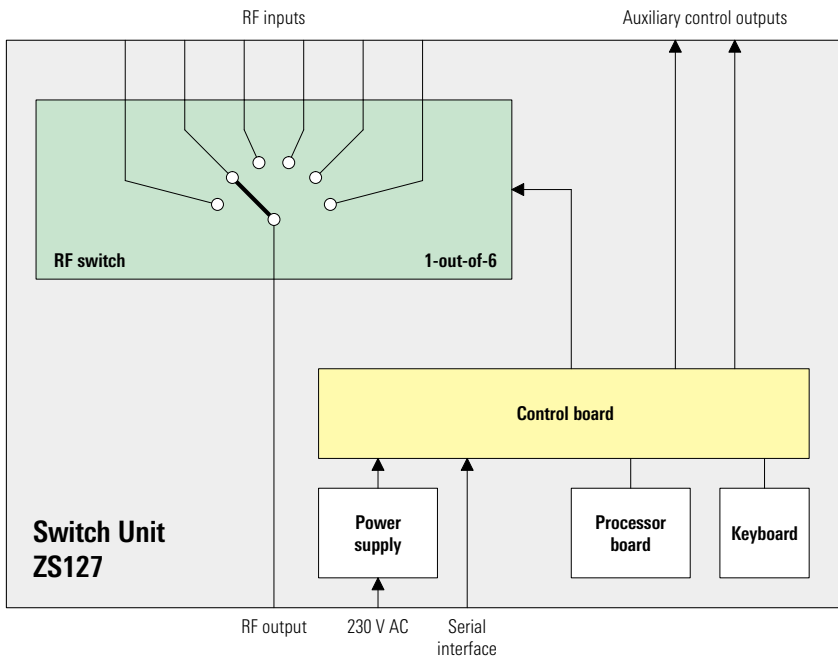
Switch Unit ZS127 has been designed as a universal RF switch for stationary, transportable and mobile systems. It comprises an internal control board, a processor board, a front-panel keypad and an internal power supply fed from 230 V AC mains.

The basic version of this model is equipped with a 1-out-of-6 RF relay, so providing six RF inputs that can be switched to one output, one at a time. RF data is specified for the standard frequency range from DC to 3 GHz, which covers most applications.

For more complex systems, e.g. with more than six RF antennas, a 1-out-of-8 and a 1-out-of-12 version are also available.

They provide eight and twelve RF inputs respectively that can be switched to one output, one at a time.

Even higher frequencies can be handled by an extended frequency model. This unit has six RF inputs that can be switched to one output, one at a time. This model's RF data is specified up to 26.5 GHz.



Rear view

The ZS127 is usually integrated into the rack at the operator position and connected to the system controller so that it can be operated via the system software. The ZS127 has a rear-panel, RS232 serial interface so that all its switching functions can be remote-controlled from the system controller.

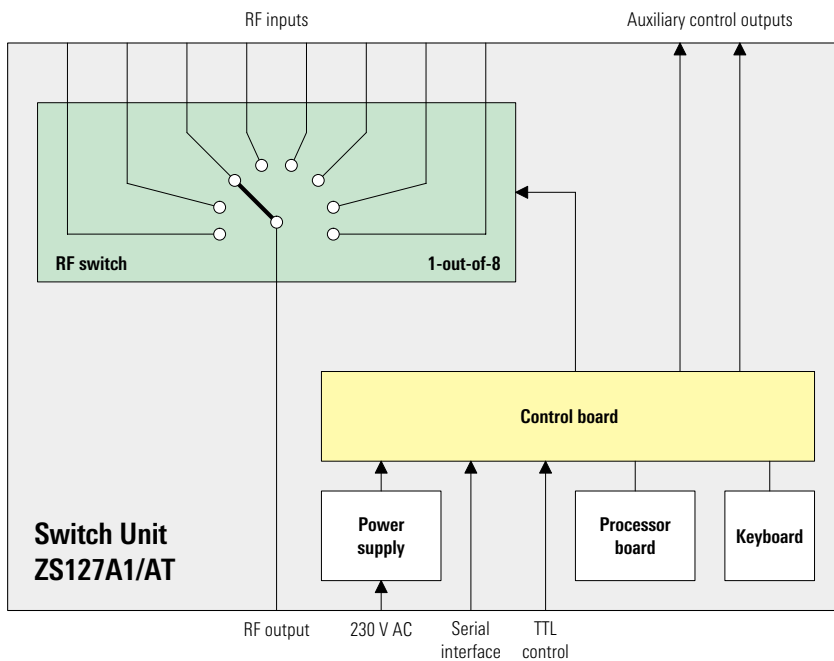
As an alternative to remote control, each Switch Unit ZS127 can be controlled manually from its front-panel keypad. Depending on the version, 6, 8 or 12 keys are used for input selection, two keys are used to switch the auxiliary control outputs and one key resets the complete unit. The current switching state is indicated by the key LED.

There are two rear-panel connectors for external switches like the ZS127Z1. Each connector has an open collector output and carries the +28 V DC supply.

## Switch Unit ZS127A1/AT

The **ZS127A1** and **ZS127AT** both have the same RF switching function as the ZS127 1-out-of-8 version. RF data is specified for the standard frequency range from DC to 3 GHz, which covers most applications.

However, the user has three different ways of controlling the switch unit, namely manually from its front panel, remotely from a system controller via an RS232 serial interface or remotely via a TTL control interface. The control mode is selected manually with a toggle switch on the front panel.



When TTL control is selected, the RF switch is controlled directly by applying TTL signals to the TTL CONTROL connector on the rear panel. There is a separate TTL line for each RF switch position, i.e. TTL 1 controls RF path 1, TTL 2 controls RF path 2, etc.

This function is useful if e.g. a receiver has some TTL outputs set to high or low, depending on the receive frequency. When connected to the TTL control inputs of the ZS127A1/AT, the receiver can directly control the switch unit to select a suitable receiving antenna.

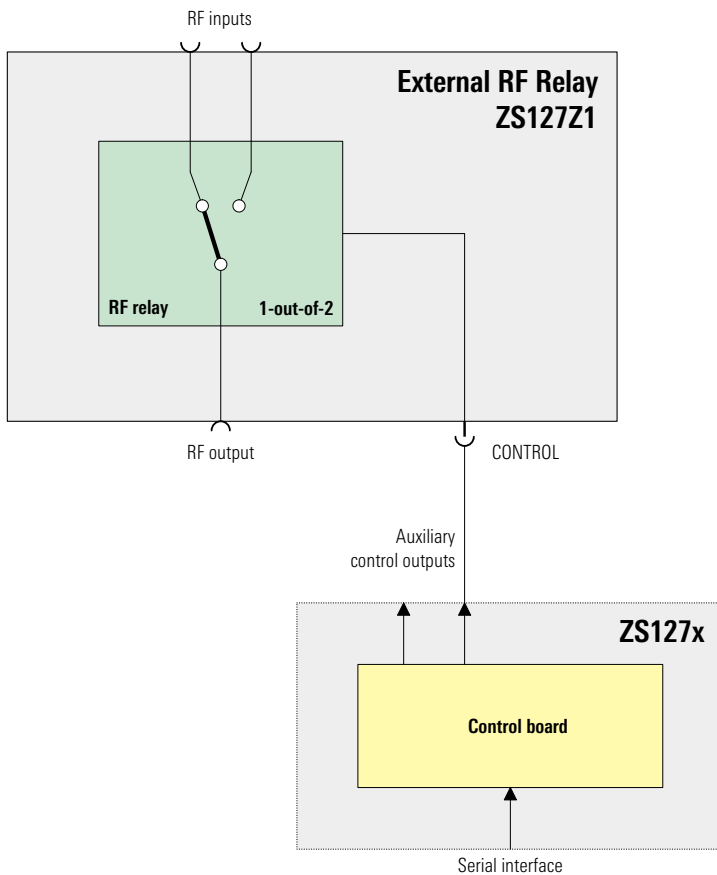
The **ZS127AT** (T for terminated) is equipped with a special relay so any input which is not selected is always terminated into 50  $\Omega$ . This is important, for example, when the switch unit is not directly connected to the receiving antennas, but to the outputs of multicouplers or power dividers whose outputs must be correctly terminated at all times.

For external switches like the ZS127Z1, there are two rear-panel connectors, each with an open collector output and a +28 V DC supply.

## External RF Relay ZS127Z1

Sometimes it is necessary to switch between two RF signal paths, e.g. to extend the switching functionality of the ZS127x or simply forward an antenna signal temporarily to a different receiving path. External RF Relay ZS127Z1 has been developed to handle this situation.

It comprises an RF relay mounted in a metal case suitable for outdoor use. Three N-type connectors are provided for the RF signals and another connector for the control input.



The relay is directly driven from a +28 V DC supply and controlled with GND signals, compatible e.g. with the auxiliary control outputs of the Switch Units ZS127x. This means that up to two ZS127Z1 may be used in conjunction with any of the Switch Units ZS127x.

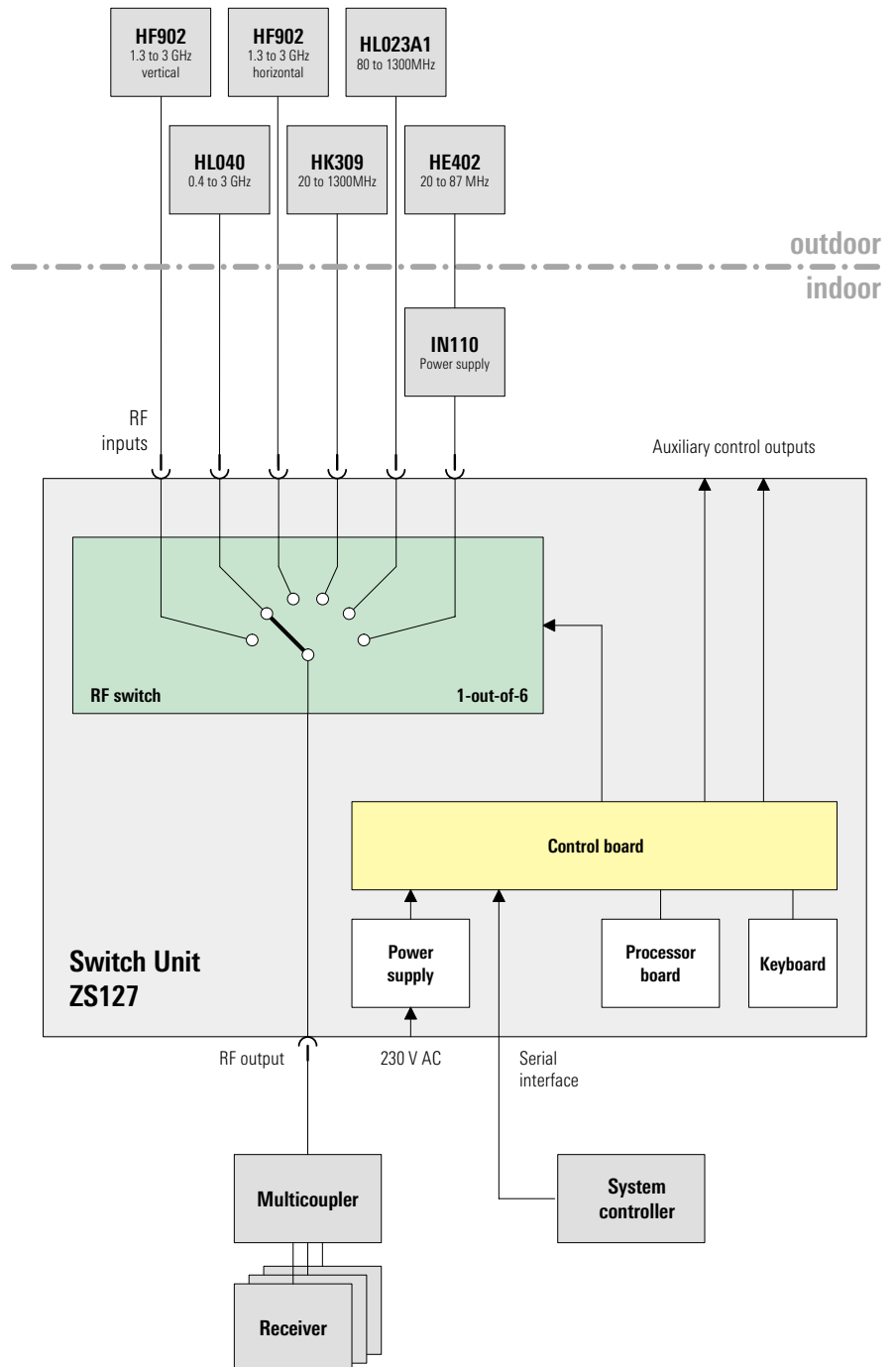
In this case, the ZS127Z1 may be operated either manually from the ZS127x's front panel or remotely from the system controller connected to the serial interfaces of the ZS127x.

## Applications

The following block diagrams show some applications that illustrate how the various members of the ZS127x family can be integrated to create monitoring systems.

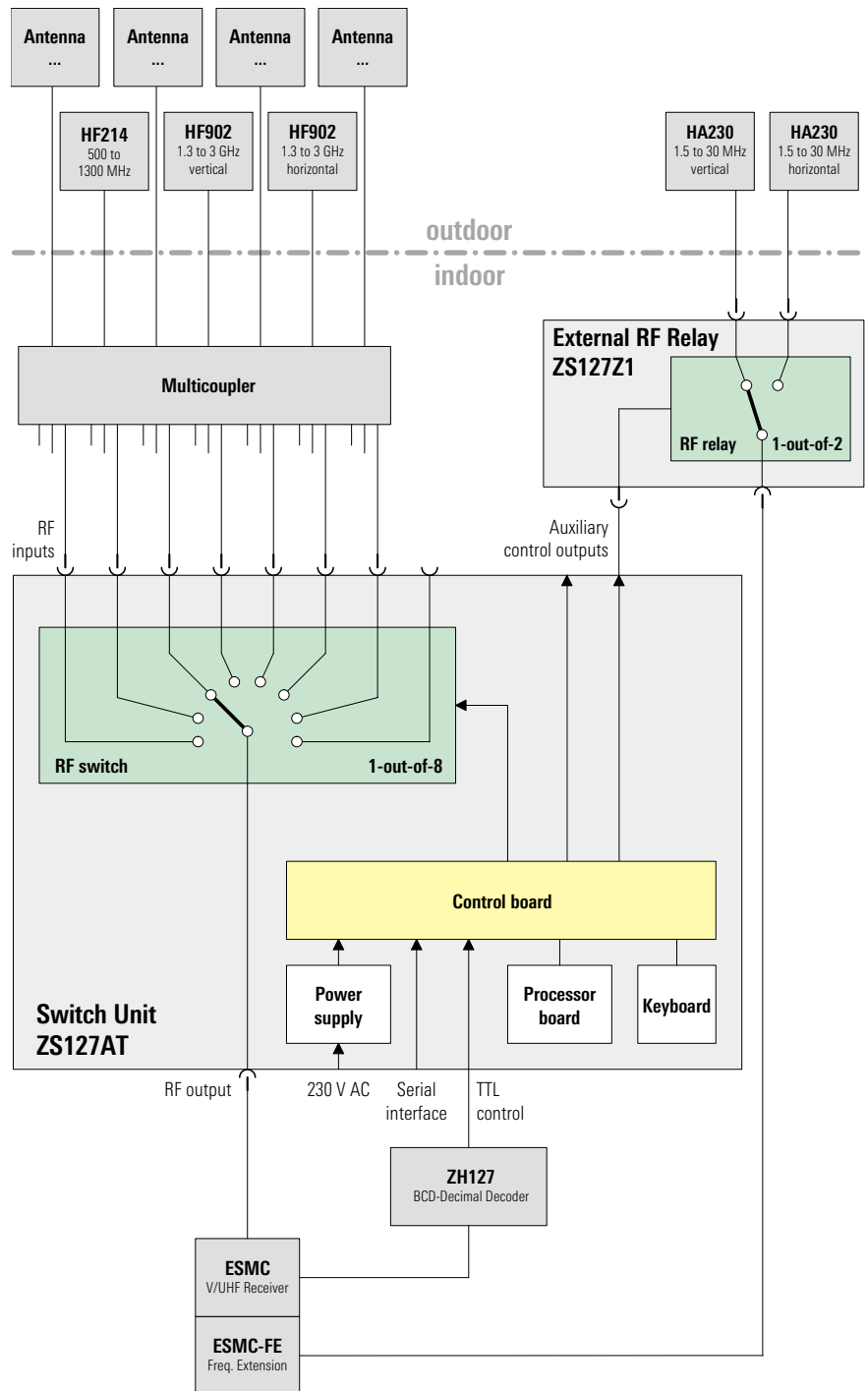
### Example 1:

Monitoring system with six receiving antennas, a receiver section and a multicoupler. Switch Unit ZS127 is remote-controlled from the system controller.



**Example 2:**

Monitoring system with several receiving antennas and a multicoupler. The switch unit inputs must be terminated. Switch Unit ZS127AT is controlled by Receiver ESMC via BCD-Decimal Decoder ZH127 using the TTL control input. An External RF Relay ZS127Z1 is used to select vertical/horizontal polarization of Antenna HA230.



## Specifications

### ZS127

<b>RF data</b>	
Frequency range	DC to 3 GHz
Input VSWR	≤1.2 (DC to 3 GHz)
Insertion loss (in/out)	≤1 dB (DC to 3 GHz)
Impedance	50 Ω
RF power	≤120 W (cold switching, DC to 3 GHz)
Switching time	≤15 ms
<b>Interfaces</b>	
RF IN	N jacks (X1 to X12) RF inputs, depending on version
RF OUT	N jacks (X100 / X200) RF outputs, depending on version
RS232C	D-SUB plug, 9 pins (X70) standard serial interface, default 9600 bit/s
EXT 1 to 2	3-pin jack (X21 / X22)
POWER	mains plug (X40) 230 V AC ±10%, 50 Hz to 60 Hz, 90 VA

<b>General data</b>	
Limit temperature range	−10 °C to +50 °C
Storage temperature range	−40 °C to +70 °C
Humidity	80% relative humidity at +50 °C
Sinusoidal vibration	5 Hz to 150 Hz
Random vibration	10 Hz to 300 Hz
Shock	40 g shock spectrum
EMC	meets EMC directive of EU (89/336/EEC) and German EMC law
Safety Quality standard	meets EN60950 / VDE0805 developed and manufactured in compliance with ISO 9000
Power supply Dimensions (W x H x D)	230 V AC ±10%, 50 Hz to 60 Hz, 90 VA 19" rackmount, 2 HU – 427 mm x 89 mm x 455 mm 484 mm x 89 mm x 508 mm (overall)
Weight (basic version)	7.0 kg

### ZS127A1/AT

<b>RF data</b>	
Frequency range	DC to 3 GHz
Input VSWR	≤1.2 (DC to 3 GHz)
Insertion loss (in/out)	≤1 dB (DC to 3 GHz)
Impedance	50 Ω
RF power	≤120 W (cold switching, DC to 3 GHz)
Switching time	≤15 ms
<b>Interfaces</b>	
RF IN	N jacks (X1 to X12) RF inputs, depending on version
RF OUT	N jacks (X100 / X200) RF outputs, depending on version
RS232C	D-SUB plug, 9 pins (X70) standard serial interface, default 9600 bit/s

TTL CONTROL	D-SUB-HD plug, 15 pins (X80)
EXT 1 to 2	3-pin jack (X21 / X22)
POWER	mains plug (X40) 230 V AC ±10%, 50 Hz to 60 Hz, 90 VA

<b>General data</b>	
Limit temperature range	−10 °C to +50 °C
Storage temperature range	−40 °C to +70 °C
Humidity	80% relative humidity at +50 °C
Sinusoidal vibration	5 Hz to 150 Hz
Random vibration	10 Hz to 300 Hz
Shock	40 g shock spectrum
EMC	meets EMC directive of EU (89/336/EEC) and German EMC law
Safety Quality standard	meets EN60950 / VDE0805 developed and manufactured in compliance with ISO 9000
Power supply Dimensions (W x H x D)	230 V AC ±10%, 50 Hz to 60 Hz, 90 VA 19" rackmount, 2 HU – 427
Weight (basic version)	7.0 kg

### ZS127Z1

<b>RF data</b>	
Frequency range	DC to 3 GHz
Input VSWR	≤1.2 (DC to 3 GHz)
Insertion loss (in/out)	≤0.5 dB (DC to 3 GHz)
Impedance	50 Ω
RF power	≤120 W (cold switching, DC to 3 GHz)
Switching time	≤15 ms
<b>Interfaces</b>	
RF IN	N jacks
RF OUT	N jack
CONTROL	3-pin plug pin 1 = GND pin 2 = n.c. pin 3 = +28 V DC / 60 mA

<b>General data</b>	
Limit temperature range	−35 °C to +55 °C
Storage temperature range	−40 °C to +70 °C
Humidity	95% relative humidity at +55 °C
Sinusoidal vibration	5 Hz to 150 Hz
Random vibration	10 Hz to 300 Hz
Shock	40 g shock spectrum
EMC	meets EMC directive of EU (89/336/EEC) and German EMC law
Safety Quality standard	meets EN60950 / VDE0805 developed and manufactured in compliance with ISO 9000
Power supply	+28 V DC
Dimensions (W x H x D)	125 mm x 80 mm x 58 mm (without connectors) 169 mm x 98 mm x 58 mm (overall)
Weight (basic version)	0.7 kg



## Ordering information

### Basic versions

Switch Unit	ZS127	3009.2605.06
Standard model including: one 1-out-of-6 RF switch (DC to 3 GHz), manual operation and RS232 interface		
Switch Unit	ZS127A1	3011.3992.08
Standard model including: one 1-out-of-8 RF switch (DC to 3 GHz), manual operation, RS232 interface and TTL control		
Switch Unit	ZS127AT	3014.5996.08
Standard model including: one 1-out-of-8 RF switch (DC to 3 GHz), not selected inputs terminated into 50 $\Omega$ , manual operation, RS232 interface and TTL control		

### Extended versions

Switch Unit	ZS127	3009.2605.08
Standard model including: one 1-out-of-8 RF switch (DC to 3 GHz), manual operation and RS232 interface		
Switch Unit	ZS127	3009.2605.12
Optional model including: one 1-out-of-12 RF switch (DC to 3 GHz), manual operation and RS232 interface		
Switch Unit	ZS127	3009.2605.66
Optional model including: one 1-out-of-6 RF switch (DC to 26.5 GHz), manual operation and RS232 interface		
Switch Unit	ZS127AT	3014.5996.12
Optional model including: one 1-out-of-12 RF switch (DC to 3 GHz), not selected inputs terminated into 50 $\Omega$ , manual operation, RS232 interface and TTL control		

### Extras

External RF Relay	ZS127Z1	3014.0994.02
1-out-of-2, DC to 3 GHz, 28 V DC supply with 5 m cable		





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