



Antenna Control Units R&S GB 127x

Rotator control plus RF and IF signal distribution

The Antenna Control Unit Family

R&S GB 127x is a cost-effective and reliable solution for controlling antenna rotators and distributing RF and IF signals. Its flexible concept allows adaptation to system requirements by adding optional extensions.

The R&S GB 127x family offers the following outstanding features:

- ◆ Suitable for stationary and mobile applications
- ◆ Tried and tested in various systems
- ◆ Compact design
- ◆ Split concept for stationary applications with remote Rotator Control Unit R&S RD 127 mounted close to the antennas, thus minimizing intercabling
- ◆ Manual operation and remote control for optimum hardware and software interworking
- ◆ Additional outputs for controlling additional switch units via the same control interface



ROHDE & SCHWARZ

Introduction

Monitoring systems usually comprise several receiving antennas that have to be dynamically switched over to the receivers in order to achieve the optimum system configuration for the individual tasks. There is also often the need to align directional antennas using azimuth, polarization or elevation rotators or adjustable-height masts.

The Antenna Control Units R&S GB 127x constitute an intelligent and flexible solution for stationary and mobile applications.

The R&S GB 127x family of universal antenna control units comprises the basic models R&S GB 127S and R&S GB 127M as well as the models R&S GB 127MU, R&S RD 127, R&S ZS 129A2, R&S ZS 129A4, R&S ZS 129A5 and R&S ZS 127Z1 for enhanced capabilities.

The models R&S ZS 129A2, R&S ZS 129A4, R&S ZS 129A5 and R&S ZS 127Z1 are described in the data sheet for the Switch Units R&S ZS 129x.

Antenna Control Unit R&S GB 127S

The Antenna Control Unit R&S GB 127S has been designed as a universal antenna control unit for stationary systems. Normally, it is used in combination with the Rotator Control Unit R&S RD 127, which contains the RF switching section and the control for the antenna rotators. In applications without antenna rotators, the Switch Units R&S ZS 129A2, R&S ZS 129A4, R&S ZS 129A5 and R&S ZS 127Z1 can be used.

Indoor unit/outdoor unit separation has important advantages in stationary systems where the receiving antennas are often mounted on high masts, far away from the operator positions.

The R&S GB 127S comprises a control board, a chipcard reader, a front panel keypad, an alphanumeric display and a power supply covering an input voltage range from 100 V to 240 V AC.

The antenna control unit is usually integrated into the rack at the operator position and connected to the system controller via up to four serial interfaces. It may be operated manually from its front panel keypad or remotely via the system software.

The four serial interfaces can be configured so that different subfunctions can be controlled via separate interface lines. This makes it possible to control different subfunctions from separate operator positions.

When the R&S GB 127S is operated manually, the user enters the requested settings via the front panel keypad. The antenna control unit guides the user by means of menus that are adapted to the individual system configuration. The current settings and relevant parameters can be read from the alphanumeric display.

The R&S GB 127S has three control outputs on its rear panel to control external units:

- ◆ One I²C bus control output comprising an I²C bus interface, the +28 V DC supply and GND, for connecting an R&S RD 127, an R&S ZS 129A2 or an R&S ZS 129A5 (to control one 1-out-of-n switch)
- ◆ Two identical open collector control outputs comprising each eight independent control lines, the +28 V DC supply and GND, for connecting an R&S ZS 129A4, an R&S ZS 129A5 (to control up to eight 1-out-of-2 switches *or* one 1-out-of-6 switch and two 1-out-of-2 switches *or* one 1-out-of-8 switch) *or* max. eight R&S ZS 127Z1

Front view of R&S GB 127S



The functionality of the system can thus be enhanced without a second control unit being required.

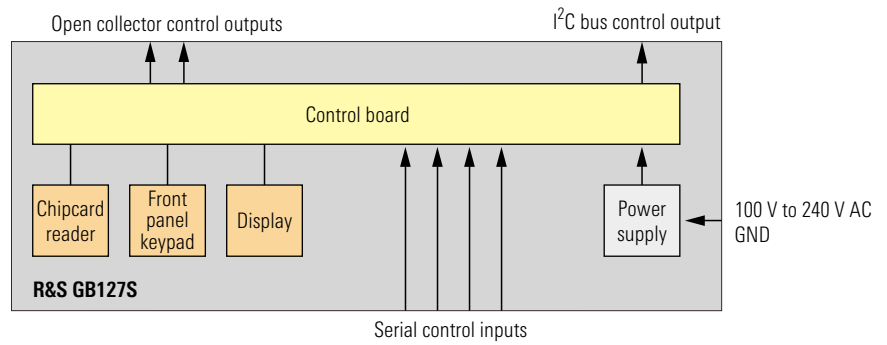
If several units are connected, you must bear in mind that the maximum supply current is 1.8 A.

The basic firmware of the R&S GB 127S is identical for each unit. Customer and system-specific information is defined and stored on a chipcard.

If the antenna control unit is delivered as part of a complete monitoring system, the chipcard will usually be programmed to the system-specific configuration by Rohde & Schwarz.

However, programming may also be performed by the customer. A null modem cable connected to the R&S GB 127S and the R&S GB 127x Card Editor, which runs under Windows XP, Windows 2000 or Windows NT4.0, are required to read from and write to the chipcard.

When the chipcard is inserted into the chipcard reader, the Antenna Control Unit R&S GB 127S is configured automatically for the system in question.



Block diagram of R&S GB 127S

The following information is stored on the chipcard:

- ◆ R&S RD 127 control enabled/disabled
- ◆ Rotator type and configuration
- ◆ Number of serial interfaces in use
- ◆ Function of each serial interface in use
- ◆ Commands used for rotator control
- ◆ Function of the commands for the control outputs and antenna switches
- ◆ Text to be output on the display

The card editor and the latest firmware are available at www.argus.rohde-schwarz.com.

Rear view of R&S GB 127S





Front view of R&S RD 127

Rotator Control Unit R&S RD 127

The Rotator Control Unit R&S RD 127 has been designed as an outdoor unit for mounting on top of masts close to receiving antennas and antenna rotators. The length of the RF cables and antenna rotator cables can be minimized, and only one RF cable and one control cable need to be routed to the equipment inside the station.

The following standard models of the R&S RD 127 are available:

- ◆ R&S RD127 Model 05 with 1-out-of-4 switch, DC to 3 GHz
- ◆ R&S RD127 Model 08 with 1-out-of-8 switch, DC to 3 GHz

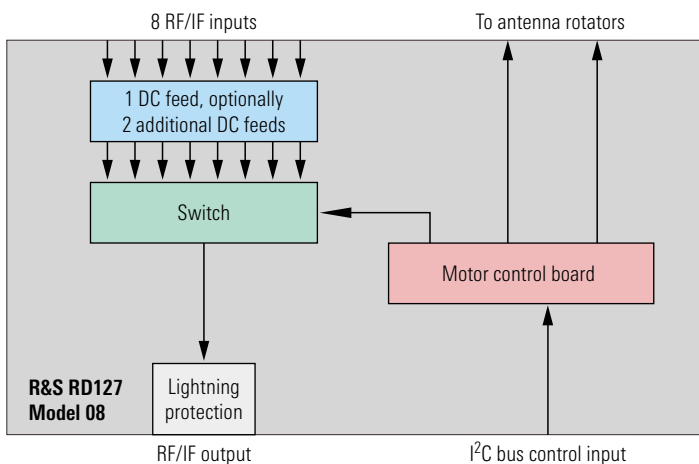
The R&S RD 127 comprises a motor control board for driving a rotator with a DC motor (e.g. Yaesu G2800) and a rotator with an AC motor (e.g. Yaesu G550), a switch, one DC feed and lightning protection. As an option, the unit may also be equipped with 2 additional DC feeds (option R&S ZS 129F1) to supply power to more than one active antenna.

As an option, the R&S RD127 can be equipped with a different type of motor control board instead of the standard board. This makes it possible to drive other types of antenna rotators. Information about the rotator types supported is available from Rohde & Schwarz on request.

Further R&S RD 127 options include a wide range of switches for antenna selection. Depending on the options installed, the R&S RD 127 can have up to eight RF inputs for connecting receiving antennas and two RF outputs each with a lightning protection option.

The R&S RD 127 is controlled from the Antenna Control Unit R&S GB 127S.

Block diagram of R&S RD 127



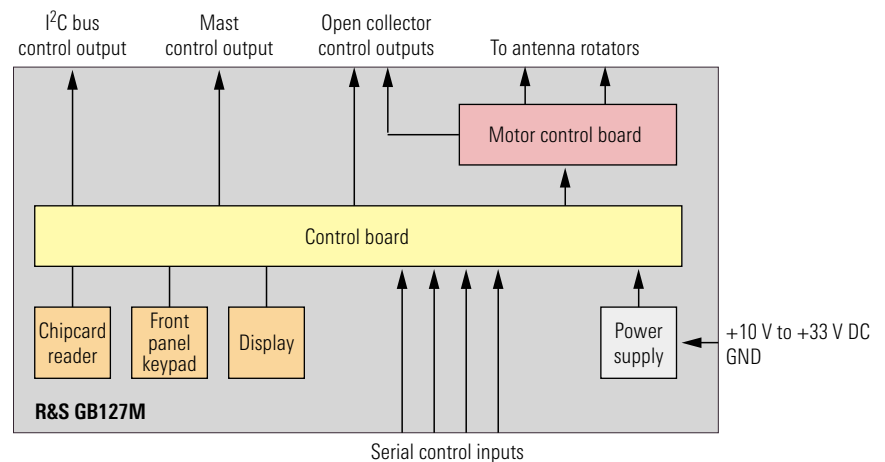
The R&S RD 127 is operated via the I²C bus control interface. A single control cable is used, incorporating an I²C bus interface, a +28 V DC supply and GND. The control cables supplied by Rohde & Schwarz for connecting the control unit and the R&S RD 127 have been tested for lengths up to 120 m. (For ranges in excess of 30 m, the control cable for the I²C bus interface and the +28 V DC supply is split). The connection between the two units requires additional lightning protection at the point of entry into the building.

Antenna Control Unit R&S GB 127M

The Antenna Control Unit R&S GB 127M has been designed as a universal antenna control unit for mobile systems and contains the control for the antenna rotators. Normally, it is used in combination with the Mast Control Unit R&S GB 127MU, which controls the mast motor.

Antenna selection switches are not integrated into the R&S GB 127M. If they are required in the system, the Switch Units R&S ZS129A2, R&S ZS129A4, R&S ZS129A5 and R&S ZS127Z1 can be used.

The R&S GB 127M comprises a control board, a motor control board for driving a rotator with a DC motor (e.g. Yaesu G2800) and a rotator with an AC motor (e.g. Yaesu G550), a chipcard reader, a front panel keypad, an alphanumeric display and a power supply covering an input voltage range from +10 V to +33 V DC. As an option, the R&S GB 127M can be equipped with a different type of motor control board instead of the standard board. This makes it possible to drive other types of antenna rotators. Information about the rotator types supported is available from Rohde & Schwarz on request.



Block diagram of R&S GB 127M

The antenna control unit is usually integrated into the rack at the operator position and connected to the system controller via up to four serial interface. It may be operated manually from its front panel keypad or remotely via the system software.

The four serial interfaces can be configured so that different subfunctions can be controlled via separate interface lines. This makes it possible to control different subfunctions from separate operator positions.

When the R&S GB 127M is operated manually, the user enters the requested settings via the front panel keypad. The antenna control unit guides the user by means of menus that are adapted to the individual system configuration. The current settings and relevant parameters can be read from the alphanumeric display.

Front view of R&S GB 127M



The R&S GB 127M has three control outputs on its rear panel to control external units:

- ◆ One I²C bus control output comprising an I²C bus interface, the +28 V DC supply and GND, for connecting an R&S RD 127, an R&S ZS 129A2 or an R&S ZS 129A5 (to control one 1-out-of-n switch)
- ◆ Two independent open collector control outputs comprising each eight independent control lines, the +28 V DC supply and GND, for connecting an R&S ZS 129A4, an R&S ZS 129A5 (to control up to sixteen 1-out-of-2 switches *or* two 1-out-of-6 switches and four 1-out-of-2 switches *or* two 1-out-of-8 switches) or max. eight R&S ZS 127Z1

The functionality of the system can thus be enhanced without a second control unit being required.

If several units are connected, you must bear in mind that the maximum supply current is 1.8 A.

The basic firmware of the R&S GB 127M is identical for each unit. Customer and system-specific information is defined and stored on a chipcard.

If the antenna control unit is delivered as part of a complete monitoring system, the chipcard will usually be programmed to the system-specific configuration by Rohde & Schwarz. However, programming may also be performed by the customer. A null modem cable connected to the R&S GB 127M and the R&S GB 127x Card Editor, which runs under Windows XP, Windows 2000 or Windows NT4.0, are required to read from and write to the chipcard.

The following information is stored on the chipcard:

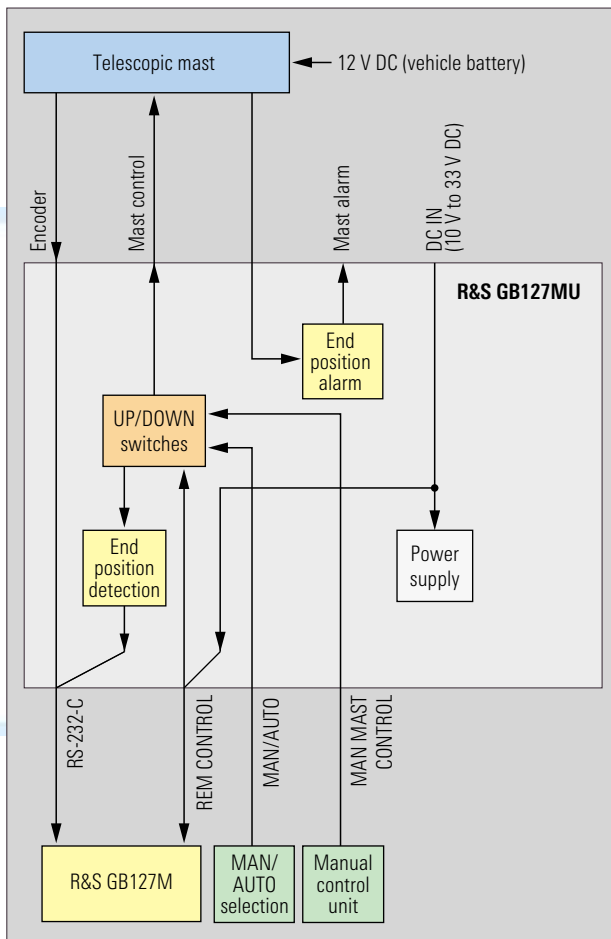
- ◆ Rotator type and configuration
- ◆ Number of serial interfaces in use
- ◆ Function of each serial interface in use
- ◆ Commands used for rotator control
- ◆ Function of the commands for the control outputs and antenna switches
- ◆ Text to be output on the display

When the chipcard is inserted into the chipcard reader, the Antenna Control Unit R&S GB 127M is configured automatically for the system in question.

The card editor and the latest firmware are available at www.argus.rohde-schwarz.com.

Rear view of model GB127M





Block diagram of R&S GB127MU

Mast Control Unit R&S GB127MU

The Mast Control Unit R&S GB127MU is the interface between a telescopic mast and the Antenna Control Unit R&S GB127M. It consists of a metal case, a control board with relays, optocouplers, power supply and connectors.

With a switch connected to the MAN/AUTO jack, the user can select automatic mast control via the R&S GB127M. Manual control is selected by means of a manual control switch connected to the MAN MAST CONTROL jack.

The high power relays that switch the motor current are part of the telescopic mast. These relays are controlled by the UP/DOWN switches in the R&S GB127MU. The exact mast position is measured by an encoder which is also part of the telescopic mast. The mast control unit forwards this position information to the R&S GB127M via an RS-232-C serial interface.

A special end position detection facility on the control board forwards control signals to the R&S GB127M when the mast reaches its upper or lower end position. The signal at the lower end position is used to initialize the position measurement.

Additional end switches in the telescopic mast provide mast alarm signals that could be used e.g. to switch a warning lamp or to block the ignition of the vehicle in order to prevent it from moving while the mast is not in the transport position.

Specifications

R&S GB127S

Interfaces	
MAINS	power plug (X100)
EXP 1 to 2	HD-Sub jack, 15 pins (X5/X6) +28 V DC output, max. 1 A 8 open collector outputs, max. sink current 0.5 A
I ² C REM CTRL	D-Sub jack 15 pins (X7) comprises I ² C bus data signals and +28 V DC/GND
COM 1 to 4	D-Sub plug, 9 pins (X1 to X4) standard serial interface, default 9600 bit/s
LPT	D-Sub jack, 25 pins (X8)
EXT KEYB	PS2 jack (X9)
Loudspeaker	integral loudspeaker for acoustic alarms
Display	LCD, 4 lines by 20 characters
Keypad	12 numeric keys + 4 function keys + up/down keys
Chipcard reader	for standard ISO chipcards, card type "2048 byte/I ² C bus"
General data	
Operating temperature range	0°C to +50°C
Storage temperature range	−40°C to +70°C
Humidity	95% relative humidity at +40°C
EMC	meets EMC directive of EU (89/336/EEC) and German EMC law
Safety	meets EN 60950/VDE 0805
Quality standard	developed and manufactured in compliance with ISO 9000
Power supply	100 V to 240 V AC/50 Hz to 60 Hz/ 180 V A
Dimensions (W x H x D)	19" rackmount 2 HU – 427 mm x 89 mm x 470 mm 484 mm x 89 mm x 495 mm (overall)
Weight (basic version)	7.6 kg

R&S RD127

RF data	
Frequency range	DC to 3 GHz
Input VSWR	Signal paths without DC feed: ≤1.4 (DC to 3 GHz) ≤1.2 typ. at 1.3 GHz Signal paths with DC feed: ≤1.4 (100 kHz to 3 GHz) ≤1.2 typ. at 1.3 GHz
Insertion loss (in/out)	Signal paths without DC feed: ≤0.6 dB (DC to 1.3 GHz) ≤1.2 dB (DC to 3 GHz) Signal paths with DC feed: ≤1.2 dB (100 kHz to 1.3 GHz) ≤2 dB (100 kHz to 3 GHz)
Impedance	50 Ω
RF power (cold switching)	≤120 W
Switching time	≤15 ms
Interfaces	
RF IN	N jacks (X1 to X8) RF inputs from receiving antennas depending on options
RF OUT	N jacks (X9/X10) RF outputs with lightning protection depending on options
ELV/POL	MIL connector, 6-pin jack (X70) depending on rotator type
AZIMUTH	MIL connector, 8-pin jack (X80) depending on rotator type
ROTATOR	MIL connector, 11-pin jack (X90) depending on rotator type
CONTROL	MIL connector, 10-pin plug (X100)
General data	
Operating 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	meets EN60950/VDE0805
Quality standard	developed and manufactured in compliance with ISO 9000
Power supply	+28 V DC (via control input)
Dimensions (W x H x D)	404 mm x 313 mm x 183 mm (without connectors) 404 mm x 356 mm x 183 mm (overall)
Weight (basic version)	11.4 kg

R&S GB127M

Interfaces	
POWER IN	D-Sub power plug with high current contacts (X100)
EXP 1 to 2	HD-Sub jack, 15 pins (X5/X6) +28 V DC output, max. 1 A 8 open collector outputs, max. sink current 0.5 A
I ² C REM CTRL	D-Sub jack, 15 pins (X7) carries I ² C bus data signals and +28 V DC/GND
COM 1 to 4	D-Sub plug, 9 pins (X1 to X4) standard serial interface, default 9600 bit/s
LPT	D-Sub jack, 25 pins (X8)
EXT KEYB	PS2 jack (X11)
ELV/POL	MIL connector, 6-pin jack (X9)
AZIMUTH	MIL connector, 8-pin jack (X10)
Loudspeaker	integral loudspeaker for acoustic alarms
Display	LCD, 4 lines by 20 characters
Keypad	12 numeric keys + 4 function keys + up/down keys
Chipcard reader	for standard ISO chipcards, card type "2048 bytes/I ² C bus"
General data	
Operating temperature range	0°C to +50°C
Storage temperature range	-40 °C to +70 °C
Humidity	+ 95% relative humidity at 40°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	meets EN60950/VDE0805
Quality standard	developed and manufactured in compliance with ISO 9000
Power supply	10 V to 33 V DC/20 A max./160 W
Dimensions (W x H x D)	19" rackmount, 2 HU – 427 mm x 89 mm x 470 mm 484 mm x 89 mm x 495 mm (overall)
Weight (basic version)	8.8 kg

R&S GB127MU

Interfaces	
DC IN	D-Sub plug with five signal contacts and two high current contacts (X1) 10 V to 33 V DC
ENCODER	D-Sub jack, 9 pins (X5) position information from encoder and reset signal to encoder
MAST CONTROL	round plug, 3 pins (X2) UP/DOWN control output to mast
MAST ALARM	round plug, 4 pins (X8) end position signals from mast
MAN/AUTO	round jack, 3 pins (X4)
MAN MAST CONTROL	round jack, 3 pins (X3) for connecting manual mast control box
RS-232-C	D-Sub plug, 9 pins (X7)
REM CONTROL	D-Sub jack with five signal contacts and two high current contacts (X6)
General data	
Operating temperature range	-20°C to +55°C
Storage temperature range	-40°C to +70°C
Humidity	95% relative humidity at +55°C
EMC	meets EMC directive of EU (89/336/EEC) and German EMC law
Safety	meets EN60950/VDE0805
Quality standard	developed and manufactured in compliance with ISO 9000
Power supply	10 V to 33 V DC
Dimensions (W x H x D)	220 mm x 83 mm x 120 mm (case) 220 mm x 83 mm x 150 mm (incl. connectors)
Weight	2 kg

Ordering information

Designation	Type	Order No.
Basic versions		
Antenna Control Unit <i>For indoor use, control via RS-232-C interface and manual operation</i>	R&S GB 127S	3022.2011.02
Antenna Control Unit with Rotator Control <i>For indoor use, control via RS-232-C interface and manual operation</i>	R&S GB 127M	3022.2511.02
Options		
Rotator Control Unit with 1-out-of-4 switch, DC to 3 GHz, with one DC feed <i>For outdoor use, control via R&S GB 127S</i>	R&S RD 127	3021.9012.05
Rotator Control Unit with 1-out-of-8 switch, DC to 3 GHz, with one DC feed <i>For outdoor use, control via R&S GB 127S</i>	R&S RD 127	3021.9012.08
Mast Control Unit <i>For outdoor use, control via R&S GB 127M</i>	R&S GB 127MU	3027.4512.02

Additional options such as different motor control boards for other antenna rotators are available on request.

Options for R&S RD 127		
DC Feed, 100 kHz to 3 GHz <i>Supplies up to 30 VDC at max. 500 mA</i>	R&S ZS 129F1	3024.6614.02

Additional options such as different switches, lightning protection for RF output, motor control boards for other antenna rotators are available on request.

The models R&S ZS 129A2, R&S ZS 129A4, R&S ZS 129A5 and R&S ZS 127Z1 are described in the data sheet for the Switch Units R&S ZS 129x.



ROHDE & SCHWARZ

ROHDE & SCHWARZ GmbH & Co. KG · Mühlendorfstraße 15 · 81671 München · Germany

P.O.B. 801469 · 81614 München · Germany · Telephone +4989 4129-0 · Fax +4989 4129-13247 · www.rohde-schwarz.com