raditeq
Product Manual

RadiCentre®
Modular Test System

Models:
CTR1009B - CTR1004B - CTR1001S

www.raditeq.com

RadiCentre® product manual

This product manual pertains to the RadiCentre® system.
Models: CTR1009B | CTR1004B | CTR1001s - **Made by Raditeq.**

It is strongly advised that this manual is carefully read before operating this product and adhere to any safety instructions it might contain.

For your convenience a Quick Start Guide has been added to this product. This Quick Start Guide contains the basic start-up steps and the safety warnings.

Please keep the Quick Start Guide (and this product manual) close at hand.

If you have any questions please contact your local reseller or Raditeq.

Supplier Information

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Email: support@raditeq.com

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WARNINGS & PRECAUTIONS

Read the contents of this product manual carefully and become familiar with the safety markings, the product instructions and the handling of the system. Please refer to the applicable product manual(s) for further information regarding the operation and control of the product(s).

This product requires a protective earth connection. The mains power source for the equipment must supply an uninterrupted safety ground to the IEC input connector(s).

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

Only Raditeq qualified maintenance personnel is allowed to perform maintenance and/or repair service on the equipment.

This product® 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 at its 'end-of-life', please return it to your local reseller or to Raditeq for recycling.

WARNINGS & PRECAUTIONS

Please make sure that (at least) one slot of 1U height is kept empty below the RadiCentre®, to ensure enough cooling of the system through the bottom air inlets of the cabinet. The temperature of the amplifiers inlet cooling air must not exceed +45°C. The outlet air temperature should be maximum 20° higher that the inlet temperature.

Position the product in such a fashion that power cables are easily accessible or connect the equipment to a mains network that can be easily disconnected from the mains.

For cleaning, use a clean, dry cloth (or a damp cloth where needed) and wipe the surface of equipment.

This product contains no hazardous substances as described in the RoHS Directive (2015/863/EU).

This product contains embedded software, which is field upgradeable from the RadiCentre® using the USB-A connection port on the backside panel of the RadiCentre®. For more information about updating your Raditeq plug-in card, please read the RadiCentre® manual.

Introduction

Product Introduction

EMC test systems can vary, from simple systems with one or two instruments, to complex installations with several integrated measurement instruments. Often even turntables and antennas can be controlled. To enable fully automated testing, these devices, as well as the connections between amplifiers, power meters, antennas and measurement receivers, need to be effectively controlled in an automated manner.

With the introduction of the RadiCentre®, cost effective, fully automated testing has finally become a reality. The RadiCentre® is designed for flexible configuration of an EMC test facility and contains up to seven independent slots that can contain any combination of different available plug-in cards. These cards determine the test facilities and are controlled through the RadiCentre®, possibly in combination with the RadiMation® software.

All plug-in cards are controlled via front-panel touchscreen on the RadiCentre® or can be addressed by the available interface ports; USB or LAN (GPIB optional) in combination with RadiMation® EMC test software (not standard included, but offered as separate product), or any other software package using the command set as defined in this programming section of this manual.

Related products

RadiMation® Automated EMC/RF Test Software

RadiMation ® is the EMC software package from Raditeq. RadiMation is used for remote control and automated RF and EMC testing. In combination with the RadiCentre® the software really shines brightest and enables the user fully automated and effective EMC and RF testing. Plug-in cards and modules are sold separately.

RadiField® Electric field generator

The patented RadiField® Triple A is no less than a revolution in EMC immunity testing. A complete paradigm shift involves a combination of high-level integration and a field combining technique, making several discrete components like combiner, coupler, power meters and cabling superfluous. This product is sold separately.

RadiSense® 10 Electric field probe

The RadiSense® 10 Electric field probe is currently the most accurate electric field probe available on the market. This probe operated from the RadiCentre® can measure up to 10 GHz.

RadiGen® RF signal generators
An important part of an EMC immunity test system is the RF signal generator, that provides the carrier signal at a certain frequency with different kinds of modulation. This carrier signal should be fast, accurate and without unwanted glitches or overshoot. The RadiGen® range of EMC/RF signal generators are the perfect solution for these applications.

RadiPower® RF power meters
The RadiPower is a RF power head designed for CW power measurements during EMC testing. A range of power heads is available to measure RF power from 4 kHz up to 18 GHz. The RadiPower is an affordable, fast and accurate RF power head with USB interface for easy connection.

RadiSwitch® Coaxial switch cards
The RadiSwitch is a series of RF switching plug-in cards for fully automated EMC testing. EMC test systems are often complex installations with many different test and measurement instrumentation. To enable full automated testing, all measuring instruments as well as the connections made between amplifiers, power meters, antennae and EMI receivers should be selected in an automated manner. The RadiSwitch is especially designed to switch RF signals between multiple instruments during EMC measurements.

The RadiCentre®

Product characteristics

Flexible
Enabling effective and fully automated testing, the RadiCentre® modular test system (model CTR1009B) contains seven versatile plug-in card slots. These slots can be configured with any combination of different Raditeq plug-in card instruments at the user's choice. The available plug-in card instruments can be combined as desired, allowing multifunctional combinations meeting different applications.

Easy to Use & Maintain
Every plug-in card is automatically recognized, initialized and ready for use when the card is inserted into the backplane and the RadiCentre® is restarted. The user can configure and control the functionality of each plug-in card instrument with the TFT touchscreen (models CTR1009B and CTR1004B). The system can be easily expanded by adding plug-in card instruments. The internal firmware can be upgraded 'in the field' by USB stick, allowing easy maintenance and minimum downtime.

Space Efficient
The RadiCentre® allows the user to configure up to seven plug-in card instruments into a mainframe of just three units height (models CTR1009B and CTR1004B). In comparison to a conventional setup a controllers, probes, switches and other equipment require one or two slots in a 19" cabinet. subsequently the RadiCentre® is very space efficient way to configure and control your EMC test setup.

Linux® Based & Software Upgrades
The RadiCentre® system contains a powerful embedded processor to control all plug-in cards and to interface with the user and/or an external computer. The operating system of the RadiCentre® is Linux® based, resulting in an extreme stable operating environment with a fast start up time and high performance. All the embedded software is stored in flash, making it easy to upgrade the system with new versions and future functionality.

Components
The RadiCentre® is delivered with the following items:

- The RadiCentre® , Pro or Slim mainframe (models: CTR1009B, CTR1004B or CTR1001S)
- USB cable
- Interlock connector: Binder 3-way plug (Slim) or ¼" stereo jack (Pro)
- Mains power lead (Pro) or AC/DC power adapter (Slim)
- Set of 19" mounting brackets (Pro)
- USB stick containing the (digital) user manual and quick start guide

RadiCentre® Models

RadiCentre® Pro - CTR1009B
The RadiCentre® Pro provides free space for seven plug-in cards in a desktop model with touchscreen. This model is also 19" rack mountable.

RadiCentre® - CTR1004B
The RadiCentre® provides free space for two plug-in cards in a desktop model with touchscreen. This model is also 19" rack mountable.

RadiCentre® Slim - CTR1001S
The RadiCentre® Slim is the entry version of the RadiCentre®. It provides space for one plug-in card in a table top enclosure. To minimize the cost of the RadiCentre® Single, local controls, such as a touchscreen display, are not included in this model.

Note that the beazle of the RadiCentre® single slot is stackable.

Detailed information
The details of these models will be provided in the following chapters. Please read the chapter(s) applicable to your RadiCentre® model(s).

RadiCentre® (Pro) : models CTR1009B & CTR1004B

The RadiCentre® Pro (7–slot, CTR1009B) and RadiCentre® (2–slot, CTR1004B) modular test systems are both 3U high and are standard delivered for usage as a desktop model with mounting (tilt) feet. The unit can also be fitted into a 19" rack when using the 19" brackets that are standard supplied.

The only difference between the RadiCentre® Pro and the RadiCentre® models is the number of slots. The RadiCentre® Pro has in total nine (9) slots and the RadiCentre® has four (4) slots. Two dedicated slots are used for the power supply (PSU) plug-in card and the main processor (CPU) plug-in card. This means that each model has respectively seven (7) and two (2) free available slots for custom selectable plug-in cards.

The slots are numbered from left to right (looking from the back of the system) and are shown on the touchscreen display. For the RadiCentre® Pro (9-slots) this means that slots numbered 1-7 are available for plug-in card instruments and slots 8-9 are dedicated for the CPU and PSU plug-in cards. For the RadiCentre® (4-slots) this means that slots 1-2 are available and slots 3-4 are dedicated.

The dedicated slots are used for the embedded Linux™ computer (CPU) plug-in card and power supply (PSU) plug-in card. Be noted that these plug-in cards cannot be placed in any other slot. The power supply card has a connection for an external interlock. The processor card has different control interfaces such as Ethernet (LAN), USB and GPIB (optional) to control the RadiCentre® from a computer. Both models can be controlled manually through the touch-screen display on the front panel.

RadiCentre® CTR1009B

RadiCentre® CTR1004B

RadiCentre® (Pro) - Models CTR1009B & CTR1004B back panel

CTR1009B

CTR1004B

Standard

Plug-in cards slots

Safety interlock connection. The interlock connector provides two floating contacts which require shorting for the system to operate. Use the supplied connector (6,3mm ¼" stereo jack) to wire to the emergency switch of your site. Connect both terminals.

Interlock plug-in

The RadiCentre® can act as a USB-device when connected to a computer. After installation of the device driver, a virtual com-port will be present.

USB-B

IEEE-488.2 interface bus to interface with a computer (optional).

IEEE-488 | GPIB

USB device connection. Can be used to update the RadiCentre® software using a USB memory stick.

USB-A (2x)

Local Area Network connection.

LAN

Used to connect the mains power with the CTR1009B or CTR1004B. This IEC inlet holds a primary fuse. When replacing the fuse, always use the correct fuse. The mains power switch is also located on the IEC inlet.

Mains inlet

Mains ON/OFF switch

RadiCentre® communication port settings

The RadiCentre® can be software controlled using different PC interface ports. The default settings for the communcation ports are as follows:

RadiCentre® model	USB virtual com port (VCP)
CTR1009B (Pro)	115200,8,N,1
CTR1004B	115200,8,N,1
CTR1001S	115200,8,N,1

RadiCentre® (Pro) - Models CTR1009B / CTR1004B - front panel

The RadiCentre® front panel contains a 7" widescreen color TFT touchscreen that is used to visualize and control the status of all the installed plug-in cards.

Next to the screen are four LED indicators that show the system status:

The "STANDBY" LED

The "STANDBY" LED appears next to the lower left side of the screen and lights up while the system is in standby mode. The mains power switch on the PSU plug-in card should be in the 'ON' position.

The "POWER ON" LED

The "POWER ON" LED appears next to the upper right side of the screen and lights up when the RadiCentre® system is switched 'ON'.

The "LASER ON" LED

The "LASER ON" LED appears next to the lower left side of the screen and lights up when the LASER of (one or more of) the laser powered plug-in cards (such as the RadiSupply® for the RadiSense®) is active.

WARNING! For safety reasons, never disconnect the fiber optic cables when one of the LASERS is switched on.

The "INTERLOCK" LED

The "INTERLOCK" LED appears next to the lower left side of the screen and lights up if the external interlock is open, or when an interlock error occurs in one of the plug-in cards.

RadiCentre® Model - CTR1001S

The RadiCentre® Slim 1-slot (CTR1001S) is the entry level version of the RadiCentre®. It provides space for one plug-in card in a table top enclosure. Please refer to the compatible plug-in cards below to see which plug-in cards work with the RadiCentre® Slim.

The plug-in card is inserted in the front of the RadiCentre® Slim. Each card that can be inserted in the RadiCentre® Slim can act as a USB device on your computer. A virtual COM-port will appear after installation of the USB driver. Use port settings: 115200,8,N,1 for this port.

The back panel of the RadiCentre® Slim contains all the cable connections. The power switch and DC-input can be found on this panel. The RadiCentre® Slim is powered by an external 12V/2A mains AC/DC adapter, which is delivered (standard) with the system.

<u>Two communication ports are located at the middle of the back panel</u>:
- One serial port with settings: 19200,8,N,1
- One USB-B connector.

The interlock connector and a push button to start the LASER are located at the top of the back panel. (Use of the LASER button is only applicable when used with a RadiSense® sensor.)

CTR1001S Back

Compatible plug-in cards

RadiSupply® - plug-in cards for the RadiSense® series
RadiSwitch® - plug-in cards with SPDT relays (SP6T relays can not be used!)
RadiPower® - plug-in cards

RadiCentre® Slim - Model CTR1001S (back panel)

The start button needs to be pressed (hold for 5 seconds) to start the LASER of the RadiSense® which is installed in the CTR1001S. The LASER can be stopped by pressing the button again.

Start button

Safety interlock connection. The interlock can be connect to your interlock system to ensure the safe use of the equipment.

Interlock

The RadiCentre® can act as a USB-device if connected to a computer. After installation of the device driver, a virtual com-port will be present. Use the standard supplied USB cable.

USB-B

Serial interface bus (RS232) to interface with a computer. Use a straight cable with standard supplied sub-D9 connectors.

RS232

The DC power input. The AC/DC power adapter with mating DC connector standard provided with the RadiCentre® CTR1001S.

Power input

A basic ON/OFF button. The button lights up when the DC Power is connected and the switch is in the ON position

ON/OFF switch
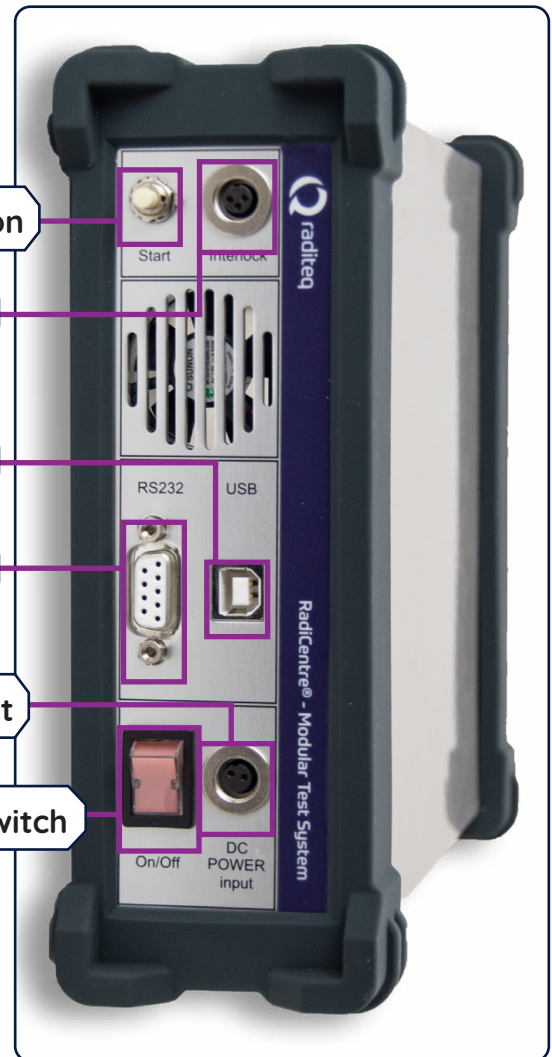
The Installation

RadiCentre® hardware configuration

The hardware configuration is carried out by the following steps:

1. Make sure that all the connections to the plug-in cards are made as described in the relevant manuals for these plug-in cards (manuals are found on: **www.raditeq.com/product-manuals**).

2. Make sure that the interlock connection of the RadiCentre® system is closed.

3. Depending on your model, plug the mains cord into the mains inlet of the RadiCentre® system or connect the mains adapter to the RadiCentre® Slim.

4. For the RadiCentre®, switch the main power switch, on the mains inlet, to the 'ON' position.

5. For the two and seven slot models, press (any point on) the front panel touchscreen to activate the RadiCentre®.

The RadiCentre® will automatically detect the installed plug-in cards and will display their controls on the display.

The system is now ready to be used.

In the case of the RadiCentre® (pro)
models, the user can control the different plug-in cards through the touchscreen of the RadiCentre® system.

The main screen will display the slot locations and the plug-in cards located in these slots. These indications can be used to open the screens of the individual plug-in cards where the main parameters for these cards are visible.

> REMARK - Please make sure that (at least) one slot of 1U height is kept empty above and below the RadiCentre® CTR1009B and CTR1004B models, to allow for sufficient cooling of the system through the bottom air inlets of the cabinet.

RadiMation® software

The RadiCentre® can be used to serve as a communication channel between Raditeq products and computer software like RadiMation®. This means that the RadiCentre® can function on it own but can be controlled by software. The RadiCentre® it self does not require any software to operate and can be fully controlled manually. If you want to configure Raditeq products with RadiMation® please consult the specific product manual for more instructions.

RadiCentre® Maintenance

Screen calibration

The RadiCentre® (Pro) can be controlled through the front touch screen. This screen can be calibrated to ensure the best possible quality of use. The RadiCentre® (pro) is delivered with factory calibrated touch screen. **therefore only calibrate the screen for maintenance.**

Follow the following instructions to calibrate the touch screen:

1. Press 'Config' in the main screen to enter the main configuration screen.

2. Press 'Calibrate Screen' to enter the screen calibration window.

3. The screen calibration window contains four points. Touch the area with the red pulsating circles to calibrate the screen. Repeat this action for each of the four points. After an area has been pressed, the circle will turn black.
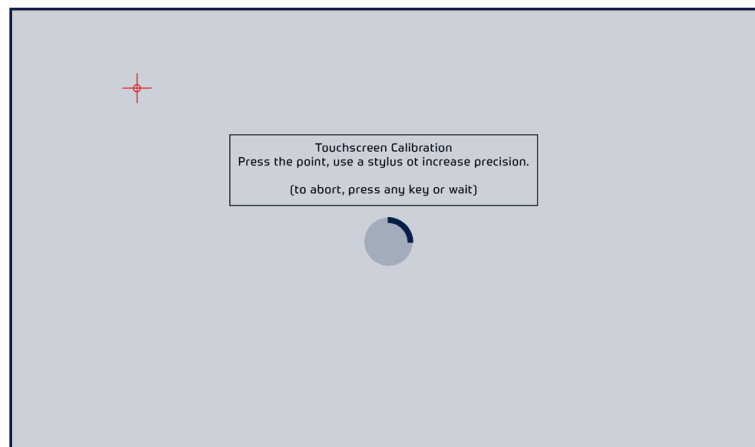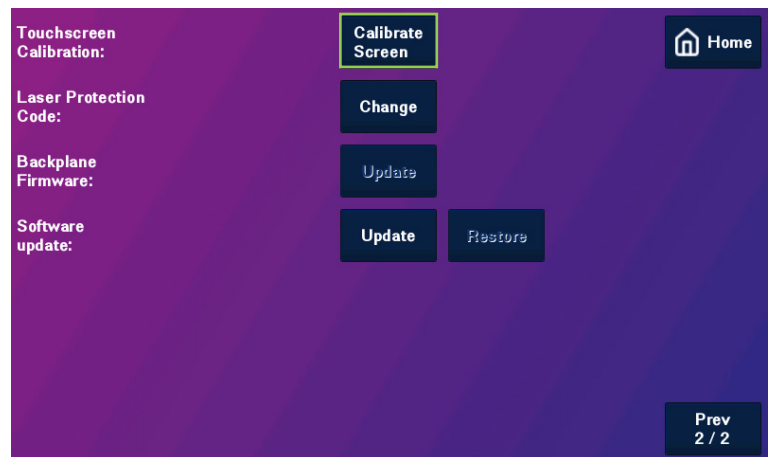
Firmware update procedure

Raditeq provides the embedded software for the plug-in cards. When a new version of this firmware is released, users can update the firmware of the RadiCentre® and/or each individual plug-in card themselves by using a USB memory stick.

Follow the instructions below to update the firmware of any plug-in card or the RadiCentre®:

1. Download the latest firmware of the device to be upgraded from our website: www.raditeq.com

2. Store the file(s) onto a USB memory stick with sufficient free space

3. Insert the USB memory stick containing the downloaded firmware into on of the USB ports at the backside of the RadiCentre®

4. Press the slot number of the plug-in card to open the slot configuration screen. This button can be found in the main screen, next to the status button of that plug-in card.

5. The slot configuration screen will display the actual software version of the plug-in card. If a newer software version is available, the 'Update Embedded Software' button will be enabled. (This button is always present in the screen, but is disabled if there is no new version present on the USB stick.)

6. Press 'Update Embedded Software' to open the software update screen. A screen dedicated to the software update will appear.

7. Read and follow the instructions on this screen carefully. Press 'Program' to update the software, or 'Cancel' to cancel or postpone the update. The update progress will be displayed on the screen.

WARNING! – Do not turn off or interupt the device during the programming process.

In some situations it is not possible to restore the software to the previous version (downgrade). if this is the case a notification will be displayed on the update screen.

Manual control of the RadiCentre®

Manual control - CTR1001S

Manual control of the RadiCentre® Slim (model CTR1001S) is done through the 'ON/OFF' switch and 'START' button on the back panel.

Laser activation - RadiSense® Series

The RadiCentre® Slim (model CTR1001S) is often used in combination with the RadiSense® electric field probe series. The RadiSense® is a laser powered probe which is controlled from the RadiCentre®. As a basic safety measure the RadiSense® laser power card can only be activated by a 'laser code' and manual starting of the laser. As the RadiCentre® Slim does not have a touch-screen, the laser can be started as defined below.

To activate the laser in the RadiCentre® Slim, follow these steps:

1. Press the 'Start' button on the back panel of the RadiCentre® Slim and hold it.

2. Five loud 'beep' sounds should be heard; four short beeps followed by one longer beep.

3. On the fifth 'beep' the laser source is activated and the red 'laser ON' LED (on the RadiSupply® plug-in card) lights up.

4. Release the 'Start' button.

This means that:

• If the activation process is to be interupted, release the 'Start' button (before the fifth 'beep'). The laser will not be activated.

• If the activation process is interupted (and released 'Start' button by accident), the laser will not be activated.

• The user is warned by an audible warnig when the start button is pressed by accident (i.e. without the intention to activate the laser).

Manual control - CTR1009B & CTR1004B

Manual control of the RadiCentre® (Pro) is performed through the touchscreen on the front panel. The following chapters will describe the RadiCentre® user interface.

Please note that other firmware versions may look different and may support other functions.

Power 'ON' the RadiCentre®

The RadiCentre® (Pro) models can be manually operated from the front panel touch-screen. This includes the toggling from 'ON' and 'OFF'.

When the AC mains cable of the RadiCentre® is correctly plugged into the mains power socket and the mains switch is switches to 'ON', simply tap the touch-screen on any position to power 'ON' the RadiCentre®.

RadiCentre® Start up & New hardware

After power 'ON' the RadiCentre® internal operating system will be loaded and started. (taking about 20 seconds). When the RadiCentre® is turned on and started up it can detect if new hardware has been installed into one of the RadiCentre® slots. The RadiCentre® will give the instruction to install new firmware to support the new hardware. The Firmware can be downloaded from the raditeq website at: www.raditeq.com/softwareupdate
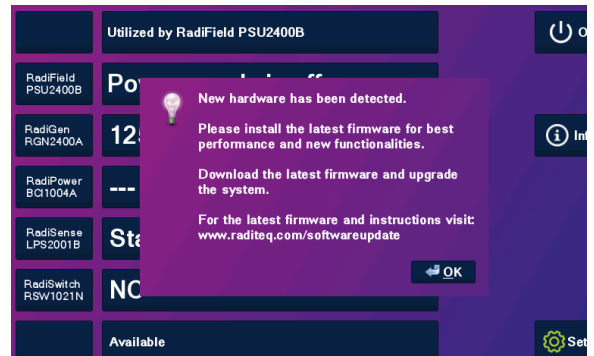
Information screen

When the Info button is tapped the 'Information screen' will be shown. This screen is displayed below and contains the following information:

- overview of all detected plug-in cards
- firmware version
- currently configured IEEE address (if applicable)

Main screen

On this page the 'main' screen of the RadiCentre® (Pro) is shown. This screen provides the user with an overview of the main parameters for each installed plug-in card, through the slots numbers and the 'status' buttons. These can, for example, show the actual field strength for a RadiSense® E-field probe or the positions of the different switches in case of a RadiSwitch® coaxial switch plug-in card.

General purpose buttons

A number of general purpose buttons are present at the right side of the 'main' screen. The general purpose buttons are present in every window of the RadiCentre® (when relevant).

The general purpose buttons and their functions are:

- **'Home' button** - Pressing this button returns the user to the 'main' screen.

- **'Info.' Button** - Pressing this button will show the user the RadiCentre® information window. In this window, the software and hardware versions of the RadiCentre® are displayed.

- '**Setup button** - Pressing this button will show to the RadiCentre® configuration window. In this window, the IEEE address (if applicable) of the RadiCentre® can be changed.

Slot numbers & 'status' button

The numbers (1 to 7) at the left hand side of the 'main' screen indicate the available slot numbers of the system. If a card is present, the 'status' button will show information of that plug-in card. These indicate which cards are installed, and will allow the user to reach the dedicated 'main status' window. All relevant data and configuration will be shown for that specific plug-in card. If no card installed the 'status' button contains the text "Available".

Control buttons

Relevant control buttons will appear at the right hand side of the screen. Depending on the card type, the buttons are used to start the plug-in card or to control its status. Please refer to the manual of the relevant card type for more information.
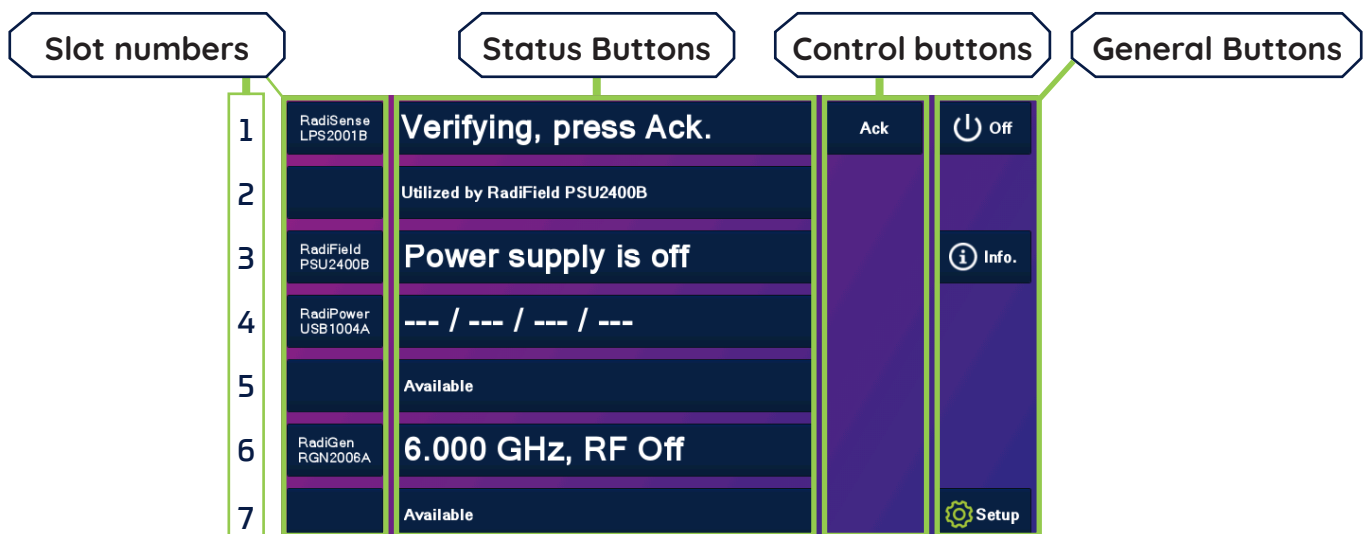
Device ID

In order to control a plug-in card in the RadiCentre® from a remote computer, the address (network or GPIB) of the RadiCentre® must be set correctly. In addition, each device in the RadiCentre® has its own unique number, corresponding with the slot number of the device. Look at the back panel of the RadiCentre® to determine the slot number of the device. When facing the back panel, the slots are numbered from left to right.

Device ID example

In this example the RadiCentre® (CTR1004B) is equipped with two seperate plug-in cards.

The Device ID is therefore made up out of; first the slot number and secondly the device port (if applicable). In the picture below you can see how the slot numbers of the RadiCentre® are arranged.

- RadiSense® - LASER power supply
- RadiPower® - Power Meter command card with 4 USB ports.

For example, a RadiSense® plug-in card is inserted in slot one (1) of a RadiCentre® Pro to control the RadiSense® plug-in card it needs to be commanded by the ID number: **1**

The RadiPower® plug-in card model USB1004A has four (4) USB ports. When this plug-in card is inserted in slot two (2) of the RadiCentre® and the user wants to send a command to one of the four (4) USB RadiPower® USB power meters, each command needs to be addressed to the correct port as shown in the picture to the right:
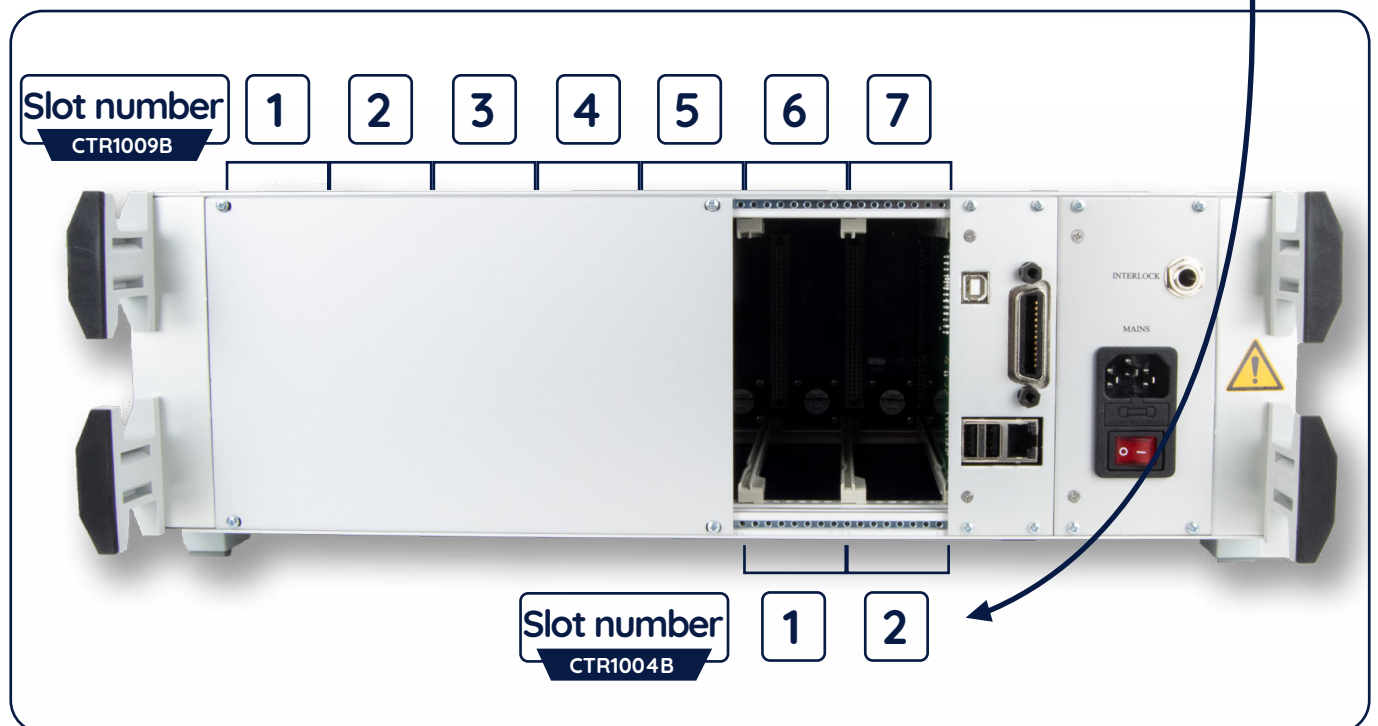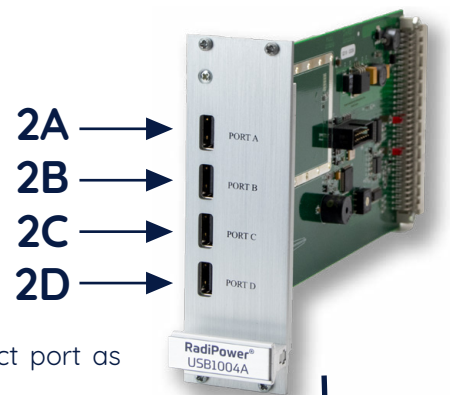
Smart Buttons

When tapping on of the slot numbers you will be redirect into the manual settings of the device. On this screen up to six (6) smart buttons are displayed. These buttons show a short overview of the status buttons of the other plugged in Raditeq cards. when tapped the user is redirected to the chosen Radi-product.
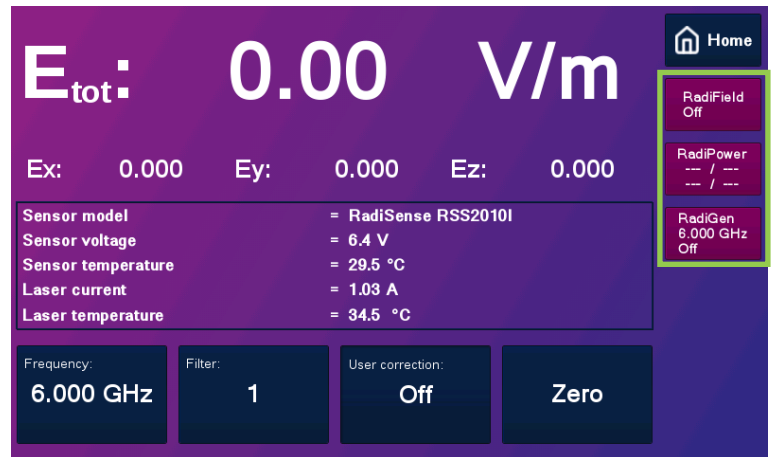
Configuring plug-in card parameters

When the parameters of a single plug-in card have to be adjusted, simply click on the 'status' button of that card in the 'main' screen. A dedicated configuration screen (the control screen) for that card will appear, allowing the user to change all the parameters of the relevant card. In addition, the data of the selected card will be displayed in a large font, allowing the user to monitor the data from a greater distance.

Remote control of the RadiCentre® (Pro) (models CTR1009B / CTR1004B)

The RadiCentre® (Pro) can be remotely controlled through either custom made software or the RadiMation® EMC software package from Raditeq nstalled on a PC.

Because these models can hold several plug-in cards, devices ID's and command prefixes are used. The use of Device ID's is explained in the following chapter. The command prefixes can be found in the programming manual which is part of this manual.

Remote control of the RadiCentre® Slim (CTR1001S)

The RadiCentre® Slim can be controlled remotely through either custom made software or the RadiMation® EMC software package from Raditeq installed on a PC. Because the RadiCentre® Slim only has one plug-in card slot, it does not use device ID's and command prefixes. The plug-in card instrument can be controlled using the commands from the instrument and programming manual.

raditeq
Programming
Manual

Programming manual

Commands
Error codes
Communication
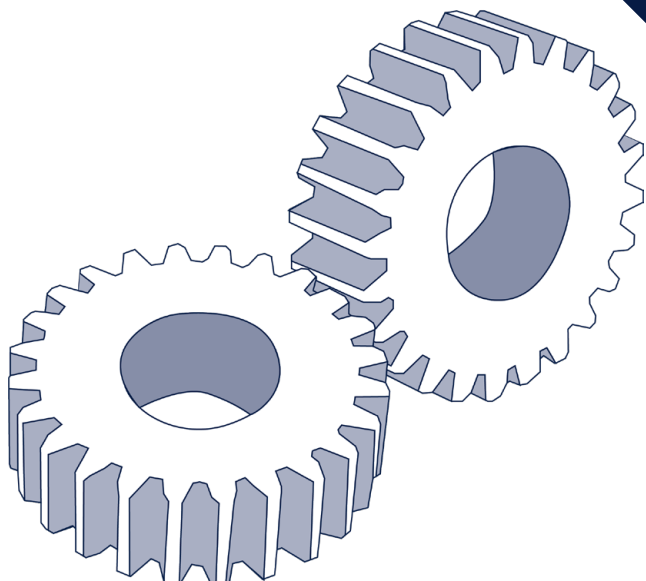
Programming manual

This manual describes the control commands and error codes that are applicable for the full range of EMC/ RF test instruments based on the RadiCentre® modular test system and all related plug-in card instruments designed and manufactured by Raditeq.

We kindly ask that you to carefully read this manual before operating your Raditeq instrument and control it by RadiMation® or any other control software.

If you have any questions please contact your local reseller or Raditeq.

RadiCentre® command set

This programming manual defines the command set, which is applicable for the control of the RadiCentre® modular test system and all related instruments and plug-in cards. The command set consists of 'generic' commands, which are applicable for all instruments and/or plug-in cards and 'specific' commands that are applicable for a specific instrument or plug-in card.

Command prefix for plug-in cards

All commands intended for plug-in cards, must be preceded by the slot number of the card. If a card has multiple ports, such as the USB1004A card for RadiPower®, the port number must also be included in the predecessor of the command. For a visual example please refer to the chapter; **Device ID example.**

Example 1 -   In order to request the identifier of the RadiSwitch® card in slot 3, the following command must be used:

3*IDN?

Example 2 -   To get an E-field reading from the RadiSense® card in slot 1, the following command must be used:

1D2

Example 3 -   To get a power value from the RadiPower® connected to port B of the card in slot 2, the following command must be used:

2BPOWER?

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

REMINDER - Since the RadiCentre® Slim only has one slot for a plug-in card, it does not use device ID's and command prefixes. The plug-in cards can be controlled using the commands described in the manual of the relevant plug-in card.

Command prefix for plug-in cards

The following table shows the general commands for the RadiCentre®. Please refer to the manuals of the plug-in cards for device specific commands.

Command	Reply	Description
"*IDN?"	"Raditeq, RadiCentre CTR1009B, version X.Y.Z"	Get the identification of the RadiCentre®
"STATUS?"	OK	Get the status of the RadiCentre® Reply is device specific
"LOCAL"	OK or error	Returns the instrument to local mode. This enables manual control of the device using the RadiCentre® touchscreen
"REBOOT SYSTEM"	None	Reboots the system

Generic commands

The commands described in this chapter are the generic commands, which are applicable for all instruments. Next to these generic commands, there is a set of instrument specific commands. The normal operation reply is specified in the 'Reply' column of the table. If case of an error situation, the reply will give an error.

REMARK: All commands are not case sensitive

Default user' commands

Command	Reply	Description
*IDN?	<manufacturer>, <product name>, <product code>, <embedded software version>. For example: Raditeq, RadiPower RPR2006P, 2.1.8	Returns the identifier string (ID) of the plug-in card or device
ID_NUMBER?	x.x.x.x.x.x.x.x For example: 1.58.95.146.21.0.0.124	Returns the unique identifier number The ID number is read from the ID chip on the plug-in card or device
LOCAL	OK or error	Returns the instrument to local mode This enables manual control of the device using the RadiCentre® touchscreen
RESET	OK or error	Resets the device and clears all errors
CLEAR	OK or error	Clears any internal error
VERSION_HW?	x For example: 2	Returns the hardware version of the plug-in card or device

Instrument specific commands

The following table shows the general commands for the RadiCentre®. Beside these commands, the generic commands are also applicable.

Command	Reply	Description
STATUS?	OK or error	Requests the status of the RadiCentre® The reply is device specific
REBOOT<space>SYSTEM	NONE	Restarts the application on the RadiCentre® **Remark**: the state of the individual cards are unchanged.

RadiSense® commands

The following table shows the general commands for the RadiSense® E-field sensors, models RSS2010x. Beside these commands, the generic commands are also applicable.

Command	Reply	Description
D3	':Dxx.xx;yy.yy;zz.zz_V_' For example:': D10.04;10.15;10.03 V'	Get field measurement from the RadiSense® Where xx.xx, yy.yy and zz.zz are 4 digit floating point values of the electrical field measured by that axis.
D5	':Dxx.xx;yy.yy;zz.zz;cc.cc_V_' For example: ':D10.04;10.15;10.03;10.07 V'	Get field (long notation) measurement from the RadiSense® Same as D3 where cc.cc is the 4 digit floating point value of the isotropic field.
D6	':Dcc.cc_V_' For example: ':D10.07 V'	Get field (short notation) measurement from the RadiSense® Where cc.cc is the 4 digit floating point value of the isotropic field.
BURST<space><n>	Returns n number of field measurements in D6 format, separated by ";". For example: "23.85;23.56;23.45;23.65;23.75" (burst of 5 measurements)	Get multiple readings from the RadiSense® Where n is the number of field measurements. Minimum 1 and maximum 60.000
MEASMODE<space><mode>	OK or error	Set the measurement mode of the RadiSense® Where mode is: 0 for buffered measurements 1 for triggered measurements

RadiSense® commands continued

Command	Reply	Description
MEASMODE?	'0' or '1' or error	Requests the measurement mode of the RadiSense®
FILTER<space>a	OK or error	Sets the filter / averaging factor of the RadiSense® Where a is value for: DYN = dynamic (16 to 64 tumes depending on the value) 1 = 4 times average 2 = 8 times average 3 = 16 times average 4 = 32 times average 5 = 64 times average 6 = 128 times average
FILTER?	For example: '3'	Requests the filter / averaging setting of the RadiSense®
ZERO	OK or error	Zeros the RadiSense®
STATUS?	'LASER ON' or 'STANDBY' or error	Requests the status of the RadiSense®
TC?	'Tnn.nn' For example: 'T35.75'	Requests the temperature of the RadiSense® in degrees Celsius
TF?	Where nn.nn is the temperature value in degrees Celcius	Requests the temperature of the RadiSense® in degrees Fahrenheit
B	'Tnn.nn' For example: 'T96.35'	Gets the sensor supply voltage of the RadiSense® Where nn.nn is a 4 digit number representing the supply voltage in the sensor (typically around 6 Volt)
FREQ<space><f>	Where nn.nn is the 4 digit temperature value in degrees Fahrenheit	Sets the frequency of the RadiSense® Where f is the frequency in Hz
FREQ?	'Bnn.nn' For example: 'B05.75'	Requests the frequency setting of the RadiSense® Returns the frequency in Hz
FREQ?<space>MIN	OK or error	Returns the minimum frequency of the RadiSense® in Hz
FREQ?<space>MAX	For example: '100000000' for 100 MHz	Returns the maximum frequency of the RadiSense® in Hz
CAL ON	OK or error	Turns ON the user correction factors inside the RadiSense®
CAL OFF	OK or error	Turns OFF the user correction factors inside the RadiSense®
CAL?	'ON' is active 'OFF' is not active	Queries the user correction settings of the RadiSense

RadiGen® commands

The following table shows the general and status commands for the RadiGen® RF signal generators. Beside these commands, the generic commands as defined.

Standard Commands for Programmable Instruments (SCPI) (RadiGen® only)

All commands send to the RadiCentre® are programmed through the Standard Commands for Programmable Instruments (SCPI). Note that all commands are not case sensitive. The Structure of the commands are as followed:

- [command] Information contained within [here] is considered not nessecary.
- [COMmand] Infromation contained within [here] is considerded not nessecary but if used the CAPITAL letters are nessecary
- **COM**mand Information in capital letters is considered nessecary and is part of the short notation.

Command example:	'[SENSe]:TEMPerature: MAXimum?'
Information needed for the command to work:	'TEMP: MAX'
Command variations:	'SENS:TEMP MAX' or 'SENSE:TEMPERATURE: MAXIMUM?'

For all command the SCPI 1999.0 is used. For more information consult the SCPI manual - version 1999.0.

Command	Reply	Description
*CLS	NONE	Clears the status byte (STB) and event status enable (ESR) register. STB and ESR are set to 0
*ESE<space> <value>	NONE	Sets bits in the standard event status enable register. <value> is the number from 0 to 128
*ESE?	<value> For example: '16'	Requests the result of the event status enable (ESE) register. Value is from 0 to 128
*ESR?	<value> For example: '16'	Requests the result of the event status enable (ESR) register. Value is from 0 to 128
*OPC?	'0' = not executed | '1' = executed	Query whether the last command has been executed
*RST	NONE	Reset all parameters to their specific default values
*SRE<space> <value>	NONE	Enables bits in the service request (SRE) register. <value> is from 0 to 128
*SRE?	<value> For example: '0'	Reads the current state of the service request enable register. Value is from 0 to 128
*STB?	<value> For example: 32	Reads the value of the instrument status byte (STB) Value is from 0 to 128
SVERsion?	For example: xx	Gets the current software version
HVERsion?	For example: xx	Gets the current hardware version
[SENSe]:TEMPerature?	For example: xx	Get the current device temperature (in °C).
[SENSe]:TEMPerature: MINimum?	For example: xx	Get the minimum temperature (in °C) under which the RadiGen® can operate within specifications
[SENSe]:TEMPerature: MAXimum?	For example: xx	Get the maximum temperature (in °C) under which the RadiGen® can operate within specifications.

RadiGen® Commands Continued

Command	Reply	Description
SYSTem:PRESet	NONE	Clears the following registers: • Status operation enable • Status questionable enable
SYSTem:SAVECONfiguration	NONE	Save the current system parameters
SYSTem:VERSion?	"SCPII version> For example: ":SYSTEM:VERSION 1994.0"	Question the version of SCPII
SOFTWARE:UPDate	For example: "SW_UPDATE"	Starts the software update procedure
SYSTem:BUSAddress	<address> For example: ":SYSTEM:BUSADDRESS 4"	Question the busaddress of the plug-in card.
SYSTem:IDNUmber?	<ID number> For example: ":SYSTEM:IDNUMBER 1.44.65.178.27.0.0.207"	Question the unique ID number of the plug-in card.
STATus:PRESet	NONE	The Status Operation Enable and Status Questionable Enable registers are cleared
STATus:OPERation	For example: '1'	Replies the Status Operation Event register. <value> = number from 0 – 128
STATus:OPERation:EVENt?	<Status operation event> For example: ":STATUS:OPERATION:EVENT 0"	Question the status operation event register
STATus:OPERation:CONDition?	<status questionable condition> For example:	Question the status questionable codition register
STATus:OPERation:EVENt: CONDition?	<status operation condition> For example: 'STATUS:OPERATION:CONDITION 0"	Question the status operation condition register
STATus:OPERation:ENABle <space><value>	NONE	Sets the Status Operation Enable register
STATus:OPERation:[EVENt: ENABle<space><value>	NONE	Set the status operation enable register
SYSTem:ERRor[:NEXT]?	<command> <space> <errorcode> For example: ":SYSTEM:ERROR 0, "No error""	Get the first system error. When this command is sent again, the second/next error is replied. Etc,

Carrier frequency commands

The following table shows the carrier frequency commands for the RadiGen® RF singal generators.

Command	Reply	Description
[SOURce]:FREQuency <space><value>	None	Set the carrier frequency <value> = frequency (in Hz)
[SOURce]:FREQuency?	For example: 50000000	Get the carrier frequency
[SOURce]:FREQuency:STARt <space><value>	None	This is the highest carrier frequency that can be set. For frequency stepping, the generator is set to this frequency when the next step will be smaller than the start frequency <value> = stop frequency (in Hz)
[SOURce]:FREQuency:STARt?	For example: 9000000	Gets the start frequency
[SOURce]:FREQuency:STOP <space><value>	None	This is the highest carrier frequency that can be set. For frequency stepping, the generator is set to this frequency when the next step will be smaller than the start frequency <value> = stop frequency (in Hz)
[SOURce]:FREQuency:STOP?	For example: 10000000	Get the stop frequency
[SOURce]:FREQuency:STEP <space><value>	None	Set the step size of the carrier frequency <value> = frequency step size (in Hz)
[SOURce]:FREQuency:STEP?	For example: 100000	Get the step size of the carrier frequency
[SOURce]:FREQuency:STEP :MINimum?	None	Set the minimum carrier frequency
[SOURce]:FREQuency:STEP: MAXimum?	For example: xx	Set the maximum carrier frequency
[SOURce]:FREQuency:STEP :MINimum?	For example: xx	Get the minimum step size of the carrier frequency step size
[SOURce]:FREQuency:STEP: MAXimum?	For example: xx	Get the maximum step size of the carrier frequency step size

Carrier amplitude commands

The following table shows the carrier amplitude commands for the RadiGen® RF signal generators.

Command	Reply	Description
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]?	For example: xx	Get the carrier amplitude
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]<space><value>	None	Set the carrier amplitude <value> = amplitude (in dBm)
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:MINimum	None	Set the minimum carrier amplitude
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:MINimum?	For example: xx	Get the minimum carrier amplitude
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:MAXimum	None	Set the maximum carrier amplitude
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:MAXimum?	For example: xx	Get the maximum carrier amplitude.
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:STEP<space><value>	None	Set the step size of the carrier amplitude. <value> = step size (in dB)
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:STEP:MINimum?	For example: xx	Get the minimum step size of the carrier amplitude step size
[SOURce]:POWer:[LEVel]:[IMMediate]:[AMPLitude]:STEP:MAXimum?	For example: xx	Get the maximum step size of the carrier amplitude step size.

Output commands

The following table shows the output commands for the RadiGen® RF signal generators.

Command	Reply	Description
OUTPut:STATe [1]	None	Set the carrier of the signal output Carrier ON/OFF, default RF
OUTPut1:STATe <space><value>	NONE	Set the output signal ON or OFF for the main output <value> = ON <value> = OFF
OUTPut2:STATe <space><value>	For example:	Set the output signal ON or OFF for the secondary output <value> = ON <value> = OFF
OUTPut1:STATe?	xx	Get the state of the output signal for the main output
OUTPut2:STATe?	…	Get the state of the output signal for the secondary output
OUTPut:SELECTed?	For example: '1'	Returns the current active output. Reply: '1' = main output is selected Reply: '2'= secondary output is selected

Amplitude modulation commands

The following table shows the amplitude modulation commands for the RadiGen® RF signal generators.

Command	Reply	Description
[SOURce]:AM:STATe <space><value>	NONE	Set the amplitude modulation ON or OFF <value> = ON or OFF
[SOURce]:AM:STATe?	For example: 'OFF'	Get the state of the amplitude modulation
[SOURce]:AM:DDS <space><state>	NONE	Turn the LF-DDS ON or OFF <state> = ON or OFF Default after *RST the LF-DDS is turned OFF
[SOURce]:AM:DDS?	For example: 'ON'	Gets the state of the LF-DDS
[SOURce]:AM:INTernal: FREQuency<space><value>	NONE	Set the amplitude modulation frequency <value> = frequency (in Hz)
[SOURce]:AM:INTernal: FREQuency?	For example: '1000'	Get the amplitude modulation frequency
[SOURce]:AM:INTernal:FREQuency: STEP<space><value	NONE	Set the step size of the amplitude modulation frequency <value> = step size (in Hz)
[SOURce]:AM:INTernal:FREQuency: STEP?	For example: '10'	Get the step size of the amplitude modulation frequency
[SOURce]:AM:INTernal:FREQuency: MINimum?	For example: xx	Get the minimum amplitude modulation frequency
[SOURce]:AM:INTernal:FREQuency: MAXimum?	For example: xx	Get the maximum amplitude modulation frequency
[SOURce]:AM:INTernal:FREQuency: STEP:MINimum	NONE	Set the minimum step size of the amplitude modulation frequency
[SOURce]:AM:INTernal:FREQuency: STEP:MAXimum	NONE	Set the maximum step size of the amplitude modulation frequency
[SOURce]:AM:[DEPTh]<space><value>	NONE	Set the amplitude modulation depth from 0 to 100%. <value> = percentage (in %), for example: 0,40 or 54,3
[SOURce]:AM:[DEPTh]?	For example: '54,3'	Get the amplitude modulation depth

Amplitude modulation commands - Continued

Command	Reply	Description
[SOURce]:AM:[DEPTh]:MINimum?	For example: xx	Get the minimum amplitude modulation depth
[SOURce]:AM:[DEPTh]:MAXimum?	For example: xx	Get the maximum amplitude modulation depth
[SOURce]:AM:OPT:2HZ		Set the preset for AM 2Hz, at 80% depth
[SOURce]:AM:POWer:[LEVel]: [IMMediate][AMPLitude]:MINimum		Question the minimum carrier level with the AM ON
[SOURce]:AM:POWer:[LEVel]: [IMMediate][AMPLitude]:MAXimum		Question the maximum carrier level with the AM ON

Pulse modulation commands

The following table shows the pulse modulation commands for the RadiGen® RF signal generators.

Command	Reply	Description
[SOURce]:PULM:STATe <space><value>	None	Set the pulse modulation ON or OFF <value> = ON or OFF
[SOURce]:PULM:STATe?	For example: 'ON'	Get the state of the pulse modulation
[SOURce]:PULSe:WIDTh <space><value>	For example: '10'	Set the width (ON-time) for the pulse modulation <value> = time (in seconds)
[SOURce]:PULSe:WIDTh?	For example: '10'	Get the width (ON-time) for the pulse modulation
[SOURce]:PULSe:WIDTh:MINimum?	For example: xx	Get the minimum width (ON-time) pulse modulation
[SOURce]:PULSe:WIDTh:MAXimum?	For example: xx	Get the maximum width (ON-time) pulse modulation
[SOURce]:PULSe:DELay <space><value>		Set the delay (OFF-time) for the pulse modulation <value> = time (in seconds) For example: 10
[SOURce]:PULSe:DELay?	For example: xx	Get the delay (OFF-time) for the pulse modulation
[SOURce]:PULSe:DELay:MINimum?	For example: xx	Get the minimum delay (OFF-time) pulse modulation
[SOURce]:PULSe:DELay:MAXimum?	For example: xx	Get the maximum delay (OFF-time) pulse modulation

Pulse burst modulation commands

The following table shows the pulse burst modulation commands for the RadiGen® RF signal generators.

Command	Reply	Description
[SOURce]:PULM:BURST:STATe <space><value>	None	Set the pulse burst modulation ON or OFF <value> = ON or OFF
[SOURce]:PULM:BURST:STATe?	For example: 'ON'	Get the state of the pulse burst modulation
[SOURce]:PULM:BURST:NUMber <space><value>		Set the number of pulses in a period for the pulse burst modulation <value> = number of pulses For example: 50
[SOURce]:PULM:BURST:NUMber?	For example: '50'	Get the number of pulses in a period for the pulse burst modulation
[SOURce]:PULM:BURST:PERiod <space><value>		Set the period time for the pulse burst modulation <value> = time (in seconds) For example: 1
[SOURce]:PULM:BURST:PERiod?	For example: '1'	Get the period time for the pulse burst modulation
[SOURce]:PULM:BURST:PERiod: MINimum?	For example: xx	Get the minimum pulse burst modulation period
[SOURce]:PULM:BURST:PERiod: MAXimum?	For example: xx	Get the maximum pulse burst modulation period
[SOURce]:PULM:BURST:NUMber: MINimum?	For example: xx	Get the minimum pulse burst modulation number
[SOURce]:PULM:BURST:NUMber: MAXimum?	For example: xx	Get the maximum pulse burst modulation number

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Pulse burst modulation commands

The following table shows the pulse burst modulation commands for the RadiGen® RF signal generators.

Command	Reply	Description
[SOURce]:PULM:BURST:STATe <space><value>	None	Set the pulse burst modulation ON or OFF <value> = ON or OFF
[SOURce]:PULM:BURST:STATe?	For example: 'ON'	Get the state of the pulse burst modulation
[SOURce]:PULM:BURST:NUMber <space><value>		Set the number of pulses in a period for the pulse burst modulation <value> = number of pulses For example: 50
[SOURce]:PULM:BURST:NUMber?	For example: '50'	Get the number of pulses in a period for the pulse burst modulation
[SOURce]:PULM:BURST:PERiod <space><value>		Set the period time for the pulse burst modulation <value> = time (in seconds) For example: 1
[SOURce]:PULM:BURST:PERiod?	For example: '1'	Get the period time for the pulse burst modulation
[SOURce]:PULM:BURST:PERiod: MINimum?	For example: xx	Get the minimum pulse burst modulation period
[SOURce]:PULM:BURST:PERiod: MAXimum?	For example: xx	Get the maximum pulse burst modulation period
[SOURce]:PULM:BURST:NUMber: MINimum?	For example: xx	Get the minimum pulse burst modulation number
[SOURce]:PULM:BURST:NUMber: MAXimum?	For example: xx	Get the maximum pulse burst modulation number

RadiAmp® commands

RadiAmp default users' commands

The following table shows the general commands for the RadiAmp® RF power amplifiers.
Beside these commands, the generic commands as defined are also applicable.

Command	Reply	Description
OFF	OK	Turns the RadiAmp® amplifier OFF OK is replied if the amplifier is 'OFF'
OPERATE	OK	Switches the RadiAmp® amplifier to OPERATE Applied RF carrier signal will now be amplified. OK is replied when the amplifier is in 'OPERATE' status
STANDBY	OK	Switches the RadiAmp® amplifier to STANDBY No RF signal will be present at the RF output of the amplifier. OK is replied when the amplifier is in 'STANDBY' status
LOCKOUT	OK	Sets the display of the RadiAmp® amplifier to REMOTE Use the LOCAL button to switch back to LOCAL mode
STATUS?	OFF STANDBY OPERATE	Returns the actual status of the RadiAmp® amplifier Reply is depending on the operational mode

RadiField® commands

RadiField® default users' commands

In addition to the generic commands the following default user commands and description are applicable for the RadiField® E-field generators:

Command	Reply	Description
RESET	OK	Resets the RadiField® E-field generator, which will: • Clear all errors • Clear all occurred crowbars • Reset the frequency to 3 GHz • Set the amplifier to standby mode (if this fails an error is replied)
STATUS?	For example: '0'	Returns the actual status of the RadiField® E-field generator in the form of an error or warning. • '0' = No error/warning • '1' = 3.3 Volt error • '2' = 5 Volt error • '4' = 10 Volt error • '8' = -10 Volt error • '16' = 50 Volt error • '32' = Current driver 3 error • '64' = Current final error • '128' = Temperature error • '256' = Power error • '512' = Driver fet adjustment error • '1024' = Final fet adjustment error • '2048' = Oven too cold warning • '4096' = Oven too hot warning • '8192' = Memory error • '16384' = Driver vGate min limit error • '32768' = Driver vGate max limit error • '65536' = Driver adjustmenttimed out error • '131072' = Final vGate min limit error • '262144' = Final vGate max limit error • '524288' = Final adjustment timed out error Some numbers represent multiple (of the previously mentioned) errors occurring at ones. For example, reply: • '3' = error 1 and 2 = 3.3V and 5V error • '5' = error 1 and 4 = 3.3V and 10V error
CLEAR	OK	Clears the internal error and crowbars are reset

RadiField® specific users' commands

The following table shows the general commands for the RadiAmp® RF power amplifiers.
Beside these commands, the generic commands as defined are also applicable.

Command	Reply	Description
MAINS?	'1' = ON '2' = OFF	Request the actual status of the RadiField® mains power
MAINS <space><value>	OK or error	Turn the main power of the RadiField ON or OFF <value> = 'ON' or 'OFF'
STANDBY	OK or error	Switches the RadiField® field generator to STANDBY In this state there will not be generated any RF Field OK is replied when the field generator is in 'STANDBY' status
OPERATE	OK or error	Switches the RadiField® field generator to OPERATE In this state the applied RF carrier signal will be amplified. OK is replied when the amplifier is in 'OPERATE' status
MODE?	Waiting for start-up Going to standby Standby Going to operate Operate Off Error	Returns the actual status of the RadiField® field generator Reply is depending on the operational mode
CURRENT?	For example: '1.2'	Measures the RF current in the PSU2400A plug-in card The current response is in Ampere (A)
TEMP?	For example: '23.6'	Measures the temperature The temperature response is in degrees Celcius (°C)
POS <space><value>	OK	Controls the position of the internal H/V polarizer in the RadiTower® mast to HORIZONTAL or VERTICAL <value> = 'HOR' or 'VER'

Command	Reply	Description
POS?	For example: 'HOR'	Gives the actual status/position of the internal H/V polarizer 'MOV' = Moving in between positions 'STOP' = Stopped, but not in horizontal or vertical position 'HOR' = In horizontal position 'VER' = In vertical position Reply is depending on the actual status/position
STOP	NONE	Stops the movement of the H/V polarizer
SND<space><soundMode	OK or error when <soundMode> is invalid	Set the sound mode of the RadiField backplane. <soundMode> can be: 0 = All sounds off 1 = Warning sound polarizer movement enabled.
SND?	<soundMode>	Question the sound mode of the RadiField backplane. <soundMode> can be: 0 = All sounds off 1 = Warning sound polarizer movement enabled.
POW<powermeter>?	For example: '-12.34 dBm'	Get the measured power level <powermeter> = FWD or RFL power level in dBm
FREQUENCY? MIN	For example: '1000000000'	Get the minimum frequency in Hz
FREQUENCY? MAX	For example: '6000000000'	Get the maximum frequency in Hz
FREQUENCY<space> <value>	OK or error	Set the frequency of the RadiField® <value> = frequency in Hz, for example: 500000000
FREQUENCY?	For example: '5000000000'	Get the frequency of the RadiField® in Hz

REMARK: The commands: POS, POS? and STOP can only be used if the H/V polarizer is connected.

RadiPower® commands

The RadiPower® range of USB RF power meters consist of the following product models:

- USB1004A   RadiPower® plug-in card with 4x USB ports
- RPR2006C   RF power meter, CW - 9 kHz to 6 GHz
- RPR2006P   RF power meter, Burst/Pulse - 9 kHz to 6 GHz
- RPR2018C   RF power meter, CW – 80 MHz to 18 GHz
- RPR2018P   RF power meter, Burst/Pulse – 80 MHz to 18 GHz
- RPR3006W   RF Power meter, ETSI Wireless – 20 MHz to 6 GHz

RadiField® default users' commands

In addition to the generic commands the following default user commands and description is applicable for the RadiPower® RF power meters:

Command	Reply	Description
RESET	OK	Resets the RadiPower® USB power meter to following settings: • Frequency: 1.3 GHz • Acquisition speed: 1 MS/sec • Filter: Auto • Log Threshold: -40.00 dBm • Mode: 0 (CW mode) [1] • VBW mode 0: 3 [2] • VWB other modes: Auto [1] [2] • Trigger mode: Edge • Edge mode: Rising • Trigger filter: 2 • Auto trigger: Off • Auto store: Off • Trigger holdoff: 0 • Log delay: 0 • Power offset: 0.00 dB • Power units: dB [1] = Excluding the C-models. In the C-models only mode 0 is supported [2] = Excluding the RPR2018x models. In these models the VBW can't be set
CLEAR	OK	When receiving the CLEAR command no action is taken

RadiPower® commands - model 'C' & 'P'

The following table shows the user commands for the RadiPower® models RPR2006C, RPR2018C, RPR2006P and RPR2018P. Applicable exceptions are marked in the specifications.

Command	Reply	Description
VERSION_SW?	<x,y,z> For example: '2.3.2'	Requests the software version of the RadiPower®
TEMPERATURE?	<temperature> For example: '312' which is equal to 31.2 °C	Requests the temperature of the RadiPower® The replied value must be divided by 10! The temperature response is in degrees Celcius (°C)
REBOOT SYSTEM	OK	Restarts the software of the RadiPower®
POWER?	<xx.xx><space>dBm For example: '-38.81 dBm'	Get the measured power level from the RadiPower® in mode 0. For the P-models: In mode 1 (max hold) the 'POWER?' command will return the highest measured value since the previous 'POWER?' command. After reading the power, the max hold value will be cleared The power response is provided in dBm
BURST? <space><number>	For example with <number> is '5': '-63.92 -63.85 -63.85 -64.03 -63.99 dBm'	Performs <number> of power measurements after each other. It replies the measured power in dBm, separated with a space. After the last send power measurement '<space>dBm' is send.
POWER_UNIT <space><unit>	OK	Sets the unit in which the reply on the 'POWER?' command will be provided. <unit> can be: 0 = dBm 1 = Watt
POWER_UNIT?	<unit> For example: '0'	Replies the power unit of the RadiPower® See the command 'POWER_UNIT<space><unit>' for the explanation of <unit>
POWER_OFFSET <space><offset>	OK	Sets the power offset in the RadiPower®

RadiPower® commands - model 'C' & 'P' - continued

Command	Reply	Description
POWER_OFFSET?	<offset> For example: '15.23'	Replies the power offset in the RadiPower® See the command 'POWER_OFFSET <space><offset>' for the explanation of <offset>
STORE	OK	The following parameters are stored by this command: • Frequency • ACQ speed • Filter • LOG Threshold • Mode [1] • VWB mode 0 [2] • VWB other modes [1] [2] • Trigger mode • Trigger edge mode • Trigger filter • Auto trigger • Trigger holdoff • Log delay • Power offset • Power units [1] = Excluding the C-models. In the C-models only mode 0 is supported [2] = Excluding the RPR2018x models. In the RPR2018x models the VBW can't be set
AUTO_STORE <space><store>	OK	Sets the AUTO store setting, with <store>: 0 = settings will not automatically be stored 1 = settings will be stored in flash after each change of the settings
AUTO_STORE?	<store> For example: '1'	Gets the AUTO store setting. See the command 'AUTO_STORE<space><store>' for the explanation of <store>
FREQUENCY <space><frequency>	OK	Sets the frequency of the RadiPower® <frequency> is in kilohertz and can be set from the minimum frequency until the maximum frequency in 100 Hz units
FREQUENCY? <space>MIN	<frequency> For example: '9 kHz'	Gets the minimum frequency of the RadiPower®

RadiPower® commands - model 'C' & 'P' - continued (2)

Command	Reply	Description
FREQUENCY? <space>MAX	<frequency> For example: '6000000 kHz'	Gets the maximum frequency of the RadiPower®
FREQUENCY?	<frequency> For example: '1300000 kHz'	Gets the frequency of the RadiPower®
FILTER <space><filter>	OK	Set the filter of the RadiPower® Filter can be set from '1' until '7' and 'AUTO'
FILTER?	<filter> For example: 'AUTO' or '2'	Gets the filter setting of the RadiPower®
VBW <space><vbw> [(1)]	OK	Sets the VBW of the RadiPower® model RPR2006x The <vbw> can be: 0 = 10 MHz 1 = 1 MHz 2 = 200 kHz 3 = 1 kHz AUTO = Set the VBW automatic, where the VBW is coupled to the sample speed of the RadiPower: VBW = 10 MHz @ 10 MSps and 1 MSps VBW = 1 MHz @ 100 kSps VBW = 200 kHz @ 20 kSps
VBW? [(1)]	<vbw> For example: 'AUTO' or '1'	Gets the VBW setting of the RadiPower®
ACQ_SPEED <space><speed>	OK	Sets the ADC sample speed of the RadiPower® <speed> is in kSps and can be: - 20 - 100 - 1000
ACQ_SPEED?	<speed> For example: '1000'	Gets the ADC sample speed of the RadiPower®
*OPT?	<options> For example: '010' or '0'	Gets the available options from the RadiPower® <options> can be '010' for 4 kHz low frequency extension. When no options are installed, '0' is replied. Available from v2.40 or higher

(1)   Not available for the RadiPower models RPR2018x. For these models the VBW can't be set

RadiPower® commands envelope tracing - model 'P'

Command	Reply	Description
MODE <space><mode>	OK	Sets the mode of the RadiPower® <mode> can be: 0 = RMS mode 1 = Max hold (peak) mode 2 = Envelope tracing mode
MODE?	<mode> For example: '0'	Returns the current mode of the RadiPower®
ACQ_LOG_STATUS?	<mode> For example: '0'	Gets the current status of the envelope tracing mode of the RadiPower® <status> can be: 0 = waiting for trigger 1 = buffers are filled
ACQ_LOG_RESET	OK	Resets (clears) the sample buffers of the RadiPower®
ACQ_LOG_DATA?	<data> or 'NO DATA'	Gets the first 1000 samples after the trigger in dBm. Values are separated by a semicolor
ACQ_LOG_DATA_ENH? <space><pretrigger>, <posttrigger>	<data>	Gets the samples before and after the trigger The <data> is in ASCII format and the samples are separated by a semicolon <pretrigger> and <posttrigger> can be set from 1 to 2000
ACQ_LOG_DATA_ENH_ BIN?<space><pretrigger>, <posttrigger>	<data>	Gets the samples before and after the trigger The <data> is in binary dump format. The special code 0x7777 represents data start, 0xAAAA represents data end. Every sample is 4 bytes <pretrigger> and <posttrigger> can be set from 1 to 2000
ACQ_LOG_THRESHOLD <space><threshold>	OK	Sets the trigger level of the RadiPower® in dBm <threshold> can be set in the range of the power range (range of the cal data table)
ACQ_LOG_THRESHOLD?	<threshold> For example: '-39.35'	Returns the actual threshold of the RadiPower®

RadiPower® commands envelope tracing - model 'P' - continued

Command	Reply	Description
ACQ_LOG_TRIGGER <space><mode>,<edge>, <trig filter> (1)	...	Sets the trigger settings of the RadiPower® <mode> can be: 0 = edge triggering 1 = level triggering <edge> can be: 0 = falling edge 1 = rising edge <trig filter> can be set from 2 to 10 and is used to evaluate edge or level trigger
ACQ_LOG_TRIGGER?	<mode>, <edge>, <trig filter> For example: '0,1,2'	Replies the actual trigger settings of the RadiPower®
ACQ_LOG_TRIG_DIST <space><trig dist>	OK	Sets the number of samples for the trigger distance of the RadiPower® <trig dist> can be set from 2 to 10
ACQ_LOG_TRIG_DIST?	<trig dist> For example: '2'	Replies the trigger distance of the RadiPower®
ACQ_LOG_MAX?	<power> For example: '-9.97 dBm'	Returns the highest power value of the RadiPower® which has been recorded since the 'ACQ_LOG_RESET' command. The power value is provided in dBm
ACQ_AUTO_TRIGGER <space><auto trig>	....	Sets the auto trigger of the RadiPower® <auto trig> can be: 0 = single triggering (new trigger can be found after the 'ACQ_LOG_RESET' command) 1 = automatic triggering (after reading the data the log is automatically reset and is searching for a new trigger)
ACQ_AUTO_TRIGGER?	<auto trig> For example: '1'	Replies the auto trigger settings of the RadiPower®
ACQ_LOG_TRIG_HOLDOFF <space><holdoff>	OK	Sets the number of holdoff samples of the RadiPower® The holdoff starts after the delay. If there was no delay it starts directly after the start searching for a trigger. If a trigger occurs during the holdoff period, the holdoff will start again. The number of samples <holdoff> can be set from 0 to 1000000

RadiPower® commands envelope tracing - model 'P' - continued (2)

Command	Reply	Description
ACQ_LOG_TRIG_HOLDOFF?	<holdoff> For example: '1000'	Gets the number of holdoff samples of the RadiPower®
ACQ_LOG_DELAY <space><delay>	OK	Sets the number of delay samples for the RadiPower® that will be used before the measurement for a trigger is started. The number of samples <delay> can be set from 0 to 2000000
ACQ_LOG_DELAY?	<delay> For example: '1000'	Gets the number of delay samples that are set before the measurement for a trigger is started

RadiPower® commands - Burst mode - RPR3006W (ONLY)
The following table shows the user commands for the RadiPower® model RPR3006W.

Command	Reply	Description
BM_MEASURE_PERIOD<T>	OK	Sets the measurement period T (in ms) Where <T> can be from 1 to 60000 ms
BM_MEASURE_PERIOD?	<T> For example: '500'	Returns the measurement period (in ms)
BM_NOISE_TIMER <n>	…	Sets the number n of samples, which are allowed below the threshold, before a new burst is counted <n> can be set between 0 and 5000 samples
BM_NOISE_TIMER?	<n> For example: '10'	Returns the number of samples which are set In this example 10.
BM_TRIG_LEVEL <l>	…	Sets the trigger level for burst detection (in dBm) <l> can be set between -50 and +10 dBm
BM_TRIG_LEVEL?	<l> For example: '-40'	Returns the trigger level in dBm
BM_GO	OK	Starts a single burst measurement
BM_STAT?	For example: '1'	Returns the status of the burst measurement 0 = measurement is not started or in progress. 1 = measurement is completed, the data is ready to be read
BM_BURST_COUNT?	For example: '252'	Returns the number of bursts found within the set measurement period The maximum number is 100.000
BM_BURST_DATA?<i>	For example: x;y;z" or "NO DATA"	Returns for burst with number <i> the start time (x); end time (y); RMS power (z). Final character is a newline
BM_BURST_DATA_DUMP	For example"x;y;z" or "NO DATA"	Returns for each burst within the measurement period the start time (x); end time (y); RMS power (z). Final character is a newline

RadiSwitch® commands

RadiSwitch® default users' commands

The following table shows the default user commands for all models RadiSwitch® cards.

Command	Reply	Description
INT_RELAY_<R>_NO	OK	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]	Switches the internal relay <R> to the Normally Closed (NC) position With <R> = "A", "B", "C" or "D"
INT_RELAY_<R>?	'NO' or 'NC' or 'ERROR xxx' [1]	Returns the status of internal relay <R> With: <R> = "A", "B", "C" or "D"
INT_TEMPERATURE_<R>?	For example: xx	Returns the temperature between the internal relays in degrees Celsius * 10 With: <R> = "A", "B", "C" or "D"

[1] 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.

RadiSwitch® commands - SP6T relay cards

The following table shows the specific commands for RadiSwitch® cards with SP6T relays.

Command	Reply	Description
INT_RELAY_<R>_n	'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, no coil is energized, and all 6 outputs are open
INT_RELAY_<R>?	'1', '2', '3', '4', '5, '6' or 'ERROR xxx'	Returns the status of internal relay <R> With: <R> = "A" or "B"

RadiSwitch® commands - External relay cards

The following table shows the specific commands for RadiSwitch® cards with external relays.

Command	Reply	Description
EXT_RELAY_<R> _n	'1', '2', '3', '4', '5, '6' or 'ERROR xxx'	Switches the external relay <R> to position <n>, With: <R> = "A" or "B" If '0' is returned, none of the outputs are active
EXT_RELAY_<R>?	'1', '2', '3', '4', '5, '6' or 'ERROR xxx'	Returns the status of external relay <R> With: <R> = "A" or "B"
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?	For example: '12V'	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' or 'OFF'	Returns if the indicator contacts of relay A are used
EXT_READBACK_B_ON	OK	Enables the use of indicator contacts of external relay B
EXT_READBACK_B_OFF	OK	Disables the use of indicator contacts of external relay B
EXT_READBACK_B?	'ON' or 'OFF'	Returns if the indicator contacts of relay B are used

Error codes

In the situation when an error occurs in a RadiCentre® system, an error code will be either displayed on the touch-screen of the RadiCentre® and/or send to the (RadiMation®) control software.

Error code structure

The RadiCentre® can display multiple and different errors. These errors are not by definition an error/fault of the RadiCentre®, but it can also be of an instrument that is attached or plugged into the RadiCentre®. The error codes all start with a unique hundred number which shows the relevant source of the error. The range of each of the error codes is shown below:

Range error codes	Device type	Device code
1-99	Generic error codes	
150-199	Reserved	Reserved
200-299	RadiSwitch	RSWxxxx
500-599	RadiField	RFSxxx (500 – 549 Amplifier / 550 – 574 Backplane / 575 – 599 Plug-in Card)
600-699	RadiPower	RPRxxxx
700-799	RadiSense	RSS20xx & LPS2001B
800-899	RadiControl	
1200-1299	RadiAmp	
1300-1399	RadiCentre	CTR100X
1500-1599	RadiGen	RGN2006

Generic Error codes

Range error codes	Description
1	Wrong command
2	Parameter too high
3	Parameter too low
4	Invalid parameter
5	Buffer overflow
6	Already in progress
7	Parity error
29	I2C Different clock setting
30	I2C Timeout
31	I2C Not-Acknowledge (NACK)
32	I2C Arbitration lost
33	Not enough memory
34	Memory fault
35	Time out
36	Serial number chip not connected
37	Serial number CRC fault
38	PWM wrong mode
39	PWM no special function
40	PWM timer not running
41	PWM max duty zero
42	SN string build fail

Generic Error codes - software update protocol

Range error codes	Description
50	Wrong command - Command not supported by the software update protocol
51	Time out - Not all command data is received within the timeout period
52	Memory fault – An erase verify or program verify in Flash memory failed
53	Not allowed – Arguments of the command are not allowed
54	Command CRC invalid – The CRC check over the command data failed
55	Block CRC invalid – The CRC check over the memory block failed
56	Buffer overflow – There are too many bytes to write or too many blocks to check

RadiSwitch® Error codes

Range error codes	Description
201	Error Switch NC
202	Error Switch No
203	Error Temperature NC
204	Error Temperature No
205	Error Interlock
206	Error 1
206	Error 2
206	Error 3
206	Error 4
206	Error 5
206	Error 6
208	Error
209	Error extern module
210	Error no extern Connected
211	Error status unknown
212	Error current limit
213	28V Not Present
214	Interlock 1
215	Interlock 2
216	Interlock 3
217	Interlock 4
218	Interlock 5
219	Interlock 6
220	RadiSwitch error switch temperature NC
221	RadiSwitch Error switch temperature NO

RadiField® error codes

Range error codes	Description
500	Already in standby mode
501	Already in operate mode
502	Already in off mode
503	Not in standby
504	Hardware failure
505	Reserved
506	Out of Specification
507	Power Measurement, frequency not set
508	Power measurement, over range
509	Power measurement, under range
510	Power Measurement, no calibration data
511	No error logs available
512	reserved
513	First send the startup command
514	Already started
515	Regulating FET
516	3V3 out of range
517	5V out of range
518	12V out of range
519	-12V out of range
520	50V out of range
521	Driver 3 current out of range
522	Final Current out of range
523	Temperature out of range
524	Power out of range
525	Driver 3 fet adjustment error
526	Final fet adjustment error
527	Going to standby
528	Going to operate
529	Going to of
530	Oven too cold
531	Oven too hot
532	Calibrating busy

Range error codes	Description
533	Power not updated
534	Driver 3 Supply volt out of range
535	Driver 2 current out of range
536	Drive 2 Adjustment error
551	Communication busy
552	Amplifier error
553	Amplifier wrong *IDN
554	Amplifier wrong answer
555	Amplifier time-out
556	Amplifier wrong mode
557	No amplifier connected
558	Received command length are no digits
559	Received command length incorrect
560	Communication amplifiers failed
561	Polarizer not detected
562	Polarizer current too high
563	Polarizer H-bridge fault
564	Polarizer strength too high
565	Polarizer speed too low
566	Polarizer wrong direction
570	The external unit is not connected. Communication test failed also on 50V
571	Communication Timeout - The Value isn't updated (through the data frame) within the timeout time.
572	One or more amplifiers are in error mode but in status no error is found
573	Received invalid data of the backplane in the sync command (50V or data frame)
574	Maximum number of retries reached on communication over the link
575	Communication busy
576	Communication timeout
577	Power supply already on
578	Power supply off
579	Incorrect impedance
580	Impedance short
581	Impedance open
582	External unit is not connected. Communication failed on 5V.

Range error codes	Description
583	Reserved
584	SW Update – 50V backplane not of
585	SW update – 50V backplane not on
586	SW Update – software downloads not started
587	SW update – Sync retries failed
588	SW update – reboot unit failed
589	SW update – amplifier to off mode error
590	SW update – transparent mode on error
591	SW update – transparent mode off error
592	SW Update – binary frame error
593	SW Update -Binary frame Header error
594	SW update – Binary frame header size error
595	Illegal backplane command length
596	Length error – received command length no digits
597	Length error – received command length incorrect
598	Mains on sequence error – BPL 50V switch error
599	Mains on sequence error – AMP startup error.

RadiPower® error codes

Range error codes	Description
601	Error frequency not set
602	Error over range
603	Error under range
604	No cal data
605	External trigger pin error (RPR3000 Series only)
606	Command not supported in the mode (RPR3000 Series only)
607	Combination measure speed and time not allowed. On 1MS/s the maximum measure time ins 32 seconds. At 5MS/s the maximum measure time is 6.2 seconds. (RPR3000 Series only)

RadiSense® - Error Codes

Range Error Codes	Description
700	Wrong identifier
701	Invalid target
702	Probe invalid reply
703	No update in time (Field is questioned but there is no valid field of the probe received in time.)
704	Invalid data frame received
705	Probe not connected
706	MSP interlock tripped
707	Laser off through time out (Communication time out or startup probe timed out that caused laser to shut off)
708	Error during justation store
709	Software update fault
710	Flash fault
711	Serial Number fault
712	PWM fault
713	ADC fault
714	Binary data fault
715	Dump not received ok
716	Card type unknown
717	Probe type unknown
718	Safety controller card type fault
719	Safety controller probe type fault
720	Justation already stopped

Range Error Codes	Description
721	Potmeter fault
722	Justation point of 0 V/m not available
723	No valid calibration data available
724	Frequency lower than calibration table
725	Frequency higher than calibration table
726	No points stored
728	Calibration fault
729	Temperature correction fault
730	Flash fault
731	Serial number fault
732	Justation field not monotone
733	Justation adc not monotone
734	Not allowed for probe type
737	Data frame CRC incorrect
738	Start aborted by user
739	Command not supported in software update mode
740	MSP too long no communication probe (longer than 5 ms)
741	SC IDN fault
742	SC HW version fault
743	SC not received start on RS232
744	SC not received start on USB
745	SC not received start on button
746	SC switch 2 not high
747	SC switch 2 not low
748	MSP switch 1 fault
749	MSP switch 2 fault
750	SC not responding
751	reserved
752	SC invalid reply
753	Laser turned on
754	3V3 out of range
755	5V out of range
756	12V out of range
757	Laser current out of range

Range Error Codes	Description
758	Laser temperature out of range
759	Trigger not received
760	SC (Safety Controller) - too long no communication with Probe
761	SC (Safety Controller) - MSP switch 1 not high
762	SC (Safety Controller) - MSP switch 1 not low
758	Laser temperature out of range
759	Trigger not received
760	SC (Safety Controller) - too long no communication with Probe
761	SC (Safety Controller) - MSP switch 1 not high
762	SC (Safety Controller) - MSP switch 1 not low
763	SC (Safety Controller) - switch 1 fault
764	SC (Safety Controller) - switch 2 faults
765	SC (Safety Controller) - MSP not questioning
766	SC (Safety Controller) - interlock tripped
767	SC (Safety Controller) - Trigger received outside window
768	SC (Safety Controller) - Start source not received
769	SC (Safety Controller) - Trigger not received
770	SC (Safety Controller) - Current out of limits
771	SC (Safety Controller) - 3V3 LPC out of limits
772	SC (Safety Controller) - 3V3 MSP out of limits
773	Startup sequence busy, command currently not allowed
774	Not supported by probe model
775	Received during start invalid data
797	Potentiometer offset temperatures not monotone
798	Potentiometer offset build busy
799	Potentiometer offset store busy

RadiControl® - Error codes

Range Error Codes	Description
800	Speed min equal or higher than speed max
801	Speed max equal or lower than speed min

RadiAmp® - Error codes

Range Error Codes	Description
1200	Already in standby
1201	Already in operate
1202	Already in off
1203	Not in standby
1204	Out of specification
1205	Null pointer
1206	Startup first
1207	Already started
1208	Regulating FET
1209	3V3 out of range
1210	5V out of range
1211	12V out of range
1212	-12V out of range
1213	24V out of range
1214	37V out of range
1215	Driver current out of range
1216	Final current out of range
1217	Temperature out of range
1218	Adjusting driver
1219	Adjusting final
1220	Going to standby
1221	Going to operate
1222	Going to off
1223	Oven too cold
1224	Oven too hot
1225	Calibrating busy

RadiCentre® - Error codes

Range Error Codes	Description
1300	Software upgrade in progress
1301	Slot Preserved for 2090 Emulation mode
1302	RadiCentre interlock tripped
1303	RadiCentre is still initializing

RadiGen® - Error codes

Range Error Codes	Description
1500 t/m 1525	Reserved

RadiCentre® specifications

Performance	RadiCentre® Pro CTR1009B	RadiCentre® CTR1004B	RadiCentre® Slim CTR1001S
Number of slots in plug-in cards	7	2	1
Display (TFT toch screen)	7" LCD with touch screen		NA
Backplane	Intelligent versatile backplane		NA
Processor	CPU with onboard RAM and Flash		NA
Operating System	Linux		NA
Model	Desktop or 19" rack mountable		Desktop
Dimensions			
Height	132 mm (3U)		50 mm
Depth	312 mm excluding rear panel		254 mm
Widht	19" (rack mountable)		180 mm
Weight	Approx. 7 kg (empty)		1,4 kg
Environmental conditions			
Temperature range	10 °C - 40 °C		
Relative humidity	10% - 90% (non-condensing)		
Power consumption			
Supply voltage	115 VAC / 230 VAC		12 VDC
Power consumption, standby	< 3 W		NA
Power consumption, empty	33 W		NA
Power consumption, maximum load	225 W		24 W
Interfaces & cables			
Interface	USB and LAN. IEEE-488 optional		USB, RS232
Connectors	IEC Inlet, USB-A 2.0, USB-B 1.1, LAN, IEEE-488 (optional) and Interlock		DC-Power, Sub D-9, USB-B 1.1,
Cables	USB cable, IEC power cord		USB Cable, AC/DC Adapter
Saftey			
Interlock	6,35mm jack plug connection to safty system disables Interlock & Interlocked laser outputs when triggered.		

Warranty Conditions

Raditeq B.V. offers a standard warranty term of three (3) years on their products, calculated from the shipping date, under the condition that the product is registered on www.raditeq.com. For registration of the product, the customer should provide the product model, serial number and the responsible reseller (if applicable). If the product is not registered, a limited warranty term of one (1) year will be applicable.

Return Material Authorization (RMA) & Warranty repair

If a defect occurs to our product within the warranty term, a Return Material Authorization (RMA) 'Warranty Repair' request can be issued using the RMA link at www.raditeq.com/support. Upon receipt of the request, an RMA number will be provided. Please do not send the product without this RMA number! The defective product should be shipped to our service department at the following address:

Raditeq B.V. – Service Department
Vijzelmolenlaan 3
3447GX WOERDEN
The Netherlands

There will be no charge for repair services (materials or labour) within the (extended) warranty term.
These warranty terms are not applicable to:

- Normal wear and tear
- Fibre 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 Raditeq
- Calibration and/or re-calibration of the product

Repair services on products that are not covered by the Raditeq warranty will be charged to the customer.

Repairs outside warranty

If a defect is not covered under warranty, an RMA fixed-repair can be ordered on the RMA link: www.raditeq.com/support If a re-calibration is needed after repair, this calibration should be ordered separately. The calibration will be performed at the ISO17025 accredited calibration laboratories of DARE!! Calibrations, based on the applicable service code / prices.

Warranty after repair

For repairs outside the original warranty period, a limited warranty of six months is applicable on the performed repair. Shipping conditions are the same as with repairs that are covered within the original warranty period.

Shipping

The customer will need to arrange shipping and cover for the costs (like e.g. transportation costs, duties, taxes) for sending the defect product the service department of Raditeq in The Netherlands. Raditeq will arrange the courier and cover for the costs for the return shipment after repair.

EU Declaration of Conformity

We

Raditeq B.V.

of

Vijzelmolenlaan 3
NL-3447GX Woerden
The Netherlands

declare under our sole responsibility that the

Product: **RadiCentre®**
models: **CTR1009B, CTR1004B, CTR1001S**

are in accordance with the European directives:

EMC Directive 2014/30/EU

Low Voltage Directive 2015/35/EU

RoHS Directive: 2015/863/EU

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

Emission: EN 61326-1:2013, Class A1
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.

Safety: EN 61010-1:2010, Safety requirements for electrical equipment
for measurement, control, and laboratory use

The technical construction files are maintained at the adress specified above.

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Authorized by: P.W.J. Dijkstra

Title of authority: Director