Pro
Series

raditeq

Product Manual

RadiLink®

RF Optical Link

Models:

RLK3000 Series

www.raditeq.com

RadiLink® product manual

This product manual pertains to the RadiLink® system.
Models: RLK3006C **Made by Raditeq.**

RLK3006C system consists of the following products

Including parts:

- RLK3086R RadiLink® TX Remote Unit, 8 Channels
- RLK3016C RadiLink® RX Plug-in Card
- RLK3004B RadiLink® LI-ion Battery Pack* (+ Charger)
- CBL3006-25m RadiLink® 25m Extension fibre

* Optional RadiLink® additional spare battery pack

Read this manual carefully before operating the product and make sure all the safety instructions are strictly followed.

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 regular manual) close at hand when you operate your new Raditeq product(s).

Please contact your local reseller if you have any questions.

Supplier Information

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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.

Connecting or disconnecting capacitive or inductive loads while the Phantom bias supplies are still active can cause high-energy spikes at the RF input(s), which may damage the radilink and/or the active antennas connected to the RadiLink inputs. Switch off all Phantom bias supplies before connecting or disconnecting any active antennas load. Please exercise caution and carefully follow these instructions to prevent harm to your 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.

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

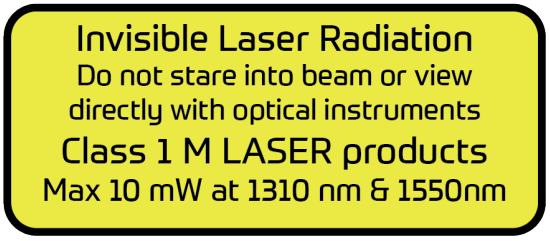
This product contains no hazardous substances as described in the RoHS Directive (2011/65/EU).

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.

LASER Safety

The RadiLink® system utilizes lasers for both analogue and digital data transmission. The plug-in card emits laser light that is transmitted via a fibre optic cable to the remote unit This unit is in turn transmits both analogue and digital data over two fibres. The maximum laser output power of each laser is 10 mW at the output ports. The wavelength of the LASER's used is 1310 nm and 1550 nm. This light is invisible to the human eye.

The RadiLink® is a fibre coupled system and a closed system. Therefore, it is classified as a class 1M LASER product, according to EN60825-1:2014 and EN60825-2:2004. It is mandatory to check the proper connection of the fibres before turning the system ON.



According to EN60825-2, the RadiLink® is equipped with an Automatic Laser Shutdown in case of a disconnection or other interruption of the laser connection between the plug-in card and remote unit. In this case the lasers are deactivated within milliseconds.

- When connecting the RadiLink® check all fibre cables before switching on the system. **Do not** attempt to switch on the system if the fibre optic cables show any sign of damage.

- NEVER look into any of the fibre optic connectors. The LASER emits light, invisible to the human eye.

To ensure maximum safety of the RadiLink® system, the following design measures are implemented:

- The digital link communicates with the remote unit before the analogue laser is started.
- An automatic loop detection system is in place to detect damaged or disconnected fibre optic cables, resulting in automatic LASER shutdown within 25 milliseconds.
- A processor in the control unit verifies all circuits before LASER activation, preventing activation in case of any faults.
- The processor verifies data validity from the remote unit, triggering an automatic LASER shut down in case of invalid data.

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.

RadiField® Electric field generator

The RadiField® makes Radiated immunity (RI) testing easy! This Electric field generator makes use of internal integrated amplifiers, antennas, combiner, coupler, power meters and cabling. This results in a powerful system in one compact product. This system uses patented field combining technology resulting in a maximumly efficient RI system which is easy to setup and cost effective to use.

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

Fibre handling and maintenance

The RadiLink® fibres are a crucial part of the system.

Only use original fibre cables supplied by Raditeq. Do not use third party fibres.

Inadequate handling and poor maintenance of the RadiLink® fibres can lead to deterioration of the system's performance which may cause permanent damage to the system. To ensure optimal system performance and longevity, it is crucial to adhere to the following handling and maintenance guidelines:

- Always use the supplied plastic end-caps to cover the fibre connectors when not in use.
- Clean the fibre surfaces with isotropyl alcohol and lint-free wipes prior to installation. After cleaning, use a non-contaminating lint-free wipe to dry the surface.
- Avoid touching the tip of the fibre connector (core surface) at all times. Dust and grease (for example from fingertips) may cause burn damage to the fibre which in turn can damage the system itself.
- Do not drop the fibres as this can damage the core and core surface.
- Avoid bending the fibres beyond the minimum bend radius (<5 cm), as this can cause the fibre core to break.
- Never pull the fibre connector out of a coupling by its jacket or sleeve. Use the connector instead.
- Fasten the connectors by hand only, without the use of any tools.
- Avoid standing on or crushing the fibres.
- Do not apply mechanical stress (pull) to the fibres.
- Before detaching the fibres, switched off the system.

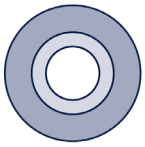
Following the precautions and guidelines above will significantly extend the system and fibre lifetime.

Cleaning Fibres

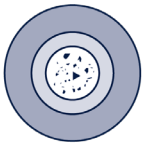
Only use the supplied isopropyl alcohol and lint free wipes to clean the contact surface of the fibres. Do not use other solvents or wipes. Put some alcohol on the wipe and rub gently over the contact surface of the fibre connector. Dry the surface with a dry part of the wipe.

Before detaching the fibres, switched off the system.

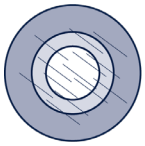
To check the quality and cleanliness of the fibres make use of a fibre inspection probe. This will give a clear view of the current state of the fibre core. Reference your observation of the fibre core with the pictures below and take the appropriate action(s).



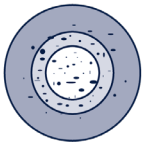
Ideal
Operational optic fibre



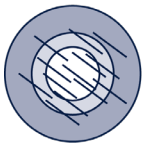
Rough surface
Try repolishing with the fine diamond film



Fine scratches
Polish more with a fine diamond film

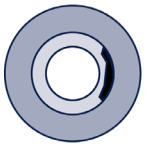


Dirt or debris
Try re-cleaning and try repolishing



Heavy scoring or scratches
try repolishing with the fine diamond film

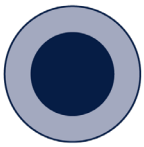
Chipped face
Unacceptable, do not use this optic fibre (Reject)



Chip outside fiber core
try repolishing. with a small chip the optic cable should still work

cracked fibre
Unacceptable, do not use this optic fibre (Reject)

Chip core
Unacceptable reject this cable and do not use it (Reject)



Broken fibre
Unacceptable, do not use this optic fibre (Reject)

Please note that analogue fibre connectors need special equipment to polish correctly.

The RadiLink® Components

Product Components

8-channel remote unit of the RadiLink® system
Product code: RLK3086R

RadiLink® Battery pack (one battery standard delivered)
Product code: RLK3004B

RadiLink® plug-in card for use in one of the RadiCentre® models.
Product code: RLK3016C

25m duplex fibre with DIN/APC8 and ST/PC connectors for connecting the remote unit to the plug-in card
Product code: CBL3006-25M

The system includes a charger for the battery pack and a shielded cable for use with an external power supply.

All items are combined in a carry case as shown below.

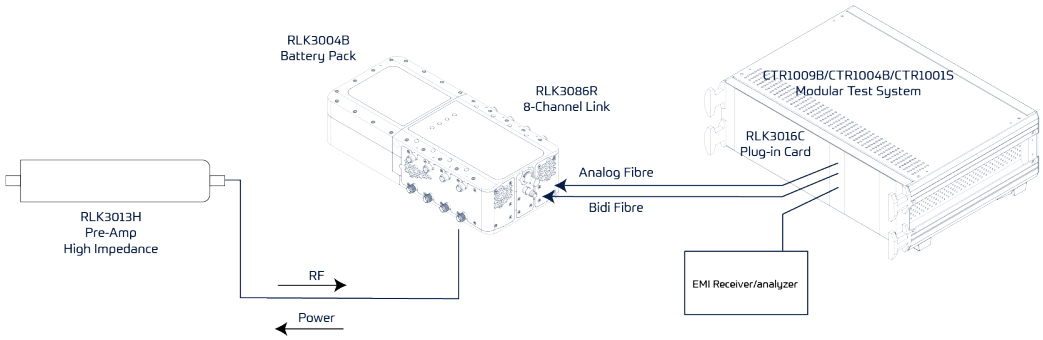
Introduction

Product Introductions

The RadiLink® is an effective replacement for coaxial cables within RF measurement setups. Unlike coaxial cables, which introduce frequency-dependent losses that increase with cable length, the RadiLink® system provides a stable RF link with minimal frequency response, and practically no losses with long fibre lengths. This is achieved by modulating and demodulating the RF signal over fibre optics. Additionally, the RadiLink® system eliminates common mode currents that flow through the shields of coaxial cables.

With its multi-channel setup, there is no need to modify the test setup between measurements, thus streamlining the testing process. The 8 channels are designed to provide a bias supply for active antennas over the coaxial connectors of each channel. This bias supply can either be generated by the RadiLink® system itself or applied externally by other devices.

The RadiLink® 8-channel system is specifically designed for conducting broadband radiated emission measurements. Its primary purpose is to transfer RF signals from a remote unit that is fully electrically isolated to a measurement system that can be located up to 100 meters away. The picture below shows a system diagram:



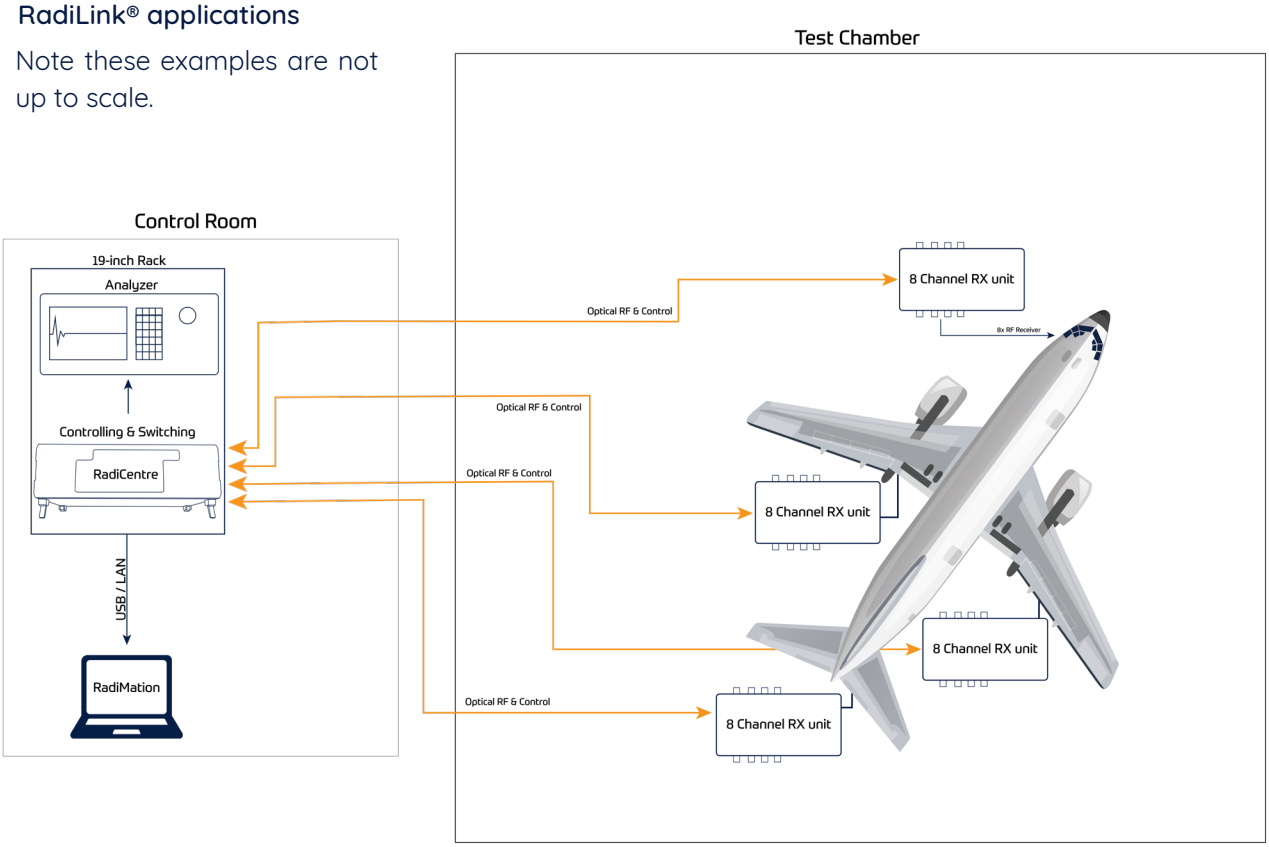
The RadiLink® system comprises two components: the 8-channel remote unit and a plug-in card designed for the RadiCentre® models. The remote unit is connected to the plug-in card using a duplex fibre.

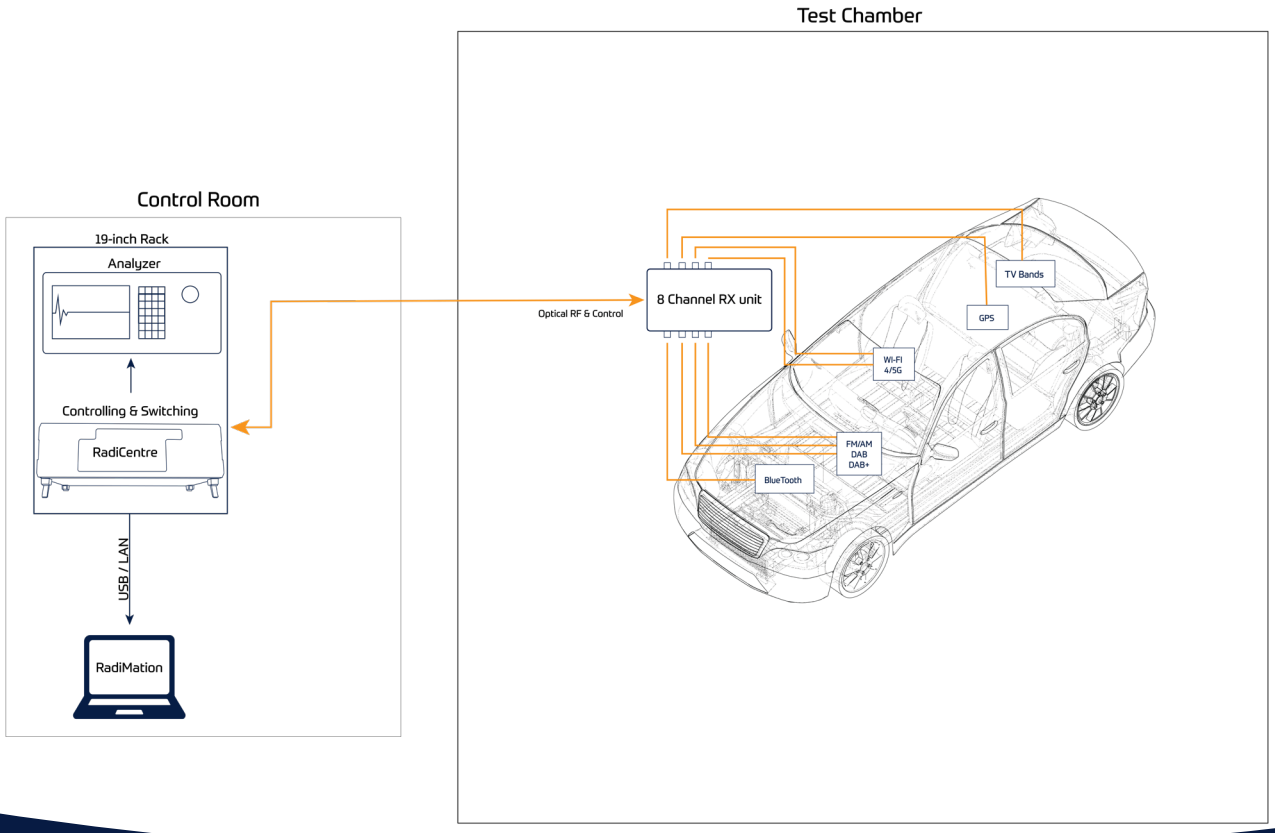
Applications for the RadiLink® are:

- Measurements according to CISPR25
- Active antenna measurement
- Antenna remoting
- RF over long distances
- General isolated RF measurements
- EMC emission measurements

RadiLink® applications

Note these examples are not up to scale.





RadiLink® features

Optical Radio Frequency (RF):
The RLK3086R and the RLK3016C are solely connected using an analogue and digital optical link. By doing this there are several benefits: the Galvanic isolation (anechoic chamber testing), lossless Long distance signal transfer, no ground loops and none frequency dependent cable response.

Built-in pre-amp:
A built-in (switch-able) low-noise pre-amplifier provides a 0, 20 or 40dB link gain. With the pre-amplifier enabled the RadiLink ® has a noise figure of 2.5 dB. This eliminates the need for an external low noise amplifier for the measurement receiver.

High dynamic range
The compression point of the RadiLink® systems is high making the total dynamic range over the combined amplifier stages 175 dB and individual range of 150 dB. Due to its higher dynamic range compared to the measurement receiver, it does not impact the measurement receiver's dynamic range, essentially making it a transparent device in front of the measurement receiver.

Multi-channel:
The RadiLink® has eight RF input channels which can be switched automatically (using software). due to this switch multiple test can be configured and prepared beforehand instead of having to manually switch for every test, greatly reducing the test time. Test times can be reduced for example during CISPR 25 measurements where multiple vehicle antennas have to be measured inside an anechoic chamber.

Single band 9kHz to 8GHz
The RadiLink has eight RF inputs which all cover a frequency range from 9kHz till 8GHz. There is no need to switch between a lower frequency band or high frequency band and possibly lose information.

Support of phantom supply for active antennas:
All RF inputs can provide a phantom supply for powering active antennas. This supply can be generated internally or externally, for each channel individually. The supply is fed over the RF input using an internal bias-tee. When the phantom power is internally generated the bias-Tee losses are automatically compensated by the RadiLink®. When the phantom power is externally applied the bias-Tee losses need to be compensated manually. The maximum phantom current is 200mA per channel. When the internal battery is used to power the RadiLink® the total phantom current may not exceed 1000 mAt over all 8 channels.

RadiLink® Battery features

Uninterrupted testing - interchangeable battery.
The RadiLink® is designed with an interchangeable battery. A fully charged battery is sufficient for 4 hours of operation. When phantom supply channels are active to power active antenna(s), the battery operating time will be reduced. The battery has the option to be used with an external power source bypassing the battery power. This results in almost continuous usage and practically uninterrupted testing.

Battery pack Protection system
The Battery pack has some internal protection measures in place under which:

- Under voltage protection
- Over voltage protection
- Over current protection
- Temperature protection

Due to the safety measures the system is more prone to have a long lifespan.

Cell Balancing
The RadiLink® has a Battery management system (BMS) system for optimum cell balancing. This helps maintain the pack's overall efficiency and lifespan by ensuring that the individual cells operate within safe and consistent voltage ranges.

Stable output power
Whether the battery voltage or the external supply is used the RadiLink® battery pack creates a stable and constant output voltage. This makes sure that the performance of the RadiLink® system is consistent independent of the input source and power supply.

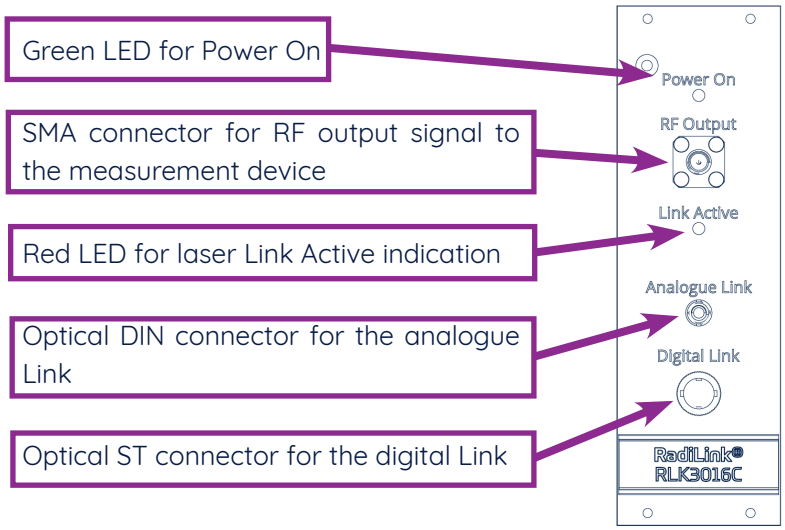
Charging of the battery pack
The RadiLink® is delivered with an external Lithium charger. The charging of a RadiLink® battery pack takes around 3 hours. It is highly advised to only use the supplied charger to charge the battery pack. If a different charger is used it may void warranty.

The RadiLink®

Product Characteristics

Install the RadiLink® RLK3016R Plug-in card in a RadiCentre®. If a RadiCentre® was ordered together with the RadiLink® system, it is already installed.

Plug-in card - connections and indicators



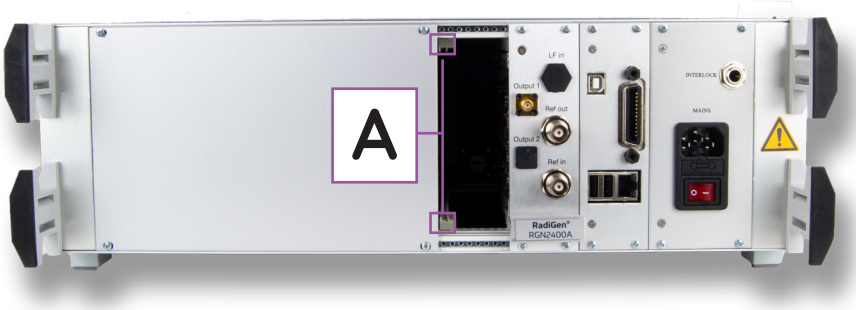
- Connect the DIN connector of the duplex fibre, marked with a green sleeve, to the Analogue link input of the plug-in card.
- Connect the ST-connector of the duplex fibre, marked with a blue sleeve, to the Digital link output of the plug-in card.

Please note that both optical connectors have a locking notch.

Hardware installation

Please follow the instructions below on how to install the Raditeq plug-in card into the RadiCentre® correctly. NOTE: before installing and inserting a new plug-in card make sure that the RadiCentre® is turned OFF.

Step 1
Choose an empty slot in the RadiCentre® in which the plug-in card can be installed.
Remove the blind panel from the slot by unscrewing the four (4) screws on the panel (two at the top and two at the bottom).



Step 2
Insert the plug-in card in the rail of the empty slot as shown in the picture A. Position the plug-in card into the slot and slowly push it, using the lower part of the plug-in card. When it reached the end of the rail, gently push and secure the plug-in card into the backplane socket.

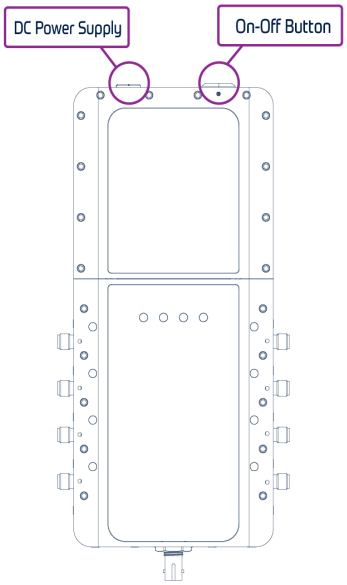
Step 3
When the plug-in card is inserted correctly into the backplane socket, fix it by tightening the four screws at the top and the bottom of the plug-in card (shown at B). For connection of the panels into the RadiCentre® a screwdriver type Pozi, size PZ1 should be used'

Step 4
After installation of the plug-in card, connect the AC mains power cord on the back of the RadiCentre® and switch the ON/OFF button to the ON position. The RadiCentre® can now be started by tapping the touch screen.

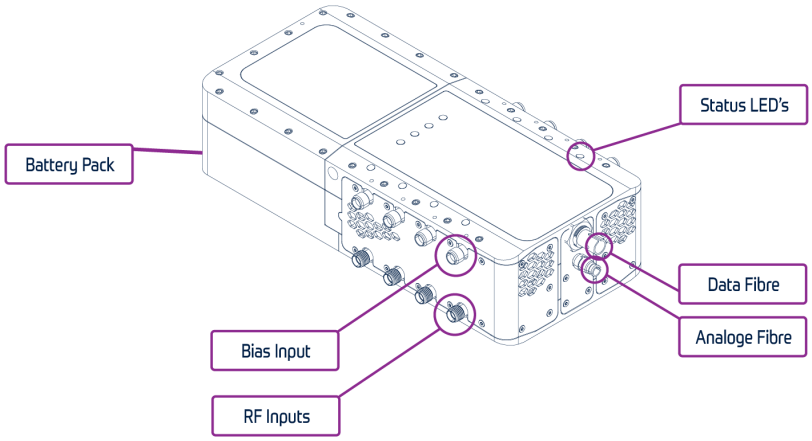
When installed properly, the plug-in card should be recognized and shown automatically on the front screen of the RadiCentre® when turned ON.

The Remote unit - Connections and indicators

Top View



Side View



Fibre Cables Connections:
Connect the duplex fibre's DIN connector, which is marked with a green sleeve, to the remote unit's Analog Link output. Connect the duplex fibre's ST connector, which is marked with a blue sleeve, to the remote unit's Digital Link input."

DC Supply Connection:
The RLK3086R can be powered by the battery pack. Furthermore, the remote unit can be connected to an external power supply using the cable that is included. When the battery pack runs out of charge, it can be recharged with the provided charger."

RF Inputs:
There are 8 SMA RF input connectors. Connect these inputs to the sources (antennas) to be measured.

Bias Supply Inputs:
Each RF input can have an active phantom supply to power an active device. This phantom supply can be internally generated by the RLK3086R or by an external power supply, for this a second set of 8 SMA connectors is placed. When applying the bias supply externally, the required voltage (compensated for the internal bias Tee losses) must be applied to the corresponding bias supply connector of the corresponding channel.

Channel status LED's

On top of the unit, there are a total of 8 multi-color LEDs positioned next to each input channel. These LEDs provide the status of each channel using the following color code:

- Green: RF channel is active
- Red: Phantom supply is present
- Orange: RF channel is active and Phantom supply is present
- Blinking LED: Overcurrent has been detected on the corresponding channel
- LED off: RF channel is not selected and no Phantom supply is present

Batt low LED

When the battery LED is on, it indicates that the battery pack is low and needs to be recharged. The RadiLink can be operated using another battery pack (sold separately) or through the external supply input.

Batt Supply LED

When the B. supply LED is on, it indicates the remote unit is operating on the battery pack.

Ext Supply LED

When the Ext. supply LED is on, it indicates the remote unit is operating on the External power.

Link Active LED

When the Link Active LED is on, it indicates that the RF signal is transmitted over the analogue fibre.

Activating the RadiLink®

Assuming that all necessary installation steps have been completed successfully and all components have been properly connected and configured, the RadiLink® system is now ready to be powered on and operated.

To switch on the RadiLink® system, locate the power button on the remote unit and press shortly to activate the system.

The remote unit has one push button with multiple functions:

- Switching ON - Briefly press the push button while the system is OFF to turn the remote unit ON. During start up, all "Channel Status" LEDs will briefly light up.
- Switching OFF - Press the push button for 5 to 10 seconds to switch the unit OFF. - Press the push button for longer than 10 seconds to abort the action, and the unit will return to its latest status. (The Batt supply and ext supply LED will light up and dim and the same time)
- Switching between Battery and External Power Supply - Press the push button for 0.5 to 4 seconds to switch the power supply between the internal battery and the external supply." The batt supply and ext supply will alternating emit light.
- Pressing the push button for longer dan 10 seconds, the action will be ignored, and the Radilink will operate as it did previously.

Activating the link

Once the remote unit is powered on, the LASER link can be activated. The way of activation is depending on the RadiCentre® model that is used.

- If the plug-in card is used in a RadiCentre® 1 (CTR1001S), the link can be activated by pressing the START-button on the back side of the RadiCentre® 1. Press this button for at least 1 second until the red LED on the plug-in card (link active) lights (during this time there will be a beeping sound, when the beeping stops the pusH button may be released).

- If the plug-in card is used in a RadiCentre® CTR1004B or CTR1009B, the link can be activated by pressing the START-button on the touch screen, followed by the ACKNOWLEDGE button on the screen. These buttons appear after the START-button has been pressed and remains present for 2 seconds. Within this time the ACKNOWLEDGE button must be pressed in order to start the link.

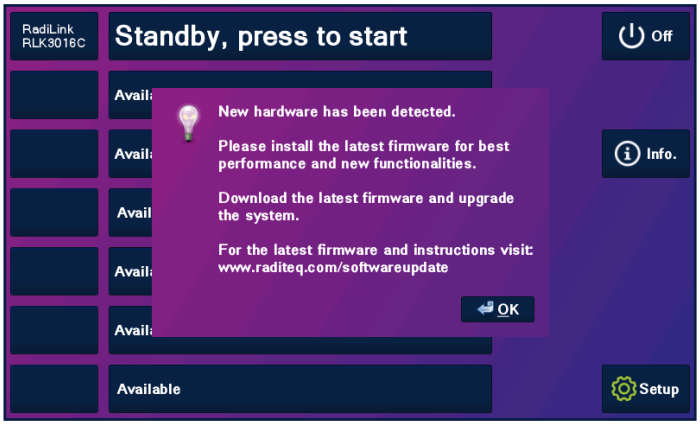
Every time after the Radicentre is powered off and on, it will request a laser safety code when the start button is pressed, the standard laser safety code is 3447

The link is now ready to transfer RF signals from the remote unit to the plug-in card.

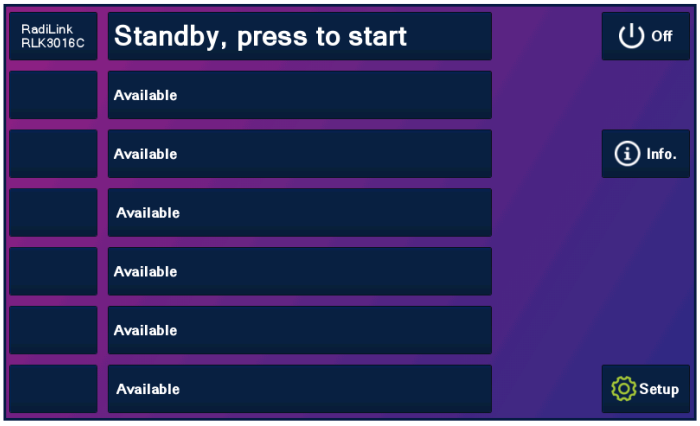
RadiCentre® setup

When new RadiLink® Hardware is installed into a RadiCentre a prompt will come up when the RadiCentre is turned on.

Press “OK” and install the newest software if required.



To turn on the RLK3086R press the “stand-by, press to start” button.



After the Radicentre is powered off and on, it will request a laser safety code when the start button is pressed, the standard laser safety code is 3447.

The RadiCentre will now prompt the message “verifying, press Ack.” By pressing the ACK button whitin 2 seconds the RadiLink plugin card will beep and initialize the laser.

Once successful, the RadiCentre homescreen will now show the selected RF input, the gain and the status of the analogue laser.

Useful parameters from the RLK3086R are shown:

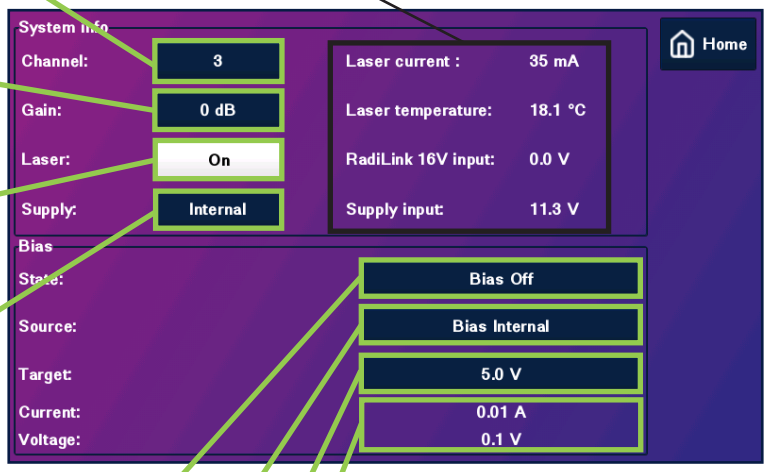
- **Laser current**
- **Laser temperature**
- **RadiLink 16V input** (the output voltage of the RLK3004B)
- **Supply input** (input voltage of the RLK3004B, depending on the selected power source, this is either the raw battery voltatge or the external supply)

Channel selection, will show the selected channel, when pressed the other channels can be chosen or none.

Gain of the link is shown, if pressed the other gain options can be chosen.

Status of the lase, if pressed the laser will turn off.

The selected power source is shown, if pressed it will switch to the external supply (or internal if external was set).



State shows the status of the phantom supply, by pressing the button it can be turned off or on.

Source shows the selected input, this can be internal or external by pressing the button it will switch to the other source.

Target will show the selected phantom target voltage (this is grayed out when using an external source). By pressing the button a key dial will show where you can enter the phantom supply.

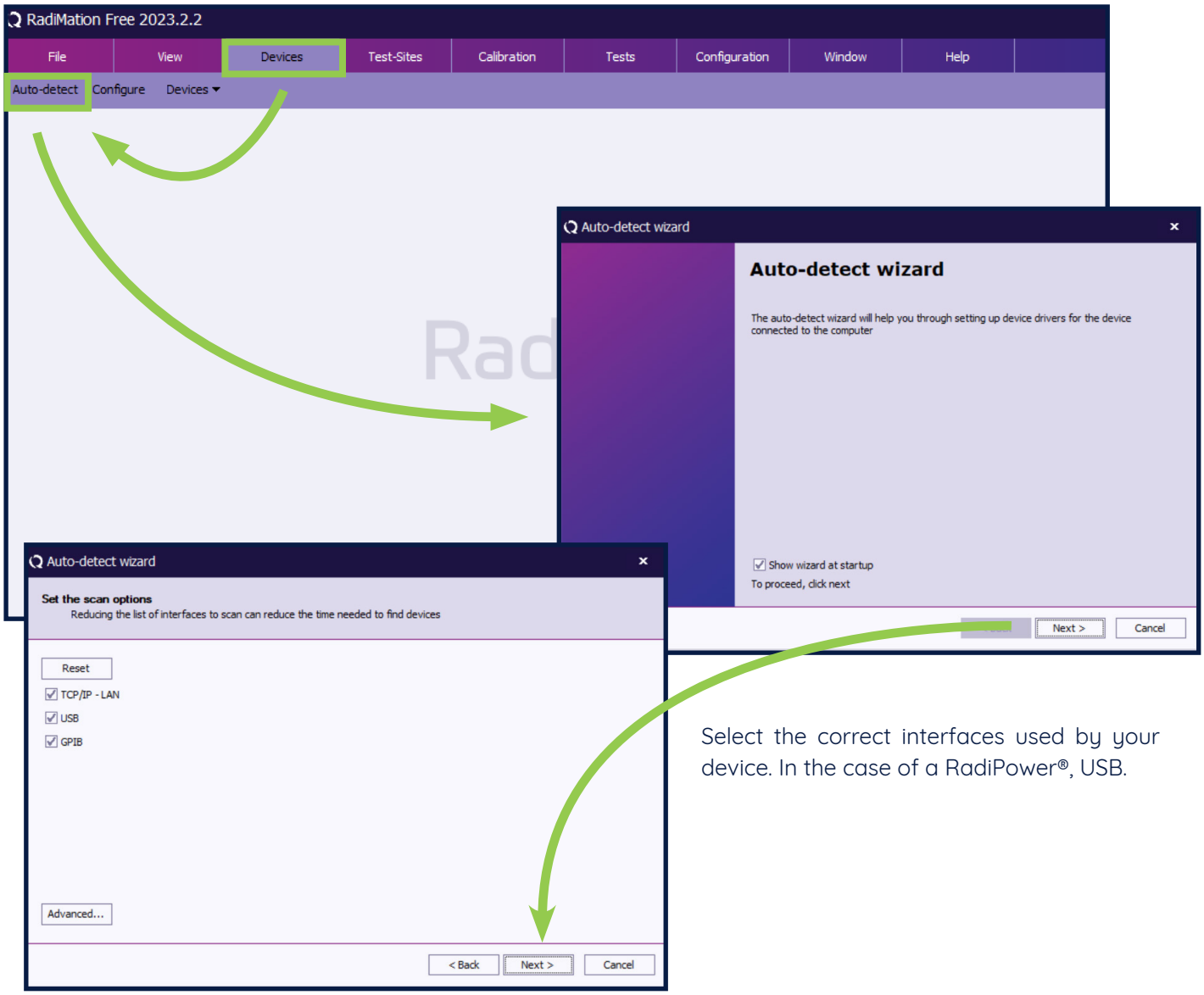
The current and voltage are measured on the RF output.

Software Configuration

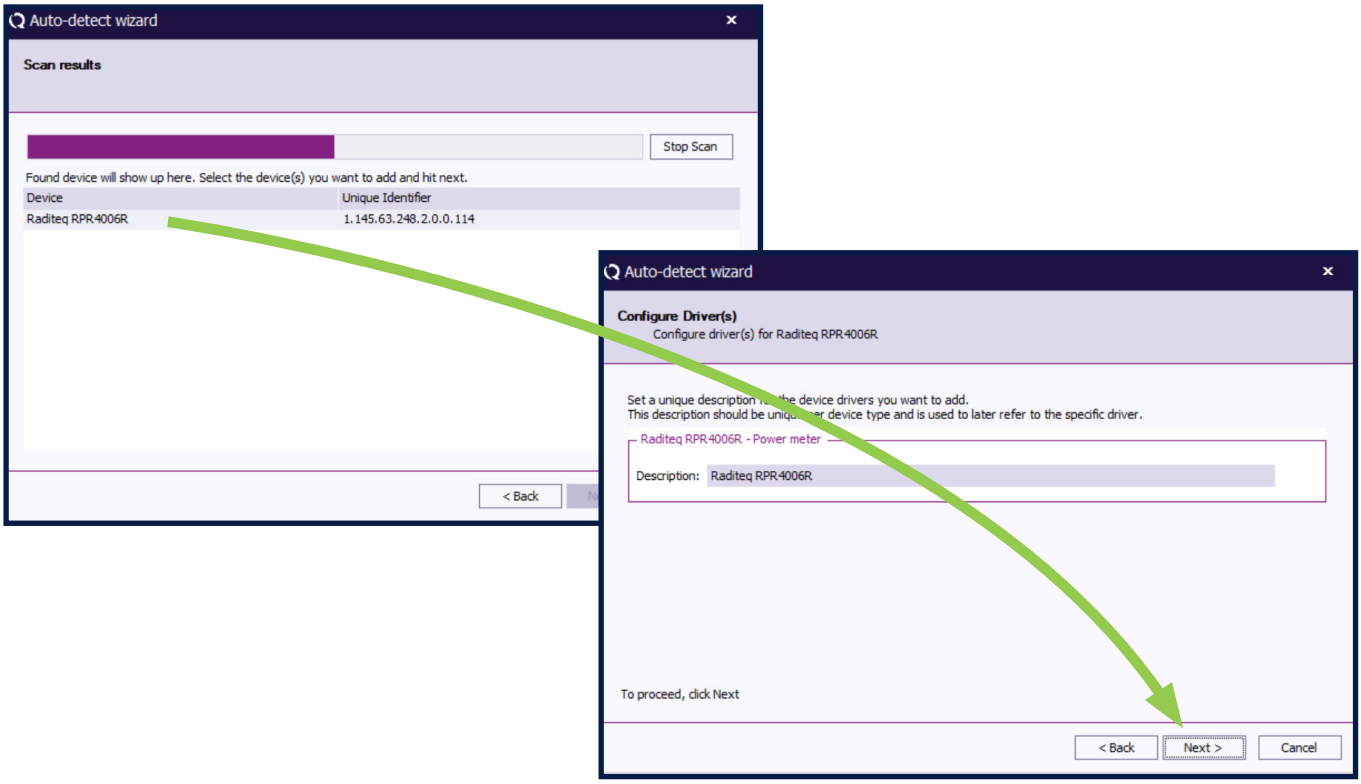
In order to control the RadiLink® from a computer, the RadiMation® EMC software package can be used. RadiMation® from Raditeq is sold separately. **A free-ware version of RadiMation® is available on:** https://www.raditeq.com/automated-emc-software/radimation-free/. If the RadiPower® is operated manually, this chapter can be skipped.

RadiMation comes (after version 2022.2) with an Auto Detect feature. This makes it possible to automatically detect Raditeq (and other hardware) and configure it.

The Auto detect start when you first download and install RadiMation. Or click Devices -> Auto-detect.



Select the correct interfaces used by your device. In the case of a RadiPower®, USB.



After Click the all setting on and press continue till the auto detect wizard completes and select (all) Devices to be added to your configuration. For more information and a instructional video go to:

https://www.raditeq.com/radimation-auto-detect-feature/

Explanation Radimation screens

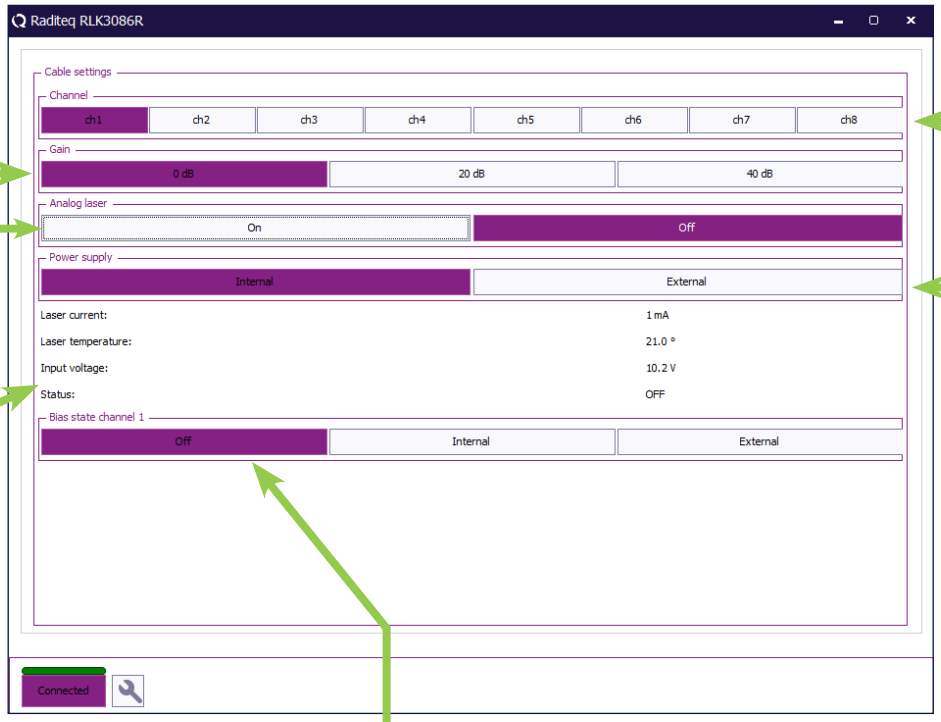
Virtual instrument

When opening the virtual instrument of the RadiLink (Devices > devices > cables > “name of the driver”), the following screen will appear in this window all RLK3086 parameters can be configured:

gain of the link is shown, by pressing the boxes another can gain setting can be selected.

Channel selection, will show the selected channel, by pressing the boxes another channel can be selected.

Status of the laser is shown, by pressing the other box the laser can be turned ON/OFF.



Useful parameters from the RLK3086R are shown:

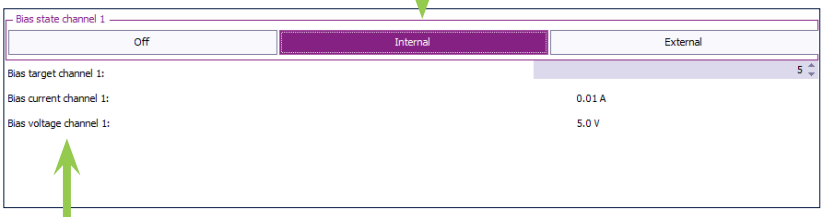
- Laser current: Laser Current
- Laser temperature: Laser temp.
- Supply input (input voltage of the RLK3004B, depending on the selected power source, this is either the raw battery voltatge or the external supply)
- Status : will show the later status (off or on) or an error meassage.

State shows the status of the phantom (here called Bias) supply, this can be:

- Off
- Internal
- External

The selected power source is shown, by pressing the other box the source can be altered.

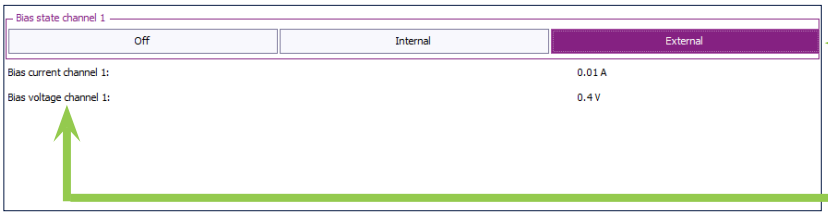
Internal Generated Phantom Supply



By pressing internal, the RadiLink will generate the phantom supply internal.

The target can be set to the appropriate voltage by typing the desired voltage.

The current and voltage are measured on the RF output.

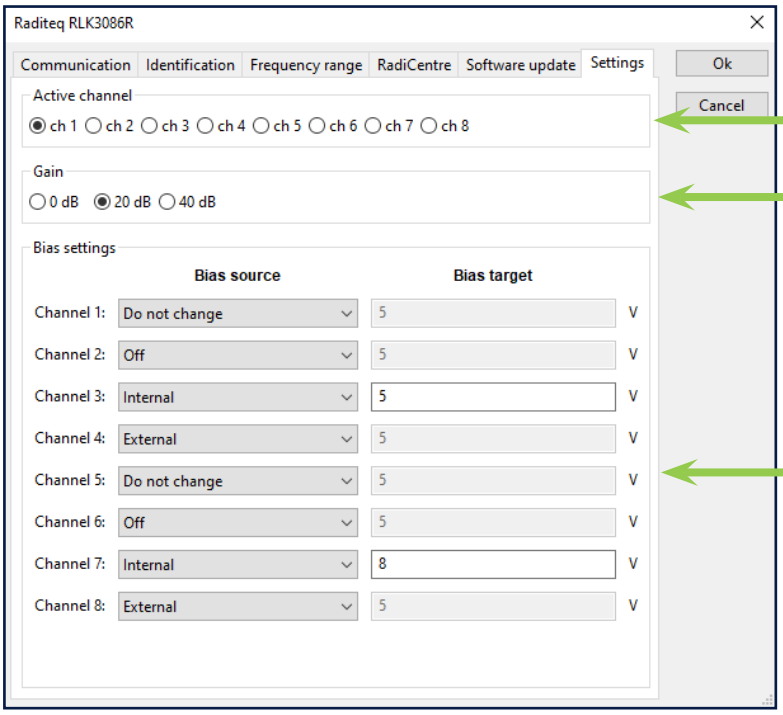


By pressing external, the RadiLink will apply the given phantom power to the RF output.

The current and voltage are measured on the RF output.

Device Driver

The device driver for automated test can be configured by pressing: devices > configure > device drivers > cables > advances > settings. Please note that there is no option to automatically turn on the laser, this must be a manual action and cannot be automated.



Channel selection, will show the selected channel, by pressing the boxes another channel can be selected.

Gain of the link is shown, by pressing the boxes another can setting can be selected.

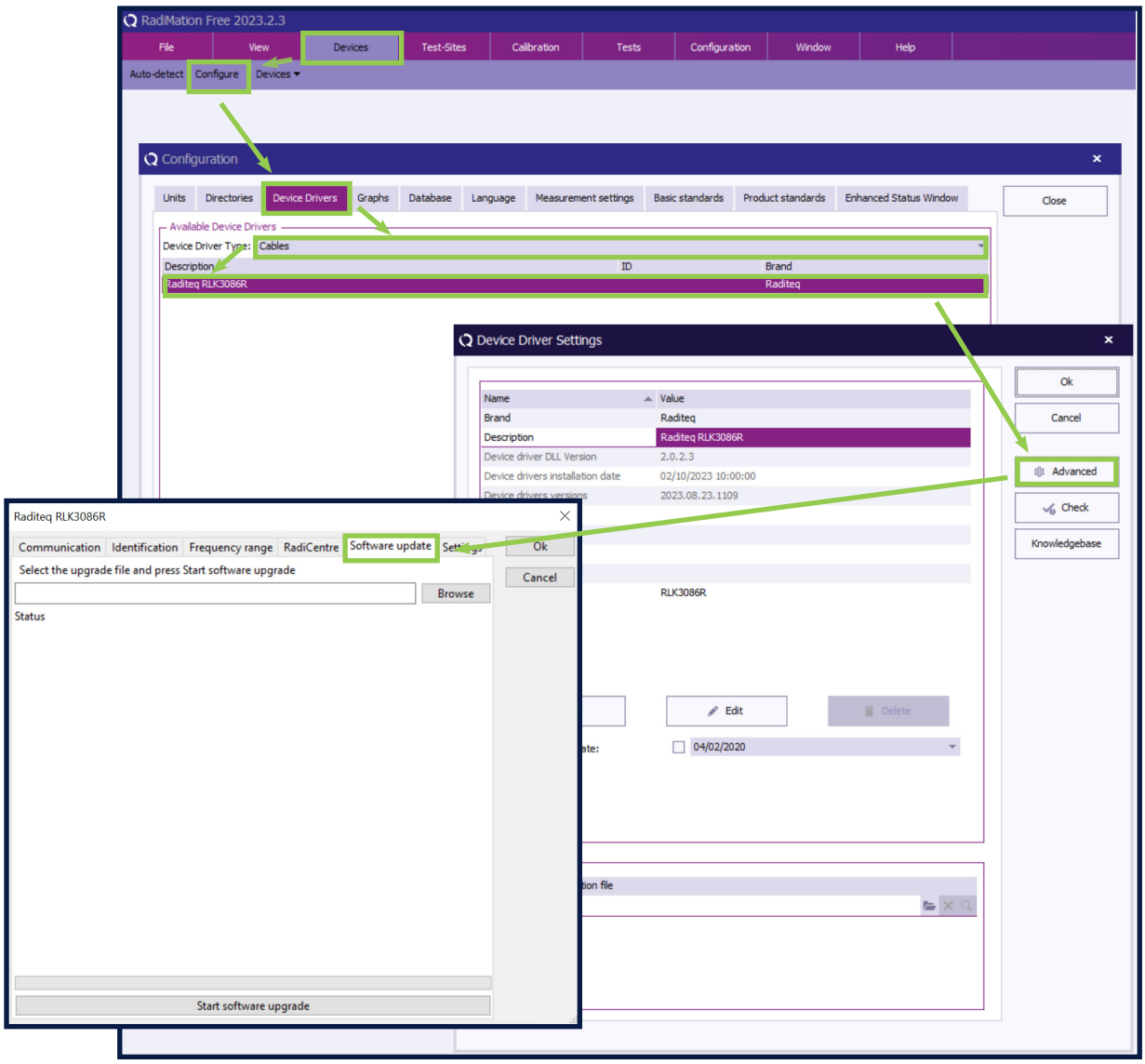
The phantom supply for each channel can be set this can be:

- Do not change >> it will adopt the settings as they are currently present.
- Off >> no phantom power
- Internal >> the phantom target must be set.
- External >> the external phantom sypply is fed on the RF (phantom target is grayed).

Firmware updates

New releases of the firmware for the RadiLink® system can be programmed using RadiMation® Free. Download RadiMation for free here: https://www.raditeq.com/download/

The update can be performed from the advanced device driver settings, selecting the “Software update” tab:



The RadiLink® system must be completely switched on prior to starting the firmware update. At the end of the programming, the remote unit will switch off due to a forced reboot. Once the programming has finished. The system can be switched on again.

Remote control commands

General Commands

Command	Description	Reply
ID_NUMBER?	Returns unique identifier number	x.x.x.x.x.x.x.x For example: 1.58.95.146.21.0.0.124
LOCAL	Return to local mode, the local display is used to set items.	OK
VERSION_HW?	Returns the hardware version	x For example: 2
*IDN?	Returns the ID of the RadiLink	Raditeq, RadiLink RLK3016C, 5.2.0
RESET	• Forward the command to the RLR • Clear all errors • Clear all notifications (buzzer)	OK
CLEAR	• Forward the command to the RLR • Clear all errors • Clear all notifications (buzzer)	OK
STATUS?	The reply <status> can be: • BIAS WARNING -> On of the bias channels does not reach the set voltage. The bias voltage is 0,5 V or more below the set level. • INITIALIZING -> Laser is initializing • INT LOW -> Internal supply is below the threshold (14V warning, 13,5V buzzer, 13V off) • EXT LOW -> External supply is below the threshold (11,5V warning, 11V buzzer, 10,5V off) • READY -> Laser is on • OFF -> Laser is off • DISCONNECTED -> No remote unit found • ERROR<space><error> -> See the errorcode for the fault.	<status>

Phantom supply

Command	Description	Reply
MEAS?<space>BIAS<channel>,CURR	Reply the measured bias current for the given <channel> in ampere. <channel> can be 1 - 8.	<current> For example: “0.051”
MEAS?<space>BIAS<channel>,VOLT	Reply the corrected measured bias voltage for the given <channel> in volt. <channel> can be 1 - 8.	<voltage> For example: “10.000”
BIAS<channel><space>STATE,<state>	Set the state of the bias for the given <channel>. <channel> can be 1 - 8. <state> can be ON or OFF	OK
BIAS<channel>?<space>STATE	Reply the state of the bias for the given <channel>. <channel> can be 1 - 8. <state> can be ON or OFF	<state> For example: “ON”
BIAS<channel><space>-SOURCE,<source>	Set the source of the given channel. <channel> can be 1 - 8. <source> can be INT or EXT.	OK
BIAS<channel>?<space>-SOURCE	Reply the source of the bias for the given <channel>. <channel> can be 1 - 8. <state> can be INT or EXT.	<source> For example: “EXT”
BIAS<channel>?<space>LVL,MIN	Question the minimum bias level for the given channel in volt. <channel> can be 1 - 8.	5.000
BIAS<channel>?<space>LVL,MAX	Question the maximum bias level for the given channel in volt. <channel> can be 1 - 8	12.000
BIAS<channel><space>LVL,<level>	Set the bias level for the given channel in volt. <channel> can be 1 - 8. <level> can be between the minimum and the maximum	OK
BIAS<channel>?<space>LVL	Question the bias level for the given channel in volt. <channel> can be 1 - 8.	<level> For example: “10.500”
INFO?	Get a list of the channels with a bias warning separated by a semicolon or OK when there is no warning.	<num>;<num>;<etc> or OK
INFO?<space><channel>	Get bias warning info for the given <channel>. OK is returned when there is no warning.	<info> with the format: “T:<target voltage> M:<measured voltage” or OK

RF Supply

Command	Description	Reply
GAIN<space><gain>	Set the gain in dB of the system. <gain> can be 0, 20 or 40	OK
GAIN?	Question the gain settings.	<gain> For example: “20”
RF<channel>	Set which RF channel must be selected. <channel> can be 1 - 8.	OK
RF?	Reply which RF channel is selected. <channel> can be 1 - 8.	<channel> For example: “1”

Power & temperature commands

Command	Description	Reply
SUPPLY<space><supply>	Set which power supply must be used. <supply> can be INT (internal) or EXT (external)	OK
SUPPLY?	Question which supply is used. <supply> can be INT (internal) or EXT (external)	<supply> For example: INT
POWEROFF	Poweroff the unit (usefull when shutting down the RadiCentre for example)	OK
PWR_OFF_TIME<space><value>	Set the auto poweroff time. <value> is in minutes. A value of 0 means auto poweroff disabled.	OK
PWR_OFF_TIME?	Get the auto poweroff time. See 'PWR_OFF_TIME<space><value>' for the expenation of <value>	<value> or error. For example "10"
MEAS?<space>INT	Reply the measured voltage of the internal supply in volt.	<supply> For example: "12.340"
MEAS?<space>EXT	Reply the measured voltage of the external supply in volt.	<supply> For example: "12.340"
MEAS?<space>INT,POST	Reply the measured voltage of the internal supply after the switch in volt.	<supply> For example: "12.340"
MEAS?<space>EXT,POST	Reply the measured voltage of the external supply after the switch in volt.	<supply> For example: "12.340"
MEAS?<space>RFTEMP	Reply the measured rf board temperature in Celsius Degrees	<temperature> For example: "35.6"
TEMPERATURE?	Reply the measured unit temperature in Celsius Degrees	<temperature> For example: "35.6"

RadiLink® Error codes

Error code	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
161	RLK3086R laser is off
162	RLK3016C communication to the RLk3086R is busy
163	RLK3016C has turned off the laser
164	RLK3086R laser turned off through too high temperature
165	RLK3086R laser turned off through too long no communi-cation from the RLK3016C
179	RLK3086R external supply too low
189	RLK3086R Battery low
188	RLK3016C has not detected the RLK3086R

Specifications

Model RLK3006C | consisting of:	8 Channel RF optical Link System
RLK3086R	RadiLink®, TX Remote Unit, 8 Channels
RLK3016C	RadiLink®, RX Plug-in Card
RLK3004B	RadiLink® LI-ion Battery Pack + Charger
CBL3006-25m	RadiLink® 25m Extension fibre
Optional Parts	
RLK3013H	RadiLink® High-Impedance Pre-amplifier Probe
RLK3004B	RadiLink® Additional Battery Pack
RF Specifications	
Frequency range	9 kHz - 6 GHz (usable up to 8 GHz)
Frequency Response [1]	±3 dB
Pre-Amplifier configurations	0 dB, 20 dB and 40 dB
Channel tracking	
• 9 kHz to 2,5 GHz	>1 dB
• 2,5 GHz to 6 GHz	>2,5 dB
1 dB Compression point:	
• 0 dB gain	0 dBm (5 dBm typical)
• 20 dB gain	-20 dBm (-15 dBm typical)
• 40 dB gain	-40 dBm (-35 dBm typical)
Max input power (damage level)	+20 dBm
Noise floor// noise figure @ 1 GHz	
• 0 dB gain	-154,8 (dBm/Hz) // 19,2 (dB)
• 20 dB gain	-170,4 (dBm/Hz) // 3,6 (dB)
• 40 dB gain	-171,8 (dBm/Hz) // 2,2 (dB)
Dynamic Range @ 1 GHz (Noise floor up to P1dB)	
• 0 dB gain	158,5 dB
• 20 dB gain	154,8 dB
• 40 dB gain	136,8 dB
Channel – channel isolation	40 dB
Harmonic suppression (Pin <p1dB -10dB)	25 dBc
Input and output Impedance	50 ohm
Input VSWR	
• 9 kHz - 1 GHz	2:1
• 1 GHz - 6 GHz	4:1
Output VSWR	3:1
Immunity to fields	200 V/m
Optical Wavelength	1310 nm (analog communication) 1310. 1550 nm (digital communication)

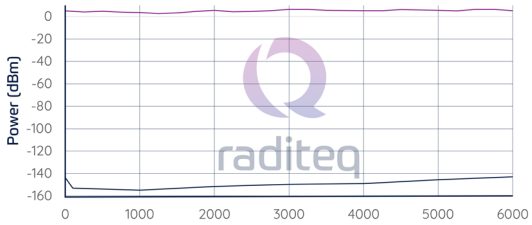
Phantom Power Specifications

Bias options	Internal generated/external applied
Impedance bias tee[2]	10,3 ohm
Max bias current	200 mA
Bias output voltage range	5-12 Vdc
Internal voltage setting resolution	1 mV
Voltage readback accuracy[3]	50 mV
Current readback accuracy	10 mA

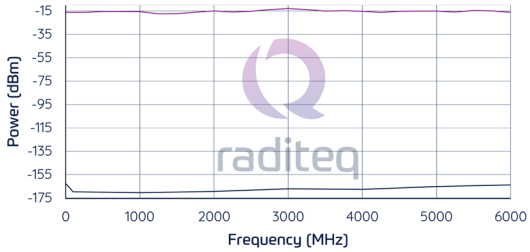
Power Consumption & Battery Life

RLK3086R (remote unit)	330 mA (laser on, phantom power off, 0dB gain)
RLK3016C (radicentre unit)	500 mA (supplied from RadiCentre)
RLK3004B	2 Ah (16Vdc Typical)
External power supply	10V to 28V
Battery duration	4 hours

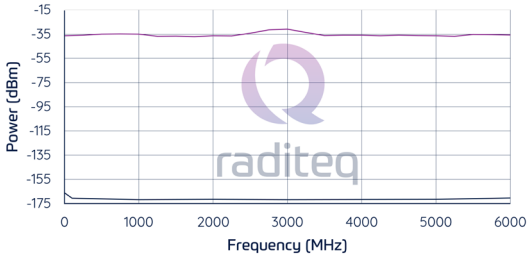
Dynamic range (0 dB)

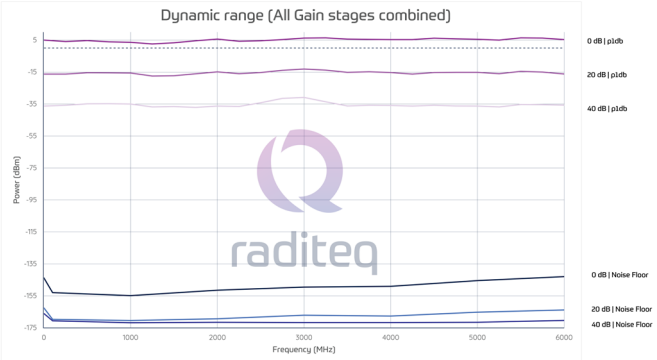


Dynamic range (20 dB)



Dynamic range (40 dB)





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:	RadiLink®
models:	RLK3086R, RLK3016R, RLK3004B

are in accordance with the European directives:

EMC Directive 2014/30/EU

Low Voltage Directive 2014/35/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. EN 60825-1:2014, Safety of laser products part 1: equipment classification and requirements
RoHs	EN 63000:2018, Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

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

Date of issue:	Publish date: 01/04/2023
Place of issue:	Woerden, the Netherlands
Authorized by:	P.W.J. Dijkstra
Title of authority:	Director

raditeq

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