Profoto RMI3
Integration Manual

Profoto

Thank you for choosing Profoto

Thank you for giving us your confidence by investing in the Profoto RMI3. For more than five decades we have sought after the perfect light. What drives us is our conviction that we can offer even better tools for the most demanding photographers. Before our products are shipped we have them pass an extensive and strict testing program. We make sure that each individual product meets our high demands on performance, quality, and safety. For this reason our flash equipment is widely used in rental studios in Paris, London, New York, and Tokyo and is also the most rented flash all over the world.

Some photographers can tell just from seeing a picture, if Profoto equipment has been used
Professional photographers around the world have come to value Profoto's expertise in lighting and light-shaping. Our extensive range of Light Shaping Tools offers photographers unlimited possibilities for creating and adjusting their own light.

Every single reflector and accessory creates its special light and the unique Profoto focusing system offers you the possibility to create your own light with only a few different reflectors.

Enjoy your Profoto product!

Safety instructions

⚠️ **NOTE ABOUT RF!**
This equipment makes use of the radio spectrum and emits radio frequency energy. Proper care should be taken when the device is integrated in systems. Make sure that all specifications within this document are followed, especially those concerning operating temperature and supply voltage range. Make sure the device is operated according to local regulations. The frequency spectrum this device is using is shared with other users. Interference can not be ruled out.

⚠️ **SAFETY PRECAUTIONS!**
Do not attempt to operate the equipment before studying the instruction manual and the accompanying safety instructions. Failure to do so may result in serious injuries.
Make sure that Profoto Safety Instructions is always accompanied the equipment!
Profoto products are intended for professional use!
Do not place or use the equipment where it can be exposed to moisture, extreme electro-magnetic fields, or in areas with flammable gases or dust!
Do not expose the equipment to rapid temperature changes in humidity conditions as this could lead to water condensation in the unit.
Equipment must only be serviced by authorized and competent service personnel!
Any modifications will break the modular certification and require the module to be re-certified.

🗑️ **FINAL DISPOSAL**
This equipment contains electrical and electronic components that could be harmful to the environment.
Equipment may be returned to Profoto distributors free of charge for recycling according to WEEE.
Follow local legal requirements for separate disposal of waste, for instance WEEE directive for electrical and electronic equipment on the European market, when the product 's life has ended!

Table of Contents

Introduction

Profoto's RMI3 is the base for our versatile modular communication platform, used in products such as the flash generator Pro-10 and the Monolight D2. It utilzes communication in the 2.4GHz ISM- band and has an impressive performance with a range of up to 300 meters (free line of sight in open space)[1].

General Description

The RMI3 module is powered by an 8-bit micro processor with a radio transceiver from Texas and features a complete feature set for wireless interaction with the Profoto Air range of professional studio equipment. The module has a 3V UART for interaction with a wide range of devices including computers and other microcontrollers.

System Diagram

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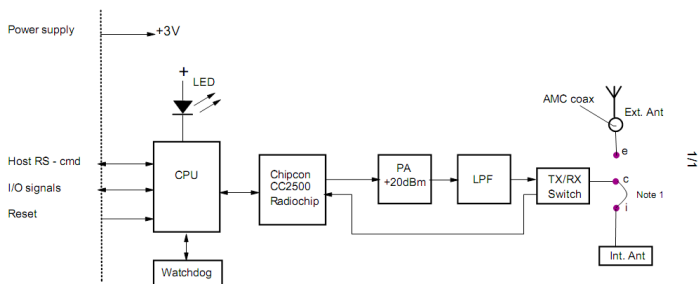
1   Actual range will vary due to site layout, surrounding materials and other radio transmissions.

Hardware Description
Mechanical Characteristics

Dimensions

46 x 18 x 10 mm +/- 1 mm [Length, Width, Height]

Weight: approx 10g

Product Image

Mechanical Drawing

EXT ANT

INT ANT

PA

RF

MCU

18.14 mm

46.44 mm

10 mm
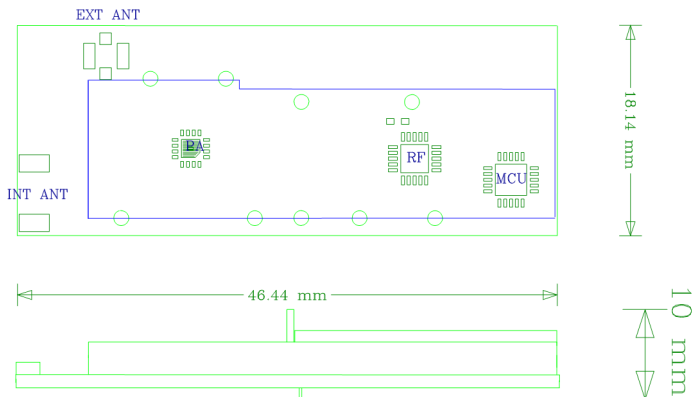
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Electrical Characteristics
PINOUT

PIN	Function
1	GND
2	VCC (Transmit)
3	Sync O.C.
4	Test_0
5	Trig
6	N.C.
7	Sync
8	COM TX
9	Reset
10	Test_2
11	Test_3
12	Test_1
13	TTL
14	RMTE
15	COM RX
16	+3V CPU

Recommended Operating Conditions

Parameter	Min	Max	Unit
DC Supply	2.7	3.5	V
Current		0.18	A
Temperature	-10	+55	°C
Humidity	0	90	% rel n.c

Interface Description

The interface to the host system is implemented as a 16 pin male connector.

The part used on the RMI3 module is an AMP Micro-MaTch (P/N: 8-215464-6).

The recommended matching female connector is P/N: 8-215079-6. It is recommended to connect the module with a female header mounted in through holes. This allows for optimum space saving and leaves the antenna connector easily accessible.

UART Serial Interface

The UART is using pins 1, 8 and 15. To connect to an RS232 line you must use a TTL level converter (a dongle from B&B Electronics is recommended) from 3.3V or use the Profoto Air USB dongle which mates with an RMI3 module and provides a USB interface to a computer.

Serial characteristics: 38400. 8, N, 1 (no flow control)

⚠ NOTE!
Connecting the module to an RS232 line without a line level converter may damage the module.

For a list of available commands please refer to the RUF documentation.

Reset Interface

The following conditions will lead to a reset on the Promote RMI3 module:

• Power on reset

• Low voltage (Brown Out) detected from internal supervisory circuit

• Reset by Software

• External reset through reset pin

RF Characteristics

Parameter	Min	Typ.	Max	Unit
Frequency range	2404		2480	MHz
Frequency stability	-25		+25	kHz
Output power EU/US	8.7	8.9	9.3	dBm
Output power Japan	5.4	6.2	8.7	mW
Output power USA/Canada	9.2	9.8	11.2	dBm

Channel list

Channel	Air Ch #	Frequency	Unit	Comment
1	1	2403.999	MHz	
2	9	2406.998	MHz	
3	2	2411.997	MHz	
4	-	2414.996	MHz	Only FHSS
5	3	2416.996	MHz	
6	4	2421.994	MHz	
7	5	2426.993	MHz	
8	10	2429.992	MHz	
9	11	2432.992	MHz	
10	12	2435.991	MHz	
11	13	2438.990	MHz	
12	-	2441.990	MHz	Only FHSS
13	6	2446.988	MHz	
14	14	2451.321	MHz	
15	7	2453.987	MHz	
16	15	2456.653	MHz	
17	16	2459.652	MHz	
18	17	2462.318	MHz	
19	18	2465.317	MHz	
20	19	2468.316	MHz	
21	20	2471.316	MHz	
22	-	2474.315	MHz	Reserved
23	8	2479.314	MHz	

Note: Channel 4, 12 is only used for frequency hopping. Channel 22 is not currently used.

Important Integration Notes

Profoto's RMI3 has been designed to allow for easy integration with a wide range of devices. There are some key factors you need to consider when integrating the module.

Mechanical Integration

The module needs at least 10 mm clearance in order to fit. This is the maximum height with consideration to the connector pins. On the module's backside there is a test point underneath the antenna which must be protected from user access. The module should arrive with a label with the serial number printed on it, which should cover the test point.

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Electrical Integration

The minimum connections needed for operation are:

PIN	Function	Comment
1	GND	Digital ground
2	VCC	Transmit mode
5	Trig	Active high
7	Sync	Active high

In order to update the firmware the following pins is needed in addition to the ones mentioned above:

8	COM TX	Transmit to host
9	Reset	
15	COM RX	Receive from host
16	+3V CPU	CPU power supply

Antenna Integration

The Promote RMI3 module is available in one hardware configurations and several software configurations. RMI3 uses an on board chip antenna. The use of any other antenna is not approved and will break the modular approval.

Regulatory Information

World-wide Usage of Radio Spectrum

The RMI3 operates on the license-free 2.4GHz ISM band for SRD (Short Range Devices). This band may be used in most parts of the world. Regional restrictions may apply.

⚠️ **NOTE!**

Refer to national regulations for the region where the RMI3 module shall be operated and make sure that they are followed.

Europe

The RMI3 module is in conformity with the essential requirements and other relevant requirements of the Radio Equipment Directive (2014/53/EU).

Please note that every end product using the RMI3 module will need to undergo EMC testing according to EN 301 489-17 V3.1.1 (or later).

For RF, conduced test results can be inherited from the RMI3 test report to the end product using RMI3. Limited EN 300 328 V2.1.1 (or later) testing for radiated spurious emission is necessary and the test must be repeated with the end product using the RMI3 module.

FCC (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and

2. This device must accept any interference received, including interference that may cause undesired operation.

⚠️ **Warning (Part 15.21)**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

15C

2.3 Specific operational use conditions

This module is approved for use in portable and mobile applications. Integrators must supply operating instructions for end users and installers to satisfy RF exposure

compliance requirements are met. Integrators and installers must also make sure that compliance with Part 15B are ensured.

2.4 Limited module procedures

This module is not shielded and therefore requires radiated emissions tests in each new host product.

2.5 Trace antenna designs

N/A, the module does not use a trace antenna, it uses a SMT chip antenna.

2.6 RF exposure considerations

WARNING: The RMI3 device radiates radio frequency energy at a level below the United States FCC radio frequency exposure limits. Nevertheless, this device should be used in such a manner that the potential for human contact during normal operation is minimized. For hand held operation, this device has been tested and meets FCC RF exposure guidelines when the device is positioned a minimum of 1.0 cm from the body. For on camera mounted operation, this device has been tested and meets FCC RF exposure guidelines when the device is positioned a minimum of 2.0 cm from the head and must not be co-located or operating in conjunction with any other antenna or transmitter. As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

2.7 Antennas

Antenna is Fractus Compact Reach Xtend, P/N: FR05-S1-N-0-102.

2.8 Label and compliance information

IMPORTANT NOTE:

The RMI3 module is labelled with its own FCC and IC ID. If the FCC and IC ID:s is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a physical label or eLabel referring to the enclosed module. In that case the end product must be labelled in a visible area with the following: Contains FCC ID: W4G-RMI3 and IC: 8167A-RMI3

MODEL: PCD0188-0000 Rev C1
FCC ID: W4G-RMI3
IC: 8167A-RMI3
202-SMH035

IMPORTANT NOTE:

In the event that these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC and Industry Canada authorizations are no longer considered valid and the FCC ID and IC Certification Number cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and Industry Canada authorization.

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IC Compliance Statement (Canada):

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

1) this device may not cause interference, and

2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.

IC RF Exposure limits

The RMI3 device complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. For hand held operation, this device has been tested and meets IC RF exposure limits when the device is positioned a minimum of 1.0 cm from the body. For on camera mounted operation, this device has been tested and meets IC RF exposure limits when the device is position a minimum of 2.0 cm from the head'

Limites d'exposition RF IC

Le dispositif RMI3 est conforme aux limites sur l'exposition aux rayonnements IC RSS-102 définies pour un environnement non contrôlé. En mode manuel, ce dispositif a été testé et respecte les limites d'exposition IC RF lorsque ce dernier est placé à au moins 1 cm du corps. Pour un fonctionnement sur caméra, ce dispositif a été testé et respecte les limites d'exposition RF IC lorsque ce dernier est positionné à au moins 2 cm de la tête.

Japan

Japanese Radio Law and Japanese Telecommunications Business Law Compliance. This device is granted pursuant to the Japanese Radio Law (電波法) and the Japanese Telecommunications Business Law (電気通信事業法) This device should not be modified (otherwise the granted designation number will become invalid).

R202-SMH035

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