

Integration Manual

RMIX, V1.4

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Preface

Thank you for choosing Profoto!

Thanks for showing us your confidence by investing in a Profoto Air device. For more than five decades we have sought the perfect light. What pushes us is our conviction that we can offer even yet better tools for the most demanding photographers. Before our products are shipped we have them pass an extensive and strict testing program. We check that each individual product comply with specified performance, quality and safety. For this reason our flash equipment is widely used in rental studios in Paris, London, New York, and Tokyo and 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!

Important user information

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 specification within this document are followed, especially 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 electromagnetic fields or in areas with flammable gases or dust!

Do not expose the equipment to hasty 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.

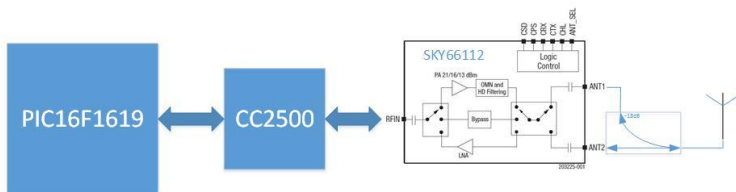
Introduction

RMIX is the base for the next generation of Profoto's versatile modular communication platform. It is based on the communication in the 2.4GHz ISM- band and has impressive performance with a range of up to 300 meters.

General Description

The RMIX module is powered by an 8-bit micro processor with a radio transceiver from Texas Instrument 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



Hardware description

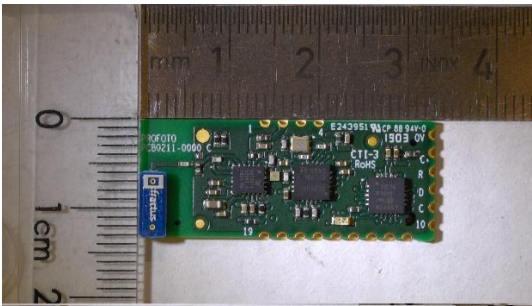
Mechanical Characteristics

Dimensions

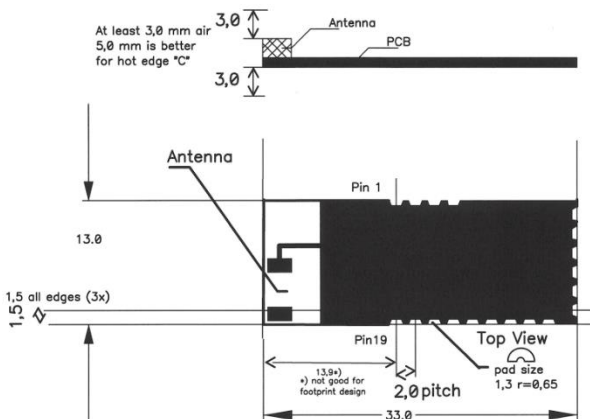
33,2 x 13,3 x 3,2 mm [Length, Width, Height]

Weight approx 1.2g

Image



Mechanical Drawing



Electrical Characteristics

Pinout

PIN		
1	GND	(radio)
2	+3V	(radio)
3	TEST_0	in/output
4	SYNC	High true, output
5	GND	(cpu)
6	+3V	(cpu)
7	RESET	Low true
8	TEST_2	Flash data
9	TEST_3	Flash clock
10	TRIGG	Mx, in/output
11	RMTE	in/output
12	TTL	Px, in/output
13	SPI_DAO	SPI interface. Data output
14	SPI_CS	SPI interface, chip select input (low true)
15	COM_RX	Serial port, high idle, input
16	COM_TX	Serial port, high idle, output
17	SPI_CLK	SPI interface, clock input.
18	SPI_DAI	SPI interface, data input
19	TEST_1	LED output, low = Light

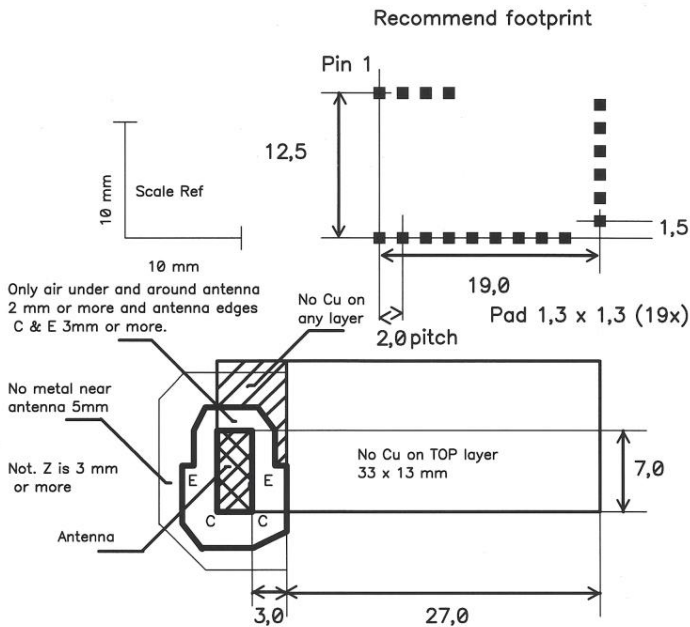
Recommended Operating Conditions

Parameter	Comment	Min	Max	Unit
DC Supply		2.7	3.3	V
Current			0.19	A
Temperature		-10	+55	°C
Humidity		0	90	%rel, n.c.

Interface Description

Connector type

The interface to the host system is implemented as a 19 solder pads. Please make sure to follow the guidelines for footprint.



UART Serial Interface

The UART is using pins 1, 15 and 16. To connect to a RS232 line you must use a TTL converter (a dongle from B&B Electronics is recommended) from 3V to 12V.

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

For a list of available commands see the software documentation.

NOTE!

Connecting the module to a UART port without a line level converter may damage the module.

Reset interface

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

- Power on reset
- Low voltage (Brown Out) detected from internal supervisory circuit
- Reset by Software
- External reset through reset pin
- Reset by watch dog

RF characteristics

Parameter	Min	Typ.	Max	unit
Frequency range	2404		2479	MHz
Frequency stability	-25		+25	kHz
Output power US		21.7	22.2	dBm
Output power EU	18.2		19.9	dBm
Output power Japan	21.7	22.2	22.7	dBm

Channel list

Channel	Frequency	Unit
1	2403,999	MHz
2	2411,997	MHz
3	2416,996	MHz
4	2421,994	MHz

5	2426,993	MHz
6	2446,988	MHz
7	2453,987	MHz
8	2479,314	MHz
9	2406,998	MHz
10	2414,996	MHz
11	2429,992	MHz
12	2432,992	MHz
13	2435,991	MHz
14	2438,990	MHz
15	2441,990	MHz
16	2451,321	MHz
17	2456,653	MHz
18	2459,652	MHz
19	2462,318	MHz
20	2465,317	MHz
21	2468,316	MHz
22	2471,316	MHz

Important Integration Notes

RMIX 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 3 mm clearance in order to fit.. The module should arrive with a 4x4 mm Data Matrix label which holds the model number, serial number and firmware information.

Electrical Integration

The minimum connections needed for operation is:

PIN	Function	Comment
1	GND	Radio ground
2	+3V	Radio power
5	GND	CPU ground
6	+3V	CPU power
8	COM TX	UART output
9	Reset	Active low
12	TTL	Active low
15	COM RX	UART input

Antenna Integration

The RMIX module is available in one configuration with an integrated chip antenna. The antenna should not be modified in any way, doing so will void the approvals for the module.

Certification information

The module has successfully undergone testing according to EN 300 328 V2.1.1, FCC 47 CFR Part 15, IC RSS - 247 Issue 2 and Japanese Ordinance concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment Article 2, Clause 1, Item 19. For end products using the RMIX module (as the only radio module), the following applies:

CE (EU/EES)

The RMIX 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 RMIX module will need to undergo EMC testing according to EN 301 489-17 V3.1.1 (or later).

For RF, conducted test results can be inherited from the RMIX test report to the end product using RMIX. 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 RMIX module.

FCC (USA)

FCC Compliance Statement (Part 15.19)

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 RMIX 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

The RMIX 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-RMIX and IC: 8167A-RMIX

MODEL: PCD0193-0000

FCC ID: W4G-RMIX

IC: 8167A-RMIX

® 202-SMH030



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.

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 RMIX 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 RMIX 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 (ARIB)

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).

MODEL: PCD0193-0000

FCC ID: W4G-RMIX

IC: 8167A-RMIX

Ⓡ 202-SMH030

