Radio Modules

RF-EMIP, RF-2400, RF-900

USER MANUAL

27th July 2021

Imprint

For Further Assistance

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Scope

This USER MANUAL applies to the following product:

K2.0036599	RF-900 Radio Module 900 MHz FHSS
K2.0036598	RF-2400 Radio Module 2400 MHz FHSS
K2.0033702	RF-EMIP Radio Module 2400 MHz DSSS

Revision history

Version	ID	Order #	Release	Date
01	10005938	K5.0040006	F07640	2021-07-13

Disclaimer

Before using the products described in this manual, be sure to read and understand all the respective instructions.

The ARRI RF-EMIP, RF-2400, RF-900 Radio Modules is/are only available to commercial customers. By utilization, the customer agrees that the Radio Modules or other components of the system are deployed for commercial use only. Otherwise the customer must contact ARRI before utilization.

While ARRI endeavors to enhance the quality, reliability and safety of their products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize the risk of damage to property or injury (including death) to persons arising from defects in the products, customers must incorporate sufficient safety measures in their work with the system and heed the stated canonic use.

ARRI or its subsidiaries do not assume any responsibility for losses incurred due to improper handling or configuration of the Radio Modules or other system components.

ARRI assumes no responsibility for any errors that may appear in this document. The information is subject to change without notice.

For product specification changes after this manual was published, refer to the latest published ARRI data sheets or release notes, etc., for the most up-to-date specifications. Not all products and/or types are available in every country. Please check with an ARRI sales representative for availability and additional information.

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or its subsidiaries be liable for or have a remedy for recovery of any special, direct, indirect, incidental, or consequential damages, including, but not limited to lost profits, lost savings, lost revenues or economic loss of any kind or for any claim by a third party, downtime, good-will, damage to or replacement of equipment or property, any cost or recovery of any material or goods associated with the assembly or use of our products, or any other damages or injury of the persons and so on or under any other legal theory.

In the event that one or all of the foregoing clauses are not allowed by applicable law, the fullest extent permissible clauses by applicable law are validated.

1 How to Use this Manual

This manual describes the necessary information for using the product.

For further details, refer to the ARRI website at http://arri.com/radio-modules

For Tech Tips, please visit the ARRI Youtube Channel at https://youtube.com/user/arrichannel:

The appendix at the back of the manual contains useful reference material including technical data, connector pin-out diagrams and dimensional drawings.

Additional Information

For useful information in addition to this user manual please have a look at the ARRI Learn & Help section on the ARRI website.

Strengthen Your Knowledge and Get Trained

The ARRI Academy courses provide unrivalled insights into the full possibilities of working with ARRI camera systems, lenses, lights and accessories.

To learn more, please visit http://arri.com/academy.

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2 For Your Safety

Before use, please ensure that all users read, understand, and follow the instructions comprehensively in this document.

Risk levels and alert symbols

Safety warnings, safety alert symbols, and signal words in these instructions indicate different risk levels:

⚠ DANGER

DANGER indicates an imminent hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **may result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **may result in** minor or moderate injury.

ADVICE

NOTICE explains practices not related to physical injury. No safety alert symbol appears with this signal word.

Note: Provides additional information to clarify or simplify a procedure.

Vital Precautions

⚠ DANGER

Risk of electric shock and fire!

Short-circuits may entail lethal damage!

Before use, read and follow all valid instructions.

Use solely and exclusively as described in the instructions.

Never open. Never insert objects.

For operation, always use a power source as indicated in the instructions.

Always unplug the cable by gripping the plug, not the cable.

Never try to repair. All repair work should be done by a qualified ARRI Service Center.

Never remove or deactivate any safety equipment (incl. warning stickers or paint marked screws).

Always protect from moisture, cold, heat, dirt, vibration, shock, or aggressive substances.

General precautions

Use only the tools, materials and procedures recommended in this document. Unplug all cables during transport.

Do not store the Radio Modules in places where it/they may be subject to temperature extremes, direct sunlight, high humidity, severe vibration, or strong magnetic fields.

3 Audience and intended use

ADVICE

The product is solely and exclusively available for commercial costumers and shall be used by skilled personnel only. Every user should be trained according to ARRI guidelines. Use the product only for the purpose described in this document. Always follow the valid instructions and system requirements for all equipment involved.

The Radio Modules is solely and exclusively for use on professional camera setups.

4 Scope of Delivery and Warranty

ADVICE

Product and packaging contain recyclable materials. Always store, ship, and dispose of according to local regulations. ARRI is not liable for consequences from inadequate storage, shipment or disposal.

Delivery

On delivery, please check that the package and content are intact. Never accept a damaged or incomplete delivery. A complete delivery includes:

- Radio Module
- Instruction manual
- Original packaging

Warranty

For scope of warranty, please ask your local ARRI Service Partner. ARRI is not liable for consequences from inadequate shipment, improper use, or third-party products.

5 Introduction

With the introduction of the Hi-5 Hand Unit ARRI offers three different exchangeable radio modules for various shooting conditions and regions:

- RF-EMIP Radio Module 2400 MHz DSSS
- RF-2400 Radio Module 2400 MHz FHSS
- RF-900 Radio Module 900 MHz FHSS

ADVICE

Certain radio modules might not be available in your country.

Main features

RF-EMIP Radio Module:

- White-coded radio module
- Certified regions: worldwide
- Fixed radio channels (14 channels)
- Compatible with existing ARRI hand units, cameras, motor controllers and the cforce mini RF motor containing ARRI's white-coded radio module
- Network mode: can pair with up to three hand units for split focus, iris and zoom operations to one camera/motor controller

RF-2400 Radio Module:

- Certified regions: worldwide
- 100 channels (= defined hopping schemes)
- Its frequency hopping transmission method ensures a strong radio link with exceptionally good interference immunity.

RF-900 Radio Module:

- Long-Range Solution
- Certified regions: USA and Canada
- 100 channels (= defined hopping schemes)
- Its frequency hopping transmission method ensures a strong radio link with exceptionally good interference immunity.
- Network mode: can pair with up to three hand units for split focus, iris and zoom operations

ADVICE

To tap the full potential of the device, have all connected units updated to the latest available firmware.

6 Layout

RF-900 Radio Module 900 MHz FHSS

RF-2400 Radio Module 2400 MHz FHSS

RF-EMIP Radio Module 2400 MHz DSSS

7 Radio types

RF-EMIP Radio Module

A white-colored ring at the base of the antenna socket identifies the white-coded radio module. There are 14 channels to choose from:

Channel	Frequency	ZigBee IEEE 802.15.4 Channel
0	2.410 GHz	12
1	2.415 GHz	13
2	2.430 GHz	16
3	2.435 GHz	17
4	2.450 GHz	20
5	2.455 GHz	21
6	2.470 GHz	24
7	2.475 GHz	25
8	2.420 GHz	14
9	2.425 GHz	15
10	2.440 GHz	18
11	2.445 GHz	19
12	2.460 GHz	22
13	2.465 GHz	23

RF-2400 Radio Module

A or orange-colored ring at the base of the antenna socket identifies the RF-2400 radio module.

ADVICE

The RF-EMIP radio module and the RF-2400 radio module cannot be mixed at the same radio network of the camera and its hand units. However, both systems can be used parallel in different radio networks.

RF-900 Radio Module

An grey-colored ring at the base of the antenna socket identifies the RF-900 radio module.

ATTENTION

Please ensure that the region is configured correctly, as it may be illegal to use the RF-EMIP, RF-2400, RF-900 in a region other than specified in the setting. All settings are compliant to FCC and IC regulations.

8 Compatibility

The RF-EMIP, RF-2400 and RF-900 Radio Modules interface with the Hi-5 Hand Unit and the Radio Interface Adapter RIA-1.

ATTENTION

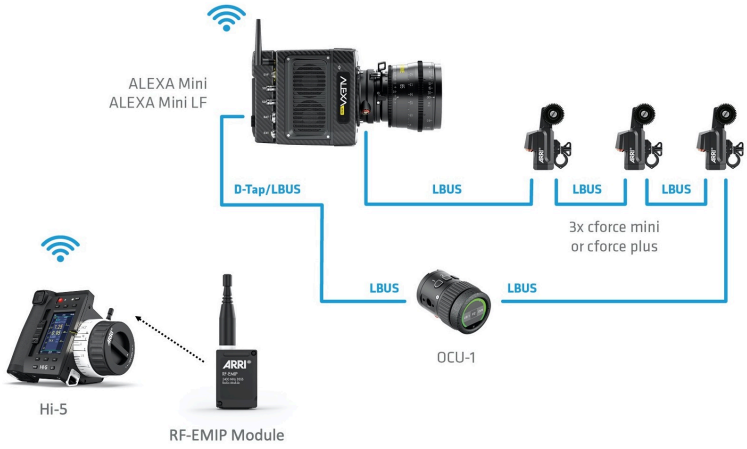
When removing the radio modules from the hosting units (Hi-5 Hand Unit, Radio Interface Adapter RIA-1), please check the temperature of the radio modules first. If they are hot, please wait until they have cooled down.

Radio Compatibility

The RF-EMIP is compatible with all devices which have a built-in EMIP100, EMIP200, EMIP300, EMIP400 or EMIP400s white-coded radio module as follows:

Built-in EMIP radio module

Sample Configuration:



Compatibilities with White-coded Radio-integrated Devices

Compatibility to cameras	– ALEXA Mini – ALEXA Mini LF – ALEXA Plus cameras (ALEXA LF, Plus, XT, SXT, 65)
Compatibility to hand units (in Network Mode)	– WCU-4 – SXU-1
Compatibility to motor controller	– UMC-4 – AMC-1 – SMC-1 – EMC-1
Compatibility to lens motor	– cforce mini RF

9 Appendix

9.1 Antenna connector

The radio connection is established via the antenna mounted to the antenna connector. The radio module inside could be damaged by electrostatic discharge via the open connector. We recommend using the originally supplied antenna only.

9.2 Specifications

Electrical/General Data

RF-EMIP Radio Module

Supported Frequency	2.400 - 2.4835 GHz
Channel Spacing	5 MHz
Band	ISM 2400 MHz
Modulation Type	Direct Sequence Spread Spectrum
Operating Mode	Point-to-Multipoint
Transmit Power	Dep. on regions between 8.9 - 70.8 mW

RF-2400 Radio Module

Supported Frequency	2.400 - 2.4835 GHz
Band	ISM 2400 MHz
Modulation Type	Frequency Hopping Spread Spectrum
Operating Mode	Point-to-point
Transmit Power	100mW

RF-900 Radio Module

Supported Frequency	902 - 928 MHz
Band	ISM 900 MHz

Modulation Type	Frequency Hopping Spread Spectrum
Operating Mode	Point-to-Multipoint
Transmit Power	Standard Mode: 100 mW Hi-Power Mode: 1 W

Connector

Interface	10pin IRISO

Environmental

Operating temperature range	-20 to +50°C (-4° to +122° F)

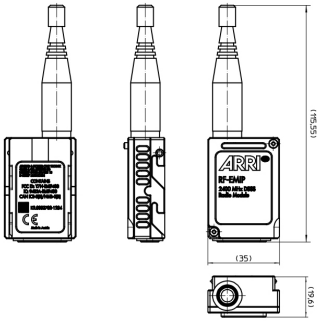
Power Consumption

Power consumption depends on the different radio modules that are used. Using the Hi-5 hand unit with one of the modules results in different power requirements:

RF-EMIP	typ. 110mA @3.3V
RF-2400	typ. 330mA @ 3.3V
RF-900	@ 100mW: typ. 250mA @ 3.3V
RF-900	@ 1W: 580mA @ 3.3V

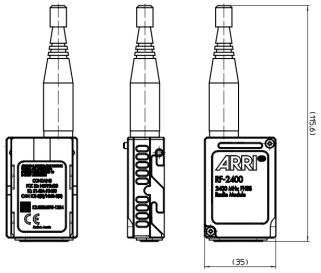
9.3 Dimensions and weight

RF-EMIP Radio Module



Weight of the RF-EMIP Radio Module: 52g/1,83oz (including antenna)

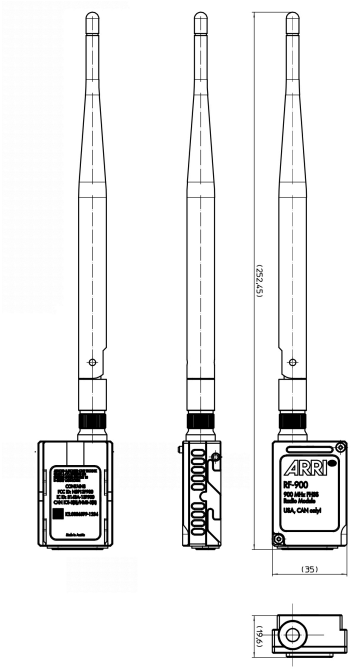
RF-2400 Radio Module



Weight of the RF-2400 Radio Module: 52g/1,83oz (including antenna)

RF-900 Radio Module

Dimensions:



Weight of the RF-900 Radio Module: 55g/1,94oz (including antenna)

9.4 Part numbers

RF-900 Radio Module

K2.0036599 RF-900 Radio Module 900 MHz FHSS

Includes:

K2.0041437 2db 900Mhz Antenna RPSMA

RF-2400 Radio Module

K2.0036598 RF-2400 Radio Module 2400 MHz FHSS

Includes:

K2.0002007 Outdoor Antenna (straight)

RF-EMIP Radio Module

K2.0033702 RF-EMIP Radio Module 2400 MHz DSSS

Includes:

K2.0002007 Outdoor Antenna (straight)

Radio Module Sets

KK.0039986 RF-900 Radio Module 900 MHz FHSS Set

KK.0039984 RF-2400 Radio Module 2400 MHz FHSS Set

KK.0039985 RF-EMIP Module 2400 MHz DSSS Radio Set

9.5 Glossary

DSSS	Direct Sequence Spread Spectrum
FHSS	Frequency Hopping Spread Spectrum
ISM	Industrial Scientific Medical
Point-to-Multi-point	In point-to-multipoint networks one device can connect with multiple devices at the same time. Also known as *Network mode* where multiple devices can operate in the same radio connection for splitting focus, iris and zoom control.
Point-to-Point	In point-to-point networks one device can connect with another single device at the same time.
ZigBEE	ZigBee is a wireless communication technology designed based on IEEE 802.15.4. It is one of the most economical, low-power consuming data transfer technology that operates with a simple networking protocol.
IEEE	Institute of Electrical and Electronics Engineers

9.6 Service Contacts

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service@linkgroup.com.tr

9.7 International declarations

EU-Declaration of Conformity

Product Description: RF module 2.4 GHz: RF-EMIP / RF-2400

The designated product conforms with the specifications of the following European directives:

1. Directive 2014/53/EU of the European Parliament and the Council of 16 April 2014 on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive - OJ L 153, 22.5.2014, S. 62–106.
2. Directive 2011/65/EU of the European Parliament and the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment - OJ L 174, 1.7.2011, S. 88–110.

The compliance with the requirements of the European Directives was proved by the application of the following standards:

Essential requirements regarding No 1

- Art. 3.1 a following 2014/35/EU: EN 62479:2010; EN IEC 62368-1:2020 + A11:2020
- Art. 3.1 b following 2014/30/EU: EN 301 489-1 V2.2.3; EN 301 489-17 V3.2.2
- Art. 3.2: EN 300 328 V2.1.1; EN 300 328 V2.2.2

Essential requirements regarding No 2

- EN 50581:2012;

To evaluate the respective information we used:

http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/index_en.htm

CE

FCC Class A Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

Industry Canada Compliance Statement

This device complies with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

(1) This device may not cause interference.

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

Cet appareil est conforme à CNR-210 d'Industrie Canada. L’exploitation est autorisée aux deux conditions suivantes:

(1) L’appareil ne doit pas produire de brouillage.

(2) L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

Japan MIC Statement

Complies with Ministry of Internal Affairs and Communications notification Article 88, Annex 43.

ADVICE

It may not be legal to operate the Radio Modules in a country/region other than the country/region selected in the Hi-5 Hand Unit or Radio Interface Adapter RIA-1 region menu.

Radio Modules

The **RF-EMIP Radio Module** contains the following radio module:

FCC ID: Y7N-EMIP400

IC ID: 9482A-EMIP400

CMIT ID: 2017DJ7863C(M)

MIC ID: 020-180030

NCC: CCAH18LP0660T0

KC: R-CRM-ARg-EMIP400

EMIP400s: ETA:1385/2018/ERLO

The **RF-2400 Radio Module** contains the following radio module:

FCC ID: NS9P2400

IC ID: 3143A-P2400

R210-114971 (Japan)

The **RF-900 Radio Module** contains the following radio module:

IC ID: 3143A-13P900

FCC ID: NS913P900

The RF-900 Radio Module has been tested and complies with the applicable limit values for protection against high-frequency energy (RF energy)