

Sirius radio module 915 MHz

- Integration Guide

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1 Document history

<i>Date</i>	<i>Author</i>	<i>Notes</i>
September 1 st , 2017	Davide Carli	Reference to SIRIUS radio Module
November 19, 2024	Pier Giorgio Peruzzi	Revision Sirius 1.0
November 25, 2024	Pier Giorgio Peruzzi	Revision Sirius 1.1
November 26, 2024	Pier Giorgio Peruzzi	Revision Sirius 1.2
January 13, 2025	Pier Giorgio Peruzzi	Revision Sirius 1.3



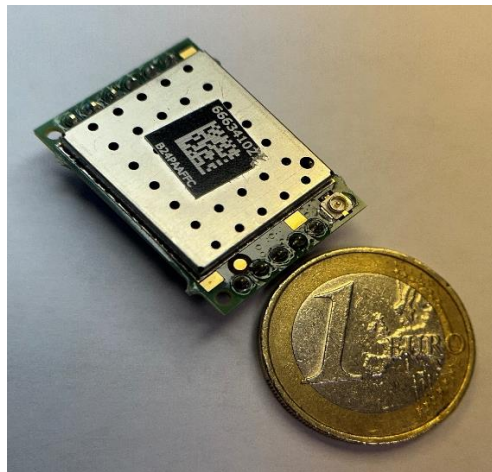
2 Introduction

This Sirius radiofrequency (RF) module operates in the 902-928 MHz ISM frequency band. It operates according to the Star Radio Protocol 2.0 specifications (Datalogic proprietary).

3 Hardware implementation

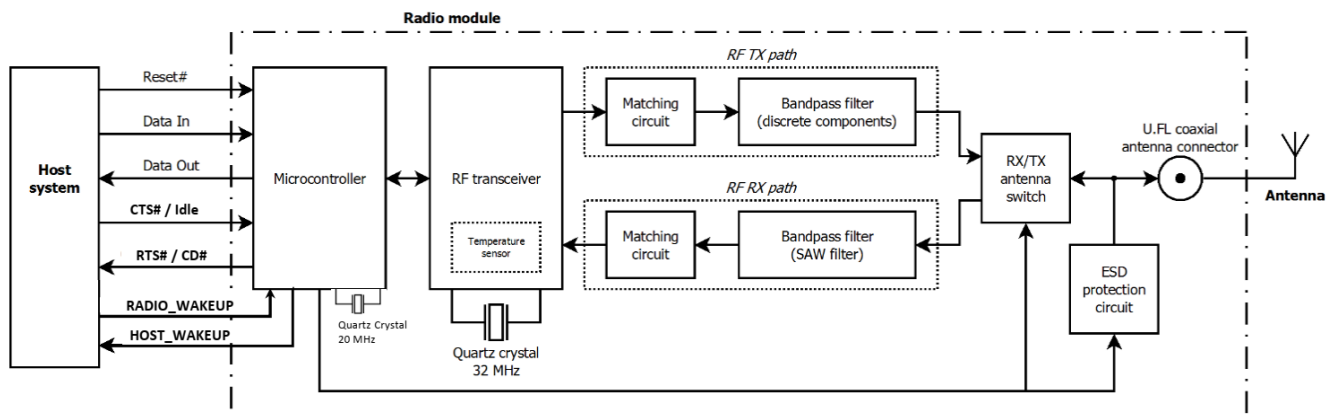
3.1 Description

Material	666341022-C
PCBA number	PCBA-1384 SIRIUS STAR RADIO, 915 MHz
Antenna	External antenna. Connector is U.F.L compatible

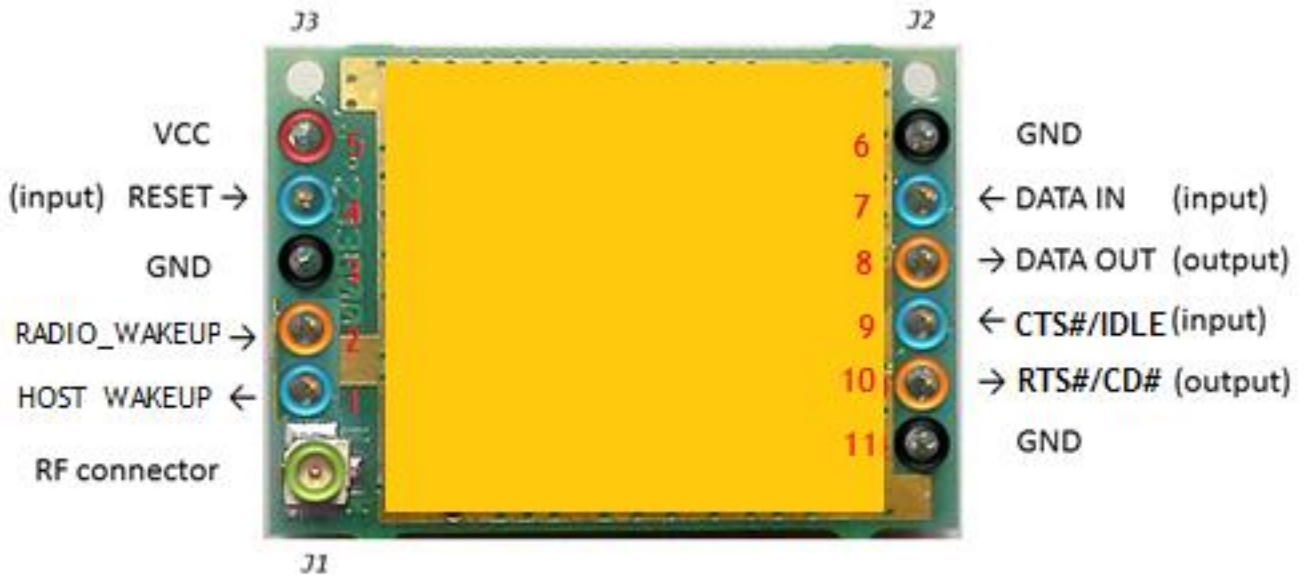


NOTE: This radio module is mechanically and electrically compatible with an implementation of the SIRIUS and Zenith radio module. The hw physical interface towards the host of these radio modules is pin-to-pin compatible. Additionally has been added two GPIO to manage the power save.

3.2 Block diagram



3.3 Pinout



4 Host interface - Hw physical layer

4.1 Pin functions

Table 1

Pin No.	Pin Name	I/O direction (radio module point of view)	Function
5	VCC	Power supply	+3,3 V power supply rail. Operating voltage range : from 3,0 V to 3,6 Vdc.
3, 6, 11	GND	Power supply	Ground.
4	RESET#	Input	Reset signal, active low.
7	DATA IN	Input	UART RX data signal.
8	DATA OUT	Output	UART TX data signal.
9	CTS / IDLE	Input	UART CTS data signal or IDLE input signal
10	RTS / CD#	Output	UART RTS data signal or Carrier Detect signal
2	RADIO_WAKEUP	Input	Radio Power Save entry
1	HOST WAKEUP	Output	Power save Request to Host



4.2 Description

The Sirius Radio Module and the Host System communicate with each other over a UART physical interface. The maximum data rate supported by the radio module over the UART interface is 921600 baud/s.

4.3 Requirements

1. Allowed voltage range for the power supply (between pins VCC and GND): from 3,0 V to 3,6 V. Typical supply voltage: 3,3 V.
2. Pins DATA IN, DATA OUT, CTS, RTS shall be connected to a UART peripheral onboard the microprocessor of the host system. This allows to reach the highest data rate supported by the radio module.
3. The HOST WAKEUP pin shall be connected on the host microprocessor to an I/O input pin that can trigger an interrupt able to wake-up the host microprocessor from deep-sleep states (e.g. with the main clock stopped). This enables the host microprocessor to enter deep-sleep states whenever possible, and to be woken up by the radio module whenever a new packet is received or a new relevant radio event must be processed.

5 Electrical characteristics

Table 2

Parameter	Min.	Typ.	Max.	Unit
Power supply voltage (between VCC pin and GND pin)	3,0	3,3	3,6	V
Operating temperature range	-30	---	+85	°C



6 RF characteristics

6.1 Speed mode

Table 5

Parameter	Typ. value	Unit
Data rate	500000	bit/s
Modulation	NRZ	
Bit rate (over-the-air)	500000	bit/s
Frequency deviation	± 220,000	kHz
Number of supported channels	12	
Index of default channel	4	
Center frequency of default channel	910,00000	MHz

Table 6

Channel index	Channel center frequency [MHz]
1	903,64900
2	905,76600
3	907,88300
4	910,00000
5	912,11700
6	914,23400
7	916,35100
8	918,46800
9	920,58500
10	922,70200
11	924,81900
12	926,93600



7 User Instructions

Section	Comment
2.2 List of applicable FCC rules	This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247, DTS and Hybrid System) and RSS-247
2.3 Summarize the specific operational use conditions	The host device integrating the module cannot be operated on aircrafts. Module shall be integrated as per this guide and not modified.
2.4 Limited module procedures	N.A.
2.5 Trace antenna designs	N.A.
2.6 Rf Exposure considerations	<p>This device meets the SAR exemption threshold listed in KDB 447498 and is authorized for portable and mobile operation. Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitters procedures.</p> <p>RF Exposure Safety According to "RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", paragraph "2.5.1 Exemption Limits for Routine Evaluation – SAR Evaluation", the device operates below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance. The evaluation has been done at a distance of 5mm.</p> <p>This module is only suitable for Extremity use condition.</p> <p>Sécurité de l'exposition aux RF Selon « RSS-102 Issue 5 (2015-03) – Conformité à l'exposition aux radiofréquences des appareils de radiocommunication (toutes les bandes de fréquences) », paragraphe « 2.5.1 Limites d'exemption pour l'évaluation de routine – Évaluation SAR », l'appareil fonctionne en dessous du niveau de puissance de sortie applicable (ajusté pour la tolérance de mise au point) pour la distance de séparation spécifiée. L'évaluation a été effectuée à une distance de 5 mm.</p> <p>Ce module est uniquement adapté aux conditions d'utilisation extrêmes.</p>
2.7 Antennas	The module has a UFL connector to attach the antenna. We have 2 antennas that can be used and their part numbers are SRFI068H-100 and SRFI068V-100
2.8 Label and compliance information	<p>The host integrators must ensure that FCC/ISED labelling requirements are met. This includes a clearly visible label on the "end product" enclosure or e-label stating "Contains FCC ID: U4F-SIRIUS915" and "Contains IC:3862D-SIRIUS915".</p> <p>Les intégrateurs hôtes doivent s'assurer que les exigences d'étiquetage FCC/ISED sont respectées. Cela inclut une étiquette clairement visible sur le boîtier du « produit final » ou une étiquette électronique indiquant « Contient l'ID FCC : U4F-SIRIUS915 » et IC : 3862D-SIRIUS915</p>
2.9 Information on test modes and additional testing requirements	N.A.



2.10 Additional testing, Part 15 Subpart B disclaimer

2.11 Note EMI considerations

2.12 How to make changes

This modular transmitter is only FCC and ISED authorized for the specific rule parts (47CFR Part 15.247) listed on the grant, and the host product manufacturer is responsible for compliance with any other FCC/ISED rules that apply to the host not covered by the modular transmitter grant of certification.

The host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

This module is a stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, the host manufacturer has to consult with the module manufacturer for the installation method in the end system. Host manufacturer is recommended to use D 04 Module Integration Guide.

The final host product may also need to be evaluated against FCC rules part 15 Subpart B and ICE-003 (criteria for unintentional radiators) in order to be properly authorized for operation as part 15B/ICES-003 – digital device.

8 FCC/ISED statements

8.1 FCC

NOTICE:

This device complies with Part 15 of the FCC. 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.

NOTICE:

Changes or modifications made to this equipment not expressly approved by Datalogic may void the FCC authorization to operate this equipment.

8.2 ISED

This device complies with Industry Canada licence-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.

