

HMC Holdings LLC

FirstWatch CPU

User Guide

Version 01.01.04



Revision History

Version #	Remark	Date (MM/DD/YYYY)	Done by
01.01.01	Initial draft	June 26, 2018	Jatin Bhatt
01.01.02	Update Header and Footer	July 15, 2018	Jatin Bhatt
01.01.03	Update FCC and IC Statement	Sep 19, 2018	Jatin Bhatt
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1. Introduction:

HMC Holding has developed FirstWatch CPU which will use for Door lock and Access control products.

FirstWatch CPU contains 2.4GHz Radio and Connectors for external microcontroller, RF module interface. 2.4GHz radio is used for communication over Bluetooth 4.0 Low Energy and ANT and 6 and 12 pin connectors are used for external microcontroller and/or 433 MHz radio is used for communication with remote control.

Its powered by 4.5V to 10V DC voltage.

2. Block Diagram:

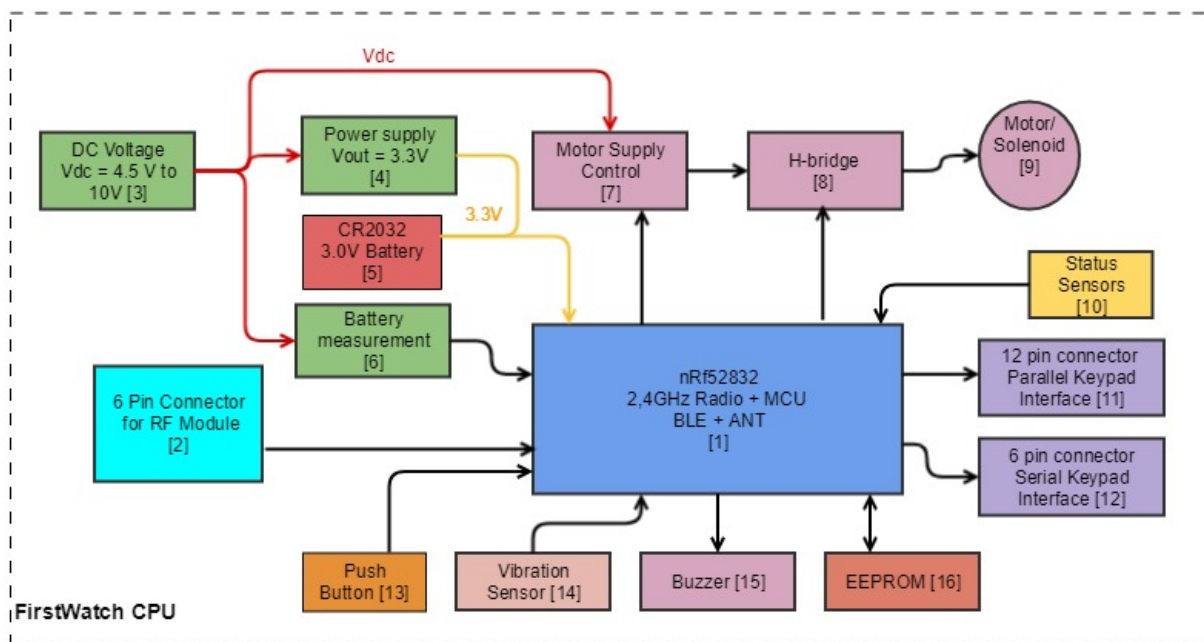


Figure 1 Block diagram of FirstWatch CPU

1. nRF52832 2.4GHz Radio + MCU

The nRF52832 SoC is a powerful, highly flexible ultra-low power multiprotocol SoC ideally suited for Bluetooth® Low Energy, ANT and 2.4GHz ultra low-power wireless applications. The nRF52832

SoC is built around a 32-bit ARM® Cortex™-M4F CPU with 512kB + 64kB RAM. The embedded 2.4GHz transceiver supports Bluetooth Low Energy, ANT and proprietary 2.4 GHz protocol stack. nRF52832 is connected with Chip Antenna which cannot be changed by end user. Max transmitting RF power is 4dBm.

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2. 6 pin connector (1x 6 pin, 2mm pitch)

This connector is used for future interface for any third party controller or RF module with SRC301. This connector has 6 pin and 6 pins descriptions are as per below:

1. Boot Loader (GPIO#1)
2. RF_RST (GPIO#2)
3. Ground
4. RF_RX/EN (GPIO#3)
5. RF_TX/DATA (GPIO#4)
6. 3.3V

3. DC Voltage

FirstWatch CPU is powered by DC voltage from 4.5V to 10V. DC voltage can be provide by Battery or AC/DC converter. DC Voltage is apply to FirstWatch CPU using **J11** connector

4. Power Supply (Voltage Regulator)

FirstWatch CPU has on board DC-DC voltage regulator which will convert 4.5V to 10V DC input voltage to 3.3V voltage which is required for nRF52832 and CC1310 and its associated circuits.

5. CR2032 – Coin Cell battery

FirstWatch CPU has RTC (in nRF52832) feature which will store date and time. CR2032 battery will provide power to nRF52832 while external power supply is not present.

6. Battery measurement

Battery measurement module will monitor supply voltage and report to nRf52832. If battery voltage is less than 4.5V then FirstWatch CPU will give low battery indication to end user.

7. Motor Supply Control

This section will control motor supply voltage. Normally, Motor section will not get powered from Battery. nRF52832 will control this section.

8. H-Bridge

An H bridge is an electronic circuit that enables a voltage to be applied across a load in opposite direction. These circuits are used to allow DC motors to run forwards or backward or activate Solenoid

9. Motor/Solenoid

Using **J3** connection, User can connect DC motor or solenoid with FirstWatch CPU. Maximum allowable current of Motor/Solenoid is 0.5A (peak) for few Seconds.

10. Status Sensors

Status sensors are used when FirstWatch CPU will use in Door Lock. Hall Effect Sensor is used for getting latch's status.

11. 12 pin connectors

User can connect matrix keypad and leds using this 12 pin connector. This connector will use for interface between Exterior unit with FirstWatch CPU board when it will use in Door lock. Its reference designator on FirstWatch CPU board is **J2**.

12. 6 pin connectors

This connector is used for future interface for any third-party controller or RF module with SRC301. This connector has 6 pin and 6 pins descriptions are as per below:

1. VBAT -4.5V to 10V DC
2. 3.3V
3. Y3/SINT (GPIO#1)
4. Y2/SDA (GPIO#2)
5. Y1/SCL (GPIO#3)

13. Push button

User can connect external switch using SW1 connector.

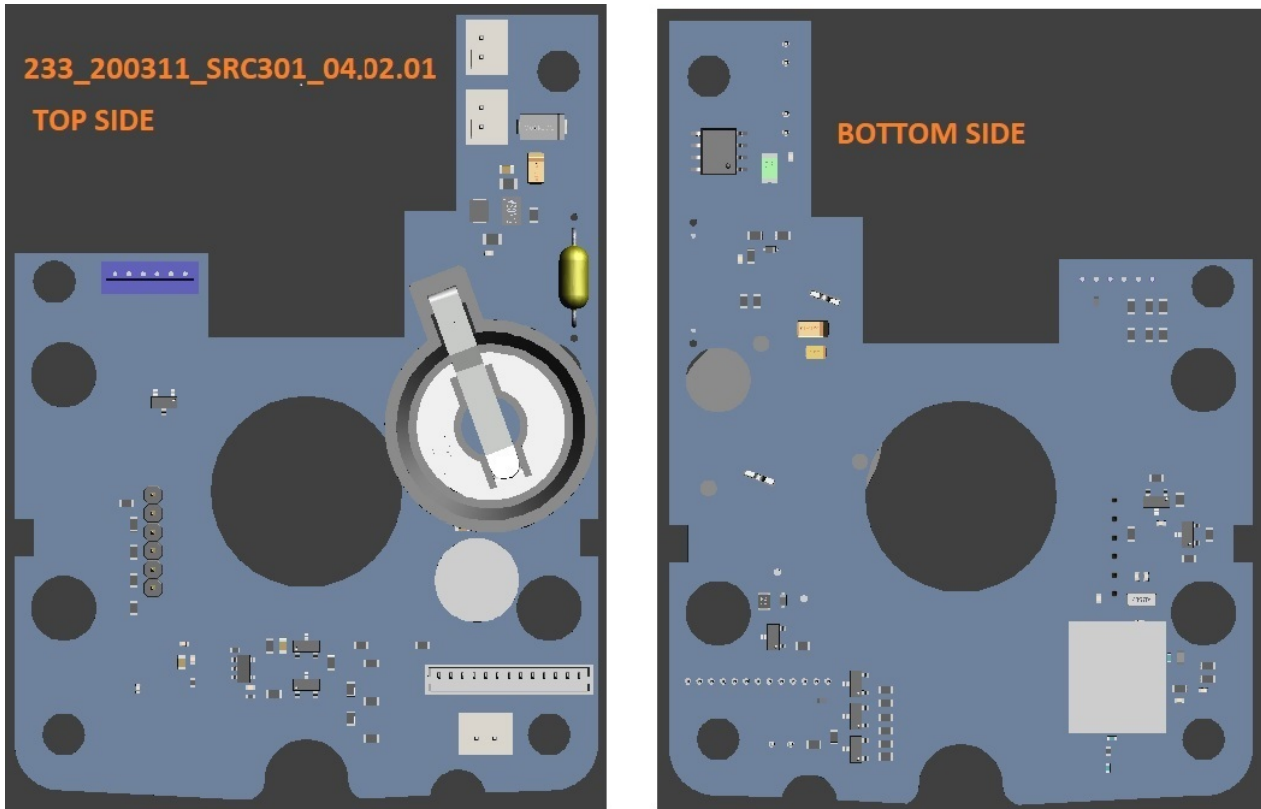
14. Vibration Sensor

SW-420 based sensor, normally closed type vibration sensor is used in FirstWatch CPU board for detect any vibration event. This vibration sensor will use for Burglary protection system.

15. EEPROM

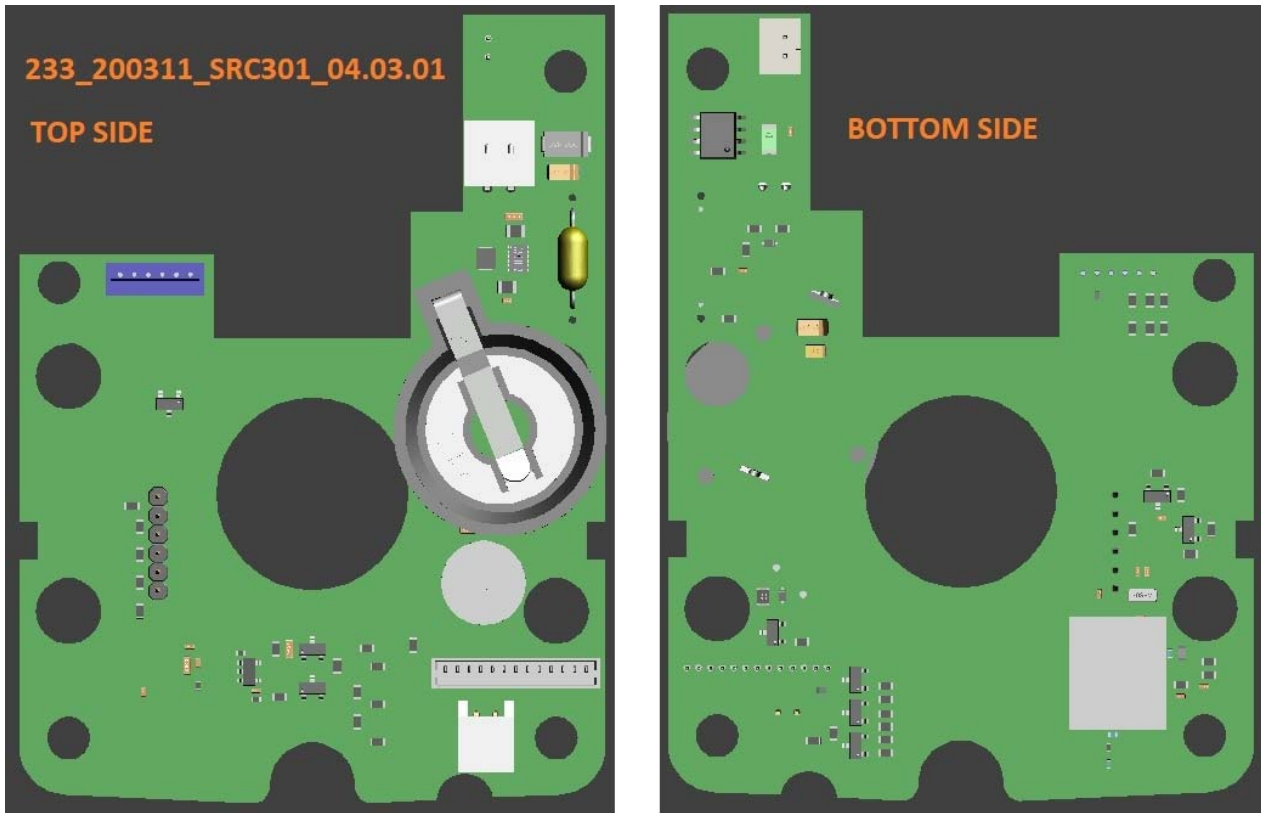
24FC64 (24XX64*) is a 64 Kbit Electrically Erasable PROM (EEPROM). The device is organized as a single block of 8K x 8-bit memory with a 2-wire serial interface. EEPROM is used for store configuration parameter and user management.

3. 3D Image of FirstWatch CPU:



Model# SRC301-A

Figure 2Top and Bottom side view of SRC301-A



Model# SRC301-B

Figure 3 Top and Bottom Side view of SRC301-B

4. End Application of FirstWatch CPU:

[A] Door Lock



Figure 4 FirstWatch Door lock

FirstWatch CPU will install in interior side of Door Lock. It will do user authentication using keycode, Mobile or remote control. After do authentication it will do lock/unlock operation.

[B] Electronics Safe – Control Unit

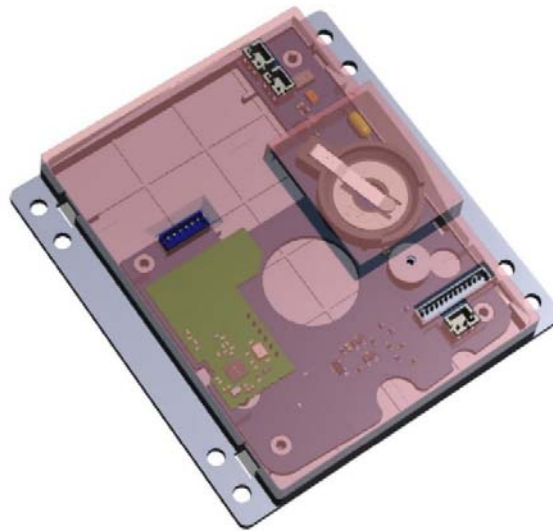


Figure 5 FirstWatch Safe Control Unit

FirstWatch CPU will install in plastic enclosure as per figure# 4 and use as an Electronics Safe – control unit. It will do user authentication using keycode, USB key, Mobile or remote control. After do authentication it will do lock/unlock operation.

5. Electrical Specification:

Absolute Maximum Ratings¹

Symbol	Description	Minimum	Maximum	Unit
VDD	Input Supply Voltage	4.5V	10V	V

Note 1: Under no circumstances should exceeding the ratings specified in the Absolute Maximum Ratings section be allowed. Stressing the module beyond these limits may result permanent damage to the module that is not covered by the warranty.

General Characteristics

Characteristic	Description
Model Name	SRC301-A, SRC301-B, SRC301-C
Product Description	FirstWatch CPU(BLE/ANT/433MHz)
Dimension	
Interface	SPI, TWI, UART, Parallel IO,I2C
Operating temperature	-25°C to +65°C
Storage temperature	-25°C to +65°C
Humidity	Operating Humidity 10% to 95% Non-Condensing Storage Humidity 5% to 95% Non-Condensing
Weight	15 g +/- 0.01g

6. Agency Certifications

FCC ID: 2AP9FSRC301

IC :24332-SRC301

AGENCY STATEMENTS

[A] Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.

FCC CAUTION: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

[B] Industry Canada Statements

Εἰς τὸ ὅτι τὸ ὄργανον τοῦ ὁποῦνδήποτε ἔργου ἔχει ἑξῆς δύο συνθήκες: (1) τὸ ὄργανον μὴ προκαλεῖται ἐνέχυρον, καὶ (2) τὸ ὄργανον δεχέται ἐνέχυρον, συμπεριλαμβανομένης τῆς ἐνέχυρου ἧς ἐνέχυρον προκαλεῖται τὸ ὄργανον.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device has been designed to operate with the antenna(s) listed below, and having a maximum gain of dBi (Integral Chip). Antennas not included in this list is strictly prohibited for use with this device. The required antenna impedance is 50ohms.

List of all Antennas Acceptable for use with the Transmitter

Chip Antenna (W3043)

- Monopole Antenna: BT, ANT
- Frequency Range [MHz]: 2400–2483.5
- Linear Max Gain [dBic]: +4
- Compact size W x L x H (3.2 x 1.6 x 1.1 mm)
- Lead free soldering compatible
- Operating Temperature [°C]: -40 to +85
- Impedance [Ω]: 50

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OEM Responsibilities to comply with FCC and Industry Canada Regulations

The Module has been certified for integration into products only by OEM integrators under the following conditions:

- This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person
- Not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

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.).

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.

Le module a été certifié pour l'intégration dans des produits uniquement par des intégrateurs OEM dans les conditions suivantes:

Ce dispositif est accordé pour une utilisation dans des configurations mobiles seul dans lequel les antennes utilisées pour cet émetteur doit être installé pour fournir une distance de séparation d'au moins 20cm de toute personne et ne pas être co-localisés avec les autres émetteurs, sauf en conformité avec la FCC et de l'Industrie Canada, multi-émetteur procédures produit.

Tant que les deux conditions précitées sont réunies, les tests de transmetteur supplémentaires ne seront pas tenus. Toutefois, l'intégrateur OEM est toujours responsable de tester leur produit final pour toutes les exigences de conformité supplémentaires requis avec ce module installé (par exemple, les émissions appareil numérique, les exigences de périphériques PC, etc.

NOTE IMPORTANTE: Dans le cas où ces conditions ne peuvent être satisfaites (pour certaines configurations ou de co-implantation avec un autre émetteur), puis la FCC et Industrie autorisations Canada ne sont plus considérées comme valides et l'ID de la FCC et IC numéro de certification ne peut pas être utilisé sur la produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'un distincte de la FCC et Industrie Canada l'autorisation.

OEM LABELING REQUIREMENTS FOR END-PRODUCT

The module is labeled with its own FCC ID and IC Certification Number. The FCC ID and IC certification numbers are not visible when the module is installed inside another device, as such the end device into which the module is installed must display a label referring to the enclosed module. The final end product must be labeled in a visible area with the following:

“Contains FCC ID: 2AP9FSRC301”

“Contains IC: 24332-SRC301”

The OEM of the Module must only use the approved antenna(s) listed above, which have been certified with this module.

Le module de est étiqueté avec son propre ID de la FCC et IC numéro de certification. L'ID de la FCC et IC numéros de certification ne sont pas visibles lorsque le module est installé à l'intérieur d'un autre appareil, comme par exemple le terminal dans lequel le module est installé doit afficher une étiquette faisant référence au module ci-joint. Le produit final doit être étiqueté dans un endroit visible par le suivant:

“Contains FCC ID: 2AP9FSRC301”

“Contains IC: 24332-SRC301”

Les OEM du module ne doit utiliser l'antenne approuvée (s) ci-dessus, qui ont été certifiés avec ce module.

OEM END PRODUCT USER MANUAL STATEMENTS

The OEM integrator should not provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

The user manual for the end product must include the following information in a prominent location:

This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

Other user manual statements may apply.

L'intégrateur OEM ne devraient pas fournir des informations à l'utilisateur final sur la façon d'installer ou de supprimer le module RF ou modifier les paramètres liés RF dans le manuel utilisateur du produit final.

Le manuel d'utilisation pour le produit final doit comporter les informations suivantes dans un endroit bien en vue:

Ce dispositif est accordé pour une utilisation dans des configurations mobiles seule dans laquelle les antennes utilisées pour cet émetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne et ne pas être co-localisés avec les autres émetteurs, sauf en conformité avec FCC et Industrie Canada, multi-émetteur procédures produit.

Autres déclarations manuel de l'utilisateur peuvent s'appliquer.