



RFN-410CL User's Guide

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1 About the RFN-410CL

The RFN-410CL is a radio communications device designed for use in Itron C1SX meters. It can also be used in Cooper Power Systems Gateways and Relay Nodes. The RFN-410CL provides a 915 MHz radio interface to an RF mesh network.

The RFN-410CL operates from a power source of 120 VAC to 480VAC, received from the host device. This voltage is then regulated to 5.0 VDC and 3.3VDC by the on-board power supply circuit. The radio modules operate in license-free bands at 915 MHz (902.75 to 927.25 MHz). RFN-410CL Nodes are fully compatible with mesh network hardware, protocols and operations. Three radio transmission data rates are available: 38.4 kb/s, 76.8 kb/s and 153.6 kb/s. The transmission power of the 915 MHz radio is adjustable from 30 dBm to -20 dBm.

2 Regulatory Notices



Warning

The Original Equipment Manufacturer (OEM) must ensure that FCC Labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the Cooper Power Systems FCC identifier (FCC ID: P9X-410CL) and IC Number (IC: 6766A-410CL) as well as the FCC Notice below.



Warning

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

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.



Warning

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



Warning

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 particular 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 or more 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.



Warning

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.



Warning

To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.”

As such, the radio component of this device is intended only for OEM integrators under the following two conditions:

The antenna must be installed such that 20 cm is maintained between the antenna and users.

The transmitter module may not be co-located with any other transmitter or antenna.

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 (e.g., digital device emissions, PC peripheral requirements).

In the event that these conditions cannot be met (for example, co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID 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 authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ASDL modems, certain laptop configurations, and similar equipment). **The final end product must be labeled in a visible area with the following: “Contains FCC ID: P9X-410CL, IC: 6766A-410CL”.**

The radio component is an integral part of the RFN-410CL and cannot be removed.

Transmitters with Detachable Antennas

This device has been designed to operate with the antennas listed below, and having a maximum gain of 5 dB. Antennas not included in this list or having a gain greater than 5 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.



Warning

Antennas that may be used with this product include:

- OD9-5-ANT 900MHz Omnidirectional - 5 dBi
- B(B)8965CN - 896-970 MHz, Base Loaded - 5 dBi
- TRA9023NP - Antenex Phantom 902-928MHz - 3 dBi
- 915 MHz Co-linear Antenna - 2 dBi

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.

3 RFN410CL Specifications

Radio Specifications	
Operating frequency	902.75 – 927.25 MHz
Reliable data transmission	Error detection, correction and retransmission
RF output power	30 dBm (maximum) to -20 dBm
Data rate	38.4 kb/s, 76.8 kb/s, 153.6 kb/s
Receiver sensitivity	-101 dBm (@ 1.0% PER, 76.8 kb/s, +25° C)
Range (w/ omni antenna)	
	Outdoor 1,000 m (3200 ft)
	Indoor 75 – 150 m (225 – 490 ft)
Mode	Frequency Hopping Spread Spectrum (FHSS)

Mechanical Specifications	
Weight	Unavailable
Dimensions	100 mm x 120 mm

Operating Conditions	
Environmental	-40° C to +85° C 0 – 95% non-condensing humidity
Power supply	AC 120V-480V (regulated to 5.0 VDC and 3.3 VDC on-board)
Power consumption	< 6W



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