FCC Part 15.247 Certification
Test Report

FCC ID: R32-RFRCU

FCC Rule Part: 15.247

ACS Report Number: 04-0170-15C

Manufacturer: Onity, Inc.
Equipment Type: Modular Radio
Model: RFRCU

Installation and Operators Guide

Room Control Unit

The Room Control Unit (RCU) is the 'brain' of Onity's new Wireless Energy Management System(EMS). It receives the temperature, humidity, guest settings, fan mode, motion status, and door status from the various system devices and determines how to operate the HVAC system and lighting control.

The RCU has six relay drivers for outputs, a local door switch input, three setup buttons, three LED indicators, a local temperature sensor input, and a Real Time Clock (RTC) interface. The RCU receives transmissions from all the wireless devices via its on board radio.

RCU Power Up

When power is first supplied to the RCU, the three LEDs each flash once, the initial configuration check is started, and the 16 DIP Switch settings are read. **These DIP Switch settings are ONLY read during the power up routine. Any changes made to these settings will not take effect until the unit is shut down and powered back up.**

If there is no response from the on board radio, the CFG LED (red) will flash. The unit will try once per second to communicate with the on board radio. As long as no communication is found, the red LED will continue to flash.

BFR – Building, Floor, Room. The unique ID of the RCU. This ID is configured in all the devices that will transmit to this RCU..

If there is a response from the on board radio, the state of the LED will depend on whether or not the unit has been configured. If the unit has been configured with a valid BFR, the red LED will turn ON. If the unit has not yet been configured with a valid BFR, the red LED will turn OFF.

RCU Buttons

As stated above the RCU has 3 setup buttons. These are explained below.

Configuration Button (CFG)

The CFG button is used to configure the BFR (Building, Floor, Room) of the unit. At this time, the BFR is a randomly generated number.

Press and hold the CFG button for 3 seconds, then release. Upon release, the red LED will flash once. Random numbers are generated to make the BFR and these are written to the radio. The radio then transmits an inquire message. If the BFR is already in use by another device in the area, an 'in use' message is received. In this case, a new BFR is generated and an inquire transmitted. This is repeated until no 'in use' transmission is received. If no 'in use' is received, then the BFR is free to use and the red LED will turn on solid.

OB/CB Button

When the *OB/CB* button is pressed, the radio will send the Open Binding message once per second for one minute, or until the *OB/CB* button is pressed again. While the unit is transmitting this message, the green LED will flash once per second.

While the unit is in the open binding mode, wireless devices such as the WDDC can be bound to this RCU.

When either one minute has passed or the button is again pressed, a close binding message is sent and the RCU exits the open binding mode.

Fast Clock Button

The fast clock button is for testing purposes only. When pressed, one second is the equivalent of one minute real time. Because the devices bound to the RCU do not have a fast clock mode, this feature is not recommended for use in the field. It was added only to facilitate testing of the unit in the lab.

Monitoring of Wireless Devices

When the RCU receives status messages from the wireless room devices, the settings are logged in the RCU memory. Anytime the RCU needs to check one of these statuses, it will check its memory to see the latest status from any of the wireless devices.

For example, if the RCU receives a message indicating that motion has been detected, it registers this in its memory. This status will not

change unless the RCU receives a message indicating that no motion has been detected.

The following list details the information the RCU will track from the wireless devices:

- Temperature Setting
- Room Temperature
- On / Off status of WDDC
- Fan button selection
- Motion Status
- Door Status (Interior and Exterior doors)
- Battery Status of each device (for future use)

The RCU expects to receive a status message from the WDDC at least once every 30 minutes. If no status is received for 35 minutes, the RCU determines that there is a problem with the WDDC unit. In this case, the RCU will shut down the HVAC system until the problem with the WDDC is solved.

Occupancy Determination

Due to the nature of this system, determination of occupancy is somewhat different than on wired systems. Because the WDDC and Remote Motion Sensor only 'wake up' once per minute to check the motion status, some special considerations must be made.

Basically, if the door is closed and motion is detected, the system determines that the room is occupied. However, with the wireless system, it is possible that the WDDC or Remote Motion Sensor will send a message that motion has been detected after the guest leaves the room. Remember, the WDDC and Remote Motion Sensor units wake up once per minute to check motion status. If at anytime during the previous minute motion has been detected, the status will show that there is motion.

For example, the guest leaves the room. 30 seconds later the WDDC wakes up and checks the motion status. Because motion was detected during the previous minute (the guest only left the room 30 seconds ago), the WDDC's status shows motion has been detected. The RCU knows that the door was closed due to the door switch transmitter. It also knows that motion was detected due to the motion sensor of the WDDC. If special considerations were not made, the system would remain in occupied mode.

In order to overcome the problem described in the example above, the occupancy determination is made as follows:

When the RCU receives a notification of a door closed event, it starts the 8 minute timer and the HVAC system operates based on the

thermostat settings. After 2 minutes have passed, the RCU checks the motion status of the room. The 2 minute delay ensures that the RCU does not have a false motion status as in the above example.

If the motion status at the 2 minute point shows that motion has been detected, the room will lock into occupied mode and the 8 minute timer will stop.

If the motion status at the 2 minute point shows that no motion has been detected, the 8 minute timer will continue and the HVAC system will continue to operate based on the thermostat settings. If at any time motion is detected in the room, the system will lock into occupied mode and the 8 minute timer will stop.

If no motion has been detected and the 8 minute timer expires, the system will enter unoccupied mode and the HVAC system will operate based on the settings programmed into the RCU for unoccupied mode.

Any motion detected even after the 8 minute timer has expired will cause the system to lock into occupied mode.

Door Opened / Door Closed Events

Anytime a door opened or door closed event is received by the RCU, it will immediately control the HVAC system based on the thermostat settings and will enable the lights if applicable. At this time, the 8 minute timer is started (32 minutes for lighting).

Door Left Open

If the door is left open, the HVAC will continue to run based on the thermostat as long as motion is detected in the room. Each time motion is detected, the 8 minute HVAC timer and the 32 minutes lighting control timer is restarted. If 8 minutes passes with no motion, the system will enter set back control. If 32 minutes passes with no motion, any controlled lighting will be shut off. If motion is again detected, the HVAC and Lighting will again be enabled and the timers restarted.

Unsold Mode

If enabled, when the RCU enters the unoccupied set back control mode, a 15 hour timer is started. If the system remains in unoccupied mode for this entire time, the system will enter the unsold (or deep set back) mode, which allows even greater savings.

The only thing that will stop this 15 hour timer is the system enters occupied mode, or the timer expires setting the unit into unsold mode.

Because the only way for the system to enter occupied mode is for the door to be closed and motion detected (after 2 minutes), the 15 hour timer will continue when staff are in the room, such as housekeeping or maintenance staff, **as long as the door is left open.**

The EUT utilizes a modular radio(FCC ID: R32-RFM100) and it has the following characteristics:

1) Federal Communication Commission Declaration of Conformity Statement

This device complies with Part 15 Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interence, and
2. This device must accept accept any interference received, including interference that may cause undesired operation.

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: Changes or modifications to this device not expressly approved by Onity could void the user's authority to operate the equipment.

2) Canadian Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. 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.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes:

1. Ce dispositif peut ne pas causer l'interférence nocive, et
2. Ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

3) RF Exposure Safety Information

In accordance with FCC requirements of human exposure to radio frequency fields, the radiating element shall be installed such that a minimum separation distance of 20cm is maintained between it and the user or general population.

Proper use of this radio in accordance to the following guidelines will result in RF exposure that is below the FCC recommended limits.

1. Do not hold any component containing the modular radio such that the it is very close to or touching any exposed parts of the body, especially the face or eyes, while operating.

2. When using any component containing the modular radio, maintain a minimum distance of 7.9 inches or 20cm or more from the body of all persons.

3. Only operate the modular radio in the following Onity host devices: Wireless DDC Thermostat(WDDC), Door Switch Transmitter(RFDSW), and PIR Motion Sensor(RFPIR).