



# REMTRON™

## Remtron™ PatriotPro User Manual

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## Revision History

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## 1. Introduction

This manual includes general information concerning the Remtron PatriotPro radio remote Operator Control Unit (OCU) operation. The information is of a general nature and does not include system-specific data, which is provided in the technical documentation accompanying the system's delivery.

Please refer to the separate MCU user manual for information about the matching machine control unit (MCU).

### 1.1 Terminology

The following represent important acronyms and long-form names used in this document:


- OCU – Operator Control Unit, historically referred to as a *transmitter*
- MCU – Machine Control Unit, historically referred to as a *receiver*

## 2. Warnings and Cautions

### 2.1 Warnings


WARNING statements have been placed throughout all text before operating or maintenance procedures, practices, or conditions considered essential to protecting personnel, equipment and property. A WARNING applies each time the related step is repeated. Before starting any task, the WARNINGS included in the text for the task should be reviewed and understood.

WARNINGS appearing in this manual follow the general format below.

	<b>WARNING</b>
	Description of warning Possible consequence of non-compliance

### 2.2 General Safety Information

- Persons under the influence of drugs, alcohol and/or other medicine that impairs reaction may not assemble, disassemble, install, put into operation, repair or operate the product.
- All conversions and modifications of an installation or system must conform to the relevant safety requirements.
- Only qualified, trained, authorized personnel may perform work on the equipment in accordance with the relevant safety requirements.
- In the event of malfunction and/or visible defects or irregularities, the product must be stopped and switched off, and the relevant master switches must also be switched off.


	<b>WARNING</b>
	<p>Observe the statutory regulations and directives applicable for the intended purpose, for example:</p> <ul style="list-style-type: none"> <li>• Accident prevention regulations</li> <li>• Safety rules and directives</li> <li>• Standards</li> <li>• Generally applicable statutory and other binding regulations for accident prevention, environmental protection, and general safety and health requirements.</li> </ul>

- Ensure that users have access to the user manual.
- The personnel working on/with the product must have read and understood this operating manual and the safety instructions.
- The safety instructions must, if necessary, be supplemented by the user with instructions concerning the work organization, work sequences, qualified personnel, etc.
- All repairs made during the warranty period must be carried out by the manufacturer or appointed authorized service center; failure to comply will invalidate the warranty.
- All repairs should be done in a clean, static-safe environment, free from contaminants like metal filings, water, oil, etc.
- It is the user's responsibility to ensure that the product always operates in good condition and that all applicable safety requirements and regulations are observed.
- Product modifications may not be carried out without the consent of the manufacturer.
- Original spare parts from the manufacturer must be used.
- Carry out periodic inspections and/or maintenance within the required intervals as required by law or prescribed in the user manual.

## 2.3 Improper Use

Ensure compliance with equipment ratings and operate only as intended, in particular:

- Ensure all supplies to the equipment are isolated before installation/maintenance
- Check that the power supply voltage/frequency data is correct
- Do not misuse or exceed operating specifications
- Ensure periodic maintenance routines are observed

	<b>CAUTION</b>
	<p>Damage to the device: The unit is rated at IP67. For environments harsher than this, use an appropriate secondary enclosure. Neglecting the above can endanger life and limb and/or cause physical damage to the product or the environment.</p>

## 2.4 Safety Instructions for Assembly / Disassembly

### Note:


Ensure suitable transient protection devices are fitted to controlled electrical relays or valves. Also, ensure the correct wiring of the crane's main contactor and the manual radio transfer switch.

- Isolate the system from the electrical power in accordance with the applicable regulations.
- Observe user-specific regulations.

- Only use suitable tools.
- Secure the installation area.

## 2.5 Operation of OCUs and MCUs with Identical System Address

To ensure safe operation, OCUs and MCUs are paired by way of a system address. This system address is unique and only assigned once by Cattron.

	<b>CAUTION</b>
	<p>Conflict of Addresses:  Addresses are never repeated and are System Unique.  The user must ensure that the system address and addressing mode are used as designed.  The system address is marked on the OCU and MCU and must match.  In the event of a breach of this undertaking, the user is liable for any resulting damage/loss and shall indemnify the manufacturer against all third-party liability claims.</p>

## 3. Why use Remote Control

Cattron Portable Remote Control (PRC) systems deliver the safety and dependability required for efficient industrial control applications such as overhead cranes, conveyors, machines, etc.

A remote control system enables an operator to be in the safest, most comfortable and most efficient position for each operation, minimizing risks of illness, injury or material damage and simultaneously boosting efficiency and productivity.

## 4. Remote Control Safety

With an OCU and a matching MCU, a machine such as a crane or a vehicle can be remotely radio-controlled, avoiding the need for a wired connection between the human interface and the controlled device. Several control elements are integrated into the OCU housing, so commands to the device are securely encoded into a radio transmission. The MCU can then receive this transmission, securely decode these commands, and provide suitable interfaces to drive the machine.

### 4.1 Radio Transmission and Security

The OCU and MCU transmission is performed using a secure RF telegram. The radio frequency typically depends on national regulations and the choice of a licensed or license-exempt frequency band.

A specific RF frequency band and channel may have been selected before the system's delivery. Depending on the frequency band, a specific number of RF channels will be available within that band. A clear unused (unless timesharing with another Cattron system) channel will be required for reliable operation.

The OCU and MCU must operate on the same RF channel to communicate.

### 4.1.1 Continuous Transmission

Typically, transmission is continuous, and the MCU uses this as part of the information required to maintain the Main Contactor control relays in an active state. Suppose the MCU does not receive a valid telegram for a defined period in this mode. In that case, it automatically turns off, i.e., the main contactor control relays and command relays are open. Depending on the application, this time varies from 0.5 s to 2.0 s.

Some MCU function relays may be maintained without communication from an OCU. An example may be the latched lights function. A wide range of non-crane-type applications may continue to run function relays without an online OCU.

**Note:**

To ensure optimum communication between the OCU and the MCU, the OCU should always be operated with line-of-sight transmission to the MCU antenna. Avoid total shielding of the signal path by metallic and other solid obstructions.

### 4.1.2 Radio Interference

Signals from other RF-emitting sources might interfere with the radio communication between the OCU and MCU. If these sources affect the radio link, it may cause intermittent operation, and changing the RF channel might be necessary.

## 4.2 Telegram Security

The transmission between the OCU and MCU is performed using a secure RF telegram. The radio frequency typically depends on national regulations and the choice of a licensed or license-exempt frequency band.

A specific RF frequency band and channel may have been selected before the system's delivery. Depending on the frequency band, a specific number of RF channels will be available within that band. A clear unused (unless timesharing with another Cattron system) channel will be required for reliable operation.

The OCU and MCU must operate on the same RF channel to communicate.

### 4.2.1 System Address

This system uses a 24-bit addressing scheme, typically comprising a 16-bit master address and an 8-bit sub-address extension, where each OCU/MCU pair shares a common, unique overall address. This address is contained in every telegram the OCU sends and is checked by the MCU every time an RF signal is received. The MCU processes a command only when the telegram address matches its defined address. This safety measure ensures that the MCU will act only upon its assigned OCU.

#### 4.2.1.1 Addressing Modes

Multiple addressing modes may be implemented depending on the specific application needs. These are; **TSAC mode** = 16-bit Master Address (MA) and 8-bit Sub Address (SA), creating one single 24-bit address.

**Example:**

OCU address = 0000 0000 0000 0001 **0000 0001**

MCU address = 0000 0000 0000 0001 **0000 0001** (MCU Online matching MA plus SA byte)

equivalent to a 24-bit address.

This mode enables an OCU to select one of up to 255 MCUs (and request a Talkback™ message from that MCU).

BSAC mode = 16-bit MA and an 8-bit SA, where each bit of the SA represents one of eight possible MCUs.



**Example:**

OCU Address = 0000 0000 0000 0001 **0100 0101**

MCU 1 Address = 0000 0000 0000 0001 **0000 0001** (MCU Online matching MA plus SA bit)

MCU 2 Address = 0000 0000 0000 0001 **0000 0100** (MCU Online matching MA plus SA bit)

MCU 3 Address = 0000 0000 0000 0001 **0100 0000** (MCU Online matching MA plus SA bit)  
equivalent to a 17-bit address.

#### 4.2.2 CRC

The telegram is checked for integrity using a 16-bit CRC. Corrupted frames will be rejected because the recalculated CRC does not match the transmitted CRC.

#### 4.2.3 Session and Frame Security

Each message is protected by an enhanced proprietary security protocol so that every telegram sent is encrypted and unique, eliminating any possibility of a 'hacking' or 'store and replay' attack ever being successful.

### 4.3 Firmware Features

Firmware enables the safe core functionality of the OCU and MCU. Additionally, it is the resident firmware 'Apps' within the firmware in conjunction with the related Configuration Parameters that enable the OCU and MCU to implement specific functionality such as Hoist Select, Crane Select, Pitch and Catch, Motion interlocking, Talkback, RFID Security and RFID re-configuration, etc.

Firmware is upgradeable over the Bluetooth™ link; this is a closed-box operation.

### 4.4 Configuration Parameters

The configuration parameters, including the System Address, Sub-Address and Addressing mode, the selected RF channel(s), and those needed to enable the programmed function to operate more fully, are initially programmed over the Bluetooth™ link, which is a closed-box operation.

Configuration parameters may also be selected when programmed to do so by interaction with such items as an RFID tag.

## 5. System Overview

Each system typically includes one or two OCUs and one MCU plus accessories, but other combinations of OCUs and MCUs are possible.

Additionally, systems may operate independently or in combinations that allow, for example, tandem control.

MCUs are available in differing interface formats, such as Relay, Safety relay, CAN, Ethernet, etc., and can be paired with these OCUs.

An MCU can be considered as a specialized Safety PLC.

The PatriotPro OCUs can be used with the 10R, 11R, 17R, and CBMCU MCUs and are backward compatible with legacy MCUs. This portfolio and the possible combinations will be continuously expanded.

These OCUs are not backward compatible with older Remtron™, Cattron™ or CattronControl™ MCUs because they have a high security, Enhanced Black Channel RF telegram format, that has become necessary to prevent a remote control system being subjected to a 'Store and Replay Attack' the possibility of which has been made more likely by the proliferation of lower cost RF scanning equipment.

This secure communication system links the OCU and MCU, and the MCU drives the machine interface (relays, etc.). Therefore, the machine is under the direct control of the OCU and, hence, the operator.

The system is available as a range of standard packages that fit most applications but can also be tailored to any custom application. This provides great flexibility to make the solution exactly fit your needs.

Standard Systems configurations and other media are available on the [www.Cattron.com](http://www.Cattron.com) website under the specific product resources tab.

These systems can wirelessly connect to the OCU or MCU and upgrade firmware to take advantage of new features as they are released. They can also wirelessly change configuration items such as frequency, address, function, interlocking, hoist crane select, SymmetryLock™, or examine function totalizers, data and error logs.

## 6. OCU Overview

### 6.1 General

These OCUs are globally compliant when supplied with an appropriate radio module for the used region; additional regional or application-specific certifications may be required for non-standard applications. They have been designed with the latest-generation safety electronics and firmware and exceed the safety-related systems requirements for ISO13849 Category 3 PL-d for the stop function and, when configured with specific options, also for defined control functions.

OCUs are equipped with two internal antennae, one for 2.4GHz and the other for the sub-GHz link. While the typical operating range depends on the local environment, it is well over 300 ft, and an open-site performance of over 750ft can be expected.

All controlled machine motions will cease if the OCU exceeds the operating range and the signal is lost.

OCUs have been approved to comply with the RF standards applicable to the region or country of use. There are license-exempt bands and license-required bands.

In North America, the 915MHz band is license-exempt (FCC Part 15 and Industry Canada RSS-210 standards).

The typical license-exempt band in Europe and other regions is 433-434 MHz or 869 MHz; again, other licensed and unlicensed frequency bands are available.

The 2.4GHz band is generally licensed-exempt, with some technical variations.

Licensed bands, including 450-470MHz, will require an operating license but provide additional reliability because they are protected from interference.

The OCUs are designed to be powered by two off-the-shelf AA batteries for the quoted 95 hours of nominal operation (depending on configuration). While the OCU would work with NiMH rechargeable batteries, battery life monitoring would not be accurate and may lead to an unexpected shutdown.

Status and feedback are provided by 6 LEDs and a haptic vibration motor. The 6 LEDs are Status, Stop, A, B, 1 and 2; Status is a Tri-color, Stop, A, B, 1 and 2 are Bi-color, and there is an ambient light sensor to adjust the intensity based on background light levels.

The Stop LED shows the current availability of the Stop switch in line with the latest standards.

LEDs A, B, 1 and 2, located to the right and left of the 'STATUS' LED, may be configured to indicate when an OCU function command, such as hoist select, or to provide a status indication of machine state via Talkback.

A Force Sensor provides continuous monitoring of OCU and freefall will safely blank functions if the OCU is dropped. High G shock is logged to monitor for equipment abuse.

## 6.2 OCU Types Overview

The Remtron PatriotPro is a lightweight, palm-sized, extremely rugged controller in standard and customized configurations.

A label insert sheet is provided to identify button functionality that suits most applications. While the front graphic is standard, customized graphics and switch configurations are possible.



**Figure 1: PatriotPro OCUs, front view**

The 'STATUS' LED (located at the center top) indicates the operational mode and any error messages.

The aperture directly under the 'STATUS' LED is an ambient light sensor that adjusts the LED intensity to improve battery life.

The four remaining LEDs, A and B, to the left of the Status LED and 1 and 2, to the right of the Status LED, indicate either selection such as hoist or crane select, information or optional Talkback information.

A Haptic (vibration) feedback motor within the case provides alerting and confirmation to an operator focused on the task at hand.

A high-reliability switch system is provided, and the rocker switches of the PatriotPro are dual-step; the other auxiliary buttons are single-step. The Stop switch uniquely features a CAT3 safety architecture and incorporates LED backlighting to provide information on the Stop switch availability as per the latest standards.

Each function pushbutton or rocker switch may have one or more steps, as described above, and these can operate different functions. Typically, the first step controls a direction or function on a two-step rocker, and the second step controls a speed increment. However, it is possible with a stepless drive to use the second step as acceleration, the first step as hold speed, and the released state as deceleration.

The direction and speed step can also be used as a CAT3 PL-d input for a high-safety function.

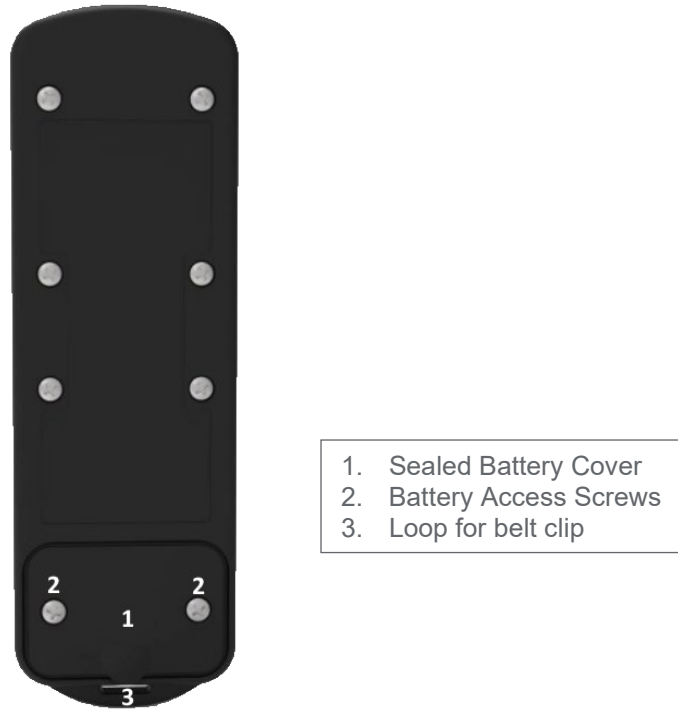
Any function usually is active only if the respective pushbutton is pressed. When the pushbutton is released, the function automatically stops. However, latched MCU functions may be defined for functions such as Lights that must be maintained without an online OCU.

Depending on the machine wiring, the Start push button is for System Start / Mainline reset and/or HORN.

At startup the pushbuttons are checked for the correct off state.

These OCUs use off-the-shelf AA Alkaline batteries that will typically provide around 95 hours of continuous operation; the batteries are accessed via a sealed cover retained by two screws, as shown below.

Figure 2: OCU, rear view



## 6.3 Data Logging

These OCU's feature a fault and data logging capability, which allows users to diagnose intermittent operational issues and record the total switch activations for planned maintenance. The Associated MCUs feature enhanced logging capabilities with totalizers and run-time per motion, enabling planned maintenance and data analytics. The OCU logs specific data, as shown in the table below. The MCU has extensive data logging that goes beyond this data set. Data log events and switch totalizers can be downloaded over Bluetooth using the Configuration PC tool. OCU Logs are shown in sequence and MCU logs are shown against a Real Time Clock.

**Table 1 - OCU Event Logging**

OCU EVENTS
Self-test
Power on
Power off
Stop switch pressed
Totalizers for every switch
Battery replaced
Run time on current batteries
Low battery warning
RF Talkback signal level below-defined level
Unit configuration changed
Data-log downloaded
Data-log cleared
Switch Read Errors

These logs are explained in more detail in the following table;

**Table 2 - Log Event Detail**

LOG	DETAIL
Self-test results	Event was completed with no error or specific detail of the fault shown
Power up	OCU power ON triggered
Power Down	OCU power OFF triggered
E-Stop pressed	E-Stop was pressed
Switch Totalizers for each switch	Current total activations for each switch
Battery Replaced	Batteries have been removed and replaced
Run time on batteries	Total run time since new batteries were fitted
Low Battery warning	Low Battery Warning has been triggered
RF received a signal level below the defined level	Received Signal Level is below -95dBm and two of the last three messages were missed.
Configuration change and config ID	Configuration or Program has been updated
Datalog download	Datalog has been accessed
Datalog cleared	Datalog has been cleared
CAT3 errors	Switch read Errors have been recorded

## 7. Operating Instructions

### 7.1 OCU First Use

Insert a new set of AA-size Alkaline batteries; these need to be installed.

### 7.2 OCU Battery – Removal and Replacement

Referring to the figure below, the battery access is under the cover on the rear of the OCU.

- To replace the batteries, insert new batteries taking note of the correct polarity as shown on the graphic under the batteries, then replace the cover and gently tighten the screws to snug the cover down.
- To gain access to the batteries, remove the two screws securing the cover, remove the cover and old batteries.

Figure 3: OCU, rear views



Figure 4: Battery Pack Removal and Replacement

### 7.3 Activating the System

The following assumes that the MCU has been installed per the user manual.

Ensure that the OCU being used is the correct one for the machine to be controlled. An OCU may operate equipment that is many hundreds of feet away. Each system is assigned a unique address; the OCU and MCU use this address, which is not normally duplicated. The OCU should have a label identifying the machine to which it is assigned.

**WARNING**


Multiple remote control systems may be used at, around, or near your operating facility. Therefore, before selecting an address for a system or spare, you must ensure it is the correct address for the equipment to operate. If the wrong address is programmed into an OCU or MCU, other remote-controlled equipment at, around, or nearby your facility may unintentionally become operational. Failure to comply with the above warnings may result in serious injury or death to personnel and damage to equipment.

## 7.4 Operating the OCU

### 7.4.1 Momentary Transmission Mode

For systems configured in the Momentary Transmission (MT) mode, the OCU will (assuming no faults and a good battery) transmit the STOP command from the OFF, Passive or Active States but will not transmit command functions until the Start sequence (STOP / START) has been completed. The OCU will continue to transmit for 5 seconds after any command button has been released or the stop switch has been pressed, then cease transmitting. The LED and Haptic indications for Stop being pressed in Sleep or Passive mode are no different from those shown in the following paragraphs.

**WARNING**


Momentary Transmission (MT) mode should not be used where it must be guaranteed that the OCU will be able to stop the machine; for these applications, a continuous mode of transmission must be used. In MT Mode, the MCU main contactor control safety relays can be configured to stay turned on for varying lengths of time, including infinite, or until the OCU has commanded them to turn OFF. MT should only be used where a risk assessment has indicated that this mode of operation presents no additional risk. In MT mode, there is no guarantee that when an OCU button is pressed, it will communicate with the MCU. Failure to comply with the above warnings may result in severe injury or death to personnel and damage to equipment.

### 7.4.2 Transition to Passive Mode

From an OFF state, the OCU can be powered up by pressing the START button. This will wake the OCU from a deep sleep state to a fully tested PASSIVE mode, where it is waiting for user input to move into another operational mode. At this point, the LEDs and Haptic will be tested, so you will see all the LEDs flash briefly and the Haptic buzz to confirm they are all working. The center Status and Right-hand LEDs 1 & 2 will then illuminate. The battery status will be shown on LEDs 1 & 2. After a few seconds, LEDs 1 & 2 will turn back OFF.

**Table 3 - Switch ON LED Sequence**

Sequence	LEDs							Function
	E-Stop	A	B	STATUS	1	2	HAPTIC	
Entering Passive State				GREEN				
At switch on after self test	RED	RED	RED	RED	RED	RED		quick verify of LEDs & haptic
		GREEN	GREEN	GREEN	GREEN	GREEN		
INTERNAL Error				BLUE			1 BUZZ	
CAT 2 Error				RED			3 BUZZ	
SWITCH Error				N/A				
Pause				ALT. RED/GRN			3 BUZZ	Alternating Red/Green with Battery state masked
Passive State	OFF			GREEN	GREEN	GREEN		Battery more than 80%
	OFF			GREEN	GREEN	AMBER		Battery 60-80%
	OFF			GREEN	AMBER	AMBER		Battery 40-60%
	OFF			GREEN	AMBER	RED		Battery 20-40%
	OFF			GREEN	RED	RED		Battery less than 20%


### 7.4.3 Transition to Active Mode

From Passive Mode, the OCU can be moved into Active (Transmitting) mode; this stage involves some critical Safety tests and a positive transition into active machine-controlling mode. The STOP switch has two contact elements under it, and they are tested every time the OCU is moved into Active mode. All switch elements are also tested at this phase to ensure none are activated. The start sequence from Passive Mode is to press the Stop switch and then press the Start switch within 3 seconds.

**Table 4 - Active Mode LED Sequence**

Sequence	LEDs							Function
	E-Stop	A	B	STATUS	1	2	HAPTIC	
Active State Transmission Battery >40%	RED F			OFF				Active and E-Stop available
Active State Transmission Battery 20-40%	RED F			AMBER F				Active and E-Stop available
Active State Transmission Battery <20%	RED F			RED F			3 BUZZ	Active and E-Stop available

At this point, the OCU is operative, and the target machine will be under direct control to verify the connection by activating a non-motion function such as the Horn button. Test all functions briefly at the start of the work session.

	<b>WARNING</b>
	<p>Before attempting to use the system, verify that the target crane or machine you wish to operate is under the direct command of your OCU. This is accomplished by operating a non-motion OCU function, such as the horn, and observing that the horn sounds on the targeted crane or machine. Failure to implement the above may result in severe injury or death to personnel and damage to equipment.</p>



#### **7.4.4 Transition to Passive Mode**

The machine may be brought to a halt at any time by simply releasing the motion control button that will deactivate the motion control, or in an emergency, pressing the STOP button that will typically deactivate the crane main contactor. When the STOP button is pressed, the OCU sets the STATUS LED Red and the ESTOP LED Green, sending a positive stop command to the MCU, and then terminates transmission, both of which will deactivate all commands and de-energize the crane main contactor.

From this stage, the OCU can either be transitioned back to Active mode or switched off.

#### **7.4.5 Transition to OFF Mode**

From Passive mode, the OCU can either be left until it powers down automatically or manually put to sleep by pressing and holding the STOP button for 3 seconds.

#### **7.4.6 Summary of Turn-On Procedure**

From OFF, press START and wait until the Status LED is green, then press STOP, START, and the OCU will be transmitting.

If at any point the Status LED ends up as RED (usually due to not waiting for the self-test to complete), press and hold the STOP button for 3 seconds until the OCU turns off and then press Start again.

### **7.5 Control Functions**

The system will have been configured in one of many different standard configurations or possibly a custom configuration. A configuration sheet will detail all the functions; some specific functions are mentioned below.

#### **7.5.1 Magnet/Vacuum Lift and Drop**

Lift is always a single-button function, whereas drop is always a two-button function for safety; depending on the number of available auxiliary buttons, the DROP may be a separate button or combined with LIFT.

##### **7.5.1.1 Separate DROP**

To Drop, press LIFT and DROP together for 3 seconds (configurable), release LIFT and then release DROP.

##### **7.5.1.2 Combined DROP**

To Drop press LIFT/DROP and ON/ALM together for 3 seconds (configurable), release LIFT/DROP, then release ON/ALM

#### **7.5.2 Hoist or Crane Select**

This function enables successive selection of two hoists or cranes, typically by pressing one button on the OCU.

The sequence typically is set to default to 'no selection' when the switch is on, and each press of the button increments around a loop of no selection, A, B, BOTH, no selection, etc.

The A, B, 1 and 2 LEDs on the top of the OCU confirm the actual selection.

Press the select button for longer than 500mS to ensure positive selection.

### 7.5.3 Lights

Lights or latched function selection is an MCU-based variation in which the relay being Latched toggles between the OFF and ON state and is not affected by the state of the MCU Mainline Contactor relay outputs. When the MLC relays turn off, this assigned relay will stay in whatever state it is, OFF>OFF or ON>ON. The state can only be changed by turning the OCU back on and changing the state or resetting the MCU's power.

This prevents an area light on a crane from automatically turning OFF when the remote is turned off.

## 8. OCU Maintenance

### 8.1 Built-in Reliability

The PatriotPro OCUs and associated MCUs have been designed to be highly reliable. They incorporate features such as RF antenna diversity, high-performance radios, built-in fault tolerance that will safely isolate any faults if possible and self-clearing in the event of a transient fault (these will still be logged) so users can expect superior reliability.

### 8.2 Maintenance Personnel

Unless customer technicians have received formal maintenance training from Cattron, the safe and approved maintenance philosophy is that faulty OCUs or MCUs should be returned to an authorized facility for repair. This ensures that safety and reliability are maintained at the required level.

#### Note:

When returning an OCU for repair, note the serial number so that the OCU configuration may be retrieved for any spare OCUs that need to be programmed.

### 8.3 Preventative Maintenance

Preventive on-site maintenance is essential to ensure system safety and longevity. The following items are recommended:

Daily Visual Inspection:

- Before use, visually inspect the OCU for cleanliness, physical damage and security of external parts (screws, battery cover, switches, etc.).
- Regular visual inspections not only mean quickly locating a source of potential problems but also may prevent serious problems from developing later.

Cleaning the OCU:

- If necessary, the OCU should be cleaned with a moist cloth and a mild soap solution and then wiped dry with a clean paper towel. Do not immerse the OCU in water and do not use any alcohol-based or oil-based solvent cleaners—these could damage the housing.


Functional Check:

- After maintenance or repair, perform a functional check to ensure the correct machine is under control and all functions are working correctly.

Mission Time:

- The OCU mission time (between major service or replacement) is expected to be about five years in a typical heavy industrial environment. The totalizer logs should be examined at least annually. Suppose the number of switch activations has exceeded 1 million operations. In that case, we recommend returning the unit for a switch assembly replacement before the projected switch life of 2 million operations is reached.

## 9. CattronLink™

	<b>WARNING</b>
	Multiple remote control systems may be used at, around, or near your operating facility. Therefore, before selecting an address for a system or spare, you must ensure it is the correct address for the equipment to operate. If the wrong address is programmed into an OCU or MCU, other remote-controlled equipment at, around, or nearby your facility may unintentionally become operational. Failure to comply with the above warnings may result in serious injury or death to personnel and damage to equipment.

These controllers feature the latest Safety, Programming and Configuration innovations that enable continuous performance and simplify upgrades.

There are two parts to this;

1. The Firmware that includes the core safety functions and the Features (or Apps) that have been integrated that give the OCU its operational capabilities, such as RFID User Authorization or Tandem Crane control
2. The Configuration Parameters define the enabled state of any features, the required configuration parameters such as Operating Frequencies, Address, Addressing Mode, Time-share Algorithms, Switches allowed to be ON at startup, RFID use, Switch Mapping and much more.

The Firmware may contain features that are not configured or used; however, if a feature is wanted, its App must be in the firmware.

Configuration parameters that are unavailable in the firmware will not be implemented even if loaded in the Configuration file.

Therefore, as features are released, the firmware must be upgraded to benefit from them (if desired).

Due to this flexible and easily upgradeable configuration concept, it is not uncommon for one OCU to be kept as a spare for multiple cranes or machines, even if its functionality is widely varying.

All OCU and MCU access is carried out wirelessly over a Bluetooth link from a laptop or PC running the Cattron software utility called CattronLink™.

### 9.1 What is CattronLink™ Software?

CattronLink™ software is a suite of apps that enable the latest generation of Cattron remote control products to be accessed over a Bluetooth® link for:

- Firmware Upgrades

- Loading or changing configuration parameters
- Examining device status, including switch and relay totalizers
- Examining the data logging stores.

CattronLink may be operated locally or remotely with the assistance of a member of the Cattron support team.

**Note:**

Not all features of CattronLink™ are available for all systems. The Cattron-S series, for example, has fixed configurations and a limited need for frequency or address management.

The User manual for CattronLink™ can be found on the Cattron.com website.

## 10. Requirements to Achieve PL-d within a 'System'

The PatriotPro OCUs meet a PL-d rating for the Main Contactor control relays.

The Stop switch and all subsequent switches are CAT3 architectures with safety-critical firmware, meeting ISO13849 performance level d.

Additionally, all OCU motion functions can meet the same performance level if two switch elements are used to operate a function. For example, on a PatriotPro, direction and speed switch inputs are combined into one control function.

The R10 and R17 MCUs have the option of Safety Relays for motion functions. If two of these are used for a function, or one is used as a motion enable and the other is placed in series, then a PL-d performance level can also be achieved in the MCU, and hence, the entire motion function can be at a PL-d level.

## 11. Technical Specifications

OCU DATA	DESCRIPTION
OCU Series	PatriotPro
Frequency Range	2.4GHz, 902-928 MHz, 433-434 MHz, 868-869 MHz, 447-473 MHz and others
Operation Range	Sub-GHz 500 ft., 2.4 GHz 600 ft.
Transmission Speed	Sub-GHz 9.6 kb/s
Power Output	Sub GHz 1-100mW, 2.4GHz 1-100mW (depends on regional RF rules)
Antennae	Internal
System Addresses	24 Bit multi-mode
Power Saving Mode	15 minutes, configurable
Voltage Supply	Two AA Alkaline Batteries
Battery Life	65 hours nominal configuration (LED and RF power dependent)
Control Elements	3 motion two-speed, 4 Aux
User Feedback	5 Multi-Color LEDs for status and fault display and Haptic
Weight	.34kg (0.75lbs)
Dimensions	206 X 71 X 38 mm (8.1 X 2.8 X 1.5 in)
Housing	Reinforced Nylon 66
Operating Temperature	-4 °F to +140 °F (-20 °C to +60 °C)
IP Protection Class	IP65
Safety Category	ISO 13849 PL-d Stop Command (PL-d possible on motions with specific configurations)

## 12. Configuration Sheets

Refer to the resource tab for PatriotPro OCU at the following web address.

[www.cattron.com/support-resources/](http://www.cattron.com/support-resources/)

## 13. RF Compliance

Information to the User regarding FCC Compliance:

- Changes or modifications not expressly approved by the manufacturer shall void the user's authority to operate the equipment.
- This Class A digital apparatus complies with Industry-Canada ICES-003 standards.
- 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
  - (2) This device must accept any interference received, including interference that may cause undesired operation.

### 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. 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. The operation of this equipment in a residential area is likely to cause harmful interference, and the user will be required to correct the interference at their own expense.

OCUs have been approved to comply with FCC Part 15 and Industry Canada RSS-210 application standards.

No United States of America FCC or Industry Canada license is required for the operation of FCC Part 15 or RSS-210 MKU OCUs.

### 13.1 Unlicensed Bands

Unlicensed bands include the following:

- 902-928 MHz in the USA and Canada
- 433-434 MHz in the EU, Brazil, China and others
- 868 MHz in the EU
- Other regions may differ based on National and regional rules.

### 13.2 Licensed Bands

Licensed bands include the following:

- 450-470 MHz in the USA and Canada
- Other regions may differ based on National and regional rules.

Due to continuous product improvement, the information provided in this document is subject to change without notice.

**Tech Support**

Contact a technical support specialist at 877.399.2937 for 24-hour support. Or visit [cattron.com/contact](http://cattron.com/contact) for additional contact details.

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