



CattronControl™ SCU32

Remote Control System
User Manual

9M02-8679-A001-EN



CONNECT. CONTROL. PROTECT.

Revision History

VERSION	DATE	NOTES
1.0	08/2014	Initial Release
2.1	03/2016	Updated branding & styles
2.2	08/2018	Corrected Stop function input table
3	11/2019	Document rebranded

Any information furnished by Cattron™ and its agents is believed to be accurate and reliable. All specifications are subject to change without notice. Responsibility for the use and application of Cattron products rests with the end user since Cattron and its agents cannot be aware of all potential uses. Cattron makes no warranties as to non-infringement nor as to the fitness, merchantability, or sustainability of any Cattron products for any specific or general uses. Cattron Holdings, Inc., or any of its affiliates or agents shall not be liable for incidental or consequential damages of any kind. All Cattron products are sold pursuant to the Terms and Conditions of Sale, a copy of which will be furnished upon request. When used as a tradename herein, Cattron means Cattron Holdings, Inc. or one or more subsidiaries of Cattron Holdings, Inc. Cattron™, corresponding logos, and other marks are trademarks or registered trademarks of Cattron Holdings, Inc. Other marks may be the property of third parties. Nothing herein provides a license under any Cattron or any third party intellectual property right.



Contents

1. Safety Instructions	5
1.1 Warning Symbols and Definitions	5
1.2 General Safety Information	5
1.3 Intended Purpose	6
1.4 Improper Use	6
1.5 Safety Instructions for Assembly/Disassembly	6
2. Radio Remote Control Controller	7
2.1 General	7
2.2 SCU32 Controller	7
2.3 System Address	7
2.4 Radio Transmission	7
2.4.1 Continuous Transmission	8
2.4.2 Radio Interference	8
2.4.3 Mounting Location	8
2.5 System Parameters	8
3. Installation	9
3.1 Mounting	9
3.2 Electrical Connections	9
3.2.1 Optocoupler Input Voltage	10
3.3 External Antenna (standard)	10
3.4 Detached Antenna Kit (optional)	10
3.5 TransKey	10
3.6 RF Channel Selection	10
3.6.1 Changing the RF Channel	10
3.7 RF Bands and Channels	11
4. Technical Data and Specifications for SCU32	13
5. Installation Notes	15
5.1 Mounting Options	15
5.2 Enclosure Dimensions	16
6. SCU32 Interface Board Connection Overview	17
6.1 Power Supply	17
6.1.1 AC Power Supply	17
6.1.2 DC Power Supply	17
6.2 Input Terminals	18
6.2.1 Optocoupler Terminals (command functions) X2 through X5	18
6.2.2 Optocoupler Terminal (E-Stop function) X6	19



6.2.3 Power Supply for Optocoupler inputs X6..... 19



1. Safety Instructions

1.1 Warning Symbols and Definitions



Warning against a hazardous situation



Warning against electrical voltage

DANGER Calls attention to a dangerous situation with high risk; severe injuries or death possible.

WARNING Calls attention to a situation with medium risk; severe injuries possible.

CAUTION Calls attention to a situation with low risk; injuries or damage to the device possible.


Note: Calls attention to important information.

1.2 General Safety Information

Persons under the influence of drugs and/or alcohol and/or other medicine that impairs their reaction may not assemble, disassemble, install, put into operation, repair, or operate the product.

All conversions and modifications of an installation/system must conform to the relevant safety requirements. Work on the electrical equipment must be performed by qualified, authorized personnel only, and in accordance with the relevant safety requirements.

In the event of malfunction and visible defects or irregularities, stop the product, switch it off, and switch off all relevant master switches.

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

- The user must instruct his personnel accordingly.
- Keep the User Manual permanently accessible at the product's place of use.
- Personnel assigned to work on/with the product must first read and understand 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, user personnel, etc.
- Only trained personnel may perform the work (maintenance and repair) on/with the product.
- It is the user's responsibility to ensure that the product always operates in a perfect condition and that all applicable safety requirements and regulations are being observed.
- Product modifications may not be carried out without the consent of the manufacturer.



- In any event, only original spare parts from the manufacturer must be used.
- Periodical inspections and/or maintenance either required by law or prescribed in the user manual must be carried out within the required intervals.


1.3 Intended Purpose

Only use the product in a technically perfect condition, by instructed personnel and subject to the compliance with the applicable safety and accident prevention regulations. The product is electrical equipment for use at the rated voltage shown on the type plate. Use for the intended purpose also requires compliance with the contents of this User Manual, particularly the requirements and instructions described therein.

1.4 Improper Use

Certain work on/with the product, as well as certain usage of the product, is not permitted. In particular, improper use includes the following:

- Tampering with electrical equipment
- Power supply connections deviating from the voltage/frequency data on the type plate
- Work on live components
- Incorrect operation
- Improper use of the product
- Removal of covers
- Insufficient maintenance
- Failure to observe the operating temperature range

	CAUTION
	<i>Damage to the device</i> Do not immerse the product in water.

Neglecting the above can result in danger to life and limb and/or may cause physical damage to the product or the environment.

1.5 Safety Instructions for Assembly/Disassembly

Only qualified persons may perform assembly/disassembly work.

Note: Ensure that the triggered electrical relay and valves have suitable interference protection. Pay particular attention to the wiring of the crane's main contactor and manual radio switchover.

- 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. Radio Remote Control Controller

2.1 General

The radio remote control controller connects over its interface to external actuators in order perform the following functions: cyclically read the status of these actuators, transform this data into a serial data string, form a telegram by adding system relevant data, and transmit this telegram via a RF signal to its corresponding receiver.

2.2 SCU32 Controller


The SCU32 controller allows the transmission of up to 32 + 4 digital commands. The controller interface to the external actuators is realized by an optocoupler interface board, providing a galvanic isolation and protecting the microprocessors against overvoltage damage by the external signal source.



Figure 1: SCU32 Controller with Han Connector

2.3 System Address

In an industrial radio remote control system, each controller/receiver pair shares a common, unique system address. The system address is contained in every telegram sent by the controller and is checked every time a RF signal is received. In order for the processors in the receiver to activate a command (relay), the system address in the telegram and the system address stored in the receiver must match. This is a safety measure to ensure that the receiver interacts only with its assigned controller.

	CAUTION
	<p><i>Conflict of Addresses</i></p> <ul style="list-style-type: none"> • The operator must ensure that the system address is used for a single pair of controllers and receivers. • If more than one receiver or controller is used to control a machine or system, the operator must take precautions so that only a single controller operates at each time. • In the event of a breach of this undertaking, the customer or the operator, respectively, is liable for the resulting damage/loss and they shall indemnify the manufacturer against all third-party liability claims.

2.4 Radio Transmission

The transmission between the controller and receiver occurs through radio communication. With regard to the actual radio frequency being used, there are several radio frequency bands available. Within the respective frequency band, a specific RF channel must be selected. Depending on the frequency band, a certain number of RF channels are available. For details regarding the available RF channels, please refer to Section 0, “



3.7 RF Bands and Channels”. The controller and receiver must operate on the same RF channel to communicate.

2.4.1 Continuous Transmission

One of the features of an industrial radio remote control system for safety-relevant applications (such as machine controls) is that it ensures that a permanent connection exists between the transmitting and receiving stations. To achieve this, the receiver constantly monitors the RF channel to verify that a communication link exists. Should the receiver not receive valid telegrams, it will automatically turn off, i.e., safety relays and command relays open.

2.4.2 Radio Interference

Signals from other RF-emitting sources might interfere with the radio communication between the controller and receiver. If the radio link is affected by these sources, it may be necessary to change the RF channel or RF band.

2.4.3 Mounting Location

The controller is supplied with an external antenna. In order to ensure optimum communication, install the controller and the receiver with line-of-sight between them. Avoid any shielding by metallic constructions. In the event that the controller must be installed inside a cabinet or building, use a detached antenna and place it accordingly, and then connect it to the receiver with an adequate coaxial cable.

2.5 System Parameters

The system parameters, including the system address and the selected RF channel, are contained in a contactless RFID TransKey. This TransKey is easy to swap into a spare unit and is located inside the housing. The TransKey is pre-programmed by Cattron.

Note: Refer to the separate *Configuration Data* documents for the specific system parameter settings of your system.



Figure 2: Controller TransKey (black)



3. Installation

The following section will help you install your unit.

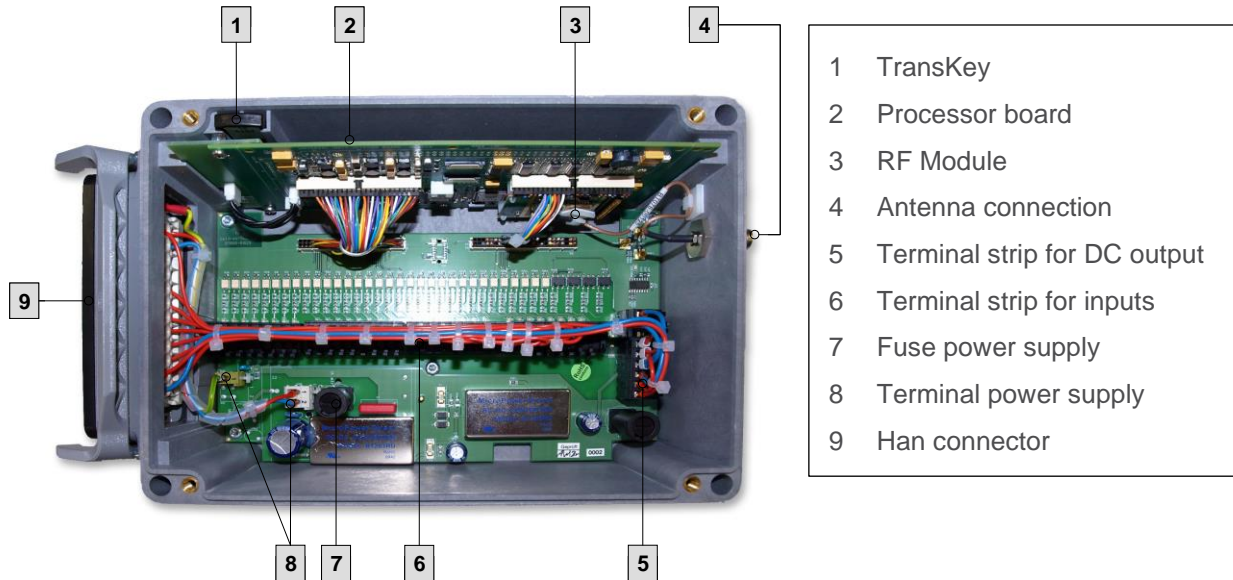



Figure 3: SCU Controller


	DANGER
	<i>Hazardous Voltage</i>
	<p>Disconnect the machine or the system from the power source before installation, and ensure that it cannot be switched on unintentionally.</p> <p>Installation and maintenance must be carried out by trained personnel only.</p>

3.1 Mounting

Mount the Control unit using the accessories included. For mounting details and options, refer to Section **Error! Reference source not found.**, “Error! Reference source not found.”.

3.2 Electrical Connections

For all electrical connections, such as the power supply including the ground (PE) and command inputs, refer to the separate electrical drawings received with the delivery of the system. Connect the unit according to these drawings.

	CAUTION
	<i>Wiring and hazard of short circuits within the housing</i>
	<ul style="list-style-type: none"> • Ensure the wiring is connected so that the wire ends are securely attached and without bare conductors; the use of crimps is recommended. • Ensure that wires are suitably supported and routed through suitable strain relief bushings where needed. • Ensure that a suitable protective earth (i.e., a ground wire/rod) is connected to the OCU PE terminal. • If any rigid metallic conduit is used, it must be connected to a suitable protective earth.



3.2.1 Optocoupler Input Voltage

The interface to the external digital actuators is achieved with optocouplers that incorporate overvoltage protection. The nominal voltage to switch the optocouplers is 12/24 VDC. This voltage can either be supplied externally into the receiver, or via the internally-available power supply.

3.3 External Antenna (standard)

The controller usually includes an external RF antenna attached the receiver housing. Ensure that the controller is installed in a location where line-of-sight exists with the receiver, and that the system does not exceed the maximum distance between the units.

3.4 Detached Antenna Kit (optional)

If the controller is supplied with an antenna kit to install the antenna detached from the receiver housing, install the antenna in a suitable location following the supplier's instructions. Run the coaxial cable from the antenna to the controller and connect it to the external antenna connection point. Ensure that the coaxial cable being used does not exceed the maximum allowable attenuation for your application, as this might reduce the range of the system.

3.5 TransKey

Verify that the controller TransKey (black) matching the receiver TransKey (yellow) is placed in the appropriate holder inside the controller enclosure. Each TransKey pair is marked with a unique system address.



Figure 4: TransKey Pair (Rx + Tx)

Note: Do not interchange the TransKeys for the controller (black) and the receiver (yellow). If the TransKeys are interchanged, the system will not operate.

3.6 RF Channel Selection

In order to ensure interference-free radio control system operation, choose an undisturbed RF channel. Since the RF channel is typically set by the manufacturer, it should be determined before shipping the system to the customer's site.

3.6.1 Changing the RF Channel

Due to interference from other systems, it may be necessary to change the RF channel preset by the manufacturer. The RF channel can be changed by reprogramming the TransKey. This is typically done by the manufacturer or can be done on-site with an appropriate programming adapter and software.

Note: When changing the RF channel, be sure to observe the country-specific regulations regarding frequency range and channel.



3.7 RF Bands and Channels

Depending on the country or region of the world, the system must operate in an application-approved RF frequency band. Following are the available license-exempt frequency bands with the available RF channels in each respective frequency band. There are other frequency bands available that may be assigned by the factory to your system; please check your configuration sheets.

Table 1: RF Channel Table for 418/419 MHz and 447 MHz

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	418.9500	1	447.8625
2	418.9750	2	447.8750
3	419.0000	3	447.8875
4	419.0250	4	447.9000
5	419.0500	5	447.9125
6	419.0750	6	447.9250
7	419.1000	7	447.9375
8	419.1250	8	447.9500
9	419.1500	9	447.9625
10	419.1750	10	447.9750
11	419.2000	11	447.9875
12	419.2250		
13	419.2500		
14	419.2750		

Table 2: RF Channel Table for 869 MHz

Channel	Frequency (MHz)
0 *	869.850
1	869.800
2	869.900
3	869.535

(*) Do not use this channel if existing systems are already operating on channels 1 and/or 2, and are in close proximity.



Table 3: RF Channel Table for 433/434 MHz

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	433.0775	36	433.9525
2	433.1025	37	433.9775
3	433.1275	38	434.0025
4	433.1525	39	434.0275
5	433.1775	40	434.0525
6	433.2025	41	434.0775
7	433.2275	42	434.1025
8	433.2525	43	434.1275
9	433.2775	44	434.1525
10	433.3025	45	434.1775
11	433.3275	46	434.2025
12	433.3525	47	434.2275
13	433.3775	48	434.2525
14	433.4025	49	434.2775
15	433.4275	50	434.3025
16	433.4525	51	434.3275
17	433.4775	52	434.3525
18	433.5025	53	434.3775
19	433.5275	54	434.4025
20	433.5525	55	434.4275
21	433.5775	56	434.4525
22	433.6025	57	434.4775
23	433.6275	58	434.5025
24	433.6525	59	434.5275
25	433.6775	60	434.5525
26	433.7025	61	434.5775
27	433.7275	62	434.6025
28	433.7525	63	434.6275
29	433.7775	64	434.6525
30	433.8025	65	434.6775
31	433.8275	66	434.7025
32	433.8525	67	434.7275
33	433.8775	68	434.7525
34	433.9025	69	434.7775
35	433.9275		

Note: Each frequency band requires its own RF Module. Changing from one band to another requires changing the RF Module and the external antenna as well, depending on the change.



4. Technical Data and Specifications for SCU32

RF	
Frequency Ranges/Power	335 MHz (< 1 mW ERP)
	433-434 MHz (<10 mW ERP)
	447-473 MHz (<10 mW ERP typical, up to 2W optional)
	868 MHz (<5 mW ERP)
	902-927 MHz (FCC Part 15)
Transmission Speed	4.8 to 20 kbit/s
Modulation	FM (8K50F1D typical)
RF Channel Spacing	12.5 kHz; 25 kHz and others
Antenna	External
Electronics	
Digital Circuitry	Dual-processor technology in Master/Slave architecture
System Addresses	24 bits = 16 million addresses
TransKey	Transponder with system parameters
Hamming Distance	d = 6 (Telegram verification)
Inputs	32 optocoupler commands (each common potential with 8 inputs)
	4 optocoupler Master Safety (common potential)
	Input voltage: 12/24 VDC
Internal Power Supply for Optocoupler Inputs	12 VDC
Operating Temperature	-20° to +60° C
Storage Temperature	-40° to +70° C
Power Supply	48, 115, 230 VAC; 50-60 Hz (nominal voltage)
	12/24 VDC (optional)
Power Consumption	10 VA
Mechanical Data	
Weight	1.8 kg
Dimensions	235 x 170 x 105 mm (L x W x H)
Material	SB plastic
IP Protection Class	IP65
Interface Connection	2 Cable glands (standard)
	Han24, Han32, Han64 (optional)



Standards

Safety

EN 60204-1

EN 60204-32

EN ISO 13557

EN 13849-1 Performance Level D

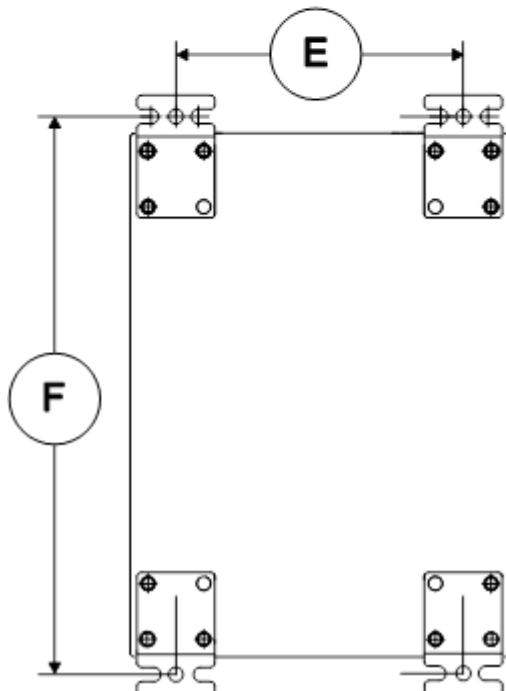
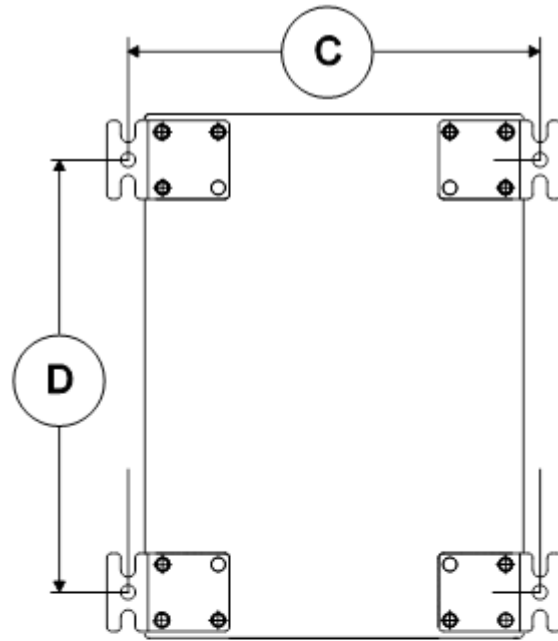
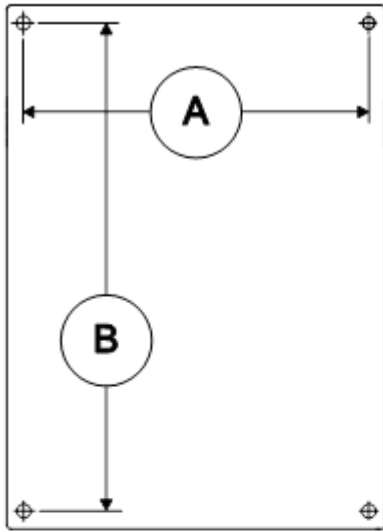
Shock / Vibration







EN 60068-2-27 / EN60068-2-6



5. Installation Notes

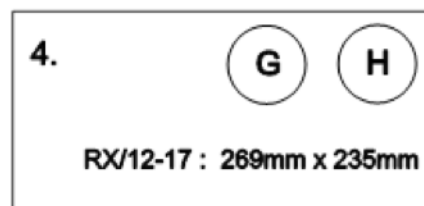
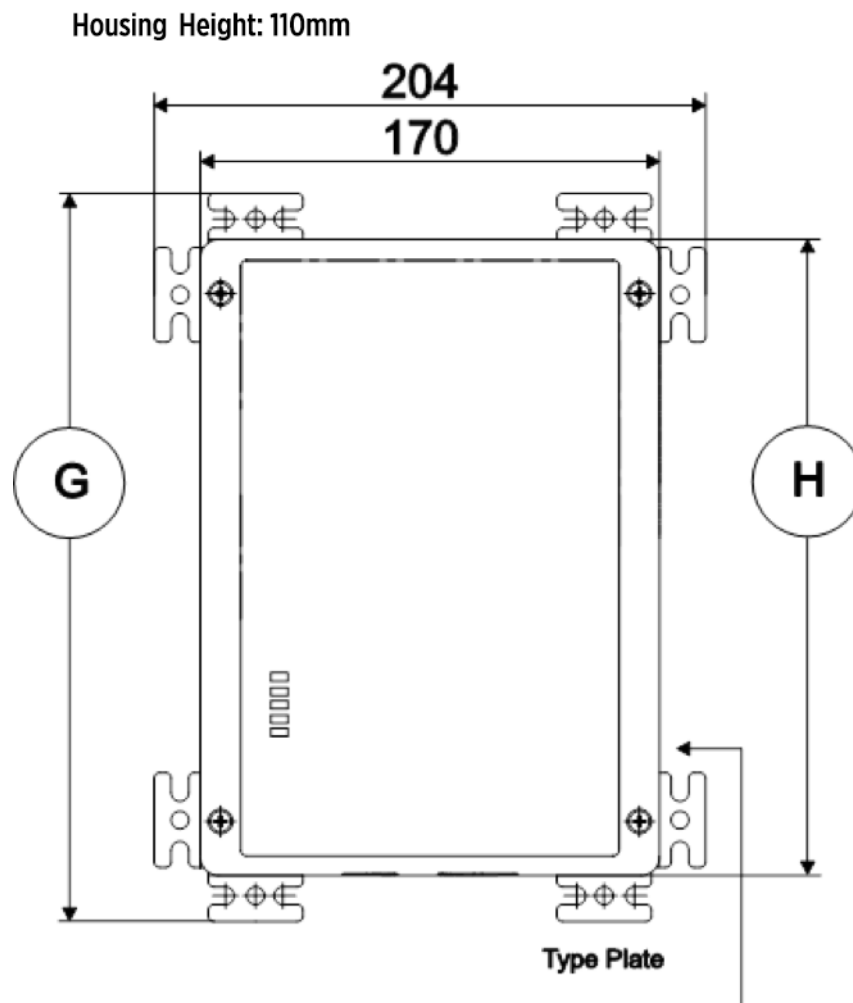
5.1 Mounting Options



1.	 
	RX/12-17 : 155mm x 219mm M4/M5
2.	 
	RX/12-17 : 185mm x 194mm M6
3.	 
	RX/12-17 : 129mm x 250mm M6



5.2 Enclosure Dimensions



6. SCU32 Interface Board Connection Overview

The SCU32 controller comprises a processor board and an interface board, which carries the power supplies and the interface connections to the machine. The connections to the machine interface are described in this section.

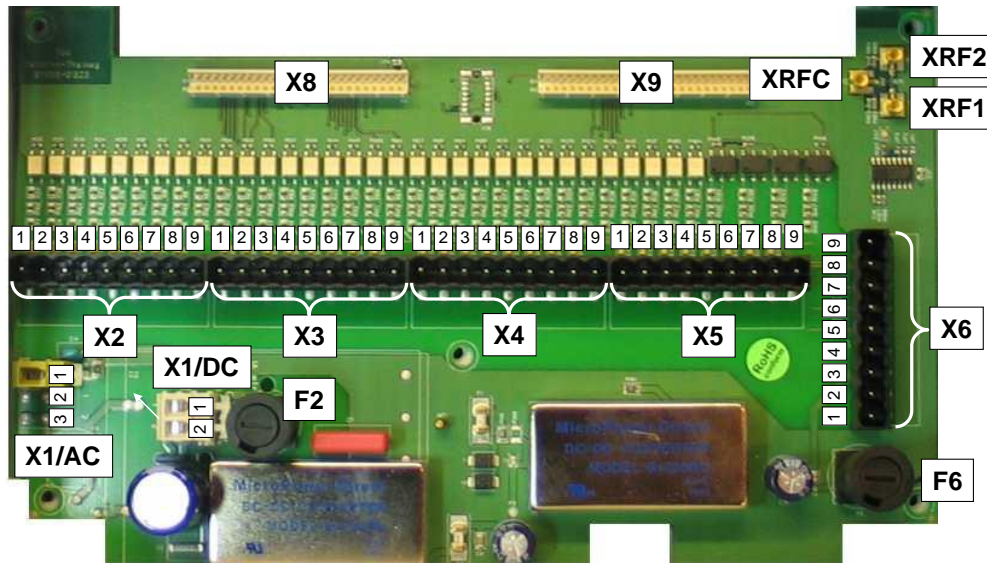


Figure 5: Interface Board

6.1 Power Supply

The receiver can be delivered with different power supplies to accept a range of AC and DC power sources.

6.1.1 AC Power Supply

The AC version of the controller can accept nominal voltages of 48, 115 and 230 VAC at 50-60 Hz.

Terminal	Connection	Description
X1/AC	1	AC
	2	AC
	3	PE

6.1.2 DC Power Supply

The DC Version of the controller can accept nominal voltages of 12 and 24 VDC.

Terminal	Connection	Description
X1/DC	1	DC+ (12/24 V)
	2	DC GND
	3	PE



6.2 Input Terminals

The controller features a total number of 32 + 4 inputs for digital commands. The inputs have galvanic isolation by means of optocouplers, which switch the electronic circuits. The optocouplers are rated for nominal voltages of 12/24 VDC.

6.2.1 Optocoupler Terminals (command functions) X2 through X5

The 32 optocoupler inputs are grouped together, with each group of eight optocouplers having a common potential.

Terminal	Connection	Input	Description
X2	1	Optocoupler 1	DI 41
	2	Optocoupler 2	DI 42
	3	Optocoupler 3	DI 43
	4	Optocoupler 4	DI 44
	5	Optocoupler 5	DI 45
	6	Optocoupler 6	DI 46
	7	Optocoupler 7	DI 47
	8	Optocoupler 8	DI 48
	9	Common Potential Optocoupler 1 - 8	

Terminal	Connection	Input	Description
X3	1	Optocoupler 9	DI 49
	2	Optocoupler 10	DI 50
	3	Optocoupler 11	DI 51
	4	Optocoupler 12	DI 52
	5	Optocoupler 13	DI 53
	6	Optocoupler 14	DI 54
	7	Optocoupler 15	DI 55
	8	Optocoupler 16	DI 56
	9	Common Potential Optocoupler 9 - 16	

Terminal	Connection	Input	Description
X4	1	Optocoupler 17	DI 1
	2	Optocoupler 18	DI 2
	3	Optocoupler 19	DI 3
	4	Optocoupler 20	DI 4
	5	Optocoupler 21	DI 5
	6	Optocoupler 22	DI 6
	7	Optocoupler 23	DI 7
	8	Optocoupler 24	DI 8
	9	Common Potential Optocoupler 17 - 24	



Terminal	Connection	Input	Description
X5	1	Optocoupler 25	DI 9
	2	Optocoupler 26	DI 10
	3	Optocoupler 27	DI 11
	4	Optocoupler 28	DI 12
	5	Optocoupler 29	DI 13
	6	Optocoupler 30	DI 14
	7	Optocoupler 31	DI 15
	8	Optocoupler 32	DI 16
	9	Common Potential Optocoupler 25 - 32	

6.2.2 Optocoupler Terminal (E-Stop function) X6

The controller features a group of four optocoupler inputs that will be used for the STOP commands. These four optocouplers can be combined on a common potential. These inputs should be as shown below before any command inputs are activated.

Terminal	Connection	Input Description	The Only Run State	Correct E-Stop State	Other E-Stop State	Other E-Stop State	Other E-Stop State
X6	5	Optocoupler Stop 4	HIGH	LOW	LOW	X	X
	6	Optocoupler Stop 3	HIGH	LOW	X	LOW	X
	7	Not Used	-	-			
	8	Optocoupler Stop 1	LOW	HIGH	X	X	HIGH
	9	Common Potential (Connect to DC GND) Stops 1 – 4					

6.2.3 Power Supply for Optocoupler Inputs X6

The controller features an independent internal 12 VDC power supply that can be used to provide the voltage necessary for the optocoupler input circuits.

Terminal	Connection	Description
X6	1	Output DC 12 V
	2	Output DC 12 V
	3	Output DC GND
	4	Output DC GND



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

Cattron Support

For remote and communication control systems support, parts and repair, or technical support, visit us online at:
www.cattron.com/contact

Cattron North America Inc., 655 N River Rd NW, Suite A, Warren, OH 44483