

Q-Controls™ Universal Interface Module

USER MANUAL

ACN# 088 609 661



QUANTUM®
REHAB
INNOVATIVE REHAB SOLUTIONS

A Division of Pride Mobility Products® Corp.

www.quantumrehab.com
www.prideservice.com
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I. SAFETY INSTRUCTIONS

The symbols below are used throughout this manual and on the product to identify warnings and notes. It is very important for you to read and understand the information that follows these symbols completely:



WARNING! Failure to follow designated procedures can cause personal injury or component damage or malfunction.



NOTE: Indicates important things to remember when using this product.

Electromagnetic and Radio Frequency Interference (EMI/RFI)

Laboratory tests have shown that electromagnetic and radio frequency waves can have an adverse affect on the performance of electric mobility vehicles. The interference can come from sources such as cellular phones, mobile two-way radios (such as walkie-talkies), radio stations, TV stations, amateur radio (HAM) transmitters, wireless computer links, microwave signals, and paging transmitters. In some cases, these waves can cause unintended movement.



WARNING! To prevent unintended movement, turn off the power to the electric mobility vehicle before using a mobile phone, two-way radio, laptop, or any other type of radio transmitter.



WARNING! The electric mobility vehicle itself can disturb the performance of other electrical devices located nearby, such as alarm systems.



NOTE: For further information on EMI/RFI, go to www.pridemobility.com. If unintended motion or brake release occurs, turn the electric mobility vehicle off as soon as it is safe to do so. Call Pride at 800-424-8205 to report the incident.

WARRANTY

For two (2) years from the date of purchase, Pride will repair or replace at our option to the original purchaser, free of charge, any of the Link Modules and their components found upon examination by an authorized representative of Pride to be defective in material and/or workmanship. This warranty does not apply to products abused or misused by the user and deemed such by Pride Mobility Products Corp. Claims and repairs should be processed through the nearest Quantum Rehab Specialist.

EXPRESSED AGREEMENT OF INDEMNIFICATION

In accepting delivery of this product, the Purchaser specifically promises that s/he will not change, alter, or modify this product or remove or render inoperable or unsafe any guards, shields, or other safety features of the product; or remove, obliterate, or obstruct any safety and instruction signs; or fail, refuse, or neglect to install any retrofit kits from time to time provided by Pride to enhance user safety. Purchaser also specifically agrees that if s/he breaches any such promises, or if s/he is remiss, neglect, or deficient in the safe operation or maintenance of this product, the Purchaser will indemnify and hold harmless Pride from any and all types of actions, suits, claims, or demands, including products liability claims by Purchaser, for injuries or loss arising out of the operation, maintenance, repair, or other use of this product. Purchaser specifically agrees that this Expressed Agreement of Indemnification is a condition of sale supported by adequate consideration and was read and understood by the Purchaser before purchase and delivery of the product.

We have compiled this manual from the latest specifications and product information available at the time of publication. We reserve the right to make changes, as they become necessary. Any changes to our products may cause slight variations between the illustrations and explanations in this manual and the product you have purchased.

TABLE OF CONTENTS

I. SAFETY INSTRUCTIONS/WARRANTY 2

II. INTRODUCTION 4

III. PRE-INSTALLATION 5

IV. INSTALLATION 7

V. OPERATION 15

VI. CHANNEL MAPPING 22

II. INTRODUCTION

The Q-Controls Universal Interface Module (Part No. CTLDC1395) provides up to seven independent switch contact pairs rated at 24V (10A max). Through its radio interface, relays can be operated independently and remotely from a Q-Controls Controller.

The Q-Controls Universal Interface Module can operate:

- A power bed.
- A power chair.
- A power door-opening mechanism, operating the lock and switching the door opener.
- A window open/close mechanism.
- Other appliances, for example, alarm sirens.



NOTE: The Universal Interface Module uses dual in-line switching relays for bed/chair operation. Both relays must operate correctly to initiate bed/chair movement. The failure of a single relay cannot lead to uncontrolled movement of the bed/chair.

CONDITIONS OF USE

This device complies with the Medical Devices Directive 93/42/EEC as a Class 1 medical device for use within the limitations contained in this document.

The device conforms to both European and US (FCC) Electromagnetic and Safety Requirements:

- *Electromagnetic Compatibility:* EN 60601-1-2, FCC CFR47 Oct 99 Part 15
- *Safety:* EN 60601-1-2, UL60601-1 1993

However, the device may emit electromagnetic radiation, which may interfere with other equipment in the vicinity. Similarly, other equipment may interfere with the device. To minimize these effects, should they occur, we recommend that other equipment should be moved away from the point of use and cable lengths shortened.

This device is intended to be installed by a trained engineer. There are no user serviceable parts inside.

Limitations of Use

For use with the Q-Controls range of products only.
Indoor use only.

Storage and Transportation

Temperature: -4°F (-20°C) to 158°F (70°C)
Humidity: 20%-80% without condensation

Batteries

We recommend the use of a UPS (uninterruptible power supply) battery backup with the Universal Interface Module. This prevents power fluctuations from affecting the operation of the Universal Interface Module. A UPS also supplies limited power from its internal batteries to maintain operation during short-term power cuts. The APC Smart-UPS 420/620 unit is available for this purpose (Part No. ELEINDV1051).

III. PRE-INSTALLATION

Before purchasing and installing a Universal Interface Module (UIM) for use with a power bed or chair, you should have carried out a medical assessment of the client's requirements and submitted it. A *Client Assessment Form* for this purpose is reproduced below:

Bed or Chair Control

Please complete if bed control is desired from a Q-Controls Controller. Remember that not all beds or chairs can be operated.

Name of Bed/Chair Manufacturer Model of Bed	
Name of Motor Manufacturer Model Number of Motors and Actuators	
Type of Connector on Handset (e.g., DIN plug, D-Plug) Number of Connectors on Handset	

Please use the box below to list the functions you need from the Q-Controls Controller. For example:

- Function 1 = Head Up
- Function 2 = Head Down
- Function 3 = Feet Up
- Function 4 = Feet Down

You can have up to 6 functions controlled from one UIM. Multiple UIMs can be used if needed.

Function 1	
Function 2	
Function 3	
Function 4	
Function 5	
Function 6	

Features

This diagram shows the main features of the Universal Interface Module:

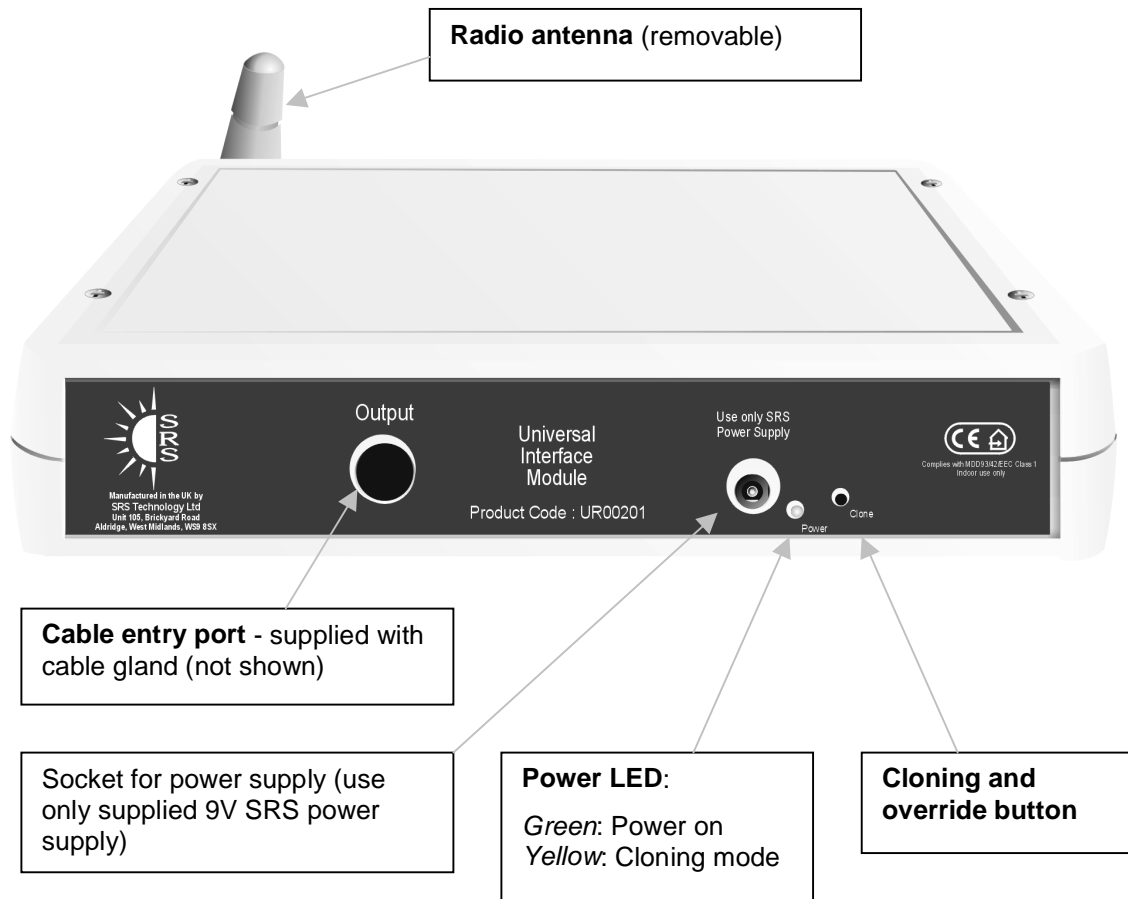


Figure 1. Main Features of the Universal Interface Module

IV. INSTALLATION



NOTE: Wiring and relay configuration is carried out by trained personnel at the factory. *Connection of the Universal Interface Module to external devices such as a power bed, power chair or door-opening mechanism must be carried out by a qualified repairman.*

Before You Start

Before installing the Universal Interface Module (UIM), carry out the following pre-installation checks:

1. Decide where you are going to mount the UIM before commencing wiring.



WARNING! In safety critical applications, mount the Universal Interface Module in line of sight of the user.

2. Test the location for any obstruction of the connection ports. If you are mounting the UIM on a wall, ensure that it is free from any concealed wiring and that it is secure for drilling.
3. Measure suitable lengths of cable to connect the UIM to the equipment to be controlled. Ensure that the cable is appropriate for the intended use as described in the equipment's documentation.

Mounting

1. Disconnect the device from the main electrical supply.
2. Remove the top cover by removing the four screws at its corners. There are three holes in the circuit board for mounting the module onto a suitable flat surface.
3. Position the UIM in the required location. Mark the positions of the holes. Put the module to one side.
4. At the marked positions, drill holes for the mounting screws.
5. Insert wall plugs, if required.
6. Place the UIM back in position and mount it to the wall using the screws provided.



NOTE: If the UIM case is damaged during this procedure, it should not be used. Contact your Quantum Rehab Specialist immediately.

Connecting the Universal Interface Module



NOTE: Ensure that you switch off and, if possible, disconnect all power supplies from anything being connected to the Universal Interface Module before attempting to connect any cables to the Universal Interface Module.

Introduction

The Universal Interface Module is designed for use with power doors/windows, door-opening mechanisms, and window-opening mechanisms. To access the circuit board, remove the four retaining screws in the top cover. Lift the top cover off.

The following diagram shows the main features of the circuit board:

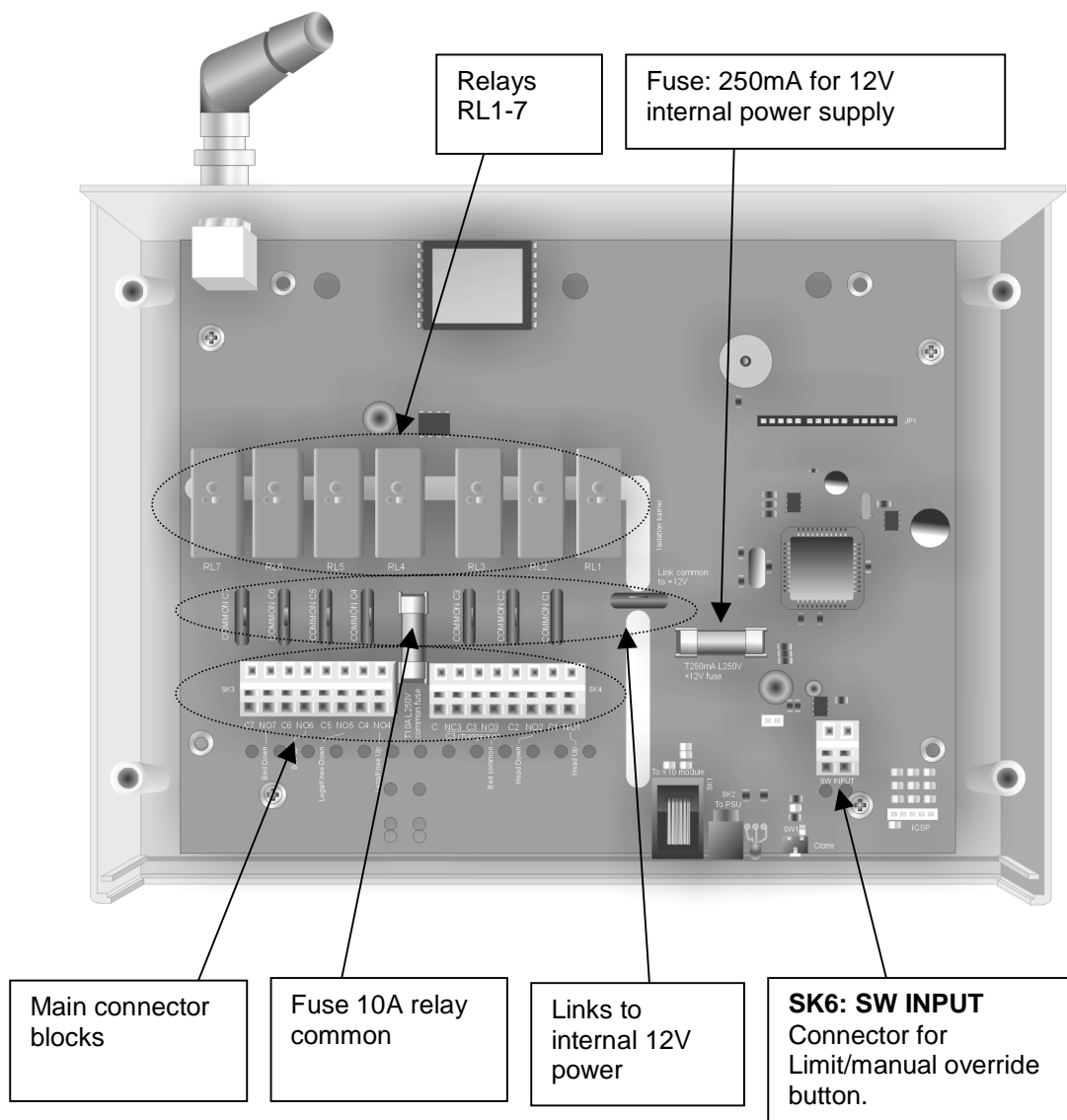


Figure 2. Layout of Circuit Board

Connecting to a Power Bed

Figure 3 shows the recommended configuration, which uses all seven relays. Remove LK8 to disconnect the module's common rail from the 12V supply.

With the remaining jumper links (LK1-7) in place, the rail joins all relay common terminals, via relay 3, to the *Bed Common* connection. Relays 1, 2, 4, 5, 6, and 7 are mapped to the individual bed functions; relay 3 (RL3) operates in conjunction with them as a safety switch. If the function relay, or relay 3, fails to operate correctly, the bed movement does not take place.

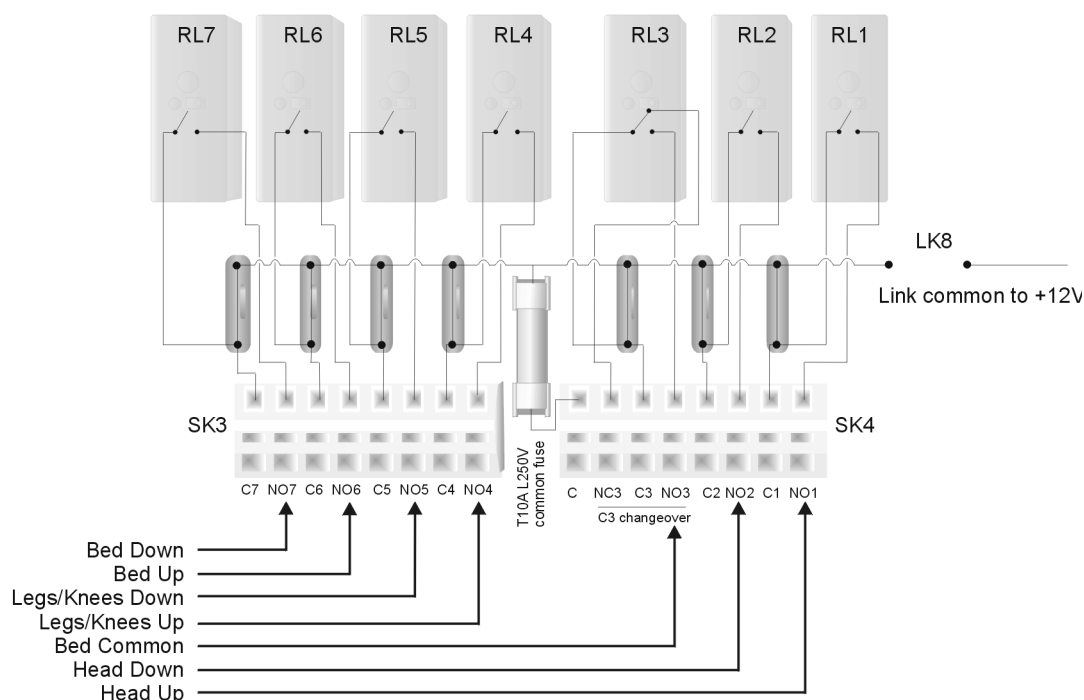


Figure 3. Recommended Configuration and Connections for Use With Motorized Bed

Limit Switch

For additional safety, you can connect a limit switch to stop all Up commands (Bed Up, Legs/Knees Up, Head Up). Use a normally open momentary switch connected to the SK6 block on the right side of the circuit board (see figure 2). This feature could also be used to provide the user with a manual override button.

Connecting to a Power Chair

Figure 4 shows the recommended configuration for a motorized chair. This uses relays 3, 6, and 7. Remove LK8 to disconnect the module's common rail from the 12V supply. Note that jumper links LK3, LK6, and LK7 must be in place for the configuration to function correctly.

Relays 6 and 7 are mapped to the *Chair Up* and *Chair Down* functions. Relay 3 (RL3) operates in conjunction with them as a safety switch. If the function relay, or relay 3, fails to operate correctly, the chair movement does not take place.

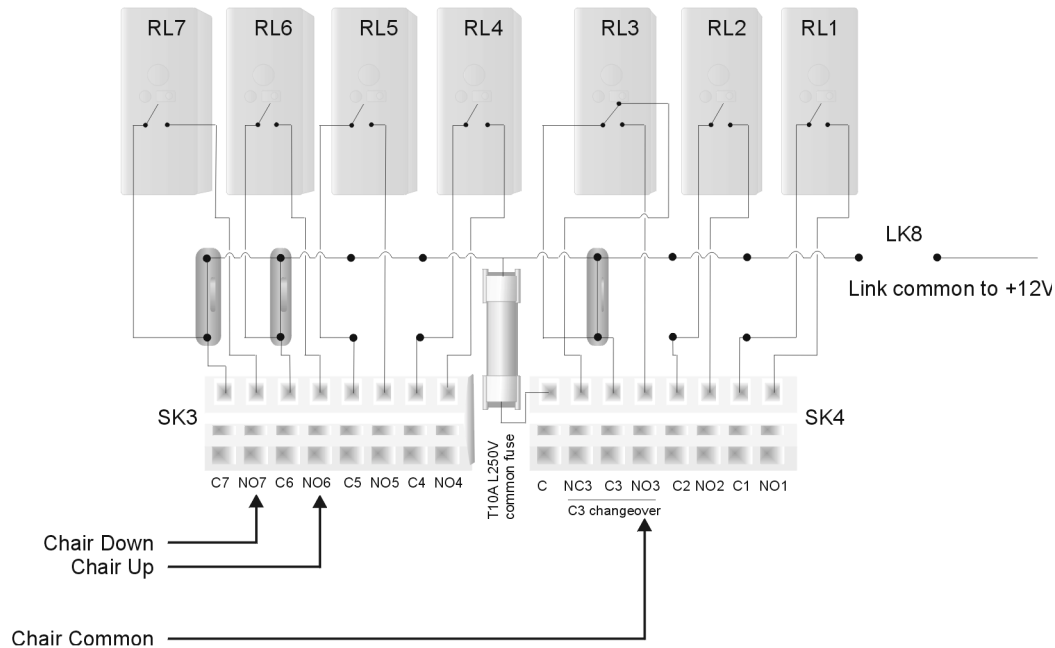


Figure 4. Recommended Configuration and Connections for Use With Motorized Chair

Limit Switch

For additional safety, you can connect a limit switch to stop the Chair Up command. Use a normally open momentary switch connected to the SK6 block on the right side of the circuit board (see figure 2). This feature could also be used to provide the user with a manual override button.

Connections for Door Mechanisms

Figure 5 shows a general-purpose configuration to operate door mechanisms.

In this configuration, relay 1 switches the door latch mechanism; relay 2 operates the opening mechanism. In both cases, the required common voltage is fed directly to the relays. Ensure that the internal 12V power rail is disconnected from these relays by removing jumper links 1 and 2. Unless you are using the 12V supply with any of the remaining relays for other applications, you can also remove LK8.

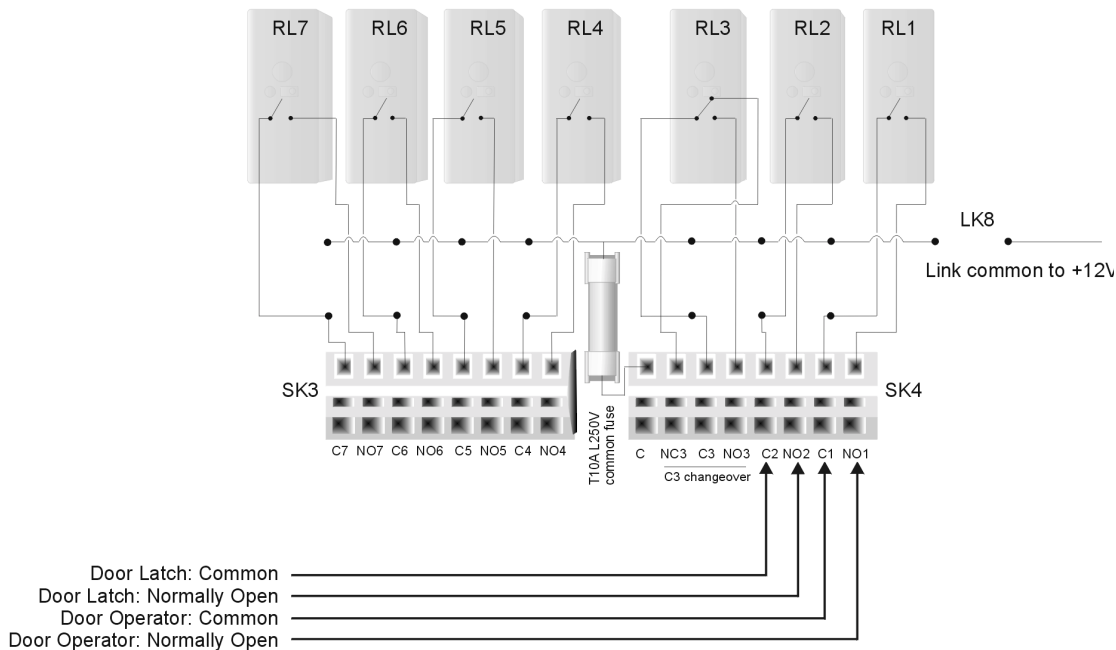


Figure 5. Recommended Configuration and Connections for Use With Door Latch and Door-Opening Mechanisms

Manual Override Button

You can configure the module with a manual override button to force the door latch and opener mechanisms to open. Use a normally open momentary switch connected to the SK6 block on the right side of the circuit board (see figure 2).

Connections for Window Mechanisms

Figure 6 shows a configuration for controlling a window open/close mechanism.

Relay 4 switches the window-opening mechanism; relay 3 operates the closing mechanism. In both cases, the required common voltage is fed directly to the relays. Disconnect the common rail from these relays by removing jumper links 3 and 4. Unless you are using the 12V supply with any of the remaining relays for other applications, you can also remove LK8.

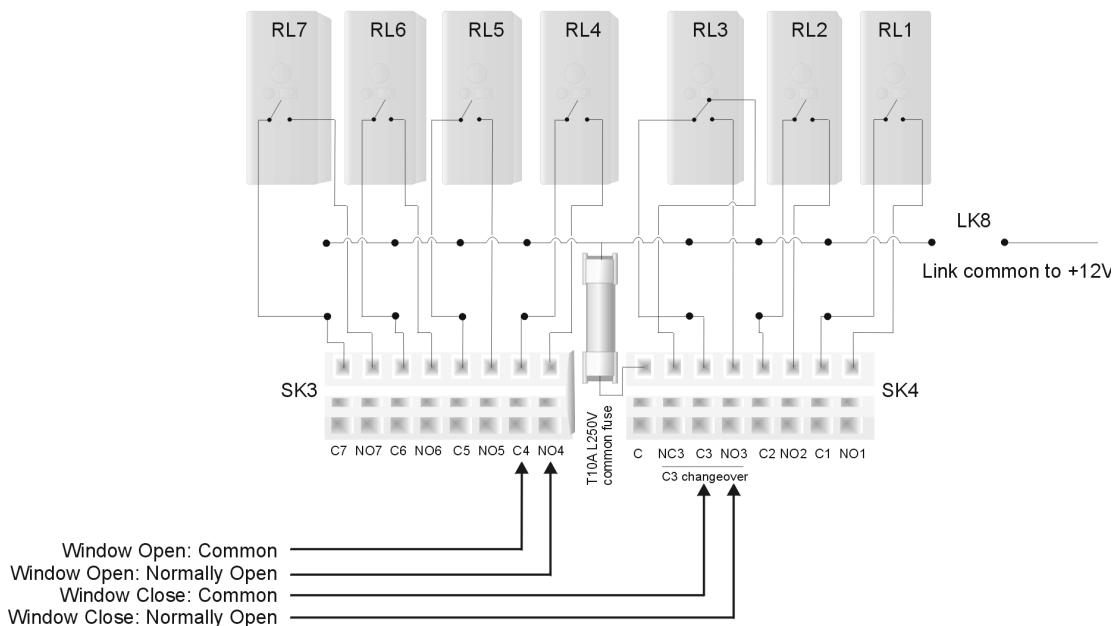


Figure 6. Recommended Configuration and Connections for Use With Motorized Window

Manual Override Button

You can configure the module with a manual override button to force the window mechanisms to open. Use a normally open momentary switch connected to the SK6 block on the right side of the circuit board (see figure 2).

Connections for Other Applications

Figure 7 outlines the configuration of the module for other applications. Any of the seven relays can be used for simple switching applications, needing just a *Normally Open* connection. Use relay 3 if you require both *Normally Open* and *Normally Closed* connections. You can program a Q-Controls Controller to operate individual relays by using channel commands (see “VI. Channel Mapping”).

Using the Module’s Internal 12V Power Supply

To use the module’s internal 12 V supply as the relay common (for example, to power an alarm siren), ensure that LK8 is in place. For each relay that you intend to use, ensure that the relevant jumper is installed. For example, if you are using relay 2, ensure that LK2 is in place.

Using Power from an Appliance

To connect the relay common to another power supply (24V, 10A max):

1. Disconnect the module’s own 12V supply from the common rail by removing the LK8 jumper.
2. Connect the common wire from the appliance to the module’s C terminal. This links to the common rail by way of a 10A fuse.

For each relay that you intend to use, ensure that the relevant jumper is installed. For example, if you are using relay 2, ensure that LK2 is in place.

Other Options

For a more complex application, in which each relay has a different common requirement, remove all jumpers and connect common supplies directly to the C1-C7 terminals.

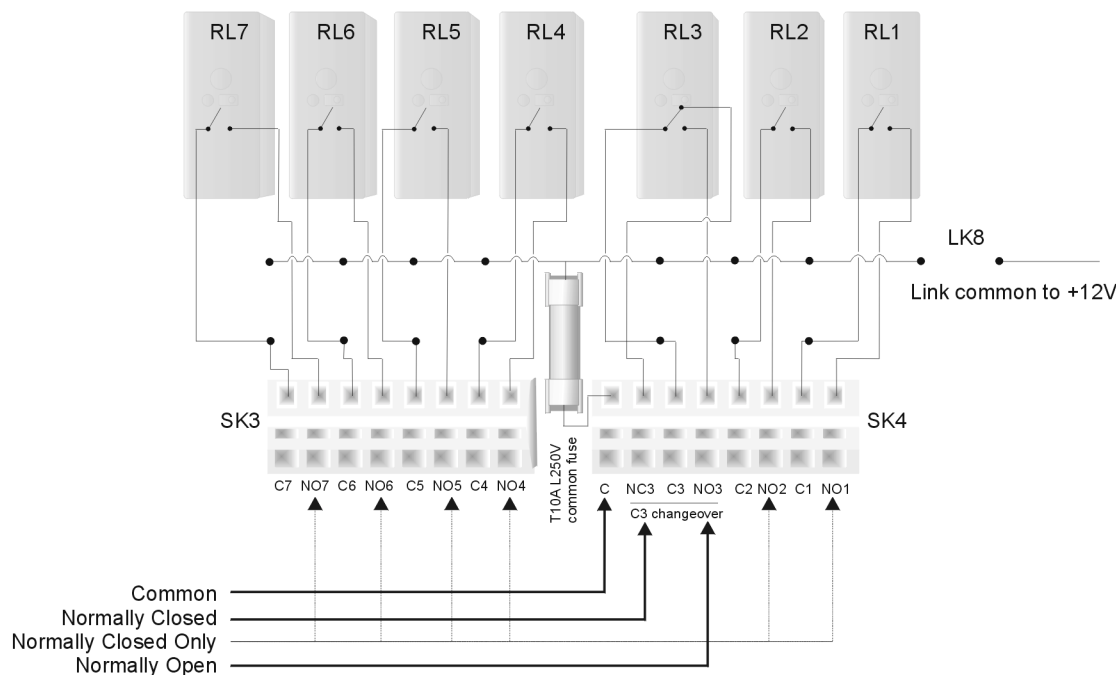


Figure 7. Recommended Configuration and Connections for Use in Other Applications

Preconfigured Modules

For specific bed/chair applications, we may have wired the Universal Interface Module with an 8-way socket labelled **Chair/Bed**. We configure the bed/chair relay and socket according to the information supplied on the medical assessment form (see “III. Pre-Installation”).

To connect the bed or chair to the Universal Interface Module:

1. Unplug the handset from the bed or chair.
2. Plug the cable supplied with the Universal Interface Module into the 8-way socket on the **Chair/Bed** connecting port.
3. Attach one of the plugs on the other end of the cable into the socket on the bed or chair.
4. Attach the handset to the spare socket on the Universal Interface Module cable.

Cloning the Universal Interface Module

When first installed, the Universal Interface Module must be “cloned” with the Q-Controls Controller. Cloning associates one or more Universal Interface Module functions with a Q-Controls Controller screen icon.

To clone a Universal Interface Module with a Q-Controls Controller screen icon:

1. With the Universal Interface Module power supply disconnected or switched off, press and hold in the cloning button.
2. Switch on or connect the Universal Interface Module’s power supply. The **Power** LED illuminates yellow and the Universal Interface Module emits a series of beeps. This indicates that the Universal Interface Module is ready for programming. You can now release the cloning button.
3. Select a required icon (e.g., **Door** icon) on your Q-Controls Controller. The Universal Interface Module is now cloned for use with the Q-Controls Controller and its functions are associated with the relevant icon(s).



NOTE: Unless the Universal Interface Module is to be decommissioned, it should be plugged into the main supply and switched on at all times.



NOTE: The Q-Controls Controller must be pre-programmed by a Quantum Rehab Specialist for use with the Universal Interface Module using the Q-Controls Management Software (see *Creating Screens to Operate the Universal Interface Module* in “V. Operation”).

V. OPERATION

This chapter describes:

- The procedure for programming and customizing a Q-Controls Controller to operate devices through a Universal Interface Module.
- How to operate Universal Interface Module-activated devices from the Q-Controls Controller.
- The operation of the Universal Interface Module and the appliances connected to it.

Creating Screens to Operate the Universal Interface Module

These instructions describe the procedure for setting up Q-Controls Controller screens with icons for a power bed, chair, door, or window. It is assumed that you are familiar with the use of the Q-Controls Management Software (for more detailed information, refer to the Q-Controls Management Software Manual).

1. Run the Q-Controls Management Software, loading the customer's data and screens.
2. On the ICON Management page, locate the client file screen where you want to import the control icons (for example: *Bedroom 1*).
3. Choose *Import Icons* mode.
4. On the Available Icons window, choose:

For bed/chair control icons

View > Link to Icons > Other Screens

For door/window icons

View > Radio Frequency Icons > Normal Operation or Link Devices

5. Locate the required icon and import it to the screen (see the Q-Controls Management Software Manual).

Icons are programmed by your Quantum Rehab Specialist to operate Universal Interface Module functions after cloning (see Cloning the Universal Interface Module). We can configure the bed/chair relay according to the information you have supplied on the medical assessment form (see "III. Pre-Installation"). You may need to adjust the function of bed and chair icons to meet your client's requirements, as described in the following sections.

Editing Chair/Bed Screens

The Bed and Chair control icons are imported with, and linked to, standard submenus:



Control Bed icon links to screen 24, "Bed 2.5"



Control Chair icon links to screen 63, "Chair"

To display these:

1. Choose *Simulate* mode.
2. Click on the Control Bed or Control Chair icon. The appropriate submenu is displayed:

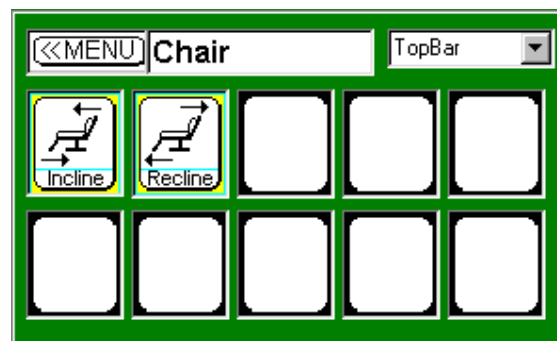
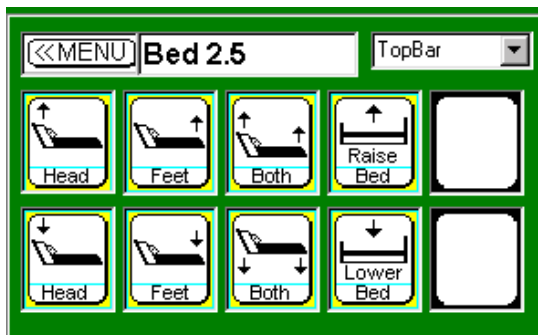


Figure 8. Bed 2.5 and Chair Screens

Add, rearrange, or delete icons using the procedures described in the Q-Controls Management Software Manual. You can import other bed and chair icons from **View > Radio Frequency Icons > Bed and Chair**.

Adjusting Chair/Bed Operating Speeds



WARNING! Ensure that switch operation is appropriate to the user's requirements and condition. For example, a rapid nudge setting may make it difficult for a client to control a bed or chair safely and effectively.

1. With the appropriate screen displayed, select *Edit Screens* mode.
2. Select the icon corresponding to the function to be adjusted.
3. Adjust the number associated with the bottom *Action* spin box. This normally shows "5" which refers to 5 x 0.5 second period of operation (the default setting of a 2.5 second motor actuation).

You can change the timer to the following values:

- 1 (0.5s)
- 2 (1.0s)
- 3 (1.5s)
- 4 (2.0s)
- 5 (2.5s)

The *RF Send Timed Sticky Press Action* transmits a timed, defined RF pulse regardless of how long the user holds the switch down.



NOTE: Current recommendations for the safe operation of beds and chairs restrict the amount of time the motors can be actuated for each icon selection.

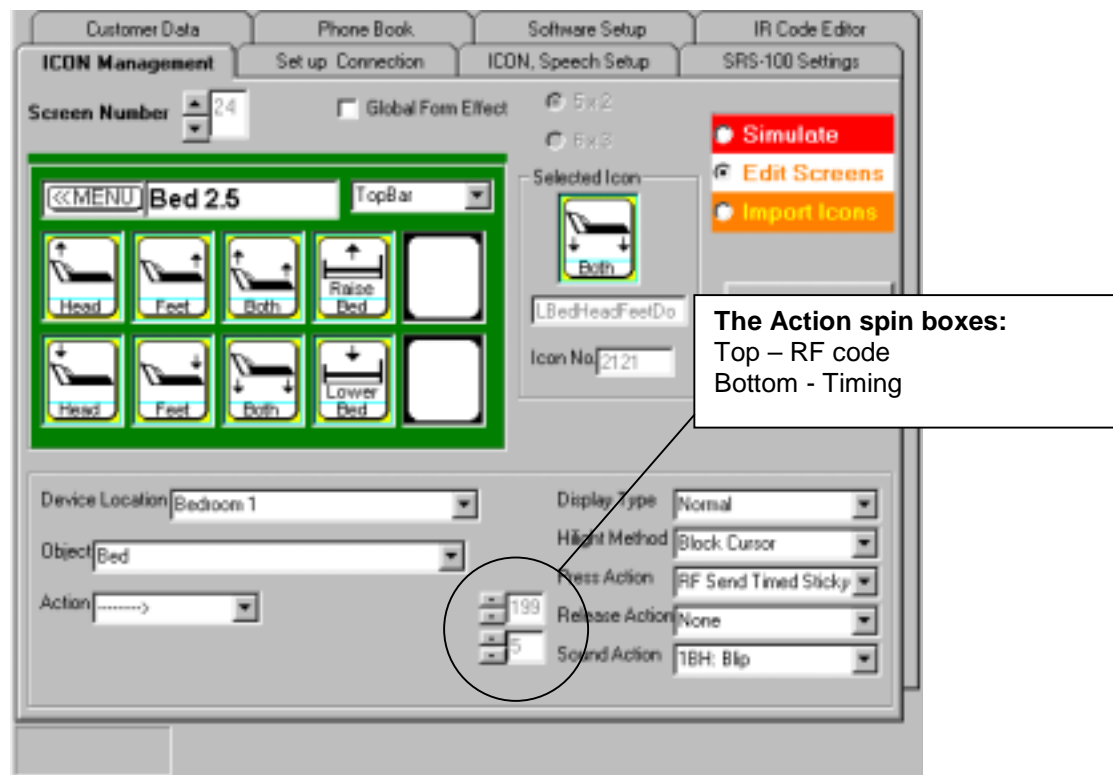


Figure 9. Changing the Timing on a Bed Icon

Operating Appliances/Devices

This section is for users of the Universal Interface Module. It describes how to operate configured appliances from a Q-Controls Controller. There are detailed descriptions of the procedures for operating a power bed and a power chair

When the Universal Interface Module operates door or window mechanisms, the exact icons used and their arrangement will depend on existing screens and configured devices. Here are a few of the icons that you might use:



Figure 10. Door Icons and Window Icons

Make sure that the installer clearly explains the screen layout and icon function.



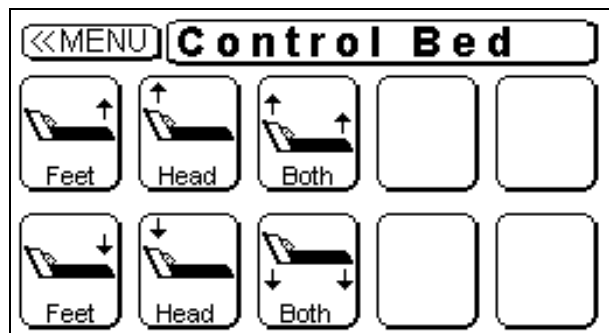
NOTE: A Q-Controls Controller must be pre-programmed for use with the Universal Interface Module using the Q-Controls Management Software (see *Creating Screens to Operate the Universal Interface Module* in “V. Operation”). The exact arrangement and function of icons may vary from that described or illustrated here.

Controlling a Power Bed



To operate a power bed, select the **Control Bed** icon on the Q-Controls Controller display. This may be on the main menu screen or on another top-level menu screen.

A Bed menu screen is displayed. A typical example is shown below:



Select the required function, for example:



Raise the foot of the bed



Lower the head of the bed



Lower the foot of the bed



Raise the head and foot of the bed together



Raise the head of the bed



Lower the head and foot of the bed together

Press the selecting device (button, key, joystick) to move the bed for a pre-defined period, typically 2.5 seconds. Release the selecting device and then press again if you need to move the bed further.

To return to the previous menu screen, select **<<MENU**



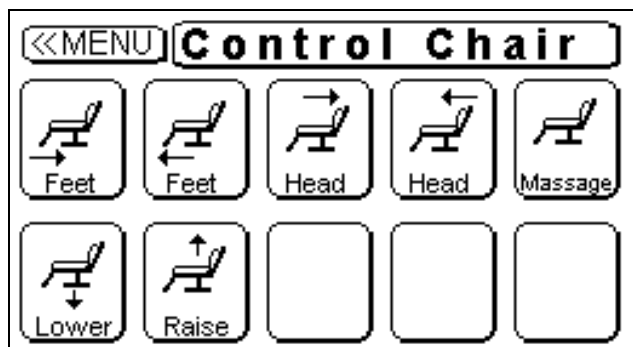
NOTE: This timed operation prevents the bed getting into a continuous rise, which could present a danger. If you want the choice of having different icons corresponding to different speeds (e.g., one “slow” *head up* icon set to incremental movement of 2.5 seconds and a “fast” *head up* icon set for 0.5 second “nudges”), then ask your Quantum Rehab Specialist to configure this for you.

Controlling a Power Chair



To operate a power chair, select the **Control Chair** icon on the Q-Controls Controller display. This may be on the main menu screen or on another top-level menu screen.

A Chair menu screen is displayed. A typical example is shown below:



Select the required function, for example:



Lower the chair's footrest



Lower the chair



Raise the chair's footrest



Raise the chair



Recline the chair's back



Operate the chair's massage function



Raise the chair's back

Press the selecting device (button, key, joystick) to move the chair for a pre-defined period, typically 2.5 seconds. Release the selecting device and then press again if you need to move the chair further.

To return to the previous menu screen, select **<<MENU**



NOTE: This timed operation prevents the chair getting into a continuous rise, which could present a danger. If you want the choice of having different icons corresponding to different speeds (e.g., one "slow" *lower chair* icon set to incremental movement of 2.5 seconds and a "fast" *lower chair* icon set for 0.5 second "nudges") then ask your Quantum Rehab Specialist to configure this for you.

Troubleshooting

An appliance might fail to respond to the transmission signal from a Q-Controls Controller because:

- The Universal Interface Module is out of range or in a signal “blackspot”.

Test the Controller closer to the module to confirm whether this is the problem. Contact your Quantum Rehab Specialist to discuss changing the antenna or relocating the Universal Interface Module.

- The power supply to the Universal Interface Module has been interrupted or disconnected.

Check all connections and cabling.

- The Universal Interface Module has not been programmed to respond to the chosen icon.

Carry out the cloning procedure described in “IV. Installation.”

- It is faulty (for example, a fuse needs changing).

Check the fuses or contact your Quantum Rehab Specialist (see figure 5).

VI. CHANNEL MAPPING

Each relay on the Universal Interface Module is individually accessible by channel commands. The following tables list:

- Channel assignments and how they relate to the relay operations.
- Q-Controls Controller RF codes to open or close each channel/relay.
- RF Codes for bed movements involving multiple channel operations.

Channel Assignment

Channels are numbered 0-10, with channels 0-3 retained for compatibility with the Q-Controls Universal Relay Box (Part No: UR00101).

Channel	Relay
Ch0	RL1
Ch1	RL2
Ch2	RL3
Ch3	RL4
Ch4	RL1
Ch5	RL2
Ch6	RL3
Ch7	RL4
Ch8	RL5
Ch9	RL6
Ch10	RL7

This table lists the Q-Controls Controller RF codes required to achieve individual channel operations.

Command	SRS RF Code	Relay	Contact Action
Ch0 Off	200	RL1	C1,NO1 Open
Ch0 On	184	RL1	C1,NO1 Close
Ch1 Off	201	RL2	C2,NO2 Open
Ch1 On	185	RL2	C2,NO2 Close
Ch2 Off	202	RL3	C3,NO3 Open
Ch2 On	186	RL3	C3,NO3 Close
Ch3 Off	203	RL4	C4,NO4 Open
Ch3 On	187	RL4	C4,NO4 Close
Ch4 Off	204	RL1	C1,NO1 Open
Ch4 On	188	RL1	C1,NO1 Close
Ch5 Off	205	RL2	C2,NO2 Open
Ch5 On	189	RL2	C2,NO2 Close
Ch6 Off	206	RL3	C3,NO3 Open
Ch6 On	190	RL3	C3,NO3 Close
Ch7 Off	207	RL4	C4,NO4 Open
Ch7 On	191	RL4	C4,NO4 Close
Ch8 Off	227	RL5	C5,NO5 Open
Ch8 On	228	RL5	C5,NO5 Close
Ch9 Off	230	RL6	C6,NO6 Open
Ch9 On	229	RL6	C6,NO6 Close
Ch10 Off	232	RL7	C7,NO7 Open
Ch10 On	231	RL7	C7,NO7 Close

Bed Commands

This table lists the RF codes assigned to bed movements involving multiple channel operations.

Command	SRS RF Code	Relays	Contact Action
Head Up	181	RL1 RL3	C1,NO1 Close C3,NO3 Close
Head Down	197	RL2 RL3	C2,NO2 Close C3,NO3 Close
Legs Up	182	RL4 RL3	C4,NO4 Close C3,NO3,Close
Legs Down	198	RL5 RL3	C5,NO5 Close C3,NO3 Close
Bed Up	177	RL6 RL3	C6,NO6 Close C3,NO3,Close
Bed Down	193	RL7 RL3	C7,NO7 Close C3,NO3 Close
Head/Legs Up	183	RL1 RL4 RL3	C1,NO1 Close C4,NO4 Close C3,NO3 Close
Head/Legs Down	199	RL2 RL5 RL3	C2,NO2 Close C5,NO5 Close C3,NO3 Close

Pride

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www.quantumrehab.com
www.pridemobility.com
www.prideservice.com
www.prideprovider.com

Pride Mobility Products Corporation
182 Susquehanna Avenue
Exeter, PA 18643
USA

Pride Mobility Products Company
380 Vansickle Road Unit 350
St. Catharines, Ontario L2R 6P7
Canada

Pride Mobility Products Ltd.
Unit 106, Heyford Park Camp Road
Upper Heyford, Oxfordshire OX25 5HA

Pride Mobility Products Australia Pty. Ltd.
21 Healey Road
Dandenong, 3175
Victoria, Australia

Pride Mobility Products Italia S.r.l.
Via del Progresso - ang. Via del Lavoro
Loc. Prato della Corte
00065 - Fiano Romano (RM)

Pride Mobility Products Europe B.V.
Tijnmuiden 28
1046 AL Amsterdam
The Netherlands

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