

Compact Remote Modules DX2-RJM, DX2-RJM-LF, and DX2-ACU

Installation Manual





GBK65701 DX2 Compact Remote Modules DX2-RJM, DX2-RJM-LF, and DX2-ACU Installation Manual Issue 1

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1 Welcome

Welcome to the Installation Manual for the DX2 compact remote modules: DX2-RJM, DX2-RJM-LF and DX2-ACU.

This manual will help you understand, install, test and operate the DX2-RJM, DX2-RJM-LF and DX2-ACU remote modules. Please read and understand this and all other relevant DX2 system manuals before installing and operating.

1.1 Using this manual

This manual uses the following information boxes to convey important and useful information:



Warning[:]

Warnings provide important information that must be followed in order to install, configure, and use the product safely and efficiently. Not following the instructions given in a warning can potentially lead to equipment failure, damage to surrounding property, injury or death.



Note:

Notes provide supporting information in order to install, configure, and use the product. Not following the instructions given in notes can lead to equipment failure.



See also:

The "See also" box provides cross-references to further information with clickable links to help you navigate the manual more easily.

1.2 Important information

Do not install, maintain or operate this equipment without reading, understanding and following this manual – including the Safety and Misuse Warnings – otherwise injury or damage may result. This manual contains integration, set up, operating environment, test and maintenance information needed in order to ensure reliable and safe use of the product.

The term 'programming' used in this manual refers to adjusting parameters and configuring options to suit an application and does not change or replace any firmware within the controller. Programming is performed using a controlled programming tool available only to authorised personnel.

The products described in this manual are not user-serviceable. Specialised tools are necessary for the repair of any component. Any attempt to gain access to or in any way abuse the electronic components and associated assemblies that make up the wheelchair controller system renders the manufacturer's warranty void and the manufacturer free from liability.

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1.4 Contact

The latest version of this manual can be downloaded from Dynamic Controls' website: www.dynamiccontrols.com

1.5 Related documentation

A DX/DX2 system comprises a number of modules (power module, remote module, etc.) depending on the application. Each DX/DX2 module has its own installation manual, which describes the installation requirements for that particular module.

This manual (GBK65701) describes the installation of the DX2-RJM, DX2-RJM-LF and DX2-ACU Remote Modules only, and must be read in conjunction with:

- the DX System Manual;
- all other relevant DX/DX2 system manuals, depending on modules fitted.





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3 Glossary

Α

ACU

Attendant Control Unit - a remote module used by a wheelchair attendant. See also RJM.

С

CAN

Controller Area Network

D

DX

Dynamic Controls' modular mobility system

DXBUS

The DX system communication bus, comprising CAN communication lines plus power supply to DX modules.

н

ннр

Hand-held programmer

0

OEM

Original Equipment Manufacturer. Generally refers to the wheelchair manufacturer.

OONAPU

Out Of Neutral At Power Up. A fault condition produced if the DX system is turned on while the joystick is not in the neutral (non-driving) position.

R

RJM

Remote Joystick Module - a remote module normally used by the wheelchair occupant. See also ACU.

U

UCM

User Control Module. The core component of all DX remote modules.





W

Wizard

A PC based programming, configuration and diagnostics tool used by the DX system.





4 Introduction

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4.1 Remote module overview

This manual describes the following DX2 compact remote modules:

- DX2-RJM DX2 Remote Joystick Module (RJM)
- DX2-RJM-LF DX2 RJM with low force joystick
- DX2-ACU DX2 Attendant Control Unit (ACU)

The DX2-RJM, DX2-RJM-LF and DX2-ACU are compact remote modules that share the same form, yet have different functions. The DX2-RJM and DX2-RJM-LF remote modules are designed for use by the wheelchair occupant, whereas the DX2-ACU has been designed for use as an attendant controller.

All of the remote modules share the same user interface, have multiple mounting capabilities and come with a fixed, trailing lead (DXBUS) that allows for easy integration into existing DX2 systems.

4.1.1 The DX2-RJM / DX2-RJM-LF



Figure 1: DX2-RJM and DX2-RJM-LF

The DX2-RJM and DX2-RJM-LF are compact, secondary remote modules designed to provide a simple interface for the wheelchair occupant using a DX/DX2 system.

With a modern, low-profile design, the remote modules employ joystick technology from the LiNX product range, and are designed to be drop-in replacements for the DX-RJM's. They also have several enhanced features, including the ability to turn the system on/off and to select and operate Drive and Accessory menu options.

rangth usars will an joy the low force joystick option with the DY2 PIM.

Low strength users will enjoy the low force joystick option with the DX2-RJM-LF, which provides smooth control with a deflection force of just 1.1 N.

Benefits

- Built-in power button enables the user to easily power up or down the system
- Built-in mode button
- Simple LED indicator shows what Drive Profile is selected
- Tri-colour battery gauge
- Attendant in charge indicator
- A range of mounting orientations standard, tray, centre-line and swing-away mounts
- Low force joystick option will improve control for those with low muscle strength





4.1.2 The DX2-ACU



Figure 2: DX2-ACU

Benefits

• Built-in power button enables the attendant to easily power up or down the system

to be a drop-in replacement for the DX-ACU's.

- Mode button:
 - Short press adjust wheelchair speed to your walking speed with digital speed control

The DX2-ACU, with its modern, low-profile design, is an attendant control unit, and an ideal secondary control solution for any DX/DX2 system. It employs joystick technology from the LiNX product range and is designed

The new design has several enhanced features, including a selection of

- Long press easily switch control between attendant and occupant
- Range of "who's in charge" options (first-in-first-served, attendant priority, user priority and DX-like)
- Simple LED speed indicator showing selected speed range

"who's in charge" options.

- Tri-colour battery gauge
- System status and attendant in charge indication
- Control your client's comfort with the ability to select and operate actuators through the joystick (with selected Master Remotes)
- Able to be mounted in a variety of orientations to suit individual chair needs
- Fully sealed case design provides improved protection against water and dust ingress

4.2 Feature comparison

Feature	DX2-RJM	DX2-RJM-LF	DX2-ACU
Suitable for wheelchair occupants	\checkmark	\checkmark	
Suitable for wheelchair attendants			\checkmark
Lightweight, modern design	\checkmark	\checkmark	\checkmark
Symmetrical design, ideal for left- and right-handed users.	\checkmark	\checkmark	\checkmark
Low-force joystick		\checkmark	
Battery indicator	\checkmark	\checkmark	\checkmark
Speed adjustment			\checkmark
Speed indicator			\checkmark
Drive profile / accessory selection	\checkmark	\checkmark	
Drive profile indicator	\checkmark	\checkmark	
Attendant indicator	\checkmark	\checkmark	\checkmark





4.3 System overview

The DX2-RJM, DX2-RJM-LF and DX2-ACU operate as secondary remotes within a DX/DX2 wheelchair control system. They connect to a master remote module via the fixed, trailing lead (DXBUS) as shown in *Figure 3: System diagram*.

Note[:]

Not all master remote modules are compatible with the compact remote modules - for more details, see section 4.3.2 Compatible master remote modules.



Figure 3: System diagram

4.3.1 System configurations

The DX2-RJM, DX2-RJM-LF and DX2-ACU compact remote modules can be used in the following system configurations:

Primary	Secondary	Secondary
DX/DX2 Master remote	DX2-ACU	-
DX/DX2 Master remote	DX2-RJM / DX2-RJM-LF	-
DX/DX2 Master remote	DX-RJM	DX2-ACU
DX/DX2 Master remote	DX-ACU	DX2-RJM / DX2-RJM-LF
DX/DX2 Master remote	DX2-ACU	DX2-RJM / DX2-RJM-LF

Note that there can be only one RJM-type module in a system configuration. That is, the configuration will support a DX2-RJM and DX2-ACU combination, or a DX2-RJM-LF and DX2-ACU combination, but it will not support a DX2-RJM and DX2-RJM-LF combination.







Note[:]

Any accessory modules, such as the DSL-105 Proximity Head Control, or DX-SNP Sip and Puff, that appear as an RJM in a DX/DX2 system, cannot be used in combination with another RJM-type module.

4.3.2 Compatible master remote modules

The DX2-RJM, DX2-RJM-LF and DX2-ACU compact remote modules will only operate with UCM II based master remote modules. The following master remote modules are compatible with the DX2-RJM, DX2-RJM-LF and DX2-ACU compact remote modules.

DX-REM24SD	DX-REM34B
DX-REMG90/A/T	DX-ACU3B
DX-REMG91/S	DX2-REM420/1
DX-REM48/A	DX2-REM550/1
(see note below)	
DX2-REMA/B-ACS2	DX-REM41D/E



Warning[:]

The compact remotes described in this manual are to be used with selected UCM II based master remote modules only - see table above. DO NOT use with UCM I based master remote modules.



Note[:]

All of the master remote modules listed in the table above, with the exception of DX-REM48/A, are UCM II based. Depending on its age, the DX-REM48/A may be a UCM I type. If you are using a DX-REM48/A, ensure that it is a UCM II type before using in a system. If you are unsure, consult your service centre.





5 Specifications

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5.1 Mechanical specifications

Parameter	Value			
Protection rating	IPx4			
Shipping weight	< 400g			
	Min	Nominal	Max	Units
Operating temperature range	-25	-	50	°C
Storage temperature range	-40	-	65	°C
Operating humidity range	0	-	90	%RH
Operating forces	Min	Nominal	Max	Units
 Joystick DX2-RJM / DX2-ACU DX2-RJM-LF 	-	1.6 1.1	-	N N
Mode button	-	< 2.5	-	Ν
Power button	-	< 2.5	-	Ν

5.2 Electrical specifications

Parameter	Min	Nominal	Мах	Units
Operating voltage (Vbatt)	18	24	32	V
ldle current	-	56	-	mA@24V
Quiescent current (power off)	-	-	0.23	mA@24V





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Figure 4: Dimensions - DX2-RJM, DX2-RJM-LF and DX2-ACU

Note: all dimensions ±0.5 mm





6 Installation

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6.1 Mounting

There are numerous options available for mounting the compact remote module, such as:

- tray mount
- clamp mount
- base plate mount

- tube mount
- drop-in mount

The choice will depend on the type of compact remote (DX2-RJM/-LF or DX2-ACU) being installed and its user (wheelchair occupant or attendant): for a wheelchair occupant, the tray, clamp and base plate mount options may be suitable; for a wheelchair attendant, the tube or drop-in mount options may be more suitable.

6.1.1 Cable routing options

The base of the remote module has two cable exit recesses located on either side. These allow the bus cable to extend from the remote at any angle between vertical and horizontal.

For plate mounting options, this means that the cable can be routed to the side of the remote module, and above the plate, as shown in *Figure 5*.



Figure 5: Cable routing options

Warning[:]

Limit to ten or fewer the number of times the compact remote module is installed on to a plate if the bus cable is at 90° to the module; frequent flexing at this angle may damage the cable.





Note[:]

The mounts shown in the following sections are suggestions only; Dynamic Controls does not manufacture or supply the mounts. The OEM is responsible for the final design of the mount and its application.

6.1.2 Tray mount

The remote module can be mounted on to any suitable flat surface, such as a tray, using the fixing holes underneath the module and two M5 bolts. The maximum torque to fasten these bolts is 3 Nm – do not exceed this rating as it may damage the remote module.

This solution is ideal for wheelchair occupants that require the remote module to be in a more central position, rather than the standard placements of the left- or right-hand armrests.



Figure 6: Fixing centres

6.1.3 Clamp mount

The compact remote has a cylindrical base which is suitable for attaching a cylindrical style clamp or clip.



6.1.4 Plate mount

The remote module can be mounted using a flat base plate (see *Figure 10: Base plate example*) and two M5 bolts. The maximum torque to fasten these bolts is 3 Nm – do not exceed this rating as it may damage the remote module.



Figure 10: Base plate example



Figure 11: Fixing the base plate





6.1.5 Tube mount



The remote module can be fixed on to a tube using a suitable tube clamp. This solution is useful for tubes that run perpendicular to the remote module, as shown left.

Figure 12: Tube mount (from above)

The tube diameter will depend on the tube clamp used, and also the fixing hole centres on the remote module (30 mm). A tube with an outside diameter of 15 - 22 mm would be suitable.

Use two M5 bolts to fasten the tube between the clamp and the base. The maximum torque to fasten these bolts is 3 Nm – do not exceed this rating as it may damage the remote module. Ensure that the DXBUS cable is not pinched when tightening the tube clamp.



Figure 13: Fixing the tube mount

6.1.6 Drop-in mount

The depth and shape of the base of the compact remote module allows it to be placed into a suitably designed cradle, such as the drop-in mount shown in *Figure 14*.

The drop-in mount is ideal for the DX2-ACU attendant remote module, allowing an attendant to remove and replace the module with ease, and also use the module at a comfortable, safe distance from the wheelchair. Design the mount to prevent the remote module from falling out accidentally, or twisting around when used in the mount. A concept drawing is shown below.



Figure 14: Concept drawing for drop-in mount





6.2 Positioning

6.2.1 DX2-RJM/-LF

Position the remote module such that a typical user's arm is in a natural, comfortable position.

Note:

It is the responsibility of both the manufacturer and the dealer to determine the most appropriate installation suitable for any single user. This includes, but is not limited to, the placement of the remote module for long term, comfortable use.

For wheelchair occupants using the DX2-RJM or DX2-RJM-LF, the OEM manufacturer should consider providing a hand guard at the front of the compact remote module to protect the user's hand against crushing, such as when manoeuvring under a table.



Warning[:]

If the wheelchair's remote module has not been fitted with a hand guard, the user should be made aware that their hand will not be protected from crushing, when, for example, manoeuvring towards or under a table.

When positioning the compact remote, consider the position of the master remote module too. The wheelchair occupant must be able to see the master remote display when the compact remote module's display is switched off or when actuators are being used, since actuator feedback is only displayed on the master remote, not the compact remote.

6.2.2 DX2-ACU

Do not install or place the compact remote module higher than 1.2 m from the ground.

To minimise the risk of snagging, Dynamic Controls recommends permanently fixing the compact remote module to the rear of the wheelchair, when used as an attendant remote, in line with *EN 12184:2009 8.6 Assistant control unit, push handles and handgrips*.

For compact remote modules that are not permanently fixed to the wheelchair, limit the length of the cable between the product and the back of the wheelchair to:

- 1. minimise the chance of the product hitting the floor, and being damaged if dropped;
- 2. minimise the chance of the joystick landing on the floor and deflecting, causing a runaway situation;
- 3. minimise the chance of snagging the cable on an external object.

The recommended total length of the bus cable, between the product and the back of the wheelchair, must be no longer than the height above the ground that the product is normally placed. For an extra margin of safety, reduce the cable length by a further 0.25 m.



Note:

It is recommended that the low force compact remote module (DX2-RJM-LF) is not used as an attendant remote. If the remote is dropped, the mass of the remote, relative to the joystick deflection force, makes a runaway more likely than if the full deflection force joystick (DX2-ACU) is used.

6.3 Wiring

For safe and reliable operation, the installation of looms and cables must follow the basic principles of power wiring.





Cables must be secured between their connectors and any point of flexing so that flexing forces are not transferred to the connectors.



Warning:

Route and position cables and remote modules so that they are free from physical strain, abuse or damage, such as snagging, crushing, impacts from external objects, pinching or abrasion.



Warning[:]

Damage to cables increases wiring impedance. A damaged cable can potentially produce localised heat, sparks or arcing and become a source of ignition to surrounding flammable material. The installation must ensure that all power cables, including the bus cable, are protected against damage and potential contact with flammable materials.

Adequate strain relief must be provided for all cables, and the mechanical limits of the cables and looms must not be exceeded.

Ensure that connectors and connector sockets are shielded from water splashes and water ingress. Cables with female connectors should face horizontally or downwards. Ensure all connectors are fully mated.



Warning[:]

Connector pins on cables connected to the power module can still be live even when the system is off. Cables with live pins should be connected, restrained or covered so that they are not exposed to human contact or materials that could cause electrical shorts.

Make sure that the cables do not extend beyond the wheelchair to prevent them from being caught or damaged by external objects. Take particular care on wheelchairs with movable structures such as a seat raise.



Warning[:]

Avoid routing the cable where it will come into continuous contact with the end user.

When installing the bus cable, avoid undue straining of the cable and connection points. Flexing of the cable should be minimised wherever possible, to extend service life and minimise the risk of accidental damage.



Warning[:]

Use of a cable chain to support the bus cable, where the cable is subject to regular cyclic bending, is recommended. The maximum stretch of the chain should be less than the length of the bus cable. The force applied to flex the cable should never exceed 10 N.



Note[:]

Appropriate life testing should be carried out to determine / confirm the expected service life and inspection and maintenance schedule.



See also:

6.1.1 Cable routing options





6.4 Programming

Before using the compact remote modules, update the system's User Profile Options and System Settings, as detailed below.

6.4.1 User profile options

n the User Profile Ontions sec-	 DX2-REM55x (AJR) User Profile Options 						
in the user Frunie Options set-		Prof 1	Prof 2	Prof 3	Prof 4	Prof 5	ACU
	Joystick Only Operation	No	No	No	No	No	Yes
ion, set the Joystick Source	Reverse Escape Enable No						
····, ································	Escape Timeout (s)	0.0	0.0				
ntion to the type of remote	Mouse Inactivity Timeout	Off					
phon to the type of remote	Joystick Source	Master	Master	Master	RJM	Master	ACU
· · · · · · · · · · · · · · · · · · ·	Neutral Maximum (%)	10					
nodule for one of the available	Joystick Switch Threshold (%)	50					
	Short Throw Shape (%)	200	200	200	200	200	200
CL.	Short Throw Travel (%)	100	100	100	100	100	100
profiles.	Joystick Angle Compensation (de	0	0	0	0	0	0
	Joystick Swap Forward/Reverse	No	No	No	No	No	No

Figure 15: Joystick Source example

For example, in Figure 15, Joystick Source has been set to RJM in Profile 4.



Note:

Dynamic Controls recommends that you do not select ACU for the Joystick Source parameter for profiles 1 - 5.

The ACU profile is automatically selected by the master remote module when the ACU takes control of a system. If another profile, other than the ACU profile, is selected and the profile has been configured with the ACU as the joystick source, then the Attendant indicator will not operate—the Attendant indicator only operates with the ACU profile.



See also:

7.1.7 Attendant indicator

6.4.2 System settings

Set RJM Enable to Yes if a DX2-RJM or DX2-RJM-LF is part of the system.

-	System Settings
Actuator System Type	CLAM or TAM
Actuator System is Critical	No
Actuator System Missing	Stop Drive
System Slowdown (%)	50
Neutral to Parkbrake Delay (ms)	100
Chair Speed Enable	No
Chair Speed	10
CANH Power Switch	Yes
CAN Terminator	Yes
UCM Joystick Swap Left/Right	No
Rotate UCM Joystick	No
ACU Enable	Yes
ACU Joystick Swap Left/Right	No
RJM Enable	Yes
RJM Joystick Swap Left/Right	No
RJM has Analog Joystick	No

Figure 16: Set RJM Enable

Set ACU Enable to Yes if a DX2-ACU is part of the system.

-	System Settings
Actuator System Type	CLAM or TAM
Actuator System is Critical	No
Actuator System Missing	Stop Drive
System Slowdown (%)	50
Neutral to Parkbrake Delay (ms)	100
Chair Speed Enable	No
Chair Speed	10
CANH Power Switch	Yes
CAN Terminator	Yes
UCM Joystick Swap Left/Right	No
Rotate UCM Joystick	No
ACU Enable	Yes
ACU Joystick Swap Left/Right	No
RJM Enable	Yes
RJM Joystick Swap Left/Right	No
RJM has Analog Joystick	No

Figure 17: Set ACU Enable







7 Operation

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7.2.10 Configuration mode	

7.1 DX2-RJM, DX2-RJM-LF operation

Note[:]

The following section details the operation for **DX2-RJM and DX2-RJM-LF only**. For a description of the DX2-ACU's operation, see section 7.2 DX2-ACU operation.

The DX2-RJM and DX2-RJM-LF (low force joystick version) are drop-in replacements for the DX-RJM. They are designed to be used by the wheelchair occupant as a secondary remote module, and connected to a DX/DX2 system via the fixed, trailing DXBUS cable.

The symmetrical design of the controller, and its trailing Power lead enables the remote modules to be fitted and operated ^{button} left of the user, right of the user or anywhere in between. The fixing holes permit a range of mounting orientations including standard, tray, centre-line and swing-away mounts.



Figure 18: The DX2-RJM, DX2-RJM-LF user interface

Warning[:]

Users should be aware that the surface of the remote module can potentially get hot when it is exposed to strong sunlight for long periods.





Figure 18 shows the main components of the DX2-RJM and DX2-RJM-LF. These are described below:

- joystick to control speed and direction
- **power button** (with status LED) to power up or power down the system, and view the system's status
- mode button to select drive profile
- information display displays selected drive profile
- **battery indicator** displays battery status
- attendant indicator displays which controller (occupant's or attendant's) has control of the wheelchair



Note

To operate, the DX2-RJM and DX2-RJM-LF must be connected to a DX system via the DXBUS trailing lead.



Warning[:]

Do not use the compact remote module if it is worn or damaged. Worn or damaged modules should be serviced immediately, especially if the DXBUS cable, joystick gaiter or keypad are ripped, torn or damaged.

7.1.1 The joystick



Warning[:]

The compact remote modules may only be used with the authorised joystick knobs. Use of any other joystick knob requires that the installer tests and confirms that the joystick returns to the neutral position whenever the joystick is deflected. Tests with the device mounted horizontally and with a water soaked knob (foam knobs only) are required if the installer judges these risks as significant.



Figure 19: The joystick

The joystick controls the direction and speed of the wheelchair.

When the joystick is deflected from the centre (neutral) position, the wheelchair will move in the direction of the joystick movement.

The speed of the wheelchair is proportional to the joystick deflection, so that the further the joystick is moved from the neutral position, the faster the wheelchair will travel.

If the user moves the joystick back to the neutral position, the wheelchair will slow down and stop.

If the user releases the joystick from any position other than the neutral position, the joystick will return to the neutral position and the wheelchair will slow down and stop.

The joystick can also be used to wake up the system when in sleep mode — see 7.1.8 Sleep mode.



Warning[:]

It is the responsibility of the wheelchair manufacturer to inform the wheelchair user about the wheelchair's stopping distances.



See also: 9.1 OONAPU 7.1.8 Sleep mode





7.1.2 Power button and status indicator



Note[:]

In the event that the wheelchair is in a runaway situation, press the remote module's power button to perform an EMERGENCY STOP. See section 7.1.3 Emergency stop.

The power button is on the left-hand side of the remote module, and incorporates a status indicator that changes colour depending on the status of the system:



Off - system OFF or sleeping



Red (flashing) - powered ON fault

Green - powered ON.

Press the power button to switch the system ON. If there is no fault with the system, the status indicator (under the power button) will light up green.

Press the power button to switch the system OFF; the system will power down and the status indicator will switch off.

If there is a fault with the system, the status indicator will indicate the fault with a series of red flashes (see section *9 Diagnostics*).

7.1.3 Emergency stop

If the user needs to stop the wheelchair quickly, the power button can be pressed to perform an EMERGENCY STOP. The wheelchair will come to a halt quickly; the rate is set by the Emergency Deceleration parameter.



Warning[:]

Ensure that the wheelchair's settings are appropriate for both the wheelchair configuration and the user. If the Emergency Deceleration parameter is set too high, the user can lose balance or fall out of the wheelchair when an emergency stop is performed.



button

See also:

See the DX System Manual / Master Remote manual for more information about the Emergency Deceleration parameter.

7.1.4 Mode button



The mode button is on the right-hand side of the remote module and incorporates a purple indicator that is lit continuously (except when a drive inhibit is present) while the system is powered up.

The operation of the mode button is dependent on the type of master remote module within the system. It can be used to:

- swap between modes (drive profile mode or accessory mode);
- step through a mode;
- step back through a mode.

The mode button reacts to two actions:





- a short press (less than ½ second)
- a long press (greater than ½ second)

The table below shows how the mode button operates with long and short presses for the compatible master remote modules.

Master remote module	Mode button press	Function
DX-REM24SD	Short	Increments drive profile.
	Long	Scrolls through the available accessory modes.
DX-REMG90/A/T	Short	Increments drive profile, and then, after the highest drive profile, it enters accessory mode.
	Long	Decrements drive profile.
DX-REMG91/S	Short	Behaviour depends on the input mode used. Typically a short press will increment a mode or profile and a long press will decrement in the same
	Long	way. Note: The RJM cannot be used in scanning input mode.
DX-REM48/A	Short	Increments drive profile. After the highest drive profile, it enters lighting mode.
	Long	Decrement profile.
		Note: The DX2-RJM cannot be used to enter/leave actuator profiles.
DX-REM34B	Short	Increments drive profile.
DX-REM41D/E	Long	Decrements drive profile.
		Note: The DX2-RJM cannot enter any accessory modes with these master remote modules.
DX-ACU3B	Short	Increments drive profile. After the highest drive profile, it enters into actuator profile (if an actuator module is connected) and the mode button will not be responded to.
	Long	Decrements drive profile.
DX2-REM420/1	Short	Increments drive profile.
DX2-REMA/B-ACS2	Long	Selects last actuator profile. Subsequent long presses increments actuator profile.
DX2-REM550/1	Short	This is configurable with the External Mode/Up Down parameter in Wizard under User Options .
	Long	This is configurable with the External Mode/Up Down parameter in Wizard under User Options .

7.1.5 Information display



The information display is a group of five LEDs that displays the currently selected drive profile.

The LEDs light up one-by-one, from left to right, as the user scrolls through the available drive profiles; the number of LEDs lit corresponds to the selected drive profile.





Note:

Whenever a new drive profile is selected which has a different joystick source, the drive profile LEDs and the mode button LED will flash briefly.

7.1.6 Battery gauge indicator

The battery gauge is situated below and left of the information display. It displays the battery's state of charge if it's not being charged or a battery charging sequence when the battery is being charged, as described below.



Figure 22: The battery gauge indicator



Note:

Users who find it difficult to differentiate the colours used in the battery gauge should use the master remote module's display to determine the battery's state of charge.

7.1.6.1 Battery gauge indicator when not charging

If the battery is not being charged, the battery gauge displays the battery's state of charge with one of three colours (green, amber and red).

The indicator is permanently lit when the battery is between **full** and **low**; when the state of charge drops to or below the battery empty level, the indicator will flash too.

The table below shows the battery gauge indicator and the recommended actions for each state.

Indicator	Battery state of charge	Recommended actions
	Flashing green - battery over- charged	Stop charging the battery
0	Green - battery full.	No action required.
٢	Amber - battery half full.	Consider starting return journey.
٥	Red - battery low.	Consider recharging battery soon.
	Flashing red - battery empty.	Recharge the battery now.

7.1.6.2 Battery gauge indicator when charging

If the battery is being charged, the battery gauge displays the battery charging sequence. The charging sequence, which repeats every 3.6 seconds, is a succession of:

green → amber → red → off → current state of charge → off

Each stage of the sequence is lit for 400 ms except for current state of charge, which is lit for 1.6 seconds. The current state of charge stage displays the battery level as the battery is charging: red (empty), amber (half full) or green (full).







Figure 23: Battery charging sequence

7.1.7 Attendant indicator



The attendant indicator displays which controller (DX2-RJM or attendant's) has control of the wheelchair (see note below).

If there is no attendant control module in the system, then this indicator will always be switched off.

If there is an attendant control module in the system, then this indicator will be switched off when either of the occupant's remote modules has control of the wheelchair.

If there is an attendant control module in the system, then this indicator will be switched on (green) when the attendant's remote module has control of the wheelchair.



Note:

This indicator only operates with the ACU profile — the ACU profile is automatically selected by the master remote module when the ACU takes control of a system. If another profile, other than the ACU profile, is selected and the profile has been configured with the ACU as the joystick source, then this indicator will not operate.

Dynamic Controls recommends that the Joystick Source parameter for profiles 1 - 5 is not programmed for ACU.



See also: 6.4.1 User profile options

7.1.8 Sleep mode

Figure 25: Sleep mode



When the system enters into sleep mode, all indicators on the DX2-RJM and DX2-RJM-LF are switched off. This minimises any distracting light when, for instance, the occupant wants to sleep.

Waking a system from sleep depends on whether the remote module waking the system was the active remote module before the system went to sleep.

7.1.8.1 Waking from sleep mode with active remote module

If the remote module waking the system was the active remote module before the system went to sleep, then the system can be woken by either:

- momentarily deflecting the joystick, or
- pressing the power button.





Note[:]

Set the joystick wake up parameter in Wizard to enable this functionality. The parameter name varies depending on the remote. For example, for a DX2-REM55x, set **Joystick Wake-up from Sleep** parameter to **Yes**. Or, for a DX-REMG91S, set the **Enable Joystick Wakeup** parameter to **Yes**.

7.1.8.2 Waking from sleep mode with inactive remote module

If the remote module waking the system was NOT the active remote module before the system went to sleep, then the system can ONLY be woken by pressing the power button.

7.1.9 Lock mode

When a DX/DX2 system is locked, the DX2-RJM and DX2-RJM-LF user inputs and display are deactivated. A DX/DX2 system cannot be locked or unlocked with the DX2-RJM or DX2-RJM-LF, but the locked status can be displayed to the user when the user presses the power button. The indication is different for DX and DX2 systems.

7.1.9.1 Locked indication in DX systems

To indicate a locked DX system, the mode button will flash (½ second on, ½ second off) when the power button is pressed.

7.1.9.2 Locked indication in DX2 systems

To indicate a locked DX2 system, the mode button displays inhibit when the power button is pressed.

7.1.10 Configuration mode

The configuration mode is used to set the user display on or off.

The normal operation is for the user display to be on, when the system is powered up, so that the user can see how the system is working and performing. However, there may be times, such as when the compact remote is used as a chin control, when the user display is not required. If the display is set to off, then nothing will be displayed on the display at any time.

The options are:

- 1. **Display on** (default setting) all LEDs will display according to their function, when the system is powered up.
- 2. Display off all LEDs are switched off at all times.



Note:

When the display is switched off, the occupant can view wheelchair information with the master remote module.

7.1.10.1 Enter configuration mode

Configuration mode can only be entered with the following button press sequence:

[Note that the system must be powered down to begin.]

- 1. Press and hold the **mode** button.
- 2. Press and hold the **power** button until both the mode and power button indicators light up green.
- 3. Release the **power** button as soon as the **power** button indicator switches off.
- 4. Release the mode button as soon as the mode button indicator switches off.

The battery gauge will light up with the current display setting.





7.1.10.2 Change display mode

To change the display mode, press the mode button to scroll through the options. The battery gauge colour indicates the option:



Display on

Display off

0

7.1.10.3 Exit configuration mode

To exit configuration mode, press the power button once. Alternatively, if there is no activity for 15 seconds, the remote module automatically exits from configuration mode.

The setting is saved automatically on exit.





7.2 DX2-ACU operation

Note[:]

The following section details the operation of the **DX2-ACU only**. For a description of the operation of the DX2-RJM and DX2-RJM-LF, see section 7.1 DX2-RJM, DX2-RJM-LF operation.

The DX2-ACU (attendant control unit) enables an attendant to take over control of a connected DX/DX2-based wheelchair. It may be permanently mounted onto a wheelchair (normally mounted at the rear) or may be a general purpose, floating unit, plugged into and used with a number of DX equipped chairs.

The DX2-ACU is connected into a DX/DX2 system via the DXBUS trailing lead, and configured with the Dynamic Wizard and HHP.

While in attendant mode, joystick control provided by the DX2-ACU is enabled and joystick control from the user remote module is disabled. Conversely, when in user mode, only the joystick control on the user's remote module is enabled and joystick control on the DX2-ACU is disabled. In either case, any other controls available on the user's remote module (lighting, actuators, etc.) are fully functional.



Figure 26: The DX2-ACU user interface



Warning[:]

When the remote module is operated while being held in the hand, be aware that it is possible for the hand to get trapped by the trailing cable.



Warning[:]

Users should be aware that the surface of the remote module can potentially get hot when it is exposed to strong sunlight for long periods.

Figure 26 shows the main components of the DX2-ACU. These are described below:

- joystick to control speed and direction
- **power button** (with status LED) to power up or power down the system, and view the system's status
- mode button to select speed, toggle who's in charge
- speed indicator displays selected speed
- battery indicator displays battery status
- attendant indicator displays which controller (occupant's or attendant's) has control of the wheelchair



Note To opera

To operate, the DX2-ACU must be connected to a DX system via the DXBUS trailing lead.



Warning[:]

Do not use the compact remote module if it is worn or damaged. Worn or damaged modules should be serviced immediately, especially if the DXBUS cable, joystick gaiter or keypad are ripped, torn or damaged.





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7.2.1 The joystick



Warning[:]

The compact remote modules may only be used with the authorised joystick knobs. Use of any other joystick knob requires that the installer tests and confirms that the joystick returns to the neutral position whenever the joystick is deflected. Tests with the device mounted horizontally and with a water soaked knob (foam knobs only) are required if the installer judges these risks as significant.



The joystick controls the direction and speed of the wheelchair.

When the joystick is deflected from the centre (neutral) position, the wheelchair will move in the direction of the joystick movement.

Figure 27: The joystick

The speed of the wheelchair is proportional to the joystick deflection, so that the further the joystick is moved from the neutral position, the faster the wheelchair will travel.

If the user moves the joystick back to the neutral position, the wheelchair will slow down and stop.

If the user releases the joystick from any position other than the neutral position, the joystick will return to the neutral position and the wheelchair will slow down and stop.

The joystick can also be used to wake up the system when in sleep mode — see 7.2.8 Sleep mode.



It is the responsibility of the wheelchair manufacturer to inform the wheelchair user about the wheelchair's stopping distances.



See also: 9.1 OONAPU

Warning:

7.2.8 Sleep mode

7.2.2 Power button and status indicator



Note:

In the event that the wheelchair is in a runaway situation, press the remote module's power button to perform an EMERGENCY STOP. See section 7.2.3 Emergency stop.

The power button is on the left-hand side of the remote module, and incorporates a status indicator that changes colour depending on the status of the system:



Off - system OFF or sleeping



Red (flashing) - powered ON - fault



Green - powered ON.

Press the power button to switch the system ON. If there is no fault with the system, the status indicator (under the power button) will light up green.

Press the power button to switch the system OFF; the system will power down and the status indicator will switch off.





If there is a fault with the system, the status indicator will indicate the fault with a series of red flashes (see section *9 Diagnostics*).



See also: 7.2.10 Configuration mode

7.2.3 Emergency stop

If the attendant needs to stop the wheelchair quickly, the power button can be pressed to perform an EMERGENCY STOP. The wheelchair will come to a halt quickly; the rate is set by the Emergency Deceleration parameter.



Warning[;]

Ensure that the wheelchair's settings are appropriate for both the wheelchair configuration and the user. If the Emergency Deceleration parameter is set too high, the user can lose balance or fall out of the wheelchair when an emergency stop is performed.



See also[:]

See the DX System Manual / Master Remote manual for more information about the Emergency Deceleration parameter.

7.2.4 Mode button

The mode button is on the right-hand side of the remote module and incorporates a yellow indicator that is lit continuously (except when a drive inhibit is present) while the system is powered up.

Figure 28: The mode button

Depending on the length of time that the button is pressed (short or long), the mode button is used to:

- change the speed setting, or
- toggle between who's in charge (occupant or attendant remote module).

7.2.4.1 Change speed setting

A short press (less than ½ second) on the mode button changes the wheelchair's speed setting.

Each short press increments the speed by 20 %, between 20 % and 100 % of the maximum speed that has been set for the Attendant Drive profile. After reaching 100 %, the speed setting will roll around to 20 %.

The speed is displayed on the speed indicator as shown in 7.2.5 Speed indicator.



Note[:]

The speed setting is recorded when the system is powered down so that it will resume the same speed setting on power up. If for any reason that the speed setting is not available on power up, or becomes corrupted, then the speed setting will default to 40 % of the speed that has been set for the Attendant Drive profile.

7.2.4.2 Change who's in charge

A long press (greater than ½ second) on the mode button toggles the control between the occupant's remote module, and the attendant's.





If the occupant's remote module has control, a long press will switch the control to the DX2-ACU, and the Attendant indicator will light up to show that the DX2-ACU has control.

If the DX2-ACU has control, a long press will switch the control to the occupant's remote module, and the Attendant indicator will switch off to show that the DX2-ACU does not have control.



7.2.5 Speed indicator



The speed indicator is a group of five LEDs that displays the currently selected speed. The LEDs light up one-by-one, from left to right, as the speed is incremented with the mode button (see *7.2.4 Mode button*).

Figure 29: Speed indicator (showing 60% speed)



Note:

During a drive inhibit, the speed indicator is switched off.

Each LED represents 20 % of the maximum programmed speed of the Attendant Drive profile. The LED on the left-hand side of the indicator represents the lowest speed (20 %). The LED on the right-hand side represents the highest speed (100 %).



Note[:]

The speed setting is recorded when the system is powered down so that it will resume the same speed setting on power up. If for any reason that the speed setting is not available on power up, or becomes corrupted, then the speed setting will default to 40 % of the speed that has been set for the Attendant Drive profile.

7.2.6 Battery gauge indicator

The battery gauge is situated below and left of the speed indicator. It displays the battery's state of charge if it's not being charged or a battery charging sequence when the battery is being charged, as described below.



Figure 30: The battery gauge indicator



Note:

Users who find it difficult to differentiate the colours used in the battery gauge should use the master remote module's display to determine the battery's state of charge.

7.2.6.1 Battery gauge indicator when not charging

If the battery is not being charged, the battery gauge displays the battery's state of charge with one of three colours (green, amber and red).

The indicator is permanently lit when the battery is between **full** and **low**; when the state of charge drops to or below the battery empty level, the indicator will flash too.





The table below shows the battery gauge indicator and the recommended actions for each state.

Indicator	Battery state of charge	Recommended actions
	Flashing green - battery over- charged	Stop charging the battery
0	Green - battery full.	No action required.
٢	Amber - battery half full.	Consider starting return journey.
0	Red - battery low.	Consider recharging battery soon.
	Flashing red - battery empty.	Recharge the battery now.

7.2.6.2 Battery gauge indicator when charging

If the battery is being charged, the battery gauge displays the battery charging sequence. The charging sequence, which repeats every 3.6 seconds, is a succession of:

green \rightarrow amber \rightarrow red \rightarrow off \rightarrow current state of charge \rightarrow off

Each stage of the sequence is lit for 400 ms except for current state of charge, which is lit for 1.6 seconds. The current state of charge stage displays the battery level as the battery is charging: red (empty), amber (half full) or green (full).



Figure 31: Battery charging sequence

7.2.7 Attendant indicator



The attendant indicator displays which remote module (DX2-ACU or occupant's) has control of the wheelchair.

If the occupant's remote module has control of the system, the indicator will be off. If the DX2-ACU remote module has control of the system, the indicator will be on (green).



indicator

Note[:]

This indicator only operates with the ACU profile — the ACU profile is automatically selected by the master remote module when the ACU takes control of a system. If another profile, other than the ACU profile, is selected and the profile has been configured with the ACU as the joystick source, then this indicator will not operate.

Dynamic Controls recommends that the Joystick Source parameter for profiles 1 - 5 is not programmed for ACU.







The system that has control is determined by the configuration mode setting and the mode button:

- 1. **on powering up**, the remote module that is initially in charge of the system is determined by the configuration mode setting;
- 2. after powering up, a long press on the mode button changes which controller is in charge.



See also: 7.2.4 Mode button 7.2.10 Configuration mode

7.2.8 Sleep mode



Figure 33: Sleep mode

When the system enters into sleep mode, and if the DX2-ACU is the active remote before entering sleep mode, all indicators on the DX2-ACU are switched off except the battery gauge indicator. If the DX2-ACU is not the active remote before entering sleep mode, all indicators on the DX2-ACU are switched off, including the battery gauge indicator.

Waking a system from sleep depends on whether the remote module waking the system was the active remote module before the system went to sleep.

7.2.8.1 Waking from sleep mode with active remote module

If the remote module waking the system was the active remote module before the system went to sleep, then the system can be woken by either:

- momentarily deflecting the joystick, or
- pressing the power button.



Note[:]

Set the joystick wake up parameter in Wizard to enable this functionality. The parameter name varies depending on the master remote. For example, for a DX2-REM55x, set **Joystick Wake-up from Sleep** parameter to **Yes**. Or, for a DX-REMG91S, set the **Enable Joystick Wakeup** parameter to **Yes**.

7.2.8.2 Waking from sleep mode with inactive remote module

If the remote module waking the system was NOT the active remote module before the system went to sleep, then the system can be woken ONLY by pressing the power button.

7.2.9 Lock mode

When a DX/DX2 system is locked, the DX2-ACU inputs and display are deactivated. A DX/DX2 system cannot be locked or unlocked with the DX2-ACU, but the locked status can be displayed to the attendant when the attendant presses the power button. The indication is different for DX and DX2 systems.

7.2.9.1 Locked indication in DX systems

To indicate a locked DX system, the mode button will flash (½ second on, ½ second off) when the power button is pressed.

7.2.9.2 Locked indication in DX2 systems

To indicate a locked DX2 system, the mode button displays inhibit when the power button is pressed.







7.2.10 Configuration mode

The configuration mode sets which remote module has the initial control of the system at power up. The options are:

- 1. First in (default setting) the remote module that powers the system up has control
- 2. Always user no matter which remote module powers up the system, the wheelchair occupant will always have initial control
- 3. Always attendant no matter which remote module powers up the system, the attendant will always have initial control
- 4. **DX-like** (last out) the remote module that has control before powering down resumes control on power up.



Note:

The settings in configuration mode are only used when powering up. After a system is powered up, control of a system can be set with the mode button.



See also[:]

7.2.4 Mode button 7.2.7 Attendant indicator

7.2.10.1 Enter configuration mode

Configuration mode can only be entered with the following button press sequence:

[Note that the system must be powered down to begin.]

- 1. Press and hold the **mode** button.
- 2. Press and hold the **power** button until both the the mode and power button indicators light up green.
- 3. Release the **power** button as soon as the **power** button indicator switches off.
- 4. Release the **mode** button as soon as the **mode** button indicator switches off.

The battery gauge will light up with the current who's in charge setting.

7.2.10.2 Change who's in charge at start-up

To change who's in charge at start up, press the mode button one or more times to scroll through the options. The battery gauge colour changes for the four options:



Amber - DX-like

Red - always occupant

Green - always attendant

7.2.10.3 Exit configuration mode

Blue - first in

To exit configuration mode, press the power button once. Alternatively, if there is no activity for 15 seconds, the remote module automatically exits from configuration mode.

The setting is saved automatically on exit.









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The installation must be fully tested after all modules and cables have been installed. The testing procedure is detailed in the DX System Manual (section 8 Testing), which must be read in conjunction with this and other DX/DX2 module manuals.



Warning[:]

Do not connect the battery positive (B+) terminal of the battery to the DX2 system until the wheelchair is lifted off the ground. To prevent the risk of injury, Dynamic Controls recommends the use of a lifting device when lifting the wheelchair off the ground.

8.1 Before testing

Check that all cables and modules in the system are connected correctly. Check especially that the polarities of the batteries, the motors and the park brakes are connected correctly and that the polarities are not swapped.

To prevent the wheelchair from suddenly driving away when you turn it on, put blocks under the wheelchair frame to lift the wheels off the ground. Check that the wheels can turn freely.

Make the final connection to the battery positive (B+) terminal and close the circuit breakers.

Turn on the DX2 system with the power button on the master remote module and program the DX2 system for the appropriate wheelchair application.

Turn off the DX2 system with the power button.

8.2 Testing the DX2-RJM / DX2-RJM-LF

8.2.1 Power button

• Test that the system powers up and down correctly with the power button. For more information on the power button, see 7.1.2 Power button and status indicator.





8.2.2 User interface

- Power up the system and verify that the information display is operating correctly and that there are no faults. For more information on the information display, see 7.1.5 Information display. For more information on fault indication, see 9 Diagnostics.
- Verify the battery gauge indicator is operating correctly. For more information on the battery gauge indicator, see *7.1.6 Battery gauge indicator*.
- Verify the attendant indicator is operating correctly only if an ACU is part of the system. For more information on the attendant indicator, see 7.1.7 Attendant indicator.

8.2.3 Mode button

- Press the mode button (using a combination of short and long presses) to change the drive profile and access accessories (if fitted). For more information on the mode button, see 7.1.4 Mode button.
- Check that the mode is displayed correctly on the information display.

8.2.4 Joystick

- Drive the wheelchair in all directions and at all speeds. Ensure that the wheelchair responds to the drive commands as programmed. For more information on the joystick, see 7.1.1 The joystick.
- Change the drive profile and drive the wheelchair in all directions and at all speeds. Ensure that the wheelchair responds to the drive commands as programmed.
- If accessories are fitted, select an accessory with the mode button and operate the accessory with the joystick.

8.2.5 Emergency stop

• Test the emergency stop feature by pressing the power button while driving the wheelchair. For more information on the emergency stop feature, see 7.1.3 Emergency stop.



Warning[:]

This procedure can be dangerous. Dynamic Controls recommends the use of a seatbelt to prevent the tester from slipping out of the seat.

8.2.6 OONAPU

- Test the OONAPU feature by powering up the wheelchair with the joystick out of the neutral (centre) position. An OONAPU warning will be displayed and the wheelchair will not drive.
- Continue the test with the joystick out of the neutral (centre) position for more than five seconds - the OONAPU warning will change to an OONAPU fault.



Note

Ensure that the DX2-RJM or DX2-RJM-LF is set as the active module for this test. Ensure that the parameter **Disable OONAPU Faults** is set to **No**.

For more information on the OONAPU feature, see 9.1 OONAPU.

8.2.7 Wake up from sleep mode

- Test the wake up feature when a system is asleep by one or both of the following:
 - momentarily deflecting the joystick. Note: this is only effective if the remote module waking the system was the active remote module before the system went to sleep, and the





system is configured to wake up from sleep with the joystick;

• momentarily pressing the power button.

For more information on waking up from sleep, see 7.1.8 Sleep mode.

8.3 Testing the DX2-ACU

8.3.1 Power button

• Press the power button a few times to test that the system powers up and down correctly. For more information on the power button, see 7.2.2 Power button and status indicator.

8.3.2 User interface

- Power up the system and verify that the speed indicator is operating correctly and that there are no faults. For more information on the speed indicator, see *7.2.5 Speed indicator*. For more information on fault indication, see *9 Diagnostics*.
- Verify the battery indicator is operating correctly. For more information on the battery gauge indicator, see 7.2.6 Battery gauge indicator.
- Verify the attendant indicator is operating correctly. For more information on the attendant indicator, see 7.2.7 Attendant indicator.

8.3.3 Mode button

- Press the mode button (using short presses) to change the driving speed.
 - Check that the speed is displayed correctly on the information display.
- Press the mode button (using long presses) to toggle between who's in charge (occupant or attendant remote module).
 - Check that the attendant indicator displays correctly.

For more information on the mode button, see 7.2.4 Mode button.

8.3.4 Joystick

• Drive the wheelchair in all directions and at all speeds. Ensure that the wheelchair responds to the drive commands as programmed.

For more information on the joystick, see 7.2.1 The joystick.

8.3.5 Emergency stop

• Test the emergency stop feature by pressing the power button while driving the wheelchair.



Warning[:]

This procedure can be dangerous. Dynamic Controls recommends the use of a seatbelt to prevent the tester from slipping out of the seat if the test is performed from the seat.

For more information on the emergency stop feature, see 7.2.3 Emergency stop.

8.3.6 OONAPU

• Test the OONAPU feature by powering up the wheelchair with the joystick out of the neutral (centre) position. An OONAPU warning will be displayed (see OONAPU) and the wheelchair will not drive.







Note: Ensure that the DX2-ACU is set as the active module for this test.

For more information on OONAPU, see 9.1 OONAPU.

8.3.7 Wake up from sleep mode

- Test the wake up feature when a system is asleep by one or both of the following:
 - momentarily deflecting the joystick. Note: this is only effective if the remote module waking the system was the active remote module before the system went to sleep, and the system is configured to wake up from sleep with the joystick;
 - momentarily pressing the power button.

For more information on waking up from sleep, see 7.2.8 Sleep mode.





9 Diagnostics

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9.1 OONAPU

OONAPU ("Out Of Neutral At Power Up") is a safety feature that prevents accidental movement of the wheelchair, either when powering up, or when the wheelchair comes out of an inhibit state.

OONAPU warning

If the system is powered on (or comes out of an inhibit state) while the joystick is not in the centre position, an OONAPU warning is displayed.



Figure 34: OONAPU sequence

During an OONAPU warning, the information display LEDs will flash continually (all on, followed by all off) to alert the user, and the wheelchair will not drive. If the joystick is returned to the centre position within five seconds, the warning will clear and the wheelchair will drive normally.

OONAPU fault

However, if the joystick remains out of neutral for longer than five seconds, an OONAPU fault will occur (see note below); the fault is displayed by the status indicator flashing red, and the wheelchair will not drive. To clear the fault, return the joystick to the neutral position and power the unit off and then on again.



Note[:]

An OONAPU fault will not be displayed if the Wizard parameter Disable OONAPU Faults is set to Yes.

An OONAPU fault will not occur if the active remote module is a DX2-ACU. Instead, if the DX2-ACU's joystick remains out of neutral for longer than five seconds, the OONAPU warning will continue to be displayed.

9.2 Drive inhibit indication

When a wheelchair is in a drive inhibit state, the information display switches off, and the mode button flashes at a rate of on for ½ second, off for ½ second.

This sequence continues for the duration of the drive inhibit.





Figure 35: Drive inhibit indication (RJM top, ACU bottom)



Note[:]

Apart from the information display and mode button, the drive inhibit indication described above does not affect any other indicators - all other indicators will continue to operate as normal.





9.3 Fault indication

When a fault occurs, a flash code is displayed on both the master remote module and the compact remote module. A flash code, which is displayed on the status indicator, is a number of flashes separated by a 1.6 second gap; the number of flashes depends on the fault. For example, one flash represents flash code one; two flashes represents flash code two, and so on.



Note:

Faults that affect the safety of the wheelchair will cause the wheelchair to stop, while less critical ones will be indicated but allow the wheelchair to continue driving. Some faults will automatically clear when the fault condition is removed (non-latched) while others are latched and must be cleared by turning the controller off, waiting five seconds, then turning the system on again.

Faults are categorised according to their source — that is, there are local faults (those that relate to the compact remote module), and there are system faults (those that relate to one or more system modules). Local faults take priority with the compact remote module and so local faults will be displayed on the compact remote module instead of system faults **if** both local and system faults occur at the same time.

When there is a local fault, the power button will flash red. All other indicators will be switched off. It is possible that the rest of the system might not indicate a fault. All local faults (faults with the compact remote module) are displayed as:

Flash Code 1: DX Module Fault

When there is a system fault, the power button will flash red. All other indicators will continue to operate according to their role. The rest of the system will indicate the same fault or a related flash code. System faults are displayed according to the flash codes described in the DX System Manual.



See also:

For a full list of flash codes and more information regarding system faults, refer to the DX System Manual.

9.4 Dealing with compact remote module faults

- 1. If the compact remote module does not react to a command:
 - Check that the module is not in sleep mode (see 7.1.9 Lock mode 7.1.8 Sleep mode or 7.2.8 Sleep mode).
 - Check that the module is not in locked mode (see 7.1.9 Lock mode or 7.2.9 Lock mode).
- 2. If there is no power to the compact remote module:
 - Check the DXBUS connector is mated correctly.
 - Replace the DXBUS extension cable (if fitted).
 - Replace the compact remote module.
- 3. For all flash code 1 faults:
 - Check the DXBUS connector is mated correctly.
 - Check the profile setting:
 - If the Joystick Source parameter (see 6.4.1 User profile options) of a programmable profile has been set up for a compact remote module (either RJM or ACU), and the compact remote module cannot be seen by the system when operating in the profile, a flash code 1 will be displayed.





- Replace the DXBUS extension cable (if fitted).
- Replace the compact remote module.

Note[:]

As it is commonplace for attendant control units to be disconnected while the wheelchair is powered up, if a DX2-ACU is disconnected while the wheelchair is powered up, and the Joystick Source parameter of any of the programmable profiles has not been set up for an ACU, then no flash code will be displayed.

Furthermore, if the DX2-ACU is disconnected when a system is operating in the ACU profile, then the system will revert to the last selected profile and no fault will be displayed.









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10.1 Parts list

Description	Part number
DX2 Remote Joystick Module (RJM)	DX2-RJM
DX2 RJM with low force joystick	DX2-RJM-LF
DX2 Attendant Control Unit (ACU)	DX2-ACU

10.2 Intended use and regulatory statement

10.2.1 Intended use DX2-RJM and DX2-RJM-LF

The DX2 Remote Joystick Modules, DX2-RJM and DX2-RJM-LF, are components of the DX/DX2 System, intended to allow powered wheelchair users to interact with the System. The DX2 Remote Joystick Modules allow control of drive functions, as well as operation of associated modules and compatible third-party equipment, as configured and connected within the DX/DX2 System. Control may extend to all features provided by the DX/DX2 System, or be limited by configuration for the particular user.

The DX2 Remote Joystick Modules are not intended for users who cannot differentiate colours to accurately determine the state of charge of the battery, where the DX2 Remote Joystick Module battery gauge is the sole means of making this assessment.

A DX/DX2 Master Remote must be installed to provide visual feedback about the system state if the information displayed on the DX2 Remote Joystick Module is insufficient for the user.

When used as a chin control, the DX2 Remote Joystick Modules are restricted to using the GPL55470 DLX-REM050-A Joystick Knob.





10.2.2 Intended use DX2-ACU

The DX2 Attendant Control Unit, DX2-ACU, is a component of the DX/DX2 System, intended to allow attendants to interact with the System. The DX2-ACU allows the attendant to take control of drive function, as configured and connected within the DX/DX2 System.

The DX2-ACU is not intended for use by users who cannot differentiate colours to accurately determine the state of charge of the battery, where the DX2-ACU battery gauge is the sole means of making this assessment.

10.2.3 Device classification

Europe

The DX2 compact remote modules DX2-RJM, DX2-RJM-LF and DX2-ACU are components of a Class I medical device as detailed in the Council Directive 93/42/EEC concerning Medical Devices.

USA

The DX2 compact remote modules DX2-RJM, DX2-RJM-LF and DX2-ACU are components of a Class II medical device (Powered Wheelchair) as detailed in 21 CFR § 890.3860.

10.2.4 Compliance and conformance with standards

In accordance with the device classification, the DX2 compact remote module is designed to enable the wheelchair manufacturer to comply with the relevant requirements of the European Medical Device Directive 93/42/EEC and 21 CFR § 820.30.

The DX2 compact remote module has been designed such that the combination of the wheelchair and controller, along with accessories as applicable, complies with the Essential Requirements of the MDD by adopting relevant clauses of harmonised standards EN12184 and EN12182, and relevant parts of the FDA Consensus standard ANSI / RESNA WC-2:2009 for performance.

10.3 Service life

If the product has not been abused and all maintenance instructions as described in the maintenance section have been properly followed, the expected service life (i.e. minimum serviceable life expectancy) of the product is five (5) years. After this period, product reliability can no longer be guaranteed and Dynamic Controls recommends the product is replaced for safety reasons. Dynamic Controls accepts no responsibility/liability for product failure if the product is continued to be used after the expected service life period has expired.

It is the OEM's responsibility to state the expected service life, as well as the inspection and maintenance schedules for all modules and cables, including the DX communications bus loom.

10.4 Maintenance

The following instructions must be passed on to the operator before use of the product:

- Keep all Dynamic Controls electronic components free of dust, dirt and liquids. To clean the product, use a cloth dampened with warm soapy water. Do not use chemicals, solvents or abrasive cleaners, as this may cause damage to the product.
- Once a month, check all vehicle components for loose, damaged or corroded components, such as connectors, terminals or cables. Ensure that all connectors are fully mated. Restrain all







cables to protect them from damage. Replace damaged components. Check for and remove any foreign objects or material.

• Every 6 months, test all switchable functions on the Dynamic Controls electronics system to ensure they function correctly.



Warning[:]

There are no user-serviceable parts in any Dynamic Controls electronic component. Do not attempt to open any case or undertake any repairs, else warranty will be voided and the safety of the system may be compromised.



Warning[:]

If any component is damaged in any way, or if internal damage may have occurred (for example by being dropped), have it checked by qualified personnel before operating.

Where any doubt exists, consult your nearest service centre or agent.

10.5 Warranty

All equipment supplied by Dynamic Controls is warranted by the company to be free from faulty workmanship or materials. If any defect is found within the warranty period, the company will repair or, at its discretion, replace the equipment without charge for materials or labour.

This warranty is subject to the provisions that the equipment:

- has been correctly installed;
- has been thoroughly checked upon completion of installation, and all programmable options correctly adjusted for safe operation prior to use;
- has been used solely in accordance with this manual and all other manuals of the Dynamic Controls electronic components that are used on the wheelchair;
- has been properly connected to a suitable power supply in accordance with this manual;
- has not been subjected to misuse or accident, or been modified or repaired by any unauthorised personnel;
- has been used solely for the driving of electrically powered mobility wheelchairs in accordance with the intended use and the recommendations of the wheelchair manufacturer;
- has not been connected to third party devices without the specific approval of Dynamic Controls.

10.6 Safety and misuse warnings

10.6.1 Warnings to be included in the user manual

The DX2-RJM, DX2-RJM-LF and DX2-ACU remote modules are part of the DX System and therefore all safety and misuse warnings that appear in the DX System Manual apply to the DX2-RJM, DX2-RJM-LF and DX2-ACU remote modules — see the Safety and Misuse warnings in the DX System Manual appendices.

In addition, the following warnings and advice must be passed on to the end user before use of the product.

- In the case of an emergency while the vehicle is driving, press the power button to perform an emergency stop and turn the controller off.
- If there is a risk of collision with a person or object in close proximity, use the joystick and/or speed selector to reduce the speed of the wheelchair.





- Make sure that the battery charger that is used with the vehicle has a drive inhibit function that is correctly connected for use with the controller. If you are not sure, ask your dealer or vehicle manufacturer.
- Users should be aware that the surface of the remote module can potentially get hot when exposed to strong sunlight for long periods.
- If the wheelchair's remote module has not been fitted with a hand guard, the user should be made aware that their hand will not be protected from crushing, when, for example, manoeuvring towards or under a table.
- Users should be informed of the battery chargers to be used with the controller and warn against using battery chargers of higher current ratings.
- The users should be aware of the wheelchair's stopping distances.

10.6.2 Service and configuration warnings

The following warnings are applicable to the installation technician and the dealer or the therapist who supplies the vehicle to the end user.

- It is the responsibility of the installer to make sure that accessories and cables of the vehicle do not interfere with the operation of the controller.
- Do not use the vehicle frame as the earth return. Any electrical low-resistance connection to the frame is a safety risk and is not allowed by international safety standards.
- To protect the wheelchair wiring from over-currents while charging, battery chargers must be able to reduce their current output when electrically shorted.
- If the vehicle loses electric power, it is important that an attendant is able to move the vehicle easily.
- After you have completed the installation, check it thoroughly. Correctly adjust all programmable options before the vehicle is used.
- After you have configured the vehicle, check to make sure that the vehicle performs to the specifications entered in the programming procedure. If the vehicle does not perform to specifications, reprogram it. Repeat this procedure until the vehicle performs to specifications. If the desired operation cannot be reached, contact your service agent.
- The dealer, therapist or other agent who supplies the vehicle to the end user has the responsibility to make sure that the vehicle is correctly configured for the needs of that user.
- For each individual user, the vehicle set-up and configuration should take into consideration his or her:
 - technical knowledge, experience and education, and
 - medical and physical condition, including the level of disability and capability (where applicable).
- It is the responsibility of the OEM and installer to make sure that the maximum driving speed of the vehicle is limited as appropriate when the vehicle is in a mechanically unstable position, for example when the seat is raised.
- It is the responsibility of the therapist/installer to minimise any risk of use error, including those arising from ergonomic features and/or the environment in which the device is intended to be used.
- Prior to handing over the vehicle, make sure that users are fully able to operate the product by giving them appropriate training on functionality and safety features, and having them test drive the vehicle in a safe area in the presence of their agent.
- The controller can cause the vehicle to come to a sudden stop. If this can be dangerous to the operator, the installer must install a seat belt and the operator must wear this belt.

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10.7 Electromagnetic compatibility

Dynamic Controls' electronic controllers have been tested on typical, representative vehicles to confirm compliance with the following appropriate EMC standards:

USA: ANSI/RESNA WC-2:2009 Sec 21 Europe: EN12184:2009 Sec 9.1

National and international directives require confirmation of compliance on particular vehicles. Since EMC is dependent on a particular installation, each variation must be tested. The guidelines in this section are written to assist with meeting EMC requirements in general.

10.7.1 Minimising emissions

To minimise emissions and to maximise the immunity to radiated fields and ESD, follow the General Wiring Recommendations in the DX System Manual.

10.8 Environmental statement

Dynamic Controls confirms that the product variants specified in this manual, as sub-assemblies of electronic and electrical equipment supplied for further integration by a medical device manufacturer, conform to applicable requirements of Directive 2011/65/EU, recast of Directive 2002/95/EC - Restriction of the use of certain Hazardous Substances in electrical and electronic equipment.



This product has been supplied from an environmentally aware manufacturer. Please be environmentally responsible and recycle this product at the end of its life through your local recycling facility. This product may contain substances that could be harmful to the environment if disposed of into a landfill.

See also: http://www.dynamiccontrols.com/designers-and-manufacturers/compliance

10.9 Symbols and labelling

10.9.1 Product label

The product label is located at the base of the compact remote module, as shown in *Figure 36*.

The product label details:

- Dynamic Controls' website address
- The product's part number
- The product's bar code
- The product's serial number
- Dynamic Controls' 'dynamic' logo



Figure 36: Location of product and other labels





10.9.2 Other symbols and labels

The following symbols and labels can be found on the compact remote module.

Symbol/label	Location	Purpose
IPx4	Base	This is the enclosure's ingress protection rating.
READ INSTALLATION MANUAL BEFORE USE	Base	Warning to read the instruction manual before using the module.
X	Base	This is the WEEE symbol (Waste Electrical and Electronic Equip- ment Directive).
Ċ	User interface	Identifies power button
Ē	User interface	Identifies mode button
	User interface	Identifies battery indicator
	User interface	Identifies attendant indicator
VOID	Base/screw head	Tamper evident seal

10.9.3 Serial number and date of manufacture

The serial number on a Dynamic Controls product provides both the date of manufacture as well as a unique serial number for the particular module.



Figure 37: Serial number example

The format, as shown in *Figure 37*, is **MYYnnnnn**, where:

M is the month of manufacture, using the letters A to L (A = Jan, B = Feb, C = Mar, etc.), **YY** is the year of manufacture, **nnnnnn** is a unique 6 digit sequential number.

For example, the module's serial number, as shown in *Figure 37*, begins with A14 indicating that it was manufactured in January 2014, and its unique, sequential value is 132800.





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EUROPE

Ph: +44-1562-826-600 +44-1562-824-694 Fax:

eusales@dynamiccontrols.com

ASIA

Fax:

Ph: (Taiwan): +886-955-335 243 Ph: (China): +86-512-6289 2847 +886-2-2598 1562

asiasales@dynamiccontrols.com

AUSTRALASIA

CORPORATE OFFICE Ph: +64-3-962-2519

+64-3-962-2966 Fax:

sales@dynamiccontrols.com

USA

Ph: +1-440-979-0657 Fax: +1-440-979-1028

usasales@dynamiccontrols.com

Dynamic Controls is the world's leading manufacturer of electronic controls for power wheelchairs and scooters. Dynamic Controls was established in 1972 and is headquartered in New Zealand. Regional centres are located in Europe, United States, Asia, and Australasia.

ISO 13485 certified – Dynamic Controls goes above and beyond industry standard expectations to ensure customers receive the best products possible.



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