EXPRESS CONTROL

EXPRESS CONTROL INSTALLATION

The Pharos Express Control is 100% solid state and has been qualified to operate in a dry environment:

- Temperature range 0°C to 50°C (32°F to 122°F)
- Humidity 10-90% relative, non-condensing
- Ingress IP40

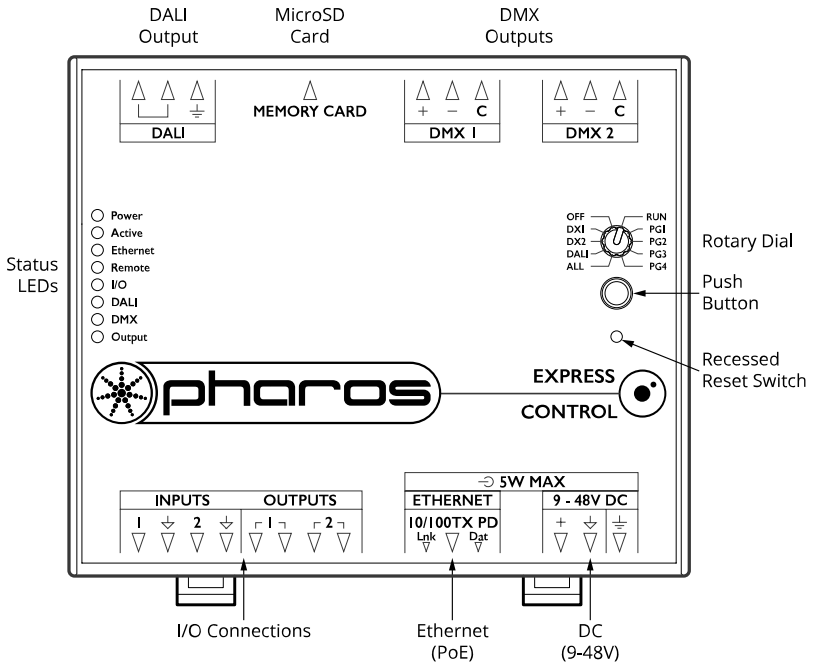
Sealed IP65 rated consumer units are available for outdoor use, please consult your Pharos distributor or representative.

Since the units require no user intervention once installed they are suitable for remote installation with all configuration and management taking place over an Ethernet network. However it is recommended that access can be gained in the unlikely event of a hardware failure.

NOTE: This equipment is not suitable for use in locations where children are likely to be present.

EXPRESS CONTROL LAYOUT

The following drawing illustrates the layout of the controller, refer to the following sections for details:



EXPRESS CONTROL VERSIONS

There are four versions of Express Control available: XPC 1 supports 512 DMX channels, with the single DMX universe optionally mirrored on both local DMX ports. XPC 2 supports 1,024 channels with both DMX universes available from the two local DMX ports. XPC 4 and 6 both feature two local DMX ports and support 2,048 and 3,072 DMX channels respectively. All versions of Express Control can also output eDMX protocols via the Ethernet port.

POWER SUPPLY

The Express Control can be powered in two different ways:

- DC power (9 to 48V)

  A limited power source approved to UL60950-1 2nd Edition, CAN/CSA C22.2 No. 60950-1.07 2nd Edition MUST be used, with an output voltage of 9 to 48V DC.

  Such a power supply can be connected directly to the Express Control using the DC Input connector. The pins on this connector are marked:

  \+ Positive input (9 to 48V DC)

  ⏚ Signal ground (0V)

  ⏚ Earth

  The power supply should be connected to the Positive and Signal ground inputs, ensuring the polarity is correct. Where possible, use a 12V (minimum) supply in preference to a 9V supply to ensure some headroom.

  Express Control will typically consume 4W.

- Power-over-Ethernet (PoE)

  A standard (802.3af) Power-over-Ethernet switch may be used to provide both power and a network connection to the Express Control using a single cable.

  The Express Control operates as a PoE Class 2 device (3.84-6.49W) and will typically consume 4W.

NOTE: Power should only be applied using one of the above methods. Redundant operation using both sources is not supported.

NOTE: Power must not be disconnected when uploading project data nor during bootloader/firmware updates to the Express Control as corruption of the data or software may occur, perhaps even rendering the unit inoperable.

GROUNDING

A dedicated earth terminal is provided which should be connected to a suitable earth.

Additionally, the Signal ground can be tied to earth to provide a suitable reference but this is not generally recommended.

If in any doubt at all, or if you have unusual power supply or grounding/earthing requirements, then please consult Pharos Support.

REALTIME CLOCK BATTERY

The Express Control's internal realtime clock is battery-backed to ensure operation when the unit is not powered. Express Control ships with a pull-tab stopping the battery from being used before installation. Remove the pull-tab by gently pulling it as instructed at time of installation. Should Express Control lose power connection, the battery should last for at least 2 months and could be replaced when necessary. Replacement battery: Renata CR2032 Lithium Button Cell.

CAUTION: Risk of explosion if battery replaced by incorrect type. Dispose of used batteries according to the manufacturer's instructions.

ATTENTION: Il y a un danger d'explosion s'il y a un remplacement incorrect de batterie. Mettre au rebut les batteries usages conformement aux instructions du fabricant.

MEMORY CARD

Express Control is shipped with a 32GB MicroSD Memory Card which should be sufficient for most projects since the Express Control's data storage is extremely efficient, even with a multitude of imported media files. However, a larger capacity card could of course be fitted if required.

As only the project's programming data resides on the card, the card is also a convenient way to backup data for archiving; the Express project file for example.

Furthermore, in the event of Express Control hardware failure, simply moving the card into a replacement unit with identical or more recent firmware is sufficient to get the project up and running again.

STATUS LEDS

The red LEDs on the front of Express Control indicate the unit's current status.

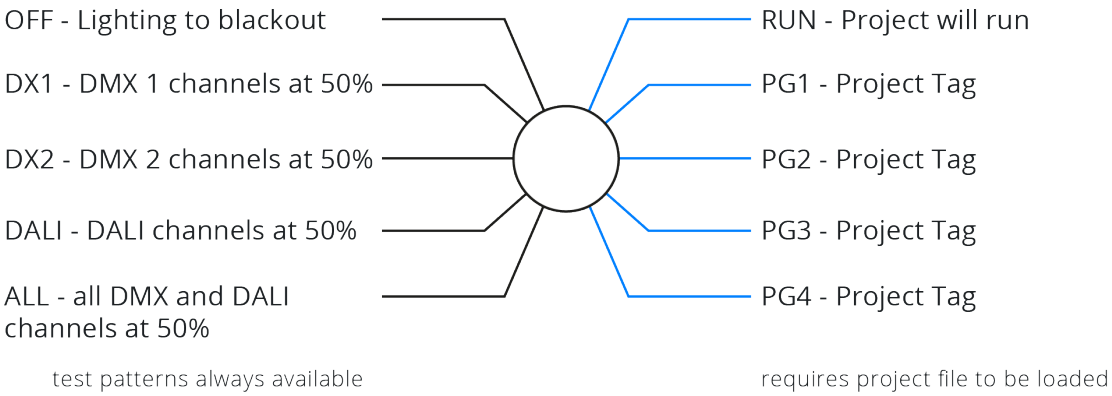
Power:	Illuminates when power is applied.
Active:	Illuminates once the boot up procedure has completed and is indicative of a fully functional unit.
Ethernet:	Indicates Pharos related network activity (not network link, see Ethernet port later) while the remaining LEDs indicate communication on the various ports of the Express Control.

Remote:	Flashes when the unit has internet access, and will illuminate when the unit is connected to a Remote Site on Pharos Cloud or a Pharos Cloud Portal.
I/O:	Flashes with any activity on Express Control's inputs or outputs.
DALI:	Illuminates with DALI power and flashes with DALI data activity.
DMX:	Indicates that valid DMX512 data is being output from the DMX ports.
Output:	Indicates that a valid project file has been loaded from the memory card and that playback and data output has started.

ROTARY DIAL AND PUSH BUTTON

- Rotary Dial

  Arrow indicates position of rotary dial which affects Express Control's behaviour between commissioning output tool and project file interaction. Positions are as follows:



- Push Button

  When the Rotary Dial is set in a commissioning output mode pressing and holding the button will increase or decrease output levels. There is no default behaviour for the push button when a project file dependent position is selected on the Rotary Dial.

RESET SWITCH

Express Control may be reset by inserting a small blunt object into the reset hole on the front of the Express Control to depress the reset switch. Press to reboot; long hold for factory reset.

NOTE: The reset must not be operated when uploading project data nor during bootloader/firmware updates to the Express Control as corruption of the data or software may occur, perhaps even rendering the unit inoperable.

ERROR CODES

Additionally, the red status LEDs are used to indicate any boot failures of the Express Control that prevent the unit from going active.

Error codes are indicated by the Power LED being on, the Active LED off and double flashing the Ethernet, Remote, and IO LEDs, followed by a 1 second pause.

The remaining LEDs indicate the error:

- DALI on solid - memory card missing (insert or replace memory card)

WATCHDOG

The internal “watchdog” is enabled by default to reset the Express Control automatically in case of a software crash as a result of either a coding error (“bug”) or a random electromagnetic event such as a power brown-out or spike, nearby lightning strike or static discharge. Please refer to the Express Help to learn how to disable this feature (not recommended).

PORTS

- DMX Outputs

  Two DMX outputs are provided. An Express Control 1 will optionally output on both the same DMX universe data, an Express Control 2 will output a separate universe on each. Express Control 4 and 6 also have two local DMX ports, with additional universes available using eDMX protocols over Ethernet. The pins on the local DMX connectors are marked:

  \+ Data + (‘Hot’ or ‘True’)
  \- Data - (‘Cold’ or ‘Complement’)
  C Data common

  To make up a cable to a 5 pin XLR the following connections should be made:

	Express Control:	5 pin XLR:
Data +	+	3
Data -	-	2
Shield	⏚	1

  The DMX ports are by default not isolated from the Express Control’s ground connection which is the recommended configuration for driving isolated inputs - the majority of DMX receivers.

- Inputs & Outputs

  Inputs: Express Control features two digital/analog inputs on the input/output connector. To connect an input signal, one connection should be made to the desired input pin, marked '1' or '2', and the other should be made to the adjacent common pin. The inputs can be individually configured to operate in one of three modes:

  Contact closure: An external volt-free switch may be connected between the input pin and the signal ground pin. In this mode, the input pin is internally pulled-up to 3.3V via a 2.2Kohm resistor, so the switch only needs to be rated at 3.3V, 2mA or greater.

  Digital input: An external voltage source (such as a 12VDC trigger output) may be connected between the input pin and the signal ground pin. In this mode, the input pin is internally pulled down to 0V via a 2Mohm resistor and the maximum input voltage supported is 24VDC. The input may be configured using Express software to specify what the 'high' and 'low' threshold voltages are.

  Analog input: An external voltage source (such as a 0-10VDC analog signal) may be connected between the input pin and the signal ground pin. In this mode, the input pin is internally pulled down to 0V via a 2Mohm resistor and the maximum input voltage supported is 24VDC. Express Control may be configured using Express software to specify what the input voltage range is. Voltages inside this range are reported as 0% to 100%. In all modes, the maximum rated input voltage is 24VDC. The inputs should never be driven with a higher voltage nor negative voltage as damage may occur.

  Outputs: Express Control features two relay outputs on the input/output connector. The relays are rated at 48V (AC or DC), 250mA. This comparatively low rating is due to the use of solid-state relays to ensure silent operation and long-term reliability. All relay outputs are fully isolated from each other (1kV) and all other ports.

  NOTE: An external power supply is required to power the relay outputs. An external PSU can be used to power one or more relay outputs.

- Ethernet

  A standard 10/100TX Ethernet connection may be made to Express Control. As Express Control supports Power-over-Ethernet (PoE), a PoE switch or midspan injector can be used. The LEDs on the RJ45 jack itself are useful for debugging the Ethernet installation:

  - The Lnk LED will illuminate when an Ethernet link has been established
  - The Dat LED will illuminate to indicate Ethernet traffic (not just Pharos-relevant)

- DALI

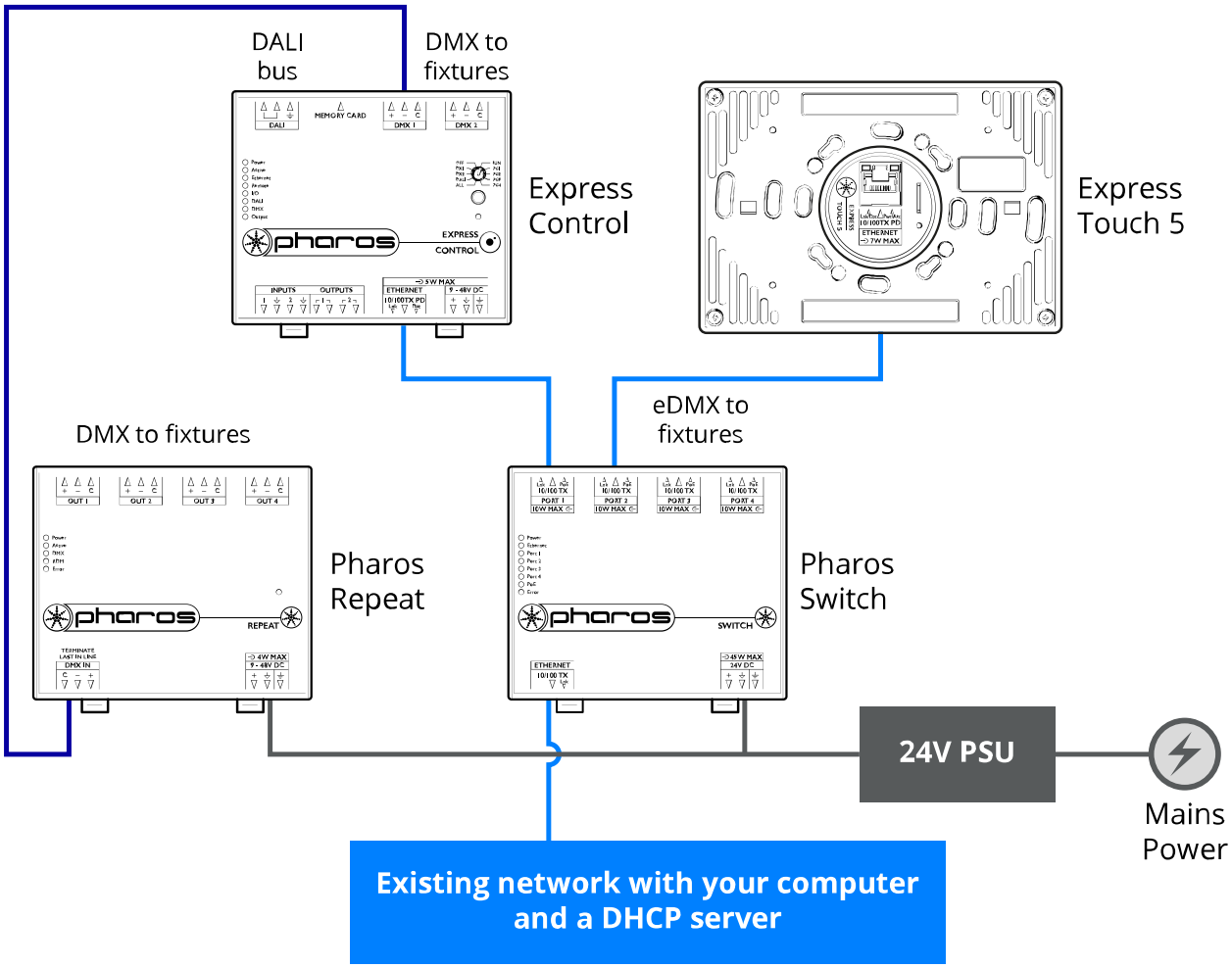
  A DALI bus interface is provided on a 3 way connector:

  - DALI bus (polarity insensitive)
  - DALI bus (polarity insensitive)
  - Optional connection point for earth (not connected)
  - The DALI data LED will indicate valid data on the bus

NOTE: DALI bus requires a dedicated DALI bus power supply to function, the DALI power LED will illuminate solidly to indicate suitable (9-26V) power. The LED will be off for no power or flash to indicate out of range power.

WIRING DIAGRAM

Illustrative example of possible wiring for a system using Express Control, including accessory devices.



WARRANTY

Pharos Architectural Controls Limited (Pharos) products are warranted for a period of five (5) years from the original date of purchase against defective materials and workmanship.

This warranty is subject to the terms, conditions and exclusions available at www.pharoscontrols.com/legal