DS485DIS User Manual

DS485DIS

DSC RS485 Display

mantracourt

Contents

Introduction

Manual Scope

This manual applies to the October 2021 release of the DS485DIS which is an improved design over the legacy module which can be recognized by its light grey enclosure. To find the user manual for this legacy module please refer to the Mantracourt website.

Overview

The DS485DIS is an LED display module which allows up to eight (8) DSC or DLC devices to be connected with mathematical functions performed such as summing for allowing an overall Result to be displayed.

In **Legacy Mode** the display can toggle between gross and a zeroed net display and optionally allows the user to cycle through the individual displays that form the Result.

When used in **Advanced Mode**, Sets can be configured. This allows two sets to be configured with up to 4 devices (children) per set. Functions and statistics for each set can be configured with an overall result based on the two sets.

Advanced mode is selected using the FUNC parameter

The inputs are all synchronised so the result display is a true representation of the instantaneous input without skew.

Requirements

This display can connect to various DSC and DLC devices but does require an RS485 interface and the MantraBus II protocol.
Suitable devices are: DSCS4MAN, DSCH4MAN, DLCSMAN and DLCHMAN.
The DSC and DLC devices must have sequential station numbers from 1 to the total number of devices when used in Legacy mode but for the new advanced "Set" mode the station numbers can be between 1 and 252. The default baudrate for the RS485 bus is 115200.
The connected devices should be configured using Instrument Explorer before connecting to this display.

> ❗ Ensure that the baudrate of the connected devices match the baudrate of the display.

Configuration

This display module is configured using a PC or laptop which can connect to the display's USB connection or directly connected to the display modules RS485 bus. Mantracourt's **Instrument Explorer** with a **DS485DIS v3** driver is used for configuration.

The operation of Instrument explorer will not be described here as the user will be familiar with its operation from configuring the DSC sensor modules.

See Command List later in the manual for a list of parameters that will be available for configuration from within Instrument Explorer.

> **ⓘ** *The Station number DS485DIS is fixed at 253 and the default USB baudrate is 115200.*
> *Instrument Explorer requires that the COM port is in the range of COM1 to COM8.*

Connecting to USB

This is the simplest option as the computer does not need an RS485 interface.

Step 1

Install Instrument Explorer and ensure that the FTDI Drivers are selected to be installed.
The Station number DS485DIS is fixed at 253 and the default USB baudrate is 115200.
Instrument Explorer requires that the virtual COM port is in the range of COM1 to COM8.

> **ⓘ** *The USB connection will power the display module.*

The COM port can be set from Windows Device Manager. Also it is recommended to change the Latency from the default of 16ms to 1ms.
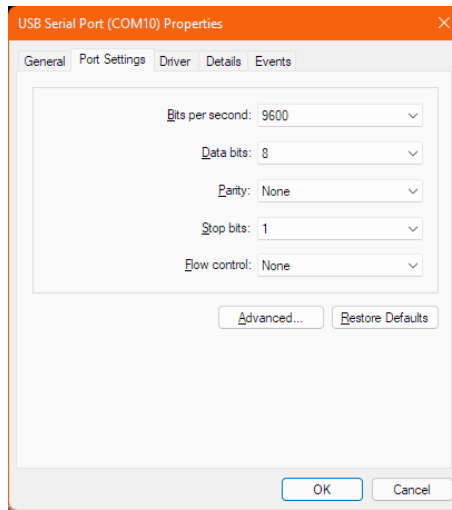
Step 2

Open **Device Manager** and locate the COM port that appears when the module is plugged in to the PC USB port.
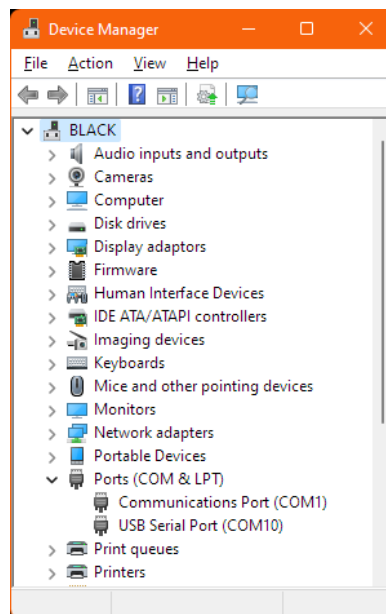
Double click the correct COM port to open the **Properties** dialog.

Step 3

Select the **Port Settings** tab and click the Advanced button.

Step 4

On the Advanced Settings dialog window select a different COM Port Number (If it is not within the range 1 to 8).

> ⓘ Note that a port **may** be reported as 'in use' if a USB device has **ever** been connected to that COM port. Ignore this and select it anyway if you are sure that there is not anything currently actively using this COM port.
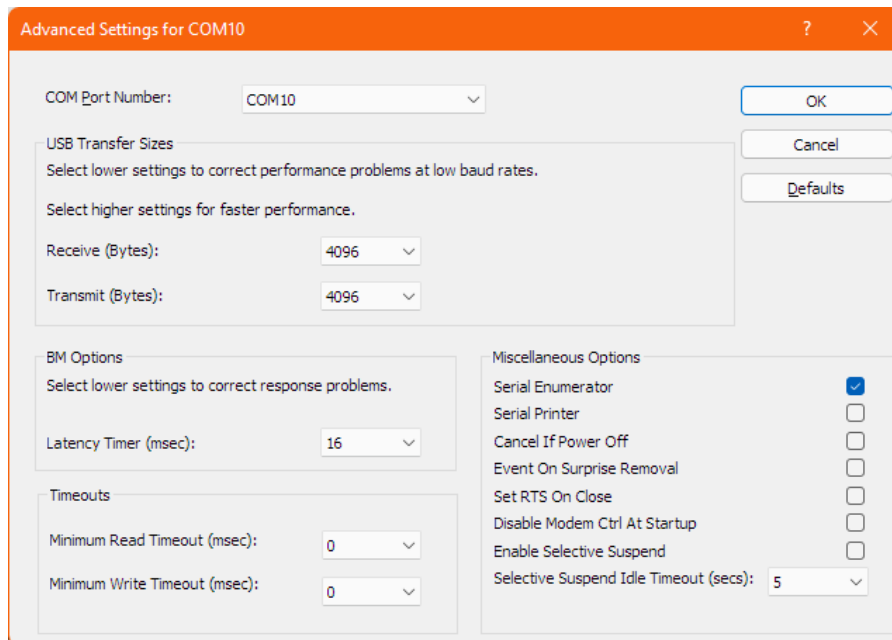
Also change the Latency Timer (msec) to 1ms.

Connecting to RS485 Bus

This is an option if the computer has an RS485 interface.

It is recommended that the display module is isolated from any working bus or connected devices and connected directly to the computer for configuration.

> **!** The display module must be activated for configuration mode.

To activate configuration mode the display must be powered up whilst holding down the two front panel keys.

The COM port must be between 1 and 8 to enable connection with Instrument Explorer.

> **i** *NOTE: If the COM port is provided by a USB to RS485 convertor then see the previous section regarding Latency as this may apply to your convertor if it is handled by FTDI drivers.*

Legacy Operation Modes

When using legacy operation the input devices must have their station numbers set sequentially from STN = 1 to STN = 8. These station numbers will represent **InP1** to **InP8** respectively.
The number of devices connected to the DS485DIS is set by parameter NOSV.

There are two modes of legacy operation.

Item Mode

The user can select which input value to view and can toggle between Gross and Zeroed Net mode.

Result Mode

The display normally shows a **Result** (Default is **sum** but other functions are available see later) of all inputs which can be toggled between Gross and Zeroed Net mode.
Also the user can step through the individual items to view their values. If in Net mode then each item can be viewed as Gross or Net.
After a user settable delay the display will always revert to the Result display.

Legacy Button Functions

Toggles between Gross display and Net display. When switching from Gross to Net display a tare is performed.

Item Mode

Any Time	Toggles between Gross display and Net display. When switching from gross to Net display a tare is performed.

Result Mode

Viewing Result	Toggles between Gross display and Net display. When switching from gross to Net display a tare is performed.
Viewing Items when in Gross mode	No effect.
Viewing Items when in Net mode	Toggles the individual item display between gross and net but does not apply a zero.

Selects next item to view.

Item Mode

Any Time	Selects the next item. Once the last item is reached the next item to be displayed will be the first item.

Result Mode

Any Time	Selects the next individual item to view. Once the last item is reached the next item to be displayed will be the result.

LED Functions

NET LED

Any Time   Indicates the display is showing a Net value.

RESULT LED

Item Mode   Always Off.

Result Mode   Indicates when an individual item is being displayed rather than the
                                      Result. **Active**: Result displayed. **Inactive**: Individual item displayed.

Advanced Operational Modes

New functionality has been introduced to Version 3 of the product to allow for **Sets**.
Sets allow for two groups of up to 4 DSC/DLC devices to be configured. Additionally the two sets can be used to produce a Result known as **FinAL**.

Advanced mode is entered by selecting 5 (Sets) in the **FUNC** parameter.

When using advanced mode the Station Numbers must be defined using parameters **IST1** to **IST8**. Station numbers can be in the range of 1 to 252. If the **IST**x is set to zero then this input is not included in the set

SEt1 is comprised of **InP1** to **InP4**
SEt2 is comprised of **InP5** to **InP8**

Advanced Button Function

Toggles between Gross Result and Net Result. When switching from Gross to Net display a tare is performed.
This key is only active when displaying the **FInAL** which is indicated by the Result LED being on**.**

Selects next item to view.
When displaying **FInAL**, indicated by Result LED being on, pressing this key will show **SEt1**. After a 3 second timeout the value for **SEt1** will be displayed. A further press will show **SEt2** followed 3 seconds later by the value for **SEt2**. The next press returns the display to showing **FInAL** which is the result of **SEt1** and **SEt2**.

Notes.
Key presses whilst the display shows mnemonics **SEt1** or **SEt2** will be ignored.

Pressing and holding this key when displaying the **FInAL** indicated by the Result LED being on will cause the Result LED to turn off (approx. 3 seconds) and put the display into a mode that allows the individual inputs that make up the sets to also be displayed.

Pressing this key whilst mnemonics **InPx** is displayed will skip to the next input without showing the value of **InPx**. This is a quick way of stepping around the inputs.

System Zero for Legacy and Advanced

Once the module is installed it may be necessary to perform a system zero. To do this power off the DS485DIS and

hold down key   and re-apply the power. The display will show "ZErOEd" and the key can now be released.
The system zero can be re-applied at any time. Performing this will reset to Gross mode.
To remove the system zero the communication interface must be used.

Physical Connections

Configuration Connections

To gain access to the USB port remove the 6 screws. A USB 'B' connector is plugged into J1.

When connected to an active USB host communication activity between the host (PC) and the DS485DIS can be observed on the Green Rx and Red Tx LED's

The DS485DIS must be powered using a separate supply as the USB cannot supply power to the display as well as the connected input devices. However, the USB can power the display **only** when used for configuration.
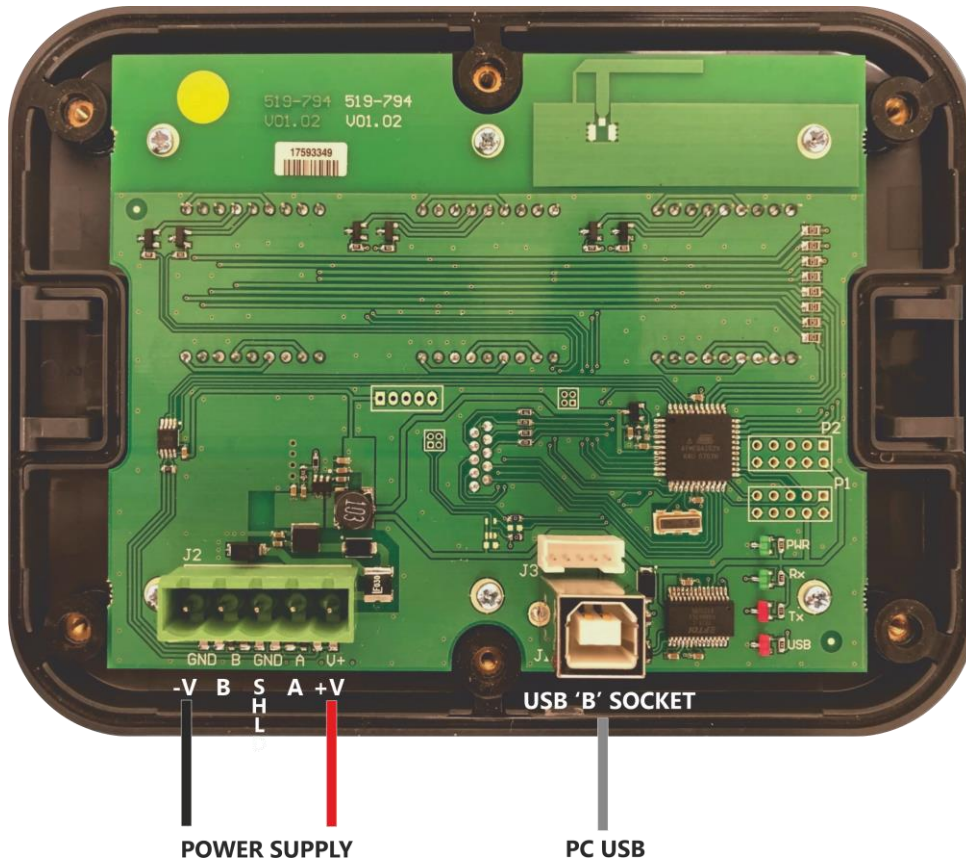
> ⓘ Power supply: 6 to 36V dc (Note that DSC and DLC have 18V MAX!)

> ⓘ To configure the module, connect to a PC USB port using a USB B to USB A cable.
>   (See Configuration section for details of configuring the display using RS485 connection)

Connecting to up to 4 DSCs using DSJ4

LK1 Shorted
To terminate RS485 bus

POWER SUPPLY

-V B S A +V
       H
       L
       D
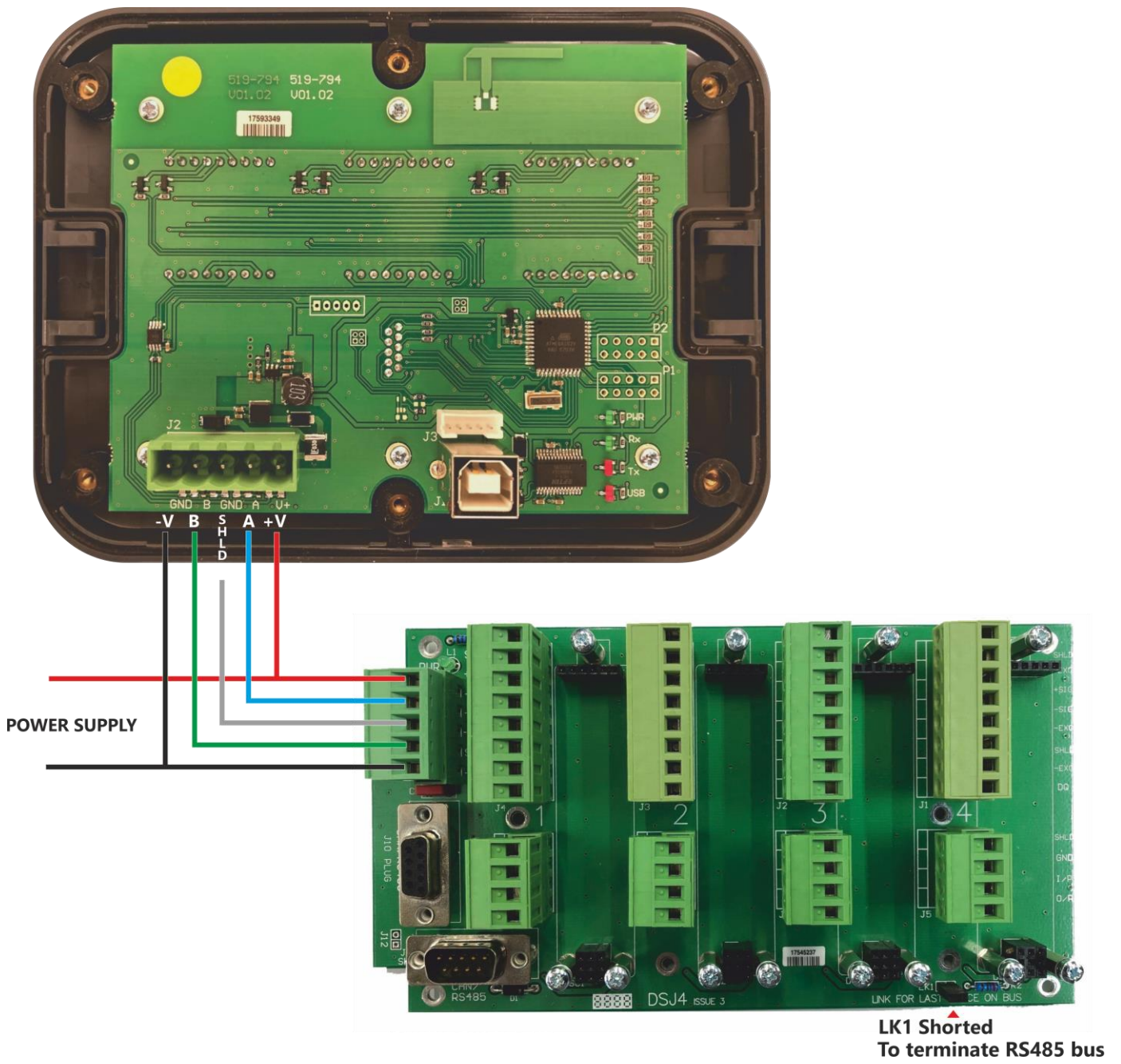
Connecting to between 5 and 8 DSCs using DSJ4

POWER SUPPLY

Lk1 NOT Shorted

LK1 Shorted
To terminate RS485 bus
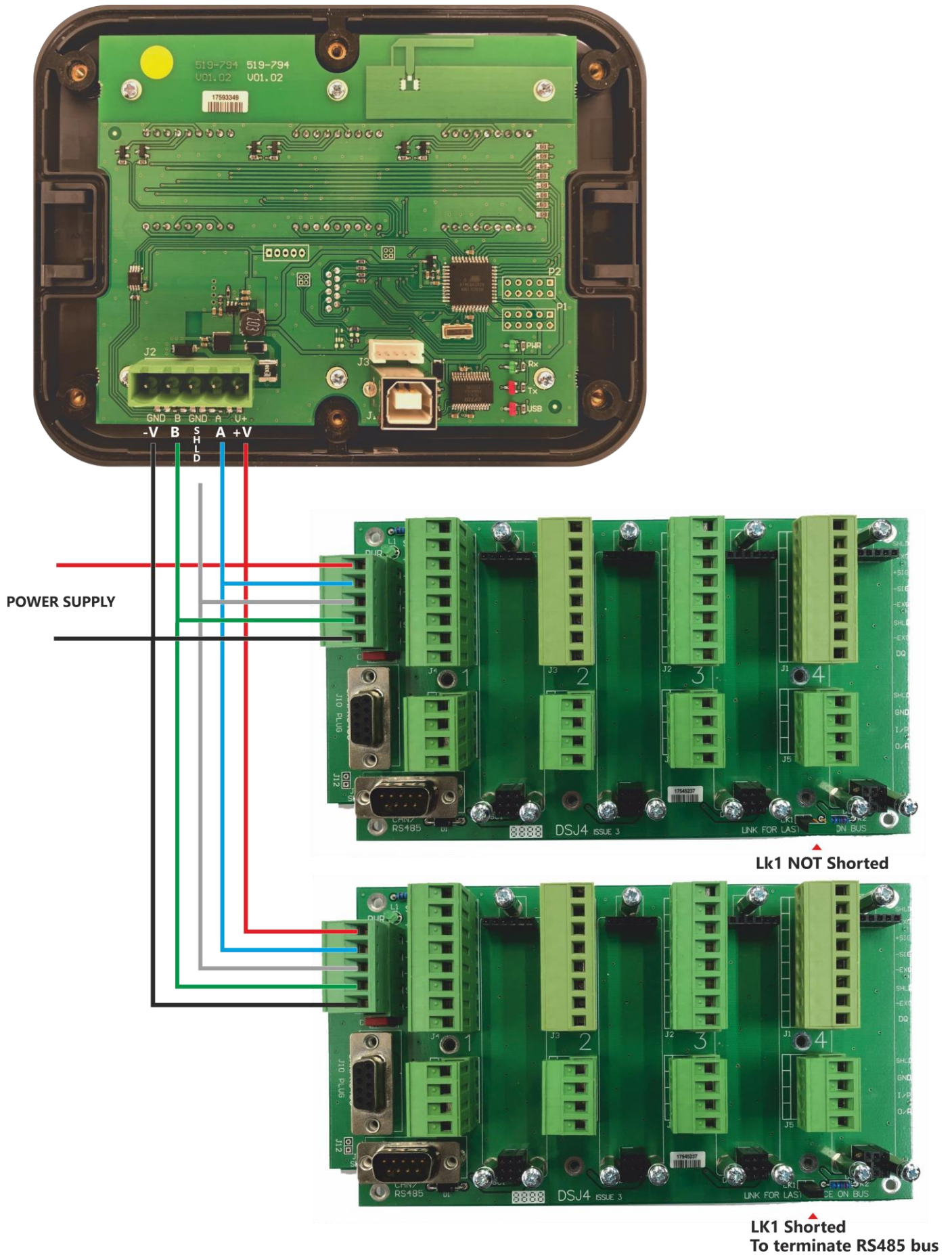
Error Reporting

When errors occur in communications on one of the attached DSC or DLC modules the display will show Err followed by a 2 digit error code.
The first digit indicates which DSC / DLC station number the error has occurred on.
The second digit indicates the error.
Only one error will be displayed at a time and on clearing the error the next (if one exists) will be displayed.
All errors are self resetting.

2nd Digit	Description
1	Communication error
2	Loadcell integrity error
3	Loadcell underrange
4	Loadcell Overrange
5	Cell limits exceeded
6	Sys limits exceeded
7	DSC/DLC Temperature limits exceeded

Errors 5 and 6 are dependent on parameter settings in the modules. The **CMIN, CMAX, SMIN** and **SMAX** parameters will set the limits for these errors.

The display may also display **OvEr** or **UndEr** if the value cannot be displayed within the constraints of the configured decimal point position.

Command List

Below is the list of Mantrabus parameters supported by the module using Mantrabus2 protocol over RS485 and via the PC software Instrument Explorer.:

> ℹ️ *Note that listen only mode is not yet implemented*

Parameter Name	Command Number	Description	Data Type
VERS	15	Version	Read only
RESU	16	Result (before scale factor)	Read only
RESS	17	Result with Scale Factor applied	Read only
SET1	18	Set 1 Value	Read only
SET2	19	Set 2 Value	Read only
SRES	20	Set Result Value	Read only
B485	40	Baudrate for RS485 port for connection to DSC and DLC bus. This requires a RST command or a power cycle to activate. **Default = 7 (115200)** **Range = 0 to 9**	Read/write
BUSB	41	Baudrate for virtual COM USB port. This requires a RST command or a power cycle to activate. **Default = 7 (115200)** **Range = 0 to 7**	Read/write
NOSV	42	Sets or returns the number of DSC or DLC devices connected. Used for Legacy mode only. Requires a display power cycle to apply new number of connected devices. **Default = 1**	Read/write

B485 baudrate table:

Value	Baudrate
0	2400
1	4800
2	9600
3	19200
4	38400
5	57600
6	76800
7	115200
8	230400
9	460800

BUSB baudrate table:

Value	Baudrate
0	2400
1	4800
2	9600
3	19200
4	38400
5	57600
6	76800
7	115200

		Range = 1 to 8	
INTV	43	Sets or returns the interval in milliseconds between display updates (and thus the rate at which the connected DSC and DLC modules are interrogated). This requires a RST command or a power cycle to activate. **Default = 300** **Range = 50 to 6000** *Note that in Instrument Explorer this parameter is entered in seconds.*	Read/write
DP	44	Sets or returns the position of the decimal point. **Default = 3** **Range = 0 to 5** | Value	Display
---	---
0	000000
1	00000.0
2	0000.00
3	000.000
4	00.0000
5	0.00000		Read/write
RS	45	Sets or returns the resolution of the display. i.e. the value that the display increments by such as 0.5. **Default = 0** **Range = Unlimited**	Read/write
FUNC	46	Sets or returns the current operating mode. This requires a RST command or a power cycle to activate. Legacy Modes = 0 to 4 | Value	Mode
---	---
0	Item Mode
1	Result Mode Sum 1+2+3+4+5+6+7+8
2	Result Mode (1+3+5+7)-(2+4+6+8)
3	Result Mode (1+3+5+7)/(2+4+6+8)
4	Result Mode (1+3+5+7)*(2+4+6+8)
5	Sets Mode (**Advanced operation**)	 **Default = 1** **Range = 0 to 5**	Read/write
RSSF	47	Result Scale Factor Used for scaling the end result. Also applied to Sets Result Default = 1.0	Read/write
K1OP	50	**NOT IMPLEMENTED IN THIS HARDWARE** Sets or returns whether Key 1 is operational. **Default = 0** **Range = 0 to 1**	Read/write
K2OP	51	Sets or returns whether Key 2 (**Tare**) is operational. **Default = 0** **Range = 0 to 1**	Read/write

K3OP	52	**NOT IMPLEMENTED IN THIS HARDWARE** Sets or returns whether Key 3 is operational. **Default = 0** **Range = 0 to 1**	Read/write
K4OP	53	Sets or returns whether Key 4 (**Next**) is operational. **Default = 0** **Range = 0 to 1**	Read/write
K4TO	54	Sets or returns duration that individual items are displayed for (in seconds) before automatically returning to display the Result. **Only effective in Legacy Result Mode.** **Default = 10** **Range = 0 to 255**	Read/write
IST1	55	Input 1 device station number Advanced mode only **Default 1** **Range 0 to 252** *Note: Starting with IST1 and progressing through to IST8, as soon as a zero is encountered no further input devices will be recognised.*	Read/write
IST2	56	Input 2device station number Advanced mode only **Default 2** **Range 0 to 252**	Read/write
IST3	57	Input 3 device station number Advanced mode only **Default 3** **Range 0 to 252**	Read/write
IST4	58	Input 1 device station number Advanced mode only **Default 4** **Range 0 to 252**	Read/write
IST5	59	Input 1 device station number Advanced mode only **Default 5** **Range 0 to 252**	Read/write
IST6	60	Input 1 device station number Advanced mode only **Default 6** **Range 0 to 252**	Read/write
IST7	61	Input 1 device station number Advanced mode only **Default 7** **Range 0 to 252**	Read/write
IST8	62	Input 1 device station number Advanced mode only **Default 8** **Range 0 to 252**	Read/write

ST1F	63	Set 1 Function Advanced Mode only | Value	Mode
0	No Sets Displayed (Only inputs)
1	Sum of Child Inputs
2	Minimum of Child inputs
3	Maximum of Child inputs
4	Delta of Child Minimum and Maximum	 **Default 1** **Range 0 to 4**	Read/write
---	---	---	---
ST2F	64	Set 2 Function Advanced Mode only | Value	Mode
0	Set2 not Displayed (Only Set1 if not disabled itself)
1	Sum of Child Inputs
2	Minimum of Child inputs
3	Maximum of Child inputs
4	Delta of Child Minimum and Maximum	 **Default 1** **Range 0 to 4**	Read/write
RESF	65	Result Function Advanced Mode only | Value	Mode
0	Result not Displayed
1	Sum of Sets
2	Minimum of both Sets
3	Maximum of both Sets
4	Delta of Child Minimum and Maximum
5	Set Delta (Set1 – Set2)	 **Default 1** **Range 0 to 5**	Read/write
RST	100	Resets the module. Some parameter changes require a reset to become active. These are B485, BUSB, FUNC, INTV and NOSV.	Command
DOZR	101	Performs a system zero.	Command
REMZ	102	Removes system zero.	Command

Specification

Physical

Property	Specification
Supply Voltage:	
Nominal Voltage	6 to 36V dc (Note that DSC and DLC have 18V MAX!)
Current Consumption: (no modules connected)	
Nominal	200mA max
Communications:	
Module Communications Bus	RS485 8 data bits, 1 stop, no parity
Configuration Bus	USB Virtual COM port
(115200 baud 8 data bits, 1 stop, no parity)	

Environmental

Property	Specification
Storage temperature	-20 to +70 º C
Operating temperature	-10 to +50 º C
Relative humidity	95% maximum non-condensing
Front panel sealing	IP65

Dimensions
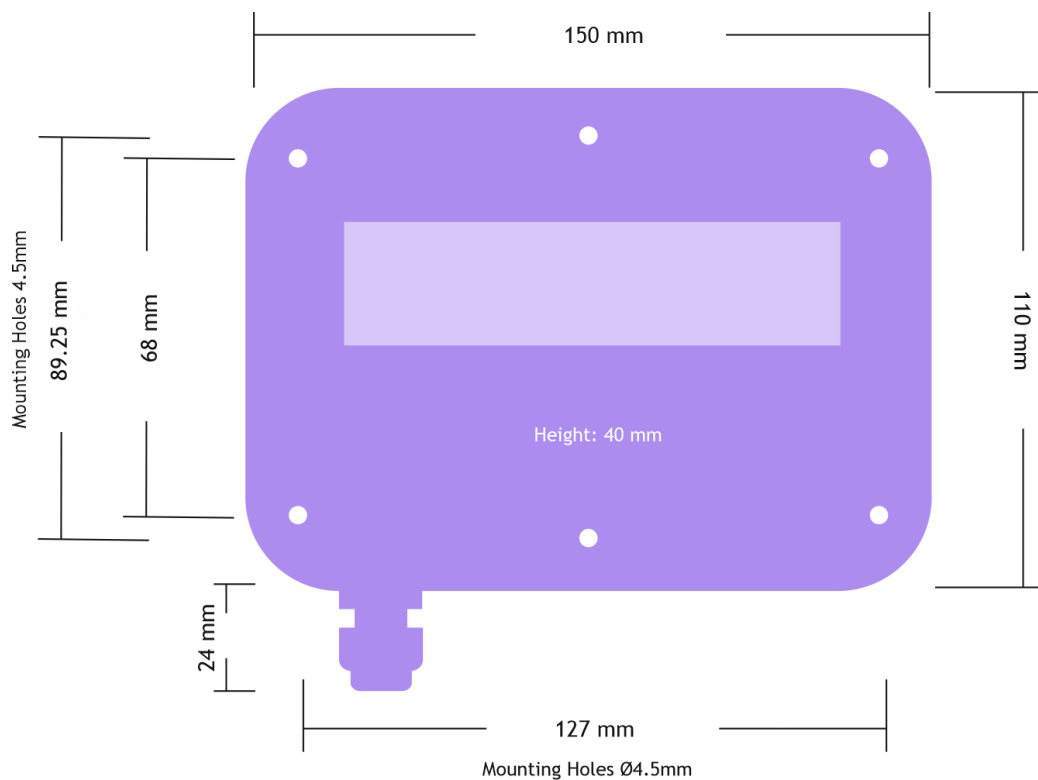
EU DECLARATION OF CONFORMITY

We, the undersigned:

Name of Manufacturer: **Mantracourt Electronics Ltd**

Address: **The Drive, Farrington, Exeter, Devon, EX5 2JB**

Country: **United Kingdom**

Declare under our sole responsibility that the following products:

DS485DIS Series

Is in conformity with the following relevant Union harmonisation legislation:

LVD directive 2014/35/EU
EMC directive 2014/30/EU
RoHS directive 2011/65/EU

Based on the following harmonised standards:

EN 61326-1:2013	**/**	**IEC 61326-1:2012**
EN 61326-2-3:2013	**/**	**IEC 61326-2-3:2012**
EN 61010-1:2010	**/**	**IEC 61010-1:2010**

Name and position of person binding the manufacturer or authorised representative:

Signed

CE

Name: **Robert Willmington-Badcock**
Function: **Managing Director**
Location: **Mantracourt Electronics Ltd**
Date of issue: **29th October 2021**

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Warranty

All DS485DIS products from Mantracourt Electronics Ltd., ('Mantracourt') are warranted against defective material and workmanship for a period of one (1) year from the date of dispatch.

If the 'Mantracourt' product you purchase appears to have a defect in material or workmanship or fails during normal use within the period, please contact your Distributor, who will assist you in resolving the problem. If it is necessary to return the product to 'Mantracourt' please include a note stating name, company, address, phone number and a detailed description of the problem. Also, please indicate if it is a warranty repair.

The sender is responsible for shipping charges, freight insurance and proper packaging to prevent breakage in transit. 'Mantracourt' warranty does not apply to defects resulting from action of the buyer such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorised modification.

No other warranties are expressed or implied. 'Mantracourt' specifically disclaims any implied warranties of merchantability or fitness for a specific purpose.
The remedies outlined above are the buyer's only remedies. 'Mantracourt' will not be liable for direct, indirect, special, incidental or consequential damages whether based on the contract, tort or other legal theory.

Any corrective maintenance required after the warranty period should be performed by 'Mantracourt' approved personnel only.

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Dated: **7th March 2023**

In the interests of continued product development, Mantracourt Electronics Limited reserves the right to alter product specifications without prior notice.

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