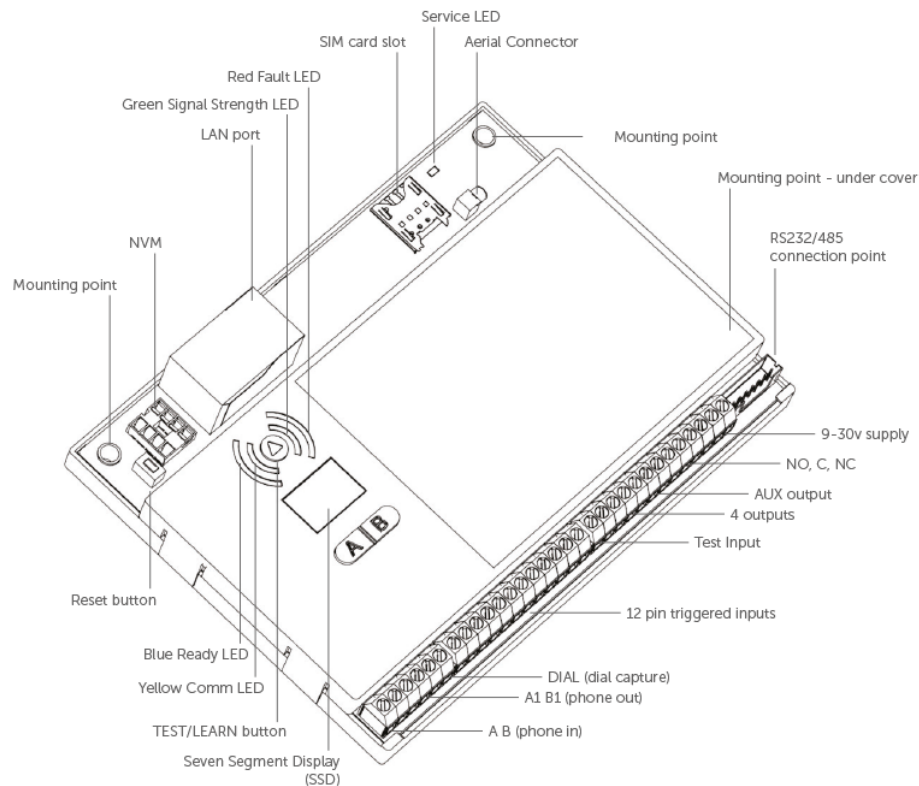




# GRADESHIFT UDL

# GradeShift UDL

## Technical Specifications



Dimensions	21 mm (h), 132mm (w), 94mm (d)	
Weight	140g including NVM and SIM	
Temperature	-20C to +60C transit, -10C to +50C operating	
Humidity	0 - 80% non - condensing	
Mounting	Any orientation	
Warranty	5 years	
Power Requirement	9.0v - 30.0v	
Current Consumption	Quiescent = 20 mA Signalling = 200 mA	
LED Indications	LED	FUNCTION
	Green	Signal Strength
	Yellow	Com Status
	Red	Fault
	Blue	Ready
	SVC	Network Status
Radio Path	2G GSM and 3G GPRS services	
Aerial	50 ohm (nominal) on MMCX socket	
Operation Method	Store and Forward (SIA) Pass Through (Fast Format/CID)	
CIE Interconnections	Input 'pin triggering' (Parallel) 12 channels, Analogue (Dial Capture), RS232 Serial, RS485 Bus	

RCT Protocols	Fast Format/Contact ID/SIA
Input Terminals	Max +30v, Min 0 Vdc (reference supply 0v terminal) 100k pull-up resistor to +5v
Low Battery	9.8v falling, 12.0v recovery
Fault Output	Changeover contacts (60v max, 100mA max)
Aux Output	Normally Open contact, may be inverted (60v max, 100mA max)
General Purpose outputs	Four. Each switched to 0v (30v max, 100mA)
User Serviceable Parts	There are no user serviceable parts within the GradeShift
Standards	Suitable for use in alarm systems complying to: EN50136-1:1998 Security Grade 4/DP3 EN50136-2:2012 SP3 (RADIO) SSF 114 v2 Larmklass 2 EN50131-10 Type Y ATS Classification: EN50136 ATS5/SP3 ATS 5 parameters: D3/M3/T4/S2/I3/A3
Environmental	EN50136/EN50131 Environmental class II Device should not come into contact with water
Emissions	EN55022
Installation	The CS5301-01 shall be installed by a service person and be powered by a Limited Power Source in accordance with clause 2.5 of EN 60950-1 or equivalent, not exceeding the maximum voltage of 30 Vdc, capable of delivering a minimum current of 200mA and be current limited (fused) to 1A. It shall be installed inside an enclosure of another I&HAS component which shall be that of a CIE conforming to EN 50131-3, or a PSU conforming to EN 50131-6.

Figure 2 - LED Indications

LED LABEL	DESCRIPTION	LED STATUS			
		ON	FLASHING	OFF	OTHER
Green	GPRS Signal Strength	Strong Signal Strength	Acceptable Signal Strength	Low Signal Strength, not acceptable	LED off and Red Fault LED on indicates no signal
Yellow	Communications	Input is triggered or Dial Capture is in progress	Sending a message to Gemini and ARC	No communication is in progress	Rapidly flashes to show successful communication
Red	Fault	Fault present see troubleshooting section	NVM contains factory defaults	No faults exist	On for 2 seconds indicates communication failure
Blue	Ready	Unit is ready to send messages to Gemini and ARC	N/A	Unit is busy and not ready to send new messages	LED off and Red Fault LED on indicates programming file is yet to be downloaded (usually takes 5-8 mins from power up with good signal)

Service (SVC) (next to aerial socket)	Network Status	N/A	SIM card registered on network	There is insufficient power or no power connected to the DualCom	Rapid flashing indicates unit is not registered to network
---	----------------	-----	--------------------------------------	---	---

# GradeShift UDL

## Step 1 - Site Survey

Use a CSL Signal Analyser to determine if sufficient base stations are available at the site and that they can supply sufficient signal strength. This will determine the optimum location for the DualCom's aerial to be mounted.

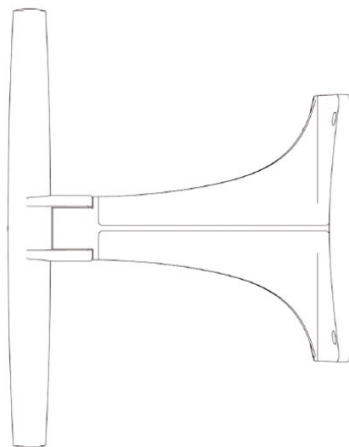
### **SITING THE AERIAL**

#### **DO...**

- **INSTALL VERTICALLY IN AN OPEN SPACE.**
- **COMPLETE A SIGNAL TEST BEFORE INSTALLING IN THE FINAL POSITION.**

#### **DON'T...**

- **INSTALL CLOSE TO METAL OR SOURCES OF INTERFERENCE, I.E. WIRING,**
- **LIGHTING, ELECTRICAL INSTALLATIONS, COMPUTERS, MONITORS, ROUTERS & OTHER EQUIPMENT.**



# GradeShift UDL

## Step 2 - Installation

**a** - Ensure the aerial is mounted and connected in the correct position to achieve maximum signal strength. Apply power and wait for 5-8 minutes for the unit to connect to the network and download its programming file. Once completed the Green Signal Strength LED should be on or flashing, indicating an acceptable signal, the Red Fault LED should be off and the Blue Ready LED will be on. A percentage will also be shown on the SSD (Seven Segment Display) which should be 40% or higher. Now the GradeShift can be located into a suitable enclosure for the grade of installation.

**b** - Wire the input triggers, attach the RS232/485 cable or connect the Control Panel's Digi-Modem PSTN terminals to the GradeShift's Dial Capture terminals (refer to wiring diagrams in Section 2 of this document). For a dual path device remember to connect for PSTN or LAN.

**c** - Connect the fault output terminals to the Control Panel as required (refer to wiring diagrams in Step 6 of this document).

**d** - Power down the the Power Supply Unit (PSU), connect 9-30volts DC supply to the GradeShift's power terminals and repower the PSU. Note that any voltage below 12v will indicate a low battery warning.


**e** - For installations using Dial Capture no GradeShift configuration is required. Simply check that your Digi-Modem has an ARC telephone number (ie 01) and an account number (ie 1234), select your signalling format, connect the GradeShift and test.

**f** - For pin triggering installations, ensure that the panel is in its normal state then press and hold the TEST/LEARN button for 3 seconds until the Green Signal Strength LED and the Yellow Communications LED flash alternately. Please note it is recommended that this step is not carried out until the instructions above have been completed.

**IF USING A SEPARATE PSU TO POWER THE GRADESHIFT, MAKE SURE THE 0V IS COMMON BETWEEN THE PSU AND THE CONTROL PANEL.**

# GradeShift UDL

## Step 3 -Test & Self Learn

In this section you will be using the  button

To send test signals, tap the TEST/LEARN button (less than 1 second). The 7 SSD should change to c1, c2, c3, A. (A = the Gemini Platform acknowledges the alarm signal). Simultaneously, the Yellow Communications LED indicates comms progress. If available, GradeShift will test the secondary (wired) path using C1, C2, C3, A to indicate successful communication.

If the test is not successful the Red Fault LED will light for 2-3 seconds at the end of the sequence. The GradeShift will make multiple call attempts if unsuccessful.

To self-learn the inputs, push the TEST/LEARN button for 3-5 seconds. 'Pi' will be displayed during the self-learn process.

# GradeShift UDL

## Step 4 - Check Signals

Once you have successfully tested your GradeShift, make sure that you check with your ARC to see that they are receiving signals. This can be achieved by calling your ARC or using their web based secure platform.

**IF YOU HAVE PURCHASED A DUAL PATH DEVICE YOU MUST ENSURE BOTH PATHS  
ARE CONNECTED BEFORE LEAVING SITE.**



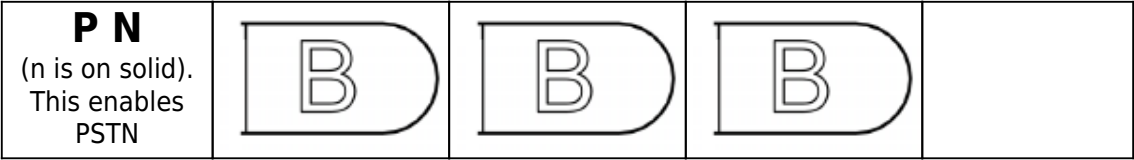
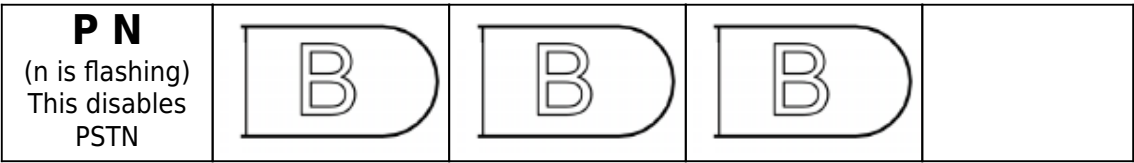
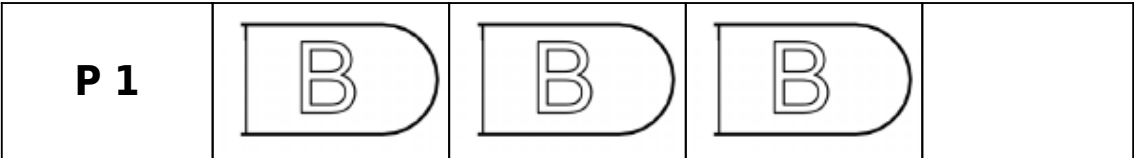
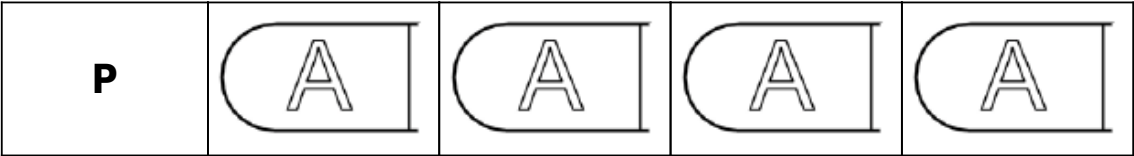
# GradeShift UDL

## Step 5 - Advanced Instructions

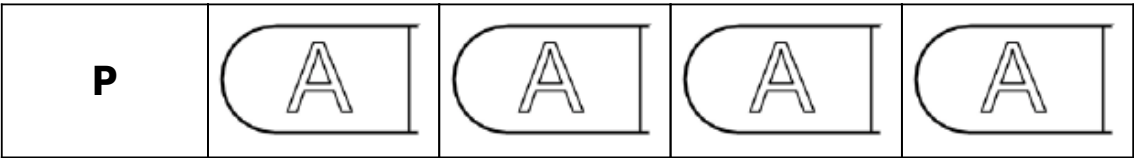
### LINE FAULT




Ensure you wire the fault output in accordance with the standard you wish to adhere to. For further information on the different options please follow the wiring diagrams in Section 2 and the full Installation Manual available via the Installer Zone


To enable/disable PSTN use the following A & B button sequence:




To enable/disable LAN:






<b>P 1</b>				
------------	---	---	--	--

<b>P L</b>				
------------	---	---	--	--

<b>P L</b> (L is flashing) This disables LAN				
---	---	---	--	--

<b>P L</b> (L is on solid). This enables LAN				
---	---	---	--	--

**Immediate PSTN/RADIO/LAN fail test (for 10 mins - engineer mode):**

<b>P L</b> (L is flashing) This disables LAN				
---	---	---	--	--

<b>T</b>				
----------	---	---	--	--

<b>E N G</b>				
--------------	---	---	--	--

<b>TE</b>				
-----------	--	--	--	--

## **FAIL TO COMMUNICATE MONITORING USING DIAL CAPTURE**

If you want to monitor the Dial Capture connection, connect an output configured as PSTN line fault on your Control Panel to one of the GradeShift's inputs. Designate that input as Dial Capture fail at your ARC. For wiring instructions see step 6

**RS232/485** - for installations using RS232 or RS485 simply follow the wiring diagrams in step 6.

**LAN** - For installations using LAN as a communication path connect a Cat5 (or higher).

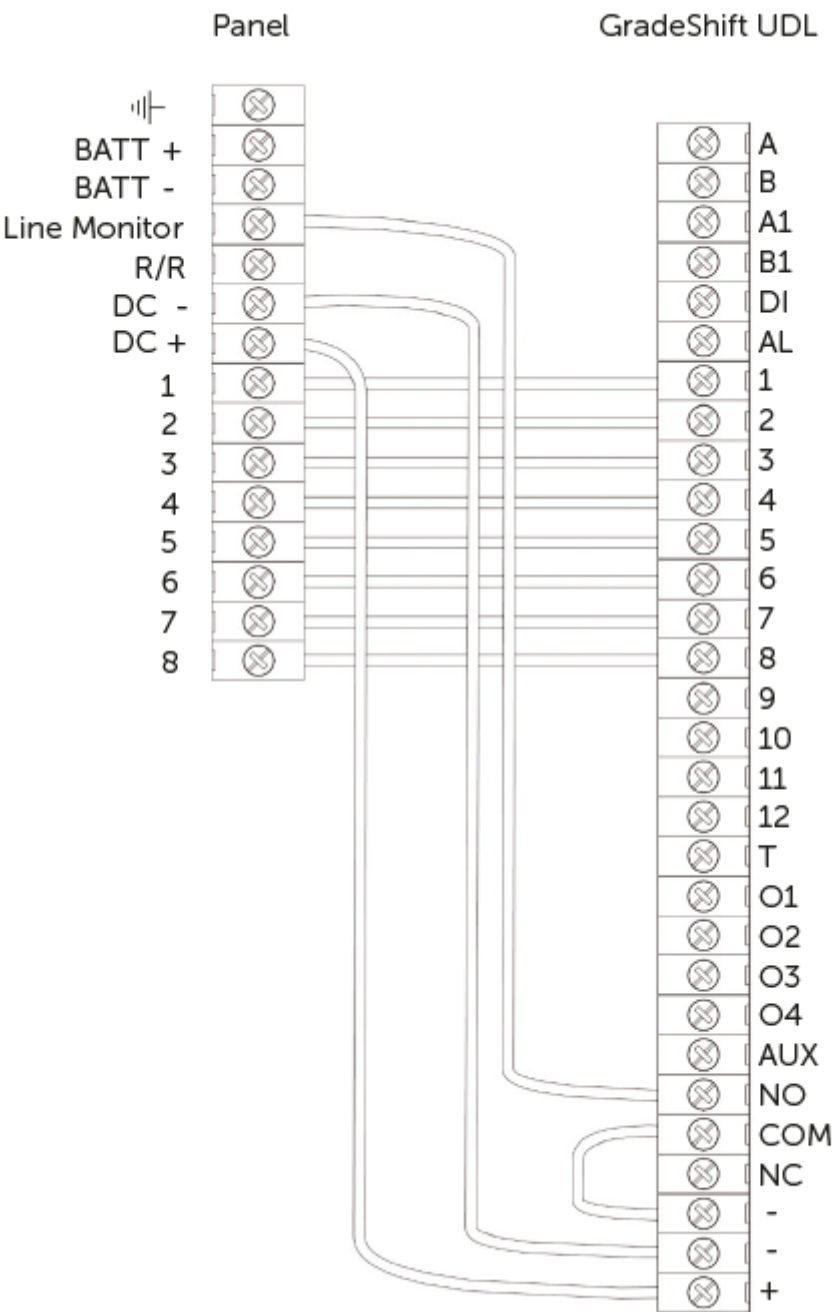
**GRADESHIFT WILL AUTOMATICALLY LEARN WHETHER THE PSTN LINE REQUIRES A 9 TO DIAL OUT AND WILL SAVE THE SEQUENCE TO ITS CONFIGURATION. IF THE PSTN CHANGES AND NO LONGER REQUIRES A 9 TO DIAL OUT GRADESHIFT WILL REVERT THE CHANGES.**

# GradeShift UDL

## Step 6 - Wiring

### PIN TRIGGERING

In the operation, GradeShift is triggered by applying or removing zero volts to the input terminals 1-12. No external pull-up resistors will be required. This is generally achieved via the digital communicator outputs of an intruder alarm or similar Control Panel. GradeShift will signal alarm conditions and will generate the relevant messages and forward them via Gemini to the ARC. Installers are advised that the intended use should avoid situations where the rate of triggering exceeds the rate at which messages may be sent to, or received by, the ARC receiver.

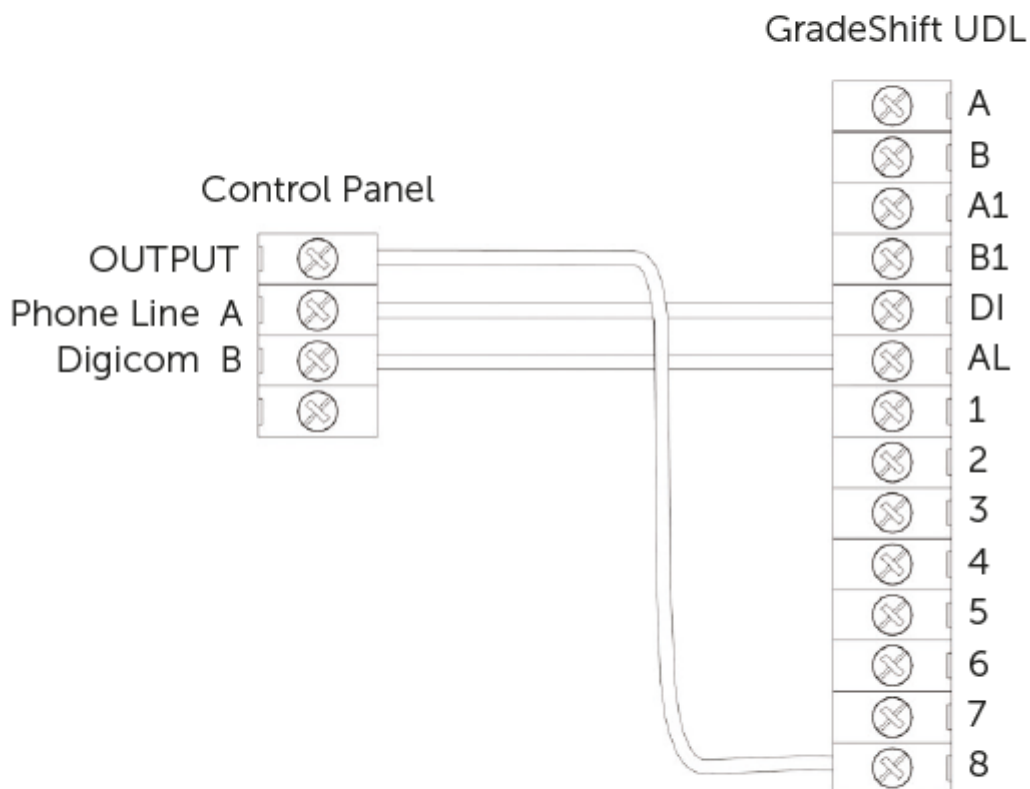


## DIAL CAPTURE

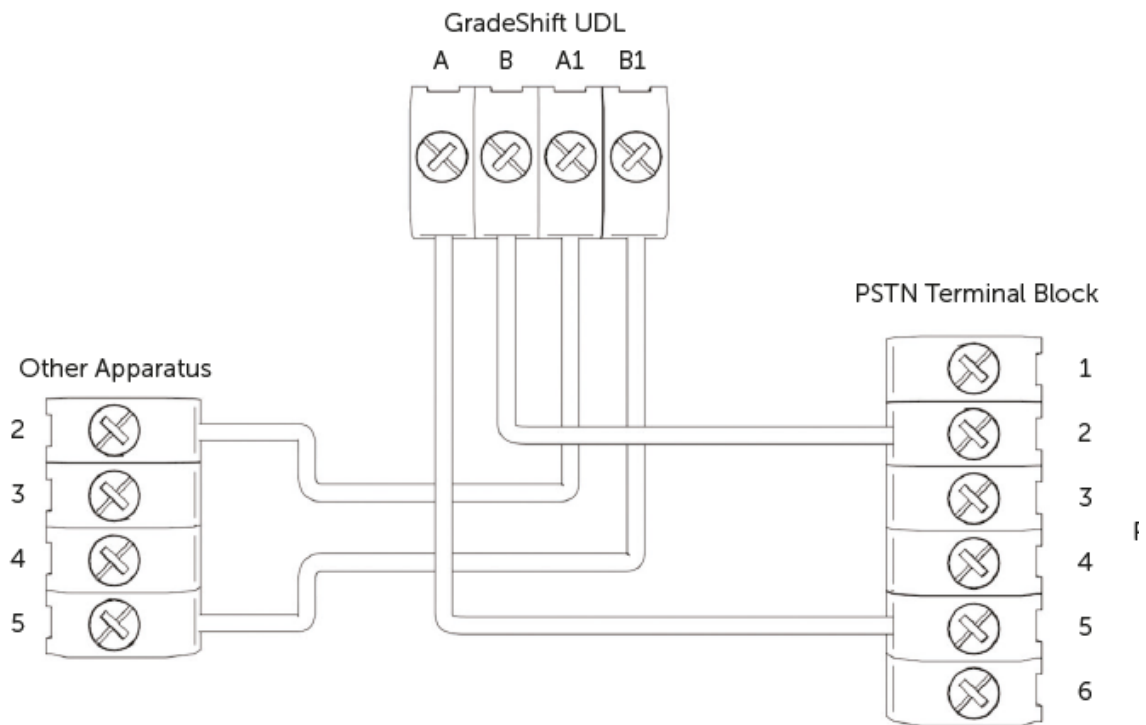
In this operation, GradeShift simulates and replaces the phone line connection to the Control Panel's Digi-Modem.

The Control Panel's Digi-Modem must use one of the following alarm formats: Fast Format, Contact ID or SIA. In the event the Control Panel needs to send a signal to the ARC, GradeShift will capture the message and forward it, via Gemini, to the ARC. The Digi-Modem must have an ARC telephone number (ie 01) and account number (ie 1234) programmed for Dial Capture to work.

If you want to monitor the Dial Capture connection, you will need to connect an output configured as PSTN line fault on your Control Panel to one of the GradeShift's inputs. That input then needs to be designated as Dial Capture Fail at your ARC.

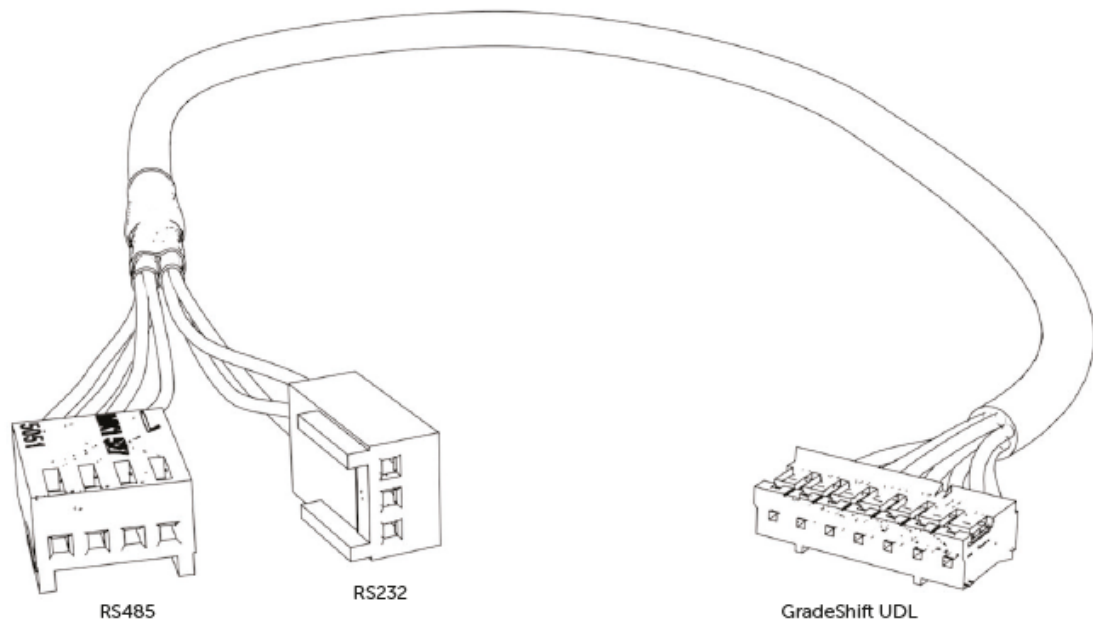


## PSTN



### **RS232/485**

For further instructions on Control Panel programming please review the how to guides on the Installer Zone



# GradeShift UDL

## Troubleshooting

**Q** - The Red Fault LED is continuously flashing, what does this mean?

A. This happens when the unit is first powered and needs to download its configuration file from the Gemini Platform which can take 5-8 minutes. You must ensure that the Yellow Service (SVC) LED is flashing every 3-5 seconds, which indicates that the unit is connected to the mobile network.

**Q** - The GradeShift repeats the 'power-up' sequence but never completes it.

A. The power supply has a low output voltage or is unable to supply the current required by the GradeShift when it is activated. Check the power supply with a multimeter. Also, test the GradeShift's operation when powered by a 'known good' 12 volt battery.

**Q** -The Red Fault LED is on, what is the problem?

A. Please refer to the error code on the SSD and the error code list at the end of this document.

**Q** -Triggering via 'Dial Capture' does not seem to work.

A. During communication between the Control Panel and the GradeShift, the display should show 'DC'. If 'DC' is displayed, but c1, c2, c3, A is not, the panel may not be compatible or is configured to send a protocol that GradeShift does not recognise. If available, check the Control Panel's programming and select an alternate signalling format. Please check our online compatibility table for the latest list of compatible Control Panels and formats: [www.csl-group.com](http://www.csl-group.com).

**Q** - The ARC is not receiving messages.

A. In most cases the GradeShift will explain the reason a signal cannot be sent to your ARC using an error code shown on the SSD. If, after trying to rectify the displayed fault, the GradeShift can still not transmit to your ARC please contact CSL Technical Support.

## ERROR CODES

ERROR CODE (E+)	DESCRIPTION	WHAT YOU SHOULD DO
0	No Errors	N/A
I o	Low supply voltage	Check supply voltage



1	NVM missing or not fitted correctly	Check NVM fitted correctly
2	NVM data error. Not programmed correctly	Check NVM programming. Call CSL Technical Support
3	NVM checksum fault	Check NVM programming. Call CSL Technical Support
4	Power Fault. Voltage low etc.	Check supply voltage is in the 10 - 30 volt range at all times
5	485 Bus Port enabled but comms have failed	Check the 485 Bus Port connections to the Control Panel or the Plug-on Adapter
10	Radio. No base stations detected	Check aerial connection and base station signals
11	Radio. Not registered on any GPRS network	Check SIM card and base station signals. Call CSL Technical Support
12	Radio. No response from radio module	Check module is fitted correctly. Check power. Call CSL Technical Support
13	SIM card missing or not fitted correctly	Check SIM card is fitted correctly
14	SIM card locked/disabled. No radio path operation possible	PUK Code required to unlock SIM. Call CSL Technical Support
15	SIM card PIN number is wrong	Check SIM PIN number in NVM. Call CSL Technical Support
17	Radio module faulty	Power down. Wait 1 minute. Re-power & re-check. Call CSL Technical Support
18	Radio. Interference or jamming signals detected	Check local radio environment. Use a CSL Signal Analyser
21	PSTN line DC voltage = low or none	Check PSTN connections to A&B terminals
22	PSTN. A phone, fax, etc. on the same line is off hook	Check for another phone, fax, etc. on the same line as DualCom or disable detection in the NVM
23	PSTN. Incoming ringing detected	Disable incoming ringing with Telephone supplier or disable detection in the NVM
24	PSTN dialling attempt. No dial tone	Check PSTN connections and that the service is available
25	PSTN. All call attempts have failed	Check PSTN connections and that the service is available
31	PSTN. Three successive call attempts have failed	Check SIM card fitted correctly. Check GPRS service

32	Radio / GPRS fault	Check SIM card fitted correctly. Check GPRS service. Check NVM programming
41	Radio / GRPS communications failure	Check Ethernet Cable is connected to LAN (IP) card. Check LAN cable is correctly connected to LAN Router/Hub/Switch at other end
43	LAN Ethernet Cable (e.g. Cat5) not connected	Check LAN wiring, Router, power supplies and DualCom's IP programming. Call CSL Technical Support
44	No response from the Default gateway. (the Router to the Internet)	Check DualCom's IP programming. Check Router is not firewalled. Call CSL Technical Support
45	LAN communications failed	Check DualCom's IP programming. Check Router is not firewalled. Check Gemini Secondary Polling Server. Call CSL Technical Support
47	Invalid Router, Gateway or WAN address	Check DualCom's IP programming
51	Radio path. All call attempts have failed.	Check all Radio settings in the NVM. Call CSL Technical Support
99	NVM data error. Not programmed correctly	Check NVM programming. Call CSL Technical Support

## CRITICAL ERRORS

To alert the User and Installer to critical error conditions, after the normal sounder beeps have timed out the GradeShift unit will continue to beep once every 5 minutes.

# GradeShift UDL

## Fire Specific Instructions

### MOUNTING

This device should be mounted inside the Fire Alarm Panel or inside a separate powered housing using the sticky mounting pads supplied. Enclosure requirements for the GradeShift UDL Fire are the same as for the Fire Alarm Panel itself. The enclosure must provide the facility to indicate the state of the fault and acknowledge outputs on the device. For Fire Alarm Panels, the enclosure must meet the requirements of EN54-21 7.3 (e.g. IP30 or above) and the supplied sticker should be applied to the outside of the housing.

### SECONDARY (WIRED PATH) CONNECTION OPTIONS

The PSTN connection requires an analogue telephone line. Connecting other telecoms equipment in parallel to the analogue telephone line used by this device can stop the unit sending polling calls and alarm calls to an Alarm Receiving Centre. Parallel connection should never be used for this device when it is used in a Fire system application. The PSTN line should be supplied as 'outgoing calls only', i.e. incoming ringing barred. The PSTN line should also be ex-directory and connected to this device only. Other equipment can be connected to the A1 & B1 terminals (i.e. series connection) to make outgoing calls only. Modifications to the telephone or data provision (including changes to the local IT network when a LAN connection is used) might prevent or hinder the transmission of alarm information. Additionally, this could cause false alerts which might cause customer inconvenience and/or (where it is provided) result in withdrawal of emergency service response.

**GRADESHIFT UDL FIRE IS SENT OUT IN EN54-21 TYPE 2 CONFIGURATION (GPRS/PSTN). THIS IS NOT CONFIGURABLE BY THE INSTALLER**

The interface to the Fire Control Equipment should be via inputs (pins) and relay outputs, as described below. The DualCom's 'Dial Capture' interface that emulates a PSTN line shall not be used, as it does not provide adequate status signalling back to the control equipment.

- AUX Relay Output: used for transmitting fire alarm ACK signals to the CIE.
- Normally Closed (N/C) Fault Relay Output: used for transmitting fault warning signals to the CIE. This relay will remain open during normal operation.
- Input 11: used for receiving the Fire Alarm/Restore signal from the CIE.
- Input 12: used for receiving Fault/Restore signal from the CIE.
- Input 1-10: used for receiving PIN inputs from any other device (i.e. security CIE).

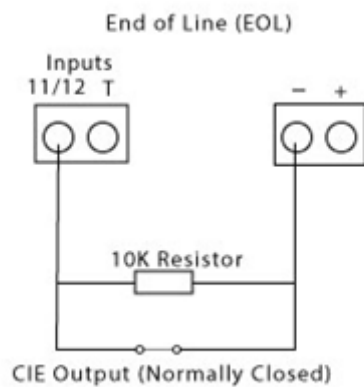
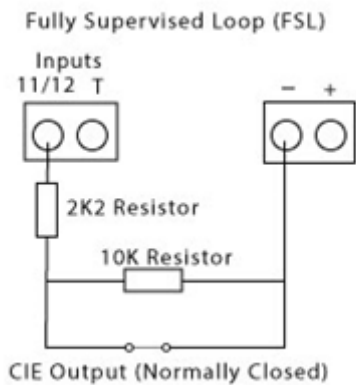
PINs 1-10 take a lower priority than 11-12 when signalling.

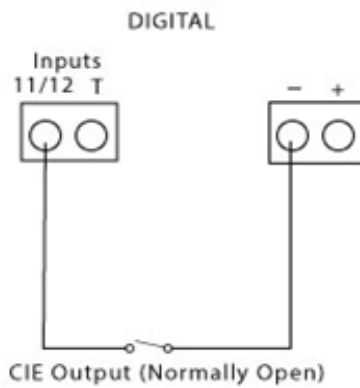
The alarm codes generated by these inputs are as follows:

SIA	CONTACT ID	FAST FORMAT
Pin 11: FA8011/FH8011	Pin 11: Event 110 group 0 zone 11	Pin 11 Channel 11
Pin 11: FA8011/FH8011	Pin 12: Event 373 group 0 zone 12	Pin 12 Channel 12

As default, inputs 11 and 12 are configured as digital inputs. They can be set up as End of Line (EOL) detection, Fully Supervised Loop (FSL) or digital inputs.

For FSL mode, a 10K and 2K2 end of line resistors should be fitted for detection of open circuit and short circuit. For EOL mode, a 10K end of line resistor should be fitted for detection of open circuit:





Inputs 11 and 12 can be configured for either EOL and FSL using the programmer menu:

- A button 4 times to *P*
- B button 3 times to *Pi*
- A button 5 times to *PF*
- B button 3 times to *Fd*

Use B button to scroll:

- *Fd* = DIGITAL
- *FE* = EOL
- *FF* = FSL

Press A button to select mode

**PINS 1 - 10 CAN BE TRIGGERED BUT THEY WILL NOT SEND FIRE ALARM/FAULT SIGNALS.**

For FSL or EOL, wire the negative supply (0V) to the panel relay **common** and the panel **N/C** terminal to the DualCom input pin with the 10K resistor in parallel.

For Digital, wire the negative supply to the panel relay **common** and the panel **N/O** terminal to the DualCom input.

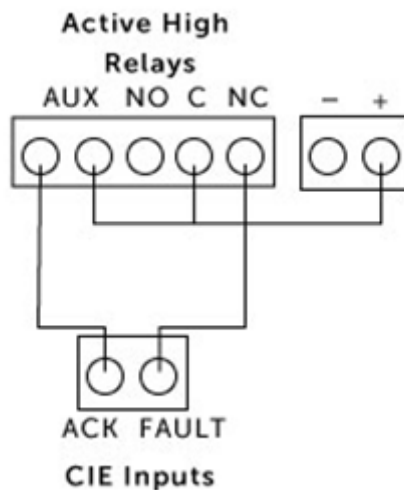
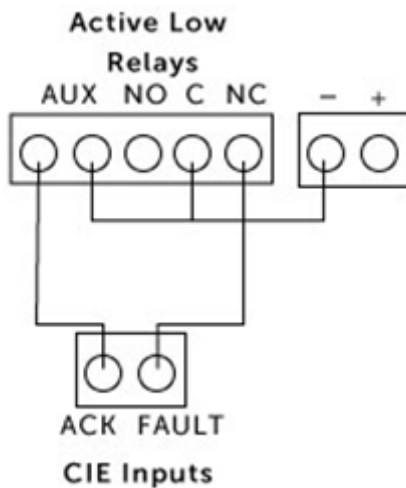
### **FAULT REPORTING & DUAL PATH OPERATION**

To meet the EN54-21 requirements for monitoring on Type 1 and Type 2 Fire systems this device sends regular polling calls to the Gemini Network on all connected and active transmission paths. The Installer shall ensure that a reporting action has been agreed with the ARC for all alarm codes, transmission path failure notifications and Polling failure reports from the Gemini Platform.

**GRADESHIFT UDL FIRE HAS BEEN DESIGNED TO WORK AS A DUAL PATH  
SIGNALLING DEVICE, INSTALLATIONS THAT USE ONLY 1 SIGNALLING PATH WILL  
NOT MEET THE SPECIFIED DP2 FAULT REPORTING TIMES.**

## RELAYS

The Acknowledgment and Fault signals are triggered by the AUX Relay and Fault Relay respectively. Depending on how the CIE input works (active high or active low), please wire them as follows:



## FAULT RELAYS

The fault relay labelled NC must be used. The device will ensure this remains open in a No Fault condition and it will close when any of the following conditions are met:

- 1 - The power is removed.
- 2- There is a short circuit in any of the interconnections between the CIE and the device. (FSL configuration only)

**3** - There is an open circuit in any of the interconnections between the CIE and the device.

(For FSL and EOL configuration)

**4** - An acknowledgement has not been received from the Gemini Platform within the allotted time after a Fire Alarm has been sent within 240 seconds (type 2), 100 seconds (Type 1)

**5** - There are no transmission paths available. Please note, all available paths must fail before a fault warning is given.

**6** - There is a watchdog event (program monitoring).

**7** - There is a memory (CRC) monitoring fault.

**A FIRE ALARM WILL NOT RESTORE UNTIL ALL FAULTS (WIRING OR PANEL) ARE CLEARED**

**FAULT RELAY SHOULD BE WIRED TO THE FIRE PANEL FAULT INPUT OR TO A SEPARATE LIGHT EMITTING INDICATOR AS REQUIRED BY EN54-21 5.3.B**

The acknowledgement relay (ACK) is normally open. It closes when an acknowledgement of a Fire Alarm is received from the Gemini Platform. It is opened again when an acknowledgment of the Fire Alarm Restore signal is received from the Gemini Platform.

**THE ACK RELAY WILL CLOSE EVEN IF AN ACKNOWLEDGMENT IS RECEIVED AFTER THE ALLOTTED TIME OF 240 SECONDS (TYPE 2) HAS EXPIRED, AS IN POINT 4 ABOVE.**

### **ACKNOWLEDGEMENT RELAY (ACK)**

The acknowledgement relay should be used to indicate the successful receipt of a Gemini Platform acknowledgement either at the Fire Alarm Panel or by a separate light emitting indicator, as required by EN54-21 5.3.a



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DualCom GradeShift UDL CS5301-01

CSL DualCom Ltd.  
Salamander Quay West, Park Lane, Harefield United  
Kingdom, UB9 6NZ

DoP No. 2544-CPR-P21310-F01-18

EN 54-21:2006  
Fire detection and fire alarm systems / Alarm  
transmission and fault warning routing equipment  
EN 50131-10:2014  
EN 50136-1:2012  
EN 50136-2:2013

Notified Body No. 2544

Type of transmission system:  
Type 1 (GPRS+IP) / Type 2 (GPRS+PSTN)  
Reporting time DP2 when installed as a Dual Path  
device.  
Environmental Class: II

[www.csl-group.com](http://www.csl-group.com)