



GradeShift G2r/G3r

INSTALLATION MANUAL

CONNECTED • SECURE • LIVE

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DualCom G2r

Installation Manual

Description

The DualCom G2r is a advanced auto-dialling Digital Communication Device for secure alarm reporting. It is supplied as a 'single path' Alarm Transmission System (ATS) that when fully installed will meet the requirements of Single Path Grade 2 installations as specified in the EN50136 standard for ATS.

DualCom G2r is supplied with a SIM Card and programmed NVM and is ready for immediate operation.

DualCom G2r is a low power devices that can operate from any voltage between 9 and 30 volts DC. Quiescent current is less than 30mA.

When DualCom G2r is triggered by the alarm system it initiates a call to the Alarm Receiving Centre over the radio path. Up to 8 channels of information may be transmitted.

The DualCom monitors its radio path continuously. A fault will be reported to the Alarm Control Panel. In addition, the Gemini network continuously monitors the polling calls from the DualCom to detect and report to the ARC a path or equipment failure.

DualCom G2r includes extensive diagnostic, testing and setup functions that use multiple LED displays that are controlled by push buttons.

DualCom G2r is housed in a plastic case which protects the electronics and meets electrical safety requirements.

DualCom G2r is available for use as a stand-alone unit with screw-terminal inputs and with an optional Plug-on Adapter for use with Control Panels having the corresponding plug-on connection.

Grade 2 and 3 tamper protected steel boxed power supplies are also available.

Note that DualCom expansion options using the 9-12 channel expander card, the remote control output card and the LAN(IP) Card can not be fitted to the single-path DualCom G2r. Where these options are required, please select a DualCom dual-path product.

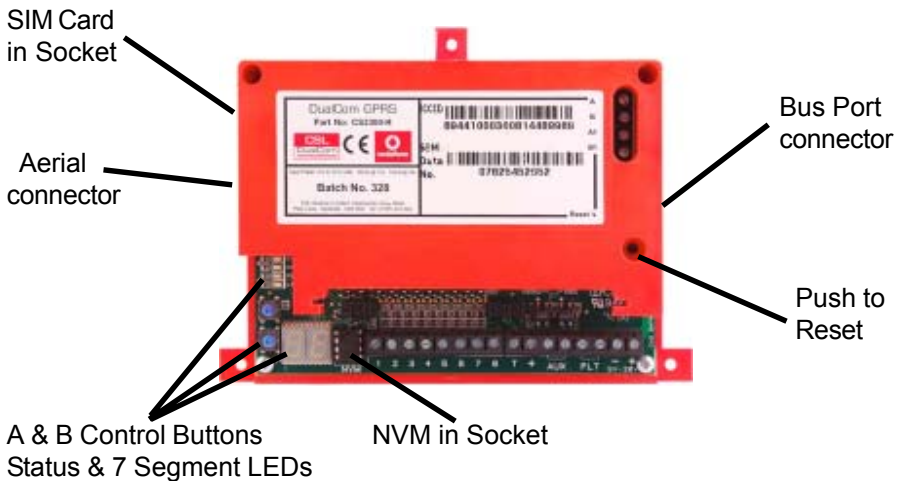
Part Numbers

- CS 3200 DualCom G2r + SIM Card, NVM and CS3107 ext. aerial.
- CS 3212 DualCom G2r + WorldSIM, NVM and CS3107 ext. aerial.

Note the CS3107 aerial may be replaced by the CS2057 aerial.

Optional Extras

- CS 2056 Aerial Extension, 5m lead.
- CS 2057 External Aerial with 5m lead.
- CS 2325 Plug-on Adapter (for Control Panels with 'plug-on' comms option)
- CS 2366 GPRS/GSM Radio Test Set
- CS 1520 Tamper protected Grade 2 Power Supply.
- CS 1530 Tamper protected Grade 3 Power Supply.



DualCom G2r
Fig 1

Site Survey

It is strongly recommended that a site survey is conducted prior to installation of a DualCom G2r to confirm that adequate radio signal strength is available at the site.

Before visiting the site, call CSL Technical Support. See page 11. Ask for a radio signal strength prediction. For this, you will need to have the Post Code of the site available. This will tell you if there is sufficient radio coverage at the proposed site.

DualCom G2r is supplied with a Vodafone UK SIM Card. Alternately the WorldSIM is also available. Call CSL Tech Support for details.

If there is little or no radio coverage at the proposed site, the DualCom's radio alarm reporting and polling path will **not** operate.

Use of the CS2366 Radio Test Set is recommended to survey the proposed site for radio signal strength and to locate the point of strongest signal. See Aerial Siting on Page 12 for more information. Make a note of this point and use it when installing the DualCom aerial.

DualCom recommends that a minimum of 2 radio base stations are available with 40% or greater signal strength on one and at least 30% on the other.

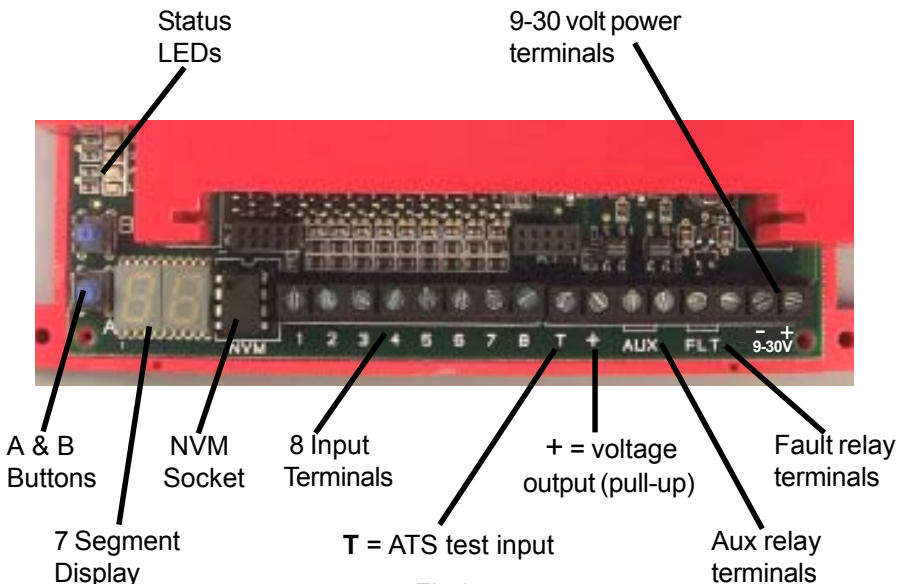


Fig 2

Installation

1. Site the aerial at the point of strongest signal ensuring that it is within the protected area. This is usually the highest point in the building and well away from metal roofs and metal walls. See Page 12.
2. Totally power down the Control Panel, both mains and battery.
3. Where required, fit the CS2325 Plug-on Adapter See page 18 & 19.
4. Connect the input triggers to the DualCom. See Fig 2 and Appendix 2. (This step is not required when the CS2325 Plug-on Adapter is used)
5. Connect to the output relays "Fault" and "Aux" as required. When installing to EN50131, PD6662 standards, ensure that fault reporting from the DualCom to the Control Panel is configured as required. See pages 28 to 30.
6. Connect the aerial to the DualCom. See page 14..
7. Connect the DualCom's '9-30v ' terminals to the Control Panel or Power Supply output (often called 'Aux supply' or 'DC power'). See Fig 2 and page 20. (This step is not required when the CS2325 Plug-on Adapter is used)

Note 1: The **CS2325 Plug-on Adapter** is designed for use with **Intruder Alarm systems**, where the supply voltage does **not exceed +15 volts**.

Note 2: The '+' terminal (next to the Aux terminals) is a voltage **output**. This terminal is **not** the supply connector. See Fig 2 and Appendix 2.

8. Reconnect the mains supply to the Control Panel. The DualCom is now ready for testing.

System Testing

Ensure you have informed your Alarm Receiving Centre that you are ready to test your DualCom.

1. When the Control Panel is powered-up, the DualCom will initialise. This will take about 1 minute. LED indications are listed in Appendix 1.

The Red and Yellow path LEDs will flash alternately when:

The NVM is an incorrect type or is faulty or is fitted incorrectly.

The NVM has been incorrectly programmed.

The NVM is blank or un-programmed.

See Appendix 1. Contact CSL Technical Support for further advice.

Path problems will be indicated by the Yellow GSM path LED. See Appendix 1, Table 15, 18 & 21.

2. To test the radio path to the ARC, use the A & B Buttons to start the test calls. See Appendix 1, Table 30.

Note: To provide the highest possible availability on the radio path, a GPRS call and a GSM call will be made.

During communication the Radio path LED will flash and the display will show 'c1, c2, c3' and 'A' to indicate the progress of the call, see Appendix 1, table 14, 17 & 20.

When the radio path has successfully communicated with the ARC, its LED will go off. Contact the ARC to ensure that **all calls** have been successfully sent and that the ARC operator can see them on their screen.

3. From the Control Panel's keypad, trigger calls for all used channels, e.g. Intruder, Open/close, P/A and Fire circuits.
4. For quicker testing of radio path failure detection, use the A & B Buttons to select 'Test tE' mode. Detection of radio path failures will now be much quicker than for normal operation. See Appendix 1, Table 30.

Simulate a Radio path failure. Disconnect the aerial lead from the DualCom and wait until the fault is actioned by the DualCom (typically 50 seconds). Observe the operation of the DualCom's Fault output. Replace the aerial lead in the aerial connector on the DualCom.

System Testing (continued)

'Test tE' mode will be automatically disabled after 10 minutes. Detection of radio path failures will return to their preset speed.

5. Contact your ARC to confirm that all signals have been received. Ensure that all 'Restore' signals are received when the DualCom input terminals return to their quiescent value.
6. If the quiescent (non-active) states of the input terminals are incorrect, i.e. 'positive applied/removed is inverted, then the ARC will report that the Alarm/Restore or Open/Close is the 'wrong way round'.

To correct this, use the A & B buttons to start the Input Learning feature. See Appendix 1, Tables 30 & 31. Input Learning is also fully described in Appendix 2.

7. If you are using the Alarm Abort feature, set the Alarm Panel, initiate an alarm condition (If the alarm system incorporates bell delay this will be overridden) and then unset the alarm system within 90 seconds.

Check that the alarm abort signal has been received by the ARC and also that the preceding alarm event has been aborted.

8. To meet EN 50131 Grade 2 standard, the DualCom is supplied with monitoring (polling) enabled on the Radio path. See Monitoring on page 18 for more information.

Polling will start automatically 45 minutes after power-up.

9. **Note the SIM Card number Serial Number (8944 1000 xxxx xxxx xxxx), the NVM 'chip' number and any security access numbers on the site records that will be stored at your office.**

10. When not communicating or indicating errors, the DualCom's display will show the received radio signal strength as a percentage. E.g. '47' = 47%.

Reliable operation is unlikely with a low signal strength (below 30%). If the display shows that the signal strength is low, you should improve the signal strength. See Aerial Siting on page 12 & 13.

11. Your DualCom is now fully tested.

Troubleshooting

Q. What if there appears to be random triggering of the DualCom ?

Ensure that 0 volts is common across all parts of the alarm system.

If the DualCom receives its power from a Power Supply that is additional to the alarm system, ensure that the 0 volt connection on the additional power supply is connected to the 0 volt connection on the alarm system.

Q. What if the Radio path signal has not been received by the Alarm Receiving Centre ?

Check, using the 7 segment display that the radio signal strength is sufficient (40 or greater) and that the GSM path status = OK.

Check with a meter that the voltage supply to the DualCom is correct and does not dip when the DualCom is signalling.

See Appendix 1, Table 15 for fault indications. These will help diagnose radio path problems.

Check that the SIM Card is inserted in its carrier correctly. See Fig 1.

Technical Support & Web Site

If you have installed the DualCom in accordance with these instructions, checked all the above points but are still experiencing problems you can contact your DualCom supplier.

In UK, DualCom installation, programming, operation or other questions may be addressed to:

The CSL Technical Support Desk:

Tel: 01895 474 444

Email: support@csl dual.com

Hours: 08.30 to 18.00 weekdays

The CSL web site: <http://www.csl dual.com> contains the latest copies of all manuals for all CSL products. Please ensure that you are working from the latest version. You can also download associated information and software samplers. Sales, shipping and contact information is here too.

Vodafone GSM/GPRS radio signal strength predictions in UK are available on-line using the postcode of the proposed installation site.

Use the CSL web site link: <http://www.csl dual.com/coverage>

Select: 'Click here for GPRS Coverage'

Enter: The site Postcode

Click: 'Check Coverage'

When the map appears....

Remove the Tick from the '3G & Mobile Broadband' box

Signal strength is shown in shades of blue. Stronger = darker blue.

Aerial Siting

ALWAYS do a site survey to find an area of strong signal **before** installation. Installing a DualCom with a weak signal is bad installation practice. The DualCom is likely to suffer signal failure causing wasted site visits, wasted time & money.

The aerial should be mounted **vertically** at the point of strongest signal. This is usually the highest point in the building (often the loft area).

Large metal structures can affect radio signals. Avoid installing the aerial directly under metal roofs or within metal skinned buildings because this **will reduce the signal strength and may inhibit operation completely**. If this is unavoidable, the strongest signal will be found away from the metal roof or close to large external windows or skylights.

Avoid installing the aerial close (2 metres) to cable runs, ducting, structural metalwork, metal pipes, water tanks and electronic equipment, e.g. photocopiers, fax machines etc. These can have similar effects to metal roofs.

Reliable operation is unlikely with a low signal strength. If the display shows that the signal strength is low, you should improve the signal strength. This may be achieved by repositioning the aerial. The GPRS aerial lead should **not be cut**, therefore repositioning the aerial may require that the DualCom is also repositioned. The CS2056 Aerial Extension is available to aid repositioning.

DualCom recommends that a minimum of 2 base stations are available with 40% or greater signal strength on one and at least 30% on the other.

The CS2366 Radio Test Set is ideal for surveying a site. This handheld unit can check the availability, signal strength and interference status of all surrounding Base Stations. In addition, it will identify the best location for a DualCom GPRS aerial within the building, help to avoid sources of interference and can confirm the availability of a GPRS service at the proposed site. See page 19.

Where a Nokia 'Net Mon' phone is available and a Vodafone SIM Card is fitted, it may be used in the same manner as the CS2366 Radio Test Set to check the Vodafone network signal strength.

A DualCom GPRS, aerial and charged battery may be used to locate the point of strongest signal. Ensure that the DualCom is fully operational then walk around the site carrying the equipment and observing the signal strength display on the DualCom. This method **can not** provide information on the availability, signal strength and interference status of all radio Base Stations in the surrounding area. Use of the CS2366 Radio Test Set is recommended.

Aerial Siting (continued)

A mobile phone may be used to locate the point of strongest signal. The signal strength indicator is normally a bar or line at the side of the phone's display.

Note: The mobile phone will only show the signal strength of the SIM card's network. This may differ from the SIM card used by DualCom.

This method **can not** provide information on the availability, signal strength and interference status of all radio Base Stations in the surrounding area. Use of the CS2366 Radio Test Set is recommended.

When you have identified the point of the strongest signal, make a note of this point and use it when installing the DualCom aerial.

An optional extra CS2056 Aerial Extension lead is available. This is 5 metres long. When used, it will **reduce** the signal by approx **10%**. Therefore, the aerial **must** be positioned to **improve** the signal strength by **at least 10%** in order to provide any benefit.

Remember: It is **always** easier to find the point of strongest signal **before** the equipment is fitted to a wall. Moving aerials, cables, trunking etc. after installation is wasted time and effort.

DualCom Mounting

DualCom may be mounted in a boxed power supply or other suitable case. The CS1520 and CS1530, grade 2 and 3 power supplies are ideal for this. The case has mountings and screw retainers for a DualCom, space for 7 amp/hour battery(s) and plenty of room for wiring.

Security

DualCom should be protected from physical assault and tampering by being fitted inside a tamper protected enclosure forming part of the alarm system, e.g. the Control Panel. The CS1520 or CS1530 Power Supplies are also ideal for this.

Aerial Connection

The DualCom G2r will normally be supplied with the CS3107 aerial and 2m lead. Alternately, the CS2057 aerial with a 5 metre lead may be supplied. Both aerials are weatherproof and may be mounted internally or mounted externally where installation standards allow. Do not cut or rejoin the aerial lead.



CS3107
Install the
aerial
vertically

Fig 3

CS2057
Install the
aerial
vertically



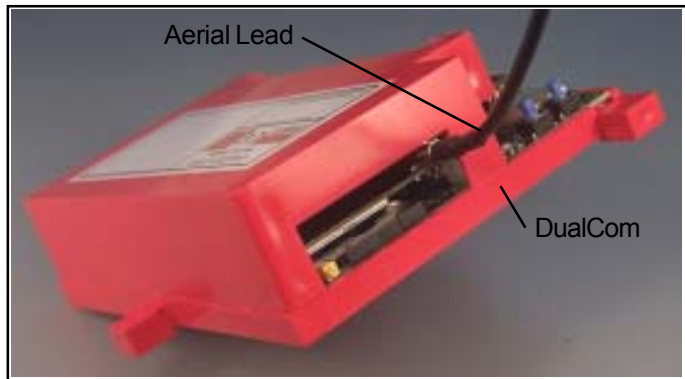
If the signal strength is insufficient, relocate the aerial and (if necessary) also relocate the DualCom.

Where relocation is required, it is better to extend the supply, triggering and other wiring to the DualCom rather than using aerial extension leads.

An optional CS2056 Aerial Extension lead is available. This is 5 metres long. When used, it will **reduce** the signal by approx **10%**. Therefore, the aerial **must** be positioned to **improve** the signal strength by **at least 10%** in order to provide any benefit.

**Plug the
aerial lead
connector
into the
DualCom**

Fig 4



SIM Card

The DualCom GPRS is supplied with a Vodafone SIM Card already fitted. The supplied SIM card is programmed for DualCom GPRS only. SIM Cards from other suppliers may be available through CSL. Call Tech Support for details.

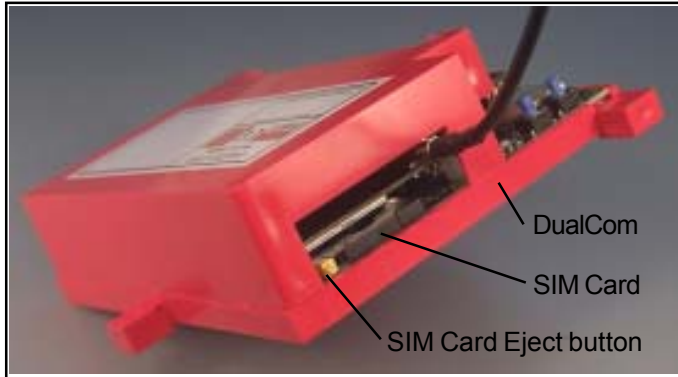


Fig 5

Remove the SIM Card

1. To eject the SIM Card, press the yellow Eject button.

The SIM Card in its black carrier will be ejected 2-3mm so that it may be pulled out using fingers.

Replace the SIM Card

1. When refitting, ensure that the SIM Card is properly seated in the black carrier.
2. Slide the carrier into the DualCom with the SIM Card gold connectors towards the DualCom's green circuit board.

The CS2325 Plug-on Adapter

The CS2325 Plug-on Adapter provides a connection between the DualCom and Control Panels that have a facility for plug-on comms.

Power to the DualCom, connections to the DualCom's 8 input channels, the DualCom's ATS Test input and the Fault output are all made via the plug-on pins. See Fig 8 and appendix 3.

Note 1: The **CS2325 Plug-on Adapter** is for use with **Intruder Alarm systems only**. The supply voltage **must not exceed +15 volts**.

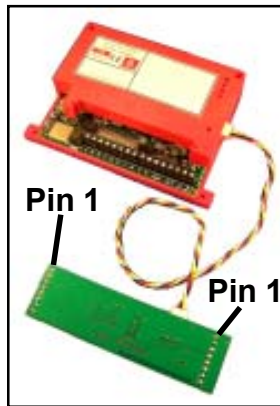


Fig 8

Installation

1. Connect the Plug-on Adapter to the DualCom and the Control Panel. Refer to the Plug-on Adapter leaflet.

Ensure that the Plug-on Adapter is connected to the Control Panel the **correct-way-round**. See the markings for 'Pin1' on the connectors and Fig 8.

2. **Do not** connect any power or supply voltage to the DualCom's '9-30 volt' Screw Terminals.

Mounting

Refer to the Plug-on Adapter leaflet.

The CS2325 Plug-on Adapter (continued)

Operation

1. When first powered, the DualCom will detect the Plug-on Adapter and thereafter will always remember that it must be connected. The Operation LED on the Plug-on Adapter will flash continuously when connection to the DualCom is established.
2. When the Plug-on Adapter is connected then the 8 input terminals on the DualCom are inactive. All inputs are provided by the plug-on pins.
3. Power for the DualCom and the Plug-on Adapter is provided by the Control Panel via the plug-on pins.

Returning DualCom to the 'Stand-Alone' mode

Where a DualCom has been used with a Plug-on Adapter and the DualCom is now required in the 'stand-alone' mode (i.e. the Plug-on Adapter is no longer required) then the DualCom's Plug-on Adapter memory must be reset.

To reset the memory,

- a). Unplug the Plug-on Adapter from the Control Panel and from the DualCom.
- b). Press and hold the DualCom's 'A' button.
- c). With the A button still held, connect the supply (9-30 volts) to the DualCom's supply Terminals until the sounder 'beeps'.

Fault & Auxiliary Relay Outputs

The Fault and Aux relays operate when the DualCom has a path fault and under other conditions (e.g. comms sent successfully).

Where the installation is specified to the EN 50131 and PD6662 standards then connect the Fault output to the Control Panel. Fault output options may be selected using the A & B buttons. See Table 2 and Appendix 1, Tables 30, 31 and 32. The default setting for DualCom G2r is table 2, option 1.

The output relays have two terminals. These are supplied 'normally open'. Where 'normally closed' outputs are required each relay may be inverted using the A & B buttons. See Appendix 1, Tables 30, 31 and 32.

The maximum electrical rating of the Fault and Aux relays is 60 volts, 100mA. These limits must not be exceeded.

A&B Selection	Fault Relay output	Aux Relay Output	Note
1	Old operation. See Table 3	Aux Output operation is unchanged by selecting this	Fault Output = operation defined before EN50131/PD6662 introduced. Selecting this does not change the previous operation of the Aux Output.
2	BSIA Form 175 operation	Aux Output operation is unchanged by selecting this	Selecting this does not change the previous operation of the Aux Output.
3	Radio Path Fault	Unused	
4	Unused	Radio Path fault	

Table 2

For compatibility with older Control Panels, the 'Old' mode may be selected using the A & B buttons. See table 2, option 1 above.

Fault Output Relay	Panel in Day/Unset state	Panel in Closed/Set state	Panel in Set state + in Alarm
Radio Path fault	Continuous	2 sec pulse	No Fault Relay action
10 unsuccessful call attempts on radio path	2 sec pulse	2 sec pulse	2 sec pulse

Table 3

In addition to the fault output options on the previous page, all output options may be selected using the CS0054 Programmer. Using the Programmer, any Fault Output option may be selected with any Aux Output option. All options are listed in Table 4 & 5.

Contact CSL Technical Support for Outputs, Programming or further advice.

Fault Output Relay	Note
Normal Operation	Operation described in Table 3
BSIA Form 175 operation	Used for PD6662 compliance
Radio Path fault	

Table 4

Aux Output Relay	Note
Radio Path fault	Operation described in Table 3
Remote Reset	May be used for PD6662 compliance
Exit Abort or Remote Reset	Operation controlled by CS0054 Programmer or an Exit Abort is detected by the DualCom
Communications Successful	A one second pulse after every message successfully passed to the ARC
AVI Output	Follows selected active Input terminals
SMS Remote Control	Send an SMS text message to the DualCom to operate this output

Table 5

EN50131 : PD6662 Connections

Path Fault Conditions

Where the installation is specified to the EN 50131 and PD6662 standards then connections will be required between the DualCom and the Control Panel to indicate a path fault condition. The Fault relay output is used for this.

Select the Fault & Aux Relay Output options using the A & B buttons. See the Fault & Auxilliary Relay Output section, and Appendix 1, Tables 30, 31 & 32.

The Fault & Aux Relay Outputs options may also be selected using the CS0054 Programmer. See the CS0054 and the CS2364 Programmer manuals.

Contact CSL Technical Support for Outputs, Programming or further advice.

Remote Servicing

EN 50131 and PD6662 standards describe Remote Servicing. Where the Control Panel needs to trigger the DualCom to send test calls to the ARC, the Test output on the Control Panel will need to be connected to the DualCom.

Connect the Control Panel 'ATS Test' output to the DualCom's 'ATS Test' input on the 'T' terminal (next to the Input 8 terminal). The polarity will be correctly preset (as well as all the channel inputs) using the Input Learning feature. See Appendix 2.

Monitoring (Polling)

To meet the EN50136 requirements for path monitoring, the DualCom sends regular polling calls to the GPRS Polling Server on the radio path.

The Installer should ensure that a reporting action has been agreed with the ARC for path failure reports from the Gemini network.

To make installation easier, the DualCom is supplied with polling disabled for 45 minutes. Polling will start automatically 45 minutes after power-up or reset.

For some testing functions it may be advantageous to turn radio polling off. See Appendix 1, Table 30 & 31. Polling will be re-enabled by the A & B buttons or when power is cycled or the DualCom is reset.

Remember to re-enable polling when testing is completed.

GPRS/GSM Radio Test Set

The CS2366 is a Radio Test Set for use with GPRS and GSM Radio Networks and the CS2000 and CS3000 range of DualComs.

It may be used to aid positioning and the testing of GPRS and GSM aerial systems.

The Test Set will measure and display radio signal strength received from each Base Station, plus the level of interference may be measured and sources of interference identified.

When fitted with a SIM card, the Test Set will display Base Stations for one network only. When no SIM card is fitted, the Test Set will display all Base Stations and all networks detected.

The Test Set contains a battery allowing remote operation for up to 12 hours. The internal battery may be recharged from the supplied mains plug-top power supply.

The Test Set is contained within a strong protective sleeve. It is supplied complete with a charger, aerial and manual, and is covered by a no-quibble 'unit exchange' 2 year guarantee.



Fig 12

System Power Supply and Battery

DualCom requires a supply of 9.0 to 30.0 volts DC.

At 12 volt supply, the quiescent current is 30mA.

At 24 volt supply, the quiescent current is 15mA.

Dualcom requires 100mA for the few seconds that it is activated.

Note: The supply voltage must not exceed +15 volts when the CS2325 Plug-on Adapter is used.

The **installer must ensure** that the Alarm System power supply(s) is rated to provide **adequate power** for this apparatus and for **any other apparatus** drawing power from the Alarm System power supply(s).

Only power supplies conforming to EN60950, EN41003 or International Safety Standards and carrying the CE mark should be used with this apparatus.

The Power Supplies' battery must be suitable to support operation for the specified time. Refer to the EN50131 Power Supply standard for the Grade of the installation.

If DualCom receives its power from a Power Supply that is additional to the alarm system, ensure that the 0 volt connection on the additional power supply is connected to the 0 volt connection on the alarm system.

If the supply voltage falls to the 'low supply voltage' limit, DualCom will send a 'low-battery signal to the ARC. The 'low supply voltage' limit is preset to 11 volts. When power is restored above 12.0 volts a test call (or battery voltage restore signal) will be sent to the ARC.

If the supply voltage continues to fall below 9 volts there will be insufficient power to operate the DualCom.

Note: The '+' terminal (next to the Aux relay terminals) is a voltage **output** to aid input triggering only. **This terminal is NOT the supply connector.** See Fig 2 & 27 and Appendix 2.

System Power Supply and Battery (continued)

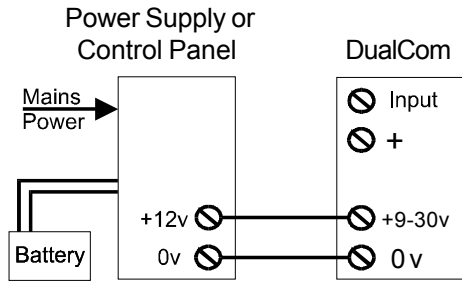


Fig 27

NVM Programming

The DualCom is supplied with its NVM already programmed for communication with the designated ARC and fitted to its socket. This NVM should not be removed from its socket.

NVMs from other types of DualCom **must not** be fitted.

The CS0054 Programmer for DualCom is available from CSL. This will read the DualCom's operational parameters and the diagnostic information, e.g. received signal strength.

Contact CSL Technical Support for further information.

SMS (Short Message Service) Sending

On the current DualCom GPRS, there is reduced facility to send SMS (text) messages to mobile phones.

Contact CSL Technical Support for further information.

SMS Remote Control

When the Aux Output is selected for SMS Remote Control (See Fault & Aux Outputs section) then the Aux Output relay may be switched on or off by sending an SMS (text) message to the DualCom from a mobile phone.

This may be used to remotely control any other item, e.g. lighting, gates.

Contact CSL Technical Support for further information.

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APPENDIX 1

LED Indications

Status LEDs

There are 4 Status LEDs next to the A & B buttons. See Fig 31 below.

These LEDs indicate Call Progress, Faults and other activity on the radio path. See Tables 14 to 16.

The Radio Service LED indicates status of the GSM/GPRS radio module. See Table 13 below.

The A & B buttons and the the 7-segment display are used for setup and measurement functions. See Tables 30 to 34.

In addition, the 7-segment display will also show error codes where errors exist in communication or operation. See Table 36.

Yellow Radio Service LED. See Fig 31 below

Yellow Status LED	Radio Path Indications	What you should do
Off	No power to DualCom radio module	Check supply.
On solid	Power-up/reset Registration	Wait 1 minute
Off + blink on once every 2 secs.	Radio Base Station detected. GSM service available. Locked-on. Ready for service. Note: GPRS service may / may not be available	

Table 13

Yellow Radio Service LED (SVC)

Yellow Radio Status LED (GSM & GPRS)

A and B Buttons

'7 Segment' display

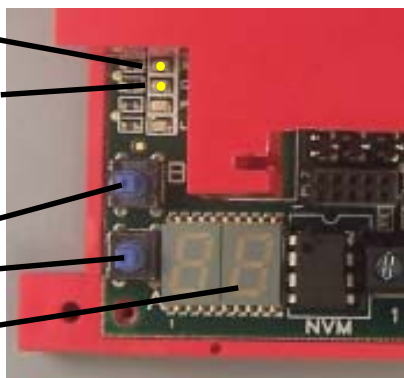


Fig 31

APPENDIX 1

LED Indications (continued)

Yellow GSM Status LED (GSM & GPRS radio). See Fig 31, page 47.

Yellow Radio LED (GSM & GPRS)	Communications Progress Indications
Off	The Radio path is not activated. No faults. No up/downloading. Not in Input Learning mode.
On solid	Communications on the Radio path are active. GSM or GPRS path activated or dialling numbers.
On + 2 off blinks per second	Communications on the Radio path are active. Dialling completed, waiting for connection to ARC.
Medium Flash On and Off 5 times per second	Communications on the Radio path are active. Connected to ARC. Waiting for 'handshake'.
Rapid Flash On and Off 12 times per second	Communications on the Radio path are active. Handshake received, sending data to the ARC.
6 medium speed flashes	Communications successful. Data received correctly at the ARC.

Table 14

Yellow Radio LED (GSM & GPRS)	Path Fault Indications
Number of flashes = 1	SIM Card = OK. Radio module = OK. Connection fault. Check aerial, signal strength, and that the Service Provider is still providing a service (Paid the bill ?)
Number of flashes = 2	No response from the radio module. Check connections.
Number of flashes = 3	SIM Card not fitted correctly.
Number of flashes = 4	The SIM Card is locked. The PUK1 Code is required to unlock it.
Number of flashes = 5	The SIM Card PIN number is missing or incorrect
Number of flashes = 6	The SIM Card SMS message centre number is invalid
Number of flashes = 7	Radio module internal test failure. Cycle power. Re-test. If fault persists contact CSL Technical Support.

Table 15

Yellow Radio LED (GSM & GPRS)	Other Indications
LEDs alternate slow flash Red, yellow, red, yellow ... On & Off 1 time per second	NVM is faulty, missing, incorrect type or fitted incorrectly.
LEDs alternate fast flash Red, yellow, red, yellow ... On & Off 5 times per second	NVM is the correct type and is working, but is not programmed correctly or is not programmed at all.
LED On + 3 short off-blinks	Up/downloading (Remote programming) in progress
Red & Yellow LEDs 4 flashes each 4 Red, 4 Yellow, 4 Red, 4 Yellow...	Input Learning mode. DualCom is 'learning' the quiescent (non-active) state of its input terminals

Table 16

APPENDIX 1

A & B buttons & the 7 Segment Display

The **A & B** buttons are used for setup and measurement functions.

When no buttons are pressed for a 1 minute period, the display will automatically return to the received radio signal strength (FSSI) display.

The DualCom 7-segment display has 3 modes.

1. Power up - Reset Mode

The **A & B** buttons can clear some NVM settings. **See Table 34.**

The display first shows all segments 'on' and all LEDs 'on' for 1 second. Then, the software version number as two separate 1 or 2 digit numbers. Then, the EN50136 Grade, Then, the initialisation states of the Radio path.

Press A button then Reset or Power-up the DualCom. This will clear the Plug-on Adapter memory and clear any pending calls stored in the NVM. The button should be held down until the Dualcom 'beep-beeps' to acknowledge this function. This also resets the polling delay to 45mins.

2. Communication Mode

The **A & B** buttons are disabled during communication. **See Table 33.**

The display shows a small **c** for all radio comms. Call progress is shown by c1, c2, c3 and 'A' to indicate a successful call.

The GSM LED will light to indicate activity and call progress.

3. Normal Mode

This 'normal' mode means that the DualCom is not in Power-up - Reset mode and not in Communication mode. **See Tables 30, 31,32 and 36.**

The **A & B** buttons can select display options and Program the NVM.

When the **A & B** buttons are not pressed for 1 minute, the display will return to the received radio signal strength (FSSI) value (00-99).

Any Error Code will display for 1 minute before reverting to the FSSI value.

APPENDIX 1

The 7 Segment Display - Normal Mode

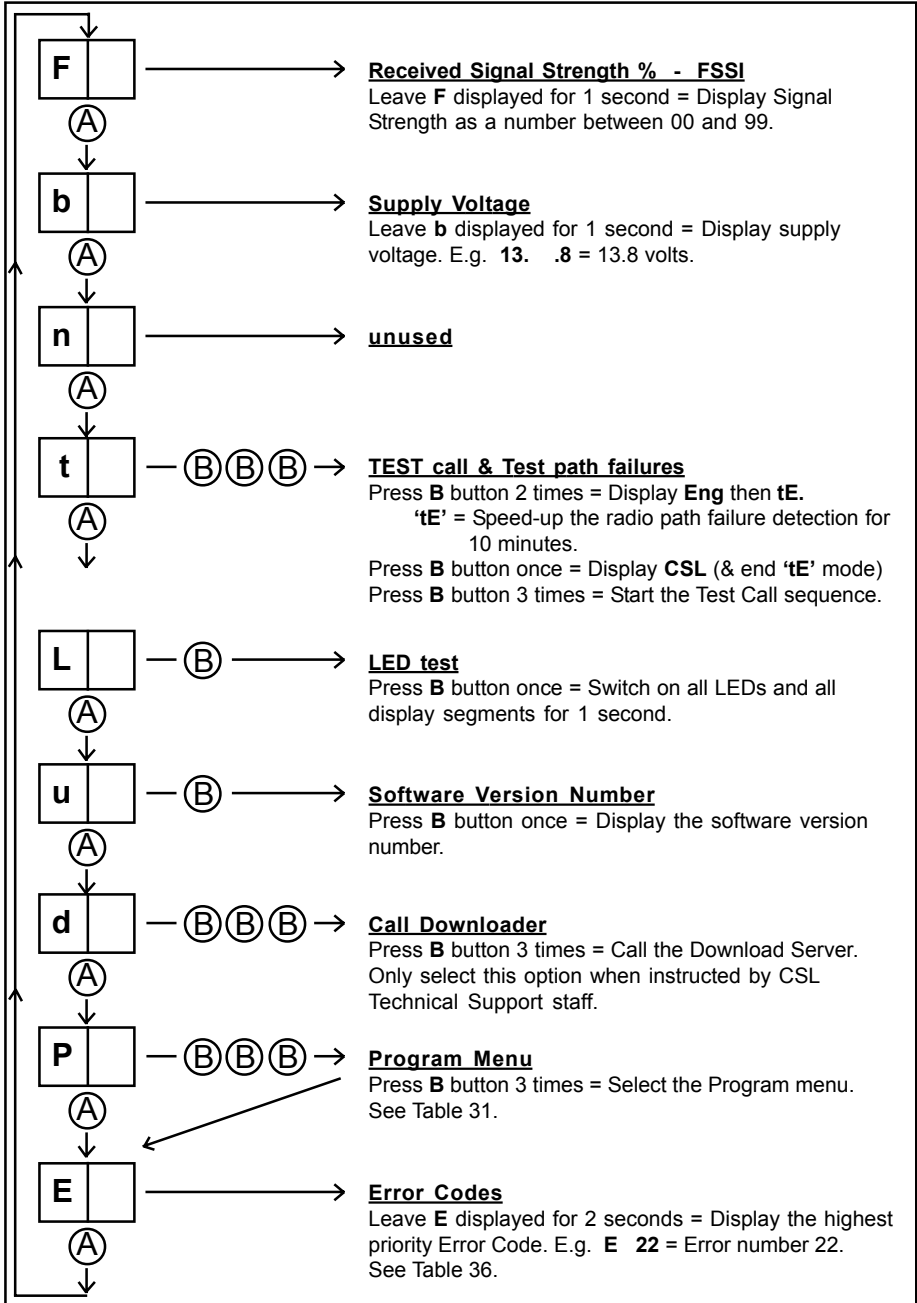


Table 30

APPENDIX 1

The 7 Segment Display - Normal Mode - Program Menu

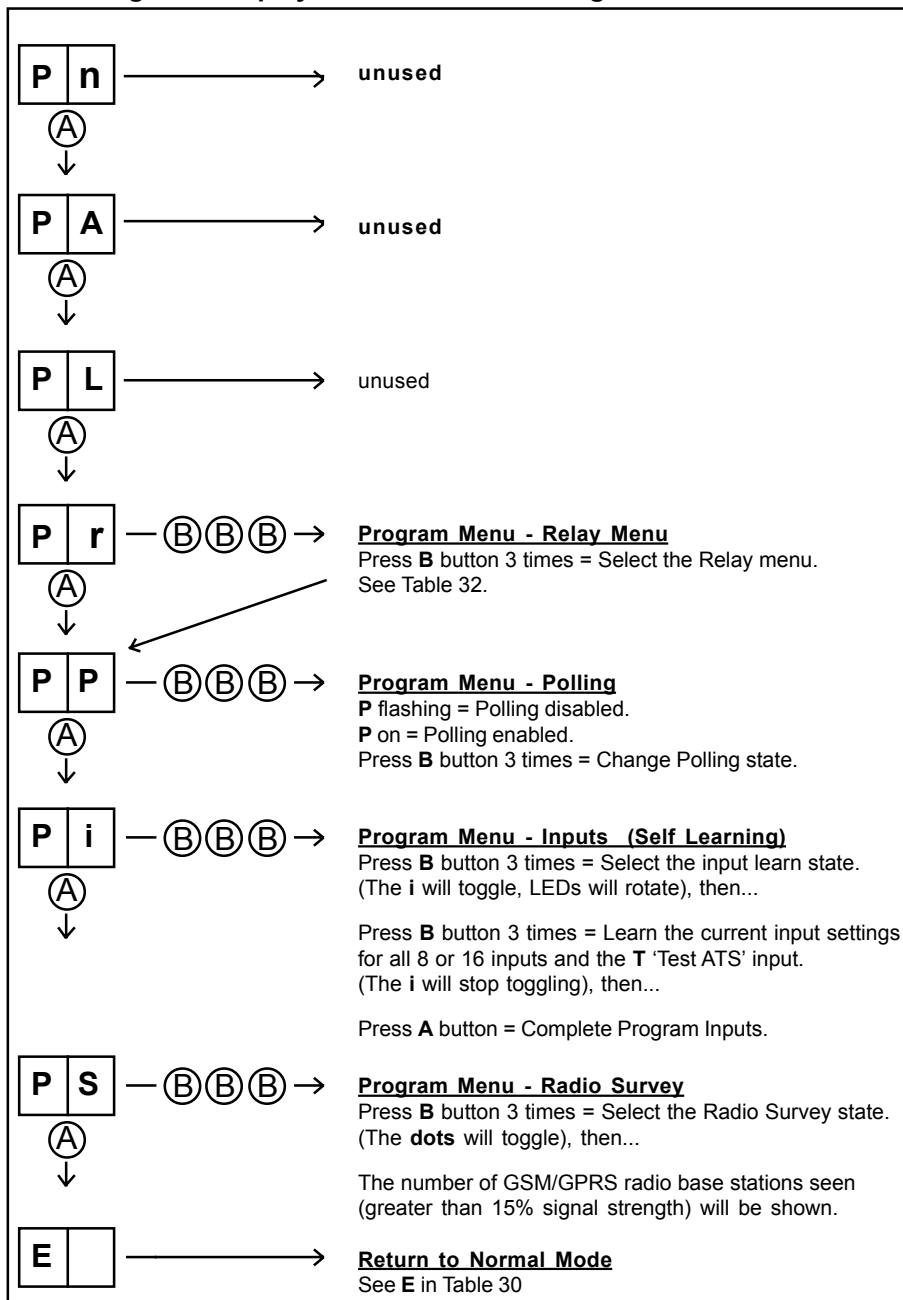


Table 31

APPENDIX 1

The 7 Segment Display - Normal Mode - Relay Menu

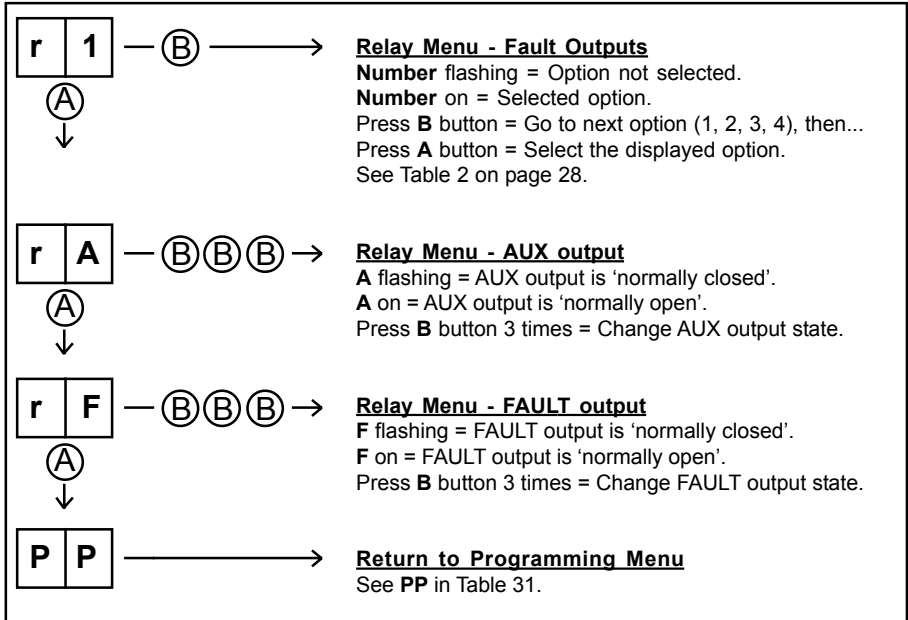
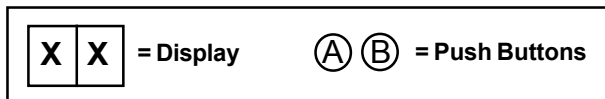


Table 32

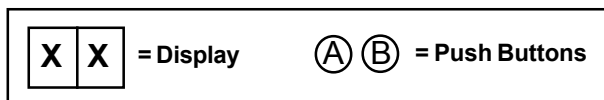


APPENDIX 1

The 7 Segment Display - Communication Mode

<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">c</td> <td style="padding: 2px 5px;">1</td> </tr> </table>	c	1	→	<p><u>Radio Communications (lower c display)</u> Call to ARC. E.g. intruder, PA, open, close, test On radio path.</p>
c	1			
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">C</td> <td style="padding: 2px 5px;">1</td> </tr> </table>	C	1	→	<p><u>Radio Communications (upper c display)</u> Polling call to Gemini. On radio path.</p>
C	1			
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">C</td> <td style="padding: 2px 5px;">2</td> </tr> </table>	C	2	→	<p><u>Call Progress</u> C1 = Comms active. Dialling numbers. C2 = Comms active. Waiting for ARC Rx 'handshake'. C3 = Comms active. Sending data to the ARC. A = Comms successful. Data received at the ARC.</p>
C	2			
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">C</td> <td style="padding: 2px 5px;">3</td> </tr> </table>	C	3	→	
C	3			
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">A</td> <td style="padding: 2px 5px;"></td> </tr> </table>	A		→	
A				
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">L</td> <td style="padding: 2px 5px;">o</td> </tr> </table>	L	o	→	
L	o			
		<p><u>Low Supply Voltage</u> The Supply voltage is too low for correct operation, or it is dipping low when the DualCom is active.</p>		

Table 33



APPENDIX 1

The 7 Segment Display - Power-up - Reset Mode

8. 8.	→	<u>Lamp Test & Software Version number</u> At Power-up or Reset, Lamp Test. The display shows 8. 8. and all LEDs will be on for 1 sec.
The Software Version Number is then displayed. E.g. 2. 39 = Version 2.39. The sounder will beep twice.		
During the display of the Software Version Number, press & hold A button = Clear the 'pending call memory', and clear the 'Plug-on Adapter memory'. Release the A button when the sounder 'beep-beeps'.		
L o	→	<u>Low Supply Voltage</u> The Supply voltage is too low for correct operation, or it is dipping low when the DualCom is active.
r o	→	<u>Reset Radio Module</u> DualCom is resetting the GSM/GPRS radio module. This will not display if the radio path has been disabled.

Table 34

APPENDIX 1

Error Codes

Where errors exist, Error Codes may be displayed. This will be the letter 'E' followed by a number. The sounder will beep with each digit.

Where there are several errors then only the highest priority (the lowest E number) will be shown.

During operation an Error Code may be displayed for up to 4 minutes. During this time, if the fault is corrected, or another error of higher priority occurs then the display will indicate the new value.

At any time that the DualCom is quiescent, the highest priority Error Code (if present) may be displayed using the A&B buttons. See Table 36 below.

Where the supply voltage is too low for DualCom operation but is sufficient to operate the display, 'Lo' will be seen on the display.

Error Code	Description	What You Should Do
0	No Errors	
'Lo'	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 Tech Support
3	NVM checksum fault	Check NVM programming. Call CSL Tech Support
4	Power Fault. Voltage low etc.	Check supply voltage is in 12-28 volt range at all times
5	Bus Port enabled but comms have failed	Check Bus Port connections and its Plug-On equipment
10	Radio. No base stations available	Check aerial and base station signals
11	Radio. Not registered on any network	Check SIM Card and base station signals. Call CSL Tech Support
12	No response from radio module	Check module is fitted correctly. Check power. Call CSL Tech Support
13	SIM Card missing or not fitted correctly	Check NVM fitted correctly
14	SIM Card locked. No operation possible	PUK code required to unlock it. Call CSL Tech Support
15	SIM Card PIN number is wrong	Check PIN number in NVM

Error Code	Description	What You Should Do
17	Radio module fault	Power down. Wait 1 min. Re-power & re-check. Call CSL Tech Support
18	Radio Jamming Detected	Check sources of interference
31	Radio. GPRS fault	Check SIM card fitted correctly. Check GPRS service.
32	Radio. GPRS communications failure	Check SIM card fitted correctly. Check GPRS service. Check NVM programming
51	Radio. All call attempts have failed	Check all radio settings in the NVM. Call CSL Tech Support
99	NVM data error. Not programmed correctly	Check NVM programming. Call CSL Tech Support

Table 36

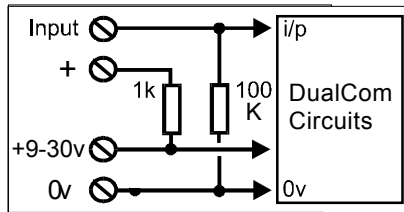
APPENDIX 2

Input Connections

There are 8 input terminals on DualCom G2r .

When DualCom is triggered, the voltages on the input terminals are 0 volts changing to a positive voltage, (normally +5 volts to +30 volts), or they may be a positive voltage changing to 0 volts. This is called 'positive applied' or 'positive removed' triggering.

The Inputs may be programmed to send an alarm call when a positive voltage is **applied** to an input or when a positive voltage is **removed**. See 'Input Self Learning' on page 39.



DualCom internal connections

The figure above shows the **internal** connections of the DualCom inputs.

The voltage supply from the Control Panel or Power Supply is connected to the +9-30v & 0v terminals.

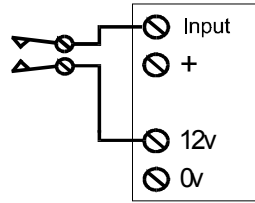
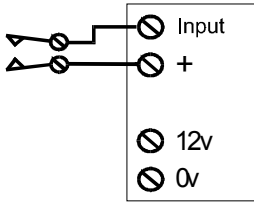
Each of the input terminals on DualCom is connected to 0 volts by a resistor. Therefore, by leaving an input terminal unconnected this will ensure that the input remains connected to 0 volts.

Note: The '+' terminal next to the 8 input terminals is a voltage **output** to aid input triggering only. **This terminal is NOT the supply connector**. See Fig 2 and above.

Examples of input triggering connections are shown below.

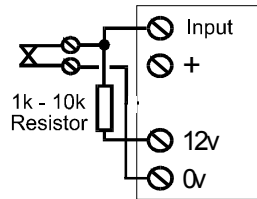
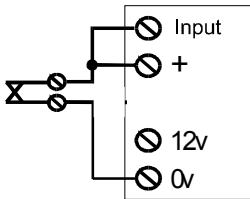
APPENDIX 2

Input Connections (continued)



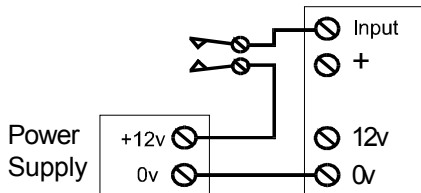
Examples of 'Positive Applied' triggering

Contact is 'Normally Open'. Input is normally at 0 volts.
When contact closes the input becomes +12 volts.



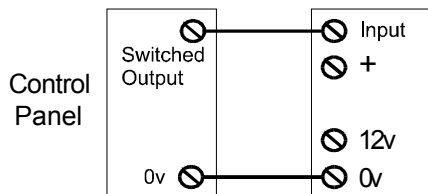
Examples of 'Positive Applied' triggering

Contact is 'Normally Closed'. Input is normally at 0 volts.
When contact opens the input becomes +12 volts.



Example of 'Positive Applied' triggering

Contact is 'Normally Open'. Input is normally at 0 volts.
When contact closes the input becomes +12 volts.

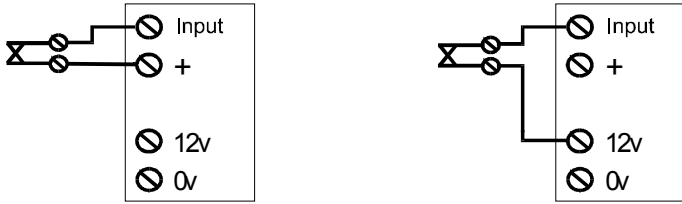


Example of 'Positive Applied' triggering

Control Panel Switched Output is 0 volts changing to a positive voltage

APPENDIX 2

Input Connections (continued)



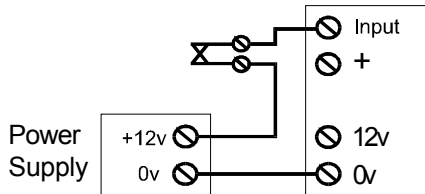
Examples of 'Positive Removed' triggering

Contact is 'Normally Closed'. Input is normally at +12 volts.
When contact opens the input becomes 0 volts.



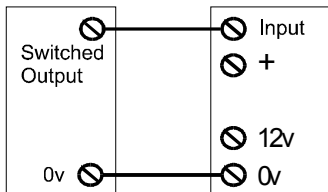
Examples of 'Positive Removed' triggering

Contact is 'Normally Open'. Input is normally at +12 volts.
When contact closes the input becomes 0 volts.



Example of 'Positive Removed' triggering

Contact is 'Normally Closed'. Input is normally at +12 volts.
When contact opens the input becomes 0 volts.



Example of 'Positive Removed' triggering

Control Panel Switched Output is a positive voltage changing to 0 volts

APPENDIX 2

Input Connections (continued)

Input Learning

To aid installation, DualCom can learn the quiescent state of its inputs, i.e. the 'non-active' state. 'Non-active' means that the voltage on the alarm inputs are in the quiescent 'not in alarm' condition and open/close inputs are in the 'open/unset' condition. This includes the 'T' input. See EN50131, PD6662 section.

Input Learning allows the unit to be programmed during installation with 'positive applied' or 'positive removed' inputs. Input Learning will correct NVMs that have been supplied with incorrect input polarities.

1. Setup the inputs 'non-active' conditions by connecting a positive voltage or 'no' voltage (0v) on each input terminal as required.

This is easily achieved by connecting the Control Panel outputs to the DualCom inputs, then put the Control Panel in the '**day state**' with **no activated detectors and all alarm conditions reset**. Ensure that the Test output is also in the quiescent state. Leave any unused DualCom inputs disconnected.

Ensure that the '**open/unset/day**' state is selected on the Control Panel. **Do not** leave the Control Panel in the 'set' or 'engineering' states.

2. When the DualCom has completed its Power-up & Reset mode, the display will show the FSSI value (00-99).
3. Press the **A** button repeatedly until '**P**' is displayed, then:
press the **B** button **3** times.
The display will show '**P0**', '**P1**', '**P2**' etc..
This is the Programming state.
4. Press the **A** button repeatedly until '**Pi**' is displayed, then:
press the **B** button **3** times.
The display will show '**Pi**' with the 'i' moving left-right.
This is the Inputs learning state.
5. Press the **B** button **3** times.
The display will show '**Pi**' with the 'i' not moving
Input Learning has now been completed and the NVM has been updated.
6. Press the **A** button **once** to return to the Programming state.

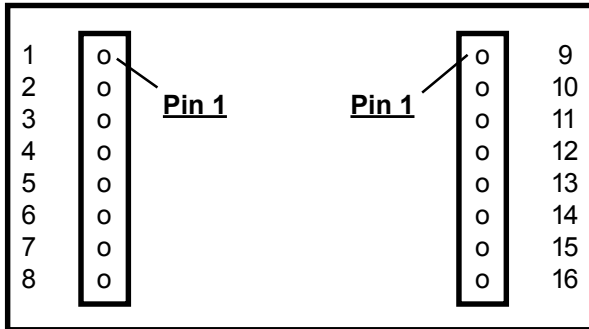
This procedure is also shown in Appendix 1, Table 30 and 31.

APPENDIX 3

Plug-on Footprint

'Plug-on' pins are mounted on some Control Panels for connection to communication devices. The pins are fitted on a plastic spacer, 0.156 inches (3.96mm) pin centre to centre. There are two rows of 8 pins spaced apart by 4.25 inches (108mm) pin centre to centre.

The view below is looking at the pins on a Control Panel, onto which the CS2325 Plug-on Adapter plugs. Note that some equipments label the pins 9-16 as '1-8' as well as the pins that are 1 - 8.



Pin Allocation

1	Input to DualCom	Input 1	Fire
2	Input to DualCom	Input 2	P.A.
3	Input to DualCom	Input 3	Burglar
4	Input to DualCom	Input 4	Open/Close
5	Input to DualCom	Input 5	
6	Output from DualCom	Tell Back	(comms successful)
7	Output from DualCom	Communications Fail	
8	Input to DualCom	(unused)	
9	Input to DualCom	+12 volts (from Control Panel)	
10	Input to DualCom	0v (from Control Panel)	
11	Input to DualCom	ATS Test input	
12	Input to DualCom	+5v (from Control Panel)	
13	Input to DualCom	Input 6	
14	Input to DualCom	Input 7	
15	Output from DualCom	PSTN Line Fail	
16	Output from DualCom	Input 8	(not used on older panels)

APPENDIX 4

Specification

Models	CS3200, CS3212
Radio Path	GPRS and (where available) GSM data
Expansion	Plug-on (Control Panel) using CS2325
Power Requirement	9.0 - 30.0volts DC, 0.1volt max ripple Note: Supply must not exceed +15 volts when CS2325 is used.
Current Consumption	30mA quiescent at 12 volt supply 15mA quiescent at 24 volt supply 100mA operating
Low Battery	10.8-11.0 volts falling, 11.8-12.0v recovery
Outputs	2 'normally open' relays (60v 100mA contacts)
Start Inputs	Max +30 volt, Min +3.5 volts DC.
EN Grade	Suitable for use 'single path ' Grade 2 installations
Dimensions	(h x w x d) 95 x 125 x 25 mm
Weight	240 grams
Temperature	-20C to +60C transit, -4C to +50C operating
Humidity	0 - 80% non-condensing
Mounting	Any orientation
Warranty	5 years

APPENDIX 4

Intended Use

DualCom is designed for use as a signalling device for use with intruder, fire and similar alarm systems. It will create messages when triggered by the changing voltage situations on DualCom's input terminals, and it will send these messages to an ARC receiver when a communication path is established via radio means.

Users 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's receiver.

DualCom includes a 'message memory' that will hold messages as they are triggered by DualCom's input terminals. When a path to an ARC receiver is established, the messages will be sent from the 'message memory'. When the 'message memory' is full of messages waiting to be sent then further triggering of DualCom's inputs will create no further messages.

EN50131 / EN50136 Grades

Dualcom G2r may form part of an alarm system that meets the EN requirements for a Single Path Grade 2 installation.

International GSM Approval

The CS2000, CS2300 and CS3200 range of DualCom products incorporate an independently tested and approved GSM/GPRS radio module that meets the requirements of International radio communication standards.

The GSM Radio Module Approval Authority is: 0681

APPENDIX 5

Glossary of Terms

Alarm Abort

A facility to reduce false alarms requiring police response. Specified by ACPO (The Association of Chief Police Officers) in UK. An Alarm Abort situation occurs when the alarm system is set, and an alarm occurs, and then it is reset by the alarm system being unset by a key or valid user code, all within 90 seconds.

This false alarm is often caused by the user of an alarm system failing to set the system correctly. The Alarm Abort signal identifies this situation to the ARC thus avoiding an unnecessary police visit to the site.

ARC Alarm Receiving Centre

A 24 hour manned centre (often privately owned & operated) capable of receiving & logging calls of alarm and forwarding them to security authorities and other relevant services. Often called a Central Station.

Central Station

See ARC

GPRS General Packet Radio Service

Digital telephone service particularly (but not exclusively) for users that may be mobile for carrying digital data (typically internet) where the path from the user is by a radio link to one (or more) fixed sites.

NVM Non Volatile Memory.

An integrated circuit memory device that does not need any power to remember data.

SMS Short Message Service.

Service provided by companies supplying a GSM communications system where a short text message may be sent to (and from) GSM mobile phones and read on the GSM mobile phone display.

SMS Message Centre

SMS messages are **not** sent 'directly' from one GSM phone (or DualCom) to another GSM phone. All messages are first sent to a Message Centre operated by the GSM Network Provider and then forwarded to the selected mobile phone(s). This normally takes a few seconds but delays of 30 minutes or more may be experienced during busy periods.

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