UNIVERSAL CONTROLLER PLUS (MCS-32)

VERSION 3 USER GUIDE

For the operation of standard vehicle rooftop lighting, secondary lighting and power management

This document is aimed to guide purchasers, installers and then the user of the Universal Controller Plus (MCS-32) simply and smoothly through its operation so that it can be applied in the most effective manner. As such it is divided into the following sections:

Embedded software enables simple system set-up together with amendments without the need to change wiring

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SECTION 1

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A : Device Family Overview

With built-in Siren

Universal Controller Plus (MCS-32)
Description: One device including all features **with** a built-in siren.

Part Number: UNI-PLS-001

Without built-in Siren

Universal Controller Plus (MCS-32)
Description: One device including all features **without** a built-in siren.

Part Number: UNI-PLS-002

The following parts are current compatible switching options for controlling hazard warning equipment via the Universal Controller Plus (MCS-32).

Mini Handset (MCS-T8)
Description: Universal Multi-Way Handset with 7 or 8 buttons as standard.

Optional built-in PTT.

Part Number: UNI-MIN-XXX

Midi Handset (MCS-T10)
Description: Universal Multi-Way Handset with 8, 9 or 10 buttons as standard.

Optional built-in PTT.

Also available with quick fit rubber shroud.

Part Number: UNI-MID-XXX

MaxiPlus Handset (MCS-T16)
Description: Universal Multi-Way Handset with 14, 15 or 16 buttons as standard.

Optional built-in PTT.

Part Number: UNI-MXH-XXX

Universal Handset Plus (MCS-T17)
Description: Universal Multi-Way Handset with 16 buttons in total.

Optional PTT side grab switch.

Part Number: UNI-HAP-XXX

Universal Display Handset (MCS-G17)
Description: Universal Multi-Way Handset with 16 buttons incorporating real-time primary and secondary battery voltage levels.

Part Number: UNI-DIS-XXX

Slimline Flush Fit Switch Unit (MCS-F5)
Description: Universal Multi-Way Switch Unit with 5 small or 5 small and one large button as standard.

Also available with optional quick fit rubber shroud.

Part Number: UNI-SLM-XXX

Maxi DIN/Flush Fit Switch Unit (MCS-F14)
Description: Universal Multi-Way Switch Unit with 13 or 14 buttons as standard.

Part Number: UNI-MAX-XXX

MaxiPlus DIN/Flush Fit Switch Unit (MCS-F16)
Description: Universal Multi-Way Switch Unit with 13 or 14 buttons as standard.

Part Number: UNI-MXF-XXX

Mega20 Flush Fit Switch Panel (MCS-F21)
Description: Universal Multi-Way Switch Panel with 20 buttons. This unit was custom designed specifically for use in a Skoda Scout.

Part Number: UNI-MUL-XXX

Universal Hand Held Microphones
Description: Stand-alone dynamic microphone with pre-amp.

Part Number: UNI-MIC-005

B : General Overview

Universal Controller Plus (MCS-32)

The Universal Controller Plus (MCS-32), Part Number UNI-PLS-001, is a device used for controlling hazard warning lighting equipment that incorporates a built-in siren amplifier, along with a number of other useful vehicle power management features, such as run-lock circuitry, split charger switching logic, head lamp flashing and priority load shedding. A version without a siren amplifier is also available.

The main feature of this device is its ability to be fully 'user' programmed via a PC (usually a Laptop). Any input or combinations of inputs can be used to control any output or combination of outputs as operationally specified for vehicles used by the Emergency or Recovery Services. The operational interface is normally done via one of many Multi-Way Switch Units or individual switches from RSG. In addition to this, under certain conditions, the MCS-32 will operate with some industry standard switches that are already in circulation or acquired from new. Also, if operationally required for larger systems the MCS-32 can be controlled via a number of Multi-Way and/or individual switches.

The programming software is supplied free of charge with the device and allows the user to create 'Configuration Files' unique to each application that can be easily amended or upgraded if required, thus, eliminating the need to add or remove relays and wires to an installation if the end user decides the original settings are not best suited to their application.

Also, if the MCS-32 does not contain sufficient switching functions in its own right, additional devices such as the Universal Load Switch (MCS-5E) and/or Universal Lighting Breakout Controller (UNI-LBC) can be added to expand the system. Alternatively, if the MCS-32 is over specified for a particular application the smaller Universal 100 Watt Siren can be used instead with the appropriate Multi-Way Switch unit, and then with, or without, the Universal Load Switch (MCS-5E) and/or Universal Lighting Breakout Controller (MCS-LBC). Also be aware RSG produces a range of small complete stand-alone systems known as Universal Compact Control Systems.

The unit is primarily ideal for controlling the vehicle lightbar, together with other peripheral light heads, particularly when interaction with other vehicle functions such as tailgate opening or hand brake operation. This is possible via a variety of switching devices ranging from a Universal Multi-Way Switch unit or via a simple array of toggle switches. When a Multi-Way Switch unit is used, it is programmed using the MSC-32 software that allows each switch function to be uniquely defined in terms of being either a single or a multi functional switch (hot key) along with one of 8 colours.

As well as all the above features the unit also has the ability to interface with vehicle CAN Bus signals or, alternatively, when fully developed operate with the Home Office Single Vehicle Architecture CiA447 CAN Bus protocol as specified in publication 39/11. Therefore, vehicle operational signals can be obtained directly from its electronic control systems, such as the ECU, rather than picking-up from the electrical/electronic signal associated with a particular vehicle function as in an indicator or brake light. As an established supplier of hazard warning control systems and data recorders RSG now has a very comprehensive library of CAN Bus data from a wide variety of vehicles that it can make available to users of the MCS-32.

In addition to controlling blue lights and sirens the MCS-32 can also communicate with other devices usually found on an Emergency Services vehicle such as Data Recorders and MDT's that is usually achieved via it's CAN Bus or RS232 connections that in turn can communicate with the vehicles Can Bus or CiA447 protocols if required.

Finally to help with installation and fault finding the MCS-32 is fitted with 24 diagnostic LED's, each of which can display one of three indication colours (green, amber and red) to give immediate feedback without the need for a PC connection.

One Box Compatibility

As a pro-active member of the One Box Consortium RSG is constantly striving to keep its products concurrent with this standard and as such is confident that devices in the Universal range and Multi-Way Switch units meet the Single Vehicle Architecture (SVO) and Driver & Vehicle Data Management System (DVDMS) criteria.

Product Versions

As the MCS-16 and the associated versions of Multi-Way Switch units are all fully programmable via the 'free' application software there is only one version of device to purchase and stock. This also means that any application written can be held confidentially within your own company without the involvement of RSG. That said in order to get the most out of this device RSG highly recommends that in conjunction with using this manual clients take advantage of RSG's free advice and training services associated with this product.

C : Compatible Switch Units

Universal Multi-Way Switch Units

A range of Universal Multi-Way handsets and switch units have been developed for use with the Universal Controller Plus (MCS-32). An extension lead is plugged in to the RS485 port an approriate adaptor is added and the handsets simply plugs in.

Each button can operate independently or in conjunction with other buttons, as well as having unique legends and back light colour, therefore each device would need to be uniquely configured. A configuration specification sheet is available which allows you to initially define the solution required along with the associated handset which will depend upon the level of control necessary.

Details of the operation and customisation of the Universal Multi-Way handsets are explained later in this manual or alternatively contact our sales team to verify that the handset you wish to use can be accommodated.

Mini Handset (MCS-T8)
Description: Universal Multi-Way Handset with 7 or 8 buttons as standard. Optional built-in PTT.

Part Number: UNI-MIN-XXX

Midi Handset (MCS-T10)
Description: Universal Multi-Way Handset with 8, 9 or 10 buttons as standard. Optional built-in PTT.

Also available with quick fit rubber shroud.

Part Number: UNI-MID-XXX

MaxiPlus Handset (MCS-T16)
Description: Universal Multi-Way Handset with 14, 15 or 16 buttons as standard. Optional built-in PTT.

Part Number: UNI-MXH-XXX

Universal Handset Plus (MCS-T17)
Description: Universal Multi-Way Handset with 16 buttons in total. Optional PTT side grab switch.

Part Number: UNI-HAP-XXX

Universal Display Handset (MCS-G17)
Description: Universal Multi-Way Handset with 16 buttons in incorporatin real-time primary and secondary battery voltage levels.

Part Number: UNI-DIS-XXX

Slimline Flush Fit Switch Unit (MCS-F5)
Description: Universal Multi-Way Switch Unit with 5 small or 5 small and one large button as standard.

Also available with optional quick fit rubber shroud.

Part Number: UNI-SLM-XXX

Maxi DIN/Flush Fit Switch Unit (MCS-F14)
Description: Universal Multi-Way Switch Unit with 13 or 14 buttons as standard.

Part Number: UNI-MAX-XXX

MaxiPlus DIN/Flush Fit Switch Unit (MCS-F16)
Description: Universal Multi-Way Switch Unit with 13 or 14 buttons as standard.

Part Number: UNI-MXF-XXX

Mega20 Flush Fit Switch Panel (MCS-F21)
Description: Universal Multi-Way Switch Panel with 20 buttons.
This unit was custom designed specifically for use in a Skoda Scout.

Part Number: UNI-MUL-XXX

Universal Hand Held Microphones

Dynamic, hand-held communications devices that offer extremely low sensitivity to hum pick-up and low susceptibility to radio frequency interference and is supplied complete with a 1m curly cord which extends up to 3 metres.

The microphone can be used as a stand-alone unit or in conjunction with a Universal Multi-Way handset

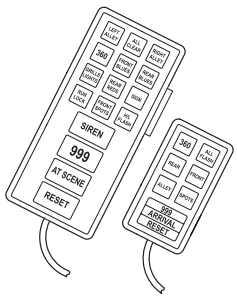
Description: Dynamic, hand-held communications devices designed for use as a stand-alone device or in conjunction with a Universal Multi-Way handset.

Part Numbers: UNI-MIC-005

Alternative PWM Handsets

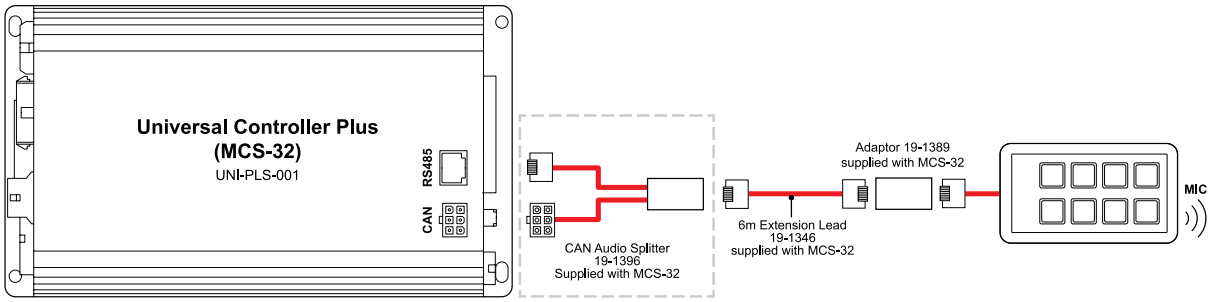
The 'Standard Factory Set-up' software with the Universal Controller PLus (MCS-32) allows compatibility with certain alternative PWM handsets.

As there are many types of handsets/keypads available due to variations in legends and switch actions it is likely that some configuration of the Universal Controller Plus (MCS-32) would be required. In most cases this would be achieved via the built-in programming interface.

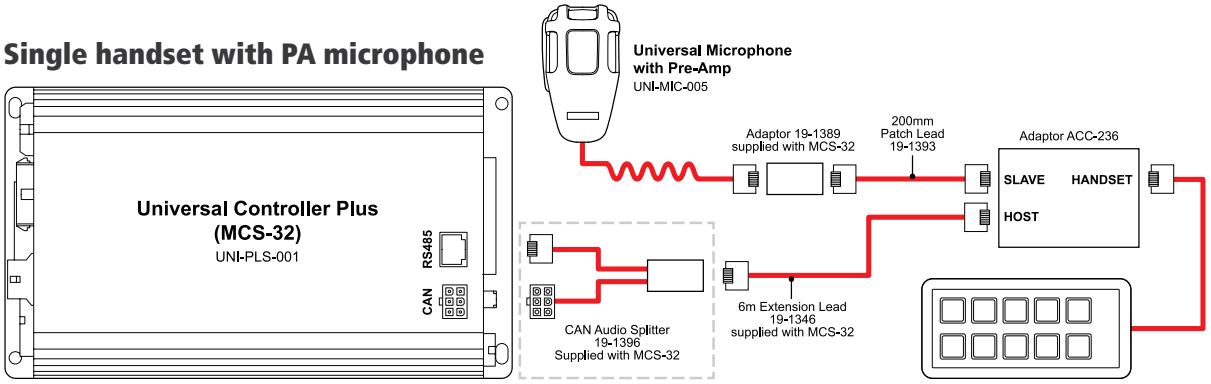


D : Typical System Specifications

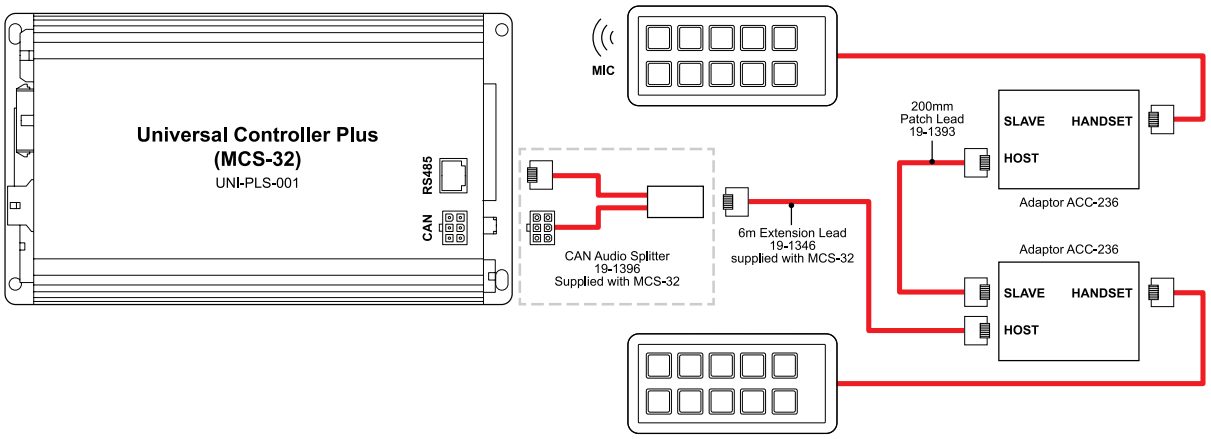
Single handset with optional built-in microphone



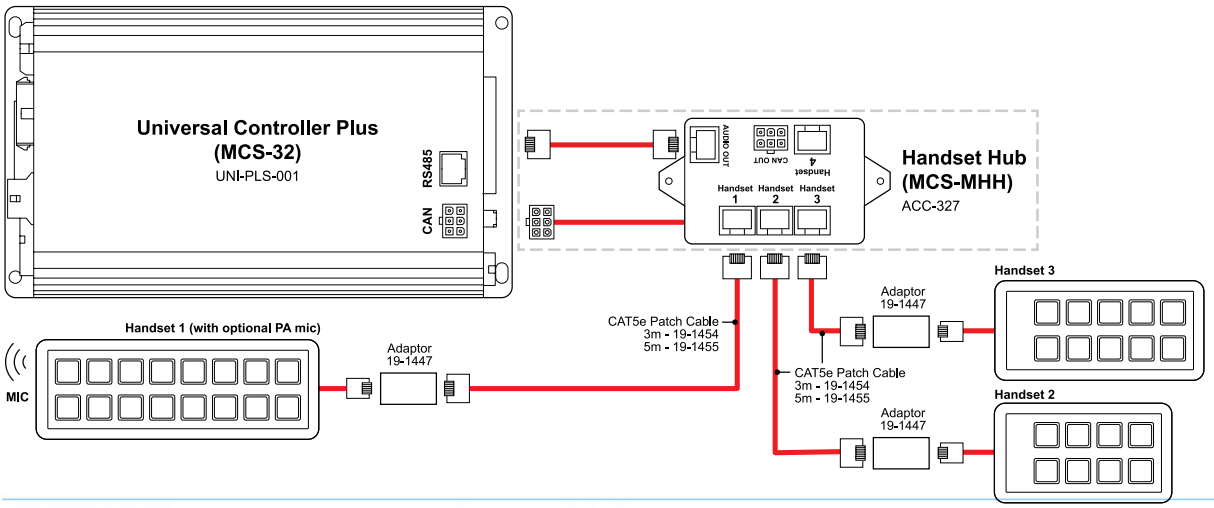
Single handset with PA microphone



Two handsets not exceeding 20 buttons in total



For applications requiring between two and four handsets



E : Product Specification

Product Overview

The Universal Controller Plus (MCS-32) consists of a main control box which contains everything required to control a vehicle mounted hazard warning system, typically comprising rooftop lighting, secondary hazard warning lights and audio equipment. It has 32 outputs and 24 configurable inputs with power management functions including runlock, split charging, load shedding and headlight flash, plus many more, some of which may be implemented via the vehicle CAN Bus system. It also includes a logic switch module to facilitate the control of a Gateway radio with voice alerts.

Operate the controller through one of our range of fully compatible hand held or dash mounted switch units and you have an economical hazard warning control system that does not compromise on features or functionality.

System Intelligence

The main control unit is supplied with default settings that will suit a variety of applications, however it can be simply customised to match the end users specific application by plugging in to a laptop/desktop PC and utilising the 'easy to use' complimentary software.

Human Machine Interface (HMI)

We have developed a collection of switch units specifically designed to interface with the Universal Controller Plus (MCS-32). They range from a 7-way handset through to a 16-way flush/DIN mount unit, with every conceivable combination in between. Handsets have the facility to operate a Public Address (PA) system via an integral microphone and the option to allocate any button to operate the Push to Talk (PTT) feature. Full details are given later in this catalogue.

One Source, One Solution

In order to simplify the installation process each unit is supplied fully loaded with all the necessary features and functions to implement a comprehensive system. Simply enable the required function via the 'easy to use' software.

Logic Functions

An abundance of logic functions means complex applications are no longer difficult to implement, particularly where certain operations are interlinked with others. So, carrying out 'and/or' functions and implementing 'do this when' or 'stop this when' are simple to apply together with the facility to alter functions allowing continual client synchronisation.

System Configuration

This is a simple 3-stage process which entails enabling and labelling inputs and outputs, configuring the system operation and down-loading the application onto the unit. This operation need only be done once, when completed it can be simply be transferred onto other units via a laptop.

General Features and Functions

OUTPUTS

32 Outputs:

- 16 Hi Power Outputs
  - 20 Amps per channel
  - Current limiting
  - Multi flash patterns
  - Timer shutdown
  - Voltage drop out
- 12 Low Power Outputs*
  - 600mA per channel
  - Positive or negative switching
  - Ideal for monitoring or special functions
- 4 Medium Power Outputs*
  - 2.5 Amps per channel
  - Positive or Negative switching
  - Drive relays
  - Small motors
  - Monitor outputs
- 2 diode pairs built in for headlight and/or tail light flashers
- Output to data logger
- Electronic Fuses
  - Electronically adjustable
  - Electronically tripped

INPUTS

24 Configuarable Inputs:

- 12 negative switching
- 12 positive switching
- Software configurable

4 Standard Inputs:

- Mic input
- Radio input
- Reset
- Standby

MULTI-WAY SWITCH OPTIONS

- Universal Multi-Way handset can be fully configured using the MCS software
- Single or up to 4 handsets

SERIAL DATA PORT

- RS485 protocol
- RS232 - via adaptor
- Link with third party MDT terminals
- USB Port

CAN OR CAN TYPE DATA PORT

- Link to RSG complementary devices such as a lightbar
- Link to other industry new standard devices
- Link with legacy equipment

USER INTERFACE

- 24 illuminated status indicators
- Indicates flash pattern
- Communication status
- Provides output status
- **Green** - OK
- **Red** - Over current
- **Amber** - Low voltage

SPECIFICATION

- Dual voltage
- 100 Amps total output
- Spec 5 approved
- e-approved

Software Operational Modules

100 WATT SIREN

- Supports 8 or 11 ohm speakers
- Can be enabled from an input or handset
- Air horn input
- HRT positive or negative activation
- Multiple siren tones selected from software
- Monitor signal active when siren on
- PA and radio re-broadcast facility
- UK and European sounds
- City Mode volume reduction feature
- Workshop mode volume suppression feature for testing
- Can be linked with other MCS siren devices to give two vehicle effect

LOAD SHEDDING MODULE

- Via internal or external monitoring
- Automatic in conjunction with other equipment activation

FAN CONTROL MODULE

- Control up to 4 intake/extractor fans
- Reverses power supply to fans
- Optional 4-way Relay Expansion Module

SALOON LIGHTING MODULE

- Ideal to control internal ambulance lighting
- Manual, semi and full automatic operation

CABINET ANTI-TAMPER MODULE

- Monitor 16 ambulance medical lockers
- Ideal for monitoring medical consumables/medicines
- Cabinet re-stock indication

AUDIO INTERCOM CONTROLLER (operates with external device)

- Announce pre-recorded messages
- Duplex or simplex intercom

SPLIT CHARGE CONTROLLER

- Monitors primary battery voltage
- Output drives charging solenoid to charge secondary battery
- Solenoid in and out voltage programmable

RUN LOCK CONTROLLER

- Outputs
  - 3 dedicated run lock outputs (2 with diodes)
  - Additional outputs assigned from software
- Enable Inputs
  - Inputs assigned in software
  - From handset, handbrake, remote button etc.
  - Hi or Lo inputs
- Reset Inputs
  - Inputs assigned in software
  - From brake light, remote button etc.
  - Hi or Lo inputs

HEADLIGHT FLASH

- Dedicated outputs x 4 (with built-in diodes) to control headlights and/or complementary flashing lamps

GATEWAY RADIO CONTROLLER

- Automatically switches between the Main & Gateway Radio (for built-up areas) within a 30 second window for the driver to exit the vehicle
- Automatic handbrake detection

ADDITIONAL FEATURES

- 16 x AND logic modules
- 16 x OR logic modules
- 32 x timer modules (1 second increments)

* SEE APPENDIX A1

F : Connection and Switch Details

F:1 Power Connections and Outputs

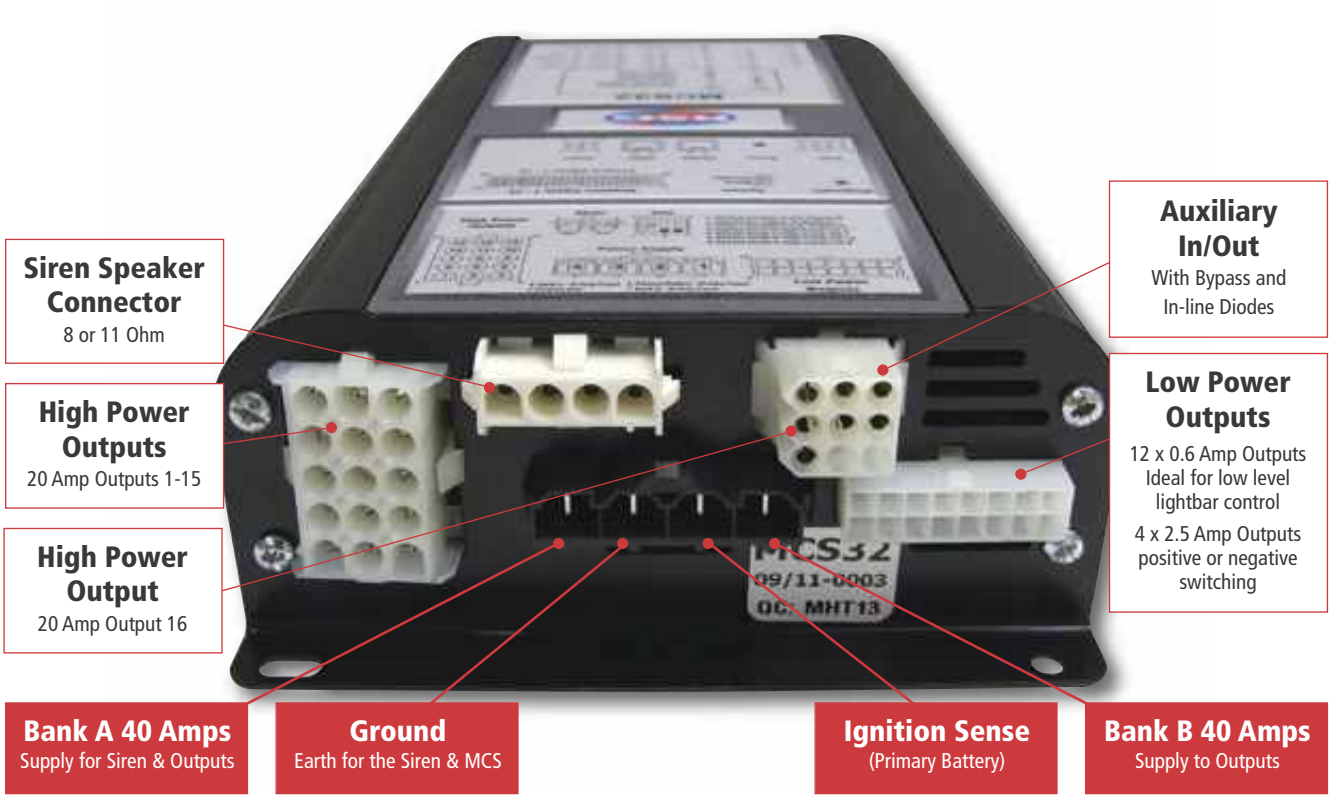
32 Outputs	
Expandable Outputs	
Headlight Flasher	Built-in Audio Warning Messages
Load Shedding	100 Watt Siren with PA
Split Charging Logic	3 Circuit Run Lock
LED Diagnostic Panel	Installer Programmable
24 Inputs	Can BUS Connection
Gateway Controller	Handset Options

F : Connection and Switch Details

F:2 **Inputs and switching options**

F : Connection and Switch Details

F:3 Outputs and Power Options



F:4 Siren Speaker Connection

F : Connection and Switch Details

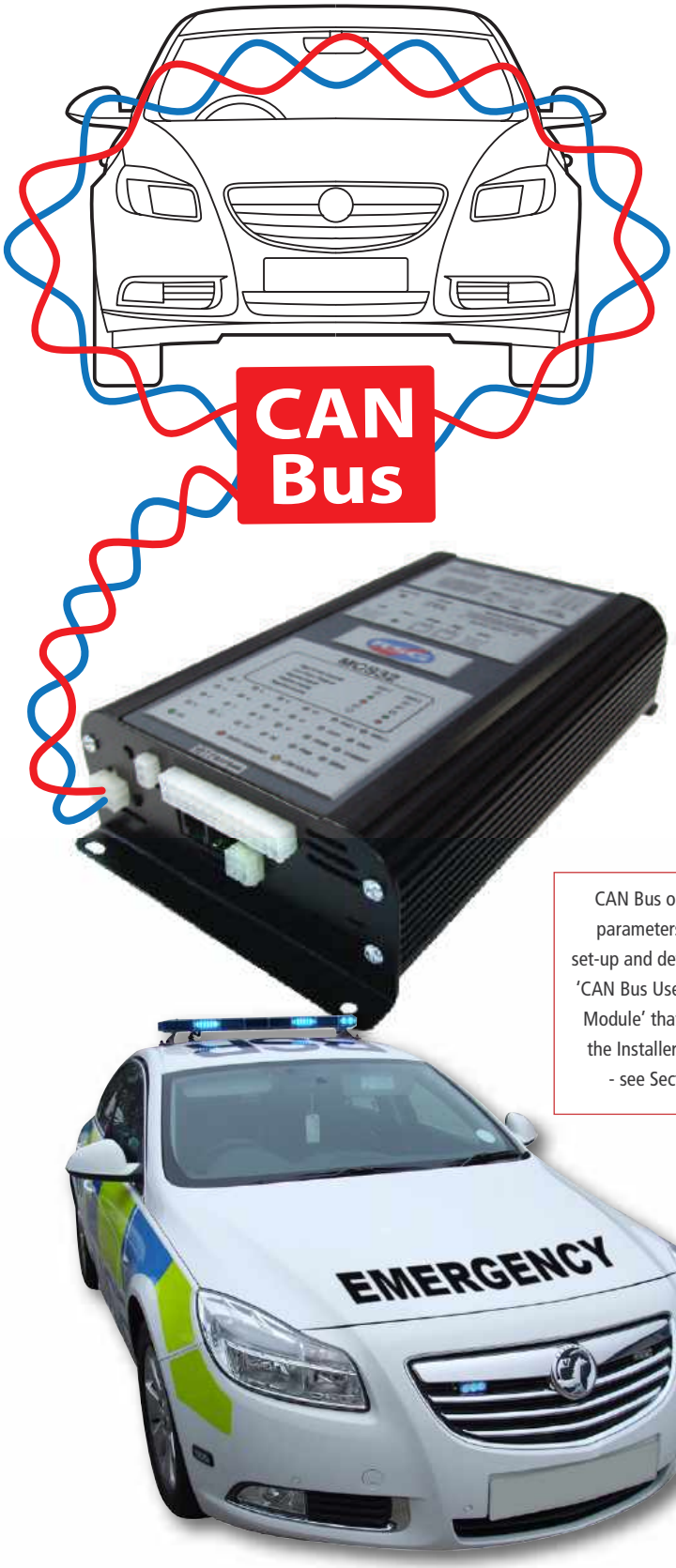
F:5 **CAN Bus Interface**

Vehicle CAN Bus High/Low

Can be used to monitor:
- Foot brake
- hand brake
- Steering wheel controls
- Lighting
- Engine running
- Lighting
- Seat belts
- Wipers
- Doors, boot and tailgate

Logic Control

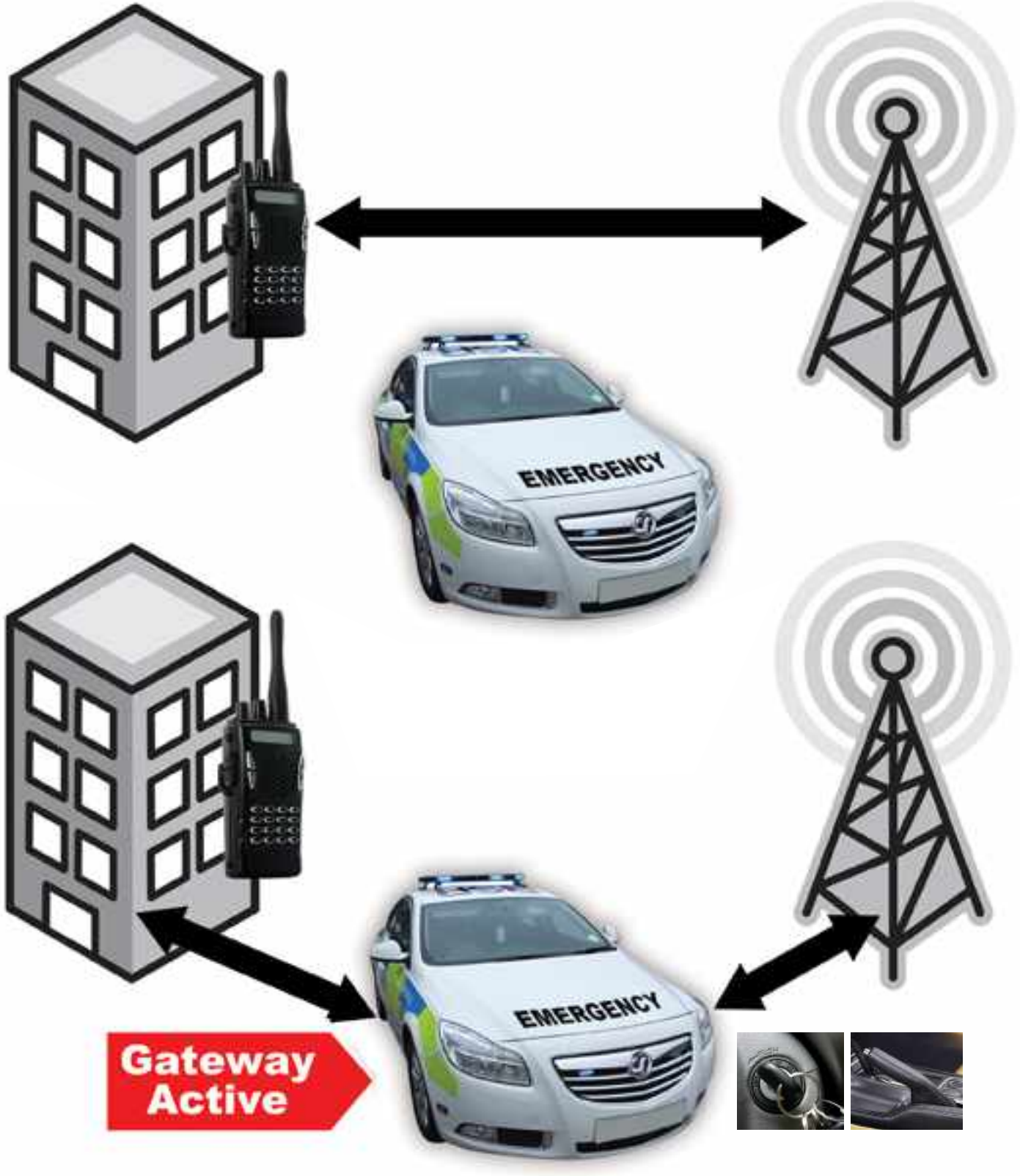
Activate Outputs to Control Hazard Warning Equipment



CAN Bus operating parameters can be set-up and defined in the 'CAN Bus User Interface Module' that is within the Installer Program - see Section K.

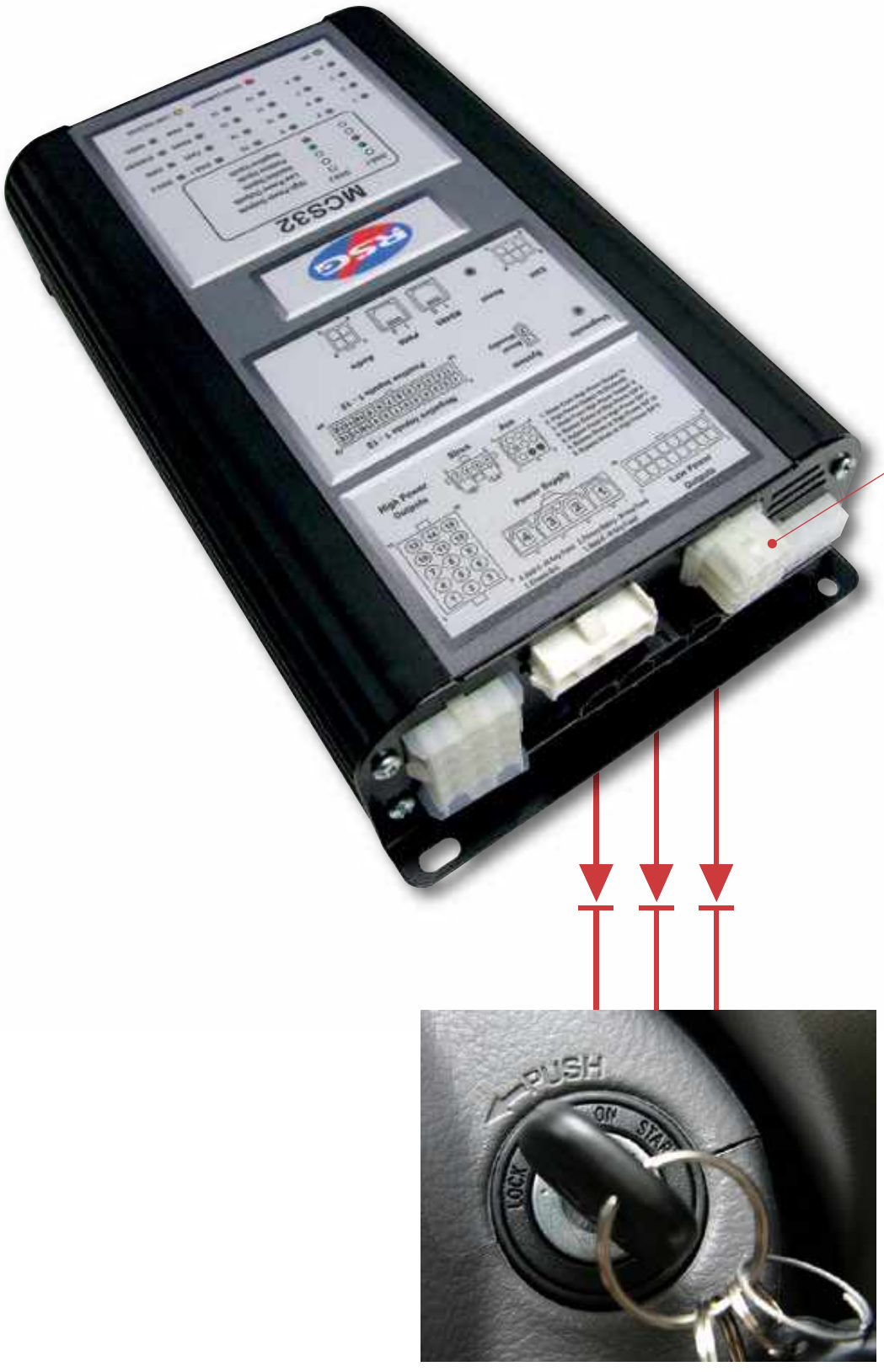
F : Connection and Switch Details

F:6 **Gateway Controller**



F : Connection and Switch Details

F:7 **Run Lock**



3 Circuit Run Lock

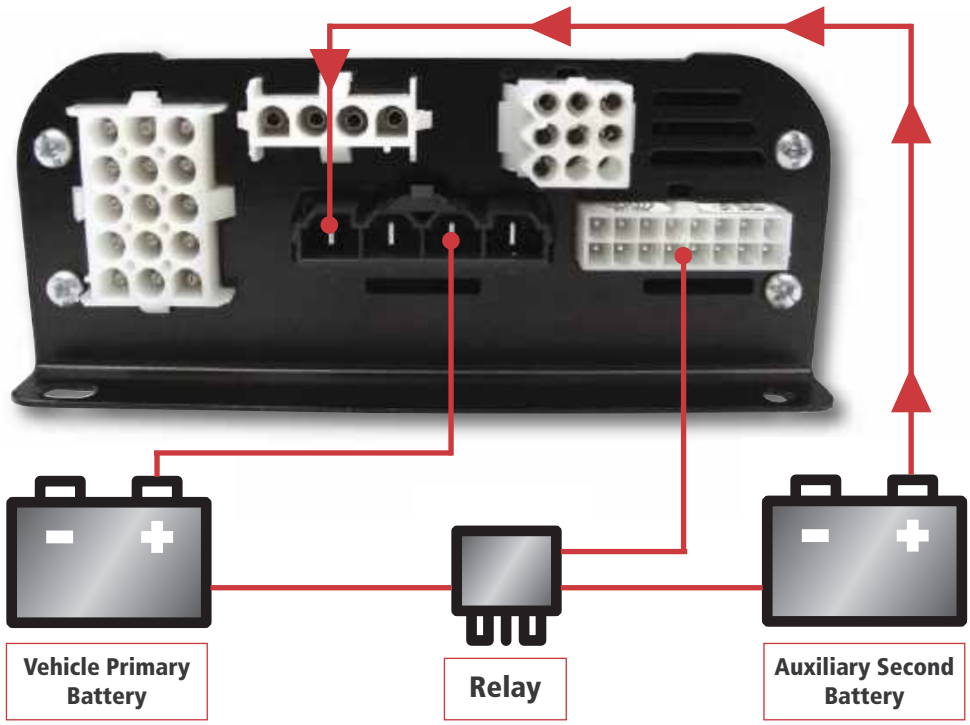
- Outputs - 3 Dedicated run lock outputs (2 with diodes), additional outputs assigned from software
- Enable inputs - Inputs assigned in software from handset, handbrake, remote buttons etc, high or low inputs
- Reset inputs - Inputs assigned in software from brake light, remote buttons etc, high or low inputs

Run Lock operating parameters can be set-up and defined in the 'Run Lock User Interface Module' that is within the Installer Program - see Section K.

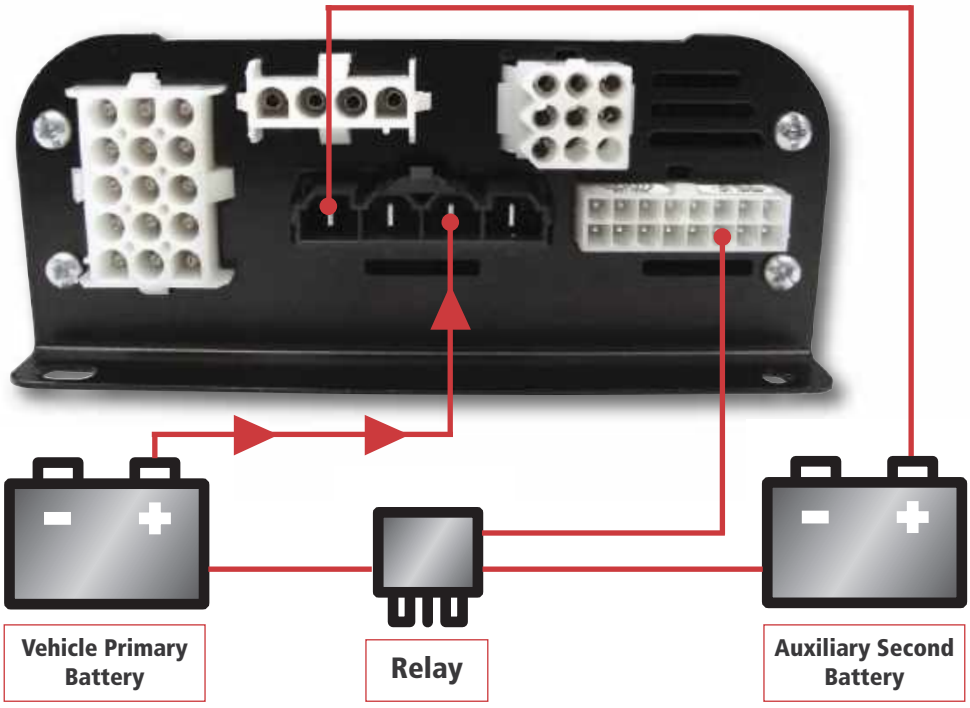
F : Connection and Switch Details

F:8 Split Charging Logic

Secondary Battery Supplying Power



Primary Battery Supplying Power



Split Charge Controller

- Pull in and drop out voltages installer adjustable
- Used to switch in and/or charge secondary battery
- Monitors primary battery voltage
- Output drives charging solenoid
- Solenoid in and out voltage programmable

Voltage levels and timing periods are set-up and defined in the 'Split Charging User Interface Module' that is within the Installer Program - see Section K.

F : Connection and Switch Details

F:9 **LED Diagnostic Display**

G : Handset and Switch Unit Options

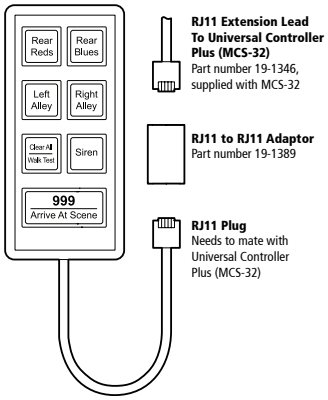
G:1 Universal Mult-Way Switch Units Overview

The range of Universal Multi-Way handsets and switch units are the preferred option for use with the Universal Controller Plus (MCS-32) particularly for new installers.

These units are supplied fully programmed by RSG to the customers specification, see pages 1:16 - 1:23 for individual specification sheets.

Each button can operate independently or in conjunction with other buttons as well as having unique legends and back light colour, therefore each device would need to be uniquely configured.

Mini Handset (MCS-T8)

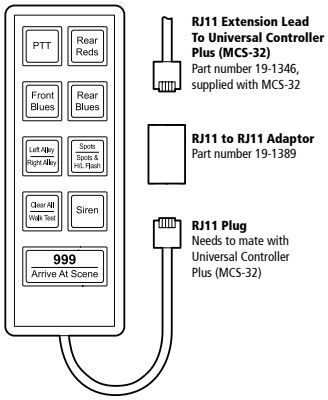


RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

Midi Handset (MCS-T10)

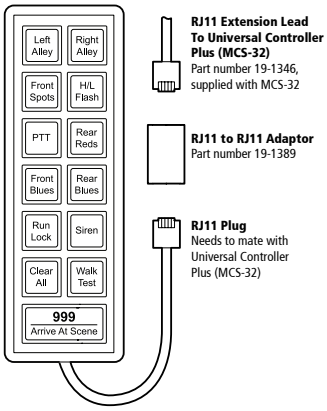


RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

MaxiPlus Handset (MCS-T16)

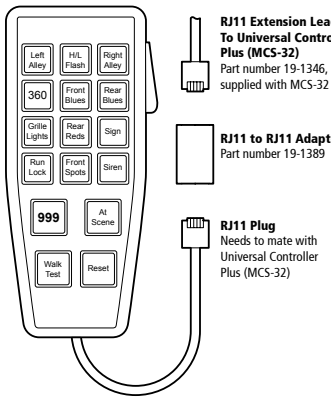


RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

Universal Handset Plus (MCS-T17)

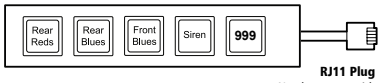


RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

Slimline Flush Fit Switch Unit (MCS-F5)

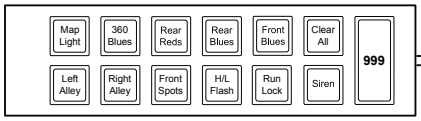


RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

Maxi DIN/Flush Fit Switch Unit (MCS-F14)

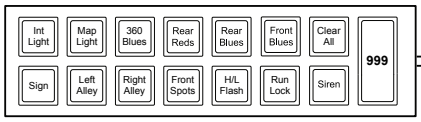


RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

MaxiPlus DIN/Flush Fit Switch Unit (MCS-F16)



RJ11 Plug
Needs to mate with Universal Controller Plus (MCS-32)

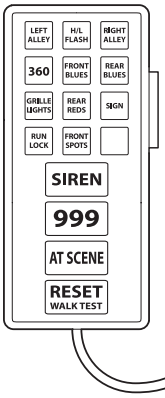
RJ11 to RJ11 Adaptor
Part number 19-1389

RJ11 Extension Lead To Universal Controller Plus (MCS-32)
Part number 19-1346, supplied with MCS-32

Alternative PWM handsets/keypads
(Bespoke programming required)

Best suited to customers who have a historic preference for a particular type of device. However, some bespoke programming and an alternative adaptor will be required.

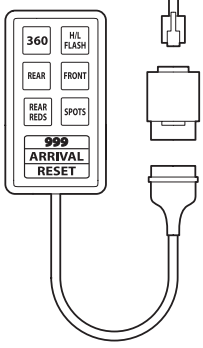
Alternative handsets/keypads must be procured and supplied by the customer or their agent.



Extension Lead To Universal Controller (CVS-012)
Note: Extension lead must always be used as it crosses wires.

RJ11 To Mate 'n' Lock And Multipole Circular Adaptor

Multipole Circular Plug
Needs to mate with Universal Controller (CVS-012)



Extension Lead To Universal Controller (CVS-012)
Note: Extension lead must always be used as it crosses wires.

RJ11 To Mate 'n' Lock And Multipole Circular Adaptor

Mate 'n' Lock Plug
Needs to mate with Universal Controller (CVS-012)

G : Handset and Switch Unit Options

G:2 Universal Mult-Way Switch Units Description

An extremely versatile range of fully programmable switch units to suit a variety of applications.

Each switch can be independently configured in terms of operation, legend designation and even colour, therefore they are the ideal interface for controlling a variety of vehicle based hazard warning systems including the Universal Controller Plus (MCS-32).

Main Features

- One of the most slimline range of switch units available in the market today
- Meets automotive protrusion regulations
- Fully programmable at source
- Each switch can have a multi-function 'HOT' key action depending on required function
- On handset versions, any switch can be programmed to act as PTT (Push To Talk) when used in conjunction with Public Address (PA) equipment
- Surface/DIN mount units will require a separate hand-held microphone
- Adjacent switches can be combined for extra visual impact
- Interactive keys for interactive lighting functions and audio warnings
- 3 stage back illumination - low brightness when OFF, high brightness when ON and both levels dimmed at night
- Back light colour can be set to suit switch function
- A fully tactile, one piece wipe clean keypad with 'positive clicks'
- Multiple mounting options for each type of switch unit
- Optional Anti-Bacterial finish available

Each switch can operate independently or in conjunction with other switches, as well as having unique legends, therefore each device would need to be uniquely configured. A configuration specification sheet is available which allows you to define the solution required along with the associated switch unit which will depend upon the level of control necessary.

Maxi Switch Unit UNI-MAX-XXX

Mini Switch Unit UNI-MIN-XXX

Midi Switch Unit UNI-MID-XXX

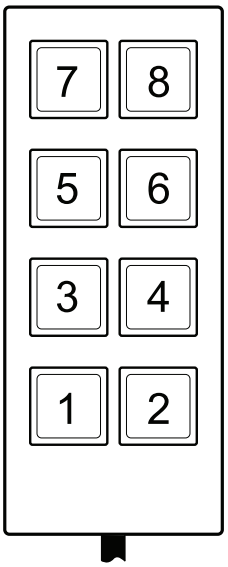
Slimline Switch Unit UNI-SLM-XXX

MaxiPlus Switch Unit UNI-MXH-XXX

Mega 20-Way Switch Unit UNI-MUL-001

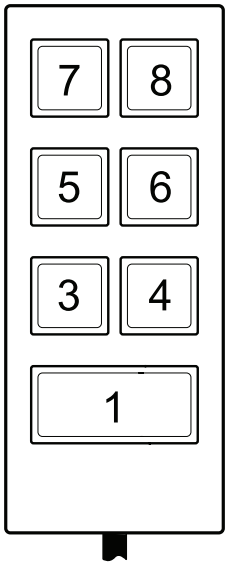
H : Handset Specification

H:1 **Universal Multi-Way Mini Handset - 8 Buttons** (MCS-T8)



Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
2					
3					
4					
5					
6					
7					
8					

H:2 **Universal Multi-Way Mini Handset - 7 Buttons** (MCS-T8)

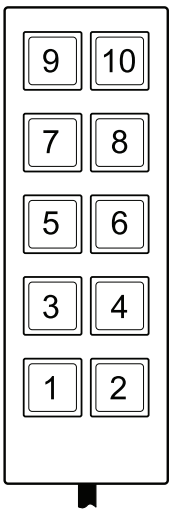


Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
3					
4					
5					
6					
7					
8					

Please Note:
Any key can be programmed for use as **PTT** *(Push To Talk), please tick the box next to the appropriate key number if required.*
L *= Latching* **M** *= Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of the handset orientation.

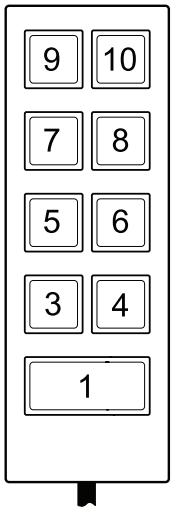
H : Handset Specification

H:3 **Universal Multi-Way Midi Handset - 10 Buttons** (MCS-T10)



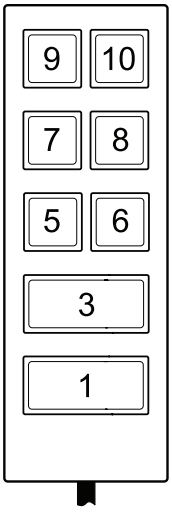
Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

H:4 **Universal Multi-Way Midi Handset - 9 Buttons** (MCS-T10)



Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
3					
4					
5					
6					
7					
8					
9					
10					

H:5 **Universal Multi-Way Midi Handset - 8 Buttons** (MCS-T10)

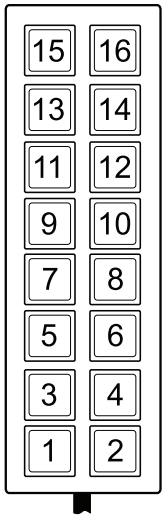


Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
3					
5					
6					
7					
8					
9					
10					

Please Note:
Any key can be programmed for use as **PTT** *(Push To Talk), please tick the box next to the appropriate key number if required.*
L *= Latching* **M** *= Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of the handset orientation.

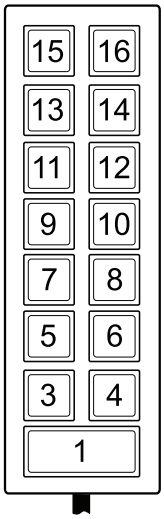
H : Handset Specification

H:6 **Universal Multi-Way MaxiPlus Handset - 16 Buttons** (MCS-T16)



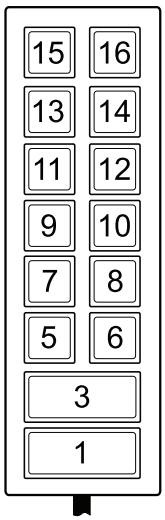
Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

H:7 **Universal Multi-Way MaxiPlus Handset - 15 Buttons** (MCS-T16)



Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

H:8 **Universal Multi-Way MaxiPlus Handset - 14 Buttons** (MCS-T16)



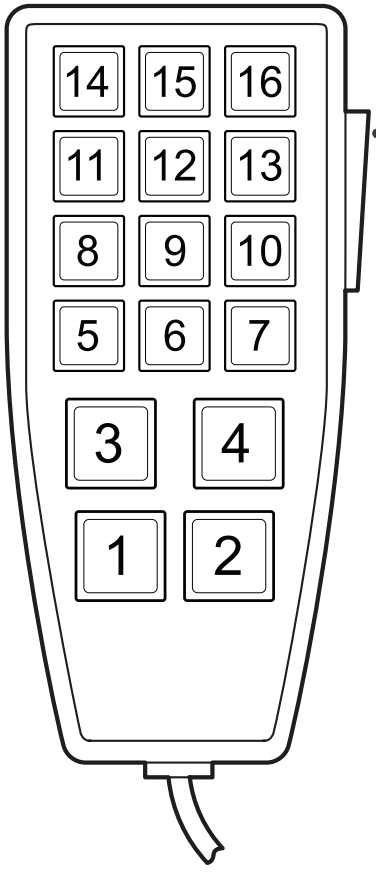
Switch No.	Legend (eg Front Spots)	Colour	PTT	L	M
1					
3					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Please Note: *Any key can be programmed for use as* **PTT** *(Push To Talk), please tick the box next to the appropriate key number if required.*
L *= Latching* **M** *= Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of the handset orientation.

H : Handset Specification

H:9 **Universal Handset Plus - 16 Buttons** (MCS-T17)

Switch No.	**Legend** (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				



Push to Talk Operating Switch (Optional)

Essential Notes:

The 16-way Handset Plus is available with and without **PTT** *(Push To Talk). Push to Talk is operated by a switch on the right hand side of the unit. Please ensure that you tick the appropriate box below.*

I **DO** require PTT (Push to Talk)		I **DO NOT** require PTT (Push to Talk)	

L = *Latching* **M** = *Momentary, please tick the box next to the appropriate key number if required.*

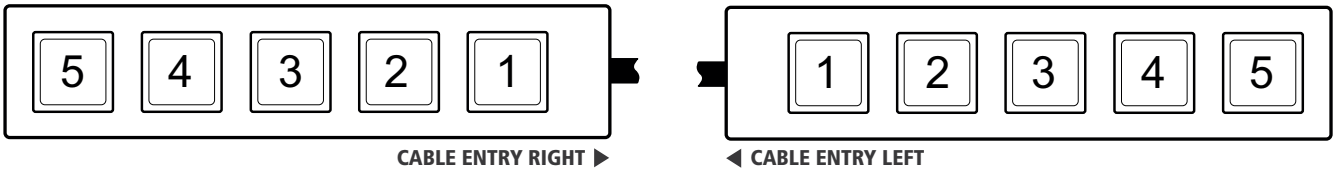
The key colour is created by the LED shining behind the key, please specify the colour required.

Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.

J : Switch Unit Specification

J:1 Universal Multi-Way Slimline Flush Fit Switch Unit

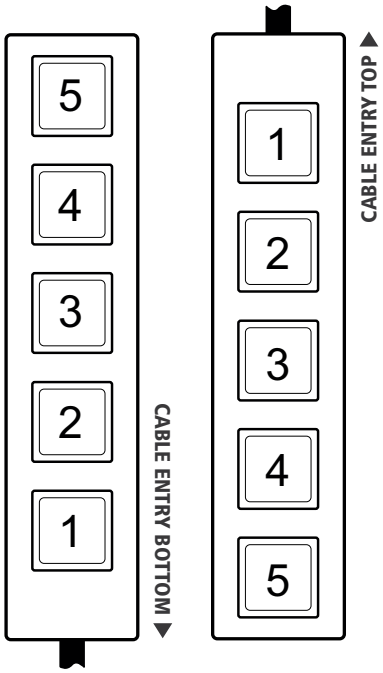
5 Small Buttons - Horizontal (MCS-F5)



Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				

I require cable entry on the **RIGHT**		I require cable entry on the **LEFT**	

5 small Buttons - Vertical (MCS-F5)



Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				

I require cable entry from the **BOTTOM**		I require cable entry from the **TOP**	

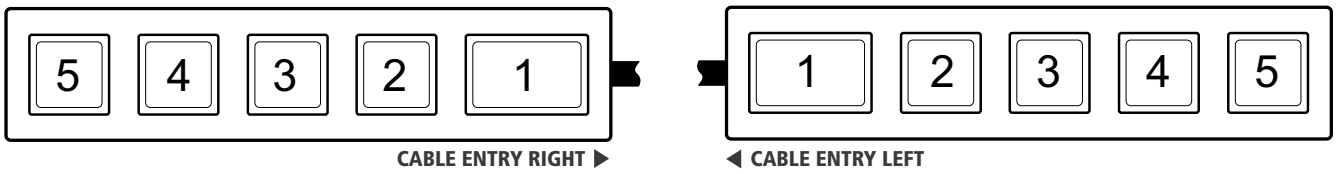
Please Note:
L = *Latching* **M** = *Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of orientation please tick the appropriate box to specify cable entry.

One Box Single Vehicle Architecture (OBSVA) Solution compatible.

J : Switch Unit Specification

J:2 Universal Multi-Way Slimline Flush Fit Switch Unit

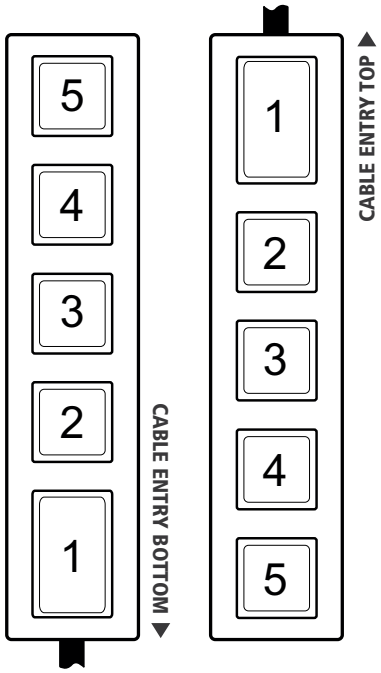
1 Large Button + 4 Small Buttons - Horizontal (MCS-F5)



Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				

I require cable entry on the **RIGHT**		I require cable entry on the **LEFT**	

1 Large + 4 Small Buttons - Vertical (MCS-F5)



Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				

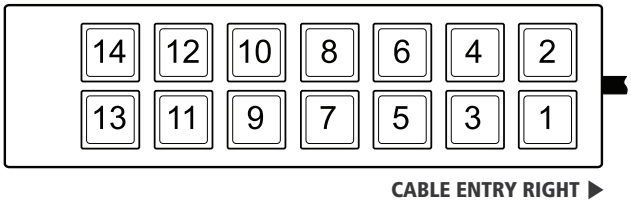
I require cable entry from the **BOTTOM**		I require cable entry from the **TOP**	

Please Note:
L = *Latching* **M** = *Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of orientation please tick the appropriate box to specify cable entry.

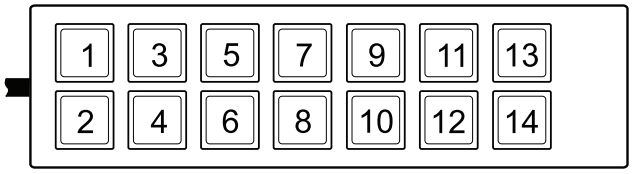
One Box Single Vehicle Architecture (OBSVA) Solution compatible.

J : Switch Unit Specification

J:3 Universal Multi-Way Maxi DIN/Flush Fit Switch Unit - 14 Small Buttons (MCS-F14)



CABLE ENTRY RIGHT ▶

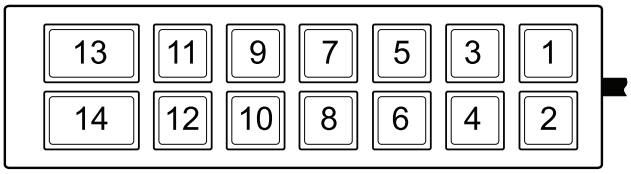


◀ CABLE ENTRY LEFT

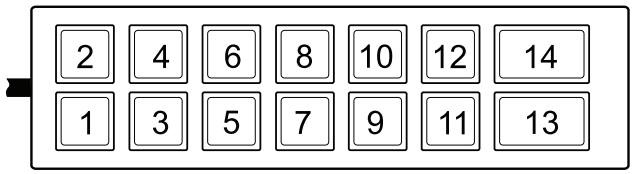
I require cable entry on the **RIGHT** ☐ I require cable entry on the **LEFT** ☐

Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

J:4 Universal Multi-Way Maxi DIN/Flush Fit Switch Unit 2 Large + 12 Small Buttons (MCS-F14)



CABLE ENTRY RIGHT ▶

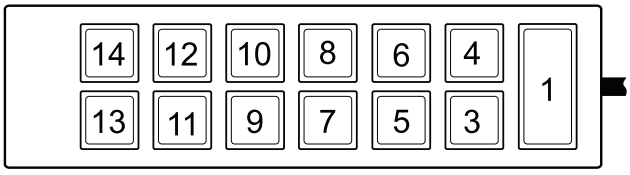


◀ CABLE ENTRY LEFT

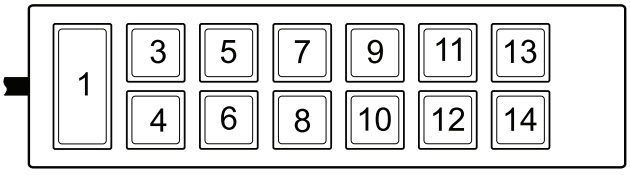
I require cable entry on the **RIGHT** ☐ I require cable entry on the **LEFT** ☐

Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

J:5 Universal Multi-Way Maxi DIN/Flush Fit Switch Unit 1 Double + 12 Small Buttons (MCS-F14)



CABLE ENTRY RIGHT ▶



◀ CABLE ENTRY LEFT

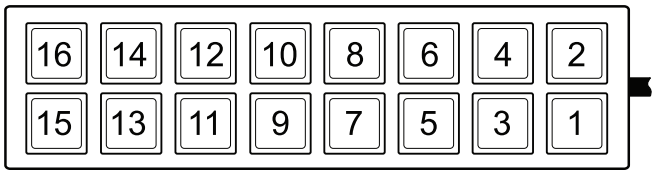
I require cable entry on the **RIGHT** ☐ I require cable entry on the **LEFT** ☐

Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

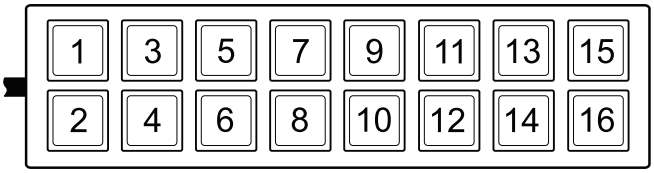
Please Note: **L** = *Latching* **M** = *Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of orientation please tick the appropriate box to specify cable entry.

J : Switch Unit Specification

J:6 **Universal Multi-Way Maxi DIN/Flush Fit Switch Unit - 16 Small Buttons** (MCS-F16)



CABLE ENTRY RIGHT ▶



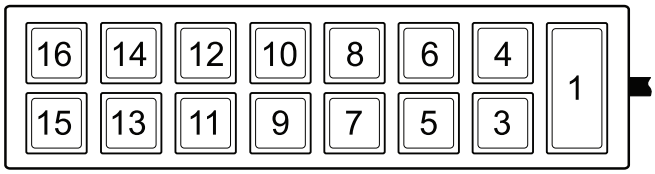
◀ CABLE ENTRY LEFT

Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
2				
3				
4				
5				
6				
7				
8				

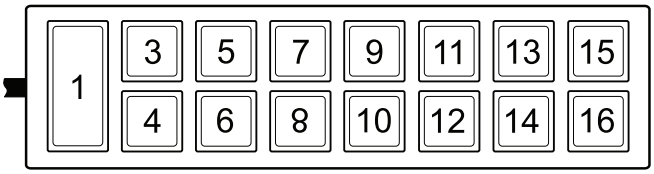
Switch No.	Legend (eg Front Spots)	Colour	L	M
9				
10				
11				
12				
13				
14				
15				
16				

I require cable entry on the **RIGHT** ☐ I require cable entry on the **LEFT** ☐

J:7 **Universal Multi-Way Maxi DIN/Flush Fit Switch Unit 1 Double + 16 Small Buttons** (MCS-F16)



CABLE ENTRY RIGHT ▶



◀ CABLE ENTRY LEFT

Switch No.	Legend (eg Front Spots)	Colour	L	M
1				
3				
4				
5				
6				
7				
8				
9				

Switch No.	Legend (eg Front Spots)	Colour	L	M
10				
11				
12				
13				
14				
15				
16				

I require cable entry on the **RIGHT** ☐ I require cable entry on the **LEFT** ☐

Please Note:
L = *Latching* **M** = *Momentary, please tick the box next to the appropriate key number if required.*
The key colour is created by the LED shining behind the key, please specify the colour required.
Keep words as short as possible and abbreviate long words, if an abbreviation is not stated we will insert a standard abbreviation.
Cable entry and button numbering will remain in the same position regardless of orientation please tick the appropriate box to specify cable entry.

K : Programming the Universal Controller Plus (MCS-32)

K:1 Overview of Programming Requirements

Using the Software and Creating Configuration Files

Details of how to program the full functions of each feature of the Universal Controller Plus (MCS-32) are given in Section 2 of this Guide. However, when reading this section it will be useful to bear in mind that this device is produced exclusively for RSG Engineering Ltd by a company called MHE Electronics and as such the unit is referred to only as the MCS-32.

It should be noted that all software programming to set-up unique 'configuration files' has to be performed exclusively via a PC using the appropriate PC based software that is available separately – part number UNI-PRO-002. Also, please note that in order to use the programming software the PC must be connected to the Universal Controller Plus via a programming cable part number ACC-259.

The programming software comes in the form of a CD that is normally supplied 'Free of Charge' and which also contains instruction for use. Although this software is easy to use by anyone who has the necessary technical skills, some training is advisable in order to obtain the full benefits of this tool. As such RSG can offer training for this facility at its premises that is normally 'free of charge' for main motor dealers and installers. Training can also be arranged on-site at customers premises, however, a nominal charge is normally made for this to cover expenses, unless significant quantities are required over the project lifetime. Although RSG can supply the software CD to suitably qualified persons, it is not normally practical to offer technical support to customers who have not partaken in formal training scheme.

Entering the Universal Controller Plus Programming Mode

Before attempting to perform any detailed programming as described in Section 2, the programming mode of the device must be entered into by following the instructions once the programming CD is loaded onto a PC.

Software Updates

No need to contact RSG for software upgrades as they are available directly on-line:

Manual Downloading Process

By utilising an 'Auto Update' system the latest version of the MCS-32 Configuration Install Files are available online. Therefore whenever a new version of 'MCS-32 Operating Software' is released new 'MCS-32 Configuration Install Files' will simultaneously be released too.

The link to the MCS Configuration Install Files is permanent and is always named the same, regardless of the internal version numbers. The link is available from the RSG Website where the files are stored using the azure online cloud storage system and as such has a permanent and very reliable presence.

www.rsg-ontop.com > Links > MCS-32 Configuration Software Update

As such all clients can decide wether to update their system before making any changes to the Configuration Files, by the software feature in the 'help' menu or to the work with the current loaded version. However, if all the latest features of the product are to be active then the latest update 'must' be downloaded. If required the RSG technical department can help with this decision. It is also worth noting that the CD supplied with the device is most likely not to be the latest version due to the time spent in storage before despatch.

K : Programming the Universal Controller Plus (MCS-32)

K:2 Allocation of Operational Parameters

Use the following pages to write down the required operating parameters and ideally use in conjunction with the appropriate Multi-Way Switch Unit Specification sheet, see section F.

1. Output signals 32 x in total

16 x High Power Outputs (20Amps maximum each)				
Supply	Output	Current Consumption	To Operate	Comment
BANK **A**	1			
	2			
	3			
	4			
	5			
	6			
	7			
	SIREN	7.5A	Power or internal siren amplifier taken from Bank A	
TOTAL CURRENT BANK A (MAX 40A)		A		

Supply	Output	Current Consumption	To Operate	Comment
BANK **B**	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
TOTAL CURRENT BANK B (MAX 40A)		B		

Primary	16	20A Max		

4 x Medium Power Outputs (2.5Amps maximum each)*				
Supply	Output	Current Consumption	To Operate	Comment
BANK **A/B**	1			
	2			
BANK **A/B**	9			
	10			

* SEE APPENDIX A1

K : Programming the Universal Controller Plus (MCS-32)

K:2 **Allocation of Operational Parameters continued**

12 x Low Power Outputs (0.6Amps maximum each)				
Supply	Output	Current Consumption	To Operate	Comment
BANK **A/B**	3			
	4			
	5			
	6			
	7			
	8			
BANK **A/B**	11			
	12			
	13			
	14			
	15			
	16			
TOTAL CURRENT LOW POWER OUTPUTS		C		

A + B + C = MCS TOTAL	**DO NOT EXCEED 80A CURRENT LIMIT OF THE MCS PLEASE REFER TO POWER SCHEMATIC FOR MORE INFORMATION**

2. Input signals 24 x in total

12 x Negative Switching Inputs		
Input	To Operate In Conjunction with Other Functions if Appropriate	Comment
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

K : Programming the Universal Controller Plus (MCS-32)

K:2 Allocation of Operational Parameters continued

12 x Positive Switching Inputs		
Input	To Operate In Conjunction with Other Functions if Appropriate	Comment
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

3. Audio Requirements

100 Watt Siren Options		
Parameter to be Specified	Required Yes/No and Operational Parameter	Comment
8 or 11 Ohm Speaker		
Siren Tones required: Yelp/Wail/HiLo/2 Tone		
Enable: Dedicated input or from handset		
Air Horn Input		
Horn Ring Transfer (HRT) Pos or Neg Switching		
Monitor Signal active when siren ON		
Normal (100 Watt) Siren Level		
City Mode Siren (80% of max)		
Workshop (Test) Mode Siren (50%-80% of max)		

Microphone and Radio Re-Broadcast Options		
Parameter to be Specified	Required Yes/No and Operational Parameter	Comment
Microphone Required - separate unit		
Microphone required with handheld switch panel		
Radio re-broadcast required		

K : Programming the Universal Controller Plus (MCS-32)

K:2 Allocation of Operational Parameters continued

4. Split Charge Controller

Parameter to be Specified	Required Yes/No and Operational Parameter	Comment
Switch-In Secondary Battery Level		
Switch-In Charge Secondary Battery Level		
Monitoring of Primary Battery Voltage		
Output to Drive Charging Solenoid		
Solenoid Pull-In Voltage Level		
Solenoid Drop-Out Voltage Level		

5. Run Lock Controller

Parameter to be Specified	Required Yes/No and Operational Parameter	Comment
Outputs:		
Run Lock Output 1 (with Diode)		
Run Lock Output 2 (with Diode)		
Run Lock Output 3 (without Diode)		
Software Assigned Inputs:		
Enable Inputs:		
From Handset (Usually On/Off) Control		
From Handbrake		
From High Signal Inputs		
From Low Signal Inputs		
Inputs Assigned in Software:		
Reset Inputs:		
From Brake Lights		
From Foot Brake		
From Clutch		
From Remote Button		
From High Level Input		
From Low level Input		
Inputs Assigned in Software:		

K : Programming the Universal Controller Plus (MCS-32)

K:2 Allocation of Operational Parameters continued

6. Special Requirements

Operational Parameter Required	Description of Operation and Comments

If appropriate provide a schematic diagram below of the operational parameters required or submit a separate drawing:

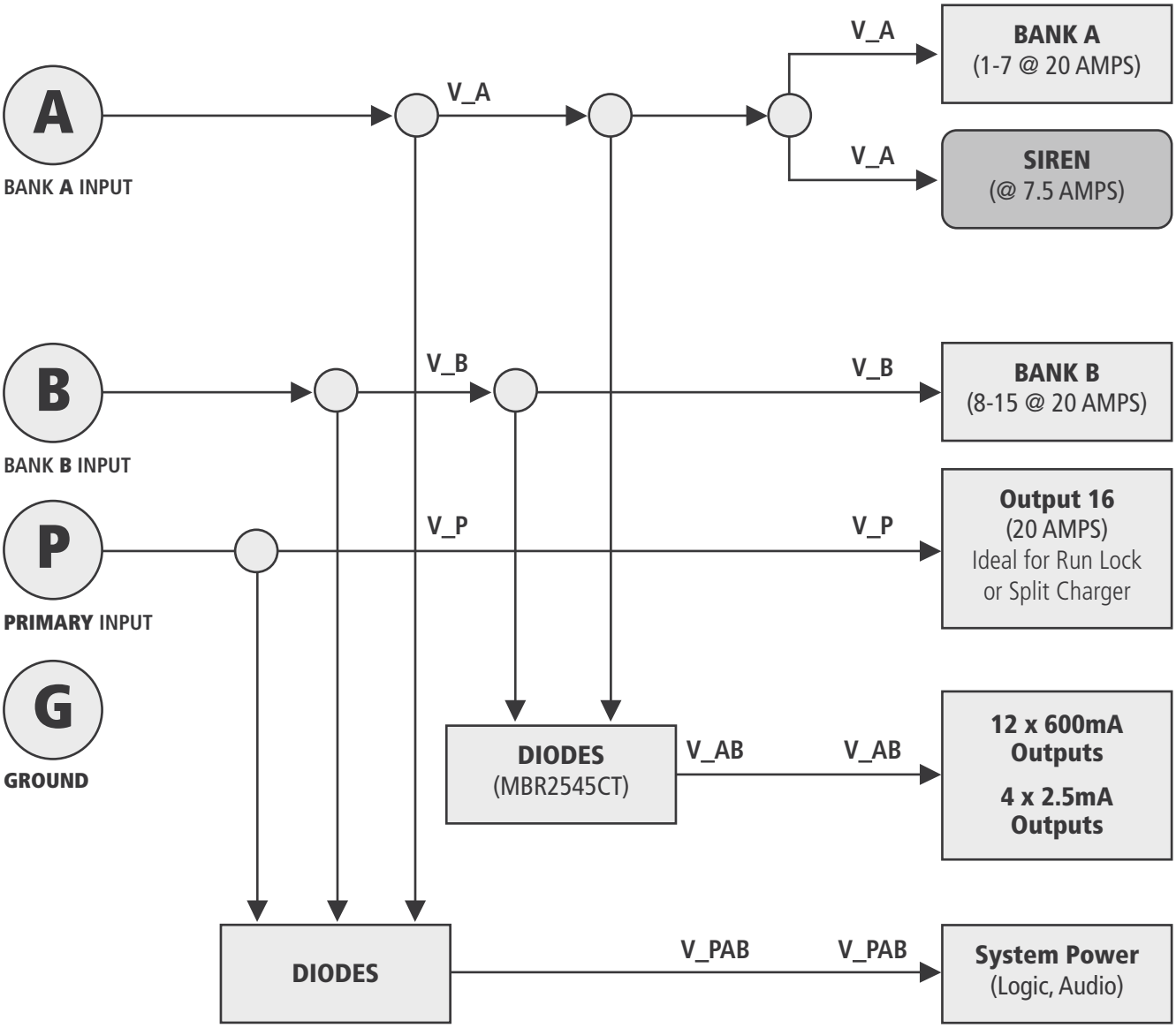
The parameters shown above should be defined by customers requiring RSG to assist with setting up a unique MCS-32 configuration file.

Completed By	Name	Company	Date

K : Programming the Universal Controller Plus (MCS-32)

K:3 **Power Distribution**

A typical sample of how power may be distributed within the MCS-32 to aid assigning outputs.



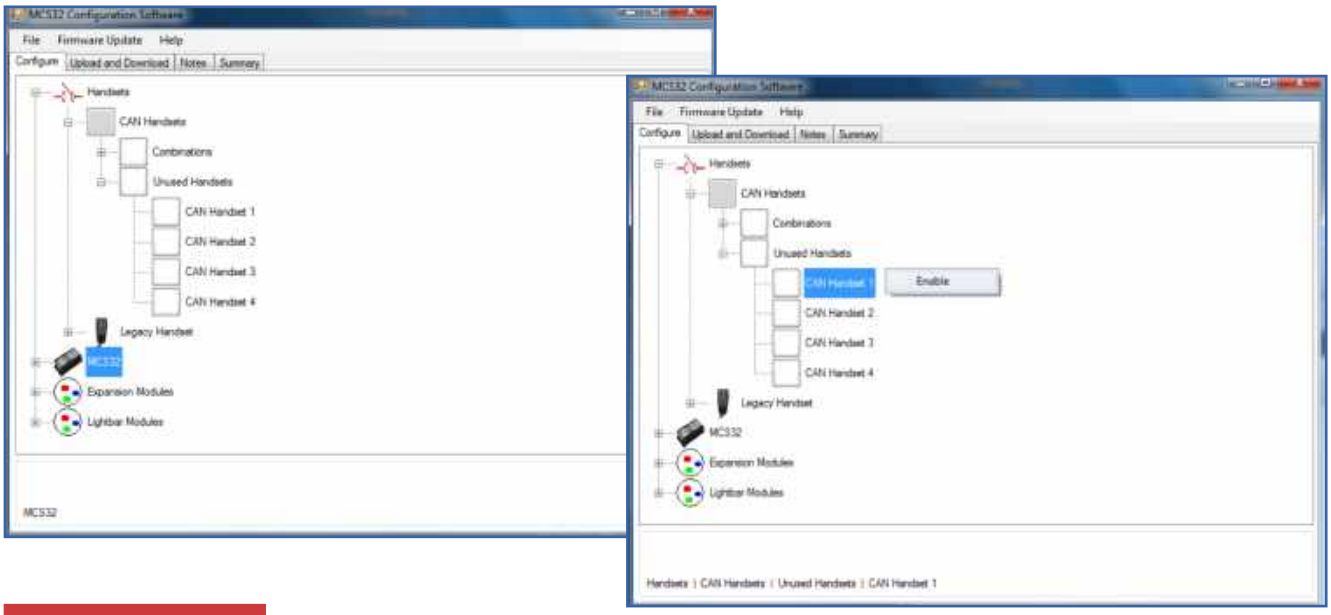
K : Programming the Universal Controller Plus (MCS-32)

K:4 User Interface - Handset Type

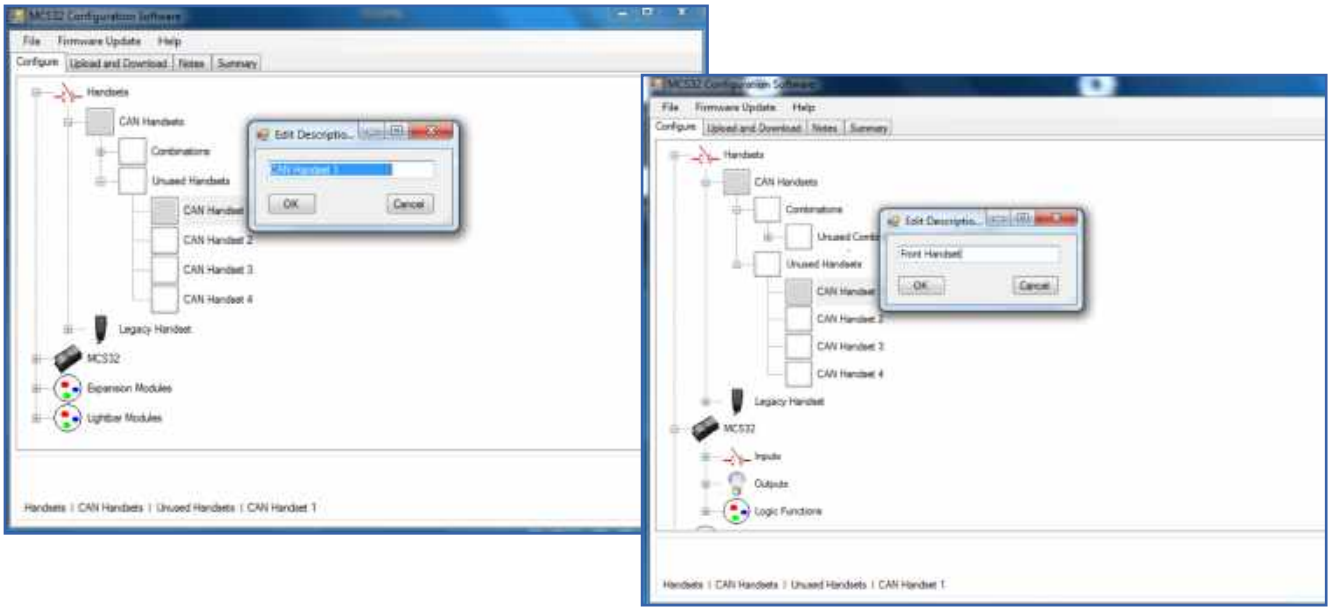
Following are the initial steps to set-up the MCS-32 and the corresponding handsets, leading on to a typical most complex function. However, as options are so vast and varied we recommend one of our training courses is attended.

Label and enable the system handset and then configure the device as shown in the example below.

Label and Enable



Configure

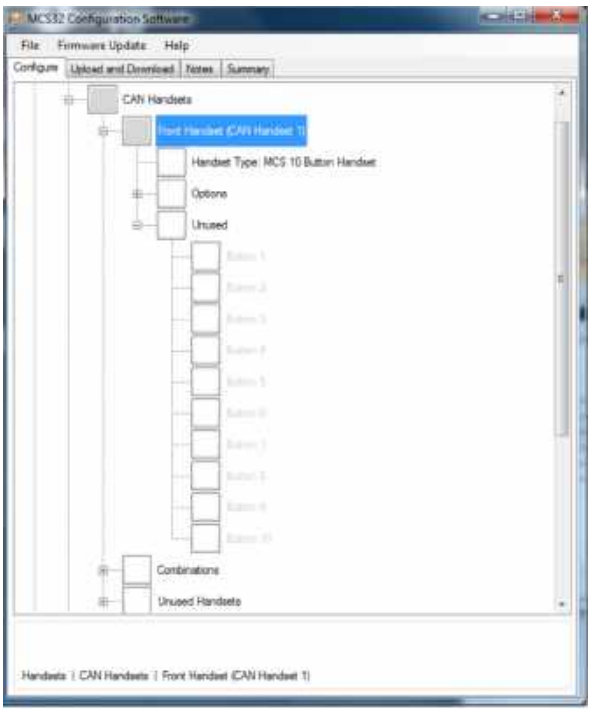


K : Programming the Universal Controller Plus (MCS-32)

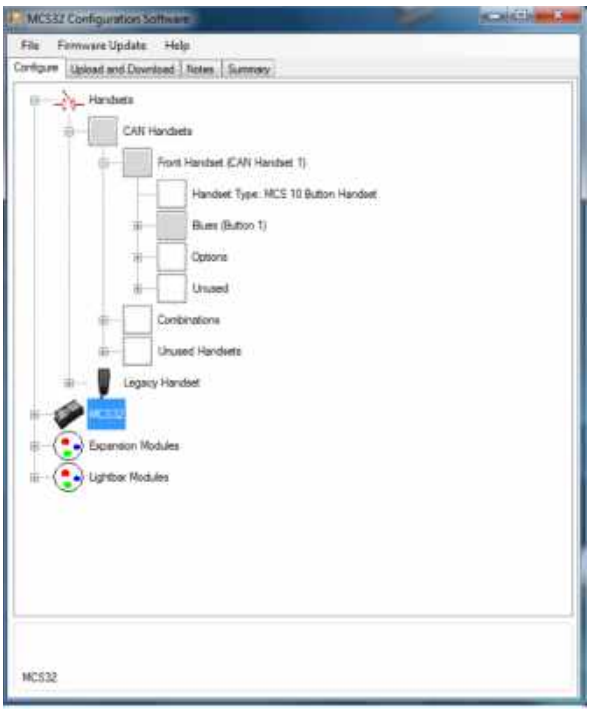
K:5 User Interface - Handset Buttons to MCS-32 Outputs

Set-up as shown in the examples below.

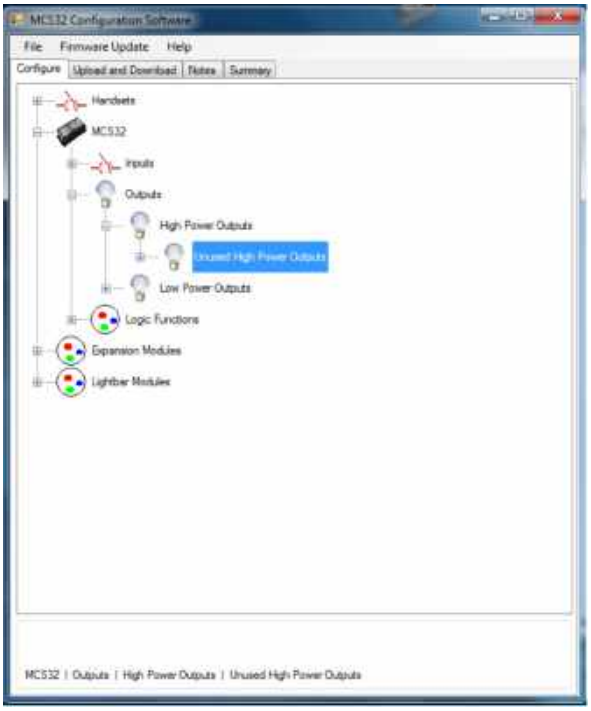
Configure Handset Buttons



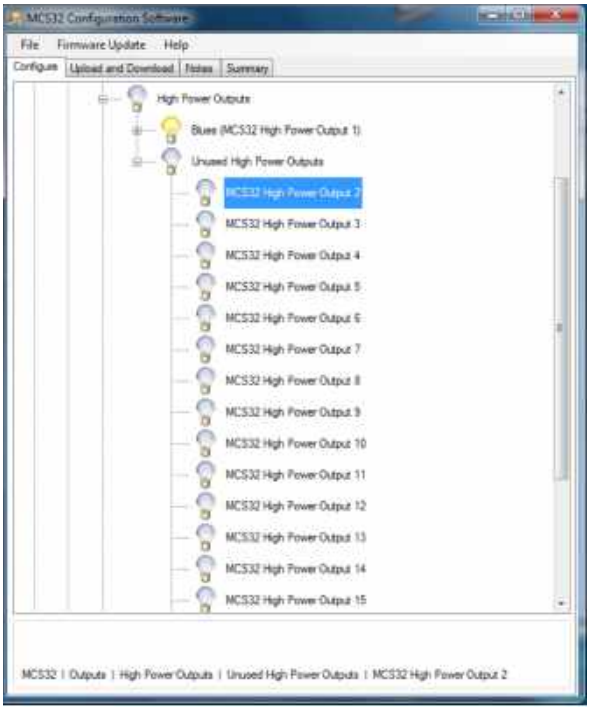
Label and Enable Handset Buttons



Configure MCS-32 Function



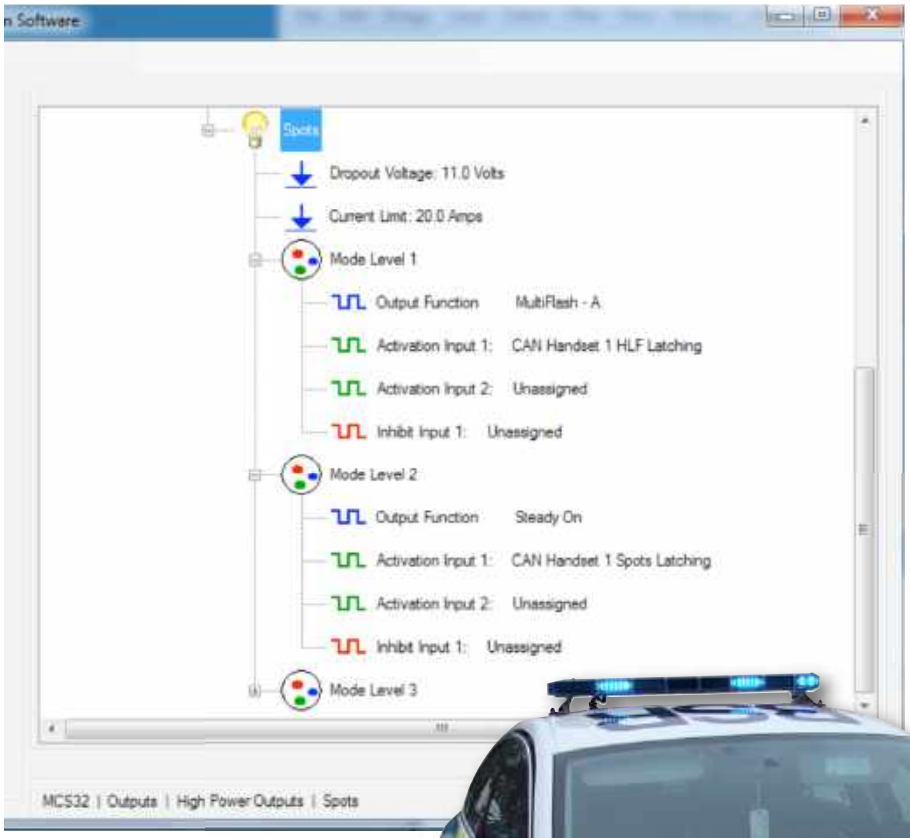
Label and Enable MCS-32 Outputs



K : Programming the Universal Controller Plus (MCS-32)

K:6 User Interface - Interactive Functions within the MCS-32

Configure



Options are so vast and varied it is recommended one of our training courses is attended - contact our sales department for details.

K : Programming the Universal Controller Plus (MCS-32)

K:7 Configuring Multiple Handsets - MCS-T8, MCS-T10, MCS-T16

The Universal Controller Plus (MCS-32) can be controlled by up to 4 Universal Multi-Way handsets. In order for a handset to be used with the MCS-32 it must be given a unique 'identity' on the system.

By default all Universal Multi-Way handsets are supplied as 'Handset 1'. Handsets 2, 3 and 4 must be re-configured.

Therefore, if you wish to use two or more handsets to control the MCS-32 these additional handsets must each be configured with their own 'identity'.

Please note that only MCS-T10 handsets and above are able to be programmed as the fourth handset.

Configuration of the handset is achieved by entering a numerical code using the handset buttons as shown here:

Step 1

- First, you need to orientate the handset so the lead is at the 6 o'clock position.
- Once the handset is in the correct orientation imagine that each row of buttons becomes a number.
- The bottom row of buttons are always row zero (**0**) regardless of the type of handset, the next row becoming one (**1**), two (**2**) and so forth travelling up the handset.

Step 2

- Ensure the MCS-32 is wired and powered up ready to accept the handset(s).
- Simultaneously press and hold down a button on row **0** and row **2**.
- Whilst holding these buttons down plug the handset you wish to configure into the MCS-32.

Step 3

- Once the handset is plugged into the MCS-32 release the buttons, the handset buttons will then all be illuminated in blue.
- Now enter the relevant code, one button at a time, using the handset buttons.
- For example **handset 2** would be row **0**, row **0**, row **2** and row **2**.

Handset 1 (default)	**0, 0, 2, 1**
Handset 2	**0, 0, 2, 2**
Handset 3	**0, 0, 2, 3**
Handset 4	**0, 0, 2, 4** (MCS-T10 handsets and above only)

Step 4

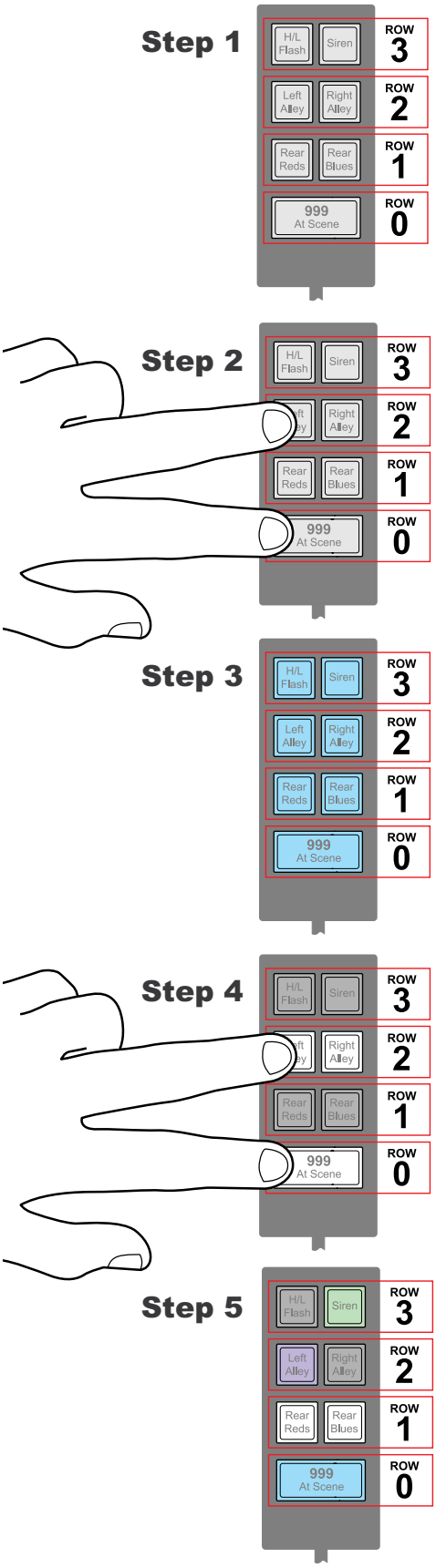
- Once you have entered the desired code row **0** and row **2** will illuminate in white.
- Simultaneously press both illuminated rows, this will save the configuration.

Step 5

- Once the configuration is saved the handset will illuminate as per your configuration within the MCS-32 software.

Note: Each stage may 'time-out' if this happens unplug the handset and start the process again from step 1.

The example below shows the configuration process for adding a second handset



K : Programming the Universal Controller Plus (MCS-32)

K:8 Configuring Multiple Handsets - MCS-T17

The Universal Controller Plus (MCS-32) can be controlled by up to 4 Universal Multi-Way handsets. In order for a handset to be used with the MCS-32 it must be given a unique 'identity' on the system.

By default all Universal Multi-Way handsets are supplied as 'Handset 1'. Handsets 2, 3 and 4 must be re-configured.

Therefore, if you wish to use two or more handsets to control the MCS-32 these additional handsets must each be configured with their own 'identity'.

Please note that only MCS-T10 handsets and above are able to be programmed as the fourth handset.

Configuration of the handset is achieved by entering a numerical code using the handset buttons as shown here:

Step 1

- First, you need to orientate the handset so the lead is at the 6 o'clock position.
- Once the handset is in the correct orientation imagine that each row of buttons becomes a number.
- The bottom row of buttons are always row zero (**0**) regardless of the type of handset, the next row becoming one (**1**), two (**2**) and so forth travelling up the handset.

Step 2

- Ensure the MCS-32 is wired and powered up ready to accept the handset(s).
- Simultaneously press and hold down a button on row **0** and row **1**.
- Whilst holding these buttons down plug the handset you wish to configure into the MCS-32.

Step 3

- Once the handset is plugged into the MCS-32 release the buttons, the handset buttons will then all be illuminated in blue.
- Now enter the relevant code, one button at a time, using the handset buttons.
- For example **handset 2** would be row **0**, row **0**, row **2** and row **2**.

Handset 1 (default)	**0, 0, 2, 1**
Handset 2	**0, 0, 2, 2**
Handset 3	**0, 0, 2, 3**
Handset 4	**0, 0, 2, 4** (MCS-T10 handsets and above only)

Step 4

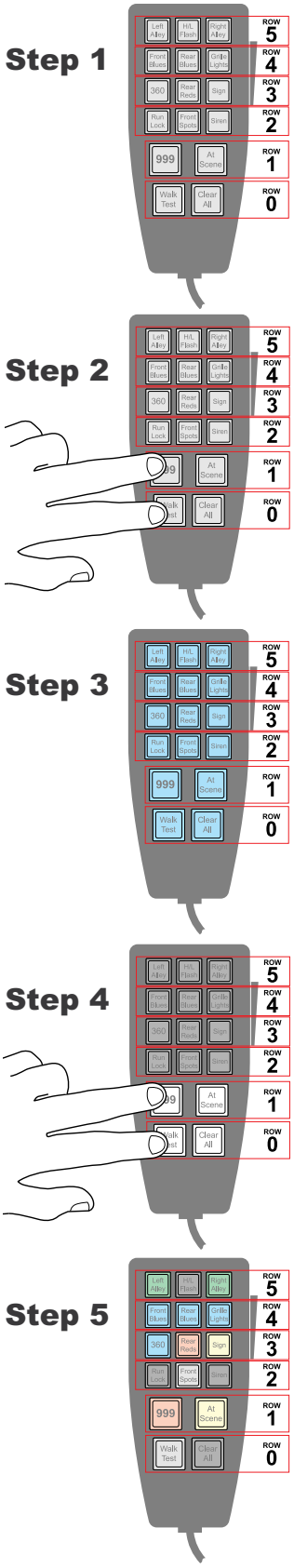
- Once you have entered the desired code row **0** and row **1** will illuminate in white.
- Simultaneously press both illuminated rows, this will save the configuration.

Step 5

- Once the configuration is saved the handset will illuminate as per your configuration within the MCS-32 software.

Note: Each stage may 'time-out' if this happens unplug the handset and start the process again from step 1.

The example below shows the configuration process for adding a second handset



UNIVERSAL CONTROLLER PLUS (MCS-32)

SECTION 2

Section 2 - Installation Guide

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1 : Specification

1:1 **Absolute Maximum Ratings**

- Supply Voltage : 12/24 Volt
- Supply Current : 40 Amps per power bank
- Standby Current : Typical : 55 milliamps (@13.8VDC, no peripherals attached)
  Max : 65 milliamps (@13.8VDC, no peripherals attached)
- Standby Temperature : -20 Deg C – 70 Deg C
- Operating Temperature : -20 Deg C – 50 Deg C

1.2 **Power**

- 2 x 40Amp DC pins on pluggable connector
  - These MUST be fused (fuse rating of 40Amps or less as the application requires).
- 1 x Ground / chassis connections
  - If the siren output is going to be used, the ground chassis line should be rated to handle 15 Amps or more
- The Primary Sense line is used to provide power to a single power output. This input should be protected with a fuse rated at 1 Amp

1.3 **Digital Inputs**

- 12 x Positive Switched
- 12 x Negative Switched

1.4 **Analog Inputs**

- Primary battery sense

1.5 **Analog Monitoring**

- Bank A voltage sense
- Bank B voltage sense
- Internal temperature monitor
- Output channel current monitors
- Siren system current monitor

1.6 **Outputs**

- 16 x High side current and voltage protected outputs
- 12 X Positive switching Monitor Outputs
- 4 x Positive or Negative switching Monitor Outputs
- 100W siren speaker output

1.7 **Communication**

- 1 x RS485 Communication
- 1 x Optilink input.
- 2 x CAN Bus 2.0

2 : Installation Requirements

2.1 Both the Bank A and Bank B supply lines MUST be fused (fuse rating of 40Amps or less as the application requires).

2.2 If the primary sense input is used, the input MUST be fused (fuse rating of 20Amps or less as the application requires).

2.3 **DO NOT** obstruct fan vents along the top, side or under surfaces of the MCS32. Do not install any equipment on top or underneath the MCS32.

The above installation requirement must be followed for safe operating and extended product lifetime.

3 : System Description

3.1 **Siren System**

The siren module supports 100W (8 Ohm or 11 Ohm) output speakers.

Using software, the Siren System can be configured for:

- PTT (Handheld Microphone Broadcast)
- Radio Rebroadcast
- HRT (Horn Ring Transfer) to enable and disable siren tones
  - Single Tap or Double Tap to Start modes
- 4 (Minimum) industry standard siren tones*, playable in any order
  - Wail
  - Yelp
  - Two-Tone
  - Pulsar
- City Mode
- Air Horn
- Test Mode (Low Power output, suitable for in-workshop testing)
- Bench Mode (Uses internal speaker for development testing on the work-bench)

*See Appendix B for the full comprehensive list of siren tones

3.2 **High Power Outputs.**

There are 16 positive switching outputs. The first 7 channels are banked collectively as Group A, and the second 8 channels are banked collectively as Group B. Group A and Group B can both source a maximum of 40 Amps each. Each channel can be programmed with individual over- current and under voltage protection. Channel 16 is sourced from the primary battery input.

Each output is independently capable of switching 20 Amps.

Using Software, the outputs can be configured for:

- Minimum Voltage Dropout (disables the output when the supply voltage drops below the set level)
- Maximum Current Protection (disabled the output when the output current exceeds the set current level for a period of time)
- Output Mode - A selection of flashing patterns is available.
- Enable Inputs
  - Up to 8 inputs can be selected to enable (turn on) the output. If ANY of the enable inputs is active, the output can turn on
- Inhibit Inputs
  - Up to 4 inhibit inputs can be selected the inhibit the output. If any of the inhibit inputs is active, the output will not be turned on. Inhibits take precedence over Enables.

3 : Sytem Description continued

3.3 **Low Power Outputs**

There are 12 negative or positive switching outputs and 4 negative or positive switching outputs. Each channel can be programmed with individual voltage protection. Positive (12V) power is sourced via a set of power diodes from either Bank A or Bank B supply inputs (whichever is higher in voltage).

With the exception of current limiting (there are none for the low power outputs), the features and configuration setup are exactly the same as for the High Power Outputs. See Above for more information.

3.4 **RS485 Serial Interface**

The MCS-32 currently supports the MHE RS485 remote handheld interface. All communication for programming the unit (either firmware updates or configuration settings) and done using this serial interface.

3.5 **CAN Bus Serial Interface**

The MCS-32 has two CAN2.0 full speed interfaces. The first interface is designated for local control using suitable MCS-32 compatible remotes, while the second is intended for bespoke vehicle communication. Consult with your installer for more information regarding these options.

3.6 **Audio Announcements and Volume Settings**

The MCS-32 has an internal speaker amplifier for making announcements to the vehicle occupants.

Please see the Software Modules: Battery Monitoring and Gateway Commander.

To set the volume levels for the MCS32, follow the following procedure:

1. Press and hold the MCS-32 Diagnostic Button on the side of the unit (this is located next to the System Connector)
2. While holding the MCS-32 Diagnostic Button, press and release the reset button (this is located just below the diagnostic button).
3. After approximately 5 seconds, the MCS-32 will beep once. Release the diagnostic button.
4. repeatedly press the diagnostic button to select the volume level required. The selected setting is shown on the diagnostic indicators LED's:
   1 Announcement speaker volume level setting.
   2 PTT microphone volume level setting.
   3 Radio rebroadcast volume level setting.
5. Once you have selected the desired volume setting to change, wait for a further 5 seconds. The MCS will beep again, and the top row will show the volume level for the selected setting.
6. Press the diagnostic button to increase the volume level, or press and hold to decrease the volume level.

3 : Sytem Description continued

3.7 **Diagnostics (Front label LED indicators)**

The MCS-32 has 24 diagnostic LED's on the top side of the unit, which can be used to assist the installer in finding faults, etc.

1 CAN1 and CAN2
- **a** OFF : The respective CAN port is not being used
- **b** RED : The respective CAN port has a fault condition
- **c** GREEN : The respective CAN port is working correctly

2 RS485
- **a** OFF : The RS485 port is not being used (has not been configured in software)
- **b** RED : The RS485 port has not detected a remote handset
- **c** GREEN : The RS485 has detected a working handset

3 PWM
- **a** OFF : The PWM port is not being used (has not been configured in software)
- **b** RED : The RS485 port has not detected a remote Optilink Handset
- **c** GREEN : The RS485 has detected a working Optilink Handset

4 STANDBY
- **a** SLOW PULSING GREEN : Unit has entered Standby Mode
- **b** OFF : Standby feature is not enabled
- **c** AMBER : If the Standby Mode is enabled the LED shows amber while the unit is timing down to Standby Mode
- **d** RED : Unit will not enter Standby Mode until active outputs are de-activated

5 SIREN
- **a** OFF : Siren has not been configured in software
- **b** SLOW PULSING GREEN : Siren is in low power standby mode (Not Enabled)
- **c** FAST PULSING GREEN : Siren is internally powered and ready to operate
- **d** GREEN : Siren Output is operating (speaker is sounding)
- **e** RED : Over-Current Safety - Siren System Disabled (Reset Required)
- **f** AMBER : Low Voltage Dropout (The siren is disabled because supply is too low)

3 : Sytem Description continued

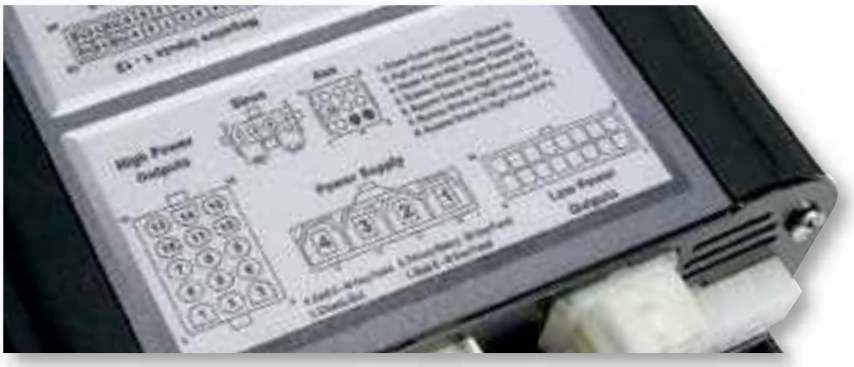
6 DIAG 1 and DIAG2. User Diagnostics.

Pressing the diagnostics button will scroll through several 'pages' of information that are reflected on LED's 1 - 16.

The DIAG1 and DIAG2 LED's are the key to which page is currently reflected on the LED's.

<table>
<tr><th>DIAG1</th><th>DIAG2</th><th>DISPLAY</th></tr>
<tr><td>OFF</td><td>OFF</td><td>High Power Outputs. LEDS 1 - 16 display the state of the outputs.
The following table defines the state of the output:
<table><tr><td>OFF</td><td>The output is not enabled</td></tr><tr><td>GREEN</td><td>The output is enabled (this does not show the flash pattern, only that the output is active)</td></tr><tr><td>AMBER</td><td>The output is enabled, but the supply voltage has dropped below the set level (Voltage Dropout)</td></tr><tr><td>RED</td><td>The output is disabled because of an excessive current fault</td></tr></table></td></tr>
<tr><td>GREEN</td><td>OFF</td><td>Low Power Outputs. LEDS 1 - 16 display the state of the outputs.
The following table defines the state of the output:
<table><tr><td>OFF</td><td>The output is not enabled</td></tr><tr><td>GREEN</td><td>The output is enabled (This does not show the flash pattern, only that the output is active)</td></tr><tr><td>AMBER</td><td>The output is enabled, but the supply voltage has dropped below the set level (Voltage Dropout)</td></tr></table></td></tr>
<tr><td>RED</td><td>OFF</td><td>Handset Inputs (RS485 or PWM)
LEDS 1 - 16 display the state of the inputs.
<table><tr><td>RED</td><td>The button is not pressed \ off</td></tr><tr><td>GREEN</td><td>The button is pressed</td></tr></table></td></tr>
<tr><td>OFF</td><td>GREEN</td><td>Positive Inputs (Inputs Connector)
LEDS 1 - 12 display the state of the inputs.
<table><tr><td>RED</td><td>The input is low (0V)</td></tr><tr><td>GREEN</td><td>The input is high (>4V)</td></tr></table></td></tr>
<tr><td>OFF</td><td>RED</td><td>Negative Inputs (Inputs Connector)
LEDS 1 - 12 display the state of the inputs.
<table><tr><td>RED</td><td>The input is low (0V)</td></tr><tr><td>GREEN</td><td>The input is high (>4V)</td></tr></table></td></tr>
</table>

4 : Wiring and Connections



4.1 **Power Inputs**

PIN	NAME	FUNCTION
1	Bank B	Power Supply to B-Bank Outputs
2	Ignition Sense	Power supply to Output 16, and input voltage sense for primary battery
3	Ground	System Ground \ Chassis
4	Bank A	Power Supply to A-Bank Outputs and the Siren

4.2 **Power Outputs**

PIN	NAME	FUNCTION	SUPPLY
1-8	Power Outputs		Bank A
9-15	Power Outputs		Bank B

4.3 **Auxiliary I/O's**

PIN	NAME	FUNCTION	SUPPLY
1	Output 16 Bypass Diode	Inline Diode from Output 16	
2	Power Output 16		Primary
3	Output 16 Bypass Diode	Inline Diode from Output 16	
4	N/C		
5	Bypass Diode	Bypass Diode to High Power Output 8	
6	Bypass Diode	Bypass Diode to High Power Output 7	
7	N/C		
8	Bypass Diode	Bypass Diode to High Power Output 10	
9	Bypass Diode	Bypass Diode to High Power Output 9	

4 : Wiring and Connections continued

4.4 **Configurable Outputs**

PIN	NAME	FUNCTION	CURRENT MAX
1, 2, 9, 10		Configurable Positive or Negative Data Outputs	2.5A*
3-8, 11-16		Positive Only Data Outputs	0.6A Continuous (1A peak) current per switch*

4.5 **System Connector**

PIN	NAME	FUNCTION
1	Reset	Connect to 12v to reset the MCS-32
2	Standby	When connected to chassis\ground, this input places the MCS-32 into a very low power mode. All functionality is suspended.

4.6 **Inputs**

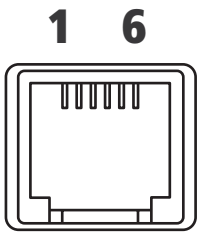
PIN	NAME	FUNCTION
1-12	Negative Inputs	User Defined
13-24	Positive Inputs	User Defined

4.7 **CAN Bus**

PIN	NAME	FUNCTION
1	Remote Power Output	12v Output for CAN Remotes. Protected with a 500mA resettable fuse
2	CAN 1 High	
3	CAN 1 Low	
4	Ground	
5	CAN 2 High	
6	CAN 2 Low	

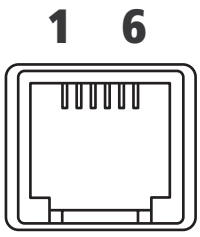
4 : Wiring and Connections continued

4.8 **RS485**



PIN	NAME	FUNCTION		
1 (Left)	Microphone Input			
2	Ground	Common		
3	A	RS485 Data		
4	B	RS485 Data		
5	12VDC	12v Supply	Output	250mA Max
6 (Right)	PTT Sw	PTT Active Low		

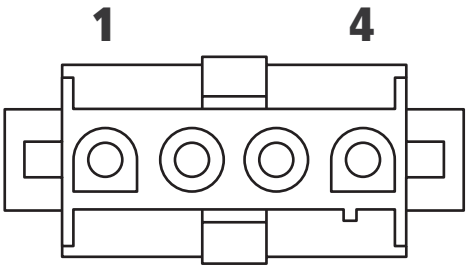
4.9 **PWM** (Obsolete in more current versions)



PIN	NAME	FUNCTION		
1 (Left)	Microphone Input			
2	Ground	Common		
3	A	Data		
4				
5	12VDC	12v Supply	Output	250mA Max
6 (Right)	PTT Sw	PTT Active Low		

4 : Wiring and Connections continued

4.10 **Speaker Outputs**



For connection to Siren Amplifier

PIN	NAME
1 (Left)	11 Ohm Speaker
2	11 Ohm Speaker
3	8 Ohm Speaker
4 (Right)	8 Ohm Speaker

4.11 **Audio**

PIN	NAME	FUNCTION
1 (Left)	Ground	Ground Connection for speaker
2	Speaker Positive	Speaker Connection for In-vehicle Announcements
3	Audio In Negative	From Radio Rebroadcast
4 (Right)	Audio In Positive	From Radio Rebroadcast

5 : Device Connections

5:1 MCS-32 Cables, Connectors and Adaptors

Cables and connectors that are supplied with the MCS-32 and are available to purchase as a spare complete kit or as individual items.

CABLE, CONNECTOR, ADAPTOR AND PIN KIT
REPLACEMENT PART NUMBER: 22-1508

6M CROSS OVER EXTENSION CABLE
REPLACEMENT PART NUMBER: 19-1346

CAN AUDIO SPLITTER ADAPTOR
REPLACEMENT PART NUMBER: 19-1396

CROSS OVER CABLE EXTENSION ADAPTOR
REPLACEMENT PART NUMBER: 19-1389

CONNECTORS AND PIN PACK
REPLACEMENT PART NUMBER: 22-1507

5:2 Cables, Connectors and Adaptors to Connect Microphone to MCS-32

Cables, connectors and adaptors supplied with the Universal Microphone and are available to purchase as spare parts.

HAND HELD MICROPHONE WITH PRE-AMP
REPLACEMENT PART NUMBER: UNI-MIC-005

IN-LINE JOINING PIECE
REPLACEMENT PART NUMBER: 19-1389

MICROPHONE CLIP KIT
REPLACEMENT PART NUMBER: ACC-242

MCS-32 'Y' SPLITTER
Links Microphone, handset and MCS-32
REPLACEMENT PART NUMBER: ACC-236

5 : Device Connections continued

5:3 Universal Devices Connections, Adaptors and Cables

Connectors and Pins compatible with MCS-32 and MCS-32S

Universal Controller Plus (MCS-32) Devices UNI-PLS-001
and Universal Controller Plus Slave (MCS-32S) Devices UNI-PLS-XXX

Connector Kit - MCS-032	Description	RSG Part Number	Farnell Part Number	Quantity	
				MCS-32	MCS-32S
Complete Connector Set	Full Set	22-1508	N/A	1	1
Part Connector Set Item Code 2011277	Pins and Plugs Only	22-1507	N/A	1	1
High Power Outputs	15-way Housing Crimp Socket	22-1407 22-1422	285-213 285-407	1 15	1 15
Siren Speaker	4-way Housing Crimp Pin	22-1409 22-1423	3422549 285-389	1 2	1 15
Aux Connector	9-way Housing Crimp Pin	22-1514 22-1515	143-211 9773800	1 9	- -
Power	4-way Housing 10 AWG Crimp Socket	22-1516 22-1449	307-5801 973-3132	1 4	1 4
Low Power Outputs	16-way Connector 22-18 AWG Crimp Socket	22-1411 22-1421	157-8475 81-6067	1 16	1 16
System	2-way Housing 22-18 AWG Crimp Socket	22-1046 22-1421	151-866 811-6067	1 2	2 2
CAN Bus Cable	CAN Audio Splitter	19-1396	N/A	1	1
Inputs	24-way Housing 22-18 AWG Crimp Socket	22-1495 22-1421	413-8417 811-6067	1 24	1 24
Audio	4-way Housing 22-18 AWG Crimp Socket	22-1037 22-1421	151-867 811-6067	1 4	- -

Microphones for use with MCS-32 Devices

General Description and Application	Item Code	RSG Part Number
MCS-32 Microphone with pre-amp (Compatible with legacy DIN adaptor) UNI-INT-001	2011274	UNI-MIC-005
Microphone for CVS-012 (complete with adaptor for manual inputs)	2011003	UNI-MIC-003
Microphone for CVS-012 (without adaptor for systems)	2011001	UNI-MIC-006
Microphone mounting kit - dash half - spare	Clip Bracket	13-1250
Microphone mounting clip - all types - spare	2011287	ACC-242

Programming Items for use with MCS-32 Devices

MCS-32 Device and Part Number	Item Description	Item Part Number	Quantity
Universal Controller Plus (MCS-32) - UNI-PLS-001 and Universal Controller Plus Slave (MCS-32S) - UNI-PLS-XXX	Programming CD Only (MCS-32) Programming Lead Only (MCS-32) Programming Lead and CD (MCS-32)	UNI-PRO-002 ACC-237 ACC-256	1 1 1
Universal Controller Lite (MCS-16) - UNI-LIT-001	Programming CD Only (MCS-16) Programming Lead Only (MCS-16) Programming Lead and CD (MCS-16)	UNI-PRO-002 ACC-XXX ACC-XXX	1 1 1
Universal Load Switch (MCS-5E) - UNI-LDS-002*	Programming Cable (MCS-5E)	ACC-248	1
Universal Lighting Breakout Controller (MCS-LBC) - UNI-LBC-001*	Programming Cable (MCS-LBC)	ACC-246	1
Universal 100w Siren (MCS-SE) - UNI-SIR-001*	Programming Cable (MCS-SE)	ACC-247	1
Basic Stand-alone 100w Siren (MCS-SSA) - PAA-167-03*	Programming Cable (MCS-SSA)	ACC-247	1
Audio Intercom Controller (MCS-AIC) - UNI-AIC-001*	Programming Cable (MCS-AIC)	ACC-XXX	1
Multi-Way Switch Units for MCS-32/CVS-012/MCS-6E*	Batch Programming Cable (MCS-32)	ACC-288	1
Multi-Way Switch Units for MCS-32*	Switch Unit Programming Cable (ACC-251)	ACC-251	1
Universal Compact Controllers (MCS-6E)*	Programming Cable (MCS-6E)	ACC-327	1

** Only issued to suitably trained and authorised resellers*

5 : Device Connections continued

Adaptors for use with MCS-32 Devices

General Description and Application	Item Part Number	RSG Part Number
MCS-32 Adaptor - Use with 2 x Switch Units or 1x Microphone and 1 x Switch Unit	2011269	ACC-236
MCS-32 CAN Fan Out Adaptor - RJ Socket to 6-way Molex	2011048	ACC-282
MCS-32 CAN Adaptor - RJ Socket to 6-way Male to 6-way Female Molex	2013007	ACC-284
MCS-32 CAN 'T' Adaptor - MCS-5E 2-way to 6-way Female Molex	2013003	ACC-278
Adaptor for CAN Handsets + MCS-32/MCS-SE + Microphone	2011040	19-1389
CAN/Audio Splitter (supplied with MCS-32)	2011257	19-1396
Handset to CVS-012 Adaptor	2012001	19-1409
Hub - Handset Adaptor	2015002	19-1447
CVS-012 Legacy Devices Adaptor	2011016	22-1468
RS485 Early Adaptor for Universal Handset 16-way Switch (supplied with switch)	2011021	24-1064
Legacy DIN Switch Unit Adaptor RJ45 with Fist Microphone Socket for CVS-012 (ODPAM)	2912049 (Original)	UNI-INT-001
Legacy DIN & Link Switch Unit Adaptor RJ45 with Fist Microphone Socket for CVS-012 (ODPAM2)	2912049 (New)	UNI-INT-002
CAN Handset/Microphone/RS485 Splitter Adaptor	2013051	ACC-309
Siren Reduction (from 100 t o 60 watts) Transformer for all MCS-32 Sirens	2013055	ACC-308

Cables for use with MCS-32 Devices

General Description and Application	Item Code	RSG Part Number
0.2m Cross Over Cable use with ACC-236 Adaptor	RSG Part Number	19-1393
1.5m Cross Over Cable General System Extension	RSG Part Number	19-1388
2.0m Cross Over Cable Microphone or Switch Unit Extension for MCS-32 and CVS-012	2011039	19-1394
6.0m Cross Over Cable as supplied with MCS-32 and CVS-012	2011017	19-1346

Sundry items for use with MCS-32 Devices

General Description and Application	Item Code	RSG Part Number
Molex Crimp Tool 16 to 24 AWG	RSG Part Number	45-1005
Extraction Tool for Molex Crimp Terminals	RSG Part Number	45-1006
Midi Handset (T10) Rubber Surround - Spare	2011232-QFT	ACC-316
Midi Handset (T10) Quick Fit Rubber Shroud - Spare	2011232-SHD	ACC-325
Handset Hub	MCS-MHH MCS-32M	ACC-327

BMW Specific Items for use with MCS-32 Devices

General Description and Application	RSG Part Number
BMW Complete Interface Loom for MCS-32 with instructions, Resistor Pack and Adaptor	KIT-156
BMW Interface Loom Only - Spare	19-1432
BMW Resistor Pack for Interface Loom	22-1558
Siren Reduction (from 100 to 60 watts) Transformer for all MCS Sirens	ACC-308