DG3 Destination Controller

Installation and Operating Manual

(Software version V1.51.00)

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540846-19

Revision History

Revision	Date	Notes
540846-16	26/05/2022	Updates of: Software version (V1.44.01 to V1.45.02), Model variants, Appendix E: Configuration Code Options (MSPX), Appendix F: CONFIG.INI file (FTP_PORT) Update of: Software version (V1.45.02 to V1.46.02)
540846-17	25/11/2022	Updates of: Software version (V1.46.02 to V1.47.01), Identification, Appendix E: Configuration Code Options (RS) Updates of: Software version (V1.47.01 to V1.48.05), External inputs I0, I1 and I2 (1A, 1B, 1C)
540846-18	02/06/2023	Updates of: Software version (1.48.05 to 1.49.02), DG3 Variants, Appendix F: CONFIG.INI file (BUS_PROFILE_NUM_RESET) Updates of: Software version (1.49.02 to 1.50.01), Appendix B: System Options (SST), Appendix C: Protocols – Port Options (IBIS-LTA and **Note added)
540846-19	13/11/2023	Updates of: ISO 9001 & ISO 14001 logos Software version (1.50.01 to 1.50.05), Appendix F: CONFIG.INI file Software version (1.50.05 to 1.51.00), Appendix E: Configuration Code Options (QG)

Please note that this document is subject to continual updating: please ensure you are using the latest edition.

This edition: **13 November 2023**

CONTENTS

GLOSSARY

Explanations relate to the use of the word in this manual and other Hanover publications; the word or phrase may have other meanings elsewhere.

bootloader - the section of software a device runs when powered up that is responsible for starting the main application and for allowing software updates

browse - move up / down a list of options in order to find the desired item

controller - on-bus device used by the driver to populate destination displays with text and graphics which have been prepared using HELEN software

cycle - in the context of "cycling the power": a reference to the action of turning a piece of equipment off (cutting the power to it) and then on again

data loader - early destination controllers were able to be used to load other destination controllers with data; the DG3 simply uses a USB FLASH memory drive.

database - information uploaded to a destination controller from a standard PC using HELEN sign-editing software. Includes destination / route number information, advertising and other service information (e.g emergency announcements, school bus messages etc.)

DERIC - **D**iminished **E**lectronic **R**oute **I**ndicator **C**ontroller

(destination) code - the number used to identify a particular destination from a list. Each code must be unique within the list and can contain up to 10 alphanumeric characters. It is the code to be entered on the driver's destination controller

(destination) list - an electronic list of information for one or more routes / destinations specified by the HELEN software and deployed via a destination controller on a destination display

display - sign

EEPROM - type of memory chip that retains its data when its power supply is switched off

ERIC - **E**lectronic **R**oute **I**ndicator **C**ontroller

Hancis - The Hancis Audio Video Computer provides the operator with video, audio and GPS within a single unit and can be placed anywhere within the vehicle. It can be interfaced to TFTs which give high quality display and functionality for on-bus passenger information

HELEN - **H**anover **E**xtended **L**ist **E**ditor for Destinatio**N** Displays - a software tool used to create and edit text, graphics and destination lists on a pc as they will appear on a Hanover destination display

HTC - **H**anover **T**ransport **C**omputer - a location aware media player specifically designed for use within the public transport passenger information sector

IBIS - communications standard - mostly used on buses with German equipment

I/P - Input

J1708 - communications standard

LED - light-emitting diode: most Hanover destination displays use LED technology

Mini fit (connector) - two-piece pin and socket interconnection where cylindrical spring-metal pins fit into cylindrical spring-metal sockets. The pins and sockets are held in a rectangular matrix in a nylon shell.

multi-drop - connection of several devices to a single communication or power line (in 'daisy chain' configuration)

O/P - Output

PCB - Printed Circuit Board

RS485 - the main electrical communications standard used for communications between destination displays and controller

RTC - **R**eal **T**ime **C**lock

RX - reception channel of serial port

sign - equipment used to present text and graphics for viewing by passengers, usually located on the front, side or rear of, or inside a bus

Super-X - display control language for determining the way text is presented on a destination display

TX - transmit channel of serial port

UTC - Coordinated Universal Time: the primary time standard by which the world regulates clocks and time. It is one of several closely related successors to Greenwich Mean Time (GMT). For most purposes, UTC is synonymous with GMT

1. Introduction

1.1 General

The best understanding of Hanover's DERIC Generation 3 (DG3 for short) destination controller will be gained by reading the complete manual - but this is not always practicable for the user. The document has therefore been written in a modular fashion in order to allow users to refer only to those parts of it they need: topics should thus appear relatively self-contained. However, there are several useful cross-references, both to other points within this manual, to other Hanover manuals and to external documents as appropriate. Accordingly, when consulting this document using a pdf reader, it is helpful to have the 'Back' (or 'Previous') and 'Next' (or 'Skip' / 'Forward') buttons enabled to obtain maximum benefit from the intra-document cross-references. For example, in Adobe Reader, press F8 to view the toolbar if it is not already visible. Right-click on a blank section of the toolbar and, in the 'Page Navigation' menu, please ensure that 'Previous View' and 'Next View' are ticked.

Reference is made to the LED destination displays and to the HELEN software used with the DG3: detailed manuals are available for these from Hanover.

Destination displays for buses and coaches are normally used on the front, side and rear of the vehicle. This practice is so widespread that Hanover often uses 'front, side and rear' to describe equipment used in those positions. However, it is important to stress that any destination display can be used anywhere on a vehicle, subject to the relevant electrical / communications connections being made.

Information about the location of the destination controller is provided in section 2.1 Fitting the destination controller.

1.2 Scope of this manual

This manual covers the installation and operation of the Hanover DG3 destination controller. It also has troubleshooting and FAQs sections which address the more common problems and queries.

Manual covers	
Section 1	Introduction to the manual (also contains technical information for the destination controller) and the DG3
Section 2	Installation
Section 3	Operation
Section 4	Troubleshooting
Section 5	FAQs which address the more common problems and queries
Manual does not cover	
The destination or in-bus destination displays themselves: • The installation and service of the destination displays: for more details, please refer to the **LED destination display - installation and service manual (ref. 540156)** • Technical specification for individual destination displays: this is provided separately for each variant	
The use of the HELEN sign-editing software for composing messages for the destination displays: for more details, please refer to the **HELEN sign-editing software - operating manual (ref. 540125)**	

Hanover produces many bespoke and custom systems - for example, with special wiring adaptations or software features. The DG3 destination controller will work well as part of a networked system (including with

third-party hardware) but users are advised to consult their system-specific documentation and / or consult Hanover (please refer to section 4.3 Hanover Technical Support) where necessary.

1.3 Brief history of Hanover destination controllers

Year	History
1989	The first ERIC (**E**lectronic **R**oute **I**ndicator **C**ontroller) had an extensive keypad and four serial ports.
1991	The original and black front DERIC (**D**iminished **E**lectronic **R**oute **I**ndicator **C**ontroller) was introduced with 128k flash memory, later expanded to 1Mb.
1999	The grey front DERIC+ was introduced. As a more versatile destination controller, it boasted faster loading and could also be used as a data loader. The DERIC+ deployed a standardised communication plug-in and allowed firmware updates directly via a serial port instead of having to change an EEPROM.
2003	Similar in many respects to the DERIC+, the ERIC+ introduced a graphic display to destination controllers and could be supplied with a 4Mb memory.
2005	The ERIC++ had the same features as the ERIC+ but contained a different and faster processor.
2011	The DG3 (DERIC Generation 3) was introduced, bringing a larger (more pixels) graphic display and USB connectivity. It worked across a wider voltage range (9-36V) than the DERIC (24-36V). An extra key was added to the front panel and it was generally easier to use. The DG3 cannot be used as a data loader however, although the USB facility renders the loss of this feature largely irrelevant.
2014	The arrival of the EG3 (ERIC Generation 3) heralded USB connectivity for the ERIC destination controllers' family, has up to four secondary communications ports and a still faster processor. It also has Ethernet connectivity.
2020	The EG4 (ERIC Generation 4) was introduced. It is an advanced user terminal incorporating a touchscreen graphical user interface, single zone audio announcement capability combined with a variety of serial interfaces and radio options specifically designed for use in the public transportation industry.

1.4 System overview

The DG3 is a compact and powerful unit that controls how the information is presented on destination and in-bus destination displays located on buses and coaches. An on-board computer can also be used to deliver full colour, high resolution pictures, video clips and announcements. The destination controller has a key panel operation with all configuration settings hidden behind a user-programmable lock code. The DG3 can be used to show route / destination details, advertising and other information, all programmed using the HELEN sign-editing software. It can also be connected to (work with) other items of on-board equipment.

Figure 1 - diagram showing typical destination controller / displays configuration. Each unit is powered individually.

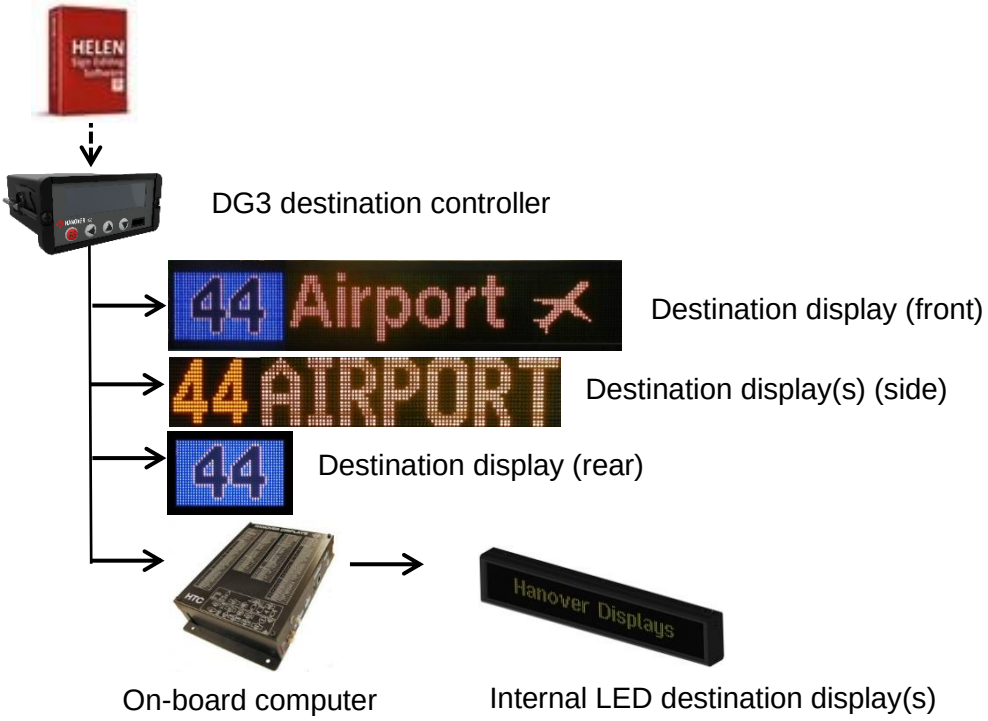


Figure 2 - diagram showing a communications network which includes an on-board computer

A database of information for all destination displays within a system is created on a standard Windows PC, using HELEN software. The database is then uploaded to the destination controller. Each destination display has a processor with an address switch that is associated with the configuration for that destination display set within HELEN. This allows it to receive the appropriate information via the DG3 which is connected to the destination display by a multi-drop communications network.

Note that any DG3 configuration parameters set in HELEN that are loaded into the destination controller will be overwritten by any manual changes to those parameters made later directly via the destination controller itself. Further list downloads will overwrite such manual changes if the configuration option is selected when exporting the list from HELEN.

Note also that any manual alterations that conflict directly with HELEN-programmed parameters should be avoided as the results are unpredictable.

Full technical details are provided in section 3 Operation.

1.5 Identification

The destination controller's identification can be determined from the silver label on the casing of the destination controller or the destination display depending on the installation.

In addition to identifying the model, it may be necessary to determine the software version installed, especially for technical support queries. To ascertain the version in use, go to 'Show status' in section 3.5.1 Status options.

1.5.1 Product label (Pre July 2022)

Figure 3a – silver label (pre July 2022) on casing of destination controller

Features	Meaning	Description
Product no.	Product number	Identifies the specific model and is explained in section 1.5.3 Model variants.
Position	-	Indicates where the destination controller is likely to be fitted on the vehicle.
Type	-	Installation type.
Our order no.	Our order number	Number used for internal use by Hanover.
Your O/N	Your Order Number	Number used to identify the order for this destination controller.
Your Part no.	Your Part number	Specific to each destination controller.
S/N	Serial Number	Specific to each destination controller.
End User	-	Is generally the ultimate operator of the vehicle.
Builder	-	References the name/customer to which the product is shipped.
Job reference	-	For the use of builder or end user.
Manufactured	-	Date when the finished destination controller is available for shipment after all checks, tests and approvals are complete.
Made in the UK	-	Shows the country of manufacture of the destination controller.
Exx-yyR-zznnnn	United Nations Standard Type Approval (EMark) number	xx = country code. yy = regulation number. zz = regulation revision number. nnnn = approval certificate number.

1.5.2 Product label (Post July 2022)

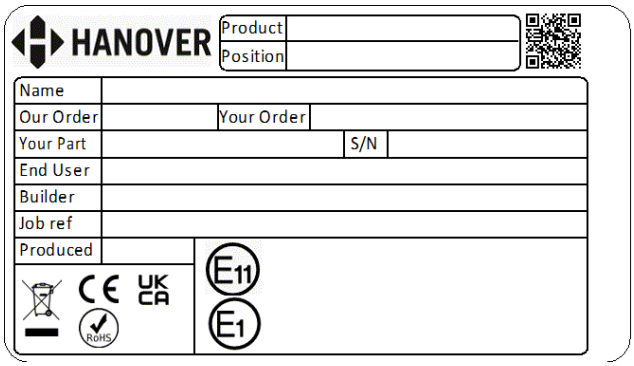


Figure 3 – silver label (post July 2022) on casing of destination controller

Features	Meaning	Description
Product	Product number	Identifies the specific model and is explained in section 1.5.3 Model variants.
Position	-	Indicates where the product is likely to be fitted on the vehicle.
QR Code	-	Serial number of product.
Name	-	Name of product e.g. size, colour etc.
Our Order	Our order number	Number used for internal use by Hanover.
Your Order	Your Order Number	Number used to identify the order for this product.
Your Part	Your Part number	Specific to each product.
S/N	Serial Number	Specific to each product.
End User	-	Is generally the ultimate operator of the vehicle.
Builder	-	References the name/customer to which the product is shipped.
Job ref	Job Reference	For the use of builder or end user.
Produced	-	Date when the finished product is available for shipment after all checks, tests and approvals are complete.
	-	WEEE (Waste Electrical and Electronic Equipment) logo = Dispose of appropriately. Do not dispose of with ordinary refuse – on all products. CE = conforms; can be sold in EU. RoHS = product contains no hazardous substances. UKCA = same as CE but for Great Britain.

Features	Meaning	Description
Exx-yyRaa-bb-nnnn-zz	The United Nations Economic Commission for Europe (UNECE) for automotive industry Regulation approvals mark	xx = country code of certifying body. yy = regulation number. aa/bb = revision of regulation. nnnn = approval certificate number. zz = approval revision number (if any).
	UNECE Reg 10	Exx-**10R**aa-bb-nnnn-zz Conforms to the Electromagnetic Compatibility requirements of the vehicles and electronic sub-assemblies (ESAs) used in automotive industry.
	UNECE Reg 118	Exx-**118R**aa-bb-nnnn-zz Conforms to the requirements of the Burning Behaviour of Materials used in the interior construction of certain categories of motor vehicles.

1.5.3 Model variants

1.5.3.1 Standard variants

The DG3 destination controller has a product number of **DG3 AA B C** where:

- **AA** indicates the build variant
- **B** indicates the secondary communications variant
- **C** indicates other options

At present, the standard variants are as follows:

AA	
01	base build with standard features
02	as base build plus RTC, secondary USB, power over USB, digital O/P and isolated digital I/P
03	as base build plus RTC, secondary USB, power over USB, digital O/P, isolated digital I/P and Ethernet interface
04	terminal mode (for connecting to HTC)
B	
0	none
1	RS232
2	not used
3	RS485 or RS422
4	isolated RS485
5	IBIS slave
6	J1708
7	RS232 (3V)
8	TTL passthrough
C	
0	none
1	no fixing clamp

1.5.3.2 Special variants

The DG3 destination controller has a product number of **DG3 AA B C** where:

- **AA** indicates the build variant
- **B** indicates the secondary communications variant
- **C** indicates other options

At present, the special variants are as follows:

AA	
05	onion variant
B	
0	none
C	
0	ITxPT application
1	init ISI application
2	HanIP application

1.5.3.3 DG3 variants

The table below shows the list of available DG3 variants.

- Hanover OS

DG3 Variants	RS485 (Sign)	Comms I/F1	Isolated digital Input	Digital Output	Ethernet	RTC	Notes
DG3 01 0 0	✓	-	✓ x2	✓ x1	-	-	
DG3 01 0 0 AUS	✓	-	✓ x2	✓ x1	-	-	
DG3 01 1 0	✓	RS232	✓ x2	✓ x1	-	-	
DG3 01 3 0	✓	RS485/422	✓ x2	✓ x1	-	-	
DG3 01 4 0	✓	Isolated RS485	✓ x2	✓ x1	-	-	
DG3 01 5 0	✓	IBIS Slave	✓ x2	✓ x1	-	-	
DG3 01 6 0	✓	J1708	✓ x2	✓ x1	-	-	
DG3 01 7 0	✓	RS232 (+23V)	✓ x2	✓ x1	-	-	
DG3 01 8 0	✓	TTL Pass-through	✓ x2	✓ x1	-	-	
DG3 02 0 0	✓	-	✓ x2	✓ x1	-	✓	
DG3 02 1 0	✓	RS232	✓ x2	✓ x1	-	✓	
DG3 02 3 0	✓	RS485/422	✓ x2	✓ x1	-	✓	
DG3 02 4 0	✓	Isolated RS485	✓ x2	✓ x1	-	✓	
DG3 02 5 0	✓	IBIS Slave	✓ x2	✓ x1	-	✓	

DG3 Variants	RS485 (Sign)	Comms I/F1	Isolated digital Input	Digital Output	Ethernet	RTC	Notes
DG3 03 0 0	✓	-	✓	✓	✓	✓	
			x2	x1	1xM12		
DG3 03 1 0	✓	RS232	✓	✓	✓	✓	
			x2	x1	1xM12		
DG3 03 3 0	✓	RS485/422	✓	✓	✓	✓	
			x2	x1	1xM12		
DG3 03 5 0	✓	IBIS Slave	✓	✓	✓	✓	
			x2	x1	1xM12		
DG3 03 5 1	✓	IBIS Slave	✓	✓	✓	✓	No fixing clamp
			x2	x1	1xM12		
DG3 03 6 0	✓	J1708	✓	✓	✓	✓	
			x2	x1	1xM12		

- Linux OS

DG3 Variant	RS485 (Sign)	Comms I/F1	Isolated digital Input	Digital Output	Ethernet	RTC	Notes
DG3 05 0 2	-	-	✓	✓	✓	-	
			x2	x1	1xM12		

1.6 Destination controller overview

1.6.1 Front view

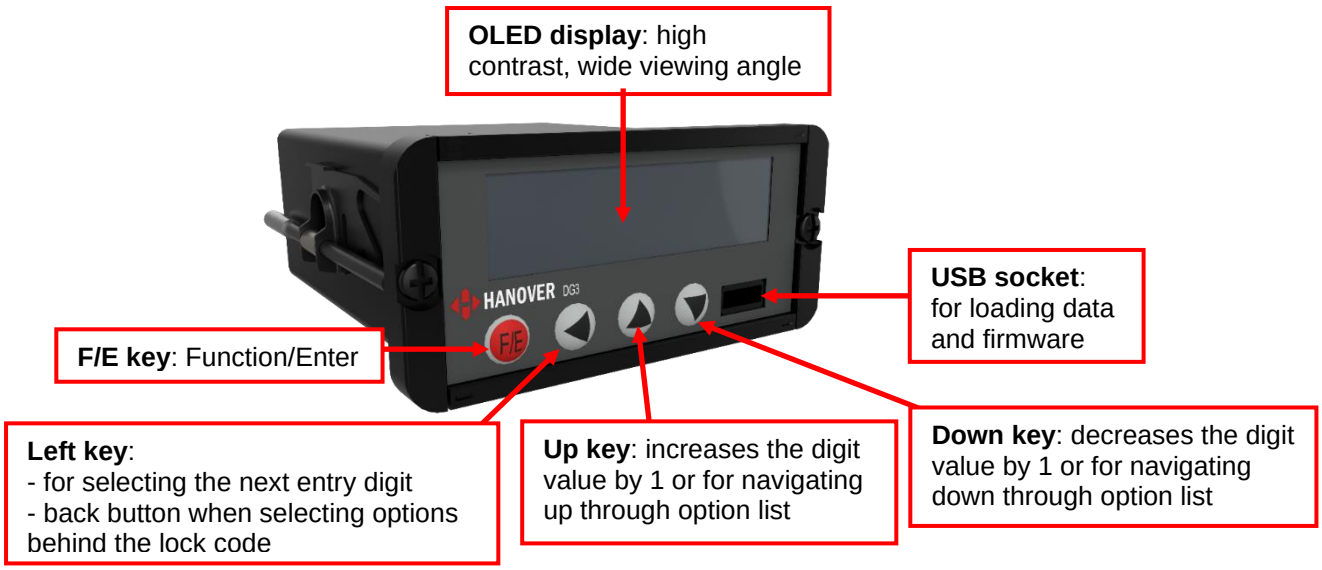


Figure 4 - diagram showing the front side of the destination controller

Notes:

- Auto-screen dimming to reduce driver glare and prolong unit life. The dimming feature activates automatically a few seconds after the unit has been left idle.
- Highlighting of selected function helps the operator to select the required option with ease.
- 8Mb internal flash memory ensuring it is capable of meeting the future requirements of the transport industry, with the ability to store large lists alongside complex firmware.
- Internal piezo sounder.

1.6.1.1 Example of an OLED display

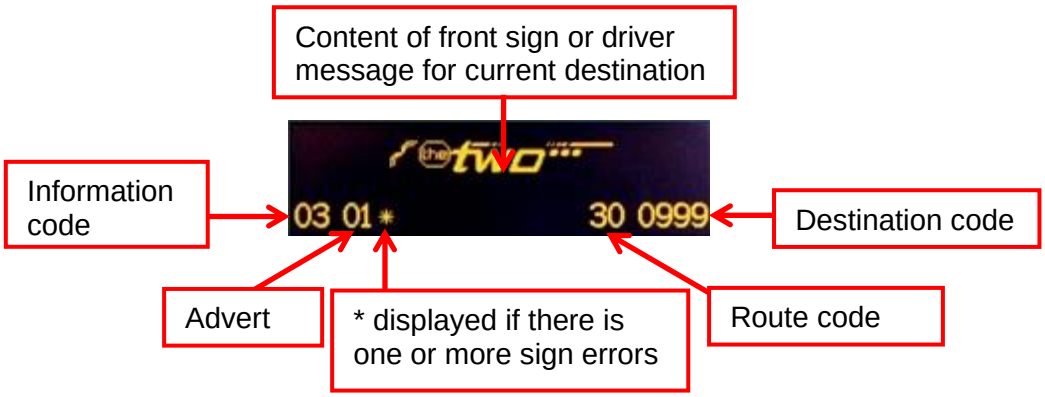


Figure 5 - diagram showing an example of OLED display

1.6.2 Rear view

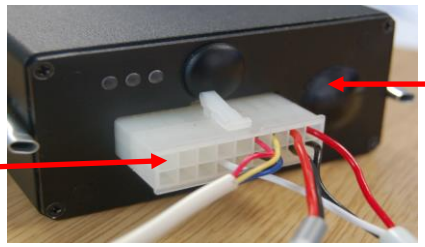


Figure 6 - diagram showing the rear side of the destination controller

1.7 Technical information

1.7.1 Specification

Specification	Values / Description
Case dimensions	W105mm x H48mm x D121mm
Mounting	Dashboard / panel using DIN clamps or screw fixing
Cut out required	W92mm x H45mm
Depth required (behind panel)	140mm minimum
Screen dimensions	71mm x 19mm OLED
Screen display	high resolution 256 x 64 pixels with one, two or three lines of text
Weight	0.37kg
Operating voltage	9-36Vdc
Typical power consumption	0.05A @ 24Vdc in testing signs mode (approx. 1.2W)
Operating temperature range	-20°C to +60°C

1.8 System supply voltages

All Hanover 24V devices are suitable for the full voltage supply range found on vehicles with a 24V battery. Some Hanover destination displays and controllers are compatible with 12V systems. For supply voltage details, please refer to the technical information for a specific product.

2. Installation

2.1 Fitting the destination controller

Standard positions for the destination controller are:

- on the dash, to the right or left-hand side
- in the destination display pod
- above or below the driver's window.

Care must be taken to ensure enough space is provided at the rear of the destination controller unit for the power and communication cables.

It is important to mount the destination controller in a suitable position for the driver for best access and visibility.

Position	Advantages	Disadvantages
Above or below the driver's window or above the windscreen in the destination display pod	This area usually has sufficient space to accommodate the destination controller and the cabling. It also allows easy access for maintenance.	Awkward for drivers to operate and difficult for them to view.
Left or right on the dash	Good visibility and access. Wiring and servicing is normally straightforward.	Difficult to find sufficient depth of space on modern vehicles.
Below the pod above the driver's head	Good visibility and access. Wiring and servicing are normally straightforward.	Possible water damage if window is opened.

The controller is not waterproof. Do not position the unit where it is likely to come into contact with water / moisture - for example, under an opening window.

Water ingress is not covered by the product warranty.

Warning: Drivers should never attempt to operate the controller whilst driving.

2.2 System wiring

The destination controller should be connected after the master switch but before the ignition switch such that the vehicle engine need not be running for the destination controller to work. However, should the user only need it to be operative whilst the engine is running, the DG3 can be inserted after the ignition switch.

2.2.1 Power and communication

Power and communication connections to the DG3 destination controller are by means of an 18-way mini fit connector found on the rear of the destination controller. If a DERIC+ or an ERIC++ was fitted before and was to be replaced by a DG3, an adaptor cable CX330K, CX330X or CX330N can be used. The standard length of the spiral cable wrap is 200mm. However, it can be customised according to the customer's needs. Please refer to section 2.2.2.1 CX330K – For replacing a DERIC+ destination controller when replacing a DERIC+ or to section 2.2.2.2 CX330X OR CX330N – For replacing an ERIC++ destination controller when replacing an ERIC++.

2.2.2 Adaptor cable

2.2.2.1 CX330K – For replacing a DERIC+ destination controller

The CX330K adaptor cable allows the DG3 to replace a DERIC+ destination controller in an existing installation.

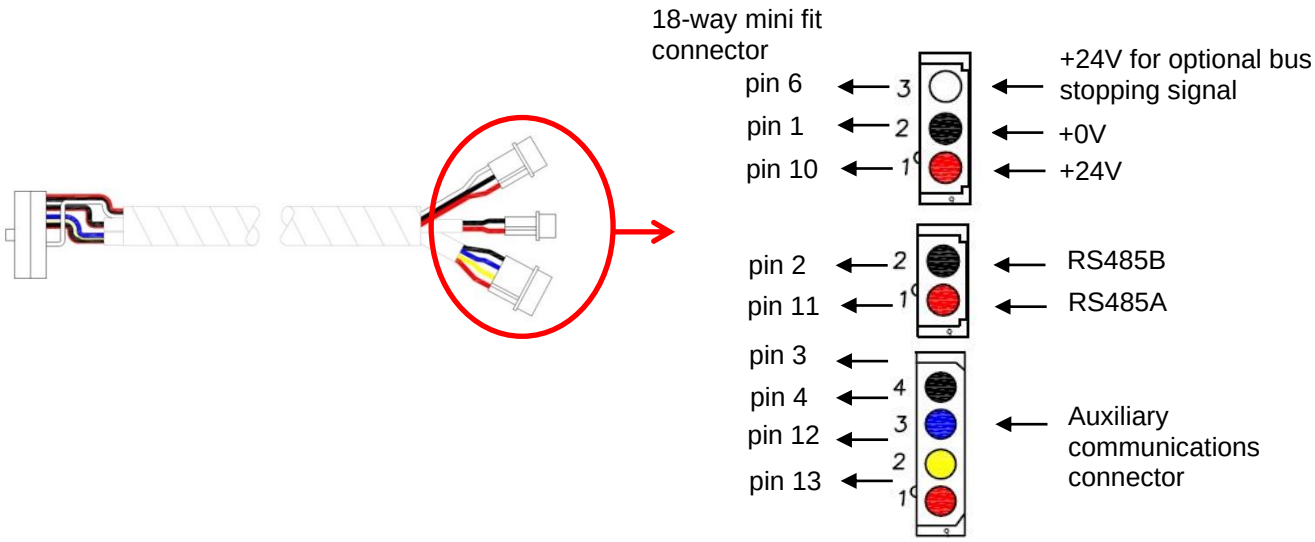


Figure 7 - CX330K cable & pinouts

The four-pin connector allows third-party equipment to be connected through minifit pins 3, 4, 12 and 13. The connections vary according to the secondary communications protocol deployed. For more details, refer to Appendix A: 18-way mini fit connector.

2.2.2.2 CX330X OR CX330N – For replacing an ERIC++ destination controller

- **Destination controller with external input options available**

The CX330X adaptor cable allows the DG3 to replace an ERIC++ destination controller in an existing installation using external input options.

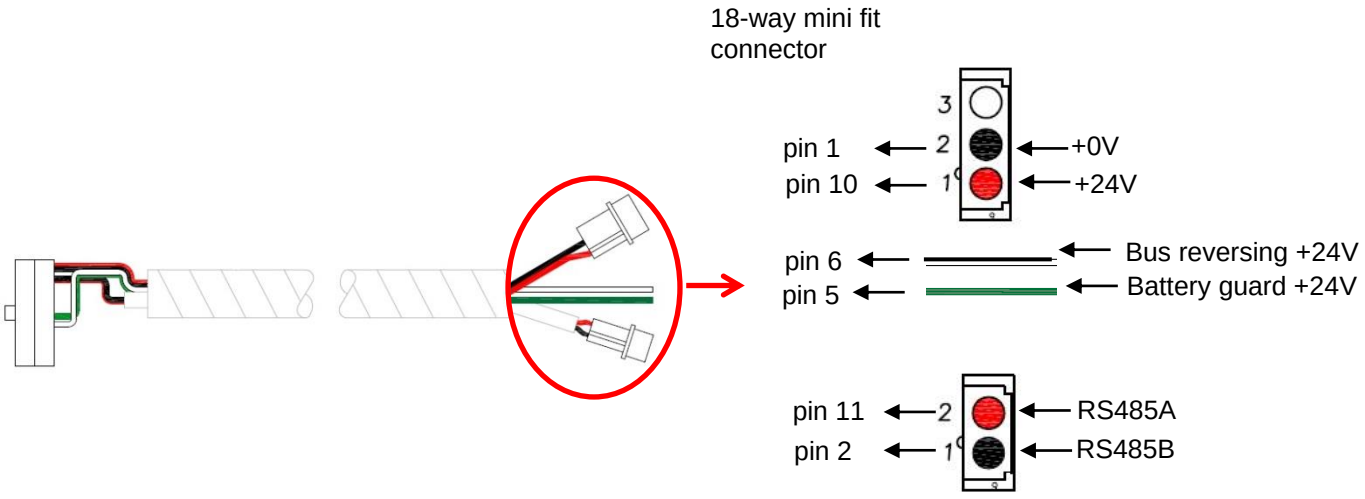


Figure 8 - CX330X cable & pinouts

Note: For an ERIC++ destination controller, the 25-way D-type connector is used for external input options. So, when replacing an ERIC++ using external input options with a DG3, a CX330X cable must be used.

Pins 5 and 6 of the 18-way mini fit connector are mainly used for bus reversing and battery guard. But they can be used for any other external inputs such as for emergency message, bus stopping or information message.

For more details about the ERIC++ bus reversing and battery guard connection cable, please refer to Appendix A: Cable Assembly Drawing in the ERIC++ Destination controller - Installation and Operating Manual (ref. 54/0114-8).

- **Destination controller with external input options unavailable**

The CX330N adaptor cable allows the DG3 to replace an ERIC++ destination controller in an existing installation not using external input options.

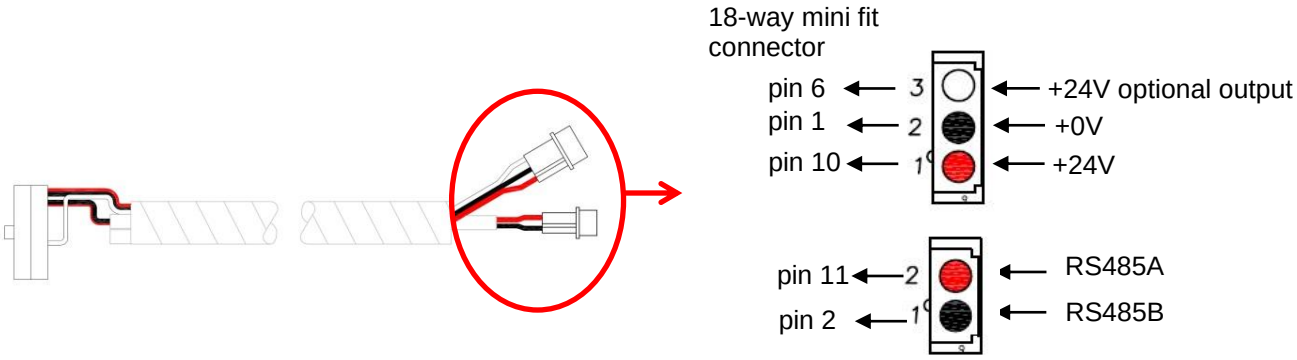


Figure 9 - CX330N cable & pinouts

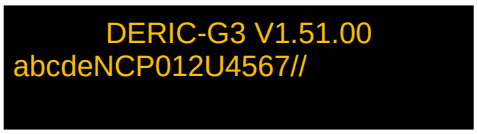
For more details about bus stopping, please refer to section 3) Displaying 'Bus stopping'.
For more details about the 18-way mini fit connector, please refer to section Appendix A: 18-way mini fit connector.

3. Operation

3.1 Getting started

3.1.1 Boot screens on power-up

Whenever the DG3 is powered up or restarted, it carries out a series of initialising checks. Normally, this sequence is rapid and can be ignored.

No.	Description	Figure
1	A splash screen as shown will then appear as the main application starts up. **Note:** The following bootloader splash screen and USB key check will only occur if the UP arrow key is pressed and held as the DG3 is powered up.	 
2	The destination controller goes through a basic initialisation process as shown. If everything is correct, it will change to the driver's information screen where the software version is displayed. However, if an error occurs during software initialisation, the screen may freeze while showing one of the error codes. If so, the user should restart the process. If this does not work, the issue should be reported to 3.3 Hanover Technical Support.	

3.2 Loading a HELEN database into the DG3

HELEN database can be loaded into the DG3 in the two following ways:

- Either 3.2.1 Via “Wireless Data Manager” software on FTP server
- or 3.2.2 Via an USB FLASH memory drive

3.2.1 Via “Wireless Data Manager” software on FTP server

It is possible to update the HELEN database into the DG3 via the “Wireless Data Manager” software on FTP server (standard port 20 and 21). For more details about “Wireless Data Manager” software, refer to Wireless Data Manager – Commissioning and Operation Guide (ref. 540934).

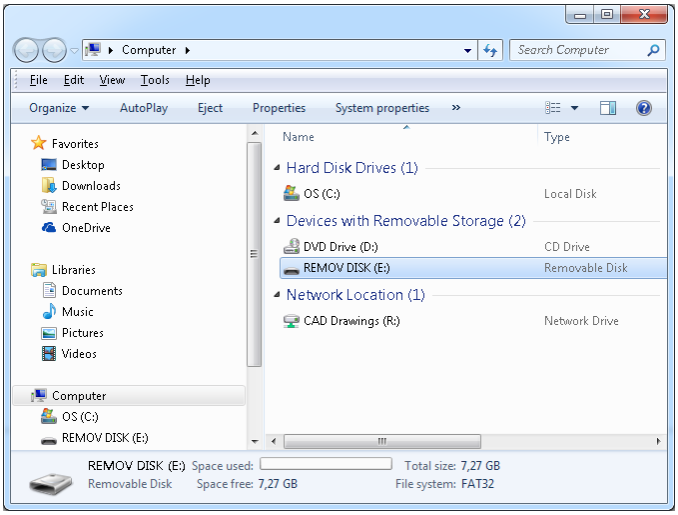
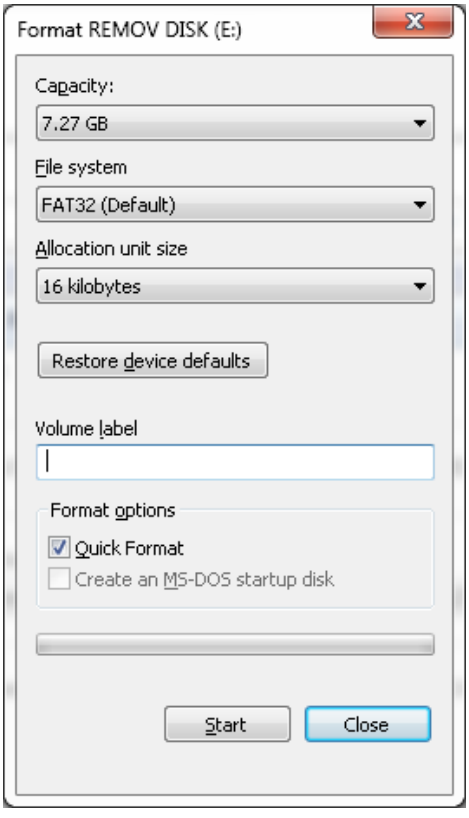
The destination controller should be configured by loading a CONFIG.INI file using an USB FLASH memory drive (which has a folder structure Hanover/dg3/config.ini). For more details about the parameters of CONFIG.INI file, refer to Appendix F: CONFIG.INI file.

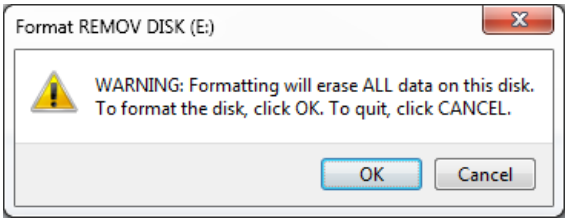
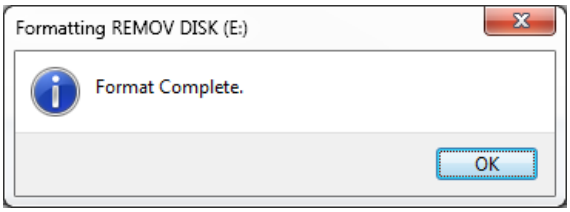
3.2.2 Via an USB FLASH memory drive

3.2.2.1 Formatting the USB FLASH memory drive

The DG3 uses a USB FLASH memory drive to load a destination list via its USB port. The stick must be formatted to use the FAT32 file system.

The table below shows how to format your USB FLASH memory drive:

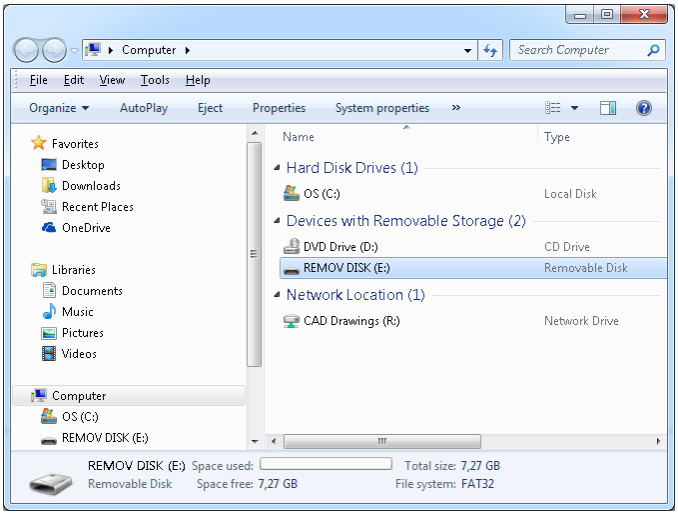
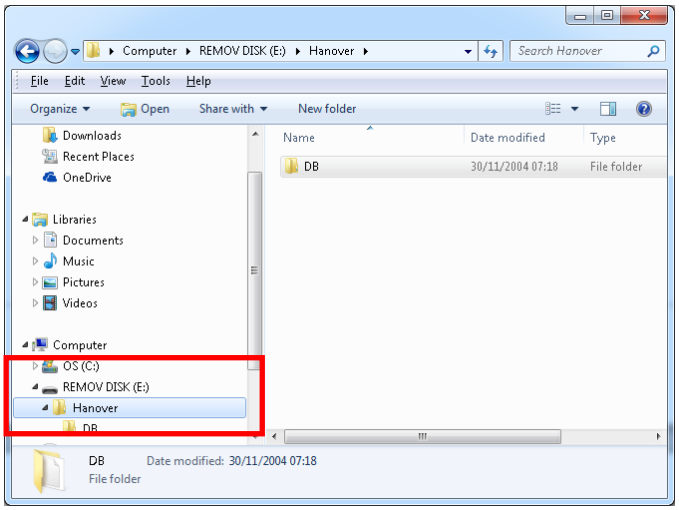
Step	Description	Figure
1	Insert the USB FLASH memory drive into the PC and locate it. It appears as **REMOV DISK (E:)** in our case. **Note:** The name and drive letter are variable and in this case, the drive letter allocated to the USB FLASH memory drive by the PC is 'E:'.	
2	Right-click on the drive E and select 'Format…'. The following window appears.	
3	Under 'File system', use the dropdown arrow to select 'FAT32 (Default)' and click Start.	

Step	Description	Figure
4	A warning will appear as shown. Ensure the stick is empty before formatting starts. Click OK.	
5	A window will then appear indicating that the formatting is complete. Click OK.	
6	Click Close on the original formatting window as shown in step 2. The USB FLASH memory drive is now formatted to FAT32 and is ready for use.	

3.2.2.2 Configuring the USB FLASH memory drive for loading

To ensure the correct data is loaded, an Eric.BIN file is saved on the USB FLASH memory drive using the directory structure **X:\Hanover\DB** (where X is the drive allocated by the PC to the USB FLASH memory drive).

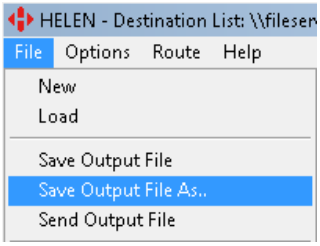
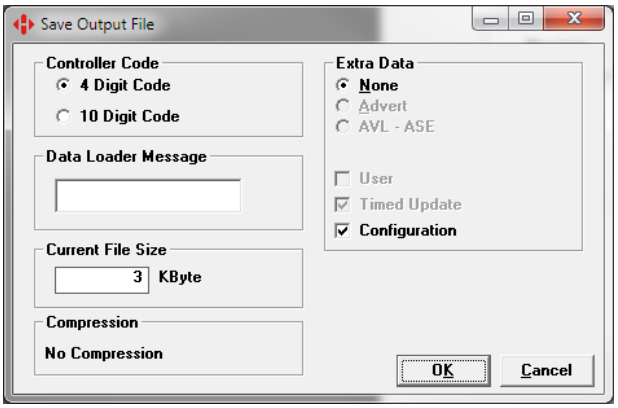
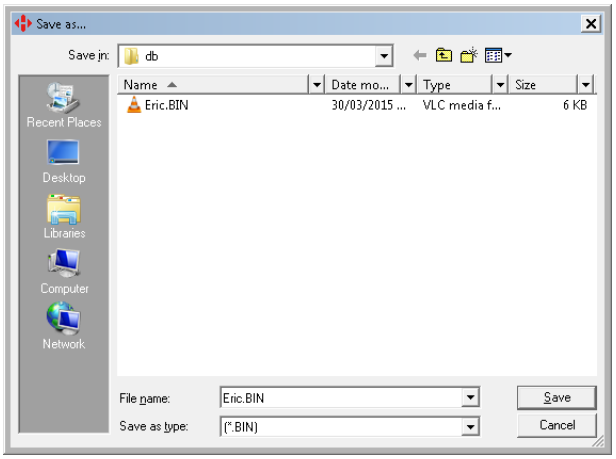
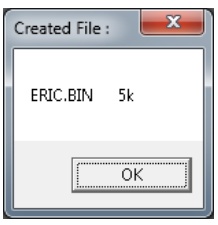
The table shows how to configure the USB FLASH memory drive:

Step	Description	Figure
1	Insert the USB FLASH memory drive into the PC and locate it. In our case, it appears as **REMOV DISK (E:)**. **Note:** The name and drive letter are variable and in this case, the drive letter allocated to the USB FLASH memory drive by the PC is 'E:'.	
2	On the USB drive, create a folder called '**Hanover**'. Open this folder and create another folder within it and name it '**DB**'. **Note:** 'DB' stands for DataBase.	
3	The USB drive is now set up to download any ERIC.BIN file into the 'DB' folder.	

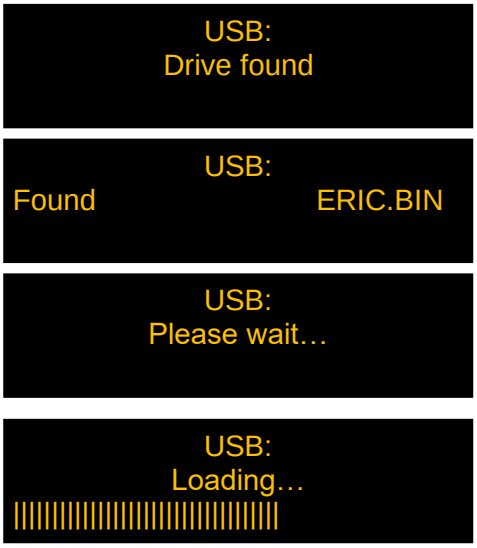
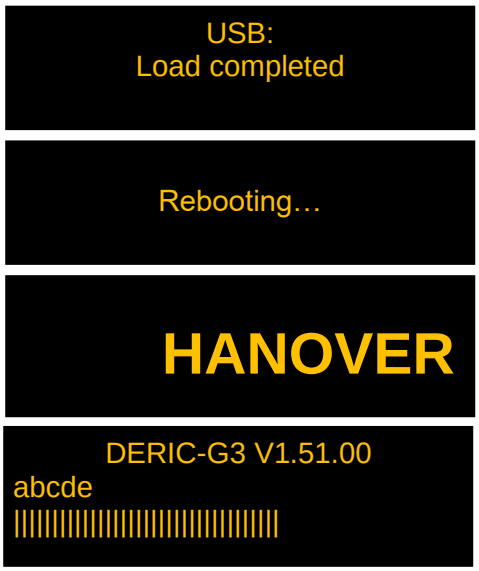
USB FLASH memory drives sometimes fail: try another stick before assuming the problem lies elsewhere.

3.2.2.3 Transferring the database to the USB FLASH memory drive using HELEN

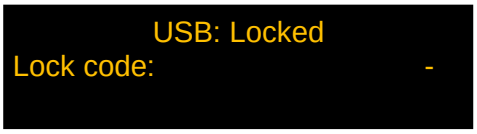
To load the database to the USB FLASH memory drive using HELEN, please ensure the USB drive is connected to the PC.

Step	Description	Figure
1	In the main HELEN window, click File → Save Output File As.. as shown.	
2	Verify that the options selected are correct and then click OK. For more details, refer to HELEN sign-editing software operating manual (ref. 540125).	
3	The 'Save As…' window will appear as shown (it may be necessary to browse to the USB folder → Hanover folder → DB folder). Ensure the text in the 'File name:' box is Eric (or Eric.BIN) and that the 'Save as type:' box has [*.BIN] in it.	
4	Click Save. Note that subsequent downloads will already have a file called Eric.BIN shown in this window: it will be overwritten.	
5	The database has been saved to the USB FLASH memory drive inside the DB folder. Click OK.	

3.2.2.4 Transferring the database from the USB FLASH memory drive to the DG3

Step	Description	Figure
1	Insert the USB FLASH memory drive into the port in the front of the destination controller. The DG3 will automatically find, transfer and save the database as shown.	
2	When it has finished, a request to remove the USB FLASH memory drive will appear as shown.	
3	The DG3 will re-boot once the USB FLASH memory drive is removed and will show the last inputted destination code. However, this number may not correspond with the new list loaded, in which case 'Bad destination' will then be shown: try inputting a number from the new list. If the destination controller is in 'remote' mode (i.e. the destination displays are being driven by an on-board computer), its screen will show 'Idle'.	
	Note that if the Eric.BIN file is corrupt, or no valid files can be found on the stick, the destination controller will show the following message 'Remove USB drive:' and will flash and beep continuously until the USB FLASH memory drive is removed, whereupon the DG3 will reboot. This will not make any change to the current loaded file.	

3.2.2.5 Transferring the database from the USB FLASH memory drive to the DG3 with 'USB Update Lock'[1] enabled

Step	Description	Figure
1	Insert the USB FLASH memory drive into the port in the front of the destination controller. Enter the USB lock code when prompted. **Note:** If incorrect, the update does not progress.	
2	If USB lock code is correct, the DG3 will automatically find, transfer and save the database as shown.	   
3	When it has finished, a request to remove the USB FLASH memory drive will appear as shown.	

[1] 'USB Update Lock' only available from DG3's firmware V1.27.01 onwards. For more information, please contact Hanover Technical Support.

Step	Description	Figure
4	The DG3 will re-boot once the USB FLASH memory drive is removed and will show the last inputted destination code. However, this number may not correspond with the new list loaded, in which case 'Bad destination' will then be shown: try inputting a number from the new list. If the destination controller is in 'remote' mode (i.e. the destination displays are being driven by an on-board computer), its screen will show 'Idle'.	   
	Note that if the Eric.BIN file is corrupt, or no valid files can be found on the stick, the destination controller will show the following message 'Remove USB drive:' and will flash and beep continuously until the USB FLASH memory drive is removed, whereupon the DG3 will reboot. This will not make any change to the current loaded file.	

3.3 Selecting the information to be shown on the destination displays

The destination controller uses the database loaded from HELEN to populate the vehicle's destination displays. Route/destination information and/or adverts and other information can be stored in the database. You can access this information on the DG3 by repeatedly pressing the F/E key when the destination controller is in normal operational mode. This will allow you to cycle through the various code and menu options.

In normal operational mode, the default position of the DG3 is to show the current route / destination code: the destination controller will revert to this state after 20 seconds of inactivity, regardless of what has been showing on its screen. Although rarely needed by the vehicle driver, the lock code is also included in this cycle. For more details, please refer to section 3.5 Accessing other functions of the DG3.

Where changes are being made to the settings behind the lock code, the user is asked whether or not they wish to save those changes. If the user makes no confirmation, the controller will continue to request confirmation until the user selects the ‘Yes’ or ‘No’ option.

3.3.1 Destination code

The destination code, accessible if the configuration code DN is set to enable (refer to Appendix E: Configuration Code Options), determines the information shown on the destination and in-bus displays and is used in a standard configuration. The information is usually in the form of a place name and/or route number whilst the code itself is a four to ten-digit number. It is shown on the front of the destination controller as **Dest no:**.

In the example below, the destination controller is set to show destination code 23: if the operator does not select another destination code within 20 seconds, it will default to showing the destination details for code 23. Suppose the choice was made to change from destination code 23 (route 382, destination Lion Green via Town Centre) to destination code 14 (route 73A, destination Brownford).

The keystrokes and results would be as follows:

Step	Description	Figure
1	Example of an initial screen where the information code has previously been set to 32 and the advert code to 19	
2	Press the F/E key repeatedly until 'Dest no:' appears	
3	Press the up arrow key	
4	Press the up arrow key	
5	Press the left arrow key	
6	Press the up arrow key	

Step	Description	Figure
7	Press the up arrow key	
8	Press the up arrow key	
9	Press the up arrow key	
10	Press F/E key to select your new destination number and the destination Brownford will appear as shown	

3.3.2 Route code

The route code is accessible if the configuration codes RN and RB are set to enable (refer to Appendix E: Configuration Code Options). Where several destinations for a particular route are managed together, the 'Route Browse' function can be used (refer to the HELEN sign-editing software - operating manual (ref. 540125)). The route code (ideally the same number as the route number - but not necessarily) is then used to group these destinations together. Route code is also used for entering a route number with a destination. It is shown as **Route no:**.

3.3.3 Information code

The information code, accessible if the configuration code IN is set to enable (refer to Appendix E: Configuration Code Options), refers to a general passenger information message which is periodically shown on the destination displays, for example, 'Merry Xmas!' or 'No evening service today'. Each message has its own code number. It is shown as **Info no:**.

In this case, the information code is set to 32; a similar process to that used for changing the destination code applies if a change is required.

3.3.4 Advert code

The advert code is accessible if the configuration code AN is set to enable (refer to Appendix E: Configuration Code Options). In the same way, each advertising message to be shown on an in-bus destination display is selected using its own code. It is shown as **Advert no:**.

All the codes are set up using HELEN software (for more details, please refer to HELEN software sign-editing software – operating manual (ref. 540125)) and stored in the database deployed by the destination controller for use by the driver or whoever needs to decide what is shown on a vehicle's destination displays.

3.3.5 Lock code

The lock code is accessible using the F/E key on the front panel of the destination controller. This 4-digit password provides access to a large range of configuration and other settings - please refer to section 3.5 Accessing other functions of the DG3. It is shown as **Lock code:**.

3.3.6 Round trip (Aller-Retour)

The round trip (aller-retour) allows the driver to choose a destination code for his outbound and return journey before going on route. He will not need to re-enter the destination code each time and can easily toggle between outbound and return number by using the left key.

The round trip (aller-retour) is accessible if the configuration code RT is set to enable (refer to Appendix E: Configuration Code Options).

3.3.6.1 Driver's setting up of outbound and return feature

- For the outbound feature, press the left arrow key. It is shown as **Out no:**.

Enter the outbound destination code and then, press F/E key.

- For the return feature, press the left arrow key. It is shown as **Return no:**.

Enter the return destination code and then, press F/E key.

3.3.6.2 Switching between outbound and return feature when on route

- When starting an outbound route, press the left arrow key and then, press F/E key. The outbound destination will be displayed.
- When starting a return route, press the left arrow key and then, press F/E key. The return destination will be displayed.

3.4 Other configurations

The DG3 destination controller can be configured in several other ways, for example, to use the route browse or driver-selectable route number functions or to show only a route number. These options are set using the HELEN software. Details are given in the HELEN sign-editing software - operating manual (ref. 540125).

Possible configurations include:

- Driver selectable route number
- Route browse
- Route number only
- Out and return (round trip)
- Two-line display

3.5 Accessing other functions of the DG3

A wide range of DG3 settings are accessible via the 'lock code' feature. Using the up, down and left arrows to key in the appropriate 4-digit lock code provides access to these settings. DG3 configuration is best carried out by configuring the settings in HELEN and downloading them into the destination controller.

However, manual changes to those parameters can then be made directly via the destination controller itself if required. Note that any such changes will then be overwritten by a future download from HELEN.

The 4-digit lock code is 0101 by default.

The functions are arranged hierarchically: in its normal operating mode, the destination controller shows level 1. The table below shows how to navigate to the other functions. The left arrow acts as the 'back' key.

1st level	2nd level	3rd level
Reach this list by pressing the F/E key	• Reach this list by keying in the lock code and using the F/E key. • Navigate through this list by using the up / down arrow keys • Reach an option in this list by using the F/E key	• Navigate through the option list by using the up / down keys • Reach an option in this list by using the F/E key • To change this option, navigate through the list by using the up / down arrow keys and using the F/E key
Lock code:	Show status?	3.5.1 Status options
	Test signs?	3.5.2 Running the destination displays test
	Configure?	3.5.3 Configuration options
	System?	3.5.4 System options
	Ports?	3.5.5 Port options
	Signs?	3.5.6 Sign options
	Dump data?	3.5.7 Dump data screen sequence
	HANCIS	3.5.8 Hanover passenger information – Simulation mode
	Set clock?	3.5.9 Setting the clock
	FuncTest	3.5.10 Functional Test
	Network	3.5.11 Network
	Back	

If any changes have been made in the settings of the DG3, the controller will prompt for confirmation. If there is no confirmation, the controller will continue to request confirmation until the user selects the ‘Yes’ or ‘No’ option.

3.5.1 Status options

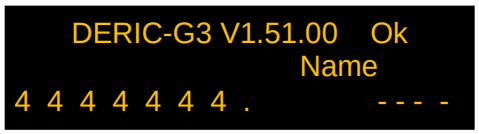
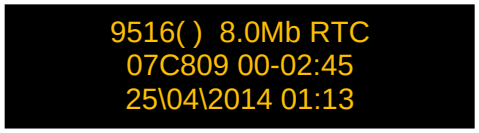
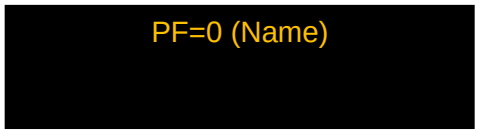
This option provides access to information about the status and configuration of the destination controller and the destination displays connected to it. The two ways to access this option are:

- either by holding down the F/E key for about 3 seconds. The HANCIS menu will be displayed first if connected. Then, press the up arrow key to access the status option.
- or by entering the lock code. 'Show status?' can be found from within the list and then selected using the F/E key. Use the up and down arrow keys to navigate between each one.

Note: If accessing the status options by holding down the F/E key, the status options screen will be displayed temporarily (only for a few seconds) and the DG3 will revert to its previous state. Whereas via the

lock code, the status options screen will remain displayed until the user presses on the left arrow key or F/E key to quit this option.

The following table shows all functions available in the status options:

No.	Figure	Description
1		• **DERIC-G3**: software name • **V1.51.00**: software version number • **Ok**: indicates database loaded successfully (otherwise, error code shown) • **Name**: name set in profile of controller config in HELEN (optional) • **4 4 4 4 4 4 4 .**: status of individual destination displays[2] • **- -**: 2 external voltage signal inputs (# = active; **-** = inactive)
2		• **9516( )**: database file size in bytes (value in brackets no longer used) • **8.0Mb**: flash memory capacity (needs to accommodate both download file and operational database file) • **RTC**: Real Time Clock (optional) • **07C809**: database file checksum value • **00-02:45**: timer / clock showing length of time in use since last reboot (DD-HH:MM = days-hours:minutes) • **25\04\2014**: date (is displayed only if RTC is fitted and enabled) • **01:13**: time (is displayed only if RTC is fitted and enabled)
3		• **PF**: destination controller profile[3] • **PF=X**: where X indicates the value of the profile • **Name**: name set in profile of controller config in HELEN (optional)

[2] This code monitors the status fed back from up to 8 passenger information signs that can be connected to the RS485 port. Each digit corresponds to one sign. The possible values and their meanings are:

.	No sign connected
0	Sign/on-board computer connected and working correctly
1	Message content error
2	Checksum error
3	Halogen bulb failure (applies to flip dot signs only but not to LED type signs)
4	No response from sign/on-board computer
5	Bad status reply
6	Communications error

[3] This is a feature that makes it easy to manage a fleet of vehicles fitted with many different signs but all using the same destination list. Full details are given in the HELEN sign-editing software - operating manual (ref. 540125).

4	1: L, 160 x 19 #0 2: L, 96 x 8 #1 3: L, 32 x 17 #2 4: L, 144 x 19 #3 5: L, 144 x 19 #4 (HANCIS) #5	• **1:, 2:, 3:, 4:, 5:, etc.:**: destination display numbers (+1) as set by HELEN software[4] • **L**: indicates route number set to left of destination display (R=right) • **(HANCIS)**: sign options - refer to Appendix D: Sign Options • **160 x 19**, **96 x 8, 32 x 17**: destination display sizes (LED columns x LED rows) • **#X**: X is the destination display address as determined by its physical switch setting[5]
5	Network: ID 2 IP static 0.0.0.0 FTP 10.0.0.10	• **Network:** refers to the unit ID assigned by the user to the unit that is used when it connects to the FTP server. If for example, the ID is 2, it will navigate to the folder "2" on the FTP server and carry out relevant FTP tasks (upload a status file, download any pending updates etc.) • **IP:** static or DHCP followed by the IP address assigned to the unit. Static = fixed and DHCP = dynamically assigned IP address. If no DHCP server is present, it will show 0.0.0.0. "DHCP-" will be displayed if the unit has not detected a DHCP server and "DHCP+" will be displayed if it has received its IP from a DHCP server. • **FTP:** displays the IP address of the FTP server the unit will try to connect to along with the username it will try to log in with.
6	MAC: 18:67:3F:00:04:07 4308833731384D336280FF37 Subnet 255.255.0.0	• **MAC**: displays the MAC address assigned to the unit by Hanover. For example: 18:67:3F:00:04:07. • **Series of numbers:** displays the unique ID assigned to the processor chip by the manufacturer. This is used to "tag" the Status files the unit sends back to the FTP server so it is capable of identifying the individual DG3s within the fleet if you change its network ID. • **Subnet**: is the assigned Subnet mask used for establishing the DG3's connection to the FTP server.

[4] HELEN allocates numbers to each destination (and internal) sign configured by the software. By convention, these start at 0. However, within the controller, 0 is reserved for the driver's message on the front of the controller itself so all these numbers are incremented by 1.

[5] There may be other signs with different switch settings included in the controller's configuration; in this example, these signs are not currently connected to the controller and are thus 'inactive'.

3.5.2 Running the destination displays test

This test can be used to determine the source of a problem, i.e. hardware, address settings or programming. The destination controller sends a message via the communications network and activates the destination displays' internal test mode. To use this feature, the lock code must be entered, 'Test signs?' found from within the list and then selected using the F/E key. 'Testing…' will flash until you press on the left arrow key to stop the test or press F/E key to return to destination.

For more details, please refer to the section 4.1.5 Destination display test function.

3.5.3 Configuration options

When a database is downloaded from a PC, it incorporates parameters that determine how the DG3 operates and thereby drives the destination displays. Using the configuration function, these parameters can be viewed and altered according to the user's requirements. To use this feature, the lock code must be entered, 'Configure?' found from within the list and then selected using the F/E key.
On the destination controller screen, there are currently 46 options plus 'Back' (available in this edition). The active option is bright whilst the other two are dimmed. Use the up and down arrow keys to navigate between each one.
An example screen looks like this:

For more details about the range of configuration code options, please refer to Appendix E: Configuration Code Options.

3.5.3.1 Configuration code option: Time entry (TV)

This feature provides a fixed time to be shown, a countdown timer or the actual time. The function only works if the clock plugin has been fitted and enabled on the DG3's processor. The default setting is TV = 0 (feature disabled); for more details, please refer to TV entry in Appendix E: Configuration Code Options.

The message generated in HELEN for the sign must be in text mode (Super-X) for this function to work.

The table below shows the three different settings for configuration parameter TV:

Value of configuration parameter: TV	Function	Refer to section
TV = 1	Set a fixed time	TV = 1 (for more details, please refer to TV entry in Appendix E)
TV = 2	Use the countdown timer	TV = 2 (for more details, please refer to TV entry in Appendix E)
TV = 3	Use the time function as a simple clock	TV = 3 (for more details, please refer to TV entry in Appendix E)

- **TV = 1 (for more details, please refer to TV entry in Appendix E)**

The message generated in HELEN for the sign must be in text mode (Super-X) for this function to work.

How to set a fixed time:

Step	Description	Figure
1	Further to setting TV=1 in the DG3's configuration, press F/E key repeatedly until the following screen is shown. The screen for the time is displayed as shown: hh:mm (in 24-hour format) for hours:minutes.	
2	The hh will flash. Use the up arrow key to increase the hh or the down arrow key to decrease the hh. Then, press F/E key to confirm your hours.	
3	The mm will flash. Use the up arrow key to increase the mm or the down arrow key to decrease the mm. **Note:** The left arrow key can be used to toggle between hours and minutes at this stage if required. Then, press F/E key to confirm your minutes.	

Note: The time entered here will be substituted for any '~' (tilde) character within the HELEN destination or driver display database. It is sometimes used by drivers 'on the fly' for entering departure times. The destination message might thus be 'Bus departs at ~'.

- **TV = 2 (for more details, please refer to TV entry in Appendix E)**

The message generated in HELEN for the sign must be in text mode (Super-X) for this function to work.

How to set the countdown timer:

Step	Description	Figure
1	Further to setting TV=2 in the DG3's configuration, press F/E key repeatedly until the following screen is shown. The screen showing the countdown in minutes (can be set between 1 and 99) is displayed.	
2	The default value '00' will flash until a value is set. Use the up arrow key to increase its value or the down arrow key to decrease its value. Then, press the F/E key to confirm and exit the function.	

Notes:

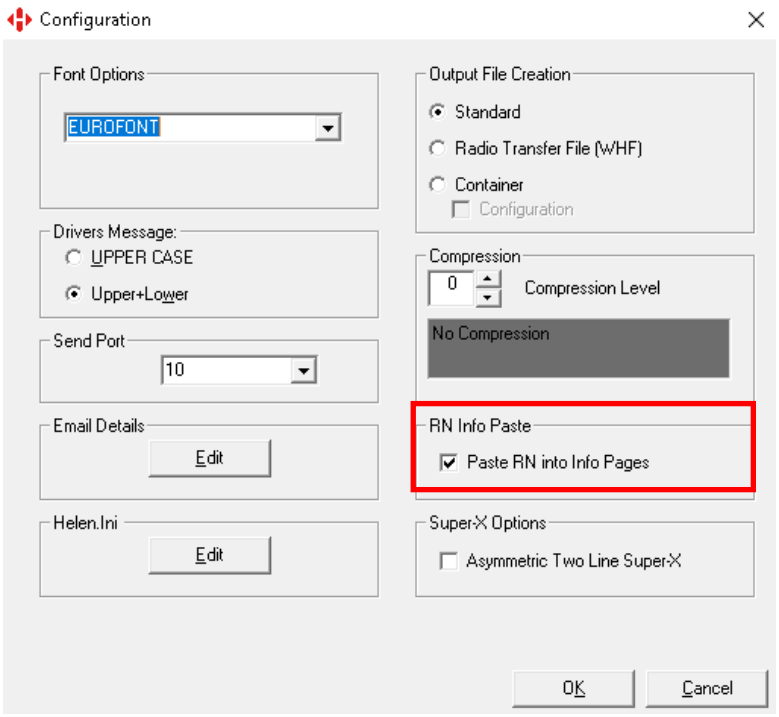
When configuring the countdown timer in HELEN software:

- Destination code: parameter CC=nnnn is included in the database config. The destination code nnnn will be automatically set when the countdown time value is entered.
- Information code: parameter CC=Inn is included in the database config. The info code nn will be automatically set when the countdown time value is entered. When the time value runs down to zero, this info code will be automatically cancelled. Note that the parameter CC=Inn is available as from DG3 software V1.36.01 onwards.

For parameter CC=Inn to function, make sure to have IN=1 or information selected in HELEN software.

To paste a route number into info pages:

- '%' has to be entered in the route number field
- SXP=1 must be set in the DG3 configuration (refer to Appendix E: Configuration Code Options).
- "Paste RN Info Pages" selected in HELEN configuration as shown below



For driver's message to be displayed on the destination controller: the value entered here will be substituted for any '#' (hash) character within the HELEN destination list: this causes any display using a destination/info code containing the '#' (hash) character to start counting down to zero on the driver's message on the destination controller when the code is selected. The driver's message on the destination controller might thus be 'Bus dep in # mins'.

For the countdown message to be displayed on the destination display: the value entered here will be substituted for any '~' (tilde) character within the HELEN destination list: this causes any display using a destination/info code containing the '~' (tilde) character to start counting down to zero on the destination display when the code is selected. The message on the destination display might thus be 'Bus departs in ~ minutes'.

- **TV = 3 (for more details, please refer to TV entry in Appendix E)**

The message generated in HELEN for the sign must be in text mode (Super-X) for this function to work.

When TV = 3 is set in the DG3's configuration, the time set in 3.5.9 Setting the clock will be displayed as the current time.

Note: The value entered here will be substituted for any '~' (tilde) character within the HELEN destination lists: this causes any display using a destination/route code containing the '~' (tilde) character to show the clock value and thereby act as a simple clock when the display is shown. The destination message might thus be 'The time now is ~'.

3.5.3.2 External inputs I0, I1 and I2: emergency message, bus reversing, bus stopping, battery guard, information message or Hanvox message

Two external inputs can be accomodated using the I0, I1 and I2 settings which are connected directly into the 18-way mini fit connector.

Note: Please make sure that Pin 5, Pin 6 and pair of Pin 7 and 16 of the 18-way mini fit connector correspond to the correct external input (I0, I1 or I2) in HELEN software:

- Pin 5 (digital input 2 of DG3) corresponds to external input I1 in HELEN software
- Pin 6 (digital input 1 of DG3) corresponds to external input I0 in HELEN software
- Pair of pins 7 and16 (digital input 0 of DG3) corresponds to external input I2 in HELEN software

The available I0, I1 and I2 values and their uses are described in the following table:

I0, I1 or I2 Value	Use for	Refer to
1	Emergency message (latched)	Emergency message
1A		
1B		
1C		
2	Emergency message (latched (inverted))	
3	Emergency message (unlatched) or Bus reversing	Emergency message or Displaying 'Bus reversing'
4	Emergency message (unlatched (inverted))	Emergency message
5	Blanking (battery guard)	Blanking the destination display (battery guard)
6	Blanking (battery guard) (inverted)	
7	Bus stopping	Displaying 'Bus stopping'
8	Bus stopping (inverted)	
9	Emergency message (toggle)	Emergency message
10	Emergency message (toggle (inverted))	
IN	Information message	Information message
INI	Information message (inverted)	
DV	Destination VOX (Hanvox)	Destination VOX (Hanvox) audio message
DVI	Destination VOX (Hanvox) (inverted)	
BR	Bus reversing	Displaying 'Bus reversing'
BRI	Bus reversing (inverted)	

For more details, please refer to the I0, I1 and I2 entries in the configuration code options table in Appendix E: Configuration Code Options.

1) Emergency message

Setting I0, I1 and I2 to the values 1, 1A, 1B, 1C, 2, 3, 4, 9 and 10 are all for emergency messages. When the input is activated, the message (for example, "Emergency - Call Police") associated with a particular destination code is shown on the destination displays. By default, this is 9999, or (0000 9999 for route browse). This code can be changed by adding the parameter EC = nnnn to the database configuration,

where nnnn is the preferred emergency destination code. This is done in HELEN via the Extensions box on the Advanced tab of a particular profile in 'Controller Config'.

By not setting a driver's message for this emergency destination, the driver's destination controller screen will not change from the previous destination when the input is activated, although the destination displays will. The user may decide that this is preferable if, for example, the driver is being threatened or is under attack.

Note: Value 3 is being mainly used for bus reversing. However, the bus reversing function can now be set using the values BR or BRI (refer to Displaying 'Bus reversing').

I0, I1 or I2 Value	Meaning	Description
1	latched	When the input is activated (volts on input), the emergency destination will remain, even if the input is deactivated. The destination must be manually reset.
1A	latched	Emergency message can be cancelled by a manual destination change.
1B	latched	Emergency message can be cancelled by a remote destination change.
1C	latched	Emergency message can be cancelled by both manual and remote destination change.
2	latched (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).
3	unlatched	Once the input is activated (volts on input), the emergency destination will remain for only as long as the input remains active.
4	unlatched (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).
9	toggle	Activating the input momentarily will set the emergency destination: activating it again will cancel it.
10	toggle (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).

2) Blanking the destination display (battery guard)

Setting I0, I1 and I2 to the values 5 and 6 are for blanking the destination display (designed to save battery life). When the input is activated, the destination controller works as normal. When deactivated, the destination displays will be blanked after a time delay set by DG3 configuration parameter BT = n where n is in minutes (default n = 0). For more details about BT, please refer to entry BT in Appendix E: Configuration Code Options.

Another parameter BL, meaning Blanking Level expressed as a percentage (0 (by default) means maximum brightness, 1 means minimum brightness and 2-99 means actual maximum brightness) sets the brightness of exterior LED displays during the BT-defined time delay period. For more details about BL, please refer to entry BL in Appendix E: Configuration Code Options.

I0, I1 or I2 Value	Meaning	Description
5	blanking	When inactive (no volts), destination displays will be blanked after period BT.
6	blanking (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).

When the Blanking Timer (BT) is up, the screen looks like this:

Blanking the destination display in this way should not be confused with the 'Blank code' facility, which is a destination code set within HELEN that defines what is shown on an otherwise blank destination display - for example, if a non-existent code is selected or the destination controller is set to an idle state. For more details, please refer to the HELEN sign-editing software - operating manual (ref. 540125). However, the destination defined by that code will also be shown during the BT-defined delay described above.

3) Displaying ‘Bus stopping’

Setting I0, I1 and I2 to the values 7 and 8 are to set up 'Bus stopping' on a destination display. On activation, in-bus destination displays will automatically show 'Bus stopping', overriding the previous message.

Alternatively, the 'bus stopping' message can be programmed for in-bus destination displays under a destination code containing the two characters 'BS' - for example: BS01 (or BS00000001) or 0000 BS01 for route browse.

In both cases, the parameter LN = n must be used to indicate the number allocated to the in-bus destination display, where n is any of the values provided in sign options. The LN setting is made within 'Sign options' (for more details, please refer to section 3.5.6 Sign options).

I0, I1 or I2 Value	Meaning	Description
7	bus stopping	Whilst the input is active (volts on input), the in-bus destination display will show the programmed message.
8	bus stopping (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).

4) Information message

Values IN and INI are for information messages. An information message is selected on activation of the external input, having been set up within the HELEN database in a similar way to a destination message.

The message is enabled by adding the parameter IC = nn, where nn = 01 - 99. This is done in HELEN via the Extensions box on the Advanced tab of a particular profile in 'Controller Config.' (nn corresponds with the message number in the HELEN database).

The parameter IP is used in conjunction with this. Please refer to the IP entry in the table in Appendix E: Configuration Code Options.

I0, I1 or I2 Value	Meaning	Description
IN	information	Whilst the input is active (volts on input) the information message will be selected.
INI	information (inverted)	As above but input sensing is inverted (volts = inactive; no volts = active).

5) Destination VOX (Hanvox) audio message

Values DV and DVI are Destination VOX (Hanvox). On activation, if Hanvox is configured and present within the system, an mp3 audio message associated with the destination / route code currently in use by the destination controller will be played twice. This works by Hanvox receiving a message from the destination controller in the form 'p /e Dnnnn' where nnnn is the current destination code. If the system is configured to use Route Browse, the route code must be a maximum of three characters: this is because Dnnnn can be a maximum of eight characters.

This feature is enabled in HELEN via the Extensions box on the Advanced tab of a particular profile in Controller Config: it is sufficient simply to add 'DV' or 'DVI' as appropriate in the box.

I0, I1 or I2 Value	Meaning	Description
DV	Destination Hanvox	Message is played twice when input active (volts on input)
DVI	Destination Hanvox (inverted)	As above, but input sensing is inverted (volts = inactive; no volts = active).

Note: When using the Extensions box in HELEN software, several different configuration codes can be added if required; they should be separated by a comma.

6) Displaying ‘Bus reversing’

Values BR and BRI are for 'Bus reversing'. The bus reversing message is programmed under a destination code whose most significant two characters are 'BR' - for example: BR01 (or BR00000001) or 0000 BR01 for route browse.

The destination code should only contain a message for the destination displays which are to show it, i.e. if the front destination display is not to change, no message content should be entered for the front destination display for this destination.

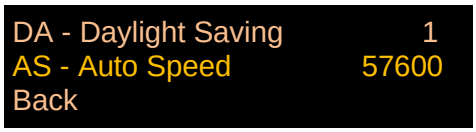
I0, I1 or I2 Value	Meaning	Description
BR	bus reversing	Whilst the input is active (volts on input), the destination displays will show the programmed message.
BRI	bus reversing (inverted)	As above, but input sensing is inverted (no volts = active).

Note: The bus reversing message can also be set using a destination code of 9999 (please refer to Emergency message).

3.5.4 System options

The system function codes determine how the DG3 is set up as a destination controller. To use this feature, the lock code must be entered, 'System?' found from within the list and then selected using the F/E key. On the destination controller screen, there are currently 10 options plus 'Back' (available in this edition). The active option is bright whilst the other two are dimmed. Use the up and down arrow keys to navigate between each one.

An example screen looks like this:



The list of system options available in the DG3 destination controller is provided in Appendix B: System Options.

3.5.5 Port options

This setting allows a different comms protocol to be set for each port for use with the destination display. To use this feature, the lock code must be entered, 'Ports?' found from within the list and then selected using the F/E key. There are currently 7 options plus 'Back' (available in this edition). The active option is bright whilst the other two are dimmed. Use the up and down arrows to navigate between each one.

An example screen looks like this:

Do not use the same protocol on more than one port: the results are unpredictable.

Note: A Hanover protocol can be assigned to an Ethernet port via the port options of the destination controller. Upon assigning a protocol to an Ethernet port, the DG3 will prompt the operator to enter the Ethernet port number the protocol will be assigned to.

An example screen looks like this:

The list of protocols available in the DG3 destination controller is provided in Appendix C: Protocols – Port Options.

Note: Destination controllers are not necessarily supplied with every possible protocol enabled.

For more details about any protocol, please contact Hanover (please refer to section 4.3 Hanover Technical Support).

3.5.6 Sign options

Be careful when using sign options as the physical sign addresses may be different from the sign addresses set up in HELEN.

This is an optional manual override to enable the contents of a destination display to be changed to display a different programmed destination display in HELEN. To use this feature, the lock code must be entered, 'Signs?' found from within the list and then selected using the F/E key. There are currently 17 options plus

'Back' (available in this edition). The active option is bright whilst the other two are dimmed. Use the up and down arrows to navigate between each one.

An example screen looks like this:

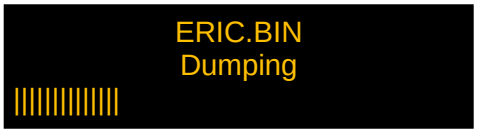
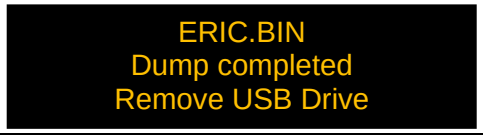
The list of sign options available in the DG3 destination controller is provided in Appendix D: Sign Options.

3.5.7 Dump data screen sequence

This facility allows the database to be 'dumped' back on to a USB FLASH memory drive if required - generally to enable the list to be copied to another destination controller. The USB FLASH memory drive will need the same folder structure in place as used when data is being loaded on to the destination controller. If Hanover\DB\eric.bin already exists on the USB FLASH memory drive, it will be backed up and renamed Hanover\DB\eric˜1.bin, Hanover\DB\eric˜2.bin etc.

Note: USB FLASH memory drives sometimes fail: try another stick before assuming the problem lies elsewhere.

The table below shows the procedure for dumping data:

Step	Procedure	Figure
1	Enter the lock code, find 'Dump data?' from within the list and then select it using the F/E key.	
2	'Insert USB Drive:' is displayed on the destination controller screen.	
3	If an USB drive is not inserted for about 10 seconds, data dump will be aborted as shown and will go back to the initial screen	
	On the other hand, if a USB drive is inserted, dump then starts automatically as shown followed by steps 4 to 6	
4	Data dump progress shown by ||||||||||||	
5	'Remove USB Drive' flashes. The USB drive can now be removed safely.	
6	This screen is shown for two seconds - then reverts to operational status	

Note: The list copied from the destination controller using “Dump data” cannot be used in HELEN.

On controllers with firmware up to and including v1.12, the message 'Insert USB Drive:' is also shown. **This should be ignored** as doing so will in fact initiate a fresh dataload (see section 3.2.2.4 Transferring the database from the USB FLASH memory drive to the DG3): no action should be taken until the controller reverts to its previous state, whereupon the process should be restarted from the status option to selection of 'Dump data?'.

3.5.8 Hanover passenger information – Terminal mode

This menu item will only become enabled if your DG3 has an HTC unit connected to the physical destination display system in your vehicle and if the HTC is selected as a destination display. Setting the destination display no. to the 'HTC' value (refer to 3.5.6 Sign options) will enable the DG3 to remotely control certain features (for example, the audio, IP address, etc.) of the HTC unit.

If an HTC is present in the system, the terminal mode will create a file to simulate a route on the internal information display. So, when a route is selected, the internal information display appears to travel the complete route triggering all the points at an exaggerated speed.

To switch on the terminal mode, the 'HANCIS' feature is accessible via the lock code (refer to 3.5 Accessing other functions of the DG3) or if configured via Hanover Central software, press and hold the F/E key.

The 3.5.8.1 HTC Terminal Menu allows the modification of settings via the:

- 3.5.8.2 Simulation Menu
- 3.5.8.3 Volumes Menu
- 3.5.8.4 System Tests
- 3.5.8.5 Settings Menu

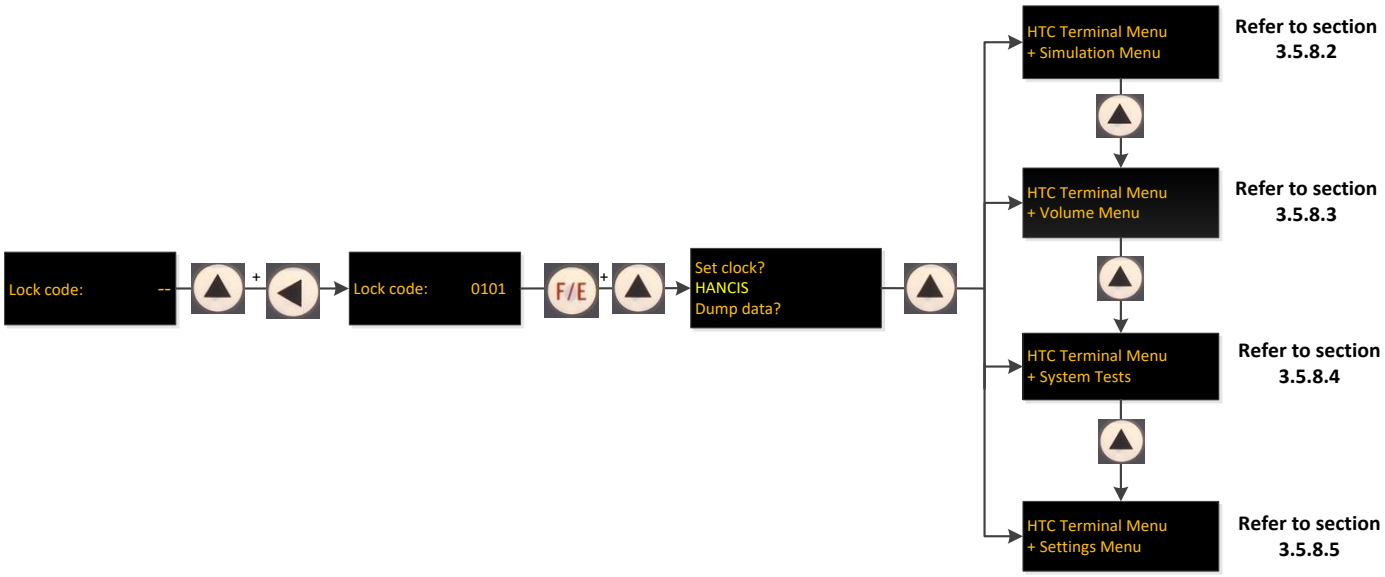
Note:

To save any new settings:

- Either press and hold F/E key for 6 seconds to return to normal operating screen.
- Or if the destination controller is left for 20 seconds of inactivity, it will assume the changes are required and will save them by default.

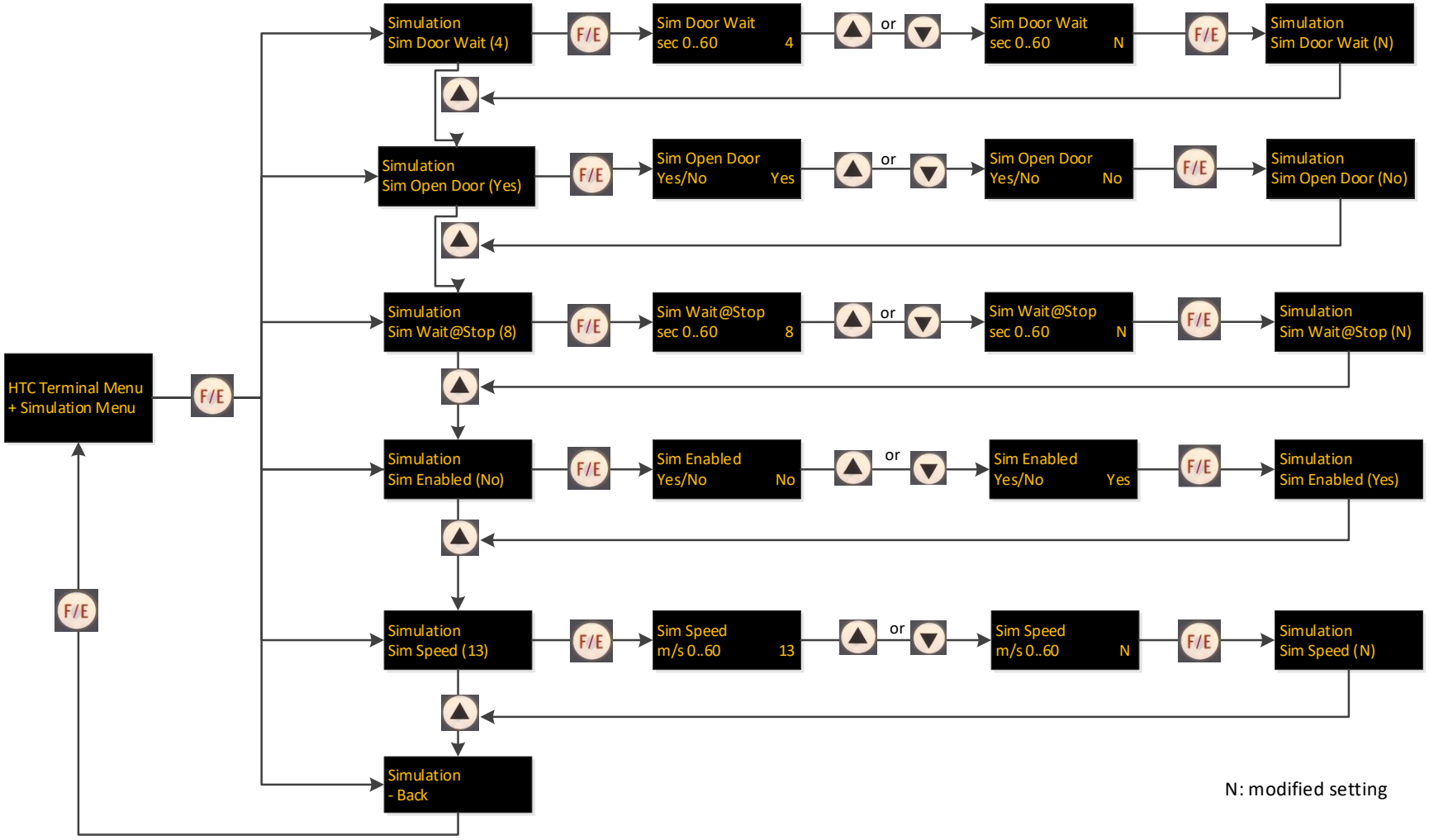
3.5.8.1 HTC Terminal Menu

The flow chart below shows the procedure for accessing the different options of the HTC Terminal Menu:



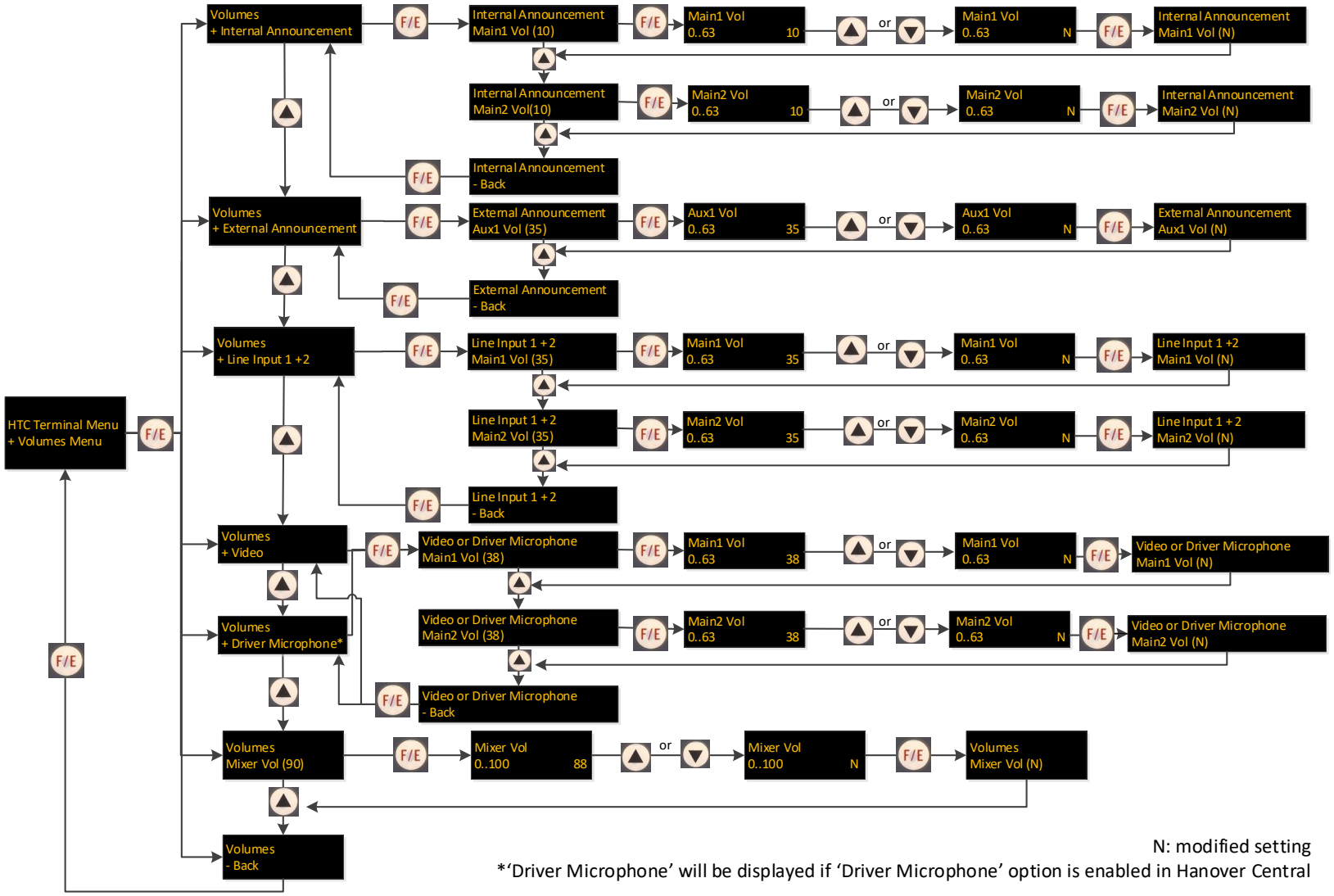
3.5.8.2 Simulation Menu

The flow chart below shows the procedure for accessing the different options of the Simulation Menu:



3.5.8.3 Volumes Menu

The flow chart below shows the procedure for accessing the different options of the Volumes Menu:

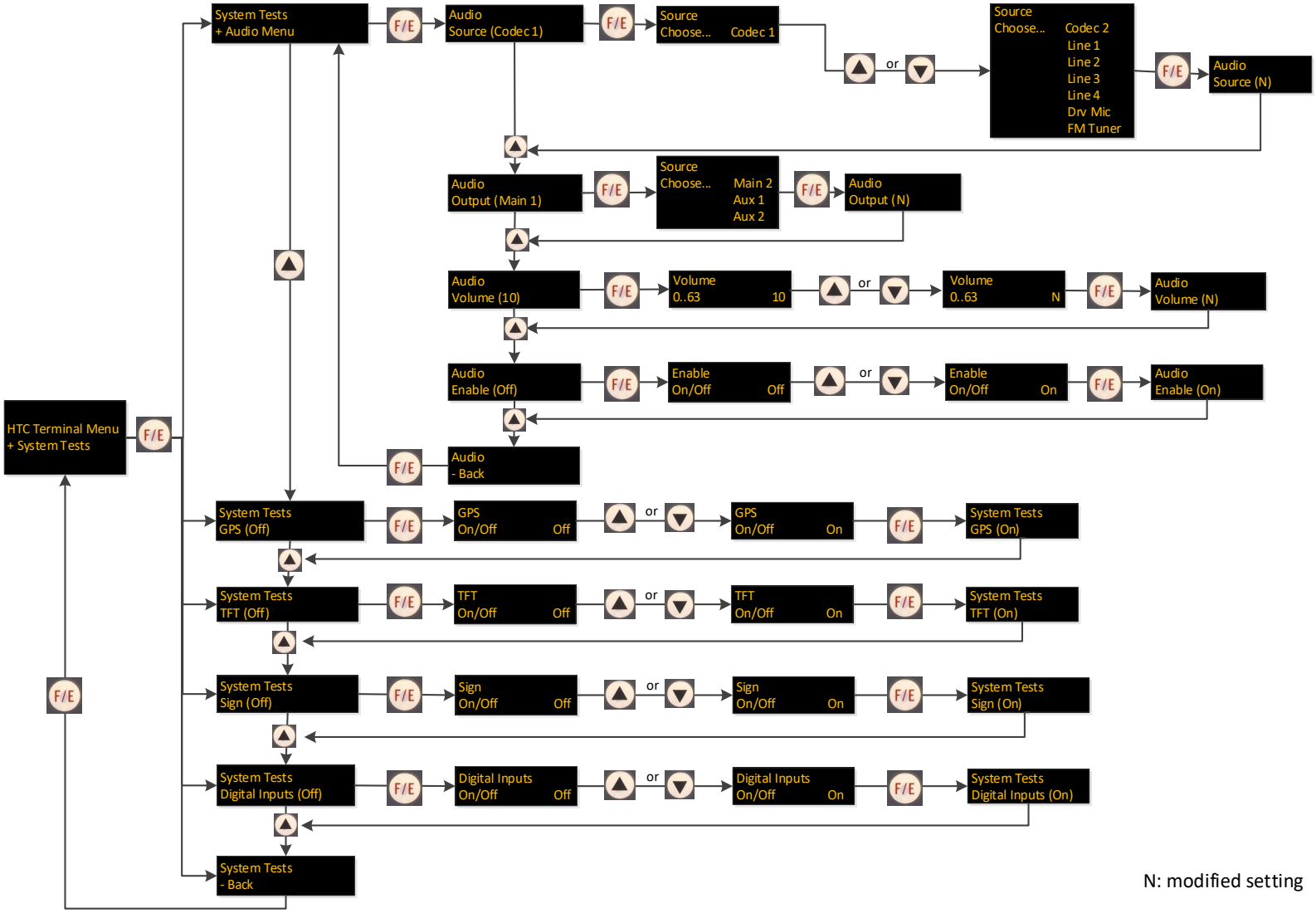


N: modified setting

*'Driver Microphone' will be displayed if 'Driver Microphone' option is enabled in Hanover Central

3.5.8.4 System Tests

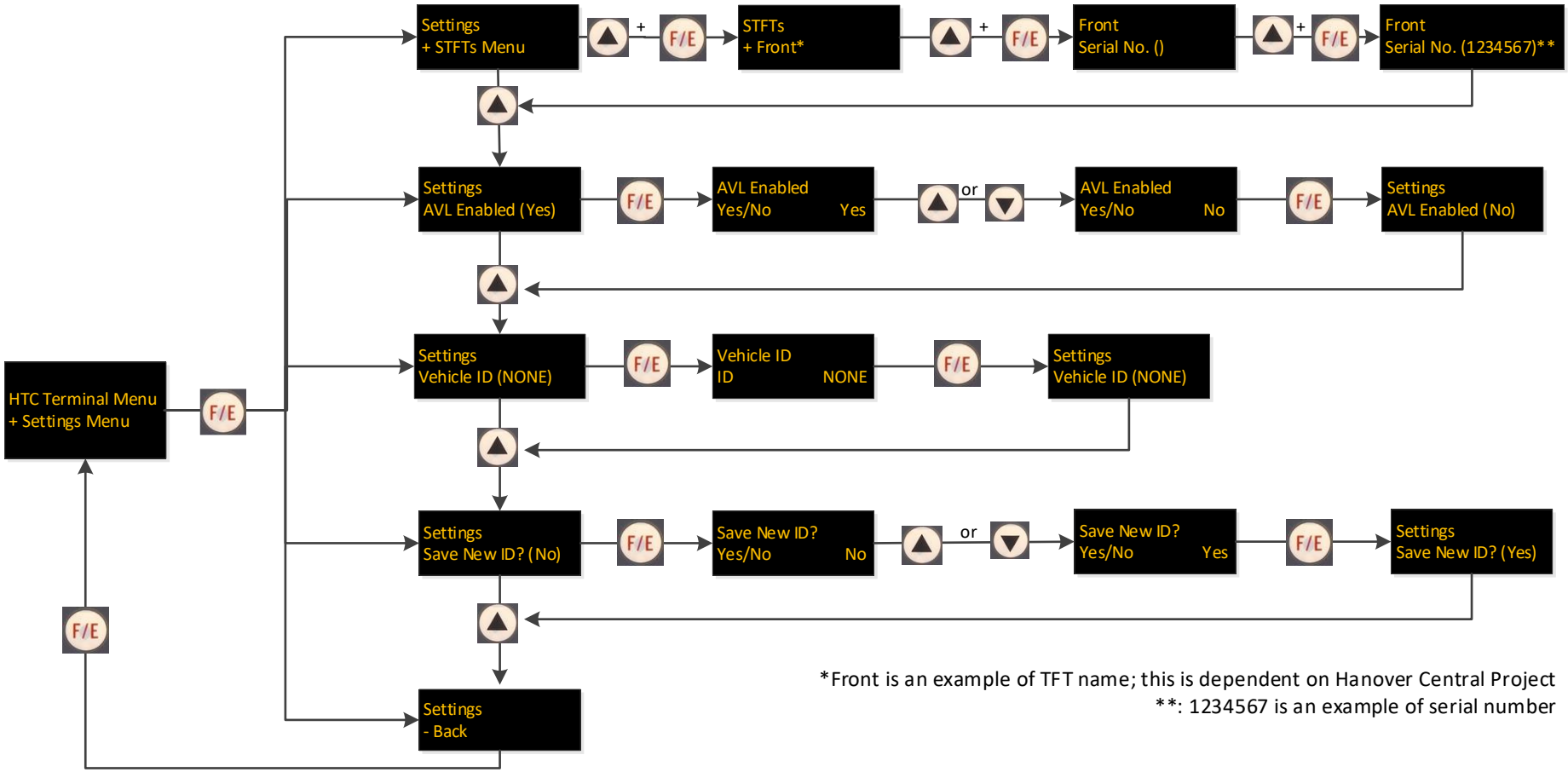
The flow chart below shows the procedure for accessing the different options of the System Tests:



N: modified setting

3.5.8.5 Settings Menu

The flow chart below shows the procedure for accessing the different options of the Settings Menu:



3.5.9 Setting the clock

This feature only works properly if RTC is fitted.

To use this feature, the lock code must be entered, 'Set clock?' found from within the list and then selected using the F/E key.

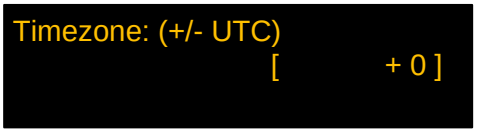
3.5.9.1 How to set the date:

Step	Description	Figure
1	The screen for the date is displayed as shown: dd/mm/yyyy for day/month/year.	
2	The dd will flash. Use the up arrow key to increase the dd or the down arrow key to decrease the dd. Then press F/E key to confirm your day.	
3	The mm will flash. Use the up arrow key to increase the mm or the down arrow key to decrease the mm. Then press F/E key to confirm your month.	
4	The yy will flash. Use the up arrow key to increase the yy or the down arrow key to decrease the yy. Then press F/E key to confirm your year.	

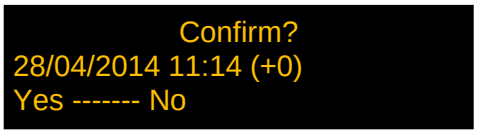
3.5.9.2 How to set the time:

Step	Description	Figure
1	The screen for the time is displayed as shown: hh:mm (in 24-hour format) for hours:minutes.	
2	The hh will flash. Use the up arrow key to increase the hh or the down arrow key to decrease the hh. Then press F/E key to confirm your hours.	
3	The mm will flash. Use the up arrow key to increase the mm or the down arrow key to decrease the mm. Then press F/E key to confirm your minutes.	

3.5.9.3 How to set the timezone:

Step	Description	Figure
1	The screen for the timezone is displayed as shown.	
2	The '+ 0' will flash. Use the up arrow key to increment the value by 15 minutes or the down arrow key to decrease the value by 15 minutes. Then press F/E key to confirm your timezone.	

3.5.9.4 How to confirm new clock settings:

Step	Description	Figure
1	The confirmation screen is displayed as shown.	
2	Use the left arrow key to confirm the new clock settings or the up arrow key if you do not want to confirm the changes made.	

3.5.10 Functional Test

Feature used only by Hanover to test final assembly and to load factory-set parameters such as serial number, manufacture date and MAC address (Ethernet).

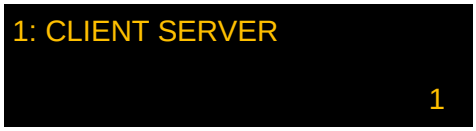
3.5.11 Network

Be careful when using these functions. Incorrect or improper use will render your network not to function properly.

The feature ‘Network’ will be displayed on the screen only if it is Ethernet enabled controller.

This setting contains the FTP Configuration Data. To use this feature, the lock code must be entered, 'Network' found from within the list and then selected using the F/E key. On the destination controller screen, there are currently 25 options. Use the up and down arrow keys to navigate between each one.

An example screen looks like this:



The list of network options in the DG3 destination controller is provided in Appendix F: CONFIG.INI file.

Note: FTP Username and FTP Password should accept any characters, however, attempting to change these from the front panel will only allow to enter characters in the ranges a-z, A-Z and 0-9. If non-alphanumeric characters are used for username and password fields, these fields can be edited using the CONFIG.INI file. Both Username and Password have a maximum acceptable length of 29 characters.

3.6 Reset options

Be careful when using these functions. Incorrect or improper use will erase the currently stored database and / or may reset all configuration and system parameters rendering your DG3 unusable within the vehicle until a database is reloaded.

There are 3 types of reset options available for DG3 as described below:

- **Lock code reset:** for resetting the lock code to the default factory value (0101).
- **Factory reset:** for resetting all the configuration settings to their default values and erasing the database.
- **Hot reboot sequence:** useful in situations where you want to perform either a lock code reset or factory reset but it is not practical to cycle the power.

3.6.1 Lock code reset

Step	Procedure
1	Switch off power to the DG3
2	Press both the **LEFT** and **UP** arrow keys together before power is applied
3	Continue holding through the boot up sequence until the following screen is displayed: DERIC-G3 V1.51.00 abcdeNCP012U4567//
4	The lock code will now be reset to the default factory value (0101)

3.6.2 Factory reset

Step	Procedure
1	Switch off power to the DG3
2	Press both the **F/E** and **UP** arrow keys together before power is applied
3	Continue holding through the boot up sequence until the following screen is displayed: CONF: loading default config
4	All parameters behind the lock code will be reset to their default factory values confirmed by the following screen: CONF: loading default config NCP012U4567// Factory settings loaded The database will be erased and the following screen will be displayed: NO DATA

3.6.3 Hot reboot sequence

Step	Procedure
1	Press both the **F/E**, **LEFT** and **DOWN** arrow keys together: the unit will reset
2	Within 3 seconds: Either hold the left and up arrow keys if a factory lock code reset is needed Or hold the F/E and up arrow keys if a full factory reset is needed

3.7 Firmware

3.7.1 Overview

Occasionally, it may be necessary to update the firmware in the DG3 for any of the following two reasons:

- There is an error in the functionality of the destination controller that affects its operation.

All software changes are tested thoroughly before release but even in the most rigorous test regime, it is possible for bugs to remain undetected. Most installations deploying standard, well-proven functions are very unlikely to be affected by bugs of this type.

- An update is needed in connection with a new feature.

Be careful as a firmware update will erase the controller's database which will need to be uploaded again afterwards.

3.7.2 DG3's firmware version

To know which firmware version your DG3 is equipped with, please follow the procedure below:

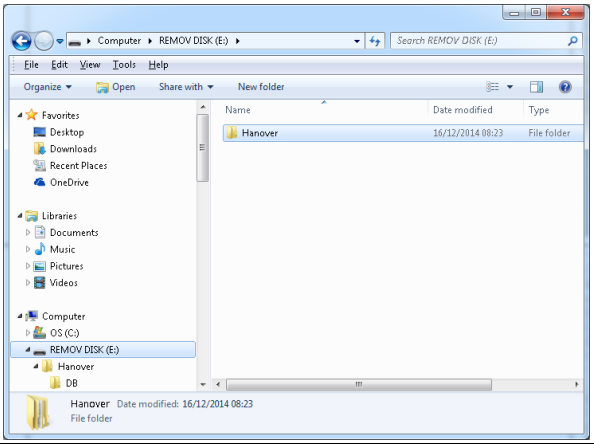
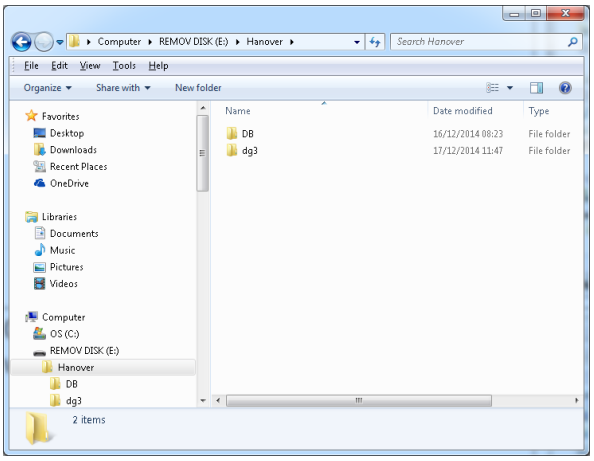
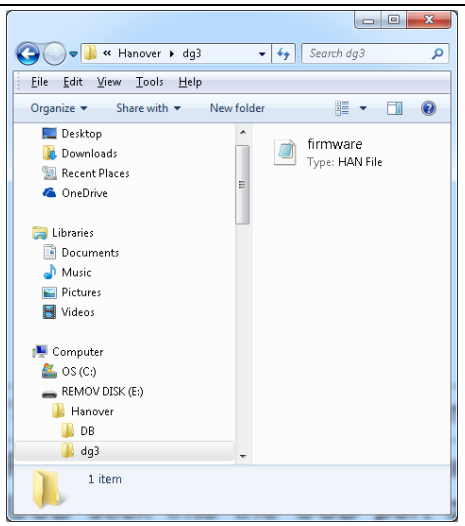
Press the F/E key, the lock code must be entered, 'Show status?' found from within the list and then selected using the F/E key. The firmware version will be displayed as DERIC-G3 V1.XX. In this case, the firmware version will remain on the screen until you exit the function by pressing on the F/E key or left arrow key.

For any enquiry about the latest released firmware version, please contact Hanover (please refer to section 4.3 Hanover Technical Support).

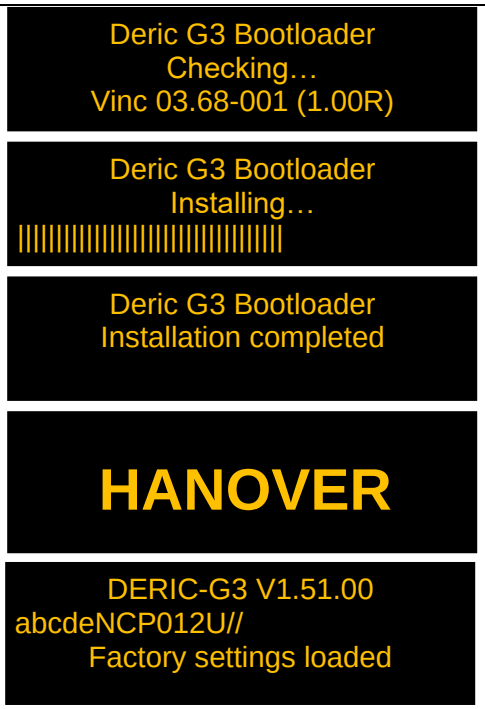
3.7.3 Firmware update via USB FLASH memory drive

Firmware for the DG3 can be loaded via an USB FLASH memory drive as follows:

Step	Description	Figure
1	Obtain a copy of the latest firmware from Hanover and save the file on a standard Windows PC. The file will be named: **firmware.han**.	
2	Insert the USB FLASH memory drive into the PC and locate it. It appears as **REMOV DISK (E:)**. **Note:** The name and drive letter are variable and in this case, the drive letter allocated to the USB FLASH memory drive by the PC is 'E:'.	

3	Create a folder called '**Hanover**' on the USB FLASH memory drive.	
4	Open this folder and create another folder within it named '**dg3**'.	
5	Copy **firmware.han** to the dg3 folder on the USB drive, so that its full path name is **E:\Hanover\dg3\firmware.han**	
6	'Safely remove' the USB FLASH memory drive from the PC.	
7	Power up the DG3 destination controller and plug the USB FLASH memory drive into the USB port on the front panel*.	
8	The message 'Load Data?' will appear on the screen. Confirm this action by pressing the F/E key.	

	The destination controller will show the message ‘Remove USB drive:’ and will flash and beep continuously until the USB FLASH memory drive is removed, whereupon the DG3 will reboot.	Found FIRMWARE.HAN Load data? Yes ------- No Please wait… Loading… IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Load completed Remove USB drive:
9	The DG3 starts rebooting and installing the firmware. • If no UP arrow key is pressed and held when the DG3 starts rebooting, the following screens will be displayed. • If UP arrow key is pressed and held when the DG3 starts rebooting, the following bootloader screens will be displayed.	Load completed Rebooting… Checking… Installing… IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Installation completed HANOVER DERIC-G3 V1.51.00 abcdeNCP012U4567// Factory settings loaded or Deric G3 Bootloader G3-BOOT V1.07.01 Vinc 03.68-001 (1.00R)

		
10	After a firmware update, the database is deleted and the destination controller will show 'NO DATA'. To transfer the database from the USB FLASH memory drive to the DG3, please refer to section 3.2.2.4 Transferring the database from the USB FLASH memory drive to the DG3.	

* When a USB FLASH memory drive is inserted into the DG3, it will always look for (and download) a firmware file first before attempting to start a data download. There is thus no problem if the stick contains an up-to-date firmware.han file as well as an eric.BIN file. However, it does mean that if an updated eric.BIN file is later saved to the stick and downloaded to the DG3, the firmware.han file on the stick will also be downloaded first. There is thus a danger that an older version of the firmware will be downloaded if more recent firmware updates have been carried out using another USB FLASH memory drive. Accordingly, it may be sensible to keep one stick for data and another for firmware.

3.8 Bootloader

3.8.1 Overview

The bootloader is the factory-installed firmware which runs at power-up and allows the boot up of the application firmware (firmware.han).

Note: When updating the bootloader, the database/destination list and destination controller firmware (firmware.han) will not be erased.

In order to update the bootloader onto the destination controller, the following units will be required:

- USB FLASH memory drive (FAT32 formatted)
- DG3 Destination Controller Bootloader (provided by Hanover)

3.8.2 Bootloader version

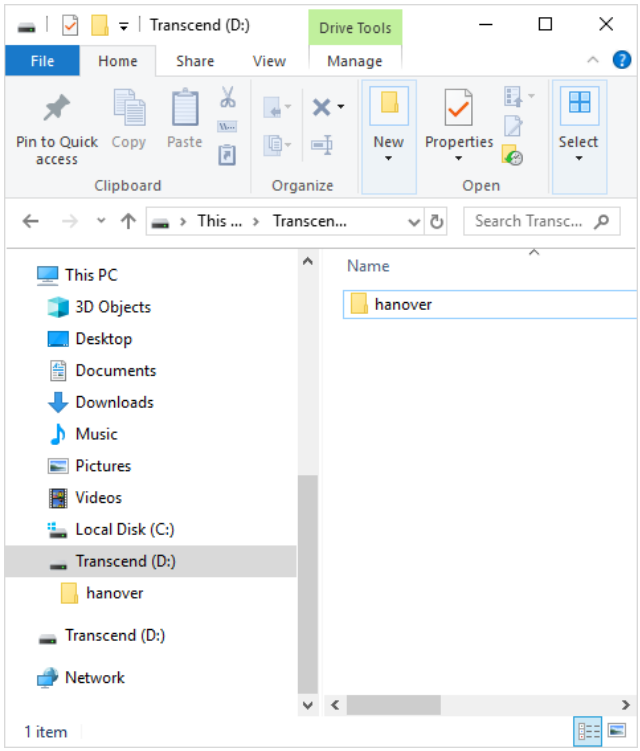
To know which bootloader version your DG3 is equipped with:

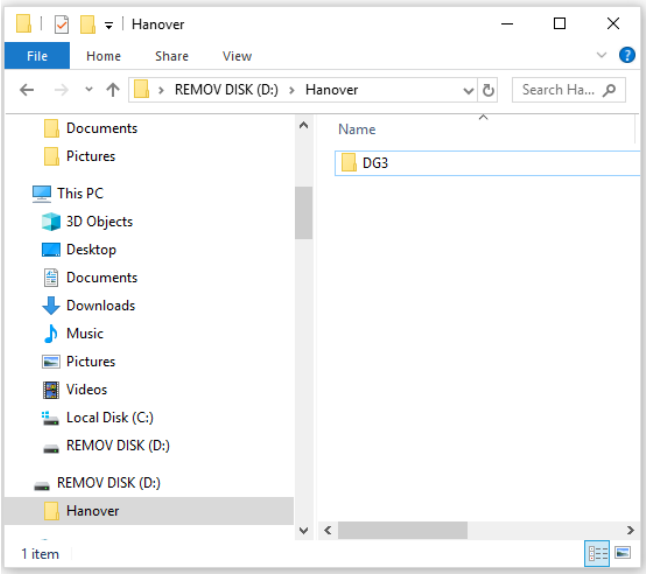
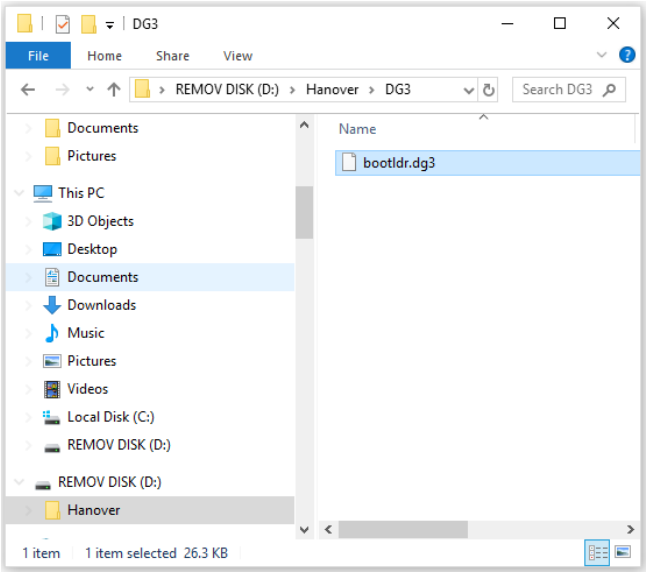
1. Switch off the DG3 destination controller.
2. Press and hold the UP arrow key while switching on the destination controller.

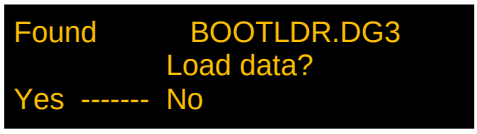
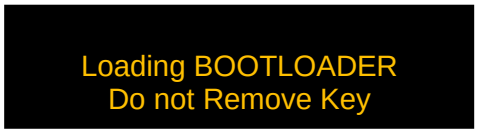
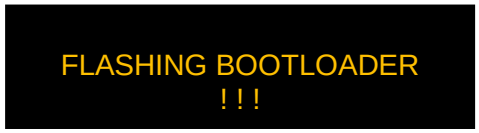
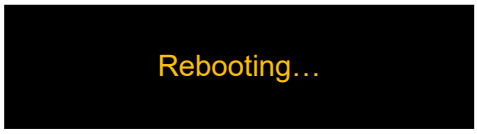
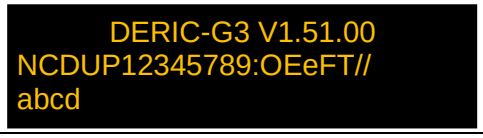
   The bootloader version will be displayed as Deric G3 Bootloader G3-BOOT V1.XX.XX.

3.8.3 Bootloader Update via USB FLASH memory drive

It is now possible to update the DG3 bootloader via an USB FLASH memory drive as follows:

Step	Description	Figure
1	Obtain a copy of the latest bootloader from Hanover and save the file on a standard Windows PC. The file will be named: **BOOTLDR.DG3**.	
2	Insert the USB FLASH memory drive into the PC and locate it. **Note:** The drive letter is variable and in this case, the drive letter allocated to the USB FLASH memory drive by the PC is 'D:'.	
3	Create a folder called '**hanover**' on the USB FLASH memory drive. **Note:** The name of the folder 'hanover' is not case sensitive.	

Step	Description	Figure
4	Open this folder and create another folder within it named '**DG3**'. **Note:** The name of the folder 'DG3' is not case sensitive.	
5	Copy **bootldr.dg3** to the dg3 folder on the USB drive, so that its full path name is **D:\hanover\DG3\bootldr.dg3** where D:\ is the USB drive path. **Note:** The name of the file 'bootldr.dg3' is not case sensitive.	
6	'Safely remove' the USB FLASH memory drive from the PC.	
7	Power up the DG3 destination controller and plug the USB FLASH memory drive into the USB port on the front panel.	

Step	Description	Figure
8	The message 'Load Data?' will appear on the screen. Confirm this action by pressing the F/E arrow key. ⚠ Do not remove the USB FLASH memory drive at any time during this procedure unless instructed to by the controller.	   
9	The DG3 will reboot and start installing the bootloader.	  
10	After rebooting, the DG3 will return to the main screen. Now, unplug the USB FLASH memory drive from the USB port on the front panel.	
11	The bootloader update is now complete. Refer to 3.8.2 Bootloader version to ensure the DG3 is now equipped with the correct version.	

4. Troubleshooting

4.1 Overview

This section lists the more common queries that occur with the DG3 destination controller. The destination controller is not intended for disassembly by the user. Hanover should be consulted (please refer to section 4.3 Hanover Technical Support) if a solution cannot be found by means of altering settings manually or via the HELEN software as described below.

Section	Issue
4.1.1	No display or backlight on destination controller
4.1.2	No communication or required information not displayed on destination displays
4.1.3	List will not load into DG3 destination controller
4.1.4	DG3 loads list correctly but shows 'Bad Destination or Bad Route'
4.1.5	Destination display test function
4.1.6	Information code on destination controller screen shows '??'
4.1.7	Advert code on destination controller screen shows '??'
4.1.8	On-screen response erratic when using keypad
4.1.9	Faults not listed here

4.1.1 No display or backlight on destination controller

No.	Description	Refer to section
1	Check that pins 1 and 10 on the mini fit connector are wired correctly by making sure the pins are pushed in securely into the connector and that the required voltage is present	Appendix A: 18-way mini fit connector

4.1.2 No communication or required information not displayed on destination displays

No.	Description	Refer to section
1	Check that the comms are wired correctly (pin 11 = red (+) and pin 2 = black (-)) by making sure the pins are pushed in securely into the connector	Appendix A: 18-way mini fit connector
2	Check all other cables and connections	
3	Run the destination displays test to check that power and communications are reaching each destination display.	3.5.2 Running the destination displays test

	When DG3 shows 'Testing…', a test pattern should be visible on the destination displays: • If visible, the destination list loaded is possibly not compatible with the destination display system on the vehicle. Check that the HELEN database file has been configured correctly • If not visible, then there is probably a hardware / communications problem	4.1.5 Destination display test function
4	A destination display status check can also be run	3.5.1 Status options

4.1.3 List will not load into DG3 destination controller

No.	Description	Refer to section
1	Check there is a valid destination list in the USB drive and that it has been correctly configured	3.2.2.2 Configuring the USB FLASH memory drive for loading
2	If problem still persists, check if the USB drive is faulty	

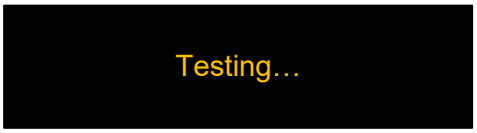
4.1.4 DG3 loads list correctly but shows 'Bad Destination or Bad Route'

No.	Description	Refer to section
1	Ensure a valid destination or route code is being entered	
2	The database may have been saved and loaded as a standard 4-digit code rather than a 10-digit route browse (or vice versa). Check in HELEN that the correct option has been selected	Figure of step 1 in 3.2.2.3 Transferring the database to the USB FLASH memory drive using HELEN
3	Resave the database to the USB drive if necessary and then upload it to the DG3 again	

4.1.5 Destination display test function

The destination display test function tests all the destination displays connected to the DG3 destination controller. This function is accessed via the menu behind the lock code (please refer to section 3.5 Accessing other functions of the DG3), 'Test signs?' found from within the list and then selected using the F/E key.

The screen looks like this:



The destination controller will then flash ‘Testing’ as shown above and send a message to all the connected destination displays for them to show a repeating test pattern. This test pattern verifies that the destination displays and the destination controller are communicating with each other and that for LED destination displays, the individual LEDs are working correctly.

LED destination displays will show a scrolling message followed by an alternating test pattern (the content of the scrolling message is described below) whilst flip dot destination displays will show just the test pattern.

There will be some variation in what is scrolled across the destination display, depending on firmware, display size etc., but the key areas will be the same.

Failure of this test sequence to appear indicates that power and / or communications are not present and / or cables may have been incorrectly connected.

Display test character string definition

LED destination displays will show scrolling text similar to that set out below, followed by a series of horizontal and vertical line test patterns:

Example: **OLED v1.39.00 X2.2 #0 160 x 24 C=3D10 P=10/100 CRC=AE98**

OLED v1.39.00 = the destination display's base software type and version

X2.2 = application software version (Super X)

#0 = destination display address, set by the physical switch on the processor

160 x 24 = the destination display resolution (horizontal x vertical)

C=3D10 = destination display configuration (for Hanover internal use)

P= 10/100 = brightness parameters of the destination display where the left value is the current brightness, and the right value is the maximum configured (max 100)

CRC=AE98 = firmware checksum (for Hanover internal use)

Note: It is possible to show the switch address of the destination display while Test Sign feature is running on the DG3 destination controller.

No.	Description
1	While the destination controller is flashing **Testing…**, press the  key to enter the address mode. • For Flip-dot destination displays: ➢ will stop display of alternating test matrix ➢ will display destination display address only (e.g. #X where X is the destination display address) On destination controller: will continue flashing **Testing…** • For LED destination displays: ➢ will stop display of scrolling test pattern ➢ will display destination display address only (e.g. #X where X is the destination display address) On destination controller: will continue flashing **Testing…**
2	Press  key to go back to normal test mode.

4.1.6 Information code on destination controller screen shows '??'

'??' will be shown if an invalid code has been selected – i.e it does not match any of the information codes stored in the database.

No.	Description	Figure
1	Further to setting "IN – Prompt for Info Num" to 1 in the configuration code options, press the F/E key repeatedly until the following screen appears	
2	Use the up and/or left arrow keys until the required digit value is reached	
3	Press the F/E key to validate	
4	The current route / destination will be shown, along with the chosen information message	

4.1.7 Advert code on destination controller screen shows '??'

No.	Description	Figure
1	Further to setting "AN – Prompt for Ad Num" to 1 in the configuration code options, press the F/E key repeatedly until the following screen appears	
2	Use the up and/or left arrow keys until the required digit value is reached	
3	Press the F/E key to validate	
4	The current route / destination will be shown, along with the chosen advert message	

4.1.8 On-screen response erratic when using keypad

If DG3 does not reliably respond to a key press, the keypad may be faulty. Contact Hanover (please refer to section 4.3 Hanover Technical Support) to arrange a return for repair.

4.1.9 Faults not listed here

The most commonly occurring faults have been described above. However, other fault conditions can occur occasionally. These often arise during data loading or because of communication set-up problems. Such faults can be identified by using the 'Show Status' function. Please refer to section 3.5.1 Status options.

4.2 If troubleshooting does not solve the problem

If the troubleshooting guide fails to solve the problem, Hanover Technical Support should be contacted for advice. However, please gather the following list of information before contacting Hanover Technical Support:

No.	Description	Figure	Refer to section
1	Software version of DG3		3.7.2 DG3's firmware version
2	Product code of DG3	On the silver label on the casing (if accessible)	1.5 Identification
3	Product codes of destination displays connected to the DG3	On the rear panels of destination displays	
4	Nature of problem, including what is or is not being displayed by the DG3 and the destination displays connected to it		
5	The eric.bin and corresponding HELEN data files		

4.3 Hanover Technical Support

Please do not hesitate to contact Hanover Technical Support located in Lewes, UK for any problem encountered or for any advice needed for using the DG3 destination controller:

Contact	
Phone	+44 (0)1273 477528 Ext.615 or Option 2
Email	support@hanoverdisplays.com

5. Queries, FAQs and other information

5.1 Overview

The previous section provides in-depth information on diagnosing problems that can occur with the DG3. This 'how to' section provides answers to typical questions and queries associated with the unit and includes cross-references and links where appropriate to the relevant sections of the manual.

If the answer is not found here, users can contact Hanover Technical Support – please refer to section 4.3 Hanover Technical Support.

5.2 Queries

How to:	Refer to section
Format a USB FLASH memory drive prior to loading a database into the DG3	3.2.1 Formatting the USB FLASH memory drive
Configure a USB FLASH memory drive for loading a database into the DG3	3.2.2.2 Configuring the USB FLASH memory drive for loading
Determine the sizes and addresses of the destination displays	3.5.1 Status options
Mimic the content of a specific display on the destination controller screen	DD entry in Appendix E: Configuration Code Options
Reset the DG3	3.6 Reset options
Change the language setting in the DG3	LG entry in Appendix B: System Options
Add a 'bus reversing' message to the destination displays	Displaying ‘Bus reversing’
Add an 'emergency' message to the destination displays	Emergency message
Use the clock function within the DG3	3.5.9 Setting the clock
Use the 'battery guard' feature	Blanking the destination display (battery guard)

5.3 Frequently asked questions

Questions	Answers
Do I need a special loading device?	No, you can use an off-the-shelf USB flash drive. It should be noted that these are not 100% reliable so you may need to try more than one.
How do I load the DG3?	A database of destination information (plus adverts and other messages if required) is prepared on a standard Windows PC using HELEN sign-editing software. This is transferred to a USB FLASH memory drive and then loaded directly into the DG3. Please refer to section. 3.2 Loading a database into the DG3
Can I change a DERIC+ for a DG3?	Yes, you will need Hanover adaptor cable CX330K and a USB flash drive. Please refer to 2.2.2.1 CX330K – For replacing a DERIC+ destination controller and 5.4.1 Replacing a DERIC+ destination controller with a DG3 destination controller.
Can I change an ERIC++ for a DG3?	Yes, you will need Hanover adaptor cable CX330X or CX330N and a USB flash drive. Please refer to 2.2.2.2 CX330X OR CX330N – For replacing an ERIC++ destination controller and 5.4.2 Replacing an ERIC++ destination controller with a DG3 destination controller.
Do I need a new database for the DG3?	No, your existing database will work.
I have to use a HELEN-compressed database, will this work?	Yes.
My database uses profiles, will this work with the DG3?	Yes, the DG3 supports profile and container file databases.

5.4 Other information

5.4.1 Replacing a DERIC+ destination controller with a DG3 destination controller

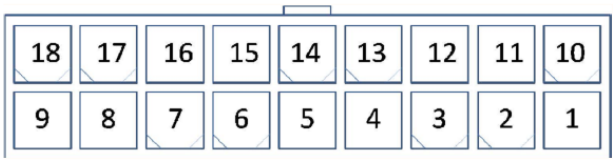
No.	Description	Refer to section
1	The casing of the DG3 is of the same size to that of the DERIC+. So, the actual position of the DERIC+ is appropriate for fitting a DG3 by direct replacement.	2.1 Fitting the destination controller
2	From the rear of the DERIC+ destination controller, unplug the 2-way (communications) and 3-way (power) plugs	2.2.2 Adaptor cable
3	Loosen and unclip the screw fixings holding the DERIC+ destination controller in place: it should then slide out of its mounting	
4	The DG3 destination controller can be used with a conversion cable CX330K when replacing a DERIC+. This has an 18-way minifit connector which plugs into the rear of the DG3 and three connectors at the other end which can be connected directly to the power and communications plugs previously connected to the DERIC+	

5.4.2 Replacing an ERIC++ destination controller with a DG3 destination controller

No.	Description	Refer to section
1	The casing of the DG3 is of different size to that of the ERIC++. Consequently, the actual position of the ERIC++ is no longer appropriate for fitting a DG3. If it is not possible to modify the size of the actual position, look for another appropriate position for fitting the DG3 while making sure the new wiring system is properly made.	2.1 Fitting the destination controller
2	From the rear of the ERIC++ destination controller, unplug the 2-way (communications) and 3-way (power) plugs	2.2.2 Adaptor cable
3	Loosen and unclip the screw fixings holding the ERIC++ destination controller in place: it should then slide out of its mounting	
4	The DG3 destination controller can be used with a conversion cable CX330X or CX330N when replacing an ERIC++. This has an 18-way minifit connector which plugs into the rear of the DG3 and three connectors at the other end which can be connected directly to the power and communications plugs previously connected to the ERIC++	

Note: ERIC++ has different features to the DERIC family of destination controllers; please refer to ERIC++ Destination controller – Installation and Operating Manual (ref. 540114) if replacing one with a DG3.

Appendix A: 18-way mini fit connector



Appendix A-1: 18-way mini fit connector: pinplan

Pin	Function	Description
1	PGND	Power ground
2	SIGN RS485B	Destination display port RS485 B*
3	[varies] **	Secondary comms (multifunction) routed to plug-in site
4	[varies] **	Secondary comms (multifunction) routed to plug-in site
5	*DIGIN2*	*Digital input 2 – (+4V) to (+36V)*
6	DIGIN1	Digital input 1 – (+4V) to (+36V)
7	DIGIN0	Digital input 0 (isolated) – Cathode connection (-)
8	USB1DP	USB host/slave port data plus
9	For USB	USB host/slave 0V return
10	24V_VIN	Main 24V power input – (+9V) to (+36V)
11	SIGN RS485A	Destination display port RS485 A*
12	[varies] **	Secondary comms (multifunction) routed to plug-in site
13	[varies] **	Secondary comms (multifunction) routed to plug-in site
14	DIGOP0	Digital output 0
15	*PGND*	*Power ground*
16	DIGIN0	Digital input 0 (isolated) – Anode connection (+) – (+4V) to (+36V)
17	USB1DM	USB host/slave port data minus
18	USBSLV	USB slave power input (terminal mode)

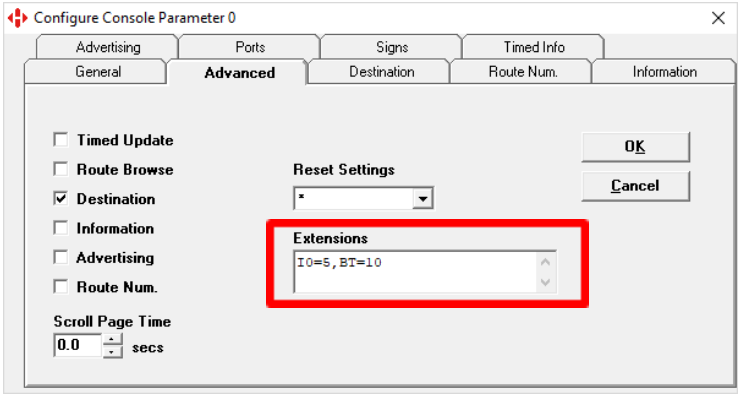
***** For special variant DG3-05-01, the destination display port will use the secondary RS485 comms. Refer to Appendix A-3: Wiring variation for additional communication protocols.

****** Refer to Appendix A-2: COMMS OPTIONS: 18-way mini fit connector.

Note: Please make sure that Pin 5, Pin 6 and pair of Pin 7 and 16 of the 18-way mini fit connector correspond to the correct external input (I0, I1 or I2) in HELEN software:

- Pin 5 (digital input 2 of DG3) corresponds to external input I1 in HELEN software
- Pin 6 (digital input 1 of DG3) corresponds to external input I0 in HELEN software
- Pair of pins 7 and16 (digital input 0 of DG3) corresponds to external input I2 in HELEN software

Example of battery guard (destination display blanking) in HELEN software:



Appendix A-2: COMMS OPTIONS: 18-way mini fit connector

Pin		4	3	13	12
Function		NC/B_3	SG/B_3	TX/A_3	RX/A_3
COMMS	**RS232**	23V 5V RTS	0V	TX	RX
	RS422	TX B	RX B	TX A	RX A
	RS485	-	B	-	A
	Isolated RS485	ISO GND -R	B	ISO GND +R	A
	IBIS MASTER	0V	0V	RX	TX
	J1708	-	B	-	A
	INTERFACE PINS	B	D	A	C
	IBIS SLAVE	TX-	RX-	TX+	RX+
	J1939 CAN	CAN_L	CAN_GND	CAN_H	CAN_GND
	TTL PASSTHROUGH	0V	TX	5V OUT	RX

Appendix A-3: Wiring variation for additional communication protocols

18-way mini fit connector pinout for additional communication protocols provided by Hanover plug-in devices are shown below:

DG3 01 1 0 **RS232 comms** **7521-01-01 plug-in interface**

Pin	Function	Description
3	GND	RS232 Plug-in Common Ground
4	N/C	No internal connection
12	RxD	RS232 Plug-in Received Data
13	TxD	RS232 Plug-in Transmitted Data

DG3 01 3 0 **RS422 comms** **7202-01-03 plug-in interface**

Pin	Function	Description
3	RxD B	RS422 Plug-in Received Data B
4	TxD B	RS422 Plug-in Transmitted Data B
12	RxD A	RS422 Plug-in Received Data A
13	TxD A	RS422 Plug-in Transmitted Data A

DG3 01 3 0 **7202-01-03 plug-in interface**
DG3-05-00 / DG3-05-01 **RS485 comms** **71020-01-xx plug-in interface**

Pin	Function	Description
3	RS485 B	RS485 Plug-in Data B
4	N/C	No internal connection
12	RS485 A	RS485 Plug-in Data A
13	N/C	No internal connection

DG3 01 4 0 **isolated RS485 comms** **7756-01-01 plug-in interface**

Pin	Function	Description
3	RS485 B	Isolated RS485 Plug-in Data B
4	GND	Isolated RS485 Plug-in Common Ground
12	RS485 A	Isolated RS485 Plug-in Data A
13	100Ω Term	Isolated RS485 Plug-in 100Ω Termination to Common Ground

DG3 01 5 0 **IBIS slave comms** **7206-01-02 plug-in interface**

Pin	Function	Description
3	Tx GND	WBMS (Wagenbus Masse Senden) (Brown)
4	Rx GND	WBME (Wagenbus Masse Empfangen) (Green)
12	Tx Data	WBSD (Wagenbus Senden Data) (White)
13	Rx Data	WBED (Wagenbus Empfangen Data) (Yellow)

DG3 01 6 0 **SAE J1708 comms** **7624-01-01 plug-in interface**

Pin	Function	Description
3	SAE #B	SAE-J1708 #B
4	N/C	No internal connection
12	SAE #A	SAE-J1708 #A
13	N/C	No internal connection

DG3 01 8 0 **TTL passthrough comms** **71034-01-01 plug-in interface**

Pin	Function	Description
3	Tx Data	TTL passthrough Transmitted Data (100Ω)
4	GND	Ground
12	Rx Data	TTL passthrough Received Data (100Ω)
13	5V OUT	5V Out (Fused 100mA)

Appendix B: System Options

This appendix lists all functions available in the system and their values selected by using the F/E key:

Option	Possible values	Value by default	Description
AS - Auto Speed	2400, 4800, 9600, 19200, 38400, 57600, 115200	57600	Sets transfer speed of destination display firmware updating (for example, an oled.bin file)
DA - Daylight Saving	1 = enabled 0 = disabled	1	In Europe (only), the destination controller will automatically adjust clock for daylight saving. Adjustment must be made manually for other territories (only applies if clock enabled in both cases).
DP - Date pos.	1 = UK: date/month/year 2 = USA: month/date/year	1 (31/12/2010)	Position of date and month (only applies if RTC fitted and enabled)
EBN – enable USB ERIC.BIN	1= enabled 0 = disabled	1	When enabled, the destination controller will search for file **hanover\db\eric.bin** when USB drive is inserted. Setting this parameter to '0' will make it impossible to load an eric.bin via USB.
KL - Key Illumination	0 - 100	30	Used to back-illuminate function keys. 100 = brightest (for dark cab situations)
UP - USB Power	Enabled = USB power is always ON. Disabled = USB power is OFF. USB power is activated for 2 minutes when the lock code* is entered to allow for updates. 1 - 5 = USB power is ON for the specified time in minutes after the unit is powered on**, then it is disabled. USB power can be re-enabled for the specified time by entering the lock code*.	Enabled	If used, this function allows the power to the USB port to be turned off.
LC - Lock Code	0000 - 9999	0101	Allows lock code to be set

Option	Possible values		Value by default	Description
LG - Language (ISO 639.2 codes)	DA - Danish EN - English FI - Finnish FR - French DE - German HE - Hebrew ID - Indonesian IT - Italian	PT - Portuguese ES - Spanish SV - Swedish NO- Norwegian RO - Romanian TR - Turkish ZH - Chinese NL - Dutch	EN	Determines the language used by destination controller (Not all languages are programmed into HELEN by default)
PF - Profile	Name 0 - Name 99		Name 0	Controller configuration set in HELEN. For more details, please refer to HELEN sign-editing software - operating manual (ref. 540125).
SS - Sign Speed	AUTO, 4800, 9600, 19200, 38400		4800	Baud rate = data transmission speed between the destination controller and displays. Destination displays themselves must have their processors set to the same baud rate as the destination controller and as each other. The AUTO setting is rarely used.
SST – Status Timeout	100, 150, 200, 250, …, 1900		100	To allow for possible status reply delays.
TU - Timed Update	1 = enabled 0 = disabled		0	Allows another destination controller configuration to be uploaded but not implemented until a pre-determined time
ZZ - Factory Code	00 - 99		00	For Hanover use only

Notes:

* When the lock code is entered, the user should return to the main screen in order to be able to insert the USB key and perform updates.

** The USB power timer is triggered when the unit is turned on. This could be through the main bus power or the ignition depending on how the unit is wired. The timer can be reset by rebooting the unit.

Appendix C: Protocols – Port Options

The protocols available in port options of the DG3 destination controller are as follows:

Option	Protocol	Description
P0 - Port 0 (fixed 485), P1 - Port 1 (configurable), P2 - Port 2 (USB), UDP1 – Ethernet**, UDP2 – Ethernet**, TCP1 - Ethernet, TCP2 - Ethernet	-	Indicates that the port function is disabled
	SIGN	The standard Hanover Signs Protocol (HCP)
	DIAG	Diagnostic tasks (RS232)
	SOCRIE-A	Customer Specific
	SOCRIE-B	
	GTMH-1	
	HANO-1	
	HANO-1F	
	HANO-2	
	HANO-2F	
	ISR-1	
	INIT-TCRA	
	VDV-IBIS	
	IBIS-2	
	IBIS-3	
	IBIS-4	
	IBIS-5	
	IBIS-6	
	IBIS-WL	
	IBIS-BE	
	IBIS-ACT	
	KIRCHHEIM-IBIS	
	FREIBURG-IBIS	
	KOR-1	
	KOR-2	
	KOR-3	
	KOR-4	
	AACHEN-IBIS	
	IBIS-VMX	
	IBIS-ARR	
	IBIS-ALMERE	

Option	Protocol	Description
P0 - Port 0 (fixed 485), P1 - Port 1 (configurable), P2 - Port 2 (USB), UDP1 – Ethernet**, UDP2 – Ethernet**, TCP1 - Ethernet, TCP2 - Ethernet	IBIS-HBG1	Customer Specific
	IBIS-HBG2	
	IBIS-LTA	
	HANVOX	
	TGX150-A	
	TGX150-D	
	PRODAT-A	
	ERG-A	
	ERG-B	
	ERG-C	
	MONET-A	
	MONET-B	
	SYSECA-A	
	SLE	
	NYCT	
	OCTA	
	J1708-3*	
	J1708-2	
	J1708-2A	
	J1708-1*	
	J1708-5*	
	SEMA	
	SEREL	
	RGLIT	
	BKB232	

***Note:**
If parameter IND=… is NOT present: J1708-1, J1708-3 and J1708-5 will use 9XXX for INFO messages when in AUTO mode but will only allow 2-digit manual entry and will look for standard 2-digit INFO messages if manually entered. Other J1708 interfaces will always access the 2-digit INFO section of the database.
If parameter IND=… is present: it will have effect in both manual and auto modes and INFO messages will always be located under destination codes specified under the IND parameter.
For example:

- If IND=PRxx (e.g. PR01), it will use information codes from the destination list in the PRxx range.
- If IND=IN, it will use information messages from the information page (not from the destinations).

Option	Protocol	Description
	BKBCORUNA	Customer Specific
	HANAUTO	
	AESYS-A	
P0 - Port 0 (fixed 485), P1 - Port 1 (configurable), P2 - Port 2 (USB), UDP1 – Ethernet**, UDP2 – Ethernet**, TCP1 - Ethernet, TCP2 - Ethernet	CAN-BCS[1] CAN-BCS-1 CAN-BCS-2 CAN-BCS-2A	**For 'New Flyer' manufactured bus** J1939 CAN bus – electric vehicle charging status display. Requires 7752 CAN plug-in. SOC message ID18FFF932 (8 bytes in length). • 1st byte (bits 5, 4) ○ 00 – off charges ○ 01 – on charge ○ 10 – error Used to initiate display when BCA=1 is set. • 2nd byte = % of battery charge level ○ 1 bit = 0.4% ○ range = 0% - 100%
		For 'BYD' manufactured bus J1939 CAN bus – electric vehicle charging status display. Requires 7752 CAN plug-in. SOC message ID 18FC08F4 or 18F737F4 (8 bytes in length). 16 bit value = % of battery charge level • 6th byte = high 8 bits (resolution = 0.1) • 5th byte = low 8 bits (resolution = 0.1)

[1] To display the charge value, a destination message must be created in text format (or Super-X) containing the character '#'. For example: BATTERY # PERCENT. The '#' character will be replaced by a decimal value e.g. 98.4. – the # character can also be placed in the driver's display to show on the front panel.
A new parameter must be included in the database to tell the controller which destination is the battery charge display: BCS=nnnn where nnnn is the destination code which uses the '#' message. This means that the correct destination code must be manually selected in order to display the battery charge state.
For 'New Flyer' manufactured bus, the battery charge display destination can be automatically set when the bus is connected to the charger. To enable this, the parameter BCA=1 must be set.

Option	Protocol	Description

P0 - Port 0 (fixed 485),
P1 - Port 1 (configurable),
P2 - Port 2 (USB),
UDP1 – Ethernet**,
UDP2 – Ethernet**,
TCP1 - Ethernet,
TCP2 - Ethernet
	IVNUPLOAD	When setting this protocol, you will be prompted to enter the following:
		• **IP PORT:** this is the port number that the DG3 can communicate with the on-board computer.
		• **MODE:** to select between SERVER and CLIENT:
		  ○ SERVER: this is set when the DG3 is the server and external devices are initiating the connection to the DG3.
		  ○ CLIENT: this is set when the DG3 is a client and the DG3 is initiating the connection to a server.

****Note:**
Parameter ZZ=12 must be set in order to change sign port.
ZZ=12, P1=-, UDP1=SIGN.
Requires latest G5 ethernet-compatible signs.

Appendix D: Sign Options

This appendix lists all functions available in the sign options and their values selected by using the F/E key:

Option	Values	Description
S0 - Sign 0 S1 - Sign 1 S2 - Sign 2 S3 - Sign 3 S4 - Sign 4 S5 - Sign 5 S6 - Sign 6 S7 - Sign 7 S8 - Sign 8 S9 - Sign 9 SA - Sign 10 SB - Sign 11 SC - Sign 12 SD - Sign 13 SE - Sign 14 LN - Internal Sign Number	-	No setting (disabled)
	*	Automatic assignment, i.e. the switch number setting in the destination display is the same as that in the destination controller's database, as determined by HELEN software
	0…23	The number of the destination display assigned by HELEN software
	EX	Adverts
	HV	Hanvox voice announcement system
	HANCIS/HTC	Hancis (or HTC) on-board computer This parameter should only be used if your DG3 has a Hancis or HTC unit connected to the physical destination display system in your vehicle. Setting destination display no. to the 'Hancis/HTC' value will enable the DG3 to remotely control certain features of the Hancis/HTC unit. It will also add an additional Hancis/HTC menu item under the main function menu.
	RN	To use this feature, you have to configure a destination display to be "RN". If any destination displays are configured as RN, then the 'R' key will be available to accept a manually entered alphanumeric value which will be sent directly to only those destination displays configured as RN.
	NN	Driver-entered Run No. feature. To use this feature, you have to configure a destination display to be "NN[2]". If any destination displays are configured as NN, then this destination display address will receive a text message with the contents of a driver-entered alphanumeric code (which is entered by pressing the FE key until 'Run No:' prompt is displayed).
EB - Escaped Binary	0: OFF 1: ON	When switched on, this option allows faster delivery of information to the destination display and is thus used to speed up delivery of large-sized graphic messages. **Note:** It has no effect on Super-X messages, whether or not they contain graphic images.

[2] Only NN is available from the 'Signs' menu for manual entry but NN or XN can be used when configuring the database e.g. S0=NN is the same as S0=XN and will both cause Run No. feature to be available.

Appendix E: Configuration Code Options

This appendix lists the parameters for configuration of the DG3 and their meaning:

Code shown as	Possible values	Value by default	Description
AL – Advertising Signs	0 - 4	0	Sets the quantity of advertising signs connected to the destination controller and causes their addresses to be numbered immediately following the last-addressed destination display. **Note:** This is not the preferred method of address-setting for the advert signs; it is better done from within the HELEN software, using the expression Sn=EX (where n= the address number of the destination display carrying the advertising message) in the "Extensions" box (see the HELEN sign-editing software - operating manual (ref. 540125)). More than one expression can be used if more than one destination display is showing the advertisement; they should be separated by a comma.
AM – Auto/Man menu enable	0 = disabled 1 = enabled	0	If this is active (AM=1), a prompt "AUTO/MAN" is available from behind the lock code. The destination controller can be fixed into 'auto' (where it is not possible for the driver to alter the destination) or 'man' (where only driver-entered destination codes will be accepted).
AN – Prompt for Ad Num	0 = disabled 1 = enabled	0	Controls: • advert only messages on internal destination displays and • advert number prompt on the destination controller screen
BCA – Battery Charge (Auto)	0 = disabled 1 = enabled	0	BCA=1 turns on automatic display of charging message when charger is connected. Works only with CAN interfaces which have been specifically designed to show Battery charge status.
BI – Browse to Idle	0 = disabled 1 = Browse to Idle is only allowed if RM = 1 2 = Browse to Idle is always allowed	1	Allows: • destination browse to include destination 0000 and • route code 0000 to browse to Idle in route browse mode
BR – Destination Browser	0 = disabled 1 = enabled	0	Requires Destination to be enabled (DN=1) and is not available if 'Route Browse' enabled (RB=1).

Code shown as	Possible values	Value by default	Description
			With the up and down keys, all destinations can be scrolled through and selected. **Note:** Do not confuse this code with that for bus reversing, which is set as an external input option - please refer to section Displaying 'Bus reversing'.
BT – Blanking Timer	0 - 100	0	Blanking timer in minutes (used with battery guard feature - please refer to section Blanking the destination display (battery guard).
BL – Blanking Level	0 - 100 where: 0 = 100% (maximum brightness) 100 = 0%	0	Brightness limit of destination displays during BT-defined period (please refer to BT above) following which, destination displays go blank - please refer to Blanking the destination display (battery guard).
CB – Confirm Browse	0 = does not prompt 1 = prompts	0	Prompts for selection confirmation when driver browses destinations in a route
DD – Driver's Display	* = use of driver's destination controller display text from HELEN 0 - 7 = show content from selected destination display on driver's display	*	Determines what is shown on driver's destination controller display
DI – Drivers ID	0 = disabled 1 - 5 = number of digits allowed	0	Prompt for driver's ID (i.e. PIN). This is used by the HTC, Hancis etc: when activated, it leads to PIN request. ID number length is set by DI value. On reboot, screen will display: 
DLN – De Lijn Mode	0 = No Delijn mode 1 = Busses 2 = Trams	0	Special functionality for Delijn project, including number-entry, status display and communication with HTC.
DAV – De Lijn AVL	0 = disabled 1 = enabled	0	Enables / disables AVL menu option when DLN=1
DM – Display Mode	0 = use of only the top line of the destination controller screen	1	Controls how driver's message is displayed on the destination controller screen

Code shown as	Possible values	Value by default	Description
	1 = use of the top two lines of the destination controller screen 2 = attempts a 'best-fit' of driver's message within destination controller screen (if necessary, by re-sizing) T = shows time in hours, mins, secs (24h clock) - where clock is enabled T12, T12S, T24, T24S = displays (12h / 24h) clock without / with seconds - where clock is enabled		
DN – Prompt for Dest Num	0 = no 1 = yes	1	In standard destination mode: it controls if • destination information and numbers are shown on the passenger destination displays and • destination codes can be viewed and changed on the destination controller. In route browse mode: this feature has no effect.
DS – Destination Code Size	3 - 6	4	Controls the size of the destination code shown on the destination controller screen; it can be set from 3 to 6 digits.
HA – Hide Adverts	0 = does not require lock code 1 = requires lock code	0	Adverts are shown on passenger destination displays and the advert code is shown on the destination controller screen. This feature controls whether changing the advert code requires the lock code.
HDM – HTC Driver menu	0 = disable HTC Driver menu 1 = enable HTC Driver menu	1	Enables/disables access to the HTC Driver menu. The HTC menu can be accessed by holding the enter key for 2 seconds. The HTC menu includes audio announcements volume etc. Disabling this feature prevents access to the HTC menu by holding the enter key.
HI – Hide Information	0 = does not require lock code 1 = requires lock code	0	Information is shown on destination displays and also on the destination controller screen. This feature controls whether changing the information code requires the lock code. If a manual info code is entered, automatically selected info codes will be replaced with the manually entered information code. This manual override is temporary and will be replaced if another destination with auto info codes is entered or if the unit is powered down (manual entry can be

Code shown as	Possible values	Value by default	Description
			disabled by setting HI=1). Also, if externally triggered info messages are activated (BUS FULL), it will override the auto info messages.
HT1 – HTC Timer 1	0…100	10	Configurable time delay that causes the DG3 to wait the defined time before transmitting update information. This is to allow the user time to enter both a new Route number and Destination number before the message is sent to the HTC. Unit of measure: Seconds (Default = 10 Seconds)
I0 – Ext Input 0	-, 1, 2 … 10, IN, INI, DV, DVI, BR, BRI, AL1, AL1I, AL2, AL2I, AL3, AL3I	7	Please refer to section External inputs I0, I1 and I2. **Note:** AL1 to AL3: 3 messages which work in the same way as Bus Stopping, in that they are only displayed on destination displays which have data for this message in the database. Requires additional parameter to be added to database (in 'Advanced' extensions box in HELEN): AL1=nnnn where nnnn is the database code containing the message to be displayed (AL1I to AL3I means input sense is inverted) e.g. I1=AL2, AL2=9998 or I0 = AL3, AL3=9996.
I1 – Ext Input 1	-, 1, 2 … 10, IN, INI, DV, DVI, BR, BRI, AL1, AL1I, AL2, AL2I, AL3, AL3I	-	Please refer to section External inputs I0, I1 and I2. **Note:** AL1 to AL3: 3 messages which work in the same way as Bus Stopping, in that they are only displayed on destination displays which have data for this message in the database. Requires additional parameter to be added to database (in 'Advanced' extensions box in HELEN): AL1=nnnn where nnnn is the database code containing the message to be displayed (AL1I to AL3I means input sense is inverted) e.g. I1=AL2, AL2=9998 or I0 = AL3, AL3=9996.
I2 – Ext Input 2	-, 1, 2 … 10, IN, INI, DV, DVI, BR, BRI, AL1, AL1I, AL2, AL2I, AL3, AL3I	-	Please refer to section External inputs I0, I1 and I2. **Note:** AL1 to AL3: 3 messages which work in the same way as Bus Stopping, in that they are only displayed on destination displays which have data for this message in the database. Requires additional parameter to be added to database (in 'Advanced' extensions box in HELEN): AL1=nnnn where nnnn is the database code containing the message to be displayed (AL1I to AL3I means input sense is inverted) e.g. I1=AL2, AL2=9998 or I0 = AL3, AL3=9996.
IN – Prompt for Info Num	0 = no 1 = yes (and can be changed)	1	Controls whether: • information code is visible or accessible on the destination controller, and • information is shown on the passenger destination displays

Code shown as	Possible values	Value by default	Description
			Note: An information message can be selected on activation of the external input. The message is enabled by adding the parameter IC = nn, where nn = 01 – 99 in the 'Extensions' box of HELEN software. Refer to External inputs I0, I1 and I2 – Information message.
IP – Ext IP INFO mode	0 = The system behaves as with a normal HELEN-configured information message. 1 - 8 = The number of destination pages is limited to this value. After they have all been shown, the information message is shown. X = The information page is shown after every individual destination page.	0	Determines how the information pages are presented when an information message is externally (using IN/INI) selected. For externally activated information messages, refer to section External inputs I0, I1 and I2 – Information message.
IPG – Global INFO mode	0,…,8, X	0	Behaves in the same way as IP=n but affects all other INFO messages (IP=n only affects externally triggered info message).
RB – Route Browse	0 = disabled 1 = enabled	0	A route number is first entered and then all destinations available for that route can be scrolled and selected. **Note:** the entries in the HELEN database must have 10 digit codes of the form 00RRRRDDDD where RRRR is the Route No to be entered and DDDD identifies the destination within that route.
RL – Route No Len	3 - 7	4	Defines the length of route number
RM – Remote Enable	0 = no 1 = yes	0	Controls whether remote control function is enabled. Must be set to '1' if remote selection of destination/route/info is required. **Note:** RM=1 by default when HANO-1, HANO-2, HANO-1F, HANO-2F are assigned to a port.
RN – Route Number	0 = no 1 = yes	0	Controls whether driver-configurable route numbers can be viewed and changed on the destination controller. **Notes:** • Pre-configured route codes cannot be altered directly via the destination controller

Code shown as	Possible values	Value by default	Description
			• This feature has no effect if the destination controller is in route browse mode.
RP – Remote Priority	0 = Remote cannot override manual number entry 1 = Remote will always override manual number entry 2 = Manual overrides remote temporarily, but a change in remote data will override manual 3 = Remote cannot select IDLE 4 = Special for Dublinbus	0	This is a way of specifying the way the driver-entered destinations can override remote commands and vice-versa. This parameter should be considered together with parameter RS (Reset Settings) which controls what is remembered after power cycle.
RS – Reset Settings	When RM = 1 (enabled): * = All visible parameters are reset, passenger destination displays are blank and DG3 enters into IDLE mode. If a number is now entered manually, DG3 stays in Local mode and will not respond to further remote inputs until 0 for destination or 99 for information is entered locally. 0 = No reset: passenger and driver destination displays return to their pre-reset state. 1 = DG3 reset to IDLE mode. 2 = Returns to last remotely selected destination, or to IDLE mode if no previous selected remote location is available.	*	Resets destination controller in various ways, depending on whether or not remote control is enabled.
	When RM = 0 (disabled): * and 0 = No reset. Passenger and driver displays show Destination, Route Number and Information as normal. 1 and 2 = DG3 reset to IDLE mode. Passenger displays are blank.	*	

Code shown as	Possible values	Value by default	Description
RSD – Reset Dest	*, 0, 1 and 2 the same as for parameter RS	*	Overrides the value of parameter RS for the Destination number. Accepted values are the same as for RS.
RSR – Reset Route	*, 0, 1 and 2 the same as for parameter RS	*	Overrides the value of parameter RS for the Route number. Accepted values are the same as for RS. If in route Browse mode – use RSR to set reset value for destination.
RSI – Reset Info	*, 0, 1 and 2 the same as for parameter RS	*	Overrides the value of parameter RS for the Information number. Accepted values are the same as for RS.
RSA – Reset Advert	*, 0, 1 and 2 the same as for parameter RS	*	Overrides the value of parameter RS for the Advert number. Accepted values are the same as for RS.
RT – Round Trip	0 = pressing  has no effect on destination controller display. 1 = enables the  key to be used to set the destination code for 'Out' and 'Return' prompts.	0	  **Note:** for more information, refer to 3.3.6 Round trip (Aller-Retour).
RZ – Route Zeros allow	0 = do not allow 1 = allow	0	Determines whether or not leading zeros of a route number are shown. If RZ = 0, leading zeros are deleted (single zero is allowed).
SPY – Slow proxy	0 = disable slow proxy mode 1 = enable slow proxy mode	0	Configure the destination display comms for a slow running proxy between the destination controller and the destination displays. For 'Movia' mode – adds large timeouts to destination display comms traffic.
T0 – Timer 0	10 - 3000	30	Sets the display time in deciseconds of the first destination page.
T1 – Timer 1	10 - 3000	30	Sets the display time in deciseconds of the second and subsequent destination pages.
T2 – Timer 2	10 - 3000	30	Sets the display time in deciseconds of all the information pages.

Code shown as	Possible values	Value by default	Description
T3 – Timer 3	0 - 3000	30	This will set the time that a Super-X scrolling page is allowed to scroll.
TV – Time Entry	0 = feature disabled 1 = sets time in hours and mins 2 = countdown timer in mins 3 = inserts current time in place of '~'	0	1 = used to set a fixed time, which will be substituted for any '~' character within the HELEN destination or driver display database. 2 = counts down from a specified number of minutes when destination/information code is selected. For more details about parameter CC to include in the database config i.e. in the 'Extensions' box of HELEN software, refer to TV = 2 (for more details, please refer to TV entry in Appendix E). 3 = inserts current time when destination code containing '~' is selected. Please refer to 3.5.3.1 Configuration code option: Time entry (TV) for more information.
WD – Wayfarer Device No	0 - 15 (default depends on Wayfarer interface)	0	Function depends on Wayfarer settings
WA – Wayfarer Address No	0 - 15 (default depends on Wayfarer interface)	0	Function depends on Wayfarer settings
ZW – ZW browse mode	0 = browse disabled until route number entered 1 = browse enabled	0	This setting requires RN=1 and BR=1 to work.
ZY – ZY (HTC)	0 = function disabled 1 = renders first six digits of 10-digit code as zeros	0	This feature requires RB =1 (route browse 'on') to work. Applies to a message sent to an HTC or another on-board computer as a 'd' message.*
QF - QF	0 = disabled 1 = sends destination code to destination controller screen and connected destination displays if 'bad destination'	0	Instead of 'Bad destination' appearing on the DG3 screen, the relevant destination code is sent as a text message to the destination displays and is also shown on the destination controller.
QG - QG	0, 1, 2, 10, 11, 12	0	• If QG=0; if an info message is selected but no destination is selected on the DG3 then the info message will not be displayed on the signs. • If QG=1; if an info message is selected but no destination is selected on the DG3 then the info message will be displayed on the signs.

Code shown as	Possible values	Value by default	Description
			• If QG=2; then only if there is a blanking code (set by parameter BC=xxxx) active will the Info message be displayed (alternated with blanking message) if no destination is set. • QG=10 is the same as QG=0, QG=11 is the same as QG=1 and QG=12 is the same as QG=2 except if you select a destination and an info message has already been selected, the info message will be automatically cleared on the DG3 and from the signs. With QG set to 10, 11 or 12 you can select an info message after a destination has been selected, and that info message will then be displayed on the DG3 and signs, but if you then select another destination the info message will be automatically cleared again.
Qn – Timed Info n (n: 1 to 8)	01/01 – 31/12 00:00 – 23:59	**/**–**/** **:**–**:**	Configurable date and time sensitive info messages • **When adding configuration to database:** ➢ **Date-sensitive info messages** Qn = d1/m1 – d2/m2 [ii] (i.e Qn = StartDate – EndDate [Info_code]) The config should be typed without spaces (except between d2/m2 and ii) e.g. Q1=01/01-31/03 01 means between 1st Jan and 31st Mar, info code 01 will be active. ➢ **Time-sensitive info messages** QTn = hh/mm hh/mm ii (i.e QTn = StartTime EndTime Info_code) The config should be typed without spaces (except between hh/mm and ii) e.g. QT1 = 01/00 01/30 01 means between 01:00 and 01:30, info code 01 will be active. **Note:** If Q1 is also present, then the time and date are combined such that from 01:00 on 1st Jan until 01:30 on 31st Mar, info 01 will be active. If you wish to 'nest' the time within a date range, for instance to enable Info code 01 between the hours 01:00 and 01:30 every day from 01st Jan to 31st Mar, you need to enter a Qn date range and a QTn Time range with the same Info No. but with different values of n. • **When entering manually from the 'Configure' menu:** Manual entry allows for a time range to be entered as well as date, this in effect is incorporating the parameter Qn and QTn under a single menu item Qn. Info no: [* *] Date: * * / * * - * * / * * Time: * * : * * - * * : * * Example: Info no: [0 1]

Code shown as	Possible values	Value by default	Description
			Date: 0 1 / 0 1 – 3 1 / 0 3 Time: 0 1 : 0 0 – 0 1 : 3 0 This means between the hours 01:00 and 01:30 every day from 1st Jan and 31st Mar, info code 01 will be active.
JBS –	0000-9999	AAAA	J1708 Bus stopping feature: sends out J1708 'M' text messages to destination displays connected to the J1708 bus. Message by default will be "Stop Requested". This message can be changed by programming a text message in the database under destination code BSnnnnnnnn. The value of JBS is a representation of the addresses (0 – 9) of up to 4 destination displays to display the message on. E.g. JBS=0002 – only shows bus stopping on destination display address 2 or JBS=6780 – displays message on destination displays 6, 7 and 8. Also, the external input must be configured as Bus Stopping e.g. I1=BS
JDF –	DEFAULT, HEX, DEC	DEFAULT	J1708 - Selects HEX or Decimal number format for 'D' message
JPF –	DEFAULT, HEX, DEC	DEFAULT	J1708 - Selects HEX or Decimal number format for 'P' message
JRF –	DEFAULT, HEX, DEC	DEFAULT	J1708 - Selects HEX or Decimal number format for 'R' message
JOF –	DEFAULT, HEX, DEC	DEFAULT	J1708 - Selects HEX or Decimal number format for 'O' message
SXP – SuperX Info Paste	0 = disabled 1 = enabled	0	When SXP = 1, this allows Info messages to specify that any combination of route, top line or bottom line of Destination page is pasted onto the Info page – ONLY works with SuperX. Info page should be programmed with single % character in those fields which is to be pasted into.
MPSX – SuperX Multi Page	0 = disabled 1 = enabled	1	MPSX messages are SuperX messages which are concatenated together as a single database field – the destination display then controls the page timings. Setting of this parameter is required if the database contains any MPSX messages.

Code shown as	Possible values	Value by default	Description
			A % character in any Info page field will cause pasting from the 1st page of the current destination but SXP=1 must still be set for non-MPSX pages.

Appendix F: CONFIG.INI file

The CONFIG.INI file has the following parameters:

Parameter	Description
CLIENT SERVER	-
ENABLE_DHCP	***Enable/Disable DHCP*** If "1", the unit will attempt to connect to a DHCP server to obtain an IP address for the unit. If it fails to communicate with a DHCP server, it will default back to the manual IP address as if "0" had been selected. Acceptable values are: "1" or "0".
TCP_UDP ENABLED	-
IP_ADDRESS	***Static IPv4 Address*** The manually entered IP address the unit will use as its own address if DHCP is set to "0" or fails to locate a DHCP server when set to "1". Acceptable values of the format X.X.X.X where X can range from 0-255.
SUBNET_MASK	***Static subnet mask*** The subnet mask associated with the unit for attempting to connect to the FTP server. Acceptable values of the format X.X.X.X where X can range from 0-255.
DEFAULT_GATEWAY	***Static default gateway*** Acceptable values of the format X.X.X.X where X can range from 0-255.
DNS_SERVER	***IPv4 address of DNS server*** If FTP_Server_IP is given in the form of a URL and needs to be resolved by DNS, the DNS Server Address must be configured (unless this address is to be provided by DHCP). Acceptable values of the format X.X.X.X where X can range from 0-255. **Note:** This is only required when the destination controller is using a fixed IP address.
CONFIG PORT	-
FTP_PORT	The port used when attempting to connect to the FTP server – value must be numerical. Default value: 21.
FTP_SERVER_IP	***IPv4 address of FTP server or URL*** The IP address (or URL) of the FTP server that the unit will attempt to connect to. Acceptable values of the format X.X.X.X where X can range from 0-255. Domain name can be specified for DNS lookup.

Parameter	Description
FTP_SERVER_USER_NAME	***Username of FTP account*** The username required to log into the FTP server. FTP Username should accept any characters, however, attempting to change these from the front panel will only allow to enter characters in the ranges a-z, A-Z and 0-9. If non-alphanumeric characters are used for username field, this field can be edited using this CONFIG.INI file. Username has a maximum acceptable length of 29 characters. **Note:** If FTP_SERVER_USER_NAME begins with a '!', it will be assumed it has been encrypted. Please contact support to be provided with an encrypted password.
FTP_SERVER_PASSWORD	***Password of FTP account*** The password required to log into the FTP server. FTP Password should accept any characters, however, attempting to change these from the front panel will only allow to enter characters in the ranges a-z, A-Z and 0-9. If non-alphanumeric characters are used for password field, this field can be edited using this CONFIG.INI file. Password has a maximum acceptable length of 29 characters. **Note:** If FTP_SERVER_PASSWORD begins with a '!', it will be assumed it has been encrypted. Please contact support to be provided with an encrypted password.
FTP_SERVER_DELAY_WAIT	***Period within which the unit will poll the FTP server*** The amount of time in seconds that the unit should leave between attempting to connect to the FTP server – value must be numerical.
UDP1_IP	The IPv4 address UDP1 port will try to connect to (UDP in client mode). If value is 0.0.0.0, then UDP will be in server mode.
UDP1_PORT	Port number for UDP1 port.
UDP2_IP	The IPv4 address UDP2 port will try to connect to (UDP in client mode). If value is 0.0.0.0, then UDP will be in server mode.
UDP2_PORT	Port number for UDP2 port.
TCP1_IP	The IPv4 address TCP1 port will try to connect to when in client mode.
TCP1_PORT	The port number TCP1 will try to connect to when in Client mode, or the initial Port number when in Server mode.
TCP1_SERV	0 or 1; sets TCP1 server mode if set to 1.
TCP2_IP	The IPv4 address TCP2 port will try to connect to when in client mode.
TCP2_PORT	The port number TCP2 will try to connect to when in Client mode, or the initial Port number when in Server mode.
TCP2_SERV	0 or 1; sets TCP2 server mode if set to 1.

Parameter	Description
UNIT_ID	***Id of unit*** Refers to the unit ID assigned by the user to the unit that is used when it connects to the FTP server to locate the relevant files for transfer – 29-character limit, must be Alphanumeric (0-9, a-z, A-Z), must not be one of the following reserved names: "CON", "PRN", "AUX", "NUL", "COM1", "COM2", "COM3", "COM4", "COM5", "COM6", "COM7", "COM8", "COM9", "LPT1", "LPT2", "LPT3", "LPT4", "LPT5", "LPT6", "LPT7", "LPT8", "LPT9".
CTRL_LOADING_ROUTEDEST	***Route/destination pairs (up to 10 pairs) that must match the selected Route/destination for the unit to access the FTP server*** -1|-1 (loads file in any destination code, 0000|0001 loads list in only route no. 0, destination code 1 etc.). Multiple codes can be specified and separated by a comma.
FTP_WIFI_MAN	Selects between "Wireless data manager" implementation and a customer specific FTP update mechanism. FTP_WIFI_MAN=1 is default and sets system to support WiFi manager. FTP_WIFI_MAN=0 sets to customer specific mode.
PAYLOAD_PATH1	***Only applicable when FTP_WIFI_MAN=0*** Path of mandant file from the ftp home.
PAYLOAD_PATH2	***Only applicable when FTP_WIFI_MAN=0*** Primary path to payload directory from the customer directory.
PAYLOAD_PATH3	***Only applicable when FTP_WIFI_MAN=0*** Path from the ftp home to the customer directories.
PAYLOAD_PATH4	***Only applicable when FTP_WIFI_MAN=0*** Secondary path to payload directory from the customer directory.
FTP_LOCK_ACTIVE	***Only applicable when FTP_WIFI_MAN=0*** Part of the customer specific update mechanism. This enables/disables the customer specific lock mechanism.
FTP_DEBUG	***For development/technical support use only*** Configures the customer specific implementation into debug mode (should be generally turned off). In debug mode, the destination controller displays information about the update process on the front screen.
FTPSERVER_MANIFEST_DIR	***Only applicable when FTP_WIFI_MAN=1*** Part of the config for Wireless data manager. This is the directory into which the unit will first look when it logs onto the FTP server. The unit will look for its manifest files in this folder. The manifest files tell the unit where on the server to look for data files (such as the database or a firmware file).
FTPSERVER_PAYLOAD_DIR	***Only applicable when FTP_WIFI_MAN=1*** Part of the config for Wireless data manager. When a directory is set, this directory will be added at the beginning of the default payload directory that the unit will connect to and download the data file. If empty, then this will operate as default and no directory changes will be made.

Parameter	Description
FTPSERVER_LOG_DIR	***Only applicable when FTP_WIFI_MAN=1*** Part of the config for Wireless data manager. This is the sub-directory into which the unit will place any log files. The log files are the mechanism by which the unit communicates its update progress back to the Wireless data manager application.
FTP_MANDANTFILE	***Only applicable when FTP_WIFI_MAN=0*** Part of the customer specific update mechanism. This configures the name of the mandant file. The mandant file is similar to the manifest files in that it provides information to the unit as to where to look for the data files.
FTP_LOCKFILELOCK	***Only applicable when FTP_WIFI_MAN=0*** Part of the customer specific update mechanism. The customer specific implementation uses lock files to control access to the data on the server. This is to prevent the unit access a data file which is being updated by another part of the system. This is the name the unit will give to the lock file to indicate that the data is locked and the unit (destination controller) is accessing the data on the server.
FTP_LOCKFILEUNLOCK	***Only applicable when FTP_WIFI_MAN=0*** Part of the customer specific update mechanism. This is part of the lock mechanism. The presence of a file with this name indicates that the data is unlocked and can be accessed.
BUS_PROFILE_NUM_RESET	**Note:** This feature is only present from DG3's firmware V1.27.01 onwards. Values: 0 or 1. If set to 0 (default), the profile number is not reset when firmware is updated. If set to 1, the profile number will reset back to 0.
ENABLE_TFTP	0 or 1; enables TFTP server (used with IVNAUTO).

Note: All the above parameters are not compulsory in the CONFIG.INI file. Only required parameters are to be included in the CONFIG.INI file.

- **Example of CONFIG.INI file:**

CLIENT SERVER=1
ENABLE_DHCP=1
TCP_UDP ENABLED=1
IP_ADDRESS=10.0.0.1
SUBNET_MASK=255.255.0.0
DEFAULT_GATEWAY=10.0.0.10
DNS_SERVER=10.0.0.50
CONFIG PORT=13010
FTP_PORT=1
FTP_SERVER_IP=10.0.254.254
FTP_SERVER_USER_NAME=hanover
FTP_SERVER_PASSWORD=9876
FTP_SERVER_DELAY_WAIT=30
UDP1_IP=255.255.255.255
UDP1_PORT=13010
UDP2_IP=255.255.255.255
UDP2_PORT=13010

TCP1_IP=10.0.0.10
TCP1_PORT=13010
TCP1_SERV=0
TCP2_IP=10.0.0.10
TCP2_PORT=13010
TCP2_SERV=0
UNIT_ID=UNITID00001
CTRL_LOADING_ROUTEDEST=-1|-1
FTP_WIFI_MAN=0
PAYLOAD_PATH1=/harddisk/kurier_e
PAYLOAD_PATH2=/kurier_e/hanover/led
PAYLOAD_PATH3=/harddisk
PAYLOAD_PATH4=/kurier_e/hanover
FTP_LOCK_ACTIVE=1
FTP_DEBUG=0
FTPSERVER_MANIFEST_DIR=/vehicle/
FTPSERVER_PAYLOAD_DIR=/new/
FTPSERVER_LOG_DIR=/log/
FTP_MANDANTFILE=mandant.csv
FTP_LOCKFILELOCK=Lock
FTP_LOCKFILEUNLOCK=LockNone
BUS_PROFILE_NUM_RESET=0
ENABLE_TFTP=0