Hornby Elite Digital Controller

**You have now learnt to select a
locomotive for control and how to
programme further locomotives as
you add them to your layout.**

**Now read on to learn how to
explore the Elite's full features and
capabilities. You will find the Elite's
menu system and procedures are
quite intuitive.**

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Hornby Elite Digital Controller (continued)

For more information visit: **www.hornby.com**

Introduction: DCC

DCC . . . Digital Command Control

On a traditional DC (analogue) layout, to control a locomotive the power feed applied to the rails is controlled, therefore normally only a single locomotive is placed on the track at any one time. DCC however, allows the user to control many locomotives on the same track at the same time on an individual basis. This is achieved by controlling the motor in each locomotive directly via track born digital signals that are sent from a DCC controller. Each loco has a small DCC decoder fitted which listens to the track born signals, decodes them and feeds power to the locomotive motor at the level commanded by the DCC controller for that particular locomotive. The decoder can also control direction and other functions on board the locomotive, e.g. lighting, etc.

The **Hornby Elite Digital Controller** offers many advanced features and is yet very simple to use. This instruction manual clearly explains all of the **Elite's** capabilities. We will start with a basic 'get you going' guide explaining how to connect your **Elite** to the track, etc. We then move on to the 'Quick Start' section explaining how to quickly select and control a locomotive and then how to programme a new address to a locomotive.

Once you have mastered the above, we move on to examine the full capabilities of the **Elite**. Each section of the manual follows the Menu System Guide. This guide shows the menu structure of the **Elite** in a simple flow diagram format (see pages 8-9).

LCD Display

Rotary Controller

Keyboard

Elite Mode Indicators

Speed Indicator

Train Direction Indicator

Function Indicators

16 Character Display

Train Direction Indicator
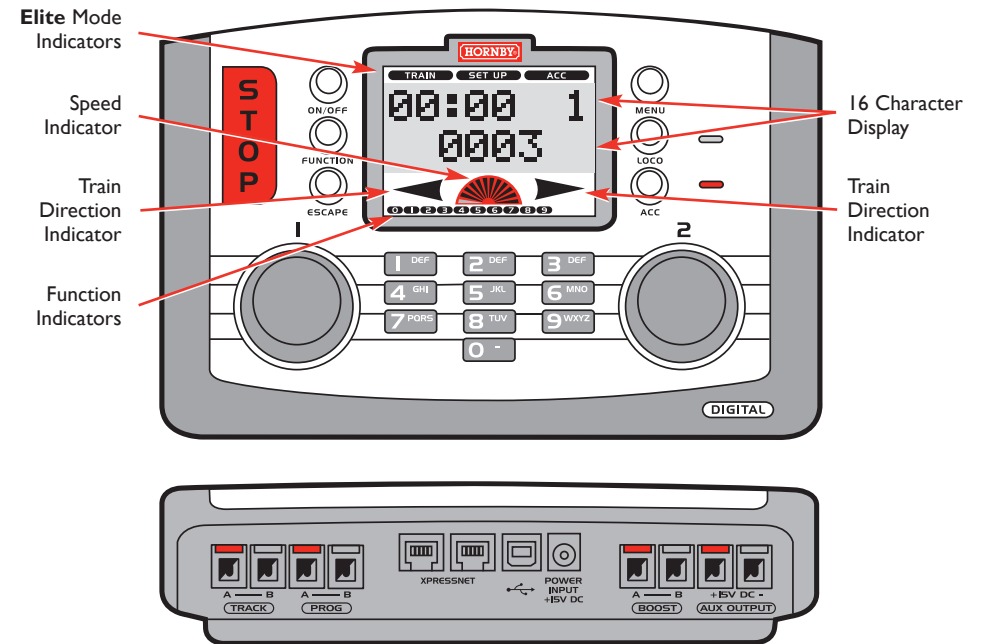
Keyboard

The 17 button keyboard includes not only keys 0 - 9 which are alpha numeric, but other keys marked **LOCO**, **ACC** (accessory), **FUNCTION**, **ON/OFF**, **MENU**, **ESCAPE** and of course **STOP**! These multi-function keys provide the basis for the programming and functioning of up to 254 locomotives and 255 accessories including points.

The keyboard has the capability of entering into the **Elite's** memory the names and numbers of locomotives and accessories as well as inputting the various functions that the **Elite** offers. Using the keypad locomotives can be addressed from 0 to 9999 and points or solenoid operated accessories from 1 - 252 if assigned to a Hornby R8247 Accessory/Points Decoder.

Rotary Controller

The **Hornby Elite Digital Controller** incorporates two rotary controllers which not only control the assigned locomotives but also assist in registering each model and accessory to the **Elite**. The controllers are able to do this by a simple click and rotate procedure.

This method is also employed to add names and locomotive numbers to the **Elite** display so that in place of locomotives being identified with just their coded number, abbreviated names and / or running numbers can be used. The pressing of the Rotary Controlllers can also determine which knob has control, the direction of the locomotive's travel plus point motor activation.

These are just a few of the functions that are associated with the Rotary Controllers, however they do go some way to illustrate the technical advances that the **Hornby Elite Digital Controller** boasts.

LCD Display

The liquid crystal display centred on the **Elite** has from top to bottom - 3 mode indicators, 2 rows of 8 characters, train direction indicators, a speed indicator, and a set of numbers 0 - 9 which show the functions that are switched on in respect of locomotives under direct control.

The **Elite** supports up to 29 decoder functions which are accessed through 5 display modes.

A clock is also included on the display which can be set to real time or can be set up to 10X faster. Working with the rotary controllers the display is able to keep the operator fully up to date with the functions of the **Elite**.

Power

The **Elite** is supplied with a 4 amp transformer. This provides the **Elite** with the possible capability of running up to 10 locomotives at any one time. However this quantity may vary depending on the current draw of each locomotive.

Please note, if the AUX OUTPUT connection is used, less power will be available for driving locomotives.

For more information visit: **www.hornby.com**

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Menu System Guide

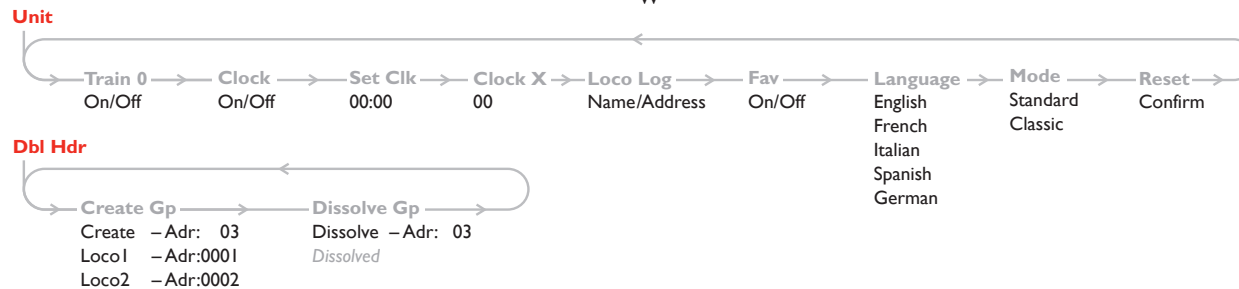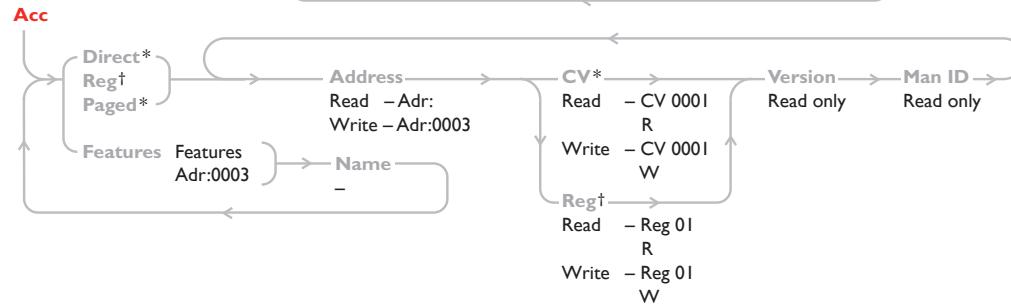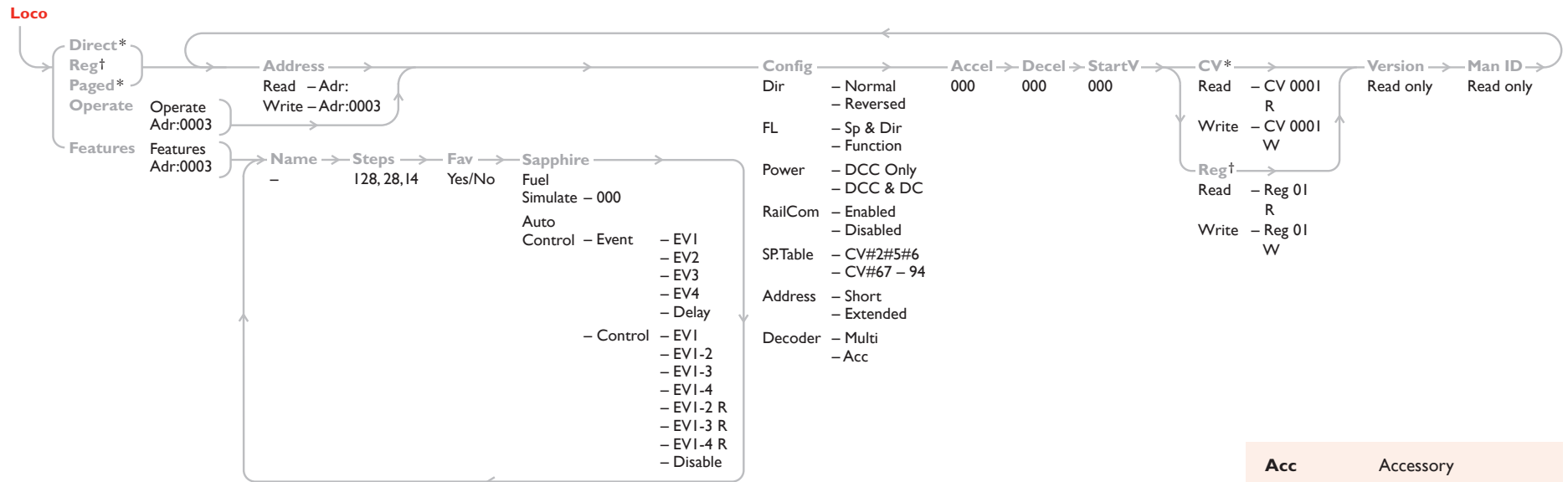You can access the *menu options* by pressing the **Menu** key on the **Elite**.

Rotate **Controller 1** to cycle through *menu options* (shown in RED).

Press **Controller 1** to select a *menu option*.

Rotate **Controller 1** to display any *sub-menu item* (shown in GREY).

Press **Controller 1** to select a sub-*menu item*.

Rotate and/or press **Controller 1** to scroll through the *headings* (shown in BLACK).

8

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Loco

Direct* **Reg**† **Paged*** **Operate**	Operate Adr:0003	**Address** Read – Adr: Write – Adr:0003
Features	Features Adr:0003	

Name –

Steps 128, 28, 14

Fav Yes/No

Sapphire
Fuel
Simulate – 000

Auto
Control – Event – EV1
– EV2
– EV3
– EV4
– Delay

– Control – EV1
– EV1-2
– EV1-3
– EV1-4
– EV1-2 R
– EV1-3 R
– EV1-4 R
– Disable

Config		**Accel**	**Decel**	**StartV**
Dir	– Normal – Reversed	000	000	000
FL	– Sp & Dir – Function			
Power	– DCC Only – DCC & DC			
RailCom	– Enabled – Disabled			
SP. Table	– CV#2#5#6 – CV#67 – 94			
Address	– Short – Extended			
Decoder	– Multi – Acc			

CV*
Read – CV 0001 R
Write – CV 0001 W

Reg†
Read – Reg 01 R
Write – Reg 01 W

Version Read only

Man ID Read only

Acc

Direct* **Reg**† **Paged***		**Address** Read – Adr: Write – Adr:0003
Features	Features Adr:0003	**Name** –

CV*
Read – CV 0001 R
Write – CV 0001 W

Reg†
Read – Reg 01 R
Write – Reg 01 W

Version Read only

Man ID Read only

Unit

Train 0	**Clock**	**Set Clk**	**Clock X**	**Loco Log**	**Fav**	**Language**	**Mode**	**Reset**
On/Off	On/Off	00:00	00	Name/Address	On/Off	English French Italian Spanish German	Standard Classic	Confirm

Dbl Hdr

Create Gp
Create – Adr: 03
Loco1 – Adr:0001
Loco2 – Adr:0002

Dissolve Gp
Dissolve – Adr: 03
Dissolved

***Direct** and **Paged** follow **CV**
†**Reg** follow **Reg**

Acc	Accessory
Accel	Acceleration
Clock X	Clock Speed
CV	Configuration Variable
Dbl Hdr	Double Heading
Decel	Deceleration
Dir	Direction
Fav	Favourite
FL	Function Lighting
Gp Adr	Group Address
Gp Create	Group Create
Gp Dissolve	Group Dissolve
Man ID	Manufacturer ID
Operate	Operations Mode
Reg	Register
SP. Table	Speed Table
Start V	Start Voltage
Set Clk	Set Clock

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Setting the On-screen Language

The **Elite** has the ability to have the screen instructions shown in four alternative languages other than English. The languages concerned are French, Italian, Spanish and German.

To change from the factory set English screen use the following procedure.

1. Press **Menu**. Screen shows "**Loco**".

2. Rotate **Controller 1**. Screen shows "**Unit**".

3. Press **Controller 1** to confirm. If necessary rotate **Controller 1** until "**Language**" is shown. Press **Controller 1**.

4. Screen shows "**Language English**". Rotate **Controller 1** until the language you require is shown. Press **Controller 1** to confirm. All instructions will then be shown in the chosen language.

5. Press **Menu** to return to the main screen.

For more information visit: **www.hornby.com**

Setting Up Your Layout

The **Elite** supplies a digital control (DCC) signal to the track. This DCC signal is received and decoded by the decoders giving control of the locomotive's speed and direction, etc. For DCC to operate at its full potential it is important that the locomotives receive a strong and consistent DCC signal from the **Elite**. Please ensure the track and connecting fishplates are clean and are firmly connected.

It is important that the entire layout is live. On a normal 8' x 4' type layout one power input may be adequate, however on larger layouts e.g. with more than one loop of track, additional power connections are recommended to guarantee equal signal and power distribution. This can be easily achieved by adding further power connections to various parts of the layout.

Should you feel that you may need such additional feeds please contact the Hornby Customer Care for basic information regarding power distribution. Other useful articles may be found on the Hornby website.

Please Note: Hornby points are self-isolating and it is recommended that power is fed to all 'exits'. To de-isolate these points it is recommended that you install 2 x **R8232 Hornby Digital Electric Point Clips** in between the point 'frogs' (see below).

In most circumstances these point clips will be quite adequate but it may in certain circumstances be necessary to add additional feeds. Again for further information please contact Hornby Customer Care.

Making Points 'Live'

The **Elite** operates most efficiently when the whole of the layout is 'live'. Hornby points are self isolating therefore it is necessary to fit each point with 2 x **R8232 Hornby Digital Electric Point Clips**. Some of these clips are included in the Hornby DCC sets, further clips are available from Hornby stockists.
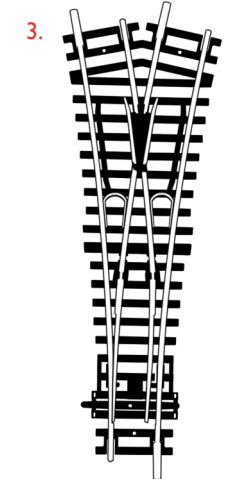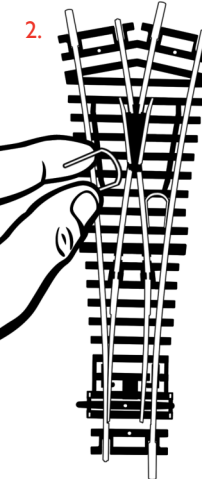
Please Note: Always use Hornby Point Motors with Hornby points.

Track Connections

Connecting the Elite to the Main Track

1. Locate the terminals at the back of the **Elite** labelled **TRACK**. See Fig. 1

2. Locate the Track to the Controller Link Wire and insert the black lead into Socket **A** and the black and white lead into Socket **B**.
(These wires must NOT be inserted into mains socket outlets.)

3. If fitted, locate the R8241 Hornby Digital Power Track section on the track circuit.

4. Press down on the left hand button on the Digital Power Track section and insert the black and white lead of the Link Wire into the socket and release the button.

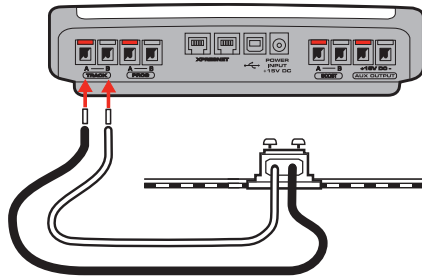5. Repeat the process inserting the black lead into the right socket of the Digital Power Track.

Fig. 1

Setting up a Programming Track

Before any programming can commence a Programming Track must be attached to the **Elite**. A Programming Track will allow for both locomotive decoders and accessory/point decoders to be programmed simply and easily.

Connect the **Elite** to the Programming Track as shown in Fig. 2.

Please Note: The majority of programming of locomotives and accessory/point decoders must be done using the Programming Track and not on the Main Track.
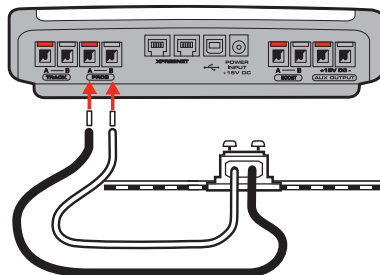
Fig. 2

For more information visit: **www.hornby.com**

Power Connections

Connecting to the Power Supply

1. Locate the Power Transformer with integral cable.

2. Locate the Power Input socket on the rear of the **Elite** (**POWER +15V DC**)

3. Take the Power Supply cable and insert the plug into the Power Input socket situated at the rear of the **Elite**.

4. Plug the Power Transformer into the mains socket and switch on the power. The LCD display shows the start-up sequence shown below.

Please Note: There is no On/Off switch on the **Elite**. Always ensure that the power supply is unplugged from the Mains when not in use.

DIGITAL

Quick Start
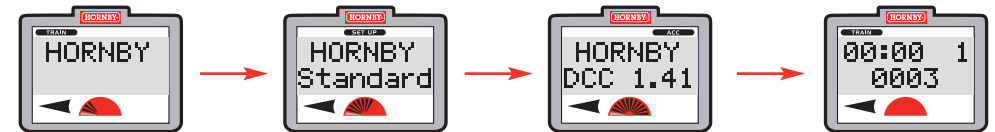
Basic Locomotive Control

Note: Either **Controller 1** or **Controller 2** may be used to either control or programme the selected locomotives or accessories, however for ease of understanding **Controller 1** will be used in the majority of examples shown throughout these instructions.

The **Elite** is now ready to control a locomotive. At the end of the start-up sequence of the **Elite** the LCD will show the Time Display mode as shown in Fig. 1.

Note: All new factory fitted digital locomotives are programmed No.3 as standard (default).

Clock →

Current active controller

Loco Address assigned or selected for the current active controller displayed
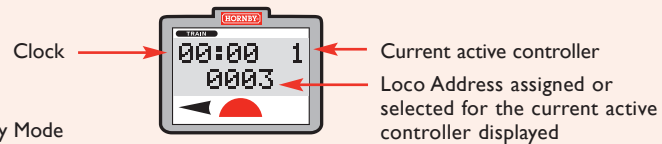
Fig. 1 Time Display Mode

Using a locomotive programmed as No. 3 please follow these instructions.

1. Place the locomotive on the track.
2. Note that "**0003**" is shown on the LCD (Liquid Crystal Display). At this stage locomotive address 0003 is assigned to both controls. Press **Controller 1** to take control of the locomotive.

3. Rotate **Controller 1** clockwise until the locomotive has reached the desired speed.
4. To slow down and stop the locomotive, rotate **Controller 1** anti-clockwise.
5. Direction of travel is controlled by pressing down and releasing **Controller 1**.

IT IS IMPORTANT THAT YOU STOP THE LOCOMOTIVE BEFORE CHANGING DIRECTION.

DO NOT REMOVE THE LOCOMOTIVE FROM THE TRACK WHILE IT IS STILL RUNNING. FAILURE TO DO THIS MAY DAMAGE THE LOCOMOTIVE DECODER.

Quick Start (continued)

Basic Locomotive Address Programming

1. Connect the **Elite** to the Programming Track as shown in Fig. 1 on page 12.
2. Place the locomotive that you require to programme on the track.
3. Press **Menu** key on the **Elite**. Screen shows "**Loco**".

4. Press **Controller 1** to confirm. Screen shows "**Direct**".

5. Press **Controller 1** to confirm. Screen shows "**Address**".

6. Press **Controller 1** to confirm. Screen shows "**Address Write**".

7. Press **Controller 1** to confirm. Screen shows "**Adr:0003**" (default address).

8. Rotate the controller or use the keypad to select the desired address number. Press **Controller 1** to confirm. For this example choose No. 1.

9. Press **Controller 1** once more. Red LED flashes for a few seconds. Screen shows "**Address Adr:0001**". After the Red LED has stopped flashing the screen shows "**Address**".

10. The locomotive is now addressed as No. 1.

11. To operate the locomotive press **Menu**. Screen shows "**00:00 1 0001**". The clock may vary from 00:00.

12. Place the locomotive on the main track and control as described on page 14.

You have now learnt to select a locomotive for control and how to programme further locomotives as you add them to your layout.

Now read on to learn how to explore the **Elite's** full features and capabilities. You will find the **Elite's** menu system and procedures are quite intuitive.
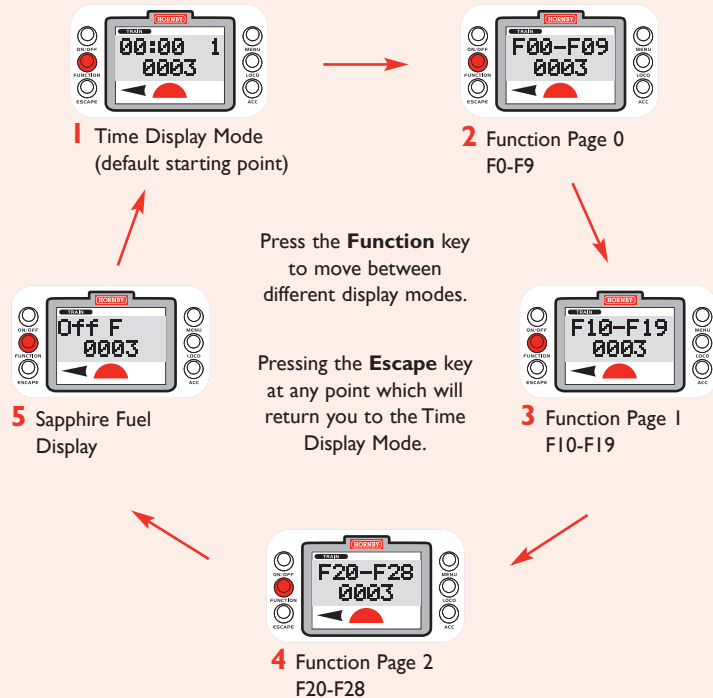
Full User Guide

The 5 Display Modes

The operation and control of locomotives is carried out using the 5 main **Elite** display modes. These display modes support throttle setting, directional control, and function control / switching.

Function Control: The **Elite** can support the operation of up to 29 decoder functions. All of the functions can be switched or controlled in a push button manner, i.e. momentarily or toggled on and off. For example momentary switching is ideal for the operation of a horn, whistle, etc.

Hornby Sapphire Decoder: The **Elite** also supports the Hornby Sapphire decoder's Fuel Simulation capability by providing a simple and easy way of displaying fuel levels within a dedicated display mode. Any locomotive fitted with a Sapphire decoder that is running Fuel Simulation can be accessed and fuel levels monitored.

To 'cycle' through the **Elite's** different display modes press the Function key on the left of the **Elite** display.

1 Time Display Mode
(default starting point)

2 Function Page 0
F0-F9

Press the **Function** key to move between different display modes.

Pressing the **Escape** key at any point which will return you to the Time Display Mode.

5 Sapphire Fuel Display

3 Function Page 1
F10-F19

4 Function Page 2
F20-F28

NOTE: Sapphire Fuel Display is only applicable to Sapphire decoders and has no function with other decoders.

Selecting Locomotives to Control

The **Hornby Elite Digital Controller** can accomodate 254 digitally controlled locomotives and 255 operating accessories stored in its memory. The **Elite** can have 64 locomotives running or on standby at any one time, providing the power is available. This number of locomotives may be far in excess of what would be expected to be seen on any model railway layout, however should a 65th locomotive be 'called up', one of the previous 64 will be removed from the queue (stack). The locomotive that is removed will be the locomotive that has the lowest current 'Speed Address' compared to the other 63. Alternatively, if all 64 locomotives are stationary the locomotive with the lowest 'Address' will be removed from the queue.

1. From any display mode press the **Loco** key. Screen shows "**Contr 1 Adr:0003**". Other address numbers (**Adr**) may be shown if they have previously been selected for control.

2. For this example **Controller 2** will be used and loco **8** selected, Select **Controller 2** by rotating it. Continue to rotate **Controller 2** until locomotive address **0008** is displayed. Note: you may use the keypad to enter the address number directly if you prefer.
Press **Controller 2** to confirm. (You may press Controller 1 but Controller 2 will remain the active

Controller). Screen shows "**Contr 2 Adr:0008**". Press to confirm.

3. The screen will now return to the previous display mode. In this example 'Clock Mode', and will show the active controller number and the new locomotive address for control. Screen shows "**00:00 2 0008**".

IT IS IMPORTANT THAT YOU STOP THE LOCO BEFORE CHANGING DIRECTION. DO NOT REMOVE THE LOCO FROM THE TRACK WHILE IT IS STILL RUNNING. FAILURE TO DO THIS MAY DAMAGE THE LOCOMOTIVE DECODER.

NOTE: In the above example the **Time Display** mode was set when the procedure was started. If one of the **Function** or **Fuel Simulation** display modes was showing when the procedure was started, that display mode will be shown at the end of the procedure. See page 16 for more information on display modes.

We suggest that you methodically go through this sequence for each locomotive in turn. Once you are more experienced with the **Elite** you will find it is intuitive to operate and will be able to effortlessly switch between locomotives when making control adjustments... have fun!

Selecting Locomotives

'Quick select' of assigned locomotives

If the locomotive address you wish to control is not shown on the **Elite's** display you can cycle through the 10 most recent locomotives that have been assigned to that controller by repeatedly pressing the **Escape** key. The current speed and direction will be displayed for each locomotive in turn. When 'quick selecting' a previously used locomotive for assignment to a controller, the **Elite's** display will revert to Time Display mode.

Note: Once a locomotive has been selected use the current active controller to operate the locomotive's speed and direction. The other controller will remain inactive. Any locomotive previously controlled with the inactive controller will continue in it's last set state for speed, direction and function status.

Note: It is possible to control speed and direction with the active controller while the **Elite** is in any of the 5 display modes. If you forget which locomotive address you are controlling simply press the **Escape** key to return to the Time Display mode. You can then read the locomotive address that is under control and then later return to any other display mode required by pressing the **Function** key.

Note: Only the active controller can be used at any one time. The other controller will remain inactive until it is selected for locomotive control.

Controlling Two Locomotives

Assigning Locomotives to a Controller

The following procedure illustrates how to assign specific locomotives to each of the **Elite's** Controllers.

1. From any display mode press the **Loco** key. Screen shows "**Contr 1 Adr:0003**".

2. Rotate **Controller 1** until the locomotive required is shown or alternatively enter the locomotive address via the keypad. For this example 10 has been selected.

3. Press **Controller 1**. Screen returns to the previous display mode, e.g. Time Mode as shown on the left.

4. Rotate **Controller 1** to move the locomotive.

5. To control a second locomotive with **Controller 2** press **Controller 2**. Screen shows "**00:00 2 0003**".

Note: the display will show the last display mode used for the last locomotive controlled by Controller 2. In this example Time Mode with locomotive address 3.

6. Press **Loco**. Screen shows "**Contr 2 Adr:0003**".

7. Rotate **Controller 2** until the locomotive required is shown or alternatively enter the locomotive address via the keypad. For this example 20 has been selected.

8. Press **Controller 2**. Screen shows "**00:00 2 0020**".

For more information visit: **www.hornby.com**

Controlling Two Locomotives

Controlling the 2 Locomotives

1. To operate locomotive 10 press **Controller 1**. Screen changes to show "**00:00 1 0010**". See Fig. 1.
   Note: Display will now show last mode selected. (e.g. Time Mode)

2. Rotate **Controller 1** to take control of locomotive 10.

3. To operate locomotive 20 press **Controller 2**. Screen changes to show "**00:00 2 0020**".
   Note: Display will now show last mode selected (e.g. Time Mode).

4. Rotate **Controller 2** to take control of locomotive 20. Note locomotive 10 will continue at its set speed set by **Controller 1**. To bring locomotive 10 back under control press and rotate **Controller 1**.
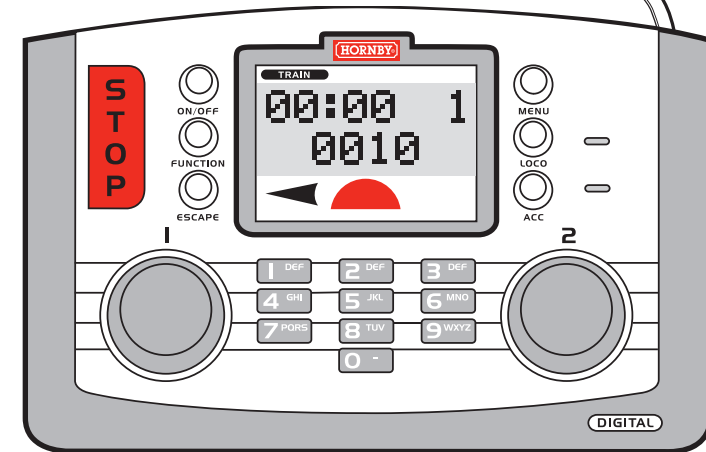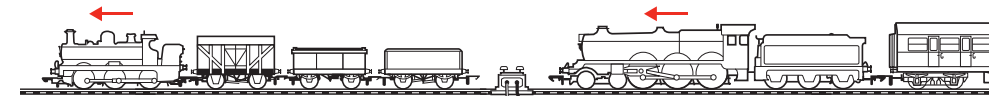
Fig. 1

Function Control

Function Introduction

Once the desired locomotive address is displayed you may immediately control speed and direction. If you wish to access any of the available functions you will need to access the appropriate Function control displays. Press the **Function** button to cycle through the 5 display modes - Function Page 0, Function Page 1, Function Page 2 and Fuel Simulation (Fuel Simulation is only applicable to Sapphire decoders and has no function with other decoders). See page 16.
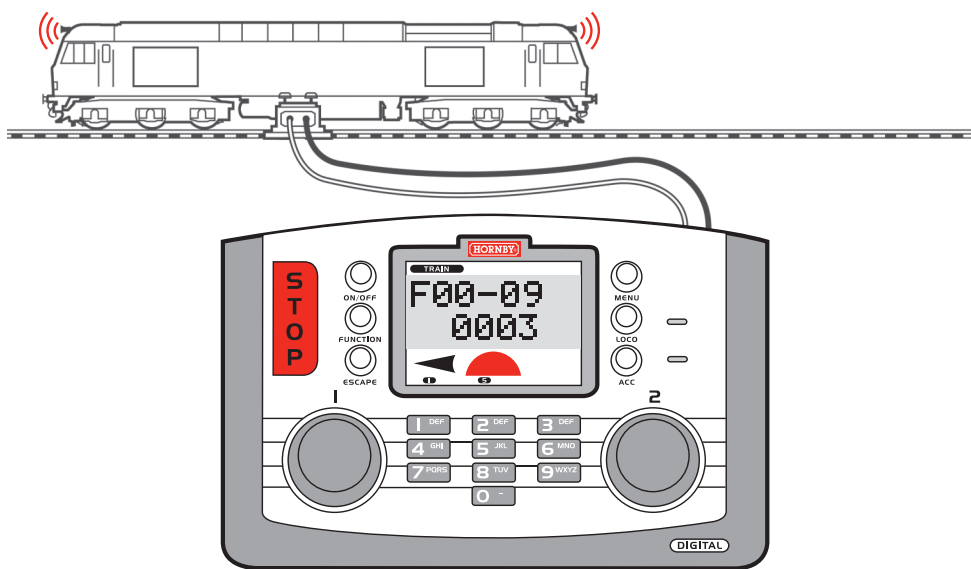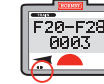
Fig. 1

Selecting Functions for Control

The examples below describe the procedure for accessing a variety of function numbers in all three Function display pages.

1. For **Function 0** select **Function Page 0** by pressing the **Function** key until the screen display is as shown.

2. Press the 0 key on the key pad and the small **Function** number **0** will illuminate on the lower left of the display.

3. For **Function 6** - if not already selected, select **Function Page 0** as described above. Press the 6 key on the keypad. **Function** number **6** will illuminate on the display.

4. For **Function 10** select **Function Page 1** by pressing the **Function** key until the screen display is as shown.

5. Press the **0** key on the keypad. **Function** number **0** will illuminate on the lower left of the display.

6. For **Function 15** - if not already selected, select **Function Page 1** by pressing the **Function** key as described above and press the 5 key on the keypad. **Function** number **5** will illuminate on the display.

7. For **Function 21** - if not already selected, select **Function Page 2** by pressing the **Function** key until the screen display is as shown.

8. Press the **1** key on the keypad. **Function** number **1** will illuminate on the display.

9. For **Function 28** - if not already selected, select **Function Page 2** by pressing the **Function** key as described above and press the **8** key on the keypad. **Function** number **8** will illuminate on the display.

Note: Each time a function is activated its corresponding icon will be illuminated within the appropriate **Function Page** to indicate that this function is now activated.

See examples below. For **On/Off** or **Momentary** action of functions see page 22.
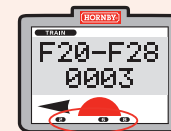
Multiple function control examples

Function Page 0 (F00-F09)
Function numbers 0, 1 and 6 are active

Function Page 1 (F10-F19)
Function numbers 10, 13 and 15 are active

Function Page 2 (F20-F28)
Function numbers 22, 26 and 28 are active

Selecting Functions for Control

Toggle ON/OFF and Momentary action

Toggle ON/OFF

To toggle a function **On** or **Off** press and release the appropriate numbered key on the key pad, please do not hold the key down. This operation works the same way you would switch on a domestic light in your house.

Momentary action

To momentarily activate a **Function** press and hold the appropriate numbered key down for as long as you wish. The **Function** will now activate for as long as you continue to keep the key pressed. The **Function** will cease as soon as you release the key.

Function Control in practice

If you are controlling many locomotives, it is good practice when you select a locomotive that you cycle through the different **Elite** function displays to check which **Functions** have been activated for that particular locomotive. Also, if the locomotive is running **Fuel Simulation**, you can check the current fuel level by examining the **Sapphire Fuel Display**. See page 16.

Emergency Stop

If not properly managed running multiple locomotives on one layout can create the potential for accidents and collisions to occur. To help avoid such incidents the **Hornby Elite Digital Controller** features an Emergency Stop key. Pressing this key causes all activity on the layout to cease.

Emergency Stop Procedure

1. Press the **STOP** key located on the **Elite**. See Fig. 1.
2. The screen will show "**E. Stop**" (Emergency Stop).
3. All activity on the layout will cease. (All power is removed.)
4. Allow at least 5 seconds to pass before restoring the power. Press **STOP** again to restore power to the layout.

Note: The locomotive that was last under direct control before the **STOP** key was pressed will be displayed after the Emergency Stop is reset.
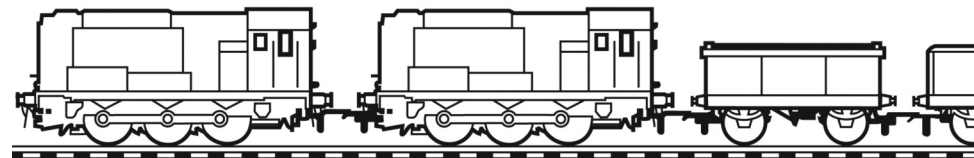
Fig. 1

Double Heading

Creating a Double Headed Group (Consist)

For this example Locomotives 1 and 2 will be consisted as No. 10. Double Head programming can be done while both locomotives are on the main circuit. Either controller can be used in this procedure to confirm a setting. Controller 1 is used in this example.

1. Press **Menu** key. Screen shows "**Loco**".

2. Rotate **Controller 1** until "**Dbl Hdr**" is displayed on the screen.

3. Press **Controller 1** to confirm. The Screen will show either "**Dissolve Gp**" or "**Create Gp**". Rotate **Controller 1** until "**Create Gp**" is displayed.

4. Press **Controller 1**. Screen shows "**Create Adr: 01**" as a default setting.

5. Decide on an Address / Number that you wish to have as the Double Heading number up to a maximum of 99. For this example 10 has been chosen.

6. Rotate **Controller 1** until 10 is displayed. Alternatively you can, using the keyboard type in 10.

7. Press **Controller 1** to confirm. Screen shows "**Loco 1 Adr: 0010**".

8. Rotate **Controller 1** or type in the number of the first locomotive that you wish to add to the Consist. For this example No. 1 has been chosen.

9. Press **Controller 1** to confirm. Screen shows "**Loco2 Adr: 0001**".

10. Rotate **Controller 1** until the screen shows "**Loco2 Adr: 0002**".

11. Press **Controller 1** to confirm. Screen shows the last locomotive that was operated.

12. To control the Consist press the **Loco** key and rotate **Controller 1** until Screen shows "**Contr 1 Adr:0010**".

13. Press **Controller 1** to confirm. Screen shows "**00:00 1 0010**". Rotate **Controller 1** both locomotives will now move.

Please Note: For both locomotives to operate in unison it is important that they each have the same acceleration and deceleration levels.

Locomotive Programming

Dissolving a Double Headed Group (Consist)

 `Loco`

 `Dbl Hdr`

 `Dissolve Gp`

 `Dissolve Adr: 01`

1. Press the **Menu** key. Screen shows "Loco". Rotate **Controller 1** until screen shows "**Dbl Hdr**".

2. Press **Controller 1** and rotate until screen shows "**Dissolve Gp**".

3. Press **Controller 1**. The screen shows "**Dissolve Adr: 01**".

4. Rotate **Controller 1** to show the Consist you wish to dissolve and press **Controller 1** to confirm.

 `Dissolve Adr: 10`

 `Dissolve Adr: 01`

 `Dissolve Adr: 02`

5. Screen will then show in sequence "**Dissolve Adr: 0010**", "**Adr: 0001**", "**Adr: 0002**", "**Gp Removed**" (Fig. 1), and finally the address of the dissolved group "**00:00 1 0010**".

6. The locomotive address displayed is the address of the Consist previously dissolved. To select another locomotive for control use the **Loco** button etc, or press repeatedly the **Escape** button to cycle through previously assigned locomotive addresses.

Note: If an attempt is made to dissolve a Consist which does not exist the screen will display "**No Member**".
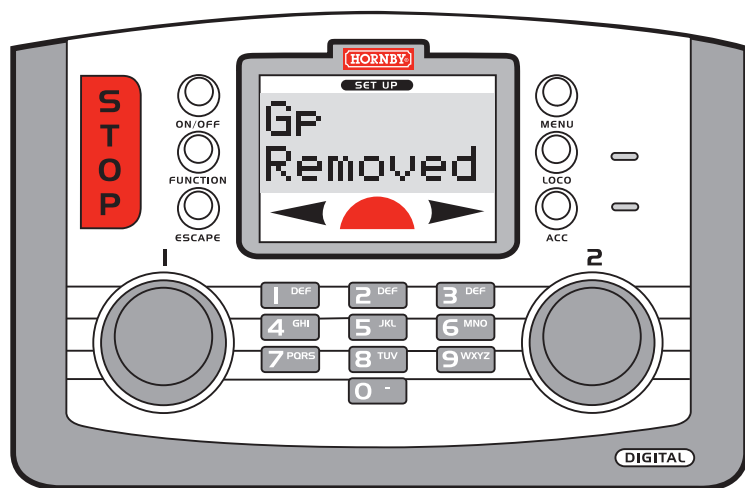

Fig. 1

For more information visit: **www.hornby.com**

Introduction: 4 Programming Modes

Reg, Paged and Direct modes

The development of DCC control can be traced back to the mid to late 1970s and over the years has advanced from having basic capabilities to today's multi-functioning units. Early decoders had 8 'Registers' for storing basic configuration information, e.g. locomotive address, acceleration / deceleration, etc. Programming these early decoders was carried out in **Reg** mode.

For decoders to become more sophisticated it was necessary to expand the number of Registers supported. This led to the development of the concept of CVs and **Paged** mode programming. 1024 CVs could now be supported, however read-back of a decoder's CVs in **Paged** mode was a complex process and slow in practice. Further advancements were made resulting in **Direct** mode.

Modern decoders using **Direct** mode programming which supports faster read-back response, etc. This is now the preferred mode for decoder programming.

The **Elite** supports all three programming modes described above, consequently the **Elite** will support a wide range of decoder types.

All the above 3 programming modes are carried out with the locomotive placed on a dedicated Programming Track.

Locomotives placed on the Programming Track can be both programmed and read-back. (Providing the decoder supports Read-Back.)

Operate mode

It is also possible to programme CVs while a locomotive is on the Main Track. To do this a special programming mode is used. This 4th mode is called **Operate** mode.

Locomotives on the Main Track may be programmed using **Operate** mode, however most decoders cannot be 'read back' unless they support RailCom®.

Note: If a decoder supports RailCom® it must be enabled in the decoder, see CV29 on page 29.

RailCom® is a technology supporting bi-directional communication between a decoder and the controller and has been developed by Lenz Elektronik GmbH.

RailCom® allows a Sapphire decoder to report back to the **Elite** fuel levels when **Fuel Simulation** is operational.

Operate mode is typically used for adjusting a locomotives acceleration/deceleration and setting default direction, etc. while the locomotive is under control on the Main Track and is stationary.

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Locomotive Programming (continued)

Programming Overview

The following sections will take you through the procedure of programming decoders. We will follow the logical flow of the 'Programming' area of the **Elite's** menu.

Once you have elected to programme a locomotive you will be first asked what programming mode you wish to use. In most cases you will select **Direct** mode. From there on you have the following 'quick access' options.

1. Programme the Locomotive Address.

2. Change the decoder operational characteristics using the **Config** menu. This is a very easy way of making changes to CV29. See the full explanation of CV29 on page 29.

3. Set Acceleration.

4. Set Deceleration.

5. Set the decoder Start Up Voltage.

6. Access CV programming - Detailed programming capability with Read Back.

7. Read Back decoder version number.

8. Read Back decoder Manufacturer ID number.

A special note re Programming 'Dummy' Cars

The **Elite**, version 1.4 and later allows address programming of 'dummy' cars. The Pendolino, HST, etc. locomotives carry decoders in their 'dummy' cars for the purpose of controlling directional lights. These decoders have to be programmed with the same address as the 'power' car's decoder for directional lighting to work correctly under **Function** control from the controller.

Note: It is not possible to read back a decoder without a load connected (i.e. no motor).

Alternative Programming Modes

As well as supporting the more common **Direct** programming mode, the **Elite** also supports **Register** programming mode, **Paged** programming mode and **Operate** programming mode. The following describes how each mode can be accessed with the **Elite**. (See page 25 for details of each mode.)

Register Programming Mode

1. Press **Menu**. Screen shows "**Loco**". Press **Controller 1** to confirm. Screen shows "**Direct**".

2. Rotate **Controller 1** until screen shows "**Reg**" and press **Controller 1** to confirm.

3. Screen shows "**Address**". Press **Controller 1** to confirm.

4. Screen shows "**Address Write**".

5. Press **Controller 1** to confirm. Screen shows "**Address Adr:0003**" or the last locomotive selected. Enter the locomotive number you wish to programme.

6. Press **Controller 1** to confirm. Red LED flashes for a few seconds. Screen shows "**Address**".

7. Return the loco to the main track. To operate the locomotive press **Menu**. Screen shows "**00:00 1 0003**" or the locomotive that was programmed.

Note: Use on Programming Track only.

Note: In the above example we have described the procedure for using **Register** mode programming of the locomotive's address.

When at step 3 in the above procedure it is possible to cycle through the other quick access programming options if you wish to change the locomotive's acceleration etc. However, you will note that there is no 'CV' programming option in the selectable options. The CV option, while in **Register** programming mode is replaced by "**Reg**" programming. When **Reg** programming is selected there are only 8 registers available for programming unlike the 1024 CVs usually available.

Alternative Programming Modes (continued)

Config Menu (CV29)

Paged Programming Mode

1. Press **Menu**. Screen shows "**Loco**". Press **Controller 1** to confirm. Screen shows "**Direct**".

2. Rotate **Controller 1** until screen shows "**Paged**" and press **Controller 1** to confirm.

3. Screen shows "**Address**". Press **Controller 1** to confirm.

4. Screen shows "**Address Write**".

5. Press **Controller 1** to confirm. Screen shows "**Address Adr:0003**" or the last locomotive selected. Enter the locomotive number you wish to programme.

6. Press **Controller 1** to confirm. Red LED flashes for a few seconds. Screen shows "**Address**".

7. Return the loco to the main track. To operate the locomotive press **Menu**. Screen shows "**00:00 1 0003**" or the locomotive that was programmed.

Note: Use on Programming Track only.

Note: In the above example we have described the procedure for using **Paged** mode programming of the locomotive's address.

When at step 3 in the above procedure it is possible to cycle through the other quick access programming options if you wish to change the locomotive's acceleration etc.

Operate Programming Mode

The **Operate** mode can be used to change a locomotive's CVs, i.e. Acceleration/Deceleration, etc. while the locomotive is on the main line, i.e. not on the Programming Track, however the **Operate** mode will not allow you to change the locomotive's address (CV 1). See writing and reading CVs in **Operate** mode on pages 40-42.

What is CV29?

All decoders have a 'special' CV (Configuration Variable) that allows the configuration of a range of parameters. This is CV29. The **Elite** has a built in menu that allows easy programming of these parameters.

Below is a brief description of each parameter controlled by the value programmed into CV29. For detailed information regarding CV29, etc. please consult NMRA DCC Standards.

DIRECTION – CV29 bit 0

Used to change the default direction which can be set to run the locomotive in reverse when the **Elite** display is indicating a forwards direction. This CV is usually set to default "**Normal"**. Changing to "**Reversed**" can be useful if a motor has been 'wired in reverse' in order to correct direction of running without dismantling the locomotive and rewiring the motor.

FUNCTION LIGHTING – CV29 bit 1

Speed step setting for headlight / rear light control. Some decoders do not read the 'direction' correctly from the speed command sent from the controller. Changing this parameter within CV29 tells the decoder where to find the direction information within the speed command. On most decoders lighting direction is handled correctly no matter which speed step setting is used i.e. 14, 28 or 127 speed steps.

POWER CONVERSION – CV29 bit 2

Loco decoders usually by default can operate under DC control on an analogue layout. However, you can disable this feature by changing this parameter. If a decoder fitted locomotive is not going to be run on any analogue layout Hornby recommends that the parameter is set to "**DCC Only"**.

RAILCOM® – CV29 bit 3

Some advanced decoders support **RailCom®**. This is a feature which enables a decoder's CVs to be read back while the locomotive is on the Main Track. The Sapphire automatically uses this feature during Fuel Simulation. It is possible to disable or enable RailCom® with this parameter. If running a Sapphire with Fuel Simulation set to "**Enable"**.

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Config Menu (CV29)

CV29 Config Programming

What is CV29? (continued)

SPEED TABLE – CV29 bit 4

By default the way a locomotive responds to the throttle is governed by CV2, 5 and 6. These CVs govern **Vstart**, **Vhigh**, and **Vmid**, which sets a basic 'speed curve'. However, advanced decoders allow you to build a custom speed curve by programming values into CVs 67-94. This parameter in CV29 allows you to choose which speed curve to apply. The Sapphire supports advanced 'speed curves'.

ADDRESS LENGTH – CV29 bit 5

Most decoders can be programmed with either "**Short**" or "**Extended**" address. e.g. Short addresses 1-127, long addresses 1-9999, where each type of address stored is different. This parameter is usually handled automatically when programming a decoder.

DECODER FUNCTION TYPE – CV29 bit 7 (bit 6 is reserved for future use)

Some decoders can operate in either **Loco** or **Accessory** modes. The 'type' can be set with this parameter.

Note: If a feature is not supported within CV29 on a particular decoder you will not be able to programme it, however nothing will change if you do attempt to change it with the **Elite**.

Note: R8249 Hornby DCC Locomotive Decoder CV29 only supports **Direction, Function Lighting, Power Conversion** and **Address Length**.

Programming CV29 with the **Config** menu

1. Press **Menu** and then either controller and if necessary rotate until screen shows "**Direct**" and press the controller.

2. Rotate until screen shows "**Config**" and press the controller to confirm.

3. The screen now shows the first of seven parameters "**Dir Normal**". Rotate the controller to the desired setting "**Dir Normal**" or "**Dir Reversed**" and press the controller to move to the next parameter.

4. Repeat step 3 for all seven parameters.

5. After the seventh parameter has been set press the controller and the **Elite** will write CV29 (the red LED will flash). When the Write sequence has finished the display will show "**Config**".

6. Press the **Menu** key to return to Time Display mode.

Note: When you run through the procedure outlined in the flow diagram on page 32 you must complete the entire sequence by selecting the desired value for each parameter as you progress.

Note: After completion of the CV programming procedure the **Elite** remembers the last CV number programmed, thus making access to CVs quicker during the programming procedure.

CV29 Config Programming (continued)

Programming CV29 with the Config menu (continued)

Loco

Press **MENU** key

Press either controller

Direct

Press either controller

Address

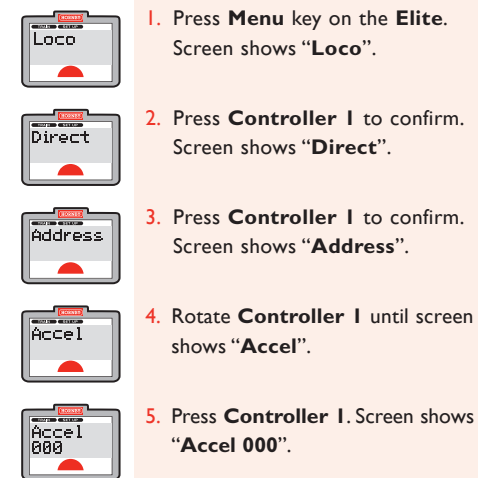Press either controller

Rotate either controller

Config

Press either controller

Dir Normal

Rotate either controller

Press either controller

FL Sp&Dir

Rotate either controller

Press either controller

Power DCC Only

Rotate either controller

Press either controller

RailCom Disable

Rotate either controller

Press either controller

RailCom Enable

Power DCC & DC

FL Function

Dir Reversed

SP.Table CV#2#5#6

Press either controller

Address Short

Press either controller

Decoder Multi

Press either controller to write CV29

Config

Rotate either controller

SP.Table CV#67-94

Rotate either controller

Address Extended

Rotate either controller

Decoder Acc

Press the **Menu** key to exit Config programming

For more information visit: www.hornby.com

Acceleration Control (CV3)

The **Elite** supports programming of acceleration/deceleration levels from 0, to a maximum of 255.

Note: Some locomotive decoders only support maximum values regarding acceleration/deceleration of 64. Please check the decoder's documentation for the maximum values regarding acceleration/deceleration. For this example No. 3 locomotive will be used. Before programming place the locomotive on the Programming Track.

Loco

1. Press **Menu** key on the **Elite**. Screen shows "**Loco**".

Direct

2. Press **Controller 1** to confirm. Screen shows "**Direct**".

Address

3. Press **Controller 1** to confirm. Screen shows "**Address**".

Accel

4. Rotate **Controller 1** until screen shows "**Accel**".

Accel 000

5. Press **Controller 1**. Screen shows "**Accel 000**".

6. Rotate **Controller 1** until the desired acceleration level is displayed. Alternatively, you can type in the level using the keypad. The lower the numbers entered the faster the acceleration; the higher the number (maximum 255), the slower the acceleration.

7. Press **Controller 1** and the red LED will flash for a few seconds. Screen shows "**Accel**". See Fig. 1.

8. Press **Menu** to return to the main screen.

Please Note:
The speed of acceleration and deceleration will depend largely on the levels chosen.

As a general rule of thumb an acceleration / deceleration level of 50 will take approximately 40 seconds to reach either maximum speed or stop. This is assuming that the Speed Step setting of the decoder is 128.
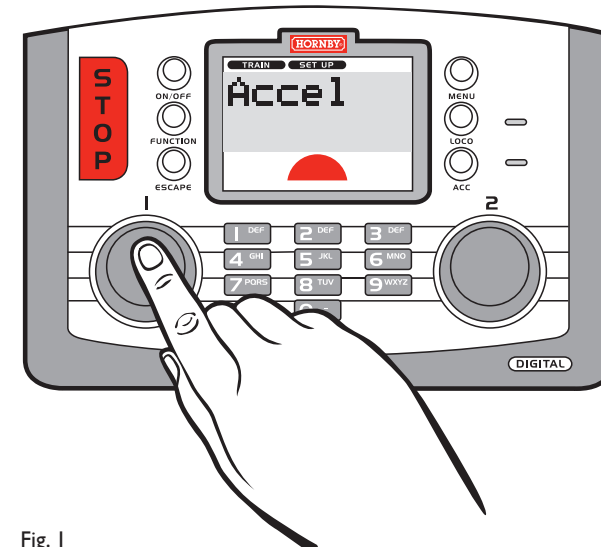
Fig. 1

Deceleration Control (CV4)

Before programming the deceleration level ensure the locomotive is on the Programming Track.

1. Press **Menu** key on the **Elite**. Screen shows "**Loco**".

2. Press **Controller 1** to confirm. Screen shows "**Direct**".

3. Press **Controller 1**. Screen shows "**Address**".

4. Rotate **Controller 1** until screen shows "**Decel**". See Fig. 1.

5. Press **Controller 1** to confirm. Screen shows "**Decel 000**".

6. Rotate **Controller 1** until the desired deceleration level is displayed. Alternatively, you can type in the deceleration level using the keypad. The lower the number entered the faster the deceleration; the higher the number, (maximum 255) the slower the deceleration.

7. Press **Controller 1**, red LED will flash for a few seconds. Screen shows "**Decel**". See Fig. 1.

8. Press **Menu** to return to the main screen.

Please Note:
1 second per acceleration level (e.g. An acceleration level of 10 equals 10 seconds approximately).

Fig. 1

Start Up Voltage (CV2)

Not all electric motors have the same start up voltage requirements. This means that some Digital locomotives may require their decoders to be adjusted to compensate for the type of motor used. The Hornby **Elite** has therefore been designed to provide the facility for the adjustment of the start up voltage which can be programmed into the decoder in up to 255 steps. The lower the number, the lower the start up voltage, however several attempts to find the optimum start up voltage may be required. Locomotive 1 will be used in this example. Place the locomotive on the Programming Track. Always check the decoder documentation re maximum value supported for any CV.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Press **Controller 1**. Screen shows "**Address**".

4. Rotate **Controller 1** until "**Start V**" is shown.

5. Press **Controller 1**. Screen shows "**Start V 000**".

6. Either rotate **Controller 1** until the required number is displayed or using the keypad type in the required level, e.g. 10. Screen shows "**Start V 010**".

7. Press **Controller 1**. Red LED will flash for a few seconds. Screen shows "**Start V**".

8. Press **Menu** to return to the main screen.

Alternatively the Start Up Voltage may be adjusted using the **Operate** mode while the locomotive is on the main line. It must be noted that once the Start Up figure has been input and **Controller 1** is pressed to confirm the red LED will not flash.

Changing and Reading CVs

There may occasions when a decoder CVs may need to be altered. This can be achieved by following the directions below.

Please Note: The range of CVs a decoder supports can vary between different decoders. Also, the maximum value that can be set for any given specific CV may be different from one decoder to another. Please check the decoder's documentation before attempting to programme a CV value.

Programming CVs on Programming Track

In the following example **Direct** mode is used for programming CV4 (Deceleration) and must be executed with the locomotive on a Programming Track.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Press **Controller 1**. Screen shows "**Address**".

4. Rotate **Controller 1** until screen shows "**CV**".

5. Press **Controller 1**. Screen shows "**CV Write**".

6. Press **Controller 1**. Screen shows "**CV 0001 W**".

7. Rotate **Controller 1** until screen shows "**CV 0004 W**".

8. Press **Controller 1** to confirm. Screen shows "**CV 0004 W 000**".

9. Rotate **Controller 1** to adjust the setting of your choice **1 - 255**. Press **Controller 1** to confirm. Red LED flashes six times. Screen returns to show "**CV**".

10. Press **Menu** to return to the main screen.

Changing and Reading CVs (continued)

Reading CVs on Programming Track

The following example in **Direct** mode is for the reading of CV3 (Acceleration) and must be executed with the locomotive on a Programming Track.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Press **Controller 1**. Screen shows "**Address**".

4. Rotate **Controller 1** until screen shows "**CV**".

5. Press **Controller 1**. Screen shows "**CV Write**".

6. Rotate **Controller 1** until screen shows "**CV Read**".

7. Press **Controller 1**. Screen shows "**CV 0001 R**".

8. Rotate **Controller 1** until the screen shows "**CV 0003 R**".

9. Press **Controller 1**. The red LED will light while the decoder is being read. Screen shows "**CV 0003 R**" and the number that CV3 was programmed as. Should the screen show "**CV 0003 R XXX**" this will denote that the CV could not be read. If this occurs refer to the decoder's specification sheet.

Please Note: Not all decoders are capable of having their CVs read. Please refer to the specification sheet supplied with the decoder.

DIGITAL

Adjusting the Speed Curve

A decoder is sent 'speed step' control information from the DCC controller (**Elite**). The physical speed the motor runs for any given 'speed step' command is governed by one of two possible 'speed curves'. One being 'simple' while the other 'complex'. The 'simple speed step' curve is made up of '3 points' and offers basic 'linear' speed response. The other 'complex' curve offers more detailed control and is made up of 27 different points.

The "basic" curve corresponds to CV values CV2, CV5 and CV6 i.e. Start Voltage, Maximum Speed and Medium speed of the locomotive.. The 'complex speed curve' has 27 definable values in the CV range, CV67 to CV94.

Selecting which of the two speed curves (basic '3 point' or the complex '27 point' curve) to be used by the decoder is controlled by CV29 bit 4. Please refer to the full description of CV29 and the programming procedure on pages 30 to 32 for further information. Before adjusting any of the Speed Curve CVs it is advisable to produce a graph particular to the locomotive you wish to programme showing how you see the speed curve progressing.

This can be achieved by using graph paper and breaking each CV value into 255 segments. Once this has been drawn plot the speed curve making a note of each of the revised CV settings. Once you have drawn on the graph the speed curve you require you can then start to install the CVs onto the locomotive decoder via the "**CV Write**" facility on the **Elite**. It is worth noting that there are several third party 'software' packages which can help plot a Speed Curve which may be more preferable than using graph paper.

Adjusting the Speed Curve (continued)

Example of programming a Speed Curve CV value

Once a decision has been made as to which of the two speed curves suit your needs for a particular locomotive you will need to programme the CV values for the speed curve selected.

In the following example you have elected to use the 'complex' speed curve. The example shows the procedure for programming CV67. CV67 is the first value in the 'complex' speed curve, all other values in the 'complex' speed curve may be programmed in the same way. i.e. CV67-CV94.

If you have elected to use the 'basic' speed curve the CVs to be programmed with the described procedure will be CV2, CV5 and CV6 i.e. Start Voltage, Maximum Speed and Medium speed of the locomotive.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Press **Controller 1**. Screen shows "**Address**".

4. Rotate **Controller 1** until screen shows "**CV**".

5. Press **Controller 1**. Screen shows "**CV Write**".

6. Press **Controller 1**. Screen shows "**CV 0001 W**".

7. Rotate **Controller 1** until screen shows "**CV 0067 W**". Press **Controller 1** to confirm.

8. Screen shows "**CV 0067 W 000**". Rotate **Controller 1** to choose the value of the CV setting (0 - 255) and press to confirm.

9. The red LED will flash confirming that the change has been accepted. Should the LED flash eight times this will denote that the programming has not been accepted. Try again.

10. Follow the above procedure working gradually through the CV settings.

Please Note:

It is advisable that before changing the factory settings that you plot the speed curve you require on graph paper or a suitable computer programme to avoid uncharacteristic acceleration / deceleration levels.

Operate Mode

Programming locomotives while on the Main Track

Introduction

Operate mode allows the change of most CV values while the locomotive is placed on the main track. For operational reasons CV1 (short address) is not accessible.

In general, the **Operate** programming procedure follows the same steps as the previous programming procedure described using **Direct** mode. However, **Operate** mode allows programming of a locomotive on the main track.

After selecting **Operate** mode you will be asked which locomotive you want to programme. i.e. you could have many locomotives on the main track and the controller needs to know which locomotive to target during the programme procedure.

Once the 'target' locomotive has been selected various locomotive parameters can be programmed or read back. Select the menu option by rotating the controller (see opposite).

In practice the usual parameters accessed while a locomotive is on the main track are Acceleration or Deceleration. On occasion you may wish to change the default direction of the locomotive, but this is less common.

Summary

Under **Operate** mode it is possible to carry out the following tasks while the locomotive is placed on the main track. Each option is selected by rotating and pressing the control knob in the same way described on page 25 regarding **Direct** mode programming.

1. Default Direction. Accessed from the **Config** menu.

Note: The **Config** menu offers a very simple way of accessing all the parameters of CV29. See the full explanation of all the parameters controlled by CV29 on page 29.

2. Set Acceleration. Accessed from the **Config** menu.

3. Set Deceleration. Accessed from the **Config** menu.

4. Set the decoder Start Up Voltage. Accessed from the **Config** menu.

5. CV programming - Detailed programming capability with Read Back (RailCom® required for read-back.)

Note: Decoders may be reset to default values. See Point 7.

Note: All Read Back functions in **Operate** mode require RailCom® functionality. See page 25.

6. Read Back decoder version number.

7. Read Back decoder Manufacturer ID number. (CV8) Writing the value "8" to this CV will reset a Hornby decoder.

Please refer to the following example opposite regarding the use of **Operate** mode. In this example we will access and change CV3 (Acceleration.)

Operate Mode (continued)

Example of changing a CV value on the main track

In the example below we will change CV3 (Acceleration) of a locomotive while it is placed on the Main track.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Operate**".

4. Press **Controller 1** to confirm. Screen shows "**Operate Adr:0003**" or the last locomotive number operated.

5. Rotate **Controller 1** until screen shows the number of the locomotive whose CV you wish to adjust. In this example number 10 has been chosen.
Press **Controller 1** to confirm.

6. Screen shows "**Config**". Rotate **Controller 1** until "**CV**" is shown and press **Controller 1** to confirm.

7. Screen shows "**CV Write**". Press **Controller 1** to confirm. Screen shows "**CV 0001 W**".

8. Rotate **Controller 1** until "**CV 0003**" is shown.

9. Press **Controller 1** to confirm. Screen shows "**CV 0003 W 000**".

10. Rotate **Controller 1** to adjust the setting of your choice **1 - 255**.

11. Press **Controller 1** to confirm. Screen shows "**CV**".

12. Press **Menu** to return to the main screen.

Please Note:

The red LED will not flash.

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Example of reading a CV on the main track

Please Note: Read back of a decoder under **Operate** mode while the locomotive is on the main track requires the RailCom® feature to be enabled in both the controller and the decoder.

Not all decoders support RailCom® and thus will not support read back while the locomotive is on the main track.

The **Elite** automatically turns on RailCom® support when a read back request is executed in 'Operational' mode. However, for read back to work, please ensure that RailCom® is enabled in CV29 in the decoder.

To enable RailCom® within CV29, please see pages 29 to 32 for more information. Enabling RailCom® in CV29 will need to be carried out under **Direct** mode with the locomotive on the programming track before any read backs can be attempted under **Operate** mode.

The following example is for the reading of CV4 (Deceleration) using **Operate** mode, i.e. on the main line.

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1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Operate**".

4. Press **Controller 1** to confirm. Screen shows "**Operate Adr:0003**" or the last locomotive number operated.

5. Rotate **Controller 1** until screen shows the number of the locomotive whose CV you wish to adjust. In this example number 20 has been chosen.
Press **Controller 1** to confirm.

6. Screen shows "**Config**". Rotate **Controller 1** until "**CV**" is shown and press **Controller 1** to confirm.

7. Screen shows "**CV Write**".

8. Rotate **Controller 1** until "**CV Read**" is shown and press **Controller 1** to confirm.

9. Screen shows "**CV 0001 R**".

10. Rotate **Controller 1** until screen shows "**CV 0004 R**" and press **Controller 1** to confirm.

11. The red LED will light while the decoder is being read. Screen shows "**CV 0004 R**" and the number that CV4 was programmed as. Should the screen show "**CV 0004 R XXX**" this will denote that the CV could not be read. If this occurs refer to the decoder's specification sheet.

12. Press **Menu** to return to the main screen.

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Locomotive Direction setting

The default direction of the locomotive can be altered using the **Elite** without taking it off the Main Track and to do this the following procedure will need to be used.

1. Press **Menu** key. Screen shows "**Loco**".

2. Press **Controller 1** to confirm. Screen shows "**Direct**".

3. Rotate **Controller 1** until "**Operate**" is displayed.

4. Press **Controller 1**. Screen shows "**Operate Adr:0003**" or the last locomotive operated.

5. Press **Controller 1**. Screen shows "**Config**". See Fig. 1.

6. Press **Controller 1**. Screen shows "**Dir Normal**".

7. Rotate **Controller 1** to show "**Normal**" or "**Reversed**". Select the preferred direction.

8. Press **Controller 1** to confirm.

9. Press **Controller 1** six more times to skip further options. Screen shows "**Config**". See Fig. 1.

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10. Press **Menu** to return to the main menu.

Fig. 1

Elite Features

The **Elite** controller has several built in features that can assist you in controlling your layout. Please read on for more information on how to use these features.

To Name a Locomotive

Using the **Elite** alphanumeric keyboard locomotives can not only be given their own unique number but also named. For this example the name 'Mallard' will be used.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Features**".

4. Press **Controller 1**. Screen shows "**Features Adr:0001**" or the last locomotive operated. Rotate **Controller 1** until loco desired is displayed.

5. Press **Controller 1**. Screen shows "**Name**".

6. Press **Controller 1**. Press **6** twice. Screen shows "**M_**".

7. Press **2** twice. Screen shows "**MA_**".

8. Press **5** four times. Screen shows "**MAL_**".

9. Press **5** four times. Screen shows "**MALL_**".

10. Press **2** twice. Screen shows "**MALLA_**".

11. Press **7** four times. Screen shows "**MALLAR_**".

12. Press **3** twice. Screen shows "**MALLARD_**".

13. Should a mistake be made or you wish to remove the name rotate **Controller 1** anti-clockwise so that the cursor is underneath the incorrect letter. Press **0** twice and the letter will disappear then continue as above.

14. Press **Controller 1** to confirm. "**Name**" is displayed. Press **Menu** to return to the main screen.

Elite Features (continued)

Changing the number of speed steps transmitted to a locomotive

There may be occasions when locomotives fitted with older generation decoders/motors may be required to be controlled by the **Elite**. To get optimum control with these locomotives, it may be necessary to change the speed step range sent from the controller.

The **Elite** by default divides the full speed range for a locomotive decoder into 128 discrete speed steps. This suits most modern decoders etc. However, in addition to the default 128 speed steps the **Elite** can be set to transmit 14 or 28 speed steps to control the full speed range. This is set on a per locomotive basis thus allowing varying speed step capability for all locomotives on the layout.

Note: fewer speed steps will give a courser control of the locomotive when compared to the full default 128 speed steps.

Note: All Hornby decoders are optimised for 128 speed steps.

Note: Changing speed steps is a controller function. Nothing will be changed in the decoder. i.e. you do not have to have the locomotive on the main or programming tracks when carrying out this procedure.

In the procedure described below we will change the number of speed steps transmitted to locomotive 1.

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Features**". Press **Controller 1**.

4. Screen shows "**Features Adr:0003**" or the number of the last locomotive 'called up'.

5. Rotate **Controller 1** to the locomotive number required.

6. Press **Controller 1**. Screen shows "**Name**".

7. Rotate **Controller 1** until screen shows "**Steps 128**". Press **Controller 1**.

8. Rotate **Controller 1** until the desired setting is displayed.

9. Press **Controller 1** to confirm. Screen shows the steps selected.

10. Press **Menu** to return to the main screen.

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Elite Features (continued)

Locomotive Favourite Settings

The Favourites setting on the **Elite** is an extremely useful function for those who have a large stable of locomotives or who use an array of 4 digit ID numbers. Most modellers have special locomotives that they always use (Favourites) and these can be 'marked' accordingly. It is then possible for the **Elite** to only allow access to these favourite locomotives. i.e. you will only be able to scroll through a specific list of locomotive addresses or locomotive names thus, speeding up access to your locomotives.

There can be up to 254 locomotives in the 'Favourites' list.

Setting up the 'Favourites' list is carried out in two stages. i.e. For the **Elite** to show just those locomotives that are on the Favourites list the "**Fav**" setting should be set to "**On**". To do this follow the procedure below. Once the Favourites list has been turned on, you must then add locomotives to the list. See procedure on the next page.

Please Note: Any locomotive addresses not included in the Favourites list will not be accessible for control. To access these locomotive address either add the locomotive address to the Favourites list or turn off the Favourites function of the **Elite** in the Unit menu.

Enabling and Disabling the Favourites List

1. Press **Menu**. Screen shows "**Loco**".

2. Rotate **Controller 1** until screen shows "**Unit**".

3. Press **Controller 1** and rotate until screen shows "**Fav**".

4. Press **Controller 1**. Screen shows "**Fav Off**" or "**Fav On**".

5. Rotate **Controller 1** to either "**Fav Off**" or "**Fav On**".

6. Press **Controller 1** to confirm. Screen shows "**Fav**".

7. Press **Menu** to return to the main screen.

Please Note:
"**Fav On**" means that only those locomotives that are on your favourites list will be able to be called up and operated.

"**Fav Off**" means that all locomotives are available for operation.

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For more information visit: **www.hornby.com**

Elite Features (continued)

Adding a locomotive address to the Favourites list

Now that the Favourite (**Fav**) function has been enabled locomotives required to be placed on the Favourite List can be programmed as follows using Locomotive 1 as an example:

1. Press **Menu**. Screen shows "**Loco**".

2. Press **Controller 1**. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Features**".

4. Press **Controller 1**. Screen shows "**Features Adr: 0003**" or the last used locomotive address.

5. Enter the locomotive address you wish to add as a favourite using **Controller 1** or the keypad.

6. Press **Controller 1**. Screen shows "**Name**".

7. Rotate **Controller 1** until screen shows "**Fav**".

8. Press **Controller 1**. Screen shows "**Fav No**". See Fig. 1.

9. If you wish the locomotive to be added to your Favourite list rotate **Controller 1** until "**Fav Yes**" is shown. Press **Controller 1** to confirm. Screen shows "**Fav**".

10. Press **Menu** to return to the main screen.

Please Note:
To call up locomotives that are not on the Favourite list the Favourite setting must be switched off. See page 46.
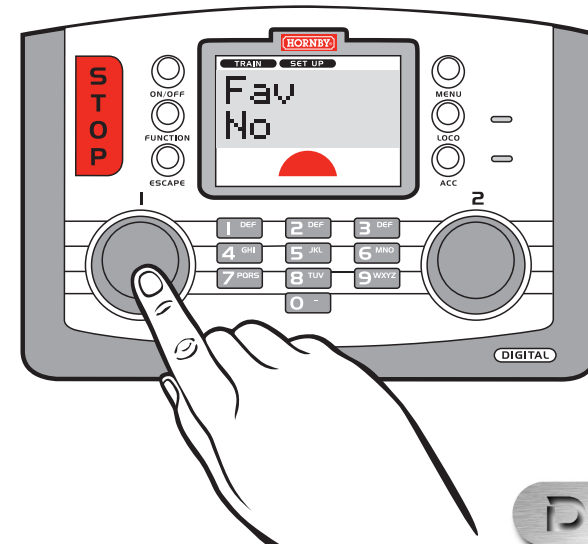
Fig. 1

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Programming the Sapphire

The Hornby Sapphire decoder has two unique features that can be controlled and programmed via dedicated menus and displays of the **Elite** version 1.4 or later.

Fuel Simulation

The locomotive will stop when the fuel has been completely depleted. The term 'fuel' is used to describe both coal and diesel oil. See page 49.
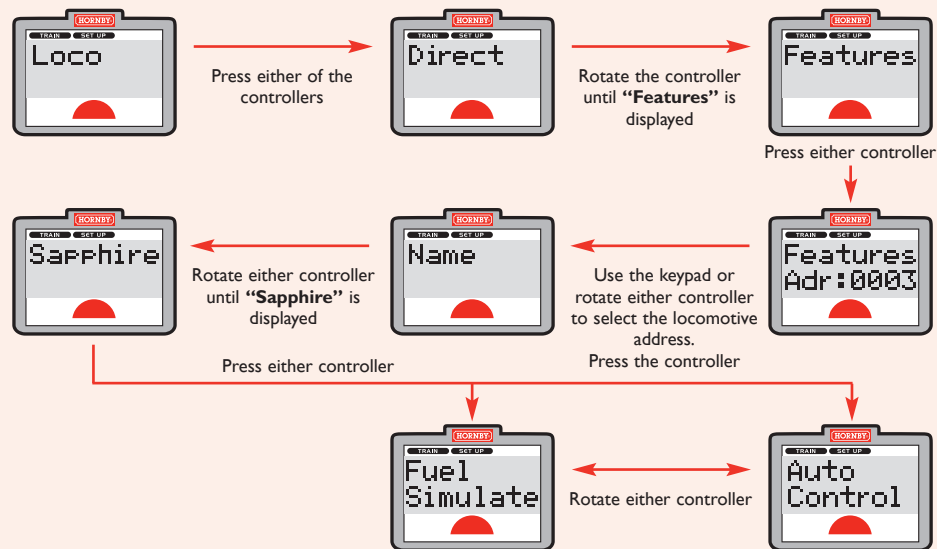
Automatic Control Cycle

The Sapphire decoder can be programmed to carry out a sequence of events under fully automatic control without any user intervention. The control cycle can be set to run once or repeat from the start. See page 51.

Once the display shows "**Sapphire**" (see below) press the controller and you will then be shown either the "**Auto Control**" or "**Fuel Simulate**". You may toggle between these sections by rotating either controller. Once the desired section is shown, press either controller to enter the desired section.

How to access the Sapphire programming menus

The flow diagram below shows how to enter the **Elite's** Sapphire programming menus. First press the **Menu** key.

Press either of the controllers

Rotate the controller until **"Features"** is displayed

Press either controller

Rotate either controller until **"Sapphire"** is displayed

Use the keypad or rotate either controller to select the locomotive address.
Press the controller

Press either controller

Rotate either controller

Fuel Simulation

An initial fuel quantity has to be set before you can run **Fuel Simulation**. The initial fuel quantity is used every time you refuel the locomotive.

Choosing initial fuel quantities

Generally a locomotive running at maximum throttle setting will stop after a few minutes if the fuel quantity is set to 10, however this is a very rough guide. It is best to start at a value of 5 and work upwards until you find the optimum quantity for your needs. The maximum quantity you can set is 254.

1. To set the initial fuel quantity follow the steps of the flow chart on page 48 until screen shows "**Features Adr:0003**". Select the desired locomotive and continue with the steps of the flow chart on page 48 until the screen shows "**Fuel Simulate**".

2. Press either controller. Screen shows "**Fuel 000**". Enter the initial fuel quantity with the keypad or by

rotating the controller (fuel value of 15 in this example). Screen shows "**Fuel 015**".

3. Press either controller to confirm. A red LED illuminates for approx. 4 seconds while the fuel quantity is programmed into the decoder. Screen shows "**Sapphire**".

4. Press the **Menu** key to return to **Loco** control, the **Fuel Simulation** is now ready to run.

1. Press the **Loco** key, select the desired locomotive and press the controller. Cycle through the display modes by pressing the **Function** key until you get to the **Fuel Simulation** display (see page 16). Screen shows "**Off F 0003**".

2. Press the **On/Off** key to turn on the simulation. Screen shows

"**On Fxxx 0003**". The fuel quantity will then be read back from the decoder (in this example 15). Screen shows "**On F015 0003**".

3. Rotate the controller to take control of the locomotive. After a while the screen will show the fuel quantity deplete at a rate dependent on the throttle setting.

Note: When a locomotive runs out of fuel it stops and requires refuelling. The headlights / rear lights on locomotives so equipped will flash when the fuel is fully depleted.

Note: The Sapphire decoder calculates the rate of fuel consumption based on the speed set on the **Elite**. A higher speed value will be required for a locomotive under a heavy load in order to maintain speed as opposed to a lightly loaded locomotive running at equivalent speed. Fuel will be consumed faster the higher the speed. The actual speed of the locomotive is not the governing factor regarding fuel consumption but the throttle setting.

Fuel Simulation (continued)

Refuelling

When a locomotive runs out of fuel it stops and requires refuelling. The headlights / rear lights on locomotives so equipped; will flash when the fuel is fully depleted. However, you can refuel a locomotive at any point.

1. Select the address of the locomotive you wish to refuel.
2. Cycle through the display modes by pressing the **Function** key until you get to the Fuel Simulation display (see page16).
3. The display will now show the fuel remaining.
4. Press the **On/Off** key to turn the simulation off. This will cause the throttle for the locomotive to be set to minimum (stationary).

Screen shows "**Off F**".

5. Press the **On/Off** key once more to refuel and restart the simulation, i.e. the fuel level will be reset to the amount previously set as the 'Initial' value. (page 49.) You now have to set a new throttle setting. This process can be repeated as many times as desired.

How many locomotives can run at the same time with Fuel Simulation?

During the simulation the **Elite** only reads back the fuel level of the locomotive address that is shown in the **Fuel Simulation** display. The **Elite** can run up to 64 Sapphire-fitted locomotives with fuel simulation.

You can control other locomotives while the simulation is running - returning to the locomotive running the Fuel Simulation to check fuel status as desired. The **Fuel Simulation** function is a Sapphire based function, once it is turned on the Sapphire will continuously calculate fuel values whether it is being monitored by the **Elite** or not.

The **Elite** will always revert to the previously set display mode when the desired controller is pressed. It is possible to set the **Elite** up so that pressing either controller will immediately show the current fuel status for the last locomotive assigned to each controller making it easy to monitor two locomotives with a single controller press.

Advanced Simulation

The **Elite** Fuel Simulation display only offers support for **Fuel** only, however the Sapphire decoder is actually capable of **Water** and **Fuel** simulation.

This involves the setting of two independent quantities which will be used in the consumption calculation. Using the CV read back capabilities of the Sapphire and utilising **RailCom®** it is possible to monitor both water and fuel levels as they are calculated. Carrying out this type of simulation involves some experience in dealing with CV values, etc. Please refer to the Sapphire instruction leaflet for the full set of CVs involved in the simulation. The **Elite Fuel Consumption** display feature sets **Water** to maximum automatically so that even though the water quantity is being depleted, it will not run out before the **Fuel** therefore **Water** is ignored.

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Automatic Control Cycle (ACC)

The **Elite** has a dedicated menu that simplifies the process of setting up the Sapphire's **Automatic Control Cycle** therefore no specialist knowledge of CVs is required.

An **ACC** is made up of a series of Events and Controls which are selected within the **ACC**. Setting up the **ACC** is executed in two parts i.e. **Event** and **Control**.

In the **Event** part of the menu, actions can be set up for the desired locomotive to carry out. For example an optional initial delay and then speed, direction and time parameters. See page 52.

In the **Event Control** part of the menu Events may be selected which can run and if needed stop the **ACC** from running. See pages 54-55.
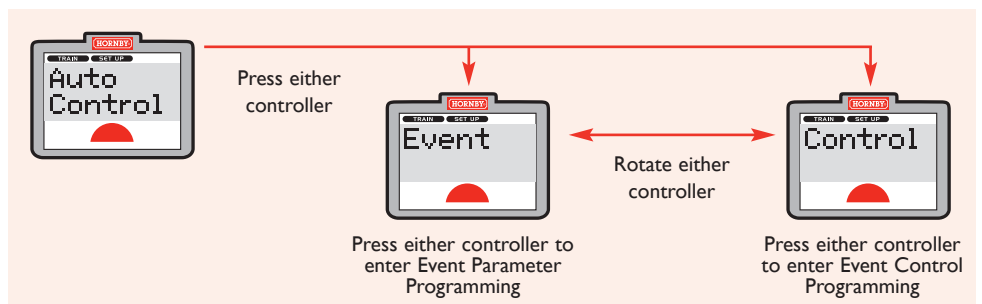
ACC Event Parameters Description

There are 4 possible locomotive **Delay time / Speed / Direction / Duration Events** that can be set to run consecutively. There is also an optional **Event Delay** parameter that allows the operator to set a delay time before the 4 **Events** start running. The **ACC** starts as soon as the locomotive is placed on the track and powered. Using the **Event Delay** parameter will prevent the locomotive trying to run while being placed on the track.

Note: An **ACC** can be set to automatically repeat or to run once. When an **ACC** is set to 'repeat' the cycle will return to the first locomotive **Delay time / Speed / Direction / Duration Event** set after the initial delay time that has been set in the "**Event Delay**" parameter. The **Initial Delay** time will not be used on subsequent cycles. When the track is powered down or up in the case of an emergency stop or the locomotive is removed or replaced on the track the ACC will commence using the "**Event Delay**" time.

Note: When planning an **ACC** it is worth making a note of exactly what you are intending to do. This will help you keep track of the parameter values that have been set. The **Elite** does not have the ability to read back the parameter values set when using the **ACC** programming feature.

Note: Each parameter value of the **ACC** is stored in specific CV locations - **Delay time / Speed / Direction / Duration** for each event. It is therefore possible to read back and verify all **ACC** parameters via the appropriate CVs using the standard programming functions of the **Elite**. Consult the Sapphire instruction leaflet for the list of **ACC** CV locations and follow the usual CV programming and read back procedures of the **Elite**.

Press either controller

Rotate either controller

Press either controller to enter Event Parameter Programming

Press either controller to enter Event Control Programming
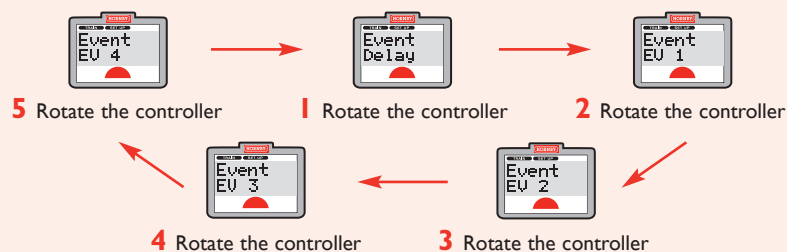
Setting the Event Parameters

The Sapphire's Automatic Control Cycle (ACC) example

Example: To set the Sapphire **ACC** so that a locomotive can carry out the following actions.
1. After an initial delay of 20 seconds.
2. The locomotive runs forwards at speed 50 for 10 seconds.
3. The locomotive stops for 5 seconds.
4. The locomotive runs in the opposite direction at speed setting 25 for 30 seconds.
5. The locomotive stops for 7 seconds before restarting the cycle from step 2.

Part 1 – Setting the **Event** parameters

With the display showing "**Event**" (see flow diagram on page 51) press the chosen controller. The screen is now set for the **Event** sub-headings.

5 Rotate the controller   **1** Rotate the controller   **2** Rotate the controller

4 Rotate the controller   **3** Rotate the controller

Part 1 continued – Setting the **Event Delay**

1. With the **Elite** display showing "**Event Delay**" press the chosen controller. Screen shows "**HH:mm:ss 00:00:00**".
2. Press the controller to move from hours to minutes to seconds. Note the relevant letters change case which signifies the relevant input section.
3. Use the keypad or rotate the controller to set the time parameter. For this example input 10 in the 'seconds' section.

4. Press the controller to set the desired value. Screen shows "**Event Delay**".

Note: If no initial delay is required set the **Event Delay** parameter to zero seconds.

Note: The **Event Delay** parameter is only used once in the **ACC**. When the initial delay has been completed the **ACC** will continue to run, cycling through each **speed / direction / duration** Event in sequence.

For more information visit: **www.hornby.com**

Setting the Event Parameters (continued)

Part 1 continued - Setting the **Events (EV1, EV2, EV3, EV4)**

In this example the 4 Events are set as follows:

EV 1 - Speed (050) / Direction (Normal) / Duration (00:00:10).

EV 2 - **Stop** (speed = 000) for 5 seconds (00:00:05). If desired, you can control the locomotive directional lighting by changing the locomotive direction parameter. e.g. the locomotive directional lighting is set to correspond with the next **Event**.

EV 3 - Run in the opposite direction at speed setting 025 for 00:00:30 seconds.

EV 4 - **Stop** for 00:00:07 seconds, you can set the direction parameter if you wish.

1. Rotate the selected controller until screen shows the first sub-menu "**EV 1**". Press the controller.

2. Screen shows "**Speed 000**" Use the keypad or rotate a controller to set the speed parameter. Press the controller when the desired value has been set (50 in this example).

3. You will then move to the next sub-menu. Screen shows "**Dir Normal**". Rotate a controller to set the desired direction "**Dir Normal**" or "**Dir Reversed**". Press the controller when the desired direction has been set and move to the next sub-menu.

4. Screen shows "**HH:mm:ss 00:00:00**". Use the keypad or rotate a controller to set the time parameters. Press the controller to move between hours, minutes and seconds. Press the controller when the desired value has been set which in this instance is 10 seconds. Screen shows "**Event EV 1**". **EV 1** (Loco **Speed / Direction / Duration**) has now been set.

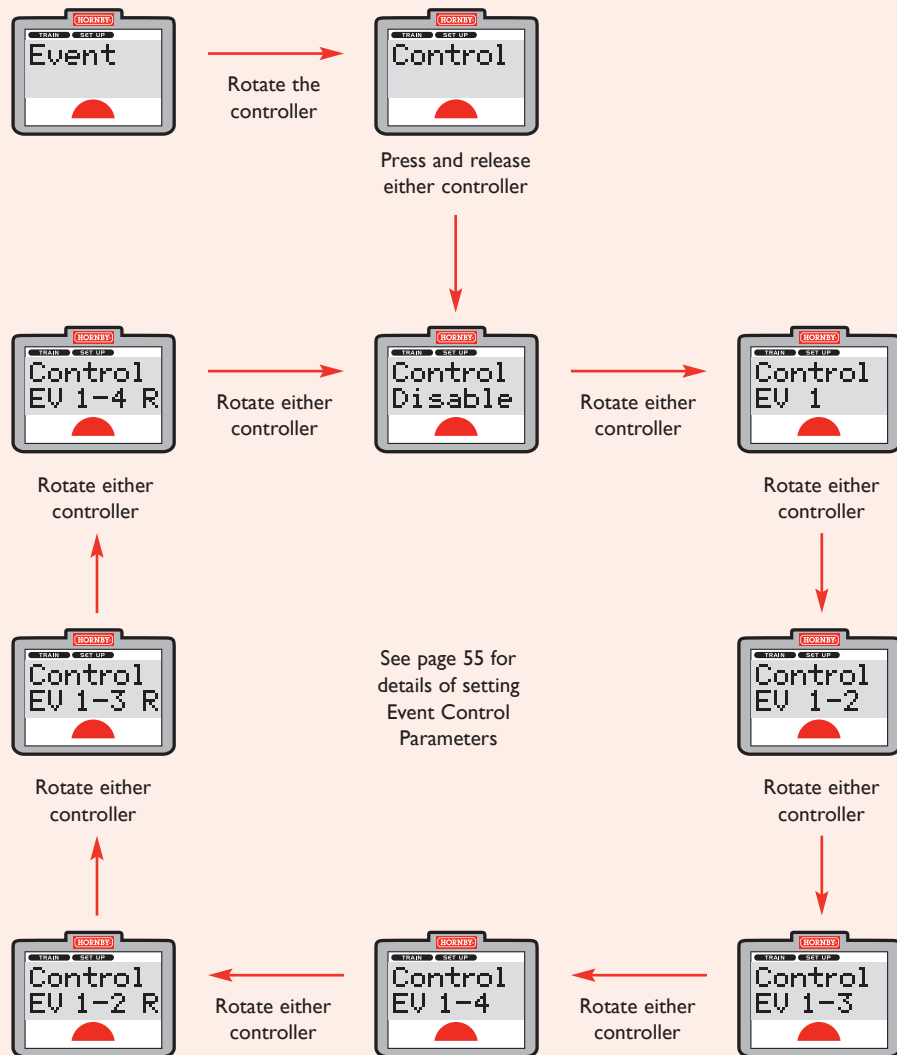5. To set the other Events (EV2, EV3, EV4) repeat steps 1 to 4 inputting the appropriate values for this example.

6. When you have finished configuring **Events** press the **Escape** key to return to "**Event**". Go to page 54.

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Part - 2 Setting the **Event Control** parameters

Event

Rotate the controller

Control

Press and release either controller

Control EV 1-4 R

Rotate either controller

Control Disable

Rotate either controller

Control EV 1

Rotate either controller

Rotate either controller

Control EV 1-3 R

Rotate either controller

See page 55 for details of setting Event Control Parameters

Control EV 1-2

Rotate either controller

Control EV 1-2 R

Rotate either controller

Control EV 1-4

Rotate either controller

Control EV 1-3

For more information visit: www.hornby.com

Part - 2 Setting the **Event Control** parameters (continued)

Follow the flow diagram on page 54 to access each **Event Control** option.

The "**Control Disable**" option will be used later to disable the **ACC**. See **Turning Off ACC** on page 56.

The first 4 displays are 'run once' options (**Control EV 1**, **EV 1-2**, **EV 1-3**, **EV 1-4**). The following 3 displays allow you to select a 'run continuously' option (**Control EV 1-2R**, **EV 1-3R**, **EV 1-4R**).

In our example we will run all 4 Event EVs programmed on a continuous basis.

1. To set our ACC running, step through each display option until the screen shows "**Control EV 1-4 R**".

2. Press and release either controller. The ACC will start to run as soon as the controller is pressed. The display will now show "**Control**".

3. Press the **Menu** key to return to 'normal' locomotive control (i.e. to manually control non-ACC locomotives).

Note: While the **ACC** is running, it is not possible to control the locomotive manually. However, locomotive functions e.g. lighting may be manually controlled.
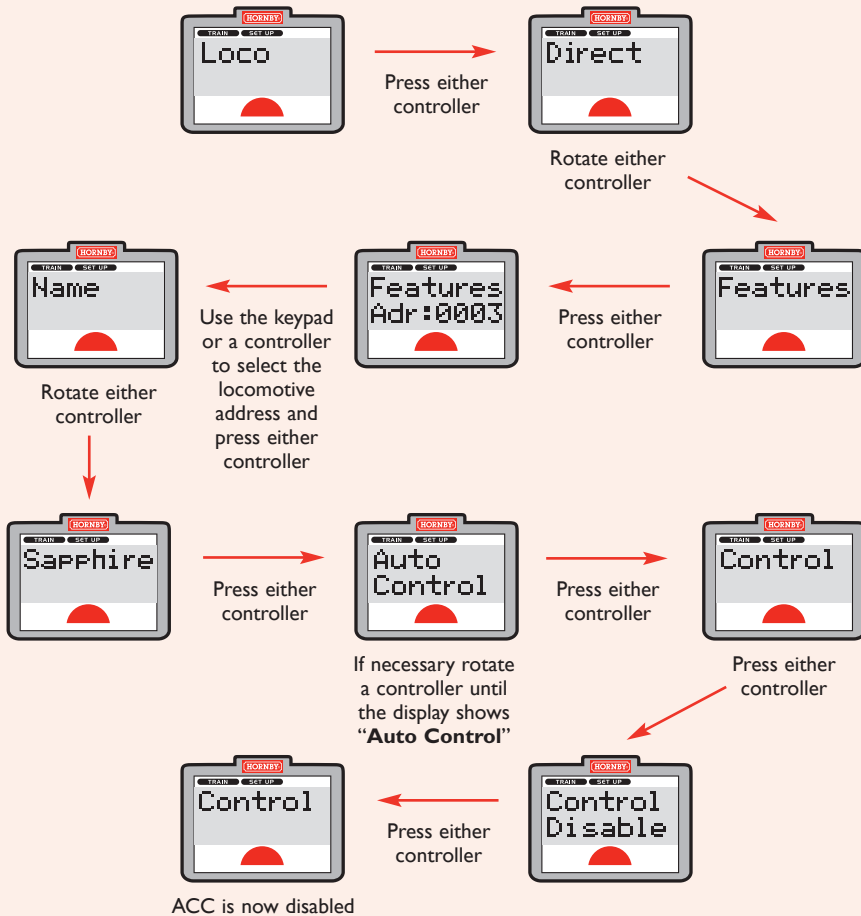
Note: The **Emergency Stop** key will halt all locomotives on the layout including those under **ACC** operation. When power is restored to the track all locomotives under **ACC** will restart and commence running their full **ACC** cycles, including any "**Initial Delay**" times if set.

Turning off ACC operation

Turning off an ACC operation within a specific locomotive

From the locomotive control screen press the **Menu** key and follow the flow diagram below.

Loco

Press either controller

Direct

Rotate either controller

Features

Press either controller

Features Adr:0003

Press either controller

Name

Rotate either controller

Use the keypad or a controller to select the locomotive address and press either controller

Sapphire

Press either controller

Auto Control

If necessary rotate a controller until the display shows "**Auto Control**"

Press either controller

Control

Press either controller

Control Disable

Press either controller

Control

ACC is now disabled

Press the **Menu** key to return to normal locomotive control.

For more information visit: **www.hornby.com**

Points and Accessories

The **Elite** is capable of controlling 252 accessory/point addresses. If for any reason a Point fails to switch it is now possible to fire the Point again with a single press of the corresponding controller.

This indicates that you are sending an Accessory address for control.

Control Adr:0001

Acc (Accessory) control mode indicator.

The new Accessory address selected for control.

Accessing and Controlling Points and Accessories

00:00 1 0001

Press the **Acc** key on the right hand side of the **Elite's** display which will then show the current status of the last accessed **Point** or **Accessory** address. If no **Point** or **Accessory** address has been accessed since power up address **0001** will be displayed.

Selecting a new Point or Accessory Address

00:00 1 0001

Control Adr:0001

1. While in **Loco** control mode, press the **Acc** key. The display will show the current status of the last accessed **Point** or **Accessory** address, or if no **Point** or **Accessory** address has been accessed since power up address **0001** will be displayed.

2. To enter a new **Point** or **Accessory** address for control press the **Acc** key again - the display shows "**Control Adr:0001**".

3. Enter the desired **Point** or **Accessory** address via the keypad or by rotating one of the controllers. Press either of the controllers. You now have control of the selected **Point** or **Accessory**.

4. Press the LEFT controller to switch the **Point** in one direction, press the RIGHT controller to set the **Point** in the opposite direction.

5. When you have finished with **Point** or **Accessory** control press the **Loco** or **Menu** key to return to **Loco** control mode.

Note: If you have previously accessed a **Point** or **Accessory** address, pressing the **Escape** will cycle through all Point or Accessory addresses in the **Elite's** memory.

Note: When switching solenoid points motors, wait a few seconds between each activation if the point motors are connected to the same R8247 Accessory Decoder or R8216 Point Decoder. This will allow the **Elite** to recharge between each operation and helps to avoid 'switching failures'.

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The **Hornby R8247 Accessory/Point Decoder** may be programmed and read back in **Direct** mode. The older **R8216 Point Decoder** must be programmed in **Reg** mode. Read back is not supported.

Note: The R8216 requires pre-charging for 20 seconds by connecting it to the **Elite** 'Track' output before disconnecting and connecting to the 'Programme' output for programming.

For third party Accessory/Point Decoders alternative programming mode and methods may be required. Please refer to the programming information supplied with the third party Accessory/Point Decoder.

R8247: Programming the addresses

In the example below we describe the procedure for programming the address of an R8247. Other parameters, e.g. the setting of the pulse duration for each output port may be programmed by accessing CV mode programming. Please see the instructions supplied with the decoder. However, for most operations regarding solenoid type point motors the decoder's address only needs to be set.

1. Press **Menu** and rotate **Controller 1** until "**Acc**" is displayed.

2. Press **Controller 1** to confirm. Screen shows "**Direct**".

3. Press **Controller 1** to confirm. Screen shows "**Address**".

4. Press **Controller 1** to confirm. Screen shows "**Address Write**".

5. Press **Controller 1** to confirm. Screen shows "**Address Adr:0001**".

6. Rotate **Controller 1** until the desired address is displayed. If you are setting up your layout it is best to start with "1".

7. Press **Controller 1** to confirm. The red LED will flash several times to denote acceptance. (If the LED flashes eight times or more the number has not been accepted.) Screen shows "**Address**".

8. Should you wish not to name the point / accessory press **Menu** to return the main screen, however if you do, follow instructions as shown in Step 2 on page 61.

Please Note: If using a Hornby Points / Accessory Decoder it is advisable for consistency that the first point motor / accessory is addressed as number **1**. Once addressed the other three outlets will be automatically programmed **2, 3, 4.** Thereafter all further Hornby accessory / point decoders will be programmed in consecutive blocks of 4.

2nd Accessory / Point Decoder Nos. (5, 6, 7, 8)

3rd Accessory / Point Decoder Nos. (9, 10, 11, 12)

4th Accessory / Point Decoder Nos. (13, 14, 15, 16) etc.

R8247 Accessory/Point Decoder

Reading back R8247 point and accessory addresses

It is possible to read back the address set up of the R8247 by selecting "Read" after the "Address" option in the procedure described on page 58. However, since the R8247 actually is supporting 4 address the "address" read back will not at first make sense.

All Point and Accessory addresses follow a group of 4 rule. i.e. if you programme the R8247 with any of the following numbers e.g. 1, 2, 3, 4 the R8247 will then programme/allocate each of those numbers to its 4 ports consecutively. The numbers 1, 2, 3, and 4 make up what is referred to as Group 1.

Each group of 4 numbers has its own unique group number. The next group (2) will consist of the numbers 5, 6, 7, and 8. Group 3 will consist of 9, 10, 11, and 12 and so on.

When reading back an R8247 the appropriate "Group number will be displayed." e.g. the value "2" would mean the R8247 is programmed 5, 6, 7 and 8.

Note: When the **Elite** is programming an R8247 (or R8216) it works out the appropriate group number for the the address you have selected and actually programmes the R8247 with the "Group" number. The R8247/R8216 does the rest by recognising the "Group" number and allocating the appropriate numbers to each of its ports.

The following table shows the relationship between group numbers and address/port allocations.

Group Number	Allocated # Range	Group Number	Allocated # Range	Group Number	Allocated # Range
1	1-4	22	85-88	43	169-172
2	5-8	23	89-92	44	173-176
3	9-12	24	93-96	45	177-180
4	13-16	25	97-100	46	181-184
5	17-20	26	101-104	47	185-188
6	21-24	27	105-108	48	189-192
7	25-28	28	109-112	49	193-196
8	29-32	29	113-116	50	197-200
9	33-36	30	117-120	51	201-204
10	37-40	31	121-124	52	205-208
11	41-44	32	125-128	53	209-212
12	45-48	33	129-132	54	213-216
13	49-52	34	133-136	55	217-220
14	53-56	35	137-140	56	221-224
15	57-60	36	141-144	57	225-228
16	61-64	37	145-148	58	229-232
17	65-68	38	149-152	59	233-236
18	69-72	39	153-156	60	237-240
19	73-76	40	157-160	61	241-244
20	77-80	41	161-164	62	245-248
21	81-84	42	165-168	63	249-252

DIGITAL

R8247: Programming and Reading CVs

1. Press **Menu**. Screen shows "**Loco**".

2. Rotate **Controller 1** until screen shows "**Acc**".

3. Press **Controller 1**. Screen shows "**Direct**".

4. Press **Controller 1** to confirm. Screen shows "**Address**".

5. Rotate **Controller 1** until screen shows "**CV**". Press **Controller 1**. Screen shows "**CV Write**". If you wish to read back a CV rotate the controller until "**CV Read**" is displayed.

6. Press **Controller 1** to confirm the desired action. i.e. read or write. Screen shows "**CV 0001 W**" or "**CV 0001 R**". 0001 is the default setting.

7. Rotate controller to select the CV you wish read/write. When the CV number is displayed press **Controller 1**.
Reading: If reading back a CV, read back will commence. After a few seconds the result of the read back will be shown. e.g. "**CV 0001 R 001**". The read back procedure is now complete.
Writing: If writing a CV, rotate **Controller 1** until the new value for the CV you wish to change is shown.

8. Press **Controller 1** to commence writing the CV. The red LED flashes several times and screen shows "**Address**".

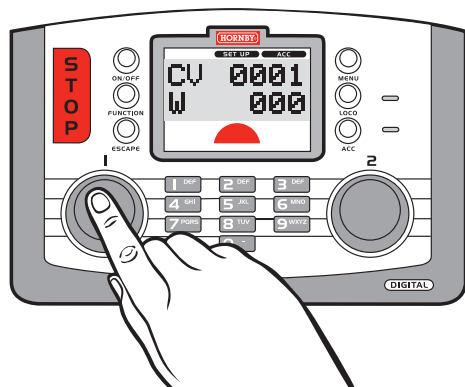9. Press Menu to return to the main screen.

Fig. 1

Step 2: Naming Points and Accessories

Using the **Elite** it is possible to name all accessories / points that are digitally operated.

1. Press **Menu** and rotate **Controller 1** until screen shows "**Acc**".

2. Press **Controller 1** to confirm. Screen shows "**Direct**".

3. Rotate **Controller 1** until screen shows "**Features**" and press **Controller 1** to confirm.

4. Screen shows "**Features Adr:0001**" and the number of the last accessory used. Rotate **Controller 1** to the accessory number you wish to name and press **Controller 1** to confirm.

5. Screen shows "**Name _**". For this example the name "**POINT 5**" will be used.

6. Press **7** twice. Screen shows "**P_**".

7. Press **6** four times. Screen shows "**PO_**".

8. Press **4** four times. Screen shows "**POI_**".

9. Press **6** three times. Screen shows "**POIN_**".

10. Press **8** twice. Screen shows "**POINT_**".

11. Press **0** twice. Screen shows "**POINT _**".

12. Press **5** once. Screen shows "**POINT 5_**".

13. Press **Controller 1** to confirm. Screen shows "**Direct**".

14. Press **Menu** to return to the main screen.

Please Note:
Should a mistake be made rotate **Controller 1** anti-clockwise so that the cursor moves back one position below the incorrect letter. Press **0** twice and the letter will disappear then continue as above.

Additional Elite Features

Having now experienced the initial control and programming abilities of the Hornby **Elite** the next section of this instruction manual explains the many additional features that the **Elite** has to offer.

Analogue Locomotive Control

It is possible (but not recommended) that a locomotive that is not fitted with a decoder (analogue) can be operated on a digital layout. This locomotive is given the address "0".

1. Make sure that analogue mode is enabled (see page 63). Press the **Loco** key and either rotate the chosen controller or type in **0.** Screen shows "**Contr Adr:0000**".

2. Press and release the selected controller. Screen shows "**00:00 1 0000**". **Loco 0** can now be controlled.

4. Rotate the selected controller. **Loco 0** will move forward. Press and release the selected controller and the locomotive will reverse.

5. Note that the control of a locomotive which is not fitted with a decoder is noisy and does not support smooth control.

Please Note: If a digital locomotive is called up the analogue locomotive will continue to run at the speed set prior to the digital locomotive being operated.

It is not possible to program acceleration or deceleration levels into an analogue locomotive. When an analogue locomotive is placed on the tracks it will emit a high pitched noise when stationary which will become louder when running - this is normal!

Only one analogue locomotive (0) can be run on a digital layout at any one time.

Additional Elite Features (continued)

Analogue Locomotive Enable / Disable

1. Press **Menu**. Screen shows "**Loco**". Rotate **Controller 1** until "**Unit**" is displayed.

2. Press **Controller 1**. Screen shows "**Train 0**". This setting is to enable / disable the use of an analogue locomotive.

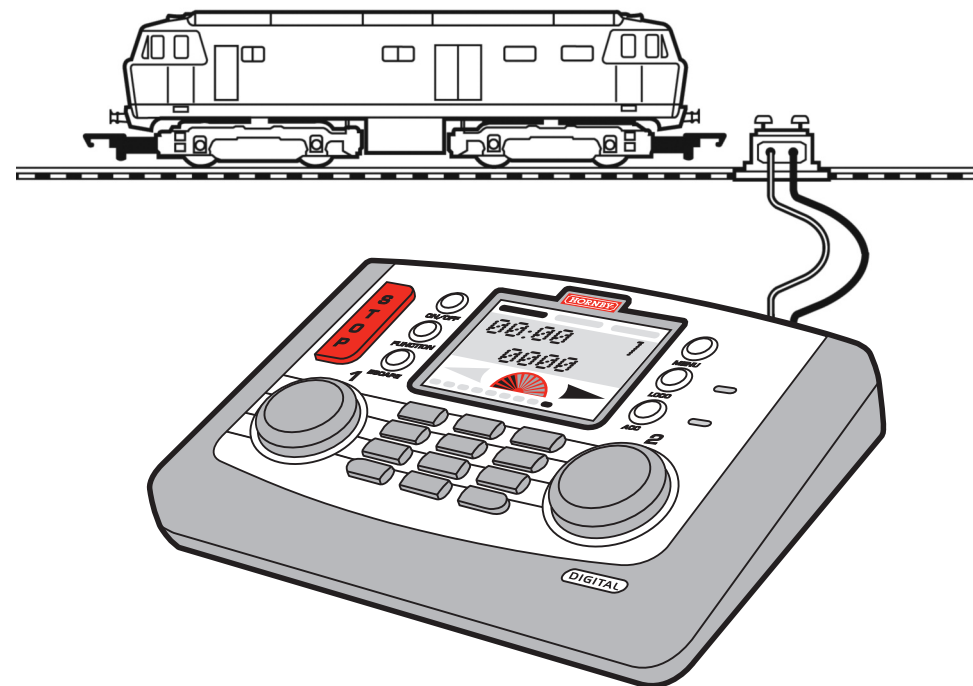3. Press **Controller 1**. Screen shows "**Train 0 Off**".

4. If desired rotate **Controller 1**. Screen shows "**Train 0 On**".

5. Press **Controller 1** to set the desired analogue function - **On** or **Off**. Screen reverts back to "**Train 0**".

6. Press **Menu** to return to the main screen.

Using the Elite's Clock

Please note that the clock will immediately start functioning as soon as the **Elite** is powered up, therefore some of the clock times that you see on the main screen may not correspond with the diagrams of the main screen shown throughout these instructions.

Clock Enable / Disable

1. Press **Menu**. Screen shows "**Loco**". Rotate **Controller 1** until screen shows "**Unit**".

2. Press **Controller 1** and rotate **Controller 1** until screen shows "**Clock**".

3. Press **Controller 1**. Screen shows "**Clock On**". See Fig. 1.

4. Rotate **Controller 1** to alternate between "**Clock On**" or "**Clock Off**". Select the desired setting.

5. Press **Controller 1** to confirm. Screen shows "**Clock**".

6. Press **Menu** to return to the main screen.

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Fig. 1

Setting the Clock in Real Time

1. Press **Menu**. Screen shows "**Loco**". Rotate **Controller 1** until "**Unit**" is displayed.

2. Press **Controller 1** and, if necessary, rotate until screen shows "**Set Clk**".

4. Press **Controller 1**. "**Set Clk 00:00**" is displayed.

5. To set the hours rotate **Controller 1** clockwise until the desired hour has been reached.

6. Rotate **Controller 2** clockwise to select minutes. The hour is now set and the minutes will flash.

7. Rotate **Controller 1** to the minutes required. If the hour setting is incorrect, rotate **Controller 2** anti-clockwise until the hours flash and reset.

8. Press to confirm. Screen shows "**Set Clk**".

9. Press **Menu** to return to the main screen.

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Setting the Clock in Scale Time

The Clock has the ability to be set at the actual time level or up to 10 times faster, 10 being the fastest. Having set the time you may now wish to increase the speed of the clock.

1. Press **Menu**. Screen shows "**Loco**". Rotate **Controller 1** until "**Unit**" is displayed.

2. Press **Controller 1** and, if necessary, rotate until screen shows "**Clock X**".

4. Press **Controller 1**. Screen shows "**Clock X 00**".

5. Rotate **Controller 1** until the speed level required is shown on the screen and press to confirm. Screen shows "**Clock X**".

6. Press **Menu** to return to main screen.

Using the Elite's Loco Log and search function

When there are numerous stationary locomotives on the same track at the same time it is quite easy to become confused as to the numbers of the locomotives on the track. The following Loco Search or Log Function is a very useful application should this happen. The following is the procedure to allow you to do this using Locomotive 1 as an example.

1. Press **Menu**. Screen shows "**Loco**".

2. Rotate **Controller 1**. Screen shows "**Unit**". Press **Controller 1** to confirm.

3. Rotate **Controller 1** until screen shows "**Loco Log**". Press **Controller 1** to confirm.

4. Screen shows "**Loco Log Address**" or "**Loco Log Name**". Rotate **Controller 1** to show "**Loco Log Address**".

5. Press **Controller 1** and type in the locomotive number you are looking for and press **Controller 1** to confirm.

6. Watch for movement on your layout. The locomotive that you are searching for will move slightly forwards and/or backwards. See Fig. 1.

7. Once you have located the locomotive press **Menu** to return to the main screen.

Please Note: Should you have named the locomotive then use the procedure above to locate the locomotive only typing in the name rather than the locomotive's address. To do this select "**Loco Log Name**" at this stage. Enter the name of the locomotive and press **Controller 1**.

The address number of the locomotive will now be displayed. Make a note of the address and select "**Loco Log Address**" and continue with the procedure described above.

Fig. 1
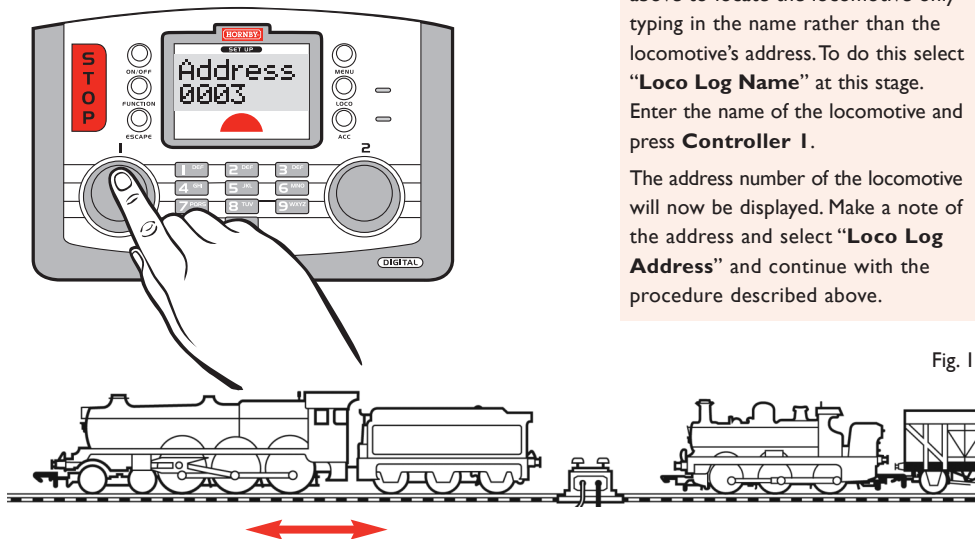
For more information visit: **www.hornby.com**

Introduction - Elite Operating Modes

Standard operating mode

This is the default mode of the **Elite** and will be briefly seen on the LCD screen during the start up sequence.

In this mode the **Elite** fully supports the Hornby RailMaster model railway control application. For more information regarding the PC application please see the Hornby website **www.hornby.com** for further information.

Classic operating mode

Under certain circumstances it may be necessary to switch to the **Classic** mode in order for the **Elite** to operate effectively with older versions of the Hornby R8215 decoder.

The **Classic** mode incorporates features that have been built into the firmware to accommodate possible factors that may lead to decoder resets when powering up the **Elite**.

The **Classic** mode also amends the Point address mapping incompatibility when the **Select** v1.1 is connected and used as a 'Walkabout'. This only applies to the v1.1 or later. Note: **Select** v1.0 does not exhibit any Point address mapping issues when used as a "walkabout."

This operating mode does not fully support PC layout control applications e.g. Hornby RailMaster.

Selecting the desired Operating Mode

1. Press the "**Menu**" key and rotate **Controller 1** until the word "**Unit**" is displayed. Press **Controller 1** to confirm.

2. Rotate **Controller 1** until the word "**Mode**" is displayed and then press to confirm.

3. The current mode of operation is now shown. Rotating **Controller 1** will toggle the display between "**Mode Classic**" and "**Mode Standard.**"

4. When the display shows the desired mode ("**Mode Classic**" or "**Mode Standard**") press **Controller 1** to confirm.

5. Press the "**Menu**" key to exit to normal operation.

Elite Reset

The **Elite** can be returned to its original factory settings by utilising the **Reset** function.

1. Press **Menu**. Screen shows "**Loco**".

2. Rotate **Controller 1**. Screen shows "**Unit**".

3. Press **Controller 1** to confirm. Screen display may vary depending on the last action taken in this mode. However, rotate **Controller 1** until "**Reset**" is displayed.

4. Press **Controller 1** to confirm. Screen shows "**Reset Confirm**".

5. If you do not wish to reset the **Elite** press **Menu** to return to the main screen. However, if you wish to reset the **Elite** press **Controller 1**. The red LED will light and then start to flash for several seconds. The screen will then go blank while the **Elite** resets. The screen will return showing "**00:00 1 0003**". The **Elite** is now reset. All information previously stored has now been deleted.

Note: Any locomotives that were under control on the track will stop when the 'reset' is executed. They will not resume movement after the 'reset'.

Overload Safety Cut Off

Should there be a short circuit or an overload the **Elite** will immediately cut the power off to the track. The red LED will light and the screen will show "**Error**".

Should this occur locate the short circuit or the item that is causing the overload and remove. To reset / restart the **Elite** press the **Escape** key.

Note: Any locomotives that were running at the time of the 'overload' will resume running after the 'overload' condition/error message is cleared. i.e. pressing the Escape key.

XpressNet Connection

Eight Hornby Walkabout Select units may be connected to the **Elite** using the ExpressNet sockets which will allow for individual control of up to 10 locomotives. See page 72 for further information re connecting "walkabouts" to the Elite.

PC as Controller

Via XpressNet protocol and the USB connection the **Elite** can be controlled by software applications running on a PC. For complete control of your layout Hornby recommends the Hornby RailMaster application. RailMaster has been created specifically to support full layout control via the **Elite**.

A USB lead will be required (not included with the **Elite**) to connect the **Elite** to a computer.

Elite Firmware Update

The firmware of the **Elite** can be updated from the internet via a PC and the USB interface. Any updates will be available direct from the Hornby website: **www.hornby.com**

Glossary

Acceleration Delay

The delay between the locomotive being stationary and reaching the desired speed.

Accessory Decoder

An electronic decoder designed for use in track side accessories such as points or signals. An accessory decoder is not for use in a locomotive.

Address

A number used to identify a locomotive or accessory that is either equipped or linked to a Decoder.

Bus

Technical term for wires that carry electrical signals around a model layout.

Command Station

The Command Station is the 'brains' of a DCC system. A Command Station is in essence a micro-computer/controller that communicates with the decoders that are located either in a locomotive or connected to accessories. The computer transmits signals to the decoders instructing them what to do, such as accelerate, decelerate, brake or switch lights on or off.

Configuration Variable (CV)

A term referring to the operating information of the particular locomotive or accessory that is stored on the specific decoder. This information will remain 'set' until changed using the Command Station.

Consist / Consisting

Consist is an American term, but in the UK it is known by Double or Triple Heading. This is where two or more locomotives are brought together and function as one.

There are three types of Consisting (1) Basic consisting where the locomotive decoders in the Consist have the same address. (2) Universal Consisting where the Consist information is stored in the Command Station. (3) Advanced Consisting where the Consist information is stored inside the decoder.

DCC

Digital Command Control. The application of computer technology to control the movements of locomotives. Each locomotive is fitted with a decoder (or 'chip') which is uniquely programmed and recognises its own identity and responds only to those control signals which are addressed to it.

DCC also allows a wide range of extras including controllable lighting and on-board sound. The accepted standards have been laid down by the NMRA (National Model Railroad Association) an American Association.

Deceleration Delay

The delay of a locomotive slowing down to a standstill.

Feedback (Load Compensating)

This allows a locomotive to remain at a constant speed regardless of loads being pulled or incline being negotiated.

Locomotive Decoder

A small PC board which contains a 'chip' that stores control information; normally fitted in locomotives. The Command Station sends coded information to the decoder which can then control the locomotives speed, direction and any operating functions that the locomotive may have e.g. lights.

Locomotive Decoders can be also fitted to accessories that have a motor as a drive for example the R8131 Hornby Operating Conveyor or the R8132 Hornby Tipper set.

Occupancy Decoder

A unit that can detect the presence of a locomotive on a specific section of track and can provide the appropriate information as 'return' data.

Power Bus

Copper strip or wires that can relay/distribute power to the track via multiple track connections.

Power Booster/Power Station

A Power Booster or Power Station is as the name implies there to provide a boost of power to the track. This can occur if a larger than normal number of locomotives are required to be running on the layout at the same time. If the transformer already fitted cannot handle this number then it will be necessary to section the layout and fit a Power Booster.

This Booster will not only provide more amperage to drive locomotives but also boost the signals to the Decoders. All Boosters fitted must still be connected to the Power Station.

Programming

The process of assigning an address or changing a decoder parameter stored in a CV is referred to as 'Programming' the decoder.

Programming Track

A section of track isolated from the main layout purposely for programming locomotives. Programming on a Programming Track negates the requirement of removing other locomotives from the main layout.

DIGITAL

Glossary

Speed Steps

A decoder fitted to a locomotive will from 'stationary' to full speed increment the locomotive's speed in discreet speed steps.

The number of steps commonly used in most DCC systems is 128. Some older decoders are designed to operate with 14 or 28 speed steps.

The number of speed steps to be used for a specific locomotive address is set in the controller on a per locomotive basis. i.e. the controller increments speed in a specific number of steps for that locomotive.

The more speed steps, the smoother the apparent control of the locomotive.

Stall Current

Stall Current is the maximum current draw in amperes that a locomotive is capable of when stalled. If the armature of a motor is prevented from turning and the maximum voltage is applied the current draw of the motor is known as the 'Stall Current'.

Throttle Notches

Determines whether a locomotive is controlled with 14, 28 or 128 speed steps. (See Speed Steps.)
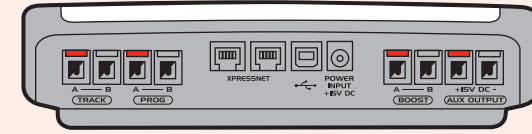
XpressNet

A high-speed communication protocol used for connecting DCC equipment together. e.g.. a 'walkabout' controller to a master control station as in a Select to an **Elite**.

XpressNet (XBUS) Input Devices

Devices using the XpressNet protocol to Control items on a digital layout.

For more information visit: **www.hornby.com**

Input and Output connections

All connections to the **Elite** are carried on the rear panel of the controller.

TRACK - This is the main DCC power output connected to the track. For troubleshooting purposes the output can usually be measured with an AC voltmeter. The reading should be approximately 15-16V AC.

PROG - This is the DCC programming output which connects to a dedicated programming track or siding arrangement. Unlike the TRACK output it is 'current limited' thus it will not 'blow up' a decoder if an error has been made in hard wiring/connection to the locomotive, etc. This output connection is only live during programming (pulses of 15-16V AC).

XPRESSNET - These two sockets are RJ12 types, and are used for the connection of 'Walkabout' units and other equipment that supports the XpressNet bus standard. Typically, you will connect Walkabout 'Select' controller/s to these sockets. Walkabout connection is provided on pins 2 to 5. The RJ12 connectors also provide 'boost' output data on pins 1 and 6.

Note: All Walkabouts must be connected with cable type R8266 RJ12 Connecting Leads (round cross section). Do not use R8236 RJ12 4-Wire 3M Lead (flat cross section). The R8236 RJ12 4-Wire 3M Lead cable may be used to connect the RJ12 sockets to R8239 Power and Signal Booster units. R8266 RJ12 Connecting Leads will not work with Booster units.

Note: When connecting Walkabouts do not connect them in a 'daisy chain'. When connecting two Walkabouts, connect one to each socket. If you wish to use more than two Walkabouts you will require 'wye adapters' R8237 Hornby Digital RJ12 Connecting Socket.

USB Port - This connection is for a standard USB cable, not miniature types as supplied with smart phones or cameras. The USB port is used to connect to a computer in order to install downloadable updates or for use with computer based DCC control software, e.g. Hornby RailMaster.

POWER - The power input socket is connected to the supplied P9300W (previously C7024) Hornby 15 Volt; 4 Amp power supply in the UK. In the USA the P9303 (previously C7033) - Digital 15 Volt 4 Amp power supply may be used (see Scalextric USA).

BOOST - This output connection is used to feed a low power version of the DCC track signal to drive one or more R8239 Hornby DCC Booster units. (The BOOST output must not be connected to the main track/power bus!) The BOOST output connection offers greater flexibility than the alternative RJ12 connection described above in that no special cables are required. For troubleshooting purposes the output can usually be measured with an AC voltmeter. The reading should be approximately 15-16V AC.

AUX OUTPUT - This is a DC output which is effectively a 'feed through' of the input DC power connected to the POWER input socket.

On small layouts the AUX OUTPUT can be used to power lighting, etc. However, any current drawn from this output will have a limiting effect on the maximum number of locomotives it is possible to run from the **Elite**. This is because locomotive power is shared with the AUX OUTPUT. Therefore, it is recommended to drive accessories, etc. from external power supplies.

DIGITAL

Trouble shooting

Locomotive will not run

Check that all the wiring is correctly connected to the track and Controller and that the transformer is plugged into the wall socket and is switched on.

Ensure that the correct loco address is displayed on the LCD.

Check that the 'STOP' key has not been pressed accidentally.

The trains do not run smoothly

The locomotives require a clean track so that they can receive their information from the Elite, therefore ensure that the track is clean. Use an R8087 Track Rubber to remove dirt from the track and wheels of the locomotive. Do not use any other abrasive material as this will permanently damage the track and/or wheels.

All locomotives move off together

Make sure that a locomotive has not been given a new address while other locomotives have been on the same track. To avoid this it is advisable to use a Programming Track to add new addresses to locomotives and Hornby Point/Accessory Decoders. See page 12.

System keeps cutting out

Check that there is no metal across the track that may be causing a short circuit. Also check that the system is not being overloaded by too many locomotives trying to run at the same time.

The 4 amp transformer included with the **Elite** should within reason be capable of providing enough power to run nine locomotives. If in doubt consult your local dealer or the Hornby DCC Helpline.

Do not connect any other controller to the Hornby **Elite** other than a Hornby Walkabout Select. When using a Select with the **Elite** ensure that the Select is not connected directly to a mains transformer.

Do not run coreless motored locomotives on a DCC layout without them having a decoder fitted.

If in doubt please contact Hornby or your local dealer for advice.
Tel. +44 (0)1843 233525   Email. help.dcc@hornby.com   Web. http://www.hornby.com
Hornby PLC, Westwood Industrial Estate, Margate, Kent CT9 4JX.

For more information visit: **www.hornby.com**