



User Manual

# DiMAX<sup>®</sup> Navigator

Version 1.51 – 08/07

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**Please read this section prior to beginning installation or operation**

## **Welcome to the World of DiMAX**

On behalf of Massoth Electronics USA, thank you for purchasing the Massoth DiMAX Navigator. Offering intuitive operation and unparalleled features, the DiMAX Navigator sets the standard for DCC cab controllers. The Navigator is designed for use with the DiMAX bus, found on all Massoth DiMAX central stations and the LGB® 55006 MTS III central station. Additionally, the Navigator is compatible with the Lenz XpressNET and Digitrax LocoNet bus protocols.

Massoth Elektronik GmbH, located in Seeheim, Germany, is a *Recommended LGB® Partner* and serves as the exclusive supplier of digital sound systems and MTS components for LGB® trains. A family-owned company, Massoth designs and builds innovative electronic components for the model railway and hobby industry.

The DiMAX Navigator is designed for years of enjoyment. Please read this manual to learn important care, safety, installation and operation tips. Additional information regarding this product can be found online at [www.massoth.com](http://www.massoth.com) or by visiting our online forum at <http://forum.massoth.com/>.

Enjoy the world of digital command control with the Navigator!

## ***PLEASE READ THIS SECTION PRIOR TO BEGINNING INSTALLATION OR OPERATION!***

### **I. Safety Details and Warnings**

- This product is not suitable for children under 8 years of age. This product may have sharp edges and inappropriate handling may cause injuries.
- The DiMAX Navigator is for use exclusively with digitally-controlled model railroads. The DiMAX Navigator must only be operated with compatible components identified in this manual.
- Never connect the bus connectors to your telephone line or to appliances with similar or same sockets. The result will be irreparable or costly.
- Do not drop shake or drop the Navigator. Exposure to such shocks may damage the product.
- Do not expose the DiMAX Navigator to prolonged periods of direct heat, sunlight, or moisture. This may affect the operation or damage the product.
- Do not open the DiMAX Navigator unless it is required by the *Wireless Transmitter Retrofit Manual*. Unauthorized opening may result in damage.
- Never use household chemical cleansers, abrasive cleaning pads, or solvents to clean this product.
- **DANGER – EXPLOSION RISK** - Do not operate the Navigator's battery charging feature when non-rechargeable batteries are installed.
- Improper use of this product voids all warranty.
- Products and specifications are subject to change without notice.

## II. Scope of Supply

The following components are included with purchase of the Navigator:

- 1 x DiMAX Navigator
- 1 x DiMAX bus cable
- 1 x User manual

Please contact Massoth Electronics USA if any of the above components are missing.

## III. Batteries for Wireless Operation

Please note, batteries are not included with this product. For peak performance, Massoth recommends AA alkaline or rechargeable (NiMH or NiCd) batteries for your wireless Navigator. The Navigator features the ability to charge rechargeable batteries during tethered operation. To enable charging, select **Wireless Transmitter Configuration** from the **Navigator Configuration** menu.

Wireless operation requires the Navigator be fitted with a wireless transmitter.

The **Wireless Transmitter Configuration** menu is only visible when a wireless transmitter has been installed. Batteries are not required for tethered operation of the Navigator.

**DANGER – EXPLOSION RISK** - Do not operate the Navigator's battery charging feature when non-rechargeable batteries are installed.

### 1. General Description

The DiMAX Navigator is a state-of-the-art cab control for digital model railroads. The DiMAX Navigator offers unparalleled features, including:

- Large, back-lit display with intuitive menu format
- Configure loco address with alphanumeric locomotive names and locomotive graphics
- Locomotive graphic library includes LGB® models and many popular G-scale models
- 10,239 loco addresses (a.k.a. 4-digit addressing)
- 14/28/128 speed step operation
- 2,048 switch addresses
- 32 Automatic functions for locomotive and switch (turnout) control
- 5 different modes for decoder programming
- 16 programmable switch routes with up to 15 switch elements per route
- NMRA functions F1 through F16
- Compatibility with NMRA parallel and LGB® MTS serial function processing
- Bi-Directional Wireless Operation (available as an upgrade for tethered versions)
- Consisting – operate up to 16 consists with as many as four locomotives per consist
- Programmable STOP keys
- Split screen display, illuminated dial control and illuminated multi-function keypad allows simultaneous operation of two devices:
  - control two locomotives (one via the illuminated dial and a second via directional buttons)
  - control one locomotive (via illuminated dial) and one switch/switch route (via directional buttons)
- **Blocking Function** to prevent accidental changes (ideal for children!)
- System status menu displays current draw, software version, etc.

- Multi-protocol operation – compatible with Massoth DiMAX, Lenz XpressNET, and Digitrax Loconet bus protocol (only RC)
- Downloadable software updates (requires Massoth PC Interface #8175001)
- Accu charging function

## 1.1. Features of the DiMAX Navigator

### 1.1.1. Form and Functions

Massoth Electronics defines a new standard with the ergonomically shaped DiMAX Navigator. The handheld cab is designed to facilitate right handed and left handed operation. The large backlit display provides detailed information for locomotives, switches and other devices on the model railway.

The DiMAX Navigator offers the unique capability of allowing the user to execute two separate functions concurrently, e.g. controlling a locomotive while operating turnouts. In addition to controlling turnouts, the second function can be used to control switch routes or control a second locomotive.

### 1.1.2. Navigator Compatibility with Other Digital Central Stations

The DiMAX Navigator is designed to operate with all Massoth DiMAX bus compatible central stations, e.g., DiMAX 800Z, DiMAX1200Z, DiMAX 1210Z, and LGB® MTS III. The DiMAX Navigator may also be used in conjunction with central stations operating the XpressNet© or LocoNet© bus protocols, e.g., Lenz®, UHLENBROCK®, ROCO®, FLEISCHMANN®, and PIKO®.

### 1.1.3. Navigator Function Limitations with the LGB® 55006 MTS III Central Station

The LGB® 55006 MTS III Central Station operates a simplified version of the DiMAX operating system. When combined with the Massoth Navigator, the MTS III central station offers enhanced operations. However, to operate the full range of features discussed in this manual, the Navigator must be operated in tandem with a Massoth central station.

When operating the Massoth Navigator with the LGB® 55006 MTS III central station, please note the following:

- Only speed steps 14 and 28 available. MTS III is limited to 14 speed steps without the Navigator. (Note: Loco decoders must be programmed for the correct speed step setting (see CV#29) to enable reception of 28 speed step commands.)
- MTS III does not offer an isolated programming track, therefore
  - Only short address (CV #1) programming is available.
  - The Navigator cannot read CV values or write CVs (other than CV#1)  
**(Note: since Software Version 1.5 you can write CVs!)**
  - Operations Mode Programming (a.k.a. Programming-on-the-Main or PoM) and Register Mode programming not available.
- No automatic function routines are available.
- Wireless operation requires the Massoth RF Receiver – Item #8132001. The Massoth Navigator operating frequency differs from that of the current MTS wireless devices. Also note, the Navigator wireless components are bi-directional; the MTS wireless components are uni-directional.

### 1.1.4. Hook Up

The DiMAX Navigator may be used in tethered (cable) mode or wireless mode. When switched *ON*, the DiMAX Navigator will log into the central station via the bus cable. When communication is unavailable via the cabled bus port, the Navigator will log in via wireless mode. If no connection can be established with the central station, an error message will be displayed. A symbol in the upper right hand corner of the Navigator display communicates the current connection mode.

### 1.1.5. Wireless Operation (Needs software version V1.20)

When operating in wireless mode, the Navigator's communication remains bi-directional. As a result, the Navigator can send commands to and receive updated information from the central station and other bus components. The DiMAX Navigator radio transmission frequency differs from that of the LGB® MTS RF Transmitter 55051, therefore both systems can be used concurrently without interference.

Compared to other DCC wireless throttles, the Navigator offers superior wireless data transfer speed and the operational range. A range of 300 feet is typical for outdoor use, but tests have revealed performance at up to 1000 feet.

Range and performance can be adversely affected by certain building materials and interference with other wireless devices, including: computer components, Blue Tooth devices, electronic garage door openers, and wireless headsets. In extreme circumstances, such environmental factors may render wireless operation impossible.

When operating the wireless Navigator in the presence of radio frequency interference, changing the channel may improve performance. (See 5.5.2.1. in this manual)

If multiple RC Navigators are used every Navigator needs to be set to a separate ID.

## 1.2. Control Elements

The DiMAX Navigator features various control devices and display indicators.

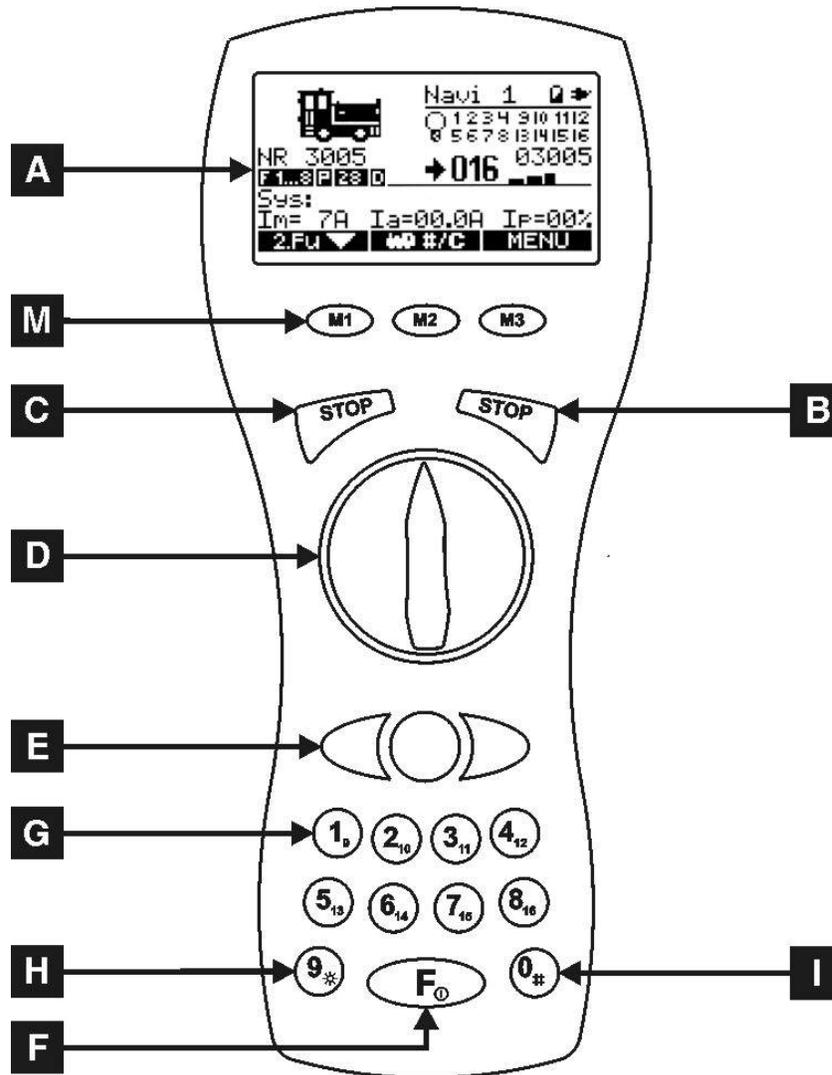
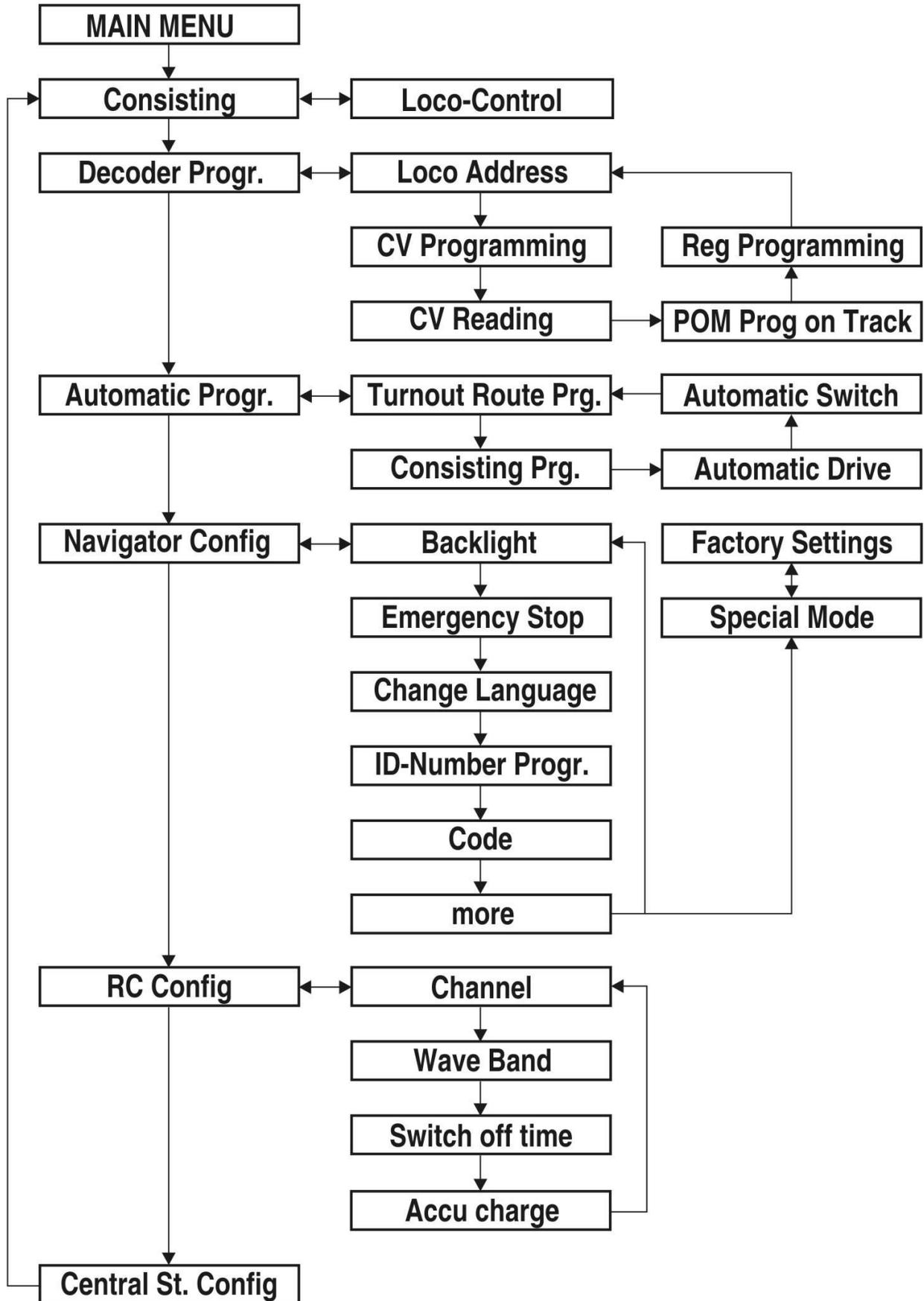


Fig.	Description
A	Display
M	Menu-Keys
B	Right-hand Stop Key
C	Left-hand Stop Key
D	Transparent Dial Knob, Throttle for Speed Control
E	Secondary Function Control Keys (programmable)
G	Key-Pad / F-Function Keys
H	Light function Key / #9 Key
I	Locomotive Selection Key / #0 Key
F	Function Level Selection / ON/OFF Key

1.2.1. Display Graphic (V1.30)

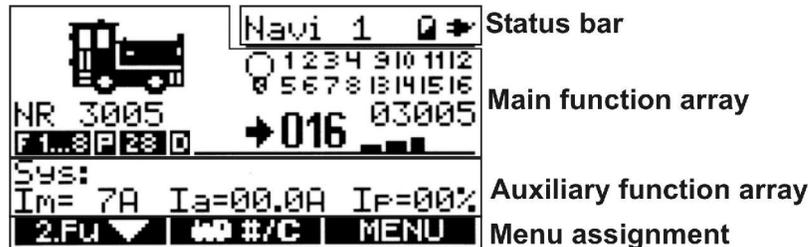


### 1.2.2. DISPLAY **A**

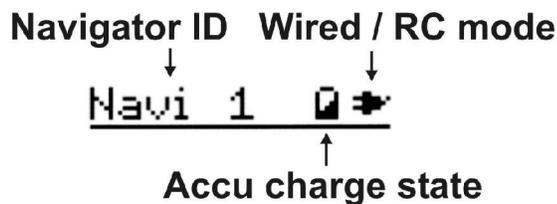
The easy-to-read display offers detailed information regarding the status of the current driving locomotive and other devices on the model railway. The following information is communicated via the Navigator display interface: loco icon, loco address, selected number of driving speed steps, selected protocol for function commands (NMRA parallel or MTS serial), status for functions F1 - F16, driving direction, driving speed (shown as integer speed step value and as a bar graph), and more.

Measuring 2-1/8" x 1-1/32" (54mm x 26mm), the backlit display provides ideal visibility in darkened rooms. The back light may also be switched off to extend battery life during wireless operation.

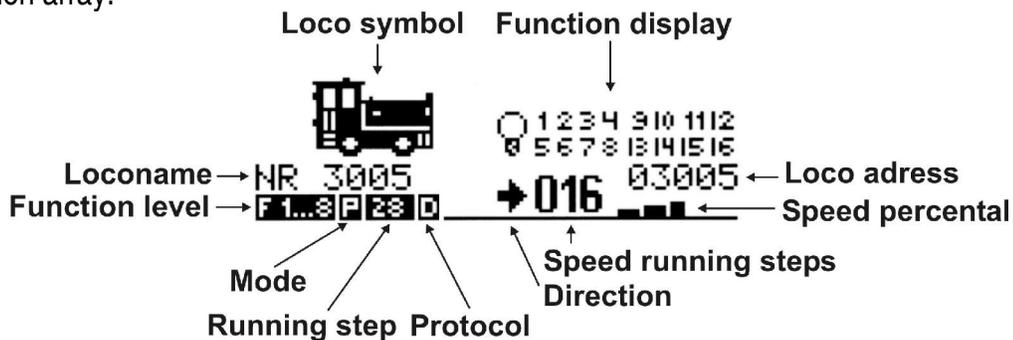
This is the general display arrangement:



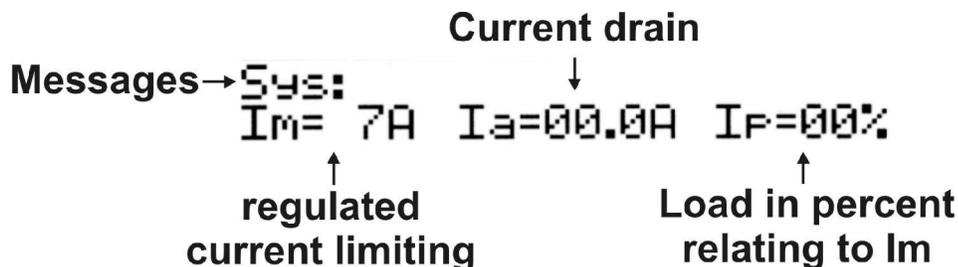
The status bar:



The main function array:



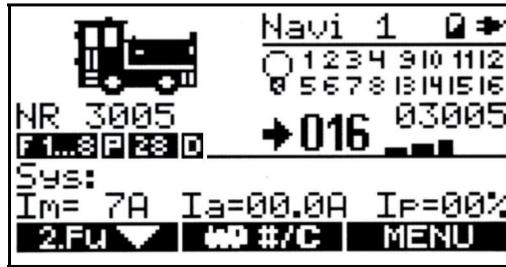
The auxiliary function array shows the following indications after start:



The menu bar shows the current assignment of the three menu keys: **M1**, **M2**, **M3**.

### 1.2.3. Menu Keys **M**

The menu keys **M1**, **M2**, **M3** are assigned different functions depending on the current menu selection. The current key functions are shown in the black background menu bar at the bottom of the display, e.g.:



### 1.2.4. Stop Keys **B** + **C**

The DiMAX Navigator features two programmable stop keys. The stop keys work independently of each other, allowing each key to be programmed to perform a different stop function. For example, one key can be programmed to trigger an Emergency Stop, removing power from the track while the second key can be programmed to send a 'Broadcast Packet Stop' command, bringing all locomotives safely to a halt without removing power from the rails. The function assignment of the stop keys is programmable for each DiMAX Navigator, allowing multiple Navigator users on the same layout to each customize their handheld. (See 5.4.2. of this manual for programming information.) With the factory default setting, the right hand stop key **B** initiates an Emergency Stop and the left hand stop key **C** cancels the emergency stop.



### 1.2.5. Controlling the Primary Function **D**

The primary function of the DiMAX Navigator is controlled by the transparent dial knob **D**. The dial knob controls direction and speed of a locomotive or a locomotive consist. The zero point of the dial knob is highlighted by a red background spotlight. In addition, the dial knob may be backlit in a similar fashion to the display. Individual programming of these features is accomplished in the Navigator's configuration menu.

### 1.2.6. Controlling the Secondary Function **E**

The secondary control function of the DiMAX Navigator is accomplished with the three keys beneath the round dial knob **D**. The secondary function can control a second locomotive or control switches, switch routes or signals. The primary and secondary function controls can be operated simultaneously, making the DiMAX Navigator uniquely suited to the complex operations of model railways.

### 1.2.7. Keyboard **G**

The keyboard of the DiMAX Navigator can be used to trigger up to sixteen functions (F1 – F16). The F-Key **F** shifts control between the first and second function level (first function level = function 1 to function 8, second function level = function 9 to function 16). On each key, second function level values are printed as subscripts to the first function level values.

### 1.2.8. Light Function **H**

The light key **H** controls the locomotive headlights. The light function, F0, is an additional function to the previously discussed functions, F1-F16.

### 1.2.9. Loco Selection Key **I** or **M2**

Pressing the Loco Selection Key **I** or **M2** leads to the locomotive selection menu of the DiMAX Navigator. There are several methods of selecting a locomotive. For more detailed information, please see section 3.1.7.

### 1.2.10. Function Level / On/Off **F**

The F key **F** defines the function level for the numbered keys 1-8. The current setting is indicated below the locomotive name on the Navigator display. The first level is displayed as **F1...8**. Accordingly, the second level is displayed **F9..16**. Pressing the F-key **F** toggles control between the first level, **F1...8** and the second level **F9..16** (You can switch the keyboard from the secondary function back to the primary function by pressing key **F** again.)

When operating the DiMAX Navigator in wireless mode, press the F-key **F** to turn the Navigator ON. To shut-down the Navigator, press and hold the F-key **F**.

## 2. Starting the Operation

### 2.1. Switching ON/OFF (Needs software version V1.30)

- During tethered operation the Navigator starts automatically
- In wireless operation the Navigator must be switched ON with the F-key **F**
- Depressing the F-key **F** for more than one second switches OFF the Navigator.

### 2.2. Selecting the Loco Address (Needs software version V1.30)

After pressing the locomotive selection key **I** or **M2** the DiMAX Navigator displays the locomotive selection window. Enter the loco address via the keypad, for example, loco address **0003**. After confirming the address by pressing **M3**, the loco is ready for driving operation and the DiMAX Navigator automatically returns to the driving mode screen. Default locomotive addresses are typically listed in the locomotive manual or the decoder manual. For most NMRA DCC decoders, the default address is 3.

### 2.3. The First Test Run

Congratulations! After entering the loco address and pressing **M3** to confirm, the loco is ready to be controlled with the transparent dial knob. With the Navigator factory default settings, the locomotive will be controlled with 28 speed steps and parallel data processing. More detailed properties like loco icon, loco name, etc., will be defined in Loco Configuration. (Please see section 3.)

Please note that lights of locomotives configured for 14 speed steps (see locomotive decoder CV#29) will not display correctly if the locomotives are controlled with 28 speed steps. The same is true for locomotives configured for 28 speed steps that are controlled with 14 speed steps. In these cases, the lights of the locomotives may flicker on/off with each advancing speed step or the lights may not work at all.

## 3. Loco Configuration

### 3.1. Access to Loco Configuration Menu (Needs software version V1.30)

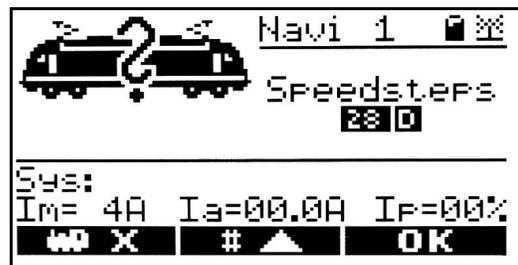
The loco configuration menu is used to define the attributes of a locomotive, for example, configured speed steps, selected protocol for function commands, or the locomotive icon. **To enter the loco configuration menu, press and hold the **M2** key for about 2 seconds.**

#### 3.1.1. Delete Locomotives (Needs software version V1.30)

The first displayed window of the loco configuration menu allows configured locomotives to be deleted. To delete the locomotive currently displayed, press the **M1** key.

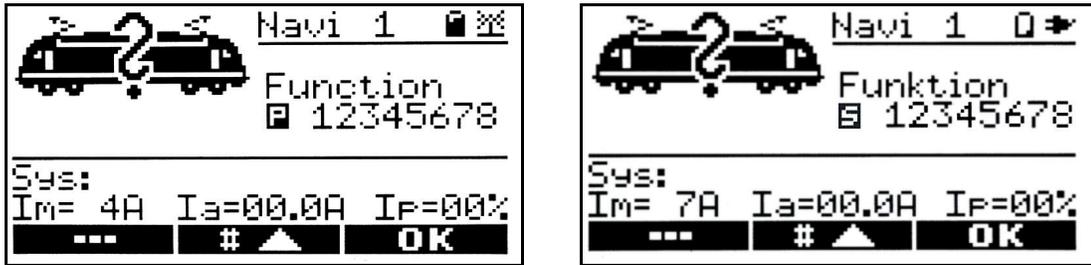
#### 3.1.2. Speed Step Configuration (Motorola operation from software version V1.40)

Upon selecting the loco configuration menu, the first window is used to select speed step configuration. Toggle between **14D**, **28D**, **128D** and **14M** speed steps by pressing the **M2** key. **D** stands for NMRA DCC operation; **M** stands for Motorola operation. Confirm the selection with the **M3** key. After pressing the “OK” key, **M3**, the next window is automatically displayed. Please note, MTS III only allows 14D and 28D speed step operation.



#### 3.1.3. Protocol for Function Commands – NMRA Parallel/MTS Serial Selection

Toggle between the NMRA Parallel (“P”) and MTS Serial (“S”) function command protocols by pressing key M2. Confirm the selection by pressing the **M3** key only if wishing to avoid configuration of the F-keys (see 3.1.4. in this manual). Please check the decoder or locomotive manual to determine the appropriate protocol for function commands.



Notes:

	<p>LGB® onboard decoders, featuring the silver/black ‘Analog and Digital’ sticker may be controlled with NMRA Parallel commands.</p>
	<p>LGB® locomotives equipped with a <i>Decoder Interface</i> or a <i>Direct Decoder Interface</i> and fitted with an LGB® 55021 decoder are controlled by MTS Serial commands. (Unless the 55021 decoder and locomotive circuit board have received a Massoth “P” upgrade.)</p>
	<p>LGB® locomotives equipped with a DCC Interface may be controlled with NMRA Parallel commands.</p>

### 3.1.4. F-Key Configuration (Needs software version V1.40)

The momentary operation operates the **F** function like a toggle switch; hitting the key once switches the function on. The second push switches the function off, e.g. lights, smoke generator etc.

The continuous operation keeps the function activated as long as the key is pressed.

The F-key configuration window shows you the selection of your operation (momentary or continuous) e.g.: when the function key # 8 is highlighted, the continuous mode is selected for the F8 function. When the function key # 8 is on normal background: the standard or momentary mode is selected for the F8 function. In the momentary operation e.g. the whistle will be triggered by hitting the respective F-key once and brief without any further influence to the triggered whistle.

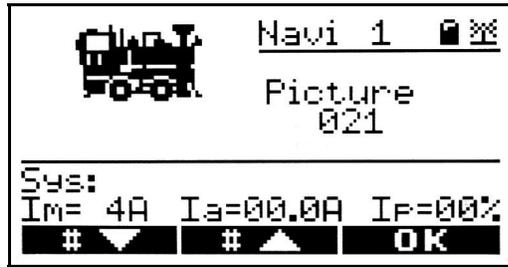
However, in continuous operation the whistle is active as long as the F-key is pressed. Releasing the F-key ends the whistle.

Confirm your selection with the **M3** key.

This F-key operation works with sound, light, smoke, or any other special function. Full use of the continuous operation function with sound can only be assured with sound units supporting this feature. The eMOTION XLS Sound Decoder and some limited brands provide this feature.

### 3.1.5. Loco Icon Selection

Use keys **M1** and **M2** to scroll through all loco icons available. In addition you may choose your locomotive icon via the number key pad to select the locomotive icon directly. (Please, see 7. Locomotive Icons in this manual.) Confirm your selection by pressing key **M3**.



### 3.1.6. Loco Name Definition

This window will automatically open after you've pressed **M3** in the above mentioned step. Now, check for the blinking cursor. Press **M2** for scrolling forward through the list of characters (choices are shown below). Use **M1** for moving backwards.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	-	/	_	

Select by scrolling through the characters – see choices below - with keys M1 (forward) and M2 (backward). Once the window shows your selected character use the right hand arrow key to move the cursor to the right . The previous character will be shown solid while the cursor in the new position keeps blinking during your next selection. Now you are ready to define the next character. You may use up to ten (10) characters for your locomotive name.

Please note that a blank character is located between the “/” and the “0”.

E.g. choose “V51” as the locomotive type or “V 51 Jack” as the locomotive V51 of your fellow model railroader Jack. End the definition of the loco name with the round stop key of the second loco function. To delete “Jack” from the locomotive name, move the cursor between “V51” and “Jack” and press the stop key . After selecting OK the new loco name will be stored and the correct name will be shown next time you select this locomotive.

This menu allows you to define your personal favorite locomotive name which will be displayed beneath the loco icon from now on in the normal driving mode. Also, when utilizing the loco driving function in the secondary function the loco name will be shown as well. In this case the loco name is displayed beneath the loco address.

The name of the locomotive is only stored in the Navigator. Thus a locomotive may have different names on different Navigators. That means: when using several Navigators at the same time, each user may define his personal choice name for the same locomotive.



### 3.1.7. Save Configuration

Once you have finalized the configuration of your locomotive, please save your entries. Pressing **M2** will save your data permanently in the central station, so when the central station is switched off, your setting will be available the next time you switch it on. Saving with **M3** will keep the data only during the duration of your current operation, so when the central station is switched off, your settings will NOT be available the next time you switch it on.

When you start your operation the next time the last selected locomotive will show up in the driving mode. However this will happen ONLY if you have saved the data with **M2** in the central station.



### 3.1.8. Defining Additional Locos

To define additional locos, please proceed according to chapter 3. of this manual.

### 3.1.9. Loco Log On (Needs software version V1.30)

Data of already defined locomotives are stored in the central station and the Navigator. All stored locomotives will be displayed in the loco selection window (see graphic below). Scroll through your stored locomotives with **M2** and select with **M3**.



OR – in case you know the loco address of your choice locomotive you may enter that address directly via the key pad and confirm this with **M3**.

In case you enter an unknown address, this will be accepted as a new active address for a new locomotive which needs to be configured later. To exit the loco selection window without choosing a locomotive press the **M3** key.

### 3.1.10. Loco Log Off (Needs software version V1.30)

You do not have access to a locomotive that is already selected by another user. The other user/ Navigator has to log off his locomotive before you are able to run this locomotive with your Navigator. Opening the loco selection window with **M2** or **0#** automatically logs off the locomotive.



**NOTE:** the management of locomotives is accomplished in the digital central station. When you select one of the locomotives available, this locomotive will be marked as occupied and can not be selected by other users. This does not depend upon the operational status of the locomotive. A driving locomotive is always logged off “passive” because it still is receiving data from the central station. The locomotive is only logged off from the control bus and may be selected by other users. If you log off a locomotive that is not moving it is logged off “active”. This means, it is logged off in the central station and it is not listed as active anymore. This can be checked easily in the display of the central station as the number of the active locomotives is always displayed in the upper right corner of the display.

### 3.1.11. Re-Gaining Control After Switching Locos

Example: You are running loco # 1. Then you want to run loco # 2. So, you select loco # 2 on the Navigator as loco #1 is still running and you drive loco #2. Now, you do not have direct access to loco #1 anymore. Loco #1 is logged off “passive”.

To return to loco #1 you have to select loco #1, again. Initially, the position of the speed dial knob will not match the current speed and driving direction of loco #1. This needs to be synchronized.

As a hint the respective part of the dial where loco #1 is actually running is backlit and blinking. Turn the dial into this direction until the light stops blinking. This indicates that you re-gained full control of loco #1.

### 3.1.12. Selecting a Logged-On Loco (Needs software version V1.10)

You cannot get access to a locomotive that is already selected by another user (see graphic below). The other user/ Navigator has to log off this locomotive for you to be able to control this locomotive with your Navigator. Open the loco selection window with **M2** or **0#** and this loco will be logged off automatically, regardless if it is driving or not.



### 3.1.13. Analog Loco

The DiMAX Navigator does also control analog locomotives. The address of an analog loco is generally "0". Locomotive properties like speed steps and functions cannot be defined for an analog locomotive. A loco configuration is not possible, the analog locomotive is displayed with the icon of an analog throttle.



**NOTE:** The digital AC on the track may cause analog locomotives to emit a high frequent sound. In general this does not have an impact on the electronics of your locomotive. (Please check your manufacturer's manual on this topic).

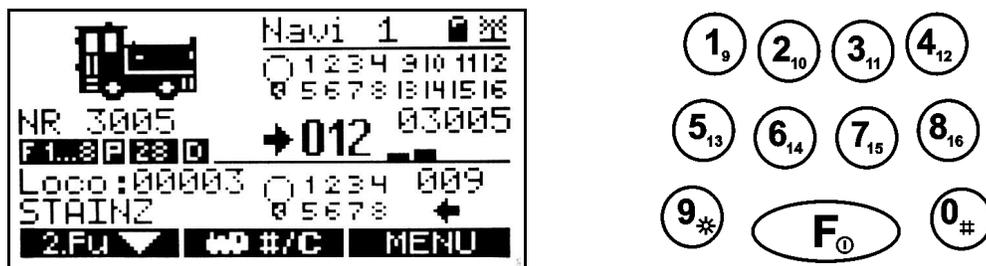
## 3.2. Driving Operation

As usual the locomotive is controlled by the transparent dial knob. With the dial knob is in the middle position the loco is not running and speed step **000** will be displayed. The arrow in front of the speed step indication symbolizes the driving direction. The zero position of the dial is marked by a red light.

### 3.2.1. Additional Functions during Driving Operations

The special functions, like smoke generator, lights, sound functions etc, are operated with the function keys 1... 8. In case the locomotive is on parallel data transfer the respective function icon is highlighted in the display. In case of serial data transfer, however, the F1 function icon is blinking several times.

The F-key toggles between function level 1 to 8 and function level 9 to 16. The functions F1 to F16 are marked on the function keys. (See graphic below)

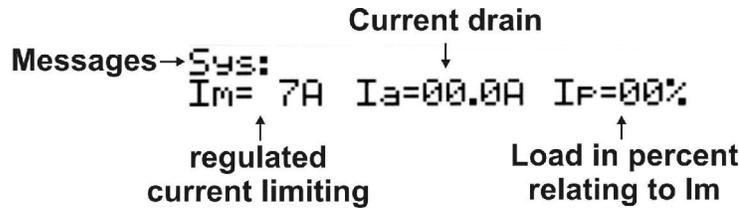


## 4. Secondary Function

The DiMAX Navigator features a secondary control function for various purposes. The secondary control function of the DiMAX Navigator is accomplished with the three keys beneath the round dial knob **D**. At the same time and parallel to the primary function the secondary function can handle a second locomotive, switches, turnout routes, or signals.

### 4.1. Info Mode (Needs software version V1.30)

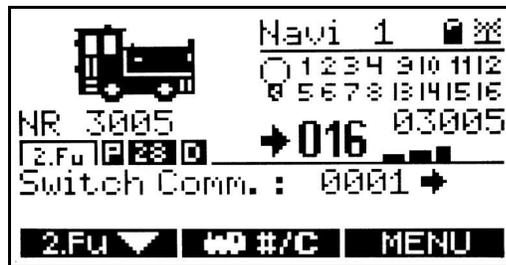
After start up, the DiMAX Navigator displays the info mode in the lower section of the display. This part of the display is also used for the secondary function. This mode shows system information of the central station e.g. maximum amperage, current amperage, and utilization ratio in percent. In addition, system messages are issued.



You may switch to the secondary function of the DiMAX Navigator with the M1 key at any time. With the first **M1** key stroke the key pad keys 0 to 9 is switched to the secondary function. This is indicated in the display beneath the locomotive name. The indication changes from **F1...8** to **2.Fu**. In this condition a locomotive can be controlled as usual with the primary controls, however, no function key triggering is possible. You may choose the assignment of the secondary function by pressing **M1** again. Pressing the F key exits the secondary function and the key pad is assigned back to the primary function.

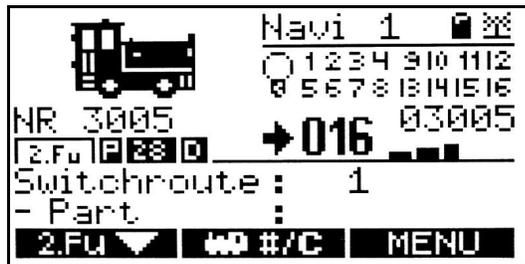
### 4.2. Switching Commands

Pressing the **M1** key the second time gives you access to the turnout command mode. Enter the address of your switch with your keyboard of the Navigator and operate this switch with the arrow keys of the secondary function to the left or to the right . In addition, you may scroll with the round stop key through the last used switches . E.g. if you used switch **#0001** and **#0006** already you may return to switch **#0001** and then to switch **#0006** by pressing the round stop key repeatedly. This even works when you change to the primary function and return to this mode by using the **F** key. Thus you may control a locomotive to the full extend and control the last 8 used switches simultaneously.



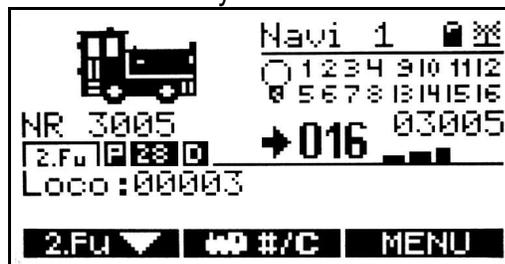
### 4.3. Operating Turnout Routes

In addition to control single switches you may operate turnout routes as well. These need to be previously defined as described in 5.3.1. of this manual. Hit the **M1** key repeatedly until the menu **switch route** is displayed. Enter the address of your turnout route via the keyboard and operate it with the right hand arrow key . All elements of the turnout route receive one after the other the previously defined command. Similar to the switch command function you may scroll the last 8 used turnout routes with the round stop key and operate them.

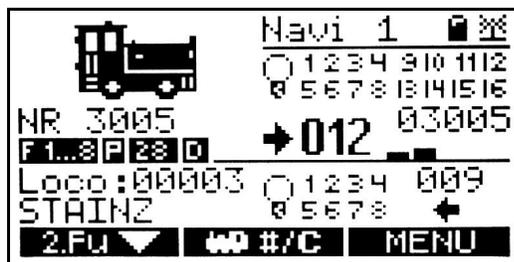


#### 4.4. Second Locomotive

Two locomotives can be controlled independently at the very same time with the DiMAX Navigator. To change into this mode press the **M1** key repeatedly - or scroll through all stored locos using the round stop button - until **loco: XXX** is indicated. Enter the address of the loco of your choice via the keyboard and confirm your selection with the right hand arrow key  $\langle \circ \rangle$ . Please note that you can only select previously stored and configured locos. You cannot define a new loco in the secondary function at this time.



After selecting a stored loco the display shows the corresponding data of this loco: loco address, loco name, light, functions 1...8 as well as driving direction and speed steps in use.



You may control the second loco with the arrow keys  $\langle \circ \rangle$ . The round stop key resets the speed steps to "0" and thus stops the locomotive. During the stop you may change the driving direction by pressing the stop key again, e.g. to change the lights during standstill. A change of locomotive is accomplished by the "0#" key. The functions F1...8 of the second loco can be controlled only when the secondary function indication is active. To activate this secondary function use key **M1**.

#### 5. General Settings

General settings of the DiMAX Navigator and various layout configurations are defined in the "main menu" section of the Navigator. Press **M3** to get from the operational window to the main menu. All menus of the Navigator agree to the same basics:



- M1 = navigation (move the cursor)
- M2 = confirm the selection
- M3 = return to normal operation

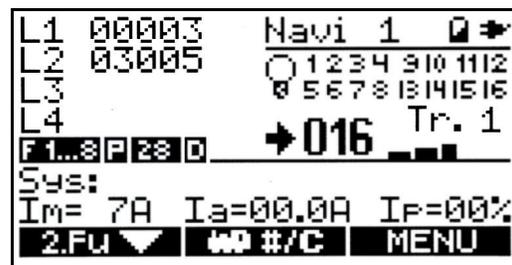
Select the menu of your choice with M1 and confirm this selection with M2.

### 5.1. Consist Operation (Multi heading)

Multiple locomotives can be combined in a consist to operate a train, e.g. long freight trains. Prior to using a consist it needs to be defined. Please see 5.3.1. of this manual.

**Note:** When defining a consist it is mandatory that all locomotives are configured with the **same number of speed steps and in parallel data processing mode**. The system will not accept locomotives with different configurations. Please see 5.3.2. of this manual for further information.

The consist selection window opens up showing consist #1 as default. Scroll through all previously defined consists with **M2**. Select and confirm your choice with **M3**. The keys **M3** and **M2** change the indication to the consist operation mode. The consist operation mode shows all of the addresses of the combined locos (max 4). Controlling a consist is comparable to regular locomotive control.



In case the selected consist contains an un-configured loco address an "X" will be displayed behind the address. The same indication is shown if one of the locos is presently used by somebody else.



If so, select a different consist with **M2** or exit the consist operation mode with **M3** and **M2**. The primary function of the DiMAX Navigator may be changed back to loco operation mode. The menu window then shows

“loco control” as first choice, see graphic below.



## 5.2. Decoder Programming (Needs software version V1.30)

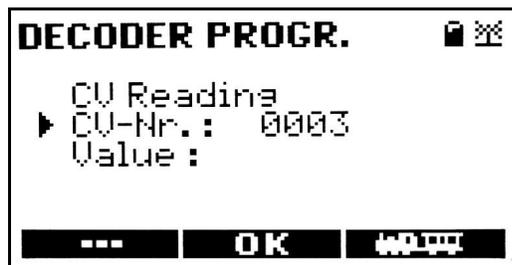
The DiMAX Navigator supports all programming methods in accordance with the latest NMRA/DCC standards. Please note that not all of the DCC systems currently available can be programmed according to this standard. The manufacturer of your DCC system should give you in-depth information. Choose the programming method applicable to your digital system. A decoder confirms every successful programming cycle with a short voltage spike (brief engine bucking). A motor needs to be connected to the decoder for this purpose, switch decoders require a switch drive. This ensures that the programming command has been received correctly and has been executed.

### 5.2.1. Locomotive Address



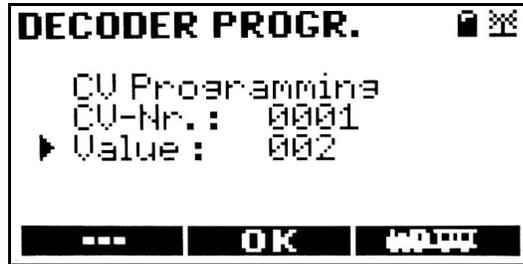
This is the menu window for brief locomotive programming. The number of addresses selectable is 1-10239. The DiMAX Navigator computes automatically the appropriate values for CV's 1, 17, and 18. In addition, speed steps can be set to 14 or 28.

### 5.2.2. CV Reading



The read-out of a decoder's CV settings shall not be mistaken for a programming procedure. However, it is essential for checking the previously programmed settings. The DiMAX Navigator supports this function. After selection of the decoder reading function a CV value needs to be inserted and the respective setting will be shown subsequently.

### 5.2.3. CV Programming



Programming (writing) the CV values is the easiest way of programming the decoder. This method is utilized by most of the DCC systems. Using your DiMAX Navigator the central station or the PC, you select the desired CV parameter and insert your desired value. Programming is done on a separate by programming track or a piece of track that is used as programming track, depending on the digital system. Please check the manual of your central station.

### 5.2.4. Writing CVs Bit By Bit

Some of the CV (e.g. CV 29, CV 49) parameters consist of multiple binary values. This means that several values are combined in one value. Each function has a bit and a value. Programming a CV of this kind requires that all values of all functions controlled by this CV need to be summed up. A deactivated function always is "0", an active function must be programmed with the respective value according to the CV table. The sum represents the value of the CV and must be written into the CV parameter. All known programming methods may be used.

Let's look at the NMRA configuration register (CV 29) of the eMOTION XLS sound decoder for example. You intend to program "normal driving direction, 28 speed steps, digital and analog operation, internal driving curve, and a short locomotive address". This sums up to 2+4=6 according to the CV table. So CV 29 should be programmed with "6".

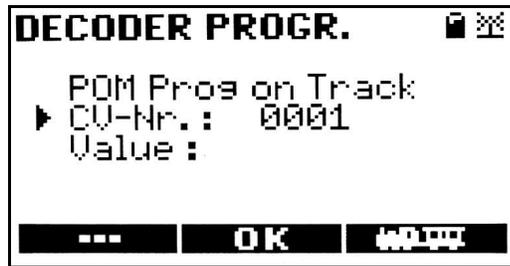
### 5.2.5. Register Programming / Indirect CV Writing



Register programming was the first method of CV programming. This old method is still supported in order to be compatible to outdated central stations and programming units. The CV value is to be entered into an intermediate variable. The decoder thereafter does the real programming. The input into register 5 and 6 is accomplished in this menu window. The CV 1 to 4 are entered directly; all other CVs with higher numbers are programmed indirectly (by register programming)

Let's assume you want to set the total volume (CV 200) of your eMOTION XLS Sound Decoder to "10". The first step is to go into the register programming mode, insert "6" thereafter "200". If this was successful the next step will be to program "5" to "10". Now your volume is set to "10".

### 5.2.6. PoM Programming on Main Track



The PoM method is the only procedure to accomplish programming on the main track. All of the CV programming can be done except CV 1, 17, and 18 (address) with the decoders.

**PoM programming should only be performed when the locomotive is not in motion.**

After choosing the “PoM Trackprg” menu insert the desired CV number and confirm your input with **M2**. The cursor will jump to the next line waiting for the input of the respective CV value. After confirmation with the **M2** key programming is initiated and will be confirmed by a brief engine bucking. To return to the primary operation window press **M3**.

**Note:** In general programming is accomplished with DiMAX Digital Central Stations only on the programming track (exception PoM). Programming on the main track by PoM is supported. Programming has been tested thoroughly with these manufacturers: Massoth®, LGB®, Lenz®, Zimo®, Esu®, Uhlenbrock®. Massoth®, LGB®, Lenz®, Zimo®, Esu®, Uhlenbrock® are registered trademarks of the respective company.

### 5.2.7. Switch Decoder Programming

For programming connect your switch decoder to the programming track and insert the necessary wire bridges or unlock the programming lock (e.g. with DiMAX Motor/Switch Decoders) as described in your switch decoder manual. One switch needs to be connected as load to the decoder otherwise there is no feedback to the Navigator. Enter the main menu with key **M3** and select decoder programming. Select the menu CV programming (older LGB® decoders need to be programmed with register programming) Enter CV number as “1” thereafter insert the value of the desired address of your switch decoder. As an example: Programming the address as “20” defines address 17 = first output, 18 = second output, 19 = third output, and 20 = fourth output.

### 5.3. Programming Automatic Functions (Needs software version V1.30)

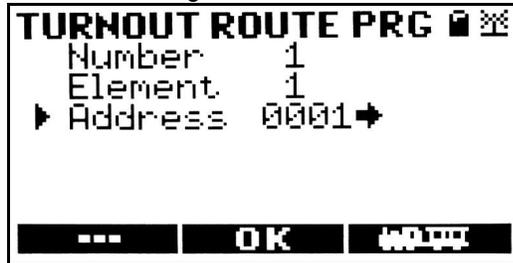
This menu contains programming for turnout routes, consists, automated loco operation, and automated switch operation.



### 5.3.1. Turnout Route Programming

The system allows configuring up to 16 turnout routes containing 15 elements (switches) each. First, define the number of the route and confirm with **M2**. The window displays element “1” and the cursor jumps to the address line requesting an address to be inserted. After inserting the address you choose the switching direction with the two arrow keys  . Confirm your selection with

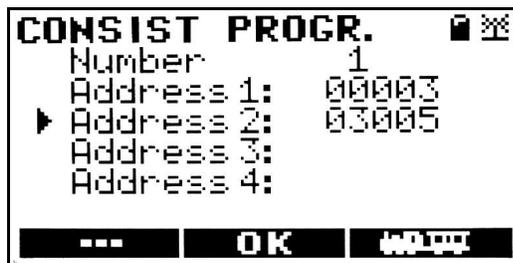
**M2**. The indication changes to element “2” asking for a new address and operating direction to be inserted.



Once you’re done configuring elements press **M3** and the Navigator recognizes this as the end of the turnout route configuration and returns to the normal driving operation. The turnout route is configured and can be operated.

In case you want to edit or shorten a turnout route OK all altered elements with **M2** and leave the menu with **M3** at the point where the elements start that need to be deleted. To delete a single element in a defined turnout route is not possible.

### 5.3.2. Programming Consists



The system allows configuring up to 16 consists containing up to 4 locomotives each. First, define the number of your consist; this number will be treated like an address. Insert the addresses of the participating locomotives and confirm each address with key **M2**. Push the **M3** key to exit the consist programming menu. The cursor always shows the last loco of the consist, hitting **M3** ends the consist programming menu and you return to the main driving operation.

### 5.3.3. Automatic Operation (Automatic Drive) (Needs software version V1.30)

**Note: Beginning with software version V1.40 all contacts in automatic drive and automatic switch will be displayed as:**

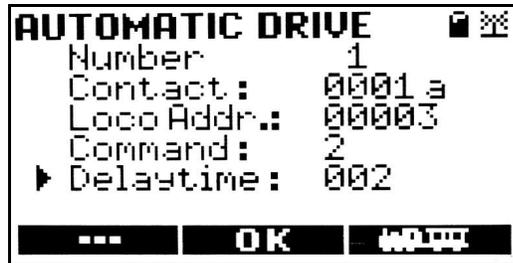
--> = a / <-- = b.

**This makes for a clear attribution to the legend of the feedback module.**

You can program minor automatic activities without a PC by using the Navigator, only. The following components are needed for this operation: reed contacts in the track (e.g. LGB® 17100), triggering magnets to be mounted underneath the locomotive (e.g. LGB® 17010) and a feedback module (280R or LGB® 55070 with a

DiMAX transducer). Let us explain the assembly of a shuttle operation: at each location on the track where a locomotive is supposed to stop, a reed contact must be installed. Take into calculation the stopping distance of the locomotive. Mount the magnet under the gearbox of the locomotive which is supposed to trigger the automatic action. Connect the contacts according to the wire diagram of the feedback module.

The 5 steps of programming are:

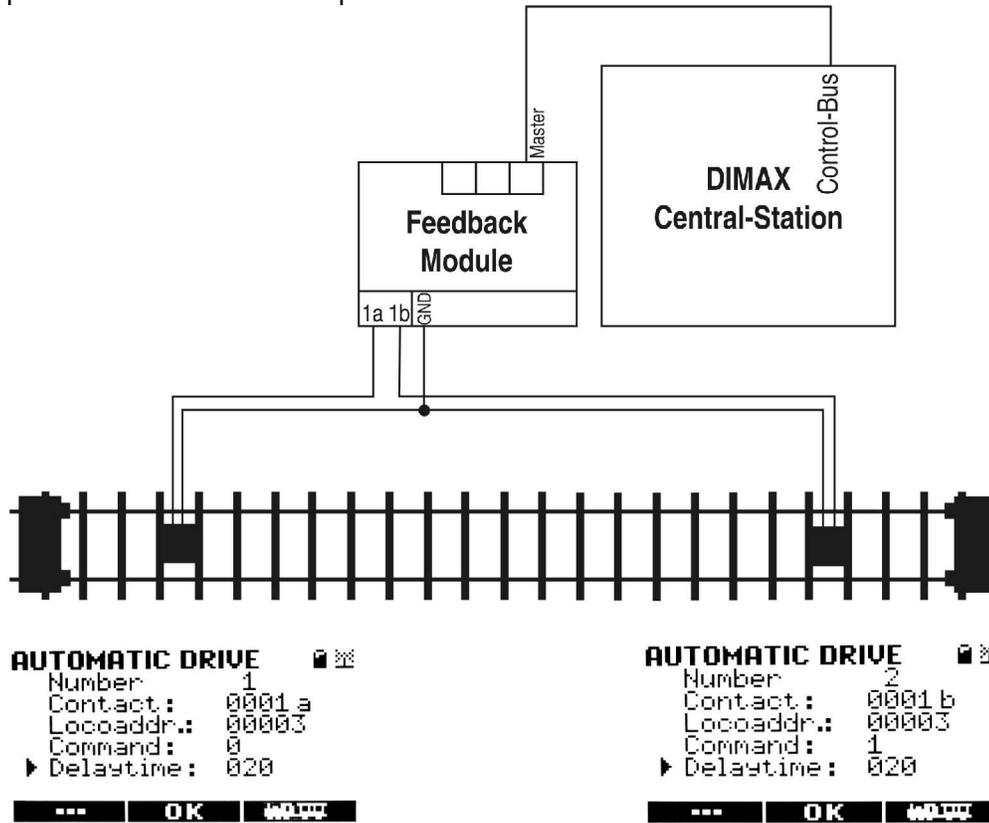


- Consecutive numbers from 1 to 16
- Define the contact numbers, up to 2048 contacts with 2 trigger directions each. (former "-->" corresponds to contact 1a, former "<--" corresponds to contact 1b on the feedback module). --> or <-- is selected by the respective arrow keys ◀○▶.
- Insert the locomotive address which is to be operated
- This line requires the insertion of the command required at the crossing of the contact:
  - 0= loco shall drive forward, even though is actually in reverse or it is standing still
  - 1= loco shall drive reverse even if it drives forward or it is standing still
  - 2= loco shall continue in the same direction (only makes sense in connection with delay time)
  - 3= loco shall reverse its current driving direction
  - 4= loco shall stop
- This line requires an insertion of delay time in seconds (value from 1 to 225)

The M2 key saves the program. Keep in mind that the automatic operation is not activated, yet. To do so reenter the menu "automatic drive" and insert the desired automatic number to be activated. The window will show all programmed parameters. Activate this automatic operation with the right hand arrow key ▶○◀. The deactivation of this function is accomplished in the same menu with the left hand key ◀○▶.

**NOTE:** The activation/deactivation is NOT shown in the Navigator's display. The activation is kept in the central station's data bank only if saved in the automatic functions in the central station. See manuals of 1200Z, 1210Z, and 800Z.

This is an example of an automatic drive operation:



Example of an automatic drive operation

More explicit instructions concerning automatic drive and automatic switch can be found on our home page [www.massoth.com/support/documentation](http://www.massoth.com/support/documentation).

### 5.3.4. Automatic Turnout Operation (Automatic Switch) (Needs software version V1.30)

The automatic function triggers switch operations by a locomotive. The following components are needed for this operation: reed contacts in the track (e.g. LGB® 17100), triggering magnets to be mounted underneath the locomotive (e.g. LGB® 17010) and a feedback module (280R or LGB® 55070 via DiMAX transducer). And for the switches one switch decoder (LGB® 55024) for each switch. At each location on the track where an automatic switch action is to take place a reed contact must be installed. The reed contact must be positioned in a good distance in front of the switch taking into account the train speed and the switch operation time. Mount the loco magnet underneath the respective locomotive and install the switch decoder according to the manual. Connect the contacts according to the wiring diagram of the feedback module.

For programming there are 4 steps necessary:

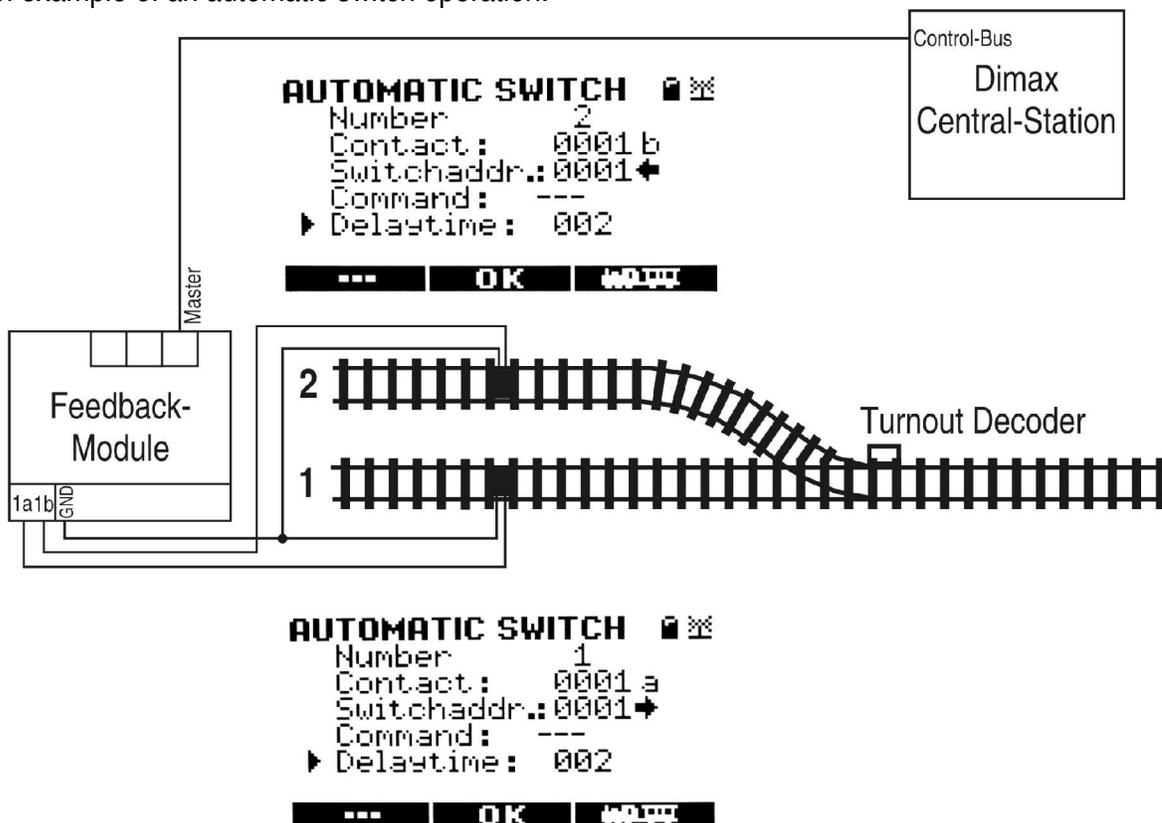


- Consecutive numbers from 1 to 16
- Define the contact numbers, up to 2048 contacts with 2 trigger directions each. (former "-->" corresponds to contact 1a, former "<--" corresponds to contact 1b on the feedback module). --> or <-- is selected by the respective arrow keys ◀○▶.
- This line requires the address of the switch to be operated with the switching direction □ or ◻
- Please ignore the command line (presently no function)
- This line defines the waiting time in seconds (value 1-255)

The M2 key saves the program. Keep in mind that the automatic operation is not activated, yet. To do so reenter the menu "automatic switch" and insert the desired automatic number to be activated. The window will show all programmed parameters. Activate this automatic operation with the right hand arrow key ◀○▶. The deactivation of this function is accomplished in the same menu with the left hand key ◀○◀.

**NOTE:** The activation/deactivation is NOT shown in the Navigator's display. The activation is kept in the central station's data bank only if saved in the automatic functions in the central station. See manuals of 1200Z, 1210Z, and 800Z.

This is an example of an automatic switch operation:

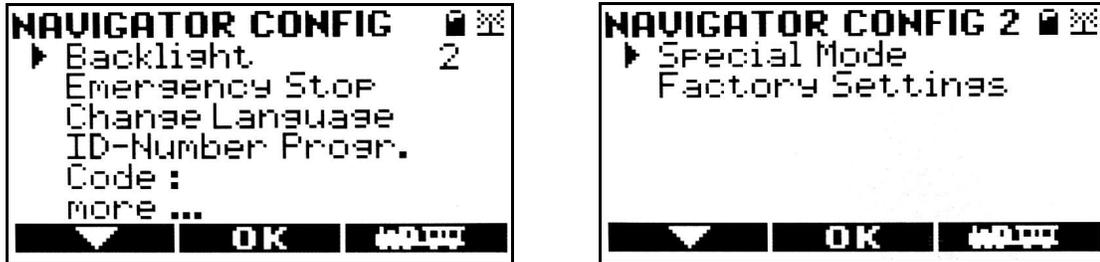


*Example of an automatic switch operation*

This setup sets the switch to the correct position depending on which track the train approaches the switch.

## 5.4. Navigator Configuration

The Navigator configuration includes backlight control, definition of the emergency mode, language selection, programming of the ID number of your Navigator, manual programming of the ID number, blocking alterations of the setting of your Navigator, as well as reset to the factory setting.



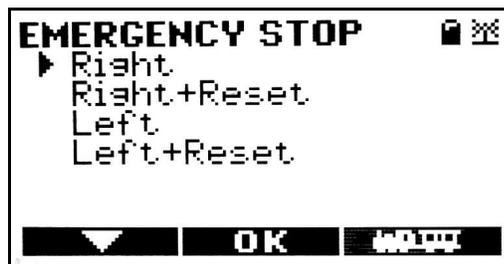
### 5.4.1 Backlight (Dimming feature needs software version V1.50)

Switch the light of your DiMAX Navigator. Following settings are available with **M2** key:

- 0 = Lights off
- 1 = LCD Display and dial knob illuminated.
- 2 = + Keypad illuminated (if new hardware)
- 3 = Lights are 50% dimmed

The red zero point marking light is always illuminated and can not be switched off. We recommend to switch off or dim the backlight during wireless operation if your ambient light is sufficient. This extends the endurance of the Navigator during wireless operation.

### 5.4.2. Emergency Stop Mode



Choose your preferred key assignment depending on if you are left or right handed. With **LEFT** and **RIGHT** you define the key which initiates the emergency stop. The emergency stop switches off the track power. The second stop key cancels the emergency stop. The option **RESET** allows sending a HALT command. All locomotives are stopped the track voltage however will not be switched off.

**NOTE:**

If you choose the option **RIGHT** the Emergency Stop is triggered by the right hand stop key. During the emergency stop both stop keys of the Navigator are blinking in red alternately. The track power is switched off and the emergency stop is cancelled with the left hand stop key. When the emergency stop is cancelled the track power is being switched on again and all locomotives that moved during the emergency stop start driving again. If you choose **RIGHT+RESET** you may choose how to halt the locomotives on your layout. The right hand key will trigger a regular emergency stop which can be cancelled with the left hand key as explained before. The left hand key, however, sends a HALT command to all locomotives running. All locomotives will

come to a stop, the track power, however, will still be on. During the **RESET** both stop keys are permanently illuminated. To cancel the **RESET** please hit the left hand key again.

At all times on top of a triggered **RESET** condition you may initiate an emergency stop.

**NOTE:** Some older decoders may not react to the RESET command. In this case the decoder will not switch off.

### 5.4.3. Language Selection (Update needs software version V1.50)

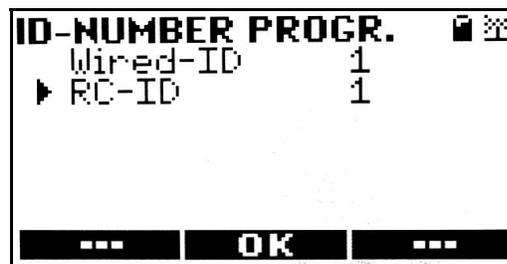
Selection of this menu item toggles the Navigator display to another language. The language depends on the language file loaded via Software-Update (Chapter 7). Language files are available at our homepage [www.massoth.com](http://www.massoth.com). There are two kinds of language files:

400H-xx1.dimax = Main language file

400H-xx2.dimax = Second language file

Assemble your individual language package on your DiMAX Navigator yourself.

### 5.4.4. Programming ID Number



In tethered operation, the ID numbers of bus components are assigned automatically. This automatic process guarantees that no ID number is used twice, thus eliminating the potential for data collisions between devices. (If two network devices share the same ID number, collisions may occur during data polling, resulting in erratic operation. A collision is when two or more network devices transmit data simultaneously.)

In tethered operation, ID numbers may also be assigned manually. Please be aware that entering an ID number that is shared with another device may adversely impact communication with the central station.

For wireless operation the IDs must be assigned manually. The IDs for tethered operation and wireless operation are independent of each other and each may be entered in this menu. After entering the ID numbers, confirm by pressing the **M2** key. The Navigator will automatically restart.

### 5.4.5. Blocking Functions (Needs software version V1.40)

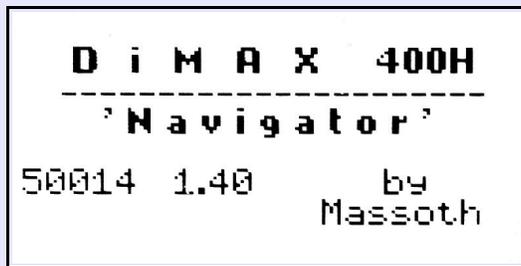
The *blocking function* allows the user to safeguard or *lock* settings on the Navigator, preventing inadvertent changes. To activate the blocking function, place the cursor on the “code:” line and insert the four-digit code of your choice. **Before confirming the code by pressing the **M2** key, write the code number in a secure place.** Upon pressing the **M2** key, the Navigator will return to the normal driving menu, however, only the following limited functions will be available:

- Round dial knob (throttle)
- Key M1 (unlock the Navigator by re-entering the code)
- Key pad 1-9

- F-keys

To deactivate the *blocking function*, press the **M1** key and insert the four-digit code. The code will appear below the division line between the primary and the secondary function. After entering the code, press the **M1** key again for confirmation. A checkmark will be displayed behind the code indicating the cancellation of the *blocking function*.

NOTE: In the event the blocking code is forgotten or misplaced, please email Massoth customer service at [usa@massoth.com](mailto:usa@massoth.com). Please include the serial number of the Navigator. Once we have received the email with the Navigator serial number, we will send the release code via return email. The serial number is briefly displayed during start-up of the Navigator. When operating in tethered mode, press and hold the F-key to extend the display period of the start-up screen. The Navigator serial number and software version will be displayed in the lower left corner of the start-up window. In this example, the serial number is “50014” and the software version is “V1.40”. The serial number is also printed on a sticker in the battery compartment.



#### 5.4.6. Return Navigator to Factory Default Settings (Needs software version V1.21)

To access this menu first choose “More” with the **M2** key then select “factory settings”

**PRESS THE **M2** KEY IF ONLY AND ONLY IF YOU ARE ABSOLUTELY SURE THAT YOU WANT TO RESET YOUR NAVIGATOR TO THE FACTORY DEFAULT SETTINGS. OTHERWISE, LEAVE THIS MENU BY PRESSING **M3**.**

If you reset your DiMAX Navigator, all previously entered data and configurations will be deleted. All configured locos, turnout routes, locomotive consists, and switches have to be reprogrammed. After selecting RESET the Navigator will restart. The reset process will require about 40 seconds.

#### 5.5. Transmitter (Needs software version V1.20)

##### 5.5.1. Transmitter Installation

The DiMAX Navigator is available for sale as a tethered unit or as a combined tethered/wireless unit. The latter version includes a factory-equipped wireless transmitter. The tethered Navigator may be retrofitted with a wireless transmitter (Item# 8133501). Please note, the retrofit procedure is outlined in the User’s Manual for the wireless transmitter.

Navigator software version V1.2 and above is required for wireless operation. Please perform the required software update if retrofitting a Navigator that is operating an earlier software revision. Additional information and software updates are available at [www.massoth.com](http://www.massoth.com).

The current Navigator operating mode, tethered or wireless, is displayed by an icon in the upper right hand corner of the display.



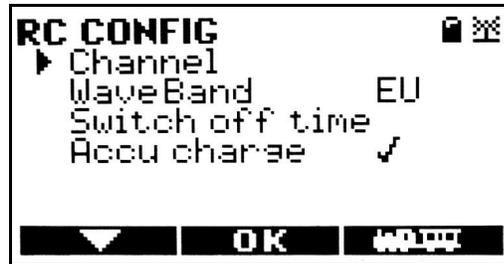
Navigator in wireless mode



Navigator in tethered mode

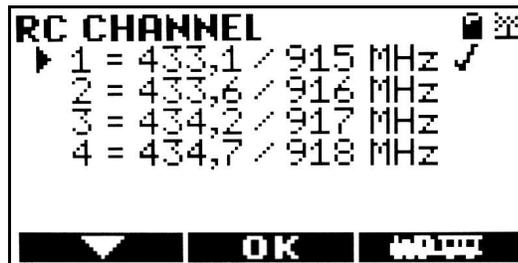
### 5.5.2. Transmitter Configuration

Beginning with software version 1.2, the DiMAX transmitter configuration menu (RC Config) is available and may be selected.



#### 5.5.2.1. Channel Selection

Choose the sub menu “channel “with the M2 key and use the cursor to select one of the four available channels. The current operating channel will display a check mark. Accept the selection by pressing the M2 key. If a new channel is selected, the Navigator will automatically switch off and restart. The factory preset channel is channel #1. In some cases it can be helpful to change the RC channel in order to enhance the range. This needs to be tested individually. Please remind, changing the RC channel in the Navigator requires the receivers



RC channel to be changed as well. For further information please read the receivers manual as well.

#### 5.5.2.2. Frequency Band Selection (Needs software version V1.30)

Choose between the American frequency band and the European frequency band.

**NOTE:** Choosing the European frequency band selection when an American (US) band transmitter is installed will not work.

#### 5.5.2.3. Turn-Off Time

To conserve battery life during wireless operation, the DiMAX Navigator switches itself OFF after a defined time period of inactivity. The Navigator *turn-off time* can be changed to reflect operational requirements. If the Navigator switches itself OFF, all currently *logged on* locomotives will be *logged off*. The same result occurs if the wireless connection is interrupted or the wireless receiver is disconnected.



**5.5.2.4. Battery Charging Function** (Needs software version V1.21)

Activate the charging function by pressing the **M2** button. If the Navigator is operated in tethered mode, the Navigator’s rechargeable batteries can be charged. This unique feature eliminates the need to remove rechargeable batteries for charging.



battery charging on



battery charging off

**DANGER - EXPLOSION RISK - Do not operate the Navigator’s battery charging feature when non-rechargeable batteries are installed. Failure to comply with this warning may lead to battery damage, Navigator damage, battery explosion and serious injury.**

The activated battery charging status is indicated by a check mark.

The battery symbol shows the charging condition of the rechargeable batteries.

-  = battery fully discharged
-  = battery 1/3 charged
-  = battery 2/3 charged
-  = battery fully charged

Battery charging during tethered operation is indicated by a blinking battery icon on the Navigator display.

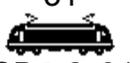
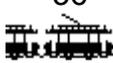
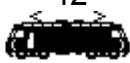
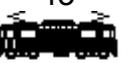
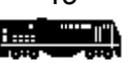
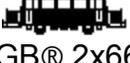
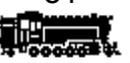
**5.6. Central Station Configuration**

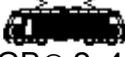
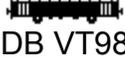
This function is not yet available.

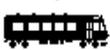
**6. Loco Icons**

The following list shows the currently available locomotive icons. The list includes most LGB® models and many additional models from other large scale manufacturers. The locomotive icons are listed using the LGB® loco series number. For example, LGB® # 21812, DR steam loco series 99 7222-5, is listed as icon number 031. Icon numbers greater than #100 are reserved for special models, e.g., LGB® series #83, the LGB®/Aster brass locomotive. The latest loco icons may be downloaded from [www.massoth.com](http://www.massoth.com). In the event you cannot locate a desired icon please contact [usa@massoth.com](mailto:usa@massoth.com) for further assistance.

The first line identifies the number of the loco icon.

 00 LGB® 2x00x	 01 LGB® 2x01x	 02 LGB® 2x02x	 03 LGB® 2x03x	 04 LGB® 2x04x
 13 LGB® 2x13x	 14 LGB® 2x14x	 15 LGB® 2x15x	 17 LGB® 2x17x	 18 LGB® 2x18x
 19 LGB® 2x19x	 21 LGB® 2x21x	 22 LGB® 2x22x	 23 LGB® 2x23x	 25 LGB® 2x25x
 26 LGB® 2x26x	 27 LGB® 2x27x	 30 LGB® 2x30x	 31 LGB® 2x31x	 33 LGB® 2x33x
 35 LGB® 2x35x	 36 LGB® 2x36x	 38 LGB® 2x38x	 39 LGB® 2x39x	 40 LGB® 2x40x
 41 LGB® 2x41x	 42 LGB® 2x42x	 43 LGB® 2x43x	 44 LGB® 2x44x	 45 LGB® 2x45x
 46 LGB® 2x46x	 47 LGB® 2x47x	 48 LGB® 2x48x	 49 LGB® 2x49x	 50 LGB® 2x50x
 51 LGB® 2x51x	 52 LGB® 2x52x	 54 LGB® 2x54x	 55 LGB® 2x55x	 57 LGB® 2x57x
 59 LGB® 2x59x	 60 LGB® 2x60x	 62 LGB® 2x62x	 63 LGB® 2x63x	 64 LGB® 2x64x
 66 LGB® 2x66x	 67 LGB® 2x67x	 68 LGB® 2x68x	 69 LGB® 2x69x	 70 LGB® 2x70x
 71 LGB® 2x71x	 72 LGB® 2x72x	 74 LGB® 2x74x	 76 LGB® 2x76x	 77 LGB® 2x77x
 78 LGB® 2x78x	 79 LGB® 2x79x	 80 LGB® 2x80x	 81 LGB® 2x81x	 83 LGB® 2x83x

 84 LGB® 2x84x	 85 LGB® 2x85x	 87 LGB® 2x87x	 88 LGB® 2x88x	 89 LGB® 2x89x
 90 LGB® 2x90x	 91 LGB® 2x91x	 92 LGB® 2x92x	 93 LGB® 2x93x	 94 LGB® 2x94x
 95 LGB® 2x95x	 96 LGB® 2x96x	 97 LGB® 2x97x	 100 LGB® 2x60x	 101 LGB® 2x42x
 102 LGB® 2x42x	 103 LGB® 2x91x	 104 LGB® 2x87x	 105 LGB® 2x25x	 106 LGB® 2x02x
 107 LGB® 2x60x	 108 LGB® 2x41x	 109 LGB® 2x92x	 110 LGB® LCE	 120 RhB G4/5
 121 RhB Gmf4/4	 122 RhB-Traktor	 123 RhB Xrot	 124 RhB Ge4/4 I	 125 RhB Ge4/6
 126 RhB Gem 4/4	 127 Bernina Ge 4/4	 130 US: Climax	 131 US: Heisler	 132 US: Shay
 133 US: Consolid.	 134 US: Porter	 135 US: Railtruck	 136 US: Gal.-Goose	 137 Draisine
 140 US: Critter	 141 US: NW2	 142 US: E8	 143 US: FA1	 144 US: FB1
 145 US: GP9	 146 US: U25B	 147 US: SD70Mac	 148 US: Dash9	 150 DB: BR182
 151 DB: BR218	 152 DB VT98	 160 Passenger 3	 161 Passenger 4	 162 Passenger 5
 170 Melodysound 1	 171 Melodysound 2	 172 Melodysound 3	 173 Hot Metal Car	 174 Cargo Car

 175 Crane Car	 176 US-Caboose	 177 Passenger 1	 178 Passenger 2	 179 Firefighter Car
 180 Light-Car	 181 Control Car	 182 Snowplow	 183 Snowplow	 185 Turntable
 186 Yard Access.	 187 City			

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### 7. Software Update

In order to add new features and functionality to the Navigator, software updates can be loaded by connecting the control bus cable to the DiMAX digital central station or the DiMAX PC module 100A.

During the software update process, the DiMAX Navigator should be the only component connected to the DiMAX central station. Detailed instructions for the software update procedure are found in the DiMAX Central Station User's Manual. Further support is available at your dealer or by emailing [usa@massoth.com](mailto:usa@massoth.com). Please visit [www.massoth.com](http://www.massoth.com) to download the latest software updates for your system.

### 8. Technical Data

The DiMAX Navigator is a handheld cab control for model railroad digital control systems. Please note the following technical specifications:

Operating in tethered mode:

Maximum voltage range	U <sub>E</sub> max 24V
Minimal voltage range	U <sub>E</sub> min 10V
Current drain	I <sub>E</sub> max 80mA
Operating on following Central stations allowed at firmwareversion V2.0	DiMAX 1200Z DiMAX 800Z MZS III

Operating in wireless mode:

Maximum voltage range	3 x Battery 1,5 Volt Mignon / Typ: AA 3 x Accu 1,2 Volt Mignon / Typ: AA NiMH or NiCd
Minimal voltage range	U <sub>E</sub> min ± 3,1V
Current drain	I <sub>E</sub> max 80mA
RC operation only with DiMAX transmitter (FM)	8133001(EU), 8132001(US), 8130001(LocoNet, XPressNet)



This product conforms to the CE standards

**RoHS**

This product is manufactured according to the latest EG Standards for lead free manufacturing conforming to RoHS standard.



Please dispose of according to your State regulations.



Do not dispose of in open fire.

## 9. Warranty

Massoth Electronics USA warrants this product for one year from the original date of purchase. This product is warranted against defects in materials and workmanship. Unfortunately, Massoth Electronics USA cannot provide warranty for the following:

- Damage to peripheral components
- Damage resulting from normal wear and tear
- Damage caused by consumer modifications or improper installation
- Damage caused by misuse

## 10. Warranty Claims

Valid warranty claims will be honored without charge during the warranty period. To initiate a warranty claim please contact your dealer or Massoth Electronics USA for an RMA (return merchandise authorization). Please include the RMA number and a copy of the dated sales receipt with the returned goods. Massoth Electronics USA cannot be responsible for return shipping charges to our repair facility.

## 11. Special Hints

- The software version as well as the serial number is briefly displayed on the start-up screen of the DiMAX Navigator. If the Navigator is operating in tethered (cabled) mode, the start-up screen will display longer if you press and hold the F-key. (Features enabled beginning with software version V1.30)
- Press and hold the right hand STOP key during start-up of the Navigator to automatically enter software update mode. (Features enabled beginning with software version V1.21)
- Press and hold the left hand STOP key during start-up to load loco address '0'. This action is only necessary if the Navigator fails to initialize properly during start-up. (Features enabled beginning with software version V1.21)

## 12. Glossary

- **Bit**  
The word “bit” is the truncated form of the term “binary digit.” A bit is the smallest unit of digital data, having a value of either “0” or “1.” Eight bits form one “byte” of digital information.
- **Booster**  
A booster amplifies a low power DCC signal, providing additional power to the model railway. Each booster supplies a single, isolated ‘power district’ on the layout.
- **Bus / Bus system**  
A bus system is the electrical connection or data highway between control components of a DCC system. The various bus systems being currently utilized by different manufacturers are typically not compatible. For example, the bus system for Massoth components is called the DiMAX bus. The bus system for Lenz is XpressNet. The bus system for Digitrax is LocoNet. Each features a separate and distinct communication protocol.
- **Byte**  
A byte is a unit of computer information consisting of eight bits. The decimal value of a byte varies between 0 and 255.
- **Central Station**  
The central station is the *brain* of a digital system. All commands, feedback instructions, etc., are processed in the central station. The central station generates the bi-polar DC waveform which is subsequently amplified by a DCC booster to power the track bus. The central station communicates with DCC components – cabs, wireless receivers, feedback modules, etc - via the bus system (DiMAX, LocoNet, XpressNet, etc.).
- **Computer Interface or PC Interface**  
A computer interface allows the user to connect a digital system to a computer. Typically, the interface is a 9-pin serial connector. With appropriate software, the computer can be used to control the model railway. Many advanced digital systems include an integral computer interface.
- **CV – Configuration Variable**  
DCC decoders allow the user to program various settings through the use of *configuration variables* or CVs. A CV consists of one byte (eight bits) of information and may have a value between 0 and 255.
- **CV-Programming, Direct Mode CV Programming, (DM)**  
CV settings may be changed by a process called CV programming. Direct Mode Programming is typically conducted on an isolated, low power (current-limited) programming track section. Programming can be accomplished in *bit-by-bit mode* (allowing one of the eight bits to be altered) or in *complete byte mode* (allowing the whole byte - all eight bits – to be altered). The DiMAX system also allows the user to *read* the value of CVs.

- **DCC**

DCC is an acronym for Digital Command Control. With DCC, a digital signal is transmitted along the rails and interpreted by devices (decoders) on the network. With NMRA DCC, the communication protocol along the rails is standardized, allowing interoperability between manufacturers. Motorola and MTH offer competing Digital Command Control systems that are not compatible with NMRA DCC. Since the central station and decoders must communicate with the same language or *protocol*, NMRA DCC is not compatible with the Maerklin (Motorola) or MTH (DCS) Digital Command Control systems.

- **Decoder**

A decoder (switch decoder, locomotive decoder) converts the commands of the central station into the respective action (e.g. operate a switch, control a motor, control lighting outputs). Locomotive decoders receive power and instructions from the bi-polar DCC waveform transmitted along the rails.

- **Digital System**

A digital system is an electronic control system designed to allow independent operation of multiple trains on the same track. Commands sent to mobile decoders allow the user to control motor speed and direction, as well as, the status of various function outputs for lights, smoke units, uncouplers, etc. Each locomotive or device controlled by the digital system requires a decoder that features a unique address. NMRA digital systems feature standardized communication protocol along the rails. This protocol is not compatible with the signal used by other non-NMRA DCC digital systems, e.g., Motorola (Motorola) and MTH (DCS).

- **Digital Address**

In a digital system, each mobile decoder (locomotive decoder, function decoder) or stationary decoder (accessory decoder, switch decoder) needs a discrete, individually distinct or unique numerical address. The capability of the digital system determines the number of available addresses. Basic systems, like LGB®'s MTS are limited to 22 locomotive addresses and 128 switch decoder addresses. More sophisticated systems, like the Massoth DiMAX, are capable of operating up to 10,239 locomotive addresses and 2,048 switch decoder addresses.

- **MTS**

MTS is an acronym for Multi-Train System, the digital system of LGB®. While this system does not feature the NMRA Conformance Warrant, it is designed to operate according to NMRA DCC standards and recommended practices (RPs).

- **NMRA**

NMRA is an acronym for the National Model Railroad Association. The NMRA sets standards and recommended practices for NMRA DCC systems. NMRA DCC features standardized communication protocol along the rails, offering interoperability between manufacturers. The standardization and interoperability does not extend to devices designed to operate on the bus system.

- **PoM = Programming on the Main, a.k.a. Operations Mode Programming**

Traditional programming methods require moving the affected locomotive to an isolated programming track. *Programming on the Main* or *Operations Mode Programming* allows the user to program the decoders of locomotives still sitting on the main operating track. When using PoM, the user selects

the locomotive address of the decoder he wishes to program. Typically, the locomotive address CVs cannot be changed with PoM. Please note some decoders are not compatible with PoM. Massoth eMOTION XL/XLS decoders are compatible with PoM. LGB® 55020, 55021, 55022, 55027 and LGB® onboard decoders are not compatible with PoM.

- **Protocol**

*Protocol* is a set of conventions governing the formatting of data in an electronic communications system. In essence, the system protocol is the communication *language* spoken between devices on an electronic network.

- **Speed Steps**

In order to control the driving speed of the locomotive motor, the central station sends *direction* and *speed step* commands to the mobile decoder. In simple terms, each speed step equates to a pre-set drive voltage for the motor. The drive voltage for each of the decoder's speed steps can be programmed by the user. The higher the number of available speed steps, the greater the resolution of motor speed control. NMRA DCC allows the central station to send 14, 28 and 128 speed step commands to mobile (locomotive) decoders. Basic decoders (e.g., LGB® 55020) and central stations (e.g., LGB® 55000, 55005) only support 14 speeds steps. Massoth central stations and decoders support 14, 28 and 128 speed steps.

### 13. Support

For more information on Massoth products, please visit our website at [www.massoth.com](http://www.massoth.com).

The website offers the latest software revisions and user manuals for download. The website is also home to the Massoth Forum, an online resource allowing users to ask questions and share information 24 hours a day. Registration is free. <http://forum.massoth.com/>

Further support is available through your retailer or via the Massoth USA Hotline.

Hotline hours (USA): 9:00 a.m. to 4:00 p.m. EST Monday thru Friday

Phone: (770) 886 – 6670

FAX: (770) 889 – 6837

Email: [sales@massoth.com](mailto:sales@massoth.com) .

### 14. Manufacturer Information

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