

Intellibox IR

The Multi-protocol Digital system
for Motorola, DCC und Selectrix
with Infrared receiver

Manual



Authors: Dr.-Ing. T. Vaupel, D. Richter, M. Berger

Translated by Wolfram Steinke

© Copyright Uhlenbrock Elektronik GmbH, Bottrop

6th Edition October 2005

Starting from Software version 1.5

All Rights Reserved

Duplication is only allowed with written Authorization

Part Number 60 500

Table of Contents

I. Description	6
I. Description	7
II. Controls	10
III. Connections	11
IV. Quick Start	12
V. Configuration of Intellibox at Power on	14
VI. Commands	18
VII. Technical Data	21
VIII. Compatible Decoders	22
IX. Compatible Devices	24
1. The Intellibox connectors	27
1.1 Definition of the Intellibox connectors	27
1.2 Connecting the clamp plugs	27
1.3 Connecting transformer, track and programming track	28
1.4 Connecting a DCC booster	30
1.5 Connecting a Märklin Booster	30
1.6 Connecting a LocoNet Booster	31
1.7 Connecting the s88 feedback modules	31
1.8 Connecting the Lokmaus	32
1.9 Connecting the IRIS-Receiver	33
1.10 Connecting a computer	34
1.11 Connecting LocoNet devices	34
1.12 Connecting Märklin devices	35
2. Display, keyboard and menus	37
2.1 The display	37
2.2 Key functions	37
2.3 The Menus	38
2.3.1 Structure and navigation	38
2.3.2 Special characters of the display	39
2.3.3 Inputs	39
3. Basic Settings	40
3.1 Menu structure	40
3.2 Menu "User Interface"	41
3.2.1 Loco Speed display	41
3.2.2 Speed knobs	42
3.3 Menu "Language"	43
3.4 Menu "Loco data format"	44
3.5 Menu "Accessory (decoder) setting"	45
3.5.1 General type	45
3.5.2 Single type	45
3.5.3 Switching time	46
3.6 Menu "Hand control"	47
3.7 Menu "LocoNet module"	48
3.7.1 Programming the module address	48
3.7.2 Programming LocoNet CV's	49
3.8 Menu "Display"	50
3.9 Menu "Scale"	50
3.10 Menu "Progr. Track"	51
3.11 Menu "Interface"	51

3.11.1 Speed	52
3.11.2 Syntax.....	52
3.11.3 Computer.....	53
3.12 Menu "s88 setting".....	53
3.13 Menu "Lokmaus addresses".....	54
3.14 Menu "Special Option".....	54
3.15 Menu "Software-Version".....	55
3.16 Menu "Loc start mode".....	55
3.17 Menu "Reset".....	56
4. The Control Panel	58
4.1 Control elements.....	58
4.2 Loco addresses	59
4.2.1 Selecting a locomotive.....	60
4.2.2 Using the address memory.....	60
4.2.3 Releasing a Loco address.....	61
4.3 The speed knob (throttle).....	61
4.4 Lights and extended functions.....	62
4.5 Changing data format of a locomotive decoder.....	63
4.5.1 Data formats (protocols).....	63
4.5.2 Symbols used to display different data formats.....	64
4.5.3 Procedure	64
4.6 Locomotive virtual addresses	65
4.6.1 Introduction.....	65
4.6.2 Virtual address assignment	65
4.6.3 Displaying a virtual address.....	66
4.6.4 Deleting a virtual address	66
4.7 Consisting (Multi-traction).....	66
4.7.1 Setting up a consist	66
4.7.2 Consist behaviour.....	67
4.7.3 Releasing a Consist.....	68
4.7.4 Storing a Consist	68
4.8 Controlling function decoders.....	69
5. Hand Controller (FRED).....	70
5.1 The FRED hand controller number.....	70
5.2 Entering the locomotive address	70
5.3 Releasing a locomotive.....	71
6. The Keyboard	72
6.1 Description.....	72
6.2 Selecting the Keyboard mode.....	72
6.3 Keyboard control.....	72
6.4 Configuring switching timing.....	73
6.5 Selection of the Keyboard address.....	73
6.6 "Table" Keyboard mode.....	74
7. The Memo Mode (Route control).....	75
7.1 Description.....	75
7.2 Selecting the Memo mode.....	75
7.3 Selecting a Route group.....	75
7.4 Programming Routes.....	75
7.5 Inserting pauses	76
7.6 Switching Routes.....	77
7.7 Concatenating routes.....	77
7.8 Setting operating speed.....	78

8. s88 Mode (Display of Feedback)	79
8.1 LocoNet Feedback module	79
8.2 s88-Module	79
8.3 Selecting the s88 Mode	80
8.4 The display	80
8.5 Monitoring another s88 status	80
9. Programming Mode	81
9.1 Programming track	81
9.2 Selecting the programming mode	81
9.3 Structure of the programming menu	81
9.4 Programming Uhlenbrock decoders	82
9.4.1 DGL750/770 menu	82
9.4.2 DGR755/756 menu	82
9.4.3 DGF 760 menu	83
9.4.4 Reset menu	83
9.5 Programming DCC decoders	83
9.5.1 Register programming	84
9.5.2 CV programming (byte)	85
9.5.3 CV programming (bit)	85
9.5.4 Paged programming	86
9.5.5 Programming on the main track	86
9.5.6 Programming long addresses	87
9.5.7 DCC programming error messages	87
9.6 Programming Selectrix decoders	88
9.7 Searching a decoder's address	89
10. IRIS Mode	90
10.1 Description of Infrared Control	90
10.1.1 Operation	90
10.1.2 Operating controls	90
10.1.3 Locomotive Control	91
10.1.4 Solenoid control	93
10.1.5 Implementing Track Route	94
10.1.6 Power on/off	95
10.2 IRIS Monitoring Mode in the Intellibox	95
10.2.1 Selection of IRIS Mode	95
10.2.2 Selection of transmission channel	95
10.2.3 The indication	95
11. LISSY Mode (usable from software version 1.55)	97
11.1 Description	97
11.2 Setting LISSY Mode	97
11.3 Operating LISSY Mode	97
11.4 Calling up a LISSY Receiver	98
12. The Computer Interface	99
13. Software Updates	100
14. Error Messages	101
Appendix	102
List of Special options	103
Special settings for the IRIS remote control	106
List of the standard commands (6050-Syntax)	109
Converting bits to bytes	110
Module address table for feedback channels	112

Coding table for solenoid decoder	113
Computer interface and modem cable	114
Standard LocoNet Cable	115
Tips and Tricks	116
Troubleshooting	119
HOTLINE	121

I. Description

The Intellibox can be used with layouts using the Motorola, DCC and Selectrix digital formats, simultaneously on the same track and is therefore a genuine multi-protocol Digital system. It is extremely efficient and compact and brings many functions into a single box.

The entire system in one box

The Intellibox has on board all the functions which formerly had to be laboriously installed into the layout.

Speed controller

Using two rotating controls, two locomotives can be independently controlled.

The booster

A high performance booster which is short circuit proof, has an output current of 3 A. Its operating voltage can be limited to 18V for N-gauge.

Keyboard

A keyboard that can switch 320 (Märklin) and/or 2000 (DCC) solenoids, with direct access to 8 items in each case. At the same time feedback on the status of the turnout or signal is indicated in the display.

Route control

To administer up to 48 routes. With a press of a single key up to 433 turnouts, in groups of 10, can be switched.

Programmer

Simple menu-driven programming of Uhlenbrock, Motorola, DCC compatible and Selectrix decoders.

Infrared Receiver

For easy control of the Intellibox using the IRIS remote control.

Interface

Computer interface connector allows computer control of model railway layouts.

Updatable system software

The Intellibox system software can be updated at any time using the internal interface.

Various data formats

The Intellibox can control locomotive, function and switch decoders of most manufacturers mixed on a layout. The following data formats can be transmitted **simultaneously**:

Motorola data format

Uhlenbrock, Märklin direct current, Viessmann

Extended Motorola data format (Gauge I)

Uhlenbrock, Märklin alternating current Gauge I format

DCC data format

Uhlenbrock, Märklin direct current, Arnold, Digitrax, Lenz, LGB, Roco and all DCC compatible decoders.

Selectrix data format

Trix

9999 decoder addresses and 128 drive positions

The Intellibox supports all addresses and speed steps of the various decoder makes.

Märklin Motorola

80 addresses, 14 speed steps

Uhlenbrock Motorola

255 addresses, 14 speed steps

Uhlenbrock DCC

9999 addresses, 128 speed steps

DCC compatible

99-9999 addresses, 14, 27, 28, 128 speed steps, according to type

Trix Selectrix

112 addresses, 31 drive positions

Informative LCD display

The large LCD display with back-lighting has a clearly arranged user interface. The clear, three column display creates a quick overview.

While running, the locomotive address, data format, speed step and driving direction of the two selected locomotives are indicated. The centre indicates the selected operating mode, e.g. in keyboard mode, turnout and signal status is displayed.

In programming mode the display shows the menu text for decoder programming.

Multilingual prompting

Operating the Intellibox is astonishingly simple with the menu driven prompting. Various languages can be selected for the control panel display.

Intelligent controller

The rotary throttle controller without end stop restores the previously saved speed step when the locomotive is reselected.

A DC-controller mode is available, i.e. clockwise rotation controls acceleration in one direction, and anti-clockwise in the other

direction, and an AC-controller mode is also available, i.e. the speed is increased with clockwise rotation of the controller and reduced by anti-clockwise rotation. The driving direction is changed with a press of the control knob.

Extended special functions

Eight special functions (for some DCC decoders) and "function" for switching of light, sound, etc. are available.

Consisting (Multi-traction)

8 combinations with up to 4 locomotives per 'traction' can be administered by the Intellibox.

Virtual locomotive addresses

Each decoder can have an address, with up to four digits, assigned to it, for example an operating or sequence number, in addition to the fixed locomotive address.

Durable memory

All settings, which have been done with the Intellibox, remain non-volatile, even if the equipment is switched off for months.

Updatable system software

Using the Intellibox's internal interface the system software can be updated at any time.

Compatible with many other devices

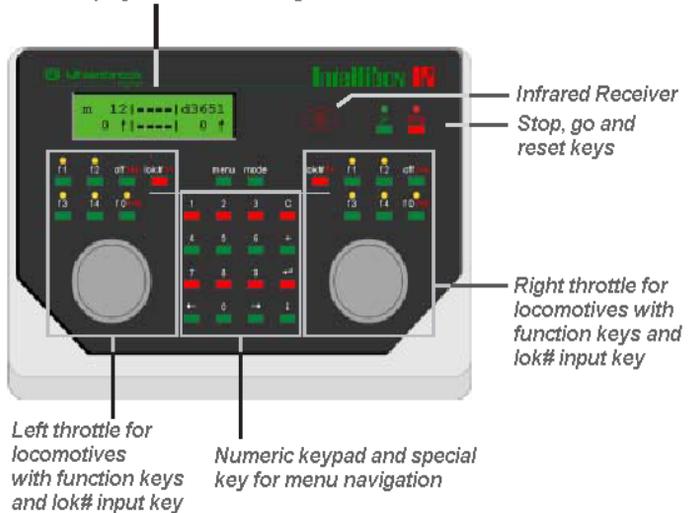
The Intellibox is capable of connecting to a diverse range of other devices.

On the back are sockets for transformer, track, programming track, DCC booster, Roco and LGB Lokmaus1, s88 feedback modules, Digitrax LocoNet, Lenz X-bus-devices (via LocoNet adapters) and a serial interface.

On the side Control 80, Control 80f, Control IR, Control unit (using adapter 61 020), keyboard and Memory from Märklin and Arnold and the Switchboard from S.E.S. can be plugged in.

II. Controls

LCD display with information about decoder format, locomotive address, speed step and driving direction (outside) and selected mode (center), e.g. in keyboard mode display of turnout and signal status.



Menu

Context sensitive option settings.

Mode

Selection between keyboard, route control (note mode), s88-Monitor, IRIS mode and Programmer.

Throttle and reversing switch

The throttle control without end stop automatically restores the memorized speed and direction when the locomotive is changed. A press on the throttle knob will stop the locomotive without inertia control (= emergency stop) and then changes the driving direction.

Auxiliary function keys f1-f4 and function

To control lights and 8 auxiliary functions

Special lok# key

Awaits the subsequent entry of a 1 to 4 digit locomotive address.

Numeric key block

Numeric keypad and special keys for easy address input, for switching of turnouts or signals, for programming decoders and for navigating menus.

III. Connections



- ① 6-pin socket: Transformer, Normal track, Programming Track
- ② 3-pin socket: Lenz/DCC Booster
- ③ 5-pin DIN socket: Lokmaus
- ④ 6-pin socket: Feedback Bus (s88)
- ⑤ 5-pin socket: Märklin Booster
- ⑥ Western-socket: LocoNet B (Booster)
- ⑦ Western-socket: LocoNet T (Throttle)
- ⑧ DB-9 socket: Computer Interface
- ⑨ Side connectors: Märklin I²C-Bus

IV. Quick Start

Important!

Please note that this quick start section should only be used to test the Intellibox. It is absolutely necessary to read the whole manual in order to understand and use all Intellibox features.

Connecting the plug

You need a transformer with 16 V AC output voltage and a minimum output power of 52 VA. The 16 V AC voltage from the transformer and the two poles of the track are connected to the clamps of plug #1 on the backside of the Intellibox.

CAUTION

Before you connect plug #1 to the Intellibox, please check carefully that the wires from the transformer have not been swapped with those from the track, or that short-circuits did not occur among the various wires of the connector!! A short-circuit between the transformer and the track could destroy the output stage of the Intellibox.

Connecting the device

If you insert the plug into socket 1 and turn the power on, the green LED above the [90] key at the top right on the front panel of the Intellibox should light up after approx. 5 seconds and to indicate the ready status of the equipment.

Presets

The Intellibox the following options preset ex factory:

Speed step display	Direct reading
Throttle control	AC control panel
Locomotive data format	New Motorola (base data format)
Solenoid data format	Motorola (base data format)
Track Gauge	Driving Power H0

If these settings are correct for your layout, you can set the first locomotive onto the track. Otherwise you should check under "Configuration of Intellibox at Power on" or under "Basic Settings" and make the necessary changes.

A full description of all options, as well as their operation is described in chapters 2 and 3.

Calling up a Locomotive

- Press [lok#] key of the right or left control panel
- Enter the desired locomotive address using the numeric keys
- Confirm with [↵]-key

Controlling a locomotive

A clockwise rotation of the control knob increases the speed, and an anti-clockwise turn reduces the speed. To change driving direction press on the control knob when the locomotive is stationary.

Switching the Light

- The [function] key switches the light on
- The [off] key switches the light off

Special function switches

- Press one of the special function keys [f1] [f2] [f3] [f4]
- Together with [lok#] key some DCC decoders can have functions f5 to f8 switched (see chapter 4.4).

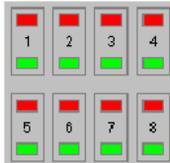
NOTE

All inputs must be made by the control panel, on which the locomotive with the desired address was called up.

Change the digital format of individual locomotives

- Place the vehicle on the track
- Press [lok#] key of the right or left control panel
- Enter the desired locomotive address using the numeric keys
- Confirm input with [↵]-key
- Press [lok#] key of the same control panel
- Press [menu] key
- With the [↓]-key scroll to the desired data format
- Confirm input with [↵]-key

Switching turnouts



*The 8 pairs of keys
of the key board*

The switching is done using the numeric keys. Using eight pairs of keys, eight turnouts or signals with the addresses 1 to 8 can be switched. The position of the turnouts is indicated in the middle part of the display.

V. Configuration of Intellibox at Power on

The Intellibox can load various configuration options at power on, if a key in the middle block of keys is held pressed.

The individual keys have different functions.

Procedure

Disconnect the Intellibox from the transformer (pull the 6 pins plug from socket 1). Press appropriate key as you return the plug to socket 1. Hold the key until the display comes on.

Test of control elements

If the [mode] key is held the Intellibox starts in a test mode for keys, speed knob and display.

Language selection

If one of the numeric keys is held when starting, the Intellibox starts with the appropriate language.

[1] German	[4] Italian	[7] Spanish
[2] English	[5] Dutch	[8] Portuguese
[3] French	[6] Swedish	[9] Danish

Configuration of display

If the [C]-key is held down at start-up the Intellibox will bring up a menu for setting the contrast of the LCD display.

Holding the [+]-key at start-up forces the Intellibox to reset contrast and brightness of the display to factory default.

Fast basic adjustment

Normally the configuration of the Intellibox is changed during the operation using the "Basic Settings" menu. Starting the Intellibox while holding the [←]-key gives direct access to the most important menu options, which can be selected and changed.

The display always indicates the active mode, with new units at factory settings. The [↓]-key can be used to scroll through the individual menu options. Pressing the [←]-key will confirm the entries shown on the display.

```

Intellibox
Basic Settings
  
```

The Intellibox starts with the following display:

This menu disappears automatically after 2 seconds. Then the display shows system's software version number and the serial number of the Intellibox, e.g.:

```

Ver: 1.550-1.550
S/N: -----
  
```

The basic configuration of the Intellibox can now be queried and changed. Pressing the [←]-key takes you to the first item:

Menu option "configuration"

```
Configuration
= reset : no
```

This menu option can return the Intellibox to its factory default.

Now there are further options:

1. Do not reset the configuration

- Press [←]-key to continue to the next option menu

2. Reset the configuration

- Press [↓]-key until the display changes to "= reset.: yes "
- Press [←]-key and hold for a system reset to its factory settings and restart in the configuration mode.

3. Reset the configuration and return to control panel operation

- Press [↓]-key until the display changes to "= reset.: yes "
- Press [←]-key

The Intellibox will do a system reset to factory settings and restarts in the control panel operating mode.

Menu option "language"

```
Language:
= English *
```

The language that the Intellibox is to use for the display is selected here. See Chapter 3.3 for detailed information.

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "locomotive data format"

Selects the desired locomotive data format that will be used for the majority of the locomotives. Detailed information in chapter 3.4.

```
Loco data fmt:
= Moto. new *
```

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "switch attitude"

Selects the desired turnout data format that will be used for the majority of the turnouts. Detailed information in chapter 3.5.

Access.Setting:
= **Motorola ***

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "Throttle control"

Selects whether to use the control panel in AC controller or DC controller mode. Detailed information in chapter 3.2.2.

Speed knobs:
= **AC style knob***

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "Speed step display"

Select whether the locomotive speed is to be displayed in per cent or speed steps. Detailed information in chapter 3.2.1.

Loc Speed disp:
= **Absolute ***

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "Track Scale"

Select the output voltage limitation of boosters ON (for N Scale) or OFF (for H0 Scale). Detailed information in chapter 3.9.

Scale:
= **Voltage: H0 ***

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "programming track"

Select whether the programming track is to be automatically switched between the programming track power and the normal

Progr. Track:
= **Automatic ***

driving power. See also chapter 3.10.

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Menu option "s88 of modules"

Register the number of s88-Feedback modules that are to be attached. Detailed information in chapter 3.12.

```
s88 modules:  
connected: .8 *
```

- Use the numeric keys to enter the number of modules to be attached.
- Press [←]-key to make the selection

Menu option "Locomotive starting mode"

Selects whether the locomotive's status, like: speed, driving direction and condition of the special functions, is saved at power down so it can resume or not when re-powering the layout.

Detailed information in chapter 3.16.

```
Loc start mode:  
= autom, Speed=0*
```

- Press [↓]-key to scroll to the desired entry
- Press [←]-key to make the selection

Terminate configuration

Press [←]-key to write the new configuration to the Intellibox and do a system reset.

```
*** reset ***
```

Further options are possible in the Intellibox Basic Settings menu (chapter 3).

VI. Commands

Important!

Use this section only as quick reference guide. Please read the whole manual in detail in order to learn and all functions and options of the equipment.

Switching Track power off/on,

Emergency stop of the entire layout off/on

[stop]/[go]

Select a locomotive

[lok#] + address input + [←]

Speed change

Turn the control knob

Changing direction, emergency stop of the currently controlled locomotive

Press the control knob

Light switch

[function] [off]

Special function switch

[f1] [f2] [f3] [f4]

Special functions switch f5-f8

[lok#] + [f1] [f2] [f3] [f4]

Select equipment mode

[mode] Press, to in the display the desired mode appear or

[mode] + [1] for keyboard mode

[mode] + [2] for Memo mode

[mode] + [3] for s88 mode

[mode] + [4] for program mode

[mode] + [5] for IRIS mode

Change keyboard key allocation

[mode] + [1] (screen-display "keyboard mode")

[menu] + number 1 key + [←]

Selection of route group

[mode] + [2] (screen-display "Memo mode")

[menu] + number of the route group (of 1-3) + [←]

s88-Modus key allocation change

[mode] + [3] (screen-display "s88 mode")

[menu] + module address + [←]

Entering a Consist (multi-traction)

1. *Select locomotive*

[lok#] + address + [←]

2. *Add a Locomotive*

[lok#] + [+] + address

input next locomotive

[+] + address

input last locomotive

[+] + address + [←]

Remove a consist (multi-traction)

Select base address

[lok#]+ address + [←]

Delete the entire group

[lok#] + [C] + "all locomotives delete" + [←]

"Uncouple" individual vehicles

[lok#]+ [C] + with [↓] locomotive select + [←]

Add virtual locomotive addresses

Call up locomotive

[lok#] + decoder address + [←]

assign virtual address

[lok#]+ [menu] + with [↓] to "virt. Addr." + address

[←] + [menu]

Searching for locomotive number

Special Option 836 to 1 set

[mode] + [4] (screen-display "Prog. Mode")

[menu] + with [↓] to " search Dec. addr."

[→] + [←]

Setting data format of individual decoders

Call up locomotive

[lok#]+ address + [←]

Adjust decoder format

[lok#]+ [menu] + with [↓] scroll to the desired entry

[←] + [menu]

Adjust data format of individual turnouts

[menu] + [mode] + with [↓] scroll to "Single type"

with [→] and [↓] to "Single type"

Input address + [→] + [↓] scroll to the desired entry

[←] + [menu]

Change basic adjustments

[menu] + [mode]

with [↓] and [→] go to the desired item

[←] + [menu]

Reset

[go] and [stop] simultaneously for approx. two seconds and the Intellibox will return to power-up state.

VII. Technical Data

Maximum supply voltage

18 V AC

Maximum current load

3 A to the rails

1 A to the I²C Bus

0,2 A to LocoNet B output

0,5 A to LocoNet T output

All outputs have short circuit protection.

Maximum number of feedback modules

s88 or s88 compatible modules - addr. 1-31

additional modules, connection through the LocoNet - addr. 1-128

NOTE Systems with a mixture of s88 and LocoNet feedback modules in address range 1-492, module addresses 1-31 remain reserved for the s88 feedback modules.

The Intellibox can control up to 2048 feedback contacts.

Maximum number of loco addresses

Motorola format, available with the Märklin Digital system - addr. 1-80

Motorola format, available with Uhlenbrock decoders - addr. 1-255

DCC format - addr. 1-9999

Selectrix format - addr. 0-111

Maximum number of solenoid device decoder addresses

Motorola format - addr. 1-320

DCC format - addr. 1-2040

Maximum number of connected Boosters

15 Märklin Boosters

15 DCC Boosters

Dimensions

180 x 136 x 80 mm

VIII. Compatible Decoders

The Intellibox can operate digital decoders independent of one another with most digital formats.

Data format

Locomotive and function decoder

Motorola format old

Motorola format new, Scale I format

DCC compatible decoders, those that use NMRA standard

Selectrix, only decoder with standard functions f0 and f1

Turnout and switching decoder

Motorola format

DCC compatible decoders, those that use NMRA standard

Tested decoders

The following decoders were tested by us. They had problem free operation with the Intellibox. We cannot guarantee compatibility of other decoders.

Locomotive decoder Motorola format

- Uhlenbrock Motorola and multi-protocol decoder, all types
- Märklin decoders, e.g. 6603 (delta), 6080, 6081, 6090, 6090x new, 6095, special decoders for individual locomotive models

NOTE

Märklin decoders 6080, 6090 and delta decoder with chips with serial numbers smaller than 701.17 or not recognizable numbering have to be operated with the old Motorola format.

Older Märklin decoders (6080 and delta decoder) can be controlled with the Intellibox only if the red cable is attached at the neutral (central) conductor of the rail.

Locomotive decoder DCC format

- Uhlenbrock DCC- and multi-protocol decoder, all types
- Old Märklin digital = decoder (c82)
- Old and new Lenz decoder, e.g. LE030, LE040, LE075, LE103, LE104, LE110, LE130, LE131, LE135, LE088XS, LE010XF, LE011XF, LE077XF
- Lenz decoder LE100, *runs only in the pure DCC*, in multi-protocol system it has problems with travel direction changes.
- Different Digitrax decoder, e.g. DZ121
- New Arnold decoders (81200, 81210), if the decoders are set to DCC mode and the automatic Motorola recognition (CV49; Bits 4=1) is switched off (see decoder manual).

- Selectrix decoders (66830, 66832), when control using the Intellibox. Operation with "foreign boosters" is not possible.
- Wangrow and North Coast engineering decoder
- XR1 decoder (Märklin compatibly)
- Roco decoder (Lenz)
- Kuehn T120, T121, T140
- ZIMO decoder MX61N, MX61/2000

Solenoid decoder Motorola format

- Uhlenbrock solenoid decoder MD2 (67 200)
- Uhlenbrock switching decoder SD1, SD2 (67 500, 67 600)
- Modeltreno solenoid decoder 66001
- Viessmann solenoid decoder 5211
- Viessmann switching decoder 5213
- Märklin K83 (6083)
- Märklin K84 (of 6084)

Solenoid decoders DCC format

- Uhlenbrock solenoid decoder MD2 (67 200)
- Uhlenbrock switching decoder SD1, SD2 (67 500, 67 600)
- Arnold K87N (86078)
- Lenz LS100/110/120
- DCC compatible decoders from other manufacturers

IX. Compatible Devices

A list of the devices tested by us.

Märklin I²C bus

Connection to Märklin I²C bus left

- Märklin keyboard 6040
- Märklin Memory 6043
- Arnold keyboard 86040
- Märklin Switchboard 6041 (up to 4 devices)

Connection to Märklin I²C bus right

- Märklin control 80 6035
- Märklin control 80f 6036
- Märklin Infra control 80f 6070
- Arnold control 80 86035
- Arnold control 80f 86036

Märklin I²C bus right or left with Uhlenbrock adapter 61 020

- Märklin Central units 6020, 6021, 6022, 6023, 6027, 6029, 6030.

NOTE With Märklin Centers 6027 the Reset button on the back of the device must be operated at system boot up!

The Märklin Centre 6030 can only be used as a turnout booster. The control panel has no function, since it is not directly connected to the I²C bus.

INFO There are major differences in the technical operation of the individual series of Märklin Centers. Nevertheless, we have endeavoured to make the Intellibox compatible with as many different versions as possible. However some centers may impair the operation of the Intellibox and the devices attached to the I²C Bus.

Connection for Lokmaus or IRIS receiver

- IRIS auxiliary receiver 66 520
- Roco Lokmaus 10750
- LGB Lokmaus 55010

Very Important

No X-bus devices can be connected in this case

s88 Feedback bus

- Märklin s88 6088
- Modeltreno s88 66002
- Viessmann s88 5217

Märklin booster connection

- Uhlenbrock Power 2 (63200), Power 3 (65600), Power 6 (65650) output Motorola, DCC, and Selectrix format
- Märklin booster 6015 and 6017 output format Motorola

TIP The boosters can output DCC format, if the special option 901 is set to "3" (For information see chapter 3.14).

DCC booster Connection

- Uhlenbrock Power 3 (65600), Power 6 (65650)
- Lenz booster LV100 and LV101
- Märklin = booster 6016
- Arnold booster 86015 with Uhlenbrock adapter 61030
- Modeltreno booster 66007

NOTE All DCC boosters can output Motorola and DCC data format.
The Selectrix format can only be output by the Intellibox and Uhlenbrock boosters Power 3 and Power 6.

LocoNet connection

- Uhlenbrock IB-Control 65400
- Uhlenbrock Profi-Control 65500
- Uhlenbrock Hand control FRED 66000
- Uhlenbrock Hand control DAISY 66200
- Digitrax Hand control DT100, DT100IR, BT-2
- Uhlenbrock Power 2 - 63200
- Uhlenbrock IB-Switch into 65800
- Uhlenbrock Switch Control 63400
- Uhlenbrock LocoNet Feedback module 63340, 63350
- Uhlenbrock LocoNet displays 63440, 63450
- Uhlenbrock mobile station adapter 63810
- Uhlenbrock mouse adapter 63840 for Roco Lokmaus 2 and higher
- Uhlenbrock X-bus adapter of 63850 for X-bus devices like e.g.
 - Lenz Hand control LH100 and LH200
 - Lenz keyboard LW100
 - Lenz digital plus Compact a starter digital control
 - Roco Lokmaus 2
 - Roco keyboard
 - Arnold control 86210

Arnold keyboard 86220

Lenz feedback unit LR100 and LR101

Lenz switch receiver LS100

- Uhlenbrock LISSY receiver 68600

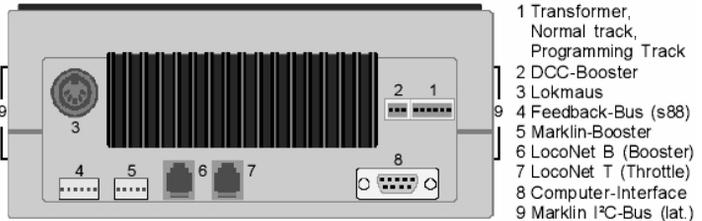
1. The Intellibox connectors

This chapter describes the connectors of the Intellibox and shows what must be taken into account when different devices are to be connected to the Intellibox.

1.1 Definition of the Intellibox connectors

Figure 1.11 is the rear view of the Intellibox with all its connectors. All designations of the connectors are included in this figure. The connectors for devices with a Märklin compatible system bus are located on either side of the Intellibox.

Figure 1.11
Connectors on the rear
side of the Intellibox
with all definitions



1.2 Connecting the clamp plugs

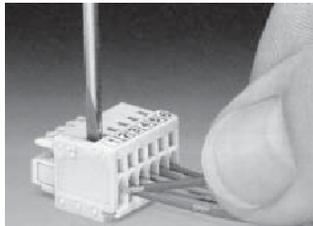
Figure 1.21
Numbering of the
clamps in connector #1

two clamp plugs are supplied with the Intellibox to connect the transformer, the normal track and the programming track as well as a Lenz booster. Use a work bench or similar surface when connecting the cables to the clamps.

The numbering of the clamps is shown in Figure 1.21.



Figure 1.22
How to insert a
wire into the plug

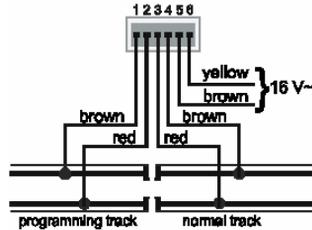


To connect a wire to the clamp plug, remove approx. 6mm of the wire insulation at the wire end. Use a small screwdriver (2.5mm) and insert it into the upper slot of the plug. A gentle downward push on the screwdriver opens the cage clamp of the plug. Insert the uninsulated wire end into the clamp. After removing the screwdriver from the upper slot of the plug, the wire is secured. As shown in the figure, it is recommended to insert the wire in a slightly bent position.

1.3 Connecting transformer, track and programming track

The 6-pins plug #1 is used to connect the transformer, the track and the programming track.

Figure 1.31
Connections of the
6-poles connector



- 1 Programming track (brown)
- 2 Programming track (red)
- 3 Digital voltage to the track (Märklin red)
- 4 Digital voltage to the track (Märklin brown-digital ground)
- 5 Ground 16 V AC from Transformer (Märklin brown)
- 6 16 V AC from Transformer (Märklin yellow)

The transformer

In order to obtain a trouble free operation of the Intellibox use a transformer of min. 52 VA output power. The maximum output AC RMS voltage from the transformer should not exceed 18V.

The transformer must be connected to clamps 5 and 6 (brown and yellow, respectively).

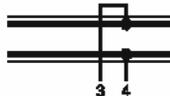
CAUTION

Ensure that the wires from the transformer have not been swapped with those from the track, or that short-circuits did not occur among the various wires of the connector. A short-circuit between the transformer and the track could destroy the output stage of the Intellibox.

The track

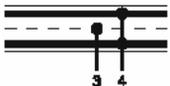
The track must be connected to clamps 3 and 4 of plug #1. For 2-rails tracks, follow this example:

Figure 1.32
Connections to a
2-rails track



For 3-rails tracks, clamp 4 is the ground potential of the digital voltage and corresponds to the brown wire of a Märklin digital system (external rails). Clamp 3 corresponds to the red wire and must be connected to the central rail.

Figure 1.33
Connections to a
3-rails track



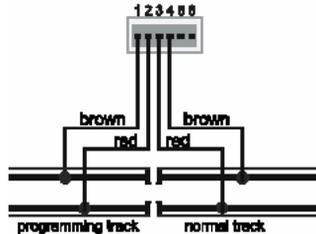
The programming track

The programming track (PT) is a special track for programming and reading out the configuration variables of loco decoders.

Very Important

Both rails of the PT must be isolated from the normal track. This must also be true for 3-rails Märklin tracks, where the two lateral rails must also be isolated. With "M" tracks this is a really difficult task (insulation of the ballast). During programming, the isolation gaps must not be crossed or bridged by locomotives or boogies, this being prejudicial to good electrical insulation.

Figure 1.34
Connections of the
Programming Track



The PT is connected to clamp 1 (brown) and 2 (red) of plug #1.

Use the basic settings of the Intellibox (section 5.8) to choose how the Intellibox handles the PT. You can choose either "only programming track" or "automatic". The latter means that you can use part of your normal layout track (but insulated on both rails). The advantage in this case is that you can drive a loco into the PT, enter the programming mode, change and read configuration variables and finally steer the loco out of the PT. The changeover between PT and normal track is done by a relay in the Intellibox.

CAUTION

In case of a short circuit between the normal track and the programming track the Intellibox will display an error message.

A short circuit also occurs when the two terminals of the Programming Track are erroneously swapped.

HINT

It is preferable that a newly installed decoder is first connected to the PT (a low-current, low-energy track) instead of the normal track, in order to check for the correctness of the installation. In fact, in case of wrong connections, it is less likely to damage the decoder. For this reason we suggest installers of decoders to choose the option "only programming track" in the basic settings of the Intellibox.

1.4 Connecting a DCC booster

In principle, all opto-isolated DCC Booster can be connected to plug #2. DCC Boosters are not able to output a Selectrix signal.

Lenz Booster

These Boosters can directly be connected to the Intellibox. The signal lines C and D and the short signal line E must be connected to the 3 pole clamp plug as shown in the picture.

Figure 1.41
Front view of the
3-pin connector



1 2 3

- 1 C = Signal +
- 2 D = Signal -
- 3 E = Short-circuit signal line

Märklin- and Arnold Digital= Booster

Märklin Digital= Boosters (6016) and Arnold Digital= Boosters (86015) are opto-isolated. Therefore they can be connected to connector #2, but only using the Uhlenbrock adapter #693.

Other DCC boosters

Only opto-isolated DCC Boosters can be connected to the Intellibox! Usually, DCC boosters have only two wires. These wires should be connected to plug #2, clamps 1 and 2 of the Intellibox.

CAUTION

These boosters are not able to transmit a short-circuit signal to the Intellibox. But they are usually protected by their own short circuit protection.

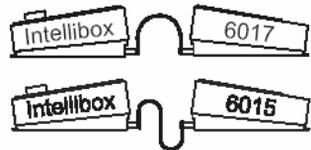
1.5 Connecting a Märklin Booster

Connector #5 is designed for Märklin Boosters (6017 and 6015) and all Märklin-Motorola compatible Boosters.

The flat cable delivered with the Märklin Booster must be tied to connector #5 of the Intellibox, running upwards. (see also the operating manual of the Booster)

Figure 1.51
Appearance of
the flat cable

On the Booster side the cable must run downwards from model Märklin 6015 and upwards from model Märklin 6017, as shown in Figure 1.51.



HINT

The SO #901 has to be changed to a value of 3, in order to control DCC locomotives on layout sections supplied through a Märklin Booster 6015 or 6017.

1.6 Connecting a LocoNet Booster

LocoNet Boosters (opto-isolated only!) must be connected to connector #6 on the rear of the Intellibox using a 6-poles Western cable. (RJ12)

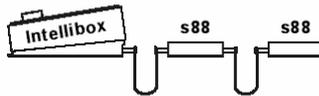
CAUTION

These boosters are not able to transmit a short-circuit signal to the Intellibox but they are usually protected by their own short circuit protection.

1.7 Connecting the s88 feedback modules

Feedback modules are used for detecting the presence of trains on several track sections and for automatic train control. All feedback modules which are compatible with the Märklin s88 (6088) can be connected here.

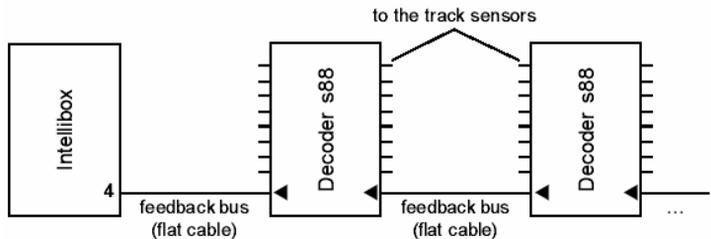
Figure 1.71
Connection of several feedback modules with the Intellibox and appearance



The flat cable delivered with the feedback modules must be connected between the Intellibox connector #4 and the first feedback module. Both ends of the flat cable, in the Intellibox and in the feedback module, must run downwards.

If several feedback modules are to be connected to the Intellibox, the enclosed special cables must be used to connect the output of one module to the input of the next module. This is shown in Figure 1.72 (see also the operating manual of the feedback module).

Figure 1.72
Connection of several feedback modules with the Intellibox via the flat cables.



1.8 Connecting the Lokmaus

Both Roco and LGB Lokmaus can be used. They must be connected to connector #3 of the Intellibox.

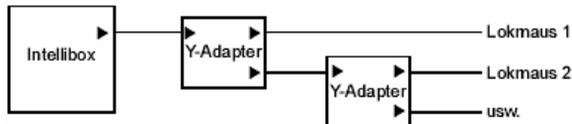
Eight different locos can be controlled with one Lokmaus. The loco can be selected using the 8-positions slider of the Lokmaus. Up to eight Lokmaus could be used at the same time with the Intellibox. With the factory setting of the Intellibox the positions 1-8 of selection switch correspond to the loco addresses 1-8.

The assignment of loco addresses to the position of the selection switch can easily be changed using the basic settings menu of the Intellibox (see also section 5.11).

Connecting more than one Lokmaus

Several Lokmaus could be connected to the Intellibox using a Y-shaped cable (ROCO 10755).

Figure 1.81
Connection of
several Lokmaus



Take into account when using a Lokmaus:

- Due to the Lokmaus characteristics, the Power on/off button can only be pressed once every 5 seconds.
- The light and the horn button can only be pressed every second.
- The light button of the Lokmaus corresponds to the [function]/[off] buttons of the Intellibox.
- The horn button corresponds to the [f1] button of the Intellibox.
- Should several Lokmaus try to control the same loco using the same position of the selection switch, then only the "first" one will actually control that loco indicated by the red LED.

CAUTION

Only Lokmaus compatible devices can be plugged into this connector. Do not plug any X-bus device in it!

1.9 Connecting the IRIS-Receiver

Receiver

The receiver is under the front left plate beside the [go]-key.

Use the IRIS remote control (Part No.66 510) pointing at the receiver (see illustration).

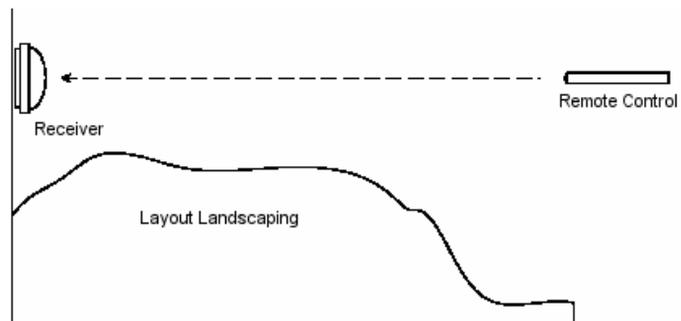
In difficult conditions, e.g. one Model railway in two rooms, it is necessary to work with several receivers.

Auxiliary receiver

Auxiliary receiver (Part No.66 520) is connected to the 5-pole DIN socket marked "Lokmaus/Iris receiver". A single auxiliary receiver can be attached directly. Two receivers are connected to the Intellibox using Y-cable, delivered with the receiver. A maximum of two auxiliary receivers can be connected to an Intellibox.

Attach the flat back of receiver using the enclosed sticking pad to the rear wall of Model railway layout. As shown in the sketch, the area between the receiver and the transmitter must be free of obstacles. The receiver must always be able to "see" the transmitter, for trouble free operation. Peak sensitivity of the receiver is the centre of dome perpendicular to the rear wall of the receiver.

During operation the remote control should always point toward the receiver. A red control LED under the transparent Dome of the receiver blinks if the receiver detects the infrared signal of a remote control.

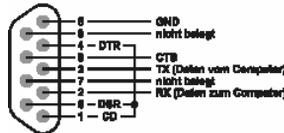


HINT If IRIS is to be used together with a Lokmaus 1, they must be connected to the Intellibox, using a Y-cable (Part No.66 530) to the Lokmaus socket on the Intellibox.

1.10 Connecting a computer

The Intellibox can be connected to the serial interface of the computer. Every IBM compatible PC or Laptop and every Apple Macintosh features a serial interface. Sometimes it is called ComPort, V.24 Interface or RS232 Interface.

Figure 1.91
Intellibox RS 232



The factory settings configure the Intellibox for an IBM compatible PC and for using only the syntax of the Märklin 6050/6051 Interface. The default Intellibox serial interface settings are: 8 data bits, 2 stop bits, baud rate 2400 bit/s, no parity, CTS line used, DTR line not used. Changes to this configuration could be made using the basic settings menu (see section 5.9)

The Intellibox can be connected to the computer using a normal Com Port cable as in the case of the connection between a computer modem and the computer (art. #691).

Figure 1.92
Connection with
a 9-pole plug

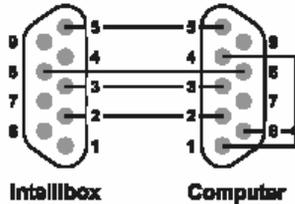
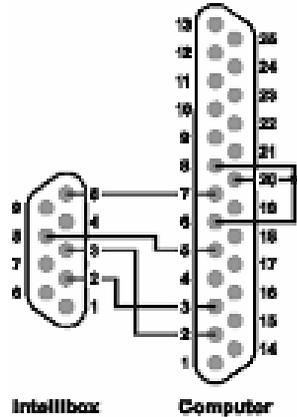


Figure 1.93
Connection with
a 25-pole plug

Should you like to build your own cable, please use the connections shown in Figure 1.92 in case of a computer with a 9-pole serial interface, or in Figure 1.93 in case of a computer with a 25-pole plug.



1.11 Connecting LocoNet devices

All presently known LocoNet devices can be connected to the Intellibox.

The LocoNet Booster must be connected to the LocoNet connector B (plug #6). LocoNet control panels, LocoNet throttles and other

LocoNet control devices should be connected to the LocoNet connector T (plug #7), which delivers no digital track signal.

1.12 Connecting Märklin devices

Left and right hand side plugs of the Intellibox can be used to connect Märklin devices (on the I²C bus).

Connections on the left hand side

Märklin-Keyboard 6040

Märklin-Memory 6043

Arnold Keyboard 86040

Märklin-Switchboard 6041 (up to 4 Switchboards)

Connections on the right hand side

Märklin-Control 80 6035

Märklin-Control 80f 6036

Märklin Infra Control 80f 6070

Arnold Control 80 86035

Arnold Control 80f 86036

Connections on both sides

Märklin-Motorola Central Units 6020, 6021, 6022, 6023

DCC Central Units 6027, 6029, 6030, Arnold 86028

Please notice!

- To connect these Central Units you need the adapter #692 from Uhlenbrock.

CAUTION

- These units must be powered on at the same time as the Intellibox. Their supply voltage must be fed using a transformer separate from the Intellibox transformer. Do not make any electrical link between the Intellibox transformer and the Central Unit transformer. A Märklin Central Unit is connected using the special adapter #692. It must be plugged to one side of the Intellibox!
- The control panel of some units can be used to control locos through the Intellibox internal Booster.
- The output section (red+brown) of the Central Units can be used to power the turnout decoders of the layout on a separate electrical circuit.
- It is not possible to control locos using the power output section (red+brown) of these units.
- If you are using the Märklin Central unit 6027 you have to press the reset button of this unit during a system power up.
- If you are using a Märklin Central unit 6029 or 6030, it is only possible to use the booster of this unit. The control panel does not work, because it is not connected to the I²C bus.

See also the section "Tips and Tricks" in the Appendix.

Available addresses in C80, C80f and Infra-Control 80f units

When you plug a Control 80 on the right side of the Intellibox, you may control the locomotive addresses from 1 to 80.

However, in the case of a Control 80f (or an Infra-Control 80f), the maximum number of locomotives depends on the combination of the units you are using:

from 1 to 99 Intellibox and C80f

from 1 to 80 Intellibox, C80f and Central Unit - Motorola format
(6020, 6021, 6022, 6023)

from 1 to 99 Intellibox, C80f and Central Unit - DCC format
(6027, 6029, 6030, 86028)

2. Display, keyboard and menus

2.1 The display

The user interface is implemented with a backlit LCD display. The display is divided in three parts and is designed in order to give the

```
m  12 | ---- | d3651
   0 ↑ | ---- | 0 ↑
```

user a quick and clear view of the available commands.

At both sides the display shows the relevant loco decoder format, the address, the speed level and the driving direction. In the middle part the display shows information on the presently active mode; e.g. the current position of the solenoid devices in "keyboard mode".

```
Decoder Program.
> Uhlenbrock
```

The text for menu-driven decoder programming is shown on the whole screen.

2.2 Key functions

[go], [stop], [stop]+[go]

Switch the digital voltage on (go) and off (stop).

A system reset is performed when [stop]+[go] are pressed at the same time for about 2.5 seconds.

[f1] [f2] [f3] [f4]

Toggle the loco extended functions.

Together with the [lok#] key f5 to f8 toggle the functions of DCC decoders (see section 4.4).

[function] [off]

Switch the direction-dependent function on and off.

[lok#]

Starts the input of a loco address.

If you are controlling a locomotive, by pressing [lok#] and [menu] in sequence enters the data-format menu.

Together with the [f5]-[f8] keys, it toggles the f5 to f8 functions of DCC decoders (see section 4.4).

See also the function of the [C] key.

[menu]

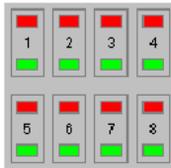
Start/end of a context menu (followed by the [mode] key).

[mode]

Toggles among the Intellibox control panel modes: keyboard, s88 monitor and programming mode.

[0] - [9]

Decimal digits



[←] [→]

One menu level (or one column) to the left or to the right

[↓]

Decrements a value by one or goes one menu entry downwards

[↑]

Increments a value by one or goes one menu entry upwards

Builds a consist

Adds a loco to a consist control

[↵]

Confirmation key (enter)

[C]

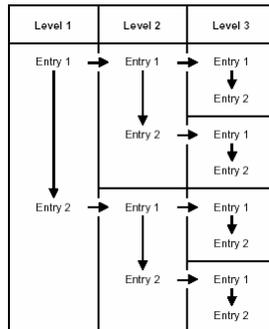
Deletes the last entry from the keyboard

Deletes a consist

2.3 The Menus

2.3.1 Structure and navigation

Figure 4.3
The structure of
the menus of the
Intellibox



[→] One menu level (or one column) to the right

[←] One menu level (or one column) to the left

[↓] One menu entry downwards (from top to bottom)

[↑] One menu entry upwards (from bottom to top)

[menu] ends a context menu and returns to the normal Intellibox control mode.

HINT

While navigating the menus the display shows the relevant messages instead of locomotive and turnout status. All control functions for locomotives are still active: speed knobious and direction change, function keys [f1]-[f4], [function]-[off] keys. Therefore, during navigation you are still able to control the last selected locomotives.

2.3.2 Special characters of the display

Should a menu level include sub-levels, the first character in the second row of the display will be a ">".

```
Decoder Program.  
> Uhlenbrock
```

Should the entry be a parameter value, which could be activated or changed, then the first character in the display will be a "=".

```
Language :  
= English *
```

All active entries are indicated with a "*" at the end of the line.

2.3.3 Inputs

Numeric values can be entered using the numeric key pad. The input position is shown by a blinking character in the display.

The [C] button clears the last entered digit.

If you want to run "horizontally" among the different levels, use the [→] and the [←] buttons to step between the columns.

The [↵] button confirms the last input or selects a parameter.

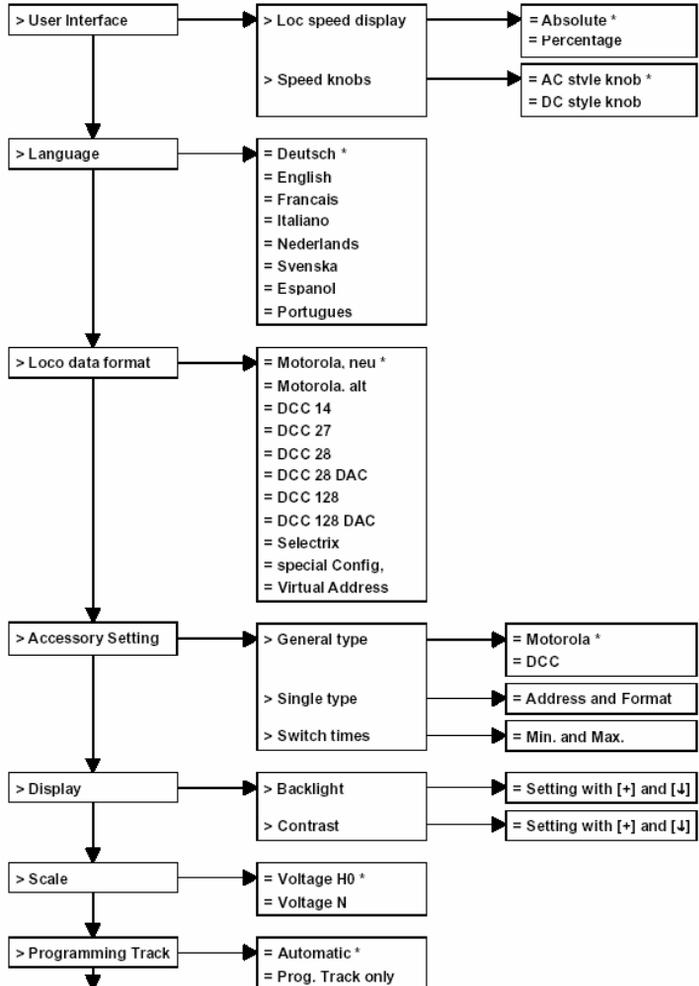
3. Basic Settings

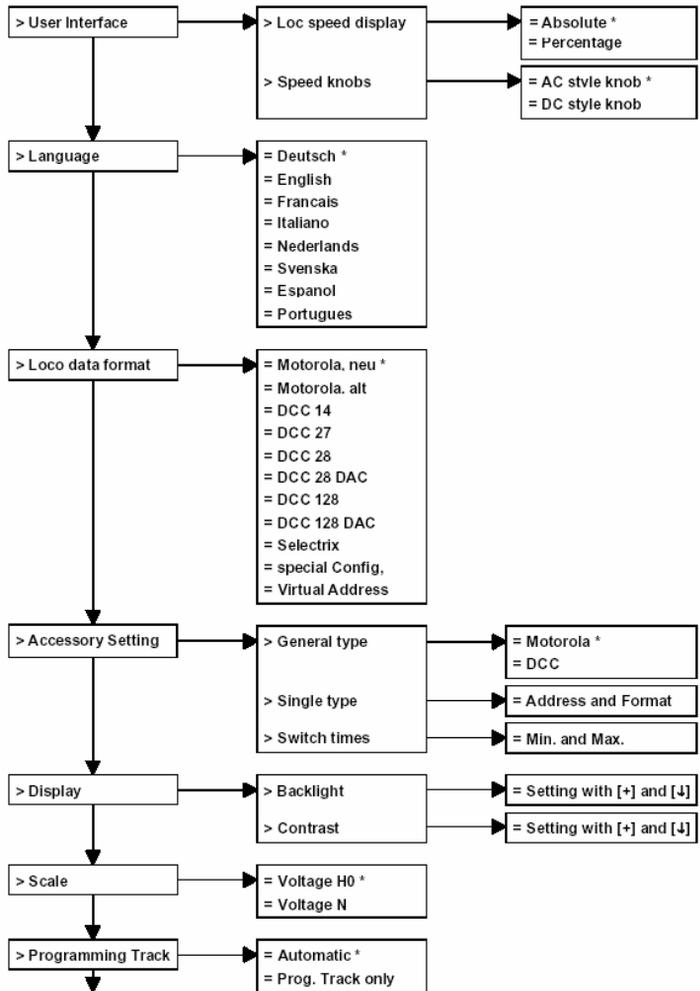
The basic settings of the Intellibox can be changed using this user friendly menu. All settings will be permanently saved in the nonvolatile memory of the Intellibox.

Press the [menu] and the [mode] buttons one after the other in order to enter the "Basic Settings" menu.

3.1 Menu structure

Default value is marked by a star (*).





3.2 Menu “User Interface”

3.2.1 Loco Speed display

The speed of the loco can be displayed in two different ways.

Absolute Speed (default factory setting)

The speed level will directly be displayed using the current operating level. According to the chosen data format the display will show numbers in the range 0-14, 0-27, 0-28, 0-31 or 0-126.

Percentage of maximum speed

The speed level will be displayed in percentage of the maximum speed independently of the current data format.

How to set loco speed display

- Press the [menu] key
- Press the [mode] key
- Scroll with the [↓] key until you read "User Interface"
- Enter the menu with the [→] key
- Scroll with the [↓] key until you read "Loc speed display"
- Enter the menu with the [→] key
- Scroll with the [↓] key until you reach your desired entry
- Select this setting by pressing the [←] key
- Go back to the main display with the [menu] key

3.2.2 Speed knobs

Here you can choose the style of the speed knob. An AC style knob or a DC style knob could be chosen.

The default factory setting is the "AC style knob".

The AC style knob

The AC Style mode works like an old-fashioned three rail AC controller.

Using the AC style, the speed will always be increased while turning the knob clockwise and will be decreased while turning the knob counterclockwise. If the max. speed or the speed zero is reached, a further turn of the knob in the same direction has no effect. The max. speed or the speed zero will be maintained.

A slight push on to the speed knob will reverse the direction of the loco.

Pushing the speed knob during driving will stop the loco first (emergency stop). Then the direction will be changed.

Depending on the decoder format, some locos stop immediately (Märklin, DCC) while other locos stop using their current deceleration rate (Selectrix).

DC style knob

The DC Style mode works like a DC speed control device for DC two rail systems.

Using the DC style, turning clockwise the speed knob starting from a zero speed level will increase the speed of the loco in forward direction. Turning the speed knob counterclockwise will decrease the speed until the zero speed level is reached. A further turn of the

Fig 3.21
How an
AC style knob
works

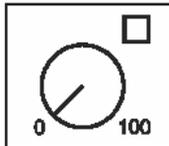
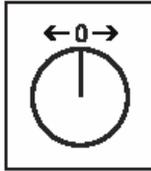


Fig 3.22
How an
DC style knob
works



knob will reverse the direction of the loco and will increase the speed in reverse direction. If the max. speed level is reached, further turns of the knob in the same direction will not cause any change. On the other hand, when speed zero is reached, you will be allowed to change direction to the locomotive after about half a second. Only after this pause is a further knob rotation accepted. This feature prevents unwanted direction changes.

A slight push on the speed knob will stop the loco. Depending on the decoder format some locos will stop immediately by a loco dependent emergency stop (DCC) while other locos will stop using their current deceleration rate (Märklin Motorola, Selectrix).

How to change the style of the speed knob

- Press the [menu] key
- Press the [mode] key
- Scroll with the [↓] key until you read "User Interface"
- Enter the menu with the [→] key
- Scroll with the [↓] key until you read "Speed knobs"
- Enter the menu with the [→] key
- Scroll with the [↓] key until you reach your desired entry
- Select this setting by pressing the [←] key
- Go back to the main display with the [menu] key

3.3 Menu "Language"

Here you can choose the language of the displayed text.

Possible languages and their code numbers are:

German (key #1), English (2), French (3), Italian (4), Dutch (5), Swedish (6), Spanish (7), Portuguese (8).

The default factory setting is "German".

How to change the language of the display

- Press the [menu] key
- Press the [mode] key
- Scroll with the [↓] key until you read "Language"
- Enter the menu with the [→] key
- Scroll with the [↓] key until you reach your desired entry
- Select this setting by pressing the [←] key
- Go back to the main display with the [menu] key

HINT

It is also possible to change the default language by switching the Intellibox on while pressing one key from 1 to 8 (see the previous table). For example, by pressing the “2” key you will set the default language to “English”.

3.4 Menu “Loco data format”

Here you can choose the default loco data format. This format will automatically be used when new decoder addresses are introduced, if no other format is explicitly defined.

This menu should be used to define the data format which will be normally used.

The default factory setting is the new Motorola format.

Possible formats are:

Motorola - old

Old Motorola data format

Loco decoder without additional functions Old-fashioned function decoders will be controlled by [f1] - [f4] (e.g. Märklin coach with automatic waiter or digital crane)

Motorola - new

Also called Gauge 1 Format, including the extended functions f1-f4.

DCC 14-27-28-128

DCC format using 14, 27, 28 or 128 operating levels

DCC 28-128 DAC

DCC format with 28 and 128 operating levels with decoder assisted consisting (DAC)

Selectrix

Trix selectrix with 31 operating levels

How to change the loco data format

- *Press the [menu] key*
- *Press the [mode] key*
- *Scroll with the [↓] key until you read "Loco data format"*
- *Enter the menu with the [→] key*
- *Scroll with the [↓] key until you reach your desired entry*
- *Select this setting by pressing the [←] key*
- *Go back to the main display with the [menu] key*

HINT

The digital format of each locomotive can be modified independently of all other locomotives. Detailed instructions are given in section 4.5.

3.5 Menu “Accessory (decoder) setting”

Solenoid device decoders from Märklin, Viessmann and Modeltreno are compatible with the Motorola format. Their addresses are defined using suitable micro-switches (DIP switches) that can be found inside each unit. Each decoder is characterized by a unique address. In the Appendix you can find a table showing the micro-switch position for each address.

However, DCC/NMRA-compliant solenoid device decoders have no micro-switches and can be programmed using the Programming track - or directly on the “main track”.

3.5.1 General type

The general data format is used for most of your accessory decoders. After defining a general type you can define the type of each solenoid device decoder following the instructions of section 4.5.2.

Possible choices are:

Motorola (default factory setting)

Accessory decoders using the Motorola data format:

Uhlenbrock, Modeltreno, Viessmann, Märklin

DCC

Accessory decoders using the DCC data format:

Roco, Arnold, LGB, Lenz, Märklin=, Digitrax, etc.

How to change the accessory (decoder) setting

- *Press the [menu] key*
- *Press the [mode] key*
- *Scroll with the [↓] key until you read “Accessory (decoder) setting”*
- *Enter the menu with the [→] key*
- *Scroll with the [↓] key until you read “General type”*
- *Enter the menu with the [→] key*
- *Scroll with the [↓] key until you reach your desired entry*
- *Select this setting by pressing the [←] key*
- *Go back to the main display with the [menu] key*

3.5.2 Single type

Independently of the general data format for accessory decoders, you can choose an individual data format for each accessory decoder address.

How to change the setting for a single type

- *Press the [menu] key*
- *Press the [mode] key*

- Scroll with the [↓] key until you read “Accessory setting”
- Enter the menu with the [→] key
- Scroll with the [↓] key until you read “Single type”
- Enter the menu with the [→] key

```
Single type:
Addr 22 = Mot.*
```

- The address of a decoder which is to get an individual data format must be entered in the first input column after "Addr".
- The [→] key can be used to jump to the right input column.
- Scroll with the [↓] key to the desired data format: "Mot." for Motorola (Märklin) or "DCC"
- Select this setting by pressing the [←] key
- Go back to the main display with the [←] key

3.5.3 Switching time

The switching pulse triggered by the pressure on a keyboard button usually lasts until the button is released.

Here the minimum and maximum switching times of the accessory decoders can be changed.

The default factory setting is minimum 100 ms (0.1 seconds) and maximum 5000 ms (5 seconds).

You can introduce values between 50 and 9999.

- Press the [menu] key
- Press the [mode] key
- Scroll with the [↓] key until you read “Accessory setting”
- Enter the menu with the [→] key
- Scroll with the [↓] key until you read “Switch time”
- Enter the menu with the [→] key
- In the 1st column you can set the minimum switching time. This is the min. duration of the voltage pulse for switching an accessory decoder, even in the case of either a very short manual actuation or a computer command. The input value will be rounded to the nearest 50 ms.

```
SwTime Min: Max:
in ms: .100 5000
```

- Should you input a “zero” value, the switching pulse will be issued for as long as the key is being pressed.
- The [→] key can be used to jump to the right input column.

- *In the 2nd column you can set the maximum switching time. Correspondingly, the max. switching time defines the max. duration of the voltage pulse for switching an accessory decoder, even when there is no command from the Intellibox to switch the accessory decoder off. The input value will be rounded to the nearest 50 ms. If you input a "zero" value, the switching pulse will always be sent while the key is being pressed.*
- *Go back to the main display with the [menu] key*

HINT These settings are common to all solenoid device decoders.

3.6 Menu "Hand control"

When the Uhlenbrock hand control FRED is connected to the Intellibox via LocoNet the first time, the centre automatically assigns a number to the internal hexadecimal identification number of the FRED. Using this number locomotive addresses can be assigned to the FRED from the Intellibox.

Viewing the assignment table

The table with the entries of the individual FREDs can be seen, but not changed.

Method:

- *Press [menu] key*
- *Press [mode] key*
- *Scroll with the [↓] key until you read "Hand contr."*
- *Enter the menu with the [→] key*

FRED	f	LADR	LNID
.1	2	75	007F

The lower line shows the hand control numbers, the designation of the function key, the locomotive address to which this key is assigned and the FRED's internal ID.

- *The cursor can be moved left or right with the [→] and [←] keys. The entries under "FRED" and "f" can be deleted with [C]-key and overwritten with the numeric keys. The appropriate loco address is then indicated under "Ladr"*
- *Return to normal driving operation with the [menu] key.*

Deleting the hand control number

If a FRED is no longer to be used on an Intellibox its entry can be deleted from the table.

Method:

- *Press [menu] key*
- *Press [mode] key*
- *Press [↓]-key to scroll the entry "Hand control"*

- Continue with [→]-key

```
FRED f LADR LNID
.1 2 75 -
```

- Press [C]-key to delete the entry under "FRED"
- Enter the desired hand control number
- Press [→]-key to move the cursor under "LNID"
- Using the [C]-key erase the entry from the Intellibox
- Return to normal driving operation with the [menu] key.

If an entry is deleted, the selected FRED number is freed. It can only be reoccupied by connecting a new FRED to the LocoNet input of the Intellibox. The Intellibox always assigns the lowest free FRED number.

3.7 Menu "LocoNet module"

In the Basic Settings menu of the Intellibox there is a menu option for the programming of Uhlenbrock into LocoNet modules, e.g. feedback modules or Switch control.

The modules are programmed via LocoNet Configurations Variables (short LNCV's). The LNCV's determine the operation and function of the modules and can have different meanings with the different modules.

Refer to the respective operating instructions of the module for a description of the individual LNCV's and the connections.

3.7.1 Programming the module address

If a model railway layout has several modules of same type, they all need a different module address for programming, so that the centre knows which module is meant.

Each new module has a specific default address. This is documented in the modules manual.

Programming LocoNet CV's

- Connect the module to the LocoNet correctly.
- Use the Intellibox [menu] and [mode] key, to enter the Basic Settings menu
- Press [↓]-key to scroll the to menu option "LocoNet Prog."
- Press [→]-key to go to the submenu.

```
LocoNet Prog.:
Art.-Nr.: .....
```

- Enter the module's part number (in this case LISSY receiver 68600) and press the [←]-key.

```
LN Prog.: 68600
Modul Adr.: . . . . .
```

- Enter the receiver's address (e.g. 1) and press the [←]-key.

```
LNPr 68600-00001
LNCV: . . . . 0 = . . . . 1
```

On the upper line the module's part number and its valid address are displayed.

On the lower line the LocoNet CV number (here "0" for the module address) and the present valid value are shown (here 1). The cursor flashes on the lower line under the "0". The upper line of the display remains unchanged during entire programming. If the module has a control LED, this flashes if the module was addressed correctly.

3.7.2 Programming LocoNet CV's

- *Connect the module to the LocoNet correctly.*
- *Use the Intellibox [menu] and [mode] key, to enter the Basic Settings menu*
- *Press [↓]-key to scroll the to menu option "LocoNet Prog."*
- *Press [→]-key to go to the submenu.*

```
LocoNet Prog.:
Art.-Nr.: . . . . .
```

- *Enter the module's part number (here 63340) and press [←]-key.*

```
LN Prog.: 63340
Modul Adr.: . . . . .
```

- *Enter the receiver's address (e.g. 1) and press the [←]-key.*

```
LNPr 63340-00001
LNCV: . . . . 0 = . . . . 1
```

On the upper line the module's part number and its valid address are displayed.

On the lower line the LocoNet CV number (here "0" for the module address) and the present valid value are shown (here 1).

- *At the cursor position enter the id number of the LocoNet CV, which you wish to program*
- *Press [←]-key. The Intellibox reads the CV and displays the value to the right of the lower line.*
- *Press [→]-key to move the cursor right and enter the new value using the number keys*
- *Press [←]-key to write the changed value*
- *Return to normal driving operation with the [menu] key.*

3.8 Menu “Display”

The Display menu could be used to adjust the brightness and the contrast of the LCD.

How to change brightness and contrast of the LCD

- *Press the [menu] key*
- *Press the [mode] key*
- *Scroll with the [↓] key until you read “Display”*
- *Enter the menu with the [→] key*
- *Scroll with the [↓] key until you reach your desired entry*
- *The adjustment can be done using the [↓] and the [+] keys*
- *Select this setting by pressing the [←] key*
- *Go back to the main display with the [menu] key*

HINT

If you leave the menu without using the [←] key, the old settings will be restored.

IMPORTANT

If the display is unreadable because of a wrong setting of the brightness and/or contrast, you could recall the default factory settings by switching the main power on while pressing down the [+] key at the same time.

3.9 Menu “Scale”

By setting the scale the output voltage of the built-in Booster will be adjusted.

H0 scale

The output voltage will not be controlled to a fixed maximum level. It could reach a max. level of 21 V peak voltage if the input AC voltage is 16 V.

N scale

The output voltage is clamped to a peak voltage of 18 V.

The factory default is the iH0i setting for H0 and all bigger gauges.

How to change the voltage of the built-in booster

- *Press the [menu] key*
- *Press the [mode] key*
- *Scroll with the [↓] key until you read “Scale”*
- *Enter the menu with the [↓] key*
- *Scroll with the [↓] key until you reach your desired entry*
- *Select this setting by pressing the [←] key*
- *Go back to the main display with the [menu] key*

3.10 Menu “Progr. Track”

The Intellibox features an internal relay, connected in such a way that an existing track of a layout (Programming Track) can be used either as a “real” Programming Track or as a “normal” track.

Here you can choose whether the programming track connector will output the programming voltage only, or if it will automatically be switched between the normal track voltage and the programming voltage.

Programming Track only

The programming track output is never connected to the normal digital voltage. The connector outputs a voltage (the programming voltage) only during read and write operations.

Automatic

The programming track connector will automatically be switched from the normal track voltage to the programming voltage when entering the programming mode.

CAUTION

Both rails of the programming track must be electrically isolated from the normal track. **DO NOT** bridge the isolation points with a bogie of a car or a loco.

The default factory setting is "automatic".

How to change the style of the speed knob

- Press the [menu] key
- Press the [mode] key
- Scroll with the [↓] key until you read “Prg. Track”
- Enter the menu with the [→] key
- Scroll with the [↓] key until you reach your desired entry
- Select this setting by pressing the [←] key
- Go back to the main display with the [menu] key

HINT

An easy test of the Programming Track can be accomplished by reading the configuration variables of a newly purchased decoder (e.g. DCC/NMRA: reading CV1 in “bite mode” should give CV1=3).

HINT

If you have just installed a decoder, in order to check the electrical connections it is advisable to test it first on the Programming track (a low-current, low-energy track) instead of the normal track. For this reason, we strongly suggest installers of decoders to choose the option “Prg. Track only” in the configuration menu of the Intellibox.

3.11 Menu “Interface”

You can change the settings of the serial interface of the Intellibox.

3.11.1 Speed

The transmission rate of the serial computer interface depends on the software in use.

Possible choices are 2400, 4800, 9600, 19200 bit/s

Factory default is 2400 bit/s.

3.11.2 Syntax

You can change the serial interface protocol used by the Intellibox. The Intellibox can be controlled with the serial protocol of the Märklin 6050/6051 Interface (see Appendix). The Intellibox will also recognize an extended serial protocol (iP50Xⁱ) fully compatible with the 6050/6051 syntax (updated documentation will be available in the Uhlenbrock and Modeltreino homepages).

6050 (syntax) only

Only the syntax of the 6050/6051 interfaces is used.

Intellibox (syntax) only

Only the syntax of the Intellibox is used.

6050 and Intellibox

Both syntaxes (P50 and P50X), are used simultaneously. The Intellibox automatically recognizes the syntax of the commands it receives.

Factory default is "6050 and Intellibox".

LocoNet

The data traffic on the LocoNet is transferred directly to the computer interface, and/or can be controlled by the computer directly.

Method:

- Press [menu]-key
- Press [mode]-key
- Press [↓]-key to scroll to the "Interface" entry
- Continue with [→]-key
- Press [↓]-key to scroll to the "syntax" entry
- Continue with [→]-key
- Press [↓]-key to scroll to the desired entry
- Press [←]-key to confirm the selection
- Press [menu]-key to return to running operation

3.11.3 Computer

The computer interface on the used computer must be setup before use. The following allocation applies:

PC (IBM compatible personnel computer)

For technicians: If the "CTS" (Clear To Send) is activated on the RS-232 interface of the Intellibox, then a +12V level is present at the CTS pin (8) of the socket allowing data transmission toward Intellibox.

Mac (Apple Macintosh computer)

For technicians: If the "CTS" (Clear To Send) is activated on the RS-232 interface of the Intellibox, then a -12V level is present at the CTS pin (8) of the socket allowing data transmission toward Intellibox.

None

The interface is deactivated.

Method:

- *Press [menu]-key*
- *Press [mode]-key*
- *Press [↓]-key to scroll to the "Interface" entry*
- *Continue with [→]-key*
- *Press [↓]-key to scroll to the "Computer" entry*
- *Continue with [→]-key*
- *Press [↓]-key to scroll to the desired entry*
- *Press [←]-key to confirm the selection*

The default is "PC".

3.12 Menu "s88 setting"

Contrary to other digital centers the Intellibox stores the feedback signals internally. The attached computer needs only to query the internal information flag, which communicates to it whether a change has occurred.

In order to be able to accomplish this inquiry procedure as fast as possible, the Intellibox needs information on how many feedback modules are attached to the feedback bus.

Method:

- *Press [menu]-key*
- *Press [mode]-key*
- *Press [↓]-key to scroll to the "s88 setting" entry*
- *Continue with [→]-key*

```
S88 modules:
connected: 31
```

- *At the cursor enter the number of feedback modules of the type s88 the attached at the feedback bus*
- *Press [menu]-key to return to running operation*

A maximum of 31 modules can be attached.

3.13 Menu “Lokmaus addresses”

Up to eight Lokmice can be connected (via Y-adapters) to the Lokmaus port. Each of the eight possible positions of the Lokmaus can be assigned a special locomotive address. Each allocation can only be used once, i.e. that even when using multiple Lokmice only maximum of eight different locomotives can be controlled.

Method:

- *Press [menu]-key*
- *Press [mode]-key*
- *Press [↓]-key to scroll to the "Lokmaus-Addr" entry*
- *Continue with [→]-key*

```
Lokmaus-Addr. :
Pos 1 = Lok    1
```

- *At the first input position after "pos" enter the number for the desired Lokmaus position*
- *Press [→]-key to move the cursor to the right input position*
- *Enter the address of the locomotive which is to be controlled at this position of the. Addresses 0 – 9999 are valid.*
- *Press [←]-key to save the data*
- *Press [menu]-key to return to running operation*

By default to the Lokmaus positions 1 to 8 are set to locomotive addresses 1 to 8.

3.14 Menu “Special Option”

The Intellibox has various special options which affect its operation and can differ between Software Versions.

Each special option can be selected and changed using an ID number. Details of individual special options can be inferred from a list for the respective software version. With later software changes a file with the appropriate explanations is on the update disk.

Method:

- *Press [menu]-key*
- *Press [mode]-key*

- Press [↓]-key to scroll to the "Special Option" entry
- Continue with [→]-key

Special Option:

N. 1 = ---

- Enter special option ID at the first input position after "N."
- Press [→]-key to move the cursor to the right input position
- Enter the value for the special option
- Press [←]-key
 - A "★" in the display indicates that the special option is active
- Press [menu]-key to return to running operation

NOTE

In the change special options menu, if the [mode]-key is pressed while the input cursor is in the section to the right of the equals sign, the displayed numerical value is represented in hexadecimal.

This function is used for display only. It can be cancelled by a further press of the [mode]-key.

Incorrect inputs can be deleted, character by character, by pressing the [C]-key. If the entire input is deleted with the [C]-key, a further operation of the [C]-key will set the factory default.

3.15 Menu "Software-Version"

Under this menu option you will find the serial number of your device and the version number of the system software.

Method:

- Press [menu]-key
- Press [mode]-key
- Press [↓]-key to scroll to the "Software Vers." entry
- Continue with [→]-key

Ver: 1.550-1.550

S/N: -----

- The upper line shows the system software version number and the lower line shows the serial number of the Intellibox
- Press [menu]-key to return to running operation

3.16 Menu "Loc start mode"

When Intellibox is turned off it stores all status data. Under the "Loc start mode" menu you can select what is to be recalled at the next power up.

no old status

No save data is to be recalled

autom, Speed=0

All states of the locomotives and consists used in the preceding session have their driving direction and the last status of their special functions restored.

autom + Speed.

Additional to the driving direction and special functions the speed of all locomotives is restored.

Thus the entire running status of the previous session is restored.

Method:

- Press [menu]-key
- Press [mode]-key
- Press [↓]-key to scroll to the "Loc start mode" entry
- Continue with [→]-key
- Press [↓]-key to scroll to the desired entry
- Press [←]-key to confirm the selection
- Press [menu]-key to return to running operation

The factory default is "no old status". T

NOTE This raises a point of safety. Are the locomotives really to drive with their "old" speed? i.e. continue where they left off.

3.17 Menu "Reset"

With this menu option the Intellibox can be returned to factory settings.

Speed step indication	Direct reading
Speed knob (throttle)	AC style knob
Locomotive data format	Motorola new (basic data format)
Turnout data format	Motorola (basic data format)
Track width	Voltage H0
Programming track	automatic
Data rate	2400 bit/s
Syntax	6050 Syntax
Computer	PC
Lokmaus addresses	address 1-8 for position 1-8
Special options	cancellation of all changes

*Fig. 3.17
the attitudes of the
Intellibox after a
RESET of the
configuration*

Configuration

All changes in the basic settings menu are deleted.

All changes to the special options are restored.

The selected language remains.

Locomotive data format

Entries made for individual locomotive decoders using the option "Change data format of a locomotive decoders" (chapter 4.5) are deleted. For the particular decoder addresses, the selected basic data format for locomotive decoder is used (chapter 3.4).

Switch data format

Entries made for individual solenoid decoders using option "Single type" (chapter 3.5.2) are deleted. For the particular decoder addresses, the selected general data format for solenoid decoder is used (chapter 3.5.1).

Method:

- *Press [menu]-key*
- *Press [mode]-key*
- *Press [↓]-key to scroll to the "reset" entry*
- *Continue with [→]-key*
- *Press [↓]-key to scroll to the desired entry*
- *Continue with [→]-key*
- *Press [↓]-key to scroll to the "yes" entry*
- *Press [↵]-key to confirm the selection*

The Reset will be executed and the Intellibox restarts.

4. The Control Panel

Locomotives can be addressed and controlled by means of the control panel. The Intellibox has two independent control panels, located left and right of the numeric keypad.

You can assign a specific data format (protocol) to each locomotive address controlled by the Intellibox. The Intellibox can, simultaneously and independently, control locomotive decoders conforming to different protocols.

Use of the control panel is possible even when the Intellibox is in programming mode or when configuring the unit.

4.1 Control elements

Fig 4.11
Front view of the
Intellibox



The [stop] key

Use the [stop] key to switch the digital voltage to the normal track OFF. The display will show “STOP”. Pressing this key will act on both control panels.

The [go] key

Use the [go] key to switch the digital voltage to the normal track ON. Pressing this key will act on both control panels.

This key is used by both driving desks.

NOTE You can reset the Intellibox by pressing both the [go] and [stop] keys for about two seconds.

The [f1] [f2] [f3] [f4] keys

These keys control the locomotive's extended functions, e.g. lights, sounds, smoke generator.

NOTE If you press [lok#] followed by one of the [f1]-[f4] keys, you will be able to switch the f5 - f8 extended functions of DCC decoders (see chapter 4.4).

[function] and [off] key

These two keys switch the locomotive lights on/off.

[lok#] key

Starts the input of a locomotive address.

After completing the locomotive address input, you can change the decoder protocol. Press [menu] and select the appropriate data format (protocol).

If you press [lok#] followed by one of the [f1]-[f4] keys, you will be able to switch the f5 - f8 extended functions of DCC decoders (see chapter 4.4).

The speed knob (throttle)

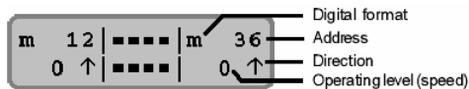
Use the knob to change a locomotive speed and direction of travel.

Suppose that you have chosen a previously controlled locomotive with the [lok#] key and, given the fact that the knob can rotate freely, the Intellibox automatically reads the previous operating level of the locomotive from its memory, and takes control from that level.

Even if you are in the process of changing an Intellibox parameter (in configuration mode), you can still control a locomotive with a speed knob; the ongoing configuring can proceed without problems.

The display

The backlit LCD continuously shows the detailed status of the currently controlled locomotives: the address, the protocol (data format), the operating level and the direction of travel are shown in the left and right sections of the display.



The data format used, locomotive address, vehicle speed and driving direction of the currently controlled vehicle are displayed at the sides, for each control panel.

The centre indicates the selected operating mode.

4.2 Loco addresses

Each locomotive in a digital system can be controlled by means of an “address” (a combination of digits that uniquely identifies the locomotive’s decoder).

Each decoder has its own address. An address should identify one, and only one, locomotive.

Normally, a locomotive decoder is controlled by only one of the two control panels. However, it is possible to control the same decoder with both throttles.

4.2.1 Selecting a locomotive

In order to control a locomotive with the Intellibox you must select its address.

To select a locomotive address, first press [lok#]-key. The display will show a blinking cursor in one of the address fields, prompting you to input a value.

There are two methods to do it:

Input via the numeric keyboard

- Press the [lok#]-key
- Input the digits that form the whole address with the numeric keypad
- Terminate address input:
 - press the [←] key,
 - press any other key in the control panel:
 - [function] [off] [f1] [f2] [f3] [f4] [lok#],
 - turn the knob (throttle),
 - press the knob to induce a change of direction.

HINT

Use the [C] key to erase wrong entries, one digit at a time. If you cancel the whole address, a further press of the [C] key will recall the previous address.

Address selection using the speed knob

- Press the [lok#]-key
- Turn the knob to change the address, clockwise to increase the value, counter clockwise to decrease it.
- Terminate address input:
 - press the [←] key,
 - press any other key in the control panel:
 - [function] [off] [f1] [f2] [f3] [f4] [lok#],
 - press the knob to induce a change of direction.

NOTE

Should you try to take control of a locomotive which is already being controlled by another knob, the Intellibox will show the message "Loco used by another controller!" After this message you can control the relevant locomotive using both manual controllers (the external or the internal ones).

4.2.2 Using the address memory

The Intellibox stores the address of the last locomotive controlled by each of the control panels in its memory.

It is possible to recall this address:

- Press [lok#]

- Press [↓]

The last valid address is displayed and is ready to be used.

4.2.3 Releasing a Loco address

To release the control of a locomotive address (the released locomotive can then be taken over by a manual controller without selection keypad, e.g. FRED by Uhlenbrock or BT-2 by Digitrax), use the following procedure:

Single locomotive

- Press [lok#]
- Cancel the whole address with the [C] key
- Press [lok#]

Consist

- Press [lok#]
- Press any number key (0-9)
- Cancel the whole address with the [C] key
- Press [lok#] Individual locomotive

4.3 The speed knob (throttle)

The speed knob serves to change locomotive speed and driving direction. The Intellibox has rotary knobs without end stops, to which it automatically restores the saved speed of a locomotive, when it is reselected by a locomotive change.

The speed knob has two different operating modes:

The AC style knob

The AC Style mode works like an old-fashioned three rail AC controller.

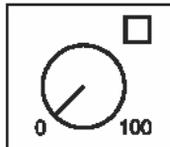
Using the AC style, the speed will always be increased while turning the knob clockwise and will be decreased while turning the knob counterclockwise. If the max. speed or the speed zero is reached, a further turn of the knob in the same direction has no effect. The max. speed or the speed zero will be maintained.

A slight push on the speed knob will reverse the direction of the loco.

Pushing the speed knob while it is running will stop the loco first (emergency stop). Then the direction will change.

Depending on the decoder format, some locos stop immediately (Märklin, DCC) while other locos stop using their current deceleration rate (Selectrix).

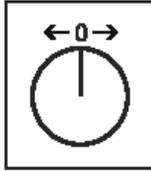
*Fig 4.31
How an
AC style knob
works*



DC style knob

The DC Style mode works like a DC speed control device for DC two-rail systems.

Fig 4.32
How an
DC style knob
works



Using the DC style, turning the speed knob clockwise starting from a zero speed level will increase the speed of the loco in forward direction. Turning the speed knob counterclockwise will decrease the speed until the zero speed level is reached. A further turn of the knob will reverse the direction of the loco and will increase the speed in reverse direction. If the max. speed level is reached, further turns of the knob in the same direction will not cause any change. On the other hand, when speed zero is reached, you can change direction to the locomotive only after about half a second. Only after this pause is a further knob rotation accepted. This feature prevents unwanted direction changes.

A slight push on to the speed knob will stop the loco. Depending on the decoder format some locos will stop immediately by a loco dependent emergency stop (DCC) while other locos will stop using their current deceleration rate (Märklin Motorola, Selectrix).

Pre-setting

The Intellibox is shipped with the AC style mode active. Changes can be made in the Basic Settings menu (see chapter 3.2.2).

4.4 Lights and extended functions

The [function] key and the extended function keys [f1]-[f4] control the lights and the locomotive decoder extended function outputs.

[function]

Switches the direction-dependent auxiliary function (usually the locomotive lights) ON.

[off]

Switches the direction dependent auxiliary function OFF.

If you press the [off] key, the auxiliary function switches on briefly, even if it was not previously switched on with the [function] key.

Extended functions

Press one of the [f1]-[f4] keys to control the relevant extended function.

Each key press toggles the relevant decoder output, from “off” to “on”, and vice-versa.

Additional functions

The [lok#] key used in combination with the [f1]-[f4] keys, controls the f5, f6, f7, f8 functions of 8-function decoders. The [lok#] key must be pressed before (not simultaneously with) the [f1]-[f4] keys.

The following key combinations are valid:

- [lok#] and [f1] control function f5
- [lok#] and [f2] control function f6
- [lok#] and [f3] control function f7
- [lok#] and [f4] control function f8.

During the control of an extended function the display will show its status (1=on, 0=off).

HINT

The function status is displayed for about 2 seconds. During this period, you can change the status of another function without having to press [lok#] first.

4.5 Changing data format of a locomotive decoder

The Intellibox is able to simultaneously control decoders with different digital data formats (protocols) on the same layout.

It is possible to transmit a different data format for each individual locomotive address. In this case it is necessary to define the protocol for each locomotive.

Section 3.4 describes how to configure the Intellibox default protocol.

4.5.1 Data formats (protocols)

The following data formats (protocols) are available:

Motorola - old

Old Motorola format with 14 speed steps

Locomotive decoders without extended functions

Control of earlier function decoders with the [f1] - [f4] keys

Motorola - new

New Märklin Motorola protocol, also known as Gauge 1 format, with 14 speed steps and extended functions f1 - f4.

DCC 14/27/28/128

DCC protocol with 14/27/28/128 operating levels

DCC 28/128 DAC

DCC protocol with 28/128 operating levels and “decoder assisted consisting” (DAC)

Selectrix

Trix Selectrix protocol with 31 operating levels

Special configuration

This menu entry allows one to modify some special settings for each particular decoder. This can be requested in case of a wrong (maybe crazy) behaviour of the decoder when using the default settings. A list of these special configurations for some decoders will be available on the Internet. In particular cases, or in case of

problems, refer to the available Hotline in order to understand which special configuration should be modified.

Locomotive virtual addresses

A virtual address is not a data format or protocol.

You can control a locomotive using a “virtual” address, different from the real one.

The Intellibox can use 4-digit virtual addresses. Therefore it is possible to address a locomotive using its “class”, e.g. 444, even if the decoder is limited to 80 addresses.

Please refer to section 4.6 for a detailed description.

4.5.2 Symbols used to display different data formats

The decoder’s data format is displayed on the left of the locomotive address.

The following symbols are defined:

Motorola - old	= m without direction arrow
Motorola - new	= m with direction arrow
DCC, all formats	= d
Selectrix	= s
Virtual address	= ★
Consist	= + (see section 4.7)

4.5.3 Procedure

Use the following procedure to assign or modify the data format of a single decoder address:

How to assign a data format to a single decoder address

- *Press the [lok#] key and enter an address (if you didn't do before)*
- *Press the [←] key*
- *Press the [lok#] key*
- *After pressing [menu], the display will show the currently assigned format marked with a "★" at the end of the line.*
- *Use the [↓] or [+] keys to scroll through the different formats.*

ATTENTION

Please do the next three steps only if you have selected "spec. Config."

```
Loco Settings
spc.Config. 1 = 0
```

- *Use the first position of the cursor to input the code number of the desired configuration (here a "1").*
- *Use the [→] key to jump to the right input column.*
- *Input the value of the desired configuration (here a "0").*

- Press the [←] key to accept the displayed format.
The selected format will be marked with a "*" character.
- Go back to the main display with the [menu] key.

4.6 Locomotive virtual addresses

4.6.1 Introduction

Railway modellers would rather designate a locomotive by its class number, than by some random (and sometimes meaningless) number. In most cases this is not possible because of the narrow range of (possible) decoder addresses. For instance, an E444 locomotive equipped with a DCC decoder with 99 addresses cannot normally be controlled with the number 444.

With the Intellibox you can use virtual addressing, i.e. addresses which are not real decoder addresses.

HINT

You can assign a virtual address to each "real" locomotive address, providing that the address is not already used by another decoder. It is not possible to assign a virtual address to another virtual address. The available range for virtual addresses is 1-9999.

Example: a class 636 locomotive is equipped with a DCC decoder with 99 addresses. The Intellibox could control the locomotive with its normal address, e.g. 10.

You can now assign a virtual address 636 to the real address number 10. Your locomotive can now be controlled with both addresses (10 and 636).

Virtual addresses can be recalled from the Intellibox control panels (IB-Control, Intellibox) and can also be stored in the Lokmaus association table. Unfortunately, it is not possible to use them with Märklin units connected to the I²C-Bus.

The locomotives associated with a virtual address can, however, be controlled using their "normal" address, using Märklin units (Control 80 or 80f).

Virtual addresses are stored in the Intellibox. If you decide that you will no longer use a particular virtual address, you can erase it from the Intellibox memory.

The selected virtual address can be used to control the locomotive just like any real address and can even be used in consisting.

4.6.2 Virtual address assignment

If an address is already displayed, press the [lok#] key and then the [menu] key. This sequence displays the data format and virtual address configuration menu.

If the Intellibox is in address input mode, you can press the [menu] key to change the format of the displayed address.

Press [→] or [+] to page through the different options until “Virt.Addr.:" is displayed. The cursor is positioned in the right column, where you can input the virtual address. Possible values are comprised between 1 and 9999.

```
Loco Settings
= vrt.Addr .232*
```

After inputting the virtual address, press the [←] to store its value. Pressing the [menu] key will take you back to the normal display.

```
* 232 | ---- | m 36
0 ↑ | ---- | 0 ↑
```

A virtual address is marked with a "*" at the left of the address field.

4.6.3 Displaying a virtual address

If you are controlling a virtual address, pressing [lok#] followed by [menu] will display the address assignment, e.g.:

```
Virt. Adr. : 232
Deco. Adr. : 12
```

4.6.4 Deleting a virtual address

To delete a virtual address, recall the locomotive by pressing the [lok#] key and using its real address, enter the data format menu by pressing [menu], input a value of zero in the “Virt. Adr.:" and confirm the entry with [←]. Alternatively, you can delete the address by pressing the [C] key.

4.7 Consisting (Multi-traction)

The Intellibox is able to control several locomotives with a single throttle. This is called “consisting”. A consist can be composed of a maximum of 4 locomotives. Each locomotive can be introduced in a consist using either its “normal” address or its virtual address.

The Intellibox can control a maximum of eight consists.

4.7.1 Setting up a consist

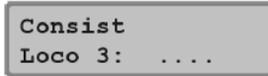
You can create a consist by adding up to three additional locomotives to a “base” locomotive.

Suppose that, in normal control mode, you are controlling the locomotive chosen as the base for the consist. Now, press the [lok#] key, followed by the [+] key. The consisting menu is displayed:

```
Consist
Loco 2: . . . .
```

With the numeric keypad, input the address of the locomotive to add to the base locomotive.

If you want to add a further locomotive, press the [+] key again and input another address. In this case the display will show:



The “consisting” sequence is terminated with the [←] key. The Intellibox display returns to the normal control panel and the consist can be controlled with the base locomotive address.

If you press [←] without inputting any number or after canceling the entry with the [C] key, no locomotive will be added to the consist. By pressing the [menu] instead of [←] you go back to the locomotive control mode.



When controlling a consist, the symbol which is normally reserved for the decoder type is substituted by a "+". On its right side you will find the base locomotive address. In the final version of the Intellibox software, the speed of the consist will be displayed as a percentage of the maximum speed.

4.7.2 Consist behaviour

After having created a consist, you can control all the locomotives using the base locomotive address. If you try to recall the address of a “consisted” locomotive, the display will show “MUL” in the speed field and the direction field of the locomotive will show a “-” symbol. Moreover, you will not be able to change the locomotive speed.



However, it is possible to change the direction of travel of this locomotive, provided the consist is stopped (speed = 0), independently of the direction of the other locomotives of the consist.

NOTE

This feature allows one to correct, if necessary, the direction of travel of a locomotive which has just been added to the consist, without the need to remove the locomotive from the consist.

If the consist includes locomotives with different numbers of operating levels, the Intellibox will operate the consist using the number of operating levels of the base locomotive.

If, for instance, the consist has a base locomotive with only 14 operating levels and another locomotive with 128 operating levels,

the Intellibox will only use 14 operating levels to control both decoders.

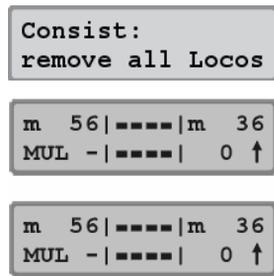
HINT To correctly use a consist, all locomotives should have the same maximum and minimum “real” speeds.

The maximum and minimum operating levels can be configured in the decoder itself. Please refer to each decoder’s operating manual.

4.7.3 Releasing a Consist

You can release a consist, (relative to the base locomotive) either completely or by unfastening one locomotive at a time.

Recall the base locomotive on the control panel. Press the [ok#] key to remove single locomotives or the whole consist. Then, press [C]. The display will show:



Pressing the [←] key will release the whole consist. Otherwise, use the [+] or [↓] keys to browse the list of locomotives in the consist. When the locomotive to be removed is highlighted, press [←].

Then the Intellibox will go back to the standard control panel. The [menu] key will return the Intellibox to the normal control panel.

HINT While you can add locomotives to a consist through their virtual address, only the real address is shown while removing single locomotives from a consist.

4.7.4 Storing a Consist

Consists can be stored in the Intellibox non-volatile memory. To do this, you must modify the base parameter “Locomotive at start-up”, as described in section 5.14.

4.8 Controlling function decoders

Function decoders are used to control models with special electric or electronic features.

From a technical standpoint, there is no difference between the data format (protocol) of a locomotive decoder and a function decoder. You can configure the protocol for these decoders as described in section 4.5 for locomotive decoders.

HINT

Function decoders can be controlled with the [f1] - [f4] keys.

You can control functions f5 - f8 of DCC decoders with the [lok#] key followed by the [f1] - [f4] keys.

The [f1] - [f4] keys are able to control function decoders conforming to the old Motorola protocol, but only if the relevant addresses are configured for this (old) protocol.

While a full compatibility exists between the old and new Motorola protocols regarding speed control, this property does not hold true for functions.

5. Hand Controller (FRED)

The Intellibox can have a total of 16 different FRED's (digital hand control from Uhlenbrock) in extended mode (controlling up to four locomotives). Further FREDs can be attached in Dispatch mode (control of a single locomotive).

In factory default setting the controller is set to operate in extended mode.

5.1 The FRED hand controller number

When the Uhlenbrock hand control FRED is connected to the Intellibox via LocoNet the first time, the centre automatically assigns a number to the internal hexadecimal identification number of the FRED. Using this number, locomotive addresses can be assigned to the FRED from the Intellibox.

Under the menu option "Basic Settings/Hand Control" (chapter 3.6) the table of entries of the individual FREDs can be seen. In addition individual FREDs can be deleted from the table with this menu.

5.2 Entering the locomotive address

If the FRED is operated in extended mode, the Intellibox assigns the locomotive addresses to individual locomotive selection keys of the FRED as follows:

- Press [lok#] key
- Press [mode] key

The middle part of the display appears as following:

```
m 12 | FRED | m 36
0 ↑ | 01f1 | 0 ↑
```

The top centre of the display shows that the centre is in the FRED input mode. Below that are located the number of the FRED (two digits) and the designated function key (f1-f4), with which the locomotive is to be called later.

The cursor is in the centre right on the lower line. You delete the current data with the [C]-key and overwrite it with the desired values.

Using the numeric keys enter the number of the desired FRED (1-16 in place 1 and 2) and the number of the function key, to which a locomotive address is to be assigned (1-4 in place 4).

- Press [↵]-key to confirm the selection
- If the selected function key has a locomotive address assigned to it, it now appears on the lower line of the display:

```
m 12 | LAdr | m 36
0 ↑ | . . 45 | 0 ↑
```

The address can be changed with numeric keys or completely deleted with [C]-key.

- *Press the [←]-key to return to normal driving operation.*

5.3 Releasing a locomotive

A locomotive is automatically released by the controller, when in the menu "Entering the locomotive address" of the Intellibox, the entry of the locomotive address is deleted with the [C]-key (see chapter 5.2).

6. The Keyboard

In a digital system turnouts and signals can be controlled by decoders. Just like with locomotives, these are assigned individual addresses to identify them.

6.1 Description

The Intellibox can operate Solenoid and switching decoders in different formats, the Motorola data format and the DCC data format. Decoders of both formats can be operated next to each other.

Solenoid decoders from Märklin, Viessmann and Modeltreño for the Motorola data format each control four turnouts.

IMPORTANT

The address, which is set by the DIP-switch of these decoders, is not identical to the addresses of the turnouts attached to the decoder. All of the Intellibox settings use these turnout addresses and not the solenoid decoder address.

A table that shows the allocation of the DIP-switches setting and the solenoid addresses, as well as the allocation to the Märklin keyboards is contained in the appendix.

As is the case for the locomotive decoders, the default data formats for solenoid and switching decoders can also be adjusted by “Basic Settings” (See chapter 3.5 for the options).

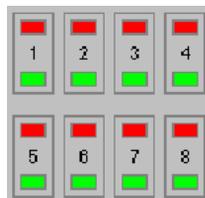
6.2 Selecting the Keyboard mode

The Intellibox has several operating modes. Three are currently available: Keyboard, s88 monitor and programming.

The Intellibox scrolls through its operating modes each time the [mode] key is pressed. The layout of the display is updated accordingly. To select the “Keyboard” mode, press the [mode] key until “Keyboard” is displayed.

6.3 Keyboard control

*Fig. 6.31
The keypad (in
Keyboard mode)
and the numbering
of key pairs*



In “Keyboard” mode, the numeric keypad is used to control electromagnetic (solenoid) devices (turnouts, signals, relays). At power up, you can control the first 8 devices without any additional configuration.

Switching is accomplished with the red and green keys. The display will show “R” or “G” when you press, respectively, a red or a green key. Additionally, the sequential address of the controlled device is also displayed.

Normally, the display will show the current status of the Keyboard:

```
m 12 | ■■■■ | m 36
0 ↑ | ■■■■ | 0 |
```

If the last key to be pressed was a red one, its rectangular marker will be in the “up” position (see figure, positions 1, 7, 8 of the available 8, 4 in each line). If, however, the last key to be pressed was a green one, its marker will be in the “down” position.

6.4 Configuring switching timing

In solenoid device decoders, especially the Märklin/Motorola type, the switching pulse, started with a key press, is usually terminated with the release of the initiating key.

To obviate the occurrence of too short (which wouldn't be able to switch the solenoid), or too long a (which could destroy the solenoid) pulse, you can configure the decoder's maximum and minimum switching times. This is done in the Intellibox's system configuration menu. Please refer to section 5.5.3.

The factory defaults are 100 ms (0.1 second), minimum duration, and 5000 ms (5 seconds), maximum duration.

NOTE

DCC decoders might not be affected by these settings. Many of them have configuration variables that define their own switching timing (output duration, waveform, etc.).

6.5 Selection of the Keyboard address

After a system reset, the red/green pairs numbered 1 to 8 in Figure 6.31 are assigned to devices from 1 to 8. Since accessory decoders usually have 4 outputs, this arrangement corresponds to the first two decoders.

To change this assignment, if you are in Keyboard mode, press the [menu] key. The display will show:

```
Keyboard
Adr.: ...1 - 8
```

The address associated with the first pair of keys ([1] and [4]) will blink in the first column of the second line. The second column shows the address controlled by the 8th pair of keys ([←] and [↓]). If you change the address for the first pair of keys, the address for the 8th pair will also change automatically. The following will be the display if the first pair of keys has an address of 17:

```
Keyboard
Adr.: ..17 - 24
```

You can also use the [-] [↓] keys to increase or decrease the displayed value (in 8 unit steps): e.g., if 9 is displayed, pressing [↓] will increase the value to 17. You can use the addresses 1-320 in

the Motorola format and the addresses 1-2040 with DCC decoders. Incorrect entries will generate an error message.

6.6 “Table” Keyboard mode

When in Keyboard mode, pressing the [menu] key it is possible to specify the address of the solenoid device controlled by the first pair of keys ([1] and [4]), thus automatically assigning following key pairs to the following solenoid devices.

However, it is also possible to assign a particular solenoid device to a particular key pair. This is the “Table” Keyboard mode. In order to switch this mode on select "0" (zero) as the address associated to the first key pair. When doing this, the display will confirm the activation of the “Table” mode with the following indication:

```
Keyboard  
Adr.: ...0 - Tab
```

It is now possible, via the configuration menu (submenu “Special Options”) to assign a specific solenoid device address to a particular key pair. In order to accomplish this task, please refer to the description of special option #810 in the Appendix.

7. The Memo Mode (Route control)

In a digital system, turnouts and signals, which are equipped with switch or solenoid decoders, can be individually switched using appropriate input devices.

7.1 Description

With the Memo mode it is possible to combine turnouts and signals into a group or a route and switch them with a single key press without the need for additional devices.

In this mode the 16 keys in the numeric key block form a group of 16 routes. 3 different groups can be called making a total of 48 routes available. Each route can contain 10 entries. The speed, with which the individual entries are to be processed, is adjustable.

7.2 Selecting the Memo mode

The Memo mode can be selected by repeated operation [mode]-key or pressing the [mode]-key, immediately followed by the [2]-key. The display changes to indicate the mode.

7.3 Selecting a Route group

3 different groups with 16 routes each can be defined. The group number is indicated in the display.

```
m 12 | MEMO | m 36
0 ↑ | Gr. 1 | 0 ↑
```

A change of the route group is possible with the following procedure.

Method:

- Press [menu] key, until in the display shows "Memo mode"
- Press [menu]-key

```
Memo :
Gr. - Nr. 1   Prog
```

- In the left part of the display after "Gr. - Nr." enter the number of the desired group of routes (1-3)
- Press the [←]-key to return to normal driving operation.

7.4 Programming Routes

Each route can be programmed with a maximum of 10 steps or step with turnouts and signals in any combination. The switching functions are given with the parameter R (red, round) or G (green, straight).

Each route has an indication to which of the three possible route groups it belongs and with which key it is to be switched.

Programming takes place in Memo mode.

Method:

- Press [menu] key, until in the display shows "Memo mode"
- Press [menu]-key

```
Memo :
Gr. -Nr. 1   Prog
```

- In the left part of the display after "Gr. - Nr." enter the number of the desired group of routes (1-3)
- Press [→]-key to move to the right part of the display
- Press [←]-key to enter the actual programming mode

```
Gr.-Nr.: 1
Route No. : 13
```

- Behind "Route No." enter the desired route number (1-16)
- Press [←]-key to confirm

```
Gr1|Step  Adr  RG
S13|  0  147  G
```

- The left part of the display shows the group number (here 1) and the route number (here 13). Enter the step number under "Step". Enter 0 for the first step
- Continue with [→]-key
- Under "Addr" enter the address (1-2000) of the solenoid which is to be switched.
- Continue with [→]-key
- Under "RG" the switching function: enter R (red, round) or G (green, straight). The entry can be toggled with the [+] or [↓] keys
- Press [←]-key to confirm
The cursor will jump back under "Step" and the next step can be programmed.
Using the [+] or [↓] keys, the list of the individual steps can be scrolled through in ascending or descending order. The appropriate entry for each step is displayed.
- Press the [←]-key to program the new route
- Press the [menu]-key to return to normal driving operation.

7.5 Inserting pauses

The input of the turnout address 0, produces a program step without switching function, for inserting pauses. Thus a time delay can be given to a slow device that needs the extra time to switch.

The pause length is set with special option 451 as a multiple of 50 ms. If the special option is set to value 10, then a pause length of $10 \times 50 = 500$ ms results. This value applies to all pauses.

The valid input range is 1 and 200. The default is 20.

7.6 Switching Routes

In memo mode a programmed route can be switched with each individual key of the numeric block.

Press [mode] key repeatedly, until the display indicates "Memo mode". Now the keys of the middle key field correspond to the routes 1 to 16.

The pertinent route is switched by pressing one of these keys.

```
m 12 | MEMO | m 36
0 ↑ | 1/13 | 0 ↑
```

The display shows the group and route number with a rotating bar between them. This is shown until all switching of the route is processed by the Intellibox.

If no indication takes place in the display, then in the selected group has no route assigned to that key.

7.7 Concatenating routes

A concatenation of routes means that one route calls another route. Thus a maximum of 433 switching functions can be implemented with a single key.

The concatenation instruction must be the last instruction in the route. No further steps are implemented after the concatenation programmed instruction steps. A looping by mutual concatenations is automatically recognized by the control desk and is not accepted.

For concatenating routes a four digit number is entered in place of the switch address. This number consists of the concatenation identifier 9, the group number 1-3 and the route number 1-16.

Method:

- Program the steps for the route as described in chapter 3 "Route programming"
- In the last step, of the already programmed route proceed with the following:

```
Gr1 | Step Adr RG
S13 | 6 9204
```

- Under "Step" enter the step number (here 6)
- Continue with [→]-key
- Enter the branch on the route under "Adr":

Digit 1 = 9 as concatenation identifier

Digit 2 = group number (1-3, here the 2)

Digits 3 and 4 = route number (1-16, here the 04)

- *The column under "RG" remains vacant*
- *Confirm with [←]-key, the cursor jumps under "Step"*
- *Press [←]-key to the program a new route*
- *Press [menu]-key to return to normal driving operation.*

7.8 Setting operating speed

Under the Special option 450 the Intellibox can configure the speed at which individual shifting processes are to be processed.

The value can be set to multiples of 50 ms. Valid input value lies between 2 and 100. The default value is 10, and corresponds to a speed of 0.5 sec. per instruction.

8. s88 Mode (Display of Feedback)

If you control your layout with a computer, your software will probably need some sort of feedback signals in order to be “aware” of track occupation and, thus, be able to automatically switch turnouts and signals.

This can be accomplished using s88 modules, which can “see” a section of track and “understand” if it is “free” or “occupied”, transmitting this data to the Intellibox. The computer software reads this information through the serial interface and issues its commands accordingly.

You can connect the Intellibox to a maximum of 31 s88 modules with 16 feedback contacts each and to further LocoNet feedback modules (addresses 32 to 128). The $31 \times 16 = 496$ s88 contacts will be superimposed to the first 496 LocoNet contacts. You can have a maximum of $128 \times 16 = 2048$ inputs.

8.1 LocoNet Feedback module

The valid address range for the LocoNet feedback modules is 1-2048, i.e. a maximum of 256 feedback modules each with 8 inputs in 2-rail (63 340) or 128 feedback modules with each 16 inputs in 3-rail (63 350), can be connected to the Intellibox. The modules can be attached to either the LocoNet **B** or LocoNet **T** socket of the Intellibox.

8.2 s88-Module

The Intellibox s88 input can support a max 31 s88-Modules with 16 inputs each.

HINT

If both s88-Module and LocoNet feedback modules are used in the same system, the LocoNet feedback module addresses should be above 496, in order to reserve the address range 1-496 for the s88-Module.

In s88 mode, the display will show the status of the s88 modules.

Unlike other digital systems, the Intellibox continuously reads all the s88 modules connected to the feedback bus and stores their status information. This way, a computer connected to the Intellibox through the serial interface is not obliged to continuously monitor the s88 modules. In the Intellibox memory there is a bit “flag” which registers the occurrence of changes in the s88 status. The computer only needs to monitor this flag.

To maximize the reading speed of the s88 modules connected to the feedback bus, the Intellibox must know how many s88 modules are connected to it. This value must be input in the system configuration menu (refer to section 5.10).

8.3 Selecting the s88 Mode

The Intellibox has several operating modes. Three are currently available: Keyboard, s88 monitor and programming.

The Intellibox scrolls among the operating modes when the [mode] key is pressed. The layout of the display is updated accordingly.

To select the "s88" mode, press the [mode] key until "s88" is displayed.

8.4 The display

The middle part of the display in s88-Mode, blocks of 16 feedback inputs are indicated. After the Intellibox is switched on this is always the first block of addresses 1-16. When using s88-modules, that is the module with address 1.



A filled rectangle indicates a closed contact, while an open circle denotes a "free" contact.

*Fig. 8.41
allocation of the
keys of the middle
key field and the
feedback addresses,
if the adjusted
module address is 1.*

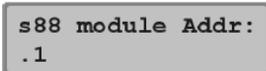
In the s88-Mode each key of the middle key field of the Intellibox is assigned a feedback input. If one of these 16 keys is pressed, then the state of the appropriate input of the attached feedback module, showing "0" for free in the display or "1" for occupied.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

8.5 Monitoring another s88 status

After a system reset, the s88 mode will display the status of the first s88 module (inputs 1-16). To monitor the status of another s88, you must change the module's address.

Pressing [menu] will display:



Change the module address with the numeric keypad. The valid range is 1 to 128. The appendix contains a table from which you can determine which feedback address belongs to which module.

Terminate with [←].

9. Programming Mode

You can program Uhlenbrock, Selectrix and DCC decoders with the Intellibox.

9.1 Programming track

Programming is carried out on a special track, called "programming track", which can be a section of normal track, electrically isolated from the rest of the layout, or a side track, available in most layouts.

CAUTION

Both rails of the programming track must be electrically isolated from the rest of the layout. In the case of Märklin track, not only the third (central) rail must be isolated, but also the two outer rails must be disconnected from the rest of the layout.

The programming track is connected to pins 1 and 2 of connector #1 for the Intellibox.

Configuration menu "Progr. Track" (section 5.8) lets you choose how the Intellibox handles the programming track. The default mode is "automatic". In this mode, the programming track supply voltage automatically changes from the normal digital voltage (in normal control mode) to the programming voltage (when the Intellibox enters the programming mode). If you use the programming track solely for this purpose you should, instead, choose the "Prg. track only" option.

9.2 Selecting the programming mode

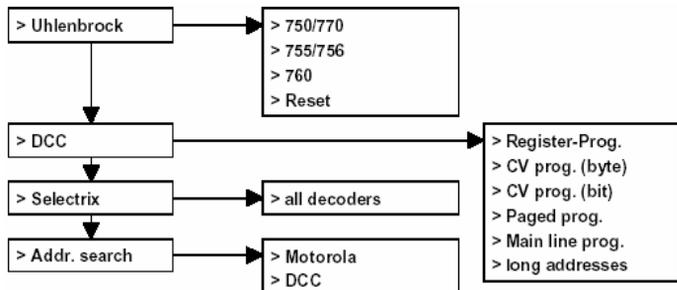
The Intellibox has several operating modes. Three are currently available: Keyboard, s88 monitor and programming.

The Intellibox scrolls among the operating modes when the [mode] key is pressed. The layout of the display is updated accordingly.

To select the "Programming" mode, press the [mode] key until "Programming" is displayed.

9.3 Structure of the programming menu

The following menus are available:



9.4 Programming Uhlenbrock decoders

The “Uhlenbrock” menu lets you program the various Uhlenbrock decoders.

CAUTION Before initiating the programming procedure, you must enter the old (current) decoder address.

Please key in, one by one, the parameters that you want to configure (terminating with [←]). Parameters that you leave blank will not be changed during the decoder’s programming procedure.

HINT The meaning of each parameter is explained in the decoder’s manual (Uhlenbrock #685). At the moment it is available only in German language.

Pressing the [←] key in the line labeled “Programming” initiates the programming sequence and transmits all the parameters to the decoder.

Pressing the [menu] key exits the menu, without programming the decoder.

9.4.1 DGL750/770 menu

This menu lets you program DGL750, DGL751 and DAL770 decoders. Valid parameters and respective values are:

old Address	1-255	
new Address	1-255	
min Speed	1-63	(1-30)
max Speed	1-63	(40-63)
Deceleration	1-79	(1-30)
Acceleration	1-79	(1-30)
2nd Address	1-255	
Analog/Digital	1/2	

Programming

Bracketed values ensure a correct behaviour of the decoder.

9.4.2 DGR755/756 menu

This menu lets you program DGR755 and DGF756 decoders.

Valid parameters and respective values are:

old Address	1-255	
new Address	1-255	
Speed Table	1-4	(see info)
min Speed	0-254	(2-50)
max Speed	0-254	(120-254)
Deceleration	1-79	(1-30)
Acceleration	1-79	(1-30)

2nd Address	1-255
3rd Address	1-255
Analog/Digital	1/2
Spc. Option	0-63
Programming	

Bracketed values ensure a correct behaviour of the decoder

INFO**Speed table**

1 = normal driving mode with load-independent speed

2 = slow driving mode (by means of the f3 function key) with load independent speed

9.4.3 DGF 760 menu

This menu lets you program DGF760 decoders.

Valid parameters and relevant values are:

old Address	1-255
new Address	1-255
Mode	1-4
PWM-Frequency	1 or 2
Voltage output 1	1-8
Voltage output	2 1-8
Flash rate1	1-79
Flash rate2	1-79
Flash assgn1	0-31
Flash assgn2	0-31
Programming	

9.4.4 Reset menu

This menu allows a user to reset all Uhlenbrock decoders to the factory default conditions. This can be accomplished by simply:

- Enter the locomotive address
- With the [↓] key choose the menu "Reset"
- Start the reset procedure with the [←] key

9.5 Programming DCC decoders

When programming DCC decoders you must use type-specific procedures. The Intellibox is able to use all procedures currently defined for DCC decoders.

DCC decoders can be programmed in the normal track or programmed and read out in the programming track (PT).

9.5.1 Register programming

Use the menu "Reg.-Prog." for 8-register decoders, programmable on the PT. These are typically older type decoders; although some newer decoders may also be programmable this way.

This menu can be used for both reading and programming the registers of the decoders.

The display will show:

```
Reg.Prog:
Reg 1 = ---
```

Input the register number in the left column. The column on the right will display the register value to be transmitted to the decoder.

Use the numeric keypad to input the relevant values, or press the [↑] key to increase the value by one unit, or the [↓] key to decrease it one unit. The [→] key moves the cursor to the right column. Values must be between 0 and 255.

Press the [←] key to start programming the desired register.

If the right column is left blank, no programming will be carried out.

During the programming procedure, the Intellibox activity is shown by the word "prog" and a spinning bar in the display.

After successfully programming a register, the display's top line will show "o.k."

If the programming operation fails, you will get an error message (refer to section 9.5.7).

Pressing the [←] key, when the cursor is in the leftmost column of the second line, will ask the Intellibox to read the value of the selected register, from the decoder's memory.

During the read operation the Intellibox will display the word "Read" and a spinning bar in the top line. This operation can take up to 30 seconds.

If the read operation fails, you will get an error message (refer to section 9.5.7).

NOTE

A read error can be generated when you try to access a write-only register. On the other hand, sometimes, read or write errors can be caused by faulty electrical contacts between the locomotive and the tracks. In this case you should correct the problem and move the Intellibox cursor with the [←] key to the left-hand column. Press [←] to re-read the same register.

After successfully reading a register, the display's top line will show "o.k.". You can now change the register's value, as described before.

CAUTION

Register no. 1 contains the decoder address. If you are programming older decoders, never use values greater than maximum allowed value for that decoder. This maximum allowed value (usually 99) should be mentioned in the decoder manual.

9.5.2 CV programming (byte)

Use the “CV Prog (byte)” menu to program DCC decoders with 1024 configuration variables (CV) (on the PT).

This type of programming is also known as “direct programming”. It is the fastest and most usual method to program a DCC decoder, taking a maximum of 5 seconds.

The programming menu will show the following display:

```
CV Prog:
CV ...1 = ---
```

Input the number of the desired CV (1-1024) in the left-hand column and its value (0-255) in the right-hand column.

Programming and reading procedure: follow what was described in section 9.5.1 about register programming. In this section, please take special notice of the highlighted paragraphs.

9.5.3 CV programming (bit)

Use the “CV Prog (bit)” menu to program DCC decoders with 1024 configuration variables (CV) (on the PT). With this programming method, you can easily read or write single bits in a CV. This is really useful when each bit in a configuration variable has a special meaning, usually controlling different decoder options.

The programming menu will show the following display:

```
CV Prog:
CV ...1,Bit0 = -
```

The menu has three columns. The left is used to input the CV number (1-1024), the central one to input the desired bit number (0-7) and the right-hand column to input the bit value (0-1).

CAUTION

Bits are numbered 0 to 7. Some decoder’s manuals (e.g. Lenz) use numbers from 1 to 8. Don’t forget to convert these values before using this menu.

Programming and reading procedures: follow what was described in section 9.5.1 about register programming, with the exception that the reading procedure is initiated by pressing the [←] key when the cursor is in the central column.

If the decoder cannot accept direct programming, the display will show an error message. You will not be able to change the desired bit through this menu: you will have to use the “CV Prog (byte)” menu (refer also to the Appendix).

CAUTION

Some decoders use decimal values for the configuration variable bits. A table is given in the Appendix, with all possible bit-byte conversions. The following table could also help the user in the conversion between different standards of different companies.

Bit no (Intellibox)	0	1	2	3	4	5	6	7
Bit no (Lenz)	1	2	13	4	5	6	7	8
Decimal value	1	2	4	8	16	32	64	128

9.5.4 Paged programming

Use the “Paged Prog.” menu to program DCC decoders with 1024 configuration variables (CV) (on the PT).

The programming menu will show the following display:

```

Page Prog:
CV ...1 = ---
    
```

Input the number of the desired CV (1-1024) in the left-hand column and its value (0-255) in the right-hand column.

Programming and reading procedures: follow what was described in section 9.5.1 about register programming. In this section, please take special notice of the highlighted paragraphs.

9.5.5 Programming on the main track

Use the “Main line Prg.” menu to program decoders on the main track. This programming mode is useful to change a decoder’s configuration variables “on the fly”.

This method uses the CV programming procedure. However, it is not possible to read the decoder’s CVs.

NOTE

Depending on the decoder’s model, programming on the main track might fail if the locomotive is not stationary on the track (speed ≠ zero).

Initially the programming menu will show:

```

Main line Prg.
Loco Addr = ...1
    
```

Input the decoder’s address. After confirming the address with the [←] key, the display will change to:

```

Loco 1:
CV ..1 = ---
    
```

Input the number of the desired CV (1-1024) in the left-hand column and its value (0-255) in the right-hand column.

For the remaining programming and reading procedures: follow was described in section 9.5.1 about register programming. In this section, please take special notice of the highlighted paragraphs.

CAUTION It is not possible to carry out “programming on the main track” when the locomotive is on the programming track.

9.5.6 Programming long addresses

This menu provides a simple method to program “long” (14 bit) addresses (DCC addresses greater than 127).

Long addresses are stored in two CVs of the decoder (CV 17 and CV 18). To enable the use of long addresses, bit 5 of CV 29 should be set to 1.

In principle, you should be able to carry out this type of programming using the normal CV direct programming procedure (refer to sections 9.5.2 and 9.5.3). If you choose to use the “programming long addresses” menu instead, the Intellibox will automatically compute the correct CV values and write to or read from all the necessary CV.

The “long addresses” menu includes the two sub-menus “read” and “program”.

Use the “read” sub-menu to read and display long addresses. The read procedure is initiated by pressing the [←] key.

CAUTION Take note that even during a read operation bit 5 of CV 29 is set to 1. From that moment on, it will no longer be possible to control the locomotive with its CV 1 “short” address, unless you reset bit 5 of CV 29 to zero.

Use the “program” sub-menu for programming addresses greater than 127. The programming operation is initiated by pressing the [8] key.

HINT The long addresses programming procedure changes the decoder’s CV 17, 18 and 29. After programming a long address, the “short” address in CV 1 and the consisting address in CV 19 are no longer available. If you want to use these addresses again, you must set bit 5 of CV 29 to zero.

9.5.7 DCC programming error messages

If the programming operation of a DCC decoder fails, the top line of the display will show one of the following error messages:

- **error**
The read or write operations of a register or a CV has failed.
- **no loc**
No locomotive is present in the programming track (PT), or the locomotive has a defective electrical contact with the PT.
- **short**
Short-circuit in the programming track.

- **danger**
Electrical contact (non allowed!) between the PT and the main track.
- **no pag**
The decoder doesn't accept paged programming.
- **in use!**
The PT is being used by another device (e.g. by the PC through the serial interface).

9.6 Programming Selectrix decoders

Use this menu to program Selectrix decoders.

The menu has the following options:

Address	0-111
Max. speed	1-7
Acc./Decel.	0-7
Pulse duration	1-4
Stop zones	1-2

Programming

Upon entering the menu, all the variables of the decoder present on the PT are read and the address is displayed. You can review the other values using the [+] and [↓] keys.

Input the values for the registers you want to change with the numeric keypad. Once all the changes are made, select "programming" and initiate the process by pressing [←]

HINT If you forget to enter even one of the 5 requested values, the programming procedure will fail.

CAUTION If the programming procedure generates an error message, repeat it, after turning (rotating) the locomotive on the PT 180°.

A zero value of the maximum speed sets some Selectrix decoders to conventional operation (read the decoder manual in order to understand how the decoder works). The conventional operation of Selectrix decoders is not handled by the Intellibox.

9.7 Searching a decoder's address

The search menu can scan for the address of a decoder that cannot be electrically read or whose address is set with DIP switches.

The search algorithm can be used with Motorola and DCC decoders.

To use this menu, follow this procedure:

- *Press the [menu] key until "Mode Programming" is displayed*
- *Press the [menu] key*
- *With the [↓] key scroll through the menus until "Address search" is displayed*
- *Choose this option with [→]*
- *Choose between Motorola and DCC with the [↓] key*
- *Begin the search with [↵]*
- *Return to the normal control panel by pressing the [menu] key*

NOTE

This operation can take a long time to complete, because the search process sequentially reads all the decoder's addresses!

10. IRIS Mode

10.1 Description of Infrared Control

10.1.1 Operation

The Infrared Intellibox Controller IRIS extends the Intellibox with a wireless remote control for indoors with a range of up to 10m.

With IRIS all locomotives on digital layout can be selected and their speed, travel direction and special functions can be controlled. IRIS can switch solenoids and routes that are stored in the Intellibox.



IRIS can is provided with 4 channels, operable with keys A, B C and D. Each channel can control its own locomotive or solenoid. If for e.g. channel A controls locomotive with address 15 and solenoids 1 to 4 then channel B can control locomotive 20 and solenoids 13 to 16. If the remote control active one can quickly switch from one locomotive to another. If a number of players re using different hand controls (up to 4 with an Intellibox), each can operate on a different channel without affecting the locomotives of the other players, provided they don't have the same address.

IRIS uses 4 transmission channels to control the Intellibox. The channel can be changed anytime by simply pressing key A, B, C or D. Each channel can select a locomotive fully independent of the channels. You can also operate a different set of solenoids selected on each channel. The addresses selected for each channel are saved in the Intellibox and are still available after switching off and on again. By default channel A, B, C and D are assigned locomotives 1, 2, 3 and 4 respectively. By default all channels control solenoids 1 to 4.

If a remote control is used, control can be switch quickly between 4 locomotives and 4 groups of solenoids.

If more remote controls are used, each can control its locomotive over a different channel without affecting the other remote controls.

10.1.2 Operating controls

Control LED

The LED blinks as long as a key is being pressed on a remote control.

Selection keys

-  Starts the selection of a locomotive address
-  Starts the selection of a solenoid address
-  Starts the selection of a route
- Activates routes
-  Turns track power on and off

Number keys

- ① to 9 To enter locomotive, solenoid and route addresses

Locomotive control

-  Increases the locomotive speed step-by-step
-  Decreases the locomotive speed step-by-step
-  Reverse travels and emergency stop
-  Forward travels and emergency stop

Special functions

-  Special function Light On
-  Special function Light Off
- ①1 to ①4 Special functions f1 to f4
-  Switch over to functions f5 to f8
-  Switch over to functions f9 to f12
-  Switch solenoid round or red
-  Switch solenoid straight or green

Channel Selector

- Ⓐ to Ⓓ Channel Selector keys

10.1.3 Locomotive Control**Selection of transmission channel**

Every transmission channel can control locomotive address with affecting the other channels,

- The transmission channel is selected with the Ⓐ to Ⓓ keys.

If every channel is programmed with locomotive address, it allows rapid changing of the locomotive by simply pressing one of the channel selector keys. If more people want to play on the layout, each player used their own remote control. To select a locomotive then by entering the new address.

Entering a Locomotive address

- Press the L key
- Enter the desired locomotive address using ① to ⑨ keys. The last 4 digits entered will be used as the address.

NOTE The selection mode is exited by pressing the  key again.

- The locomotive address won't take effect until one of the following functions is activated:

 – Light on or off

 – Speed up or down

 – Travel direction changed

 – Function activated

NOTE The selection mode is also exited if no key is pressed for at least 10 seconds.

Example:

- +①+

Locomotive address 1 is selected and the light is switched on.

- +①+②+③+④+⑤+⑥+

Locomotive address 3456 is selected – only the last 4 digits are used for the address is selected.  increases the speed.

- +①+②++

The channel's Locomotive address is not selected because the  was pressed again.  switches the lights on the active locomotive on.

Speed Control

With the  and  keys the speed of the locomotive is increase or lowered respectively. If the keys are held the speed changes step-by-step until the key is released or the maximum speed has been reached or the locomotive is stopped.

Selecting direction

With the  and  keys the travel direction is set to reverse or forwards respectively. If a key is pressed when the locomotive is in motion it will first do an emergency stop and then move in the selected direction.

Emergency stop

If either of the arrow keys is press while the locomotive is running, firstly an emergency stop will be executed and then the it will move off in the selected direction.

Light switching

The locomotive lights can be switched on with the **F10** key and off with the **OFF** key. It can also be switched on using the **☺** for as long as it is held down.

Special functions

Keys **F1**, **F2**, **F3** and **F4** switch function f1 to f4 on and off.

Using the **F+4** “shift” key followed one of the **F1** to **F4** keys will switch f5 to f8. The **F+8** “shift” key does the same for f9 to f12 (only possible from software version 2.0 onward)

If after pressing a “shift” key a key other than a function key is pressed the shift mode will be cancelled.

The shift mode will automatically cancel if no key is pressed within 10 of pressing either the **F+4** or the **F+8** key.

10.1.4 Solenoid control**Transmission channel selection**

4 solenoids (e.g. turnouts) can be switched with via each transmission channel without affecting the other channels by using the red/green keys.

- A transmission channel is selected key **A**, **B**, **C** or **D**.

If the turnouts are set up on all 4 channels they can be quickly switch up to 16 turns by changing channels.

If more people want play on the layout using individual remote controls then each player uses a different transmission channel. In this case, the turnouts must be accessed, by entering the appropriate address.

Entering a turnout address

The solenoid switches are programmed with turnout addresses by setting an address for the left key pair. The other 3 pair will automatically have the next 3 addresses.

- Press the **☺** key

Key in the desired turnout address using the numeric keys **0** to **9**. The last four digits will be used as the address.

NOTE The selection mode is ended by pressing the **☺** key again.

- The turnout address will only take effect after one of the following keys is pressed:
 - **red** – Switches the solenoid with the underlying address to round or red.
 - **grn** – Switches the solenoid with the underlying address to straight or green.

NOTE The selection mode is also exited if no key is pressed for at least 10 seconds.

Example:

- $\text{Ⓛ} + \text{①} + \text{red1}$

The left red/green key pair is programmed to the base address of 1. The other 3 key pairs are automatically programmed to the following 3 addresses. The red1 key switches the solenoid with the selected address (here 1) to round or red.

- $\text{Ⓛ} + \text{⑤} + \text{⑥} + \text{①} + \text{②} + \text{③} + \text{④} + \text{red5}$

The left red/green key pair is programmed to the base address of 1234, because only the last four digits are accepted. The other 3 key pairs are automatically programmed addresses 1235 to 1237. The red5 key switches the solenoid with the selected address (here 1236) to round or red.

- $\text{Ⓛ} + \text{①} + \text{②} + \text{Ⓛ} + \text{red1}$

No solenoid address is programmed because the selection mode is cancelled by pressing the Ⓛ -key. The left red key red1 switches the solenoid with the previously selected address to round or red.

Switching of solenoids

Solenoids are switched by pressing the red or green keys for respective address. If the left red/green key pair was programmed for turnout address 11 then the other three pairs have been programmed to addresses 12, 13 and 14.

- red – switches the solenoid to round or red
- grn – switches the solenoid to straight or green

10.1.5 Implementing Track Route

All track routes that are stored in the Intellibox can be implemented by remote control.

- Press the Ⓛ key
- Enter the desired route address using the numeric keys ① to ⑨ .
- Press Ⓛ again to implement the route.

NOTE The route will not be implemented if a different key is pressed after entering the digits of the address.

Valid values for route addresses are 1-48. The last two digits entered are used as the address.

NOTE The selection mode is also exited if no key is pressed for at least 10 seconds.

Example:

- $\text{Ⓛ} + \text{①} + \text{Ⓛ}$

Route 1 is implemented.

- $\text{Ⓛ} + \text{①} + \text{②} + \text{③} + \text{④} + \text{Ⓛ}$

Route 34 is implemented, because only the last two digits are used.

- + +

No route is implemented because the key was not pressed. e switches the light of the locomotive being controlled on.

10.1.6 Power on/off

Using the key the track power to the layout can be switched on and off.

10.2 IRIS Monitoring Mode in the Intellibox

In IRIS mode the centre of the Intellibox display shows all selections made by the remote control for the active channel.

10.2.1 Selection of IRIS Mode

The IRIS mode can be entered with multiple presses of the [mode] key or by pressing the [mode] key followed immediately by the [5] key.

If the IRIS mode is engaged the centre of the display reads as follows:

```
m 12 | I R I S | l o k #
7   | M O D E |
```

10.2.2 Selection of transmission channel

In IRIS mode the menu key will enter sub-menus that can be navigated using the [+] and [↓] keys in order to select the desired transmission channel. The selection is entered by pressing the [←]

10.2.3 The indication

Locomotive addresses

If the key is pressed on the remote control the middle section of the Intellibox display shows the current locomotive address for that channel. The normal display for the speed controls are still shown on either side.

```
m 12 | L o k : | l o k #
7   |   2 3 |
```

If subsequently digits are pressed on the remote control to change the locomotive address the changes will be displayed on the display.

Speed and direction

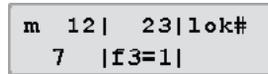
If the speed and direction are changed the Intellibox display will update accordingly:

```
m 12 |   2 3 | l o k #
7   |  2 5 ↑ |
```

The display shows the locomotive address, current speed step and direction for the current locomotive.

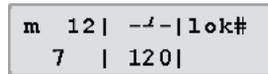
Special function status

If a function is changed by the remote control the display will show the function being changed and its status: 1 = function is on, 0 = function is off.



Turnout address

If the  key on the remote control is pressed the current valid turnout address for the left key pair is shown.



If the remote control changes the address the display will be updated accordingly.

Turnout status

If a solenoid is changed by remote control the display will show the state of all four of the solenoids switchable by the remote control.



Rectangle below = solenoid green/straight/on

Rectangle above = solenoid red/round/off

Track route addresses

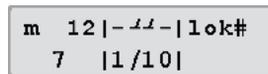
If the  key is pressed on the remote control the display shows:



If subsequently the digit keys are used to enter a route number, the entry can be verified on the display.

Route status

If a route is implemented from the remote control the route will display the operation of the route in the same way as the Intellibox in Route Mode.



The display shows the group and route number with a rotating slash between them. This will show until the Intellibox has completed processing the route.

11. LISSY Mode (usable from software version 1.55)

In a digital system each locomotive has an address and can receive control commands via this address. When considering full automatic control of the trains on a digital layout, the question frequently asked is: "Where on the layout is which locomotive at a particular time". This can be solved by a system that reads addresses of running locomotives, nothing prevents automatic control of a layout.

11.1 Description

LISSY consists of a tiny transmitter, which is fastened under each participating locomotive and using infrared light sends the locomotive address downward towards the track. Sensors are placed in the track, to receive the radiated information from the passing vehicle and relay it to the LocoNet. LISSY receivers located in various places of the layout track receive the following information:

- the locomotive address of the passing locomotive
- one of four train categories of the passing locomotive
- the driving direction of the locomotive at the detecting point
- the speed of the locomotive at the detecting point

The LISSY mode of the Intellibox can indicate the locomotive address, train category and driving direction of a train passing the reading point (in the middle part of the display). This allows block sections and shadow stations be supervised. You then know at any time which locomotive is on which track section.

11.2 Setting LISSY Mode

The LISSY mode can be selected by repeated operation [mode]-key or pressing the [mode] key immediately followed by the [6]-key. The centre of the display changes to indicate the new mode.

11.3 Operating LISSY Mode

If the LISSY mode is selected, a LISSY receiver can be monitored in the middle part of the display:

```
m 12 | L↑-2 | d3651
0 ↑ | 234 | 0 ↑
```

The above display indicates that the monitored point was passed by locomotive with address 234 with the driving direction indicated by the arrow. The train category of the locomotive is the 2 indicated at the end of the line. If a car with a LISSY transmitter passes monitored point, this is indicated by a W in the display:

```
m 12 | W↑-2 | d3651
0 ↑ | 234 | 0 ↑
```

If a LISSY receiver reports a vacant block section, the data in the middle part of the display is cleared.

```
m  12 | . . - . | d3651
   0 ↑ | . . . . | 0 ↑
```

If the LISSY receiver reports a locomotive and indicated this in the middle part of the display, then control of this locomotive can be taken over on one of the two controllers of the Intellibox. For this you press [←]-key in order to take over the locomotive on the left controller and [→]-key in order to take over the locomotive on the right controller.

11.4 Calling up a LISSY Receiver

In the LISSY mode of the Intellibox all of the 4096 possible LISSY receivers can be monitored. The address of the LISSY receivers to be supervised can be changed with [menu]-key.

Method:

- Press [mode]-key repeatedly until the display reaches "LISSY mode"
- press [menu] key

```
LISSY-Receiver
Adr.: ...1
```

- Using the numeric keyboard another address can be registered. Addresses 1-4096 are valid.
- With [menu] key return to normal driving.

12. The Computer Interface

Connecting to the computer quickly.

Using a normal modem cable or Uhlenbrock into PC interface cable (61010) connect the Intellibox with the serial interface of a computer. With a maximum data transmission rate of 19200 Baud the interface of the Intellibox is clearly faster than other digital controllers. In addition the input buffer and an extended command set result in a clear speed increase.

Installation

Depending on the software, it may be necessary to configure the serial interface (refer to section 5.9).

An application that uses the new communications protocol (P50X) adopted in the Intellibox, doesn't need to be user-configured. Everything is done automatically.

The default settings of the serial interface are as follows:

Speed: 2400, 4800, 9600 or 19200

Start bits: 1

Stop bits: 2

Data bits: 8

Parity: none

Handshake: hardware, RTS-CTS

Compatibility and protocols

The Intellibox serial protocol is completely compatible with the serial protocol of the Märklin 6050 and 6051 Interfaces. The Intellibox can be used with any train control software designed for the Märklin Interface.

In addition to the Märklin syntax, the Intellibox uses several advanced commands that either replace Märklin commands or can be used simultaneously. This can be defined in a configuration menu in the Intellibox system parameters (section 3.11.2).

The Intellibox serial protocol is described in a file, available through download from our Internet sites.

13. Software Updates

The Intellibox system software can be updated to a newer version, by downloading the new software from the computers, through the serial interfaces. This procedure doesn't require any physical intervention on the Intellibox.

Hardware requirement

You need to power the Intellibox with a transformer. You will also need a serial cable to connect the Intellibox to a Personal Computer.

There is no need to open up the Intellibox!

Software requirement

Contact your local retailer to obtain a diskette with the software update, or download it from our Internet sites.

How to updates the software

- Connect the serial cable between the Intellibox and a PC serial (COM) port.
- Switch off the Intellibox for about 10 seconds. Switch it back on and wait for the completion of the initialization procedure.
- Run the application 'bupdate.exe' on your PC and follow the onscreen instructions.

Checking the software version

With the 'Software vers.' menu in the system's parameters, you can check the software version of your Intellibox.

- Press the [menu] key
- Press the [mode] key
- Press the [↓] key until 'Software vers.' is displayed
- Enter this menu by pressing [→]
- The top line displays the system's software version number, while the bottom line shows the Intellibox serial number.
- Press the [menu] key to return to the main screen.

14. Error Messages

In case of error during normal Intellibox operation, its power supply is immediately interrupted, the red LED above the [stop] key starts blinking and the display shows an error message.

```
-- Short --
rail pwr output
```

Short-circuit on the main track.

```
-- Short --
Booster
```

Short-circuit on a section controlled by a Booster.

```
-- Short --
LocoNet or C/D
```

Short-circuit on the C/D lines booster or LocoNet outputs.

```
-- Short --
Layout PT C/D LN
```

Short-circuit on the DCC booster output (connector #2 pin 1 and 2) or on the LocoNet B output between (connector #6 pin 1 and 6).

Short-circuit between main track and PT, DCC booster or LocoNet outputs.

```
-- Short --
Lokmaus
```

Short-circuit on the Lokmaus bus.

```
-- Short --
Dev. overheated
```

Overheating: If you continuously use the Intellibox at its maximum rated output, its heat sink could become too hot. In this case, an internal thermal protection circuit is activated and the Intellibox is shut down to avoid permanent damage to its electronic circuitry.

HINT As soon as the error has been corrected and/or the temperature decreases, you can power your layout again by pressing the [GO] key.

Appendix

List of Special options

The Intellibox uses up to 1000 Special Options (SO), numbered from 0 to 999. These are modifiable only via the Intellibox menus, not by a PC. However, the PC can read the value of all SO's.

Each SO controls a particular aspect of the Intellibox configuration. Only some of these SO's are documented along with their "meaning". These are the SO's which make sense to be able to be modify. **Please do NOT change the value of other SO's** as this could interfere or even impede correct Intellibox operation. A maximum and a minimum value is internally associated with each SO. The Intellibox does not allow selecting a value outside that range.

SO #20 factory default = 1

Whether (1) or not (0) P50 commands to an already "busy" locomotive are allowed ("busy" = already controlled by another (non-PC) device).

SO #21 factory default = 0

Whether (1) or not (0) to discard P50 turnout commands issued while the Intellibox is in Power Off.

SO #25 factory default = 1

Whether (1) or not (0) to always send a DCC signal - eventually a DCC idle signal (if there is no DCC Lok in the refresh cycle).

HINT

If you have no DCC locomotives, in order to increase the Intellibox transmission rate to the tracks please write "0" to this SO.

SO #27 factory default = 2

0 = no "purging"

1 -240 = Time in minutes between the last command delivered to a loco and the time when the commands for that loco are purged from the refresh cycle.

SO #28 factory default = 0

Defines the "purging condition"

= 0 locomotive speed = 0

= 1 locomotive speed \neq 0

SO #812 factory default = 1

Default s88 module number to be shown when activating the s88 mode after turning on the Intellibox. Possible values are 1-128.

HINT

The s88 module # 32-128 only correspond to LocoNet sensors.

SO #861-868 factory default = 1

You can select what extended function (F1 - F4) is controlled through the "F1" Lokmaus key (i.e. the right function key of the Lokmaus). Furthermore, you can also tell the Intellibox, whether the function is to be toggled at each key press, or if the function is to be turned on only as long as the Lokmaus key is kept pressed ("pulsed" or "push-button" behaviour). The following table shows the association between the special options and the Lokmaus number:

Special option number	861	862	863	864	865	866	867	868
Lokmaus number	1	2	3	4	5	6	7	8

The value of each of these SO must be within 1 to 8. One would choose a value from 1 to 4 in order to specify which function to change (toggle), while you would choose a value from 5 to 8 (i.e. +4 with respect to the previous case) in order to specify which function to "push button" on. This concept is explained in the following table:

"Toggled" extended function	F1	F2	F3	F4	-	-	-	-
"Pulsed" extended function	-	-	-	-	F1	F2	F3	F4
Special option value	1	2	3	4	5	6	7	8

For example: the default for all these SO's is 1. This implies that, upon each new closure of the Lokmaus "F1" key, the F1 function status is toggled. Setting one of these SO's, let's say SO #864, to the value 3 would imply that, upon each new closure of the Lokmaus #4 "F1" key, the F3 function status is toggled. Setting that very SO to the value 5 would imply that, upon pressing the Lokmaus #4 "F1" key, the F1 function is turned on - and that this very function is turned off as soon as the Lokmaus "F1" key is released.

The following table could be used in order to register the chosen values of the Special Options 861-868.

Special option value	861	862	863	864	865	866	867	868
Default value	1	1	1	1	1	1	1	1
User's value								

SO #871-878 min = 0, max = 255

In the "Table Keyboard mode" (see Special Option 810), each turnout control key-pair is associated to a user-defineable turnout address. The first turnout address is taken from the value of SO #871 decremented by 1, the second from SO #872 (-1), the 3rd from SO #873 (-1), the 4th from SO #874 (-1), the 5th from SO #875 (-1), the 6th from SO #876 (-1), the 7th from SO #877 (-1) and the 8th turnout address is taken from SO #878 (-1).

For example: setting SO #871 to the value 10 would allow you to control the turnout address 11 through the [1] and [4] key-pair (of

course: only if this special "Table Keyboard mode" has been activated with SO #810=0).

The following table could be used in order to register the chosen values of the Special Options 871-878.

Special option value	871	872	873	874	875	876	877	878
Key pair	1	2	3	4	5	6	7	8
Default address	10	20	30	40	50	60	70	80
User's value								

SO #901 factory default = 1

This SO has to be changed to a value of 3, in order to control DCC locomotives on layout sections supplied through a Märklin Booster 6015 or 6017. Factory default = 1 means no DCC signal output.

SO #907 factory default = 1

"Idle" format on the main track at Intellibox startup:

1 = Motorola

4 = DCC

5 = mixed Motorola and DCC

The following table could be used in order to register the chosen values.

Special option value								
User's value								

Special settings for the IRIS remote control

The special functions from IRIS, described in this chapter, are all changed via special options the Intellibox (see basic settings, menu option "special options").

IRIS as DC speed control

In factory setting the Intellibox is set to AC-Control station mode when using IRIS. The ⊕ and ⊖ keys are used to increase and decrease the speed respectively and the → key for forwards and the ← for reverse travel.

Users, who are used to controlling locomotives in the DC mode, have the option to adapt the behavior of IRIS to operate in DC mode.

DC control panel mode with plus and minus keys

To set IRIS to the DC control panel mode the following Special Options must be changed:

Special Options 732 = 27; DC control mode on ⊕ key

Special Options 733 = 28; DC control mode on ⊖ key

In DC control mode the locomotive moves forward from a standstill using the ⊕ key. If the ⊕ key is held down the speed is increased step-by-step. If the ⊖ key is pressed the locomotive runs in reverse and if the key is held the locomotive accelerates step-by-step.

For a running locomotive the other key can be used to reduce the locomotives speed. When running forwards the ⊖ key will slow the locomotive and for reverse the ⊕ key is used. If the key is held, the speed will be reduced step-by-step until the locomotive comes to a stop. If the locomotive is to then run in the opposite direction the key must be released momentarily and then pressed again.

DC control mode with arrow keys

If the → and ← keys are to be used instead of the ⊕ and ⊖ key for DC control mode the following Special Options must be changed:

Special Options 716 = 27; DC control mode on → key

Special Options 717 = 28; DC control mode on ← key

If Special Option 732 and 733 remain at factory default the ⊕ and ⊖ keys will control the speed as usual.

Rapid speed change

In both cases it is possible to set unused keys the change the speed in larger steps. To do this the following Special Options must be changed:

Arrow keys

Special Options 716 = 23; ⬅ key increase the speed in large steps
 Special Options 717 = 26; ➡ key decrease the speed in large steps.

Plus and Minus keys

Special Options 732 = 23; ⊕ key increase the speed in large steps.
 Special Options 733 = 26; ⊖ key decrease the speed in large steps.

The step size for the larger steps is set in Special Option 769. the factory default setting is 4 (speed step pre key press).

Direction changing with [f+8]

If functions f9 to f12 are not used the Ⓢ key can be used for switching the travel direction.

Travel direction switching

Special Option 730 = 43; Ⓢ sets speed step "0" (=Emergency stop) and change direction.

Rapid speed change in AC control mode

The ⬅ and ➡ keys can be set for large speed steps.

Special Options 716 = 23; ⬅ key increase the speed in large steps.

Special Options 717 = 26; ➡ key decrease the speed in large steps.

The step size for the larger steps is set in Special Option 769. the factory default setting is 4 (speed step pre key press).

Direct setting to a specific speed step

As factory default IRIS will only accept the numeric keys in input mode for setting locomotive, turnout and route addresses.

It is possible to set up the numeric keys so they will set the locomotive speed to a specific speed step. To set specific speed steps for the numeric keys Special Options 780 to 789 must be set. Special Option 780 is used for key ① and Special Option 789 is used for key ⑨.

Option number	780	781	782	783	784	785	786	787	788	789
Option value	31	32	33	34	35	36	37	38	39	40

With the following settings it is possible to set the keys to give speed step of approx. 10%:

Key	0	1	2	3	4	5	6	7	8	9
Step 14 SSteps	1	2	4	5	7	8	9	11	12	14
Step 28 SSteps	1	4	7	10	13	16	19	22	25	28
Step 31 SSteps	1	4	7	11	14	17	21	24	28	31
Step 128 SSteps	1	16	29	43	57	70	84	98	112	126

If the **Ⓚ** key is to be used to stop the locomotive Special Option 780 must be set to a value of 29..

Factory default for all the Special Options described above is 255. With that setting the keys are inactive in control panel mode and can only be used for entering addresses.

Direct control of 8 different turnouts

IRIS can be programmed so that the red and green keys can each control a single turnout. It is then possible control 8 turnouts per channel. If a red or green key is pressed the corresponding turnout is switched over to the other way from its current state.

To use this mode of operation the following Special Options must be changed:

Key	1	2	3	4	5	6	7	8
Option Number	740	742	744	745	741	743	745	747
Option Value	140	141	142	143	144	145	146	147

If the left red key is set to turnout address 1 then the remaining keys will adopt the following addresses:



Factory default for Special Options 791 to 798 is 255. With value the red and green keys cannot be used to switch routes.

IRIS used for PC control

If the Intellibox is connected to a PC IRIS can be used in conjunction with the PC control program. It is possible to send all the IR command through to the PC. Further it is possible to set commands to keys that the Intellibox itself cannot process, but the PC program can. In all cases a PC program that can interpret the commands must be used.

For the technical point on using IRIS with a PC we refer you to the technical documentation on the Intellibox Interface Protocol. This document can be downloaded from our website – www.uhlenbrock.de.

List of the standard commands (6050-Syntax)

By means of the standard "P50" or "6050-type" binary commands the Intellibox is able to communicate with any program written for the Märklin 6050/6051 interfaces. In the following table you will find the decimal values of the available P50 commands.

Locomotive and solenoid device commands are composed of two bytes, with the exception of the emergency stop command. The first byte defines the type of command, while the second byte represents the decoder address. Using these commands you are allowed to control locomotives with an address range 0 to 255 (standard P50 range is 1-80). All other commands are composed of just one byte. The only commands implying a reply from the interface are those dealing with feedback modules.

Command byte	Address byte	Function
97	-	Emergency stop, same as [stop] key
96	-	End of emergency stop, same as [go] key
1-14		Locomotives: operating levels 1-14 and "function light" off
15		Locomotives: direction change and "function light" off
17-30		Locomotives: operating levels 1-14 and "function light" on
31		Locomotives: direction change and "function light" on
64-79		Locomotives: toggle extended functions f1, f2, f3, f4 Command byte = $64+1*f1+2*f2+4*f3+8*f4$ fx = 0 " Extended function fx off fx = 1 " Extended function fx on
33	0-255	Solenoid devices: green (straight)
34	0-255	Solenoid devices: red
35	-	Solenoid devices: switch off the last addressed decoder Assignment of address bytes: 1-4 = outputs #1-4 of the first solenoid device decoder 5-8 = outputs #1-4 of the second solenoid device decoder 255 = third output of the last (64.) solenoid device decoder
128	-	Feedback modules: read without reset
129-159	-	Feedback modules: read n s88 modules till the indicated module 129 " reads only the first feedback module 159 " reads all 31 feedback modules The Interface replies with 2 bytes per module, showing the status of the inputs from 1-16
192	-	Feedback modules: read with reset ("reset-mode" = default)
193-223	-	Feedback modules: read a single s88 module 193 " reads the first feedback module 223 " reads the last feedback module (#31) The Interface replies with 2 bytes per module, showing the status of the inputs from 1-16

HINT A manual on the extended serial protocol (called P50X) of the Intellibox is available on diskette (ask your local dealer) or at our Internet sites.

Converting bits to bytes

Some DCC decoders do not accept the “bit-wise” programming mode. When programming a single bit of a configuration variable it could be necessary to convert the 8 bits of a CV to a complete byte.

The following table could be used for this purpose. In the table the label “CV address” represents the decimal value corresponding to the 8 bit sequence.

CV Address	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
5	1	0	1	0	0	0	0	0
6	0	1	1	0	0	0	0	0
7	1	1	1	0	0	0	0	0
8	0	0	0	1	0	0	0	0
9	1	0	0	1	0	0	0	0
10	0	1	0	1	0	0	0	0
11	1	1	0	1	0	0	0	0
12	0	0	1	1	0	0	0	0
13	1	0	1	1	0	0	0	0
14	0	1	1	1	0	0	0	0
15	1	1	1	1	0	0	0	0
16	0	0	0	0	1	0	0	0
17	1	0	0	0	1	0	0	0
18	0	1	0	0	1	0	0	0
19	1	1	0	0	1	0	0	0
20	0	0	1	0	1	0	0	0
21	1	0	1	0	1	0	0	0
22	0	1	1	0	1	0	0	0
23	1	1	1	0	1	0	0	0
24	0	0	0	1	1	0	0	0
25	1	0	0	1	1	0	0	0
26	0	1	0	1	1	0	0	0
27	1	1	0	1	1	0	0	0
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0
32	0	0	0	0	0	1	0	0
33	1	0	0	0	0	1	0	0
34	0	1	0	0	0	1	0	0
35	1	1	0	0	0	1	0	0
36	0	0	1	0	0	1	0	0
37	1	0	1	0	0	1	0	0
38	0	1	1	0	0	1	0	0
39	1	1	1	0	0	1	0	0
40	0	0	0	1	0	1	0	0
41	1	0	0	1	0	1	0	0
42	0	1	0	1	0	1	0	0
43	1	1	0	1	0	1	0	0
44	0	0	1	1	0	1	0	0
45	1	0	1	1	0	1	0	0
46	0	1	1	1	0	1	0	0
47	1	1	1	1	0	1	0	0
48	0	0	0	0	1	1	0	0
49	1	0	0	0	1	1	0	0

CV Address	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	
50	0	1	1	0	0	1	1	0	0
51	1	1	0	0	0	1	1	0	0
52	0	0	1	0	1	1	0	0	0
53	1	0	1	0	1	1	0	0	0
54	0	1	1	0	0	1	1	0	0
55	1	1	1	0	0	1	1	0	0
56	0	0	0	1	1	1	0	0	0
57	1	0	0	1	1	1	0	0	0
58	0	1	0	1	1	1	0	0	0
59	1	1	0	1	1	1	0	0	0
60	0	0	1	1	1	1	0	0	0
61	1	0	1	1	1	1	0	0	0
62	0	1	1	1	1	1	0	0	0
63	1	1	1	1	1	1	0	0	0
64	0	0	0	0	0	0	1	0	0
65	1	0	0	0	0	0	1	0	0
66	0	1	0	0	0	0	1	0	0
67	1	1	0	0	0	0	1	0	0
68	0	0	1	0	0	0	1	0	0
69	1	0	1	0	0	0	1	0	0
70	0	1	1	0	0	0	1	0	0
71	1	1	1	0	0	0	1	0	0
72	0	0	0	0	1	0	0	1	0
73	1	0	0	1	0	0	0	1	0
74	0	1	0	1	0	0	0	1	0
75	1	1	0	1	0	0	0	1	0
76	0	0	1	1	0	0	0	1	0
77	1	0	1	1	0	0	0	1	0
78	0	1	1	1	0	0	0	1	0
79	1	1	1	1	0	0	0	1	0
80	0	0	0	0	1	0	0	1	0
81	1	0	0	0	1	0	0	1	0
82	0	1	0	0	1	0	0	1	0
83	1	1	0	0	1	0	0	1	0
84	0	0	1	0	1	0	0	1	0
85	1	0	1	0	1	0	0	1	0
86	0	1	1	0	1	0	0	1	0
87	1	1	1	0	1	0	0	1	0
88	0	0	0	1	1	0	0	1	0
89	1	0	0	1	1	0	0	1	0
90	0	1	0	0	1	1	0	0	1
91	1	1	0	1	1	0	0	1	0
92	0	0	1	1	1	0	0	1	0
93	1	0	1	1	1	0	0	1	0
94	0	1	1	1	1	0	0	1	0
95	1	1	1	1	1	0	0	1	0
96	0	0	0	0	0	1	1	0	0
97	1	0	0	0	0	1	1	0	0
98	0	1	0	0	0	1	1	0	0
99	1	1	0	0	0	1	1	0	0

CV Address	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
100	0	0	1	0	0	1	1	0
101	1	0	1	0	0	1	1	0
102	0	1	1	0	0	0	1	0
103	1	1	1	0	0	0	1	0
104	0	0	0	1	0	1	1	0
105	1	0	0	1	0	1	1	0
106	0	1	0	1	0	1	1	0
107	1	1	0	1	0	1	1	0
108	0	0	1	1	0	1	1	0
109	1	0	1	1	0	1	1	0
110	0	1	1	1	0	1	1	0
111	1	1	1	1	0	1	1	0
112	0	0	0	0	1	1	1	0
113	1	0	0	0	1	1	1	0
114	0	1	0	0	1	1	1	0
115	1	1	0	0	1	1	1	0
116	0	0	1	0	1	1	1	0
117	1	0	1	0	1	1	1	0
118	0	1	1	0	1	1	1	0
119	1	1	1	0	1	1	1	0
120	0	0	0	1	1	1	1	0
121	1	0	0	1	1	1	1	0
122	0	1	0	1	1	1	1	0
123	1	1	0	1	1	1	1	0
124	0	0	1	1	1	1	1	0
125	1	0	1	1	1	1	1	0
126	0	1	1	1	1	1	1	0
127	1	1	1	1	1	1	1	0
128	0	0	0	0	0	0	0	1
129	1	0	0	0	0	0	0	1
130	0	1	0	0	0	0	0	1
131	1	1	0	0	0	0	0	1
132	0	0	1	0	0	0	0	1
133	1	0	1	0	0	0	0	1
134	0	1	1	0	0	0	0	1
135	1	1	1	0	0	0	0	1
136	0	0	0	1	0	0	0	1
137	1	0	0	1	0	0	0	1
138	0	1	0	1	0	0	0	1
139	1	1	0	1	0	0	0	1
140	0	0	1	1	0	0	0	1
141	1	0	1	1	0	0	0	1
142	0	1	1	1	0	0	0	1
143	1	1	1	1	0	0	0	1
144	0	0	0	0	1	0	0	1
145	1	0	0	0	1	0	0	1
146	0	1	0	0	1	0	0	1
147	1	1	0	0	1	0	0	1
148	0	0	1	0	1	0	0	1
149	1	0	1	0	1	0	0	1

Module address table for feedback channels

The Intellibox displays the individual feedback channels in blocks of 16. This corresponds to the module addresses of s88-Modules.

After switching the Intellibox on the first block the channels 1-16 are always displayed. If other channels are to be displayed, the appropriate module address must be entered from s88-Mode after manipulation of the [menu]-key.

Module address	Input	Module address	Input	Module address	Input
1	1 - 16	44	689 - 704	87	1377 - 1392
2	17 - 32	45	705 - 720	88	1393 - 1408
3	33 - 48	46	721 - 736	89	1409 - 1424
4	49 - 64	47	737 - 752	90	1425 - 1440
5	65 - 80	48	753 - 768	91	1441 - 1456
6	81 - 95	49	769 - 784	92	1457 - 1472
7	97 - 112	50	785 - 800	93	1473 - 1488
8	113 - 128	51	801 - 816	94	1489 - 1504
9	129 - 144	52	817 - 832	95	1505 - 1520
10	145 - 160	53	833 - 848	96	1521 - 1536
11	161 - 176	54	849 - 864	97	1537 - 1552
12	177 - 192	55	865 - 880	98	1553 - 1568
13	193 - 208	56	881 - 896	99	1569 - 1584
14	209 - 224	57	897 - 912	100	1585 - 1600
15	225 - 240	58	913 - 928	101	1601 - 1616
16	241 - 256	59	929 - 944	102	1617 - 1632
17	257 - 272	60	945 - 960	103	1633 - 1648
18	273 - 288	61	961 - 976	104	1649 - 1664
19	289 - 304	62	977 - 992	105	1665 - 1680
20	305 - 320	63	993 - 1008	106	1681 - 1696
21	321 - 336	64	1009 - 1024	107	1697 - 1712
22	337 - 352	65	1025 - 1040	108	1713 - 1728
23	353 - 368	66	1041 - 1056	109	1729 - 1744
24	369 - 384	67	1057 - 1072	110	1745 - 1760
25	385 - 400	68	1073 - 1088	111	1761 - 1776
26	401 - 416	69	1089 - 1104	112	1777 - 1792
27	417 - 432	70	1105 - 1120	113	1793 - 1808
28	433 - 448	71	1121 - 1136	114	1809 - 1824
29	449 - 464	72	1137 - 1152	115	1825 - 1840
30	465 - 480	73	1153 - 1168	116	1841 - 1856
31	481 - 496	74	1169 - 1184	117	1857 - 1872
32	497 - 512	75	1185 - 1200	118	1873 - 1888
33	513 - 528	76	1201 - 1216	119	1889 - 1904
34	529 - 544	77	1217 - 1232	120	1905 - 1920
35	545 - 560	78	1233 - 1248	121	1921 - 1936
36	561 - 576	79	1249 - 1264	122	1937 - 1952
37	577 - 592	80	1265 - 1280	123	1953 - 1968
38	593 - 608	81	1281 - 1296	124	1969 - 1984
39	609 - 624	82	1297 - 1312	125	1985 - 2000
40	625 - 640	83	1313 - 1328	126	2001 - 2016
41	641 - 656	84	1329 - 1344	127	2017 - 2032
42	657 - 672	85	1345 - 1360	128	2033 - 2048
43	673 - 688	86	1361 - 1376		

Coding table for solenoid decoder

The address of decoders conforming to the Motorola format (from the companies Märklin, Viessmann and Modeltreno) is defined using 8 micro switches. Since every decoder controls 4 solenoid devices, the decoder address is different from the solenoid device address.

The following table shows the position of the 8 micro switches of these decoders. The correlation with solenoid device addresses and Märklin Keyboard is also included.

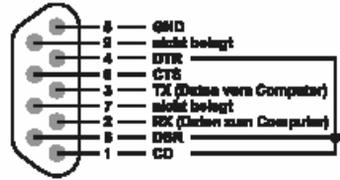
Keyboard number	Keyboard keys	Sol. dev. addr.	Decoder Micro switches ON							
1	1.4	1-4	-	2	3	-	5	-	7	-
1	5.8	5-8	-	-	3	-	5	-	7	-
1	9..12	9-12	1	-	-	4	5	-	7	-
1	13..16	13-16	-	2	-	4	5	-	7	-
2	1.4	17-20	-	-	-	4	5	-	7	-
2	5.8	21-24	1	-	-	-	5	-	7	-
2	9..12	25-28	-	2	-	-	5	-	7	-
2	13..16	29-32	-	-	-	-	5	-	7	-
3	1.4	33-36	1	-	3	-	-	6	7	-
3	5.8	37-40	-	2	3	-	-	6	7	-
3	9..12	42-44	-	-	3	-	-	6	7	-
3	13..16	45-48	1	-	-	4	-	6	7	-
4	1.4	49-52	-	2	-	4	-	6	7	-
4	5.8	53-56	-	-	-	4	-	6	7	-
4	9..12	57-60	1	-	-	-	-	6	7	-
4	13..16	61-64	-	2	-	-	-	6	7	-
5	1.4	65-68	-	-	-	-	-	6	7	-
5	5.8	69-72	1	-	3	-	-	-	7	-
5	9..12	73-75	-	2	3	-	-	-	7	-
5	13..16	77-80	-	-	3	-	-	-	7	-
6	1.4	81-84	1	-	-	4	-	-	7	-
6	5.8	85-88	-	2	-	4	-	-	7	-
6	9..12	89-92	-	-	-	4	-	-	7	-
6	13..16	93-96	1	-	-	-	-	-	7	-
7	1.4	97-100	-	2	-	-	-	-	7	-
7	5.8	101-104	-	-	-	-	-	-	7	-
7	9..12	105-108	1	-	3	-	5	-	-	8
7	13..16	109-112	-	2	3	-	5	-	-	8
8	1.4	113-116	-	-	3	-	5	-	-	8
8	5.8	117-120	1	-	-	4	5	-	-	8
8	9..12	121-124	-	2	-	4	5	-	-	8
8	13..16	125-128	-	-	-	4	5	-	-	8
9	1.4	129-132	1	-	-	-	5	-	-	8
9	5.8	133-136	-	2	-	-	5	-	-	8
9	9..12	137-140	-	-	-	-	-	-	-	8
9	13..16	141-144	1	-	3	-	-	6	-	8
10	1.4	145-148	-	2	3	-	-	6	-	8
10	5.8	149-152	-	-	3	-	-	6	-	8
10	9..12	153-156	1	-	-	4	-	6	-	8
10	13..16	157-160	-	2	-	4	-	6	-	8
11	1.4	161-164	-	-	-	4	-	6	-	8
11	5.8	165-168	1	-	-	-	-	6	-	8
11	9..12	169-172	-	2	-	-	-	6	-	8
11	13..16	173-176	-	-	-	-	-	6	-	8
12	1.4	177-180	1	-	3	-	-	-	-	8
12	5.8	181-184	-	2	3	-	-	-	-	8
12	9..12	185-188	-	-	3	-	-	-	-	8
12	13..16	189-192	1	-	-	4	-	-	-	8
13	1.4	193-196	-	2	-	4	-	-	-	8
13	5.8	197-200	-	-	-	4	-	-	-	8
13	9..12	201-204	1	-	-	-	-	-	-	8
13	13..16	205-208	-	2	-	-	-	-	-	8
14	1.4	209-212	-	-	-	-	-	-	-	8
14	5.8	213-216	1	-	3	-	5	-	-	-
14	9..12	217-220	-	2	3	-	5	-	-	-
14	13..16	221-224	-	-	3	-	5	-	-	-
15	1.4	225-228	1	-	-	4	5	-	-	-
15	5.8	229-232	-	2	-	4	5	-	-	-
15	9..12	233-236	-	-	-	4	5	-	-	-
15	13..16	237-240	1	-	-	-	5	-	-	-
16	1.4	241-244	-	2	-	-	5	-	-	-
16	5.8	245-248	-	-	-	-	-	6	-	-
16	9..12	249-252	1	-	3	-	-	6	-	-
16	13..16	253-256	-	2	3	-	-	6	-	-
-	-	257-260	-	-	3	-	-	6	-	-
-	-	261-264	1	-	-	4	-	6	-	-
-	-	265-268	-	2	-	4	-	6	-	-
-	-	269-272	-	-	-	4	-	6	-	-
-	-	273-276	1	-	-	-	-	6	-	-
-	-	277-280	-	2	-	-	-	6	-	-
-	-	281-284	-	-	-	-	-	6	-	-
-	-	285-288	1	-	3	-	-	-	-	-
-	-	289-292	-	2	3	-	-	-	-	-
-	-	293-296	-	-	3	-	-	-	-	-
-	-	297-300	1	-	-	4	-	-	-	-
-	-	301-304	-	2	-	4	-	-	-	-
-	-	305-308	-	-	-	4	-	-	-	-
-	-	309-312	1	-	-	-	-	-	-	-
-	-	313-316	-	2	-	-	-	-	-	-
-	-	317-320	1	-	3	-	5	-	7	-

Computer interface and modem cable

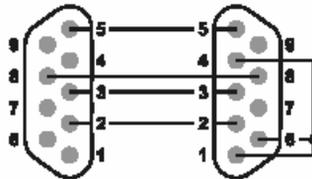
The Intellibox computer interface socket is wired as follows:

Pins 2, 3, 5 and 8 go to the computer. Pins 1, 4 and 6 are bridged together in the Intellibox.

It is best to obtain a standard comport cable in which all the connections are wired one to one from the 9-pole plug to the 9-pole socket.



Intellibox RS232



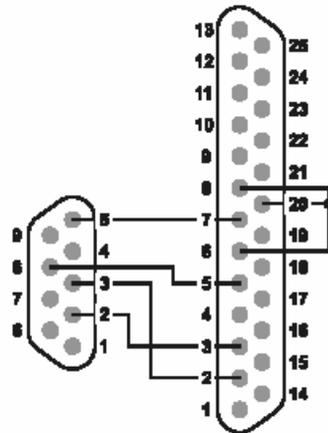
Intellibox

Computer

With the connection to a 9-pole input socket all connecting poles are normally wired one for one. If only the four connections 2, 3, 5 and 8, are interconnected pins, 1, 4 and 6 must be interconnected on the computer side.

With the connection to a 25-pin input socket, on older computers, pins 2, 3, 8 and 5 on the Intellibox are connected in with the pins 3, 2, 5 and 7 of the 25-pin wall plug respectively.

In addition the pins 6, 8 and 20 are shorted together.

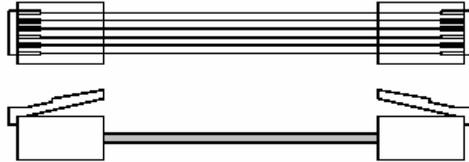


Intellibox

Computer

Standard LocoNet Cable

Standard LocoNet Cable and western connector (RJ12) consist of standard LocoNet Cable of 6-conductors. When manufacturing the cables, attention must be paid to correct wiring.



If the cable lies flat, both western plugs must have the 'latch' pointing upward.

Tips and Tricks

Some Märklin locomotive can't be controlled

Older Märklin decoders (6080 and Delta decoders) can only be controlled with the Intellibox if the red wire from the centre pick up is connected to the rail.

Old and new Märklin function decoders

The Panorama car and the Märklin Digital remote control rotary crane (7051+7652), are controlled with the old Motorola protocol, using f1-f4 functions. They are not able to operate with the new Märklin-Motorola protocol.

New Märklin locomotives (with smoke, sound effects, etc), new Märklin decoders (60901, etc.) and Uhlenbrock decoders (755, 756, 760 in operating mode 1-3) operate only in the new protocol, and ignore the f1-f4 function signals of the old protocol.

Problems controlling the lights in DCC decoders

If the locomotive lights no longer respond to the [function] key, it's most likely that the decoder is configured for 28 operating levels while the Intellibox expect 14/27 speed levels for that locomotive address. To solve this situation, change (in the Intellibox) the configuration of the relevant decoder address to 28 operating levels.

Remember that NMRA standards impose the following specifications for CV #29:

14 operating levels -> CV#29 Bit 1 = 0

27 operating levels -> CV#29 Bit 1 = 0

28 operating levels -> CV#29 Bit 1 = 1

128 operating levels -> CV#29 Bit 1 = 1

Problems of DCC Decoders with other Data formats

Some DCC decoders have problems running cleanly if decoders using different data formats are on the rails as well. These decoders falsely interpret the Motorola or the Selectrix data signal as analog voltage and will "stutter" when driving or suddenly drive off with full speed.

With some decoders this behavior can be eliminated by switching off the automatic recognition of the analog operation. How the decoder is configured to pure digital operation can be found in the operating instructions for the appropriate decoder.

With some newer decoder types programming to pure digital operation is done by setting bit 2 of the configuration variable CV 29 to zero. Note however that is not possible with all DCC decoders.

With simple decoders there is no possibility of eliminating this problem.

Controlling the Märklin Digital turntable

The turntable can be retrofitted with a specific decoder (7687) compatible with the Motorola protocol. The different functions respond to the solenoid devices addresses 225 to 240.

Attention!

The Märklin turntable decoder can only be put into programming mode within the first 5 seconds of switching on of the operating voltage. The Intellibox needs approx. 13 seconds to boot up. Subsequently the decoder will not accept any further instructions, if Intellibox and turntable are switched on at the same time.

Operation of the Märklin digital turntable

We recommend installing a switch in the yellow and red wires to the turntable decoder. The switch remains open until the Intellibox has completed its boot up. Then it is closed and the programming process can begin, as in the operating instructions of the turntable described.

Add	Key	Function
225	red green	Ends programming Programming / Input
226	red green	Cancels programming Rotates 180°
227	red green	Next segment clockwise Next segment anticlockwise
228	red green	Rotation clockwise Rotation anticlockwise
229	red green	Rotates to segment #1 Rotates to segment #2
230	red green	Rotates to segment #3 Rotates to segment #4
231	red green	Rotates to segment #5 Rotates to segment #6
232	red green	Rotates to segment #7 Rotates to segment #8
233	red green	Rotates to segment #9 Rotates to segment #10
234	red green	Rotates to segment #11 Rotates to segment #12
235	red green	Rotates to segment #13 Rotates to segment #14
236	red green	Rotates to segment #15 Rotates to segment #16
237	red green	Rotates to segment #17 Rotates to segment #18
238	red green	Rotates to segment #19 Rotates to segment #20
239	red green	Rotates to segment #21 Rotates to segment #22
240	red green	Rotates to segment #23 Rotates to segment #24

Controlling the Märklin Digital rotary crane

The address of the digital rotary crane must be configured for the old Motorola protocol. The crane's functions, like turning the cab and raising/lowering the boom, are controlled with the [f1] and [f2] keys and the speed knob. The working lights and the magnet are switched on with the [function] key and switched off with the [off] key.

HINT If, in multi-protocol operation, the crane should not respond correctly, try changing its address.

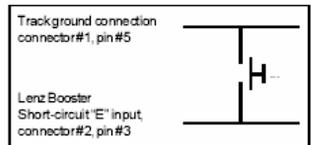
Controlling the Roco crane wagon (Digital DCC)

The address of the Roco digital crane wagon (40110 or 46800) should be configured for DCC - 14 operating levels. The crane wagon uses one locomotive address. The different functions are operated with the [function], [off] and [f1] keys and turning the corresponding knob.

NOTE The decoder address cannot be read on the programming track. Should you program a different address, you will get an error message, even if the programming procedure was successful.

Emergency stop button in the Lenz Booster output

If you connect the Intellibox ground (connector #1, pin #5) with the Lenz Booster short circuit signaling line "E", (connector #2, pin #3) with a momentary switch, the Intellibox will shut off power to the track and to all connected Boosters. You can have a number of "emergency stop" buttons, connected in parallel, spread along your layout.



Troubleshooting

Problem	Cause	Solution
The Intellibox does not turn on.	The Intellibox does not have AC input power.	Check the plug on the transformer and the clamps in socket 1 the Intellibox. Examine the connection between Intellibox and transformer and the mains supply to the transformer.
The Intellibox is in the wrong language.	The wrong language has been set under "Basic Settings" menu.	Switch the Intellibox off. Restart the Intellibox, while holding down one of the following keys: 1 German 6 Svenska 2 English 7 Espanol 3 Francais 8 Portugues 4 Italiano 9 Dansk 5 Nederlands
The Lokmaus is not functioning.	The Lokmaus does not have good contact. The allocation of the locomotive address to the switch position of the Lokmaus is incorrect.	Check that the Lokmaus is correctly plugged in or if perhaps a Y-adapter is used and correctly attached. Make sure that the locomotive you wish to control is registered correctly in classification tables for the "Lokmaus addresses".
The Intellibox can be switched on using the [go]-key, the green LED lights up, but locomotives and turnouts don't operate.	The connection between track and the Intellibox output is interrupted. If the track is attached to an external auxiliary booster, then that connection can also be interrupted between the Intellibox and the booster or the connection between the track and the track output of the boosters.	Check the connections of the track at socket 1, the Intellibox and the connection at the track itself. Check the cable connection to the external booster. With a booster attached to socket 5 check whether the flat cable is correct and whether it was inserted into the socket correctly. (chapter 1 - Booster connection).
The red LED above [stop]-key flashes again and again after only short periods of operation.	The Intellibox is constantly overloaded by too many running locomotives and lit up trains. It overheats and switches off.	Divide your layout into several sections, isolated from each other and feed these with additional external boosters (e.g. Uhlenbrock power 3).

Problem	Cause	Solution
The red LED (stop) constantly flashes	The track has a short circuit. The Intellibox overheated. The track connected to an external booster has a short circuit	Check the error message in the Intellibox display. Look for the item which is causing the track short circuit and wait until the Intellibox cools down again.
Individual locomotives do not run.	The locomotive decoders are not addressed with the correct data format.	Since decoders cannot give feedback to the Intellibox, the Intellibox cannot determine by simply selecting the locomotive address, which data format is required to control the decoder. Check the data format needed for each of the locomotive decoders and set it to the correct data format (chapter 4.5.3).
Some solenoid decoders do not function.	The solenoid decoders use a different data format from that selected for output from the Intellibox as the general data format for solenoid decoders.	Check the data format of the “not working” solenoid decoders and adjust it in the “Basic settings” menu – accessory setting – set the correct data format for each decoder used.
All solenoid decoders work but the locomotives do not run.	You have a combination of Intellibox and Märklin centre plugged in at the side (6020, 6021, 6022, 6023, 6027, 6029, 6030) and the layout is not correctly connected to the devices.	Since the added on Märklin centre can control only turnouts, you must guarantee that the cable to the turnout decoders is attached at the track output of the Märklin centre and the cable for the rails to the track output of the Intellibox.
After switching on the Intellibox the LED or the display of the added on Märklin centre (6020, 6021, 6022, 6023, 6027, 6029, 6030) flickers.	The Märklin centre gets too low a supply and is therefore not fully functional.	The Märklin centre must be supplied with power by a separate transformer.
After locomotive address was assigned to the Märklin 80 or 80f, the display flashes and the locomotive cannot be controlled.	Another controller is controlling the locomotive.	It is not possible to control the locomotive with the Märklin control 80. With the Märklin 80f control is possible after input of a new locomotive address.

HOTLINE

When you are at a loss on how to continue
we are here for you.

Mondays to Fridays 14:00-16:00

Wednesdays 16:00-18:00

02045-858327

Before you call us,

Make sure you have the following at hand:

Serial number of your Intellibox,
version number of the system software of your Intellibox
and this manual.

You can obtain our catalog from your specialist dealer
or from us for 3.50 euro plus postage of 5.00 euro in stamps.
All our products have a warranty of two years.
We reserve the right to change data in this booklet at anytime.