FRED

Digital Hand Controller

Manual

Uhlenbrock
digital

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Part Number 66 000

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1. General Description

1.1 History

In 1998, Stefan Bormann and Martin Pischky who are both members of FREMO (Friends circle of European model railroaders) developed a simple digital hand control for use at FREMO meetings with the DCC layout which was constructed by the club members. They called it FRED, an acronym for "Fremos Einfacher Drehregler", (German for "Fremos simple rotary speed regulator").

Due to its popularity, also outside of the FREMO, they decided to have the controller manufactured commercially.

With co-operation from Uhlenbrock Electronik GmbH, the controller came into being. It makes available, not only the original Dispatch mode, but also an Extended mode with larger functionality.

1.2 Overall Operation

FRED is a digital hand control for digital centers with LocoNet interface. It controls up to 4 locomotives, independent of the data format, switches lights, up to eight special functions and emergency stop. The Memory function ensures that the programmed locomotive addresses are not lost even if the controller is disconnected from the net.

1.3 Operating Modes

The hand controller can be set to different operating modes. The Dispatch mode, as it was used on the FREMO layout, can be used with any digital center having a LocoNet interface. FRED can take control of an address made available by the centre at the push of a button. It can control a locomotive and switch its special functions.

The extended mode is only possible with the Intellibox from Uhlenbrock or the Twin-Center from the Fleischmann company. Then each FRED can control up to four different locomotives. All special functions of the individual decoders can be switched. The addresses are easily assigned to the hand control by the centre. With the help of [lok#]-key the function keys can be used to select the locomotive.

1.4 Memory function

FRED stores all locomotive addresses which it is currently controlling. If it is disconnected from the LocoNet and reconnected in another location it can continue to control the same locomotives.

1.5 Connection

The FRED is connected to an Intellibox LocoNet socket with the enclosed coiled Loco Net cable. It does not matter whether you select socket "LocoNet B" or "LocoNet T". The LocoNet plugs are keyed and cannot be inserted into the sockets the wrong way round.

1.6 Control Panel

Description of the individual elements

① Speed control with control LEDs

② Driving direction switch with control LEDs

③ Emergency Stop key

④ Special function keys

⑤ Light function

⑥ Locomotive selection key
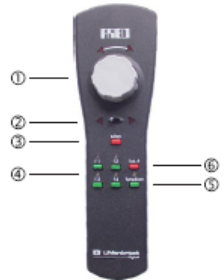
Speed Control

The FRED speed control has a rotary knob with end stop. This delivers absolute speed information to the attached digital centre. That means when it is positioned at the left stop the driving speed is "zero" and at the right stop the speed is at maximum.

Driving direction switch

The rocker switch for the changing of the driving direction gives instant feedback about the selected driving direction. If the switch is pushed to the right, the locomotive runs forward, if to the left, the locomotive reverses. If the switch is operated while the locomotive is running, an emergency stop is activated.

Control LEDs

When switching to another locomotive the speed and direction of this locomotive may not always agree with the position of speed control and direction switch of the FRED.

The triangular control LED's help to adjust the appropriate control to match the new locomotive for problem-free switching to another locomotive.

In this case, the control LED's above the speed control always indicate the direction to turn speed control, when the position of the speed control does not agree with the current speed of the locomotive.

As long as one of the control LED's above the speed control is on, indicating the current locomotive's speed and direction do not agree, no driving data is transferred to the locomotive. The speed control is then turned to the indicated direction till the LED goes out, showing that the speed control now agrees with the speed of the current locomotive. If the speed control is to be brought to the

zero position (because the current locomotive speed is zero) then the left LED above the control knob flashes. Only after the speed control and the current locomotive speed are synchronized and the control LED's are off, will changes in the speed control settings lead to data being conveyed to the locomotive.

The control LED's above the direction switch indicate the current direction to the selected locomotive, even if this does not agree with the switch position of the FRED (e.g. after FRED assumes control of a locomotive).

If the switching position and LED display do not agree, then the appropriate LED flashes. The switch position must first be set to coincide with the flashing LED, before a direction change can be accomplished.

Emergency Stop key

The currently controlled locomotive can be instantly stopped (without inertia) with [stop]-key. After an emergency stop, the left LED of the speed control flashes, because the set speed differs from the actual speed of the selected locomotive. The controller must be set to zero after an emergency stop. Once the LED is off, the locomotive can be controlled again.

Light function

[function]-key serves to switch the locomotive lights on and off.

The [lok#]-key

The locomotive selection key changes between operating mode and locomotive selection mode.

Some DCC decoders have functions f5 to f8. Pressing [lok#]-key together with one of the function keys [f1, f2, f3 or f4] operates these functions.

1.7 Technical Data

Power consumption of a FRED is 2-20mA, depending on the brightness setting of the LEDs.

In Extended mode, a maximum of 16 FREDs can be connected to one Intellibox or Twin-Center. In addition to this, as many FREDs as desired can be connected in Dispatch mode.

In Dispatch mode as many FREDs as desired can be connected to other control centres.

2. Configuration

In configuration mode various settings can be changed.

2.1 Mode Selection

The FRED can be placed into configuration mode by holding the [stop]-key while it is being plugged into the LocoNet.

2.2 The Individual Settings

The colour of the LEDs above the [f1] to [f4] function keys indicates the active configuration.

Every press of a function key changes the corresponding configuration and with that the colour of the corresponding LED.

Locomotive behaviour after Handover

Set with the [f1]-key

LED above [f1] green – After the handover the locomotive runs at the speed and direction as set by the control centre (factory default).

LED above [f1] red – If a locomotive is handed over to the hand control or relinquished by the controller, then immediately after the transfer the locomotive does an emergency stop.

Operating mode selection

Set with [f2]-key

LED above [f2] green – Extended mode for Intellibox and Twin-Center (factory default)

LED above [f2] red – Dispatch for any desired LocoNet Controller

Selection of control centre for Extended mode

Set with [f3]-key

LED above [f3] green – Used with Intellibox (factory default)

LED above [f3] red – Used with Twin-Center from Fleischmann

LED Brightness

The LED brightness can be adjusted with [lok#]-key together with the [function]-key.

When numerous FREDs are connected, lowering the brightness will markedly lower the power being drawn from the LocoNet.

2.3 Ending the Mode

When changes in configuration are completed, return to the normal operating mode simply by pressing the [stop]-key.

3. Intellibox Mode

The Intellibox mode is available starting from the version 1.2 of the Intellibox system software. It is an extended mode in which up to four locomotives can be controlled with a FRED.

In Extended mode up to 16 different FREDs can be connected to an Intellibox. Further FREDs can be attached in the Dispatch mode.

3.1 Setting for the Intellibox

Connect the FRED to the LocoNet while holding down the [stop]-key.

The colour of the LEDs above the function keys shows the set configuration. Each push of a function key changes the corresponding setting and the colour of the matching LED. Adjust the FRED as follows:

LED above [f1] alternatively green or red (see chapter 2.2)

LED above [f2] green - Extended mode for Intellibox and Twin-Center

LED above [f3] green – Used with the Intellibox

Press the [stop]-key to exit configuration mode.

3.2 The FRED hand control number

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

Assignment of the hand control numbers

The first FRED connected with the Intellibox is automatically assigned hand control number 1. Each subsequent FRED receives the next number of the sequential to 16.

NOTE The Hand control number is assigned by the Intellibox. On another Intellibox the same FRED will most likely have a different number because it was connected in a different order.

The hand control numbers are stored in the Intellibox in non-volatile memory. They cannot be overwritten. In order to remove a number from the memory of the Intellibox, it must be explicitly erased (see below).

Displaying the assignment table

In the Intellibox Basic Settings/Hand contr. Menu, the table of entered hand controls can be viewed but not altered.

Procedure:

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

- *Scroll down to "Hand contr." with the* [↓]*-key*

```
FRED f LADR LNID
  .1 2    75 007F
```

The lower row displays in order the hand control number, the internal ID of the connected FRED hand control, the state of the function key and the locomotive address which was assigned to this key.

- *The cursor can be moved left and right with the* [←] *and* [→] *keys respectively. The entries under "FRED" and "f" can be deleted with the* [C]*-keys and overwritten with the numeric keys. The corresponding locomotive address will then be shown under "LAdr".*
- *The* [menu]*-key will take you back to normal running mode.*

Deleting the Hand control number

If a FRED is no longer to be used, the entry can be removed from the table in the "Basic Settings/Hand contr." menu.

Procedure:

- *Press the* [menu]*-key*
- *Press the* [mode]*-key*
- *Scroll down to "Hand contr." with the* [↓]*-key*
- *Then with the* [→]*-key*

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

- *Delete the entry under "FRED" using the* [C]*-key*
- *Enter the desired hand control number*
- *Move the cursor to the "LNID" column with the* [→]*-key*
- *Using the* [C]*-key delete the item from the Intellibox memory*
- *The* [menu]*-key will take you back to normal running mode.*

When the entry is deleted and the selected FRED is no longer assigned, it can only be reassigned by connecting a new FRED to the Intellibox LocoNet. The Intellibox always assigns the lowest available FRED number.

If, for example, FRED numbers 1 and 3 are assigned because number 2 was deleted, the next FRED to be plugged in will be assigned the numbers 2.

TIP

If a number of controls are used it is advisable to place a small sticker with the operating number on each device.

Figure 3.21
The table for a FRED
in the Intellibox

Hand control number	LNID	f1	f2	f3	f4
1	007F	lok# 12	lok# 101	-	lok# 41

Changing the Hand control number

If the installed hand controllers are to be assigned new numbers all entries in the FRED table must be erased first. After that all the hand controls can be inserted in the desired order.

Because the Intellibox assigns the numbers automatically they can only be numbered in sequence.

3.3 Assigning the Locomotive address via Intellibox

In extended mode, the locomotive addresses for the FRED's individual loco selection keys are assigned from the Intellibox, using the following procedure:

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

The middle part of the display will show the following entry:

```
m  12|FRED|m  36
  0 ↑|15f1|  0 ↑
```

The top of the centre display indicates that the Intellibox is in FRED input mode. Just below that is the number of the FRED (two digits) and the designated function key (f1 to f4). The cursor is under the right hand digit.

All entries can be erased with the [C]-key and re-assigned with the numeric keys.

Using the numeric keys, enter the FRED number (1-16 at digits 1 and 2) and function key (1-4 at digit 4) for which a locomotive address is to be assigned.

- *Press the* [↵]*-key to confirm the entry*

If the selected function key already has a locomotive address assigned to it this will be shown on the lower line:

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

This address can be changed with the numeric keys or completely erased with [C]-key.

- *The* [menu]*-key will take you back to normal running mode.*

3.4 Locomotive selection on the FRED

It is possible to control up to 4 locomotives which are easily assigned by the central controller.

If the FRED has no locomotive address assigned to it when it is plugged into the LocoNet it will automatically power up in locomotive selection mode. If at least one locomotive is assigned and available when the FRED is plugged in, the [lok#]-key can be used to select the locomotive.

In locomotive selection mode the four function keys, [f1] to [f4], are used for locomotive selection. The different colours of the LEDs above the function keys have the following meaning:

LED red – Key is not assigned

LED green – Key is assigned

LED blinking green – Key is assigned and selected

A locomotive is selected by pressing the function key to which the address of the locomotive you wish to control was assigned. Since the FRED does not have an indicator, we recommend that you note the key allocation or provide the keys with numbered stickers.

The FRED leaves the locomotive selection mode automatically when a function key is pressed. If no selection was made then the selection mode can be exited by pressing the [lok#]-key.

3.5 Releasing a locomotive

A locomotive is removed from the controller automatically, from the Intellibox menu "Assignment of the Locomotive Address" (see Chapter 3.3). The entry for the locomotive address is deleted with the [C]-key.

3.6 Switching Special Functions

The operation of the special functions f1 to f4 is done by pressing keys [f1] to [f4] when in operating mode. The state of the special function is toggled with each press of the respective key.

The LEDs above the keys indicate whether the individual special functions are switched on (LED yellow) or switched off (LED out).

In order to be able to switch functions [f5] to [f8] on decoders with 8 special functions, the [lok#]-key is used as shift key. As long as [lok#]-key is held pressed, special functions [f5] to [f8] can be switched. The LEDs above the keys thereby show the state of these special functions. The following combinations of keys apply:

- [lok#] and [f1] switches Special function [f5]

- [lok#] and [f2] switches Special function [f6]

- [lok#] and [f3] switches Special function [f7]

- [lok#] and [f4] switches Special function [f8].

4. Dispatch Mode

In this operating a locomotive address released by a LocoNet digital centre (Dispatch procedure) can be taken over by the FRED. The FRED can then control only that locomotive.

If the hand control does not have a locomotive under control, then only the LED above [function]-key lights up red. All other LED's are out.

4.1 Settings for the operation on FREMO module layouts

Connect FRED to the LocoNet with the [stop]-key pressed.

The configuration can be changed with the function keys on the FRED. Press the appropriate key as often as needed until the relevant LED indicates the desired state:

LED above [f1] red – Emergency stop when taking control of the locomotive

LED above [f2] red – Dispatch Mode

LED above [f3] – in Dispatch without influence

These LEDs should be dimmed right down using the [function]-keys in order save power. This is important when many FREDs are used simultaneously on a control centre.

Continue with the next chapter or press the [stop]-key to exit the configuration mode.

4.2 Preparing a Locomotive address on the control centre

With Intellibox and TwinCenter:

- *Press the* [lok#]-*key for the selected locomotive*
- *Clear the address with the* [C]-*key*
- *For a consist address enter the desired digit and clear it with the* [C]-*key*
- *Press the* [lok#]-*key again*

With Digitrax DT10:

- *For the selected address press the* [sel/set]-*key*
- *Then press the* [mode/disp]-*key*

The manual for the corresponding other controller describes how to store the locomotive address in the dispatch memory.

4.3 Taking over Locomotive on a FRED

A locomotive can be transferred to hand control by holding the [stop]-key down. The locomotive address will be taken from the Dispatch buffer of the attached LocoNet centre (Intellibox, Twin-Center or DigiTrax) when a [function]-key is pressed. If the selection was successful, the LEDs show the current state of the selected locomotive and the LED above the [function]-key is no longer red, but shows the state of the light function of the locomotive.

4.4 Releasing a locomotive

To release control of a locomotive the [emergency stop]-key must be pressed and held. The controlled locomotive is released by pressing the [function]-key. A successful release of the locomotive is indicated by all status indicators (LED) turning off and only the LED above the [function]-key lighting up red.

4.5 Switching Special Functions

To operate the special functions f1 to f4 press keys [f1] to [f4] when in operating mode. The state of the special function is toggled with each press of the respective key.

The LEDs above the keys indicate whether the individual special functions are switched on (LED yellow) or switched off (LED out).

To switch functions [f5] to [f8] on decoders with 8 special functions the [lok#]-key used as shift key. Holding the [lok#]-key pressed, special functions [f5] to [f8] can be switched and the LEDs above the keys thereby show the state of these special functions. The following combinations of keys apply:

- [lok#] and [f1] switches Special function [f5]

- [lok#] and [f2] switches Special function [f6]

- [lok#] and [f3] switches Special function [f7]

- [lok#] and [f4] switches Special function [f8].

5. Twin-Center Mode

The Twin-Center mode is exactly like the Intellibox mode. In extended mode up to four locomotives can be controlled with a FRED. It is available with all software Versions of the Twin-Center.

The Twin-Center treats the FRED like a Twin-Box with 4 hand controls. For FRED and Twin-Centers to operate together each FRED must first be given a Twin-Box address. Subsequently each of the four function keys of the FRED must be assigned a hand control number from the Twin-Center. A minimum of 4 FREDs can be allocated with one of four function keys and maximum of 16 FREDs can be allocated with one function key each.

More about the important settings in the following chapters.

5.1 Setting for the Twin-Center

Connect FRED to the LocoNet with the [stop]-key pressed.

The colour of the LEDs above the function keys indicates the configuration. Each push of a function key changes the corresponding configuration and the colour of the LED, Set the FRED as follows:

LED above [f1] green or red – see Chapter 2.2

LED above [f2] green – Extended Mode for Intellibox and Twin-Center

LED above [f3] red – Used with Twin-Center

Continue with the next chapter or press the [stop]-key to exit the configuration mode.

5.2 Setting of Twin-Box Address of a FRED

The Twin-Center treats the FRED like a Twin-Box. Each FRED must be set to a particular Twin-Box address under which it can be addressed by the Twin-Center.

Set the FRED to Twin-Center mode as described in Chap. 5.1. Press the [f4]-key. Now the keys [f1] to [f4] correspond to the switches 1 to 4 of a virtual DIP-Switch with the Twin-Box address for this FRED can be set up.

The following settings give individual addresses:

Address	f1	f2	f3	f4		Address	f1	f2	f3	f4
1	off	off	off	off		9	on	off	off	off
2	off	off	off	on		10	on	off	off	on
3	off	off	on	off		11	on	off	on	off
4	off	off	on	on		12	on	off	on	on
5	off	on	off	off		13	on	on	off	off
6	off	on	off	on		14	on	on	off	on
7	off	on	on	off		15	on	on	on	off
8	off	on	on	on		16	on	on	on	on

The four function keys can be used to the turn the corresponding LEDs on and off. An off LED represents an "off" DIP switch setting and a lit LED the "on" position.

Alternatively the address can be incremented by the [lok#]-key and decremented by the [function]-key.

Pressing the [stop]-key programs the address to return to the configuration mode.

NOTE The Twin-Box address is stored by the Twin-Center. At another Twin-Center the FRED must have its Twin-Box address set again. Therefore different addresses for the same hand control can result at different Twin-Centers.

5.3 Assigning the Hand Control Number

So that the FRED can be used with the Twin-Center each function key must be assigned a hand control number. This assignment is made in the Basic Settings menu of the Twin-Center.

During the assignment the function keys f1 to f4 correspond to Twin-Box connection (Ports) A to D.

Function key	f1	f2	f3	f4
Port	A	B	C	D

For example, [f1]-key from FRED #2 is to be addressed with hand control number 5, so the following settings must be made on the Twin-Center:

- *Press the [menu]-key*
- *Press the [mode]-key*
- *Scroll down to "Hand contr." with the* [↓]*-key*
- *Then with the* [→]*-key*
- *Scroll down to "Hand contr.No." with the* [↓]*-key*
- *Then with the* [→]*-key*

```
H-Nr. TwBox Port
   5      2    A
```

- *In the "H-No". column enter the desired hand control number (here 5)*
- *In the "TwBox" column enter the value (here 2)*
- *In the "Port" column enter the function key that is to be used (here the letter A for F5-key)*
- *Press the [↵]-key to confirm the entry*

Valid Hand control number range is 1 to 16.

5.4 Assigning a Locomotive Address

A function key on the FRED is assigned with a locomotive address from the Twin-Center by assigning a locomotive address to a key that corresponds to the hand control (See Chap 6.2).

- *Press the [menu]-key*
- *Press the [mode]-key*
- *In the middle part of the display it will show the following:*

```
m  12|H-Nr|m  36
  0 ↑|...5|  0 ↑
```

The middle top of the display shows that the centre is in hand controller input mode.   On the lower line is the hand control number. The cursor is located on the bottom line right-most digit. The [C]-key can be used to erase the entry subsequently overwritten with the new value,

- *Press the [↵]-key to confirm the entry.*
- *If the selected function key has a locomotive address assigned the display will appear as follows:*

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

The [C]-key can be used to erase the entry and subsequently overwritten with the new value.

- *Press the [↵]-key to confirm the entry and return the operating mode.*

5.5 Special function switching

The operation of the special functions f1 to f4 is done by pressing keys [f1] to [f4] and [function] when in operating mode. The state of the special function is toggled with each press of the respective key.   The LEDs above the keys indicate whether the individual special functions are switched on (LED yellow) or switched off (LED out).

In order to be able to switch functions [f5] to [f8] on decoders with 8 special functions the [lok#]-key is used as shift key. As long as [lok#]-key is held pressed, special functions [f5] to [f8] can be switched and the LEDs above the keys thereby show the state of these special functions. The following combinations of keys apply:

- [lok#] and [f1] switches Special function [f5]

- [lok#] and [f2] switches Special function [f6]

- [lok#] and [f3] switches Special function [f7]

- [lok#] and [f4] switches Special function [f8].

6. Appendix

Error messages

The FREDs error indication is by blinking all triangular LEDs. The reason is given by the LEDs above function keys f1 and f2.

LED above f1 is red

The FRED is receiving no response from the LocoNet.

The FRED buffer on the Intellibox is completely full with 16 FREDs. Hence the new FRED cannot be given a hand control number. Either remove an "old" Fred from the hand control list or use the FRED in Dispatch mode.

On a Twin-Center the FRED was probably assigned an incorrect or no hand control number. The particular entry must be checked and corrected.

LED above f2 is red

The Intellibox being used is unable to communicate with the FRED because it does not have the correct software version for extended mode.

Either use the FRED in dispatch mode or update the Intellibox system software.

Reset of the Intellibox

If the Intellibox configuration is reset from Basic Settings menu all FRED addresses are erased.

Intellibox Software Update

Check the current version which the Intellibox has under "Basic Settings/Version" .

From Version 1.2 the Basic Setting "Hand contr." was added. If you have an older version you must update the software.

The FRED includes the appropriate update disk or alternatively you can download the information/update from the Uhlenbrock Internet site www.uhlenbrock.de.

Do the update by following the Read-me file instructions.

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