

DV4mini

DV4mini: D-Star/DMR/C4FM Hotspot-USB-Stick Interface Description



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Functions:

The DV4mini software handles the lowest physical layer of the digital transmission protocols (Layer-1). It sends and receives wireless data transparently using the selected operation mode. i.e. if DMR is selected the transceiver will use 4FSK raised cosine mode, in Dstar it uses GMSK and in C4FM it uses 4FSK mode. The received data can be read by the host software. The host can send formatted data to the firmware which is then sent out in the 70cm band. All higher protocol functions are done by the host software.

Interface:

The DV4mini uses a virtual serial interface.

Linux: the device is automatically detected by Linux as soon as connected to USB. The device name is /dev/ACMx where x is a number starting from 0.

Windows: when the device is connected for the first time Windows will automatically install a driver. This is a standard Windows driver and no external driver file is needed. The device gets the name COMx where x is a number between 1 and 255.

The driver must be opened like a standard RS-232 with these parameters: 115200,n,8,1

Format of communication packets :

Byte 0 ... 0x71

Byte 1 ... 0xfe

Byte 2 ... 0x39

Byte 3 ... 0x1d

Byte 4 ... command

Byte 5 ... length of parameters

Byte 6 - n ... parameters

List of command codes:

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Commands in detail:

SETADFQRG:

Set the QRG of Receiver and Transmitter. The RX qrg ist set immediately. The TX qrg is set with the next transmission.

Length: 8

Parameters:

Byte 0	RX-qrg	LSB
Byte 1	RX-qrg	
Byte 2	RX-qrg	
Byte 3	RX-qrg	MSB
Byte 4	TX-qrg	LSB
Byte 5	TX-qrg	
Byte 6	TX-qrg	
Byte 7	TX-qrg	MSB

in DMR mode only simplex (RX=TX qrg) is allowed.

SETADFMODE:

Set the operating mode

Length: 1

Parameters:

Byte 0 ... mode

mode:

'D' = Dstar

'M' = DMR

'F' = Fusion C4FM

FLUSHTXBUF:

Sends all data from the TX buffer

length: 0

no parameters

ADFWRITE:

Write binary data to the transmit buffer. The data are then transmitted as soon as the TX buffer is filled (see also ADFSETTXBUF). The PTT is keyed automatically, a preamble is sent automatically.

Length: 1 to 245

Parameters: binary data stream to be sent. MSB is sent first.

ADFWATCHDOG:

The DV4mini returns a ADFWATCHDOG message upon receiving this message:

length: 0

no parameters

The DV4mini returns the following data:

Command: ADFWATCHDOG

length: 8

Byte 0 ... RSSI MSB

Byte 1 ... RSSI LSB

Bytes 2,3,4,5,6,7 ... serial number of the DV4mini stick

This message is used to read the RSSI and also to check if the DV4mini is still alive and connected.

ADFVERSION:

length: 0

no parameters

The DV4mini returns an ADFVERSION message including a variable length string with the version number of the firmware.

ADFSETSEED:

Write a random number to the DV4mini stick which is then used as seed for random functions.

Length: 4

Parameters:

Byte 0 value LSB

Byte 1 value

Byte 2 value

Byte 3 value MSB

“value” is a random number. The host PC usually takes this from the internal clock.

ADFGREENLED:

Switch on/of the green LED to show an RX sync

Length: 1

Parameters:

Byte 0 ... 0=off, 1=on

As soon as the host software recognizes a SYNC it can switch on the green LED.

ADFSETTXBUF:

Sets the size of the transmit buffer. This buffer is used to handle gaps in the received data stream.

Length: 1

Parameters:

Byte 0 ... buffer size in 100ms steps (min:100ms max:1500ms which is min:1 and max:15)

ADFGETDATA:

Request the contents of the receive buffer.

length: 0

no parameters

the DV4mini returns an ADFGETDATA message with variable length. The parameter field contains the contents of the RX buffer.

ADFSETPOWER:

Set the output power of the DV4mini 70cm transmitter.

Length: 1

Parameters:

Byte 0 ... value from 0(min) to 9(max)

ADFDEBUG:

This is only sent from DV4mini to the host. It contains a variable length string with debug messages which can be printed out.

Usual usage:

This sequence is usually used to operate the DV4mini stick:

1. using the ADFWATCHDOG command search for the stick
2. as soon as the stick is found implement a 1s timer which sends ADFWATCHDOG. Use the return value to a) check if DV4mini is still connected b) to read the actual RSSI value (if needed).
3. Set the operation mode SETADFMODE
4. set the RX and TX qrg SETADFQRG
5. set the output power ADFSETPOWER
6. to transmit data simply send a buffer using the ADFWRITE command. The transmitter is

keyed automatically.

7. Setup a timer (i.e. 100ms) which sends the ADFGETDATA command in order to read received data.