

SPROG DCC

SPROG II DCC Decoder Programmer Firmware User Guide



Table of Contents

Table of Contents	2
SPROG II Firmware User Guide	3
General Commands.....	3
Programmer Commands.....	3
Rolling Road Tester Commands	3
Bootloader Command	3
Input Format.....	4
Acknowledgement Messages	4
The Mode Word.....	4
Commands in Detail	5
M - Display Mode Word	5
M n - Set Mode Word	5
R – Read Mode from EEPROM.....	5
S – Display Status	6
W – Write Mode to EEPROM	6
Z [n] – ZTC Compatibility Mode	6
? - Display Help.....	6
ESC - Shutdown.....	6
Programmer Commands	6
Rolling Road Tester Commands.....	6
Bootloader Command	7
Useful Links	9

SPROG II Firmware User Guide

This section gives information for advanced users who may wish to write their own software for controlling a SPROG II.

Commands may be sent directly to SPROG II by using a terminal emulator program such as windows HyperTerminal, by using the SPROG II console in JMRI, or even from programs that you write yourself.

The virtual COM port should be set for 8 bits, no parity, one stop bit at a speed of 9600 baud. SPROG does not echo characters that are sent to it. All commands must be entered on a single line terminated by carriage return. Maximum input line length is 64 characters, including carriage return. Format of parameters is dependent upon the command. The maximum number of parameters on any line is 6.

General Commands

M [n] – Display [Set] operating mode
R – Read mode from EEPROM
S – Display Status
W – Write mode to EEPROM
Z [n] – ZTC Compatibility Mode
? - Display Help
ESC - immediately shutdown power to track

Programmer Commands

C CV [Val] - Read [program] CV using direct bit mode
V CV [Val] - Read [program] CV using paged mode

Rolling Road Tester Commands

A [n] – Display [Set] Address
O byte [byte] [byte] [byte] - Output bytes as DCC packet.
+ - Track power on
- - Track power off
<[step | <] - Reverse speed step[s]
>[step | >] - Forward speed step[s]

Bootloader Command

B a b c – Start Bootloader

Input Format

Input values are always parsed as decimal, unless overridden with 'b' or 'h' prefix for binary or hexadecimal, respectively. E.g. h15 is equivalent to 21 decimal. The O command is an exception to this rule.

Acknowledgement Messages

CV values are given in hexadecimal.

Message	Meaning
!O	Overload
!E	Error
No-ack	No acknowledge pulse received during programming
OK	Programming operation completed

The Mode Word

The “Mode Word” determines the operational mode of SPROG. If the mode is changed, the new mode may be stored permanently in EEPROM memory. The Mode Word is read from the EEPROM each time the SPROG powers up.

The Mode Word is a 16 bit binary value, with each bit corresponding to a particular feature, as shown in the table.

Bit	Name	Feature
0	UNLOCK	Unlock the firmware ready to receive an update via the bootloader. This bit is not stored in EEPROM and is cleared each time SPROG is reset
1	Reserved	SPROG II echoes all received characters if this bit is set
2	Reserved	Do not use, always set to 0 for future compatibility
3	CALC_ERROR	Set to calculate error byte for O command. If clear then error byte must be supplied on the command line
4	RR_MODE	Set for rolling road/test mode
5	ZTC_MODE	SPROG II uses modified DCC timing for older ZTC decoders
6	BLUELINE	Modify direct mode programming algorithm to suit Blueline decoders
7	Reserved	Do not use, always set to 0 for future compatibility
8	DIR	Direction for rolling road/test mode and booster mode. Set for reverse
9	SP14	Select 14 speed step mode for rolling road/test mode and booster mode.
10	SP28	Select 28 speed step mode for rolling road/test mode and booster mode.
11	SP128	Select 128 speed step mode for rolling road/test mode and booster mode.
12	LONG	Use long addresses in rolling road/test mode and booster mode
13-15	Reserved	Do not use, always set to 0 for future compatibility

Commands in Detail

M - Display Mode Word

Display the current mode word value.

M n - Set Mode Word

Set the Mode Word with the value n.

R – Read Mode from EEPROM

Read a previously saved mode word from EEPROM.

S – Display Status

Display SPROG II status - TBD

W – Write Mode to EEPROM

Write the current mode word to EEPROM.

Z [n] – ZTC Compatibility Mode

Some older ZTC decoders (e.g. ZTC401) require modified DCC timing.

Z 0 – return to normal DCC timing

Z 1 – Enable ZTC compatibility mode.

This command manipulates the ZTC_MODE bit of the mode word.

? - Display Help

Displays the SPROG II firmware version, e.g.:

SPROG II USB Ver 2.4

>

ESC - Shutdown

DCC output is turned off immediately.

Programmer Commands

C cv - Read a CV using direct bit mode

C cv val - Program a CV using direct bit mode

V cv - Read a CV using paged mode

V cv val - Program a CV using paged mode

If no val value is given, then these command read the specified CV and display the value in hexadecimal.

If val is given then it is written to the CV.

Rolling Road Tester Commands

A – Display Address

A n – Set Address

Display or set the decoder address (decimal) to be used in speed/direction packets. If a new address is set then current speed step will be reset to zero. This command does not perform any programming of decoder CVs.

O byte [byte] [byte] [byte] - Output bytes as DCC packet.

Any arbitrary DCC packet may be generated using this command. SPROG II

will add the correct pre-amble bits, start bits, and error byte. Note that all address and data bytes and, optionally, the error byte must be given on the command line, this command does not use the address set by the 'A' command. If the mode word CALC_ERROR bit is set then SPROG II will calculate the correct error byte which must not be given on the command line. If CALC_ERROR is not set then the error byte must be given on the command line, allowing erroneous packets to be generated for decoder testing.

Unlike other commands, bytes must be given as two hex digits *without* a h prefix.

+ - Track power on

Turn on track power and check for overload condition after 100ms. When there is no DCC data being transmitted, DCC pre-amble will be transmitted.

- - Track power off

Turn off track power.

<<[<] - Reduce/Reverse speed step[s]

>>[>] - Increase/Forward speed step[s]

Adjust speed step relative to current speed. If decoder is running in reverse then Reduce/Reverse will increase the reverse speed and Increase/Forward will decrease the reverse speed. If decoder is running forward then Reduce/Reverse will decrease the forward speed and Increase/Forward will increase the forward speed. Increment or decrement is determined by the number of '<' or '>' characters in the command. Speed will not increment/decrement past maximum forward or reverse speed step nor through zero. The current speed step will be reported after performing this command:

< - display Reverse speed step

< step - Set Reverse speed step

> - display Forward speed step

> step - Set Forward speed step

Set forward or reverse speed step directly.

Bootloader Command

B a b c - Start Bootloader

Exactly three arguments, a, b, c, must be given with the B command but their values are not checked. This helps prevent inadvertent issuing of the b

command. The B commands starts the bootloader ready to receive updated SPROG II firmware. In addition, the firmware must be unlocked by setting the unlock bit of the Mode Word.

Useful Links

SPROG homepage <http://www.sprog-dcc.co.uk> for the latest information, updates, downloads, etc., for SPROG II.

North American distributor for SPROG II <http://www.bbmgroup.com/sprog>

SPROG DCC Yahoo group <http://groups.yahoo.com/group/sprog-dcc> for latest news and discussion of DecoderPro.

Java Model railroad Interface <http://jmri.sourceforge.net> for DecoderPro.

JMRI Yahoo group <http://groups.yahoo.com/group/jmriusers> for latest news and discussion of DecoderPro.

Sun Microsystems <http://java.sun.com> to download the Java programming language JRE required by DecoderPro.