Junior Computer][PrintMonitor operation manual

If no terminal is connected or recognized, the Junior Computer][behaves exactly like the original Junior Computer.

If a VT100 compatible terminal is connected, it must be configured as follows:

```
2400, 3600, 4800, 7200, 9600 oder 19200 Baud
8 Bit, No Parity, 1 Stop Bit
```

The actual terminal baud rate is automatically recognized by the Junior Computer][.

If the keyboard does not respond, a higher baud rate may need to be selected. For example, a transmission rate of 2400 baud will not work with the ESP32 terminal.

With the latest ROM version and a revision 3 board, an automatic power-on reset occurs and the speaker beeps once. For older versions of the board or if there is no beep, the RST (Reset) button must be pressed once.

The advanced monitor can be called manually by pressing the **AD** (address) key, entering the address E000 using the hex keyboard, and then pressing the **GO** key.

If no connected terminal is recognized, the computer jumps back to the reset address `1C1Dh` of the original Junior Computer ROM.

If a terminal is recognized, the start screen is displayed and the hex monitor can be started by pressing the **M** key.

All inputs are not case sensitive. So 'M' and 'm' are interpreted as equal.

The maximum input length in the hex monitor is 255 characters.

The input prompt is displayed in the hex monitor

```
*
```

Here you can enter the following commands:

- Enter a hexadecimal address and confirm with <Return> to display the content of a single memory address.

```
*E000

E000- 4C
```

- Enter a start and end address separated by a . (period) to show a block of memory.

```
 *E000.E008

 E000- 4C DC F8 A4 F8 B1 F6 E6    F8
```

 The listing can be interrupted at any time by pressing the <Esc> key.

- A dump command followed by a **PD** (print dump) command outputs the data to a connected parallel printer.

- To change the data of a specified address, enter the address followed by : (colon).
 Then enter one or more (hex) data bytes and finally confirm with <Return>.

```
 *200: 4C 00 F8
```

- [startaddress] **G** (Go) jumps to a user routine and executes it

```
 *200G

 0200-R
```

 If no start address is specified, the command jumps to the last address stored in the address register. If the called program terminates with an RTS op-code (ReTurn from Subroutine), the GO command automatically returns to the print monitor.

- Inputs can be cascaded

```
 * E000 200.202

 E000- 4C
 0200- 4C 00 F8
```

[startaddress[.endaddress]] **L** (List) disassembles the 6502 instructions starting from the last specified address. If no end address is specified, the next 23 instructions are displayed.

```
 *E000L

 E000- 4C 00 F8    JSR   $F800
 E003- AD 01 16    LDA   $1601
 E006- 29 08       AND   #$08
 E008- F0 F9       BEQ   $F808
 …
 E030- 8D 00 16    STA   $1600

 *L

 E033- 60          RTS
 E034- A2 02       LDX   #$02
 …
```

- [startaddress[.endaddress]] **P** - like **L,** but outputs the data to a connected parallel printer.

- **LM** (Load Modem) starts the XMODEM/CRC read mode.

The message "Begin data transfer. Press <ESC> to abort" is shown on the terminal.

The loading process can be aborted by pressing the <Esc> key. In the terminal, select the file that you want to send to the junior computer. If the download is completed without errors, the message "Transfer successful" is displayed. Otherwise the message "Transfer error" appears and the loading process has to be repeated.

The full command is:

[startaddress [. endaddress]] LM

where all values in square brackets are optional. If the **LM** command is entered without any additional parameters, the load routine reads the start address under which the data is to be stored from the first two bytes of the data stream.
If a start address is specified, the first two bytes of the data stream are ignored and the data is stored at the specified address.

The XMODEM protocol always loads and stores complete data blocks with a size of 128 bytes. If the file to be loaded has a size that is not a multiple of 128 bytes, the remaining data bytes are padded with the value 1Ah and written to memory.

By specifying an end address, overwriting of data in memory can be prevented.

Examples:

`LM`   reads data from an input file to the address specified in the first two bytes

`2000 LM`   reads data from an input file and stores it at address 2000h

`300.400 LM`   reads data from an input file and stores it at address 300h up to and including address 400h

After loading, the monitor returns to the prompt. There, by entering G (Go), a possibly loaded program can be executed immediately without specifying a start address.

- **SM** (Save Modem) starts the XMODEM/CRC write Mode.

The message "Begin data transfer. Press <ESC> to abort" is displayed. Pressing the <Esc> key aborts the saving process. The name of the file to be received must now be selected in the terminal program. If the save process is completed without errors, the message "Transfer successful" is displayed. Otherwise the message "Transmission error" appears and the saving process has to be repeated.

The full command is:

startaddress . endaddress SM

A memory dump from the start address up to and including the end address is written to the output file.

The first two data bytes of the output file contain the start address in LSB MSB format. So with a start address of 2400h, the first two bytes are 00 24.

It is written in complete data blocks of 128 bytes each. Missing bytes are filled with the value 00h.

Example:

`2000.21FF SM`   writes all data from address 2000h up to and including 21FFh to an output file

Only the XMODEM protocol with 16-bit CRC check for both reading and writing data is supported.

- Enter **Q** (Quit) and confirm with <Return> to return to the start screen.

- **M** (Monitor) calls the original Junior Computer Monitor program at address `1C1Dh`.

April 2022, Jörg Walke