

### 3.3 Using the Tape system.

Because the Mode 7 Simulator ROM is undertaking a large number of background 'housekeeping' tasks under interrupt, it is unable to respond quickly when cassette data is detected.

Therefore, when tape operations are in progress ALL interrupts apart from tape interrupts are disabled. This means that the Electron's timers will not be updated.

Also, to maximise processor speed, the screen will be blanked and mode 6 will be selected, as described in the previous section. This leads to a flashing effect because the mode 2 screen is re-instated between data blocks on the tape so that you can read the printed messages.

Normal operation will be restored after about four seconds with no data received.

### 3.4 Mode 7 Memory Map.

Display pointer	&7FFF	)
variables	&7FE8	) Always in main
		) memory
Mode 7 code		)
store memory	&7C00	(HIMEM if Master
		RAM active)
Mode 2 display	&7800	)
memory		) In shadow memory
		) if Master RAM active
Update pointer	&2800	)
variables	&27E0	(HIMEM if Master
		RAM not active)
ROM vector	&180	) Always in
entry code	&150	) main memory

### 4.1 Operation of the function keys.

As you may be aware, the Electron has an extended system of function keys that normally produce BASIC keywords. If you are not familiar with this, de-activate the Mode 7 Simulator ROM with CTRL-BREAK then press and hold down the FUNC key (top left, just below ESCAPE) and press A. The BASIC keyword "AUTO" will appear on the screen.

The BBC micro does not have this extended system, but just has 10 function keys, equivalent to FUNC-1 to FUNC-0 on the Electron. Extra functions can be obtained on the BBC micro by pressing SHIFT, CTRL, or CTRL and SHIFT as well as the function keys. Several programs make use of these extra functions, eg. Wordwise-Plus, so when the Mode 7 Simulator ROM is active the keyboard is modified to simulate the BBC micro situation:

the bottom row of function keys (FUNC-Z to FUNC-/) are equivalent to SHIFT-f1 to SHIFT-f0.

the next row of function keys (FUNC-A to FUNC-;) are equivalent to CTRL-f1 to CTRL-f0 (FUNC-: is inhibited).

the row under the numbers (FUNC-Q to FUNC-P) are equivalent to SHIFT-CTRL-f1 to SHIFT-CTRL-f0.

FUNC-= is equivalent to SHIFT-CTRL-COPY.

So if you are running a BBC program that instructs you, for example to "press CTRL-f6" the key you should press is FUNC-H.

TAB = CTRL I

Of course, you may be using mode 7 in an Electron program that expects the Electron key functions. In this case you should type:

**\*EFN <RETURN>**

and the keyboard will return to normal operation. To get back to BBC function mode type:

**\*BFN <RETURN>**

In some situations you will find it necessary to press <BREAK> after these commands to get the expected results.

#### 4.2 Operation of the shifted cursor keys

Just as described in the previous section for function keys, so the cursor and COPY keys in the BBC micro have extra SHIFT and CTRL functions.

When the Mode 7 Simulator ROM is active and a program is running that expects SHIFT-cursor and CTRL-cursor these are correctly interpreted.

The various symbols on the Electron cursor keys will then be accessible instead by pressing CTRL along with a number key (1 to 9):

CTRL	CTRL	CTRL	CTRL	CTRL	CTRL	CTRL	CTRL	CTRL	CTRL
-1	-2	-3	-4	-5	-6	-7	-8	-9	✓
:	~	£	_	{	}	^	[	]	~

To test these characters for yourself, first disable cursor editing by typing:

**\*FX4,1 or \*FX4,2.**

#### 5.1 Mode 7 Simulator ROM command summary.

**\*MODE7ON** followed by BREAK activates the ROM. CTRL-M-BREAK will keep the ROM active.

**\*MODE7OFF** followed by BREAK de-activates the ROM. So does CTRL-BREAK.

**\*MODE7.** followed by BREAK toggles between the two. That is, if the ROM is inactive it is interpreted as \*MODE7ON, and if the ROM is active it is interpreted as \*MODE7OFF.

N.B. the above commands can all be shortened by not typing the central "ODE" section, eg. type:

**\*M7ON <RETURN> <BREAK>**

and the ROM will be activated.

**\*EFN** Interpret function keys as Electron function keys. (See section 4.1).

**\*BFN** Interpret function keys as BBC micro SHIFT/CTRL function keys (See section 4.1) - this is the default when the Mode 7 Simulator ROM is active.

**\*MRAP** Select Rapid updating mode (See section 3.1) - this is the default with Wordwise or the Master RAM board active.

**\*MNORM** Select Normal updating mode (See section 3.1) - this is the default with neither Wordwise nor the Master RAM board active.

### Direct Keyboard Entry.

If you are in BBC function key mode (see section 4.1) you can enter codes 129 to 137 directly. FUNC-Z (SHIFT-f1) corresponds to 129, FUNC-X (SHIFT-f2) corresponds to 130, and so on up to FUNC-. (SHIFT-f9) which corresponds to 137.

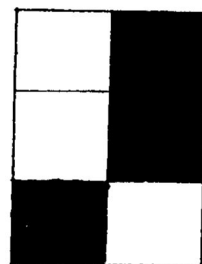
### Graphics Characters.

Following a graphics control code all lower case and numeric characters are printed as graphics instead. Each graphics character takes up as much space as that allocated to an alphanumeric character and is split up into six blocks. The code for any particular character is calculated by assigning a number to each block, adding up the numbers for the blocks required and adding 160 to that.

The numbers are:

1	2
4	8
16	64

so the code for:



would be 186.

For example, to get a green copy of this shape type:

**VDU146,186:PRINT <RETURN>.**

### Flashing Characters.

The Mode 7 Simulator ROM can only produce flashing characters which go between their normal colour and black. So if you have a flashing character on a coloured background it will not disappear completely as it flashes.

## 7. \*MCOMM - The Prestel Terminal.

This software allows the Electron to be used as a 1200/75 baud viewdata terminal. When used with an RS423 adaptor, a modem and a telephone, services such as Prestel and viewdata Bulletin Boards run by enthusiasts around the country, can be dialled up.

With the RS423 adaptor, modem and telephone connected, activate the Mode 7 Simulator ROM and type **\*MCOMM <RETURN>**. The menu screen will be displayed. Press <ESCAPE> and the screen will clear. Dial the Prestel or Bulletin Board number and when you hear a high-pitched whistle press the DATA button on your modem.

Pages are normally accessed by typing a sequence ending in #. The <RETURN> key has been programmed to send a #, so to access for example page 800 you should type:

**\*800 <RETURN>**

Pressing <ESCAPE> will return to the menu screen (but remember your phone bill!). From the menu you can enter the following commands:

- \* allows you to enter operating system \* commands. When you have finished, type <RETURN> or <ESCAPE> to return to the menu.

- L Loads in a function key file called KEYS. This will have been created by entering \*KEY commands to program the keys and then typing:

**\*SAVE KEYS 800 C00.**

Press <RETURN> or <ESCAPE> to return to the menu.

You may wish to program function keys with numbers of regularly used pages. The normal !M sequence can be used to represent the <RETURN> key, eg. **\*KEY1!\*800!M**. If you include your Prestel ID number and password take great care over the security of your disc.

While you are on the terminal screen various facilities are available from the function keys. If you press the CTRL function keys (FUNC-A to FUNC-;) then the \*KEY strings that you have programmed will be sent.

The ordinary function keys have the following effects:

- f1 stores the number of the current page in the 'tag' store so that it can be recalled later. A bleep will sound when the operation is complete. The tag store is 256 bytes long and wraps round on itself.
- f2 fetch the next page from the tag store by sending its number. If the tag store is empty a bleep will sound. The fetch operation wraps round from the last page tagged back to the first.
- f3 clear the tag store. A bleep will sound when the operation is complete.
- f4 reveal any hidden text on quiz pages by removing any conceal control codes.
- f5 download telesoftware onto disc. This should only be used when instructed on the displayed page. The number of pages to be received will be checked, then you will be given the option of changing the filename to be used. If you wish to use a different filename press N then follow the prompts. While downloading, pages of what look like garbage surrounding readable text will appear. As each page is received the lower case suffix letter to the page number will increment. If there are any errors in the page it will be repeated up to six times and then the download will abort and an error message will be printed.  
Note that after an error the page that prompted you to press f5 will be displayed. This is not necessarily the last page that was sent, so you should press f8 to repeat the last page sent before continuing.

f6 toggles the programming of the <RETURN> key between # and actual <RETURN>. This is to allow the use of the Telecom Gold or other 'Gateways' from Prestel which require <RETURN> at the end of an input instead of #. The new character will be sent when f6 is pressed, then <RETURN> can be used again. If you press <RETURN> and do not get the expected result, try re-programming it with f6.  
The re-programming also applies to the IM sequence in function key strings, so that these can be set up to send Telecom Gold commands as well.

f7 sends an Escape code (decimal 27, hex &1B). This can not be done with the Escape key because the terminal uses it to change to the menu.

f8 repeat the current page by sending the \*00 command.

f9 request the previous page by sending the \*# command.

f10 log off by sending the \*90# command.

COPY saves the current screen on disc. You will be prompted for a filename.

While a page is being received, only the characters that are actually sent will be displayed. The rest of the page will be updated (see section 3.1) afterwards.

The terminal uses 1024 bytes of main memory between &2300 and &2700 as an RS423 input buffer. This is because it can not act quickly enough to stop the original 256 byte input buffer overflowing and producing garbage. The new buffer is large enough to hold a complete page.

The telesoftware downloading buffer is situated in main memory between &1F00 and &2300.