Support Group Application Note
Number: 036
Issue: 4
Author:

Acorn

Master 128 Welcome Disc"Converter" Program

Some commercial software written for the BBC Model B or B+ may not work on the Master Series computers because of minor changes in the specification of the machine or because the software is badly written. This program attempts to provide an environment more similar to the Model B computer in order to overcome some of these problems.

Applicable Hardware : BBC Master 128

Related Application Notes:

Support Group
Acorn Computers Limited
Acorn House
Vision Park
Histon
Cambridge CB4 4AE

The changes provided are as follows:

a) Forcing OSHWM to &1900 (some programs assume that PAGE will be at least this high).

b) Setting MODE 7 (some programs assume this).

c) A simulation of FX20 is provided. On issuing this command characters 32-126 (&20-&7E) are reset to their normal patterns, read from 'ROM' (actually the MOS's private RAM). All other characters are undefined.

In the default state (FX20,0), any attempt to define a character will copy the corresponding bank of 32 characters into page &C00 and then define the character, so a maximum of 32 soft characters are available.

In FX20,1 state OSHWM is moved up by 1page, and this page is used for characters &10-&BF; all other characters when defined will be put in page &C00.

In FX20,2 state OSHWM is moved up by 2 pages:
the 1st page is used for characters &A0-&BF;
the 2nd page is used for character &C0-&DF.
All other characters use page &C00.

In FX20,3 state OSHWM is moved up by 3 pages:
the 1st page is used for characters &A0-&BF;
the 2nd page is used for characters &C0-&DF;
the 3rd page is used for characters &E0-&FF.
All other characters use page &C00.

In FX20,4 state OSHWM is moved up by 4 pages:
the 1st page is used for characters &A0-&BF;
the 2nd page is used for characters &C0-&DF;
the 3rd page is used for characters &E0-&FF;
the 4th page is used for characters &20-&3F.
All other characters use page &C00.

In FX20,5 state OSHWM us moved up by 5 pages:
the 1st page is used for characters &A0-&BF;
the 2nd page is used for characters &C0-&DF;
the 3rd page is used for characters &E0-&FF;
the 4th page is used for characters &20-&3F;
the 5th page is used for characters &40-&5F.
All other characters use page &C00.

In FX20, <6-255> state OSHWM is moved up by 6 pages:
the 1st page is used for characters &A0-&BF;
the 2nd page is used for characters &C0-&DF;
the 3rd page is used for characters &E0-&FF;
the 4th page is used for characters &20-&3F;
the 5th page is used for characters &40-&5F;
the 6th page is used for characters &60-&7F.
Characters &80-&9F use page &C00.

d) Some programs attempt to define soft characters by putting data in page &C00 (or above OSHWM is FX20,n has been issued).

The converter attempts to overcome this by looking at the font flags byte every time a character is printed. If this indicates that the character is stored in 'RAM', then the 8 bytes corresponding to that character are copied over to the MOS's character workspace, where the real soft characters are stored. In addition, when a character is defined, the bytes are put in the page specified by the font page locations, as well as being passed to the MOS for storage in its workspace.

e) Some programs use the abbreviation '*D.' for '*DISC', '*CO.' for '*CODE', or '*LI' for '*LINE'. Using abbreviations in commercial software is normally considered bad practice, as paged ROMs in higher priority sockets may interpret the command as one of theirs (eg *DISARM). In this case the command '*DUMP", '*CONFIGURE' and '*LIST' have been added to the operating system and the above abbreviations are mis-interpreted as these. The converter intercepts the command line interpreter and converts any abbreviation of these commands to the full command.

f) On the BBC Model B, OSBYTE 179 is defined to read the primary OSHWM, ie the value OSHWM would be if no pages were reserved for soft characters. On the Master Series, this call has been reused because soft characters do not move OSHWM up. The converter sets up this call to return &1900. The converter also sets up the normal OSHWM value to <primary HWM>+<FX20 state>.

g) Some programs check the value of INKEY(-256) (or the equivalent OSBYTE) in order to prevent the software running on inappropriate machines (eg Electrons). The converter makes this call return -1, ie the value returned by OS 1.20.

h) On the first release of the system, the 1770 DFS (version 2.20) does not return a value of 1 in the accumulator on return from a successful OSFILE load (ie OSFILE entered with A=&FF). The converter intercepts OSFILE if the DFS is the current filing system, and sets A to 1 on exit from this call (1770 DFS version 2.24 correctly returns A=1).

i) On OS 1.20 locations &E0, &E1 pointed to a 640 x multiplication table in the MOS RAM. Some applications software needs a table of this kind for its own VDU handling routines, and assumes that these locations point there. On the Master Series no table of that form exists, and locations &E0, &E1 are used for other purposes. The converter provides its own multiplication table, and on exit from every OSWRCH call points locations &E0, &E1 to it.

j) Some programs assume that the soft key buffer is at &B00, and load soft key definitions directly there. The converter intercepts OSRDCH and INKEY, to checksum page &B00 and if it has changed since the last time, sets up real soft key definitions corresponding to the contents of page &B00. Note that if ANFS is present, programs that poke page &B00 may interfere with network operations.

k) Some programs write directly to locations &367-&36E, which on OS 1.20 contain the font ROM/RAM flags, and the font page locations. The programs do this so they can store soft characters in other pages, eg pages &900, &A00. On the Master Series all fonts are stored in the MOS's private RAM, so these locations have been reused.

The converter sets up these locations as they would be on a Model B, having preserved their original values elsewhere. Then on entry to OSWRCH it refers to these locations to see if the character being printed is stored in 'RAM', and if so, copies the 8 bytes for that character into the MOS's soft character workspace. Then before calling OSWRCH it copies the locations away, restoring the old values for the duration of the call before swapping them back on exit!

l) On OS 1.20, the TAB(X,Y) vdu sequence has no effect while in VDU 5 mode. On the Master Series this command has now been implemented in this mode, to move the graphics cursor accordingly. Unfortunately, some software 'accidentally' issues this sequence while in VDU 5 mode and relies on it not having any effect. The converter intercepts this sequence an suppresses it when in VDU 5 mode.

m) Some programs simulate a reset by calling the reset vector and assume that the disc filing system will be selected. On the Master Series the filing system is normally preserved over BREAK. The converter issues a '*DISC' command on every reset. This can still be overridden by holding down a key which is recognised by a filing system, eg the space bar selects the cassette filing system.

n) Some software uses the *TYPE command (resident in the DFS on Model Bs) to send VDU sequences to the screen (even though this version of *TYPE calls OSACSI, which messes up sequences containing character 13). On the Master Series, the MOS provides a *TYPE command which converts control codes into GSREAD format (eg |L for character 12), and also allows for the termination of lines by CR, LF, CRLF or LFCR.

The converter provides its own *TYPE command which more closely resembles the one in DFS 1.20.

How it works

The converter program resides in a bank of sideways RAM. On the reset service call (&27), code is copied to &DD00 in the filing system RAM and the OSCLI, OSBYTE, OSWRCH and OSRDCH vectors are pointed into this code. On the vectors claimed call (&0F) the OSFILE vector is intercepted if the new filing system is the 1770 DFS.

Note that because the vectors point into the filing system RAM, a program which calls OSBYTE from an event routine which is entered during an OSWRCH call will probably crash the machine, because he filing system RAM will not be paged in at that time.

How to load the converter

<Cassette>
To install the converter program, wind the Welcome cassette to the appropriate place, and type
    CHAIN "CONVERT"
then follow the instructions.

<Disc>
To install the converter program, mount the Welcome disc and type
    CHAIN "CONVERT"
then follow the instructions.

The converter will remain installed until you switch off the computer or you load another image into sideways bank 4.