MICROTEXT

TELETEXT/TELESOFTWARE

ADAPTOR FOR THE

AMSTRAD 'CPC' COMPUTERS

CONTENTS

FOREWORD

Thankyou for choosing the Microtext Teletext Adaptor for your Amstrad. The adaptor was designed and built to a high standard and uses the very latest technology to give you a high performance unit that with care should give years of trouble free service.

Please note that you must have a valid television licence to use the adaptor and that this should be for colour if your computer has a colour monitor.

Microtext will not be liable for any claims for damages or losses arising out of any feature of the product. This does not affect your statutory rights.

INTRODUCTION

You now have access to the Ceefax and Oracle Teletext services available in the U.K. both the services are completely free, the BBC's service on BBC1 and BBC2 being financed from the licence fee and the Oracle service on ITV and Channel 4 from advertising. The adaptor may also be used on the Teletext services in many overseas countries including Australia, Austria, Belgium, Denmark, Dubai, Finland, West Germany, Eire, Italy, Malaysia, Netherlands, New Zealand, Norway, Portugal, Spain, South Africa and Sweden.

Telesoftware for the Amstrad is available in the U.K. on the Channel 4 '4-Tel' service.

The Microtext adaptor uses the tuning circuitry you've already got at home in your video to provide cost-effective Teletext facilities. An additional aerial or power supply is not required.

GETTING STARTED

The Microtext adaptor comes complete with software on cassette, a connecting lead and the manual. Each adaptor is carefully checked and tested before despatch.

1. The software supplied should now be copied to your own cassette or disc using the following procedure and the 'master' safely stored away.

Disc users:-

```
Rewind the tape.
MEMORY 31000
|TAPE
LOAD "teletext"
|DISC
SAVE "teletext"
|TAPE
LOAD "textcode"
|DISC
SAVE "textcode",b,32768,5800
```

Cassette users:-

```
Load and rewind the master tape.
MEMORY 31000
LOAD "teletext"
LOAD "textcode"
Load your own cassette, rewind.
SPEED WRITE 1
SAVE "teletext"
SAVE "textcode",b,32768,5800
Rewind your tape.
```

Your own copy of the software will load much faster than the original supplied and should be used from now on when you wish to use the adaptor.

2. Connect the lead between the socket on the adaptor and the 'Video out' socket on the rear of your video recorder. The standard lead supplied is fitted with a 'BNC' connector which is suitable for the overall majority of video recorders, however, other connectors are sometimes used and should the connector supplied not be suitable for your machine then please refer to the 'VIDEO CONNECTIONS' section of this manual.

3. With your computer switched off, fit the adaptor onto the 'Floppy Disc' port of a 464 or the 'Expansion' port of a 664 or 6128 taking care to line up the polarizing key of the adaptor's connector with the slot on the computers connector. Switch on your video and select BBC1. Switch on the computer and check that the power light comes on and if not switch off and check the connections.

3. The software may now be run with RUN "teletext" (or RUN "" for cassette users), once the software has loaded, after a short delay (no more than 30 seconds) the index page for the BBC's CEEFAX service on BBC1 should be displayed.

USING TELETEXT

Selecting pages.

Using Teletext is simple, each page has a three digit number and Teletext pages are selected by simply entering the number for the page you require, the top line of the display will go green and the numbers of some of the other pages on the service will be displayed whilst the adaptor is waiting for your selected page to come in.

Changing channels.

Different Teletext services are present on all four channels in the U.K. and channel changing is done on your video recorder. Page 100 is automatically selected by the adaptor on power-on as this is the index page for the services on BBC1 and ITV. The index page for BBC2 may be found on 200 and Channel 4 on 400.

As well as selecting pages by typing their number some other facilities are available which are selected by simply pressing the appropriate key.

'N' Next page. If you have selected page 105, pressing 'N' will cause 106 to be selected.

'B' Back a page. From 105 the adaptor will select page 104 etc.

'R' Reveal. Some pages have hidden sections such as the answers to puzzles or jokes and these are revealed by pressing 'R'.

'H' Hold. Some pages may be several screens long and are updated at a preset rate, you can hold a particular page by pressing 'H'. 'HOLD' will be displayed in the top right-hand corner of the screen. Hold is released by pressing any key.

'P' Print. If you have a printer connected to your Amstrad, the page on your screen will be sent to your printer.

'S' Save. Pages may be saved to Disc or cassette by pressing 'S', you will be prompted to enter a filename and after pressing 'enter' the page will be saved by that name.

'L' Load. Saved pages may be later reloaded, again you will be asked for a filename and a previously saved page will be reloaded and displayed.

'T' Load Telesoftware. Don't press 'T' unless you mean it ! Please see the next section for a full description of this facility.

TELESOFTWARE

Both the BBC and Channel 4 are transmitting Telesoftware - computer programs specially encoded and transmitted on Teletext pages. The Microtext adaptor will load this software into your computer just as if it came from disc or cassette.

Telesoftware is loaded by the adaptor automatically just press 'T' followed by the number for the page you wish to load.

The display area is cleared and various status messages will be displayed as loading of Telesoftware progresses. The various messages and their meanings are explained below:-

WAITING

The adaptor is waiting for a page.

WAITING FOR BLOCK nn

Some telesoftware is 'ordered' which means that the adaptor must wait for BLOCK 1, load it, then wait for, then load BLOCK 2 etc.

CRC ERROR

A cyclic redundancy check (CRC) is added to pages which carry telesoftware to ensure that any errors in the received data are detected, the page is then ignored, it will soon be sent again and hopefully received OK next time.

PARAMETER ERROR nnnn

This message is displayed if the data being transmitted does not comply with the RTF (Redefineable Telesoftware Format) standard used by the adaptor.

FOUND BLOCK nn

The received page has passed the crc and parameter checks.

LOADING

The page (or block) is being loaded into the computer.

When loading is complete, the normal 'Ready' prompt will appear on the screen. At this point the program loaded from Telesoftware will have replaced the Microtext Basic program. This may now be saved to disc or cassette in the normal way. If the program fails to run straight away, press Control-Shift-Escape, reload and run the saved version.

Overiding CRC protection.

CRC errors are, more often than not, an indication that the signal being received is poor. However, sometimes CRC errors can be found even when 100% Teletext is the norm. This is due to the CRC being sent by the Broadcasters being incorrect. The 'O' command provides a solution to this annoying problem but should only be used if the CRC OK message is NEVER seen whilst attempting to load a

Telesoftware program. To use, enter '0' before entering 'T', this will overide the CRC checking mechanism in the adaptor and results in the extra status message 'IGNORING CRC ERROR' being displayed. Please note that this command should only be used as a last resort, as a side effect is that any real errors received may be allowed through. The parameter checking routine will catch most of them and may result in the 'PARAMETER ERROR' message being displayed from time to time. Messages such as 'LINE TOO LONG' and 'DIRECT COMMAND FOUND' mean, unfortunately, that you will have to start again.

Telesoftware on Channel 4.

The telesoftware index on channel 4 is currently on page 460 and this page should be consulted for details of programs available. The service for the Amstrad started in February 1986 and it is hoped that more and more software will be available as the service takes off.

Telesoftware on CEEFAX.

CEEFAX Telesoftware may be found on page 700, currently all the software transmitted by CEEFAX is for the BBC micro and so will not run on the Amstrad. But some 'text only' files such as an education newsletter and some background information on the 'Microlive' television program will be of interest to Amstrad users. To access this information enter 'T' and the page No. you require, wait for the data to load and then enter and run the small program given on the next page.

```
10 n=&3000
20 last=PEEK(&8039)
30 last=last+256*PEEK(&803A)
40 IF n=last THEN 80
50 PRINT CHR$(PEEK(n));
60 n=n+1
70 GOTO 40
80 END
```

WRITING YOUR OWN PROGRAMS

The software for the adaptor consists of a small 'executive' program written in Basic and the machine code section which loads into memory at 32768 (8000 hex). The interface to the machine code section is straight forward and this concept enables the user to access Teletext data from his (or her) own programs without the need to get involved with the intricacies of the adaptor. The basic program is contained in a file called "TELETEXT" and machine code in "TEXTCODE". The machine code section is always required to be loaded when the adaptor is in use but the basic section may be modified for your own use or even replaced by your own program. A simple example program is given on page 13. The first lines of your program should read as follows:-

```
10 MODE 0
20 MEMORY &7C00
30 LOAD "TEXTCODE"
40 CALL &8000
```

There follows, details of the function of each routine within the machine code section of the software, each is a subroutine and should be accessed with a CALL statement to the entry address given. All entry points are vectored and will remain the same in any future releases of software so retaining compatibility. Addresses are given in hexadecimal.

8000 System Initialise.

This routine must be called at least once before any of the other routines are used.

8003 Select page.

The page number required is specified as three parameters to the CALL. Each parameter specifies a page number digit whose value must lie between &30 to &39 (1-9) or from &41 to &46 (A-F).

8006 Is page in ?

The byte at 8036 will be set to 1 by this routine if the adaptor has received the page previously requested.

8009 Write page to RAM.

This routine will copy the content of the page received from the adaptors own internal memory to the computers memory, the page will then occupy the 960 bytes from 7C40 to 7FFF inclusive, line 1 being stored at 7C40 to 7C67, line 2 at 7C68 to 7C8F and so on. Direct access to this data from your programs may be achieved with PEEK statements. See the last section of the 'Teach in' for the interpretation of some of the characters used.

800C Display page.

This routine takes the 960 bytes from the computers memory at 7C40 and displays it on the screen in Teletext format.

800F Display line 1.

This routine will read the first line of a page (40 bytes) from the adaptors memory into the computers memory starting at 7C40 and then update the top line of the display with the data read.

8015 Print page.

The print page routine sends the content of the page memory at 7C40 to the printer in Teletext format.

A SMALL EXAMPLE PROGRAM

```
10 REM Load machine code routines.
20 MODE 0:MEMORY &7C00:LOAD"textcode"
30 REM Set up inks for display.
40 INK 0,0:INK 1,6:INK 2,18:INK 3,24
50 INK 4,2:INK 5,8:INK 6,20:INK 7,26
60 BORDER 0:SPEED INK 48,16
70 REM Initialise Adaptor.
80 CALL &8000
90 REM Request page 119.
100 CALL &8003,ASC("1"),ASC("1"),ASC("9")
110 REM Wait for page to arrive.
120 CALL &8006:IF PEEK(&8036)=0 THEN 120
130 REM Small delay while adaptor loads page.
140 FOR d=1 TO 50:NEXT d
```

```
150 REM Copy page from adaptor to RAM @ 7C40
160 CALL &8009
170 REM Display page on screen.
180 CALL &800C
```

TELETEXT Teach-in.

A television signal contains hundreds of individual lines. Each line contains brightness and colour information for a particular line on the screen and when each is suitably demodulated and displayed, a complete picture is formed. The whole picture is repeated 50 times a second. The first twenty two lines contained in the television signal are not displayed on a properly adjusted television and sixteen of these may be used by the broadcasters for Teletext information. You may have seen a series of 'dancing dots' at the top of the picture on a badly adjusted television, those dots were Teletext. Although up to sixteen lines may be used, the broadcasters are currently using six or seven of these for Teletext. The data is sent as a digital stream with a '1' represented by white and a '0' by black, each of the picture lines used contains Teletext data for the whole of one line of a Teletext page. Therefore with six Teletext lines 50 times a second and 24 lines to a page, pages are transmitted at an approximate rate of 12 per second. The data itself consists of 360 bits with one bit every 144 nanoseconds (a data rate of 6.9375 Megabits/second). These 360 bits are organised as 45 eight bit bytes. The first two of these are always set to the pattern 101010 etc and enable

the adaptor to synchronise its internal crystal oscilator with the incoming data so as to ensure that it is 'clocked' in the middle of each data bit. The next byte is always set to 11100100 and is used by the adaptor to gain 'frame sync' so ensuring the precise timimg of the loading of complete 8 bit bytes. This synchronisation process is performed by the adaptor on every line containing Teletext data. Having acheived synchronisation with the incoming data from the first 3 bytes, the adaptor then goes on to interpret the remaining data. The next two bytes contain a row number and are hamming coded. This coding consists of 'information bits' and 'protection bits', these are decoded by the adaptor in such a way that even if an error is present then the correct result will be obtained or if multiple errors are detected then the whole line will be ignored. Whilst waiting for a page, the adaptor decodes this row No. and waits until row 0 is received, it is this row that contains the page number (also hamming coded) and is used to instruct circuitry within the adaptor whether to load subsequent lines or not. The row 0 of other pages is displayed on the top of the screen whilst the adaptor is waiting for a page to come in. Having received the row 0 of the page required, the adaptor loads any subsequent Teletext data lines into its own internal memory and continues to do so until the next row 0 is received. The remaining 40 bytes of each line of data (except if the row No. = 0) contain the information for the 40 characters of a Teletext page. Each character is encoded with odd-parity and if the adaptor spots a parity error, it will replace that character with a space but only if the character in that position on the page was not

previously received correctly. In this way, even if the Teletext signal is very poor, as each page is likely to be repeated with the same information, a correct display will eventually be built up on the screen. All of these error handling precautions are provided in the light of the fact that there is no such thing as a perfect Teletext signal. A measure of the quality of a Teletext decoder is how well it performs in the presence of errors and in this respect the Microtext Teletext adaptor is second to none.

As you have seen on your display, various display attributes such as colour, graphics, flash etc. are sent along with the Teletext data, this is done with control characters which are written into the computers memory along with the ascii characters. All of the characters in this area of memory at 7C40 have d7 set to 0. Characters having a value above 31 (1F) are in general, standard ascii codes, those below 32 (20) are control codes, they are normally displayed as a space and the function of each is explained below with reference to the decimal value of the character.

00 This code is not used.

01 Alpha red. Subsequent characters are to be displayed in red as text (letters and numbers etc).

02 Alpha green. As above but green.

03 Alpha yellow.

04 Alpha blue.

05 Alpha magenta (purple).

06 Alpha cyan (light blue).

07 Alpha white.

08 Flash. Subsequent characters are to flash.

09 Steady. Subsequent characters dont flash.

10 End box. Used to 'box' subtitles on Teletext TV's.

11 Start box.

12 Normal height. Characters are to be single height.

13 Double height. Characters and the background colour are to be twice the normal height.

14,15 and 16 Not used.

17 Graphics red. Subsequent characters (except upper case letters) are to be interpreted as graphics symbols.

18 Graphics green.

19 Graphics yellow.

20 Graphics blue.

21 Graphics magenta.

22 Graphics cyan.

23 Graphics white.

24 Conceal display. Characters are to be replaced by spaces until 'reveal' is activated.

25 Contiguous graphics. Graphic symbols are to consist of joined up blocks.

26 Seperated graphics. Graphic symbols to consist of seperated blocks.

27 Not used.

28 Black background.

29 New background. The background colour is set to that of the current foreground colour.

30 Hold graphics. Instead of a space, control characters are to be displayed as the last graphic symbol used.

31 Release graphics. Display spaces where control characters are present.

Codes 7,9,12,25,28 and 31 are presumed at the beginning of each line.

GOOD TELETEXT RECEPTION

Hopefully the signal you are receiving is perfectly adequate for Teletext. This section is to help those who may be experiencing problems.

Any flaws in the Teletext signal which you receive will be seen as missing or corrupt characters or worse still, missing or mixed up lines. The following lists possible sources of these errors.

1. Check the tuning of your Video, for this run the adaptor and whilst looking at the time as displayed in the top right hand corner of the page tune your video. Then check using a rolling page like the news on 119.

2. Reliable Teletext reception requires a good quality, low noise signal free from any perceptible snow on the picture, but this alone does not guarantee perfect Teletext. Very close reflections (ghosting) can be almost invisible on the TV picture but can give rise to Teletext reception errors, the extent of this effect can vary between channels. Problems can be avoided or cured by adhering to the following:-

1. Loft or Indoor aerials are rarely satisfactory. Expenditure on good quality aerial installations at the outset will prove to be an investment in the long term.

2. Splitting your aerial signal to feed more than one television should be avoided. If you must split the signal then use a propriatory splitter and

make sure that each output is either terminated with 75 ohms or connected to a television.

3. Reflections from nearby buildings or other large objects can cause problems. An aerial having at least 18 elements should be used and it should be tried in all positions, including variation of height. If a satisfactory result is not possible by this means, moving the aerial to a different location is occasionally the only answer.

PRINTER COMPATIBILITY

Currently the operating software supports Epson compatible printers using 7 or 8 bit data. Control codes ESC 1, ESC 2 and ESC K are used, the printer should be set as is normally required for the Amstrad - AUTO LF disabled and no connection to pin 14 of the printer. Software for the non-Epson compatible Amstrad DMP-1 printer can also be provided on request.

P101 CEEFAX 101 Mon 9 Jun 17:15/44

BBC Headlines

SOUTH AFRICA New violence at
Crossroads squatter camp.....113 213
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WALDHEIM election criticised
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from New Forest camp.....110 210

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REAGAN awaits shuttle report...112 212

CRICKET England falter at Lord's.311/2

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A page from CEEFAX - the BBC's Teletext Service.

VIDEO CONNECTIONS

The Microtext adaptor requires as its input, a 1 Volt composite video signal as available via a connector at the rear of domestic video recorders. This signal is also sometimes available at the rear of some televisions.

A BNC connector is supplied with the adaptor as standard as this is the connector used on around 95% of domestic videos. Other connectors are sometimes used and this section will help you to identify the connector used on your machine.

6 PIN DIN

Sometimes used on equipment of european origin, the DIN connector is of the same style as that used on the adaptor itself and exactly the same as that used for the monitor connection on your Amstrad computer. For those who wish to make their own lead, signal is on pin 2 with earth on pin 3.

SCART

A multipin connector easily identified by the fact that it has 21 pins and measures approximately one and a half inches by half an inch. Signal is on pin 19 with earth on pin 17.

PHONO

This is a co-axial connector, in the centre is a hole for a pin and there is a connection to earth around the outside. The overall diameter of the connector is around 8mm or 3/10ths of an inch.

PL259 or 'UHF'

Again a co-axial connector, the barrel of the connector is threaded, sometimes cerated at the end and the overall diameter is around 16mm or 6/10ths of an inch.

If the BNC connector supplied is not suitable for your video then please accept our apologies for any inconvenience and return your lead to Microtext. Include a note stating your name and address, the type of connector required and the make and model number of your video recorder. A new lead will be sent to you by return of post, free of charge.

The adaptor may used in a different room from your video if required and leads can be supplied to order at 50p per metre to a maximum length of 25 metres to enable this. Please state which type of connector is required when ordering.

*** GUARANTEE ***

Your Microtext Teletext adaptor is guaranteed for 12 months from the purchase date and covers electronic faults caused by faulty components or manufacture. Any repair for faults caused by mechanical damage to or modification of the adaptor will be charged in full.

Should a claim arise under the guarantee, please return the product to the following address ensuring it is adequately packed to avoid damage.

Microtext, 7 Birdlip Place, Horndean, Hampshire, PO8-9PW