

11038

*MORLEY  
ELECTRONICS*

*TELETEXT ADAPTER  
SUPPORT ROM*

*User Guide*

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## 1. INTRODUCTION

The Teletext support ROM was adapted to work in conjunction with the ATSRom supplied with the adapter. This should give you all the advantages of Acorn compatibility with the ATS plus added features such as page printing/spooling and extended oscli commands. Either ROM will work independently of each other therefore you can for example disable the SUPPORT ROM and run solely with the ATS or vice versa.

## 2 INSTALLING YOUR TELETEXT SUPPORT ROM

2.1 Switch off and unplug the computer from the mains supply.

2.2 (BBC model B) Open the computer case by removing the four screws marked FIX and remove the keyboard.

2.3 Fit the MORLEY TELETEXT SUPPORT ROM into one of the ROM sockets near the front right hand corner of the computer, below the keyboard. (THE NOTCHED END OF THE ROM MUST GO TO THE REAR). We recommend that you install it to the left of BASIC and ATS (in other words lower priority than BASIC and our ATS) and to the right of your DFS (if fitted). Do not move the IC in the leftmost socket. See Fig 1.

2.4 Refit keyboard and case.



## 2.5 (MASTER SERIES)

We have found the best way of using the software with the Master is to install the ROMs in a proprietary cartridge such as those marketed by Care Electronics. When installing the ROMs in these cartridges the ATS should be in a higher priority than the support ROM. To ascertain this after installation simply type \* ROMs. If the ATS has the highest number all should be ok. If not simply swap the two ROMs around.

## 3 TESTING YOUR SUPPORT ROM

3.1 If the teletext terminal menu appears instead of BASIC when you switch on, check that you have installed the TELETEXT ROM in the correct socket(see Fig.1) and that the pins on the BASIC ROM have not been damaged and are in the socket.

## 4 TUNING YOUR NEW ADAPTER AND USING THE TERMINAL SOFTWARE

4.1 To start you will have to tune your ADAPTER to your local transmitter, in most cases your ADAPTER will do this without any user intervention but under certain conditions eg: a weak or noisy signal, you may have to help it by 'finetuning' it a little.

To tune, just type in \*MTUNE. This will download and run a short basic program from the ROM. This will scan downwards from channel 68 to channel 22 (Approx.) and will stop when it has found a signal strong enough to receive 'Teletext'. You will then be prompted to 'finetune', 'continue' or 'store' the channel. At this stage we recommend that you only use the 'store' option, as in most cases the first four found will be the best channels. If, however you suffer from 'shadow channels' in your area it may have found these first. Just press C to continue past these 'shadows' and 'store' the correct channels when found. If you seem to be receiving too many errors use the 'finetune' option. This will select the menu page from the channel concerned and prompt you to finetune up or down using the two CURSOR KEYS. We recommend that you tune up until errors start to appear in the page header, making a note of the frequency in the bottom left corner of the screen and then repeat this, tuning down past the channel. You should find that the best results are obtained at a frequency midway between the two. When the tuning program has found four channels it will automatically save the channel frequencies to the current filing system under the file name CHANNEL. It will also save the data out in an ATS ready format. This must be reloaded with \*LTUNE if used with ATS, or by typing \*CHANNEL (or \*/CHANNEL for tape users) before using your SUPPORT ROM in future. Your ADAPTER will not work without this. If you cannot receive four channels, eg: channel 4, the program will automatically save the other channels, when it reaches it's lowest limit.

4.2 After loading your channel data you can simply type \*TTEXT to enter the terminal mode.

The terminal menu page should now be displayed, and you will notice the box marked 'Page No.?. To select a page simply type in the required page number and press the TAB key to display it. You will notice on the top left of the display the page number requested and next to this you will see the Teletext service name and the number of the page currently being transmitted. This top line of the page is referred to as the page header. You can select any other page/channel or use the HOLD, REVEAL, PRINT and SAVE functions from here without returning to the menu. There is also a page link facility available from the display, this allows you to follow the menu structures through by using the left/right cursor keys. To get back to the menu simply press ESCAPE.

Other options available from the menu page are:-

- 'S' Save the currently selected page to disc/tape under the current directory only.
- 'Q' Quit to previous language ROM.
- 'P' Dump the current page to printer (text only).

- 'N' Select a new channel 1-4 or A-Z (see XCHAN for more info. on extended channels).
- 'H' Hold page - prevents updating.
- 'R' Reveals any hidden text.
- 'B' Toggle beeps on/off.
- 'M' Select operating mode. 7 bit 16 line is default and will be all you will need to use at present, however if the broadcasters decide to upgrade their present system eg: full field or eight bit, simply toggle through to the relevant mode.
- 'V' Verify page for errors (at present not implemented by ITV).
- \*\* O/S commands, up to 21 characters.
- @ Spool current page to a disc file called 'PAGES'.

4.3 If you would like your current 'channel data' put into ROM and have an EPROM programmer, simply load your ROM image to &3000 then \*LOAD CHANNEL 6F4F. These locations are left as &FF in the EPROM, allowing it to be reprogrammed without first being erased. If you are using the SWR disk follow the instructions for loading the channel data then:

\*SAVE ROM 1 3000+4000 D9CD 8000.

The ADAPTER will then work from switch—on without having to load data from disk or tape. The permanent channel data can be overridden at any time by loading alternative CHANNEL data as usual. If you don't have access to an EPROM programmer, just send us your ROM and a dump of your channel data, with a cheque for £5.00 and we will reprogram your EPROM for you.

## 5 SUMMARY OF OSCLI COMMANDS

Note all commands will allow M to be prefixed to avoid clashes with other ROMs and should always be used when ATS is enabled.

### \*TTEXT

Enter Teletext terminal mode from current language.

### \*STEXT

Enter terminal through service entry, can be used from within a basic program. (Tube compatible).

### \*BBC1

### \*BBC2

### \*ITV1

### \*ITV2

These commands are used to select the various British television channels. They may be used either as a direct command or alternatively entered into a BASIC program.

This command is used to select channel n where n = 1 to 4. The channels are assigned in order:-

CH1 = BBC1  
CH2 = BBC2  
CH3 = ITV  
CH4 = CH.4

It works in similar way to \*BBC1 etc.

#### \*SEE

Display page that is currently in the TELETEXT ADAPTER'S memory. This may be a transmitted page or a page that has been loaded using \*RLOAD. It may be used either as a direct command or alternatively entered into a BASIC program.

#### \*LSEE

Display and update currently selected page in a similar way to \*SEE. This routine will perform a loop until a key is pressed.

#### \*TUNE

Initialise tuning of ADAPTER. This will download and run a short BASIC program from ROM. It may be altered by the user to suit their own requirements if necessary by simply pressing escape and listing it, then after alterations saving it to disc/tape. The program was written to find the four main British Television stations and to handle UHF frequencies ranging from 880 Mhz (channel 72 down to channel 21). In some parts of the country there may be more than four channels available. If for example you have two ITV channels the best way to save these is to firstly run the tune program and store the first four channels found, and when finished and the channel data is saved simply type \*SAVE "CHAN" C3F+9. Then run the tune program again but this time when it finds the first ITV CHANNEL select continue to store the second, again when finished type \*SAVE "CHAN2" C3F+9. You should now have two

different sets of channel data and you may then use whichever set you wish by simply typing \*/CHAN1 or \*/CHAN2. There is also the possibility (if for example you are using your ADAPTER abroad) that you may have access to different channels and the tune program will not recognise these by name. The reason for this is that it reads the page header and compares it with the DATA statement in line 310. The way to handle this is to run the program and when it reports not identified select finetune and write down the characters in the page header. This can then be added to the data statement eg:-

```
310 DATA CE, BBC1, &C40, CE, BBC2, &C42, IT, ITV, &C44, C4,  
CHANNEL 4, &C46
```

could be changed to:

```
310 DATA CE, BBC1, &C40, CE, BBC2, &C42, IT, ITV, &C44, RA, RAI,  
&C46
```

If you were trying to save RAI (Italian Teletext channel) in place of Channel 4.

**\*TIME**

Display time from Teletext header at cursor. It may be used either as a direct command or alternatively entered into a BASIC program.

**\*LTIME**

Similar to \*TIME but displays and updates cursor. This command will stay in a loop until a key is pressed.

**\*DATE**

Display date from Teletext header at cursor. It may be used either as a direct command or alternatively entered into a BASIC program.

**\*HEAD**

Display Teletext header at cursor. It may be used either as a direct command or alternatively entered into BASIC program.

**\*PWAIT nnn**

Selects page nnn. This command waits for the page requested then displays and updates it until a key is pressed.

**\*TRANSFER nnnn (HEX)**

This command transfers the page currently in the ADAPTER's memory to address nnnn. It may then be displayed at any time by using \*DISPLAY. You may also TRANSFER directly to the screen by using \*TRANSFER 7C00. If required you may write a program to read data from the page that has been transferred. The data is transferred with bit 7 of every byte set to keep it compatible with the Acorn system. Therefore any program written to read the data should AND the byte with &7F to unset it before use.

**\*DISPLAY nnnn (HEX)**

Display stored page from address nnnn, This command will display a page that has already been stored with \*TRANSFER NOTE. If no page exists it will still move 1k of memory to the screen RAM, which can give some strange effects.

**\*RELOAD filename**

Allows you to reload saved pages from disc/tape to the screen for display. Press Return after display to dump to printer, or any other key to exit routine.

**\*RESET**

Resets ADAPTER's registers to default values.

**\*RLOAD nnnn (HEX)**

Loads data from address nnnn into ADAPTER text RAM. This data will remain in the ADAPTER's memory until it receives a transmitted page.

**\*RBYTE**

Reads byte from current text RAM address, equivalent to \*FX53. The byte read depends on the address selected in the ADAPTER, this can be defined with OSbyte commands detailed later.

**\*ROW nn**

Read into memory specified page row from the ADAPTER's memory to location &CC9/&CE8. The row can then be displayed by using PRINTS&CC0.

**\*SUBCODE**

This command may be used to find which subpage is currently being received. It returns the subcode of the current page as two BCD nibbles to locations &C19 (LSN) and &C1A (MSN). Therefore if the contents of &C19=02 and the contents of &C1A=01 then you would be receiving subpage 12.

**\*GSTAT**

The transmitted Teletext page is actually 2k. The first 1k rows 0 to 23 are displayed by default. The broadcasters use the second half of the page, (commonly known as ghost rows) to transmit certain information. One of these rows not displayed is known as the Teletext service data packet (TSDP). This command will display the last 20 bytes of channel status from this row.

**\*LSTAT**

This command is similar to GSTAT except that it displays and updates at the current cursor position. It will stay in a loop until a key is pressed.

**\*CRCBC**

Each page has it's own cyclic redundancy check (CRC) which checks to see if the page is corrupted in any way. This command checks the page CRC, returns error 139 and VDU7's if an error is found. Note however, that sometimes the CRC can be wrong due to the broadcasters not updating them on time. You may find for example that after midnight the CRC's won't have been updated to correspond to the page because the date has changed, this is usually corrected in the morning. The CRC checking routine can be disabled by using an OSbyte call.

**\*BCRC**

This command is similar to CRCBC except that it does not return an error, but flags the result in location &8B. If the contents of &8B=0 then there has been no error detected.

**\*TSDP nnnn (HEX)**

Dumps the TSDP (Teletext service data packet), from the ghost rows to address nnnn. See also \*GSTAT for more details of the TSDP.



**\*DTSDP**

Similar command to \*TSDP except that it dumps the TSDP to the current cursor position.

**\*PLINK nnnn (HEX)**

Also found in the ghost rows (row 16), are the page links, these allow menu structures to be followed through. This command dumps the page links to address nnnn after hamming decoding.

**ROW 16 (data packet 27): Linked pages**

This row contains six page numbers including the subpage, hamming encoded. This means that each byte must be decoded to 1 nibble by masking out bits 0, 2, 4, 6, and then moving the other bits down. Eg: 0x1x1x0x decodes to 00000110 or 6. The last 2 bytes of this row are the CRC for the associated page.

**\*DLINK**

Similar command to \*PLINK except that it dumps the page links to current cursor position.

**\*BUG**

All software has at least one bug! One of ours returns the last error message.

**\*HERMANN**

Disables Teletext ROM to avoid clashes with other software. Enable with \*FX251,0.

**\*SDATE nnnn (HEX)**

Transfers the date displayed in the page header as a string to address nnnn. It can easily be displayed using PRINT \$&nnnn or read into a variable by using AS=\$&nnnn.

**\*STIME nnnn (HEX)**

Similar to \*SDATE except that it transfers the time from the displayed header.

**\*SGSTAT nnnn (HEX)**

Similar to \*SDATE except that it transfers the broadcast service data packet from the current page ghost rows.

**\*ERASE**

This command clears the Teletext ADAPTER's page RAM. It can then have a page loaded in from memory using \*RLOAD and displayed in the normal way.

**\*TSPPOOL**

Saves current page to file named PAGES. Any of the spool commands simply

tag the page onto the end of the PAGES file. This can be reviewed at any time by using \*TYPE PAGES or \*RELOAD PAGES.

**\*TSAVE filename**

Saves currently selected page from ADAPTER to specified file. The page can be reviewed using \*RELOAD.

**\*CTSPOOL c nnn**

Saves page and 10 subpages from page nnn on channel c to file named PAGES with full error checking. These, as with other spool commands can be reviewed by using \*TYPE PAGES or \*RELOAD PAGES.

**\*DTSPOOL c nnn**

Saves page and 10 subpages from page nnn on channel c to file named PAGES similar to \*CTSPOOL but with no error checking.

**\*TPRINT**

Dumps current page from ADAPTER to printer in ASCII format with all graphics characters stripped off.

**\*CPSPOOL c nnn**

Dumps page and 10 subpages on channel c and page nnn to printer in ASCII format with all graphics characters stripped off. With full error checking.

**\*DSPOOL c nnn**

Dumps page and 10 subpages on channel c and page nnn to printer similar to \*CPSPOOL but with no error checking.

**\*DPRINT nnnn (HEX)**

Dumps page from address nnnn to printer in ASCII format with all graphics characters stripped off. This command can also be used to dump an ordinary MODE 7 screen, if it has previously been loaded to the address specified.

**\*SWR n (HEX)**

Selects bank n for loading ROM software into Sideways RAM. (STL only).

**\*ADAPTER**

Check system for malfunction (message displayed).

**\*PAGE nnnmmmm (HEX)**

Selects page where nnn=the page no. and, if required, mmmm=the subpage no. (X=wildcard).

Examples:

\*PAGE 1710001 selects page 171, subpage 1 (1/2)  
using \*PAGE 1X50002

page subpage  
will receive pages 175, 185, 115 etc. If subpage 2 is transmitted.

**\*FPAGE nnnmmmm (HEX)**  
 Similar command to \*PAGE but returns cursor and does not wait for page to be received. All \*WAIT commands work in conjunction with this command.

**\*WAIT0**  
 Wait for page update and display in loop.

**\*WAIT1**  
 Wait for requested page to be received. Header displayed.

**\*WAIT2**  
 As WAIT 1 without header display.

**\*WAIT3**  
 As WAIT 1 but returns after page update.

**\*WAIT4**  
 Waits for update, then displays page once only.

**\*WAIT5**  
 Waits for update, then spools page to file "PAGES".

**\*WAIT6 filename**  
 As WAIT5 but spools to specified file.

**\*WAIT7**  
 As WAIT4 but dumps page to printer.

**\*HON**  
 Enables header display during \*WAIT commands.

**\*HOFF**  
 Disables header display during \*WAIT4 to 7 commands.

**\*ACQEN annn**  
 The ADAPTER has four acquisition circuits. This means that you may pre-program pages that will be displayed whenever found. This command enables acquisition circuit a, which requests page nnn, a = 0 to 3. This allows up to 4 pages to be placed in the ADAPTER's acquisition circuit, you may then view them using \*LSEE.

**\*ACQDIn**  
 This command will disable acquisition circuit n.

**\*HAMMD**  
 Decodes hamming byte in location &89, decoded value returned in location &89. See \*PLINK for more information on hamming encoding.

**\*CBCON**  
 Reads the 2 control bytes sent in page header and returns them in location &CBF.

**\*CBHOUR**

Read page subcode hour tens, hour/ten units returned in location &CBF. Therefore a page with subpage 111 would return &10 to location &CBF

**\*CBMIN**

As \*CBHOUR except that it reads the page subcode minutes. The minute tens/units are then returned in location &CBF.

**\*CBUNIT**

As \*CBHOUR except that it reads the actual page subcode tens and units. This has the actual page number returned in reverse order to location &CBF.

**\*UCHAN**

This command sends new channel data to the digital tuning registers. Before issued the data should be stored in locations &F8 and &F9, where &F8 = hi byte and &F9 = lo byte.

**\*XCHAN**

This command allows for up to 24 channels to be selected. The channel data has to be programmed into the ROM. If required please write for further information on this procedure.

EXTENDED OSCLI COMMANDS (for use with 2nd k of data when transmitted).

**\*ALSEE**

Similar command to \*SEE except that it displays the selected page and associated ghost rows alternately.

**\*BLOCK0**

This command selects text RAM (the 1st k) as default on all access.

**\*BLOCK1**

Similar to \*BLOCK0 except that it selects packet RAM (ghost rows) as default on access.

**\*GGSPool**

Similar command to \*TSPool except that it saves the current page with all data packets to a file named GPAGE.

**\*CGSPool cnnnn (HEX)**

Similar command to \*TSPool except that it saves the page and 10 subpages with all data packets on channel c from page nnnn, to a file named GPAGES, with full error checking.

**\*DGSPool cnnnn (HEX)**

Similar command to \*DTSPool except that it saves the page and 10 subpages with all data packets on channel c from page nnnn, to a file named GPAGES, with no error checking.

**\*CSSPOOL cnnnn (HEX)**  
Similar to \*CGSPOOL, but only 2 data packets (27 page links and 30 TSDP) saved with page.

**\*DSSPOOL cnnnn (HEX)**  
Similar to \*DGSPool, but only 2 data packets (26 page links and 30 TSDP) Saved with page.

**\*GSAVE filename**  
Save current page with all data packets to specified file.

**\*SSAVE**  
Saves current page with 2 data packets to file GPAGE.

**\*GSEE**  
Similar to \*SEE except that it displays only the data packets in second 1k to teletext RAM.

**\*GTRAN nnnn (HEX)**  
Transfers all data packets from the ghost rows to address nnnn.

**\*WAIT8**  
Waits for page selected with \*FPAGE, to be updated, then saves page with all data packets to file GPAGE.

**\*WAIT9 filename**  
Similar to \*WAIT8 but waits for page to be updated, then save page with all data packets to specified file.

Note:- All OSCLI commands can be abbreviated in the normal way, however because of the extensive commands offered by the ROM you may find that some of the commands sound a little strange, eg: CGSPOOL the reason for this is to try and stop clashes with other software when abbreviated, don't worry you'll soon get used to them.

## 6 OSBYTE COMMANDS

### 6.1 Refer to Appendices B & C

<b>*FX50,n</b>	Write byte n to Teletext ADAPTER
<b>*FX51</b>	Initialise bus for transfer (must precede *FX50 sequence).
<b>*FX52</b>	Equivalent to *SEE
<b>*FX53</b>	Read byte from ADAPTER (returned in X, Y and loc. &89).
<b>*FX54, n,m</b>	Send two bytes to tuning control I.C.
<b>*FX238,1</b>	Disable CRC checks
<b>*FX238,0</b>	Enable CRC checks
<b>*FX251,1</b>	Disable Teletext ROM
<b>*FX251,0</b>	Enable Teletext ROM

## 7 SOFTWARE SUPPORT

7.1 There is already some software support for use with the ADAPTER. At present a utility disk, with programs demonstrating some of the ADAPTER's features and including a MODE 7 dump for most common printers is available for £5.95 and M/B Software have modified their already excellent DESIGN 7 screen editor/designer to work with our ADAPTER. This allows you to select a channel or page, 'see' it and drop it into the editor for modification and use in your own programs.

7.2 We will of course update the terminal software should there be any future advances in the current systems eg: channel 5.

7.3 All efforts have gone into making our terminal software as user-friendly and 'bug'-free as possible, but any thoughts or ideas on improvements would be gratefully received.

## 8 TECHNICAL PROGRAMMING DETAILS

### 8.1 Tuning I.C.

As described earlier the ADAPTER is tuned by software. You can write to the tuning I.C. using \*FX54,n,m where n = MSB & m = LSB. To write a new frequency to the tuner, use the following program:

```
5 INPUT "Frequency of transmitter in Mhz." ; freq
10 N = ((freq+39.1)*20+&8000)DIV256
15 M = ((freq+39.1)*20+&8000)MOD256
20 PRINT "MSB = " , N , "LSB = " , M
25 OSCLI ("FX54,"+STR$(N)+","+STR$(M))
```

### 8.2 Teletext IC's

You can also read or write directly to the teletext IC, using OSbytes 50 to 53. For more details see Appendix A, and the following example.

### 8.3 Read & display header demo.

```
10 *FX51 :Enable new serial I/O command sequence
20 *FX50,34 :Teletext device address
30 *FX50,9 :Register address
40 *FX50,0 :Teletext memory ROW to be accessed by the next read
50 *FX50,0 :Teletext memory COLUMN
60 FOR 0=0 TO 39:*FX53 : Read a byte from current teletext RAM address
70 VDU?&89:NEXT:END : Byte is returned in location &89.
```

### Register Description

Any bits which display attributes eg: double ht. will be of no use as these do not affect the data memory of the computer display. Values programmed into each register are given at the end of each description as "Hex: n".

## ROM COMPATIBILITY

If you have any problems in getting the ADAPTER to work try checking that none of the ROMs have been disturbed. I.e: pins not in etc. Next, try switching off all ROMs except BASIC, DFS (if fitted) and the Teletext ROM. Some ROMs can cause problems, such as SLAVE, which can prevent the channel data being saved correctly and the TORCH CPN ROM, which will stop the ADAPTER working totally. Other problems may be caused by commands being intercepted by other ROMs. such as BROM which will trap \*PAGE. One solution is to put the Teletext ROM in a higher priority socket and address other ROMs using a prefix (Z for BROM) and switch the ROM off with \*HERMANN when not in use. ROM workspace:&70—&8F, copied to page &C and restored on exit. Page &COO-&CFF: This was considered safe workspace, as the user-defined characters would not normally be in use when the ADAPTER is operating in MODE 7.

**APPENDIX A**  
**REGISTER MAP CCT**

Ta	7+p / 8 BIT	ON/ OFF	GHOST ROW ENABLE	DEW/ FULL FIELD	TCS ON	T1	T0	R1 Mode
-	BANK SELECT A2	ACQ. CCT A1	ACQ. CCT A0	DEW/ TB	START COL SC2	START COL SC1	START COL SC0	R2 Page Request Address
-	-	-	PRD 4	PRD 3	PRD 2	PRD 1	PRD 0	R3 Page Request Data
-	-	-	-	-	A 2	A 1	A 0	R4 Display Chapter
BKGND OUT	BKGND IN	COR OUT	COR IN	TEXT OUT	TEXT IN	PON OUT	PON IN	R5 Display Control (Normal)
BKGND OUT	BKGND IN	COR OUT	COR IN	TEXT OUT	TEXT IN	PON OUT	PON IN	R6 Display Control (Newsflash)
STATUS ROW BTM/ TOP	CURSOR ON	CON- CEAL/ REVEAL	TOP/ BOTTOM	SINGLE/ DOUBLE HEIGHT	BOX ON 24	BOX ON 2-23	BOX ON 0	R7 Display Mode
-	-	-	-	CLEAR MEM.	A 2	A 1	A 0	R8 Active Chapter
-	-	-	R 4	R 3	R 2	R 1	R 0	R9 Active row
-	-	C 5	C 4	C 3	C 2	C 1	C 0	R10 Active column
D7 (R/W)	D6 (R/W)	D5 (R/W)	D4 (R/W)	D3 (R/W)	D2 (R/W)	D1 (R/W)	D0 (R/W)	R11 Active data

Register Description

Any bits which display attributes eg: double ht. will be of no use as these do not affect the data memory of the computer display. Values programmed into each register are given at the end of each description as 'Reset : n'.



### Register R1 — Mode

Register address: 00000001 (01h) 1

T1 T0

These bits control the display interlacing & timing, and are not used.  
Reset : 0,0

TCS On

1 = generated sync, 0 = broadcast sync. Not used. Reset : 0

DEW/Full field

A 0 in this bit selects field flyback operation, with DEW between lines 6—22. A 1 selects full field operation, with data allowed on every line. May be used in later versions of the software or in user-written programs to receive full field Teletext on eg: cable or satellite channels. Reset : 0

Ghost row enable

For normal operation this bit would be 0 and one block of memory (1k\*8) would be used. When this bit is set to 1, two blocks are used and 'ghost rows', data packets for page linking, extra languages, etc. can be received. Reset : 1

Acq. ON/OFF

When this bit is 0 the page acquisition circuit operates normally. If it is set to 1 the acquisition function is switched off and the display may be used for displaying any external data input. Not used Reset : 0

7+P/8 Bit

Normal 7 bit plus parity reception of data is enabled when this bit is 0 : When set to 1, full 8 bit reception is enabled and the parity bit can then be checked or stripped off by software. Can also be used to receive 8 bit.

Ta

Test bit. Must be set to 0 at all times.  
This register increments to register R2 after writing 1 byte of data.

### Register R2 — Page request address

Register address: 00000010 (02h) 2

R2 Page request address

Start column SC2 SC1 SC0

These three bits are set up to indicate which column in the on-chip page request RAM should be addressed first when a byte is written to register R3.  
Reset : 0,0,0

T8

Test bit must be set to 0.

Acquisition CCT. A1, A0

These two bits select the acquisition circuit to be used for the next page request. This is only on a multipage decoder. Reset : 0,0

Bank select A2

This selects one of two 4K banks of memory for page acquisition and is not used. Reset : 0

This registers increments after 1 byte of data to R3.

Register R3 — Page request data

Register address 00000011 (03h) 3.

PRD4 to PRD0

These five bytes represent the data which is stored in the on-chip page request RAM. These are written sequentially by the controlling software, starting at the column selected by the SC bits in register R2.

This register address does not increment to any other as following bytes are written as page data and cause the on-chip RAM address pointer to be incremented.

Reset : 00010001 00010000 00010000 00000000 00000000 00000000 00000000.  
(Page 100xxxx)

Registers R4 — R7 are not used.

Register R8 — Active chapter.

Register address: 00001000 (08h)8

A2 A1 A0

these three bits select the memory block to be read/written to. The control software uses 0 (000) to access the normal page and 3 (011) to read the ghost rows. Reset : 0,0,0

Clear memory

A1 written to this bit clears the memory block selected by bits A2—A0. This acts as a 'CLS' in the teletext display RAM. Reset : 1 written on BREAK

Register R9 — Active row

Register address: 00001001 (09h)9

**Bits R4—R0**

These five bits select the row address in RAM to be accessed by any read/write operation to display RAM.

Addresses are expected to be 0—25 (19h). Writing an address between 26 and 31 (1A—1Fh) will cause unusual effects. Reset : 0,0,0,0,0

Register R10 — Active column Register address: 00001010 (0Ah) 10

**Bits C5—C0**

These six bits select the column address in RAM to be accessed by any read/write operation to display RAM.

Addresses are expected to be 0—39 (27h). Writing an address between 40 and 63 (28—3Fh) will cause unusual effects. Reset : 0,0,0,0,0

**Register R11 — Active data**

Register address: 00001011 (0Bh) 11

This register is used to access the location in display RAM set by writing to registers R8—R10.

This can be used to read the current contents of the selected location or write a new value to the selected location in RAM.

Reading or writing to this register increments the current RAM addresses pointer to the next location. Note: When the pointer reaches the end of row 23 it resets to row 0: To read rows 24—25 they must be selected by writing to register R9.

**PAGE REQUEST FORMAT**

D4	D3	D2	D1	D0	Column
DO CARE MAG.	HOLD	MAG 2	MAG 1	MAG 0	0
DO CARE PAGE TENS	PT3	PT2	PT1	PT0	1
DO CARE PAGE UNITS	PU3	PU2	PU1	PU0	2
DO CARE HOURS TENS	X	X	HT1	HT0	3
DO CARE HOURS UNITS	HU3	HU2	HU1	HU0	4
DO CARE MINUTES TENS	X	MT2	MT1	MT0	5
DO CARE MINUTES UNITS	MU3	MU2	MU1	MU0	6

X = don't care      MAG = magazine      PT = page tens  
 PU = page units      HT = hours tens      HU = hours units  
 MT = minute tens      MU = minute units

## Appendix B: Faultfinding

If you have problems with your ADAPTER, try the following hints. If you still have problems give us a ring to see if we can help before sending it back.

1. Try \*SEE: if the screen fills with white squares (CHRS255) check the 5v supply on the user port connector.
2. Try \*TTEXT, then press TAB. 'P.100' should appear in the top left hand corner of the display. If random characters appear on the display, especially white squares, check the 12v supply.
3. Try deactivating other ROMs and disconnecting any peripherals that might cause problems. TORCH CP/M seems to cause most problems of this kind.
4. If you have problems downloading, the first thing to try is \*GSTAT if this works ok. then try checking the pages for errors. If white squares or division signs are most common, or the same error appears on the same characters eg: all 's' changed to 'w' it's possible that the signal is too strong. Try an attenuator, 6 or 12 dB. Complete lines missing or corrupted data usually indicates the ADAPTER needs retuning — try carefully finetuning. Random characters corrupted usually indicates a weak or noisy signal. Try an aerial amplifier, around 6—8 dB for bad cases. Remember it will amplify any ghosts or noise as well, so it may not provide a complete cure.
5. Remember the broadcasters sometimes make mistakes in transmitting telesoftware, so don't always blame the ADAPTER it's always best to give them a day or two to sort themselves out before ringing us to find out the problem.
6. If your ADAPTER has been functioning ok. for some time and it then starts to produce errors it's always worthwhile checking the transmitter information to see if it's at low power for repairs or service.

## WARRANTY

MORLEY ELECTRONICS warrants that this product, is free of defects in materials and workmanship for a period of 1 year from the date of purchase, and will replace or repair it free of charge if it is returned to the address given in the front cover.

**NOTE:** MORLEY ELECTRONICS will not be liable for any injury, loss or damage, direct or consequential, arising out of use of, or the inability to use, this product. Nor will the above warranty apply if the unit has been opened or tampered with in any way.

DO CARE MINUTE UNITS				
DO CARE FIVE TENS				
DO CARE TWO HUNDRED TENS				
DO CARE HUNDRED UNITS				
DO CARE MINUTE TENS				
DO CARE MINUTE UNITS				

E = 1000 units      M = 100 units      FT = 100 units  
 PE = 100 units      ST = 100 units      BT = 100 units  
 MT = 100 units      ST = 100 units      ST = 100 units