

TTX2000 S

TELETEXT ADAPTOR FOR

THE ZX SPECTRUM

 **VOLEX**
ELECTRONICS

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TELETEXT ADAPTOR FOR
THE ZX SPECTRUM

USER GUIDE

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1.0 INTRODUCTION

- 1.1. Your VOLEX Teletext Adaptor gives you access to all broadcast Teletext service within the U.K. It consists of the adaptor unit proper, which fits neatly beneath your Spectrum, and a separate power supply unit which provides 18v for the tuner inside the adaptor.

* NOTE The power supply output should ONLY be plugged into the VOLEX adaptor. Under no circumstances plug this into your Spectrum computer or damage might occur.

- 1.2. In addition to viewing ordinary Teletext pages, the VOLEX adaptor enables you to download broadcast telesoftware into your Spectrum. The downloader is resident in the memory inside the adaptor itself, and has been developed specifically for the new 4-TEL Telesoftware services on Channel Four Television, or compatible services. (No extra equipment is required to do this, although you may use a printer or microdrives as usual in conjunction with the adaptor). As such, the format of broadcasts is different to the RTF (Redefinable Telesoftware Format) adopted by the BBC Ceefax service. The Channel 4 format does not depend on the use of 'ghost rows' — See Appendix. For the user, however its main features are simplicity of use, efficiency of data transmission, and the ability to cope with future enhancements in an elegant manner.
- 1.3. The VOLEX adaptor contains PROM-based software, which 'takes over' from the BASIC ROM inside your Spectrum when the combination is switched on. The adaptor will thereby generate the first display page itself; subsequent display of Teletext information requires the VOLEX adaptor to be correctly set up and tuned to an off-air Teletext broadcast — See 2.0.
- 1.4. Please note that for satisfactory Teletext reception you must have a good quality aerial installation capable of giving clean, ghost-free normal television reception. If poor results are obtained, this is the first area to investigate. (See Problems)

2.0. INSTALLATION

Ensure adequate ventilation for the VOLEX Teletext Adaptor. Do not, for example, operate the unit on a carpet or directly above any source of heat.

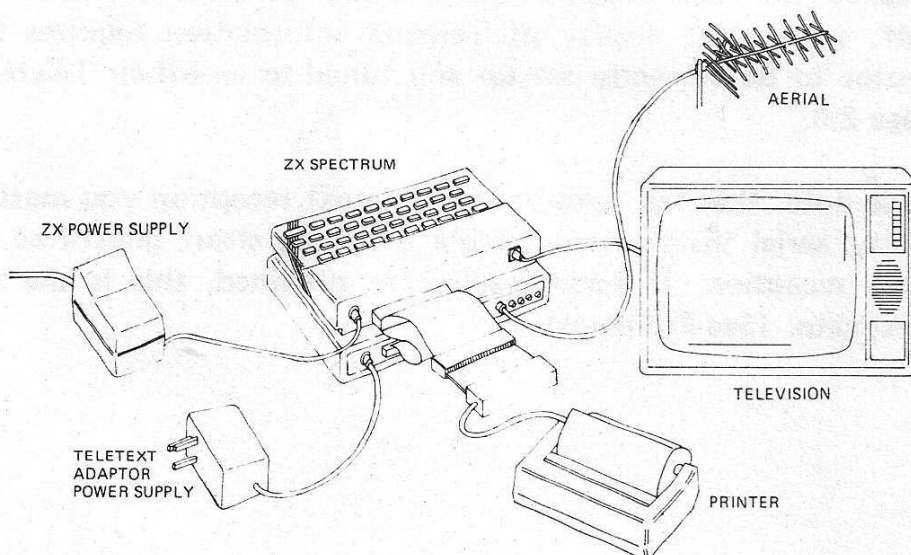
2.1. SETTING UP

Place the VOLEX adaptor beneath your Spectrum computer, and interconnect the two using the ribbon connector supplied (See Fig. 1). If you wish to use microdrives, also plug in 'interface 1' in the normal manner, keeping the VOLEX adaptor underneath.

If you have a Sinclair ZX Printer, or Alphacom 32 thermal printer, connect this to the free end of the ribbon by means of the plug strip provided. Note that other so-called 'Spectrum compatible' printers, or interfaces to standard centronics printer may not work because they clash with VOLEX hardware. See Appendix 6.5 for further details.

Disconnect the aerial lead from the back of the television set and reconnect it to the socket marked AC at the rear of the Teletext Adaptor. Connect the TV socket at the back of the ZX Spectrum to the Aerial Socket on the Television set (using the ZX Spectrum aerial lead). Connect the Teletext Adaptor power supply into the 18v socket on the Teletext Adaptors rear panel (Fig. 1) . Connect the ZX Spectrum power supply to your Spectrum.

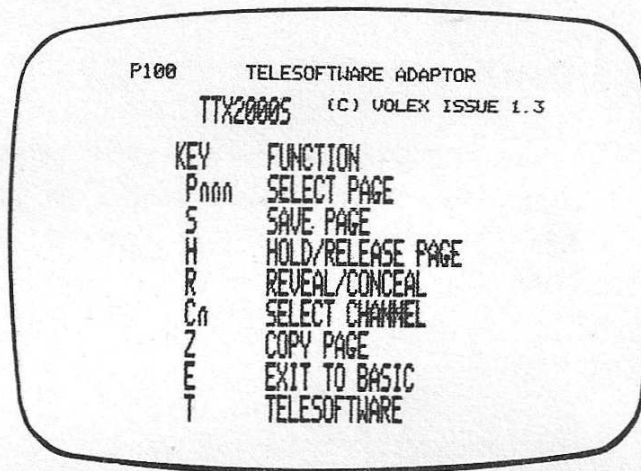
Fig. 1. LAYOUT OF PERIPHERALS



You are now ready to begin receiving Teletext, and downloading broadcast telesoftware.

- 2.2 Switch on your TV set, then VOLEX adaptor then Spectrum computer. The menu page should appear almost immediately.

Fig. 2



Press ENTER when you have read the menu.

Depending on the settings of the tuning controls, the top row of the screen (henceforth called the 'header') may display changing characters (possibly nonsense). The first task, then, is to tune the four preset controls on the VOLEX adaptor to your local TV channels. In areas where two sets of stations can be received, you must tune to the stronger signals (as indicated by fewer or zero errors). We suggest you assign the channels as follows:-

Channel 1	BBC 1
Channel 2	BBC 2
Channel 3	IBA (ITV)
Channel 4	IBA (CH4)

2.3. TUNING PROCEDURE

Press key C on the Spectrum keyboard. This switches off AFC (Automatic Frequency Control) inside the VOLEX Adaptor, making tuning easier.

Turn preset 1 fully anti-clockwise until a faint clicking sound is heard; this means the control is at one extreme. Now, SLOWLY turn the control clockwise, using a small screwdriver, whilst observing the header (See 2.2) until the word CEEFAX and page numbers, mainly in the range 100 - 199, appear. Tuning will be quite critical, and may be assumed to be correct when the right-hand portion of the header displays a continuously updated time of day.

Press key 1 to restore AFC.

By now, CEEFAX page 100 may well have appeared since the Adaptor assumes you have requested page 100 in the absence of information to the contrary.

2.4. Press C, then 2, then C again.

This selects Channel 2 then switches AFC off again. Proceed in a similar manner to 2.3, but this time adjust preset 2 to get pages 200 - 299 of CEEFAX (on BBC 2). When you have correctly tuned into the station press 2 to restore AFC.

2.5. Press C, then 3, then C.

Follow the tuning procedure using preset 3 to get ORACLE (on ITV). Press 3 to restore AFC.

2.6. Press C, then 4, then C.

Adjust preset 4 for ORACLE on Channel 4 (including 4-TEL). Press 4 to finish the setting up.

You are now able to select channels at will, merely by pressing C, followed by the appropriate number. The AFC automatically pulses 'off' while the Adaptor changes channel then comes on again to prevent tuning drift. For this reason you should not adjust the preset controls unless you first press C to cancel AFC.

Note that the telesoftware broadcasts are on Channel Four. This is discussed in more detail later.

First, however, the key functions available are described as follows.

3.0. KEY FUNCTIONS SUMMARY

3.1. Cn

Selects channel 'n'. n must be 1, 2, 3, or 4.

Keying C alone disables AFC to allow finer tuning.

3.2. E.

Exits to BASIC.

To return to the menu page (See Fig. 2) and hence normal operation, key NEW then OUT 127,0. (Also see section 5.0.).

3.3. H.

Holds current page on screen. Useful if the page is one of a group of 'rotating' (changing) pages, such as horoscope or recipes you want to read at your leisure.

To return to normal operation press H again.

While a page is held, the top left of the screen displays the word HOLD.

3.4. P.

Select the following page for display (NOT for downloading a program from this page – (See 3.8)).

Pages Onn and 9nn are invalid and will never occur; that is to say, valid pages are in the range 100 – 899. If you enter a digit by mistake, complete the 3 digits, then press P followed by the correct page number required.

3.5. R.

Reveal a concealed piece of text (e.g. the answer to a quiz). To conceal the result, press R again.

Whenever a new page or channel is selected, conceal mode is automatically adopted.

3.6. S.

Save the current display page to microdrive.

The screen will go blank except for the prompt 'page-name?' Enter up to ten characters (for page identification) then press RETURN. The name will appear on the microdrive catalogue.

See Appendix 6.4. to view stored frames.

3.7. Z.

Copy the current display page to printer.

3.8. B.

Brighten the display. Useful on certain TV sets to enhance the picture quality.

To revert to normal brightness, press B again.

Note that this function operates on the header immediately, but on the page the next time it is received.

3.8.1 T.

Telesoftware. The first press selects the 4 TEL Telesoftware index page P460. Any subsequent pressing of key T causes the header to display the message.

'TELESOFTWARE DOWNLOADER'

You should now key a 3 digit number corresponding to the desired program for downloading as shown on the index page.

Telesoftware is such an important feature that it is dealt with separately in the following section.

3.9. ENTER. reverts to the main menu. (See Fig. 2.).

4.0. TELESOFTWARE

- 4.1. Generally speaking you should not attempt to load a program unless you have substantially error-free normal Teletext reception.

If poor reception is experienced, downloading will take longer than usual, but should still be possible.

If good reception cannot be achieved see section 1.4.

If however, normal pages are received intact, it is remarkably easy to load software into your Spectrum using the Teletext Adaptor. This procedure will now be described, and assumes you are loading Channel 4 format programs from a Channel Four broadcast.

See Appendix 6.2 for details of receiving BBC RTF broadcasts.

- 4.2. Having pressed T to enter the Telesoftware Downloader routine, key in the required number. The headers will continue to 'roll' (change continuously) until the required page comes along.

This may be a complete (short) program — e.g. a test program — or, more likely, one of a number of rotating sub-pages which together constitute a complete program or file. In either case the border colour will flash momentarily to indicate what the current status of the page is. Colours have the following meanings.

WHITE	The page has been acquired successfully. No errors were detected. (Page O.K.)
RED	The page had an error and was rejected. The adaptor will search for this page again.
GREEN	The page was one which had already been received and was 'skipped over'.

4.3. In addition to border colour changes, a number of Status Reports may be produced. Each one terminates with the message 'RETRY? ... (Y/N)'. Pressing key Y allows the download attempt to proceed; N causes a 'cold start', reverting to the menu page. (See Fig. 2). Status reports have the following meanings:

BREAK Enter has been pressed by the user.

NO PAGE The selected page was not found within the timeout period. (Approx. 2 minutes).

NOT DATA The page was not Channel 4 format telesoftware page. It may actually have been such a page, but suffered a transmission error which made it appear not to be so.

BAD PAGE A transmission error has corrupted the page or its header.

4.4. When all the data has been downloaded, what happens next depends on the type of file concerned.

'Auto-run' program files will execute immediately and so the machine behaviour depends on the program itself.

'Normal' program files will locate in the Spectrum which will display the message:

O. OK. 0.2.

in BASIC. Border colour is white, the screen green.

At this point the program can be listed, saved or run in the normal way.

5.0. USING YOUR VOLEX ADAPTOR FROM BASIC

It is possible to alter the page number being searched for by POKEING certain addresses.

These may be computed from VARS +n where VARS = 23296 and n = offset, as follows:

OFFSET	CONTAINS	RANGE	COMMENTS
23	Magazine no.	0 - 7	0 = Mag. 8
24	Page Tens	0 - F	Hexadecimal
25	Page Units	0 - F	Hexadecimal

Page Representation

An ASCII image of the screen exists in RAM and may be used by application programs as required.

Pointers to the area are in

111	Low Byte	add this to
112	High Byte	256 times this.

The data is a 960 byte block.

Returning to BASIC

Key NEW then OUT 127,0 to 'cold start', or RANDOMIZE USR 23500 to 'warm start' Teletext .

Further information will be published in the form of an advanced user's guide to the VOLEX Teletext adaptor available from:

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6.0. APPENDIX

- 6.1. The Teletext broadcasting system operated in the U.K. by the BBC and IBA uses some of the hitherto unused lines during the field blanking interval (at the top of normal TV picture) as Data lines, which may be decoded by suitable receiving apparatus to produce displayed Teletext pages on a 40 page character x 24 rows format.
- 6.2. The VOLEX Teletext Adaptor converts a Sinclair Spectrum computer into a Teletext Decoder. In addition, Telesoftware broadcasts can be received and loaded into the Spectrum. The PROM in your 4-DATA adaptor cannot cope with the older BBC, RTF format directly (it is only directly compatible with Channel Four telesoftware – or identical format – broadcasts).

The users wishing to load BBC RTF format programs can obtain an RTF format downloader program, on cassette, directly from our Sales Dept. (It is theoretically possible that an RTF downloader could itself be downloaded by your 4-DATA Adaptor. Whether this happens depends on the BBC and IBA position at the time!)
- 6.3. The VOLEX Teletext Adaptor is designed to comply, as far as is practicable within the limits imposed by the Spectrum to the Broadcast Teletext specification dated September 1976 published jointly by the BBC, IBA and BREMA.
- 6.4. Viewing of stored frames may be accomplished from BASIC, with or without your VOLEX Adaptor connected.

Frames are stored as a copy of the screen memory area key:

```
BORDER 0 : LOAD* "M"; 1; "pagename" CODE: PAUSE 0
```

then press ENTER. The frame "pagename" will be displayed.

6.5. To print a copy of a stored frame.

Key:

```
BORDER O : LOAD* "M" ;1; "pagename" CODE : COPY:  
PAUSE 0
```

then press ENTER. The frame will appear on the printer.

Note that your VOLEX hardware may clash with some printer interfaces, so disconnect the adaptor before using the printer, if this is the case.

Using other printers direct from TTX2000 routines might be possible, depending on hardware; TTX2000 uses partially decoded I/O space (A7 and IORQ low) for its own purposes.

The printer routine is vectored at 23411, so the user can install other printer drivers if required.

7.0. PROBLEMS

If you believe your VOLEX adaptor is faulty because some rows, or characters, are missing or incorrect on the display, or wrong pages sometimes appear, it is extremely likely that the fault is with the quality and strength of aerial signal you have plugged into it, and not the unit itself. If difficulty is experienced in this respect, we recommend that you contact your local TV aerial supplier; to check the signal reception. The VOLEX Teletext Adaptor is capable of very good performance and will perform error-free on signals of less than 50% 'eye height' (That means as good as any standard teletext TV set).

Typical faults are:

- a) Coaxial aerial cable badly terminated or not soldered to plug.
- b) Aerial pointing in the wrong direction, or broken.
- c) Loft or indoor aerial used (a roof aerial is recommended).

Every effort should be made to ensure the best possible level and quality of signal so that the result will not vary with time or weather conditions etc.

