User's Manual

Champion

Champion Cards

CONTENTS

INTRODUCTION

This manual covers the installation and operation of the CIRTECH Champion range of printer cards and Serial Adaptor. The Champion parallel interface cards offer a wide range of features to suit the facilities available on modern printers, including Epson FX and Apple Imagewriter (the Champion Imagewriter version is supplied with a Serial Adaptor).

The main features of the Champion range are:

- Character font selection

- Text screen dump - 40/80 column

- Left and right margin set

- Line and page length

- Extensive graphics dump features, including X-Y scaling and rotate

- Full 8 bit interface

- Serial I/O capability (requires Serial Adaptor)

If you have purchased an Imagewriter version, you will also have a Serial Adaptor and Serial Printer Cable.

Your CIRTECH Champion card has been designed to give you many years of useful, trouble-free service. It was designed and manufactured in Scotland using state-of-the-art techniques to combine low cost with high reliability and advanced performance.

CHAPTER 2

INSTALLATION

This chapter provides step-by-step instructions for installing your Champion card. We recommend that you read all of the instructions first to familiarise yourself with the procedure.

GENERAL HANDLING PRECAUTIONS:

- Always make sure that the power is turned OFF before you remove or install any part. On the //e, check that the red LED at the left rear of the circuit board is not illuminated.

- Before handling any part inside the APPLE or the card, 'discharge' yourself by touching an 'earthed' surface (eg. the case of the power supply inside the APPLE) to remove any static charge you may be carrying. You should 'discharge' yourself regularly throughout the installation procedure.

- Hold the card only by its edges and do not touch the gold edge connector fingers to avoid contamination.

INSTALLATION PROCEDURE:

The following procedure is used to install the card in your APPLE:

- Set ALL external power switches to OFF (printer, monitor, etc.)

- Remove the top cover of your APPLE by pulling upwards at the rear.

- Locate slot 1 on the circuit board (second from the left on the APPLE][+, extreme left on the APPLE //e). The card will operate in any slot except '0' but CP/M and PASCAL systems expect to find it in slot 1.

- (If you have an Imagewriter version, this instruction is not required). Pass the printer cable attached to the card through the aperture in the rear case of the APPLE][+ opposite slot 1. If you have an APPLE //e, you must disconnect the cable from the card before the cable can be passed through the back panel. Remember to reconnect the cable correctly, as shown in Fig. 1 overleaf before proceeding to the next stage of the installation.
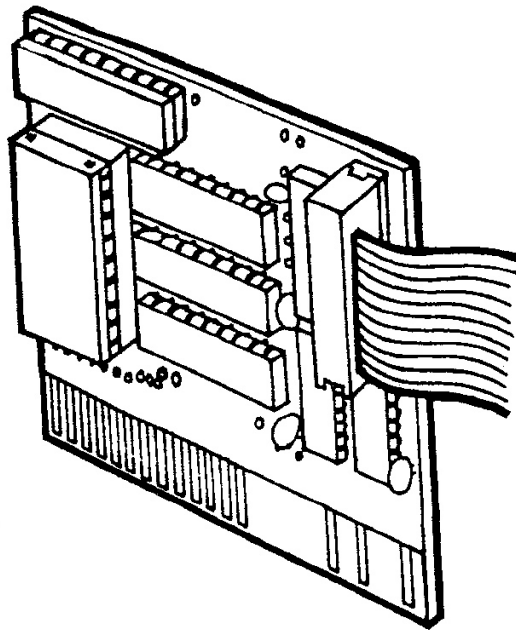
Fig. 1

Connection of the Cable to the Champion card

- Align the card with slot 1 (the component side should face to the right as viewed from the keyboard) so that the gold connector is directly over the slot.

- Press the card into the slot using firm pressure until the card is fully seated (make sure the card is not tilted towards the front or the rear of the APPLE). Fig. 2 below shows the correct installation of the card in the Apple.
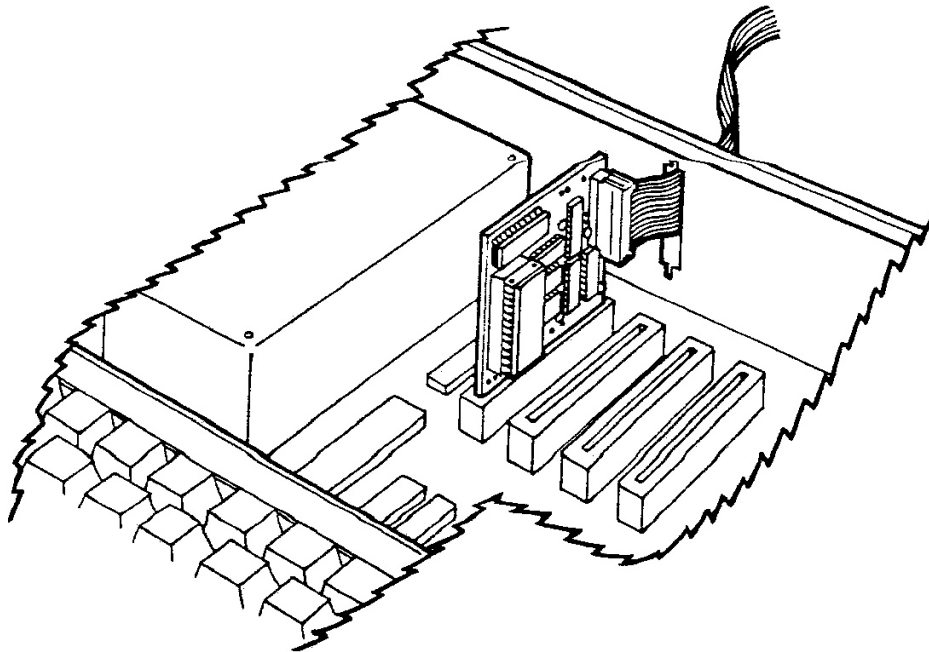

Fig 2

Installation of the Champion card in the Apple

- If you have an Imagewriter version of the Champion, you should now install the Serial Adaptor (see installation instructions in Chapter 7) and connect the serial cable.

- Replace the cover on your APPLE, connect the other end of the cable to your printer, and that's the installation complete!

CHAPTER 3

OPERATION

The CIRTECH Champion Card has been designed to be very simple to operate and to be compatible with virtually all modern printers and APPLE software.

The Champion uses the same control codes as the APPLE and GRAPPLER+ interface cards and in the same way (i.e. it is functionally identical). However, the Champion also offers a much improved range of commands over either of these cards while maintaining full compatibility.

If you intend to use the card as the printer interface for a commercial software program, you will not need to read further than this section of the Reference Manual. However, the following sections of the Manual may be of assistance should you encounter any problems getting your printer or software to operate with the card.

If your commercial software program has a printer card selection menu, you may find that the Champion card is not listed. In that case, you should select the card type listed below for the applicable type of program. The second card type listed should be selected if this first choice card type does not operate correctly.

'Graphics' Type Programs

    Grappler
    Apple Parallel

'Other' Programs

    Apple Parallel
    Grappler

Obviously, printer card selection varies from program to program and you may find you have to select another card type, but the above options are most likely to produce fully compatible operation.

ACTIVATING YOUR PRINTER FROM A CHAMPION CARD

From APPLESOFT

To activate the card from BASIC, simply type PR#n where 'n' is the number of the slot in which the card is installed. When the card is active, all text typed on the keyboard will be printed. The characters you type will not appear on the screen unless the 'echo' function is activated (see 'SCREEN ECHO ON/OFF' in the following chapter on general purpose control commands). To de-activate the card, simply type PR#0 from BASIC.

From PASCAL

The PASCAL language recognises the CHAMPION automatically as the PRINTER: (device #6) and you can output to it in the normal way, eg. from the F)iler, you can T)ransfer program listings to the printer as follows:

DEMO.TEXT, PRINTER:

From CP/M

CP/M also recognises the CHAMPION as a printer device and all the usual CP/M LST: or printer commands work normally, eg.

PIP LST:=DEMO.DOC

will print a copy of the file DEMO.DOC.

CHAMPION CONTROL COMMANDS

The Champion card's many features are activated by sending a control string to it. The card uses a control character to recognise when you are 'talking' to it and not to the printer. From APPLESOFT and APPLE DOS or PRODOS based programs, the control character is CTRL-I or CHR$(9) (ASCII 09) and, from PASCAL or CP/M, it is CTRL-Y or CHR(25) (HEX 19).

If the Champion card is 'active', the control string can be entered directly from the keyboard or from within a program. If you enter it from the keyboard, you must hold the 'CONTROL' key down whilst pressing the 'I' or 'Y' key (depending on the operating system) once, let go both keys and then type the appropriate command string (see below for details of commands).

From within a BASIC program, you should PRINT CHR$(9); followed by the command string inside quotes. If you entered the command from the keyboard, the APPLE's BASIC interpreter will not recognise it as a 'BASIC' command and will print 'SYNTAX ERROR?' after the command has been executed. This is quite normal.

From within a PASCAL program, the control character is CHR(25); from MBASIC - CHR$(25); and from CP/M - ASCII 09, HEX 19, DECIMAL 25.

CHAPTER 4

GENERAL CONTROL FEATURES

The following commands are general purpose controls:

NOTE: From **CP/M** or **PASCAL**, the control character is **CTRL-Y** NOT CTRL-I. Therefore, when using the following commands from CP/M or PASCAL, CTRL-Y should be substituted for CTRL-I.

- ### AUTO LINEFEED

When the card is first activated, it will automatically send a line feed command to your printer when it receives a carriage return command (unless you are using it from PASCAL or CP/M which provide their own line feed). The feature can be controlled by using the following control commands:

[CTRL]I K - AUTO LINEFEED OFF
[CTRL]I A - AUTO LINEFEED ON

- ### BELL ON/OFF

The Champion can prevent the BELL character from being sent to your printer by sending the following code:

[CTRL]I C

The BELL can be re-activated by sending:

[CTRL]I B

- ### SCREEN ECHO ON/OFF

You can 'echo' what is being printed to the screen at the same time as it is being printed by using the following commands:

[CTRL]I J - SCREEN ECHO OFF
[CTRL]I I - SCREEN ECHO ON

NOTE: The screen 'echo' cannot be activated from either CP/M or PASCAL to protect any 80 column screen which is being displayed.

- ### HI-BIT MASKED

This function will allow BIT 7 (the high bit) to be passed directly to the printer (BASIC normally has the high bit set). This allows access to special character sets available on many printers activated by ASCII codes 128 to 255. The function is controlled as follows:

[CTRL]I H - Allow HI-BIT through
[CTRL]I X - HI-BIT always set to 0

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CLEARING THE PRINT BUFFER (Champion Cachecards only)

On the Champion Cachecard, the print buffer is filled by output from the APPLE whether or not your printer is on-line, thus freeing the computer from servicing the 'slow' printer. This results in no long waits while a print operation is taking place; the microprocessor on the Cachecard controls the printer and sends characters stored in the Cachecard's on-board memory. If for any reason you do not wish to print the contents of the buffer memory, then you can clear this memory simply by pressing [CTRL] RESET on the APPLE keyboard. This action will empty the buffer and re-initialise the print buffer. (If your printer has its own in-built buffer, it will not stop printing until this buffer is empty - see your printer manual for further information.)

STRAIGHT THROUGH MODE

The Champion will allow characters, including [CTRL]I (or [CTRL]Y from CP/M or PASCAL), to be sent to the printer directly without the card trying to interpret them. This function is controlled as follows:

[CTRL]I nT followed by the characters you wish to send

n = the number of characters (as a decimal number, eg. 23) you wish to send straight through

NOTE: If you make n = 0, then the control interpretation on the card will be permanently disabled, allowing all characters to be sent through uninterpreted.

RESET CHAMPION CARD

The default settings of the various functions (see below) can be re-installed by means of a control code. This code will also reset the printer:

[CTRL]I @

NOTE: This code will not clear the print buffer on the Champion Cachecards (please refer to 'Clearing the Print Buffer' above).

DEFAULT VALUES:

The card sets up default values for various features when first used, as follows:

BASIC: AUTO LINEFEED ON; BELL ON; SCREEN ECHO OFF; HI-BIT SET LOW

CP/M & PASCAL: AUTO LINEFEED OFF; BELL ON; SCREEN ECHO OFF (CANNOT BE ACTIVATED); HI-BIT SET LOW

The card will reset to the appropriate default values if you change from BASIC to CP/M or PASCAL, or switch the computer off.

DEFAULT OUTPUT MODE:

The various versions of Champion cards available default to the following output modes when first activated:

STANDARD CHAMPION AND APPLE DMP VERSION: PARALLEL OUTPUT

CHAMPION IMAGEWRITER VERSION: SERIAL OUTPUT

CHAPTER 5

TEXT FEATURES

The Champion cards offer a wide range of text, character and formatting features, as follows:

NOTE: From **CP/M** or **PASCAL**, the control character is **CTRL-Y** NOT CTRL-I. Therefore, when using the following commands from CP/M or PASCAL, CTRL-Y should be substituted for CTRL-I.

- ## CHARACTER SET SELECTION

Several different character sets can be selected on your printer by using the following codes:

[CTRL]I nF (n = character set)

n	Character Set
0	UK
1	Custom Character Set
2	Alternative Custom Set on NLQ
3	USA
4	FRANCE
5	GERMANY
6	ITALY
7	SPAIN
8	SWEDEN
9	DENMARK (EPSON ONLY)
10	JAPAN (EPSON ONLY)

These controls will select different character sets on different makes of printer (please consult your printer manual for further instructions).

- ## CHARACTER SIZE SELECTION:

The letter style used by your printer can also be selected by using the following commands:

[CTRL]I nQ - SELECT CHARACTER SIZE

eg. on an EPSON printer, the value of 'n' gives the following character sizes:

n	Character Size (EPSON)	Character Size (APPLE DMP or IMAGEWRITER)
0	Pica (10 cpi)	Pica (10 cpi)
1	Proportional type 1	Pica proportional
2	Proportional type 2	Elite proportional
3	Condensed (17 cpi)	Ultra-condensed (17 cpi)
4	Elite (12 cpi)	Condensed (15 cpi)
5	Pica (10 cpi)	Elite (12 cpi)
6	Pica (10 cpi)	Pica (10 cpi)
7	Pica (10 cpi)	Extended (9 cpi)

NOTE: If your printer has been set up, by means of its internal controls, to use a character size other than Pica, then the Champion card, when activated, will not alter this setting unless the appropriate control commands are given.

- ## ENLARGED OR WIDE CHARACTERS:

Enlarged or wide characters can also be selected by the following commands:

    [CTRL]I W - sets WIDE mode
    [CTRL]I V - deselects WIDE mode (also deselects
                ENHANCED mode - see below)

- ## ENHANCED OR BOLD CHARACTERS

Enhanced or bold characters can also be selected as follows:

    [CTRL]I E - sets ENHANCED mode
    [CTRL]I V - deselects ENHANCED mode (also deselects
                WIDE mode - see above)

- ## DOLLAR AND POUND SIGNS

A special command is also available to translate Dollar signs ($) to Pound signs (£) on your printer, allowing the use of American financial software. The commands are as follows:

    [CTRL]I # (or £ on //e) - prints $ as £
    [CTRL]I $ - prints $ as $

TEXT FORMATTING COMMANDS

A variety of text formatting commands are also available:

[CTRL]I nL - **Sets left margin,** i.e. all printing will start 'n' characters in from the left hand edge of the paper.

[CTRL]I nR - **Sets right margin,** i.e. causes a carriage return and line feed at the first space after 'n' characters from the left margin setting. This feature prevents words being split at a specified margin. If 'n' = 0 then this function is disabled. **NOTE:** This command is not available from CP/M or PASCAL.

[CTRL]I nP - **Sets page length.** This command will cause the listing to skip 6 lines at the bottom of each page. 'n' should be the total length of the page. This command also sets the top of form to the current print head position. If 'n' = 0, then this function is disabled.

[CTRL]I nN - **Sets line length** to 'n' characters from the left margin. If 'n' = 0, then there is no limit to the number of characters in a line.

SCREEN 'SNAPSHOT'

The Champion also allows you to print a 'snapshot' copy of the 40 or 80 column (//e only) screen, using the following command:

[CTRL]I nS - **Instant screen dump.** If 'n' is omitted, then the currently active screen will be dumped. If 'n' is greater than 127, an 80 column screen dump will occur. If 'n' is less than 128, a 40 column screen dump will be selected.

DEFAULT VALUES:

STANDARD CHARACTER SET; PICA (10 cpi); NORMAL; MARGINS AND PAGE LENGTH DISABLED; NO LIMIT ON LINE LENGTH

The card will reset to the appropriate default values if you change from BASIC to CP/M or PASCAL, or switch the computer off.

CHAPTER 6

GRAPHICS FEATURES

The Champion has an advanced set of graphics dump commands, giving a great degree of power and flexibility in the printing of the hi-resolution graphics pages in the Apple.

NOTE: From **CP/M** or **PASCAL**, the control character is **CTRL-Y** NOT CTRL-I. Therefore, when using the following commands from CP/M or PASCAL, CTRL-Y should be substituted for CTRL-I.

- DENSITY SELECTION

These commands allow you to select the density of the image to be printed:

[CTRL]I nQ ('n' = 0-7 as listed below)

n	Mode	Dots/Inch (EPSON)	Dots/Inch (IMAGEWRITER & DMP)
0	Normal	60	80
1	Double Density	120	144
2	Double Density/Double Speed	120	160
3	Quad Density	240	136
4	CRT Graphics	80	120
5	Plotter Graphics (X:Y = 1:1)	72	96
6	CRT Graphics II	90	80
7	Normal	60	72

The **default** density is 0 - **normal density**

NOTE: Your printer may not be capable of printing at all the above densities. Please refer to your printer manual for further information.

- GRAPHICS DUMP CONTROL

The following commands all result in an immediate graphics dump to the printer when [RETURN] is pressed after the command string.

The command string must be preceded by **[CTRL]I G.**

For example, to print page one with background fill, rotated and inverse type, the command would be as follows:

[CTRL]I GRIJ [RETURN]

or, in an **APPLESOFT** program:

```
10  PRINT CHR$(4); "PR#1";
20  PRINT CHR$(9); "GRIJ"
```

in an **MBASIC** program from CP/M:

```
10  LPRINT CHR$(25); "GRIJ"
```

in a **PASCAL** program:

```
PROGRAM GRAPHIC
VAR PRINT:TEXT;
BEGIN
REWRITE(PRINT, 'PRINTER:');
WRITELN(PRINT,CHR(25),'GRIJ');
END.
```

2 - PAGE SELECTION.   Selects high resolution graphics page 2 to print. Default value is page 1.

D - DOUBLE SIZE.   Produces a graphics image twice the height and twice the width of a normal image.

E - DOUBLE DENSITY MODE.   Note: This command exists to maintain compatibility with the GRAPPLER+. Density selection commands should be used to set the dot density (E has the same effect as [CTRL]I 1Q).

I - INVERSE. Produces an inverse image, i.e. white on black instead of black on white.

J - BACKGROUND FILL.   Produces a grey filled background on which the image appears.

K - FADING. Produces the effect of fading the image.

O - OR. Produces an image made up by OR-ing HGR page 1 with HGR page 2. The result looks as if one page is overlaid on the other.

P - AND.   Produces an image made by AND-ing HGR page 1 with HGR page 2. The result is an image with only the points that are common to both pages being printed.

Q - EX-OR.   Produces an image made up by EXclusive OR-ing HGR page 1 and HGR page 2. The result is as if one page is in front of the other.

R – ROTATE. This command will produce an image that has been rotated by 90 degrees clockwise.

– **SCALING**

The following commands enable you to 'scale' the image to your requirements. You must ensure your printer is capable of printing enough 'dots' across the page before trying to use some of the higher value scaling commands.

X Axis Commands (width of image):

Command	Scale Factor
S	2
T	3
U	4
V	5

Y Axis Commands (height of image):

Command	Scale Factor
W	2
X	3
Y	4
Z	8

GRAPHICS DEFAULT VALUES:

After completion of the selected graphics dump, the card resets default values for graphics dumps to the following:

**HGR PAGE 1, NOT ROTATED, NORMAL, 1:1 SCALE**

CHAPTER   7

SERIAL ADAPTOR

The Champion has a unique feature! With the addition of a CIRTECH Serial Adaptor (contact your dealer for more information), it will operate as a bi-directional RS232 type serial interface with software selectable baud rates on input and output.


INSTALLATION PROCEDURE

The following procedure is used to install the Serial Adaptor in your APPLE. We recommend that you read all of the instructions first to familiarise yourself with the procedure.

-   Always make sure that the power is turned OFF before you remove or install any part. On the APPLE //e, check that the red LED at the left rear of the main circuit board is not illuminated. Set all external power switches to OFF (printer, monitor, etc.)

-   Locate the games connector inside the machine (it's an empty IC socket on the right towards the rear, near Slot 7).

-   You will find the following steps much easier to carry out if you remove any cards you may have in Slots 5, 6 and 7 at this point. You should also disconnect anything that is plugged into either the games connector or the video connector (4 pins in a row, located near the games connector).

-   Carefully remove the serial adaptor from its packaging and remove the protective foam from the pins on the base of the adaptor. Align these pins with the games connector socket (the flat cable connected to the adaptor should point towards the rear of the APPLE).

-   Gently push the pins on the serial adaptor into the games socket until they are fully seated. Make sure all the pins have entered the socket properly.

-   You should now connect the small red plug attached to the adaptor to the video connector (if you have an Apple //e the plug can only go on one way; if you have an Apple][+, the two small lugs on the plug should be towards the rear of your Apple). The correct installation on various models of APPLE is shown in Figs. 3, 4 and 5 overleaf.
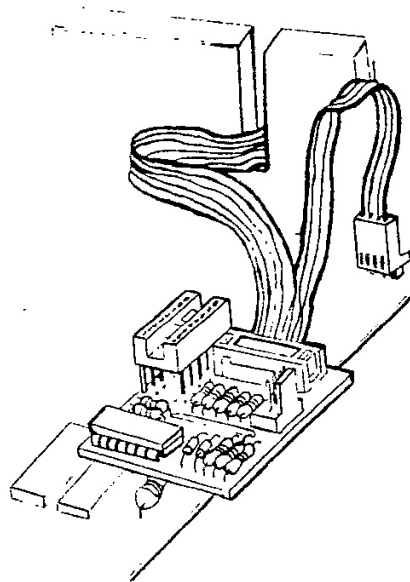
Fig. 3
Correct Installation of Serial Adaptor in Apple][+
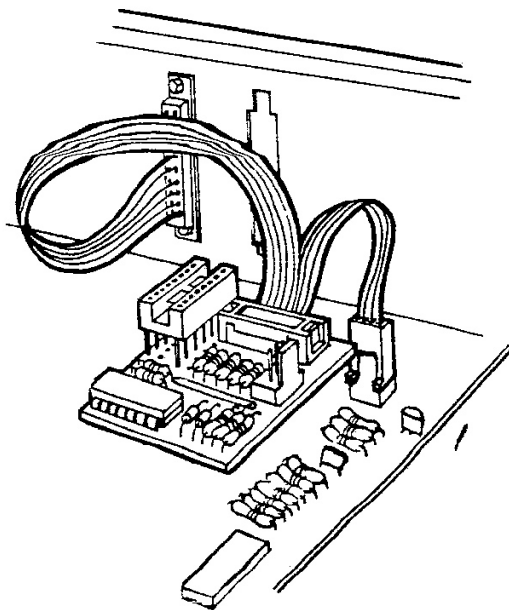
Fig 4
Correct Installation of Serial Adaptor in European Apple //e
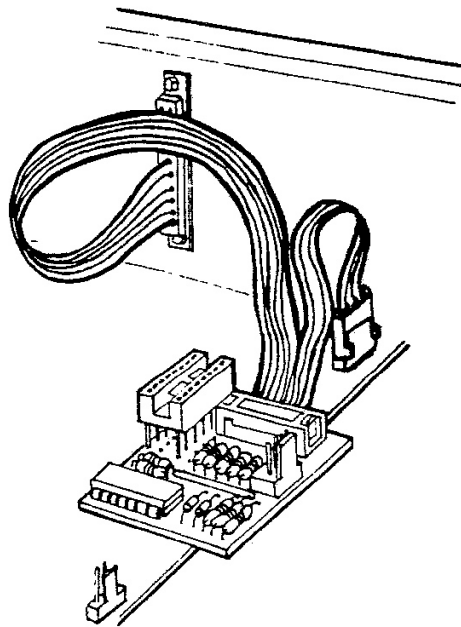
Fig. 5
Correct Installation of Serial Adaptor in American Apple //e

-   If you have a][+, then attach the D-type connector from the
    adaptor firmly to the back panel of your Apple using the
    hardware supplied with the Apple. If you have a //e, remove
    the cover from Aperture 7 in the back panel, place the
    connector in the aperture and bolt it to the panel using the
    fixing screws provided.

-   Finally, reconnect anything that was connected to your games
    or video connector to the duplicate connectors that appear
    on the top of the Serial Adaptor. Then double-check that
    the adaptor is still firmly seated on the games port.

-   Don't worry that there are no direct 'hardware' connections
    between the Champion card and the Serial Adaptor - these two
    devices communicate through the Apple motherboard.

-   Remember to replace any cards you may have removed earlier
    before replacing the cover.

Imagewriter Switch Settings

If you have purchased an **Imagewriter** version Champion, the
Imagewriter printer DIP switches should be set up as follows:

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	SW 1		**SW 2**
1	ON	1	ON
2	ON	2	ON
3	OFF	3	OFF
4	OFF	4	OFF
5	ON		
6	ON		
7	OFF		
8	OFF		

With the **Imagewriter** version of the Champion, **serial output** is **selected by default.** It is therefore not necessary to read the remainder of this chapter (unless you wish to use the serial input for some purpose) to be able use the Champion with the Imagewriter.

SELECTING SERIAL OR PARALLEL OUTPUT

The Champion cards can be switched between parallel and serial output. When first activated, the standard Champion selects parallel output by default and the Champion Imagewriter version defaults to serial output. The following commands should be used to switch between the output modes:

   [CTRL]I 1= (type the '=' sign) - **switches to serial output**
   [CTRL]I 0= (type the '=' sign) - **switches to parallel output**

This keyboard command can be used only if you have an on-line device connected to the currently active output (parallel or serial).

For example, if you wish to switch to serial mode to drive a serial printer or plotter and you do not have an active parallel printer connected to the Champion, you will not be able to activate the serial mode from the keyboard because the Champion will operate as a parallel interface when switched on and will wait for the non-existent parallel printer to become ready. The short programs listed below can be used instead of the keyboard commands.

Applesoft:

If you have an on-line device connected to the currently active output, you can use the keyboard commands given above to select serial or parallel mode. If not, you should use the following program:

```
10 PRINT CHR$(4); "PR#1";
20 PRINT CHR$(9); "1=";
```

This example would activate the Champion and switch to serial mode. To switch to parallel mode, "0=" should be substituted for "1=".

Pascal:

You cannot switch between parallel and serial output from the keyboard when using PASCAL, but should use the following program:

```
PROGRAM PARALLEL
VAR PRINT:TEXT;
BEGIN
REWRITE(PRINT,'PRINTER:');
WRITELN(PRINT,CHR(25),'1=');
END.
```

This will switch the Champion to serial output. To switch to parallel output, '0=' should be substituted for '1='.

CP/M:

It is not possible to switch between outputs from an MBASIC program running under CP/M (because of a minor 'bug' in MBASIC), but you can switch output at the CP/M 'A>' prompt level. To do this you should type the following:

[CTRL-P][CTRL-Y]1= (return)   (screen shows A>^Y1=)

The printer now prints a ? and the Champion is switched to serial output. To switch to parallel output, '0=' should be substituted for '1='.

Type [CTRL-P] again to turn off the printer and you can now run your application program.

Another convenient way of switching between parallal and serial output from CP/M is to use the following short programs. To do this, you require your System Master disk or a disk containing the file DDT.COM. You should type in the parts shown in **bold** type – the sections in normal print are the computer's responses (remember to press (RETURN) at the end of every line you enter):

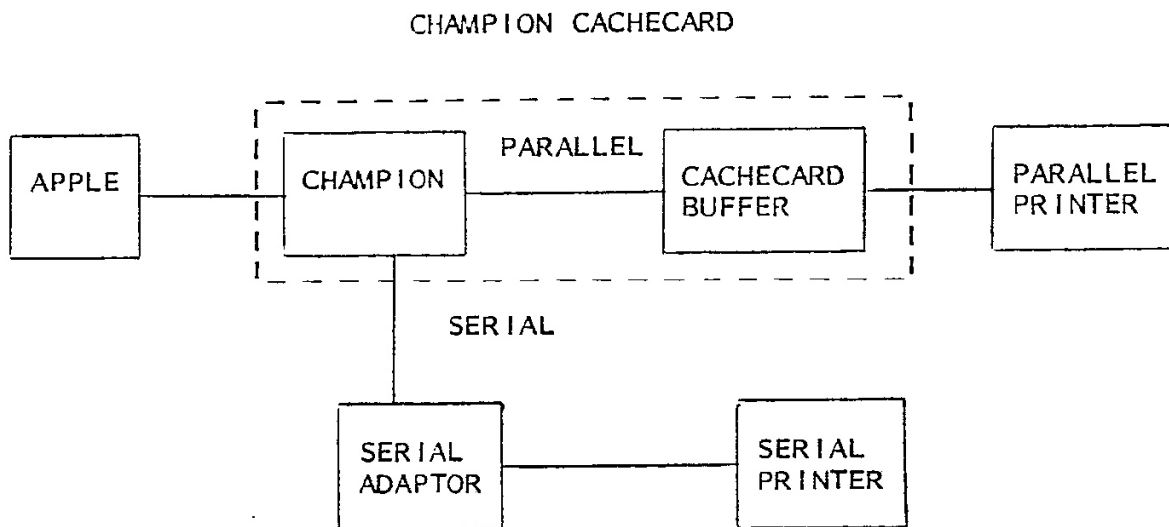| SERIAL OUTPUT	PARALLEL OUTPUT
A>**DDT**	A>**DDT**
DDT VERS 2.2	DDT VERS 2.2
-**A100**	-**A100**
0100 **MVI E,19**	0100 **MVI E,19**
0102 **MVI C,5**	0102 **MVI C,5**
0104 **CALL 5**	0104 **CALL 5**
0107 **MVI E,31**	0107 **MVI E,30**
0109 **MVI C,5**	0109 **MVI C,5**
010B **CALL 5**	010B **CALL 5**
010E **MVI E,3D**	010E **MVI E,3D**
0110 **MVI C,5**	0110 **MVI C,5**
0112 **CALL 5**	0112 **CALL5**
0115 **JMP 0**	0115 **JMP 0**
0118 .	0118 .

(now check the program has been entered correctly)

```
-L100                          -L100
0100 MVI  E,19                 0100 MVI  E,19
0102 MVI  C,05                 0102 MVI  C,05
0104 CALL 0005                 0104 CALL 0005
0107 MVI  E,31                 0107 MVI  E,30
0109 MVI  C,05                 0109 MVI  C,05
010B CALL 0005                 010B CALL 0005
010E MVI  E,3D                 010E MVI  E,3D
0110 MVI  C,05                 0110 MVI  C,05
0112 CALL 0005                 0112 CALL 0005
0115 JMP  0000                 0115 JMP  0000
0118 INR  L                    0118 INR  L
-[CTRL]C                       -[CTRL]C
A>SAVE 1 SERIAL.COM            A>SAVE 1 PARALLEL.COM
```

Now all you will require to do is type SERIAL or PARALLEL at the
'A>' prompt to select the required output mode.

NOTE: If you have a Champion Cachecard, the serial output is not
buffered by the card, i.e. the card feeds the serial port before
the buffer (see following diagram).

CHAMPION CACHECARD

This system has the advantage that, because the buffer can accept
information very quickly, it is possible, for example, to use a
serial plotter while printing on a parallel printer. This can be
accomplished by selecting parallel output and sending all your
printed information into the card (and therefore stored in the
buffer), then selecting serial output and sending your plotter
data while the printer information is fed to the printer by the
Cachecard buffer.

SELECTING BAUD RATES:

The Champion uses **default** settings of baud rate at **9600** bits/second with a frame structure of 1 start, 8 data and 2 stop bits to transmit and receive serial data. The baud rate of the input and output may be changed independently, as follows:

[CTRL]I n? (type the '?' sign)
where 'n' = the baud rate selection:

n	Output Rate		n	Input Rate
0	75		8	75
1	110		9	110
2	300		10	300
3	600		11	600
4	1200		12	1200
5	2400		13	2400
6	4800		14	4800
7	9600		15	9600

The rate can be changed at any time (even if you are not using serial input or output).

SERIAL INPUT:

The Champion, with a Serial Adaptor fitted to your APPLE, can operate as a serial input device. This function is available whether you have selected serial output or not.

To operate the card as a serial input, simply type IN#n, where 'n' is the number of the slot in which the Champion is installed.

NOTE: All data received is in true ASCII, i.e. bit 7 will be clear. The APPLE will print characters with BIT 7 clear as flashing or inverse depending on the code. You should convert the values you receive before printing them on the screen.

CHAPTER 8

TECHNICAL INFORMATION

NOTE: The information contained in this section is proprietary to CIRTECH and may not be copied or used for any manufacturing or design purposes unless authorised in writing by CIRTECH.

GENERAL:

The card mimics an APPLE super serial or firmware card by using the same identification code in ROM but the hardware is similar in operation to an APPLE parallel card.

HARDWARE:

The card can be divided into two areas, the first being the APPLE interface containing three main sections, as follows:

- 2Kbyte ROM containing the operating software

- Address decoding logic for the ROM and the printer status line

- High current latch/buffer to drive the data lines to the printer

The ROM is divided into two main sections by the decoding logic. Section 1 occupies the peripheral card 256 byte ROM space for the slot in which the card is installed, eg. C100-C1FF if the card is in slot 1. Section 2 is the 2Kbyte ROM space from C800 to CFFE available to all peripheral cards.

The decoding logic also modifies address line 0 so that when the software checks the printer status address, it forces a read on a lower ROM address if the printer is not busy. This feature greatly reduces the cost of the card by removing the need for a tri-state device to place the printer status onto the APPLE peripheral bus, and using the ROM instead. The printer status can be read by checking location $C1C1 (assuming the card is in slot 1). Bit 7 is the status of the 'BUSY' line from the printer. The character to be sent to the printer is written to the Device I/O address for the card (i.e. $C090 if in slot 1).

The CIRTECH Champion has a much reduced component count over other printer cards because of advanced design techniques such as the above. The result of this is twofold; firstly, the physical size of the card can be reduced, thus improving the cooling inside your APPLE and, secondly, the overall reliability is considerably improved, simply by having fewer components to go wrong! Great attention has also been placed on electrical performance during card layout to produce a card that gives optimum results.

The second hardware area is the print buffer.   The buffer can be divided into four sectons:

-    The input/output latches and status lines

-    Dynamic RAM memory (16 or 64K)

-    ROM program memory

-    Microprocessor controller

The hardware of the buffer is a straightforward microcomputer arrangement based around the Z80 microprocessor.   The buffer operates completely independently of the APPLE and can accept information from the APPLE at up to 19,000 characters/second.

SOFTWARE:

The software on the card is again divided into two sections; first the APPLE interface control:

The on-board ROM contains all the software to give the card its many features.   It is divided into three main parts; the command interpreter, the text handler and the graphics routines.   The command interpreter 'waits' for a [CTRL]I to be sent to the card and then conditions a set of flag memory locations using the command codes that are sent.

The second section of the software is a ROM for the Z80 micro- processor in the buffer area.   This ROM contains an algorithm which controls the buffer memory using a priority system, the main priority being to pick up characters from your Apple as quickly as possible.

The software obeys three different protocol systems, described below (s = the slot number into which the card is plugged).

'BASIC' entry from a machine language program

Data is sent by loading the accumulator with the character and doing a 'JSR' to the start address of the 256 byte ROM of the slot in which the card is installed.   This system is used by APPLESOFT.

'SUPER SERIAL CARD' or PASCAL 1.0 entry

This system has three entry points to the ROM on the card, as follows:

Addr.	Routine	X Register	Y Register	A Register
$C800	Initialisation			
	On Entry	$Cs	$s0	anything
	On Exit	$Cs	$s0	(unchanged)

Notes: $C800 space is enabled. The software initialises the Champion to default values.

Addr.	Routine	X Register	Y Register	A Register
$C84D	Read			
	On Entry	$Cs	$s0	anything
	On Exit	$Cs	$Cs	character in

Notes: $C800 space is enabled. Pascal returns serial input (from Serial Adaptor if present) data in the A Register

Addr.	Routine	X Register	Y Register	A Register
$C9AA	Write			
	On Entry	$Cs	$s0	character out
	On Exit	error code	$Cs	(changed)

Notes: $C800 space is enabled. Output character is transmitted through the parallel or serial port on the Champion.

PASCAL 1.1 or 1.2 (firmware) card entry points

Addr.	Offset for	X Register	Y Register	A Register
$Cs0D	Initialisation			
	On Entry	$Cs	$s0	anything
	On Exit	$00	$s0	(changed)

Notes: SC800 space is enabled. The software initialises the Champion to default values.

Addr.	Offset for	X Register	Y Register	A Register
$Cs0E	Read			
	On Entry	$Cs	$s0	anything
	On Exit	error code	$Cs	character in

Notes: $C800 space is enabled. Character in from Serial Adaptor (if present) is returned in the A Register.

Addr.	Offset for	X Register	Y Register	A Register
$Cs0F	Write			
	On Entry	$Cs	$s0	character out
	On Exit	error code	$Cs	(changed)

Notes: $C800 space is enabled. The byte in the A Register is sent out through the parallel or serial port on the Champion.

Addr.	Offset for	X Register	Y Register	A Register
$Cs10	Status			
	On Entry	$Cs	$s0	request (0 or 1)
	On Exit	error code	$s0	error code

Notes: $C800 space is enabled. Request = 0 asks the Champion whether it is ready to transmit another byte; request = 1 asks the Champion whether it has an input character available (it will always return 'yes'). On exit, carry bit Set for Yes or Clear for No.

SERIAL ADAPTOR

The Serial Adaptor is designed to operate as an RS232C type interface to your computer. The input and output lines are connected to the games socket pins and signals through conversion circuitry, as follows:

SIGNAL	GAME PORT PIN NO.	NAME	RS232 PLUG PIN NO.
REC DATA (INPUT)	4 (on //e)	SW2	3
or DTR (INPUT)	3 (on][+)	SW1	20
XMT DATA (OUTPUT)	12	AN3	2
DSR (OUTPUT)	13	AN2	6

The REC DATA and DTR signals are switched into pin 4 (or 3 on the][+) depending on whether you are transmitting or receiving. (Because the serial interface is 'software' driven, it is not possible to transmit and receive at the same time.) The output pins switch between +12V and -5V and, as such, are not sutable for driving cables exceeding 10 feet in length.

It is also possible to use the CTS signal (pin 6 on the RS232 plug) in place of the DSR output by linking two points on the Adaptor. Please contact CIRTECH for details.

All the hard work of encoding and decoding the serial bit stream is done by software residing in the ROM on the Champion card. The format for the data stream is one start bit, eight data bits, two stop bits with no parity. This information may be necessary if you are driving a serial printer or plotter.

CHAPTER 9

COMMERCIAL PROGRAM INFORMATION

This chapter contains information on how to modify some commercial programs to enable them to operate correctly with the Champion range of printer interface cards.

APPLEPLOT

The following instructions enable you to modify your Appleplot program for use with your Champion card.

1. Copy your Appleplot disk.

2. Place the copy program disk (not the original) into your disk drive.

3. Carefully type in the following lines precisely as shown below - where [RETURN] appears, press the return key.

    LOAD APPLEPLOT [RETURN]

    CALL -151 [RETURN]

    1FDC:71 49 [RETURN]

    7F56:43 48 41 4D 50 49 4F 4E 20 20 20 20 20 20 20 [RETURN]

    7FD7:43 48 41 4D 50 49 4F 4E 20 20 20 20 20 20 20 [RETURN]

    8301:97 3A 84 22 4F 50 54 49 4F 4E 53 3A 20 22 3B 5A 31 24 3A 8A 31 [RETURN]

    8316:3A BA 22 9 47 22 3B 5A 31 24 3A 8A 30 3A AB 32 30 3A [RETURN]

    8315:3n (do not type n; 'n' = the number of the slot in which the Champion card is installed; for example, if your Champion is installed in slot 2, type 8315:32) [RETURN]

    3D0G [RETURN]

    SAVE APPLEPLOT [RETURN]

4. The program is now complete and you can boot the disk. When you choose the print option, you will now be offered the choice of: (1) CHAMPION or (2) Qume, and you should select (1).

VISIPLOT and VISITREND/PLOT

The following short program will modify VISIPLOT and VISITREND/ PLOT to enable use with your Champion card.

Instructions are as follows:

1. Boot the system with a DOS 3.3 system master disk in the disk drive.

2. Replace the DOS 3.3 disk in the drive with the VISIPLOT disk.

3. Type CATALOG followed by [RETURN] to display the list of files contained on the disk. Check this list to see if it contains the file VISIPLOT.DRIVER. If this file appears in the catalog, then proceed with the instructions at (4.) below. However, if the file VISIPLOT.DRIVER is not on the list, execute the following instruction:

    type:
    RENAME SILENTYPE.D,VISIPLOT.DRIVER
    (followed by [RETURN])

    Then continue with the instructions at (4.)

4. Type NEW followed by [RETURN]

5. Then type in the following program, taking great care to check each line for errors:

    ```
    5 A$="VISIPLOT.DRIVER"
    6 B$="SILENTYPE.D"
    7 C$=","
    10 DATA 169,137,32,237,253,169,199,32,237,253,169,141,32,237,
       253,96
    20 D$=CHR$(4)
    30 PRINT D$;"BLOAD";A$
    40 PRINT D$;"RENAME";A$;C$;B$
    50 FOR A=39129 TO 39144
    60 READ B
    70 POKE A,B
    80 NEXT
    90 PRINT D$;"BSAVE";A$;",A$98C3,L$81"
    ```

    Check the entire program again very carefully to ensure there are no errors. When you are sure it is correct, type RUN.

6. When the program has finished running, your disk will be configured correctly for use with the CIRTECH CHAMPION range of printer interface cards.

CHAPTER 10

CONTROL COMMAND SUMMARY

NOTE: From **CP/M** or **PASCAL**, the control character is **CTRL-Y** NOT CTRL-I. Therefore, when using the following commands from CP/M or PASCAL, CTRL-Y should be substituted for CTRL-I.

GENERAL COMMANDS:

TEXT COMMANDS:

- [CTRL]I followed by:

n	Character Set
0	UK
1	Custom Character Set
2	Alternative Custom Set on NLQ
3	USA
4	FRANCE
5	GERMANY
6	ITALY
7	SPAIN
8	SWEDEN
9	DENMARK (EPSON ONLY)
10	JAPAN (EPSON ONLY)

– **[CTRL]I followed by:**

nQ – **Character size selection** (n = character type)   10

n	Character Size (EPSON)	Character Size (APPLE DMP OR IMAGEWRITER)
0	Pica (10 cpi)	Pica (10 cpi)
1	Proportional type 1	Pica proportional
2	Proportional type 2	Elite proportional
3	Condensed (17 cpi)	Ultra-condensed (17 cpi)
4	Elite (12 cpi)	Condensed (15 cpi)
5	Pica (10 cpi)	Elite (12 cpi)
6	Pica (10 cpi)	Pica (10 cpi)
7	Pica (10 cpi)	Extended (9 cpi)

– **[CTRL]I followed by:**

W – **Wide characters**	10
E – **Enhanced mode**	10
V – **Deselects wide and enhanced mode**	10
# – **Prints $ as £**	10
$ – **Prints $ as $**	10
nL – **Left margin** (n = column number)	11
nR – **Right margin** (n = columns from left margin)	11
nP – **Sets page length**	11
nN – **Sets line length** (if n = 0, there is no limit to the number of charactrers in a line)	11
nS – **Screen 'snapshot' dump** (copies currently displayed screen if 'n' missing; if 'n' 127 – selects 80 column screen; if 'n' < 128 – selects 40 column screen).	11

GRAPHICS COMMANDS:

– **[CTRL]I nQ – selects dot density** (n = density number)   12

n	Mode	Dots/Inch (EPSON)	Dots/Inch (IMAGEWRITER & DMP)
0	Normal	60	80
1	Double Density	120	144
2	Double Density/Double Speed	120	160
3	Quad Density	240	136
4	CRT Graphics	80	120
5	Plotter Graphics (X:Y = 1:1)	72	96
6	CRT Graphics II	90	80
7	Normal	60	72

GRAPHICS COMMANDS (cont.):   PAGE

-       [CTRL]I G followed by:

        2 - Selects HGR page 2   13
        D - Double size   13
        E - Double density (same as [CTRL]I 1Q)   13
        I - Inverse   13
        J - Background fill   13
        K - Fading   13
        O - OR HGR 1 with HGR 2   13
        P - AND HGR 1 with HGR 2   13
        Q - EX-OR HGR 1 with HGR 2   13
        R - ROTATE   14

-       SCALING COMMANDS: [CTRL]I G followed by:

        S - X axis x2   14
        T - X axis x3   14
        U - X axis x4   14
        V - X axis x5   14
        W - Y axis x2   14
        X - Y axis x3   14
        Y - Y axis x4   14
        Z - Y axis x8   14

SERIAL I/O COMMANDS:

-       [CTRL]I n=   where 'n' is:

        1 - switches to serial output   18
        0 - switches to parallel output   18

-       BAUD rate selection: [CTRL]I n? ('n' selects rate as   21
        follows):

n	Output Rate		n	Input Rate
0	75		8	75
1	110		9	110
2	300		10	300
3	600		11	600
4	1200		12	1200
5	2400		13	2400
6	4800		14	4800
7	9600		15	9600

I N D E X

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