INTRODUCTION

The Tasman Interface Operating Instructions describe the use of the Tasman interface with both the ZX 48K Spectrum and the Spectrum 128. The section dealing with the 128 mode will often refer the user to the 48K instructions. Some sections of the 48K instructions are equally applicable to running the interface in 128 mode and these sections should be referred to for greater detail.

Part of this manual will occasionally reference to the 16K software. Since the introduction of the Spectrum 128, the 16K software has been replaced by the 128K software. Should this cause any great inconvenience please contact Tasman Software at the address below.

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Instructions for Using the Interface Software in 128 Mode

The programs provided on the 48K side of the interface tape are also supplied for the Spectrum 128 on the 128K side. The following sections detail the differences between the programs when used in 128 mode. It is recommended that reference is made to the appropriate 48K section for greater detail.

(A) LLIST, LPRINT and text copy – "tasintbas" and "tasintcode"
The software used to LPRINT, LLIST and print a text screen copy is the machine code program "tasintcode". The Basic program "tasintbas" allows you to configure the machine code program for your printer and your requirements. Sections 1 to 10 of the manual apply to the 128 mode without any alteration.

(B) Text Copy – "tasmini"
In addition to the text copy provided by the "tasintcode" software, a text copy can be printed using the "tasmini" software recorded on the 128K side of the interface tape. The text copy software loads at location 64256 and should be loaded with the following command:

CLEAR 64255: LOAD "tasmini"CODE

Play the tape on the side marked 128K. Once the software has loaded a text screen copy is printed by executing:

RANDOMIZE USR 64256

The software is loaded above RAMTOP and, therefore, will not be cleared by NEW.

The character code at location 64259 is printed out at the beginning of each line during a text screen copy. It is set to zero on the tape but you can POKE a number into it – 14 for example will result in a screen copy in enlarged text on most Epson-type printers.

Memory location 64260 and 64261 contain the codes for the printer carriage return and linefeed respectively. The tape is supplied with these locations holding 13 and 10 respectively.

Memory location 64262 holds zero as supplied and is the number of spaces printed at the beginning of each line of the text copy. You can POKE a number into this location to centre the screen copy output on the paper.

(C) High Resolution Screen Copies
A number of fast machine code high resolution screen copy programs are available. The high resolution screen copies all load at location 64256 and should be loaded with the following command:

CLEAR 64255: LOAD “xxxxx”CODE

Where xxxxx is the name of the program to be loaded. A high resolution screen copy is printed by executing:

RANDOMIZE USR 64256

The following list describes the screen copy software provided.

tasepson	- Epson FX-80 and RX-80, Brother HR5 and M1009, Star SG-10, Amstrad DMP 2000.
tas star	- Star DMP 510 and DMP 515
tastandy	- Tandy Colour Graphic Printer CGP 115
tas-seik	- Seikosha GP80 and GP100
tas-starg	- Star Gemini
tas-shinwa	- Shinwa CP80, Mannesmann Tally MT80, Cosmos 80, Datac Panthers

The user should refer to the appropriate 48K section of this manual which details a series of pokes that can be made to each program. All of the numbers mentioned for POKEing should be substituted according to the table below:

23351 = 64511	23543 = 64503
23530 = 64490	23550 = 64510
23496 = 64456	23546 = 64506
23361 = 64321	23318 = 64278
23442 = 64402	23319 = 64279
23456 = 64416	23296 = 64256
23461 = 64421	23548 = 64508

(D) LPRINT and LLIST – tasbuff
“tasbuff” is a reduced version of tasintcode that will load anywhere in memory. To load this software type:

CLEAR XXXXX-1: LOAD “tasbuff”CODE XXXXX

where XXXXX is the start address at which you want the software to reside. The software is initialised by typing:

RANDOMIZE USR XXXXX

To change the code sent to the printer for a pound sign you should poke location XXXXX+35. If your printer does an automatic linefeed upon receipt of a carriage return code, you cab stop tasbuff sending a linefeed code by POKEing XXXXX+34 with zero.

(E) Grey Scale Screen Copy Software – Tascopy

The machine code program tcopy_code enables a grey scale high resolution screen copy to be printed on Epson type printers. The Tascopy Basic program allows the code be configured for your printer.

Tascopy loads the “bytes: tcopy_code” at location 64256 and a screen copy is printed by executing:

RANDOMIZE USR 64256

(F) Summary

The programs recorded on the 128K side of the tape are as follows:

File type	Filename	Load Address	Length of Code
program	tasintbas	-	-
bytes	tasintcode	64716	652
bytes	tasmini	64256	256
bytes	tasepson	64256	256
bytes	tas-star	64256	256
bytes	tastandy	64256	256
bytes	tas-seik	64256	256
bytes	tasbuff	64256	256
bytes	tas-starg	64256	256
bytes	tas-shinwa	64256	256
program	tascopybas	-	-
bytes	tcopy_code	64256	256

All of the software supplied on the Tasman Interface tape can be transferred to microdrive by executing:

SAVE*”m”;1;”filename”CODE XXXXX,YYYYY

where XXXXX = the start address and YYYYY = length of code.

The Tasman Interface
Operating Instructions

(1) Connecting the Interface

BEFORE CONNECTING THE SPECTRUM TO A PRINTER VIA THE TASMAN INTERFACE ENSURE THAT POWER IS NOT BEING SUPPLIED EITHER TO THE SPECTRUM OR TO THE PRINTER.

Attach the interface unit to the Spectrum by aligning the lug of the interface edge connector with the notch in the Spectrum expansion connector and push both together. Plug the ribbon cable into the interface (a lug on the plug determines which way the plug should face) and connect the other end of the ribbon cable to the printer. Both the printer and the Spectrum can now be turned on.

(2) Tasword Two and the Tasman Interface

Tasword Two already contains the necessary software to drive full width printers via the Tasman Interface. Simply load Tasword Two and ensure that the interface codes are set as described in the leaflet that accompanies the Tasword Two manual. See the appendix for configuring Tasword Two for the Type B interface.

(3) The Tasman Interface Software

To LLIST and LPRINT with your own programs you must load the Tasman interface software. Follow the instructions given below. The numbers in square brackets are the numbers that must be typed if you are using a 16K Spectrum.

(4) Using the Interface Software for the first time

Position the cassette in your recorder at the beginning of the side marked as being for a 48K [16K] Spectrum. Type:

LOAD””

and then press ENTER and play the tape. You will see the Interface Software load in two parts: first the “program: tasintbas” and then “bytes: tasintcode”.

It is the “bytes: tasintcode” that drives the printer via the interface. The “program: tasintbas” is a Basic program that enables you to configure the machine code “tasintcode” to your printer and your requirements, and to save your personally configured “tasintcode” onto tape.

The basic program “tasintbas” will start to run as soon as the load is complete. Read the instructions on the screen carefully.

You will first be asked if your printer has one or two codes for carriage return and linefeed. Just press ENTER to choose the default value shown and press ENTER is answer to each of the following questions to choose the default values for carriage return and linefeed. Also press ENTER to answer Yes to the question concerning printing beyond the end of a line.

You will then be asked:

“Do you wish to specify character codes for printing? (Y/N)”

Press N for no and you will then be asked to press either R to restart, B to enter Basic, or S to save the machine code. Press B to enter Basic and then try some LPRINT statements, i.e.

LPRINT”Testing”

If this seems successful you might like to try LLIST to list the Basic program.

(5) Troubleshooting
If printing does not take place or is incorrect then your printer probably uses different codes for carriage return/linefeed than the default values assumed by the program. Consult your printer manual and RUN the program again to specify the correct codes for your printer. (Some printers have an internal switch which can be set to specify whether or not a linefeed should automatically be performed after a carriage return).

(Carriage return means move the printhead to the left hand side of the paper. Linefeed means move the paper up one line.)

(6) Specifying Character Codes for Printing
On running the interface software and specifying the carriage return/linefeed codes you will be asked if you wish to specify character codes for printing. Press Y to answer yes and the Spectrum character set will be shown on the screen together with a numerical code for each character. These numbers are the codes that are sent to the printer in order to print each character. You can change the code that is sent for any character by following the instructions shown on the screen. You may want to do this because, for example, the Spectrum code for the £ sign is 96 but some printers require code 35 to print this character.

After being allowed to specify the codes for normal characters the interface software allows you to do the same for the user defined graphics characters.

Finally, you can specify codes for the Spectrum graphics symbols. Each graphics symbol can be a sequence of up to four codes to be output on printing. This can be useful for sending printer control codes as described in Sec. 9. Each symbol is set by default to a single space (code 32).

(7) Saving Customised Printer Software
Load and run the Interface software as described in sections 4 and 6. When you are given the option of saving the machine code put a blank tape in your cassette recorder and follow the instructions given by the program.

(8) Loading and Using the Customised Printer Software
The machine code printer software must be loaded before you can use LPRINT and LLIST in your own programs. The machine code must reside in a 652 byte region beginning at 64716 [31948]. First lower RAMTOP by executing

CLEAR 64715 [31947]

and then load your customised printer software by executing

LOAD””CODE

Before you can LLIST or LPRINT you must initialise the interface by executing

RANDOMIZE USR 64719 [31951]

RUN and NEW reset the Spectrum to send output to a ZX printer so put the statement

RANDOMIZE USR 64719 [31951]

as a program line near the beginning of your program. It does not matter if this initialisation statement is executed more than once. The machine code printer software will not be effected by NEW as it resides above RAMTOP provided that the above CLEAR statement has been executed.

You can save your customised printer software onto tape with your own programs so that it loads automatically. Your own Basic program should start with the following lines:

```
10 GOTO 40
20 CLEAR 64715 [31951]
30 LOAD""CODE
40 RANDOMIZE USR 64719 [31951]
50 start of your own program proper
```

Save your own Basic program by executing

SAVE"progname" LINE 20

and save the machine code onto the tape immediately after the Basic program by executing

SAVE"tasintcode" CODE 64716 [31948],652

(9) Sending Printer Control Codes

You may wish to send a character code to your printer that is outside the normal range (32-127) for the Spectrum characters. Codes greater than 127 are normally interpreted by the interface software as tokens representing the Spectrum keywords and the entire keyword is printed. Codes below 32 are normally interpreted as tab control codes for printing, or as colour codes etc which are ignored on printing. (The Spectrum character set and codes are given in Appendix A of the manual.)

The interface will send a code to the printer that is outside the normal range 32-127 (rather than interpreting it as described in the above paragraph) provided that it is preceded by code 27. For example, the control code for enlarged text on many printers is 14:

LPRINT CHR$ 27;CHR$ 14; "This is enlarged"

The control code sequences to begin and end underlining on some printers are 27,45,1 and 27,45,0 so to print

An underlined word

use

```
LPRINT "An ";CHR$ 27;CHR$ 27;CHR$ 45;CHR$ 27;CHR$ 1;"underlined";
       CHR$ 27;CHR$ 27;CHR$ 45;CHR$ 27;CHR$ 0; " word"
```

where the code 27 must itself be preceded by a code 27 as it is outside the normal range 32-127.

A convenient way of sending a sequence of printer control codes is by defining a Spectrum graphics symbol to be the sequence. Each of the sixteen Spectrum graphics symbols can be defined to be a sequence of up to four character/control codes. For example, with a printer that has the above control code sequences for underlining RUN the Basic interface program and define the graphics symbol with code 140 to be the sequence given by:

140 ■ 27 45 1

and the symbol with code 131 to be the sequence given by:

131 ■ 27 45 0

Then the above example

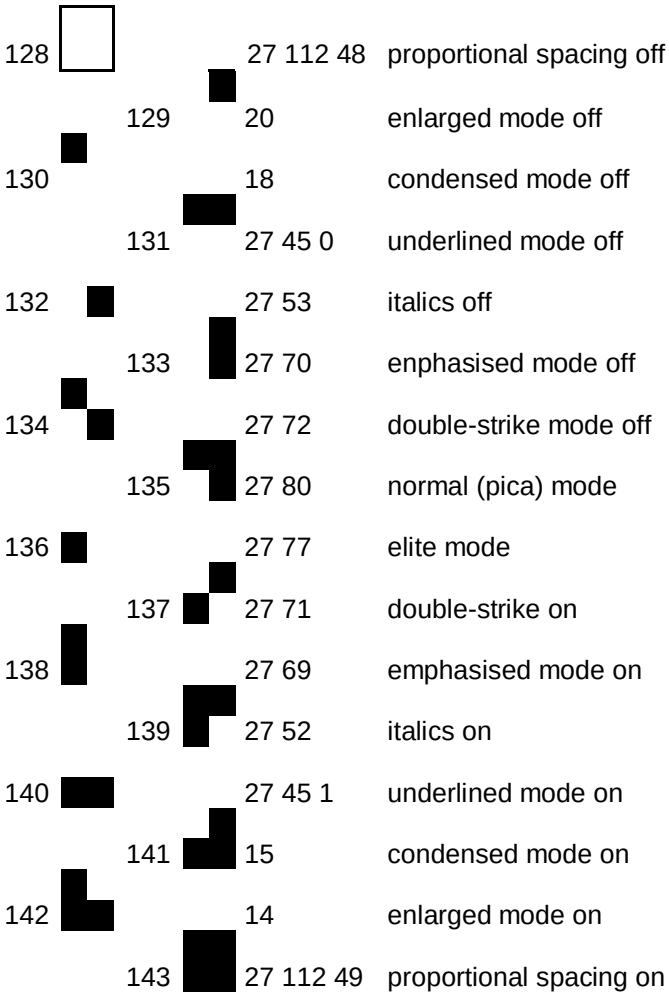
An underlined word

is obtained by executing

LPRINT "An ▬underlined▬ word"

Note that the codes in graphics symbol sequences are NOT to be preceded by code 27 if they are out of range. If graphics symbols are defined as control code sequences then they will have the same effect in program listings as they do in LPRINT statements.

The following suggested set of graphics symbol code sequences is for Epson and Star printers but some of the sequences will work on other printers:



(10) Text Copy

Once the interface has been initialised by RANDOMIZE USR 64719 [31951] a copy of the text on the screen is printed by:

RANDOMIZE USR 64716 [31948]

You can replace the copy statements in your program with this statement. Note that it is the text that is printed, and not any graphics or graphics symbols. If the pixels within a character area do not exactly match with one of the Spectrum characters then a space is printed for that character area.

A version of the text copy code which resides in the Spectrum printer buffer area of memory is recorded on the Tasman Interface Software tape. See Sec. 11 for details.

(11) Printer Buffer Text Copy Software

This software is provided to enable the user to run programs that use memory above 64715 [31947] and which provide output by using the COPY statement. Masterfile by Campbell Systems is such a program. This software is loaded into the printer buffer. It is recorded on each side of the tape immediately after the "bytes: tasintcode" with the name "tasmini". To load this software type:

LOAD "tasmini" CODE

and play the tape. Once this software has been loaded a text screen copy is obtained by executing:

RANDOMIZE USR 23296

and you can replace the COPY statements in your program with the above statement. Note that the printer buffer is cleared by NEW.

In the printer buffer software the character code at location 23299 is printed out at the beginning of each line during a text screen copy. It is set to zero on the tape but you can POKE a number into it – 14 for example will result in a screen copy in enlarged text on many printers.

Memory locations 23300 and 23301 contain the codes for the printer carriage return and linefeed respectively. The tape is supplied with these locations holding 13 and 10 respectively.

Memory location 23302 holds zero as supplied and is the number of spaces that will be printed out at the beginning of each line of screen copy. You can POKE a number unto it to, for example, centre the screen copy output on your printer paper.

(12) High Resolution Screen Copies

Programs can be written to print screen copies including graphics. These programs vary according to the graphics capabilities of the printer in use. The Basic programs take some time to copy a screen and machine code versions can be written.

Epson FX-80:

```
10 LPRINT CHR$ 27;CHR$ 27;"A";CHR$ 27;CHR$ 8;:REM line spacing
20 FOR y=175 TO 7 STEP -8
30 REM set normal density bit-image mode:
40 LPRINT CHR$ 27;CHR$ 27; "K";CHR$ 27;CHR$ 0;CHR$ 27;CHR$ 1;
50 FOR x=0 TO 255: LET c=0
60 FOR z=0 TO 7: LET c=c+POINT(x,y-z)*2↑ (7-z):NEXT z
70 LPRINT CHR$ 27;CHR$ c;
80 NEXT x:LPRINT:NEXT y
```

Fast machine code versions of this program are recorded on each side of the tape for the printers listed below. They all reside in the printer buffer and will be removed by "NEW".

Epson FX-80

To load the screen copy software for the Epson FX-80 execute:

LOAD "tapepson" CODE

and play the tape. Once this software is loaded a high resolution screen copy is obtained by executing:

RANDOMIZE USR 23296

POKE 23551,1 changes the program to give a small size screen copy and POKE 23551,0 gives a large size screen copy. The left margin position can be changed by POKE 23530,X where X is a number that is greater than the number of spaces to be printed on the left hand side of the paper.

Epson RX-80

POKE 23496,4 in the "tapepson" described above converts the code to run on the Epson RX-80.

Star DMP 515/510

To load the screen copy software for the Star DMP 515/510 type:

LOAD "tas-star" CODE

Once this software is loaded a high resolution screen copy is obtained by executing:

RANDOMIZE USR 23296

POKE 23361,1 and POKE 23551,1 changes the program to give a small size screen copy. POKE 23361,3 and POKE 23551,0 gives a large size screen copy. Large screen copies do not reproduce the two rightmost character positions of the screen. The left margin position can be changed by POKE 23530,X where X is a number that is one greater than the number of spaces to be printed on the left hand side of the paper.

Tandy Colour Graphic Printer

To load the colour screen copy software for this printer execute

LOAD "tastandy" CODE

Once this software is loaded a high resolution colour screen copy is obtained by executing:

RANDOMIZE USR 23296

POKE 23442,107 and POKE 23456,48 and POKE 23461,106 gives a horizontally printed screen copy. POKE 23442,106 and POKE 23456,45 and POKE 23461,107 gives a vertically printed screen copy. Horizontal screen copies do not reproduce the two rightmost character positions of the screen. The black, red, blue and green colours are copied from the screen. The Tandy values for the colours to be printed are held in a look up table from 23543 to 23550 inclusive. White is entered as the number 7. To change the table so that magenta on the screen is printed as red, for example, the number for magenta on the Spectrum is 3 and since the start of the table is 23543 you are going to poke 23543+3=23546. The Tandy number for red is given on page 18 of the printer manual as 3 so execute

POKE 23546,3

Feed out several inches of paper before printing a horizontal screen copy.

Seikosha GP80/100

To load the screen copy software for these printers execute:

LOAD "tas-seik" CODE

and play the tape. Once this software is loaded a high resolution screen copy is obtained by executing:

RANDOMIZE USR 23296

POKE 23318,0 and POKE 23319,0 changes the program to give a small size screen copy and POKE 23318,24 and POKE 23319,79 reverts to a large size screen copy. Large screen copies do not reproduce the two rightmost character positions of the screen. The printer remains in graphics mode after the screen copy has been printed.

(14) Summary: Programs Recorded on Each Side of the Tape

(1) "program: tasintbas"	Basic program for configuring (2);
(2) "bytes: tasintcode"	software for LLIST and LPRINT;
(3) "bytes: tasmini"	screen text copy software;
(4) "bytes: tasepson"	Epson FX-80 high resolution screen copy
(5) "bytes: tas-star"	Star DMP 515/510 high res screen copy
(6) "bytes: tastandy"	Tandy Colour Graphic Printer high resolution colour screen copy
(7) "bytes: tas-seik"	Seikosha GP80/100 high res screen copy

TASCOPY

Introduction
The TASCOPY software produces large "grey scale" screen copies printed vertically on the paper. In these grey scale copies each pixel (dot) on the screen is printed as a patterns of dots on the printer, with different dot densities for the various colours.

TASCOPY supports all eight pin dot matrix printers with Epson type control codes, e.g. Epsons, Shinwa CP-80, Mannesmann Tally MT-80, Star DMP 510/515, Brother HR5.

Using TASCOPY for the first time
Position the cassette in your recorder with the 48K side uppermost. Type:

LOAD"TASCOPY"

and then press ENTER and play the tape. You will see the screen copy software load in two parts: first the "program: TASCOPY" and then the "bytes: tascopy".

It is the "bytes: TASCOPY" that is used to produce screen copies. The "program: TASCOPY" is a Basic program that enables you to configure the machine code "tascopy" to your printer and your requirements, and to save your personally configured "tascopy".

The Basic program "TASCOPY" will start to run as soon as the load is complete. The first question posed by the program prompts you to press a key to specify the model of printer that you are using. Press the appropriate key.

If your printer is not on the list and is "Epson compatible" then one of the choices for the printer model will almost certainly work and the correct choice will have to be determined by working through the list. Epson compatible printers use ESC K as a control code sequence for bit image printing and ESC 3 or ESC A as a control code sequence to control the linefeed. If

you have to use this trial and error approach then reset the printer after each attempt at printing a screen copy.

The “OTHER” printer option allows you to customise the the software for printers not in the list, provided that you understand the appropriate sections of your printer manual.

If using a Brother HR5 then refer to your manual to determine if the ESC A sequence produces linefeeds in increments of 1/36 or 1/72 of an inch.

You will then be asked if your printer is set up to: (select A or B as appropriate):
(A) do an automatic linefeed on receipts of a carriage return from the computer; or
(B) require a linefeed code from the computer in addition to a carriage return.

The Tascopy code will then be configured and you will be given the choice of saving the code, running the Basic program again, entering Basic, or printing a test screen copy. If you have loaded the software for the first time then try printing a screen copy.

Saving Customised TASCOPY Software
Load and run the software as described above and press the appropriate key when given the option to save to cassette or microdrive. Then follow the program prompts.

Loading and Using Customised TASCOPY Software
To load your customised Tascopy software from cassette execute:

LOAD””CODE

or, if loading from microdrive number 1:

LOAD*”m”;1;”tascopy”CODE

To print a screen copy execute, either as a direct command, or from within a program:

RANDOMIZE USR 23296

The Tascopy machine code resides in the Spectrum printer buffer and is removed by NEW.

You can save your customised Tascopy machine code program onto tape or microdrive with your own program so that it loads automatically. Your own Basic program should start:

```
10 GOTO 30
20 LOAD””CODE     or, on microdrive:     30 LOAD*”m”;1;”tascopy”CODE
30 start your own program proper
```

Save your own Basic program by executing:

cassette	microdrive number 1
SAVE”name”LINE 20	SAVE*”m”;1;”name”LINE 20

and save the Tascopy machine code after the Basic program by executing:

SAVE”tascopy”CODE 23296,256	SAVE*”m”;1;”tascopy”CODE 23296,256

Notice
Some printer manuals warn that the continuous printing of bit image data can damage the printhead. Whilst no such damage was detected in comprehensive testing of the Tascopy software Tasman Software Ltd can assume no responsibility for any damage so caused.

APPENDIX

The following programs are also supplied on the tape:

(8) "bytes: tasbuff". A version of (2) that loads into the printer buffer. This interface software can be used with Omnicalc and other programs which use the same area of memory as tasintcode. Initialise the interface by RANDOMIZE USR 23296. Location 23321 contains the printer code for the pound sign.

(9) "bytes: tas-starg". Screen copy software for the Star Gemini 10X. RANDOMIZE USR 23296 for a screen copy. Poke 23548,1 and POKE 23361,1 for a small size copy.

(10) "bytes: tas-shinwa". Screen copy software for the Shinwa CP-80. RANDOMIZE USR 23296 for a screen copy. POKE 23548,1 for a small size screen copy.

(11) "bytes: t2a". Some daisy wheel typewriter/printers do not work properly with Tasword Two due to timing problems. This software can be merged with Tasword Two to overcome this difficulty. If your typewriter/printer misses letters when printing Tasword Two text files then create a customised version of Tasword Two by the following procedure:

(i) Load Tasword;
(ii) Enter Basic by pressing the STOP control key and then the B key followed by ENTER;
(iii) Execute: LOAD"t2a"CODE
and play the 48K side of the interface software tape. "t2a" is recorded near the end of the tape.
(iv) RUN Tasword and save your customised program by pressing the STOP control key and then the T key.

TASMAN TYPE B INTERFACE

The instructions for using Tasman Type B Interface and Type B interface software are identical to the instructions given in the interface manual with the exception that Tasword Two must be modified to drive the Type B interface. Create a customised version of Tasword Two for the Type B Interface by the following procedure:

(i) Load Tasword;
(ii) Enter Basic by pressing the STOP key and then the B key followed by ENTER;
(iii) Execute: LOAD"t2b"CODE
and play the 48K side of the interface software tape. "t2b" is recorded near the end of the tape.
(iv) RUN Tasword and save your customised program by pressing the STOP control key and then the T key.

The interface control codes should remain as supplied on the tape for the Tasman Interface.