
HSAjet TCU MANUAL



A guide to operating and managing the HSAjet TCU series – with and without display.

Definitions of warnings, notices and tips:



Warning

Do not do this, or your equipment may be damaged or not work



Notice

Additional information to or emphasizes a topic.



Tip

A different way of doing things or something that might be able to help you use the product.

Assistance

For assistance, please contact your local distributor where you purchased the product.

Version: 2005-04-07 for TCU release 2.1

Third Party Companies and Trademark Information.

Mention of third party products, companies, and web sites in this documentation is for informational purposes only. HS Automatic ApS provides this information only as a convenience to users and makes no representation whatsoever regarding the content of any other web sites. When you access a third party site, please understand that it is independent from HS Automatic ApS and that HS Automatic ApS has no control over the contents on that web site.

HP® is a registered trademark of Hewlett-Packard Company. © 1994-2000 Hewlett-Packard Company. All rights reserved

IMPORTANT - FOR YOUR SAFETY	2
<i>Power Supply</i>	2
<i>Environment</i>	2
CONCEPT OF THE THE TCU.....	3
DIFFERENT MODELS OF THE TCU	3
FEATURES OF THE TCU	4
<i>Message resolution and speed</i>	4
THE TCU KEYBOARD.....	5
GETTING STARTED WITH YOUR TCU	6
<i>You need this equipment to print</i>	6
<i>Recommended equipment</i>	7
<i>To-Do-list for printing</i>	8
CONNECTING THE TCU PARTS	9
TCU CONNECTORS	10
DESIGNING TCU PICTURES	12
<i>How to design a picture using OBJ INKdraw</i>	13
STARTING THE TCU	21
<i>Start-stop print</i>	21
<i>Purge heads</i>	21
USING THE TCU (NON-DISPLAY VERSION).....	23
<i>Setting date / time without display</i>	24
USING THE TCU (DISPLAY VERSION)	25
<i>Setup</i>	26
<i>Printing</i>	28
MENU OVERVIEW	30
UPGRADING YOUR TCU	33
<i>Getting the upgrade firmware</i>	33
<i>Doing the upgrade</i>	33
ERROR SITUATIONS	34
ADJUSTING THE LANGUAGE	35
THE TCU INSIDE	36
<i>Replacing battery and fuses</i>	37
APPENDIX	39
<i>Technical overview</i>	39
<i>Start sensor connections</i>	40
<i>Encoder connections</i>	42

Important - For your safety

Please follow these guidelines for safe operation.

Power Supply

- ☐ Only use the unit within the specified power range. Please check the label before connecting
Frequency: 50 Hz (220V-240V) or 50/60 Hz (110V-120V)
- ☐ Only use a good, undamaged cable

Environment

- ☐ The TCU is electronic equipment and designed to be operated in a dry environment. Please do not expose printer or print heads to water or dirt.
- ☐ Do not subject the printer to strong shocks or vibrations
- ☐ Do not expose printer to open flames



Before removing back panel, make sure the unit is turned off and the power cord is unplugged.



The unit is is not serviceable by customers. Only the documented service jobs should be performed by the user, please see the end of this documentation.



Take great care when you connect RS232 (serial cable) to the TCU. You **must make sure that computer and TCU are both grounded.**

Otherwise, you can burn the serial ports in either PC or TCU.

Concept of the the TCU

The HSAjet TCU (Tiny Controller Unit) is a very cost-effective printing solution designed for limited printing jobs still requiring a high-resolution and high quality print. It is the ideal solution for simple printing jobs, e.g. stamping of checks, paper documentation, pre-coding, internal logistics, date documentation e.g. integrated in letter openers, or in the pharmaceutical industry.

Ideal Solution

The HSAjet TCU is the ideal printing solution for small messages, i.e. text printing, barcode printing, counter printing, time- and date printing, expiry data printing and logo printing.

It is a very compact solution and calls for a minimum amount of maintenance. Consequently, no special training is required to operate and maintain the HSAjet TCU, and the cartridges are clean and easy to install. In addition, the HSAjet TCU has a design of stain-less steel and can easily be implemented in production areas.

Advanced Technology

The HSAjet TCU is based on standard HP cartridges and makes use of the thermal inkjet technology. Thermal inkjet technology places small ink drops extremely accurately and gives a very high image and text quality.

The ink is available either black or colored (red, blue, yellow, green), which enhances possible printing applications. The HSAjet TCU also enables printing on almost any surface such as cardboard, paper, wood, and plastic.

Different models of the TCU

The TCU is available in 2 different models:

Standard	Button for start / stop print. Most simple version. No direct editing of messages possible on the unit. It is possible to add switch or terminal to select messages.
Integrated v/ display	Simple editing of start position and prompts possible. Indication of current message, number of prints etc. Same features in one unit as standard TCU with terminal.

Features of the TCU

Below the most important features of the TCU is explained.

Print using high-resolution HP cartridges. Because the TCU is based on the HP® technology, you get high resolution and little or no maintenance. If a cartridge is empty or damaged, simply replace it with a fresh one. You can also use different types of ink and different colors with the same printing system.

Messages stored on standard Compact Flash modules. All messages and setup information is stored on Compact Flash cards. They are standard and can be purchased anywhere. It is no problem to create more messages and have many different cards to choose from. Each card stores 16 different messages.



Compact Flash

Very simple to use. The TCU is designed to be a select-and-print solution. The operator can do little more than select the correct message, adjust the start delay and activate the print. No possibility to change any of the message content as the designer has control of which objects that prompts for value before print. This makes the TCU ideal for applications where security is an issue.

Messages are designed in graphic program on a PC. Use OBJ INKdraw to design all messages.

Both static and variable content. In the design process, all content in the message is based on objects. You can move objects around and use all objects available in OBJ INKdraw. You can use your own logos and even create 2-d barcodes. When saved, this background forms a static picture, to which you can add a number of variable fields such as counters, dates and barcodes.

Prepare-as-you-print. It is possible to load a new message and prepare it's settings while another message is printing. When it is time to change message, simply press print, and confirm change to a new message.

Message resolution and speed

The maximum speed available for the printer depends on the resolution you have selected when you design your message. The table below gives an overview:

DPI	Using	Max speed m/minute
600 x 600	Two rows	39
300 x 300	Two rows	156
300 x 300	One row	78
300 x 150	Two rows	312

The resolution is stored inside the TCU message and can not be altered on the unit.

The TCU keyboard



The TCU keyboard is identical to the keyboard of the *HSAjet* SA. But not all keys are used in the TCU, as some functions are not available.



Used to start and stop print activity



Enter the setup menu



Enter the previous menu or go to main menu



Arrow keys, use with enter to select message.



Enter activates edit mode or accepts a choice



Getting started with your TCU

Congratulations on the purchase of your TCU.

This section will tell you how to get started when you unpack your unit. For instructions on how to connect start sensor and encoder, please refer to next section.

You need this equipment to print

In order to print with your unit, you need to have at least the following equipment



TCU Unit.

This can be with or without terminal / print selector.



Compact flash card, from 16 to 256 MB.

This holds both the system files and the messages you wish to print



HP stall(s)

Either 1 or 2 stalls, or a double stall unit. Cables are included.



HP ink cartridge

Should be compatible with HP51645A cartridge (known as "45" type)



Start sensor

In it's simplest form a mechanical switch, but can also be a photoelectric or inductive sensor. The TCU can use both NPN and PNP sensors.

Recommended equipment



Terminal / Message selector

To be able to use more than 1 message per card, use the terminal or message selector



Encoder

If you wish to ensure a perfect printout in highest resolution, you should use an encoder (wheel not shown in picture)



Compact flash writer

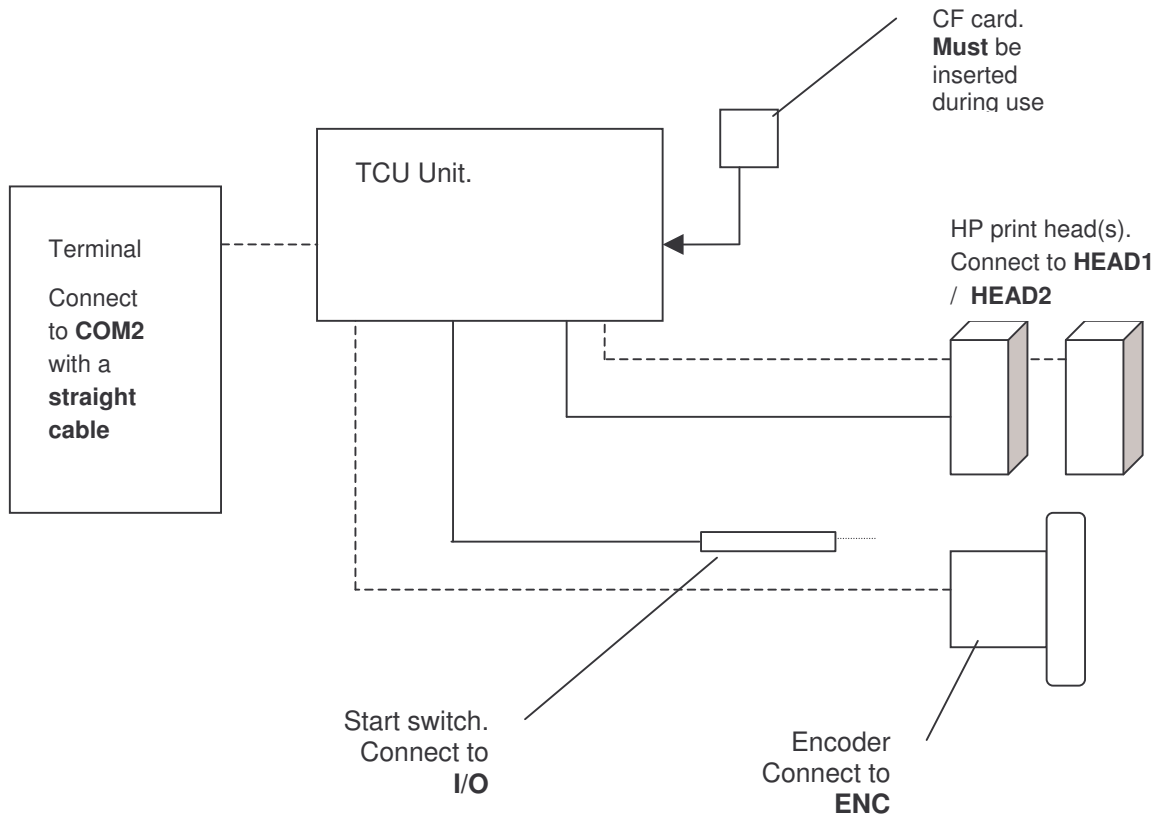
For easy transfer of messages from PC to TCU. Typically this is a USB unit, but they are also available in PCMCIA version.

To-Do-list for printing

- ❑ Connect parts are described on the following page
- ❑ Make sure CF card is formatted and contains system files and at least 1 set of TCU files. (zip file with demo files available from HSA)
- ❑ Insert CF card into TCU
- ❑ Insert cartridges into stalls
- ❑ Turn on TCU unit
- ❑ Select message
- ❑ Start print

Connecting the TCU parts

Once you have checked that you have all the parts for your TCU, connect them as follows.
Optional parts are shown with dotted lines.



TCU connectors

Power connector

The TCU operates at 110V or 220V depending on which type you order. The mains plug connector is a standard type **IEC**.



Notice that the TCU is using 24 V in the I/O and encoder connector, where the previous HSA equipment uses 12 V.

I/O connector

The main function for this connector is to provide the start signal, to begin print. In the same connector is also an additional input as well as 2 output signals (additional IN/OUT are not currently used).

It is located in the back of the board, as a 9-pin female SUB-D.

The wiring of the I/O connector **is required** for proper function of the print – you will not get a printout without a start signal.

You can use either a simple mechanical switch or a 24V photo cell for the start signal, please see pinout and connection guide in the back of this manual.



Notice that the "Print mode" button (Red on front of TCU) is *not* the same as the "Start print" signal. It only tells the machine to prepare for the print process.

Encoder connector

This connector is where the signals for the encoder are coming in. You will notice that there is a "normal" encoder input and an inverse input. Which one you use depends on your encoder. Active high use normal, for active low use inverse. Head connectors HP

Two connectors are available for the HP heads. Head1 and Head2 are both 25-pin SUB-D, you need a **straight-through cable (1:1)** to connect to the heads.

Please see the pinout and connection guide in the back of this manual.

COM 1

Use a crossed 9-pin SUB-D cable to connect to a PC.



You need a **crossed** 9-pin serial cable to connect to a PC.

This type of cable is also called Nullmodem (9-9)

As you can see from connection table below, cross pin 2 and 3.

<u>Signal</u>	<u>SUBD 1</u>	<u>SUBD 2</u>	<u>Signal</u>
Receive Data	2	3	Transmit Data
Transmit Data	3	2	Receive Data
System Ground	5	5	System Ground

COM 2

Use this 9-pin SUB-D to connect the TERM3 terminal or the Print Selector box.

For both these you need a **straight- through (1:1) cable**.

Designing TCU pictures

The TCU pictures / files are designed using the OBJ INKdraw software.

In each picture you can have a fixed background and a number of variable fields. The background is a "photography" of the canvas in OBJ INKdraw, meaning that you in the design process can place any number of objects, and move them around as you please. When the file is saved, the canvas is converted to a fixed image. The variable fields such as counters and dates are then added to this image in the print job on the TCU.

An illustration of this process:

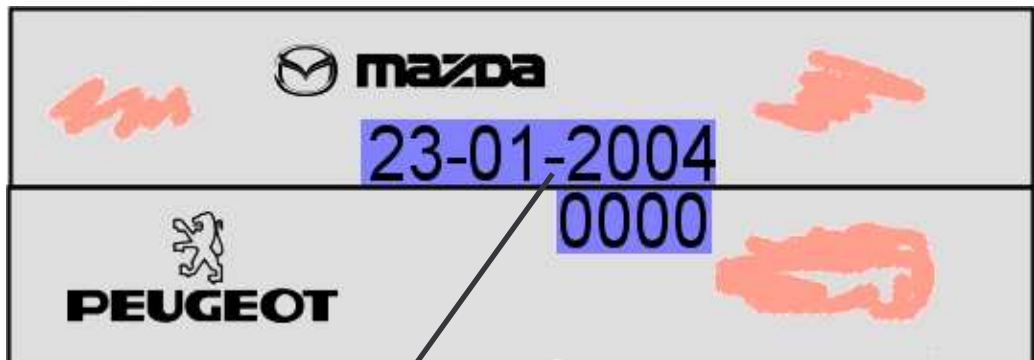
Design:

everything is an object. Text, logos, barcodes etc can be moved around freely.



Print:

The grey area (text, logos and barcodes) are converted to one fixed image. Variables (Blue) are imposed on top.



Variable content
(TCU objects) will
be on top

Design a picture using CB Inkdraw

All pictures for the TCU are designed using CB Inkdraw. You do this in a special mode, selected when you start a new picture. You can also change to this mode later, and thereby turn your existing pictures into TCU pictures.

Features of the TCU

- ☐ 1 or 2 HP heads, up to 2 x 12,7mm print height (1 inch)
- ☐ Message length up to 2 meters, depending on resolution.
- ☐ Memory is dynamically allocated between message length, font sizes and resolution.
- ☐ 4 special TCU objects: date, time, counter and text prompt. Available is 2 time, 2 counter, 4 dates and 10 text prompts
- ☐ All other OBJ INKdraw objects available will become static background

Starting a new picture

When you want to design pictures for the TCU, you must select "HP" as the head type, and make sure to check "TCU". You will be able to add 1 or 2 heads of 12,7mm.

Dialog box when making a new TCU picture



Notice

If you wish to change a "normal" HP message to TCU, and you have more than 2 heads, you will be asked to delete some of the heads before you can continue. The TCU will only work with max two heads.

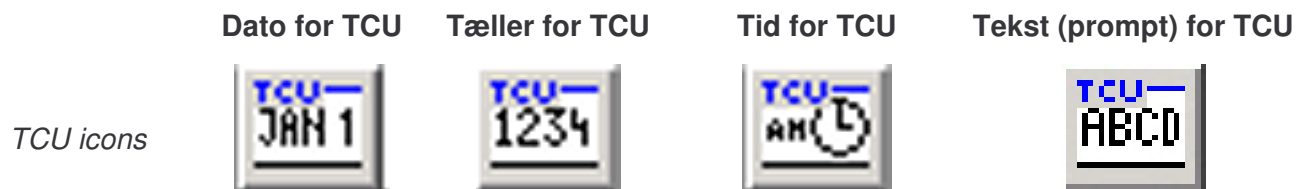
Message Objects

After selecting the message length, you will see the normal canvas where you can add objects like you normally do. However, some functions are disabled, as they do not work on the TCU:

Icon bar with disabled icons softened.



In addition to the disabled icons, four new icons are added to the icon bar



Differences compared to normal objects

The TCU objects are different compared to normal objects in several ways.

- You have only 3 different font sizes / types per message to choose from (see section on TCU fonts)
- The TCU objects can not overlap.
- You can drag the objects freely sideways, but vertically you are limited to the setup of the chosen font.

Date / Time

The formats for the Date/Time object is limited to the following:

DATE FORMATS (1)

dd
mm
yy
yyyy
dd/mm
mm/dd
dd/mm-yy
dd/mm-yyyy

DATE FORMATS (2)

mm/dd-yy
mm/dd-yyyy
yy/mm/dd
yyyy/mm/dd
"#J" (day of year, 3 digits)

TIME FORMATS

hh
nn
hh:nn

Where the letters mean the following for the date 29 February 2004 14:45

Code	Meaning	Values possible	In example above
dd	day, 2 digits	00 - 31	29
mm	Month, 2 digits	00 - 12	02
yy	Year, 2 digits	00 - 99	04
yyyy	Year, 4 digits	2004 - 9999	2004
hh	Hour, 2 digits (24 hour clock).	00 - 23	14
nn	Minute, 2 digits	00 - 59	45



At the moment, dates are formatted on the canvas as Windows usually formats dates. For non-English settings this means that you might see the canvas display f.ex. "dd-mm-yyyy" but you have selected "dd/mm-yyyy". The TCU will print as the drop-down.

In later releases you will be able to input your own format.

Counter

The TCU counter object can only display numbers, and only the decimal format.

You can choose, as with the normal counter, to count up/ down and how many decimal places you want. You can also choose a lead-in from either "space", "0" or "nothing" (in which case the object will be left-adjusted).

Text (prompt)

TCU text is used if you wish to enter variable information before print. The user is asked before print starts about the content, and can enter all available characters on the TCU keyboard. If nothing is entered, the content put in the object in OBJ INKdraw will be used.

Also, in OBJ INKdraw you can set a max length, up to 16 characters.

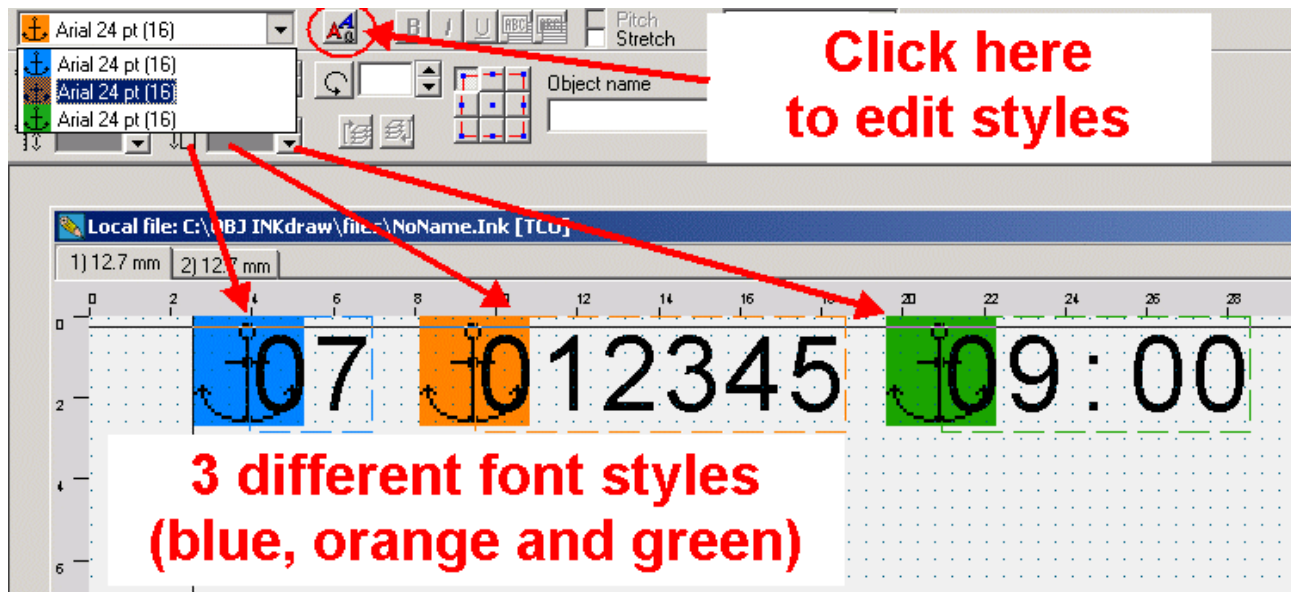
Working with TCU font styles

The variable TCU objects display textual information. Because of its resources, the TCU is not able to place and scale fonts freely. That is why the *font anchors* were made.

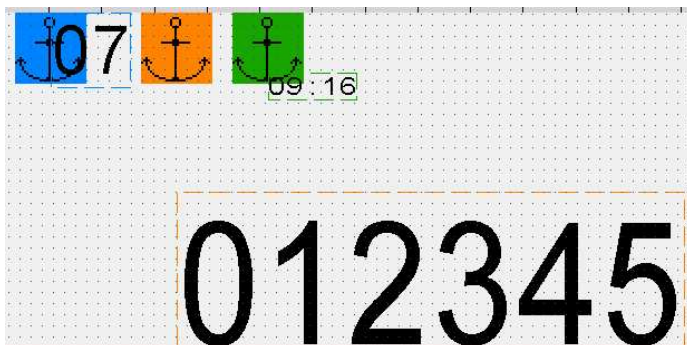
For every TCU message you can choose up to 3 different fonts, each linked to an anchor with a different color. Within each of the 3 fonts, you can choose between font type (Arial, Courier, and every other installed true type font), a font size, bold - you can even stretch the font freely.

Each of the 3 fonts can be freely placed relative to the anchor, which is fixed to the top of the head. You can always move the font left and right in single-pixel steps.

Some illustrations will show the point of anchors:



As you can see in the above picture, the 3 different font styles have been added to the TCU picture. So far, none of the font styles have been edited (in new pictures, they always default to Arial 24pt, at 16 px offset).



Here the fonts have been edited to 3 different sizes and positions. Notice how the anchors are kept in the same position and the text is relative to the anchor.

Editing TCU fonts

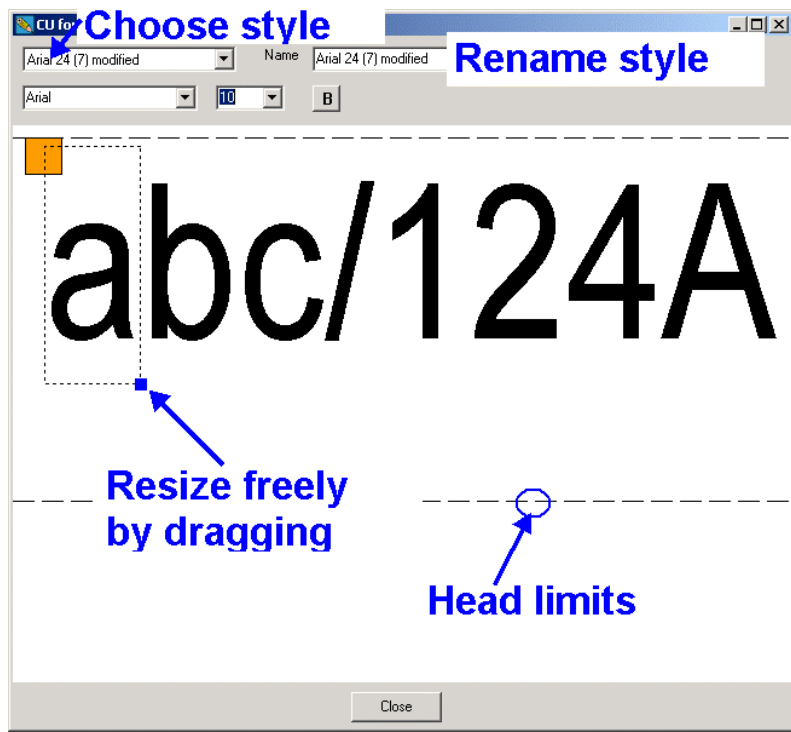
To edit the TCU fonts, click the icon next to the font style selector. This will bring up the font editor window.

To edit the font style, select it in the drop-down top left and alter the appearance.

You can either set a pre-defined size or drag freely.

Notice the head limits (dotted lines) - you can not exceed these.

When you are done editing the font style(s), press *Close*.



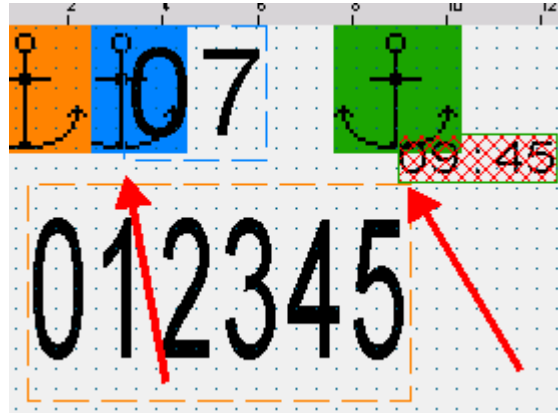
Limitations of the TCU fonts

Although the font specifications are quite flexible, there are a few limitations in the TCU:

You can not have the other two TCU font styles start for the duration of an object. If you do, the last will not be printed.

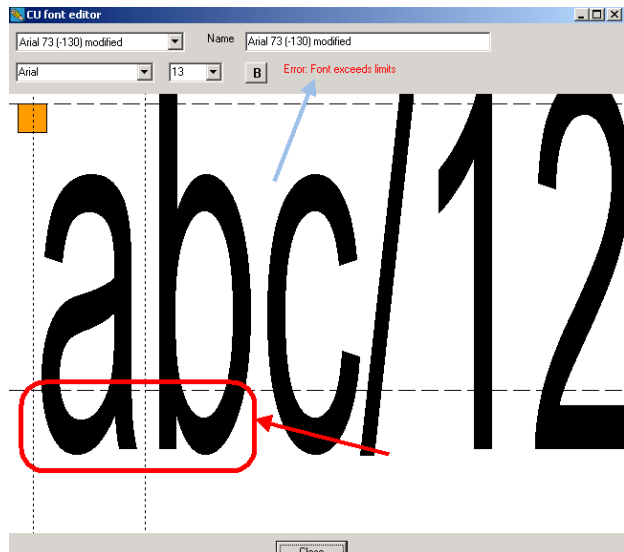
In this example, the blue and green objects both start within the horizontal position of the orange.

However TCU texts do not have this limitation.



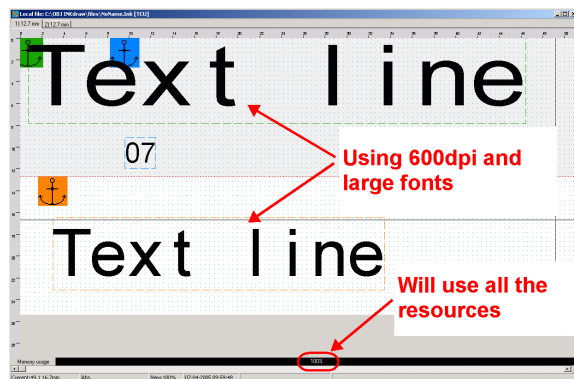
Fonts can not exceed limits of the head.

They will automatically be moved into the limits of the head.



The TCU has limited memory resources. A combination of the following: 600 dpi, large fonts and long message length, can cause the memory to be used 100%. Reduce one or more of these factors to go below 100%.

The bar at the bottom of the picture will flash red if all memory is used.



Saving the TCU message

Working with TCU files is just like working with INK files. In fact, the TCU file *is* an INK file until you transform it (compile it) into TCU files.

When you save the TCU message, it will be saved to the files directory, where your normal OBJ files are placed – as an INK file.

To transform the file into TCU format, press “Compile to CF”  or press “F10”

This will open the "Save" dialog box. You can select your CF card drive here, if a formatted card is inserted, and set options.

TCU save dialog

Enter a file name into the filename box. You may choose any location, it is recommended to choose your CF drive directly.

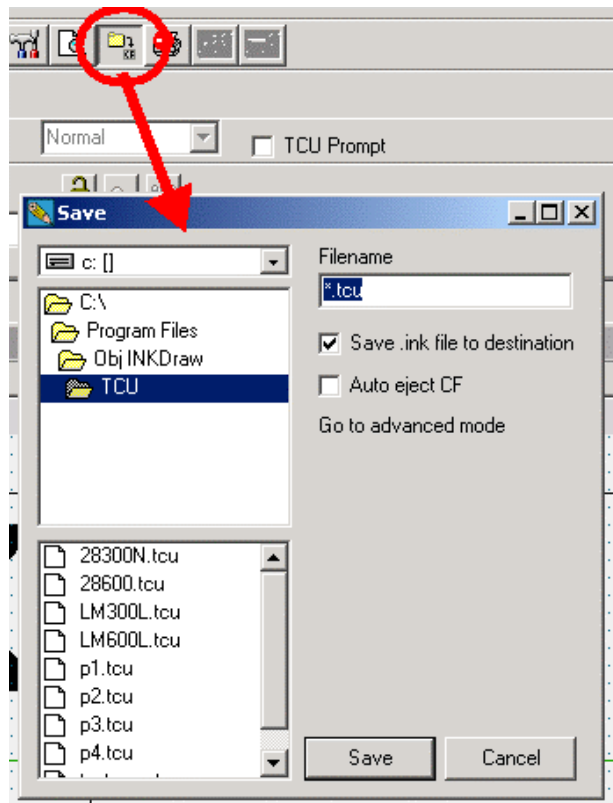
You can choose to save the .INK file along with the TCU file, so you always have them together.

If you click

Notice:

Only English characters are permitted in the file name (a-z and 0-9).

It is strongly recommended that you remember to eject the CF card. Failure to do so may corrupt your files.





When you have saved, you will notice that not only 1 but minimum **4** files have been created, all with the same name. **They are *all* needed for the TCU to load the file correctly.** You must copy over all 4 files to the compact flash.

<i>filename.fnt</i>	Font data for the TCU objects
<i>filename.pic</i>	Background (non TCU object)
<i>filename.tab</i>	Tables for the printout
<i>filename.tcu</i>	TCU Object data
<i>filename.p??</i>	Text prompt data. Only if there are text prompts in the message



It is strongly recommended to use *short filenames*, meaning no more than 8 characters, and no spaces. Otherwise, the files will be shown as

filena→1 (ex: "filename 1")

For the NON-DISPLAY TCU, the file names must be **TCU-1, TCU-2**, etc. up to TCU-10.

Starting the TCU

The Compact Flash card must be inserted into the TCU before turning on power.

When you start up the TCU, and turn on the power, the *FPGA* file will be loaded. You can compare this to the startup of a PC – it needs an operating system to work.



The FPGA file is located on the compact flash card, and must always be present. If you delete it, you can not use your TCU.

You should always have the following files on your flash card:

FPGAFILE.EPR	(TCU operating system)
LANGUAGE	(language file)



Do not remove the compact flash card when the TCU is turned on. This may damage the card and/ or the internal memory of your unit.

After loading the FPGA file – which will take less than 2 seconds – your unit will load the first file found on the compact flash card. It is now ready to print.

Start-stop print

Press the red button to start / stop print. The print will start from last counter value if it is restarted.

Purge heads

Press the black button to purge all heads. This is useful to test head status.

HSAjet TCU

The non-display TCU can be used for very simple operations where you only have to select a message and start printing.



Using the TCU (non-display version)

The Non-Display TCU works just like the version with display – only, you don't have the display to select messages. Instead, you have 2 other methods of selecting messages.

Without print selector

If you wish to use the unit without any message selector (print selector or terminal), you can use only one file per flash card. This file will automatically be loaded when you turn on the power. Simply press print button on the front to start print process.



If more than 1 TCU file is present on the flash card, the first file found will be loaded. This is the file first written to the card, and is not necessarily the first file alphabetically.

Print Selector



To add more flexibility, you can connect a print selector box. This is a separate item available for purchase, and is not included with the TCU.

When changing between each of the 10 positions and 2 test pictures, you select a file and load it. Press the start button on the TCU to activate print.



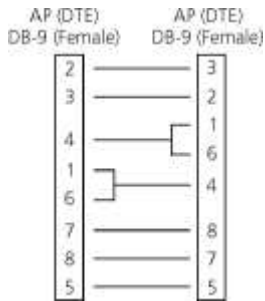
With the print selector you also have access to 2 test pictures on the flash card. Test-1 and Test-2, which are pre-defined from HSA and write-protected to prevent deletion.



File names for use with the print selector must have names from **TCU-1 to TCU-10**
(inclusive the dash)

Setting date / time without display

If you do not have a display connected to your TCU, it is necessary to connect it to a normal PC to set the internal date / time. Follow this procedure for instruction.



Connect a *crossed over* 9-pin serial cable from your PC to the TCU (COM1).

This cable is often referred to as a **Null-Modem cable**, which has pins 2 and 3 crossed.

It is only necessary to connect pins 2, 3 and 5.

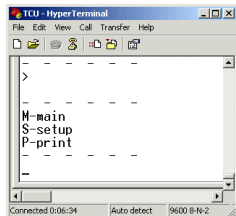


Install a terminal program.

HSA has tested this with HilGraeve's HyperTerminal, which is free for personal use. Please see <http://www.hilgraeve.com/hpte/index.html>

**9600 bps,
8 data bit,
2 stop bit
no parity, no flow control**

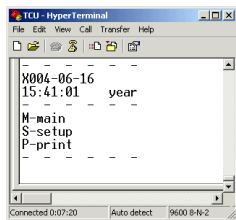
Connect using the parameters listed to the left.



TIP!

Resize the window so that you see 2 menu lines (screen) plus navigation menu

Once you turn on the TCU, you should see the main menu. The terminal simulates the TCU TERM3 screen, so that you see the TERM3 screen in the top section, and the navigation menu in the bottom section. Use **ESC**, **S**, and **P** to navigate.



Press **S** to go to setup menu and use 8, 4, 6, 2 to navigate the menu. "X" is the cursor.

When the "X" is above what you wish to change, press *enter* and type the new value. Then press *enter* again to accept.



If you wish, you can do everything over the serial connection that you can do with a terminal. This is a simple way of adding a terminal without purchasing additional hardware.

Using the TCU (display version)

When you turn on the TCU, it will show the main menu.



The FPGA file is located on the compact flash card, and **must always be present**. If you delete it, you can not use your TCU.

Likewise, the compact flash card must always remain inserted as long as the TCU is in function.



The main menu simply is a list of files available on the installed compact flash memory card. The first file will always be loaded into memory when you turn on the machine.

You will see a ">" in front of the file currently selected.

If more than 2 files are available there will be arrows indicating that you can scroll up / down the list to select a file.

When the unit is not in print mode, "Choose file." is displayed.



When a message is printing you will see "printing" displayed. This indicates that the current message is in print function.



If a *different* message is printing, you will see it's name displayed. Here, *apples* is printing while *oranges 1* is loaded.

Notice the ">" to the right indicating that there are more files available.

From the main menu you have these options

- ☐ Load the selected file by pressing the enter key, or use arrow keys to locate a different file name
- ☐ Press the setup button to enter the configuration menu
- ☐ Press the print button to start print



It is easy to find the file name if you know the start letter(s). The TCU has built-in *find-as-you-type function*.

If you start typing on the numeric keypad, the display will jump to the filename that best matches they characters typed in. Press **Enter** to load the file, or **ESC** to cancel.

Setup

The configuration of the TCU is done through several screens. Navigate between the individual screens with arrow up / down. Go back to the main menu with ESC.

To select an option, navigate with arrows left / right and press ENTER.



Screen 1 is for the basic setup.

Purge

Pressing enter on this will purge all connected heads to clean them.

Spit

Pressing enter on this will allow you to set up the automatic spit function

Cart

Press enter to change cartridges. Use this to turn off power on the heads when changing. You will see a separate screen indicating that you can change the cartridges.

S000

Start delay. Press enter to edit, then enter a number.

Edg+

Press enter to toggle negative / positive edge



Settings for spit.

Rate 00

How often the printer is spitting. Input a value in seconds

Burst 00

How many rows the printer is spitting each time.

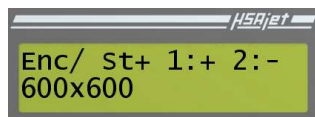
Recommended spit settings



Based on our experience and the dry time of standard HP cartridges, a recommended spit setting is **20** seconds and **10** burst.



Confirmation for cartridge change. Press enter when done.



Screen 2 is to test encoder / start sensor and to show the resolution.

Enc /

When there is encoder activity, the / will change between / - \ |

St

When the start sensor is activated, the "+" will change to "-"

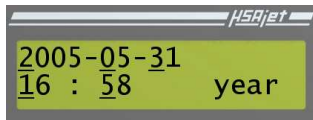
1:+ 2:-

Shows if the message is configured for head 1 / 2.

600 x 600

Indicates the current print resolution.

The print resolution is set in OBJ INKdraw when you create the message. You can not change it in the TCU.



Screen 3 is for the date / time setup

You move between the individual parts of the date / time with arrows left / right, press enter to edit / accept changes.

Dates / times should be entered in YYYY-MM-DD HH:MM format, in a 24-hour clock. The text will show you what part you are editing (year, mon, day, hour, min)



Screen 4 is the version information

You can not edit anything here, but the screen shows what version of the TCU software / Eprom you are using. This is very helpful if you need to report any issues with your unit.

Printing

The TCU allows you to print with one file and at the same time prepare another message for quick change of print jobs.

When you press the print button the print mode will be activated.

If you have defined the message to have one or more prompts, the prompt screen will ask you to enter the values of the object.



Until further notice, you can only use **numeric characters** in the TCU. This means that you can not use prompts for textual input - only for dates and counters.

The date input will be in the same format defined in OBJ INKdraw, you will not have to enter for example ":" or "/" characters.

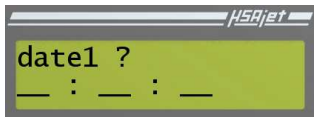


If you have 2 single stalls connected to your unit, you can of course place one head on each side of the object to print onto.

But you can *not* print different directions on the two heads. This means that if you have variable content on both sides, one will print reversed.

Prompts

A prompt is set on the objects if you want the user to enter a value before the print starts. For example, you can use prompts for best-before dates or start values of counters.



Enter the desired date and press enter to accept the value.

Prompt for date1
object.



If you press enter and wish to change the value of the prompt you just entered, you can press ESC to go back. This is only possible if your prompt is not the last to be entered.

To start over, stop print and from the main menu press print again without loading a different file.

After entering prompts you will see to the print screen.



Print screen

- | | |
|----------|--|
| 000000 | The numbers indicate the number of prints that were done since last print start. |
| <-> | You can adjust the start delay during print with the arrow keys left/right. |
| ESC:main | Informs that ESC will go to main menu |
| 0000<-> | Start delay setting. Change with arrows left/ right. Arrows up/down changes 100s. This value is stored in the message for next use |

During print mode, if you press **print** button, you will stop the print activity.

Pressing **ESC** will take you to the main menu. From there you can load a new file, and press print to go to the print menu. All the time the file that was printing before will still remain in memory.

Restarting print

If you press print and you have loaded a different file, you will be prompted if you want to restart the old print job, or start the new.



- Acceptable values are
- Y: start over with the same print job
 - N: start with the new file
 - ESC: do nothing - do not start print.



- Pressing (N)o to restart the print (so, to start with a new message) will prompt you to save the settings of the current message.
- Start position and prompts will be saved.
- After selecting you return to the main menu.

Connecting to the TCU by RS/232

Connection information

To connect to the TCU, you need to use these parameters:

Cable type	Crossed (Null-Modem)
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1

You also need to use a communication software (terminal program). For example “advanced serial port monitor” by Agg Software.

What you can do with remote control

As there is no “protocol” for the TCU, you can do the same thing you can do with the keyboard on the terminal (Term3).

This means that you can

- ☐ Select messages
- ☐ Start / stop print
- ☐ Change parameters (date/time, start delay, spit)
- ☐ Enter prompts

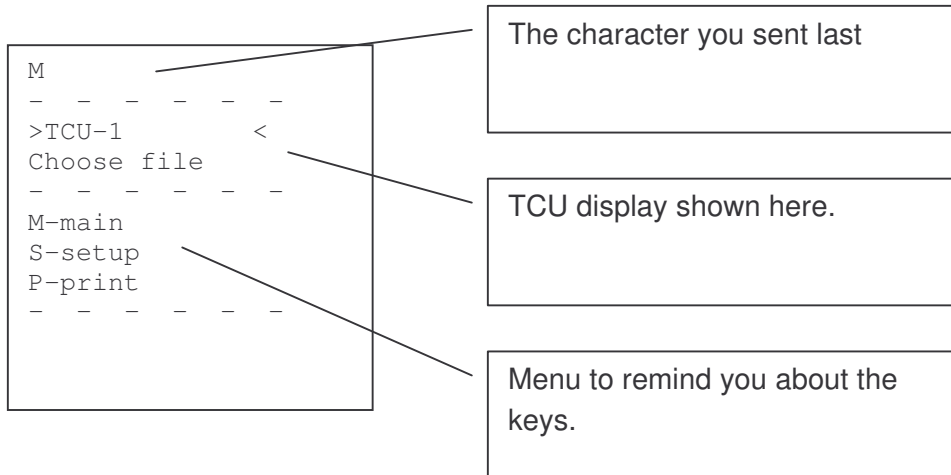
Special characters

The normal letters, numbers etc are sent as they are, but there are some special characters to be aware about:

#0D	Enter key
#1B	ESC key
2, 4, 6, 8	Act as arrow keys. 2 = down, 8 = up, etc.
S (capital)	Setup screen
M (capital)	Main screen, same function as ESC
P (capital)	Print start / stop

Connecting to and controlling the TCU

Once you connect to the TCU, you will see a menu like that displayed on the TCU unit. The answer from the TCU is split into 3 parts:



Every time you send a character, the 9 lines (split by #0A) are returned by the TCU.



The TCU has no internal buffer. You need to send **one character at a time** for all operations.

What you sent should **not** be followed by any characters (like CR, LF, etc)

Loading a file

- ☐ If you know the file name, send it one character at a time. This uses the type-ahead function of the TCU.
- ☐ If not, you need to know the files position, and send as many “2” as the needed
- ☐ “#0D” (enter key)
- ☐ “Y” (Yes to load)
- ☐ Hint: You only need to enter as many characters as needed to find the file. So if your files are named A, B, C... you only need to send 1 character, then enter.

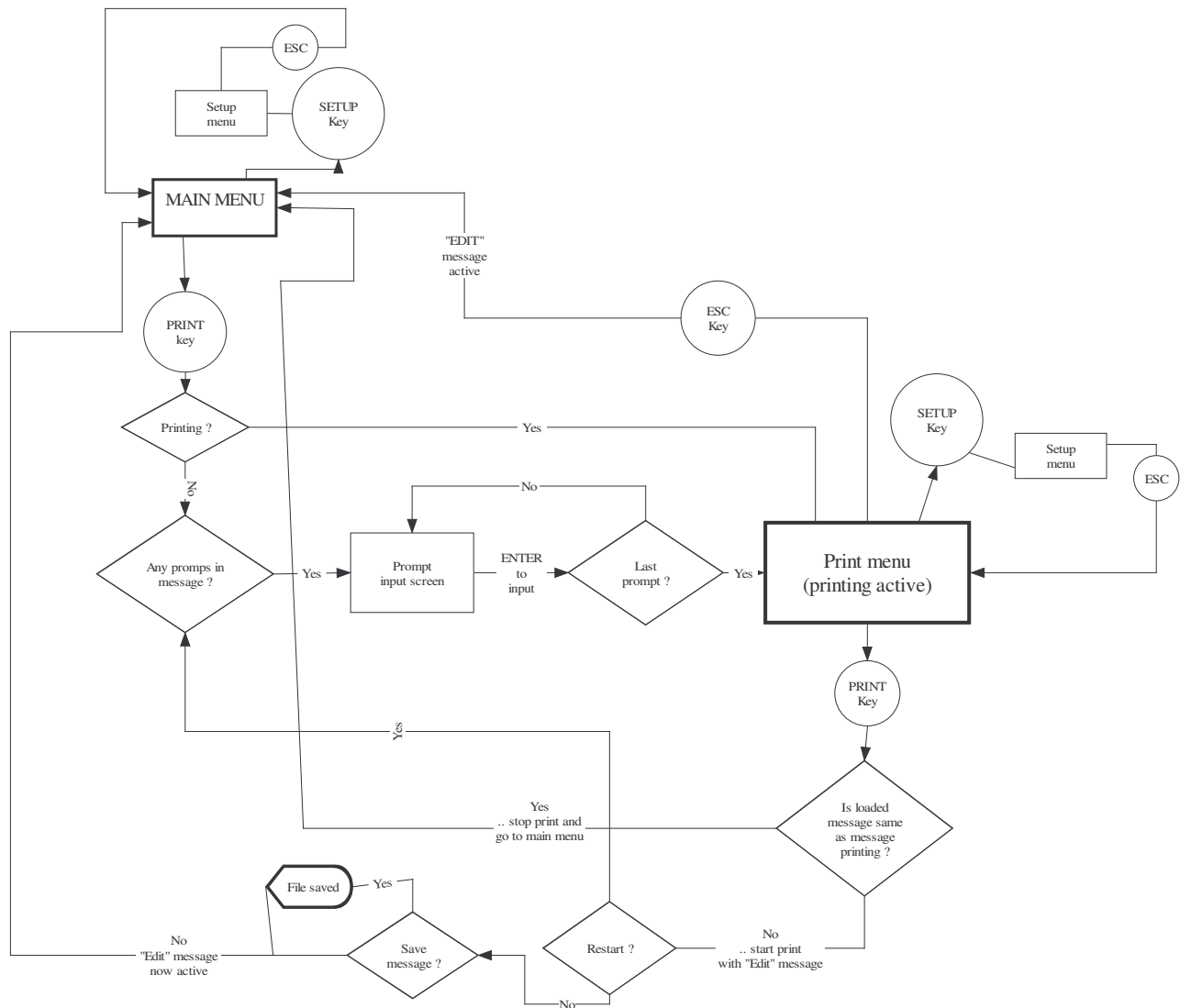
Activate print

- ☐ “P” starts and stops print mode
- ☐ During print mode, you can change the start distance with 2, 4, 6, 8.
2 and 8 to change -/+ 100, 4 and 6 to change -/+ 1.

Use the setup menu

- ☐ To change settings, send “S” and navigate the menu with 2, 4, 6, 8.
- ☐ Start editing fields with “#0D” and accept the change again with “#0D”

Menu overview



Upgrading your TCU

Sometimes it is necessary to upgrade your TCU. This could be because new features are added or the unit is improved in other ways. It is possible to do this directly from the TCU itself, the process requires a compact flash card and takes about 30 seconds.

Getting the upgrade firmware

The firmware is distributed from HSA. Over time, it will be available from our web page for download. It will be distributed in one file called **firmware.000** where **000** is a number. An internal check is done to make sure that it is a valid firmware file and that you don't downgrade.

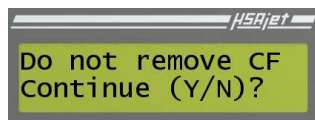
Simply place the firmware file on a compact flash card. You may use the same card that you stored messages on. Once the upgrade is done, you can safely delete the firmware file from the compact flash card.

Doing the upgrade

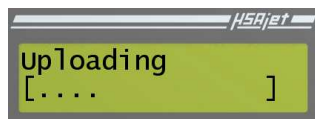
When you turn on the TCU with the compact flash card containing the firmware file inside, it will automatically detect if there is an upgrade available. You will see the following on the screen:



New firmware has been found. You can choose if you wish to upgrade or not. Press **Y** to upload the upgrade, or **N** to skip upload.



It is important that you leave the Compact Flash card in the TCU when you upgrade. You are asked again to confirm that you understand this. Press **Y** to start the actual upgrade.



During upgrade you will see this message and the dots will indicate the progress.

The upgrade will take about 10-15 seconds.

When the progress bar (dots) is not longer counting, you can switch off your unit.

Error situations

Should an error situation occur, the TCU display will show you what the error could be. The following will describe the error situations.

If you have the Print Selector, the error LED will either flash (★) or be lit continuously (Ⓢ)

Display on TCU	Meaning of error	Shown on Print Selector
Error No CF installed	The CF card is missing or not formatted. <i>Check that you have inserted a valid CF card before turning on the TCU.</i>	Ⓢ
Error FPGA missing	The file with the FPGA is not on the CF card. <i>Place this file on the card and try again.</i> You can download a copy from HS Automatic's web page	Ⓢ
Error Language missing	There is no language file on the CF card. <i>Place this file on the card and try again.</i> You can download a copy from HS Automatic's web page	Ⓢ
Error File incompl	The file you were trying to load is missing one or more parts. Remember that each TCU file is 4 parts (TCU, FNT, TAB and PIC). <i>Check that you copied all 4 parts.</i>	★
Error Write Protected	The file you were trying to load is write protected.	★
	File missing. This applies to the special file names on the Print Selector, you can't select a non-existing file on the terminal. <i>Turn dial to an existing file.</i>	★

Adjusting the language

The language of the TCU is by default English. The setup of the language is done via a language file on the compact flash card, called LANGUAGE (notice no extension). As it is just a simple text file, you can create your own language strings for the TCU interface.

Simply create a backup of the file and replace the original with your translated version



The lines **must** be in the same order as the original file. If you add/ remove lines, the display will not be correct.

String lengths are fixed, any additional characters are chopped off

Even if you redefine prompt letters, you must still use Y and N to answer.

Format of the language file

The language file consists of different lines, with a description and the actual value, separated by an '=' (equal sign). For your help, the length of the text is inserted in []. This is only for information, since the line will automatically be chopped or spaces will be added.

The order of the lines *is* important. Do not delete or add lines, and do not remove any '='.

Below a few lines from the file

```
Print mode active (active file), main menu [16] = Printing
Print mode active (other file), main menu [4] = prt:
Choose message, main menu [16] = Choose file
Purge menu [5] = Purge
Edge toggle [3] = Edg
```

Translating the language file

When you translate the file, you can add your own description to the left side of the '='. You do not have to keep the numbers or brackets []. Below an example of a Danish translation

```
Udskriver aktiv fil, hovedmenu = Udskrives
Udskriver anden fil, hovedmenu = Uds:
```

The TCU inside

This section will describe the insides of the TCU. This is mostly for your information, but also to inform about simple service jobs you can do.



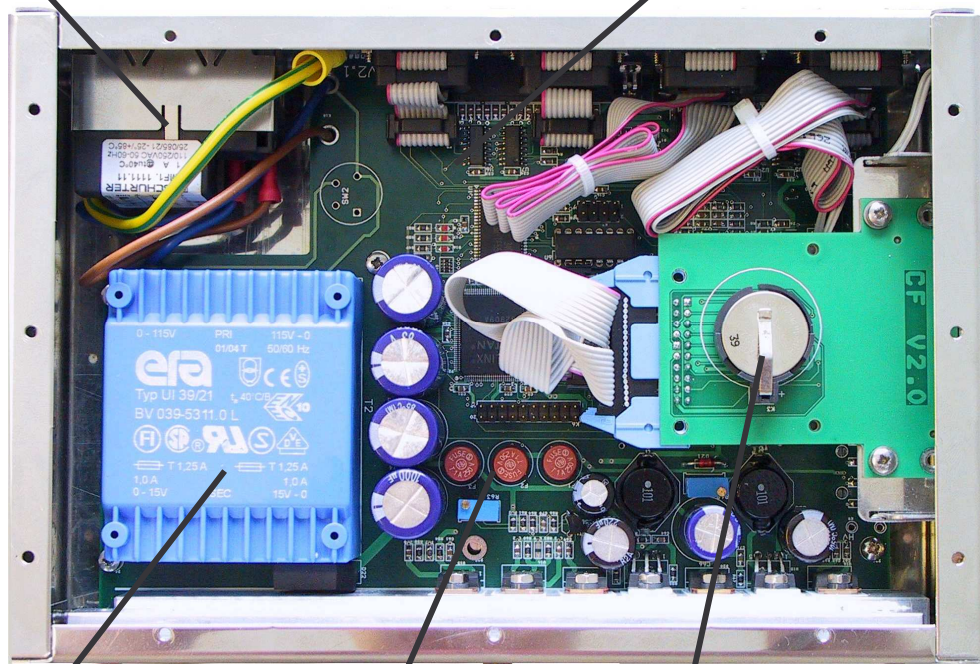
Before removing back panel, make sure the unit is turned off and the power cord is unplugged.



Performing any other service jobs on the unit than the ones described here will void your warranty.

Power connector
shielding

Main PCB



Power Supply

3 Fuses
1 A type TR

Battery for internal clock
Type CR2032

Replacing battery and fuses

Should it occur that a fuse is burned or the internal clock battery is dead, they can be replaced by the user. Fuses are located both inside and outside the TCU unit.

Please notice the picture below which illustrates the location of these parts.

Internal Battery

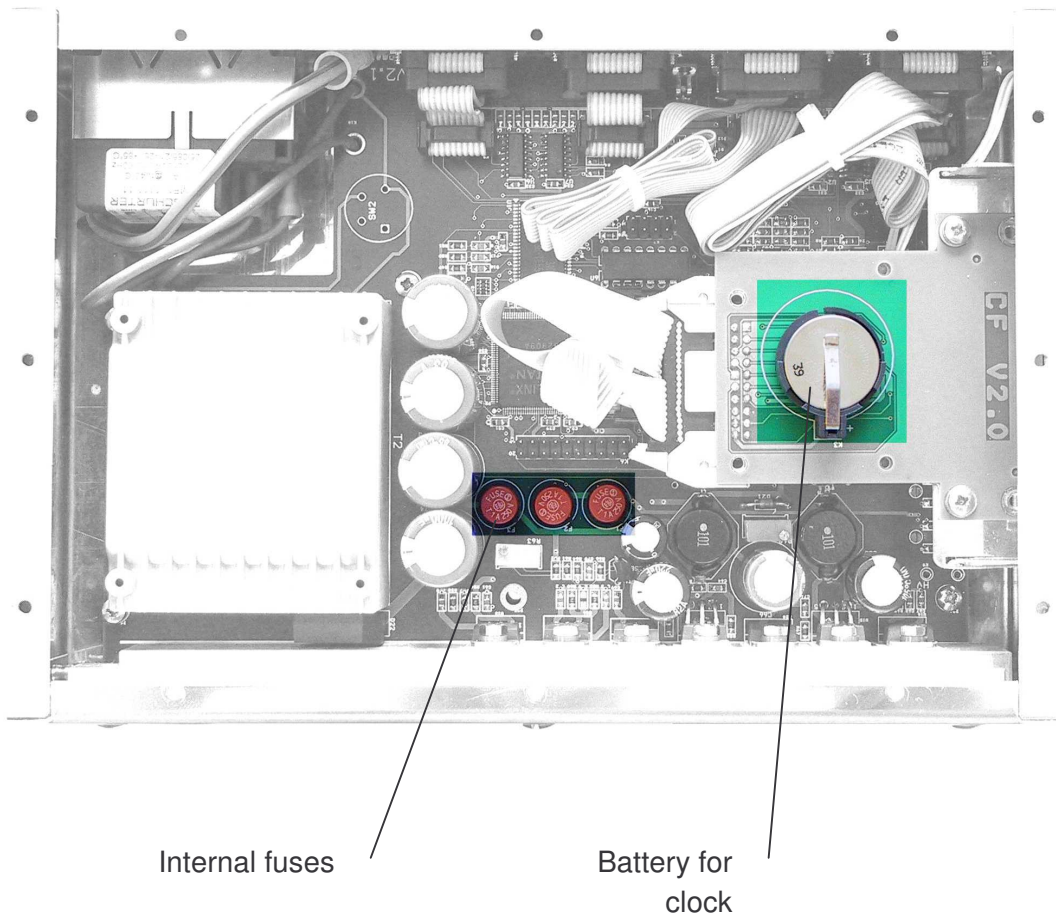


Located just above the compact flash reader. You should use a button cell battery of type CR2032.

Please place the battery like this illustration, with "+" ***upwards***.

Internal fuses

There are 3 fuses inside the TCU. All are of **type TR, 1A, 220V**.

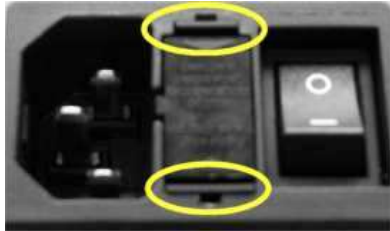


External fuses

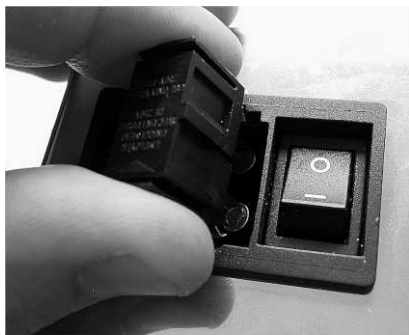
Next to where the power cord is connected there are 2 fuses. If the unit will not turn on, one of these could have been burned.

You should use **20 x 5 mm glass fuses**, 315mA in 220V version and 630mA in 115V version.

To replace, follow this guide



Press on the two taps located on each side of the plastic cover



Now you can lift out the holder with the fuses inside



Take out the burned fuse and replace it



Press on the holder until you hear a “click”

Appendix

Technical overview

Printer HP HSAjet TCU

Print Head	HP 12.7 mm
Max nr of heads	2 (Total height 25.4 mm / 1 inch)
Distance to surface	0.5 mm – 3 mm
<i>Speed / resolution (Horizontal x Vertical)</i>	
600 x 600 dpi => max resolution	38 m/min
300 x 300 dpi	76 / 150 m/min
150 x 300 dpi => max speed	300 m/min
<i>Max message length:</i>	Depends on resolution and font sizes.
Ink	All HP inks

Print Capacity

Design software	OBJ INKdraw (Free)
Font support	Full support for Windows Truetype®
Text	Scale, Rotate, different fonts on each object
Static Objects	Unlimited per message
<i>Variable Objects</i>	
- dato	Maximum 4 per message
- tid	Maximum 2 per message
- tæller	Maximum 2 per message
- text	Maximum 10 per message
Special Functions	Change of date, time, counter, text by use of prompts
Barcode Printing	Yes (not variable). All symbologies, incl 2d.
Graphics / Logos	Scaleable to max height

Inputs / Outputs

Print sensor	Negative / positive flank
Encoder	Encoder input (24 V and 5 V), Quadratur / Position mode
Message Selector	HSAjet print selector, HSAjet Terminal, RS232

System

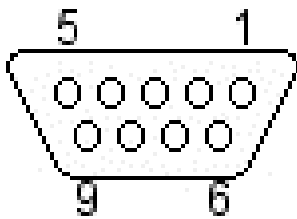
Operator interface language	English, user-defineable
Internal Memory	0.5 mb
External Memory	CF card (32 to 256 Mb)
Voltage	115 V / 230 V

Warranty

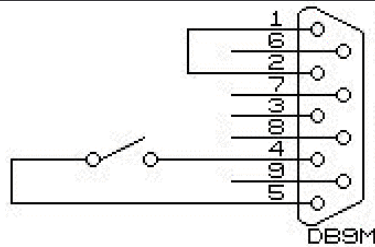
Equipment	1 year
Service (minimum)	5 years

Start sensor connections

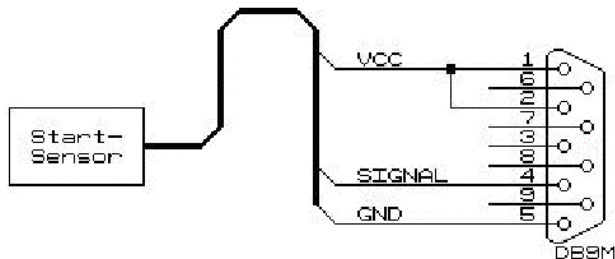
As a start sensor, you can use a simple switch, or a photo cell. The output is 24V, but typically photo cells are 10-30V.



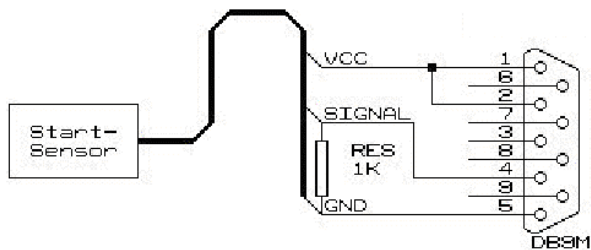
PIN.....	DESCRIPTION
1.....	V I/O
2.....	5 V
3.....	IN 2
4.....	START
5.....	GND
6.....	IN 1
7.....	24 V
8.....	OUT 1
9.....	OUT 2



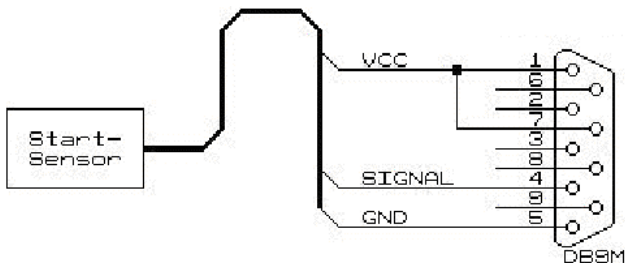
Using a **simple mechanical switch**.
Loop pins 1-2 and connect the switch between pins 4 and 5.



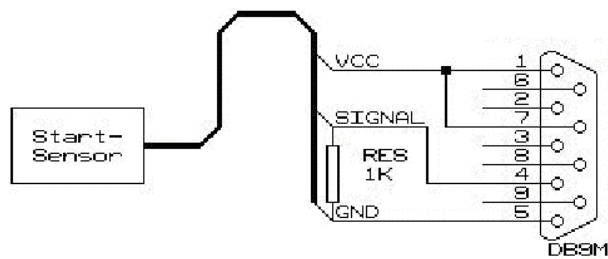
5 Volt NPN / PUSH/PULL sensor.
VCC to pins 1,2
Signal to pin 4
GND to pin 5



5 Volt PNP sensor.
VCC to pins 1,2
Signal to pin 4
GND to pin 5
1 K resistor between pin 4 and 5



24 Volt NPN / PUSH/PULL
VCC to pins 1,7
Signal to pin 4
GND to pin 5



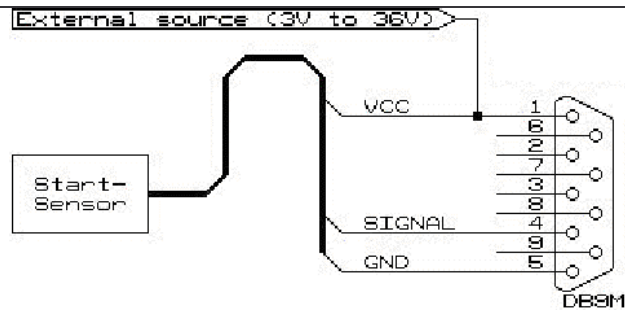
24 Volt PNP sensor.

VCC to pins 1,7

Signal to pin 4

GND to pin 5

1 K resistor between pin 4 and 5

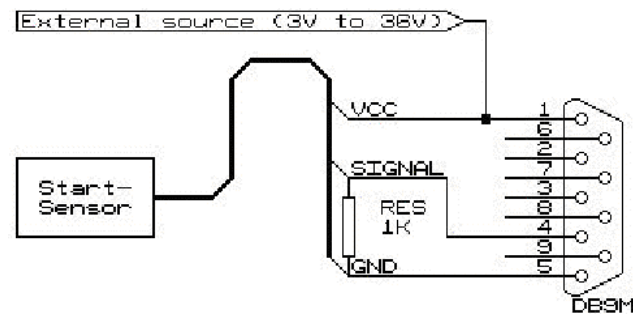


External power source, +3-36V, using NPN / PUSH/PULL sensor

VCC to pin 1

Signal to pin 4

GND to pin 5



External power source, +3-36V, using PNP sensor

VCC to pin 1

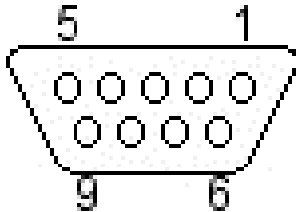
Signal to pin 4

GND to pin 5

1K resistor between 4 and 5.

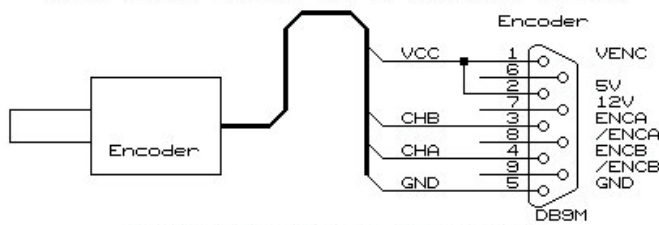
Encoder connections

For the encoder, you can use either a single or double channel. If you have both channels connected, you need to activate “Quadrature” in the software, and divide distance / pulses by 4.



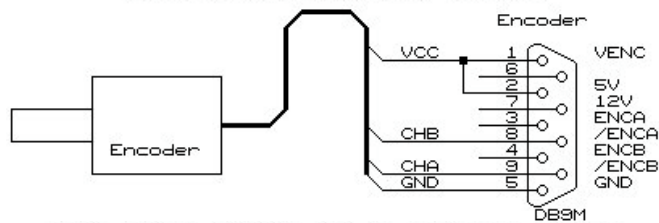
PIN.....	DESCRIPTION
1.....	V ENC
2.....	5 V
3.....	ENC A
4.....	ENC B
5.....	GND
6.....	INK LEVEL (not used)
7.....	24 V
8.....	ENC A (inv.)
9.....	ENC B (inv.)

USING DOUBLE CHANNEL NPN OR PUSH/PULL ENCODER



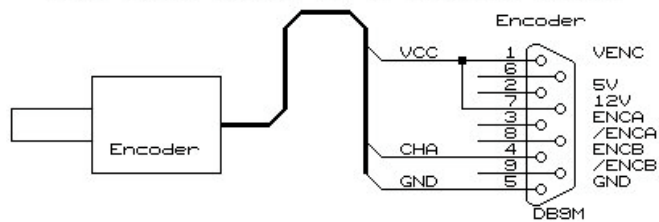
5 VOLT encoder double channel
NPN / PUSH/PULL encoder

USING DOUBLE CHANNEL PNP ENCODER



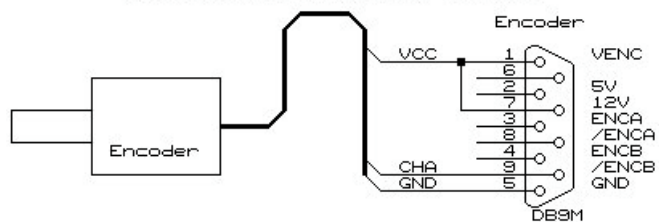
5 VOLT encoder double channel
PNP encoder

USING SINGLE CHANNEL NPN OR PUSH/PULL ENCODER



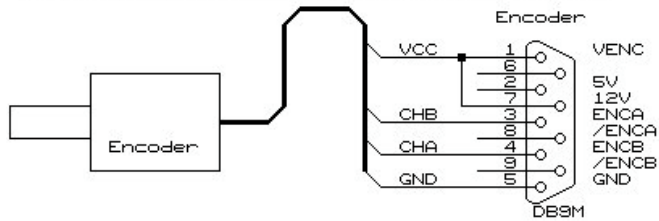
24 VOLT encoder single channel
NPN/ PUSH/PULL encoder

USING SINGLE CHANNEL PNP ENCODER



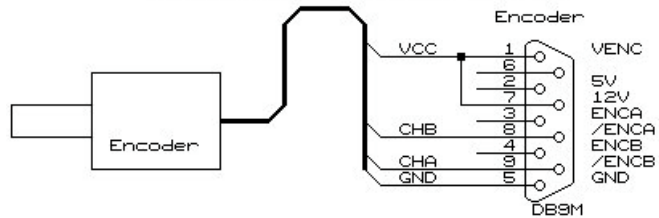
24 VOLT encoder single channel
PNP encoder

USING DOUBLE CHANNEL NPN OR PUSH/PULL ENCODER



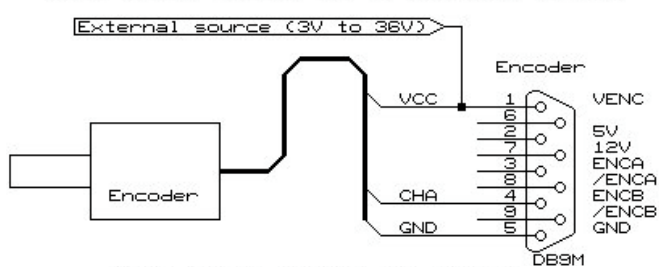
24 VOLT encoder double channel
NPN / PUSH/PULL encoder

USING DOUBLE CHANNEL PNP ENCODER



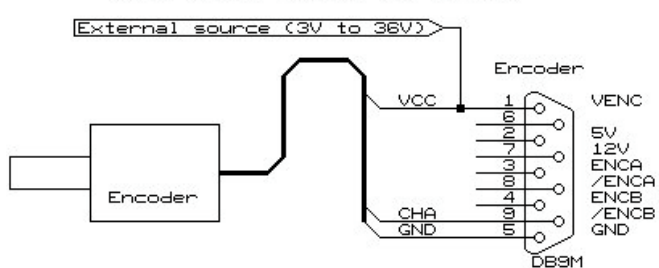
24 VOLT encoder double channel
PNP encoder

USING SINGLE CHANNEL NPN OR PUSH/PULL ENCODER



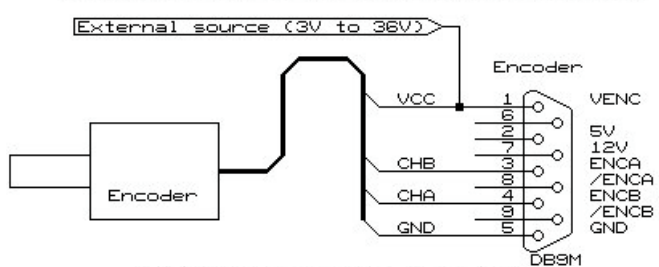
External power source, 3-36V, encoder
single channel
NPN/ PUSH/PULL encoder

USING SINGLE CHANNEL PNP ENCODER



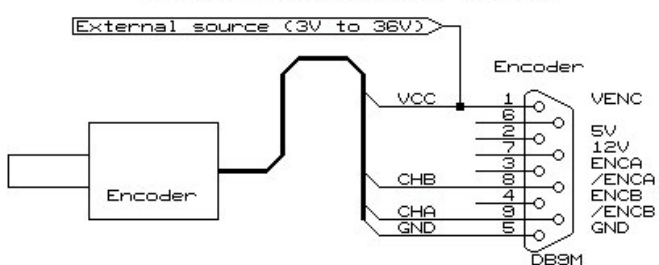
External power source, 3-36V, encoder
single channel
PNP encoder

USING DOUBLE CHANNEL NPN OR PUSH/PULL ENCODER



External power source, 3-36V, encoder
double channel
NPN / PUSH/PULL encoder

USING DOUBLE CHANNEL PNP ENCODER



External power source, 3-36V, encoder
double channel
PNP encoder