DIGITAL YACHT

TECHNICAL NOTES

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Article applies to - HSC100 and HSC100T Compass Sensors

ISSUE: Re-configuring an HSC100 Compass Sensor

Our popular HSC100 compass sensor comes in two versions; the original HSC100 and the newer HSC100T which outputs HDT and ROT for Class A Transponders.

In some installations, it is necessary to re-configure the HSC100 to output a different format of compass heading sentence or to change the damping on the HSC100T to get a more stable output. The following Tech Note explains how this can be done using Tera Term, which is a free terminal program available for download at the link below;

http://en.sourceforge.jp/projects/ttssh2/downloads/51174/teraterm-4.69.exe/

SOLUTION:

Install Tera Term on the PC that you will be using to do the re-configuration on.

With the power to the HSC100 turned off, connect the HSC100 to the PC using either a USB to NMEA converter or a 9 way serial cable (if the PC is a fairly old model that still has a traditional COM port). Below are two diagrams that show the different methods of connecting the PC to the HSC100 – the USB to NMEA adaptor shown is the Digital Yacht model and if you are using a different model the wiring colours may be different so please check the manual for the USB to NMEA adaptor you are using.
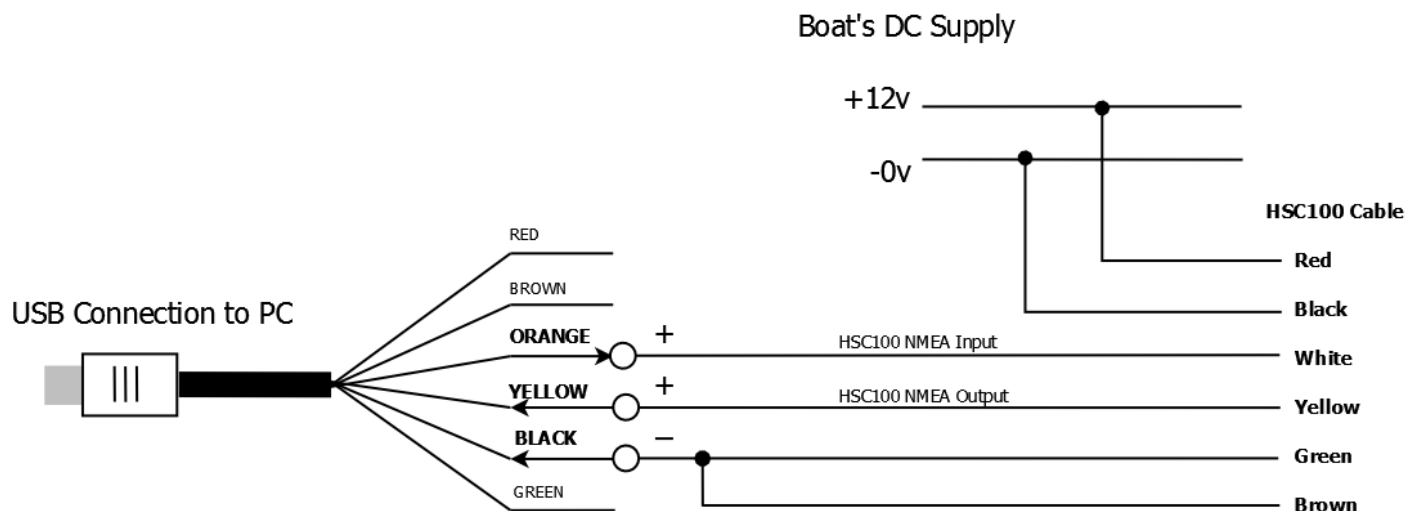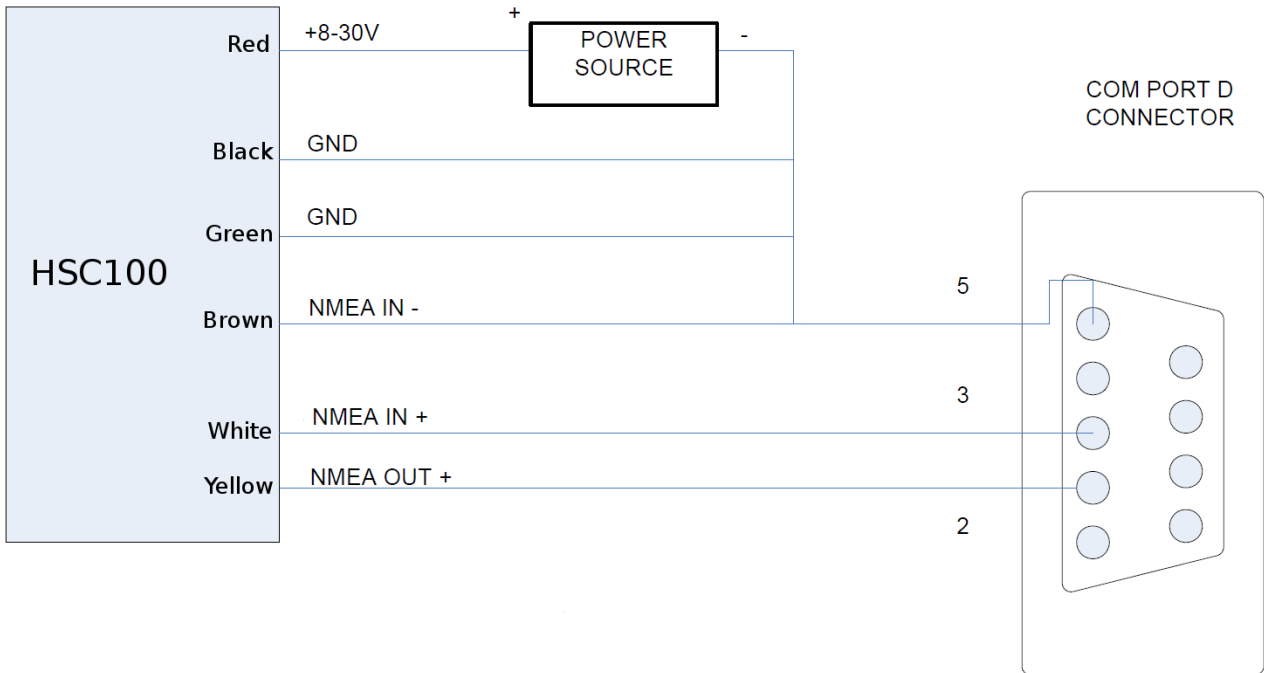
Once the HSC100 is wired correctly to the PC, apply power to the HSC100 and run Tera Term. You should see the window shown in Fig 1. Now you need to select the correct Serial Port number. If your PC has a traditional Serial Port, this will probably COM 1, but if you are using a USB adaptor, Windows will have assigned a COM port number to the adaptor. To find out what number, go to the Windows Device Manager and look in the "Ports (COM&LPT)" section.

Once you have selected the correct Serial Port, click OK and then select "Setup > Serial Port" and ensure the baud rate is set to 4800 baud. You should now be seeing a terminal window with NMEA compass data scrolling down the screen as shown in Fig 2.
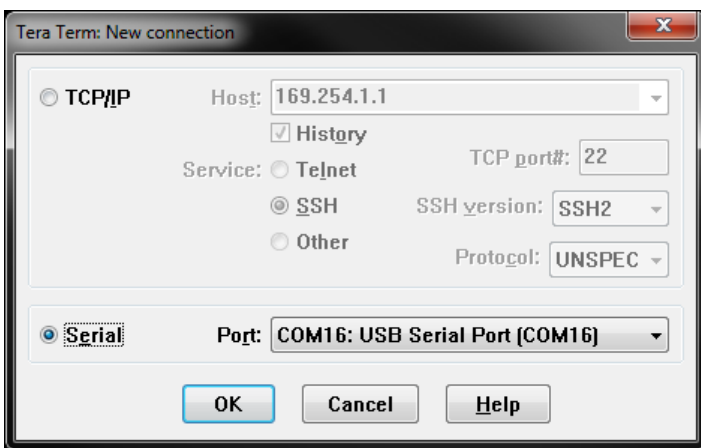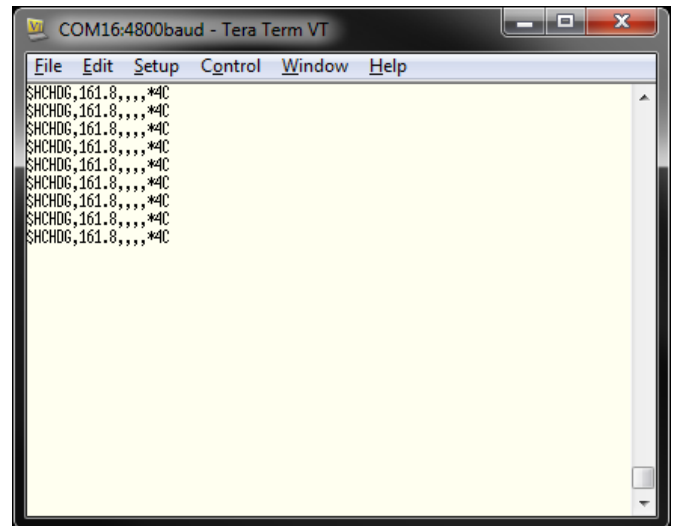

Figure 1

Figure 2

The exact NMEA 0183 data you see, will depend upon the model of HSC100 you have;

HSC100   -   pre-configured to output **$HCHDG,xxx.x,,,,*yy**.

HSC100T   -   pre-configured to output **$HEHDT,xxx.x*yy** and **$HEROT,z.z,A*yy**

Where XXX.X = the compass heading, Z.Z = the rate of turn and YY = the NMEA checksum.

To re-configure the HSC100, you need to make a couple of changes to the Tera Term terminal settings; select Setup>Terminal and you will see the window shown in Fig 3. Make sure that the New-Line Transmit setting is set to CR+LF and ensure that the Local Echo tickbox is ticked as shown.
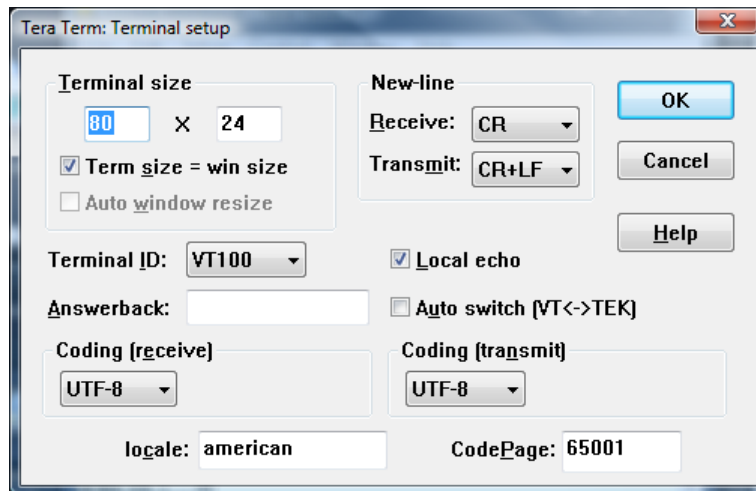

Figure 3

We know that the PC is receiving data from the HSC100, but to make sure that the PC is correctly talking to the HSC100, we are going to send the following command to the HSC100 which will turn off the blue LED.

$PATC,IIHDG,DLED

Select the text string above and press Ctrl+C to copy the string to the PCs clip board. Then click on the Tera Term window to make it active and type Alt+R which will paste the command from the clip board to the Tera Term output with the correct carriage return and line feed commands that NMEA 0183 needs.

You should see an acknowledgement string **$PATC,IIHDG,ACK** output by the HSC100 as shown below in Fig 4 and the blue LED on the HSC100 should be turned off. If this has worked, repeat the process but this time with the string below, which will turn the LED back on.
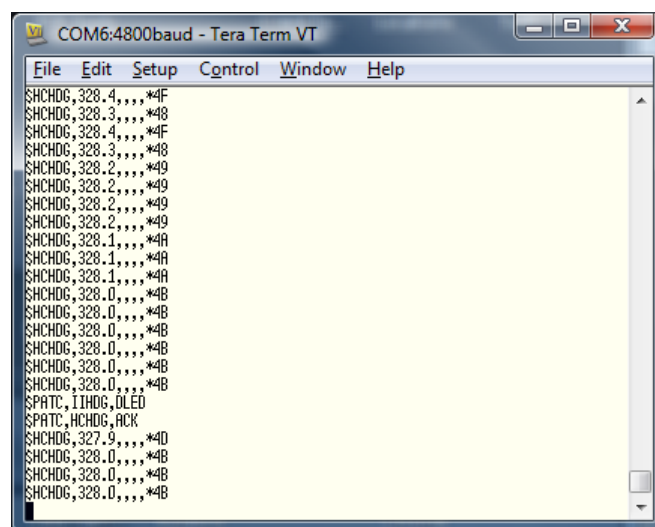
$PATC,IIHDG,ELED

Figure 4

Once you are happy that the HSC100 and PC are talking to each other, we can start to send the configuration commands to the HSC100.

CHANGING THE HSC100 OUTPUT SENTENCES

The HSC100 supports four different heading sentence outputs; HDG, HDM, HDT and HCC. If the equipment that you are connecting the HSC100 needs a different sentence output, this can easily be configured.

Some older devices do not like receiving data with checksums and it is possible to configure the HSC100 to not output a checksum. Also in some very specialised applications, with multiple compass sensors, you can configure the HSC100 to output its serial number so that the source of the compass data can be differentiated – but this is a very uncommon requirement.

The message to configure the output sentence, checksums and serial numbers is;

$PATC,IIHDG,CFG,abc

The last three digits "abc" decide the configuration as per the table shown below;

HSC100 Configuration Table

"ab" Value	Sentence	Checksum	Serial No	
00	$HCHDG	No	No	
01	$HCHDG	Yes	No	(HSC100)
02	$HCHDG	No	Yes	
10	$HCHDT	No	No	
11	$HCHDT	Yes	No	
12	$HCHDT	No	Yes	
20	$HCHDM	No	No	
21	$HCHDM	Yes	No	
22	$HCHDM	No	Yes	
30	$HCHCC	No	No	
31	$HCHCC	Yes	No	
32	$HCHCC	No	Yes	
40	$HEHDT	No	No	
41	$HEHDT	Yes	No	(HSC100T)
42	$HEHDT	No	Yes	

"c" Value	Damping
0	No ROT
1	8secs
2	16secs
3	32secs
4	64secs

NOTES :-

i)   For HSC100T units that output the Rate of Turn, the last digit "c" sets the damping.

ii)   The default configurations for the HSC100 and HSC100T are shown in **bold**

The following are some example commands of the more common requests we have had;

1)   To configure a normal HSC100 to output HDT with checksums;

$PATC,IIHDG,CFG,110

2)   To configure a normal HSC100 to output HDM with no checksums;

$PATC,IIHDG,CFG,200

3)   To configure a new HSC100T to increase the damping to 32seconds;

$PATC,IIHDG,CFG,413

CHANGING THE HEADING OUTPUT DAMPING

We have covered the changing of the Rate Of Turn damping above but it is also possible to change the damping of the heading data. By default this is set to 50% and it can be set between 0% (no damping) and 100% (very high damping).

The lower the damping, the more sensitive the heading readings will be but this can also result in a very unstable, "jittery" performance that is not good for radar overlay. However, if you make the damping to high, the heading can appear slow to respond and always out of sync with what the boat is actually doing.

To change the heading damping, use the following command;

$PATC,IIHDG,DHD,ddd.d

Where ddd.d = the damping value between 0.0% and 100.0%.

CHANGING THE OUTPUT UPDATE RATE

The majority of HSC100s are sold to enable radar overlay on a multi-function display which needs a high output rate. Therefore the default HSC100 output rate is set at 10hz, which is once every 0.1sec (100mS). In some situations it may be desirable to reduce this rate, for instance if there is already a lot of NMEA0183 data being received.

To change the Output Update Rate, use the following command;

$PATC,IIHDG,TXP,uuuu

Where uuuu = the update rate in milliseconds between 100 (0.1sec) and 3000 (3secs).

RESETTING THE HSC100

To reset some of the HSC100 settings back to the factory defaults use the following command;

$PATC,IIHDG,0CV

This does not completely reset the HSC100, but it makes the following changes;

Output Rate 10Hz (100mS)
Output Damping 50%
Heading Offset 0deg