# FOOBARENGINEERING CANZEPHYR

CANZEPHYR Board User Guide

Zephyr Bioharness HRM interface to CAN.

CAN Ant Radio Board www.FooBarEngineering.com

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#### Introduction

The FooBarEngineering CAN Zephyr interface board (CANZEPHYR) is based on the proven WSL range of loggers and designed to interface sensors to the CAN bus.

The CANZEPHYR allows a single Zephyr HRM to be interfaced into existing loggers and systems using CAN.

The standard CANZEPHYR supports a single zephyr devices to be connected to a CAN network.

The CANANT can be configured to have a user specified CAN address and device configuration.

Further cost options include in built logging function based on the WSL range of loggers.

#### Hardware



# Specifications

#### Electrical Data

Supply Voltage	7.9Vdc to 28Vdc
Supply Protection	Reverse and over voltage
Supply Current	100mA @ 12V
Temperature Range Operating	-10°C to +60°C
Temperature Range Storage	-20°C to +70°C

#### I/O Information

1x CAN	1Mbit, 512k, 256k, 128k software selectable
1x Bluetooth link for Zephyr HRM	Multiple device ID are supported but only a single link is connected at a time. This allows for multiple drivers to share a single vehicle interface.

#### **Communication Ports**

1x USB (Debug use only) RS232 terminal for setup and in use testing/ offloading of data. CAN 2.0B  $\,$ 

# Mechanical Data

CAD model of the board available on request.

Size (without mating connectors) 42.5 x 20 x 3.00 mm



Weight 10 grams

# Wiring connectors

Molex PICOBLADE Series 9 pin header Part number 0510210900, pre terminated wire assemblies are available.

J1	
1	V Supply
2	CAN H
3	CAN L
4	RS232 Tx
5	RS232 Rx
6	Gnd
7	Not Used Do Not Connect
8	Not Used Do Not Connect
9	Not Used Do Not Connect

# Zephyr device setup

The device id selection is user configurable via a small csv setup file.

This is an example ant setup section from a setup file, for each channel you can setup the connection profile and the device ID for connecting to a specific sensor.

On load this the created a set of received channels that can then be viewed logged or transmitted over CAN.

Example setup for 4 possible connection id's:

Setup	Bluetooth	1
Address	0	C83E990D69B1
Address	1	C83E990DB467
Address	2	C83E990D784A
Address	3	C83E990DF412
END_OF_TABLE		

The data packets requested from the connected device is configured in a second setup section, the general packet is always requested.

Setup	Zephyr	1
BreathWaveform	1	
ECGWaveform	1	
RRPacket	1	
Accel	1	
Summary	1	

# Channels sourced from biometric harness.

When a device is added to a channel it sources data dependant on the data selected, here is a list of the data sourced from the sensor.

Packet	Channel name	Unit
General packet	ZephyrHeartRate	BPM
	ZephyrRespirationRate	BPM
	ZephyrSkinTemperature	centigrade
	ZephyrPosture	degrees
	ZephyrVMU	VMU/s
	ZephyrPeakAcceleration	G
	ZephyrBatteryVoltage	V
	ZephyrBreathingWaveAmp	V
	ZephyrECGAmplitude	V
	ZephyrECGNoise	V
	ZephyrX-axisAccelerationMin	G
	ZephyrX-axisAccelerationPeak	G
	ZephyrY-axisAccelerationMin	G
	ZephyrY-axisAccelerationPeak	G
	ZephyrZ-axisAccelerationMin	G
	ZephyrZ-axisAccelerationPeak	G
	ZephyrSystemChannel	raw
	ZephyrGSR	nanoSiemens
	ZephyrSPO2	%
	ZephyrBloodPressure	mmHg
	ZephyrALARM	raw
	ZephyrBatteryStatus	raw
	ZephyrButtonWorn	raw
breathing wave packet	ZephyrHsBreathingWave	raw
ecg packet	ZephyrHsECGAmplitude	raw
Respiration rate packet	ZephyrHsR-R	raw
accel nacket	ZenhyrHsY-axisAcceleration	6
accerpacket		6
		6
		6
cummon, sociat	ZanhurCaraTamparatura	continue de
summary packet		centigrade
	ZepnyrHeartRateConfidence	%

The interpretation of these channels is best described in the Zephyr documentation.

## Viewing real time data for a connected Zephyr device.

Data and channel status can be viewed in real time from the sensors within the terminal using the "zephyr" command.

ewd - HyperTerminal	-	×
<u>File Edit View Call Iransfer H</u> elp		
Bluetooth Connection address [C83E990D7849] state:Connected         Press 1-9 to see more channel data,'esc' to exit         970:ZephyrRespirationRate       :0.0 BPM         970:ZephyrSkinTemperature       :0 centigrade         970:ZephyrPosture       :-7 degrees         970:ZephyrPosture       :0.01 VMU/s         970:ZephyrPeakAcceleration       :0.03 G         970:ZephyrBatteryVoltage       :4.058 V         970:ZephyrBreathingWaveAmp       :0.0000 V         970:ZephyrECGAmplitude       :0.000800 V         970:ZephyrECGNoise       :0.000020 V		
Connected 0:00:18 ANSIW 2400 8-N-1 SCROLL CAPS NUM Capture Print echo		

Additional channels can then be accessed using the 1-9 keys.

## CAN message transmit of received ant data setup.

The CAN protocol is user configurable via a small csv setup file.

Any channel sourced can be sunk by a CAN message.

Here is an example CAN setup section from a setup.

Setup	CAN	1						
Termination	0							
Speed	1000000							
Name	CanId	offset	size	signed	ratio	zero	period	unit
HrmHeartRate	11	0	16	0	1.0	0	100	BPM
BssSpeed	11	16	16	0	0.1	0	100	kph
END_OF_TABLE								

This will transmit a single CAN ID at 10 Hz containing heart rate and speed.

The unit supports up to 8 separate can ID's with up to 16 channels contained within them.

# Configuration using USB debug interface

Connection to the WSL is done through Hyperterminal and a USB serial port connection. If you have not connected to a WSL before, you will need to install the correct USB drivers.

#### Installing USB drivers

The correct USB drivers are contained within the folder

lpcopen\_examples\_windows\_usb\_drivers\_v1.20. The drivers are located in the Hyperterminal folder on the USB flash drive.

Connect the WSL to the computer via a USB cable, switch the WSL on via the switch on the top of the unit. The computer might make the sound that a new USB device has been connected, don't worry if it doesn't we have to hand install the drivers.



Search for device manager, click on the Ports, find the port that has a question mark. Right click, Update driver. Browse for the driver folder located on the USB flash driver, the x64 folder if your computer is a 64 bit machine.

The computer should then install the correct drivers for the WSL, and give the port a specific number – such as COM4.

#### Connecting to a WSL

Double click the Hyperterminal Icon a connection name dialogue will come up, call the connection WSL, click okay.

iption	?	×	
nection			
choose an icon for the	e connection:		
	?	×	1
he phone number th	at you want to	o dial:	
Australia (61)		~	
80			
COM4		~	
	?	×	Tł
			ch
			СС
cond: 2400	~		
a bits: 8	~		
Parity: None	~		
o bits: 1	~		
ontrol: Hardware	~		
	<u>R</u> estore Defaul	ts	
OK Can	cel	pply	
	iption iection choose an icon for the choose an icon for the Australia (61) 08 COM4 COM4 COM4 Cond: 2400 a bits: 8 Parity: None p bits: 1 ontrol: Hardware OK Can	iption ?  hection choose an icon for the connection:  ?  the phone number that you want to Australia (61)  08  COM4 ?  COM4 ?  cond: 2400 ?  bits: 8 ?  pbits: 8 ?  pbits: 1 ?  Control: Hardware CEestore Default OK Cancel	iption ? ×  nection choose an icon for the connection:  ? ×  the phone number that you want to dial:  Australia (61)  08  COM4 ?  ?  Australia (61) ?  Bestore Defaults OK Cancel Apply

A new dialogue will then appear which is the Connect To. Change the Connect Using: drop down to the COM port that was installed as the USB driver. The quickest way is just to use the down arrow on the keyboard.

Once the correct COM port is selected hit enter.

The COM port properties dialogue will pop up. Don't change anything, just hit enter. This will connect the computer to the WSL.

E ewd - HyperTerminal	-	$\times$
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ransfer <u>H</u> elp		
요 🖉 🗇 🖧 🖆		
<pre>&gt;setup load Send setup using the Xmodem now CCCC Xmodem successfully received 3840 bytes Saving Details :size 133:0k Saving Ant :size 138:0k Saving BlueTooth :size 177:0k Saving Zephyr :size 132:0k Saving CAN :size 409:0k Saving CAN :size 409:0k Saving Display :size 278:0k Saving Display :size 278:0k Saving Telemetry :size 188:0k Saving Beacon :size 279:0k Set flag to force setup load after reset Setup Loaded PLEASE RESET UNIT. &gt;</pre>		

The following dialogue should come up showing that you are communicating to the WSL. At this point you can now program the WSL, watch incoming information, look at the details of the configuration.

#### List of WSL commands

#### '?' List all registered functions

You can view all the available commands on the WSL by typing a ?, pressing enter, from the command prompt.

E WSL - HyperTerminal	(1 <del></del> )/	×
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>C</u> all <u>I</u> ransfer <u>H</u> elp		
<pre>&gt;? Registered Function List '?' List all registered functions 'Ver' Prints version information 'Reset' Resets the unit 'RIC' Real Time Clock debug 'Data' Data debug 'Log' Log debug 'SPI debug 'IPL' InterProcessor Link debug 'Setup' Controls the setup 'Ant' Ant Debug Commands 'Zephyr' Zephyr Debug Commands 'Accel debug 'Elem' Telem debug &gt;&gt; &gt;&gt;</pre>		×
Connected 0:04:06 Auto detect 2400 8-N-1 SCROLL CAPS NUM Capture Print echo		

Here is a list of the basic commands:

'Ver' Prints version information.

'Reset'- Resets the unit.

'Ant' view the Ant channels, esc to exit

'Can' view the CAN bus status and data.

'Log' internal data logger.

'Setup' used to load setup files to the unit.

# Internal Data Logger

The Canant is capable of logging data internally (Cost Option) and offloading a tab delimited text file that can be used with many viewers.

The Log command gives access to the all the Log functions such as offloading data files from the box.



If the WSL has recorded data then the logs are listed under logger data. To offload the data use the command

log offload [session] – the session number being the number of the left hand side under Logger data. An example would be – log offload 1, press enter and you will then follow the procedure to complete a data offload. If you don' designate an effort to offload then the last recorded data set is offloaded.

When you type log offload 1, you will be prompted to Retrieve log data using 1K modem. From the HyperTerminal menu select Transfer, Receive File...

A dialogue will open..select the folder where you want the data to download to and select 1K modem for the receiving protocol, press enter or Receive

A CONTRACTOR OF CALL	esktop	Browse
	and a	
ise receiving prot	0001:	

A second dialogue will open which is where you set the file name. We have been using a file name definitrion of date\_rider\_effort.txt.

An example file name would be 20160704\_PC\_01.TXT

The transfer might time out because you have a limited time to set the information in the two dialogues. If it times out, just repeat the previous two steps, it remembers the first dialogue information so the second time through should be quicker, thus enabling the download.

Once complete a confirmation is printed on the screen.