FOOBARENGINEERING CANANT

CANANT Board User Guide

General purpose ANT radio interfaced using CAN.

CAN Ant Radio Board www.FooBarEngineering.com

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Introduction

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

The CANANT allows ant dertified devices to be interfaced into existing loggers and systems using CAN.

The standard CANANT supports 8 ant channels for devices like heart rate monitors, Crank torque and speed and cadence.

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
8 separate ANT channels	Selectable to standard ANT+ profiles or a range of and defined customer profiles.

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

ANT device setup

The ANT device 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:

	1			
Setup	Ant	1		
Ant channel	Device type	Device number(0=search)	Sensor Calibration	
0	hrm	0		
1	bss	25697	WheelCircum(m)	2.01
2	bcs	0		
3	bss_bcs	0	WheelCircum(m)	2.01
4	ant_display	33		
5	ant_display_config	34	ConfigPeriod	10000
6	tpms	15731		
7	tpms	15494		

Supported device profiles.

The basic list of sensor profile supported that can be calibrated are:

bss,	Bike speed sensor
bcs,	Bike cadence sensor
bss_bcs,	Combined bike speed and cadence
bps_power,	Crank power
bps_trq_wheel,	Wheel torque based power
bps_trq_crank,	Crank torque based power
bps_trq_ctf,	Crank torque based ctf sensors
hrm,	heart rate
ctrl,	ant + ctrl profile
can_tx,	ant based CAN user transmit of data
mo2,	Moxy ant+ sensor
tpms,	tyrewizz ant+ tyre pressure sensor
ant_display, ant_display_config,	Foobar Garmin Ant Display Foobar Garmin Ant Display

Custom sensors added by request.

Channels sourced from each device type.

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

Device	Channel name	Unit
bss	BssDeviceId	
	BssBatteryVoltage	V
	BssSpeed	kph
	BssDist	m
Bcs	BcsDeviceId	
	BcsBatteryVoltage	V
	BcsCadence	rpm
Bss_bss	CbscDeviceId	
	CbscSpeed	kph
	CbscCadence	rpm
Ctrl	CtrlDeviceId	
	CtrlCommand	
	CtrlCount	
Can_tx	CanTxDeviceId	
	CanDataA	
	CanDataB	
hrm	HrmDeviceId	
	HrmHeartRate	BPM
Mo2	MO2DeviceId	
	MO2HgConc	g/dl
	MO2Hg%	%
toma	TomeDoviceId	
tpms		millih e r
	TyrePressure	dogC
	Tyreremp	dege
Any hos	BosPower	W
sensor	вругожен	vv
	BpsTorque	Nm
	BpsSpeed	kph
	BpsCadence	rpm
bps_power	BpsLeftPedalPower	%
	BpsRightPedalPower	%
	BpsInstCadence	rpm
	BpsInstPower	w

	BpsAveragePower	W	
bps_trq_wheel	BpsWheelAveragePower	I	W
	BpsWheelAverageTorque		kph
	BpsWheelInstCadence		rpm
	BpsWheelAverageSpeed		kph
	BpsWheelDistance		m
bps_trq_crank	BpsCrankAveragePower		W
	BpsCrankAverageTorque		Nm
	BpsCrankInstCadence		rpm
	BpsCrankAverageCadence		rpm
bps_trq_ctf	BpsCTFPower	W	-
	BpsCTFTorque	Nm	4
	BpsCTFCadence	rpm	1
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Viewing real time data for a connected ANT device.

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

🗄 ewd - HyperTerminal ile Edit Yiew Çall Transfer Help	-		×
) 🖆 🗇 🐉 🛍 🎦			
Press '0-8' to see ANI channel data, 'esc' to exit CHAN-1: Heart Rate Monitor: ReceivingData:Id 2: CHAN-2: Bike Speed Sensor: SearchingForChannel:Id 25697 CHAN-3: Bike Cadence Sensor: SearchingForChannel:Id 0: CHAN-4: Bike Speed & Cadence Sensor: SearchingForChannel:Id 0: CHAN-5: Ant Display: BroadcastData:Id 33: CHAN-6: Ant Display Config: BroadcastData:Id 34: CHAN-7: Tyre Pressure: SearchingForChannel:Id 15731: CHAN-8: Tyre Pressure: SearchingForChannel:Id 15494: -	rate rate rate rate rate rate	3 0 0 0 0 0 0 0	

Data for each channel can then be accessed using the 0-8 keys, for example channel 1 can be accessed by keying the number '1' will show the following data received from sensor serial number 2.

ewd - HyperTerminal	Help							-	×
	100								
Press '0-8' to see CHAN-1:Heart Rate I 985:HrmDeviceId 493:HrmHeartRate	ANT chann Monitor :	el data Receiv	a, 'es ingDat :2 :72	c'to a :Io BPM	exit	2:rate	2		
Connected 0:02:50 ANSIW	2400 8-N-1	SCROLL	CAPS	NUM	Capture	Print echo			

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.

CAN message reception for data to be viewed on the Garmin ANT dashboard.

The CANANT can receive channel to be transmitted onto the FooBarEngineering ANT dashboard app for Garmin watches and trip computers. The app is available for download from the garmin app store.



2 ANT channels must be configured for the dash app communication with devive id's as shown below.

ant_display	33
ant_display_config	34

FooBarEngineering Ltd CANANT User Guide V1.0 The reception of the CAN data is configured in the small setup csv file

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
Data1	13	0	-16	0	0.0001	0	0	v
Data2	14	16	-16	0	0.0001	0	0	v
Data3	15	0	-16	0	0.0001	0	0	v
Data4	16	16	-16	0	0.0001	0	0	v
END_OF_TABLE								

This receives data from 4 separate CAN ids and sources channels (note the 0 in the period indicating the can message is to be received not transmitted).

The display is configured in a separate section of the setup file an example is shown below

Setup	Display	1			
Field ID	Channel Name	Short Name	Alarm Min	Alarm Max	Alarm Colour
1	Data1	D1	-0.5	0.5	1
2	Data2	D2	3000	30000	1
3	Data3	D3	0	100	1
4	Data4	D4	0	100	1
END_OF_TAE	BLE				

The short name allow user defined acronyms to be used and alarms allow colouration of the channel fields.

Configuration using USB debug interface

Connection to the WSL is done through Hypertermial 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 Hytperterminal 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	?	×	
ection			
choose an icon for th	e connection:		
	?	×	A
			۲ ۲
he phone number th	n <mark>at y</mark> ou want te	o dial:	(
Australia (61)		~	
80			
COM4		~	
	?	×	Th
			ch
			со
cond: 2400	~		
a bits: 8	~		
Parity: None	~		
o bits: 1	~		
ontrol: Hardware	×		
	Restore Default	ts	
OK Car	ncel	pply	
	iption iection choose an icon for th Australia (61) 08 COM4 Cond: 2400 a bits: 8 Parity: None p bits: 1 ontrol: Hardware OK Car	iption ? hection choose an icon for the connection: ? the phone number that you want to Australia (61) 08 COM4 ? cond: 2400 a bits: 8 Parity: None p bits: 1 Control: Hardware OK Cancel A	iption ? × nection choose an icon for the connection: ? × the phone number that you want to dial: Australia (61) 08 COM4 ? ? * Cond: 2400 ? Parity: None ? 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 Edit View Call Transfer H</u> elp		
1 🗳 🏐 🖏 💾		
<pre>>setup load Send setup using the Xmodem now CCCC Xmodem successfully received 3840 bytes Saving Details :size 133:ok Saving Ant :size 138:ok Saving BlueTooth :size 177:ok Saving Zephyr :size 132:ok Saving CAN :size 409:ok Saving Logger :size 1814:ok Saving Display :size 278:ok Saving Telemetry :size 188:ok Saving Beacon :size 279:ok Set flag to force setup load after reset Setup Loaded PLEASE RESET UNIT. ></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.

WSL - HyperTe	rminal	-	×
<u>File Edit View</u>	<u>C</u> all <u>I</u> ransfer <u>H</u> elp		
🗅 🗃 🍵 🌋			
>? Registere 'Ver' 'Reset' 'Data' 'Log' 'Data' 'Log' 'SPI' 'Setup' 'Setup' 'Setup' 'Ant' 'Setup' 'Ant' 'St' 'Ant' 'Sephyr' 'Accel' 'Telem' > > >	ed Function List List all registered functions Prints version information Resets the unit Real Time Clock debug Data debug Log debug SPI debug InterProcessor Link debug Controls the setup Ant Debug Commands Bluetooth Debug Commands Zephyr Debug Commands Accel debug Telem debug		×
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

: C:\Users\wa	rra\Desktop	Browse
lse receiving	protocol:	
1K Xmodem		

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.