Android Data Logging for TuneBoy flashed ECU

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Introduction

Designed to run in conjunction with the TuneBoy firmware for Multistrada 1200 and Diavel, the Ducati Data Logger reads and records the engine data, into a format acceptable for playback in the TunBoyTrim program.

For ANDROID, it is necessary to connect to the bike using a BlueTooth ELM327 device instead of the OT-2. In general these will have a standard OBDII connector and will use the DDA to OBDII adapter supplied with the Tune Boy kit.

Why BlueTooth

Android does not allow you to (natively) create an AdHoc WiFi connection. Don't ask me why …

It is possible with a root kit'ed phone and a DLL swap, but that seems like a lot to ask of the general public.

Why do we need an AdHoc connection ? Because the OT2 doesn't provide an Infrastructure connection… Again, don't ask me why ….

So how do we get around this impasse ? BlueTooth obviously !!

It's cheap to implement, and Android is very happy working with BlueTooth.

Blue Tooth OBDII diagnostic dongles are available everywhere ranging in price from about $10AU upwards. In theory the more expensive ones *may* work better, however all development work for this project has been with 'cheap' ones from China sourced off EBAY. These must be ELM327 devices (V1.4 or later)	

Requirements

This then brings us to the requirements for this Application.

- Android 2.2 or later with BlueTooth supported.
- A Tuneboy flashed ECU (with Cruise and Tune Key)
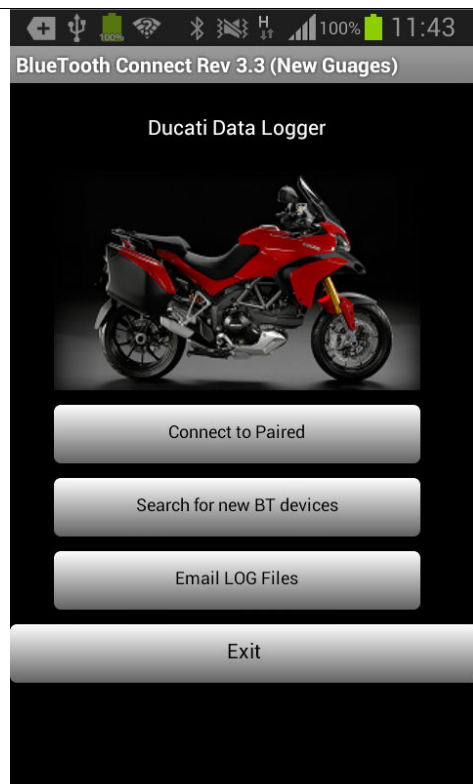- A BlueTooth OBDII diagnostic adapter (ELM327 or STN1110)

Start Screen Main buttons

The start Screen gives you several options for connecting by BlueTooth or sending saved log files by Email. **Connect to Paired** : connects quickly to a BlueTooth device you have already paired with. **Search for new BT devices** : listens for broadcasting devices nearby and presents a list of devices to choose from. (Asks you to pair if you haven't done so already) **Email Log Files** : Allows you to choose a log file, trace file, or even debug file and email to yourself, (or someone else even)…	

Additional Notes :

Although the BlueTooth ELM327 powers up when plugged into the bike, and you can 'pair' and connect to it with your phone, the application won't actually work unless the bike is powered on. (Key On).
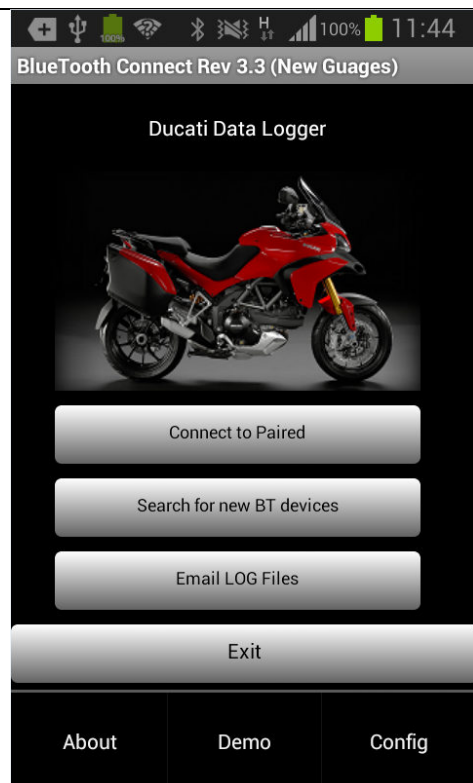
Start Screen 'Soft Menu' buttons

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Several extra functions exist via Androids 'soft' menu button.

About : Help and About.

Demo: Demonstration display (animation only, using bogus made up values. Drag finger across display to open TP).

Config: Allows personalization of this application.

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Additional Notes :

Main Logging Screen

Once your BlueTooth connection is made, the App will automatically open the Main Logging Screen which allows you to START and STOP the logging, as well as displays some 'live' information while logging. (Logging will start automatically if you have selected that feature in 'Config')

Eg: Throttle Position and RPM, AirFuel Ratio, Engine Temp, and the status of several key 'switches' on the bike… (BRAKE and CLUTCH, Like PreFlight).

TP Gauge : Indicates how far open the throttle bodies are open in % (not the twist grip)

AFn bars: Air Fuel ratio pointer(s)

RPM bar : RPM

Message Window : Shows important messages as required (error Warnings etc)

sp: Speed
cc: CC set speed
AT : Air Temp in deg C
ET : Engine Temp in deg C
Status Line : shows size of log file and samples per seconds
EXIT button : exit this screen
LOG button : start and stop the logging of data

Gear : gear (Yellow indicates ABS light is on)
Clutch indicator : RED = clutch pulled
Brake Indicator : RED = Brakes ON
Tx/Rx LEDs : indicates BlueTooth Data
Optional Output Files:
Log File Name : The .RAW file for TuneBoy Trim.

Additional Notes :

- LOG files are stored in your phones "**Android/data/mstd.logging/files"** directory
- By default a .RAW file is created. This is readable by TuneBoy Trim
- Optionally you may enable a simple trace file (.TXT)
- Optionally you may enable a simple .CSV file
- A _DEBUG.TXT file may be created
- Swiping your finger across the gauges, (left to right), while in Demo Mode, will open the throttle and play a silly sound effect.
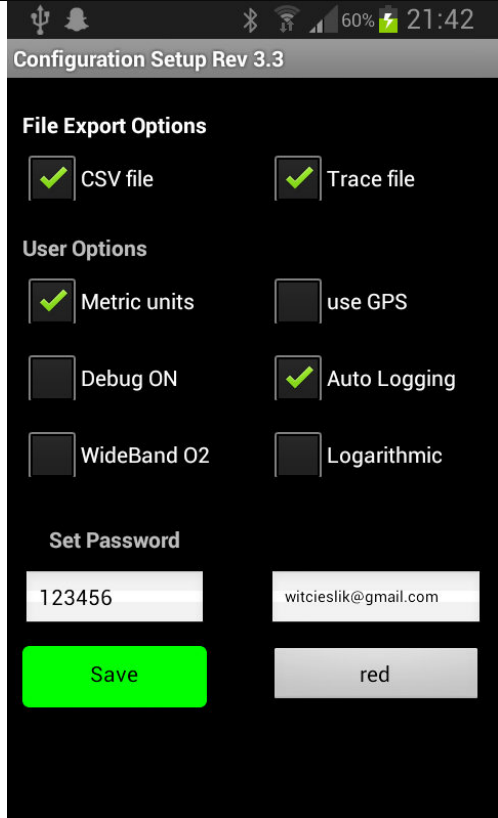
Configuration Screen

This allows the persistent configuration of various 'personal' features.

The most obvious of which is choosing Metric or Imperial units.

Other configurable features include :

The type of output file, type of O2 sensor employed, Debugging enabled, and Automatic Logging enabled etc …

Enable CSV file creation *(not implemented yet)*
Enable simple Trace file.

Metric units (Imperial if not ticked)
GPS data recorded (RFFU)

Enable Debugging file (for me)
Auto logging as soon as connected.

Use Wideband O2 values if ticked (Narrow band if not ticked)
Use Logarithmic scaling on screen view for TP and RPM scale.

Password field (RFFU)

MailTo is passed to your mail app as the recipient.

Save Button to save any changes.
(green=no changes, red=changes to be saved)

Choose your Start Screen bike color

Additional Notes :

Note to self: CAF1 command needs to be tested again …

can't remember if it's needed or not …

Email LOG files

In addition to being able to connect the phone to a PC and drag the Log files to your Computer in the normal fashion, the app now supports emailing files using your choice of email client.

To Email a log file, simply scroll through the list until you find the one you want, then hold that entry . Your phone will start up your Email application with the file already attached. If you have an Email name set in '**Config'** then this too is populated into the 'To' field. You just have to push whatever your 'send' button is. You can edit any of the fields before sending. If you have multiple options for sending Email, then the first time you do this, Android will ask you to select one and confirm if this is the one you want to use. (Only happens the first time).	File to Email Rev 3.3 29-May-2013_200643.csv 29-May-2013_200643.raw 29-May-2013_200643.txt 29-May-2013_201601.csv 29-May-2013_201601.raw 29-May-2013_201601.txt 29-May-2013_202354.csv 29-May-2013_202354.raw 29-May-2013_202354.txt 29-May-2013_204600.csv

Additional Notes :

Additional File System comments

All files are stored in your phones "**Android/data/mstd.logging/files**" directory

- TuneBoy Trim file stored as [datetime.raw]
- Trace files are stored as [datetime].txt
- CSV files are stored as [datetime].csv
- Debugging option creates [datetime]_DEBUG.txt

Tested with :

The following Android devices have been tested.

Phone	Android	Approx average SpS
Samsung Galaxy SII	4.0.3	50
Samsung Galaxy SII	4.1.2	50

Known Issues

Issue	Importance	Possible fix
Logging format not read by TuneBoyTrim yet	High	W.I.P
Throttle BLIP command missing	Low	
Possible issue with data "over run"	High	
Takes a while to discover the BT devices which makes starting up kinda slow… **Resolved by adding the ability to connect to a previously paired device .**	Resolved	I might speed up discovery by assuming your paired devices are available and not search for them
Logging pauses if screen goes to sleep **Fixed with 'Keep alive'**	Resolved	Need to move logging code to 'service' instead of activity Although Keep Alive will attempt to keep your screen Open, it helps if you can adjust your screen timeout to the maximum (eg, 10 mins for the GalaxySII)
Possible need more SpS **New pump mode gets 40+ sps but data has less info.**	Resolved	Remove live updates while logging to file ? Didn't help…
Nice to Have(s)		
A screen that graphs the output (s)?		Not sure what graphs are really useful ….
CC extensions		In Progress
Reset Service Indicator		Wishlist
Shop Enable of Heated Grips		Wishlist
Reset dash PIN code		Wishlist

Installation

- Installation of the Application simply involves getting the APK file onto your android device and running it.
- Connecting the hardware to the bike is simply done by using the adapter cable that came with your OT-2 to connect the BlueTooth ODBII module to the bikes 4-pin diagnostic connector

Installing the APK file on your Android

- If you don't normally install apps you might need to enable Unknown Sources.

- To install applications from other sources, you also need go to Settings -> Application Settings and enable Unknown Sources. Also go to Settings -> SD Card and Phone Storage -> Disable Use for USB Storage. (You can enable it again later).

- You need to transfer the APK file to your phone. The best way is to email it to the e-mail account on your Android phone. Once the APK is on your phone just tap on it and it should prompt the install process.

Connecting the hardware

Take the 4-pin to OBDii adapter cable originally supplied with the OT-2 and connect it to the bikes diagnostic port. Now plug the BlueTooth ELM327 into the ODBII port.

It should power up straight away, and you can 'pair' and connect to it with your phone.

Other TuneBoy products for Multistrada 1200, Diavel and Panagale

TuneBoy Quick Shifter

A strain gauge based Quick Shifter that offers these features :

- Low cost to implement
- Installs neatly in place of the existing gear linkage
- True analogue output that allows clutchless DOWNSHIFTs as well as the usual UPSHIFTS
- Allows lightning fast, full throttle upshifts, and silky smooth automatic throttle 'blip' downshifts.