

The 603-200 Vintage Watch



A modern opensource watch in a vintage shell

<https://hackaday.io/project/181159-the-603-200-watch>

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Description of the product

The 603-200 is the first watch of a planned line of watches based on the same concept which is inspired by the Japanese TokyoFlash® brand (www.tokyoflash.com). We want to push the concept to a fully modern connected watch capable of establishing communication with your SmartPhone or any other IoT.

This watch is an **open source** device. The customers and makers have access to all the documentation

- Kicad-Pcb® files to make correction or updates
- Arduino IDE Sketches available from www.github.com to update or modify the watch's behaviour
- Python code available from www.github.com to update or modify the watch's behaviour. You get access to hundreds of ESP32 code coming from the makers community.
- Technical documentation to create new top side displays (sister board) and design add-ons
- 3D files for CNC and 3D printers for those willing to create enclosure/shells in various material

What the watch can do :

The 603-200 Morphwatch® has been mainly designed to produce **exciting visual effects** with its collection of 192 LEDs. There are 4 circles of 603 size format SMD color LEDs.

- 1 external circle of 60 WHITE 603 LEDs for the seconds
- 2 intermediate circles of PURPLE 603 LEDs for the minutes
- 1 internal circle of YELLOW 603 LEDs for the hours

Each LED can be programmed independently with I2C libraries or through PYTHON Script. The user can be very creative with visual effects.

Now the visual effects put aside, the watch has much more to offer because it has a powerful Espressif® ESP32 PICO D4 chip. Therefore, it is a complete connected modern watch which is capable of **interaction with your smartphone** through Bluetooth. Using your phone you can use the watch to communicate into a private MESH wireless digital network. You can ask your watch to vibrate when your phone is away (with Bluetooth) or very far away (with WIFI).

With **4 buttons**, you can design your watch to **trigger a relay, send an emergency email, send a vibration information to another watch** and more....

With MESH ESPNOW protocol, each watch can talk to another, sometimes over hundreds of meters : you can build your private long range messaging system outside cellular networks...

You can switch **your watch to be an access point, a web server** so any one can connect to grab information (a watch business card concept...)

And of course, you have guessed already, this watch can tell you the time !

Schematic diagrams

The watch is composed of 2 PCBOARD.

The Motherboard with the following main components

- TP4054 "Battery_Management:MCP73831-2-OT"
- CP2104 "Interface_USB:CP2104"
- DS3231MZ "Timer_RTC:DS3231MZ"
- ME6211C33M5G-N "Regulator_Linear:TLV70033_SOT23-5"
- ESP32-PICO-D4 "RF_Module:ESP32-PICO-D4"

The mother board has been designed to keep the most important watch components on the main PCB. Doing this, it allow the re-use of the mainboard for other watch projects with a limitation of production costs. It is also a feature to reduce the costs of watch enclosure design, should further versions be produced. The sandwich design is also there to keep the battery in place between the 2 boards.

The mainboard has the following functions

- WIFI, MESH, ESP Now and BlueTooth capabilities for connection to the internet or to the smartphone or to a network of neighborhood watches.
- ESP32 Computing power and compatibility with ARDUINO IDE and PYTHON
- A Real Time clock to keep the time while the watch is in power saving mode
- A vibration motor for interaction with the owner
- All the necessary modules to handle lipo battery charging and battery voltage regulation

There is also an onboard PCB Antenna 4 buttons and a small vibration motor.

The Sisterboard with the following components

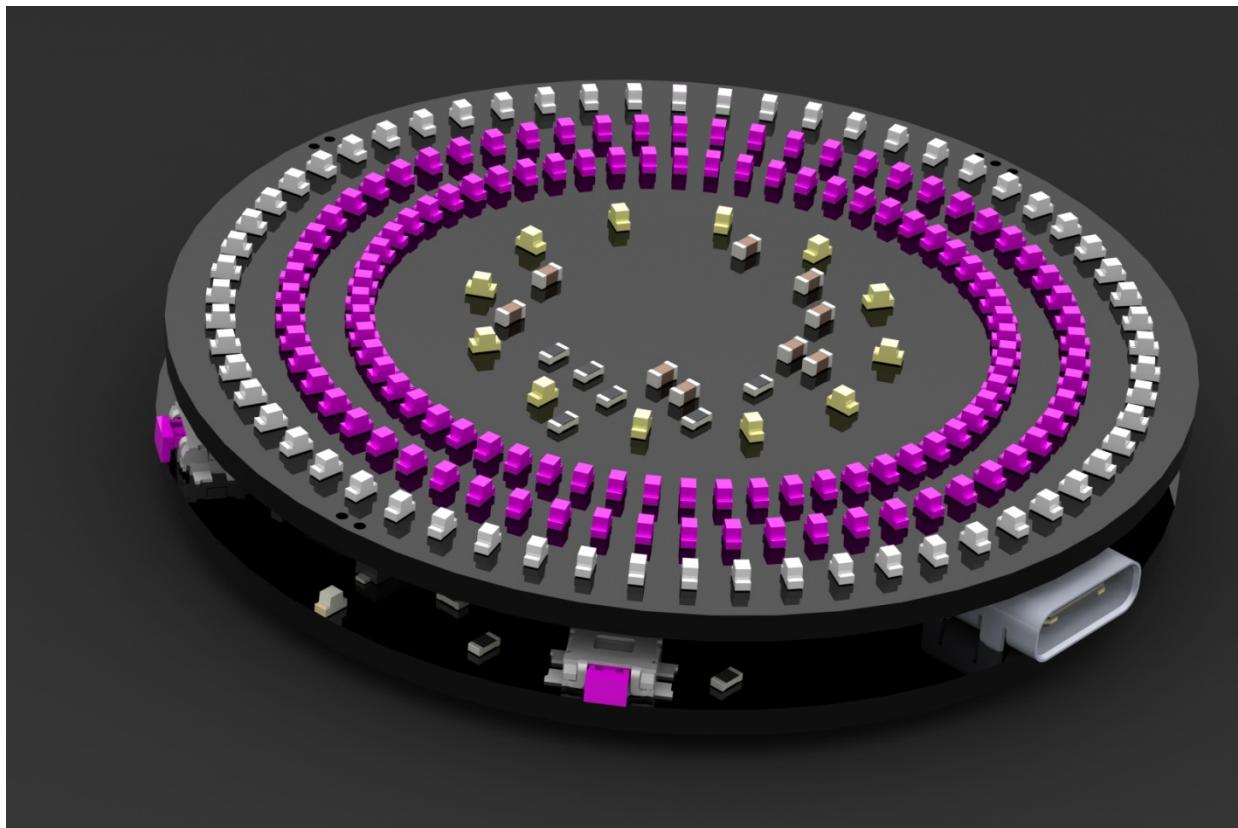
- A IS31FL3733-TQ LED Matrix IC2 controller
- A collection of 192 units of 603 LED

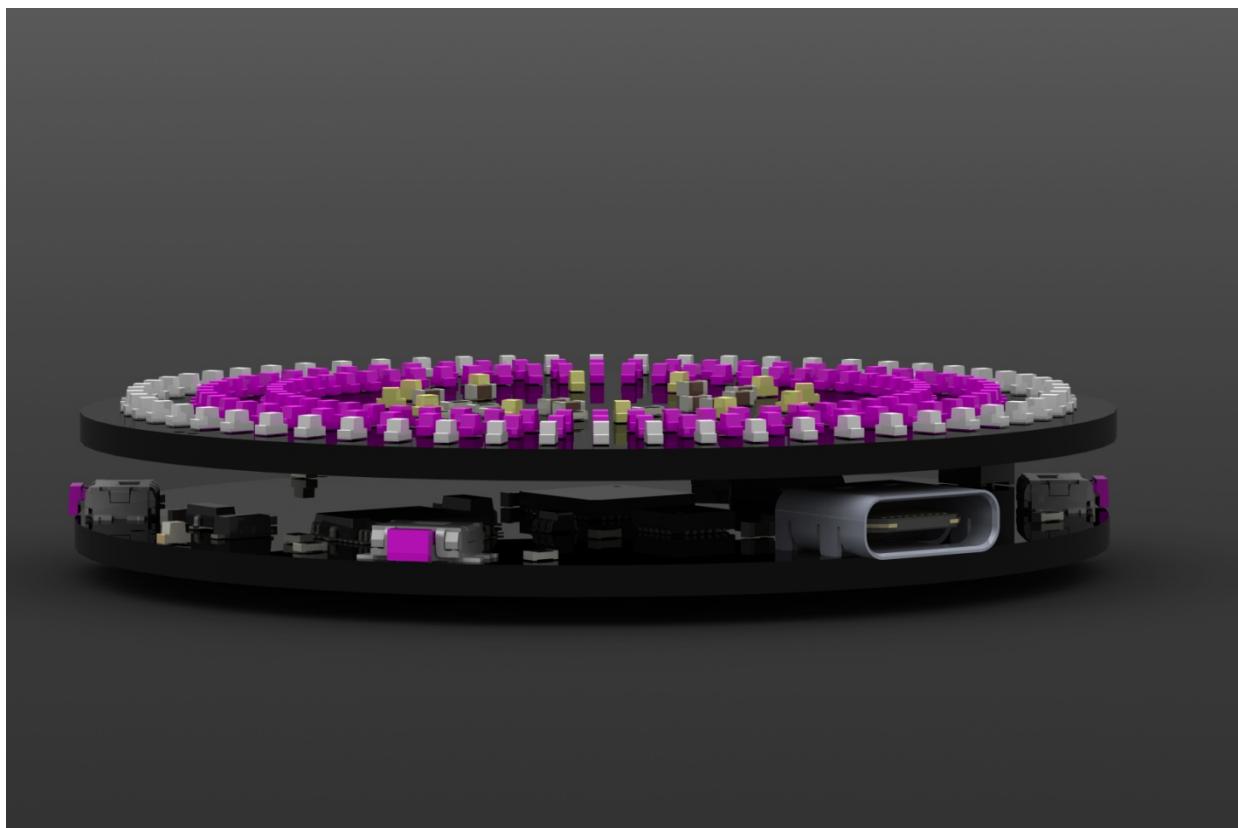
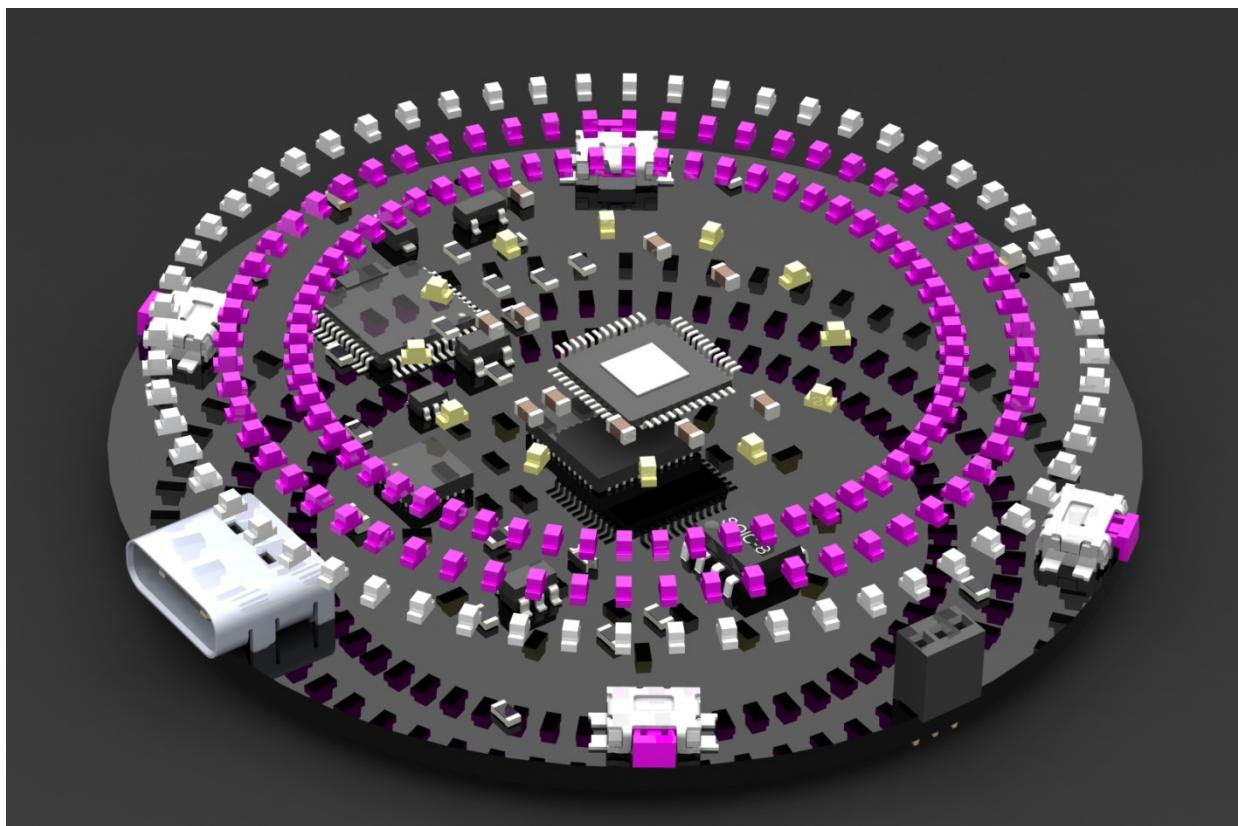
The sister board is connected to the main board via 1.27 pin headers. The watch has been designed in 2 parts on purpose. It allows the creation of different sister boards with new LED graphics (animals, various shapes and ideas) keeping most of the important electronic design unchanged on the main board. It allows the creation of a collection of swappable sister board customer may purchase or design in a second time, extending the life of the product. It is also possible to design additional sister board with IPS displays, Oled etc

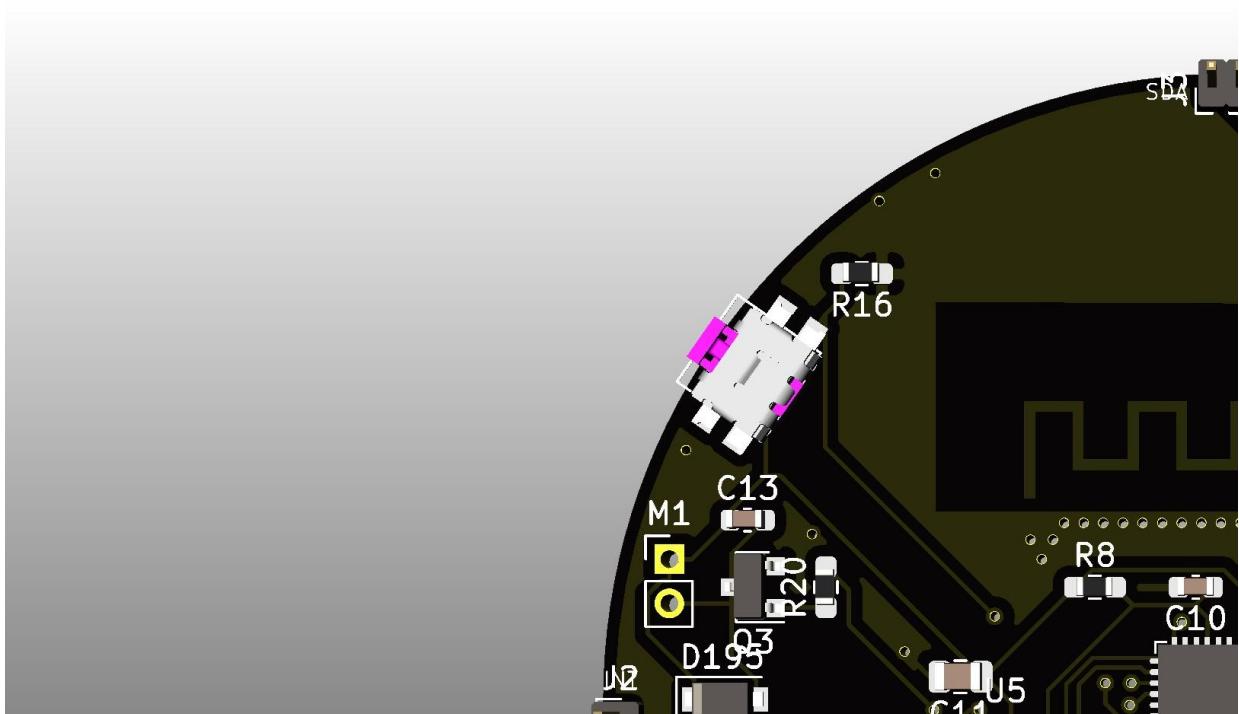
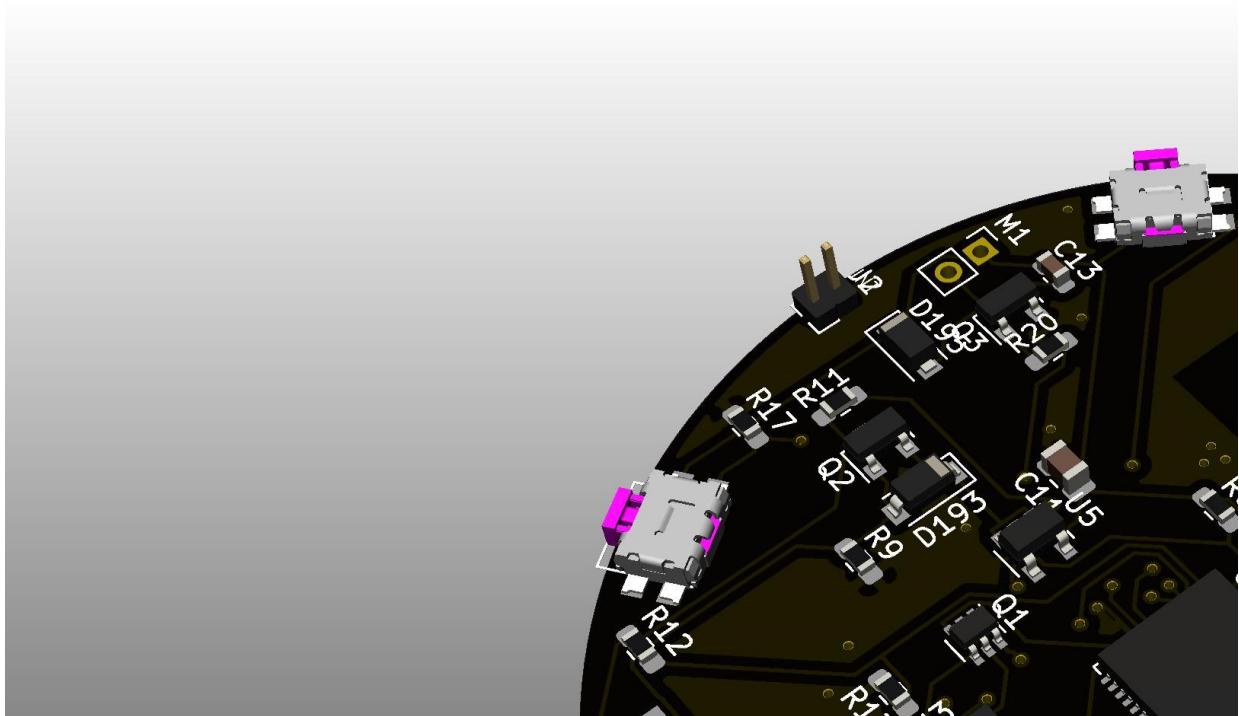
The sister board has the following functions

- I2C communication to talk to the IS31FL3733-TQ LED controller
- 192 LED which can be independently managed

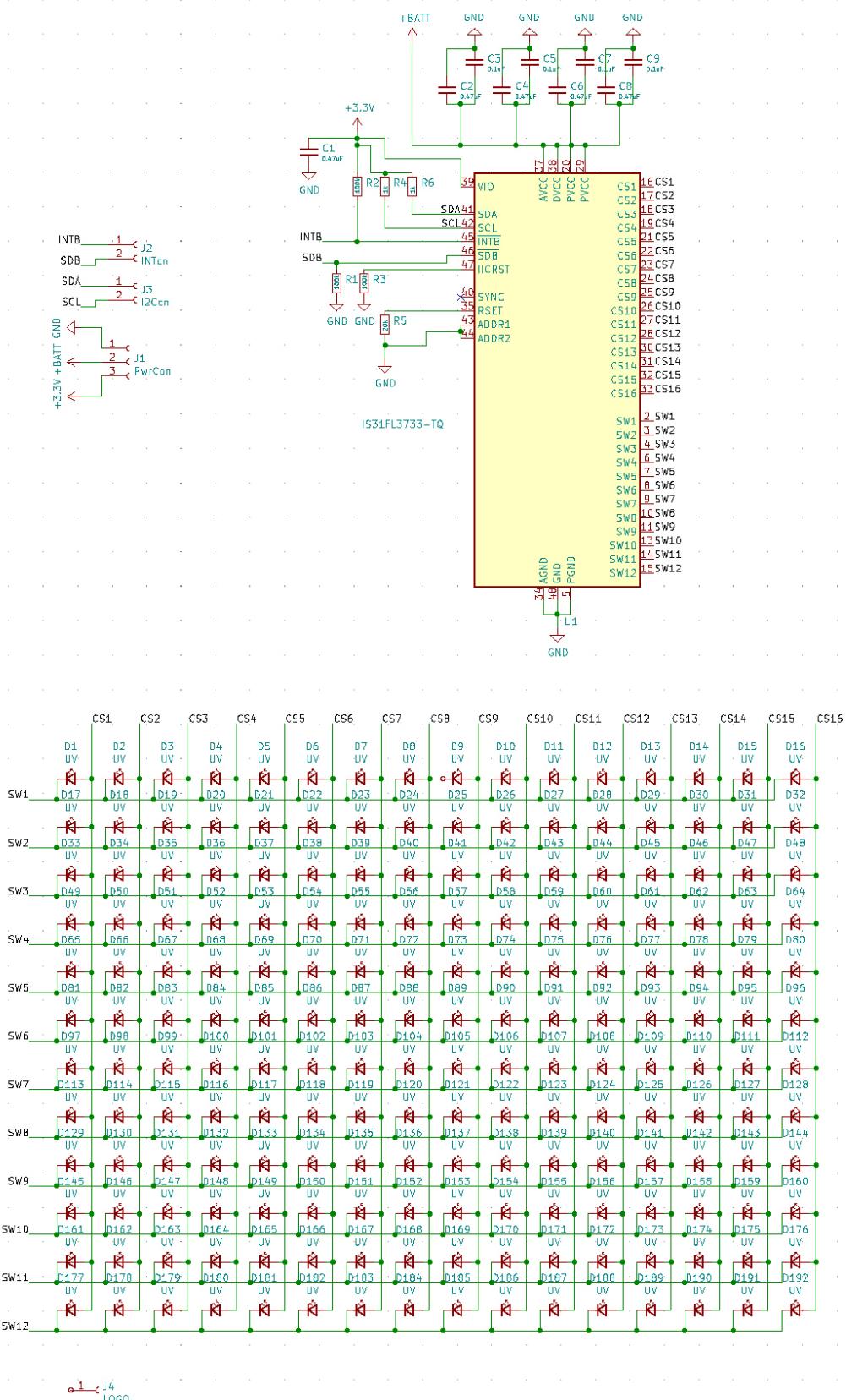
Preliminary DESIGN (Subject to improvement)







LED SISTER BOARD



WATCH MOTHER BOARD

