

ankiDB™ Micro

ankiDB™ Micro is hardware and firmware optimized for sensors and networking.

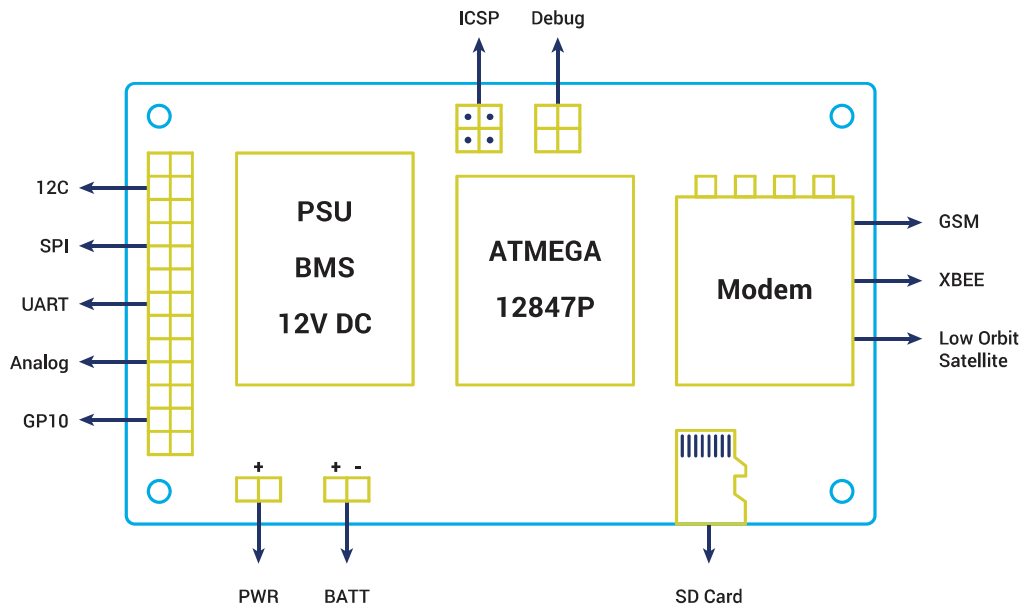
The ankiDB micro stack comprises of hardware nodes and routers and firmware. The ankiDB micro provides hardware nodes for industrial and off-grid sensor data capture.

ankiDB micro stack provides a low power optimized firmware stack to run on ankiDB micro hardware. The user does not have to write code to use the hardware. we provide data capturing and communication support out of the box. Users can configure the nodes and routers using a hyper terminal to take care of different sensors and networking setup requirements.

The specifications of ankiDB micro hardware is given below:

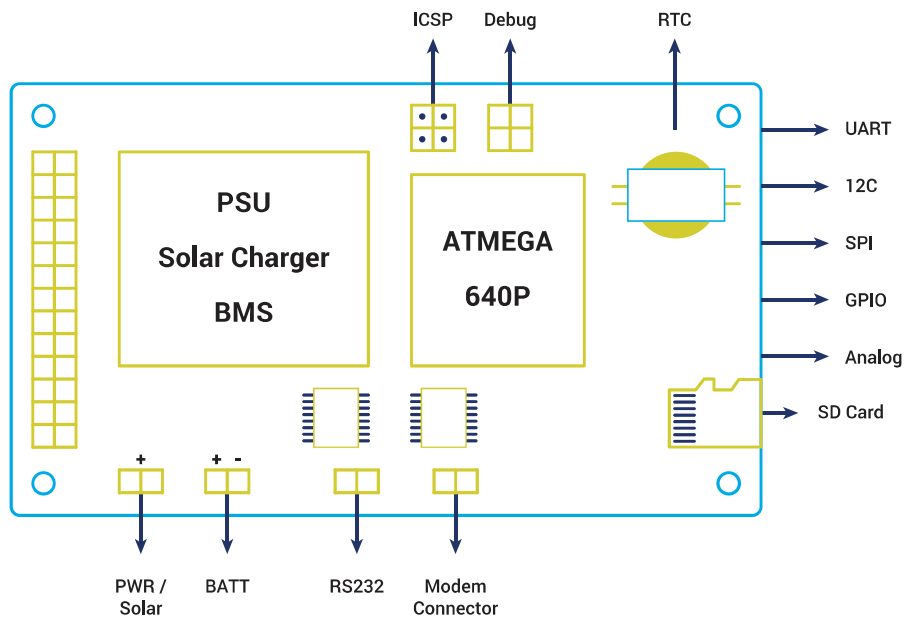
[Schematic]

Solar Node



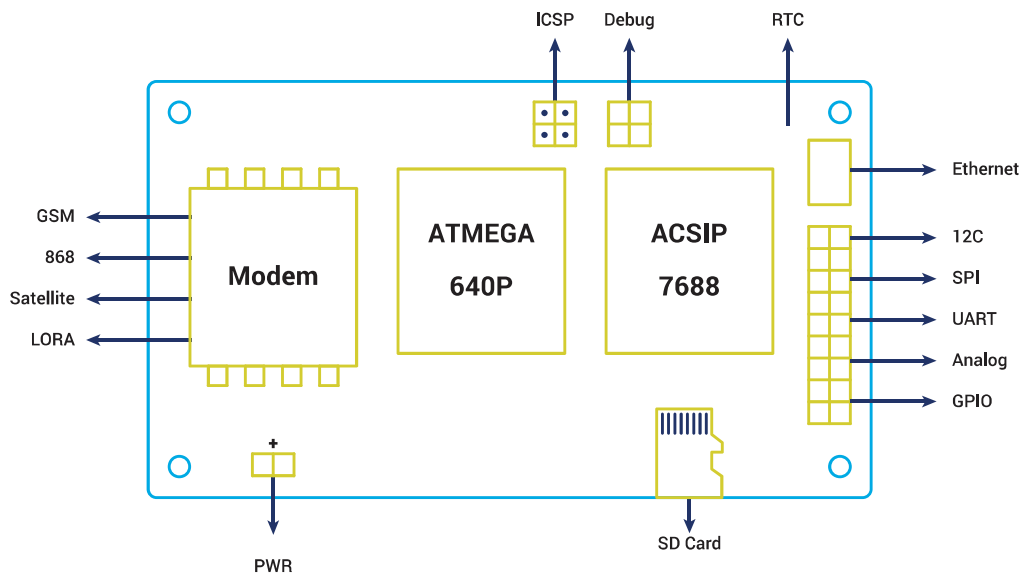
[Image Caption]

Solar Router



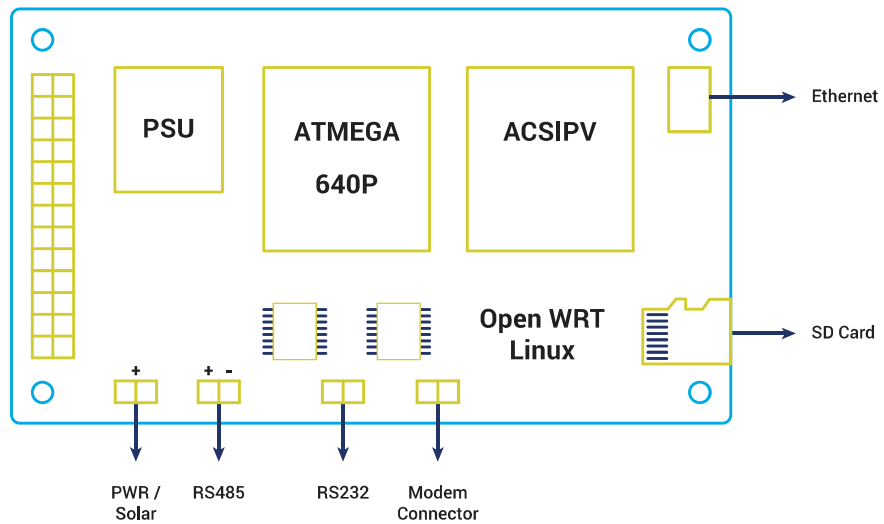
[Image Caption]

Industrial Node



[Image Caption]

Industrial Router



[Image Caption]

Hardware Support

ankiDB micro firmware is optimized for quick sensor interfacing and networking. The firmware provides support for AVR MCU and MEDIATEK 7688 MPU. The AVR MCU code is developed on top of AVR libc and we provide bootloader, watchdog and power-on-reset (POR) support. We provide a hardware abstraction layer that implements support for UART, I2C, ADC, SPI as well as providing drivers for peripherals.

The ankiDB hardware can be configured using a hyper terminal and to support writing variables to hardware, we provide EEPROM support. The libraries also provide large number of sensor and peripheral drivers as well as networking support. The HAL layer takes care of register access and interacting with the microcontroller and peripherals at the lowest level so application programming can be done by just switching the target CPU.

The pin mapping for different SKU are provided via board files that are invoked at compile time. that maps different ports and pins to named constants. This allows ankiDB micro to support multiple hardware configurations without writing different programs for different configurations. We include support for bootloaders to allow firmware update on UART.

The support for creating data files for logging is provided by SDBFS (Storage disk Block File system), a record-oriented file system modeled on Digital RT11 that includes out of the box synchronization support with ankiDB cloud. The library provides an RTC (PCF2127) for timestamping.

Networking

ankiDB micro provides drivers for GSM, 868 radio, Wi-Fi and ethernet. ankiDB micro includes drivers for Telit GL865 modules for GPRS and SMS support. The nodes and routers can use Telit modem to connect and send data on http networks. The library provides support for low power mode (halt after each request), continuous mode (connect and send a burst of data) as well as normal mode (send a data point every 5 minutes). The support for long range sub Giga Hz communication is provided by drivers for DIGI868 modules. There is support for low throughput (10k) and long range and high throughput (80k). The library supports making both star and mesh networks.

We provide RS485 MODBUS as well as Ethernet for wired communication. The hardware SKU have standard modem interface that provides V(in), RESET and Rx, Tx lines. This makes it easy to integrate other Radio modems in our SKU.

Low Power Optimization

Yuktix ankiDB nodes and routers are power optimized. We provide nodes that can operate on batteries for years. The hardware does the sensing and then goes to deep sleep, conserving power. It wakes up to transmit and the cycle repeats. The ankiDB micro nodes come with a provision of battery and charging. This makes them ideal for off-grid and remote location deployments where human supervision would be hard to provide.

Configuration Tool

ankiDB micro nodes and routers support configuration via a command line. No extra hardware is required for configuration and you just need to connect to a standard UART port using a hyper terminal. Thus, using a standard windows laptop and cable, you can configure settings like upload frequency, serial numbers and destination address. There are also commands to query the nodes and get data about operation. This allows for easy debugging and configuration of the units in the field.

OpenWRT and Python SDK

ankiDB provides support for Wi-Fi and Ethernet using OpenWRT, a Linux operating system targeting embedded devices. OpenWRT is also used by most of the commercial home routers and provides excellent support for complex networking needs. The routers and nodes running OpenWRT provide high level application support using Yuktix python SDK. The python SDK can collect data using pyserial and ethernet, provides local storage support using MySQL and email and SMS integration. The routers can be configured using a web interface.

Cloud Integration

The ankiDB micro hardware is part of a plan to remove data silos and bring the information on the network. The ankiDB micro hardware can communicate directly to the cloud or to the nearest ankiDB routers. The routers in turn connect to the cloud. We provide easy ways to receive the data collected from ankiDB micro. You can use ankiDB cloud or instruct the ankiDB cloud to send data to a machine of your choice via our push gateway. Integration with other applications are possible using both push and pull technologies. We provide REST API for easy integration.