



Blackthorn

Blackthorn is our most versatile, small form factor technical operations capability platform providing operators a single board solution for a myriad of rapidly evolving mission requirements. Blackthorn can be tailored to meet operational requirements by programming the device directly through USB with the Arduino IDE (Integrated Development Environment) or any professional IDE (requires separate JTAG programmer). Blackthorn is completely developed and manufactured in the USA through approved vendors and sources.

Programming Methods

Turnkey

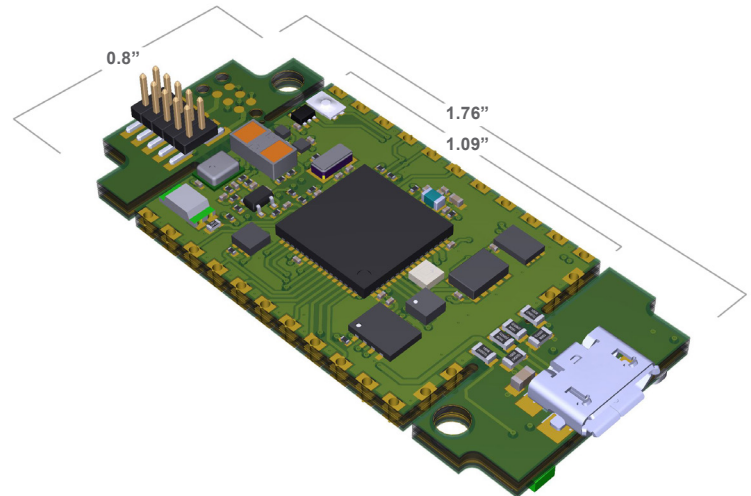
TAG will provide a mission ready, pre-programmed board that is customized by TAG's in-house engineers and thoroughly tested to meet individual customer specific mission requirements.

Arduino IDE

Blackthorn is pre-loaded with an Arduino compatible bootloader that allows developers and users to customize the firmware through the use of the popular Arduino IDE and a standard USB cable, minimizing the number of tools needed for development. Firmware customizations utilizing this method are only limited by the capabilities offered through the Arduino IDE. After code has been verified and tested, the USB interface is easily removed from the main board to minimize the overall size of the board and prevent access to the programming interface.

Bare Metal Programming

Advanced developers can unlock the full potential of the ARM Cortex-M4F processor by utilizing their professional IDE of choice (Atmel Studio, MPLAB, Visual Studio, etc.) along with a standard JTAG programmer for developing bare metal firmware to minimize power consumption and optimize task operation efficiency. This method of programming utilizes the 10-pin JTAG header, which can be easily removed from the main board to minimize the overall board size and also prevent access to the programming interface once the code has been verified and tested.



Features

- ▶ **Operating Voltage:** 5 - 16 VDC
- ▶ **Output Supply:** 3.3V output for providing up to 500mA for external peripherals
- ▶ **Processor:**
 - 32-Bit ARM® Cortex®-M4F operating at 120MHz
 - Program Memory: 512KB Flash
 - SRAM: 192KB
 - Peripherals: SPI, I2C, UART, I2S, ADC, DAC, PWM
- ▶ **Input Power Connections:**
 - USB Micro B Connector
 - Edge Mount Castellations (0.1' pitch spacing) for Direct Solder Connection
- ▶ **Onboard Sensors:** Ambient Light Sensor, Hall Effect Sensor, MEMS Microphone, Real Time Clock (w/ battery backup), 3-Axis Accelerometer, RGB LED, Tact Switch, Laser Distance Sensor, Micro SD Socket, Crypto Authentication IC, 16Mb External Flash
- ▶ **Dimensions:**
 - 1.76" x 0.8" x 0.34" (With Headers)
 - 1.09" x 0.8" x 0.16" (Without Headers)

Sensors

ALS (Ambient Light Sensor)	<ul style="list-style-type: none"> ▶ Measures the intensity of light present and outputs an analog voltage value ▶ Operation Example: Control a device on/off or detect tampering based upon the presence or absence of light
MEMS Microphone	<ul style="list-style-type: none"> ▶ Provides an analog voltage value based on the audio amplitude levels present at the microphone port ▶ Operation Example: Wake up processor from deep sleep and perform an action when audio amplitude level exceeds programmed threshold
HES (Hall Effect Sensor)	<ul style="list-style-type: none"> ▶ Outputs a logic high or low signal based on the presence/absence of a magnet ▶ Operation Example: Can be embedded inside a host door or enclosure and used to detect when the host has been opened based on the proximity of a nearby magnet
RTC (Real Time Clock)	<ul style="list-style-type: none"> ▶ Provides triggering for a timing-based event ▶ Timing an event can be based upon mission needs or include a power saving deep sleep mode at specific timing intervals
Accelerometer	<ul style="list-style-type: none"> ▶ Digital device capable of measuring up to +/-8G in X, Y and Z axis ▶ Interrupt outputs that can wake processor based on activity, no activity or threshold ▶ Operation Example: Wake up processor and turn on collection equipment when motion is detected. When no activity has occurred for set period of time, turn off collection equipment.
RGB (Red, Green & Blue) LED	<ul style="list-style-type: none"> ▶ User programmable LEDs for visual indicator status ▶ Operation Example: After motion has been detected by the accelerometer, turn on the Red LED for 5 seconds
Tact Switch	<ul style="list-style-type: none"> ▶ Normally open momentary tact switch for user input ▶ Operation Example: Hold the tact switch for 2 seconds to wake up the processor and perform desired actions. Hold the tact switch for greater than 5 seconds to put the processor into low power mode.
LDS (Laser Distance Sensor)	<ul style="list-style-type: none"> ▶ Capable of measuring distances up to 157" (4m) ▶ Operation Example: Detect when an individual passes in front of the device and turn on collection device
Micro SD Socket	<ul style="list-style-type: none"> ▶ Provides removable storage interface for logging sensor data ▶ Operation Example: Log date and time when motion is sensed, or object is detected on laser distance sensor
Crypto Authentication Chip	<ul style="list-style-type: none"> ▶ 256-bit secure key management co-processor ▶ Allows advanced users to configure key based secure access and authentication
Flash Memory	<ul style="list-style-type: none"> ▶ Fast, efficient, non-volatile storage for high speed processing ▶ Operation Example: Non-volatile local storage memory for logging motion detection when data logging on SD card is prohibited



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