

# CRIUS ALL IN ONE PRO v1.0 Multi Rotor Flight Controller

## Manual rev 1.1



### **Features:**

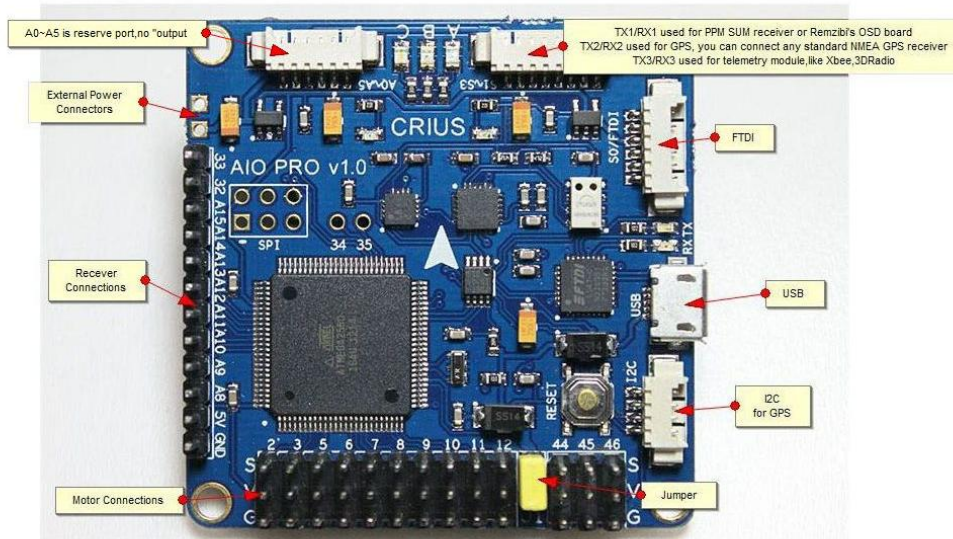
- Supported MegaPirateNG and MultiWii firmware
- Up to 8-axis motor output
- 8 input channels for standard receiver
- 4 serial ports for debug/Bluetooth Module/OSD/GPS/telemetry
- 2 servos output for PITCH and ROLL gimbal system
  - A servos output to trigger a camera button
- 6 Analog output for extend device
- A I2C port for extend sensor or device
- Separate 3.3V and 5V LDO voltage regulator
- ATMega 2560 Microcontroller
- MPU6050 6 axis gyro/accel with Motion Processing Unit
- HMC5883L 3-axis digital magnetometer
  - MS5611-01BA01 high precision altimeter
  - FT232RQ USB-UART chip and Micro USB receptacle
- On board logic level converter
- Match the standard of RoHS

### **Flight mode for Multiwii**

- One of the following basic mode
  - Acro
  - Level
  - Alt Hold
  - Head Lock
- Optional mode
  - HeadFree (CareFree)
  - GPS Hold (Need GPS receiver or Extend Board)
  - GPS Back to home position (Need GPS receiver or Extend Board)

### **Flight mode for MegaPirate**

- Acro
- Alt Hold
- Simple
- Loiter (uses GPS)
- Guided (uses GPS)
- Position (uses GPS)
- Circle (uses GPS)
- RTL (uses GPS)
- Auto(uses GPS)
- Follow Me(uses GPS)



### Motor connection

- MultiWii : D2/D3/D5/D6/D7/D8/D9/D10
- MegaPirateNG: D2/D3/D5/D6/D7/D8/D11/D12

External Power: if you don't power it by the BEC from the ESC Also needed to power Expansion Board.

- cam pitch = input from RX
  - cam roll = same
  - aux4= same (aux port 1-4 u can see in the MultiWii config tool on PC)
  - aux3= same (aux port 1-4 u can see in the MultiWii config tool on PC)
  - aux2= same (aux port 1-4 u can see in the MultiWii config tool on PC)
  - aux1= same (aux port 1-4 u can see in the MultiWii config tool on PC)
  - yaw = input from RX
  - pitch = input from RX
  - roll = input from RX
  - throttle = input from RX
  - 5v = so the RX gets power
  - gnd= ground
  - trigger 9 = to trigger the cam if needed
  - echo 10 = optional echo ultrasonic sensor (??)
  - 2x Motor out 11, 12 (where do i put which motor????)
  - 5v bridge, jumper (if you power it by the BEC from the ESC this must be closes)
  - pitch 44 = for the CAM Gimbal system
  - roll 45 = for the CAM Gimbal system
  - trigger 46 = another trigger
- D9/D10 is sonar sensor port when you use MegaPirateNG firmware

### I2C port

(scl, sda, 5v, gnd) = this is the for expanding like Gps.

### S0/FTDI

(gnd, gnd, 5v, rx0, tx0, dtr) = can be connected a bluetooth module or standalone FTDI cable(if the USB on board is broken)

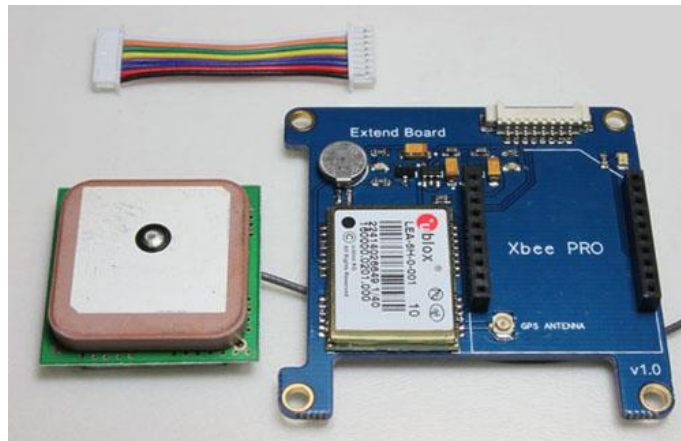
### S1-S3

(tx1, rx1, tx2, rx2 tx3, rx3, vcc, gnd) = TX1/RX1 used for PPM SUM receiver or Remzibi's OSD board  
 TX2/RX2 used for GPS, you can connect any standard NMEA GPS receiver  
 TX3/RX3 used for telemetry module, like Xbee, 3DRadio etc

### A0-A5

A0-A5 is reserve port, no "output"

## Extend Board for ALL IN ONE PRO



### Features:

- Included U-blox LEA-5H GPS Module and Xbee socket. ( Been advise this will now be LEA-6H GPS module)
- Working with AIO PRO FC, provides full UAV functionality.
- 2 separated 3.3V LDO voltage regulator
- 25X25mm active GPS antenna with 200mm cable



Extend Board connects to S1-S3 port

### Please note:

The extended board must be powered via external power pins on the main board and the yellow jumper is to be removed.

# Software code changes for Multiwii and Megapirate

## Multiwii

add this code to def.h in MultiWii 2.0 or later version after

```
/*  
*****  
***** IMU Orientations and Sensor definitions *****  
*****  
*/
```

//please submit any correction to this list.

```
#if defined(CRIUS_AIO_PRO_V1)  
#define MPU6050  
#define HMC5883  
#define MS561101BA  
#define ACC_ORIENTATION(X, Y, Z) {accADC[ROLL] = -X; accADC[PITCH] = -Y; accADC[YAW] = Z;}  
#define GYRO_ORIENTATION(X, Y, Z) {gyroADC[ROLL] = Y; gyroADC[PITCH] = -X; gyroADC[YAW] = -Z;}  
#define MAG_ORIENTATION(X, Y, Z) {magADC[ROLL] = X; magADC[PITCH] = Y; magADC[YAW] = -Z;}  
#define MPU6050_EN_I2C_BYPASS // MAG connected to the AUX I2C bus of MPU6050  
#undef INTERNAL_I2C_PULLUPS  
#endif
```

then add this to "boards and sensor definitions" in config.h

```
#define CRIUS_AIO_PRO_V1 // Crius Multiwii AIO PRO v1.0
```

## Megapirate

These settings are all in APM\_Config.h you will see this tab when you load the Attitude.pde file in the MegaPirateNG/ArduCopter folder.

```
// Select your sensor board  
#define PIRATES_SENSOR_BOARD PIRATES_FREEIMU_4  
/*  
PIRATES_ALLINONE  
PIRATES_FFIMU  
PIRATES_FREEIMU  
PIRATES_BLACKVORTEX  
PIRATES_FREEIMU_4 // New FreeIMU 0.4.1 with MPU6000, MS5611 and 5883L  
PIRATES_DROTEK_10DOF_MPU // MPU6000, MS5611 and 5883L  
*/
```

```
// Select your baro sensor  
#define CONFIG_BARO AP_BARO_MS5611_I2C  
/*  
AP_BARO_BMP085_PIRATES  
AP_BARO_MS5611_I2C  
*/
```

```
// For BlackVortex, just set PIRATES_SENSOR_BOARD as PIRATES_BLACKVORTEX, GPS will select automatically  
#define GPS_PROTOCOL GPS_PROTOCOL_AUTO  
/*  
GPS_PROTOCOL_NONE without GPS  
GPS_PROTOCOL_NMEA  
GPS_PROTOCOL_SIRF  
GPS_PROTOCOL_UBLOX  
GPS_PROTOCOL_IMU  
GPS_PROTOCOL_MTK  
GPS_PROTOCOL_HIL  
GPS_PROTOCOL_MTK16  
GPS_PROTOCOL_AUTO auto select GPS  
GPS_PROTOCOL_UBLOX_I2C  
GPS_PROTOCOL_BLACKVORTEX  
*/
```