Differences Between IMU6410, IMU6420 and IMU8420

The IMU6410 was SOC Robotics first integrated 10DOF IMU Data Logger that initially didn't support logging to uSD, ANT/ZigBee wireless communication or optional high performance MS5611 barometert. The SDANT10 daughter card added these missing features.

With the introduction of the IMU6420 Lithium Polymer battery support with on board charger was added and the SDANT10 features were built on to a single board eliminating the need for the daughter card creating a more compact and reliable platform. The IMU6420 also changed a few expansion port pins to allow hardware PWM support enabling use of this board to control a UAV, gliding craft or similar devices. The external serial flash chip was also dropped.

The IMU8420 was a major upgrade with a new high performance AVR32 32 bit processor allowing a sophisticated Extended Kalman Filter to run in real time on the platform due to the processors hardware floating point unit. The EKF was a collaborative development between SOC Robotics and researchers at Simon Fraser University. The AVR32 also brought significantly faster logging performance while the on chip AST increased real time clock precision with usec resolution so the time stamp is now output to the nearest 100useconds (this can be reduced).

IMU6410	ATmega1284P	11.0592MHz	8 bit CPU
IMU6420	ATtmega1284P	11.0592MHz	8 bit CPU
IMU8420	AT32UC3C2512	64MHz	32 bit CPU

Feature	IMU6410	IMU6420	IMU8420
Processor	Atmega1284P	Atmega1284P	AT32UC3C2512
Type	8 bit	8 bit	32 bit
Clock Rate	11.0592MHz	11.0592MHz	64MHz
Hardware FPU	No	No	Yes
AST Clock (14usec)	No	No	Yes
Flash	128K	128K	512K
RAM	16K	16K	64K
EEPROM	4K	4K	0K
Serial Flash	1Mx8	0M	0M
uSD	Yes	Yes	Yes
Accelerometer	ADXL345	ADXL345	ADXL345
Gyrocompass	L3GD20	L3GD20	L3GD20
Magnetometer	HMC5883	HMC5883	HMC5883
Barometer	BMP085	BMP180 or MS5611	BMP180 or MS5611
LiPo + Charger	No	Yes	Yes
AA battery	Optional	Optional	Optional
EKF	No	No	Yes
HVR	No	No	Yes
Wireless	Yes	Yes	Yes
A/D	10 bit/8 Ch	10 bit/8 Ch	12 bit/8 Ch
D/A	No	No	12 bit/2 Ch
Serial Ports	1	1	3
Hardware PWM	No	Yes	Yes

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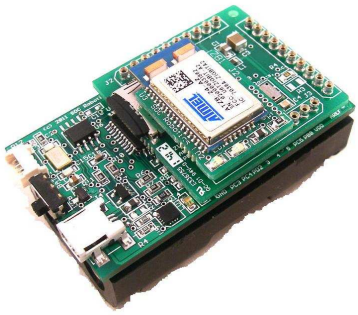
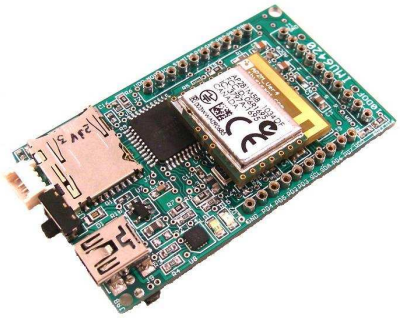
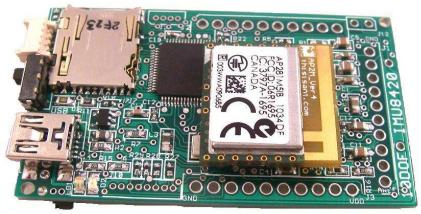
The IMU8420 processor has a number of important features that currently are not implemented but will be in future IMU Data Logger software releases. The processor has a DMA engine that significantly speeds up logging to uSD as the current software does not use DMA. The large on chip SRAM will allow logging of very high speed short duration events (burst logging) such as measuring acceleration at 3000Hz for short time periods. Combining the on chip event subsystem with the 1msample/sec 12 bit A/D allows the IMU to log ultra fast analog events.

With the introduction of Version 1.00 IMU Data Logger software ZigBee wireless support is fully integrated allowing wireless control of the data logger along with additional logging features on the IMU8420. The EKF cycles in 1.84msec while sensor acquisition takes 900usec giving a real time maximum cycle rate of just under 3msec. The EKF produces roll, pitch and yaw in real time that can now be logged along with all the sensor data. Version 1.00 also fixed a clock error with the IMU6410 and IMU6420. See the Version 1.00 release notes for additional information on each device.

Now that the IMU8420 calculates roll, pitch and yaw in real time it can be used as a motion stabilization controller with the addition of a three-axis motion control daughter card (which is in the works) or by having it control one of our other motion control boards like GenX or GenX32.







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