Project Apex II - Technical Design Document

Custom Data Format

We have the following data available to the flight computer via various sensors etc, that we will transmit via telemetry:

- Number of GPS satellites in view
- ADC channels (4)
- Temperature sensors (2+)
- Ionising Radiation Detector count (2)
- Photodiode/light (1)
- RSSI (1)
- Humidity (1)

We are using the standard UKHAS format for the main telemetry packets:

\$\$<CALL SIGN>,<COUNTER D>,<TIME HH:MM:SS>,<LATITUDE DD.DDDDDDD>,<LONGITUDE
DD.DDDDDD>,<ALTITUDE METRES MMMMM>,<O SPEED KM/H DDDD.DD>,<O BEARING DDD.DD>,<O
TEMPERATURE INTERNAL C D.DD>,<O TEMPERATURE EXTERNAL C D.DD>,<O TEMPERATURE CAMERA C
D.DD>,<O BAROMETRIC PRESSURE hPa(millibars)>,<O CUSTOM DATA>*<CHECKSUM><NEWLINE>

Given this, we will use the following format for the Apex II telemetry:

\$\$APEX,<TICKS>,<TIME>,<LAT>,<LON>,<ALT>,<SPEED>,<BEARING>,<SATS>,<INT_TE MP>,<EXT_TEMP>,<ADDITIONAL_TEMP(S)>,<PRESSURE>,<BATT_VOLTS>,<ADDITIONAL ADC(S)>,<IRD_1>,<IRD_2>,<PD_FREQ>,<PD_CONF>,<HUMIDITY>,<RSSI>

Formatting

- TEMP: Temperatures in degrees C. Variable length decimal floating points, fixed at two decimal places (xx.xx)
 - o Internal
 - External
- ADC: Raw reads **only**, **12bit** words. Transmit as **fixed length hex** (0x0000 0xFFFF)
 - o Pressure
 - Battery voltage
- IRD: 16bit word. Transmit as fixed length hex (0x0000 0xFFFF)
- PD FREQ: 16bit word, transmit as fixed length hex (0x0000-0xFFFF)
- PD CONF: **16bit** word, transmit as **fixed length hex** (0x0000-0xFFFF)
 - Each hex digit is 2bits GAIN, 2bits CHANNEL
 - o One hex character is like ccgg, where c = channel and g = gain
- HUMIDITY: Time in seconds, 16bit word, transmit as fixed length hex (0x0000 0xFFFF)
- RSSI: **8bit** ADC read. Transmit as **fixed length hex** (0x00 0xFF)