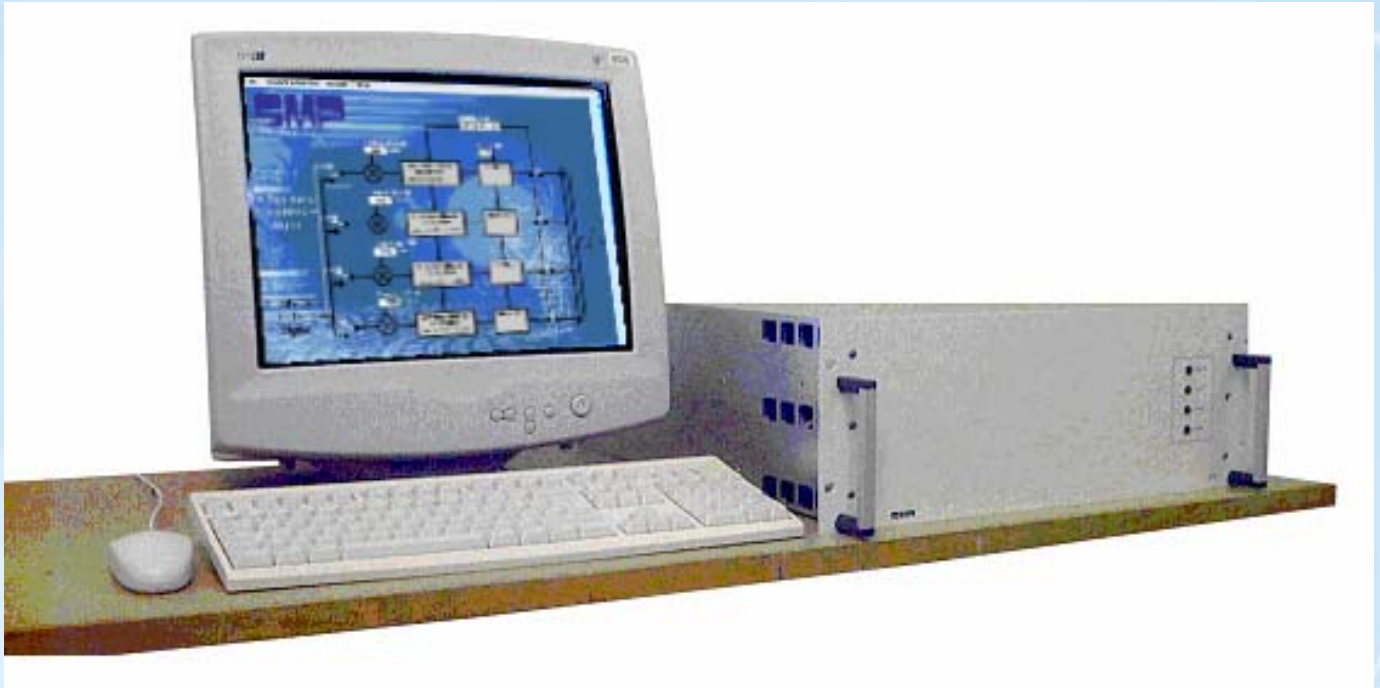# BITGRABBER 2
Radionavigation Digitizer

The **Bitgrabber-2** is a digitizer dedicated to radionavigation applications: GALILEO, GPS, GLONASS, COMPASS, QZSS.

The Bitgrabber-2 includes 2 RF signal conditioning channels, 1140-1310 MHz and 1550-1610 MHz, that ends into state-of-the-art 10-bit 500 Msps ADCs.

The Bitgrabber-2 provides a high-speed 32-bit LVDS external interface to recorders using a very simple FIFO-like handshake.

The Bitgrabber-2 also includes a 100 Mb buffer which can be used as:
- elasticity buffer between the A/N converters and the recorder,
- storage medium in the stand-alone snapshot mode.

SPECIFICATIONS:

☞ **REMOTE CONTROL**
- – Interface   :   Ethernet
- – Protocol   :   TCP/IP
- – M&C   :   telnet-like ASCII commands and monitoring table
- – GUI interface   :   JAVA applet downloadable using a common HTTP browser
- – Download snapshot-mode interface   :   USB 1.1

☞ **RF CHARACTERISTICS**
- – Input level   :   -55 to -75 dBm
- – Bandwidth   :   1140-1310 MHz @ 1dB (A-band), 1550-1610 MHz @ 1 dB (B-band)
- – Noise factor   : $\leq$ 6 dB
- – Amplitude flatness   : $\pm$ 0.5 dB
- – Group delay variation   : $\leq$ 10 ns (A-band), $\leq$ 20 ns (B-band)
- – AGC mode   :   Automatic / Manual
- – AGC dynamic range   :   20 dB
- – Downconverter phase noise   :

|	
10 Hz	-60 dBc/Hz
100 Hz	-90 dBc/Hz
1 kHz	-105 dBc/Hz
10 kHz	-110 dBc/Hz
100 kHz	-120 dBc/Hz
$\geq$1 MHz	-125 dBc/Hz

☞ **DIGITAL CHARACTERISTICS**
- – ADC nr of bits   :   10
- – ADC sampling rate   :   500 Msps
- – ADC SFDR   :   55 dB
- – Demodulation channel   :   4
- – Frequency shift   : $\pm$ 250 MHz   (100 kHz Step)
- – Bandwidth   :   25, 50 or 100 MHz
- – Quantizer   :   1, 2, 4, 8 bits
- – Multiplexer   :   11 configurations from single channel to 4 channels
- – Internal buffer size   :   100 Mb

☞ **RECORDER INTERFACE**
- – Connector type   :   Hirose DX10BM80s, 80 pins
- – Nr of data bits   :   32
- – Handshake pins   :   8
- – Electrical signalling   :   LVDS
- – Maximum clock rate   :   125 MHz
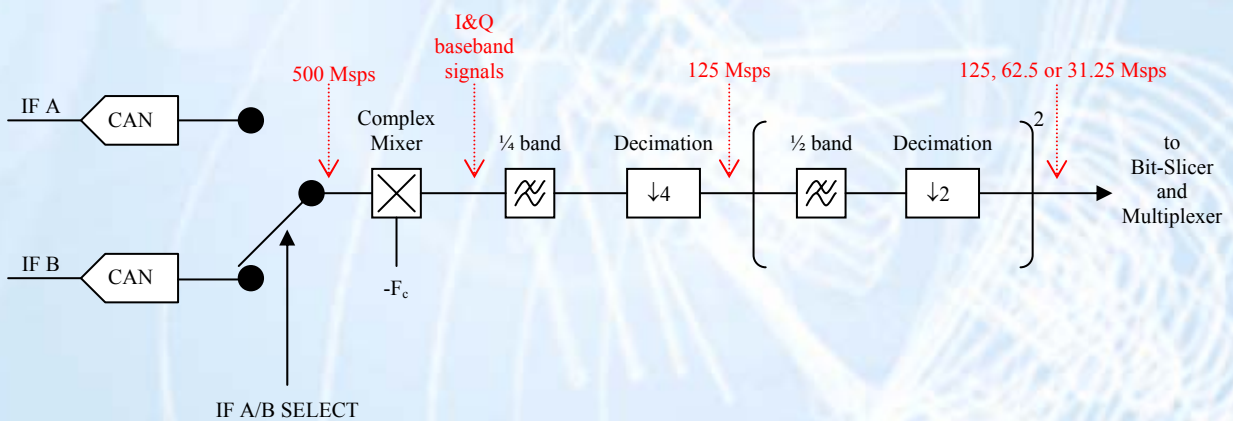- – Maximum throughput rate   :   500 Mb/s

RF PROCESSING:
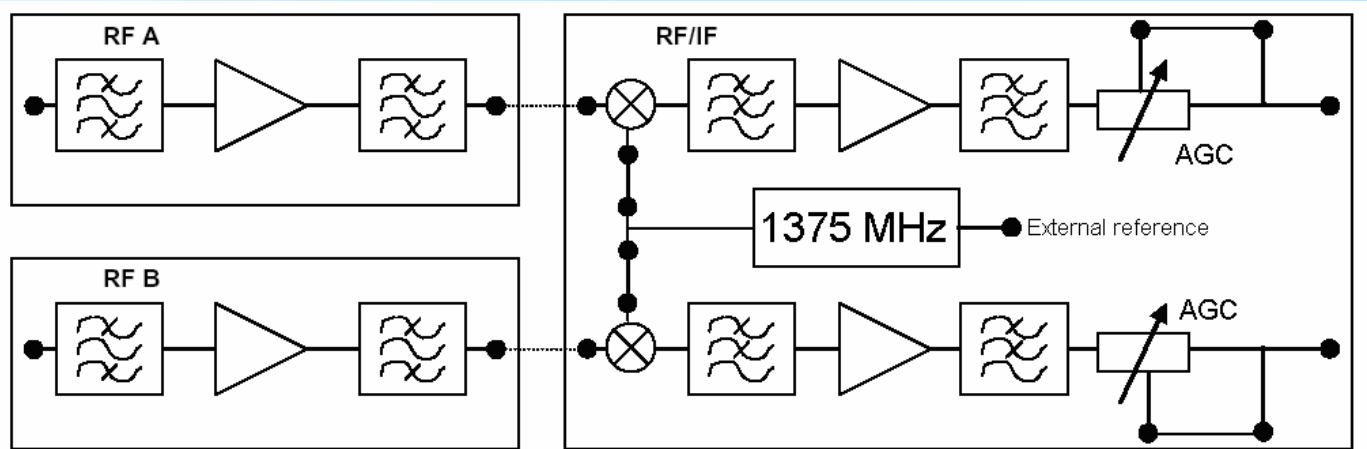
As shown in the block diagram, the RF signals are amplified and filtered before being downconverted in the RF/IF module. It also includes 2 independent AGCs to ensure signal level correction at the ADC input.

Note that RF/IF inputs (RF signals and OL inputs) can be accessed on the unit rear panel.

DIGITAL PROCESSING:

The Bitgrabber-2 FPGA implements 4 independent demodulator (downconverter + band filtering) that can be configured to take their signal input either on the 1140-1310 MHz channel or on the 1550-1610 MHz channel. The signal is digitally downconverted and filtered into a selectable 100, 50 or 25 MHz bandwidth. Then, the quantizer rounds the internal 10-bit signal to 8, 4, 2 or 1 bit data. The 4 demodulation channels are mixed into a 32-bit word format before reaching the buffer memory.

STORAGE MODES:

The Bitgrabber-2 can store data in 2 different modes:

- **Snapshot mode**: the internal 100 Mb buffer is used as storage unit. Data can be downloaded to a PC unit via the USB interface.

- **Continuous mode**: data are sent to the recorder external interface. The internal buffer is used to compensate recorder asynchronisms in the data flow.
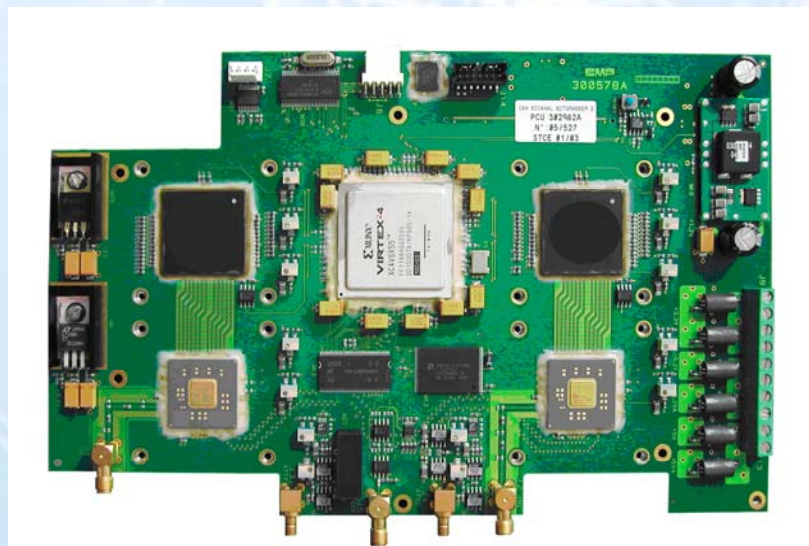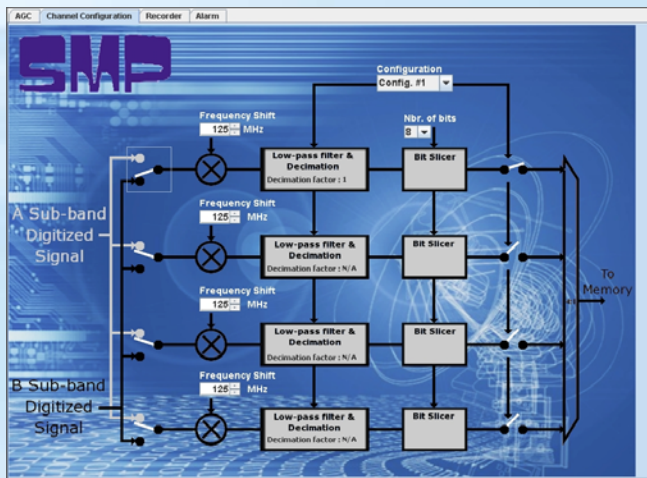
BITGRABBER MODULE VIEWS:
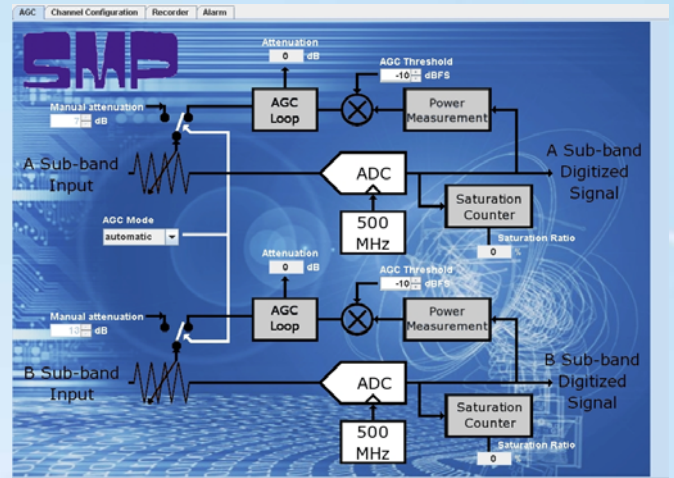

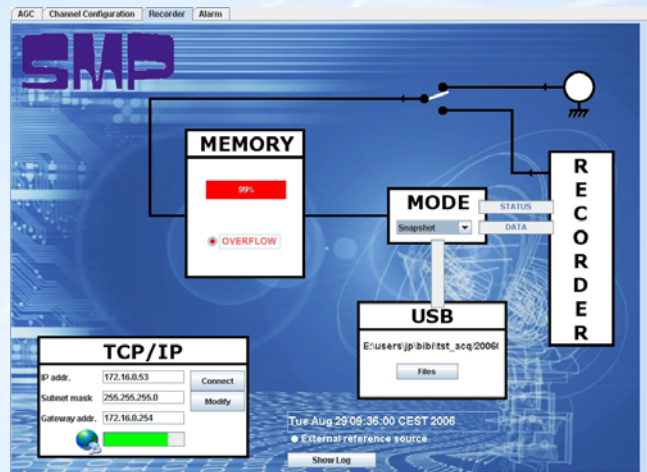*RF board*
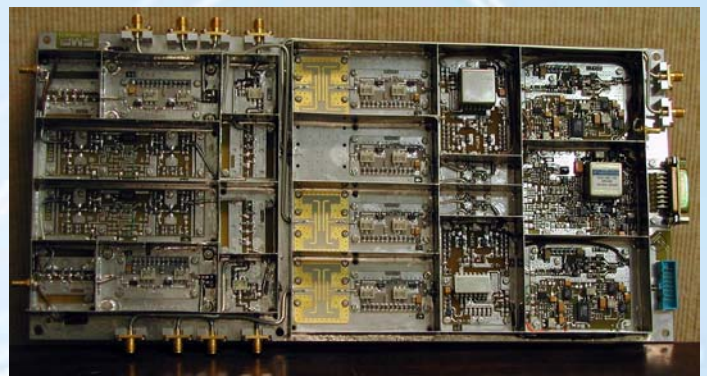
RF/IF board

ADCs and FPGA board

GUI SCREENSHOTS:

Channel configuration window

AGC and ADC control window

Buffer and Recorder Window

OPTIONS:

● LNA
● Antenna
● Customizable recorder interface upon request

ENVIRONMENTAL CONDITIONS	POWER LINE	
● Operating	● Voltage	: 230 V ±10 % / 47 to 63 Hz
– Temperature : 10° C to 40°C	● Power	: ≤ 180 VA
– Humidity : Up to 95 % at 30° C		
● Non operating	PHYSICAL CHARACTERISTICS	
– Temperature : -40° C to 70° C	● Drawer	: 19 inches x 4 U x 530 mm
– Humidity : Up to 95 % at 30° C	● Weight	: ≤ 20 kg