

Product Feature



The Eagle Series are high speed, mobile field measurement instruments that continuously survey all Cellular or PCS Pilot channel signals and report their power profiles.

receiver are phase locked via the GPS 1pps output with the base station transmitter source by using the satellite as a common clock reference. The Super Eagle can be configured to survey continuously all or just specific base stations. Super Eagle scans all 512 base

high-speed driving and fast fade analysis. The architecture is highly parallel, time multiplexed hardware with a pipelined engine that provides its high speed and allows the Super Eagle to capture in real-time co-channel interference and multipath

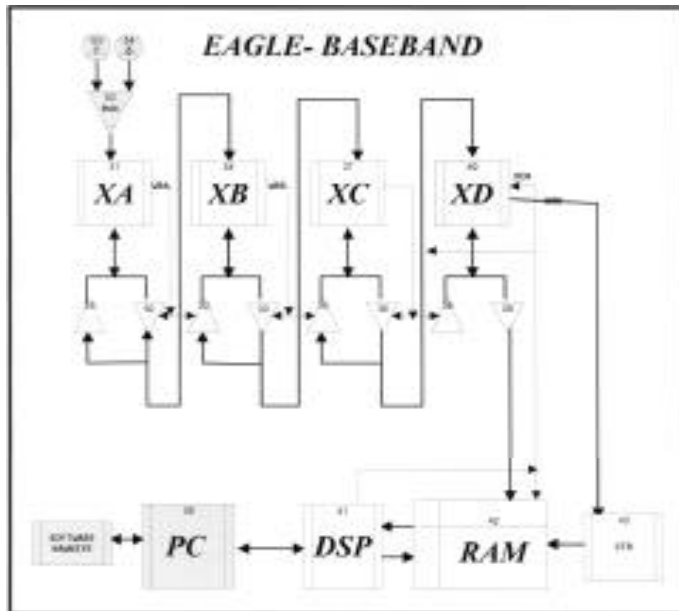


Figure 1. Eagle Series Block Diagram

stations and the associated multipaths in one frame time (27 msec). This provides a fast "snap shot" of all the base stations for accurate information. The output of raw data from the Super Eagle is coupled to Hawkeye, the standard propagation and multipath

The BVS Super Eagle Product Features

The Super Eagle is a CDMA system-independent mobile measurement system that continuously surveys CDMA Pilot channel signals and reports their PN position and power profiles. Both cellular and PCS models are available. Measured profiles indicate the distributions of interference and multipath components as a function of relative power and delay spread. The correlated signal energy (E_c/I_0), RF carrier energy and PN offset positions are provided without any interaction to the base station, allowing users to verify neighbor lists and signal coverage. The system employs a wide-band coherent receiver with an eight-channel GPS to synchronize and track the CDMA signals. The clocking and RF oscillator circuits of the

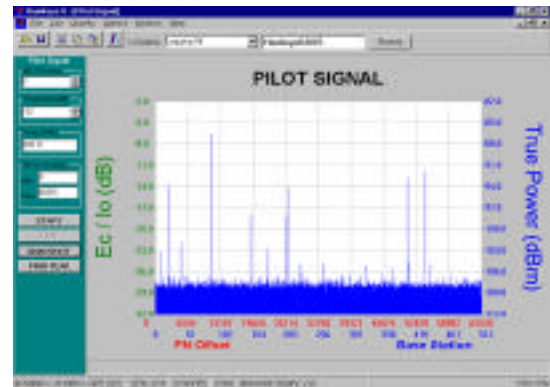


Figure 2. 12 CDMA stations shown: Pilot Scan Output



Figure 3. Top Base Stations shown

fading display software which is included. The standard equipment is configured to comply to IS-95/IS-97 and PCS JED-008 standards.

The main blocks of the Super Eagle are the 1.25 MHz wide RF receiver, 2048 chip digital corre-

lator bank with E_c/I_0 sensitivity of -30dB, a GPS phase lock module, reference clock generator, DSP module and communication control processor. Figure 1. above shows the functional block diagram of the salient elements of the hardware design. In addi-

tion to the CDMA wideband receiver (LNA N.F= 1.6dB), a second narrowband IF is split off the main signal with a high selectivity, tuning the Cellular or PCS frequencies. The synthesized receiver scans 15 ms per channel and also can measure the Received Signal Strength Indicator [RSSI]. The dynamic range of the receiver is -115 to -30 dBm with a 30 kHz bandwidth and better than -50 dB adjacent channel rejection at +30 kHz.

At the front end of the correlator bank, the demodulated in-phase and quad phase baseband signals from the RF modules are sampled by 8 bit ADCs at 16 times the chip rate of 1.2288 MHz. The correlator consists of four banks of ASICs to compute correlation power in parallel with a chip resolution. Each bank consists of two ASICs implementing a bank of 256, 8 bit shift registers to store the last 256 phases of the input, a DSP loadable 256 bit shift register to store PN phases and seventeen 16 bit accumulators to compute correlated power every chip period. The correlators are initially synchronized to GPS. The input samples to correlators are software selectable. Hence, by selecting the first sample for the first bank and the eighth sample for second bank the correlation power resolution will be half chip. With optional add-on boards, resolution of the correlation power can be improved up to 1/16th of the chip. The genlock board extracts the frequency reference for the correlator banks and time reference to DSP card from the 8 channel differential GPS. The DSP card consists of a high speed TI DSP (TMS 320C50 series with 30 nsec instruction time) and a dual UART to download power profiles to the external device.

Hawkeye Software Output

The DSP computes the optimum 256 PN phases and downloads to the PN shift register and continuously reads the correlation power from the ASICs and the timing reference from the genlock board. In a standard unit, the time tags and correlation power above a configurable threshold value are downloaded to through an RS-232 port at up to 115 kbaud. The unit can be customized to interface to any external device for fast or synchronous download of raw data, without any threshold via its internal parallel port.

Applications:

- * Survey Cellular/ PCS Base station Code Domain and Continuous wave power and update base station lists.
- * Computation, setting and regular update of the multipath combining thresholds and hand-off thresholds from the real time data from the Super Eagle.
- * Coverage studies for Cellular and PCS CDMA

systems.

- * Analysis of co-channel interference or multipath components.
- * Data for statistical characterization of multipath propagation and interference for analysis of antenna performance.
- * Identify "Island PNs" (unphased base stations)
- * Channel modeling and analysis of multipath fading.

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