

Technical Summary

The P19800B Spectrometer ASIC digitizes the input and produces an accumulated frequency-domain spectrogram for up to 4GHz bandwidth (span). The ASIC includes a VGA, a 6-bit 8GS/s ADC, a polyphase filter-based FFT, and an accumulator capable of accumulating up to 34 seconds of frequency-domain magnitude. The ASIC also includes an output data interface, a PLL based frequency synthesizer and an SPI interface for the ASIC's control and data interchange at low speed (Fig.1). The chip is offered in a 15x15 pin BGA package (0.8mm pitch) and as an IP block for integration into SoCs. The Rev 2 ASIC (P19800B) is offered as a component and on a miniature PCB (Fig.2). Alternatively, an evaluation board with a socket is being offered (Fig.3). The evaluation board contains a PSoC which can interface through USB to control the ASIC.

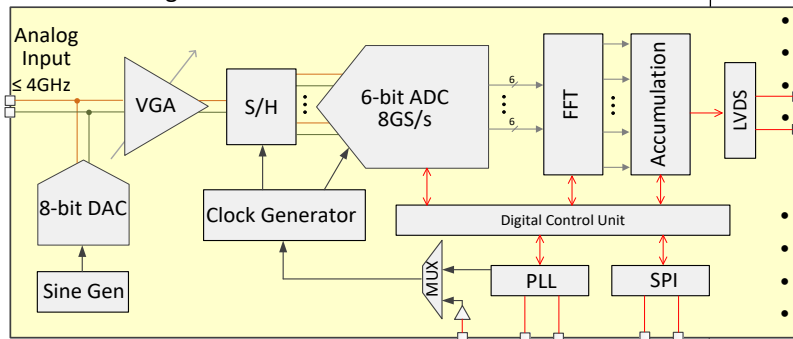


Figure 1. A block diagram of the P19800B ASIC.

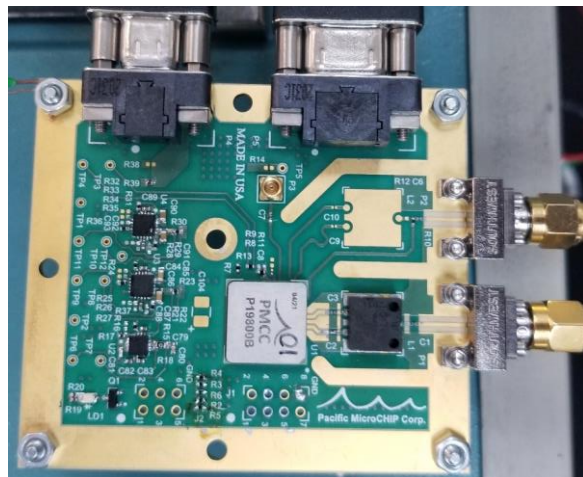


Figure 2. Miniature integrated PCB P19800BEVAL2.



Figure 3. Evaluation PCB P19800BEVAL3.

Operational Capabilities

The ASIC digitizes the RF signal and splits spectrum into 8192 frequency bins. The power or magnitude is measured in each bin and the result accumulated. Specific capabilities/features:

- Analog input signal bandwidth up to 5.5GHz
- Integrated VGA allowing up to 9dB gain adjustability
- Sampling rate up to 8GS/s
- Input signal FSR programmable from 66mVpp to 400mVpp differential
- Digitizer ENOB > 4.5-bit to 4GHz
- Scalable sampling frequency and number of bins
- Power consumption < 1.6W (full functionality)
- Power consumption < 1.2W (4MHz bin resolution)
- Accumulation time programmable from 2us to 34s
- An integrated 16GHz PLL with selectable Fref
- An SPI interface for control, diagnostics and readout
- Temperature range -40°C to 110°C
- 15 x 15 BGA package (12.8mm x 12.8 mm)
- Fabrication technology: 28nm Bulk CMOS

Potential Applications

- Remote sensing instruments
- Radio astronomy
- Synthetic aperture radiometers
- Spectrum analyzers
- Software Defined Radio (SDR)

Usage Example

A signal was composed of a sinusoidal tone at 227MHz along with bandpass noise (600MHz-900MHz). The top image shows a screen capture when measuring using a standard spectrum analyzer (50lbs). Bottom image shows the result using the P19800B ASIC.

