

ASIC Summary

The P19800B spectrometer ASIC processes up to 5.5GHz bandwidth input signals provided by microwave front ends. The ASIC (Fig.1) includes a VGA, a 6-bit ADC, an FFT based on polyphase filtering and an accumulator capable of accumulating up to 34 seconds of frequency-domain data. The chip also includes an output data interface, a PLL based frequency synthesizer and a SPI interface for the ASIC's programming and data interchange at low speed. The chip (Fig.2) is offered in a BGA package and as an IP block for integration into SoCs. The P19800B ASIC is also offered on an evaluation board (Fig.3). A block diagram of the PCB's components is shown in Fig.4

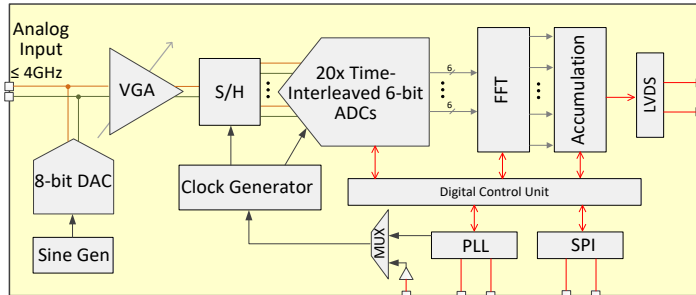


Figure 1. A block diagram of the ASIC.



Figure 2. The ASIC chip and the BGA package.

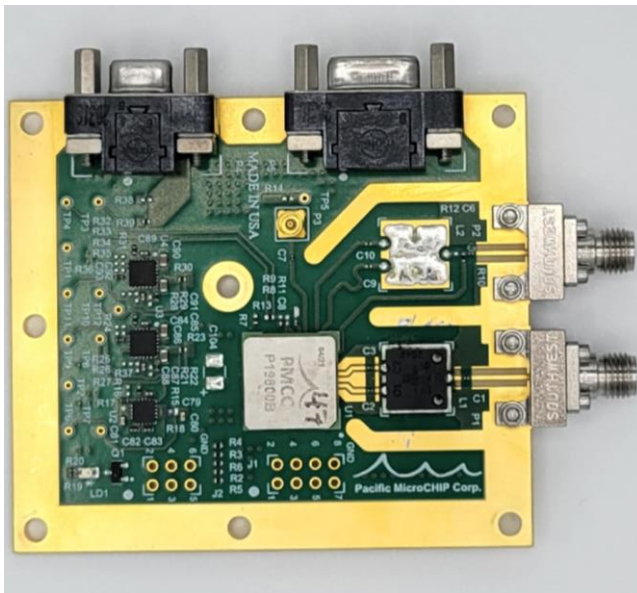


Figure 3. EVAL2 Evaluation Board.

ASIC Operational Capabilities

The ASIC digitizes the RF signal and splits the spectrum into 8192 frequency bins. The power or magnitude is computed for each bin and the result accumulated.

- Input signal bandwidth up to 5.5GHz
- Sampling rate up to 8GS/s
- Input signal FSR programmable from 66mV to 400mV pp differential
- Digitizer ENOB > 4.5-bit to 4GHz
- Power consumption < 1.6W (full functionality)
- Power consumption < 1.2W (4MHz bin resolution)
- Up to 8192 Frequency bins within 0 to 4GHz
- 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 CMOS

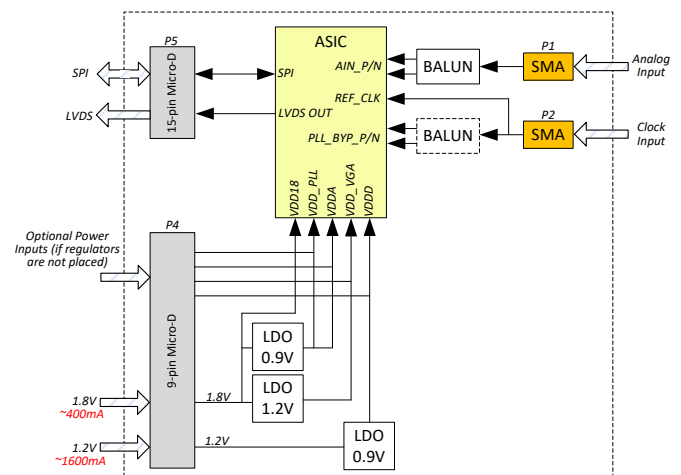


Figure 4. Block diagram of EVAL2

EVAL2 Operation requirements:

- +1.2V @ 1.6A and +1.8V @ 400mA
- Single-ended reference clock @ 0dBm with frequency between 32MHz and 2GHz.
- SPI Master for configuring and controlling the ASIC
- (Optional) LVDS receiver on an FPGA for faster data readout capability

Applications

- Remote sensing instruments
- Radio astronomy
- Planet and Sun exploration missions
- Synthetic aperture radiometers