



# M-CODE DIRECT ACQUISITION ASIC



MITRE

## DESCRIPTION

A Direct Acquisition (DirAc) ASIC provides for rapid direct acquisition of the next-generation M-code signal. The DirAc processor rapidly acquires the M-code signal by searching over time and frequency in parallel. The processor can search +/- 400 Hz of frequency uncertainty and +/- 1 second of time uncertainty with a mean time of 1 second while providing 10 msec of coherent integration time. The processor exceeds all requirements described in the Operational Requirements Document for GPS.

The DirAc processor uses a code-matched filter bank architecture that includes a backend 32-point Fast Fourier Transform to perform the parallel time and Doppler frequency offset search. The DirAc exploits the unique characteristics of the M-code signal and uses a pipelined design to provide the equivalent processing capability of 1.6 million parallel correlators.

The DirAc processor, when combined with an external memory, has the non-coherent integration capabilities necessary to acquire the M-code signal under jamming conditions.

## FEATURES

- ▶ 0.18  $\mu$ m CMOS technology
- ▶ 35 million transistors
- ▶ Package: 504 pin TBGA, 2.1 "sq
- ▶ Power: 7 W @ 40 MSPS
- ▶ 4 TerraOps/Sec
- ▶ Frequency search +/- 400 Hz
- ▶ Capable of searching a large time uncertainty
- ▶ Up to 10 msec coherent integration time
- ▶ Up to 128 non-coherent additions
- ▶ Supports 50/200 Hz data messages
- ▶ Code Doppler corrections
- ▶ Flexible detection processing
- ▶ 1.6 million effective parallel correlators

- ▶ 1.5-bit I&Q input data for USB and LSB
- ▶ Power down mode
  - Data message
  - Time and frequency uncertainty
  - Number of non-coherent additions
  - Detection threshold

## APPLICATIONS

Direct acquisition of the GPS M-code signal

## FOR FURTHER INFORMATION CONTACT:

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