Micronetics’ dithering module is designed as an easy way to eliminate spurs caused by quantization errors in high speed A/D converters. This module feature a patent pending technology to efficiently combine low pass filtered noise with the analog signal, resulting in low signal insertion loss and low power consumption. The module is designed for 70 MHz analog signals (other frequencies upon request) and eliminates the need to design special circuitry for the noise biasing, amplification and filtering as well as combining the signal to the out of band noise.

**DESCRIPTION**

The dithering module is a two port device with an analog signal input and a signal + noise output. The complete noise generating circuitry is contained within this module. The dithering module is specified by two paths, one being the analog signal path and the other being the noise output of the combined signal + noise path. The module also features built in LO rejection filtering.

**COMMON NOISE CONVERSIONS**

- \( N = N_0 + 10 \log (BW) \)
- \( N_0 = 20 \log (\mu V_{RMS} / Hz) \)
- \( N = 20 \log (V_{RMS}) - 10 \log (R) + 30 \ dB \)

where:

- \( BW = \text{bandwidth in hertz} \)
- \( R = \text{impedance in ohms} \)
- \( N = \text{power in dBm} \)
- \( N_0 = \text{power spectral density in dBm/Hz} \)

**SMDM-70-TTL OUTPUT CHARACTERISTICS**

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**SPECIFICATIONS**

**Analog Signal Path:**
- Pass Band Frequency: 60-80 MHz
- Insertion Loss: 1.0 dB max
- Impedance: 50 ohm
- VSWR: 1.4:1 max
- LO Rejection: 55 dB min @ f>450 MHz

**Noise Output:**
- Frequency: 200 kHz - 2.0 MHz
- Noise Flatness: 2 dB P-P max
- Noise power: -40 dBm min, -34 dBm max
- Low pass noise rejection: -150 dBm/Hz @ 5.0 MHz
- Total noise rejection @ f>15 MHz

**General Specs:**
- Operating Temp: -40 to +85 degC
- Storage Temp: -55 to +100 degC
- Supply: 15V ± 0.5V @ 75 mA max
- Control Logic TTL:
  - Logic 1: Noise On (internal pull up)
  - 2.8 - 5.5 V
  - Logic 0: Noise Off
  - 0 - 0.75 V

**How to order:**

SMDM-70-TTL
Dithering module, surface mount
SMDM-70-TTL-EVAL
coaxial connectorized, populated evaluation board
NOTES:

2. FOR SUGGESTED MOUNTING DETAIL SEE MICRONETICS
1. ALL SOLDERING PERFORMED WITH 596

DRAWING: 9205104
NOTES:
1. MATERIAL: NEMA GRADE FR-4 OR EQUIVALENT
2. FINISH: SnPb PLATE
3. BOTTOM SIDE TO BE GROUND PLANE