

# TAMING THE MONSSTR™

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## MOdular Non-volatile Solid STate Recorder

Martin Small  
CALCULEX, Inc  
P.O. Box 339  
Las Cruces NM 88004

Phone: 1-505-525-0131; Fax: 1-505-524-4744  
e-mail: [martys@calculex.com](mailto:martys@calculex.com) Web: <http://www.calculex.com>

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# Introduction

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- Solid State Basics
- FLASH EPROM Internals
- MONSSTR™ Basics
- MONSSTR™ I/O
- MONSSTR™ Features
- MONSSTR™ Power
- Tape or Solid State
- High Performance Computing

# Solid State Basics

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- Random Access Memory (RAM)
  - Volatile, requires battery backup
  - SRAM (Static)
    - Flip Flops
    - Speed
  - DRAM (Dynamic)
    - Low Power
    - Refresh

# Solid State Basics

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- EPROM
  - Non-volatile
  - UVEPROM
    - Relic
  - E<sup>2</sup>PROM
    - Word read/write
    - Page mode
  - FLASH
    - Write zeros only
    - Block erase to 1's

# FLASH EPROM Internals

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- SRAM Array
- State Machine
  - Programming
  - Reading
  - Erasing
  - Status
  - Identification
- Block Structure

# MONSSTR™ Basics

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- Gigabyte =  $1 \times 10^9$  = GB =  $8 \times 10^9$  Bits
- Megabyte =  $1 \times 10^6$  = MB =  $8 \times 10^6$  Bits
- System Speed                      Sustained    Burst
  - Model 7000                      128 MB/s    160 MB/s
  - Model 6000                      64 MB/s     80 MB/s
  - Model 5000                      64 MB/s     80 MB/s

# MONSSTR™ Basics

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• Storage Capacity	Canister	System
– Model 7003R	34.6 GB	103.8 GB
– Model 7002R	34.6 GB	69.2 GB
– Model 7001R	34.6 GB	34.6 GB
– Model 6002R	8.6 GB	17.2 GB
– Model 6001R	8.6 GB	8.6 GB
– Model 5000R	4.3 GB	4.3 GB

# MONSSTR™ Basics

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• System Size	H''	x	W''	x	D''	(In. <sup>3</sup> )
– Model 7003R	12	x	17	x	13	(2652)
– Model 7002R	12	x	13	x	13	(2028)
– Model 7001R	12	x	9	x	13	(1404)
– Model 6002R	12	x	10	x	6	(720)
– Model 6001R	12	x	7	x	6	(504)
– Model 5000R	12	x	4	x	4	(192)



# MONSSTR™ Basics

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- Rugged and Laboratory Chassis
  - Power options
- Dual Controller Options
- Multiplexer Options
  - PCM, 1553, Analog, IRIG
- 2x and 4x Speed Enhancements
  - Interoperability between speeds
- 2x and 4x Density Enhancements
  - Interoperability between densities

# MONSSTR™ I/O

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- Digital Instrumentation Tape Emulation
  - Ampex DCRsi™
  - Metrum Datatape LP-400™
  - Sony DIR-1000™
- Computer Peripheral Tape Emulation
  - Ultra SCSI (16-bit, 20 MHz, 40 MB/s)
  - Std. SCSI and SCSI-2 compatible

# MONSSTR™ I/O

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- CALCULEX MONSSTR-Link™ I/O
  - 32-Bit, 40 MHz (160 MB/s)
  - 32-bit and 64-bit PCI Bus Interface
  - Device Drivers for multiple OS
    - Windows NT
    - Sun Solaris
    - Digital Unix
- High-speed Network Interface
  - Fibre Channel

# MONSSTR™ Features

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- Hot Swap Canisters
- Momentary Power Outage
- Read after Write with Rewrite
- 2% Spare Memory
- Random Read while Write

# MONSSTR™ Features

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- Dual Ports
  - Partitioned Operation => Independent Ports
  - Non-partitioned => Master/Slave Ports
- Daisy-chained Expansion
- Circular Buffer Mode (erase before write)
- Redundant (shadow) Write (live dubbing)

# MONSSTR™ Power

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- Canister (each, excluding memory)
  - Model 7000 24W
  - Model 6000 12W
  - Model 5000 12W
- Memory (maximum sustained data rate)
  - Model 7000 28W
  - Model 6000 14W
  - Model 5000 14W

# MONSSTR™ Power

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- Controllers
  - 20 Watts each
- Power Supply
  - 90+ % efficient
- Total System Power (single controller, maximum sustained data rate)
  - Model 7003                      133W
  - Model 6002                      64W
  - Model 5000                      51W

# Tape or Solid State

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	Tape	SSR
Archival	X	
Acquisition		X
Harsh Environment		X
Performance		
– Data Rate		X
– Bit Error Rate		X
Reliability		X
PM, Wear Items		X
Power Consumption		X
Heat, Noise, Package Size		X



# High Performance Computing

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- High Data Transfer Rate
- 5 Microsecond Seek Time (Maximum)
- L3 Cache
- Random Read while Write
- Scalable Growth Path
- Data Compression / Expansion