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SYSTEM

Product Information

M01-NVSRAM

PCI Express® Non Volatile SRAM MMIO • M.2 Module

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General

The M01-NVSRAM is a non volatile static RAM, organized as 1024k x 32bit, for PCI Express® direct access (memory-mapped read/write to a linear address space, aka MMIO). The M01-NVSRAM is housed on a 2280 size M.2 module, suitable for any PCI Express® based M.2 host connector (M-keyed). The data transfer between host (CPU) and SRAM is controlled by an FPGA via PCI Express®. Other than a normal SSD, the M01-NVSRAM is not a block device, and does not require a file system or software drivers for data storage. The M01-NVSRAM supports memory-mapped I/O in a BYTE, WORD and DWORD mode instead.

The M01-NVSRAM is equipped with two 16-Mbit nvSRAMs, to be read and written an infinite number of times. Automatic store to so called QuantumTrap nonvolatile elements is initiated on power-down, and recall to SRAM is managed at power-up. A simple on-board capacitor delivers sufficient energy for the store operation at power-down, and no battery is needed for backup. Data retention is guaranteed over 20 years.

The M01-NVSRAM is suitable e.g. for industrial applications with need for a reliable power fail safe data buffer.
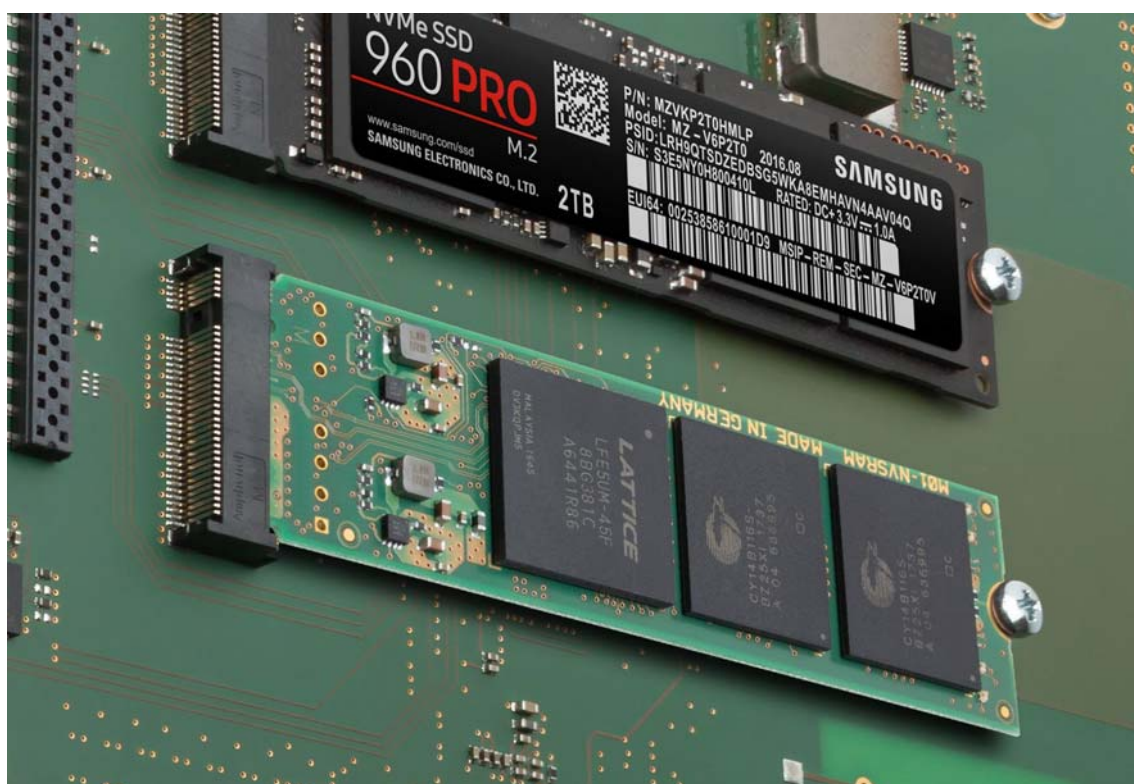
Feature Summary

M.2

▸ M.2 Type 2280 module (according to the PCI Express® M.2 Specification)
▸ Socket 3 System Interface, module key M, PCIe-based adapter pinout (PCIe x1 Gen1)
▸ 2280-D5-M double sided module (4.2H host socket recommended)
▸ +3.3V, 300mA max.
▸ Random read/write access tbd MB/s
▸ Custom specific M.2 module design on request

FPGA

▸ Lattice ECP5, 45k LUTs, SERDES 2.5Gbps
▸ Industrial temperature
▸ PCI Express® interface used for memory-mapped read/write transactions in the memory address space
▸ Control function for one or two attached nvSRAMs organized x 32
▸ Custom specific FPGA firmware on request

SRAM

▸ 2 x Cypress CY14B116S (512kx32, 16Mbit each) nvSRAM, 4MByte in total, AutoStore/Recall
▸ Embedded nonvolatile elements incorporate QuantumTrap technology, producing the world's most reliable nonvolatile memory
▸ Infinite read, write, and recall cycles
▸ 1 million store cycles to QuantumTrap elements (automatically on power-down event)
▸ Data retention 20 years
▸ Industrial temperature

Feature Summary

Applications

▸ Fast memory-mapped random access read/write transfers

▸ No file system required, operating system not necessary involved

▸ Code examples available for download

▸ Suitable for real time applications

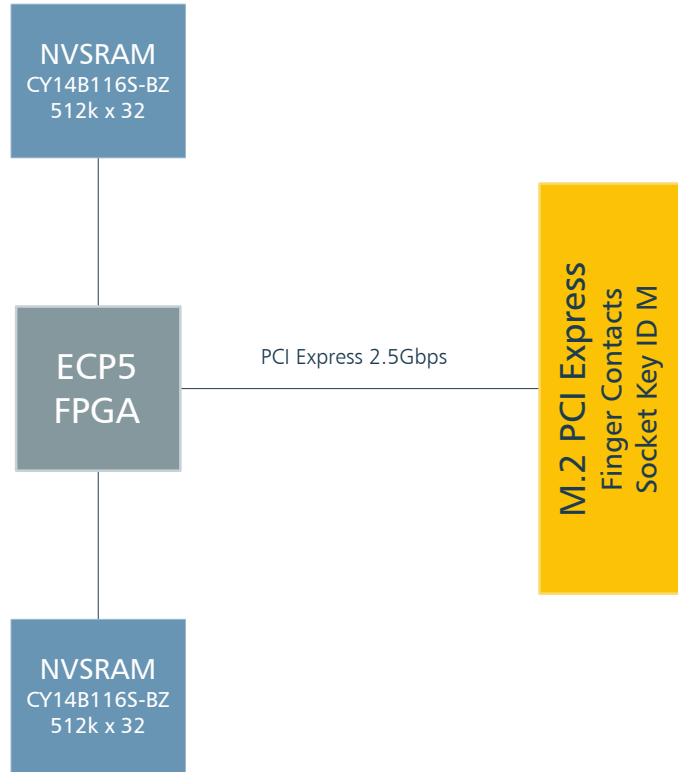▸ Industrial applications with need for a reliable power fail safe data buffer

Environmental & Regulatory

▸ Designed & manufactured in Germany

▸ Certified quality management according to ISO 9001

▸ Long term availability

▸ Rugged solution

▸ Coating, sealing, underfilling on request

▸ RoHS compliant

▸ Operation temperature -40°C to +85°C (industrial temperature range)

▸ Storage temperature -40°C to +85°C, max. gradient 5°C/min

▸ Humidity 5% ... 95% RH non condensing

▸ Altitude -300m ... +3000m

▸ Shock 15g 0.33ms, 6g 6ms

▸ Vibration 1g 5-2000Hz

▸ MTBF 59.3 years

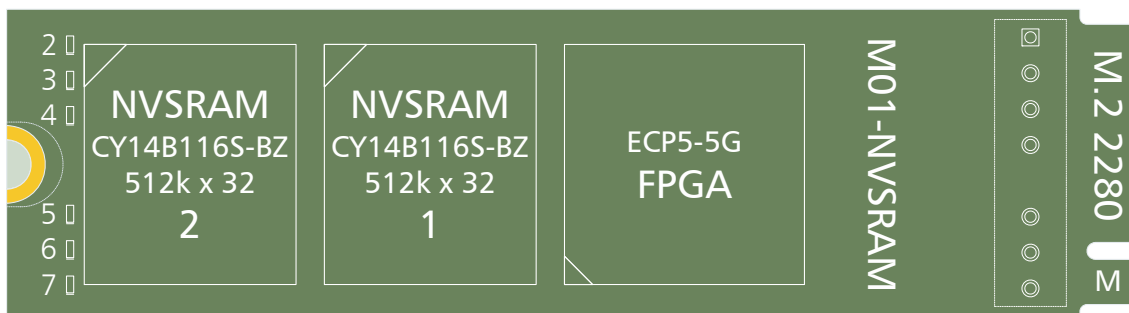▸ EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

all items are subject to change w/o further notice

Block Diagram

NVSRAM
CY14B116S-BZ
512k x 32

Simplified Block Diagram
M01-NVSRAM
Memory-Mapped (MMIO)
Non-Volatile SRAM
M.2 Module
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ECP5
FPGA

PCI Express 2.5Gbps

M.2 PCI Express
Finger Contacts
Socket Key ID M

NVSRAM
CY14B116S-BZ
512k x 32

Component Orientation

M01-NVSRAM • M.2 PCIe • Non Volatile Linear Memory • © EKF • ekf.com

	LED Functions
2	FPGA ready
3	FPGA initialization phase
4	Not populated - reserved for custom use
5	Not populated - reserved for custom use
6	FPGA Wishbone activity (internal transfers)
7	PCI Express® link established
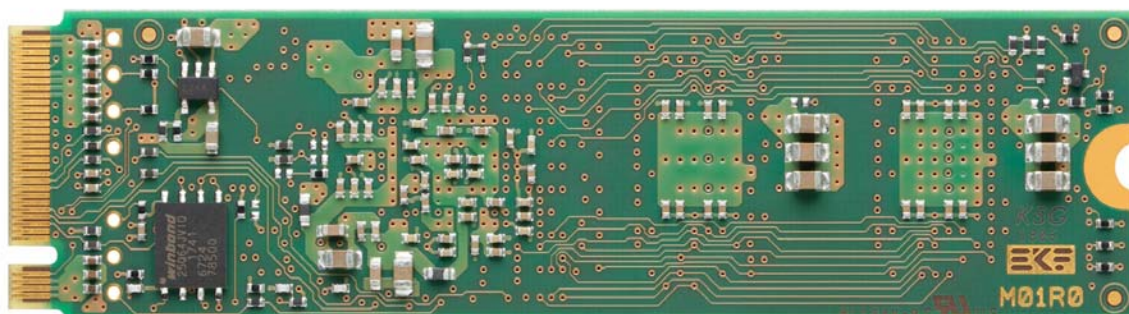
M01-NVRAM on a CPU Side Card

Beyond All Limits:

EKF High Performance Embedded

Industrial Computers Made in Germany

boards.   systems.   solutions.