M7010

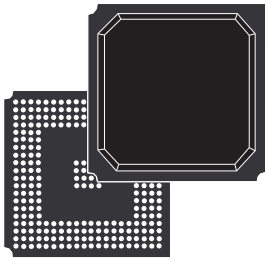
16K x 68-bit Entry NETWORK SEARCH ENGINE

DATA BRIEFING

FEATURES SUMMARY

- 16K ENTRIES IN 68-BIT MODE
- TABLE MAY BE PARTITIONED INTO UP TO FOUR (4) QUADRANTS
  (Data entry width in each quadrant is configurable as 34, 68, 136, or 272 bits.)
- UP TO 83 MILLION SUSTAINED SEARCHES PER SECOND IN 68-BIT and 136-BIT CONFIGURATIONS
- UP TO 41.5 MILLION SEARCHES PER SECOND IN 34-BIT and 272-BIT CONFIGURATIONS
- SEARCHES ANY SUB-FIELD IN A SINGLE CYCLE
- OFFERS BIT-BY-BIT and GLOBAL MASKING
- SYNCHRONOUS, PIPELINED OPERATION
- UP TO 31 SEARCH ENGINES CASCADABLE WITHOUT PERFORMANCE DEGRADATION
- WHEN CASCADED, THE DATABASE ENTRIES CAN SCALE FROM 124K to 992K DEPENDING ON THE SIZE OF THE ENTRY
- GLUELESS INTERFACE TO INDUSTRY-STANDARD SRAMS
- SIMPLE HARDWARE INSTRUCTION INTERFACE
- IEEE 1149.1 TEST ACCESS PORT
- OPERATING SUPPLY VOLTAGES INCLUDE:
  V_{DD} (Operating Supply Voltage) = 1.8V
  V_{DDQ} (Operating Supply Voltage for I/O) = 2.5 or 3.3V
- 272 BALL, 27mm x 27mm, CAVITY-UP BGA

Figure 1. 272-ball PBGA Package



272 PBGA
27mm x 27mm
1.27mm ball pitch

DESCRIPTION

Overview

The M7010 is a feature-rich hardware search engine optimized for networking and communications applications. It incorporates leading-edge Associative Processing Technology (APT, trademark of Cypress Semiconductor, Inc.) and Advanced Power Management. The data table may be partitioned into up to four (4) quadrants, allowing the user to configure each quadrant with different table entry widths (x34, x68, x136, or x272-bit). It is also programmable to accelerate performance.

Performance

The M7010 outperforms competitive solutions using software sequential search algorithms in conjunction with SRAMs or ASICs, or hardware implementation with ASICs and CAMs. The latter solution, while faster than a software-based solution, still suffers from performance degradation when depth-cascaded and is unable to scale to next-generation requirements. The M7010-based solutions overcome all of these drawbacks.

Applications

The performance and features of the M7010 makes it ideal in applications such as enterprise LAN switches, broadband switching and routing equipment, supporting multiple data rates from OC–48 and beyond.

Figure 2 illustrates how a search engine subsystem can be optimized using a host bridge ASIC (or a dedicated co-processor, such as the Cypress Semiconductor LNI8010), the M7010, and synchronous or non-synchronous SRAMs. It also illustrates how this system fits into a switch-router implementation.

Table 1. Product Range

Part Number	Operating Supply Voltage	Operating I/O Voltage	Speed
M7010R-083ZA1	1.8V	2.5 or 3.3V	83MHz
M7010R-066ZA1	1.8V	2.5 or 3.3V	66MHz

Figure 2. Switch/Router Implementation Using the M7010

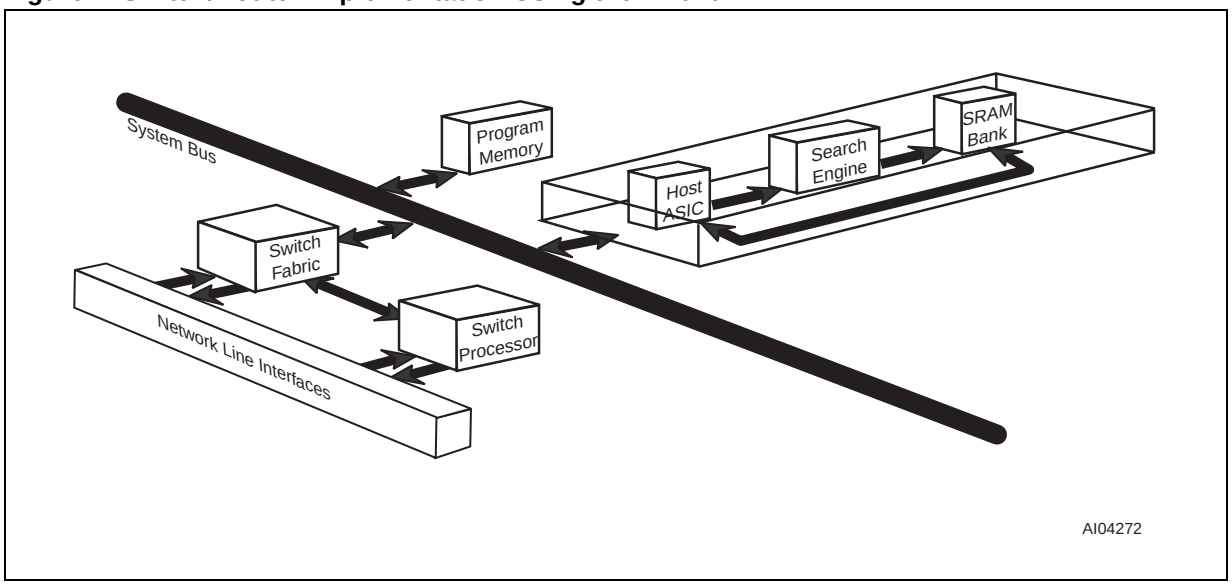


Table 2. Signal Names

Symbol	Type	Connection Name
Clocks and Reset		
CLK2X	I	Master Clock
PHS_L	I	Phase
RST_L	I	Reset
Command and DQ Bus		
CMD[8:0]	I	Command Bus
CMDV	I	Command Valid
DQ[67:0]	I/O	Address/Data Bus
ACK(1)	T	READ Acknowledge
EOT(1)	T	End of Transfer
SSF	T	SEARCH Successful Flag
SSV	T	SEARCH Successful Flag Valid
SADR[21:0]	T	SRAM Address
CE_L	T	SRAM Chip Enable
WE_L	T	SRAM WRITE Enable
OE_L	T	SRAM Output Enable
ALE_L	T	Address Latch Enable

Cascade Interface		
LHI[6:0]	I	Local Hit In
LHO[1:0]	O	Local Hit Out
BHI[2:0]	I	Block Hit In
BHO[2:0]	O	Block Hit Out
FULI[6:0]	I	Full In
FULO[1:0]	O	Full Out
FULL	O	Full Flag
Device Identification		
ID[4:0]	I	Device Identification
Test Access Port		
TDI	I	Test Access Port's Test Data In
TCK	I	Test Access Port's Test Clock
TDO	T	Test Access Port's Test Data Out
TMS	I	Test Access Port's Test Mode Select
TRST_L	I	Test Access Port's Reset

Note: Signal types are: I = Input only; I/O = Input or Output; O = Output; and T = Tristate

1. ACK and EOT Signals require a pull-down resistor of 47 ohms.

Figure 3. Connections

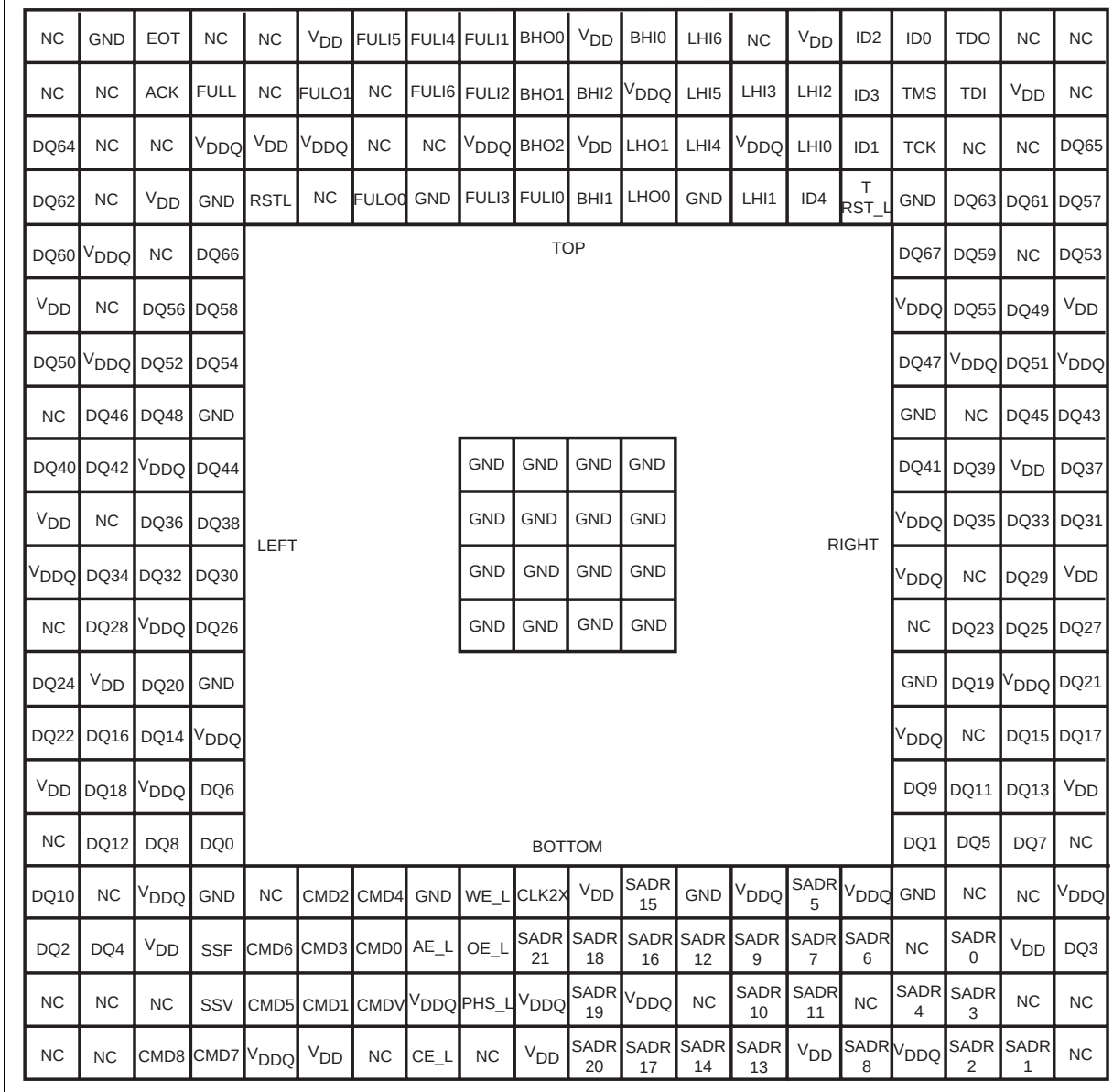
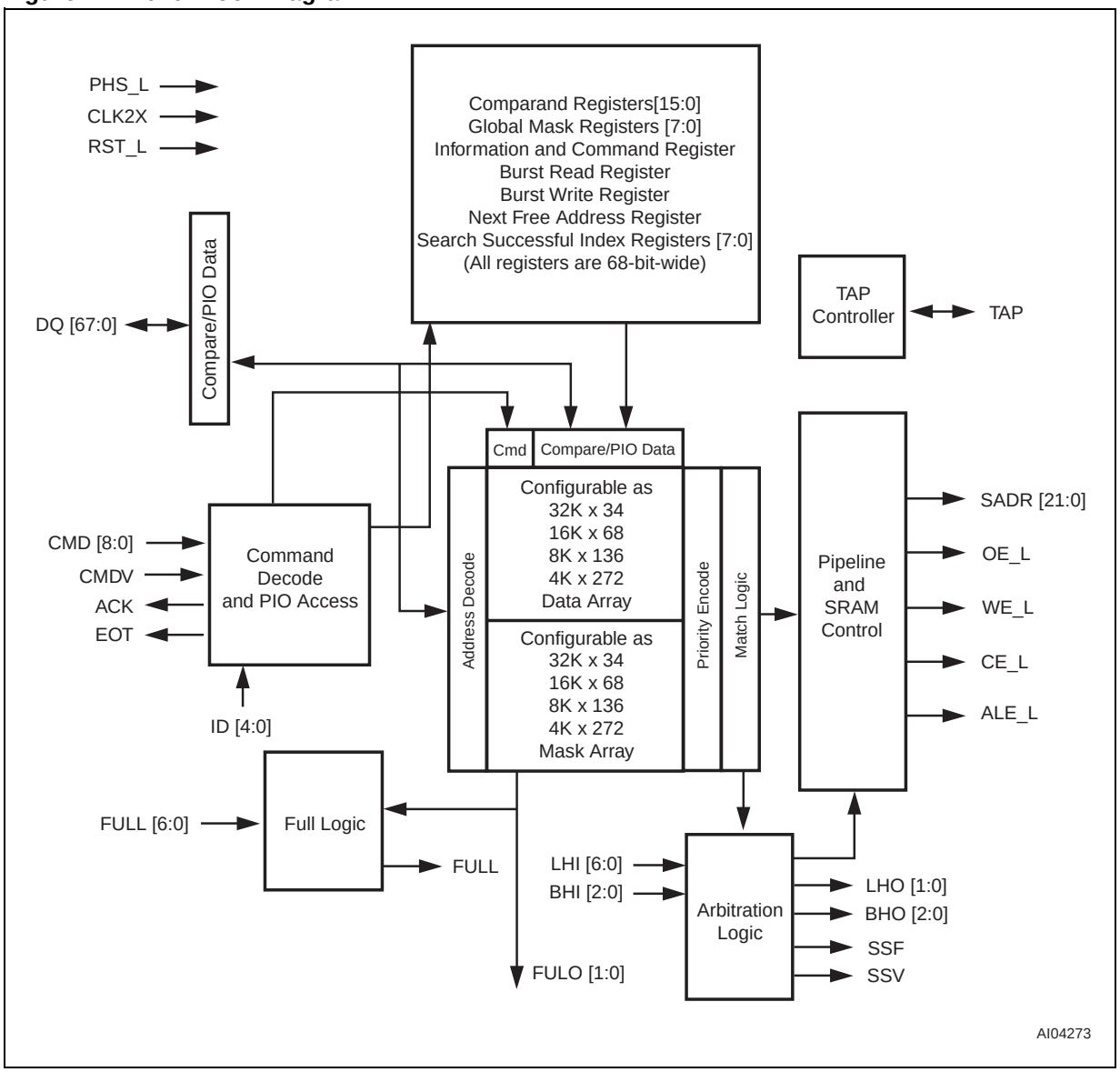


Figure 4. M7010 Block Diagram



PART NUMBERING

Table 3. Ordering Information Scheme

Example: M70 10 R –083 ZA 1 T

Device Type

M70 Search Engine

Density

10 = 1Mb (16K x 68-bit Table Entries)

Operating Supply Voltage

R = V_{DD} = 1.8V

Speed

–083 = 83 Million Searches per Second

–066 = 66 Million Searches per Second

Package

ZA = PBGA, 272-count, 27mm x 27mm(1)

Temperature Range

1 = 0 to 70 °C

Shipping Option

Tape & Reel Packing = T

Note: 1. Where “Z” is the symbol for BGA packages and “A” denotes 1.27mm ball pitch

For a list of available options (e.g., Speed, Package) or for further information on any aspect of this device, please contact the ST Sales Office nearest to you.