

# VSC055

## Enhanced I<sup>2</sup>C Backplane Controller

### Product Brief



#### Overview

The VSC055 Enhanced I<sup>2</sup>C Backplane Controller is an integrated CMOS circuit that significantly reduces system cost by integrating all of the digital logic typically required to monitor a storage enclosure. The VSC055 may be used in any embedded control application including parallel SCSI, Fibre Channel or any other application where the monitoring and control of a large number of digital I/O signals is required. Programming the VSC055 is easy through a convenient programming model, which reduces the overall duration of the design-in cycle. Data is read and written to the device over an addressable (3-bit) I<sup>2</sup>C serial interface, allowing multiple VSC055 devices on a single two-wire bus.

#### Device Features

- Up to 64 bits of user-definable, bi-directional general purpose I/O (5 volt tolerant)
- Slave mode I<sup>2</sup>C serial interface
- Integrated Port Bypass, Clock Recovery and Signal Detect support for up to 16 drives
- Eight programmable fan speed monitoring inputs
- Eight programmable pulse width modulated fan control outputs
- Pairing of GPI/O pins for direct input/output signal routing/buffering

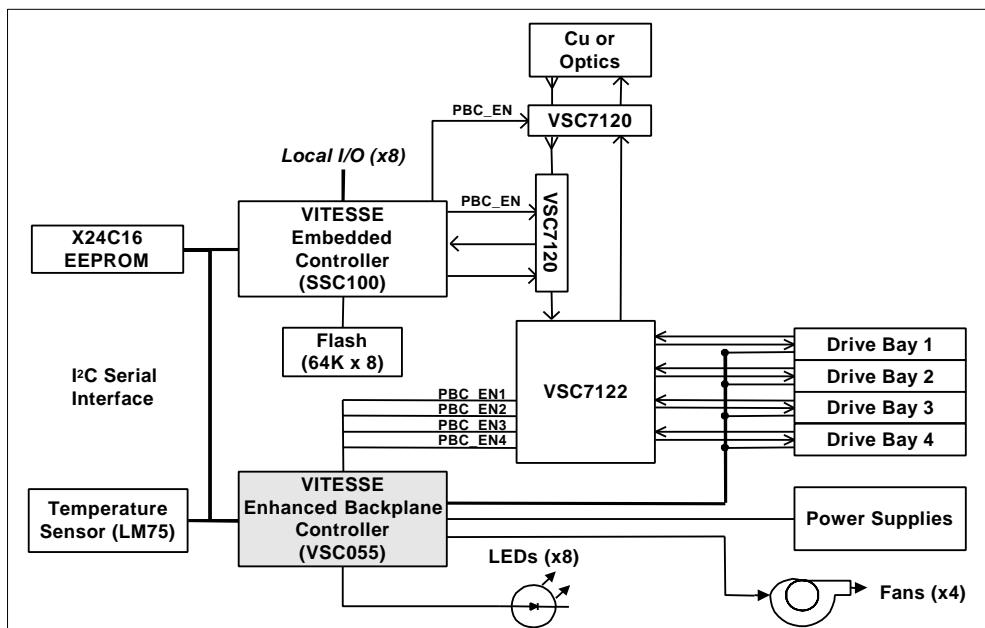
- Two clock input ranges: 8 to 10MHz (crystal) or 8.0 to 53.125MHz (oscillator)
- Automatic synchronization control between multiple devices
- Selectable direct LED drive flashing capability
- Pin-programmable addressing for up to 16 devices on a single serial bus
- 100 PQFP Package

#### I<sup>2</sup>C Serial Interface

The VSC055 uses an I<sup>2</sup>C serial interface to communicate with embedded controllers such as Vitesse's SSC100/200 and VSC205/210. The slave interface on the VSC055 uses a three-bit (A2:0) addressing scheme for identification on the serial interface. The ASEL pin determines the four-bit device type identifier. Up to sixteen, VSC055 or SSC050 devices may reside on a single I<sup>2</sup>C interface.

#### I/O Pins

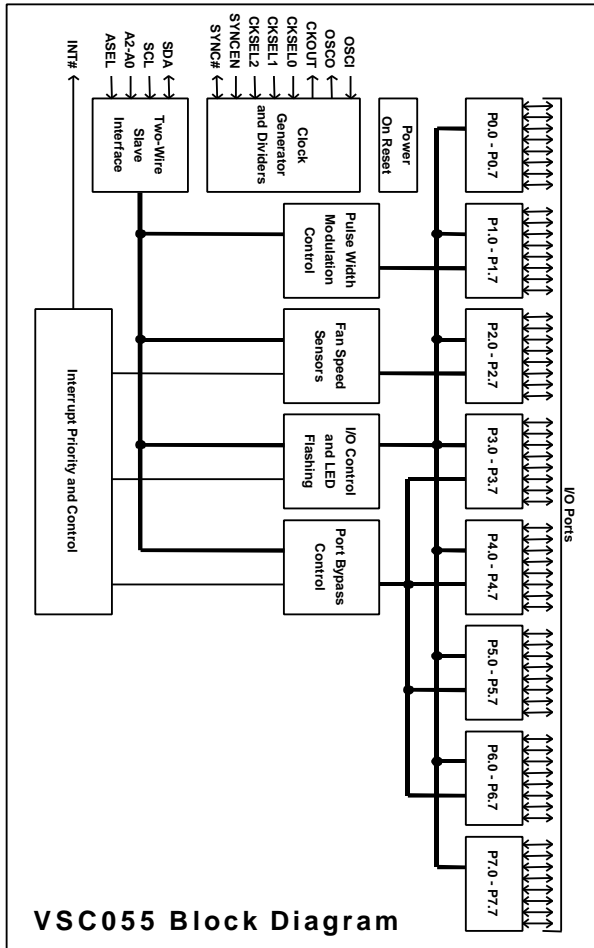
The VSC055 has 64 bi-directional I/O pins. The functionality of these pins is configurable via programming of the VSC055. All I/O pins have a 12mA drive strength, support 3.3V TTL, and are 5V tolerant. To enable the designer to configure and program the VSC055, the 64 I/Os are arranged in registers of eight pins. Certain groups of pins have additional functionality beyond simple input or output to support the integrated fan speed sensors, PWM control, and FC-AL port bypass control.



Application for a Single Loop, Single Controller with Four Drives

## LED Flash Rate Control

The built-in flexibility of the VSC055 allows all sixty-four of the I/O pins to drive LEDs. Each pin is independently programmed to flash an LED at one of seven predefined flash rates or by firmware definition.



**VSC055 Block Diagram**

## Fan Speed Sensor

The VSC055 includes eight pins (P2.0 to P2.7), which can be configured as fan speed sensors. This feature enables the designer to provide high value monitoring features at significantly reduced costs. Embedded controllers may access the VSC055 to determine the rotational speed (RPM) of fans attached to each of the eight inputs. The VSC055 may also be programmed to signal an interrupt if any one of the speed sensors fall below the designer's predefined level.

## Pulse Width Modulation Control

The VSC055 includes eight pins (P1.0 to P1.7), which can be configured for three different pulse rates with adjustable high/low duty cycle. This feature enables the designer to control fan speed

via an external power MOSFET. Embedded controllers may access the VSC055 to manage the rotational speed (RPM) of fans attached to each of the eight outputs.

## FC-AL Port Bypass Control

Up to thirty-two of the sixty-four I/Os may be configured to monitor and manage FC-AL port bypass control devices. Sixteen pairs of I/Os include special logic to monitor Enable Bypass signals, which may be generated by FC-AL disk drives, and control Port Bypass Control Enable (PBC\_Enx) signals on port bypass devices such as Vitesse's VSC7122.

The unique functionality of the VSC055 provides the system designer with additional flexibility and control over the port bypass function in a FC-AL enclosure. This allows system designers to differentiate and add value by controlling when and how a drive is removed or inserted into a FC-AL enclosure.

This feature may also be used for non-FC-AL applications. It is useful wherever system designers require flexible monitoring and control of backplane signals.

## Interrupt Support

There are up to sixty-four interrupt sources within the VSC055. I/O pin signal transitions, fan speed sensor threshold levels and transitions on port bypass inputs may be configured to generate interrupts. Advanced interrupt priority and management logic provides the system designer with maximum flexibility and a simple and convenient programming method for handling interrupts.

## Related Documents

- VSC055 Data Manual
- SSC100/200/VSC205/210 Data Manual
- Any SDK Specification

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