Monitoring Additional Supplies with the ADM1062–ADM1069 Super Sequencers™

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INTRODUCTION

The ADM1062–ADM1069 Super Sequencers accurately monitor a number of input rails. The ADM1062–ADM1067 have 10 input pins dedicated to monitoring (VH, VP1 to VP4, VX1 to VX5) and the ADM1068 and ADM1069 have eight (VH, VP1 to VP3, VX1 to VX4). Each of these pins has two internal programmable comparator circuits. By programming these circuits undervoltage only, overvoltage only or undervoltage and overvoltage trip points can be set up around each monitored supply. These trip points are 1% accurate at all allowable voltages and across the entire operational temperature range of the devices.

The VH pin is a high voltage input; it can detect voltages as high as 14.4 V and as low as 2.5 V. This range is broken down to two smaller selectable ranges for better resolution.

The VP1 to VP3 pins can monitor from 0.573 V to 6 V. This range is broken down to three smaller selectable ranges for better resolution, which is especially important for accuracy at low voltages.

The VX1 to VX4 pins are dual-purpose pins. They can be configured as normal voltage monitors. In this instance they have a single programmable range of 0.573 V to 1.375 V (which is identical to the lowest range on the VP1 to VP4 pins). They can also be set up as digital input pins, looking for logic signals to trigger a certain event.

Note that if any of the VX1 to VX5 pins are set up as logic inputs, their undervoltage and overvoltage comparators are not being used. These unused circuits can then be mapped onto the corresponding VP1 to VP4 pins and used to set up a second undervoltage and overvoltage window around the supply on that pin. This is useful for setting up a warning window around a supply and an outside fault window.

Each input pin on the ADM1062, ADM1063, ADM1064, ADM1066, and ADM1069 is multiplexed to an internal 12-bit ADC to add another degree of monitoring. The ADC can be programmed to detect another undervoltage or overvoltage threshold on each supply. The ADC can operate in a round-robin fashion when enabled. Note that the ADM1066 offers two auxiliary ADC inputs which allow 12 supplies to be connected to the ADC.

Information based on the monitoring circuits is available to the user in many ways. The most obvious way of determining the status of the inputs is to simply look at the outputs of a programmed ADM1062–ADM1069 device to see which inputs are good and which are faulting. Some of the outputs can be programmed as dedicated status signals such as a "Power Good" or an "Interrupt."

All devices have an on-board fault register that stores information on which inputs are reporting faults. For example, a user can poll the device over the SMBus to find out which faulting supply generated an interrupt or warning. The ADM106x Configuration Tool will display this information for the user.

The devices with an on-board 12-bit ADC (ADM1062, ADM1063, ADM1064, ADM1066, ADM1069) offer voltage readback over SMBus. An SMBus master can poll the device at any time to read back the current voltage level on any or all of the inputs (up to a total of 12 in the ADM1066). These readings will be accurate to 0.25% for all allowable voltages and across the entire operational temperature range of the devices. Note that the ADM106x Configuration Tool will also display this information.

This application note describes ways in which the voltage monitoring capabilities of the ADM1062–ADM1069 can be extended to monitor extra supplies.

Method 1

Figure 1 shows how two supplies can be monitored for undervoltage and overvoltage on a single input pin. When neither supply is present, the VX1 pin is pulled to ground with a resistor. The resistor value should be chosen so that the voltage on the VX1 is above the programmed UV threshold level only when both the 3.3 V and 2.5 V supplies are present. This technique does not allow the sequencing engine to distinguish between voltage faults on either supply. Voltage readback is also not possible. There is an extra margin of error introduced by the external resistors; accurate components minimize this error.
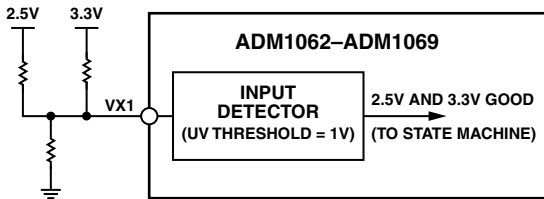

Figure 1. Monitoring Two Supplies on a Single Input Pin via Resistor

A similar technique can also be used to implement two card detect pins if the ADM1062–ADM1069 are implemented on a pluggable module. Figure 2 assumes that the two card detect pins are grounded by the backplane when the board or module is correctly seated in the backplane. Only when both card detect pins are connected to ground is the voltage on VX3 pulled below the preprogrammed trip point on the VX3 input detector.
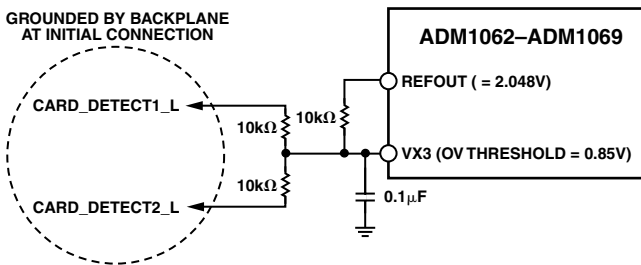

Figure 2. Implementing Two Card Detect Pins on a Single Input

Method 2

Multiple supplies can be monitored on a single pin if external comparator circuits are used. The outputs of the comparators can be tied together so that a fault on any rail will be detected on the ADM1062–ADM1069 input pin connected to the comparator outputs. Figure 3 shows how two supplies can be monitored on a single input pin.

This technique can be extended to any number of extra rails but, as with previous solutions, the sequencing engine is not able to distinguish between voltage faults on any supply monitored by the comparators. Voltage readback is also not possible on these supplies. The accuracy of the thresholds on these extra rails is dependent on the accuracy of the comparator reference and the accuracy of any resistor dividers used to scale down supplies. This solution only detects undervoltage faults on each rail monitored by comparators; extra comparators can be added to provide overvoltage monitoring on each rail.
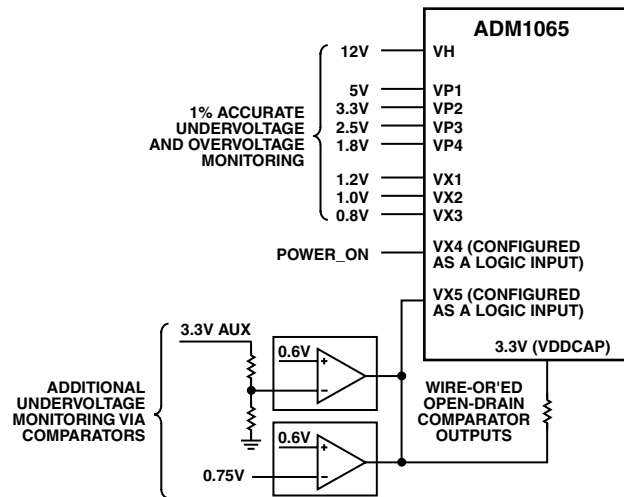

Figure 3. Monitoring Additional Supplies via Comparators

For more information on Analog Devices Super Sequencers please visit: www.analog.com/sequencers.

To download the ADM1062–ADM1069 Configuration Tool please visit: www.analog.com/sequencers.

For other queries please email: sequencing@analog.com.

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