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APPLICATION NOTE 210

Meet SFF-8472 Resolution and Accuracy Goals with Internal Calibration

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Abstract: This application note shows how to provide precalibration, called internal calibration by the SFF-8472 standard, for monitoring optic signals. The calibration technique uses a laser driver, the MAX3996, and a temperature-controlled resistor and monitoring IC, the DS1858, to meet SFF-8472 resolution and accuracy goals.

Introduction

Some standards, such as the SFF-8472, require that fiber optic signals be monitored. Two means of calibration are available to the designer. Precalibration, referred to by the SFF-8472 Standard as internal calibration, calls for the conditioning of the analog signals to comply with a mandated scale. Postcalibration, referred to by the SFF-8472 Standard as external calibration, is a computational technique conditioning the digital output to comply with a mandated scale. Application note 174, "[Monitor calibration in fiber optic applications](#)" explains the two types of calibration. This application note is an example of how to provide precalibration when using the [DS1858](#) given a fixed design, and meet SFF-8472 resolution and accuracy goals. For designers who intend their module to serve in a wide range of applications, a more flexible solution with built-in internal calibration is better suited.

Scaling the DS1858

The SFF-8472 Standard specifies scaling for the five channels in the *Internal Calibration* section. In the DS1858, temperature and V_{CC} are factory calibrated to comply with the respective scales. For the remaining three channels, referred to in the standard as Tx Bias, Tx Power, and Rx Power, the three inputs on the DS1858 are MON1, MON2, and MON3. All three MON channels are identical. Therefore, the assignment is arbitrary. All three channels are factory calibrated to read FFFF at 2.5V. We will show how to condition the signals coming into MON1 and MON2 to provide a scale that is compliant with the SFF-8472.

Example Using the DS1858 and MAX3996

Figure 1 shows the use of a laser driver, the [MAX3996](#), along with the DS1858 in a design that satisfies internal calibration requirements of SFF-8472. Supply bypassing and pins were left out for simplicity.

resistor or potentiometer is suggested for R3, such as the [DS1804](#).

Concluding Remarks

The preceding work shows that, for a given design, a discrete implementation of the internal calibration requirement is reasonably attainable within the allowable error budget of the SFF-8472 standard. Part-to-part variation was taken into account. By preprocessing the signal going into the DS1858 no loss of resolution occurs.

Other implementations using other laser drivers, will differ in detail only but will achieve similar results. Typically, two or three op amps and a small number of discrete components are adequate to achieve similar results.

Related Parts		
DS1858	Dual Temperature-Controlled Resistors with Three Monitors	Free Samples
MAX3996	+3.0V to +5.5V, 2.5Gbps VCSEL and Laser Driver	Free Samples

More Information

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