Keywords: Bias, DAC, DS1863, DS1865, Optical Transceiver

Mar 17, 2008

APPLICATION NOTE 4196

How to Program the Bias DAC in Manual Mode for the DS1863/ DS1865 PON Controllers

Abstract: This application note explains how to program the DS1863/DS1865 PON controllers' integrated Bias DAC for manual mode.

Introduction

The DS1863 and DS1865 PON controllers integrate a 13-bit Bias DAC, which operates in either manual or automatic mode. This application note describes the procedure for programming the DAC in the manual mode.

Controlling the BIAS DAC

If the BIAS-EN bit (Table 02h, Register 80h) is written to 0, the BIAS DAC is manually controlled by the MAN IBIAS Register (Table 02h, Registers F8h–F9h).

The MAN IBIAS Register is a 14-bit register, configured as described below.

MAN IBIAS Register

F8h	Reserved	Reserved	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}
F9h	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
	Bit 7							Bit 0

Programming in the Manual Mode

To program the BIAS DAC Register, the user must have Password Level 2 access. Also the BIAS-EN bit should be set to 0. To change the value, the MAN_CNTL Register (Table 02h, Registers FAh) is used to clock the MAN IBIAS value to register into the Bias DAC. The procedure for writing the DAC is then:

1. Write the MAN IBIAS value with a write command.
2. Set the MAN_CLK bit to a 1 with a separate write command.
3. Clear the MAN_CLK bit to a 0 with a separate write command.

Programming a 13-Bit DAC with a 14-Bit Register

The MAN IBIAS Register is 14 bits, however, the Bias DAC is only 13 bits in resolution. The bit 2^7 (bit 7 of register F9h and bit 0 of register F8h) in the MAN IBIAS Register is redundant. The rollover occurs in the following manner:

- Increasing DAC value from 0000h to 3FFFh

  The lower 8 bits of the DAC are incremented using register F9h. When the register value reaches FFh,

register F8h is incremented by 1 bit, and register F9h is set to 80h and starts incrementing. The process repeats until all bits are 1.

- Decreasing DAC value from 3FFFh to 0000h

  Decrement the lower 8 bits of the DAC by using register F9h. When the register value reaches 00h, register F8h is decremented by 1 bit, and register F9h is set to 7Fh and starts decrementing. The process repeats until all bits in both registers are at 00h.

Conclusion

The programming procedure presented here controls the Bias DACs in the DS1863/DS1865 PON controllers.

Application Note 4196: www.maxim-ic.com/an4196

Related Parts

DS1863: QuickView -- Full (PDF) Data Sheet -- Free Samples

DS1865: QuickView -- Full (PDF) Data Sheet -- Free Samples

AN4196, AN 4196, APP4196, Appnote4196, Appnote 4196