COOLDIM_PRG_BOARD

User manual for CDM10V programming board

About this document

Scope and purpose

CDM10V programming user manual describes the “COOLDIM_PRG_BOARD” burner board usage, the UART protocol handling and the fusing details.

Intended audience

CDM10V programming board user.

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1 CDM10V BURNER

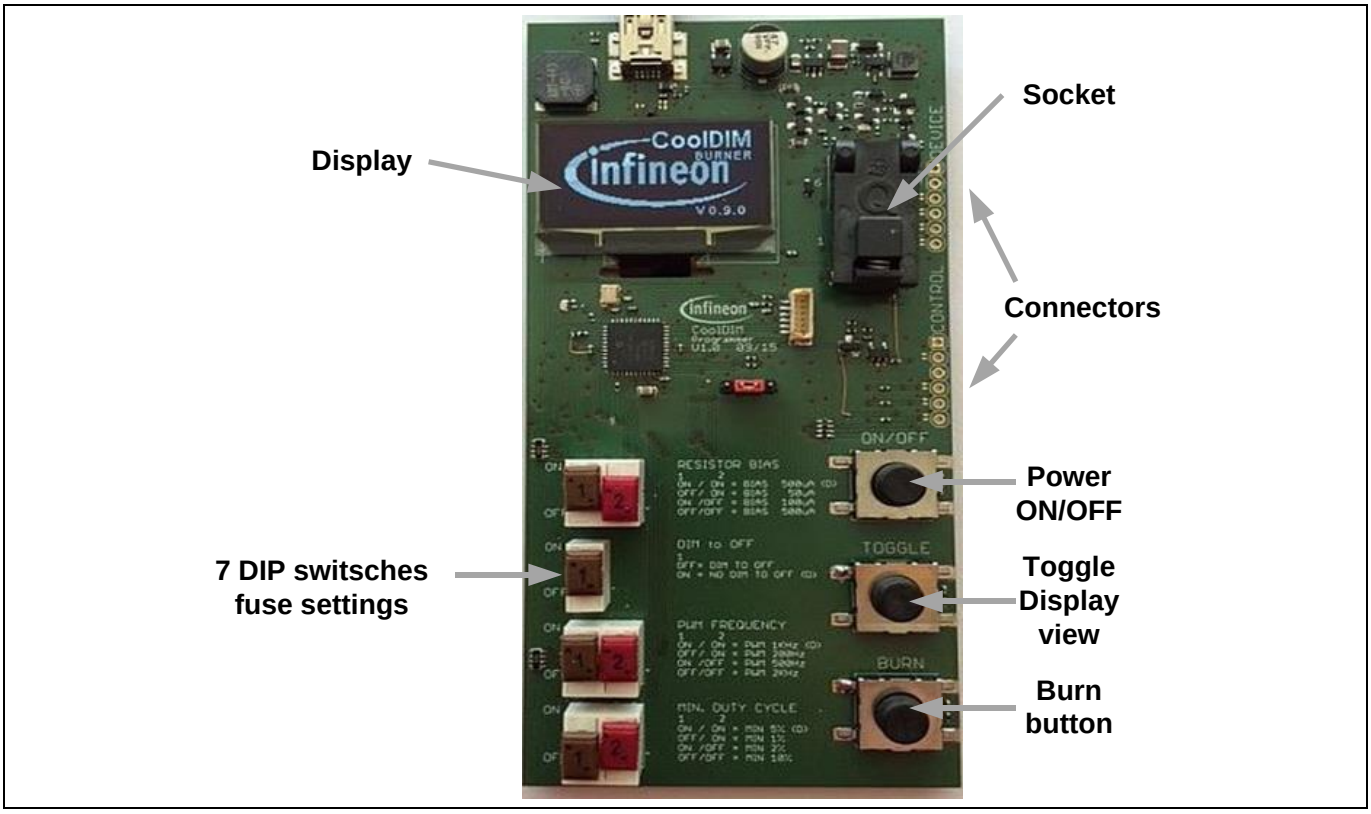


Figure 1 CDM10V BURNER

1.1 Introduction

The COOLDIM_PRG_BOARD is used to set fuses inside CDM10V chip. It is supplied from a USB power supply (5 V / 1 A) or could also be connected to a USB port of the PC. User will be guided through the burning process by the microcontroller firmware. If an error occur during handling user will be advised by firmware how to proceed. When no button is pressed during 5 minutes the display is switched off automatically and the LED below the display is flashing once per second, pressing any button will switch on the display again.

1.2 Chip orientation

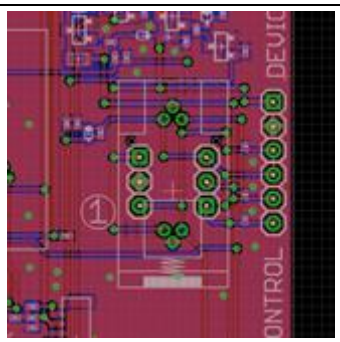


Figure 2 Chip orientation

Pin “1” of the chip shall be located in the lower left corner of the open socket. This is marked with a “1” on the PCB.

1.3 Control buttons

ON/OFF

Check if chip is applied in correct position and turn supply voltage on or off. When supply is turned on all 4 parameters are measured and shown in display. If one parameter could not be measured a contact fail is expected supply is turned off and the user is informed to check the socket. If none of the parameter could be measured user is informed that it is expected that socket is empty and supply is turned off. Only if all parameter could be measured correctly (+/- 10%) supply stays on and allows the use to proceed.

Toggle

Toggle screen to show either chip settings or board settings. To burn the board settings user has to switch to board settings view.

Burn

Start the fuse burning procedure. Fuse burning will only be started if:

1. The board settings differ from chip settings
2. Setting one (or several) bit to “1”

If these conditions are not fulfilled, burn procedure is aborted.

1.4 Switches

The switches are used to set the state of the fuses. Please note: user is only able to set a fuse bit from “0” to “1”. If a bit is already set to “1” it could be not reversed and burn fuse will be aborted. The decoding of the switches is printed on the board and will be shown in board settings view on the display.

Table 1 CDM10V settings

Dimmer / resistor bias	**00**	**200 µA**	**DEFAULT**
	01	100 µA	
	10	50 µA	
	11	500 µA	
Dim-to-off	**0**	**NOT ENABLED**	**DEFAULT**
	1	ENABLE DIM-TO-OFF	
PWM frequency	**00**	**1000 Hz**	**DEFAULT**
	01	500 Hz	
	10	200 Hz	
	11	2000 HZ	
Minimum duty cycle	**00**	**5%**	**DEFAULT**
	01	2%	
	10	1%	
	11	10%	

1.5 Connectors / Jumper

Optional connectors for external socket board.

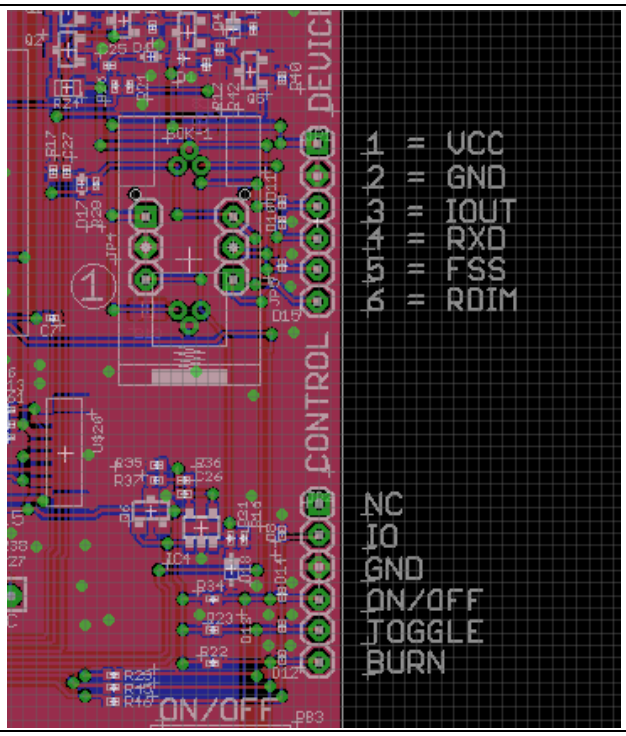


Figure 3 Connectors

2 Fusing details

2.1 UART configuration

The serial port (9600 Baud, 1 stop bit, no parity) enables a onetime reconfiguration of parameters for device function. The reserved CMD bit has to be set to HIGH. After this bit the 7 programming has to be sent in the order shown in the picture below.

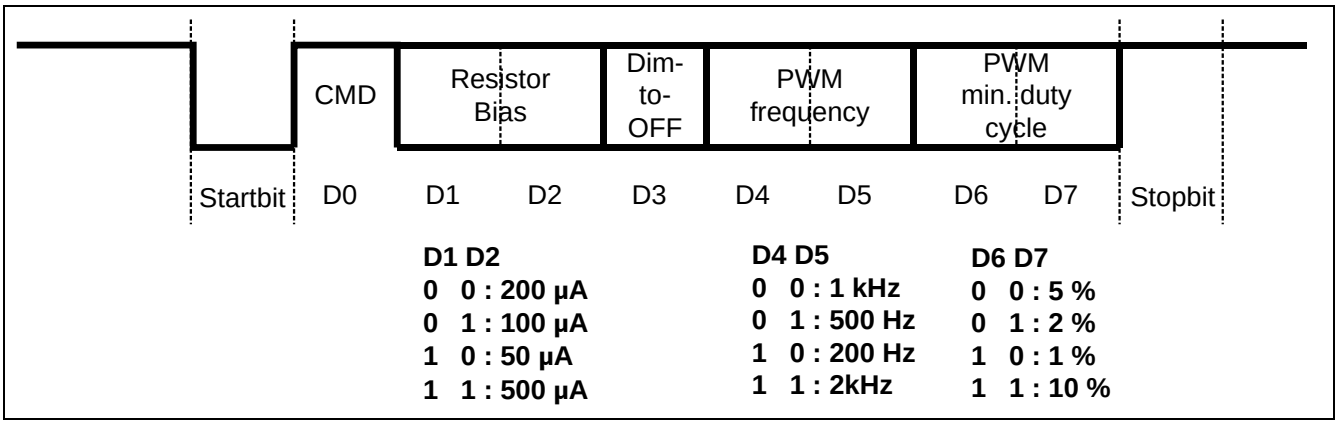


Figure 4 UART data frame format

The figure below shows the minimal fuse programming circuit diagram. The LED is optional and can be used to signalize the correct fusing procedure.

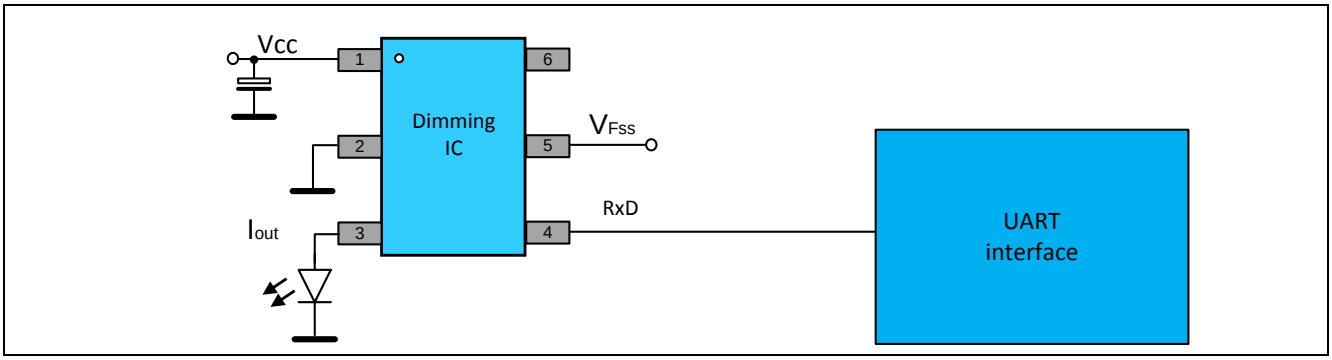


Figure 5 FUSE programming minimal circuit

2.2 Fusing conditions

Table 2 Fusing conditions

Condition	Nom. value	Limits
Vcc	11.0 V	
V_{Fss}	4.1 V	+-0.1 V
I_{Fss}	20 mA	
Temperature	25°C	

2.3 Fusing procedure

To ensure the correct efuse burning automatic programming and checking procedure is implemented. Remark that fusing can be done one time only per device.

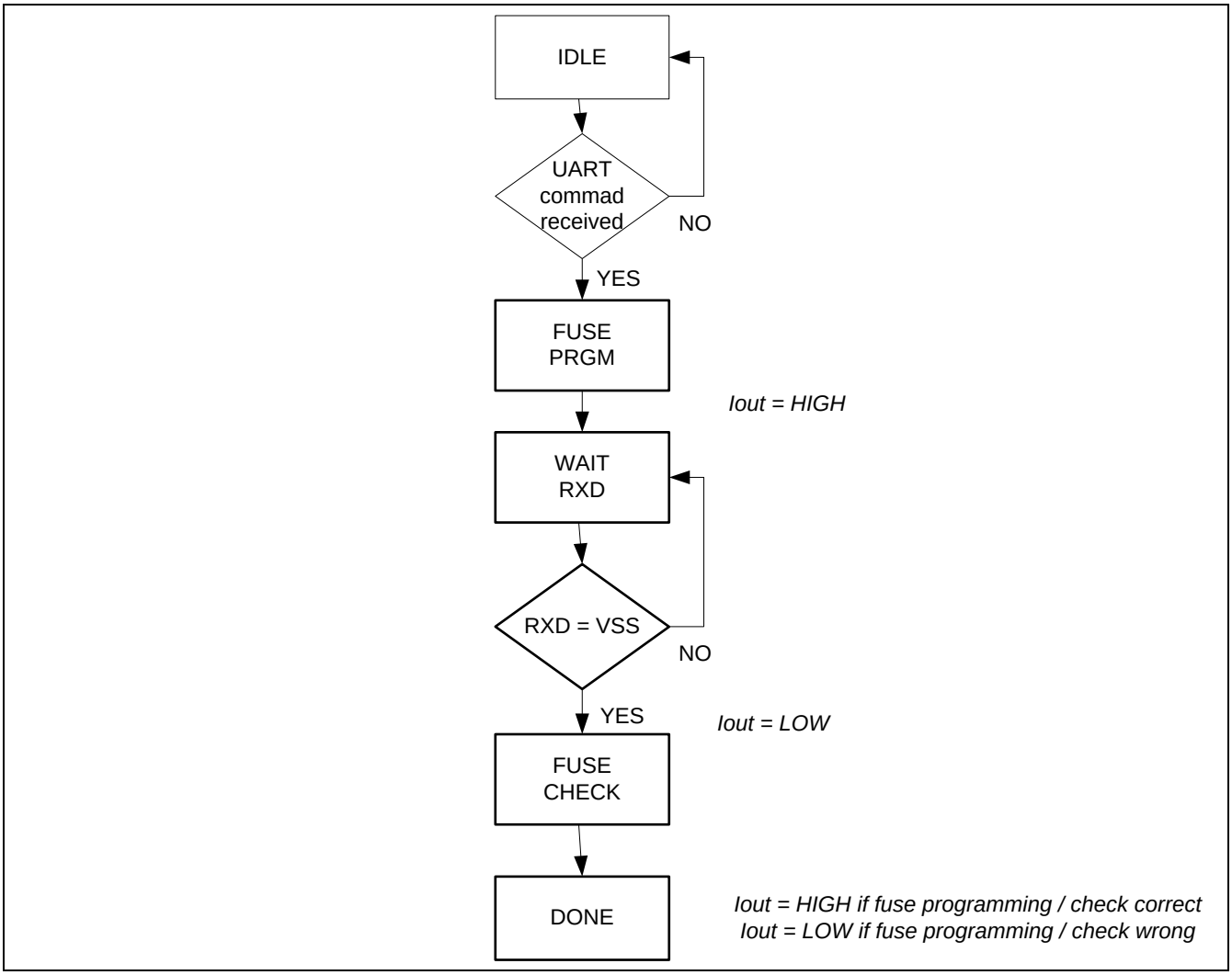


Figure 6 Fusing procedure

IDLE

The device is awaiting the correct UART frame. After correct frame is received (CMD bit is set to HIGH) the fuse programming procedure is started.

FUSE PRGM

Here the actual fuse procedure is performed. This takes at least ~10.5 ms. The end of the procedure signalized by setting the I_{out} pad to high state.

WAIT RXD

The FUSE programming is done, this is signalized by setting I_{out} to HIGH state. After detecting this state the RXD should be set to HIGH within 100 ms to procced with the next state, the I_{out} is set to LOW.

FUSE CHECK

In this state the fuses will be read out and compared with the received UART byte. This step takes ~100 µs.

DONE

If the compared data it correct the I_{out} is set to HIGH if not this will say in LOW in this state. Remark that the power down/up step is required to return to the normal operation after the whole efuse burning procedure is performed.

The detailed fusing timing is shown in the figure below. Remark the 100ms timing after the FUSE PRGM state.

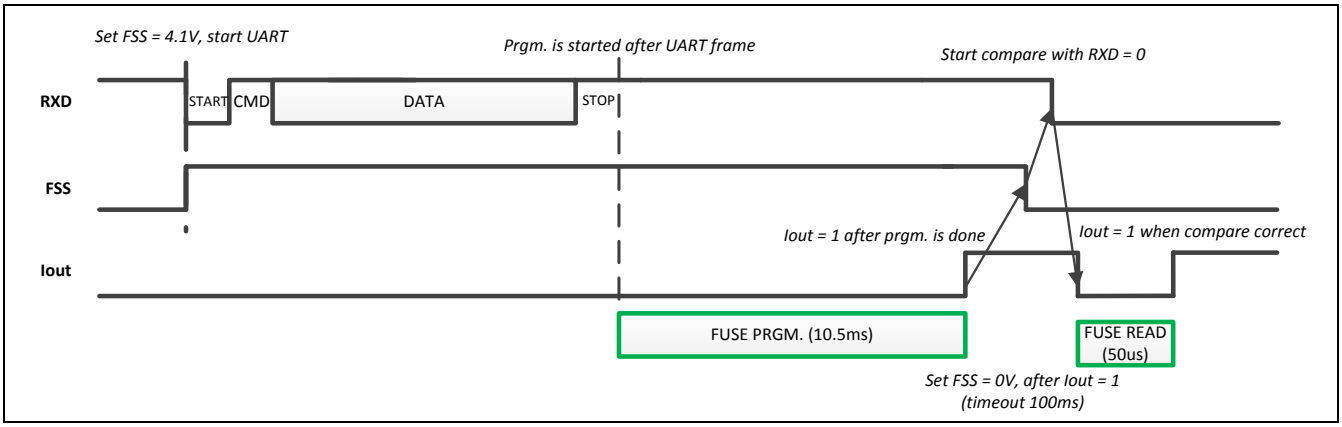


Figure 7 Fuse timing

Revision history

Document version	Date of release	Description of changes

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Edition 2017-09-19

Published by

Infineon Technologies AG

81726 Munich, Germany

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Document reference
UM_201709_PL21_011

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