

iND83205 "Realplum"

Realplum EVB Quick Start Guide

6/8/2020

Application Note





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3.0 REALPLUM HARDWARE INTRODUCTION

3.1 REALPLUM IC

The "RealPlum" IC is an automotive LED lighting integrated device that combines together a 32bit MCU (Cortex M0) with a power management unit capable of handling 45V Load dump from the car battery, 3 high voltage constant current open drain IO with PWM, a LIN slave transceiver supporting LIN auto-addressing, a LIN master transceiver for extension and an integrated 10 bit ADC for monitoring, aging and temperature compensation purpose.

- Full automotive qualification AEC-Q100 Grade1
- CPU architecture:
 - ARM Cortex M0 processor
 - System Tick Timer (Systick, 24bits, interruptible)
 - Serial Wire Debugger (ARM)
 - Built-in Nested Vectored Interrupt Controller (NVIC)
 - Programmable Watch-Dog Timer
 - 3 programmable timers
- Memory:

Ο

- o 64kBytes of Flash Program Memory, 10 years retention in automotive environment
- 16kBytes of SRAM
- Peripherals/Digital Features
 - Clock and Reset Manager
 - RCO: system and always on (wake up support)
 - Reset POR and BOR (no external reset)
 - One SAE J2602 LIN Slave Controller and Transceiver
 - Supports LIN auto-addressing through an internal LIN switch
 - o One SAE J2602 LIN Master Controller and Transceiver
 - Only available when the internal LIN switch is not used
 - Watch dog timer (ASIC side)
 - o 3x16bits PWM required to control LED current driver, with independent prescaler and 16bit timer
- Peripherals/Analog Features:
 - 3 Programmable 45mA max constant current / high voltage IO open drain
 - Temperature Sensor/Monitor with ADC
 - o Battery voltage detection and monitoring
 - o Hardware over temperature protection
 - 10 bits SAR ADC with 11 channels
 - Buffered bandgap voltage
 - Junction Temperature
 - Forward voltages of 3 external LEDs
 - GPIO1, GPIO2, GPIO3, GPIO4
 - One accurate VBAT channel
 - MCU Core Voltage
 - o Integrated voltage regulators



- LDO 3.3Vout (ASIC Core and IO supply + MCU I/O)
- LDO 1.5VOut (MCU Core/Flash)

Package:

4x4 mm 20 lead QFN package

Application:



Figure 1: Realplum Block Diagram



3.2 REALPLUM EVB

The Realplum evaluation board (EVB) is a convenient platform for users to test the capabilities of the device

The EVB provides access to each of the chip's pins for easy testing.

An RGB LED is installed on the EVB, and each output can be debugged via a jumper.

Anti-reverse diodes and jumpers are installed at the power input of the EVB. Consider the voltage drop of the diode when testing.

Programs are loaded into the chip in the SWD mode using an external debugger. The chip cannot be powered by SWD3.3v, and the loading process needs to be powered by VIN



Figure 2: Realplum Evaluation board



3.2.1 Realplum EVKit Features

Realplum 32-bit Cortex M0

Indie Semiconductor's Realplum 32-bit ARM Cortex M0.

Power Management

Power is supplied to the EVB from an external DC power supply using a screw terminal connector.

- Red/Green/Blue LED
- Provision for three switches for exercising GPIO1, GPIO2, and GPIO3
- Indicator LED connected to GPIO4

3.2.2 Realplum EVB Schematic



Figure 3: Realplum EVB Schematic



3.3 REALPLUM EVB BOARD CONFIGURATION

J4 must be shorted with a jumper to apply VIN to the Realplum device.

Three jumpers are needed at J1 to provide power for the red, green, and blue LEDs.

When programming by the SWD port, a jumper may be needed at J8 to provide the debugger with a VTT reference voltage of 3.3V.

4.0 LAUNCHING DEMO CODE (IAR): STARTING AND CONFIGURATION

- The Realplum Software Development Kit, SDK, software works with IAR open (free) version. The free version allows the creation of downloadable code limited to 16kBytes. All demos can be individually selected and the compiled code fits within the 16kB limit. If more complex programs are compiled it may be necessary to license the full version of IAR.
- Before launching IAR, it is necessary to add Realplum configuration files within the ARM config directory.

1) First, create a "/indiesemi/" folder within the IAR ARM devices area and the IAR ARM flashloader area:



Figure 4: Screenshot – new folder in IAR devices area



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Figure 5: Screenshot – new folder in IAR flashloader area

2) Copy the indie Realplum Software Development Kit into your working area:

Unzip the provided file - libdev.realplum.B1.01.02.00.0000.zip (or similar / later revision) anywhere in your working environment.

3) Locate the two Realplum device config files

The two files realplum.i79 and realplum.menu are provided within the software development kit. They are located under the following directory: libdev.realplum.B1.01.02.00.0000\drivers\devices

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Figure 6: Screenshot – device file location in SDK

4) Copy these two files and paste them into the /indiesemi folder within the IAR ARM/config/devices subfolder



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Figure 7: Screenshot – device file location in IAR

5) Locate the Realplum flashloader config files

The flashloader files are provided within the software development kit. They are located under the following directory: libdev.realplum.B1.01.02.00.0000\drivers\flashloader

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Figure 8: Screenshot – flashloader file location in SDK

6) Copy the flashloader files and paste them into the /indiesemi folder within the IAR ARM/config/flashloader subfolder



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Figure 9: Screenshot – flashloader file location in IAR

You are now ready to launch IAR and the Realplum SDK code:

7) Go back to the indie Realplum SDK directory and launch Realplum IAR project (IAR IDE Workspace)

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Figure 10: Screenshot – SDK project area



The project will open. Select the Realplum_app tab as circled in the figure below.

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Figure 11: Screenshot – Realplum_app tab



Application Note REALPLUM EVKIT QUICK START GUIDE

Now you can build the demo code:



Figure 12: Screenshot – Rebuild All

There may be a list of Warnings and these can be ignored.



The code is now ready to be loaded into the Realplum microcontroller:

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Figure 13: Screenshot – Download and Debug

Once the code has been loaded into the MCU, you are now able to run it (DEBUG\GO)



5.0 ANNEX: OVERVIEW OF IAR CONFIG

The IAR environment should be configured for Realplum demo and Flash programming:

→ General Options within the IAR Project should indicate the indiesemi Realplum device

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Figure 14: Screenshot – IAR device selection

→ The links to debugger and flash programmer are within the indie Realplum SDK:



Figure 15: Screenshot – IAR flashloader selection

You can now re-flash the Realplum evaluation board with the SDK code and explore its structure.



6.0 REVISION HISTORY

Rev #	Date	Action	Ву
0.1	6/5/2020	Initial Release	SW
0.2	6/8/2020	General clean up work, improved figure captions	SW



7.0 CONTACTS

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