

SRS PWM

System Requirements Specification



Status: Draft

Author: automatically generated from the SiSy model

Table of contents

1	Purpose	2
2	Overall description of the task.....	2
3	Functional requirements.....	2
4	Hardware requirements.....	3
5	Process requirements	3
6	Attachment	4



1 Purpose

All elements of this project are parts of a course for the professional development of embedded systems. This Embedded Systems Engineering course is intended to develop a broad interdisciplinary understanding and knowledge of the participants as well as to develop practical skills for the realization of embedded systems.

The hardware platform for this course is the mySTM32 Board lite. It has a microcontroller of the STM32 family and all required input and output devices or add-ons.

2 Overall description of the task

A microcontroller application is to be developed in which an LED fades in and out gently for the human eye. The PWM frequency must be flicker-free and the fading in and out of the LED should be clearly perceptible. Fading in and out can also be done non-linearly.

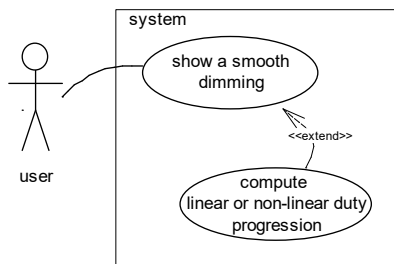


figure 1: uc: PWM tasks, user's perspective

List of top level requirements:

- system: show a smooth dimming
- system: compute linear or non-linear duty progression

3 Functional requirements

When the microcontroller is started, the PWM frequency is configured to 1000 Hz. As long as the system is switched on, the new duty value is calculated (linear or not linear) and the LED is dimmed with this value. The cycle duration is set with a short waiting routine.

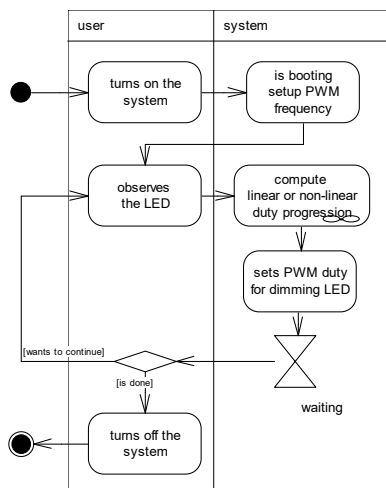


figure 2: show a smooth dimming



4 Hardware requirements

The hardware platform for this course is the mySTM32 Board lite. It has a microcontroller of the STM32 family and all required input and output devices or add-ons.

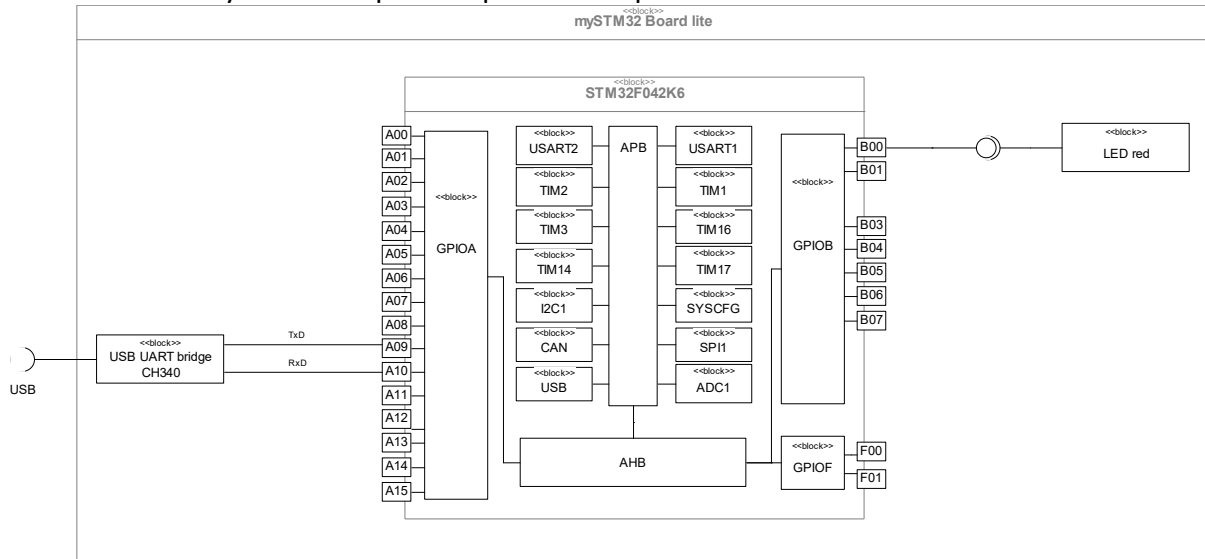


figure 3: PWM HRM

- connected pinB0 : LED red
- connected USB

5 Process requirements

A software process is the defined sequence of activities, the agreed rules, techniques, tools and the expected results of the activities for the production of software. Defined software processes ensure the plannability, controllability and quality of results in the manufacture of software. The following simple software process is agreed as a binding workflow for this course.

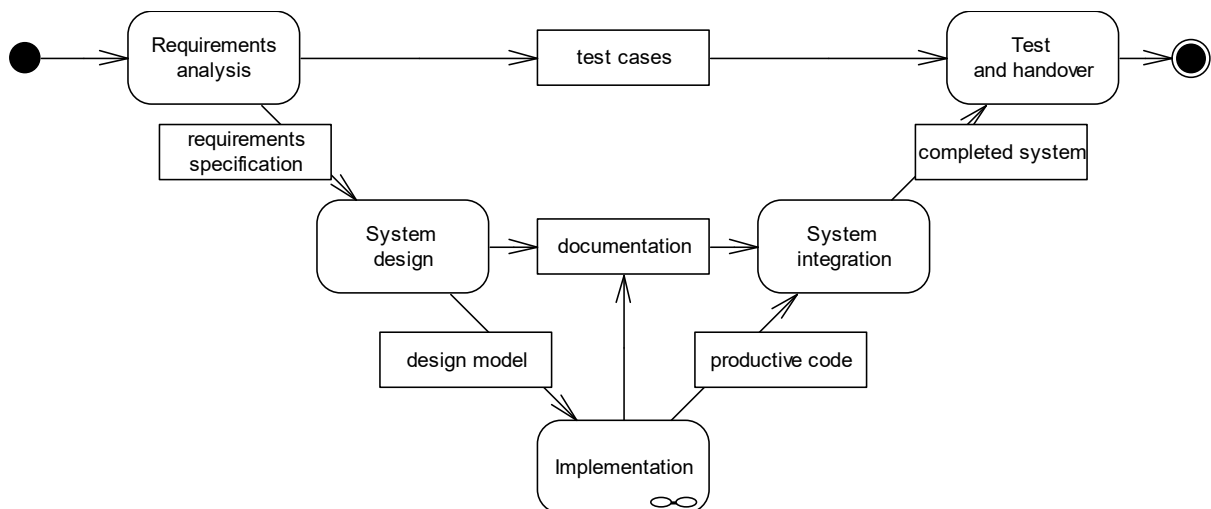


figure 4: act: lightweight model driven embedded software process



table 1: lightweight model driven embedded software process

Activity	Expected results
Requirements analysis	<ul style="list-style-type: none"> - User's perspective as use case diagram (as SysML / UML model) - required functionalities as activity diagrams (as SysML / UML model) - Test cases (as a document) - HRM hardware resource model (as SysML model) - SRS System Requirements Specification (as a document)
System design	<ul style="list-style-type: none"> - Class model of the concept level / architecture model (as UML model) - if necessary, state model (as UML model) - System documentation (as a document)
Implementation	<ul style="list-style-type: none"> - Class model of the realization (as UML model) - Behavioral models of the realization (as UML model) - Productive code (as a transferable format of the target platform, * .hex, * .elf) - System documentation (as a document)
System integration	<ul style="list-style-type: none"> - hardware software integration - the completed system
Test and handover	<ul style="list-style-type: none"> - the tested system - the technical system documentation (as a document) - the user documentation (as a document)

6 Attachment

List of figures

figure 1: uc: PWM tasks, user's perspective 2
figure 2: show a smooth dimming..... 2
figure 3: PWM HRM 3
figure 4: act: lightweight model driven embedded software process..... 3

List of tables

table 1: lightweight model driven embedded software process 4