STSW-STUSB006
Quick Start

STUSB4761 NVM customization through I²C using NUCLEO-F072RB

v1.0

STUSB

life.augmented

Table of Content

PART 1:

Preparing Binary for Nucleo

Software prerequisite

- IAR, Keil or ARM GCC are needed to recompile project

- Project compilation is mandatory if default NVM content is not suitable for application

Firmware preparation vs NVM content

- Project is delivered assuming default NVM configuration (as per datasheet):

Name	Date modified	Type	Size
gpio.h	9/11/2019 3:40 AM	C/C++ Header	3 KB
i2c.h	9/11/2019 3:40 AM	C/C++ Header	4 KB
main.h	9/30/2019 7:48 AM	C/C++ Header	4 KB
mxconstants.h	3/28/2018 9:16 AM	C/C++ Header	3 KB
stm32f0xx_hal_conf.h	9/11/2019 3:40 AM	C/C++ Header	13 KB
stm32f0xx_it.h	9/11/2019 3:40 AM	C/C++ Header	3 KB
STUSB_NVM.h	9/18/2019 8:48 AM	C/C++ Header	1 KB
tim.h	9/11/2019 3:40 AM	C/C++ Header	4 KB
usart.h	9/11/2019 3:40 AM	C/C++ Header	4 KB
USB_PD_defines.h	9/30/2019 8:05 AM	C/C++ Header	4 KB

STSW-STUSB006
  Drivers
  EWARM
    settings
    STSW-STUSB006
  Inc
  MDK-ARM
  Src

- Default STUSB_NVM.h file content:

```
uint8_t Sector0[8] = {0x83,0x04,0x61,0x47,0x2A,0xAB,0x98,0x96};
uint8_t Sector1[8] = {0x04,0x08,0x2C,0x77,0x2C,0x74,0x2C,0x74};
uint8_t Sector2[8] = {0x2E,0x74,0x2D,0x74,0x23,0x74,0xC0,0x03};
uint8_t Sector3[8] = {0x59,0x38,0x00,0x00,0x00,0x00,0x00,0x00};
uint8_t Sector4[8] = {0x00,0x00,0x00,0x00,0x00,0x00,0x61,0x01};
```

STUSB_NVM.h update

- NVM content is updated by modifying STUSB_NVM.h file

- STUSB4761 parameters can be customized to fit with application requirements using STSW-STUSB005 Graphical User Interface and exporting custom STUSB_NVM.h file:
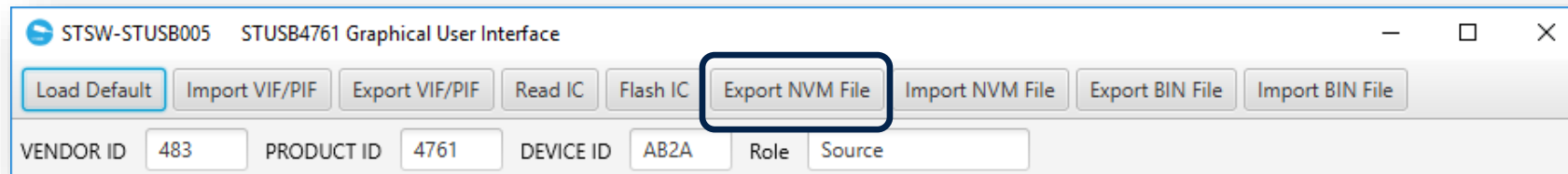
➔ New STUSB_NVM.h file must be imported in STUSB-STUSB006 library, replacing the default file.

➔ project compilation is mandatory to get updated binary file

IAR compilation

- ## IAR version used: 8.20 or later
  - Open project: Project.eww
  - After STUSB_NVM.h update, compile
  - New binary file is located here:

Keil version used: uVision 5

- Open project: NVM_Flasher_STM32F072RB.uvprojx
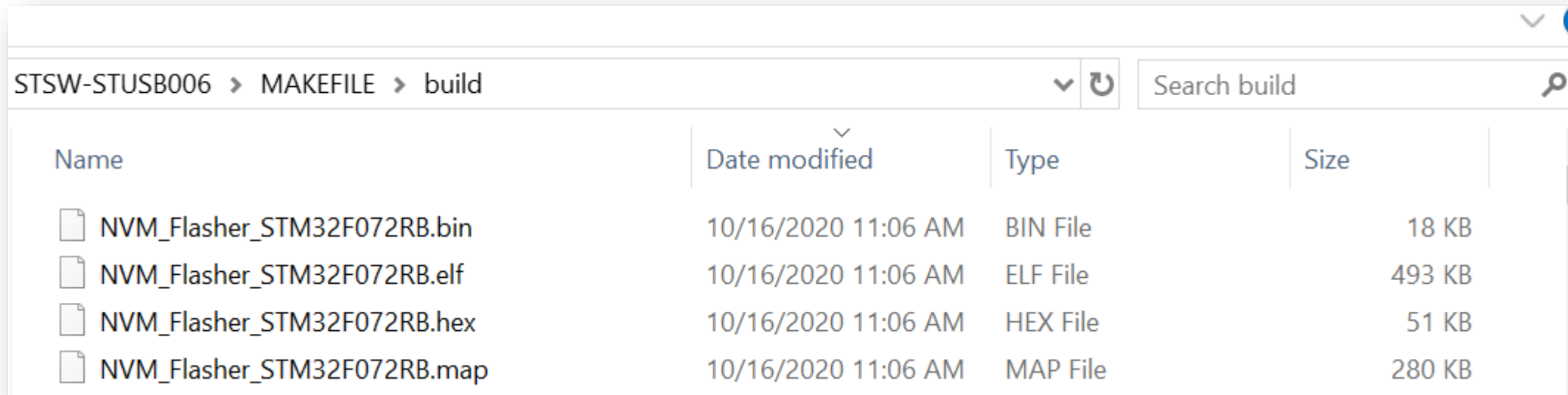- After STUSB_NVM.h update, compile
- New binary file is located here:

> STSW-STUSB006 > MDK-ARM > STSW-STUSB006 > Exe

Name	Date modified	Type
NVM_Flasher_STM32F072RB.axf	10/15/2020 4:03 PM	AXF File
NVM_Flasher_STM32F072RB.bin	10/15/2020 4:03 PM	BIN File
NVM_Flasher_STM32F072RB.hex	10/15/2020 4:03 PM	HEX File

GCC compilation

GNU Arm Embedded Toolchain:

- version used: 9 2020-q2-update with GNUmake make-4.3
- Make using Makefile in STSW-STUSB006/MAKEFILE
- After STUSB_NVM.h update, compile
- New binary file is located here:

| STSW-STUSB006 > MAKEFILE > build | Search build |

Name	Date modified	Type	Size
NVM_Flasher_STM32F072RB.bin	10/16/2020 11:06 AM	BIN File	18 KB
NVM_Flasher_STM32F072RB.elf	10/16/2020 11:06 AM	ELF File	493 KB
NVM_Flasher_STM32F072RB.hex	10/16/2020 11:06 AM	HEX File	51 KB
NVM_Flasher_STM32F072RB.map	10/16/2020 11:06 AM	MAP File	280 KB

- Connect NUCLEO-F072RB to PC

- Board will be mounted as mass storage device on windows browser:
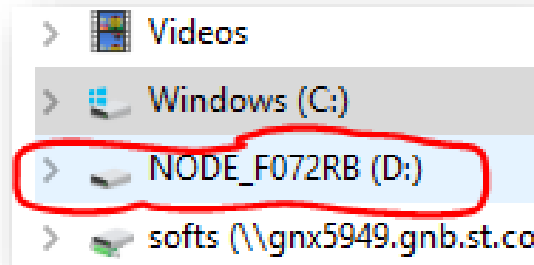
- Drag and drop NVM_Flasher_STM32F072RB.bin in NODE_F072RB
  → LD1 of Nucleo is blinking during FW copy and then it is continuous green

or

- Use STLinkUtility to flash NVM_Flasher_STM32F072RB.hex in Nucleo board

PART 2:

Connecting Nucleo for STUSB4761 Flashing

Nucleo F072RB connections

Nucleo black-button:

- Reset stm32 firmware

Nucleo blue-button (PC13 available on Nucleo CN7 – pin23):

- Press: reset to default condition
- Release: start new flashing

| STM32F072 pin	CN10 pin number (Nucleo)	Target board	Function
PC8	1	LED1	Orange LED: ON when STUSB4761 is not supplied (default condition) or action on going
PC9	2	LED2	Red LED: ON if NVM flashing fails
PB8	3	I2C_SCL	To be connected to stusb4761 SCL pin (pull up to 3V3 mandatory)
PB9	5	I2C_SDA	To be connected to stusb4761 SDA pin (pull up to 3V3 or stusb4761 Vreg_2v7 mandatory)
GND	9	GND	To be connected to stusb4761 GND
AVDD	*7*	*3V3*	*3V3 for I2C pull up if no pull up on stusb4761 board*
PA5	11	Nucleo LD2 Green LED	Green LED: ON when flashing done and OK
PA6	13	VCONN	Supply stusb4761 during NVM flashing
PA7	15	PWMout for Buzzer	Buzzer ON if flashing fails
PA8	23	Board connection detection	Active Low. Mechanical board insertion detection

Nucleo F072RB connections location

- See below physical connection locations on Nucleo: red circles
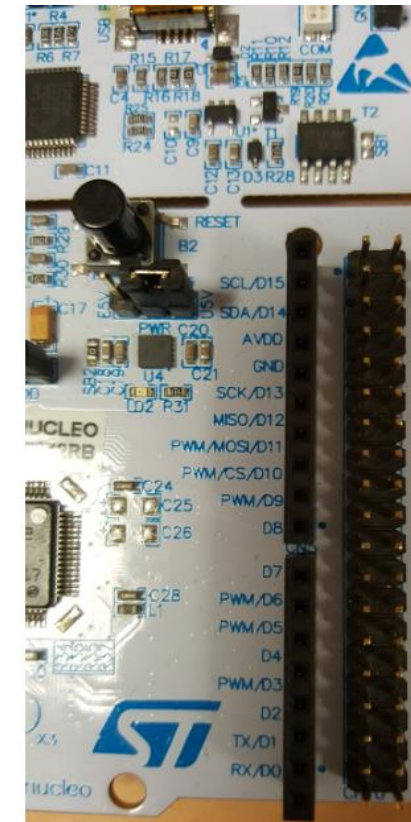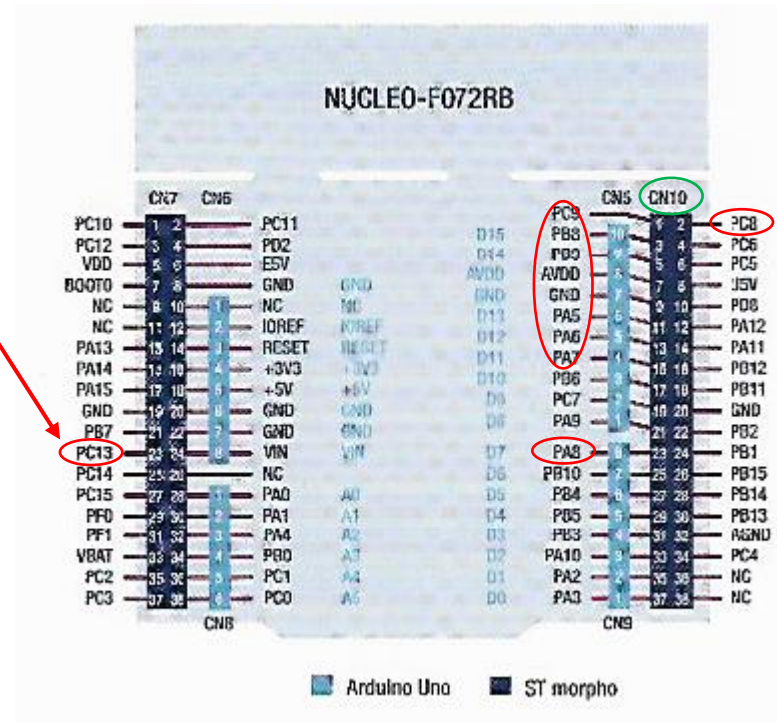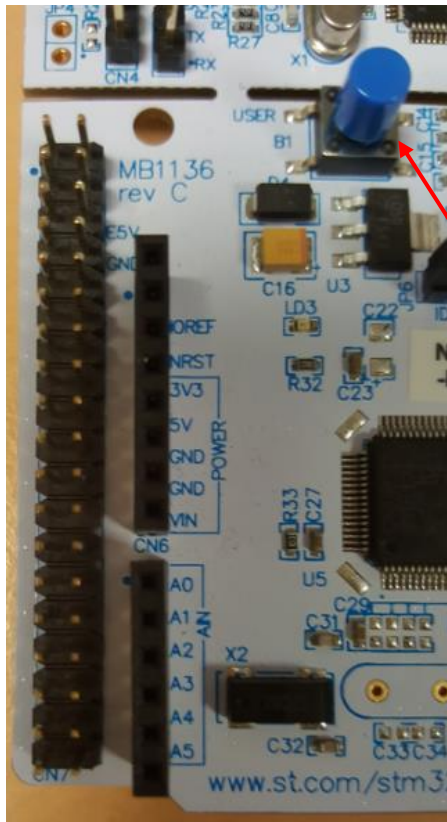
- Rising edge of blue_button, enables power for STUSB4761 and I2C sequence starts 50ms after power up
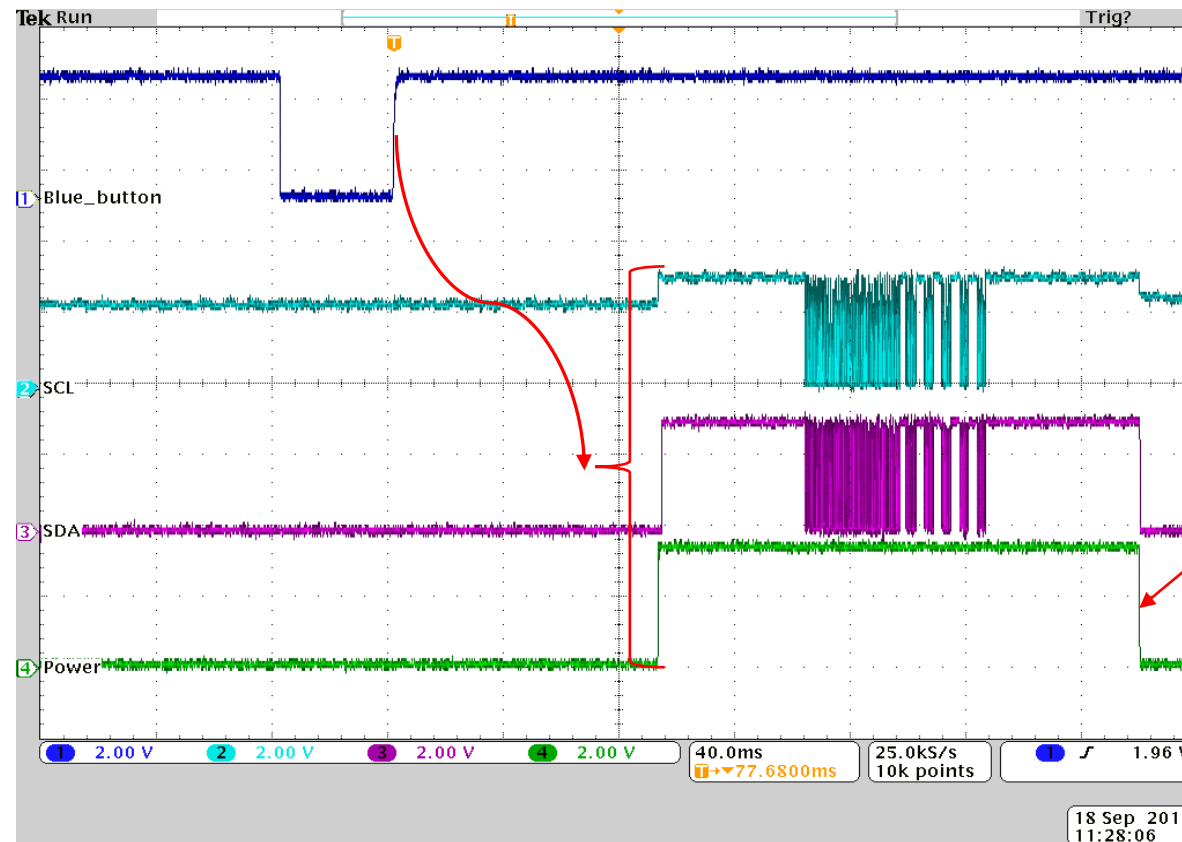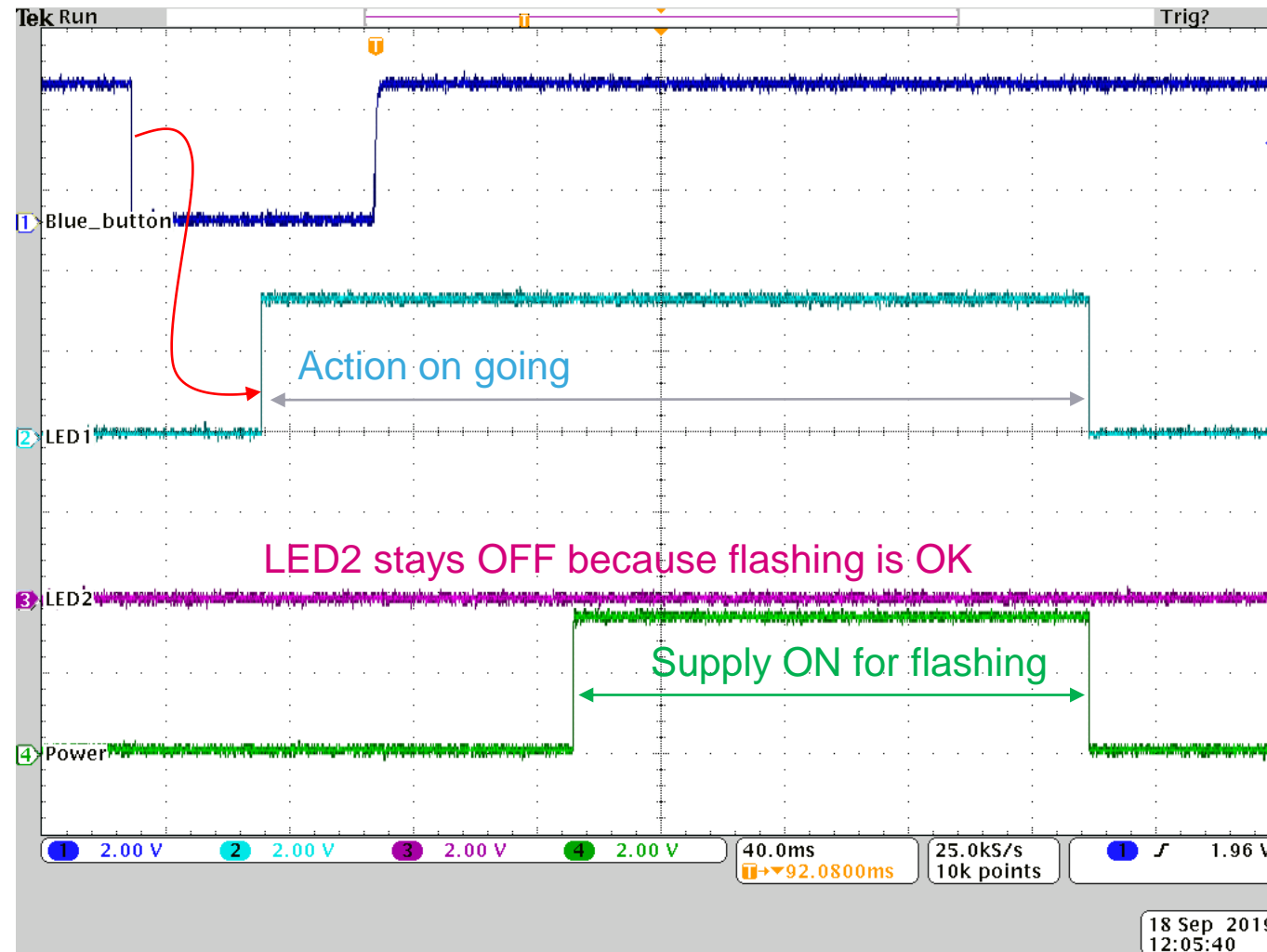

Flashing ends: supply is stopped
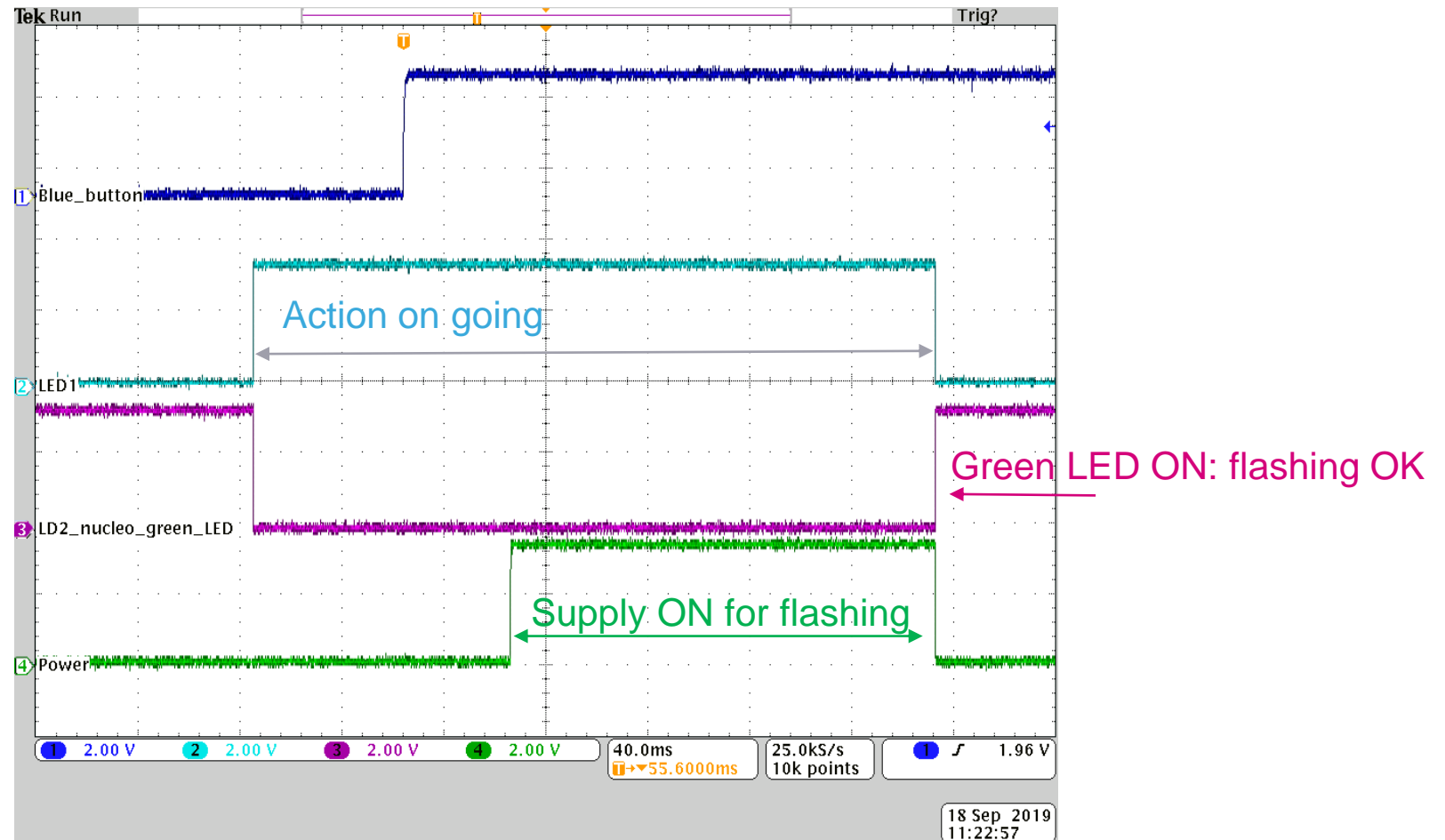
LED1 & LED2 behavior when flashing OK

- LED1 is ON during flashing sequence. As flashing goes well LED2 stays OFF after flashing ends
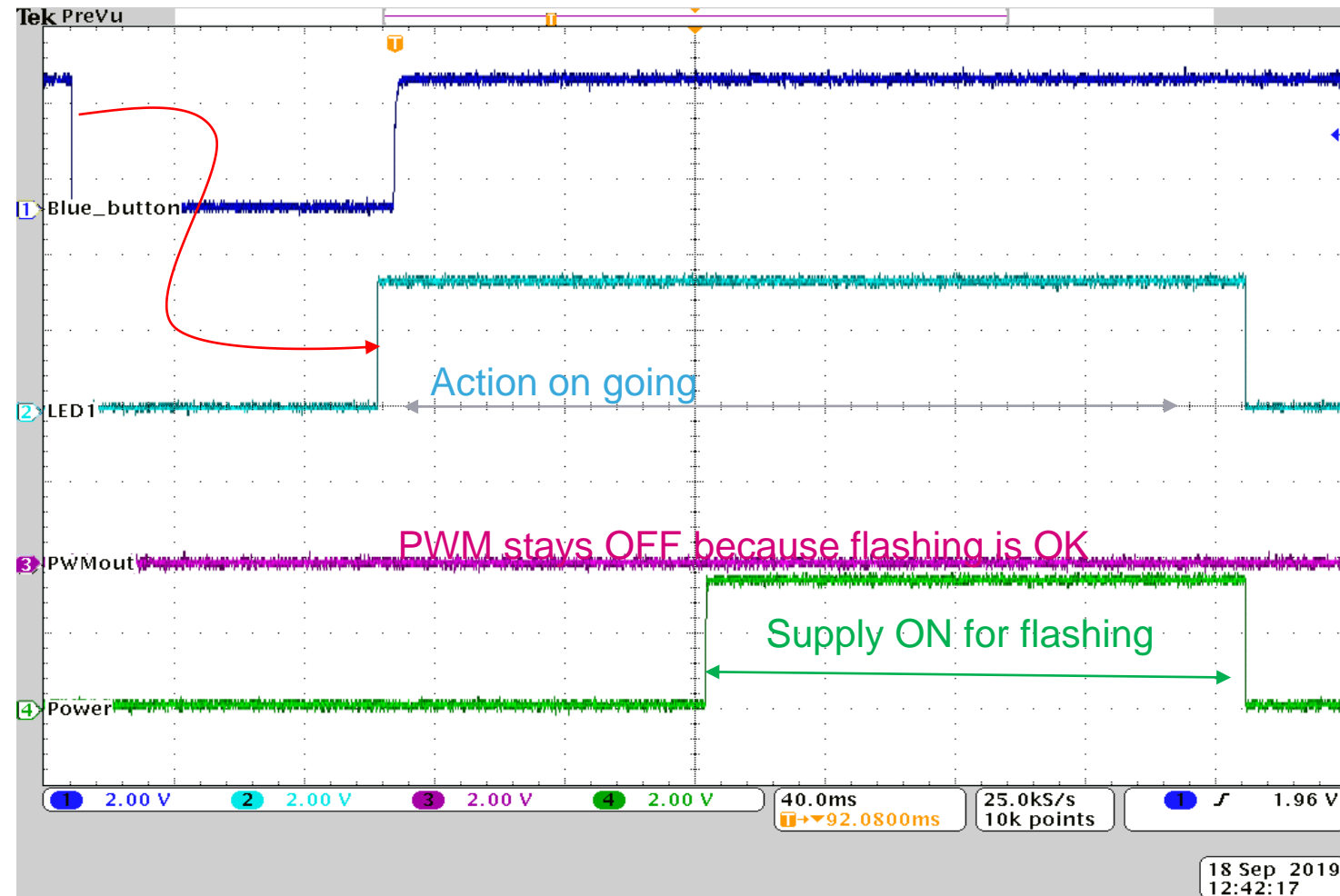
LED1 & LED2 behavior when flashing OK

- LED1 is ON during flashing sequence, as flashing goes well Green led is ON after flashing ends
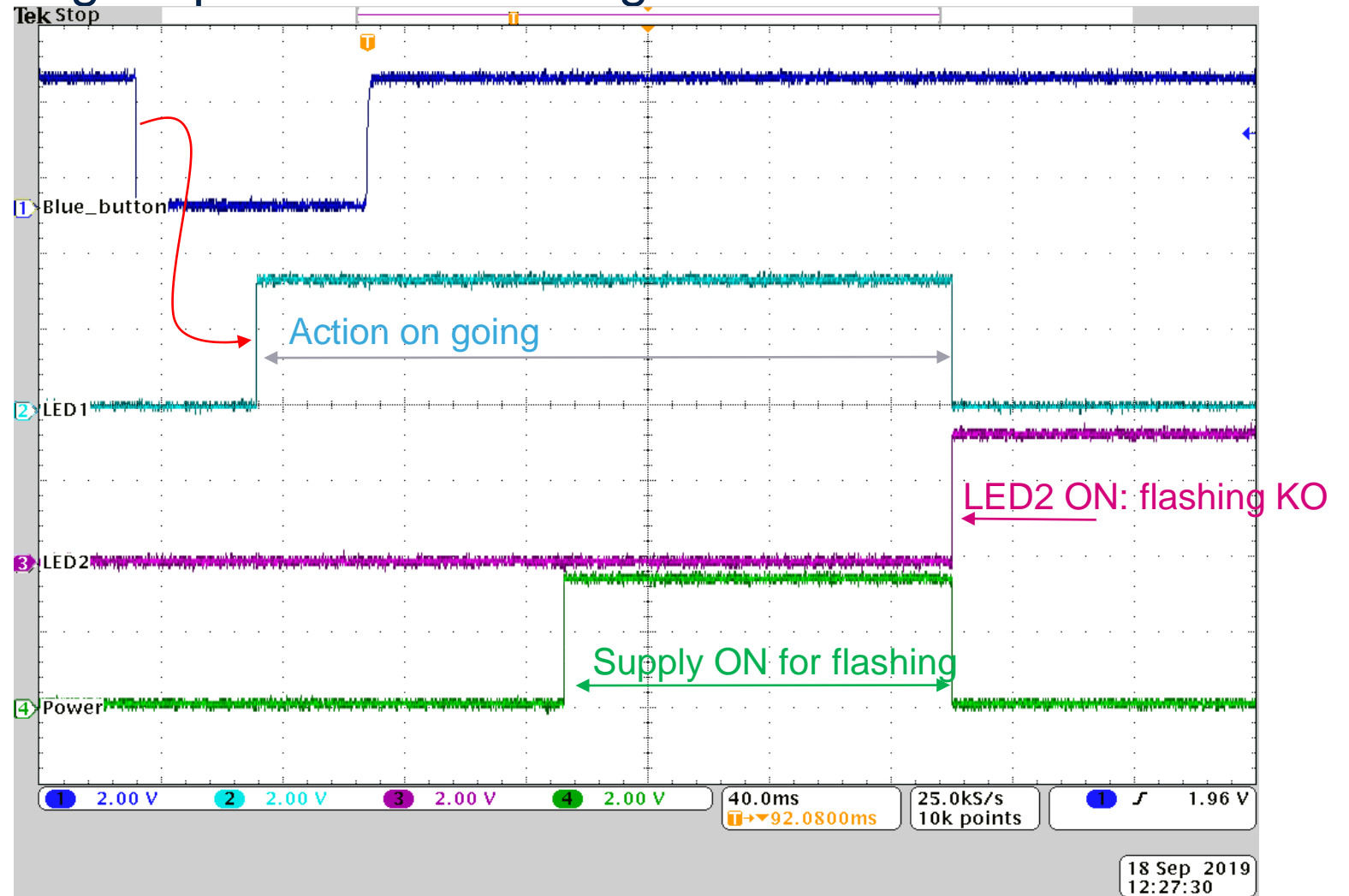
LED1 & PWM behavior when flashing OK

- LED1 is ON during flashing sequence. As flashing goes well PWM stays OFF after flashing ends

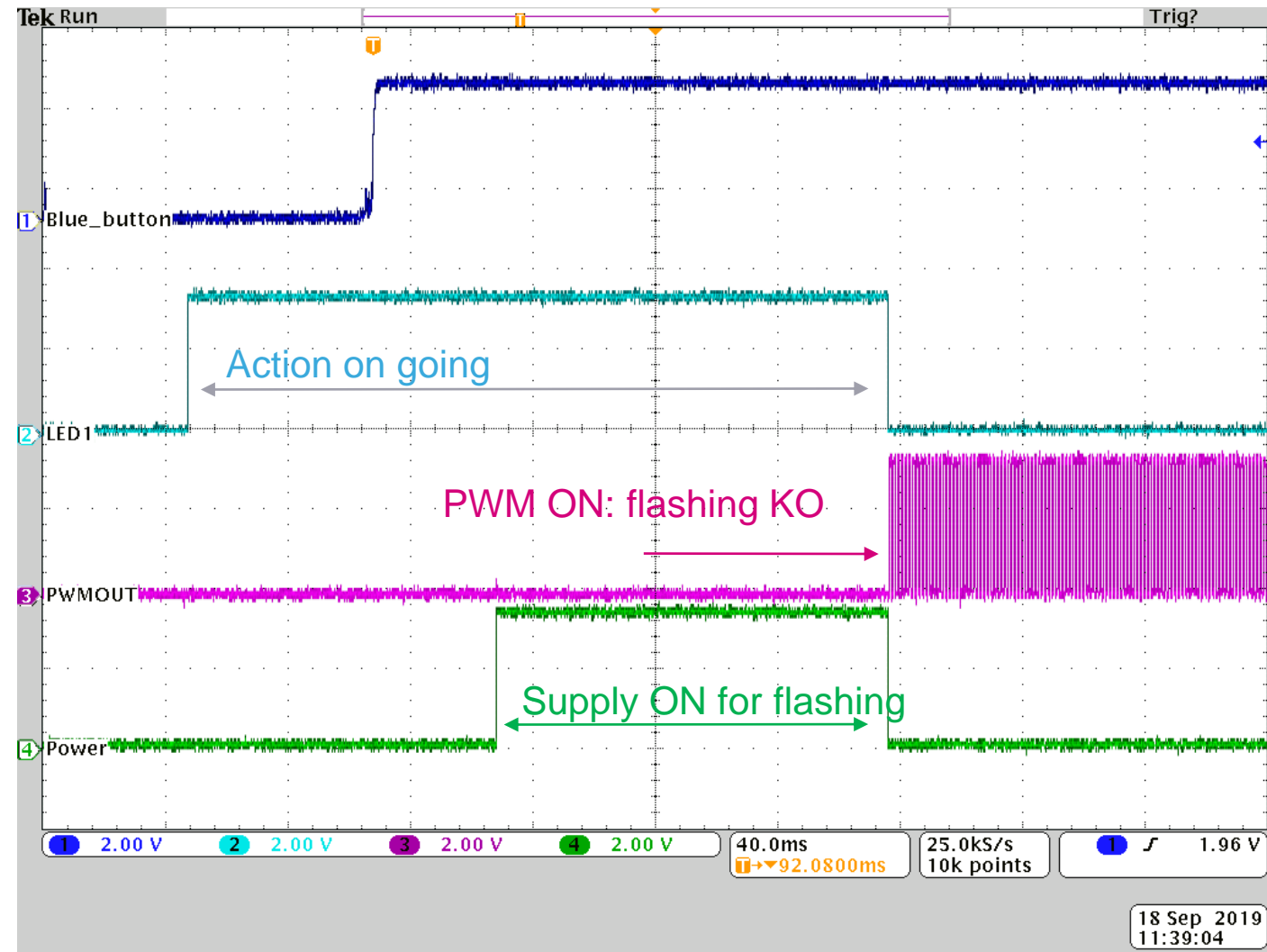# LED1 & LED2 behavior when flashing fails

- LED1 is ON during flashing sequence. As flashing failsLED2 is ON after flashing ends

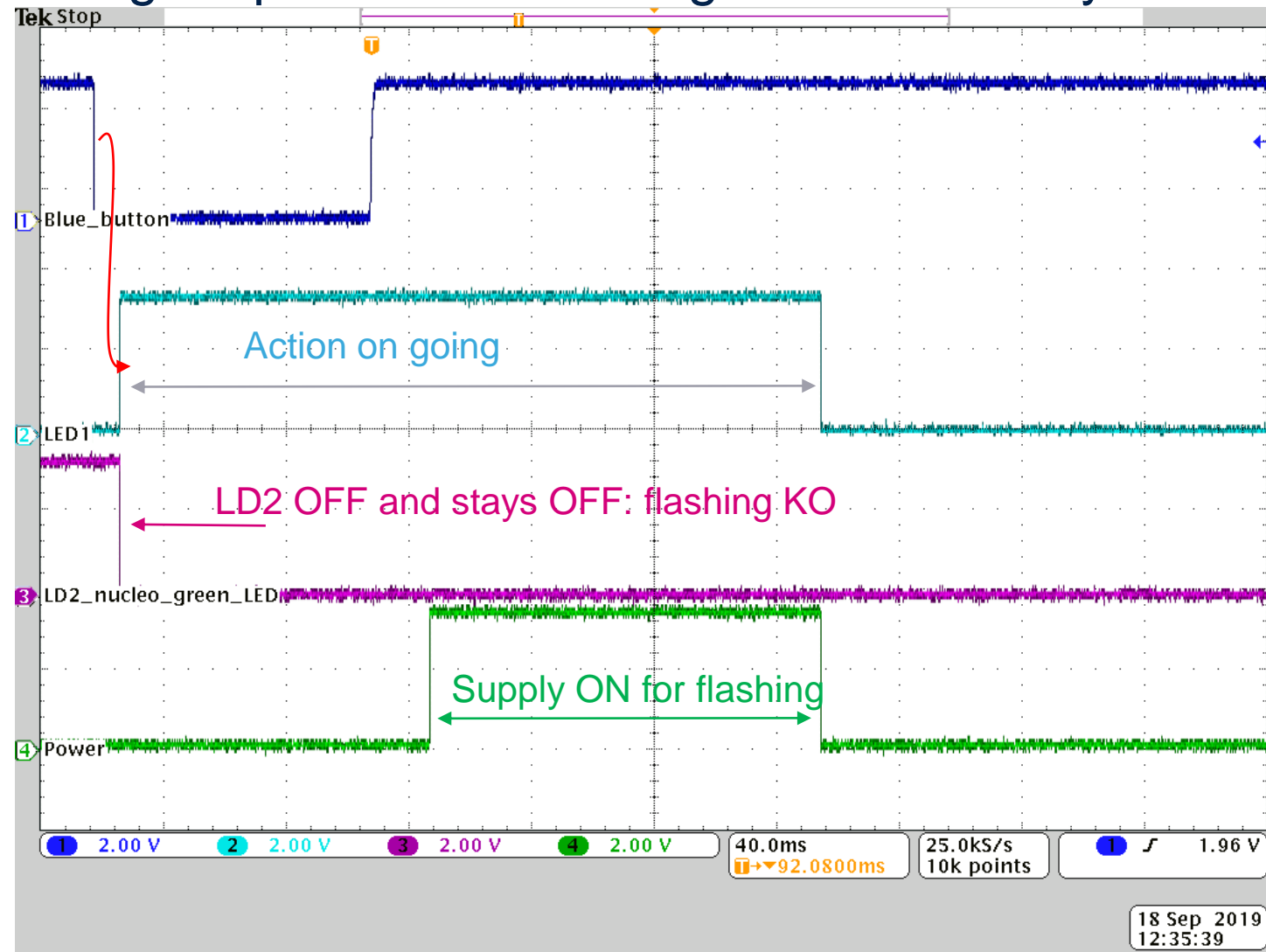# LED1 & PWM behavior when flashing fails

- LED1 is ON during flashing sequence. As flashing fails well PWM is switched ON after flashing ends
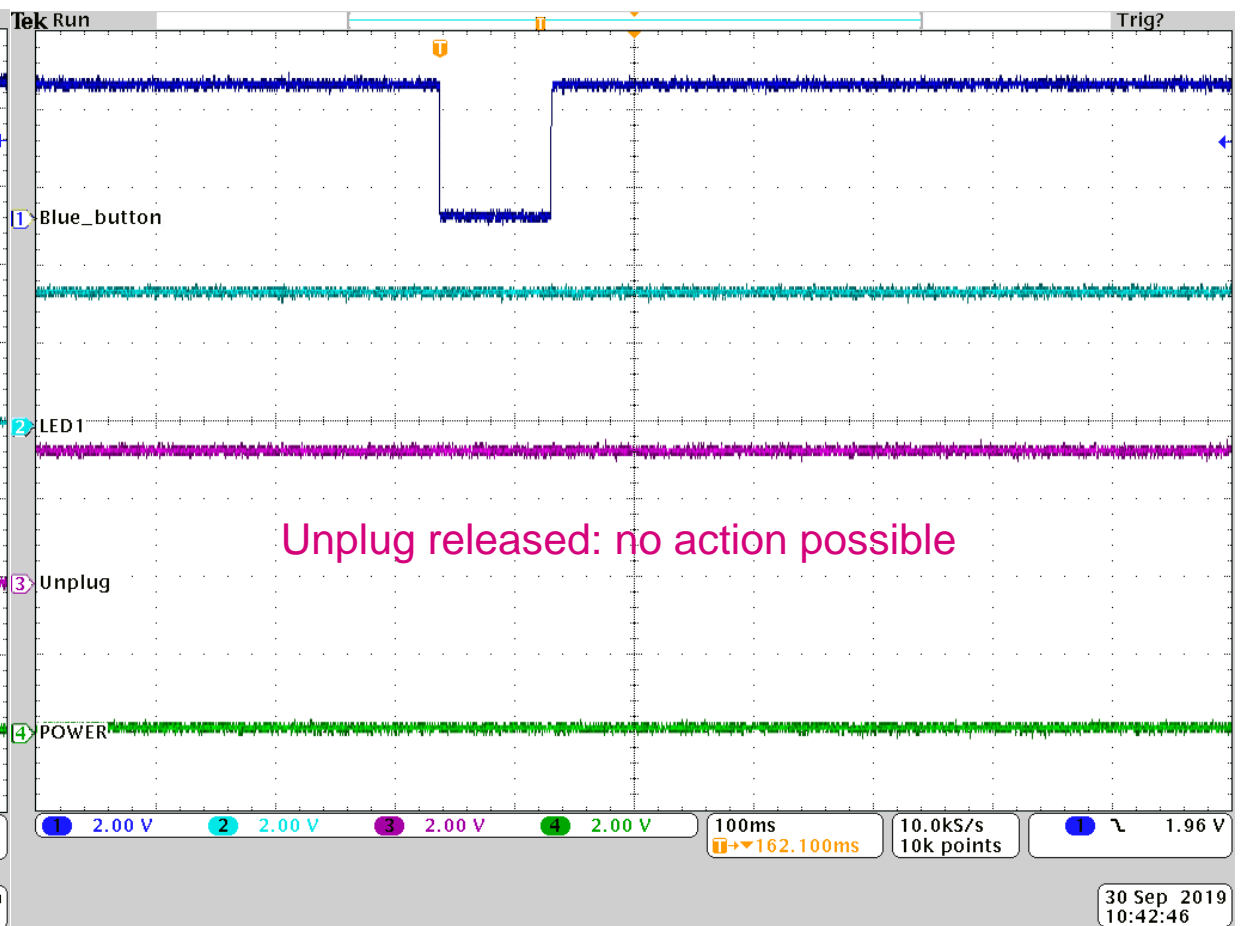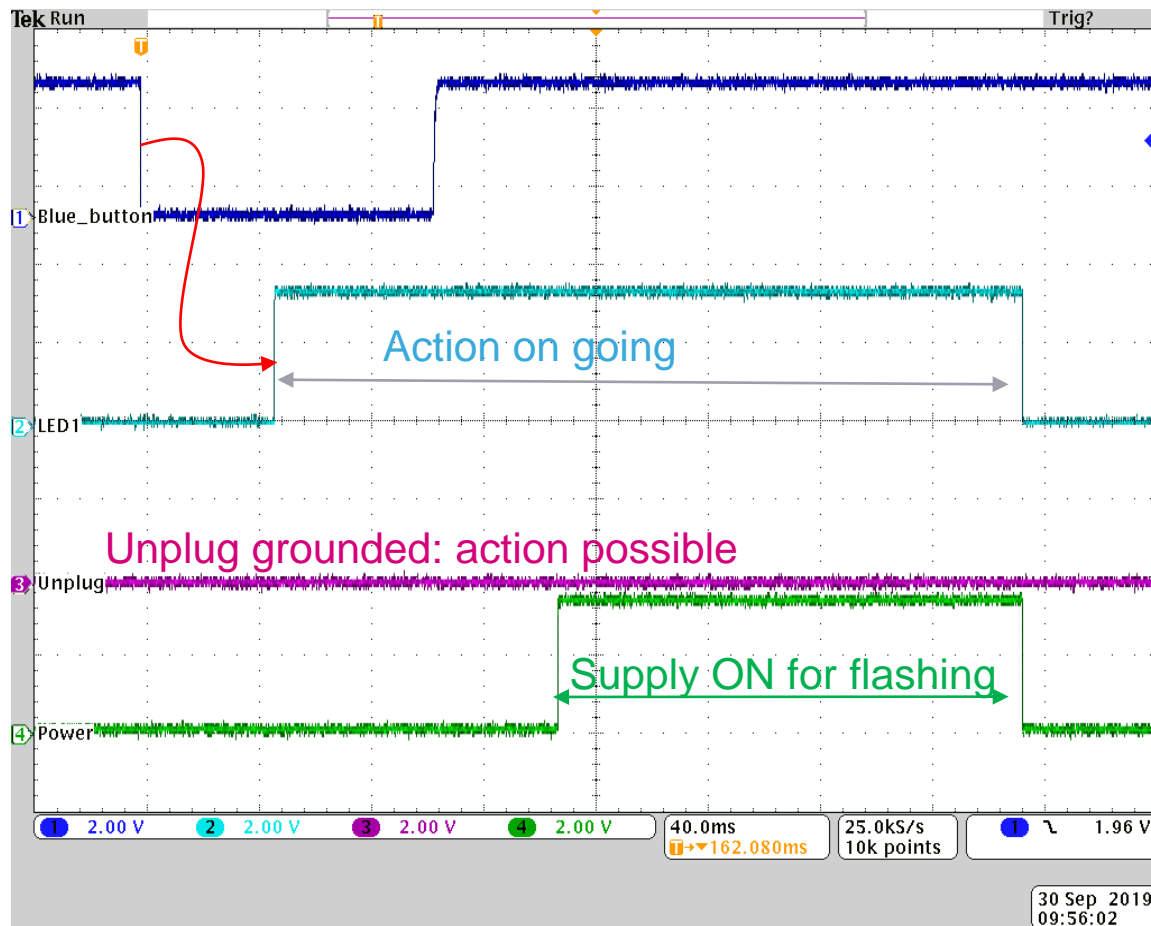
LED1 & LED2 behavior when flashing fails

- LED1 is ON during flashing sequence. As flashing fails LED2 stays OFF after flashing ends

- Behavior difference when Unplug pin is grounded or released while Blue buttn is pressed

LEDs behavior when Unplug set

- When Unplug in is released, Green LED and LED2 go to OFF. LED1 back to ON