AURIX™ Application Kit - TC3xx Safety

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Included

- Application kit AURIX™ – TC397 TFT
- Evaluation Board AURIX™ – TC3xx Safety 3V1
- Power Supply Adapter 12V, 2A (plugs: USA, UK, EU)
- USB Cable for power and debugging
- Magnet to test GMR sensor

Sales name: APPKIT_A2G_SAFETY
Ordering Code: APPKITA2GSAFETYTOBO1

QR-Code call to action
www.infineon.com/aurixsafetykit

AURIX™ Application Kit - TC3xx Safety

Idea of Safety Kit:

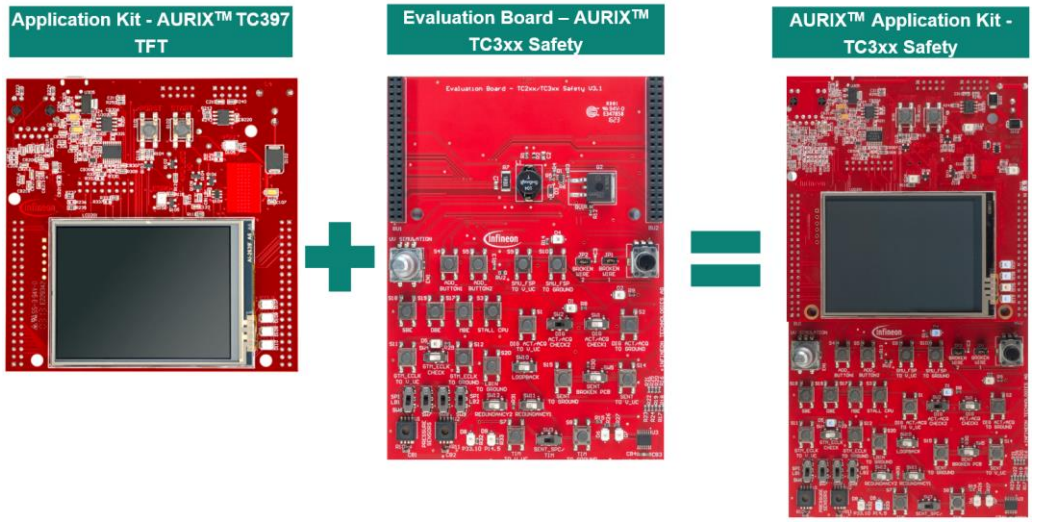
- Explore the full potential of AURIX™ TC3xx ASILB/D's safety features using the AURIX™ Application kit TC3xx Safety
- Learn how to build an ISO26262 complaint application on system level
- Understand how to integrate Tricore™ AURIX™ TC3xx as SEooC to reach ASIL D

The Safety Kit demonstrator:

- The board show cases a wide range of safety functions reflected by a set of typical automotive safety requirements
- Combination of an Application Kit TC397 TFT with an add-on shield board
- Possibility to inject error/fault via hardware / software and to monitor the triggering of SMU alarms on TFT screen

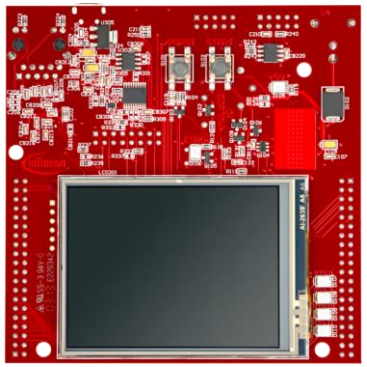
Supporting materials:

- Quick Start Guide with setup instructions
- Comprehensive Application note explaining hardware and software safety features
- Example documentation about a use case metric calculation
- Free available safety software for demonstration purpose



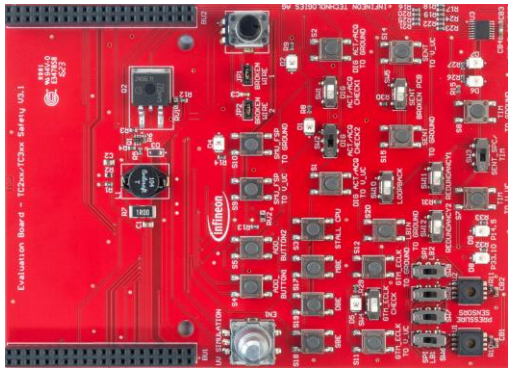
Overview

Application Kit AURIX™ TC397 TFT



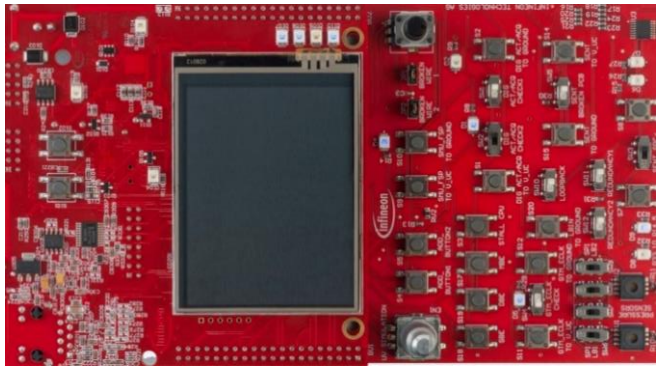
- Infineon's AURIX™ TC397 in LFBGA-292 Package
- LCD XGA Display 320x240
- SD card slot (mini SD)
- High Speed CAN Transceiver (CAN FD capable)
- USB to UART bridge
- Ethernet Gigabit PHY
- LIN-Transceiver
- Crystal 20MHz (default) or External Clock
- USB miniWiggler JDS for easy debugging
- 4 Low Power Status LEDs
- RTC with alarm
- Acoustic beeper
- 100mm x 100mm

Evaluation Board – AURIX™ TC3xx Safety



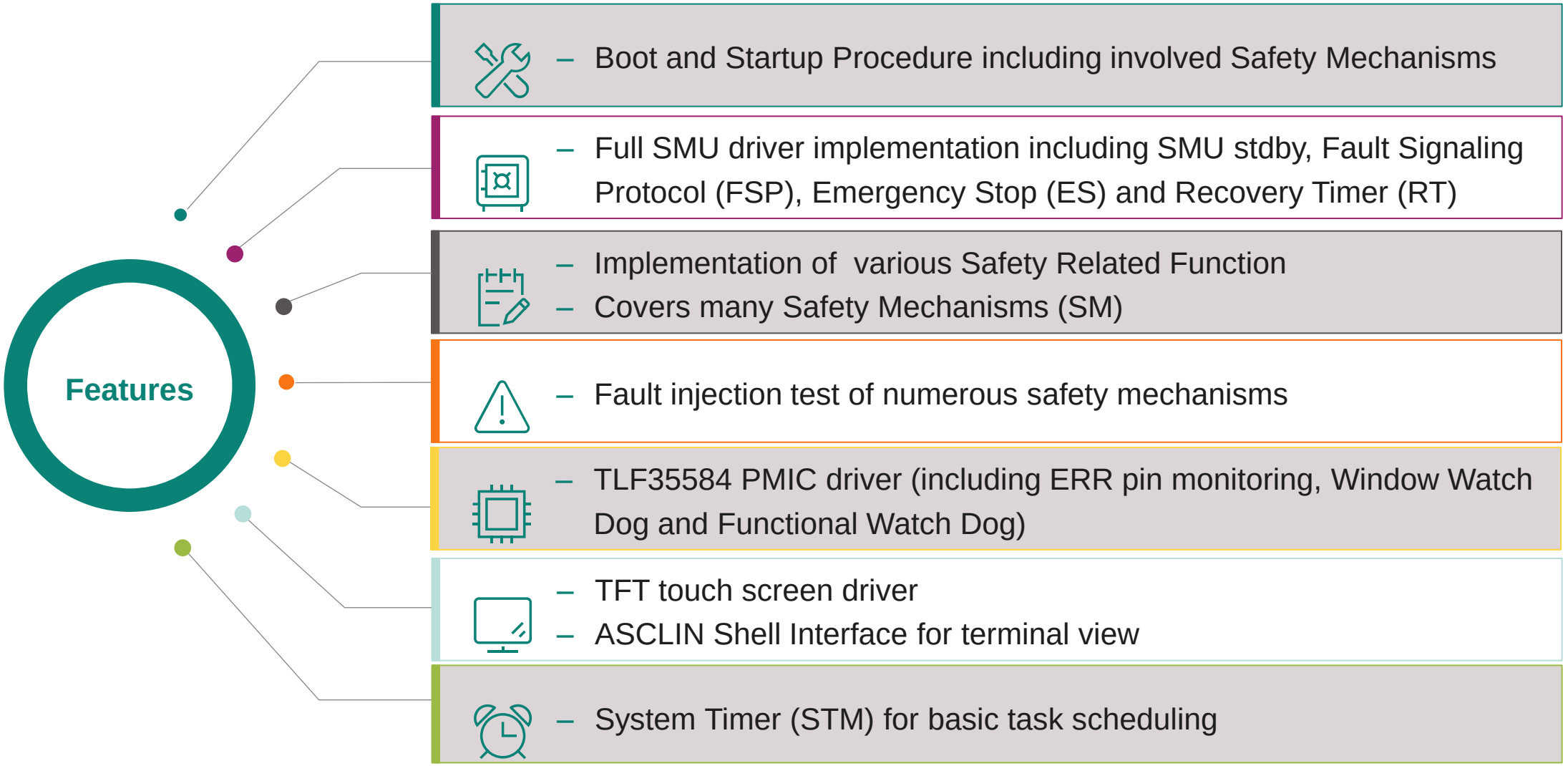
- TLE5012BD E9200 dual die magnetic angle sensor
- Temperature sensor
- KP256 pressure sensors
- Encoder for generating PWM
- Potentiometer for broken wire detection simulation
- Buttons to inject errors
- Switches to change between the different pins
- Low power status LEDs
- Jumpers for breaking signal lines on PCB
- Infineon power transistor
- 140mm x 100mm

AURIX™ Application Kit - TC3xx Safety



- Combination of Application Kit AURIX™ TC397 TFT + Evaluation Board AURIX™ - TC3xx Safety
- Implementation of safety related functions
- Real time data via TFT display
- Fault injection into system through touch screen display, button and switches
- Broken wire detection and undervoltage simulation by hardware circuitry
- AURIX™ Development Studio based well structured, free safety software project
- Comprehensive Application Note describes hardware and software
- Safety Kit demo FMEDA available

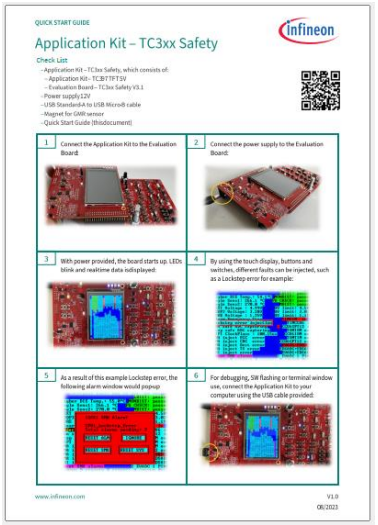
Key Features

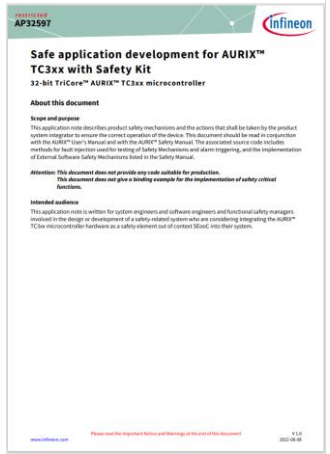


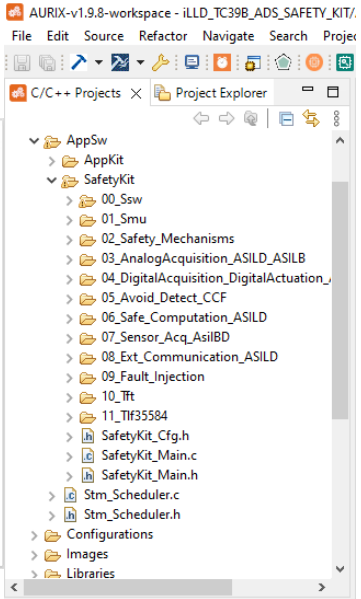
AURIX™ Application Kit - TC3xx Safety Plastic case (Complete Set)

- **List of Item**
  - AURIX™ TC397 5V TFT Kit
  - Evaluation Board TC3xx Safety
  - Power Supply 12V
  - USB cable
  - Magnet to test GMR sensor
  - Quick start guide
  - Plastic case with foam

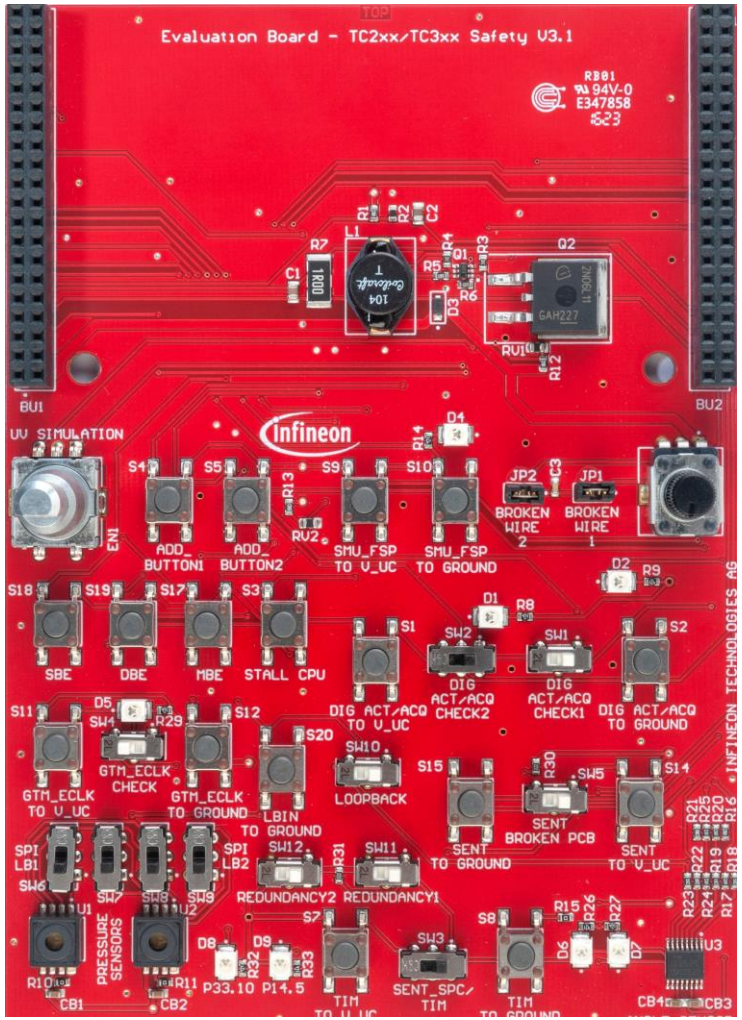
- **Check out**
  - www.infineon.com/aurixsafetykit
  - Application Note „AP32597 Safe Application Development“
  - Functional Safety demonstration code (also pre-installed)
  - Free software available on web
  - Further functional safety training materials
  - Sales name:APPKIT_A2G_SAFETY



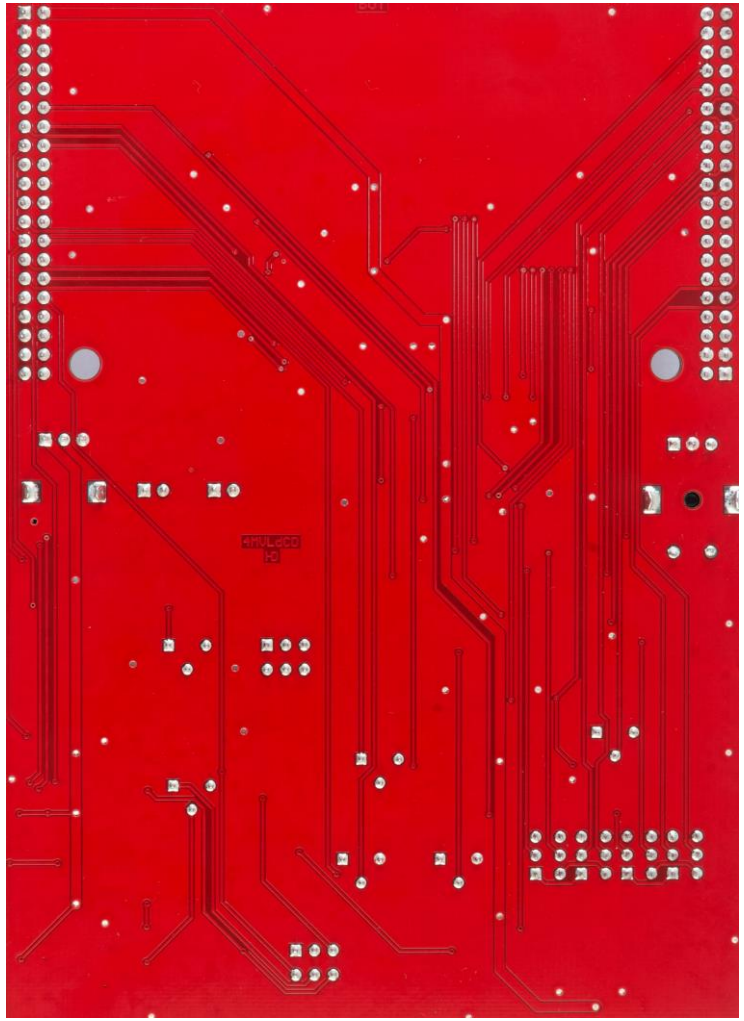




Evaluation Board AURIX™ - TC3xx Safety

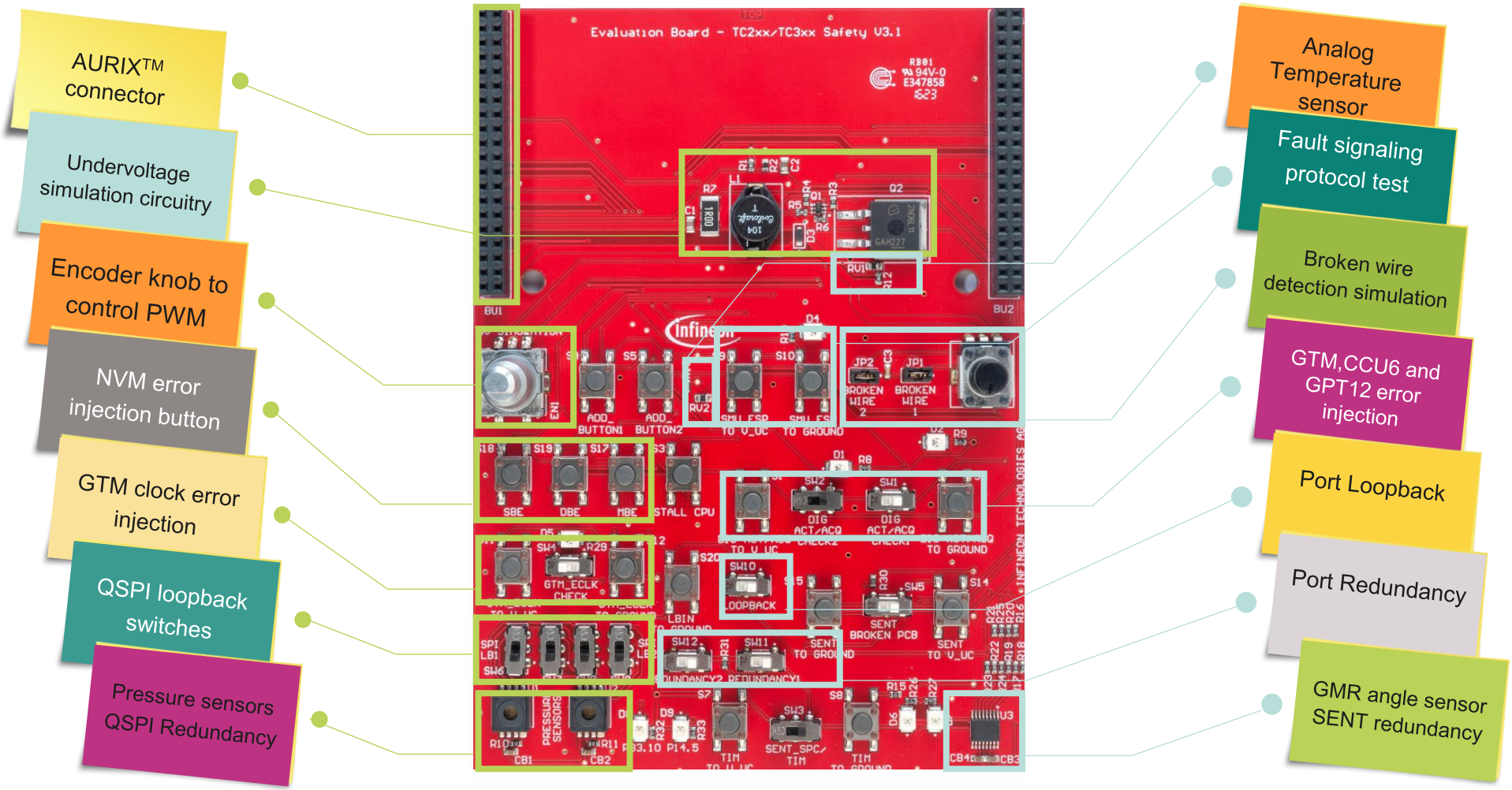


Top View



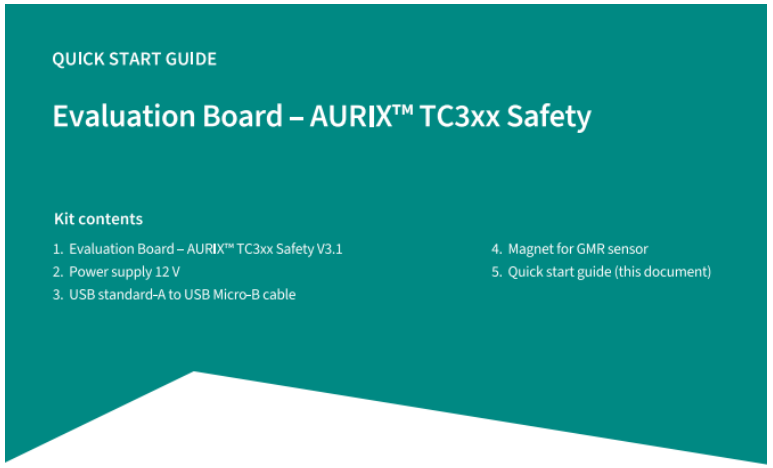
Bottom View

Available Functionalities



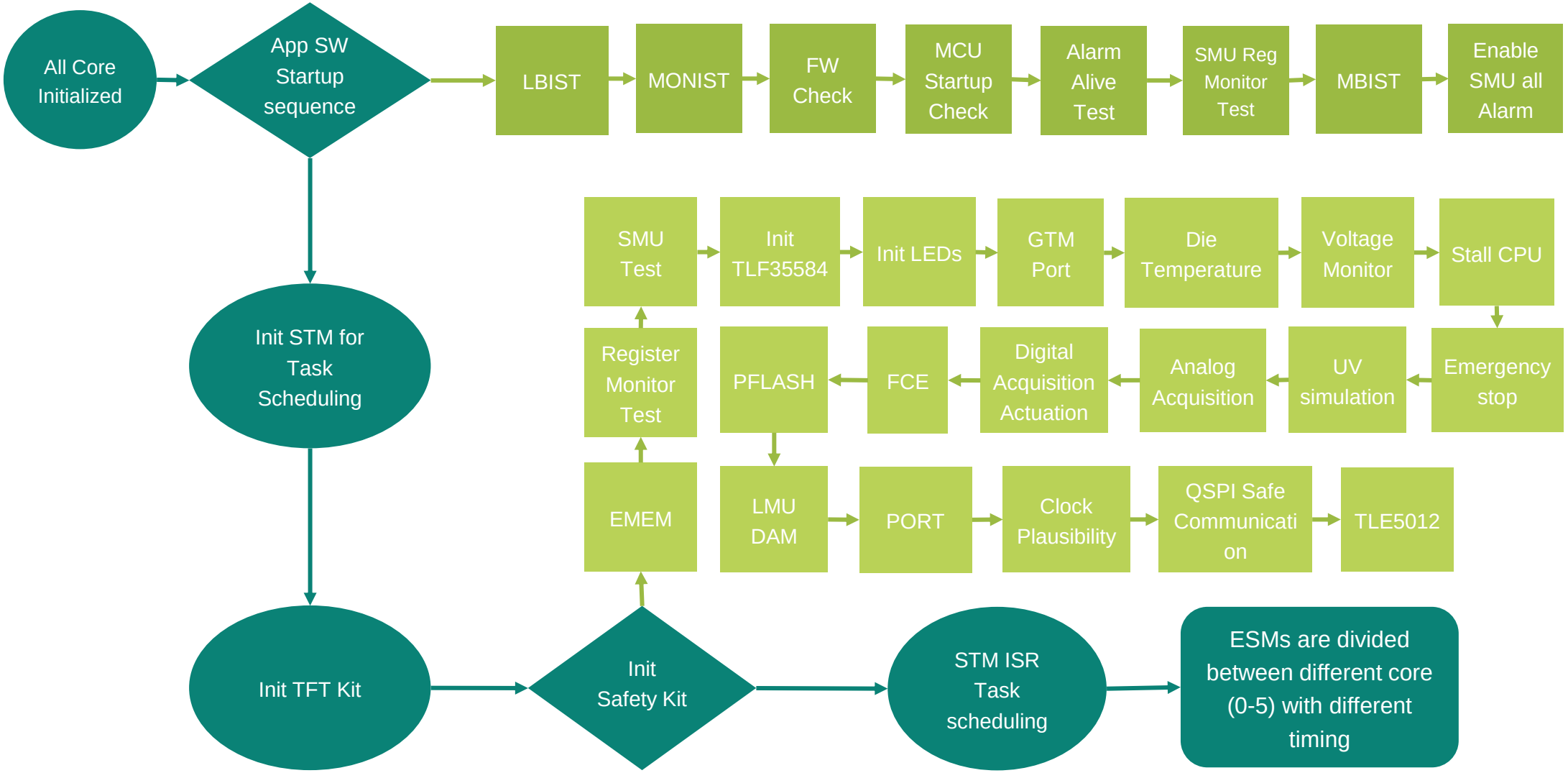
Evaluation Board - AURIX™ TC3xx Safety Card Box (Standalone Set)

- Extension board for users already owning an AURIX™ Application Kit TC397 TFT (KIT_A2G_TC397_5V_TFT)
- The board comes with following accessories
  - Evaluation Board – AURIX™ TC3xx Safety
  - Power Supply
  - USB Cable
  - Small Magnet for GMR sensor
  - Quick Start Guide

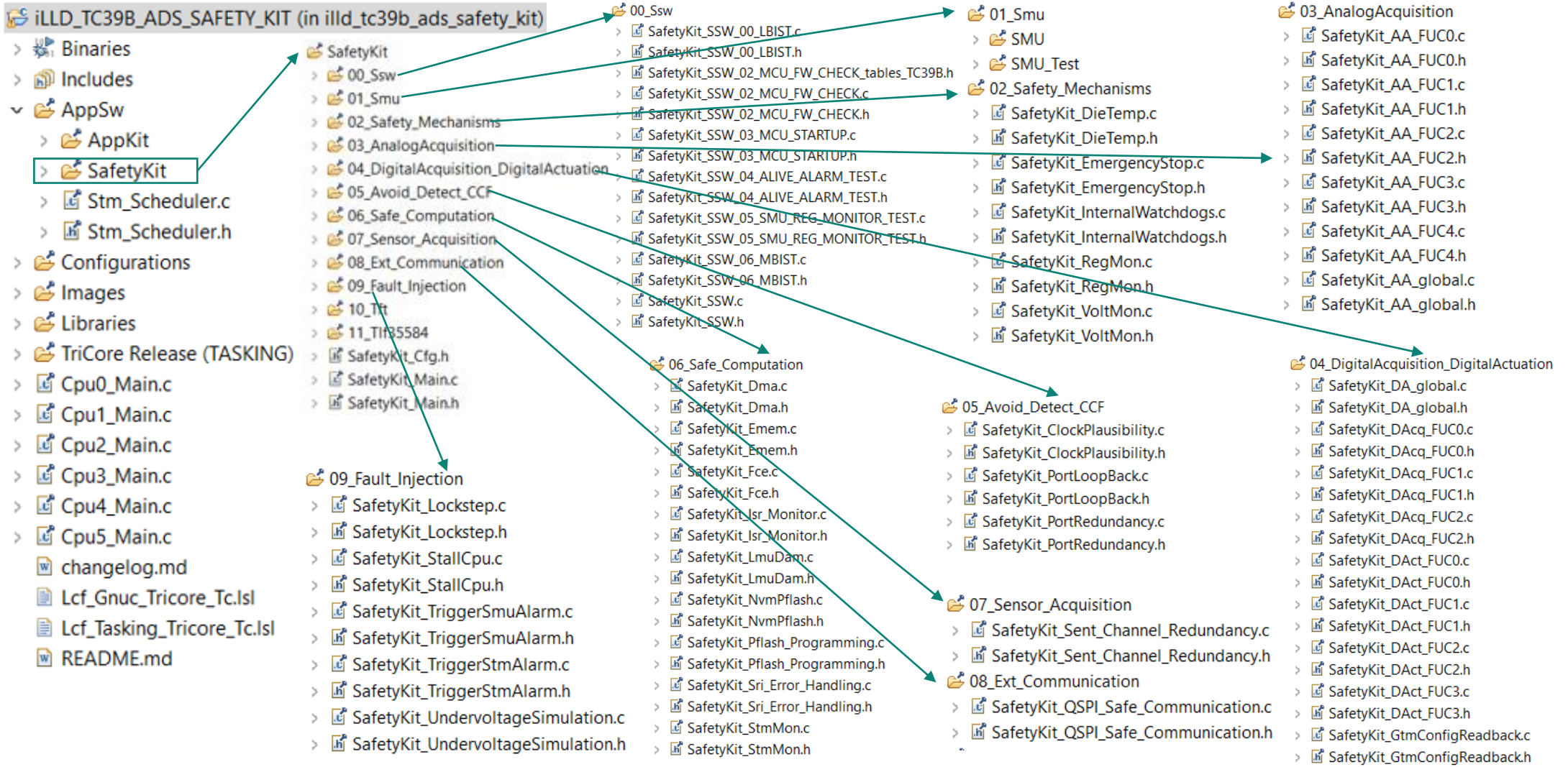


- **Check out**
  - www.infineon.com/aurixsafetykit
  - Application Note „AP32597 Safe Application Development“
  - Functional Safety demonstration code (also pre-installed)
  - Free software available on web
  - Further functional safety training materials
  - Sales name:EVABOARD_A2G_SAFETY

Software Flow



Software (ADS Project) Overview



User Interface

```
g_SafetyKitStatus.analogAcquisitionMode = run_AA_ASILD_FUCO_mode
g_analogAcquisitionStatus = (
  evadcConversionResult = (
    3564,
    3503,
    0),
  evadcVoltageResults = (
    4.2760253,
    4.276123,
    0.91918945),
  evadcRv1NtcTemp = 37.37323,
  evadcRv2NtcTemp = 37.369354,
  evadcRv1Calibration = 0.074560642,
  evadcRv2Calibration = 0.0,
  evadcRv1MeasDoneFlag = 1,
  evadcRv2MeasDoneFlag = 1,
  evadcUvSimSig1DoneFlag = 0,
  evadcUvSimSig2DoneFlag = 0,
  evadcBrokenWireMeasDoneFlag = 0,
  edsadcConversionResult = (0, 0, 0),
  edsadcVoltageResults = (0.0, 0.0, 0.0),
  edsadcRv1NtcTemp = 0.0,
  edsadcRv2NtcTemp = 0.0,
  edsadcRv1Calibration = 0.0,
  edsadcRv2Calibration = 0.0,
  initCnt = 3)
```

Debugger View

Terminal View

TFT Touch Display

```
Hello World
I am the Safety Application kit TC397  ADS SW 3V1  with HW 3V1...

Enter 'help' to see the available commands

Shell>help
standby     : Switch TLF35584 to standby or TLF30682 to disable state
showtlf     : Show status of TLF register
trigAlarm   : Trigger an SMU alarm
help      : Display command list, and command help.
Shell>trigAlarm
Syntaxerror : invalid node
Shell>trigAlarm ?
Syntax      : trigAlarm AG AN
            > Trigger the SMU alarm AN of group AG
Shell>trigAlarm 8 23
Shell>
Default IGCS0 SMU Alarm!
See alarm status regs


Default IGCS0 SMU Alarm!
See alarm status regs


Default IGCS0 SMU Alarm!
See alarm status regs
```

```
SafetyKit TC397 ADS SW 3V1  HW 3V1
                                LBIST: passed
Higher DIE Temp.: 67.8°C MONBIST: passed
Angle Sens1: 272.6 °C     FW CHECK: passed
Angle Sens2: 260.7 °C        MBIST: passed
VEXT Voltage : 4.99V       UV limit: 4.50V
VDDP3 Voltage: 3.29V       UV limit: 3.02V
CORE Voltage : 1.25V       UV limit: 1.18V
Clear Emergency Stop          TIMTIM  in
Lockstep error injection       TIMCCU6 in
Run safe ADC capturing       CCU6GPT12 in
Stop safe ADC capturing         TOMIOM out
QSPI ClockPlaus : 100.10us     CCU6IOM out
DMA inject ECC  error          TOMTIM out
DMA inject CRC  error        CCU6GPT12 out
DMA inject Dest error         EVADC+EVADC
DMA inject TS error          EDSADC+EDSADC
SRI inject error              EVADC+EDSADC
Reset SMU alarms          2 EVADC 1 PIN
 iMENU  STDOUT0  STDOUT1  GRAPH0  OFF
```

```
SafetyKit TC397 ADS SW 3V1  HW 3V1
                                LBIST: passed
Higher DIE Temp.: 65.3°C MONBIST: passed
Angle Sens1: 272.7 °C     FW CHECK: passed
Angle Sens2: 261.0 °C        MBIST: passed
VEXT                                4.50V
VDDP3                               3.02V
CORE                                1.18V
Clear                                in
Locks                              U6 in
Run s                              12 in
Stop                                M out
QSPI                                M out
DMA i                               M out
DMA i                              2 out
DMA i                             VADC
DMA i                            DSADC
SRI i                            DSADC
Reset SMU alarms          2 EVADC 1 PIN
 iMENU  STDOUT0  STDOUT1  GRAPH0  OFF

  IGCS2 SMU Alarm!
  FSI_PFlash_2BitErr
  Total alarms pending: 2
  RESET ALM   IGNORE
  RESET SMU   RESET SYS
```

```
SafetyKit TC397 ADS SW 3V1  HW 3V1
SMU_struct_init: pass
SMU_core_init: pass                    up
SMU_core_alarm_config: pass
SMU_core_alive_test: pass
SMU_core_alive_test_clear: pass
SMU_core_Keys_test: pass
SMU_core_Keys_test_clear: pass
SMU_core_FSP_config: pass
SMU_core_FSP_reaction_to_alm: pass
SMU_core_SW_alarm_trigger: pass
SMU_stdby_FSP0_driving_enable: pass
SMU_stdby_FSP1_driving_enable: pass
SMU_core_alarm_PES_set: pass
SMU_SFF_trigger_test: pass
SMU_SFF_test_result_check: pass
SMU_SFF_alm_flag_clear: pass
SMU_recovery_timer_conf: pass        down
 iMENU  STDOUT0  STDOUT1  GRAPH0  OFF
```

Key Take away

Ready to Start

- Start developing and exploring the safety features of AURIX™ microcontroller in one package
- Learn how to build ISO26262 complaint application on system level by utilizing Infineon sensors and other components
- Understand how to integrate AURIX™ TC397 as SEooC to reach ASIL D

Free Safety Software

- Free Safety software based on AURIX™ development Studio (ADS)
- Implementation of many safety related function
- Showcase numerous Safety Mechanisms (SM)
- Error injection test possibility via Touch screen and hardware component

Collaterals

- Quick Start Guide
- Detail overview of the kit and available material on Infineon official website
- Comprehensive Application note about hardware and software features
- Example documentation about a use case metric calculation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