/IPB/20_Software/SCDD Library/LVDC DSP_C

SCDD_Qspi

Software Component Detailed Design

Version: 0.1 (SW_0300 Baseline)
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ID	Software Component Detailed Design
SCDD_Qspi_1	1 **Software Component Design Description**
SCDD_Qspi_2	1.1 **Introduction**
SCDD_Qspi_3	This document describes the needed requirements for a SWC or BSWM.
SCDD_Qspi_4	This is module is the Software Component Detail Description. It contains each SW component of each SW architecture. It is always structured in: External Interface Internal Design Requirements

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SCDD_Qspi_5	[2] **Attributes**
SCDD_Qspi_6	Agreed attributes for SWE.3 (ENG.6)
SCDD_Qspi_7	**Delta_ObjectType:** Showing the status of the implementation. Values: • tbd (default) • heading • feature • information • requirement
SCDD_Qspi_8	**Delta_SW_Construction_Status:** Showing the status of the implementation. Values: • tbd (default) • ready for implementation -> Requirement is ready and can be implemented • created -> internal design (inclusive design review) and source code is ready (inclusive code review) • finished -> module test (inclusive code review) done • postponed -> requirement that is not part of the current release
SCDD_Qspi_9	**Delta_SW_Construction_Comment:** Contains a comment if needed Values: • "free text"

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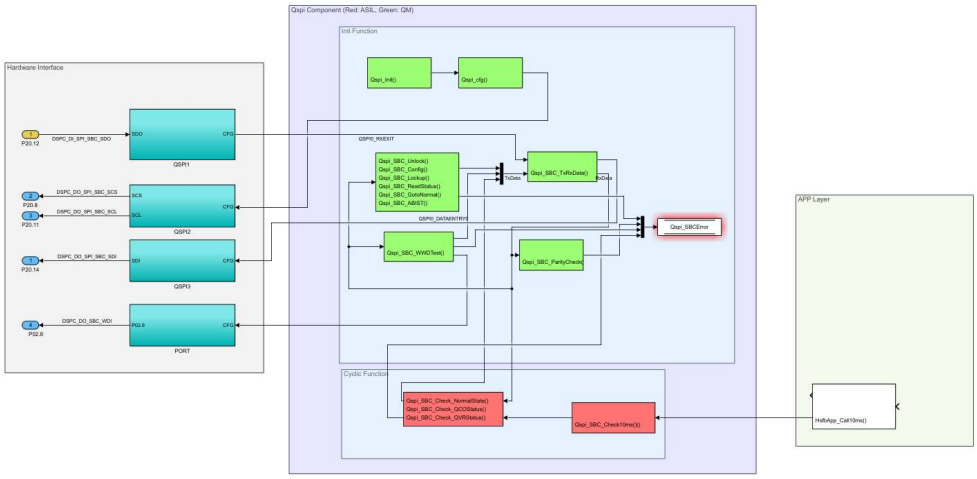
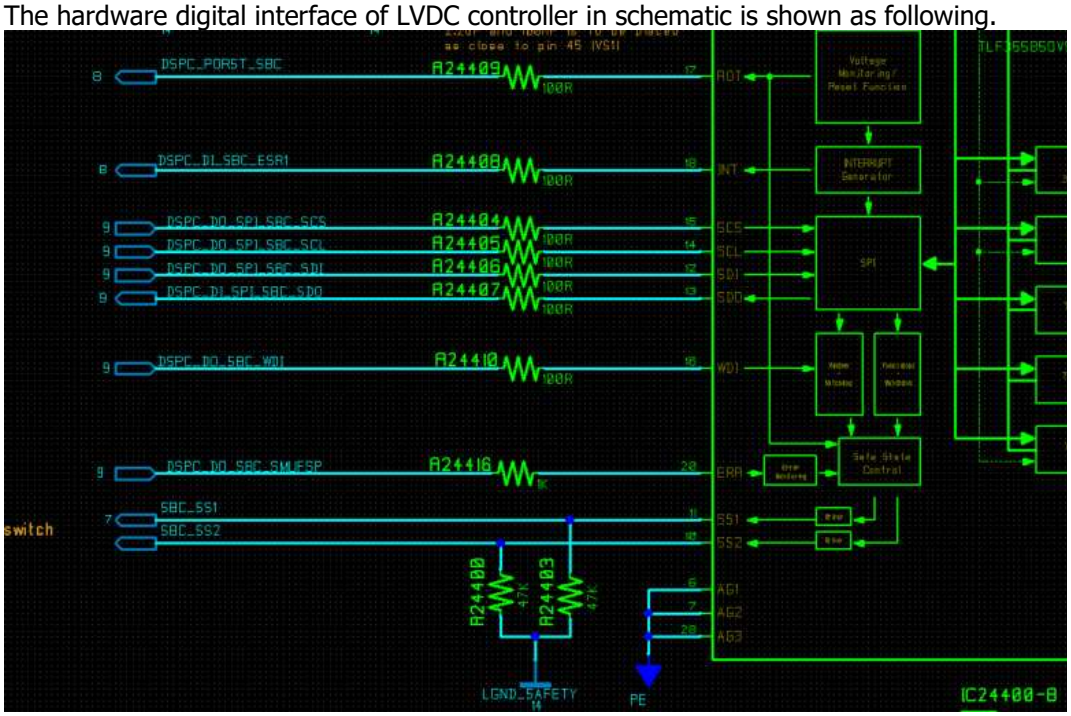
SCDD_Qspi_10	[3] **Views**
SCDD_Qspi_11	**SwConstructionView**: This view is used for the sw construction process.
SCDD_Qspi_12	**SCDD_EditView**: This view is used for creating the content of SCDD

ID	Software Component Detailed Design
SCDD_Qspi_13	# 4 Qspi
SCDD_Qspi_14	## 4.1 External Interfaces
SCDD_Qspi_15	The function interface of this component are as following:

Function	Signal Name	Data Type	Direction
Qspi_Init	N/A	N/A	N/A
Qspi_cfg	N/A	N/A	N/A
Qspi_StartUp	N/A	N/A	N/A
Qspi_SBC_Unlock	N/A	N/A	N/A
Qspi_SBC_Lockup	N/A	N/A	N/A
Qspi_SBC_Config	N/A	N/A	N/A
Qspi_SBC_ReadStatus	N/A	N/A	N/A
Qspi_SBC_GotoNormal	N/A	N/A	N/A
Qspi_SBC_ABIST	N/A	N/A	N/A
Qspi_SBC_WWDTest	N/A	N/A	N/A
Qspi_SBC_Check_NormalState	N/A	N/A	N/A
Qspi_SBC_Check_QCOStatus	N/A	N/A	N/A
Qspi_SBC_Check_QVRStatus	N/A	N/A	N/A
Qspi_SBC_TxRxData	TxData	uint16	Input
Qspi_SBC_TxRxData	RxData	Uint16	Output
Qspi_SBC_ParityCheck	N/A	N/A	N/A

SCDD_Qspi_16	## 4.2 Internal design
SCDD_Qspi_27	The Qspi component is designed with hand code 4-header structure.
SCDD_Qspi_83	
SCDD_Qspi_18	## 4.3 Requirements
SCDD_Qspi_19	### 4.3.1 ASIL
SCDD_Qspi_42	The Qspi component is ASIL-B level.

<table>
<tr><th>ID</th><th>Software Component Detailed Design</th></tr>
<tr><td>SCDD_Qspi_20</td><td>4.3.2 Hardware Interface</td></tr>
<tr><td>SCDD_Qspi_78</td><td>The C code of this component can be found in following link:
https://desoeap16.delta.corp/svn/IPB_PPE_auto_porsche/trunk/20_Design/23_Software/2304_Implementation/10_APPL/40_DcDcController/4010_HSFB_LVDC_B1_MBD/30_Bsw/Mcal/Qspi</td></tr>
<tr><td>SCDD_Qspi_47</td><td>The hardware schematic can be found in following link:
https://desoeap16.delta.corp/svn/IPB_PPE_auto_porsche/trunk/20_Design/25_Layout_Design/2502_Isolated_IPB/11_LV-DCDC_PWR-CTRL%20BD/C0/SCH&PCB/2954802300M.scm</td></tr>
<tr><td>SCDD_Qspi_44</td><td>The HSI of LVDC controller can be found in following link:
https://desoeap16.delta.corp/svn/IPB_PPE_auto_porsche/trunk/20_Design/20_System_Design/2020_System_Archicture/50_HSI/HSI_all_C0.xlsx</td></tr>
<tr><td>SCDD_Qspi_76</td><td>The SBC requirement can be found in following link:
https://desoeap16.delta.corp/svn/IPB_PPE_auto_porsche/trunk/80_Functional_Safety/86_Product_Development_at_Software_Level/SBC_Requirements_LVDC.xlsx</td></tr>
<tr><td>SCDD_Qspi_79</td><td>The hardware digital interface of LVDC controller in schematic is shown as following.
 
</td></tr>
<tr><td>SCDD_Qspi_81</td><td>The hardware digital signals of LVDC controller are as following.
<table>
<tr><th>Signal Name</th><th>Description</th></tr>
<tr><td>DSPC_DI_SPI_SBC_SDO</td><td>SPI Data Output Pin</td></tr>
<tr><td>DSPC_DO_SPI_SBC_SCS</td><td>SPI Chip Select Pin</td></tr>
<tr><td>DSPC_DO_SPI_SBC_SCL</td><td>SPI clock signal Pin</td></tr>
<tr><td>DSPC_DO_SPI_SBC_SDI</td><td>SPI Data Input Pin</td></tr>
<tr><td>DSPC_DO_SBC_WDI</td><td>WatchDog pin</td></tr>
</table></td></tr>
<tr><td>SCDD_Qspi_21</td><td>4.3.3 Qspi Function</td></tr>
</table>

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SCDD_Qspi_52	4.3.3.1 **Qspi_Init Function**
SCDD_Qspi_55	This function is the initialization function of Qspi component. This function will call Qspi_cfg function.
SCDD_Qspi_92	Qspi_cfg is used for configuration of Qspi peripheral.
SCDD_Qspi_57	4.3.3.2 **Qspi_StartUp Function**
SCDD_Qspi_58	This function is used for configuration of SBC. This function will call Qspi_SBC_Unlock, Qspi_SBC_Config, Qspi_SBC_Lockup, Qspi_SBC_ReadStatus, Qspi_SBC_GotoNormal, Qspi_SBC_ABIST, Qspi_SBC_WWDTest function.
SCDD_Qspi_74	Qspi_SBC_Unlock: Write unlock key to PROTCFG register. Qspi_SBC_Config: Write configuration to SYSPCFG0, SYSPCFG1, WDCFG0, WDCFG1, FWDCFG, WWDCFG0, WWDCFG1 register. Qspi_SBC_Lockup: Write lock key to PROTCFG register.
SCDD_Qspi_86	Qspi_SBC_ReadStatus: Read configuration of SYSPCFG0, SYSPCFG1, WDCFG0, WDCFG1, FWDCFG, WWDCFG0, WWDCFG1 register.
SCDD_Qspi_87	Qspi_SBC_GotoNormal: Write GotoNormal command to DEVCTRL and DEVCTRLN register.
SCDD_Qspi_88	Qspi_SBC_ABIST: Write ABIST command to ABIST_SELECT0, ABIST_SELECT1, ABIST_SELECT2, ABIST_CTRL0 register.
SCDD_Qspi_89	Qspi_SBC_WWDTest: Test WWD counter by stop WDI one period and read WWDSTAT register.
SCDD_Qspi_59	4.3.3.3 **Qspi_SBC_Check10ms Function**
SCDD_Qspi_60	This function is used for checking SBC status every 10ms. This function will call Qspi_SBC_Check_NormalState, Qspi_SBC_Check_QCOStatus, Qspi_SBC_Check_QVRStatus function.
SCDD_Qspi_75	Qspi_SBC_Check_NormalState: Check Normal state by read DEVSTAT register.
SCDD_Qspi_85	Qspi_SBC_Check_QCOStatus: Check QCO status by read MONSF1, MONSF0, OTFAIL register.
SCDD_Qspi_84	Qspi_SBC_Check_QVRStatus: Check QVR status by read MONSF1, MONSF0, OTWRNSF register.
SCDD_Qspi_61	4.3.3.4 **Qspi_SBC_TxRxData Function**
SCDD_Qspi_62	This function is used for sending TX data to SBC, and receiving RX data from SBC. If the parity of RX data is not correct, then it will send TX data for maximum 5 times.
SCDD_Qspi_63	4.3.3.5 **Qspi_SBC_ParityCheck Function**

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SCDD_Qspi_64	This function is used for calculating the parity of RX data from SBC.