/IPB/20_Software/SCDD Library/LVDC DSP_C

SCDD_Port

Software Component Detailed Design

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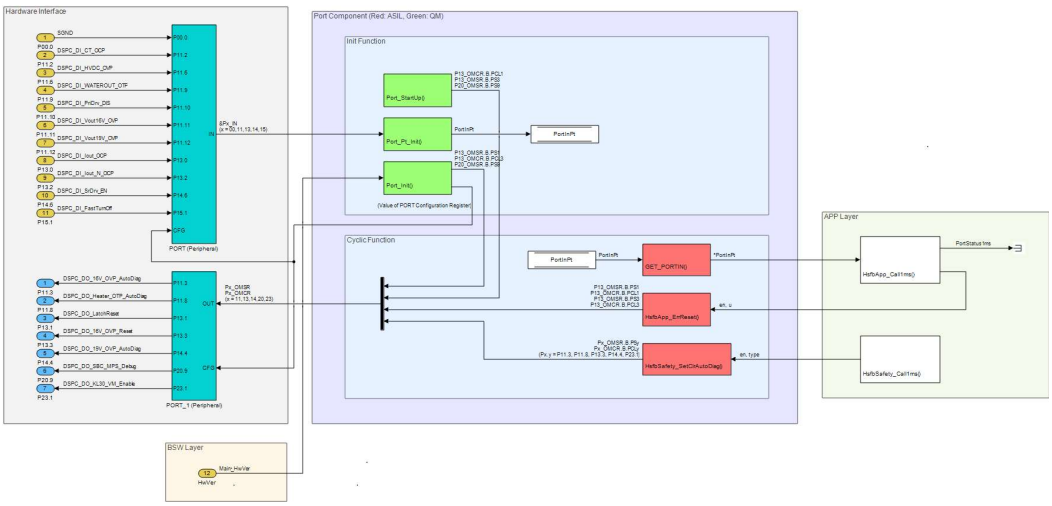
ID	Software Component Detailed Design
SCDD_Port1	1 **Software Component Design Description**
SCDD_Port2	1.1 **Introduction**
SCDD_Port3	This document describes the needed requirements for a SWC or BSWM.
SCDD_Port4	This is module is the Software Component Detail Description. It contains each SW component of each SW architecture. It is always structured in: External Interface Internal Design Requirements

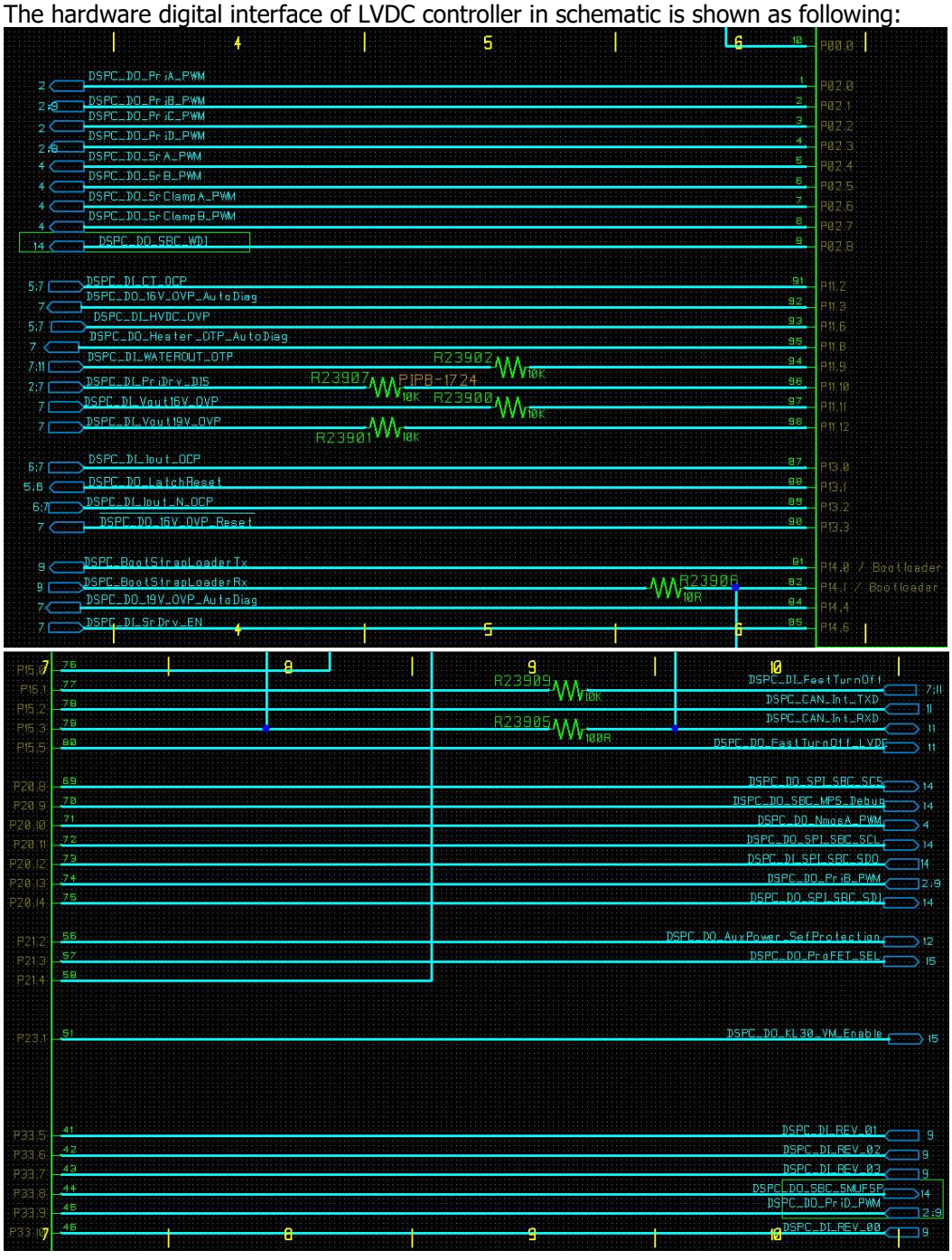
ID	Software Component Detailed Design
SCDD_Port5	2 **Attributes**
SCDD_Port6	Agreed attributes for SWE.3 (ENG.6)

ID	Software Component Detailed Design
SCDD_Port10	[3] **Views**
SCDD_Port11	**SwConstructionView**: This view is used for the sw construction process.
SCDD_Port12	**SCDD_EditView**: This view is used for creating the content of SCDD

ID	Software Component Detailed Design
SCDD_Port13	4 **Port**
SCDD_Port14	4.1 **External Interfaces**
SCDD_Port95	The function interface of this component are as following:

Function	Signal Name	Data Type	Direction
Port_Init()	N/A	N/A	N/A
Port_Cfg()	N/A	N/A	N/A
Port_Pt_Init()	N/A	N/A	N/A
Port_Pin_IOCR_Cfg()	N/A	N/A	N/A
Port_StartUp()	N/A	N/A	N/A
HsfbApp_ErrReset()	en	boolean	Input
HsfbApp_ErrReset()	u	boolean	Input
HsfbSafety_SetClrAutoDiag()	en	boolean	Input
HsfbSafety_SetClrAutoDiag()	type	uint16	Input

SCDD_Port16	4.2 **Internal design**
SCDD_Port15	
SCDD_Port18	4.3 **Requirements**
SCDD_Port19	4.3.1 **ASIL**
SCDD_Port24	The Port component is ASIL-B level.
SCDD_Port20	4.3.2 **Hardware Interface**
SCDD_Port25	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/Port

ID	Software Component Detailed Design
SCDD_Port26	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
SCDD_Port27	The hardware digital interface of LVDC controller in schematic is shown as following: 
SCDD_Port28	The hardware digital PWM signals of LVDC controller are as following: **Signal Name** | **Pin No. / Name** | **Description** DSPC_DI_CT_OCP | P11.2 | CT Current OCP Latch Statu DSPC_DO_16V_OVP_AutoDiag | P11.3 | LV Voltage 16V OVP AutoDi DSPC_DI_HVDC_OVP | P11.6 | HV Voltage OVP Latch Statu DSPC_DO_Heater_OTP_AutoDiag | P11.8 | WaterOut OTP Auto Diagnos DSPC_DI_WATEROUT_OTP | P11.9 | WaterOut Temperature OTF

SCDD_Port28

DSPC_DI_PriDrv_DIS	P11.10	Primary Driver Disable Signa
DSPC_DI_Vout16V_OVP	P11.11	LV Voltage 16V OVP Latch S
DSPC_DI_Vout19V_OVP	P11.12	LV Voltage 19V OVP Latch S
DSPC_DI_Iout_OCP	P13.0	LV Positive Current OCP Lat
DSPC_DO_LatchReset	P13.1	Latch Status Reset Signal
DSPC_DI_Iout_N_OCP	P13.2	LV Negative Current OCP La
DSPC_DO_16V_OVP_Reset	P13.3	LV OVP Reset Signal
DSPC_DO_19V_OVP_AutoDiag	P14.4	LV Voltage 19V OVP AutoDi
DSPC_DI_SrDrv_EN	P14.6	Sr Driver Enable Signal
DSPC_DI_FastTurnOff	P15.1	FastTurnOff Signal From CO
DSPC_DO_FastTurnOff_LVDC	P15.5	FastTurnOff Signal From DS
DSPC_DO_SBC_MPS_Debug	P20.8	SBC MPS Debug signal
DSPC_DO_AuxPower_SefProtection	P21.2	Auxpower Self-Protection Si
DSPC_DO_ProFET_SEL	P21.3	Profet Select Signal
DSPC_DO_KL30_VM_Enable	P23.1	KL30 Enable Signal
DSPC_DI_REV_01	P33.5	HW Variant Code 01
DSPC_DI_REV_02	P33.6	HW Variant Code 02
DSPC_DI_REV_03	P33.7	HW Variant Code 03
DSPC_DI_REV_00	P33.10	HW Variant Code 00

SCDD_Port21

4.3.3 **Port Function**

SCDD_Port31

4.3.3.1 **ASIL Function**

SCDD_Port55

4.3.3.1.1 **GET_PORTIN(n)**

SCDD_Port32

This function is a macro function, which will return the value of different pin.
The input of this function is the index of PortInPt.
The output of this function is the value of pin which is indexed.

SCDD_Port39

The enumerate value of each signal are show as following:

Number	Signal Name
0	FastTurnOff
1	PriDriveDis
2	SrDriveEn
3	IpriCbc
4	IpriOcp
5	VinOvp
6	IoutPOcp
7	IoutNOcp
8	Vout16VOvp
9	Vout19VOvp
10	WaterOutOtp

SCDD_Port75

4.3.3.1.2 **void HsfbSafety_SetClrAutoDiag(bit en, u16 type)**

ID	Software Component Detailed Design
SCDD_Port77	This function is an external function called by HsfbSafety with a cycle time of 1ms. The input of this function are enable and type. The enable shows the AutoDiag is setting or clearing the trigger of the AutoDiag signal. The type has valid value of 0, 1, 2, 3, 4, which stand for AutoDiag process of OVP16V, OVP19V, OTP, KL30 and AutoDiag finish.
SCDD_Port78	For OVP16V AutoDiag (type = 0): When enable is true, the DSPC_DO_16V_OVP_AutoDiag and DSPC_DO_16V_OVP_Reset will be set to high. When enable is false, the DSPC_DO_16V_OVP_AutoDiag and DSPC_DO_16V_OVP_Reset will be set to low.
SCDD_Port79	For OVP19V AutoDiag (type = 1): When enable is true, the DSPC_DO_19V_OVP_AutoDiag will be set to high. When enable is false, the DSPC_DO_19V_OVP_AutoDiag will be set to low.
SCDD_Port80	For OTP AutoDiag (type = 2): When enable is true, the DSPC_DO_Heater_OTP_AutoDiag will be set to high. When enable is false, the DSPC_DO_Heater_OTP_AutoDiag will be set to low.
SCDD_Port81	For KL30 AutoDiag (type = 3): When enable is true, the DSPC_DO_KL30_VM_Enable will be set to low. When enable is false, the DSPC_DO_KL30_VM_Enable will be set to high.
SCDD_Port82	For AutoDiag finish (type = 4): The DSPC_DO_16V_OVP_Reset and DSPC_DO_KL30_VM_Enable will be set to high. The pin of DSPC_DO_16V_OVP_AutoDiag and DSPC_DO_19V_OVP_AutoDiag will be set to input mode.
SCDD_Port84	4.3.3.1.3 **void HsfbApp_ErrReset(bit en, bit u)**
SCDD_Port85	This function is an external function called by HsfbApp with a cycle time of 1ms. The input of this function are enable and reset command.
SCDD_Port86	When current reset command is different with last current reset command, the DSPC_DO_LatchReset will be set to high (low) if current reset command is true (false).
SCDD_Port87	If enable is true, when reset command is true or Ovp16VResetCnt is not 0, the DSPC_DO_16V_OVP_Reset will be set to low, and the Ovp16VResetCnt will add 1 every 1ms. In this case, when Ovp16VResetCnt is larger than DELAY_MS_OVP16V, Ovp16VResetCnt will be set to 0. If enable is true, when reset command is false and Ovp16VResetCnt is 0, the DSPC_DO_16V_OVP_Reset will be set to high.
SCDD_Port100	4.3.3.1.4 **void Port_OTP_AutoDiag10ms(void)**
SCDD_Port101	This function is an external function called by Scheduler with a cycle time of 10ms. This function has no input and no output.
SCDD_Port102	This function will get the enable command from ComServ module, if the command is set to 1 and different with last command, the DSPC_DO_Heater_OTP_AutoDiag will be set to high and maintain 300ms. If get the disable command from ComServ module, the DSPC_DO_Heater_OTP_AutoDiag will be set to low.
SCDD_Port107	4.3.3.1.5 **void KL30_AutoDiag(void)**

<table>
<tr><th>ID</th><th>Software Component Detailed Design</th></tr>
<tr><td>SCDD_Port108</td><td>This function is an external function called by Main only when startup.
This function has no input and no output.</td></tr>
<tr><td>SCDD_Port109</td><td>When the DSPC_DO_KL30_VM_Enable is set to low, check the KL30 and KL30C voltage is within range, otherwise, it will report error.And than DSPC_DO_KL30_VM_Enable is set to high, the volatge measure will work normal.</td></tr>
<tr><td>SCDD_Port33</td><td>4.3.3.2 QM Function</td></tr>
<tr><td>SCDD_Port56</td><td>4.3.3.2.1 void Port Init(Void)</td></tr>
<tr><td>SCDD_Port58</td><td>This function is the initialization function of Port component. This function will intialize the configuration of Port and the value of PortInPt. At the same time the DSPC_DO_SBC_MPS_Debug and DSPC_DO_LatchReset will be set to high and the DSPC_DO_16V_OVP_Reset will be set to low.
This function has no input and no output.</td></tr>
<tr><td>SCDD_Port59</td><td>This function will call following function:
Port_Cfg()
Port_Pt_Init()</td></tr>
<tr><td>SCDD_Port57</td><td>4.3.3.2.2 void Port_Cfg(void)</td></tr>
<tr><td>SCDD_Port61</td><td>This function is used for configuration of IOCR and PDR register.
This function has no input and no output.</td></tr>
<tr><td>SCDD_Port62</td><td>This function will call following function:
Port_Pin_IOCR_Cfg()</td></tr>
<tr><td>SCDD_Port60</td><td>4.3.3.2.3 void Port_Pin_IOCR_Cfg(void)</td></tr>
<tr><td>SCDD_Port65</td><td>This function is used for configuration of IOCR, OMSR register.And different ports will be configurated by HW version, for exemple the DSPC_DO_SBC_MPS_Debug and DSPC_DO_KL30_VM_Enable.</td></tr>
<tr><td>SCDD_Port72</td><td>The PORT IOCR configuration are as following:
<table>
<tr><th>Signal Name</th><th>Pin No. / Name</th><th>Function</th></tr>
<tr><td>DSPC_DO_PriA_PWM</td><td>P02.0</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_PriB_PWM</td><td>P02.1</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_PriC_PWM</td><td>P02.2</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_PriD_PWM</td><td>P02.3</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_SrA_PWM</td><td>P02.4</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_SrB_PWM</td><td>P02.5</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_SrClampA_PWM</td><td>P02.6</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DO_SrClampB_PWM</td><td>P02.7</td><td>Output Function 1</td></tr>
<tr><td>DSPC_DI_CT_OCP</td><td>P11.2</td><td>Input</td></tr>
<tr><td>DSPC_DO_16V_OVP_AutoDiag</td><td>P11.3</td><td>Output Function 0</td></tr>
<tr><td>DSPC_DI_HVDC_OVP</td><td>P11.6</td><td>Input</td></tr>
<tr><td>DSPC_DO_Heater_OTP_AutoDiag</td><td>P11.8</td><td>Output Function 0</td></tr>
<tr><td>DSPC_DI_WATEROUT_OTP</td><td>P11.9</td><td>Input</td></tr>
<tr><td>DSPC_DI_PriDrv_DIS</td><td>P11.10</td><td>Input</td></tr>
</table></td></tr>
</table>

SCDD_Port72

DSPC_DI_Vout16V_OVP	P11.11	Input
DSPC_DI_Vout19V_OVP	P11.12	Input
DSPC_DI_Iout_OCP	P13.0	Input
DSPC_DO_LatchReset	P13.1	Output Function 0
DSPC_DI_Iout_N_OCP	P13.2	Input
DSPC_DO_16V_OVP_Reset	P13.3	Output Function 0
DSPC_BootStrapLoaderTx	P14.0	Output Function 5
DSPC_BootStrapLoaderRx	P14.1	Input
DSPC_DO_19V_OVP_AutoDiag	P14.4	Output Function 0
DSPC_DI_SrDrv_EN	P14.6	Input
DSPC_DI_FastTurnOff	P15.1	Input
DSPC_CAN_Int_TXD	P15.2	Output Function 5
DSPC_CAN_Int_RXD	P15.3	Input
DSPC_DO_FastTurnOff_LVDC	P15.5	Output Function 0
DSPC_DO_SPI_SBC_SCS	P20.8	Output Function 3
DSPC_DO_SBC_MPS_Debug	P20.9	Output Function 0
DSPC_DO_NmosA_PWM	P20.10	Output Function 1
DSPC_DO_SPI_SBC_SCL	P20.11	Output Function 3
DSPC_DI_SPI_SBC_SDO	P20.12	Input
DSPC_DO_PriB_PWM	P20.13	Input
DSPC_DO_SPI_SBC_SDI	P20.14	Output Function 3
DSPC_DO_AuxPower_SefProtection	P21.2	Output Function 0
DSPC_DO_ProFET_SEL	P21.3	Output Function 0
DSPC_DO_KL30_VM_Enable	P23.1	Output Function 0
DSPC_DI_REV_01	P33.5	Input
DSPC_DI_REV_02	P33.6	Input
DSPC_DI_REV_03	P33.7	Input
DSPC_DO_SBC_SMUFSP	P33.8	Output Function 0
DSPC_DO_PriD_PWM	P33.9	Input
DSPC_DI_REV_00	P33.10	Input

SCDD_Port68

4.3.3.2.4 **void Port_Pt_Init(void)**

SCDD_Port69

This function is used for initializing the value of PortInPt. The address of PORT register will be stored in PortInPt[index].Port, and the bit information is stored in PortInPt[index].Pin.
This function has no input and no output.

SCDD_Port74

The value of PortInPt[x].Port and PortInPt[x].Pin are as following:

Number	**Signal Name**	***PortInPt[x].Port**	***PortInPt[x].Pin**
0	PORT_E_FastTurnOff	P15_IN.U	1
1	PORT_E_PriDriveDis	P11_IN.U	10
2	PORT_E_SrDriveEn	P14_IN.U	6
3	PORT_E_IpriCbc	P00_IN.U	0
4	PORT_E_IpriOcp	P11_IN.U	2
5	PORT_E_VinOvp	P11_IN.U	6
6	PORT_E_IoutPOcp	P13_IN.U	0

<table>
<tr><th>ID</th><th>Software Component Detailed Design</th></tr>
<tr><td>SCDD_Port74</td><td>
<table>
<tr><td>7</td><td>PORT_E_IoutNOcp</td><td>P13_IN.U</td><td>2</td></tr>
<tr><td>8</td><td>PORT_E_Vout16VOvp</td><td>P11_IN.U</td><td>11</td></tr>
<tr><td>9</td><td>PORT_E_Vout19VOvp</td><td>P11_IN.U</td><td>12</td></tr>
<tr><td>10</td><td>PORT_E_WaterOutOtp</td><td>P11_IN.U</td><td>9</td></tr>
</table>
</td></tr>
<tr><td>SCDD_Port92</td><td>4.3.3.2.5 void Port_StartUp(void)</td></tr>
<tr><td>SCDD_Port93</td><td>This function is the initialization function for StartUp.The DSPC_DO_SBC_MPS_Debug and DSPC_DO_16V_OVP_Reset will be set to high and the DSPC_DO_LatchReset will be set to low.
This function has no input and no output.</td></tr>
</table>