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BC78 / MAX77978

Register Map, Custom script and OP Code Command Guide

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USBC Register Map

The slave address of the MAX77978 USBC is 0100101x(0x4Ahex/0x4Bhex).

The least significant bit is the read/write indicator.

Register reset Type

Type M : Registers are reset each time when VDD < VDD_UVLO.

Addr [Hex]	Name	Reset value	AP Type	b7	b6	b5	b4	b3	b2	b1	b0
0x00	DEVICE_ID	0x78	RO	Device ID							
0x01	DEVICE_REV	0x02	RO	Device REV							
0x02	FW_REV	0x00	RO	FW REV							
0x03	FW_SUB_VER	0x00	RO	FW SUB REV							
0x04	UIC_INT	0x00	RC	APCmdResI	SYSMsgI	VBUSDetI	VbADCI	DCDTmoI	StopModI	ChgTypI	AttachedHoldI
0x05	CC_INT	0x00	RC	VCONNOCPI	VSAFE0VI	DetAbrtI	WtrI	CCPinStatI	CCISatI	CCVcnStatI	CCStatI
0x06	PD_INT	0x00	RC	PDMsgI	PSRDYI	DataRoleI	RSVD	RSVD	DisplayPortI	RSVD	RSVD
0x07	ACTION_INT	0x00	RC	Action7I	Action6I	Action5I	Action4I	Action3I	Action2I	Action1I	Action0I
0x08	USBC_STATUS1	0x00	RO	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	CoreActive
0x09	USBC_STATUS2	0x00	RO	SYSMsg							
0x0A	BC_STATUS	0x00	RO	VBUSDet	RSVD	PrChgTyp			DCDTmo	ChgTyp	
0x0B	DP_STATUS	0x00	RO	DP_ExitMode	DP_Attention	DP_Configure	DP_Status	DP_EnterMode	DP_DiscoverMode	DP_DiscoverSVID	DP_DiscoverIdentity
0x0C	CC_STATUS0	0x00	RO	CCPinStat		CCISat		CCVcnStat	CCStat		
0x0D	CC_STATUS1	0x00	RO	RSVD	RSVD	VCONN_OCP	VCONN_SC	Vsafe0V	DetAbrt	Wtr	RSVD
0x0E	PD_STATUS0	0x00	RO	PDMsg							
0x0F	PD_STATUS1	0x00	RO	DataRole	PowerRole	VCONNS	PSRDY	FCT_ID			
0x10	UIC_INT_M	0xBF	RW	APCmdResM	SYSMsgM	VBUSDetM	VbADCM	DCDTmoM	StopModM	ChgTypM	AttachedHoldM
0x11	CC_INT_M	0xFF	RW	VCONNOCPM	VSAFE0VM	DetAbrtM	WtrM	CCPinStatM	CCISatM	CCVcnStatM	CCStatM
0x12	PD_INT_M	0xFF	RW	PDMsgM	PSRDYM	DataRoleM	RSVD	RSVD	DisplayPortM	RSVD	RSVD
0x13	ACTION_INT_M	0xFF	RW	Action7M	Action6M	Action5M	Action4M	Action3M	Action2M	Action1M	Action0M
0x14	VBUS_VOLTAGE_L	0x00	RO	VBUS_VOLTAGE7_0							
0x15	VBUS_VOLTAGE_H	0x00	RO	RSVD	RSVD	RSVD	RSVD	RSVD	VBUS_VOLTAGE10_8		
0x16- 0x1F	Not used	0x00	RO	0	0	0	0	0	0	0	0
0x80	SW_RESET	0x00	RW	UIC_SWRST							
Addr [Hex]	Name	Reset value	AP Type	b7	b6	b5	b4	b3	b2	b1	b0
0x20	Reserved	0x00	RW	0x00							
0x21	AP_DATAOUT0	0x00	RW	AP Request Opcode							
0x22- 0x41	AP_DATAOUT1-32	0x00	RW	Opcode data							
0x42- 0x50	Not used	0x00	RO	Return 0							

0x51	AP_DATAIN0	0x00	RO	USBC Response Opcode
0x52- 0x71	AP_DATAIN1-32	0x00	RO	Opcode data

0x00: Device ID

Name		Function	Addr	Type	Reset
DEVICE_ID		Device ID	0x00	M	0x78
BIT	Mode	Name	Reset	Description	
7:0	R	DEVICE_ID	0x00	Device ID	

0x01: Device Revision

Name		Function	Addr	Type	Reset
DEVICE_REV		Device Revision	0x01	M	0x01
BIT	Mode	Name	Reset	Description	
7:0	R	DEVICE_REV	0x01	Device Revision	

0x02: FW Revision

Name		Function	Addr	Type	Reset
FW_REV		FW Revision	0x02	M	0x00
BIT	Mode	Name	Reset	Description	
7:0	R	FW_REV	0x00	FW Revision	

0x03: FW Sub Revision

Name		Function	Addr	Type	Reset
FW_SUB_REV		FW Revision	0x03	M	0x00
BIT	Mode	Name	Reset	Description	
7:0	R	FW_SUB_REV	0x00	FW Sub Revision	

0x04: UIC Interrupts

Name		Function	Addr	Type	Reset
UIC_INT		Interrupts	0x04	M	0x00
BIT	Mode	Name	Reset	Description	
7	R/C	APCmdResl	0	AP Command respond interrupt 0 = No Interrupt, 1 = AP command response pending	
6	R/C	SYSMsgl	0	USBC System message interrupt 0 = No Interrupt, 1 = USBC System message pending	
5	R/C	VBUSDetl	0	VBUS Detection Interrupt 0 = No Interrupt, 1 = New VBUSDet status interrupt	
4	R/C	VbADCI	0	V _{BUS} Voltage ADC Interrupt 0 = No Interrupt, 1 = New VbADC status interrupt	
3	R/C	DCDTmol	0	DCD Timer Interrupt 0 = No Interrupt, 1 = New DCDTmo status interrupt	

2	R/C	StopModel	0	Stop Mode Interrupt 0 = No Interrupt, 1 = New stop mode status interrupt
1	R/C	CHGTypI	0	Charge Type Interrupt 0 = No Interrupt, 1 = New ChgTyp status interrupt
0	R/C	AttachedHoldI	0	Attached Hold Interrupt 0 = No Interrupt, 1 = New attached hold status interrupt

0x05: CC Interrupts

Name		Function	Addr	Type	Reset
CC_INT		Interrupts	0x05	M	0x00
BIT	Mode	Name	Reset	Description	
7	R/C	VCONNOCPi	0	V _{CONN} OCP Interrupt 0 = No Interrupt, 1 = New V _{CONN} OCP status interrupt	
6	R/C	VSAFE0Vi	0	VSAFE0V Interrupt 0 = No Interrupt, 1 = New VSAFE0V status interrupt	
5	R/C	DetAbtrl	0	CC Detection Abort Interrupt 0 = No Interrupt, 1 = New CC detection abort interrupt	
4	R/C	Wtrl	0	Moisture/Dry Interrupt 0 = No Interrupt, 1 = New moisture/dry status interrupt	
3	R/C	CCPinStatI	0	CC Pin State Interrupt 0 = No Interrupt, 1 = New CCPinStat status interrupt	
2	R/C	CCISatI	0	CCISat Interrupt 0 = No Interrupt, 1 = New CCISat status interrupt	
1	R/C	CCVcnStatI	0	CCVcnStat Interrupt 0 = No Interrupt, 1 = New CCVcnStat status interrupt	
0	R/C	CCStatI	0	CCStat Interrupt 0 = No Interrupt, 1 = New CCStat status interrupt	

0x06: PD Interrupts

Name		Function	Addr	Type	Reset
PD_INT		Interrupts	0x06	M	0x00
BIT	Mode	Name	Reset	Description	
7	R/C	PDMsgI	0	PD Message Interrupt 0 = No Interrupt, 1 = New PD message Issued	

6	R/C	PSRDYI	0	PSRDY Message Interrupt 0 = No Interrupt, 1 = New PDRDY message Issued
5	R/C	DataRoleI	0	Data Role Interrupt 0 = No Interrupt, 1 = DataRole status is changed
4	R/C	RSVD	0	Reserved
3	R/C	RSVD	0	Reserved
2	R/C	DisplayPortI	0	DisplayPort Status Update Interrupt 0 = No Interrupt, 1 = New DisplayPort Status Update Interrupt
1	R/C	RSVD	0	Reserved
0	R/C	RSVD	0	Reserved

0x07: Action Interrupts

Name		Function	Addr	Type	Reset
ACTION_INT		Interrupts	0x07	M	0x00
BIT	Mode	Name	Reset	Description	
7	R/C	Action7I	0	Action7 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
6	R/C	Action6I	0	Action6 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
5	R/C	Action5I	0	Action5 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
4	R/C	Action4I	0	Action4 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
3	R/C	Action3I	0	Action3 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
2	R/C	Action2I	0	Action2 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
1	R/C	Action1I	0	Action1 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	
0	R/C	Action0I	0	Action0 interrupt 0 = No Interrupt, 1 = Action7 Interrupt	

0x08: USBC Status 1

Name		Function	Addr	Type	Reset
USBC_STATUS1		Status	0x08	M	0x00
BIT	Mode	Name	Reset	Description	
7	R	RSVD	0	Reserved	
6	R	RSVD	0	Reserved	
5	R	RSVD	0	Reserved	
4	R	RSVD	0	Reserved	
3	R	RSVD	0	Reserved	
2	R	RSVD	0	Reserved	
1	R	RSVD	0	Reserved	
0	R	CoreActive	0	Reports whether the internal core is active. 0 = Core is not active 1 = Core is active	

0x09: USBC Status 2

Name		Function	Addr	Type	Reset
USBC_STATUS2		Status	0x09	M	0x00
BIT	Mode	Name	Reset	Description	

7:0	R	SYSMsg	0x00	0x00 = SYSMMSG_NONE, 0x03 = SYSERROR_BOOT_WDT, 0x04 = SYSERROR_BOOT_SWRSTREQ, 0x05 = SYSMMSG_BOOT_POR, 0x06 = SYSMMSG_EUSBS_IRQ, 0x30 = SYSERROR_SYSP0S 0x31 = SYSERROR_APCMD_UNKNOWN, 0x32 = SYSERROR_APCMD_INPROGRESS, 0x33 = SYSERROR_APCMD_FAIL, 0x40 = SYSERROR_INTER_I2C_FAIL, 0x50 = SYSERROR_USBDP_RX_ERROR, 0x51 = SYSERROR_USBDP_TX_ERROR, 0x60 = SYSMMSG_DP_5V_SHORT, 0x61 = SYSMMSG_DN_5V_SHORT, 0x62 = SYSMMSG_SBU1_5V_SHORT, 0x63 = SYSMMSG_SBU2_5V_SHORT, 0x65 = SYSMMSG_CC1_5V_SHORT, 0x66 = SYSMMSG_CC2_5V_SHORT, 0x70 = SYSERROR_UNKNOWN_RID_TWICE, 0x80 = SYSERROR_USER_PD_COLLISION, 0xC0 = SYSMMSG_MTP_WRITEFAIL, 0xC1 = SYSMMSG_MTP_READFAIL, 0xC2 = SYSMMSG_MTP_ERASEFAIL, 0xC3 = SYSMMSG_MTP_CUSTMINFONOTSET, 0xC4 = SYSMMSG_MTP_OVERACTIONBLKSIZE, 0xD1 = SYSERROR_IRQ_FC, 0xD2 = SYSERROR_IRQ_SYS_UVLO, 0xDB = SYSERROR_OPCODE_TIMEXP, 0xE0 = SYSERROR_FIRMWAREERROR, 0xE1 = SYSERROR_ACTION_UNKNOWN, 0xE2 = SYSERROR_ACTION_OFFSET, 0xE3 = SYSERROR_ACTION_UNKNOWN_CMD, 0xE4 = SYSERROR_ROM_READFAIL, 0xE5 = SYSERROR_CMD_OFFSETFAIL, 0xE6 = SYSERROR_EXECUTE_OFFSETFAIL, 0xE7 = SYSERROR_EXECUTE_REG_WRITEAND_FAIL, 0xE8 = SYSERROR_EXECUTE_REG_WRITEOR_FAIL, 0xE9 = SYSERROR_EXECUTE_REG_READ_FAIL, 0xEA = SYSMMSG_EXECUTE_I2C_WRITEBURST_FAIL, 0xEB = SYSMMSG_EXECUTE_I2C_READBURST_FAIL,
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				0xEC = SYSMSG_EXECUTE_I2C_READ_FAIL, 0xED = SYSMSG_EXECUTE_I2C_WRITE_FAIL, 0xEF = SYSMSG_EXECUTE_I2C_FAULT, 0xF0 = SYSERROR_EXECUTE_I2C_BUS_BUSY, 0xF1 = SYSERROR_EXECUTE_I2C_ARBITRATION_LOST, 0xFE = SYSERROR_FWTESTMODE
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0x0A: BC Status

Name		Function	Addr	Type	Reset
BC_STATUS		Status	0x0A	M	0x00
BIT	Mode	Name	Reset	Description	
7	R	VBUSDet	0	Status of VBUS Detection 0 = VBUS < V _{VBDDET} , 1 = VBUS > V _{VBDDET}	
6	R	RSVD	0	Reserved	
5:3	R	PrChgTyp	000	Output of Charger Detection, combined with PrChgTyp, determines which charger is detected 000 = Unknown, 001 = Samsung 2A, 010 = Apple 0.5A, 011 = Apple 1A, 100 = Apple 2A, 101 = Apple 12W, 110 = Reserved, 111 = Reserved	
2	R	DCDTmo	0	During Charger Detection, DCD detection timed out 0 = No Timeout or detection has not run, 1 = DCD Timeout occurred	
1:0	R	ChgTyp	00	Output of Charger Detection, combined with PrChgTyp, determines which charger is detected 00 = Nothing attached, 01 = SDP, USB Cable attached, 10 = CDP, Charging Downstream Port: current depends on USB operating speed, 11 = DCP, Dedicated Charger: current up to 1.5A	

0x0B: DP Status

Name		Function	Addr	Type	Reset
DP_STATUS		Status	0x0B	M	0x00
BIT	Mode	Name	Reset	Description	
7	R	DP_ExitMode	0	Display Port Exit Mode 0 = No Interrupt, 1 = DisplayPort Exit Mode Message	

6	R	DP_Attention	0	Display Port Attention Mode 0 = No Interrupt, 1 = DisplayPort Attention Mode Message
5	R	DP_Configure	0	Display Port Configure Mode 0 = No Interrupt, 1 = DisplayPort Configure Mode Message
4	R	DP_Status	0	Display Port Status Mode 0 = No Interrupt, 1 = DisplayPort Status Mode Message
3	R	DP_EnterMode	0	Display Port Enter Mode 0 = No Interrupt, 1 = DisplayPort Enter Mode Message
2	R	DP_DiscoverMode	0	Display Port Discover Mode 0 = No Interrupt, 1 = DisplayPort Discovers Mode Message
1	R	DP_DiscoverSVID	0	Display Port Discover SVID 0 = No Interrupt, 1 = DisplayPort Discovers SVID Message
0	R	DP_DiscoverIdentity	0	Display Port Discover Identity 0 = No Interrupt, 1 = DisplayPort Discovers Identity Message

0x0C: CC Status 0

Name		Function	Addr	Type	Reset
CC_STATUS0		Status	0x0C	M	0x00
BIT	Mode	Name	Reset	Description	
7:6	R	CCPinStat	00	Output of active CC Pin 00 = No Determination, 01 = CC1 Active, 10 = CC2 Active, 11 = Reserved	
5:4	R	CCiStat	00	CC Pin Detected Allowed VBUS Current in UFP mode 00 = Not in UFP mode, 01 = 500mA, 10 = 1.5A, 11 = 3.0A	
3	R	CCVcnStat	0	Status of Vconn Output 0 = V _{CONN} disabled, 1 = V _{CONN} enabled	

2:0	R	CCStat	000	CC Pin State Machine Detection 000 = No Connection, 001 = SINK, 010 = SOURCE, 011 = Liquid corrosion mitigation mode, 100 = Debug SRC Accessory, 101 = Error, 110 = Disabled, 111 = Debug SNK Accessory
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0x0D: CC Status 1

Name		Function	Addr	Type	Reset
CC_STATUS1		Status	0x0D	M	0x00
BIT	Mode	Name	Reset	Description	
7	R	RSVD	0	Reserved	
6	R	RSVD	0	Reserved	
5	R	VCONN_OCP	0	VCONN Over Current Detection 0 = VCONN current < VCONN_ILIM, 1 = VCONN current > VCONN_ILIM	
4	R	VCONN_SC	0	VCONN Short-Circuit Detection 0 = VCONN Current < VCONN_SC, 1 = VCONN Current > VCONN_SC	
3	R	VSafeOV	0	Status of VBUS Detection 0 = VBUS < VSAFE0V, 1 = VBUS > VSAFE0V	
2	R	DetAbrt	0	Charger Detection Abort Status 0 = Charger Detection Run, 1 = Charger Detection Abort	
1	R	Wtr	0	Moisture/Dry Status 0 = Dry, 1 = Moisture	
0	R	RSVD	0	Reserved	

0x0E: PD Status 0

Name		Function	Addr	Type	Reset
PD_STATUS0		Status	0x0E	M	0x00
BIT	Mode	Name	Reset	Description	

7:0	R	PDMsg	0x00	PD Message 0x00 = Nothing happened, 0x01 = Sink_PD_PSRdy_Received, 0x02 = Sink_PD_Error_Recovery, 0x03 = Sink_PD_SenderResponseTimer_Timeout, 0x04 = Source_PSRdy_Sent, 0x05 = Source_PD_Error_Recovery, 0x06 = Source_PD_SenderResponseTimer_Timeout, 0x07 = PD_DR_Swap_Request_Received, 0x08 = PD_PR_Swap_Request_Received, 0x09 = PD_VCONN_Swap_Request_Received, 0x0A = Received PD Message in illegal state, 0x0B = Sink_PD_Evaluate_State, SrcCap_Received, 0x11 = VDM Attention message Received, 0x12 = Reject_Received, 0x13 = Not_Supported_Received, 0x14 = PD_PR_Swap_SNKTOSRC_Cleanup, 0x15 = PD_PR_Swap_SRCTOSNK_Cleanup, 0x16 = HardReset_Received, 0x17 = PD_PowerSupply_Vbus_Enable, 0x18 = PD_PowerSupply_Vbus_Disable, 0x19 = HardReset_Sent, 0x1A = PD_PR_Swap_SRCTOSWAP, 0x1B = PD_PR_Swap_SWAPTOSNK, 0x1C = PD_PR_Swap_SNKTOSWAP, 0x1D = PD_PR_Swap_SWAPTOSRC, 0x20 = Sink_PD_Disabled, 0x21 = Source_PD_Disabled, 0x30 = Get_Source_Capabilities_Extended_Received, 0x31 = Get_Status_Received, 0x32 = Get_Battery_Cap_Received, 0x33 = Get_Battery_Status_Received, 0x34 = Get_Manufacturer_Info_Received, 0x35 = Source_Capabilities_Extended_Received, 0x36 = Status_Received, 0x37 = Battery_Capabilities_Received, 0x38 = Battery_Status_Received, 0x39 = Manufacturer_Info_Received, 0x3A = Security_Request_Received, 0x3B = Security_Reponse_Received, 0x3C = Firmware_Update_Request_Received, 0x3D = Firmware_Update_Response_Received, 0x3E = Alert_Received,
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				0x40 = VDM_NAK_Received, 0x41 = VDM_BUSY_Received, 0x42 = VDM_ACK_Received, 0x43 = VDM_REQ_Received, 0x63 = DiscoverMode_Received, 0x65 = PD_Status_Received
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0x0F: PD Status 1

Name		Function	Addr	Type	Reset
PD_STATUS1		Status	0x0F	M	0x00
BIT	Mode	Name	Reset	Description	
7	R	DataRole	0	Current Data Role 0 = UFP, 1 = DFP	
6	R	PowerRole	0	Power Role 0 = Sink 1 = Source	
5	R	VCONNS	0	VCONNS 0 = V _{CONN} Sink 1 = V _{CONN} Source	
4	R	PSRDY	0	PSRDY Received as Sink 0 = Nothing Happened, 1 = PSRDY Received	
3:0	R	FCT_ID	0000	Factory ID PD message 0001 = GND (0ohm), 0010 = 1Kohm, 0011 = 255Kohm, 0100 = 301Kohm, 0101 = 523Kohm, 0110 = 619Kohm, 0111 = Open	

0x10: UIC Interrupt Masks

Name		Function	Addr	Type	Reset
UIC_INT_M		UIC Interrupt Masks	0x10	M	0xBF
BIT	Mode	Name	Reset	Description	
7	R/W	APCmdResM	1	APCmdRes Interrupt Mask 0 = Unmask, 1 = Mask	

6	R/W	SYSMsgM	1	SYSMsg Interrupt Mask 0 = Unmask, 1 = Mask
5	R/W	VBUSDetM	1	VBUSDet Interrupt Mask 0 = Unmask, 1 = Mask
4	R/W	VbADCM	1	VbADC Interrupt Mask 0 = Unmask, 1 = Mask
3	R/W	DCDTmoM	1	DCDTmo Interrupt Mask 0 = Unmask, 1 = Mask
2	R/W	StopModeM	1	Fake V _{BUS} Interrupt Mask 0 = Unmask, 1 = Mask
1	R/W	CHGTypM	1	ChgTyp Interrupt Mask 0 = Unmask, 1 = Mask
0	R/W	AttachedHoldM	1	UIDADC Interrupt Mask 0 = Unmask, 1 = Mask

0x11: CC Interrupt Masks

Name		Function	Addr	Type	Reset
CC_INT_M		CC Interrupt Masks	0x11	M	0xFF
BIT	Mode	Name	Reset	Description	
7	R/W	VCONNOCPM	1	VCONNOCP Interrupt Mask 0 = Unmask, 1 = Mask	
6	R/W	VSAFE0VM	1	VSAFE0V Interrupt Mask 0 = Unmask, 1 = Mask	
5	R/W	DetAbtM	1	DetAbt Interrupt Mask 0 = Unmask, 1 = Mask	
4	R/W	WtrM	1	Wtr Interrupt Mask 0 = Unmask, 1 = Mask	
3	R/W	CCPinStatM	1	CCPinStat Interrupt Mask 0 = Unmask, 1 = Mask	
2	R/W	CCStatM	1	CCStat Interrupt Mask 0 = Unmask, 1 = Mask	
1	R/W	CCVcnStatM	1	CCVcnStat Interrupt Mask 0 = Unmask, 1 = Mask	

0	R/W	CCStatM	1	CCStat Interrupt Mask 0 = Unmask, 1 = Mask
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0x12: PD Interrupt Masks

Name		Function	Addr	Type	Reset
PD_INT_M		PD Interrupt Masks	0x12	M	0xFF
BIT	Mode	Name	Reset	Description	
7	R/W	PDMsgM	1	0 = Unmask, 1 = Mask	
6	R/W	PSRDYM	1	0 = Unmask, 1 = Mask	
5	R/W	DataRoleM	1	0 = Unmask, 1 = Mask	
4	R/W	RSVD	1	Reserved	
3	R/W	RSVD	1	Reserved	
2	R/W	DisplayPortM	1	0 = Unmask, 1 = Mask	
1	R/W	RSVD	1	Reserved	
0	R/W	RSVD	1	Reserved	

0x13: Action Interrupt Masks

Name		Function	Addr	Type	Reset
ACTION_INT_M		Action Interrupt Masks	0x13	M	0xFF
BIT	Mode	Name	Reset	Description	
7	R/W	Action7M	1	0 = Unmask, 1 = Mask	
6	R/W	Action6M	1	0 = Unmask, 1 = Mask	
5	R/W	Action5M	1	0 = Unmask, 1 = Mask	
4	R/W	Action4M	1	0 = Unmask, 1 = Mask	
3	R/W	Action3M	1	0 = Unmask, 1 = Mask	
2	R/W	Action2M	1	0 = Unmask, 1 = Mask	
1	R/W	Action1M	1	0 = Unmask, 1 = Mask	
0	R/W	Action0M	1	0 = Unmask, 1 = Mask	

0x14: VBUS Voltage Low

Name		Function	Addr	Type	Reset
VBUS_VOLTAGE_L		VBUS Voltage Low	0x14	M	0X00
BIT	Mode	Name	Reset	Description	
7:0	R	VBUS_VOLTAGE7_0	0x00	VBUS Voltage Low bits [7:0]. The LSB is 0.025 V.	

0x15: VBUS Voltage High

Name		Function	Addr	Type	Reset
VBUS_VOLTAGE_H		VBUS Voltage High	0x15	M	0X00
BIT	Mode	Name	Reset	Description	
7	R	RSVD	0	Reserved	
6	R	RSVD	0	Reserved	
5	R	RSVD	0	Reserved	
4	R	RSVD	0	Reserved	
3	R	RSVD	0	Reserved	
2:0	R	VBUS_VOLTAGE10_8	000	VBUS Voltage High bits[2:0]. The LSB is 0.025 V.	

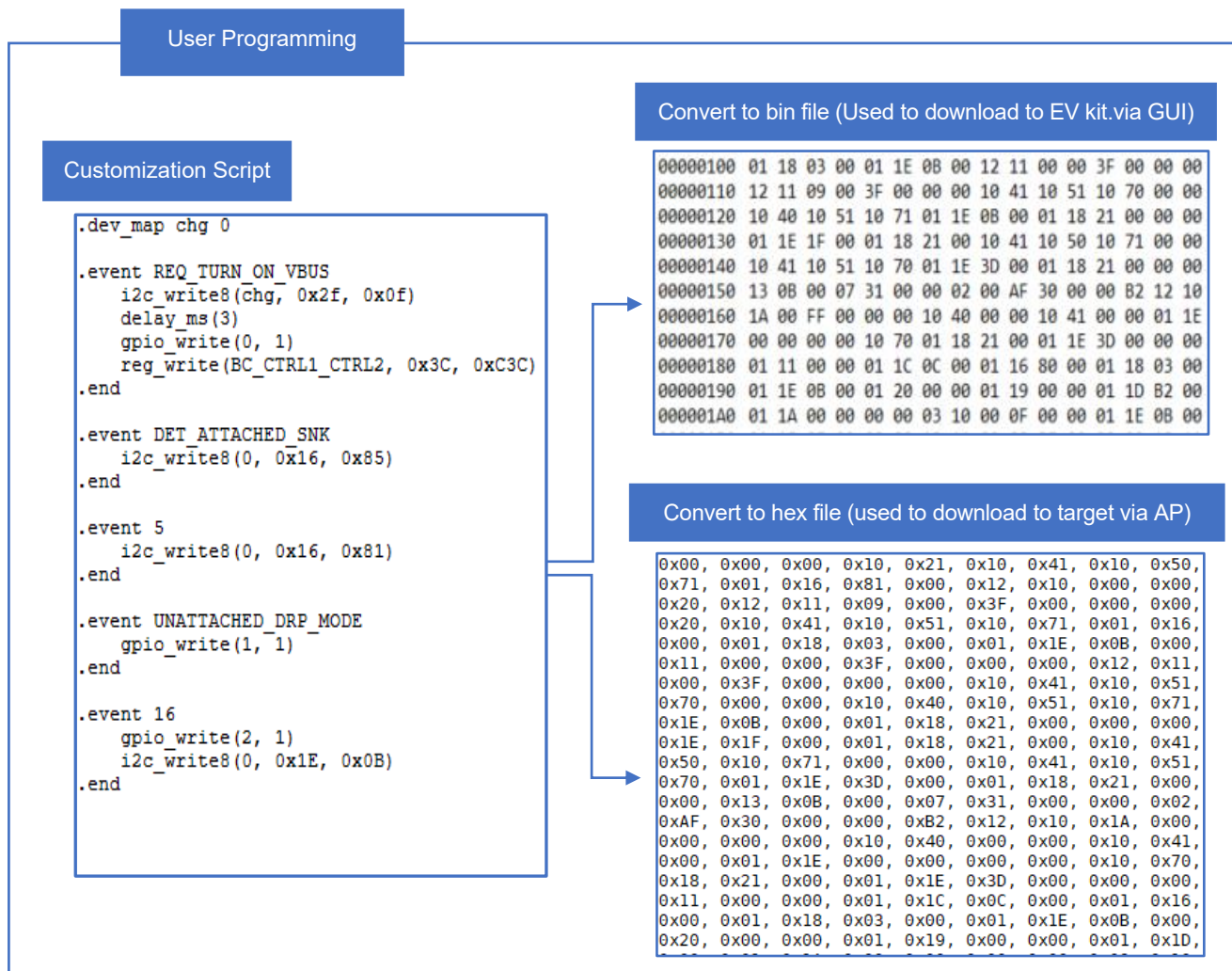
0x16 - 0x1F: Not used**0x80: UIC Software Reset**

Name		Function	Addr	Type	Reset
SW_RESET		UIC Software Reset	0x80	M	0x00
BIT	Mode	Name	Reset	Description	
7:0	R/W	UIC_SWRST	00	UIC (and MAXQ) Software Reset 0x0F = Reset	

Customization Script

The customization script is the core of the configurability of the MAX77978 when used in the autonomous configuration. It allows the user to configure either a GPIO state or perform an I2C action when an event is detected on the USB Type-C interface. The customization script is written in the graphical user interface (GUI). The software translates the customization script to hexadecimal format and writes it to the IC configuration area. The configuration by GUI must be stored in the MTP area of the IC to start operating as per the customization commands.

Figure 1 shows the simple implementation of the customization script. Developers can define the functions and the sequences for each Event Id listed on the Event Item List using the MAX77978 GUI. The GUI provides users not only the interface to create the customized code but also the functionality to detect syntax errors in the script usage.



[Figure 1] User Programming of Customization Script.

Customization Commands

Table 1 lists the syntax operation of customization commands recognized by the GUI.

Table 1. Commands for peripheral device

TYPE	COMMAND	DESCRIPTION
Comment	;	Any character after ";" is ignored
Directives	.event [ID] or .event [name]	The directive is to indicate the start point of action. See the Event Item List regarding the number/name of Event. ID: Event ID, name: Name of Event List
	.end	The directive is to indicate the end point of action. One Event should be started ".event_[]" and ended ".end".
	.dev_map [name] [id]	Mapping device name to device id. available to use name or id in the script. name: the name mapped to the id. id: I2C slave address declared in Custom Config (0x56 Opcode)
	.label [name]	The directive is to indicate the destination of goto_if_equal(...), goto_if_greater, goto_if_less command and goto(...) command.

Table 2 lists the commands recognized by the GUI for customizing the behavior of the IC.

Table 2. Commands for operation

TYPE	COMMAND	DESCRIPTION
I2C Command	i2c_write8(dev_id, address, data)	Function to write 8-bit hex data
	i2c_write8_masked(dev_id, address, data, mask)	Function to write 8-bit hex data with mask
	i2c_read8(dev_id, address, mask)	Function to read 8-bit hex data
GPIO Command	gpio_write(gpio no, state)	Function to write values to a specific GPIO
Register Command	reg_write(register_name, data, mask)	Function to write values to a specific internal register
	reg_read(register_name, mask)	Function to read values from a specific internal register
Common	delay_ms(time)	Time delay during (time) ms. Time = 1~5 (min: 1, max: 5) The delay may cause a timeout issue with PD communication, so use this API with care.
Flow Control Command	goto(label_name)	Jump statement used to go to a specific label, cannot be used to jump to another event.
	goto_if_equal_r(var_read, data_b, label_name)	Jump statement used to go to a specific label if the read value var_read and data_b are equal, cannot be used to jump to another event.
	goto_if_greater_r(var_read, data_b, label_name)	Jump statement used to go to a specific label if the read value var_read is greater than or equal to data_b cannot be used to jump to another event.
	goto_if_less_r(var_read, data_b, label_name)	Jump statement used to go to a specific label if the read value var_read is less than or equal to data_b, cannot be used to jump to another event.

Event List

The events related to changes on the physical pins on the USB Type-C connector, MAX77978 pins, or registers as well as requirements according to PD messages are summarized in Table 3.

Table 3. Event List

ID	NAME	TRIGGERED BY	TYPICAL USE	SAMPLE CUSTOMIZATION COMMANDS
0	REQ_TURN_ON_VBUS	Hard_reset PD message in SOURCE Mode or PR_Swap PD message when V_{BUS} is lower than vSafeOV	1. Hard Reset: When MAX77978 is under the SOURCE Mode and is required to turn on V_{BUS} 2. PR_Swap: MAX77978 is requested to become the new SOURCE and is required to turn on V_{BUS}	<i>.dev_map chg 0 .event REQ_TURN_ON_VBUS i2c_write8(chg, 0x16, 0x8A); I2C Mode Enable, TURN ON V_{BUS} .end</i>
1	REQ_TURN_OFF_VBUS	Hard_reset PD message in SOURCE Mode or PR_Swap PD message when V_{BUS} is higher than vSafe5V, USB port is disconnected, or enters contract as SINK	1. Hard Reset: When MAX77978 is under the SOURCE Mode and is required to turn off V_{BUS} 2. PR_Swap or USB port disconnect or enter contract as SINK: MAX77978 is the old SOURCE and is required to turn off V_{BUS}	<i>.dev_map chg 0 .event REQ_TURN_OFF_VBUS i2c_write8(chg, 0x16, 0x82); I2C Mode Enable, TURN OFF V_{BUS} .end</i>
2	TURN_ON_VCONN	Detected interrupts on VCONN	Notify VCONN is active to external MUX	<i>.event TURN_ON_VCONN gpio_write(1, 1) .end</i>
3	TURN_OFF_VCONN	Detected nothing on VCONN	Notify VCONN is inactive to external MUX	<i>.event TURN_OFF_VCONN gpio_write(1, 1) .end</i>
4	DET_ATTACHED_SNK	Entering the Attached.SNK state, R_p is detected on one of the CCx	SINK Mode: System can pull current from V_{BUS}	<i>.dev_map chg 0 .event DET_ATTACHED_SNK i2c_write8(chg, 0x16, 0x85); I2C Mode Enable, Charger on, DCDC on .end</i>
5	DET_ATTACHED_SRC	Entering the Attached.SRC state, R_d is detected on one of the CCx	SOURCE Mode: External device requests power from V_{BUS}	<i>.dev_map chg 0 .event DET_ATTACHED_SRC i2c_write8(chg, 0x16, 0x8A); I2C Mode Enable, OTG on .end</i>
6	DET_UNATTACHED_DRP	Entering the unattached DRP mode, CCx is open	DRP.Mode (UnAttached state) MAX77978 is waiting for an attached port.	<i>.event DET_UNATTACHED_DRP gpio_write(3, 1) .end</i>
8	DET_DEBUG_SRC	Detected Debug Accessory, R_d is detected on both CC lines	Debug path enable: DN to DN1, DP to DP2 switches	<i>.event DET_DEBUG_SRC reg_write(BC_CTRL1_CTRL 2, 0x0900, 0x3F00) .end</i>
9	DET_DEBUG_SNK	Detected Debug Accessory, R_p is detected on both CC lines	Debug path enable: DN to DN1, DP to DP2 switches	<i>.event DET_DEBUG_SNK reg_write(BC_CTRL1_CTRL 2, 0x0900, 0x3F00) .end</i>

11	DET_CC1_ACTIVE	Detected Rp or Rd on CC1	Notify CC1 is active to external MUX	<pre>.event DET_CC1_ACTIVE gpio_write(1, 1) .end</pre>
12	DET_CC2_ACTIVE	Detected Rp or Rd on CC2	Notify CC2 is active to external MUX	<pre>.event DET_CC2_ACTIVE gpio_write(1, 0) .end</pre>
14	CC_SRCCUR_1P5	Advertised 1.5A as Source current	Notify new 1.5A source current	<pre>.event CC_SRCCUR_1P5 gpio_write(2, 1) .end</pre>
15	CC_SRCCUR_3P0	Advertised 3.0A as Source current	Notify new 3.0A source current	<pre>.event CC_SRCCUR_3P0 gpio_write(3, 1) .end</pre>
16	DET_SINKCCI_OP5	MAX77978 is under SINK mode, detected 56kΩ Rp (500mA source)	Set charger input current limit to 500mA	<pre>.dev_map chg 0 .event DET_SINKCCI_OP5 i2c_write8_masked(chg, 0x1E, 0x0B, 0x0B) .end</pre>
17	DET_SINKCCI_1P5	MAX77978 is under SINK mode, detected 22kΩ Rp (1.5A source)	Set charger input current limit to 1.5A	<pre>.dev_map chg 0 .event DET_SINKCCI_1P5 i2c_write8_masked(chg, 0x1E, 0x1F, 0x1F) .end</pre>
18	DET_SINKCCI_3P0	MAX77978 is under SINK mode, detected 10kΩ Rp (3.0A source)	Set charger input current limit to 3.0A	<pre>.dev_map chg 0 .event DET_SINKCCI_3P0 i2c_write8_masked(chg, 0x1E, 0x3D, 0x3D); CHGIN_ILIM 3A .end</pre>
19	DET_SDP	Detected SDP (Standard Downstream Port)	Notify SDP device is connected on the Type-C connector	<pre>.dev_map chg 0 .event DET_SDP i2c_read8(chg, 0x1E, 0xff) goto_if_less_r(var_read, 0xA, if_0) goto(if_end) .label if_0 i2c_write8(chg, 0x1E, 0xA) .label if_end .end</pre>
20	DET_CDP	Detected CDP (Charging Downstream Port)	Notify CDP device is connected on the Type-C connector	<pre>.dev_map chg 0 .event DET_CDP i2c_read8(chg, 0x1E, 0xff) goto_if_less_r(var_read, 0xB, if_0) goto(if_end) .label if_0 i2c_write8(chg, 0x1E, 0xB) .end</pre>

				<i>.label if_end .end</i>
21	DET_DCP	Detected DCP (Dedicated Charging Port)	Notify DCP charger is connected on the Type-C connector	<i>.dev_map chg 0 .event DET_DCP i2c_read8(chg, 0x1E, 0xff) goto_if_less_r(var_read, 0x4D, if_0) goto(if_end) .label if_0 i2c_write8(chg, 0x1E, 0x4D) .label if_end .end</i>
24	DET_VSAFE5V	Detected V_{BUS} is higher than vSafe5V	Indication V_{BUS} is present	<i>.event DET_VSAFE5V gpio_write(3, 1) .end</i>
25	DET_VSAFE0V	Detected V_{BUS} is lower than vSafe0V	Indication V_{BUS} is not present and Enable External discharge circuit on the V_{BUS} Path	<i>.event DET_VSAFE0V gpio_write(3, 0) .end</i>
26	VIO_HIGH	Detected VIO high	Notify VIO high	<i>.event VIO_HIGH gpio_write(3, 1) .end</i>
27	VIO_LOW	Detected VIO low	Notify VIO low	<i>.event VIO_LOW gpio_write(3, 0) .end</i>
29	SWITCH_MODULE_OPEN	Initiate switch module	Notify switch module initiation	<i>.event SWITCH_MODULE_INIT gpio_write(3, 1) .end</i>
37	DET_MOISTURE	Detected Moisture	Notify moisture is present on the Type-C connector	<i>.event DET_MOISTURE gpio_write(3, 1) .end</i>
38	DET_DRY	Detected Dry	Notify no moisture is present on the Type-C connector	<i>.event DET_DRY gpio_write(3, 0) .end</i>
40	REC_PD_HARDRESET_SINK	In sink mode, received hard-reset PD Message	Required charger input current limit to minimum value the sink shall not draw more than iSafe0mA when V_{BUS} is driven to vSafe0V	<i>.dev_map chg 0 .event REC_PD_HARDRESET_SINK i2c_write8(chg, 0x1E, 0x00); 100mA end</i>

41	DONE_PD_HARDRESET_SINK	In sink mode, hard-reset sequence completed	Required charger current limit to acquired value, the sink can draw current expected	.dev_map chg 0 .event DONE_PD_HARDRESET_SINK i2c_write8(chg, 0x1E, 0x3D); CHGIN_ILIM 3A .end
50	DONE_POR	MAX77978 Power on sequence completed	Configure external device register to be initial setting	.dev_map chg 0 .event DONE_POR i2c_write8(chg, 0x16, 0x80); I2C Mode Enable, Charger=OTG=DCDC off .end
51~54	DET_GPIO#_INT	Detected GPIO# of MAX77978 going from high to low	Indication for GPIO# changes from high to low	.dev_map chg 0 .event DET_GPIO8_INT gpio_write(3, 1) .end
60	USBDP_IDLE	MAX77978 Power on sequence completed, PD communication changes to the idle state, waiting for PD message.	Set the external device to the initial state	.dev_map chg 0 .event USBDP_IDLE i2c_write8(chg, 0x16, 0x80); I2C Mode Enable, Charger=OTG=DCDC off .end
64	SNK_RDY	PD sink is at a stable power with no on-going negotiation, ready to respond to requests from Source	Notify MAX77978 is ready to work as Sink	.event SNK_RDY gpio_write(3, 0) .end
65	SRC_RDY	PD source is at a stable power with no on-going negotiation, ready to respond to requests from Sink	Notify MAX77978 is ready to work as Source	.event SRC_RDY gpio_write(3, 1) .end
66~71	SNK_REQ_POS#	When MAX77978 is configured source mode, MAX77978 advertises the PDO options.	Set external charger OTG voltage and current limit based on the system definition.	.event SNK_REQ_POS0 i2c_write8(chg, 0x1F, 0x8F) .end
73	REQ_SWITCH_CONTROL_SDP_CDP	Detected SDP or CDP	Set USB Switch to close	.event REQ_SWITCH_CONTROL_SDP_CDP reg_write(BC_CTRL1_CTRL2, 0x0900, 0x3F00) .end
74	REQ_SWITCH_CONTROL_DCP	Detected DCP	Set USB Switch to open	.event REQ_SWITCH_CONTROL_DCP reg_write(BC_CTRL1_CTRL2, 0x0020, 0x0020) .end

75	REQ_SWITCH_CONTROL_DCDTO	Detected Data Contact Detection Timeout	Set USB Switch to close	.event REQ_SWITCH_CONTROL_DC DTO reg_write(BC_CTRL1_CTRL 2, 0x0900, 0x3F00) .end
83	DET_SINKPDI_OP0_TO_OP5	When SrcCap Current is detected $0 < \text{SrcCur} < 0.5\text{A}$	Set input current limit to the minimum value	.event DET_SINKPDI_OP0_TO_OP5 i2c_write8(chg, 0x1E, 0x02) .end
84	DET_SINKPDI_OP5_TO_IP0	When SrcCap Current is detected $0.5\text{A} \leq \text{SrcCur} < 1\text{A}$	Set input current limit to 0.5A	.event DET_SINKPDI_OP5_TO_IP0 i2c_write8(chg, 0x1E, 0x0B) .end
85	DET_SINKPDI_IP0_TO_IP5	When SrcCap Current is detected $1\text{A} \leq \text{SrcCur} < 1.5\text{A}$	Set input current limit to 1.0A	.event DET_SINKPDI_IP0_TO_IP5 i2c_write8(chg, 0x1E, 0x15) .end
86	DET_SINKPDI_IP5_TO_2P0	When SrcCap Current is detected $1.5\text{A} \leq \text{SrcCur} < 2\text{A}$	Set input current limit to 1.5A	.event DET_SINKPDI_IP5_TO_2P0 i2c_write8(chg, 0x1E, 0x1F) .end
87	DET_SINKPDI_2P0_TO_2P5	When SrcCap Current is detected $2\text{A} \leq \text{SrcCur} < 2.5\text{A}$	Set input current limit to 2.0A	.event DET_SINKPDI_2P0_TO_2P5 i2c_write8(chg, 0x1E, 0x29) .end
88	DET_SINKPDI_2P5_TO_3P0	When SrcCap Current is detected $2.5\text{A} \leq \text{SrcCur} < 3\text{A}$	Set input current limit to 2.5A	.event DET_SINKPDI_2P5_TO_3P0 i2c_write8(chg, 0x1E, 0x33) .end
89	DET_SINKPDI_3P0_TO_3P5	When SrcCap Current is detected $3\text{A} \leq \text{SrcCur} < 3.5\text{A}$	Set input current limit to 3.0A	.event DET_SINKPDI_3P0_TO_3P5 i2c_write8(chg, 0x1E, 0x3D) .end
90	DET_SINKPDI_3P5_TO_4P0	When SrcCap Current is detected $3.5\text{A} \leq \text{SrcCur} < 4\text{A}$	Set input current limit to 3.5A	.event DET_SINKPDI_3P5_TO_4P0 i2c_write8(chg, 0x1E, 0x47) .end
91	DET_SINKPDI_UPPER_4P0	When SrcCap Current is detected $\text{SrcCur} \geq 4\text{A}$	For the input current limit higher than 4A, set it according to the customer definition	.event DET_SINKPDI_UPPER_4P0 i2c_write8(chg, 0x1E, 0x51) .end

Customization Script GUI Interface

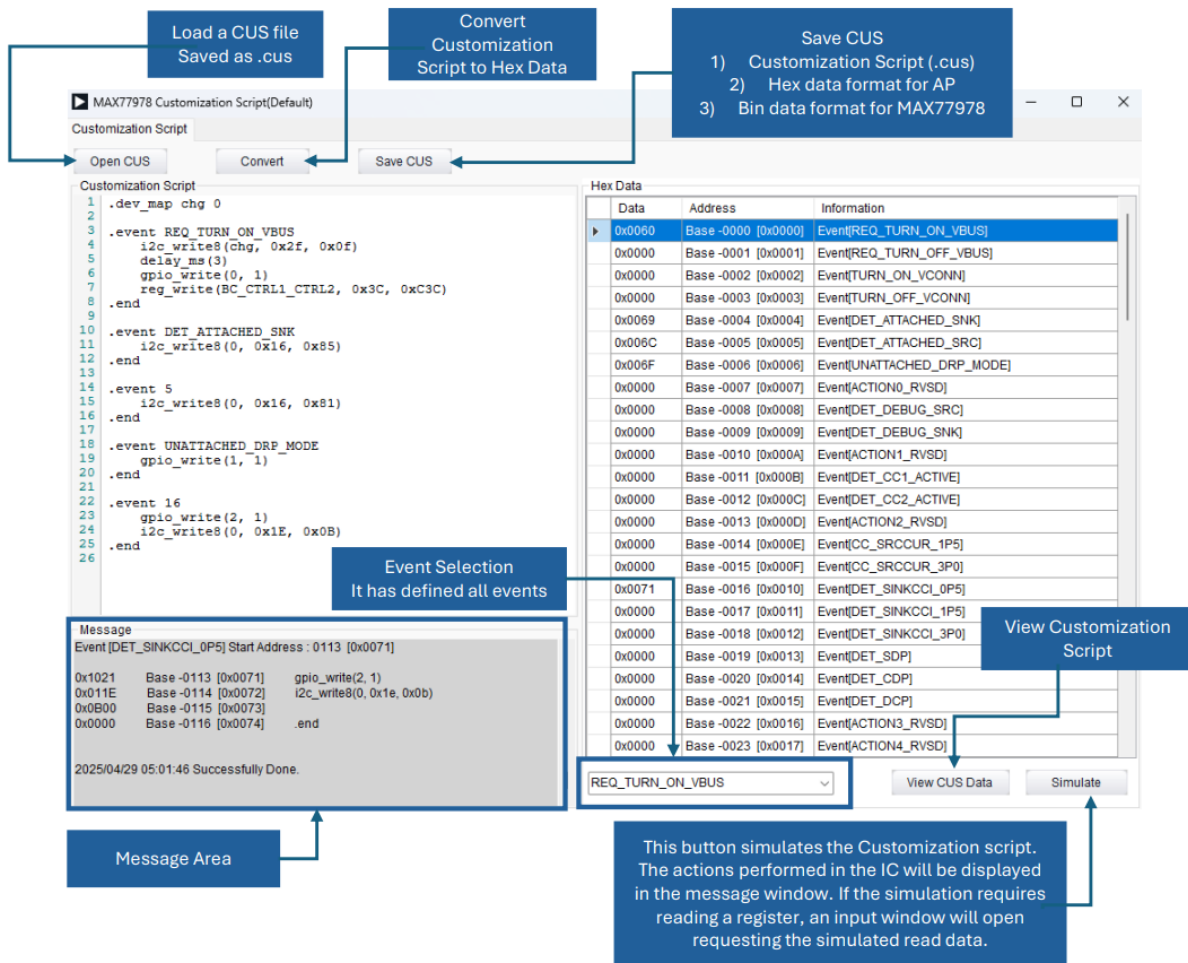


Figure 2. Description of Customization Script Generation GUI

Customization Script Download Flowchart

The following flowchart describes the process of using the GUI to edit or create a customization script and convert the script to programmable data in the IC.

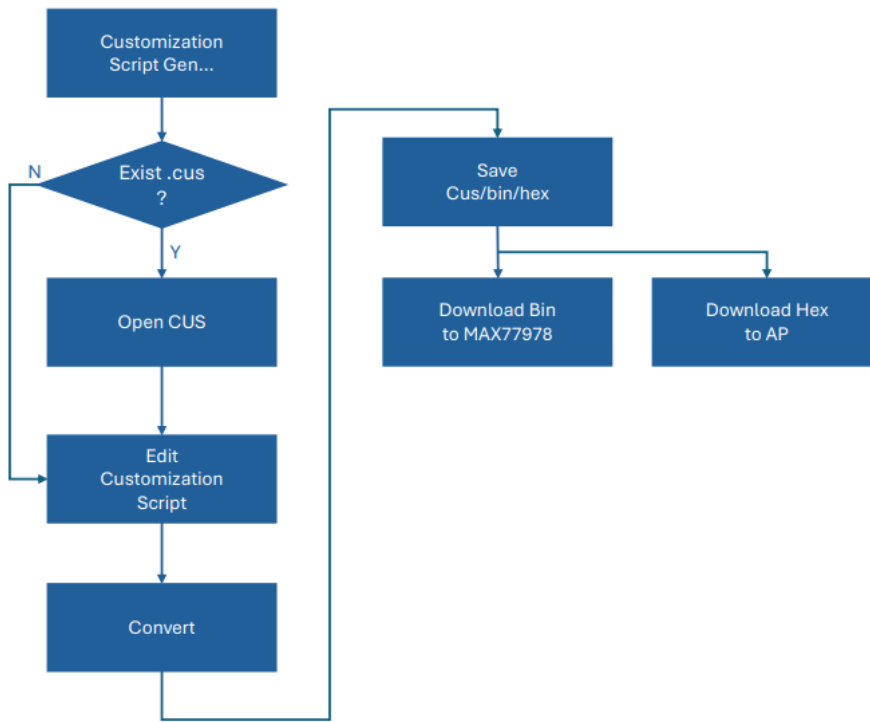


Figure 3. Downloading Customization Script

Customization update Flowchart for MTP

The following flowchart describes the process of updating .cus script in MTP

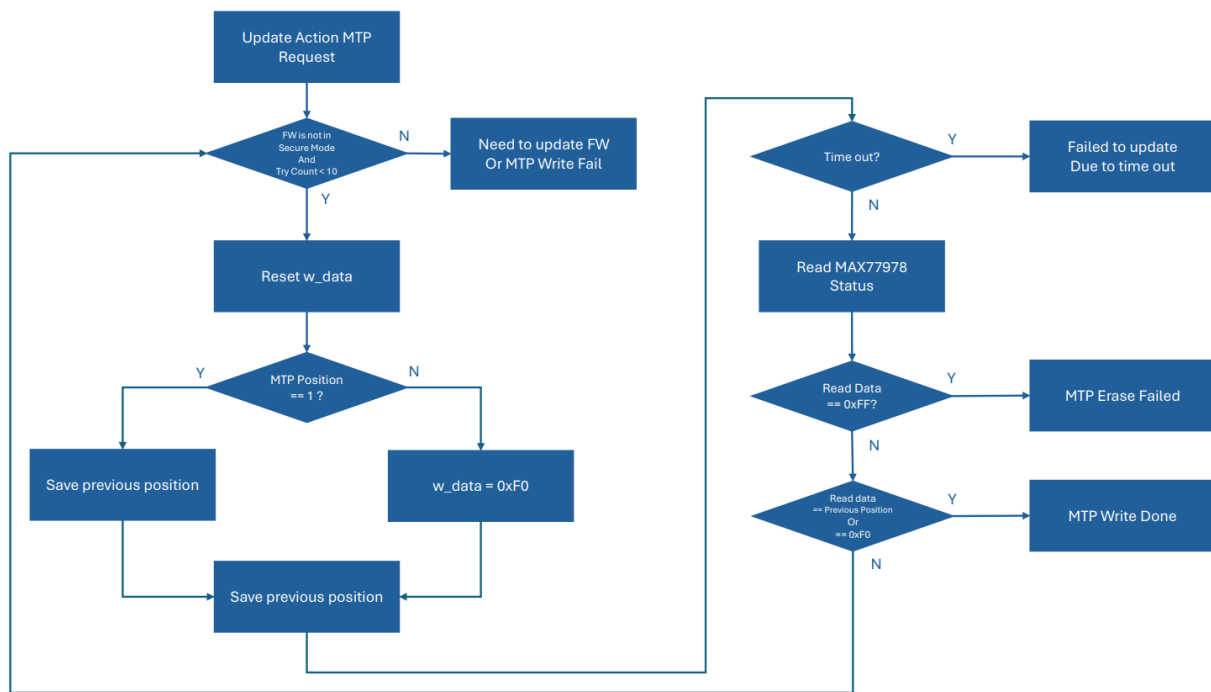


Figure 4. Updating Customization Script

Opcode 0x60 - Action MTP update flow chart

The following flowchart describes the process of updating action in MTP block

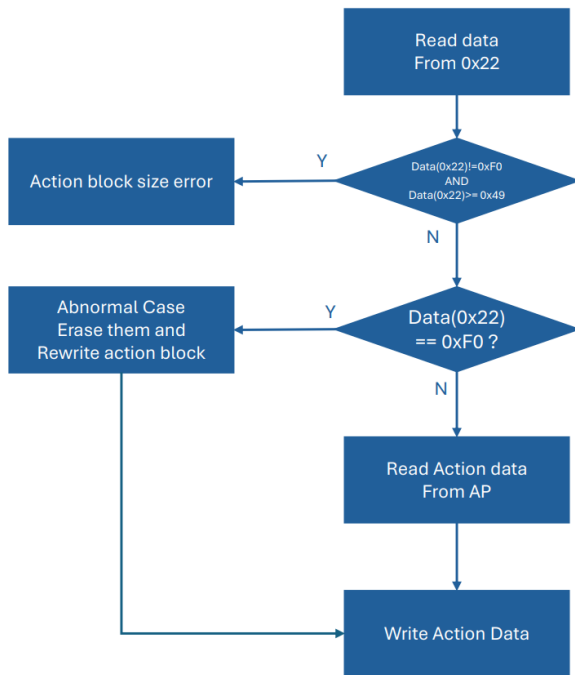


Figure 5. Updating Action in MTP block

OPCode Commands

All configuration and control commands to the MAX77978 are sent and received as a packet using an OPCode to identify the packet. The MAX77978 contains a 32-byte buffers for reading and writing OPCode commands.

Simplified Block Diagram of the OPCode Command Process

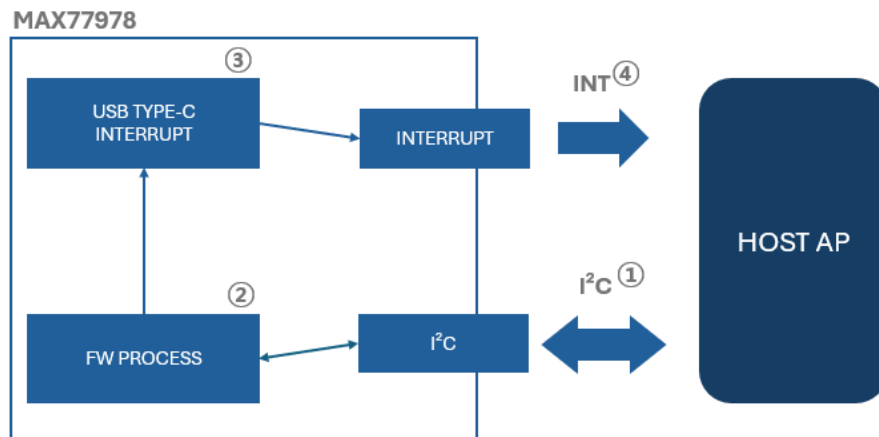


Figure 6. OPCode Command Process

- 1) The host AP sends the OPCode Command.
- 2) The MAX77978 FW processes the received command.
- 3) When the process of the command by the firmware is finished, a USB Type-C Interrupt occurs.
- 4) MAX77978 sends INT to notify the host AP that the processing of the command was completed.

OP Code Commands

All configuration and control commands to the USBC are sent and received as a packet using an opcode to identify the packet.

A. Messages sent to the USBC

- 0x21 – Opcode sent to USBC
- 0x22 – 0x41 Message sent to USBC
- Message sizes can be as short as 1 byte (Opcode only) and up to 33 bytes (Opcode plus 32 bytes).
- Registers 0x21 to 0x41 act as a scratch pad for writing the message to the USBC.
- All messages are acknowledged by the USBC by sending data first (0x22-0x41) and opcode last (0x21) to generate an interrupt
- Data written to 0x21 – 0x41 is not auto cleared – the data will remain in the registers until the application processor over-writes it with a new message.

B. Messages received from USBC

- 0x51 – Opcode identifying the message type
- 0x52 – 0x71 – message sent to application processor
- Message sizes can be as short as 1 byte (Opcode only) and up to 33 bytes (Opcode plus 32 bytes).
- Data written to 0x51 – 0x71 is not auto cleared – the data will remain in the registers until the USBC over-writes them with a new message.

Addr [Hex]	Name	Default [Hex]	USBC Type	AP Type	B7	B6	B5	B4	B3	B2	B1	B0
0x20	Reserved	0x00	RO	RW	0x00							
0x21	AP_DATAOUT0	0x00	RO	RW	AP Request Opcode							
0x22	AP_DATAOUT1	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x23	AP_DATAOUT2	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x24	AP_DATAOUT3	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x25	AP_DATAOUT4	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x26	AP_DATAOUT5	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x27	AP_DATAOUT6	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x28	AP_DATAOUT7	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x29	AP_DATAOUT8	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2A	AP_DATAOUT9	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2B	AP_DATAOUT10	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2C	AP_DATAOUT11	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2D	AP_DATAOUT12	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2E	AP_DATAOUT13	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x2F	AP_DATAOUT14	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0

0x30	AP_DATAOUT15	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x31	AP_DATAOUT16	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x32	AP_DATAOUT17	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x33	AP_DATAOUT18	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x34	AP_DATAOUT19	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x35	AP_DATAOUT20	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x36	AP_DATAOUT21	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x37	AP_DATAOUT22	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x38	AP_DATAOUT23	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x39	AP_DATAOUT24	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3A	AP_DATAOUT25	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3B	AP_DATAOUT26	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3C	AP_DATAOUT27	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3D	AP_DATAOUT28	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3E	AP_DATAOUT29	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x3F	AP_DATAOUT30	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x40	AP_DATAOUT31	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x41	AP_DATAOUT32	0x00	RO	RW	B7	B6	B5	B4	B3	B2	B1	B0
0x42-0x50	Not used	0x00	RO	RO	0x00							
0x51	AP_DATAIN0	0x00	RW	RO	USBC response Opcode							
0x52	AP_DATAIN1	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x53	AP_DATAIN2	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x54	AP_DATAIN3	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x55	AP_DATAIN4	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x56	AP_DATAIN5	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x57	AP_DATAIN6	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x58	AP_DATAIN7	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x59	AP_DATAIN8	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5A	AP_DATAIN9	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5B	AP_DATAIN10	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5C	AP_DATAIN11	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5D	AP_DATAIN12	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5E	AP_DATAIN13	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x5F	AP_DATAIN14	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x60	AP_DATAIN15	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0
0x61	AP_DATAIN16	0x00	RW	RO	B7	B6	B5	B4	B3	B2	B1	B0

0x62	AP_DATAIN17	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x63	AP_DATAIN18	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x64	AP_DATAIN19	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x65	AP_DATAIN20	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x66	AP_DATAIN21	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x67	AP_DATAIN22	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x68	AP_DATAIN23	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x69	AP_DATAIN24	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6A	AP_DATAIN25	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6B	AP_DATAIN26	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6C	AP_DATAIN27	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6D	AP_DATAIN28	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6E	AP_DATAIN29	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x6F	AP_DATAIN30	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x70	AP_DATAIN31	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0
0x71	AP_DATAIN32	0x00	RW	R0	B7	B6	B5	B4	B3	B2	B1	B0

0x15: VCONN Switch Over Current read

Addr	Name	VBUS Alarm Read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x15								
0x51	0x15								
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	ccVcnllim			
Bit	Name		Reset	Description					
2:0	ccVcnllim			VCONN Switch over current 000 = 200mA, 001 = 300mA, 010 = 400mA, 011 = 500mA, 100 = Reserved, 101 = Reserved, 110 = Reserved, 111 = Reserved,					

0x16: VCONN Switch Over Current read

Addr	Name	VBUS Alarm Read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x16							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	ccVcnllim		
0x51	0x16							

0x17: VBUS Alarm read

Addr	Name	VBUS Alarm Read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x17							
0x51	0x17							
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	DIS_VOLT_ALARM
0x53	VBUS_ALARM_HI_CFG [7:0]							
0x54	RSVD	RSVD	RSVD	RSVD	VBUS_ALARM_HI_CFG [11:8]			
0x55	VBUS_ALARM_LO_CFG [7:0]							
0x56	RSVD	RSVD	RSVD	RSVD	VBUS_ALARM_LO_CFG [11:8]			
Bit	Name		Reset	Description				
0	DIS_VOLT_ALARM			Disable Voltage Alarm 0 = Disable, 1 = Enable				

7:0	VBUS_ALARM_HI_CFG		0x0000 = High Voltage, 0x0001 = 25mV (Low 0x01, High 0x00), 0x0002 = 50mV (Low 0x02, High 0x00), 0x0003 = 75mV, 0x0004 = 100mV, 0x0005 = 125mV, ... 0x00FA = 6250mV (Low 0xFA, High 0x00), ... 0x01C2 = 11250mV (Low 0xC2, High 0x01), ... 0x07FE = 51150mV (Low 0xFE, High 0x07)
3:0			
7:0	VBUS_ALARM_LO_CFG		0x0000 = Low Voltage, 0x0001 = 25mV (Low 0x01, High 0x00), 0x0002 = 50mV (Low 0x02, High 0x00), 0x0003 = 75mV, 0x0004 = 100mV, 0x0005 = 125mV, ... 0x00FA = 6250mV (Low 0xFA, High 0x00), ... 0x01C2 = 11250mV (Low 0xC2, High 0x01), ... 0x07FE = 51150mV (Low 0xFE, High 0x07)
3:0			

0x18: VBUS Alarm write

Addr	Name	VBUS Alarm Read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x18								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	DIS_VOLT_ALARM	
0x23	VBUS_ALARM_HI_CFG [7:0]								
0x24	VBUS_ALARM_LO_CFG [3:0]				VBUS_ALARM_HI_CFG [11:8]				
0x25	VBUS_ALARM_LO_CFG [11:4]								
0x51	0x18								

0x22: Error Recovery

Addr	Name	Error Recovery				Reset		
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x22							
0x51	0x22							
0x52	RSVD							ErrorRecovery

Bit	Name	Reset	Description
0	ErrorRecovery	0	Force transition to Error Recovery 0 = No Action, 1 = Action

0x23: GPIO Control Read

Addr	Name	GPIO Control				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x23								
0x51	0x23								
0x52	RSVD	RSVD	GPIO1 Output	GPIO1 Direction		GPIO0 Output	GPIO0 Direction		
0x53	RSVD	RSVD	GPIO3 Output	GPIO3 Direction		GPIO2 Output	GPIO2 Direction		
BITFIELD		BIT	RESET	DESCRIPTION					
GPIO1_OUT	5	0	GPIO1 Output	0 = Low					
				1 = High					
GPIO1_DIR	4:3	0	GPIO1 Direction	0 = Dedicated Function					
				1 = Input					
				2 = Output					
				3 = Reserved					
GPIO0_OUT	2	0	GPIO0 Output	0 = Low					
				1 = High					
GPIO0_DIR	1:0	0	GPIO0 Direction	0 = Dedicated Function					
				1 = Input					
				2 = Output					
				3 = Reserved					
GPIO3_OUT	5	0	GPIO3 Output	0 = Low					
				1 = High					
GPIO3_DIR	4:3	0	GPIO3 Direction	0 = Dedicated Function					
				1 = Input					
				2 = Output					
				3 = Reserved					
GPIO2_OUT	2	0	GPIO2 Output	0 = Low					
				1 = High					
GPIO2_DIR	1:0	0	GPIO2 Direction	0 = Dedicated Function					
				1 = Input					
				2 = Output					
				3 = Reserved					

0x24: GPIO Control Write

Addr	Name	GPIO Control			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x24							
0x22	RSVD	RSVD	GPIO1 Output	GPIO1 Direction		GPIO0 Output	GPIO0 Direction	
0x23	RSVD	RSVD	GPIO3 Output	GPIO3 Direction		GPIO2 Output	GPIO2 Direction	
0x51	0x24							

0x27: GPIO 0/GPIO 1 ADC

Addr	Name	GPIO 0/GPIO 1 ADC			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x27							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	adc_range
0x51	0x27							
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	adc_range
0x53	GPIO0							
0x54	GPIO1							
Bit	Name		Reset	Description				
0	adc_range			GPIO's ADC Range LSB 0 = 4.9mV, 1 = 19.6mV				
7:0	GPIO0			GPIO0 ADC range				
7:0	GPIO1			GPIO1 ADC range				

0x28: SrcCap AVS Request

Addr	Name	SrcCap AVS Request				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x28								
0x22	Req_AVS_Pos								
0x23	OUTPUT_VOLTAGE_LOW								
0x24	OUTPUT_VOLTAGE_HIGH								
0x25	RSVD	Operating_Current							
0x51	0x28								
Bit	Name		Reset	Description					
7:0	REQ_AVS_POS			Request Position of PDO					
7:0	OUTPUT_VOLTAGE_LOW		0x00FA	0x0000 = Min Output Voltage, 0x0004 = 100mV (Low 0x04, High 0x00), 0x0008 = 200mV (Low 0x08, High 0x00), 0x000C = 300mV, 0x0010 = 400mV, 0x0014 = 500mV,					
7:0	OUTPUT_VOLTAGE_HIGH			... 0x03E8 = 25000mV (Low 0xE8, High 0x03), ... 0x05B4 = 36500mV (Low 0xB4, High 0x05), ... 0x0780 = 48000mV (Low 0x80, High 0x07)					
6:0	OPERATING_CURRENT			0x00 = Max Operating Current, 0x01 = 50mA 0x02 = 100mA 0x03 = 150mA ... 0x1E = 1500mA ... 0x28 = 2000mA ... 0x3C = 3000mA ... 0x7C = 6200mA 0x7D - 0xFF = Reserved					

0x2F: Get SinkCap

Addr	Name	Get SinkCap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x2F							
0x51	0x2F							
0x52	NumOfPDO			PwrRole	DataRole	RSVD	RSVD	RSVD
0x53	PDO0[7:0]							
0x54	PDO0[15:8]							
0x55	PDO0[23:16]							
0x56	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
Bit	Name		Reset	Description				
7:5	NumOfPDO		000	Number of Power Data Objects				
4	PwrRole		0	Power Role of Current Source 0 = Sink, 1 = Source				
3	DataRole		0	Data Role of Current Source 0 = UFP, 1 = DFP				

0x30: Current SrcCap

Addr	Name	Current SrcCap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x30							
0x51	0x30							
0x52	RSVD	SEL_PDO_POS				NumOfPDO		
0x53	PDO0[7:0]							
0x54	PDO0[15:8]							
0x55	PDO0[23:16]							
0x56	PDO0[31:24]							
●●	●●●●●●●●							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							

Bit	Name	Reset	Description
6:3	SEL_PDO_POS	000	Selected Position of PDO 000 = Unselected – Should send request message using OPCODE 0x32, SrcCap Request, 001 – 111 = Selected PDO number
2:0	NumOfPDO	000	Number of Power Data Objects

0x31: Get Source Cap

Addr	Name	Get Source Cap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x31							
0x51	0x31							
0x52	NumOfPDO			PwrRole	DataRole	RSVD	RSVD	RSVD
0x53	PDO0[7:0]							
0x54	PDO0[15:8]							
0x55	PDO0[23:16]							
0x56	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
Bit	Name	Reset	Description					
7:5	NumOfPDO		Number of Power Data Objects					
4	PwrRole		Power Role of Current Source 0 = Sink, 1 = Source					
3	DataRole		Data Role of Current Source 0 = UFP, 1 = DFP					

0x32: SrcCap Request

Addr	Name	SrcCap Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x32							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	Req_PDO_Pos		
0x51	0x32							

Bit	Name	Reset	Description
2:0	REQ_PDO_POS		Request Position of PDO

0x33: Set SrcCap

Addr	Name	Set SrcCap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x33							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	NumOfPDO		
0x23	PDO0[7:0]							
0x24	PDO0[15:8]							
0x25	PDO0[23:16]							
0x26	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
0x51	0x33							
Bit	Name		Reset	Description				
2:0	NumOfPDO			Number of Power Data Objects				

0x34: Send Get Request

0x21 Send Get Request								
Addr	Name	Send Get Request				Reset		
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x34							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	ReqMsgType		
0x23	ExtDB0							
0x24	ExtDB1							
0x51	0x34							
Bit	Name	Reset	Description					
2:0	ReqMsgType		Request Message Type 000 = Source Cap Extended, 001 = Status, 010 = Battery Cap, 011 = Battery Status, 100 = Manufacturer Info					

7:0	ExtDB0		Extended Data Block [0]
7:0	ExtDB1		Extended Data Block [1]

0x35: Read Get Request

Addr	Name	Read Get Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x35							
0x51	0x35							
0x52	RespMsgType			MsgDataLen				
0x53	Data							
0x54	Data							
••	••••••••••							
	Data							
Bit	Name	Reset	Description					
7:5	RespMsgType		Response Message Type 000 = Source_Cap_Extended, 001 = Status, 010 = Battery_Cap, 011 = Battery_Status, 100 = Manufacturer_Info					
4:0	MsgDataLen		Data Length					

0x36: Send Get Response

Addr	Name	Send Get Response			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x36							
0x22	RespMsgType			MsgDataLen				
0x23	Data							
0x24	Data							
0x29								
0x41	Data							
0x51	0x36							
Bit	Name		Reset	Description				

7:5	RespMsgType		Response Message Type 000 = Source_Cap_Extended, 001 = Status, 010 = Battery_Cap, 011 = Battery_Status, 100 = Manufacturer_Info
4:0	MsgDataLen		Data Length

0x37: Send Swap Request

Addr	Name	Send Swap Request				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x37								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	SwapName			
0x51	0x37								
0x52	Result								
Bit	Name		Reset	Description					
2:0	SwapName			000 = N/A, 001 = Data Role, 010 = Power Role, 011 = VCONN					
7:0	Result			0x00 = Wait, 0x01 = Accepted, 0x02 = Rejected, 0x03 = Not Supported, 0xFC = Disconnected, 0xFD = Other State, 0xFE = Corrosion State, 0xFF = Send Failed					

0x38: Send Swap Response

Addr	Name	Send Swap Response				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x38								
0x22	RSVD	RSVD	PR_SWP_Resp		DR_SWP_Resp		VCONN_SWP_Resp		
0x51	0x38								
Bit	Name		Reset	Description					

5:4	PR_SWP_Resp		00 = Accept SNK and Reject SRC, 01 = Accept SRC and Reject SNK, 10 = Accept Dual, 11 = Wait
3:2	DR_SWP_Resp		00 = Accept UFP and Reject DFP, 01 = Accept DFP and Reject UFP, 10 = Accept Dual, 11 = Wait
1:0	VCONN_SWP_Resp		00 = Accept On and Reject Off, 01 = Accept Off and Reject On, 10 = Accept Off/On, 11 = Wait

0x39: Get EPR SinkCap

Addr	Name	Get EPR SinkCap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x39							
0x51	0x39							
0x52	NumOfPDO			PwrRole	DataRole	RSVD	RSVD	RSVD
0x53	EPR PDO8[7:0]							
0x54	EPR PDO8[15:8]							
0x55	EPR PDO8[23:16]							
0x56	EPR PDO8[31:24]							
••	••••••••							
	EPR PDOx[7:0]							
	EPR PDOx[15:8]							
	EPR PDOx[23:16]							
	EPR PDOx[31:24]							
Bit	Name	Reset	Description					
7:5	NumOfPDO	000	Number of Power Data Objects					
4	PwrRole	0	Power Role of Current Source 0 = Sink, 1 = Source					
3	DataRole	0	Data Role of Current Source 0 = UFP, 1 = DFP					

0x3A: SrcCap PPS Request

Addr	Name	SrcCap PPS Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x3A							
0x22	Req_APDO_Pos							
0x23	OUTPUT_VOLTAGE_LOW							
0x24	OUTPUT_VOLTAGE_HIGH							
0x25	RSVD	Operating_Current						
0x51	0x3A							
Bit	Name		Reset	Description				
7:0	REQ_APDO_POS			Request Position of PDO				
7:0	OUTPUT_VOLTAGE_LOW		0x00FA	0x0000 = Min Output Voltage, 0x0001 = 20mV (Low 0x01, High 0x00), 0x0002 = 40mV (Low 0x02, High 0x00), 0x0003 = 60mV, 0x0004 = 80mV, 0x0005 = 100mV, ...				
7:0	OUTPUT_VOLTAGE_HIGH			0x00FA = 5000mV (Low 0xFA, High 0x00), ... 0x01C2 = 9000mV (Low 0xC2, High 0x01), ... 0x03E8 = 20000mV (Low 0xE8, High 0x03)				
6:0	OPERATING_CURRENT			0x00 = Max Operating Current, 0x01 = 50mA 0x02 = 100mA 0x03 = 150mA ... 0x1E = 1500mA ... 0x28 = 2000mA ... 0x3C = 3000mA ... 0x7C = 6200mA 0x7D - 0xFF = Reserved				

0x3C: Set PPS Mode

Addr	Name	SET PPS Mode			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x3C							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	MODE
0x23	OUTPUT_VOLTAGE_LOW							
0x24	OUTPUT_VOLTAGE_HIGH							
0x25	RSVD	OPERATING_CURRENT						
0x51	0x3C							
Bit	Name		Reset	Description				
0	MODE			Mode 0 = Disable, 1 = Enable				
7:0	OUTPUT_VOLTAGE_LOW			0x0000 = Min Output Voltage, 0x0001 = 20mV (Low 0x01, High 0x00), 0x0002 = 40mV (Low 0x02, High 0x00), 0x0003 = 60mV, 0x0004 = 80mV, 0x0005 = 100mV,				
7:0	OUTPUT_VOLTAGE_HIGH			... 0x00FA = 5000mV (Low 0xFA, High 0x00), ... 0x01C2 = 9000mV (Low 0xC2, High 0x01), ... 0x03E8 = 20000mV (Low 0xE8, High 0x03)				
6:0	OPERATING_CURRENT			0x00 = Max Operating Current, 0x01 = 50mA, 0x02 = 100mA, 0x03 = 150mA, ... 0x1E = 1500mA, ... 0x28 = 2000mA, ... 0x3C = 3000mA, ... 0x7C = 6200mA, 0x7D - 0xFF = Reserved				

0x3E: SNK PDO Request

Addr	Name	SNK PDO Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x3E							
0x22	ReadSNKPDO	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
0x51	0x3E							
0x52	NumOfPDO							
0x53	PDO0[7:0]							
0x54	PDO0[15:8]							
0x55	PDO0[23:16]							
0x56	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
Bit	Name	Reset	Description					
7	ReadSNKPDO		Read SNK PDO 0 = RAM, 1 = MTP					
7:0	NumOfPDO		Number of PDOs					

0x3F: SNK PDO Set

Addr	Name	SNK PDO Set			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x3F							
0x22	WriteSNKPDO	RSVD	RSVD	RSVD	RSVD	NumOfPDO		
0x23	PDO0[7:0]							
0x24	PDO0[15:8]							
0x25	PDO0[23:16]							
0x26	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
0x51	0x3F							
Bit	Name	Reset	Description					

7	WriteSNKPDO		Write SNK PDO 0 = RAM, 1 = MTP
2:0	NumOfPDO		Number of PDOs

0x48: Send VDM

Addr	Name	Send VDM			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x48							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	NumOfVDO		
0x23	VDMHeader[7:0]							
0x24	VDMHeader[15:8]							
0x25	VDMHeader[23:16]							
0x26	VDMHeader[31:24]							
0x27	VD00[7:0]							
0x28	VD00[15:8]							
0x29	VD00[23:16]							
0x2A	VD00[31:24]							
0x2B	VD01[7:0]							
0x2C	VD01[15:8]							
0x2D	VD01[23:16]							
0x2E	VD01[31:24]							
0x2F	VD02[7:0]							
0x30	VD02[15:8]							
0x31	VD02[23:16]							
0x32	VD02[31:24]							
••	••••••••••							
	VD0x[7:0]							
	VD0x[15:8]							
	VD0x[23:16]							
	VD0x[31:24]							
0x51	0x48							
Bit	Name		Reset	Description				
2:0	NumOfVDO			Number of VDOs				

0x4A: Get PD Message

Addr	Name	Get PD Message			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x4A							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RX/TX
0x51	0x4A							
0x52	RSVD	MsgType		MsgDataLen				
0x53	MessageHeader[7:0]							
0x54	MessageHeader[15:8]							
0x55	DataObjcet(s) or ExtendedMessageHeader[7:0]							
0x56	DataObject(s) or ExtendedMessageHeader[15:8]							
0x57	DataObject(s) or Data							
0x58	DataObject(s) or Data							
0x59	DataObject(s) or Data							
0x5A	DataObject(s) or Data							
••	••••••••							
	DataObject(s) or Data							
	DataObject(s) or Data							
	DataObject(s) or Data							
	DataObject(s) or Data							
Bit	Name		Reset	Description				
0	RX/TX			RX or TX Message 0 = RX Message, 1 = TX Message				
6:5	MsgType			00 = Control Message, 01 = Data Message, 10 = Extended Message (for PD version 3.0)				
4:0	MsgDataLen			Message Data Length Bytes except Message Header				

0x4B: Get VDM Response

Addr	Name	GetVDM			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x4B							
0x22	VDMStatus	VDMType						
0x51	0x4B							
0x52	VDMType							
0x53	MessageHeader [7:0]							
0x54	MessageHeader [15:8]							
0x55	VDMHeader[7:0]							

0x56	VDMHeader[7:0]		
0x57	VDMHeader[15:8]		
0x57	VDMHeader[23:16]		
0x58	VDMHeader[31:24]		
0x59	VD00[7:0]		
0x5A	VD00[15:8]		
0x5B	VD00[23:16]		
0x5C	VD00[31:24]		
••	••••••••••		
	VD0x[7:0]		
	VD0x[15:8]		
	VD0x[23:16]		
	VD0x[31:24]		
Bit	Name	Reset	Description
7	VDMStatusClear	0x81	VDM clear status 0 = Not Clear, 1 = Clear
6:0	VDMType		VDM Type 000001 = Discover Identity, 000010 = Discover SVIDs, 000011 = Discover MODEs, 000100 = Enter Mode, 000101 = Exit Mode, 000110 = Attention, 010000 = Display Port Status, 010001 = Display Port Configure

0x4C: SNK EPR PDO Request

Addr	Name	SNK EPR PDO Request				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x4C								
0x22	ReadSNKPDO	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x51	0x4C								
0x52	NumOfPDO								
0x53	EPR PDO8[7:0]								
0x54	EPR PDO8[15:8]								
0x55	EPR PDO8[23:16]								
0x56	EPR PDO8[31:24]								
••	••••••••••								
	EPR PDOx[7:0]								

	EPR PDOx[15:8]		
	EPR PDOx[23:16]		
	EPR PDOx[31:24]		
Bit	Name	Reset	Description
7	ReadSNKPDO		Read SNK PDO 0 = RAM, 1 = MTP
7:0	NumOfPDO		Number of EPR PDOs

0x4D: SNK EPR PDO Set

Addr	Name	SNK EPR PDO Set				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x4D								
0x22	WriteSNKPDO	RSVD	RSVD	RSVD	RSVD	NumOfPDO			
0x23	EPR PDO8[7:0]								
0x24	EPR PDO8[15:8]								
0x25	EPR PDO8[23:16]								
0x26	EPR PDO8[31:24]								
••	••••••••••								
	EPR PDOx[7:0]								
	EPR PDOx[15:8]								
	EPR PDOx[23:16]								
	EPR PDOx[31:24]								
0x51	0x4D								
Bit	Name	Reset	Description						
7	WriteSNKPDO		Write SNK PDO 0 = RAM, 1 = MTP						
2:0	NumOfPDO		Number of EPR PDOs						

0x4E: SRC EPR PDO Request

Addr	Name	SRC EPR PDO Request				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x4E								
0x22	ReadSRCPDO	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x51	0x4E								

0x52	NumOfPDO		
0x53	EPR PDO8[7:0]		
0x54	EPR PDO8[15:8]		
0x55	EPR PDO8[23:16]		
0x56	EPR PDO8[31:24]		
••	••••••••••		
	EPR PDOx[7:0]		
	EPR PDOx[15:8]		
	EPR PDOx[23:16]		
	EPR PDOx[31:24]		
Bit	Name	Reset	Description
7	ReadSNKPDO		Read SRC PDO 0 = RAM, 1 = MTP
7:0	NumOfPDO		Number of EPR PDOs

0x4F: SRC EPR PDO Set

Addr	Name	SNK EPR PDO Set				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x4F								
0x22	WriteSRCPDO	RSVD	RSVD	RSVD	RSVD	NumOfPDO			
0x23	EPR PDO8[7:0]								
0x24	EPR PDO8[15:8]								
0x25	EPR PDO8[23:16]								
0x26	EPR PDO8[31:24]								
••	••••••••••								
	EPR PDOx[7:0]								
	EPR PDOx[15:8]								
	EPR PDOx[23:16]								
	EPR PDOx[31:24]								
0x51	0x4F								
Bit	Name	Reset	Description						
7	WriteSRCPDO		Write SRC PDO 0 = RAM, 1 = MTP						
2:0	NumOfPDO		Number of EPR PDOs						

0x55: Customer Configuration read

Addr	Name	Customer Configuration read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x55								
0x51	0x55								
0x52	PSDET[7]	PSDET[6]	PSDET[5:4]			PSDET[3:2]		PSDET[1]	PSDET[0]
0x53	USBVID[7:0]								
0x54	USBVID[15:8]								
0x55	USBPID[7:0]								
0x56	USBPID[15:8]								
0x57	I2CSLV1[7:0]								
0x58	I2CSLV2[7:0]								
0x59	I2CSLV3[7:0]								
0x60	I2CSLV4[7:0]								
0x63	FRS	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x65	RSVD	RSVD	RSVD	RSVD	RSVD	rpValue			
Bit	Name		Reset	Description					
7	PSDET[7]		0	Moisture Detection 0 = Disable, 1 = Enable					
6	PSDET[6]		1	Memory Update 0 = Disable, 1 = Enable					
5:4	PSDET[5:4]		10	TypeC state 0 = SRC, 1 = SNK, 2 = DRP					
3:2	PSDET[3:2]		00	CC Try SNK/SRC 0 = None, 1 = Try.SNK, 2 = Try.SRC					
1	PSDET[1]		0	Debug Target SNK 0 = Disable, 1 = Enable					
0	PSDET[0]		0	Debug Target SRC 0 = Disable, 1 = Enable					
7	FRS		0	Fast Role Swap 0 = Disable, 1 = Enable					

2:0	rpValue	0	Source mode Rp Value 0 = RP Default, 1 = RP 1.5A, 2 = RP 3.0A
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0x56: Customer Configuration write

Addr	Name	Customer Configuration write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x56								
0x22	PSDET[7]	PSDET[6]	PSDET[5:4]		PSDET[3:2]		PSDET[1]	PSDET[0]	
0x23	USBVID[7:0]								
0x24	USBVID[15:8]								
0x25	USBPID[7:0]								
0x26	USBPID[15:8]								
0x27	I2CSLV1[7:0]								
0x28	I2CSLV2[7:0]								
0x29	I2CSLV3[7:0]								
0x30	I2CSLV4[7:0]								
0x33	FRS	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x35	RSVD	RSVD	RSVD	RSVD	RSVD	rpValue			
0x51	0x56								

0x59: Get EPR Source Cap

Addr	Name	Get EPR Source Cap			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x59							
0x51	0x59							
0x52	NumOfPDO			PwrRole	DataRole	RSVD	RSVD	RSVD
0x53	EPR PDO8[7:0]							
0x54	EPR PDO8[15:8]							
0x55	EPR PDO8[23:16]							
0x56	EPR PDO8[31:24]							
••	••••••••••							
	EPR PDOx[7:0]							
	EPR PDOx[15:8]							
	EPR PDOx[23:16]							
	EPR PDOx[31:24]							
Bit	Name	Reset	Description					
7:5	NumOfPDO		Number of Power Data Objects					

4	PwrRole		Power Role of Current Source 0 = Sink, 1 = Source
3	DataRole		Data Role of Current Source 0 = UFP, 1 = DFP

0x61: VENDOR_CC_CTRL3_CC_CTRL2_CC_CTRL1 read

Addr	Name	VENDOR_CC_CTRL3_CC_CTRL2_CC_CTRL1 read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x61								
0x51	0x61								
0x52	ccConnDry	RdopenDis	ccCompEn	ccSnkExitEn	ccLpDrpCycle		ccDrpPhase		
0x53	ccOvpDis	ccUlpSrcSel		ccLpModeSel		ccRpCtrl			
0x54	ccWtrDeb		ccWtrSel			ccLadderDis	SBU_DET_EN	WtrCycle	
Bit	Name		Reset	Description					
7	ccConnDry		0	ccConnDry 0 = Moisture detection enabled, 1 = Dry connector detection enabled					
6	RdopenDis		0	RdopenDis 0 = Rd is open during dry detection, 1 = Rd is present during APPLY_RD cycle of dry detection					
5	ccCompEn		0	ccCompEn 0 = 0x0, 1 = 0x1					
4	ccSnkExitEn		0	ccSnkExitEn 0 = Exit ATTACHCED_SNK state based on CHGIN level only, 1 = Exit ATTACHED_SNK state based on CHGIN level or when CC < VRA_RDOP5					
3:2	ccLpDrpCycle		00	ccLpDrpCycle 00 = 75ms when ccConnDry is 0, 01 = 200ms when ccConnDry is 0, 10 = 400ms when ccConnDry is 0, 11 = 800ms when ccConnDry is 0					
1:0	ccDrpPhase		00	ccDrpPhase 00 = If ccLpDrpCycle is 2b00 then 35% else 12.5%, 01 = If ccLpDrpCycle is 2b00 then 40% else 35.0%, 10 = If ccLpDrpCycle is 2b00 then 45% else 50.0%, 11 = 50%					
7	ccOvpDis		0	ccOvpDis 0 = OVP enable, 1 = OVP disable					

6:5	ccUlpSrcSel	00	ccUlpSrcSel 00 = Reserved, 01 = Reserved, 10 = 1uA current source enable, 11 = 5uA current source enable
4:3	ccLpModeSel	00	ccLpModeSel 00 = Low power mode disable, 01 = Ultra low power mode enabled, 10 = Low power mode disable, 11 = Automatic Ultra low power mode enabled
2:0	ccRpCtrl	000	ccRpCtrl 000 = Current sources driven by TCPCI normative registers, 001 = ULP current on CC line not pulled-down and not used as vconn (bit ccUlpSrcSel), 010 = 5uA on CC line not pulled-down and not used as vconn, 011 = 80uA on CC line not pulled-down and not used as vconn, 100 = 180uA on CC line not pulled-down and not used as vconn, 101 = 330uA on CC line not pulled-down and not used as vconn, 110 = RFU, 111 = Open
7:6	ccWtrDeb		ccLpModeSel 00 = 500us, 01 = 1ms, 10 = 2ms, 11 = 20ms
5:3	ccWtrSel		ccWtrSel 000 = 0.2V, 001 = 0.4V, 010 = 0.6V, 011 = 0.8V, 100 = 1.0V (recommended threshold), *= reserved
2	ccLadderDis		ccLadderDis 0 = 0x0, 1 = 0x1
1	SBU_DET_EN		SBU_DET_EN 0 = SBU comparator disabled, 1 = SBU comparator enabled by digital
0	WtrCycle		WtrCycle 0 = Water detection run for 1 DRP cycle very 2.4s, 1 = Water detection run for 1 DRP cycle very 4.8s

0x62: VENDOR_CC_CTRL3_CC_CTRL2_CC_CTRL1 write

Addr	Name	VENDOR_CC_CTRL3_CC_CTRL2_CC_CTRL1 write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x62								
0x22	ccConnDry	RdopenDis	ccCompEn	ccSnkExitEn	ccLpDrpCycle		ccDrpPhase		
0x23	ccOvpDis	ccUlpSrcSel		ccLpModeSel		ccRpCtrl			
0x24	ccWtrDeb		ccWtrSel			ccLadderDis	SBU_DET_EN	WtrCycle	
0x51	0x62								

0x63: VENDOR_BC_CTRL2_BC_CTRL1 read

Addr	Name	VENDOR_BC_CTRL2_BC_CTRL1 read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x63								
0x51	0x63								
0x52	dcdCpl	shortDeb	noBcComp	RSVD	RSVD	RSVD	chgDetMan	ChgDetEn	
0x53	dpMonEn	RSVD	dnMonEn	dpDnMan	dpDrv		dnDrv		
Bit	Name		Reset	Description					
7	dcdCPI		0	dcdCPI 0 = 2000ms, 1 = 800ms					
6	ShortDeb		0	ShortDeb 0 = 50ms, 1 = 7.5ms					
5	noBcComp		0	noBcComp 0 = BC1.2 compliant, 1 = Not BC1.2 compliant					
1	chgDetMan		0	chgDetMan 0 = Not enabled, 1 = Request manual run of charger detection					
0	ChgDetEn		0	ChgDetEn 0 = Not enabled, 1 = Enabled					
7	dpMonEn		0	dpMonEn 0 = Disabled, 1 = Enabled					
5	dnMonEn		0	dnMonEn 0 = Disabled, 1 = Enabled					
4	dpDnMan		0	dpDnMan 0 = Resources on DP and DN are controlled by charger detection FSM, 1 = Drive voltages on DP and DN according to DPDrv and DNDrv					

3:2	dpDrv	00	dpDrv 00 = 20K pd to ground, 01 = 0.6V, 10 = 3.0V, 11 = Open
1:0	dnDrv	00	dnDrv 00 = 20K pd to ground, 01 = 0.6V, 10 = 3.0V, 11 = Open

0x64: VENDOR_BC_CTRL2_BC_CTRL1 write

Addr	Name	VENDOR_BC_CTRL2_BC_CTRL1 write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x64								
0x22	dcdCpl	shortDeb	noBcComp	RSVD	RSVD	RSVD	chgDetMan	ChgDetEn	
0x23	dpMonEn	RSVD	dnMonEn	dpDnMan	dpDrv		dnDrv		
0x51	0x64								

0x65: VENDOR_ADC_CTRL1 read

Addr	Name	VENDOR_ADC_CTRL1 read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x65							
0x51	0x65							
0x52	adcInSel				RSVD	RSVD	VbusVoltageLock	adcEn
0x53	adcvalue							
Bit	Name		Reset	Description				

7:4	adcInSel	0	adcInSel 0000 = GND, 0001 = CC1 - scale 1, 0010 = CC1 - scale 2, 0011 = CC2 - scale 1, 0100 = CC2 - scale 2, 0101 = SBU1 (SBUx sw open - water detection measurement), 0110 = SBU2 (SBUx sw open - water detection measurement), 0111 = reserved, 1000 = GPIO0, 1001 = GPIO1, 1010 = SBU1 (SBUx sw maintain - AUX measurement), 1011 = SBU2 (SBUx sw maintain - AUX measurement), * = reserved
1	VbusVoltageLock	0	VbusVoltageLock 0 = VBUS_VOLTAGE_L and VBUS_VOLTAGE_H behave according to TCPC spec, 1 = VBUS_VOLTAGE_L and VBUS_VOLTAGE_H retain the last cached values
0	adcEn	0	adcEn 0 = Not enabled, 1 = Enabled
7:0	adcvalue	0	adcvalue

0x66: VENDOR_ADC_CTRL1 write

Addr	Name	VENDOR_ADC_CTRL1 write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x66							
0x22	adcInSel				RSVD	RSVD	VbusVoltageLock	adcEn
0x51	0x66							
0x52	adcInSel				RSVD	RSVD	VbusVoltageLock	adcEn
0x53	adcvalue							

0x67: VENDOR_USBSW_CTRL read

Addr	Name	VENDOR_USBSW_CTRL read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x67							
0x51	0x67							
0x52	usb0vpDis	RSVD	DPSw			DNSw		
Bit	Name		Reset	Description				

7	usbOvpDis	0	usbOvpDis 0 = OVP enable, 1 = OVP disable
5:3	DPSw	000	DPSw 000 = Open, 001 = DP connected to DP1, 010 = DP connected to eDP, 011 = DP connected to charger detect (read only), 100 = DP connected to AUXN (UR), 101 = DP connected to SDA, * = reserved
2:0	DNSw	000	DNSw 000 = Open, 001 = DN connected to DN1, 010 = DN connected to eDN, 011 = DN connected to charger detect (read only), 100 = DN connected to AUXN (UT), 101 = DN connected to SCL, * = reserved

0x68: VENDOR_USBSW_CTRL write

Addr	Name	VENDOR_USBSW_CTRL write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x68								
0x22	usbOvpDis	RSVD	DPSw			DNSw			
0x51	0x68								

0x69: VENDOR_VBUS_CTRL_SBU_CTRL2_SBU_CTRL1 read

Addr	Name	VENDOR_VBUS_CTRL_SBU_CTRL2_SBU_CTRL1 read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x69							
0x51	0x69							
0x52	sbuOvpDis	sbuUlpSrcSel		sbuCompEn	sbuClampDis	sbuRpCtrl	sbuSafeStateEn	RSVD
0x53	sbuWtrDeb		sbuWtrSel			RSVD	ccUlpExtraPulse	
0x54	RangeSwSel	RangeSwEn	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
Bit	Name		Reset	Description				

7	sbuOvpDis	0	sbuOvpDis 0 = OVP enable, 1 = OVP disable
6:5	sbuUlpSrcSel	0	sbuUlpSrcSel 00 = Reserved, 01 = Reserved, 10 = 1uA current source enable, 11 = Reserved
4	sbuCompEn	0	sbuCompEn 00 = 0x0, 01 = 0x1, 10 = 0x2, 11 = 0x3
3	sbuClampDis	0	sbuClampDis 0 = SBU current source clamped to (~1.5V), 1 = SBU current source not clamped (~4.0V)
2	sbuRpCtrl	0	sbuRpCtrl 0 = Current sources driven by TCPCI normative registers, 1 = ULP current on SBU lines not pulled-down (bit ccUlpSrcSel)
1	sbuSafeStateEn	0	sbuSafeStateEn 0 = Safe State pulldown disabled, 1 = Safe State pulldown enabled
7:6	sbuWtrDeb	00	sbuWtrDeb 00 = 500us, 01 = 1ms, 10 = 2ms, 11 = 20ms
5:3	sbuWtrSel	000	sbuWtrSel 000 = 0.2V, 001 = 0.4V, 010 = 0.6V, 011 = 0.8V, 100 = 1.0V (recommended threshold), 101 = SBU comparator disabled, 110 = SBU comparator disabled, 111 = SBU comparator disabled * = reserved
1:0	ccUlpExtraPulse	0	ccUlpExtraPulse 0 = No extra pulse(PASS1 behavior), 1 = 2 ULP consecutive pulses, 2 = 3 ULP consecutive pulses, 3 = 4 ULP consecutive pulses
7	RangeSwSel	0	RangeSwSel 0 = High range (0-51.150V), 1 = Low range (0-25.575V)
6	RangeSwEn	0	RangeSwEn 0 = Automatic VBUS range switching disabled, 1 = Automatic VBUS range switching enabled

0x6A: VENDOR_VBUS_CTRL_SBU_CTRL2_SBU_CTRL1 write

Addr	Name	VENDOR_VBUS_CTRL_SBU_CTRL2_SBU_CTRL1 write				Reset		
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6A							
0x22	sbu0vpDis	sbuUlpSrcSel		sbuCompEn	sbuClampDis	sbuRpCtrl	sbuSafeStateEn	RSVD
0x23	sbuWtrDeb		sbuWtrSel			RSVD	ccUlpExtraPulse	
0x24	RangeSwSel	RangeSwEn	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
0x51	0x6A							

0x6B: VENDOR_SBUSW_CTRL read

Addr	Name	VENDOR_SBUSW_CTRL read				Reset		
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6B							
0x51	0x6B							
0x52	sbuSafeStateEn	RSVD	SBU2Sw				SBU1Sw	
Bit	Name		Reset	Description				
7	sbuSafeStateEn		0	sbuSafeStateEn 0 = Safe State pulldown disabled, 1 = Safe State pulldown enabled				
5:3	SBU2Sw		0	SBU2Sw 000 = Open, 001 = SBU2 connected to SBUX-2 (AUXN/UR), 010 = SBU2 connected to SBUX-1 (AUXP/UT), 011 = SBU2 connected to ADC, 100 = Reserved, 101 = SBU2 connected to SBUX-2 (AUXN) and to ADC (read-only/ for AUX measurements), 110 = SBU2 connected to SBUX-1 (AUXP) and to ADC (read-only/ for AUX measurements), 111 = Reserved				
2:0	SBU1Sw		0	SBU1Sw 000 = Open, 001 = SBU1 connected to SBUX-1 (AUXP/UT), 010 = SBU1 connected to SBUX-2 (AUXN/UR), 011 = SBU1 connected to ADC, 100 = Reserved, 101 = SBU1 connected to SBUX-1 (AUXP) and to ADC (read-only/ for AUX measurements), 110 = SBU1 connected to SBUX-2 (AUXN) and to ADC (read-only/ for AUX measurements), 111 = Reserved				

0x6C: VENDOR_SBUSW_CTRL write

Addr	Name	VENDOR_SBUSW_CTRL write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6C							
0x22	sbuSafeStateEn	RSVD	SBU2Sw			SBU1Sw		
0x51	0x6C							

0x6D: EUSB_REVISION

Addr	Name	EUSB_REVISION			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6D							
0x51	0x6D							
0x52	DIG_MAJOR				DIG_MINOR			
0x53	DIG_STAGE		DIG_PATCH					
0x54	ANA_MINOR							
0x55	ANA_MAJOR							

0x6E: SRC PDO Request

Addr	Name	SRC PDO Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6E							
0x22	ReadSRCPDO	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
0x51	0x6E							
0x52	NumOfPDO							
0x53	PDO0[7:0]							
0x54	PDO0[15:8]							
0x55	PDO0[23:16]							
0x56	PDO0[31:24]							
••	••••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
Bit	Name		Reset	Description				

7	ReadSNKPDO		Read SRC PDO 0 = RAM, 1 = MTP
7:0	NumOfPDO		Number of PDOs

0x6F: SRC PDO Set

Addr	Name	SNK PDO Set			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x6F							
0x22	WriteSRCPDO	RSVD	RSVD	RSVD	RSVD	NumOfPDO		
0x23	PDO0[7:0]							
0x24	PDO0[15:8]							
0x25	PDO0[23:16]							
0x26	PDO0[31:24]							
••	••••••••							
	PDOx[7:0]							
	PDOx[15:8]							
	PDOx[23:16]							
	PDOx[31:24]							
0x51	0x6F							
Bit	Name		Reset	Description				
7	WriteSRCPDO			Write SRC PDO 0 = RAM, 1 = MTP				
2:0	NumOfPDO			Number of PDOs				

0x71: EUSB_TUNE1 read

Addr	Name	EUSB_TUNE1 read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x71								
0x51	0x71								
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_CROSSOVER			
0x53	RSVD	RSVD	RSVD	RSVD	TUNE_IUSB2				
0x54	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_RES_FSDIF			
0x55	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_HSDISC			
Bit	Name		Reset	Description					
2:0	TUNE_USB2_CROSSOVER		0	TUNE_USB2_CROSSOVER 000 = +0mV(default), 001 = -5.9mV, 010 = -10.1mV, 011 = -16mV, 100 = Reserved, 101 = +16mV, 110 = +10.1mV, 111 = +5.9mV					
3:0	TUNE_IUSB2		0	TUNE_IUSB2 0000 = -5.55% (nominal = 378mV), 0001 = -2.78%, 0010 = +0% (default-nominal = 400mV), 0011 = +2.78%, 0100 = +5.55%, 0101 = +8.33%, 0110 = +11.1%, 0111 = +13.88%, 1000 = +16.66%, 1001 = +19.44%, 1010 = +22.22%, 1011 = +25%, 1100 = +27.78%, 1101 = +30.56%, 1110 = +33.34%, 1111 = +36.11% (nominal = 545mV)					
2:0	TUNE_RES_FSDIF		0	TUNE_RES_FSDIF 000 = +2.3ohm, 001 = +0ohm (default, nominal = 45ohm), 010 = -2.1ohm, 011 = -3.95ohm, 100 = -6ohm, 101 = -8ohm, 110 = -10.15ohm, 111 = -12.1ohm					

2:0	TUNE_HSDISC	0	TUNE_HSDISC 000 = -4.3% (nominal = 550mV), 001 = +0% (default, nominal = 575mV), 010 = +4.3%, 011 = +8.6%, 100 = +13%, 101 = +17.3%, 110 = +21.6%, 111 = +26% (nominal = 725mV)
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0x72: EUSB_TUNE1 write

Addr	Name	EUSB_TUNE1 write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x72								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_CROSSOVER			
0x23	RSVD	RSVD	RSVD	RSVD	TUNE_IUSB2				
0x24	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_RES_FSDIF			
0x25	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_HSDISC			
0x51	0x72								

0x73: EUSB_TUNE2 read

Addr	Name	EUSB_TUNE2 read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x73								
0x51	0x73								
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_SQUELCH_U			
0x53	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_SLEW		
0x54	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_EQU		
0x55	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_PREEM			
Bit	Name		Reset	Description					
2:0	TUNE_SQUELCH_U		0	TUNE_SQUELCH_U 000 = -60% (nominal = 50mV), 001 = -50%, 010 = -40%, 011 = -30%, 100 = -20%, 101 = -10%, 110 = +0% (default, nominal = 125mV), 111 = +10% (nominal = 137.5mV)					

1:0	TUNE_USB2_SLEW	0	TUNE_USB2_SLEW 00 = +60%, 01 = +37%, 10 = +14.9%, 11 = +0% (default, nominal = 380ps)
1:0	TUNE_USB2_EQU	0	TUNE_USB2_EQU 00 = +0% (default), 01 = +4.1%, 10 = +6.8%, 11 = +9.2%
2:0	TUNE_USB2_PREEM	0	TUNE_USB2_PREEM 000 = +38.3%, 001 = +29%, 010 = +18.8%, 011 = +8.6%, 100 = +0% (default), 101 = +9.9%, 110 = +19.8%, 111 = +29.6%

0x74: EUSB_TUNE2 write

Addr	Name	EUSB_TUNE2 write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x74								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_SQUELCH_U			
0x23	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_SLEW		
0x24	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_EQU		
0x25	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_PREEM			
0x51	0x74								

0x75: EUSB_TUNE3 read

Addr	Name	EUSB_TUNE3 read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x75								
0x51	0x75								
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_HS_COMP_CURRENT		
0x53	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_SLEW		
0x54	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_EQU		
0x55	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_HS_COMP_CURRENT		
Bit	Name		Reset	Description					
1:0	TUNE_USB2_HS_COMP_C URRENT		0	TUNE_USB2_HS_COMP_CURRENT 00 = -33.3%, 01 = -16%, 10 = +0% (default), 11 = +33.3%					
1:0	TUNE_EUSB_SLEW		0	TUNE_USB2_SLEW 00 = +68%, 01 = +42.6%, 10 = +17.2%, 11 = +0% (default, nominal = 230ps)					
1:0	TUNE_EUSB_EQU		0	TUNE_EUSB_EQU 00 = +0% (default), 01 = +7.5%, 10 = +12.7%, 11 = +16.7%					
1:0	TUNE_EUSB_HS_COMP_C URRENT		0	TUNE_EUSB_HS_COMP_CURRENT 00 = -33.3%, 01 = -16%, 10 = +0% (default), 11 = +33.3%					

0x76: EUSB_TUNE3 write

Addr	Name	EUSB_TUNE3 write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x76							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_HS_COMP_CURRENT	
0x23	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_SLEW	
0x24	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_EQU	
0x25	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_HS_COMP_CURRENT	
0x51	0x76							

0x77: EUSB_LDO_CTRL read

Addr	Name	EUSB_LDO_CTRL read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x77								
0x51	0x77								
0x52	RSVD	LDO_HP_EN_CTRL	LD03P3_HP_EN	LD01P8_HP_EN	LD01P2_HP_EN	LD03P3_OVC_EN	LD01P8_OVC_EN	LD01P2_OVC_EN	
0x53	LDO_BGEN	LDO_FW_CTRL	LD03P3_FASTD_EN	LD01P8_FASTD_EN	LD01P2_FASTD_EN	LD03P3_EN	LD01P8_EN	LD01P2_EN	
0x54							DISABLE_LDO_TIMER	FORCE_EUSB_ON	
Bit	Name		Reset	Description					
6	LDO_HP_EN_CTRL		0	LDO_HP_EN_CTRL 0 = High-Performance mode controlled by digital, 1 = High-Performance mode controlled by EUSB_LDO_CTRL register					
5	LD03P3_HP_EN		0	LD03P3_HP_EN 0 = High-Performance mode disabled, 1 = High-Performance mode enabled					
4	LD01P8_HP_EN		0	LD01P8_HP_EN 0 = High-Performance mode disabled, 1 = High-Performance mode enabled					
3	LD01P2_HP_EN		0	LD01P2_HP_EN 0 = High-Performance mode disabled, 1 = High-Performance mode enabled					
2	LD03P3_OVC_EN		0	LD03P3_OVC_EN 0 = OverCurrentProtection disabled, 1 = OverCurrentProtection enabled					
1	LD01P8_OVC_EN		0	LD01P8_OVC_EN 0 = OverCurrentProtection disabled, 1 = OverCurrentProtection enabled					
0	LD01P2_OVC_EN		0	LD01P2_OVC_EN 0 = OverCurrentProtection disabled, 1 = OverCurrentProtection enabled					

7	LDO_BGEN	0	LDO_BGEN 0 = LDO_BGEN request disabled, 1 = LDO_BGEN request enabled
6	LDO_FW_CTRL	0	LDO_FW_CTRL 0 = LDO power-up controlled by FSM, 1 = LDO power-up controlled using EUSB_LDO_FSM_CTRL and EUSB_LDO_STATUS registers
5	LD03P3_FASTD_EN	0	LD03P3_FASTD_EN 0 = LDO FastD disabled, 1 = LDO FastD enabled
4	LD01P8_FASTD_EN	0	LD01P8_FASTD_EN 0 = LDO FastD disabled, 1 = LDO FastD enabled
3	LD01P2_FASTD_EN	0	LD01P2_FASTD_EN 0 = LDO FastD disabled, 1 = LDO FastD enabled
2	LD03P3_EN	0	LD03P3_EN 0 = LDO disabled, 1 = LDO enabled
1	LD01P8_EN	0	LD01P8_EN 0 = LDO disabled, 1 = LDO enabled
0	LD01P2_EN	0	LD01P2_EN 0 = LDO disabled, 1 = LDO enabled
1	DISABLE_LDO_TIMER	0	DISABLE_LDO_TIMER 0 = LDO timeout timer enabled, 1 = LDO timeout timer disabled
0	FORCE_EUSB_ON	0	FORCE_EUSB_ON 0 = LDO timeout interrupt and status are valid and enabled, 1 = LDO timeout interrupt and status are not valid

0x78: EUSB_LDO_CTRL write

Addr	Name	EUSB_LDO_CTRL write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x78								
0x22	RSVD	LDO_HP_EN_CTRL	LD03P3_HP_EN	LD01P8_HP_EN	LD01P2_HP_EN	LD03P3_OVC_EN	LD01P8_OVC_EN	LD01P2_OVC_EN	
0x23	LDO_BGEN	LDO_FW_CTRL	LD03P3_FASTD_EN	LD01P8_FASTD_EN	LD01P2_FASTD_EN	LD03P3_EN	LD01P8_EN	LD01P2_EN	
0x24							DISABLE_LDO_TIMER	FORCE_EUSB_ON	
0x51	0x78								

0x79: EUSB_LDO_STATUS read

Addr	Name	EUSB_LDO_STATUS read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x79							
0x51	0x79							
0x52	RSVD	RSVD	EUSB_BGRDY	EUSB_POWERUP_FAIL	EUSB_IP_ENABLED	LD03P3_STATUS	LD01P8_STATUS	LD01P2_STATUS
Bit	Name		Reset	Description				
5	EUSB_BGRDY		0	EUSB_BGRDY 0 = eUSB BGRDY not ok, 1 = eUSB BGRDY ok				
4	EUSB_POWERUP_FAIL		0	LD01P8_HP_EN 0 = eUSB power-up did not fail, 1 = eUSB power-up failed				
3	EUSB_IP_ENABLED		0	LD01P2_HP_EN 0 = eUSB IP is off, 1 = eUSB IP is enabled				
2	LD03P3_STATUS		0	LD03P3_OVC_EN 0 = LDO is off or not ready, 1 = LDO is ok				
1	LD01P8_STATUS		0	LD03P3_OVC_EN 0 = LDO is off or not ready, 1 = LDO is ok				
0	LD01P2_STATUS		0	LD01P8_OVC_EN 0 = LDO is off or not ready, 1 = LDO is ok				

0x7B: EUSB_TUNE4 read

Addr	Name	EUSB_TUNE4 read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x7B							
0x51	0x7B							
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_FS_RES		
0x53	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_CTRL_FS_SLEW	
0x54	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_HS_ECR
0x55	Override_The_Default	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
Bit	Name		Reset	Description				

2:0	TUNE_USB2_FS_RES	0	TUNE_USB2_FS_RES 00 = +2.3 ohm 01 = +0 ohm (default setting - nominal value = 45 ohm) 10 = -2.1 ohm, 11 = -3.95 ohm, 00 = -6 ohm, 01 = -8 ohm, 10 = -10.15 ohm, 11 = -12.1 ohm
1:0	TUNE_USB2_CTRL_FS_SLEW	10	TUNE_USB2_CTRL_FS_SLEW 0 = Slower (+41.6%), 1 = Slower (+19.48%), 2 = Default value, 3 = Faster (-4.16%)
0	TUNE_EUSB_HS_ECR	10	TUNE_EUSB_HS_ECR 0 = Low threshold 1 = High threshold (increase noise immunity)
7	Override_The_Default	0	Override_The_Default 0 = Not MTP, 1 = MTP

0x7C: EUSB_TUNE4 write

Addr	Name	EUSB_TUNE4 write				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x7C								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_FS_RES			
0x23	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_USB2_CTRL_FS_SLEW		
0x24	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	TUNE_EUSB_HS_ECR	
0x25	Override_The_Default	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x51	0x7C								

0x7D: EUSB_CTL read

Addr	Name	EUSB_CTL read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x7D								
0x51	0x7D								
0x52	BABBLE_TMR_EN	BABBLE_TMR_SEL		DISABLE_USB2_PD	RSVD	EUSB_HS_ECR_EN	HOST_SEL	PERIPH_SEL	
0x53	HIZ_EN	RSVD	RSVD	RSVD	BABBLE_TMR_LSFS_EN	BABBLE_TMR_LSFS_RECOVERY_EN	BABBLE_TMR_LSFS_RECOVERY_SEL		
0x54	AUTO_RESUME_EN	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	
0x55	EUSB2_RPTR_EN	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	

Bit	Name	Reset	Description
7	BABBLE_TMR_EN	0	BABBLE_TMR_EN 0 = Babble timer feature disabled, 1 = Babble timer feature enabled
6:5	BABBLE_TMR_SEL	00	LDO_HP_EN_CTRL 00 = 0.25ms, 01 = 0.8ms, 10 = 1.5ms, 11 = 3.0ms
4	DISABLE_USB2_PD	0	DISABLE_USB2_PD 0 = Pulldown enabled, 1 = Pulldown disabled
2	EUSB_HS_ECR_EN	0	EUSB_HS_ECR_EN 0 = eUSB2 High Speed ECR functionality disabled, 1 = eUSB2 High Speed ECR functionality enabled
1	HOST_SEL	0	HOST_SEL 0 = Repeater Normal Mode, 1 = Forces Repeater into Host Repeater Mode
0	PERIPH_SEL	0	PERIPH_SEL 0 = Repeater Normal Mode, 1 = Forces Repeater into Peripheral Repeater Mode
7	HIZ_EN	0	HIZ_EN 0 = Takes USB2.0 D+/D- lines out of HiZ mode, 1 = Forces USB2.0 D+/D- lines into HiZ mode
3	BABBLE_TMR_LSFS_EN	0	BABBLE_TMR_LSFS_EN 0 = Babble timer feature in LS/FS disabled, 1 = Babble timer feature in LS/FS enabled
2	BABBLE_TMR_LSFS_RECOVERY_EN	0	BABBLE_TMR_LSFS_RECOVERY_EN 0 = Babble recovery in LS/FS disabled, 1 = Babble recovery in LS/FS enabled
1:0	BABBLE_TMR_LSFS_RECOVERY_SEL	00	BABBLE_TMR_LSFS_RECOVERY_SEL 0 = 10us, 1 = 30us, 2 = 60us, 3 = 120us
7	AUTO_RESUME_EN	0	AUTO_RESUME_EN 0 = Disables eUSB2 Repeater Auto Resume functionality, 1 = Enables eUSB2 repeater Auto Resume functionality
7	EUSB2_RPTR_EN	0	EUSB2_RPTR_EN 0 = eUSB2 Repeater module disabled, 1 = eUSB2 Repeater module enabled

0x7E: EUSB_CTL write

Addr	Name	EUSB_CTL write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0

0x21	0x7E							
0x22	BABBLE_TMR_EN	BABBLE_TMR_SEL		DISABLE_USB2_PD	RSVD	EUSB_HS_ECR_EN	HOST_SEL	PERIPH_SEL
0x23	HIZ_EN	RSVD	RSVD	RSVD	BABBLE_TMR_LSFS_EN	BABBLE_TMR_LSFS_RECOVERY_EN	BABBLE_TMR_LSFS_RECOVERY_SEL	
0x24	AUTO_RESUME_EN	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
0x25	EUSB2_RPTR_EN	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
0x51	0x7E							

0x80: Current EPR SrcCap

Addr	Name	Current EPR SrcCap				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x80								
0x51	0x80								
0x52	RSVD	SEL_PDO_POS				NumOfPDO			
0x53	EPR PDO8[7:0]								
0x54	EPR PDO8[15:8]								
0x55	EPR PDO8[23:16]								
0x56	EPR PDO8[31:24]								
••	••••••••								
	PDOx[7:0]								
	PDOx[15:8]								
	PDOx[23:16]								
	PDOx[31:24]								
Bit	Name	Reset	Description						
6:3	SEL_PDO_POS	1000	Selected Position of PDO 0000 = Unselected – Should send request message using OPCode 0x32, SrcCap Request, 0001 – 1011 = Selected PDO number						
2:0	NumOfPDO	000	Number of Power Data Objects						

0x82: EPR SrcCap Request

Addr	Name	EPR SrcCap Request			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x82							
0x22	RSVD	RSVD	RSVD	RSVD	Req_PDO_Pos			
0x51	0x82							
Bit	Name		Reset	Description				

3:0	REQ_PDO_POS	1000	Request Position of PDO
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0x83: EPR Result Read

Addr	Name	EPR Result Read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x83							
0x51	0x83							
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	Req_Mode		
0x53	RSVD	RSVD	RSVD	RSVD	RSVD	action		
0x54	RSVD	RSVD	RSVD	RSVD	RSVD	data		
Bit	Name		Reset	Description				
2:0	Req_Mode			EPR Mode requested 000 = Reserved, 001 = Enter, 010 = Enter Acknowledged, 011 = Enter Succeeded, 100 = Enter Failed, 101 = Exit				
2:0	Action			EPR Action 000 = Reserved, 001 = Enter, 010 = Enter Acknowledged, 011 = Enter Succeeded, 100 = Enter Failed, 101 = Exit				
2:0	Data			EPR Data 000 = Unknown Cause, 001 = Cable not EPR Capable, 010 = Source Failed to become VCONN Source, 011 = EPR Capable bit not set in RDO, 100 = Source unable to enter EPR Mode, 101 = EPR Capable bit not set in PDO				

0x84: Set EPR Mode

Addr	Name	Set EPR Mode				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x84								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	Req_Mode			
0x51	0x84								
Bit	Name		Reset	Description					

2:0	Req_Mode	001	Request Mode 000 = Reserved, 001 = Enter, 010 = Enter Acknowledged, 011 = Enter Succeeded, 100 = Enter Failed, 101 = Exit
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0x85: Master I2C Control read

Addr	Name	Master I2C Control read			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x85							
0x22	SID[7:0]							
0x23	REG[7:0]							
0x24	LEN[7:0]							
0x51	0x85							
0x52	SID[7:0]							
0x53	REG[7:0]							
0x54	LEN[7:0]							
0x55	Data0[7:0]							
0x56	Data1[7:0]							
0x57	Data2[7:0]							
0x58	Data3[7:0]							
...								
0x6A	Data21[7:0]							
0x6B	Data22[7:0]							
0x6C	Data23[7:0]							
Bit	Name		Reset	Description				
7:0	SID		0	Slave address				
7:0	REG		0	Indicate the read register				
7:0	LEN		0	Length for the read register				
7:0	Data0		0	1 st Read Data				
7:0	Data1		0	2 nd Read Data				
	...			...				
7:0	Data23		0	24 th Read Data				

0x86: Master I2C Control write

Addr	Name	Master I2C Control write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x86							
0x22	SID[7:0]							
0x23	REG[7:0]							
0x24	LEN[7:0]							
0x25	Data0[7:0]							
0x26	Data1[7:0]							
0x27	Data2[7:0]							
0x28	Data3[7:0]							

...	
0x3A	Data21[7:0]
0x3B	Data22[7:0]
0x3C	Data23[7:0]
0x51	0x86

0x91: Set Factory Ship Mode

Addr	Name	Set Factory Ship Mode write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x91							
0x22	EN_FSHIP[7:0]							
0x51	0x91							
Bit	Name		Reset	Description				
7:0	EN_FSHIP		0x00	Factory Ship Mode 0 = Disabled, 1 = Enabled				

0x98: GPIO Interrupt write

Addr	Name	GPIO Interrupt write			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0x98							
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	gpioNum	
0x23	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	gpioMode	
0x24	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	gpioDBNCsel	
0x25	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	gpioIRQsel	
0x51	0x98							
Bit	Name		Reset	Description				
1:0	gpioNum			GPIO Number 00 = GPIO0, 01 = GPIO1, 10 = GPIO2, 11 = GPIO3				
1:0	gpioMode			GPIO Mode 01 = The GPIO is configured as an input, * = Reserved				

1:0	gpioDBNCsel		GPIO DBNC Selection 00 = No debounce, 01 = 7ms debounce, 10 = 15ms debounce, 11 = 31ms debounce
1:0	gpioIRQsel		GPIO IRQ Selection 00 = No interrupt, 01 = interrupt on falling-edge detection, 10 = interrupt on rising-edge detection, 11 = interrupt on any-edge detection

0x99: GPIO Input Status read

Addr	Name	GPIO Input Status read				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x99								
0x51	0x99								
0x52	RSVD	RSVD	RSVD	RSVD	GPIO3value	GPIO2value	GPIO1value	GPIO0value	
Bit	Name	Reset	Description						
3	GPIO3value		GPIO3 value 0 = Low, 1 = High						
2	GPIO2value		GPIO2 value 0 = Low, 1 = High						
1	GPIO1value		GPIO1 value 0 = Low, 1 = High						
0	GPIO0value		GPIO0 value 0 = Low, 1 = High						

0x9B: Set Source Current

Addr	Name	Set Source Current				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0x9B								
0x22	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	ccSrcCurAdv		
0x51	0x9B								
0x52	RSVD	RSVD	RSVD	RSVD	RSVD	Result			

Bit	Name	Reset	Description
1:0	ccSrcCurAdv		SRC Current Advertise 0 = default advertised, 1 = 1.5A advertised, 2 = 3.0A advertised
2:0	Result		Result 0 = Set Rp default, 1 = Set Rp 1.5A, 2 = Set Rp 3.0A, 3 = Invalid parameter

0xC3: RISC_V_WRITE_BOX

0x00: RISC_V_WRITE_BOX								
Addr	Name	RISC_V_WRITE_BOX			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0xC3							
0x22	Register_Address[7:0]							
0x23	Register_Address[15:8]							
0x24	Register_Address[23:16]							
0x25	Register_Address[31:24]							
••	••••••••••							
	Bit[7:0]							
	Bit[15:8]							
	Bit[23:16]							
	Bit[31:24]							
0x51	0xC3							

0xC4: RISC_V_READ_BOX

Addr	Name	RISC_V_READ_BOX				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0xC4								
0x22	Register_Address[7:0]								
0x23	Register_Address[15:8]								
0x24	Register_Address[23:16]								
0x25	Register_Address[31:24]								
0x51	0xC4								
0x52	VALUE[7:0]								
0x53	VALUE[15:8]								
0x54	VALUE[23:16]								

0x55	VALUE[31:24]
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0xE0: Set Water Detect Thrs

Addr	Name	SET_WATER_DETECT_THRS				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0xE0								
0x22	CC_THR_WTR								
0x23	SBU_THR_WTR								
0x51	0xE0								
Bit	Name		Reset	Description					
7:0	CC_THR_WTR		0xCC	CC Pins Threshold for Water Detection Unit: Volts / LSB: 4.9mV / Default value: 204 (1V) 0x00 = Min Voltage, 0x01 = 4.9mV, 0x02 = 9.8mV, 0x03 = 14.7mV, 0x04 = 19.6mV, 0x05 = 24.5mV, ... 0xCC = 999.6mV(1V), ... 0xFF = 1249.5mV					
7:0	SBU_THR_WTR		0xCC	SBU Pins Threshold for Water Detection Unit: Volts / LSB: 4.9mV / Default value: 204 (1V) 0x00 = Min Voltage, 0x01 = 4.9mV, 0x02 = 9.8mV, 0x03 = 14.7mV, 0x04 = 19.6mV, 0x05 = 24.5mV, ... 0xCC = 999.6mV(1V), ... 0xFF = 1249.5mV					

0xE1: Set Dry Detect Thrs

Addr	Name	SET_DRY_DETECT_THRS				Reset			
	b7	b6	b5	b4	b3	b2	b1	b0	
0x21	0xE1								
0x22	CC_THR_DRY								
0x23	SBU_THR_DRY								

0x51	0xE1		
Bit	Name	Reset	Description
7:0	CC_THR_DRY	0xCC	CC Pins Threshold for Dry Detection Unit: Volts / LSB: 4.9mV / Default value: 204 (1V) 0x00 = Min Voltage, 0x01 = 4.9mV, 0x02 = 9.8mV, 0x03 = 14.7mV, 0x04 = 19.6mV, 0x05 = 24.5mV, ... 0xCC = 999.6mV(1V), ... 0xFF = 1249.5mV
7:0	SBU_THR_DRY	0xCC	SBU Pins Threshold for Dry Detection Unit: Volts / LSB: 4.9mV / Default value: 204 (1V) 0x00 = Min Voltage, 0x01 = 4.9mV, 0x02 = 9.8mV, 0x03 = 14.7mV, 0x04 = 19.6mV, 0x05 = 24.5mV, ... 0xCC = 999.6mV(1V), ... 0xFF = 1249.5mV

0xE2: Set Dry Detect TmrS

Addr	Name	SET_DRY_DETECT_TMRS			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0xE2							
0x22	dry_detection_delay_ms[7:0]							
0x23	dry_detection_delay_ms[15:8]							
0x24	dry_detection_cc_delay_ms[7:0]							
0x25	dry_detection_cc_delay_ms[15:8]							
0x51	0xE2							
Bit	Name	Reset	Description					

7:0	dry_detection_delay_ms	0x3A98	Dry Detection Delay/Period Unit: Milliseconds (ms) / LSB: 1ms / Default value: 15000 (15s) 0x0000 = 0ms (Low 0x00, High 0x00), 0x0001 = 1ms (Low 0x01, High 0x00), 0x0002 = 2ms (Low 0x02, High 0x00), 0x0003 = 3ms (Low 0x03, High 0x00), 0x0004 = 4ms (Low 0x04, High 0x00), 0x0005 = 5ms (Low 0x05, High 0x00), ... 0x3A98 = 15000ms (Low 0x98, High 0x3A), ... 0xFFFF = 65535ms (Low 0xFF, High 0xFF)
15:8			
7:0	dry_detection_cc_delay_ms	0x1388	Dry Detection CC Delay/Period Unit: Milliseconds (ms) / LSB: 1ms / Default value: 5000 (5s) 0x0000 = 0ms (Low 0x00, High 0x00), 0x0001 = 1ms (Low 0x01, High 0x00), 0x0002 = 2ms (Low 0x02, High 0x00), 0x0003 = 3ms (Low 0x03, High 0x00), 0x0004 = 4ms (Low 0x04, High 0x00), 0x0005 = 5ms (Low 0x05, High 0x00), ... 0x1388 = 5000ms (Low 0x88, High 0x13), ... 0xFFFF = 65535ms (Low 0xFF, High 0xFF)
15:8			

0xE3: Set ADC Time Out

0x21:00 ADC Time Out								
Addr	Name	SET_ADC_TIMEOUT			Reset			
	b7	b6	b5	b4	b3	b2	b1	b0
0x21	0xE3							
0x22	adc_timeout_ms[7:0]							
0x23	adc_timeout_ms[15:8]							
0x51	0xE3							
Bit	Name		Reset	Description				
7:0	adc_timeout_ms		0x0014	ADC Time Out Unit: Milliseconds (ms) / LSB: 1ms / Default value: 20 (20ms) 0x0000 = 0ms (Low 0x00, High 0x00), 0x0001 = 1ms (Low 0x01, High 0x00), 0x0002 = 2ms (Low 0x02, High 0x00), 0x0003 = 3ms (Low 0x03, High 0x00),				

15:8			0x0004 = 4ms (Low 0x04, High 0x00), 0x0005 = 5ms (Low 0x05, High 0x00), ... 0x0014 = 20ms (Low 0x14, High 0x00), ... 0xFFFF = 65535ms (Low 0xFF, High 0xFF)
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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
1	10/08, 2024	Initial release	—
2	11/15, 2024	- Deleted unused PD status bits - Removed unused opcodes	P. 5, 15, 36
3	01/07, 2025	- Added Water Opcodes	P. 57 - 60
4	02/07, 2025	- Added EUSB_TUNE4, EPR opcode	P. 37 - 38 P. 55 - 56
5	02/26, 2025	- Fixed Opcode Typo - Updated Opcode command description	P. 20 P. 39, 41, 44, 46 P. 49, 50, 52, 56
6	03/04, 2025	- Updated Opcode command description - Fixed 0x55 opcode typo - Modified 0x65/0x66 Opcode	P. 20, 37 P. 42 - 43
7	03/05, 2025	- Updated SYSMsg following PDP	P. 11 – 13
8	03/17, 2025	- Updated GPIO Opcode Direction (0x23/0x24) - Added new GPIO Opcodes (0x98/0x99)	P. 25 - 26 P. 59
9	03/25, 2025	- Removed unused CC Status bits - Updated EPR opcodes - Updated Master I2C opcodes' length - Updated EUSB_LDO Opcode	P. 6, 14 P. 54 - 55 P. 57 – 59 P. 60
10	04/07, 2025	- Added Override bit to Opcode 0x7B/7C - Modified 0x80 EPR PDO number	P. 55 - 56 P. 57 - 58
11	04/22, 2025	- Removed AttachHold Interrupt & Mask - Added FRS & Rpvalue bits to 0x56 opcode - Added 0x9B opcode - Modified Datarole Interrupt description - Added EPR Opcodes	P. 6, 8, 9, 16, 32 P. 38 - 42 P. 66
12	05/23, 2025	- Added SYSMSG 0x90 & 0x91 - Added Custom script function & events & flow-chart - Added Opcode commands process - Modified 0x27 Opcode	P. 11 P. 20 - 32 P. 39

13	11/25, 2025	- Added 0x3B Opcode	P. 40
14	12/03, 2025	- Modified USBC Register Map - Updated descriptions (0x04/0x05/0x0A/0x0C/0x11) - Updated function name and description (0x0D/0x10) - Changed reset values (0x01/0x10/0x14/0x15) - Added function (0x0F)	P. 6, 8, 9, 12, 14 P. 15, 17, 18, 19 P. 20, 21
15	12/12, 2025	- Modified USBC Register Map - Updated function description (0x0D)	P. 6, 15
16	12/18, 2025	- Updated the descriptions and bit definitions of the Opcode Commands (0x7D/0x7E,0x7B/0x7C,0x69/0x6A,0x67/0x68,0x77/0x78)	P. 63, 64, 66, 73 P. 74, 75, 76, 77
17	01/08, 2026	- Updated function description (0x28)	P. 42
18	01/26, 2026	- Renamed Opcode Command (0x3A)	P. 49
19	04/02, 2026	- Changed the bit description of CC Status 0(0x0C, bit 0x11) from Audio Accessory Mode to Liquid corrosion mitigation mode.	P. 14
20	04/14, 2026	- Added Opcode Command (0x91)	P. 84
21	05/06, 2026	- Updated descriptions of USBC registers(0x09,0x14,0x15). - Updated the descriptions and bit definitions of the Opcode Commands (0x17,0x18,0x30,0x4B,0x55,0x65,0x71,0x7B,0x83,0x98,0xC3) - Removed the Opcode Command (0xD0, Secure update start)	P. 11, 20 - 22 P. 39 - 40 P. 44 - 45 P. 54 - 55 P. 58 - 59 P. 63 - 64 P.71 - 72 P.78 - 79 P.83, 86 - 89

22	05/08, 2026	- Renamed register at address 0x0E from PD_STATUS1 to PD_STATUS0 - Renamed register at address 0x0F from PD_STATUS2 to PD_STATUS1 - Updated bit[1] of register 0x10 from Reserved (RSVD) to AttachedHoldM	P. 6
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