SmartXX
LT OPX

Software Developer Documentation

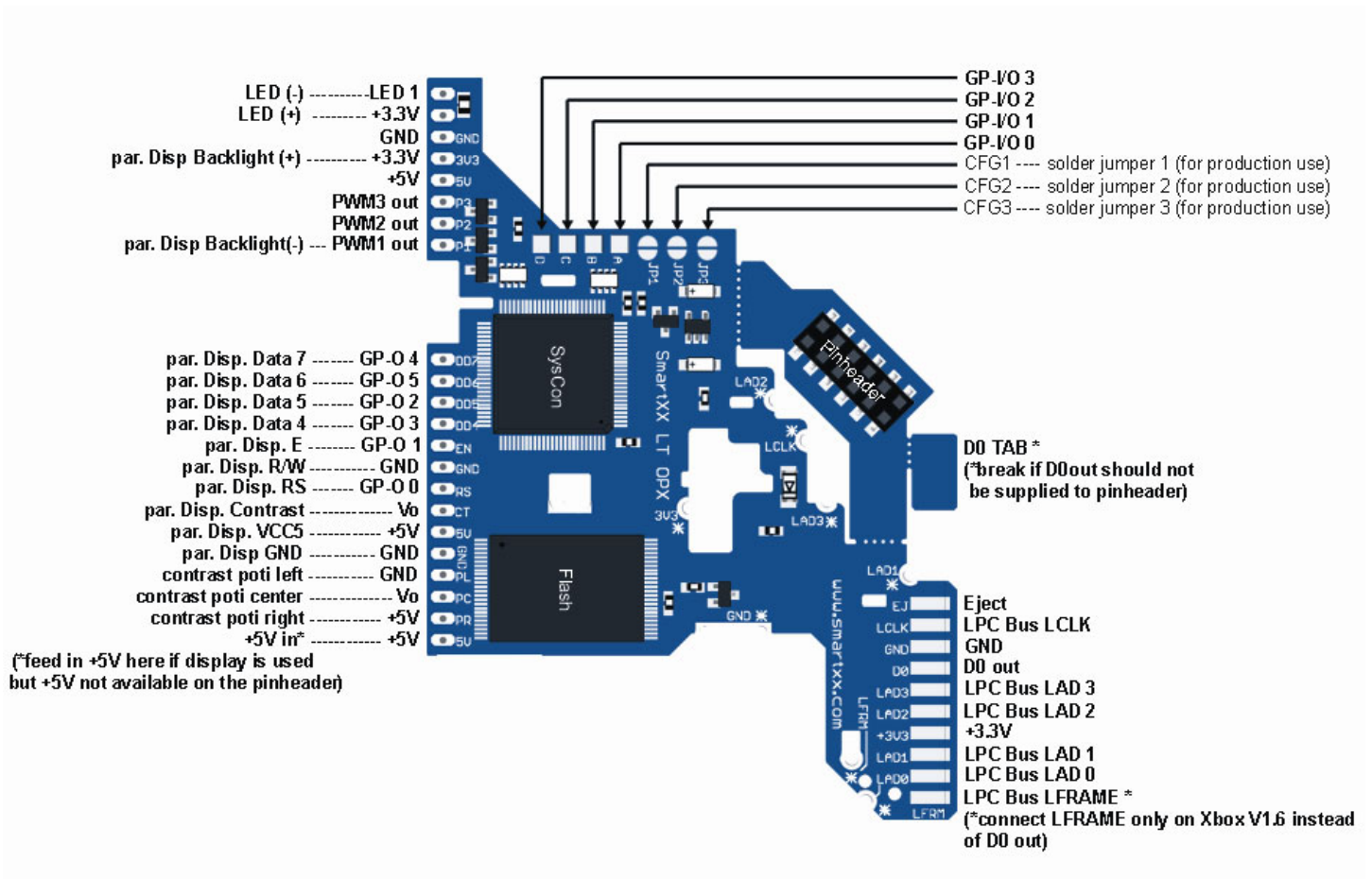PV SysCVer5 Rev0.20

Preliminary

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TABLE 1: REGISTER MAP OVERVIEW

Address (hex)	Name Funktion	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Value on POWER-ON Reset
F700h read	GP-I/O Input	-	-	-	-	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0	*1
F700h write	GP-O (Display Port)	-	GP-O 5 (Data 6)	GP-O 4 (Data 7)	GP-O 3 (Data 4)	GP-O 2 (Data 5)	GP-O 1 (E)	GP-O 0 (RS)	-	-000 000-
F701h read	Chip Version	-	-	-	-	SysCon Chip Version				---- 1001 *2
F701h write	PWM1 Out (Brightnes Control)	-	PWM Value (PWM 1 out, Value 0 to 127)							-000 0000 *3
F702h read	Solder Jumper State	-	-	-	-	-	CFG3	CFG2	CFG1	*4
F702h write	LED Controll	-	-	-	-	-	-	-	Led	---- --0x *5
F70Ah write	GP-I/O Output	-	-	-	-	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0	---- 0000
F70Bh write	GP-I/O Direction Control	-	-	-	-	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0	---- 1111 *6
F70Ch write	PWM2 Out (Brightnes Control)	-	PWM Value (PWM 2 out, Value 0 to 127)							-000 0000 *3
F70Dh write	PWM3 Out (Brightnes Control)	-	PWM Value (PWM 3 out, Value 0 to 127)							-000 0000 *3

Legend:

Shaded boxes	=	Not implemented or not used
-	=	Not implemented. For future compatibility write '0' , read value may undefinded and have to be mask
*1	=	Also initial state depends on connected hardware
*2	=	To be changed on newer Syscon Revisions
*3	=	PWM values from '0' to '127' are allowed to write.
		Value '0' => output is open collector all the time, value '127' => output is low all the time.
		Value in between cause the output to toggle between those two states with the value defined ratio
*4	=	Depends on setup of Solder Jumper configuration (soldered or not soldered together)
*5	=	When '0' then LED is 'ON', when '1' LED is 'OFF'
		'x' states the D0 level (SmartXX is ON or OFF)
( )	=	GP-O function as used from OS already (build V3331)

2-1 GP-I/O REGISTER

FIGURE 2-1-1:   GP-I/O READ REGISTER (ADDRESS:F700h)

—	—	—	—	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0
bit 7	bit 6	Bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7:   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3:   read level from GP-I/O 3

bit 2:   read level from GP-I/O 2

bit 1:   read level from GP-I/O 1

bit 0:   read level from GP-I/O 0

NOTE:

 —   =   this bit is not used, read value is undefind and should be mask

FIGURE 2-1-2:   GP-I/O WRITE REGISTER (ADDRESS:F70Ah)

—	—	—	—	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

bit 7:   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3:   write level to GP-I/O 3

bit 2:   write level to GP-I/O 2

bit 1:   write level to GP-I/O 1

bit 0:   write level to GP-I/O 0

NOTE:

 —   =   this bit is not used, write to it has not affect, for future compatibility there should be written a '0'

FIGURE 2-1-3: GP-I/O DIRECTION CONTROL REGISTER (ADDRESS:F70Bh)

—	—	—	—	GP-I/O 3	GP-I/O 2	GP-I/O 1	GP-I/O 0
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

If bit is set to '1' the corespondig GP-I/O is input, if set to '0' coresponding GP-I/O is a output.

bit 7:   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3:   set direction of GP-I/O 3

bit 2:   set direction of GP-I/O 2

bit 1:   set direction of GP-I/O 1

bit 0:   set direction of GP-I/O 0

NOTE:
— = this bit is not used, write to it has not affect, for future compatibility '1' should be written

2-2 GP-O REGISTER

FIGURE 2-2-1: GP-O WRITE REGISTER (ADDRESS:F700h)

—	GP-O 5 (Data 6) [SPI-OUT]	GP-O 4 (Data 7) [SPI-CS2]	GP-O 4 (Data 4)	GP-O 2 (Data 5)	GP-O 1 (E)	GP-O 0 (RS)	—
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

bit 7:   not used

bit 6:   write level to GP-O 5   (parallel Display signal 'Data 6')

bit 5:   write level to GP-O 4   (parallel Display signal 'Data 7')

bit 4:   write level to GP-O 3   (parallel Display signal 'Data 4')

bit 3:   write level to GP-O 2   (parallel Display signal 'Data 5')

bit 2:   write level to GP-O 1   (parallel Display signal 'E')

bit 1:   write level to GP-O 0   (parallel Display signal 'RS')

bit 0:   not used

NOTE:
( ) = GP-O function as used from OS already (build V3331)
— = this bit is not used, write to it has not affect, for future compatibility '0' should be written

2-3 SPECIAL WRITE REGISTER

FIGURE 2-3-1:   PWM1 OUTPUT WRITE REGISTER (ADDRESS:F701h)

—	PWM Value						
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

7 Bit Pulse Wide Modulation (PWM) output controll register:
This feature is mainly implemented to allow LED or EL Backlight units, normaly build into standard LCD Displays, to be controlled by software. If not used for this purpose, this output could even be used for other functions like simple brightness control of hooked up LED's or even as single digital output.

bit 7   not used

bit 6 - bit 0:   Pulse Wide Modulation (PWM) Value

Value Range: '0' to '127',
where '0' means output is always 'high' (open collector)
and '127' means output is always 'low' (GND)

Values in between '0' and '127' defines the ratio between 'low' to 'high' time.

NOTE:
—   =   this bit is not used, write to it has not affect, for future compatibility '0' should be written

FIGURE 2-3-2:   PWM2 OUTPUT WRITE REGISTER (ADDRESS:F70Ch)

—	PWM Value						
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

Extended 7 Bit Pulse Wide Modulation (PWM) output controll register:
This output could be used for functions like simple brightness control of hooked up LED's or even as single digital output.

bit 7   not used

bit 6 – bit 0:   Pulse Wide Modulation (PWM) Value

Value Range: '0' to '127',
where '0' means output is always 'high' (open collector)
and '127' means output is always 'low' (GND)

Values in between '0' and '127' defines the ratio between 'low' to 'high' time.

NOTE:
—   =   this bit is not used, write to it has not affect, for future compatibility '0' should be written

FIGURE 2-3-3:   PWM3 OUTPUT WRITE REGISTER (ADDRESS:F70Dh)

—	PWM Value						
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

Extended 7 Bit Pulse Wide Modulation (PWM) output controll register:
This output could be used for functions like simple brightness control of hooked up LED's or even as single digital output.

bit 7   not used

bit 6 – bit 0:   Pulse Wide Modulation (PWM) Value

Value Range: '0' to '127',
where '0' means output is always 'high' (open collector)
and '127' means output is always 'low' (GND)

Values in between '0' and '127' defines the ratio between 'low' to 'high' time.

NOTE:
—   =   this bit is not used, write to it has not affect, for future compatibility '0' should be written

FIGURE 2-3-4:   LED WRITE REGISTER (ADDRESS:F702h)

—	—	—	—	—	—	LED 2	LED 1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

Led's are switch by ground. If bit is set to '0' then LED is 'ON', if bit is set to '1' then LED is 'OFF'
On powerup LED is set corresponding to D0 output from SysCon

bit 7:   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3:   not used

bit 2:   not used

bit 1:   not used

bit 0:   switch LED 'on' or 'off'

NOTE:
—   =   this bit is not used, write to it has not affect, for future compatibility '0' should be written

2-4 SPECIAL READ REGISTER

FIGURE 2-4-1:   CFG SOLDER JUMPER READ REGISTER (ADDRESS:F702h)

—	—	—	—	—	CFG3	CFG2	CFG1
bit 7	bit 6	Bit 5	bit 4	bit 3	bit 2	bit 1	bit 0

A not soldered CFG Solder Jumper read's as '1' , if soldered it will read as '0'

bit 7:   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3:   not used

bit 2:   CFG3 Solder Jumper state

bit 1:   CFG2 Solder Jumper state

bit 0:   CFG1 Solder Jumper state

NOTE:
  —   =   this bit is not used, read value is undefind and should be mask

2-5 SYSCON CHIP INTERNALS

FIGURE 2-5-1:   SYSCON VERSION READ REGISTER (ADDRESS:F701h)

—	—	—	—	SysCon Chip Version			
bit 7	bit 6	bit 5	Bit 4	bit 3	bit 2	bit 1	bit 0

bit 7   not used

bit 6:   not used

bit 5:   not used

bit 4:   not used

bit 3 – bit 0:   SysCon Chip Version
                  This version register should always read first, before using any other functions on the Chip, to
                  take care of future Syscon Verions function map layout changes.

NOTE:
  —   =   this bit is not used, read value is undefind and should be mask