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Si5345-D EVALUATION BOARD USER'S GUIDE

Description

The Si5345-D-EVB is used for evaluating the Si5345 Any-Frequency, Any-Output, Jitter-Attenuating Clock Multiplier revision D. The device revision is distinguished by a white 1 inch x 0.187 inch label with the text "SI5345-D-EB" installed in the lower left hand corner of the board. (For ordering purposes only, the terms "EB" and "EVB" refer to the board and the kit respectively. For the purpose of this document, the terms are synonymous in context.)

EVB Features

- Powered from USB port or external power supply.
- Onboard 48 MHz XTAL or Reference SMA Inputs allow holdover mode of operation on the Si5345.
- CBProTM GUI programmable V_{DD} supply allows device to operate from 3.3, 2.5, or 1.8 V.
- CBPro GUI programmable V_{DDO} supplies allow each of the 10 outputs to have its own power supply voltage selectable from 3.3, 2.5, or 1.8 V.
- CBPro GUI-controlled voltage, current, and power measurements of V_{DD} and all V_{DDO} supplies.
- Status LEDs for power supplies and control/status signals of Si5345.
- SMA connectors for input clocks, output clocks, and optional external timing reference clock.



Figure 1. Si5345-D Evaluation Board

1. Functional Block Diagram

Below is a functional block diagram of the Si5345-D-EB. This evaluation board can be connected to a PC via the main USB connector for programming, control, and monitoring. See section "3. Quick Start" or section "10.3. Overview of ClockBuilderPro Applications" for more information.

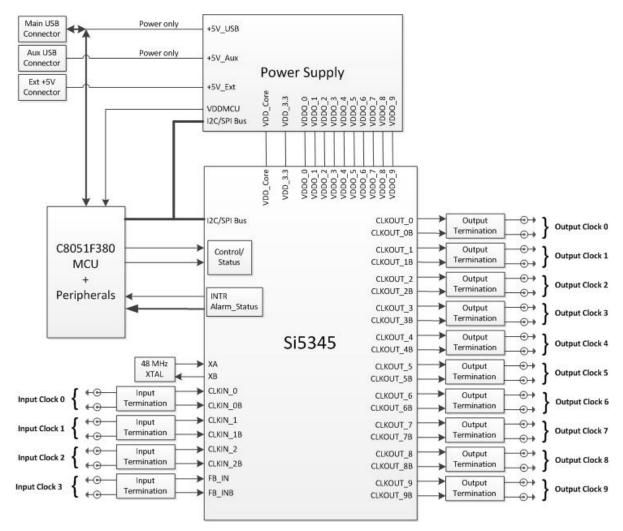


Figure 2. Si5345-D-EB Functional Block Diagram



2. Si5345-D-EVB Support Documentation and ClockBuilderPro™Software

All Si5345-D-EVB schematics, BOMs, User's Guides, and software can be found online at the following link: http://www.silabs.com/products/clocksoscillators/pages/si538x-4x-evb.aspx

3. Quick Start

- 1. Install ClockBuilderPro desktop software from http://www.silabs.com/CBPro.
- 2. Connect a USB cable from Si5345-D-EB to the PC where the software was installed.
- 3. Leave the jumpers as installed from the factory, and launch the ClockBuilderPro software.
- 4. You can use ClockBuilderPro to create, download, and run a frequency plan on the Si5345-D-EB.
- 5. For the Si5345 data sheet, go to http://www.silabs.com/timing.

4. Jumper Defaults

Location	Туре	I = Installed 0 = Open		Location	Туре	I = Installed 0 = Open
JP1	2 pin	0		JP23	2 pin	0
JP2	2 pin	I		JP24	2 pin	0
JP3	2 pin	0		JP25	2 pin	0
JP4	2 pin	I		JP26	2 pin	0
JP5	2 pin	I		JP27	2 pin	0
JP6	2 pin	I		JP28	2 pin	0
JP7	2 pin	I		JP29	2 pin	0
JP8	2 pin	0		JP30	2 pin	0
JP9	2 pin	0		JP31	2 pin	0
JP10	2 pin	I		JP32	2 pin	0
JP13	2 pin	0		JP33	2 pin	0
JP14	2 pin	I		JP34	2 pin	0
JP15	3 pin	1 to 2		JP35	2 pin	0
JP16	3 pin	1 to 2		JP36	2 pin	0
JP17	2 pin	0		JP38	3 pin	All Open
JP18	2 pin	0		JP39	2 pin	0
JP19	2 pin	0		JP40	2 pin	0
JP20	2 pin	0		JP41	2 pin	0
JP21	2 pin	0		J36	5 x 2 Hdr	All 5 installed
JP22	2 pin	0				
*Note: Refer t	o the Si534	15-D-EB schematic	s fo	r the functional	ity associated	l with each jumper.

Table 1. Si5345-D-EB Jumper Defaults*



5. Status LEDs

Location	Silkscreen	Color	Status Function Indication
D27	5VUSBMAIN	Blue	Main USB +5 V present
D22	3P3V	Blue	DUT +3.3 V is present
D26	VDD DUT	Blue	DUT VDD voltage present
D25	INTR	Red	MCU INTR (Interrupt) active
D21	READY	Green	MCU Ready
D24	BUSY	Green	MCU Busy

Table 2. Si5345-D-EB Status LEDs

D27, D22, and D26 are illuminated when USB +5 V, Si5345 +3.3 V, and Si5345 V_{DD} supply voltages, respectively, are present. D25, D21, and D24 are status LEDs showing on-board MCU activity.

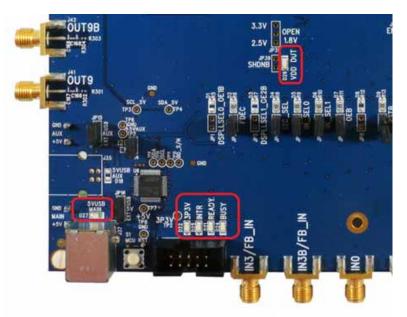


Figure 3. Status LEDs



6. External Reference Input (XA/XB)

An external reference (XTAL) is used in combination with the internal oscillator to produce an ultra-low jitter reference clock for the DSPLL and for providing a stable reference for the free-run and holdover modes. The Si5345-D-EVB can also accommodate an external reference clock instead of a crystal. To evaluate the device with a REFCLK, C111 and C113 must be populated and the XTAL removed (see Figure 4 below). The REFCLK can then be supplied to J39 and J40.

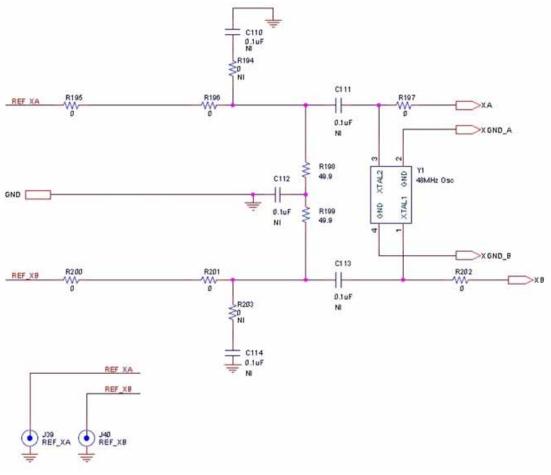


Figure 4. External Reference Input Circuit



7. Clock Input Circuits (INx/INxB)

The Si5345-D-EB has eight SMA connectors (IN0, IN0B–IN3, IN3B) for receiving external clock signals. All input clocks are terminated as shown in Figure 5 below. Note input clocks are ac-coupled and 50 Ω terminated. This represents four differential input clock pairs. Single-ended clocks can be used by appropriately driving one side of the differential pair with a single-ended clock. For details on how to configure inputs as single-ended, please refer to the Si5345 data sheet.

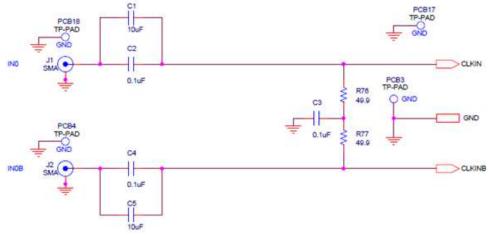


Figure 5. Input Clock Termination Circuit

8. Clock Output Circuits (OUTx/OUTxB)

Each of the twenty output drivers (10 differential pairs) is ac-coupled to its respective SMA connector. The output clock termination circuit is shown in Figure 6 below. The output signal will have no dc bias. If dc coupling is required, the ac coupling capacitors can be replaced with a resistor of appropriate value. The Si5345-D-EVB provides pads for optional output termination resistors and/or low frequency capacitors. Note that components with schematic "NI" designation are not normally populated on the Si5345-D-EB and provide locations on the PCB for optional dc/ac terminations by the end user.

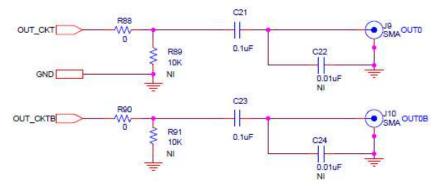


Figure 6. Output Clock Termination Circuit



9. Installing ClockBuilderPro (CBPro) Desktop Software

To install the CBOPro software on any Windows 7 (or above) PC:

Go to http://www.silabs.com/CBPro and download ClockBuilderPro software.

Installation instructions and User's Guide for ClockBuilderPro can be found at the download link shown above. Please follow the instructions as indicated.

10. Using the Si5345-D-EVB

10.1. Connecting the EVB to Your Host PC

Once ClockBuilderPro software is installed, connect to the EVB with a USB cable as shown below.

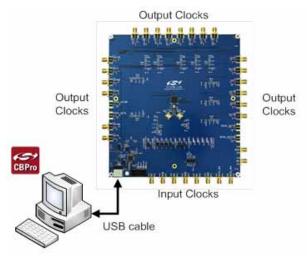


Figure 7. EVB Connection Diagram



10.2. Additional Power Supplies

Although additional power (besides the power supplied by the host PC's USB port) is not needed for most configurations, two additional +5 VDC power supplies (MAIN and AUX) can be connected to J33 and J34 (located on the bottom of the board, near the USB connector). Refer to the Si5345-D-EB schematic for details.

The Si5345-D-EB comes pre-configured with jumpers installed at JP15 and JP16 (pins 1-2 in both cases) in order to select "USB". These jumpers, together with the components installed, configure the evaluation board to obtain all +5 V power solely through the main USB connector at J37. This setup is the default configuration and should normally be sufficient.

Figure 8 shows the correct installation of the jumper shunts at JP15 and JP16 for default or standard operation.

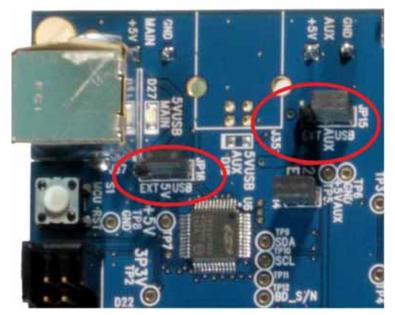


Figure 8. JP15-JP16 Standard Jumper Shunt Installation

Errata Note:Some early versions of the 64-pin Si534x-EVBs may have the silkscreen text at JP15-JP16 reversed regarding EXT and USB, i.e., USB EXT instead of EXT USB. Regardless, the correct installation of the jumper shunts for default or standard operation is on the right hand side as read and viewed in Figure 8.

The general guidelines for single USB power supply operation are listed below:

- Use either a USB 3.0 or USB 2.0 port. These ports are specified to supply 900 mA and 500 mA respectively at +5 V.
- If you are working with a USB 2.0 port and you are current limited, turn off enough DUT output voltage regulators to drop the total DUT current ≤ 470 mA. (Note: USB 2.0 ports may supply > 500 mA. Provided the nominal +5 V drops gracefully by less than 10%, the EVB will still work.)
- If you are working with a USB 2.0 and you are current limited and need all output clock drivers enabled, re-configure the EVB to drive the DUT output voltage regulators from an external +5 V power supply as follows:
 - Connect external +5 V power supply to terminal block J33 on the back side of the PCB.
 - Move the jumper at JP15 from pins 1-2 USB to pins 2-3 EXT.



10.3. Overview of ClockBuilderPro Applications

Note: The following instructions and screen captures may vary slightly depending on your version of ClockBuilder Pro. The ClockBuilderPro[™] installer will install **two** main applications:

ClockBuilder Pre Warrel - Sincer Labe	
SILICON LABS We Make Timing Simp	
Work With a Design	Quick Links
Create New Design	Jitter Attenuator Clock Products
Den Design Project File	Knowledge,Base Custom,Part,Number,Lookup ClockBuilder Go IOS App
ex Open Sample Design	
Evaluation Board Detected Sr5345 EV8 Open Default Plan Open EVB GUE	
Quick Tools	A REAL PROPERTY OF A REAL PROPER
Export Configuration	
Q _a Preferences	Version 0.104 Built on 7/17/2014

Figure 9. Application #1: ClockbuilderPro Wizard

Use the CBPro Wizard to:

- Create a new design
- Review or edit an existing design
- Export: create in-system programming

A DUTSH I	IC INT	Regis	let futtor	Regulators	All Voltages	10190	Status Register	•	 CONTRACTION NUMBER
				Veltage	Curre		Power		Soft Reset and Calibratio
VDD	1.80V	12	64	1.320	v 520	mA	686 mW	Finad	SOFT_RST_ALL
VDDA			Gen	3.287	v 126	mA	414 mW	Read	SOFT_RST
V0000	2.50V	-	0.0	2,485	V 13	mĂ,	32 mW	Read	Hard Reset, Sync. &
V0001	2.50%		0.0	2.501	v 13	nA.	13 mw	Read	Power Down
V0002	2.50V	12	100	2.488	V 34	m4.	23 mill	Read	HARD_RST
VODOS	1.80V	12		0.003	v 0	mA.	0 1110	Read	SINC
V0004	2.50V	2	0.0	2.498	y 34	nA.	25 mW	Read	POIs 0
V0005	2.50V		Co.	2.497	V 54	mA.	25 mW	Read	Frequency Adjust
VDDD6	2.50V	12	Co.	2.494	/ 14	mA.	25 mW	Read	FINC
V0007	1.80V	12	0	0.000	v 0	mA.	0 mW	Read	rpcc
VDDDB	2.50V	2	0	2.486	V 13	mA	32 mW	Read	
V0009	2.50V	12	06	2.513	V	nA.	15 mW	Read	
All Output [Select V	(citage	t	Tota	755	mĂ	1.372 W	Read All	
Supplies	Power		Power O	 Fill 	Compare Desk	in Eitin	sates to Measure	unerts.	

Figure 10. Application #2: EVB GUI

Use the EVB GUI to:

- Download configuration to EVB's DUT (Si5345)
- Control the EVB's regulators
- Monitor voltage, current, power on the EVB



10.4. Common ClockBuilderPro Work Flow Scenarios

There are three common workflow scenarios when using CBPro and the Si5345-D-EVB. These workflow scenarios are:

- Workflow Scenario #1: Testing a Silicon Labs-Created Default Configuration
- Workflow Scenario #2: Modifying the Default Silicon Labs-Created Device Configuration
- Workflow Scenario #3: Testing a User-Created Device Configuration

Each is described in more detail in the following sections.

10.5. Workflow Scenario #1: Testing a Silicon Labs-Created Default Configuration

The flow for using the EVB GUI to initialize and control a device on the EVB is as follows.

Once the PC and EVB are connected, launch ClockBuilder Pro by clicking on this icon on your PC's desktop.



Figure 11. ClockBuilderPro Desktop Icon

If an EVB is detected, click on the "Open Default Plan" button on the Wizard's main menu. CBPro automatically detects the EVB and device type.



Figure 12. Open Default Plan

Once you open the default plan (based on your EVB model number), a popup will appear.



Figure 13. Write Design to EVB Dialog



Select "Yes" to write the default plan to the Si5345 device mounted on your EVB. This ensures the device is completely reconfigured per the Silicon Labs default plan for the DUT type mounted on the EVB.



Figure 14. Writing Design Status

After CBPro writes the default plan to the EVB, click on "Open EVB GUI" as shown below.

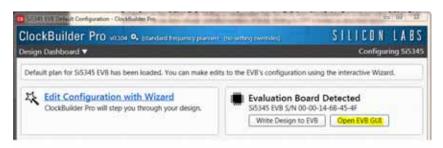


Figure 15. Open EVB GUI

The EVB GUI will appear. Note all power supplies will be set to the values defined in the device's default CBPro project file created by Silicon Labs, as shown below.

fo DUT SPI I	C DUT Re	gister Editor	Regulators	All Voltages	GPID	Status Registe	ers
			Voltag	e Curre	nt	Power	
VDD	1.80V	• On	1.320	v 520	mA	686 mW [Read
VDDA		On	3.287	/ 126	mA	414 mW	Read
VDDOO	2.50V	- On	2.485	/ 13	mA	32 mW [Read
VDD01	2.50V	• On	2.503	/ 13	mA	33 mW (Read
VCDO2	2.50V	• On	2.488	/ 14	mA	35 mW	Read
VDDO3	1.80V	0	0.003	v	mA	0 mW [Read
VD004	2.50V	• On	2,498	/ 14	mA	35 mW [Read
VDD05	2.50V	• On	2.497	/ 14	mA	35 mW [Read
VDD06	2.50V	• On	2.494	/ 14	mA	35 mW [Read
VDD07	1.80V	•	0.009	v 0	mA	0 mW	Read
VDDO8	2.50V	- On	2.486	/ 13	mA	32 mW [Read
VDD09	2.50V	• On	2.513	v 14	mA	35 mW [Read
	Select Volt		Tota	755	mA	1.372 W	Read Al

Figure 16. EVB GUI Window



10.5.1. Verify Free-Run Mode Operation

Assuming no external clocks have been connected to the INPUT CLOCK differential SMA connectors (labeled "INx/INxB") located around the perimeter of the EVB, the DUT should now be operating in free-run mode, as the DUT will be locked to the crystal in this case.

You can run a quick check to determine if the device is powered up and generating output clocks (and consuming power) by clicking on the Read All button highlighted above and then reviewing the voltage, current and power readings for each VDDx supply.

Note: Shutting "Off" then "On" of the VDD and VDDA supplies will power-down and reset the DUT. Every time you do this, to reload the Silicon Labs-created default plan into the DUT's register space, you must go back to the Wizard's main menu and select "Write Design to EVB":

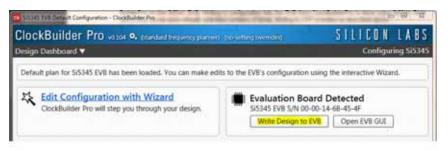


Figure 17. Write Design to EVB

Failure to do the step above will cause the device to read in a pre-programmed plan from its non-volatile memory (NVM). However, the plan loaded from the NVM may not be the latest plan recommended by Silicon Labs for evaluation.

At this point, you should verify the presence and frequencies of the output clocks (running to free-run mode from the crystal) using appropriate external instrumentation connected to the output clock SMA connectors. To verify the output clocks are toggling at the correct frequency and signal format, click on View Design Report as highlighted below.

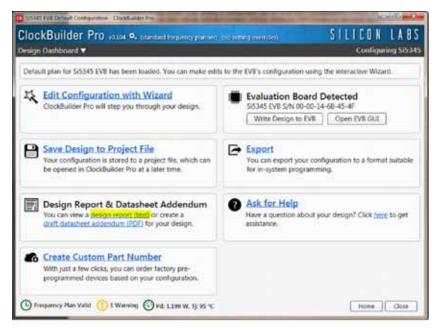


Figure 18. View Design Report



Your configuration's design report will appear in a new window, as shown below. Compare the observed output clocks to the frequencies and formats noted in your default project's Design Report.

<pre>Design Report SILSMAD 100 HF to 350 HHF * * Samed on your calculated frequency plan, a SISSMAD, grade device is required for your design. See the datasheet Ordering Guide for more information. Design Host Interface:</pre>	50345 Dep	an Freport.	and the second	-
<pre>* Based on your calculated frequency plan, a 31534%Å grade device is required for your design. See the datasheet Ordering Ouide for more information. Design</pre>	esign Repo	rt .		
<pre>required for your design. See the datasheet Ordering Guide for more information. Design Host Interface: I/O Fover Supply: VDD (Core) SFI Mode: 4-Wire I2C Address Range: 104d to 107d / 0x60 to 0x6B (selected via A0/A1 pins) XA/XE: 48 MBz (XTAL = Crystal) IND: 25 MHz Differential IND: 25 MHz Differential IND: 25 MHz Differential IND: 25 MHz Differential IND: 15 MHz [19 + 11/25 MHz] Differential IND: 19.44 MHz [19 + 11/25 MHz] Differential OCT: 161.1320125 MHz [141 + 17/128 MHz] Compute: OCT: 161.1320125 MHz [141 + 17/128 MHz] Enabled, IVDS 2.5 V OCT: 162.5 MHz [156 + 1/4 MHz] Enabled, IVDS 2.5 V OCT: 162.5 MHz [166 + 21/512 MHz] Enabled, IVDS 2.5 V OCT: 164.00025 MHz [166 + 21/512 MHz] Enabled, IVDS 2.5 V OCT: 164.00025 MHz [166 + 21/512 MHz] Enabled, IVDS 2.5 V OCT: 154.70005004002264 MHz [174 + 796/1135 MHz] Enabled, IVDS 2.5 V OCT: 156.52 MHz [155 + 13/25 MHz] Enabled, IVDS 2.5 V OCT: 156.52 MHz] Enabled, IVDS 2.5 V OCT: 156.52 MHz] Enab</pre>	5133450	100 HI to 350 HHI *		
<pre>Bost Interface: I/O Fower Supply: VCD (Core) SFL Mode: 4-Wire IZC Address Range: 104d to 107d / 0x65 to 0x6B (selected via AO/Al pins) XA/XB: # MMiz (XTAL - Crystal) Inputs: IND: 25 MHz Differential INI: 25 MHz Differential INI: 15.44 MHz [18 + 11/15 MHz] Differential INI: 19.44 MHz [18 + 11/15 MHz] Differential INI: 19.44 MHz [18 + 11/15 MHz] Differential OCTO: 141.132815 MHz [161 + 17/128 MHz] Enabled, IVDS 2.5 V OUT1: 425 MHz Enabled, IVDS 2.5 V OUT1: 56.25 MHz [168 + 1/4 MMz] Enabled, IVDS 2.5 V OUT5: 156.26 MHz [167 + 21/512 MHz] Enabled, IVDS 2.5 V OUT5: 272.1440425 MHz [167 + 21/512 MHz] Enabled, IVDS 2.5 V OUT5: 71.140425 MHz [155 + 11/125 MHz] Enabled, IVDS 2.5 V OUT5: 155.52 MHz [155 + 13/125 MHz] I Enabled, IVDS 2.5 V OUT7: Duaged OUT5: 155.52 MHz [155 + 13/125 MHz] Enabled, IVDS 2.5 V OUT7: Duaged OUT5: 155.52 MHz [155 + 13/125 MHz] Enabled, IVDS 2.5 V OUT7: Duaged OUT5: 155.52 MHz [452 + 2/25 MHz] Enabled, IVD5 2.5 V OUT7: Duaged OUT5: 155.52 MHz [452 + 2/25 MHz] Enabled, IVD5 2.5 V OUT7: Duaged OUT5: 155.52 MHz [452 + 2/25 MHz] Enabled, IVD5 2.5 V OUT7: Duaged OUT5: 155.52 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V OUT5: 052.05 MHz [422 + 2/25 MHz] Enabled, IVD5 2.5 V DIF [400 + 150 + 150 + 150 + 150 + 150 + 150 + 150 + 150 + 150</pre>	required	for your design. See the datasheet Ordering Guide for more		
<pre>Bost Interface: I/O Fower Supply: VCD (Core) SPI Mode: 4-Wire I2C Address Range: 104d to 107d / 0x68 to 0x6B (selected via AO/Al pins) XA/XB: 4E MHz (XCAL - Crystal) Imputs: INO: 25 MHz Differential INO: 25 MHz Differential INI: 15.44 MHz [18 + 11/25 MHz] Differential INI: 19.44 MHz [18 + 11/25 MHz] Differential OUTD: 161.1328125 MHz [161 + 17/128 MHz]</pre>				
<pre>//O Fower Supply: VDD (Core) SFI Mode: 4-Wire SFI Mode: 4-Wire IIC Address Range: 104d to 107d / 0x68 to 0x68 (selected via A0/A1 pins) XX/XE: 48 MHz (XTAL = Crystal) Inputs: INV: 15 MHz Differential IHL: 25 MHz Differential IHL: 25 MHz [18 + 11/25 MHz] Differential IHL: 25 MHz [18 + 11/25 MHz] Differential IHL: 25 MHz [18 + 11/25 MHz] Differential Outputs COTO: 141.1328125 MHz [161 + 17/128 MHz] Computs COTO: 141.1328125 MHz [161 + 17/128 MHz] Enabled, LVDS 3.5 V COTT: 158.25 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V COTT: 158.25 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V COTT: 158.25 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V COTT: 158.25 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V COTT: 158.25 MHz [156 + 21/512 MHz] Enabled, LVDS 3.5 V COTTS: 672.1640625 MHz [672 + 21/128 MHz] Enabled, LVDS 2.5 V COTTS: 672.1640625 MHz [155 + 11/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 11/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 11/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 11/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 11/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 11/25 MHz] COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTT: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155 + 21/25 MHz] Enabled, LVDS 2.5 V COTTS: 155.52 MHz [155</pre>				
<pre>SPI Mode: 4-Wire 122 Address Range: 104d to 107d / 0x68 to 0x68 (selected via &0/&1 pins) XX/XB: 45 MMs (XTAL - Crystal) Imputs: INO: 25 MMs Differential INI: 25 MMs Differential INI: 15.44 MMs [18 + 11/25 MMs] Differential INI: 19.44 MMs [18 + 11/25 MMs] Differential OCTO: 141.1328125 MMs [161 + 17/128 MMs] Enabled, 1VDS 2.5 V OCTO: 156.25 MMs [156 + 1/4 MMs] Enabled, IVDS 2.5 V OCTO: 156.25 MMs [166 + 21/512 MMs] Enabled, IVDS 2.5 V OCTO: 156.26 MMs [166 + 21/512 MMs] Enabled, IVDS 2.5 V OCTO: 156.26 MMs [166 + 21/512 MMs] Enabled, IVDS 2.5 V OCTO: 156.26 MMs [167 + 21/128 MMs] Enabled, IVDS 2.5 V OCTO: 156.26 MMs [672 + 21/128 MMs] Enabled, IVDS 2.5 V OCTO: 156.50 MMs [155 + 13/25 MMs] Enabled, IVDS 2.5 V OCTO: 155.52 MMs [155 + 13/25 MMs] Enabled, IVDS 2.5 V OCTO: 155.52 MMs [155 + 13/25 MMs] Enabled, IVDS 2.5 V OCTO: 155.52 MMs [155 + 13/25 MMs] Enabled, IVDS 2.5 V OCTO: 155.52 MMs [422 + 2/25 MMs]</pre>				
<pre>12C Address Range: 104d to 107d / 0x68 to 0x68 (selected via &0/A1 pins) XX/XB:</pre>				
<pre>XX/XB:</pre>				
<pre>48 MHz (XTAL = Crystel) Inputs: IND: 25 MHz Differential IHL: 35 MHz Differential IHL: 35 MHz Differential IHL: 35 MHz Differential IHL: 19.44 MHz [19 + 11/25 MHz] Differential Outputs: OUTD: 141.1328125 MHz [161 + 17/128 MHz] Enabled, LVD5 3.5 V OUTI: 525 MHz Enabled, LVD5 3.5 V OUTI: 156.25 MHz [156 + 1/4 MMz] Enabled, LVD5 3.5 V OUTI: 162.04013635 MHz [169 + 21/512 MHz] Enabled, LVD5 3.5 V OUTI: 162.04013635 MHz [169 + 21/512 MHz] Enabled, LVD5 3.5 V OUTI: 162.04013635 MHz [169 + 21/512 MHz] Enabled, LVD5 3.5 V OUTI: 162.04013635 MHz [169 + 21/512 MHz] Enabled, LVD5 3.5 V OUTI: 174.7306370044032864 MHz [174 + 796/1135 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz]</pre>	14% AG	dress wander road to road 1 Akos to Akos (serected Are Wolwi	(prus)	
<pre>Imputs: IND: 25 MHz Differential IHI: 25 MHz Differential IHI: 25 MHz Differential IND: 19.44 MHz [19 + 11/25 MHz] Differential IHI: 19.44 MHz [19 + 11/25 MHz] Differential OUTD: 161.1328125 MHz [161 + 17/128 MHz] Znabled, IVDS 2.5 V OUTI: 628 MHz Enabled, IVDS 2.5 V OUTS: 161.58.35 MHz [166 + 11/512 MHz] Enabled, IVDS 2.5 V OUTS: 162.040019625 MHz [160 + 21/512 MHz] Enabled, IVDS 2.5 V OUTS: 167.21.640425 MHz [160 + 21/512 MHz] Enabled, IVDS 2.5 V OUTS: 072.1640425 MHz [472 + 21/128 MHz] Enabled, IVDS 2.5 V OUTS: 072.1640425 MHz [472 + 21/128 MHz] Enabled, IVDS 2.5 V OUTS: 155.52 MHz [155 + 13/25 MHz] Enabled, IVDS 2.5 V OUTS: 155.52 MHz [422 + 2/25 MHz]</pre>		DTAL - Crystali		
<pre>INV: 25 MMz Differential INI: 25 MMz Differential INI: 25 MMz Differential INI: 15.44 MMz [18 + 11/25 MMz] Differential OUTD: 161.1328125 MMz [161 + 17/128 MMz] Computs OUTD: 161.1328125 MMz [161 + 17/128 MMz] Enabled, IVDS 2.5 V OUTI: 525 MMz Enabled, IVDS 2.5 V OUTS: 156.25 MMz [156 + 1/4 MMz] Enabled, IVDS 2.5 V OUTS: 156.25 MMz [166 + 21/512 MMz] Enabled, IVDS 2.5 V OUTS: 157.21.4640425 MMz [166 + 21/512 MMz] Enabled, IVDS 2.5 V OUTS: 072.14640425 MMz [672 + 21/128 MMz] Enabled, IVDS 2.5 V OUTS: 072.14640425 MMz [672 + 21/128 MMz] Enabled, IVDS 2.5 V OUTS: 156.52 MMz [155 + 13/25 MMz] Enabled, IVDS 2.5 V OUTS: 155.52 MMz [155 + 13/25 MMz]</pre>				
Differential THI: 25 MHz Differential INI: 19.44 MHz [19 + 11/25 MHz] Differential INI: 19.44 MHz [19 + 11/25 MHz] Differential OUTDUI: 19.44 MHz [19 + 11/25 MHz] COUDI: 19.1328125 MHz [141 + 17/128 MHz] Knabled, LVDS 2.5 V OUTI: 525 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V OUTI: 156.25 MHz [156 + 1/4 MHz] Enabled, LVDS 3.5 V OUTI: 162.040035425 MHz [148 + 21/512 MHz] Enabled, LVDS 2.5 V OUTS: 672.1440425 MHz [148 + 21/512 MHz] Enabled, LVDS 2.5 V OUTS: 672.1440425 MHz [672 + 21/128 MHz] Enabled, LVDS 2.5 V OUTS: 672.1440425 MHz [672 + 21/128 MHz] Enabled, LVDS 2.5 V OUTS: 672.1440425 MHz [575 + 12/128 MHz] Enabled, LVDS 2.5 V OUTS: 000464 [525 V OUTS: 155.52 MHz [155 + 12/15 MHz] Enabled, LVDS 2.5 V OUTS: 000464 [422 + 2/25 MHz]		25 Mar.		
<pre>THL: 35 MHz Differential INJ: 19.44 MHz [19 + 11/25 MHz] Differential INJ: 19.44 MHz [19 + 11/25 MHz] Differential Outputs: OUTD: 161.1328125 MHz [161 + 17/128 MHz] Enabled, LVD5 3.5 V OUTI: 625 MHz [164 + 17/128 MHz] Enabled, LVD5 3.5 V OUTI: 625 MHz [156 + 1/4 MHz] Enabled, LVD5 3.5 V OUTI: 162.040.03625 MHz [169 + 21/512 MHz] Enabled, LVD5 2.5 V OUTI: 672.1640625 MHz [169 + 21/512 MHz] Enabled, LVD5 2.5 V OUTI: 672.1640625 MHz [672 + 21/128 MHz] Enabled, LVD5 2.5 V OUTI: 174.730637004405264 MHz [174 + 796/1135 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz] Enabled, LVD5 2.5 V OUTI: 155.52 MHz [155 + 13/25 MHz]</pre>	1000			
<pre>INE: 19.44 NHE [19 + 11/25 NHE] Differential INE: 19.44 NHE [19 + 11/25 NHE] Differential Outputs! Outp: 141.1328125 NHE [141 + 17/128 NHE] Enabled, LVDS 3.5 V OUT1: 625 NHE [156 + 1/4 NHE] Enabled, LVDS 3.5 V OUT2: 156.25 NHE [156 + 1/4 NHE] Enabled, LVDS 3.5 V OUT3: Outpace OUT4: 145.04L035625 NHE [145 + 21/512 NHE] Enabled, LVDS 2.5 V OUT5: 672.1640425 NHE [145 + 21/512 NHE] Enabled, LVDS 2.5 V OUT5: 672.1640425 NHE [145 + 21/512 NHE] Enabled, LVDS 2.5 V OUT5: 672.1640425 NHE [672 + 21/125 NHE] Enabled, LVDS 2.5 V OUT5: 672.1640425 NHE [672 + 21/125 NHE] Enabled, LVDS 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVDS 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVDS 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVDS 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVDS 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 21/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 155.52 NHE [155 + 11/25 NHE] Enabled, LVD5 2.5 V OUT5: 00T6: 00T6:</pre>	7811			
Differential IHS: 13.44 HDE [15 + 11/25 MHz] Differential Cutputs: OUTD: 141.1328125 MHz [161 + 17/128 MHz] Enabled, LVDS 2.5 V OUT1: 625 MHz Enabled, LVDS 2.5 V OUT3: 56.25 MHz [156 + 1/4 MMx] Enabled, LVDS 2.5 V OUT4: 162.04031823 HHz [160 + 21/512 HHz] Enabled, LVDS 2.5 V OUT5: 72.1440425 MHz [672 + 21/128 MHz] Enabled, LVDS 2.5 V OUT5: 72.1440425 MHz [672 + 21/128 MHz] Enabled, LVDS 2.5 V OUT5: 156.52 MHz [155 + 13/25 HHz] Enabled, LVDS 2.5 V OUT7: Unused OUT4: 155.52 MHz [155 + 13/25 HHz] Enabled, LVDS 2.5 V OUT5: 00155 622.08 MHz [422 + 2/25 HHz]		Differential		
<pre>IH3: 13.44 NHz [15 + 11/25 MHz] Differential OUTputs! OUTD: 161.1320125 NHz [161 + 17/120 NHz] Xnabled, EVD5 2.5 V OUTI: 625 NHz [156 + 1/4 NHz] Enabled, EVD5 3.5 V OUT3: 156.25 NHz [156 + 1/4 NHz] Enabled, EVD5 2.5 V OUT3: Oursed OUT4: 162.041035625 NHz [165 + 21/512 NHz] Enabled, EVD5 2.5 V OUT5: 672.1640425 NHz [672 + 21/125 NHz] Enabled, EVD5 2.5 V OUT5: 672.1640425 NHz [672 + 21/125 NHz] Enabled, EVD5 2.5 V OUT5: 672.1640425 NHz [672 + 21/125 NHz] Enabled, EVD5 2.5 V OUT5: 0nused OUT5: 155.52 NHz [155 + 13/15 NHz] Enabled, EVD5 2.5 V OUT5: 0nused OUT5: 155.52 NHz [155 + 13/15 NHz] Enabled, EVD5 2.5 V OUT5: 0nused OUT5: 155.52 NHz [155 + 13/15 NHz] Enabled, EVD5 2.5 V OUT5: 00used OUT5: 155.52 NHz [155 + 2/25 NHz]</pre>	INZ:	19.44 MHz [18 + 11/25 MHz]		
Differential Outputs: OUTS: 141.1328125 MHz [141 + 17/128 MHz] Exabled, LVDS 3.5 V OUT1: 525 MHz [154 + 1/4 MHz] Exabled, LVDS 3.5 V OUT3: UNDsed OUT4: 142.04L035625 MHz [148 + 21/512 MHz] Exabled, LVDS 2.5 V OUT5: 672.1440625 MHz [169 + 21/512 MHz] Exabled, LVDS 2.5 V OUT5: 672.1440625 MHz [672 + 21/128 MHz] Exabled, LVDS 2.5 V OUT5: 154.73004405264 MHz [174 + 796/1135 MHz] Exabled, LVDS 2.5 V OUT5: 155.52 MHz [155 + 13/25 MHz] Exabled, LVDS 2.5 V OUT5: 155.52 MHz [155 + 13/25 MHz]				
Outputs: OUTpi 161.1320125 MHz [161 + 17/128 MHz] Enabled, 1972 2.5 V OUT1: 625 MHz Enabled, 1975 2.5 V OUT3: 156.15 MHz [156 + 1/4 MHz] Enabled, 1976 2.5 V OUT3: Unused OUT4: 142.041035625 MHz [168 + 21/512 MHz] Enabled, 1978 2.5 V OUT5: 672.1640425 MHz [672 + 21/128 MHz] Enabled, 1978 2.5 V OUT5: 174.7030637004405286 MHz [174 + 798/1135 MHz] Enabled, 1978 2.5 V OUT5: 155.52 MHz [155 + 13/15 MHz] Enabled, 1976 2.5 V OUT5: 155.52 MHz [155 + 13/15 MHz]	214.84			
<pre>OUTD: 141.1328125 MHz [141 + 17/128 MHz]</pre>		Differential		
<pre>OUTD: 141.1328125 MHz [141 + 17/128 MHz]</pre>	Outputs			
<pre>Knabled, LVDS 2.5 V OUT1: 625 MHz Enabled, LVDS 3.5 V OUT3: 156.25 MHz [156 + 1/4 MHz] Enabled, LVDS 2.5 V OUT3: Unused OUT4: 142.04L015425 MHz [168 + 21/512 MHz] Enabled, LVDS 2.5 V OUT5: 672.1460425 MHz [672 + 21/125 MHz] Enabled, LVDS 2.5 V OUT5: 672.1460425 MHz [672 + 21/125 MHz] Enabled, LVDS 2.5 V OUT5: 174.7030637004405266 MHz [174 + 796/1135 MHz] Enabled, LVDS 2.5 V OUT5: 155.52 MHz [155 + 13/15 MHz] Enabled, LVDS 2.5 V OUT5: 155.52 MHz [452 + 2/25 MHz]</pre>		161.1320125 MHz (161 + 17/120 MHz)		
Enabled, LVDS 3.5 V OUT2: 156.25 NMz [156 + 1/4 NMz] Enabled, LVDS 2.5 V OUT3: Unused OUT4: 162.041015625 NMz [160 + 21/512 NMz] Enabled, LVDS 2.5 V OUT5: 672.1640425 NHz [672 + 21/128 NHz] Enabled, LVDS 2.5 V OUT6: 174.7030637004405256 NMz [174 + 796/1135 NMz] Enabled, LVDS 2.5 V OUT6: 155.52 NMz [155 + 13/15 NMz] Enabled, LVDS 2.5 V OUT5: 155.52 NMz [155 + 13/15 NMz] Enabled, LVD5 2.6 V OUT5: 622.08 NMz [422 + 2/25 NHz]				
OUT2: 156.15 MHz [156 + 1/4 MHz] Enabled, LVD5 2.5 V OUT3: Onumed OUT4: 162.04L015425 MHz [168 + 21/512 MHz] Enabled, LVD5 2.5 V OUT5: 672.1440425 MHz [672 + 21/128 MHz] Enabled, LVD5 2.5 V OUT5: 174.7030637004405286 MHz [174 + 796/1135 MHz] Enabled, LVD5 2.5 V OUT7: Dumaed OUT5: 155.52 MHz [155 + 13/15 MHz] Enabled, LVD5 2.5 V OUT5: 155.52 MHz [155 + 13/15 MHz]	00711			
<pre>Enabled, IVDS 2.5 V OUT3: Dunaed OUT4: 10:040-04003625 MHz [148 + 21/512 MHz] Enabled, IVDS 2.5 V OUT5: 672.1440425 MHz [672 + 21/128 MHz] Enabled, IVDS 2.5 V OUT6: 174.7030837004405286 MHz [174 + 796/1135 MHz] Enabled, IVDS 2.5 V OUT7: INDuaed OUT8: 155.52 MHz [155 + 13/25 MHz] Enabled, IVDS 2.5 V OUT9: 622.08 MHz [422 + 2/25 MHz]</pre>				
<pre>OUT3: Dunaed OUT3: 16:.041015625 NH: [160 + 21/512 NH:] Enabled, LVDS 2.5 V OUT5: 672.1460425 NH: [672 + 21/128 NH:] Enabled, LVDS 2.5 V OUT6: 174.7030637004405286 NH: [174 + 796/1135 NH:] Enabled, LVDS 2.5 V OUT7: Tousaed OUT5: 155.52 NH: [155 + 13/15 NH:] Enabled, LVDS 2.5 V OUT5: 622.08 NH: [622 + 2/25 NH:]</pre>	OUT2:			
OUT4: 145.041015625 HHz [140 + 21/512 HHz] Enabled, 2VD5 2.5 V OUT5: 672.1440455 HHz [672 + 21/128 HHz] Enabled, 1VD5 2.5 V OUT6: 174.730637004405264 HHz [174 + 796/1135 HHz] Enabled, 1VD5 2.5 V OUT7: Unused OUT6: 155.52 HHz [155 + 13/25 HHz] Enabled, 1VD5 2.5 V OUT7: 522.08 HHz [422 + 2/25 HHz]				
Enabled, 1VDS 2.5 V OUT5: 672.1640625 NHz [672 + 21/128 NHz] Enabled, 1VDS 2.5 V OUT6: 174.7030837004405286 NHz [174 + 798/1135 NHz] Enabled, 1VDS 2.5 V OUT7: Inused OUT5: 155.52 NHz [155 + 13/25 NHz] Enabled, IVDS 2.5 V OUT9: 622.08 NHz [422 + 2/25 NHz]				
OUTS: 672.1840425 MHz [672 + 21/128 MHz] Enabled, IVDS 2.5 V OTT6: 174.7030637004405286 MHz [174 + 796/1135 MHz] Enabled, IVDS 2.5 V OUT7: Noused OUT5: 155.52 MHz [155 + 13/25 MHz] Enabled, IVD0 2.5 V OTT5: 622.08 MHz [622 + 2/25 MHz]	WU1 81			
Enabled, 1VDS 2.5 V OUT6: 174.7030837004405286 MHz [174 + 798/1135 MHz] Enabled, 1VDS 2.5 V OUT7: Unused OUT5: 155.52 MHz [155 + 13/25 MHz] Enabled, 1VDS 2.5 V OUT9: 622.08 MHz [622 + 2/25 MHz]	OUTSI			
Ensbled, 1VDS 2.5 V OUT9: Nuused OUT9: 155.52 MHz [155 + 13/25 MHz] Ensbled, 1VD0 2.5 V OUT9: 622.08 MHz [622 + 2/25 MHz]				
OUT7: Unused OUT5: 155.52 MHz [155 + 13/25 MHz] Enabled, LVD5 2.5 V OUT5: 622.08 MHz [622 + 2/25 MHz]	0076:			
OUTS: 155.52 MHz [155 + 13/25 MHz] Enabled, IVD0 2.5 V OUTS: 622.08 MHz [622 + 2/25 MHz]	in a second			
Enabled, LVDS 2.5 V OUT9: 622.08 MHz 622 + 2/25 MHz				
OUT9: 622.08 MHz [622 + 2/25 MHz]	OUIDI			
	00724			

Figure 19. Design Report Window

10.5.2. Verify Locked Mode Operation

Assuming you connect the correct input clocks to the EVB (as noted in the Design Report shown above), the DUT on your EVB will be running in "locked" mode.



10.6. Workflow Scenario #2: Modifying the Default Silicon Labs-Created Device Configuration

To modify the "default" configuration using the CBPro Wizard, click on Edit Configuration with Wizard:

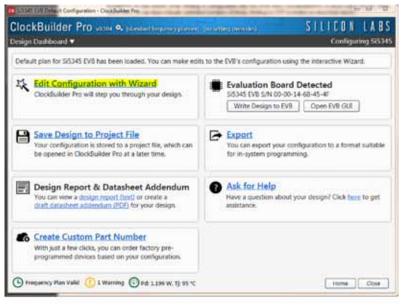


Figure 20. Edit Configuration with Wizard

You will now be taken to the Wizard's step-by-step menus to allow you to change any of the default plan's operating configurations.

lockBuild	State of the local division of the local div	and the second se		SILICON LAB
http://dila.bep		iot 🔍 prandent imparecy partners	to setting the states	Configuring SIS3
Design 10		,D0 through DESIGN, JD7, that can be a	sed to store a design/configurat	ior,vevision identifier.
Design ID:	S345EVEL The string you	joptional; max 8 characters) enter here is stored as ASCE bytes in re	gisters DE3GN_300 (Herough DE	MUNJET.
Padding Mode:	NULL Pade 2f you do n characters	not enter the full 8 characters, the ream	ning bytes of DESERVI, Eth will be	e padded with 0x00 bytes (aka NULL
	C Space Pad If you do n character)	not enter the full 8 characters, the reacti	ning bytes of OCSICPLIDs will be	e pecided with 0x20 bytes (space
Design Notes Enter anything yo	o want here. The h	text is stored in your project file and ind	kided in design reports (Miture N	estures.

Figure 21. Design Wizard



Note you can click on the icon on the lower left hand corner of the menu to confirm if your frequency plan is valid. After making your desired changes, you can click on Write to EVB to update the DUT to reconfigure your device real-time. The Design Write status window will appear each time you make a change.



Figure 22. Writing Design Status

10.7. Workflow Scenario #3: Testing a User-Created Device Configuration

To test a previously created user configuration, open the CBPro Wizard by clicking on the icon on your desktop and then selecting Open Design Project File.

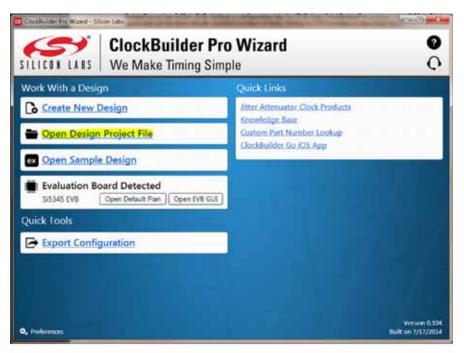


Figure 23. Open Design Project File



Si5345-D-EVB

Locate your CBPro design file (*.slabtimeproj or *.sitproj file).design file in the Windows file browser.

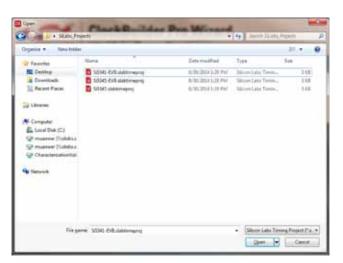


Figure 24. Browse to Project File

Select Yes when the WRITE DESIGN to EVB popup appears:



Figure 25. Write Design to EVB Dialog

The progress bar will be launched. Once the new design project file has been written to the device, verify the presence and frequencies of your output clocks and other operating configurations using external instrumentation.



10.8. Exporting the Register Map File for Device Programming by a Host Processor

You can also export your configuration to a file format suitable for in-system programming by selecting Export as shown below:

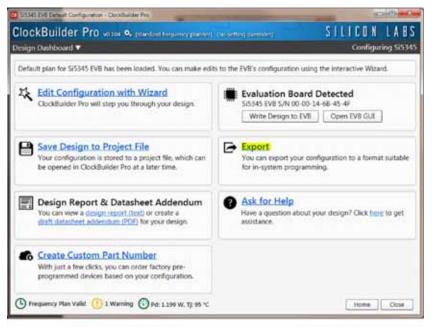


Figure 26. Export Register Map File

You can now write your device's complete configuration to file formats suitable for in-system programming.

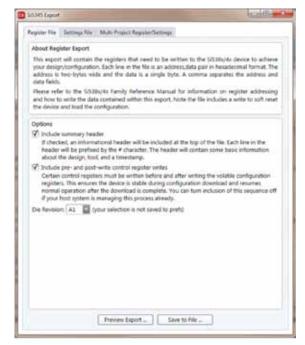


Figure 27. Export Settings



11. Writing a New Frequency Plan or Device Configuration to Non-Volatile Memory (OTP)

Note: Writing to the device non-volatile memory (OTP) is **NOT** the same as writing a configuration into the Si5345 using ClockBuilderPro on the Si5345-D-EB. Writing a configuration into the EVB from ClockBuilderPro is done using Si5345 RAM space and can be done virtually unlimited numbers of times. Writing to OTP is limited as described below.

Refer to the Si534x/8x Family Reference Manuals and device data sheets for information on how to write a configuration to the EVB DUT's non-volatile memory (OTP). The OTP can be programmed a maximum of **two** times only. Care must be taken to ensure the configuration desired is valid when choosing to write to OTP.

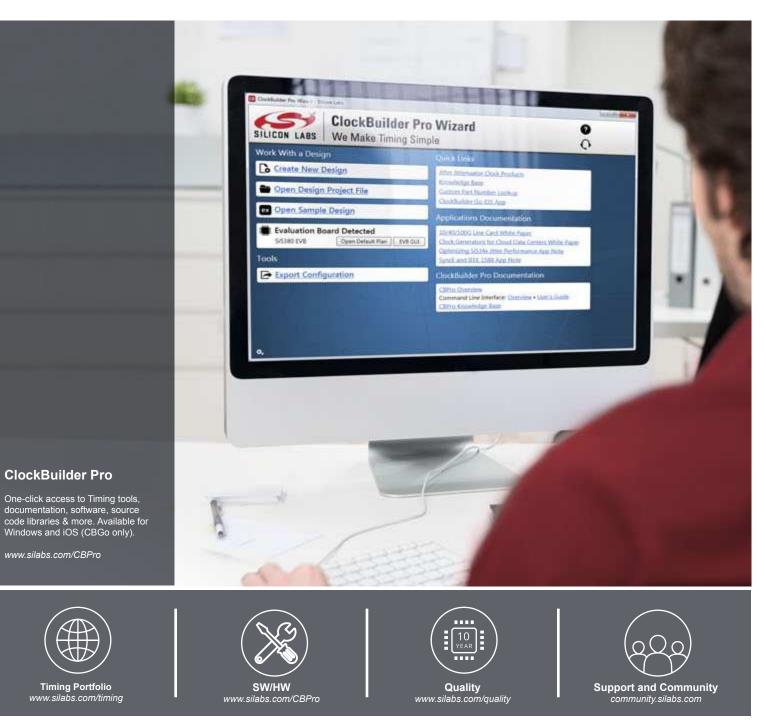
12. Si5345-D-EVB Schematic, Layout, and Bill of Materials (BOM)

The Si5345-D-EVB Schematic, Layout, and Bill of Materials (BOM) can be found online at:

http://www.silabs.com/products/clocksoscillators/pages/si538x-4x-evb.aspx

Note: Please be aware that the Si5345-D-EB schematic is in OrCad Capture *hierarchical format* and not in a typical "flat" schematic format.





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