

# P-SRAM<sup>™</sup> Serial QSPI Evaluation Kit User Guide AS3xx201-108xxEVAL

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#### **Revision History**

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#### 1. Overview

The Avalanche P-SRAM<sup>™</sup> serial QSPI evaluation kit enables the users to evaluate Avalanche P-SRAM serial QSPI product using a STMicro Nucleo motherboard connected to Avalanche daughterboard via a standard Asynchronous SRAM interface. The STMicro Nucleo motherboard communicates with the computer using a USB 2.0 cable type A/B and terminal emulator software using Avalanche proprietary software application. This evaluation kit is designed to work with the STMicro NUCLEO-H743ZI2 with UNO R3 compatible header.

## Avalanche P-SRAM Product Support

The Avalanche P-SRAM daughterboard can be populated with one of the following P-SRAM devices:

Part #	Density	Voltage (Vcc/Vccq)	Frequency	Package
AS3032204-0108X0IWAY	32Mb	2.7 V to 3.6V	108Mhz	8-Pin WSON
AS3032204-0108X0ISAY	32Mb	2.7 V to 3.6V	108Mhz	8-Pin SOIC
AS3016204-0108X0IWAY	16Mb	2.7 V to 3.6V	108Mhz	8-Pin WSON
AS3016204-0108X0ISAY	16Mb	2.7 V to 3.6V	108Mhz	8-Pin SOIC
AS3008204-0108X0IWAY	8Mb	2.7 V to 3.6V	108Mhz	8-Pin WSON
AS3008204-0108X0ISAY	8Mb	2.7 V to 3.6V	108Mhz	8-Pin SOIC
AS3004204-0108X0IWAY	4Mb	2.7 V to 3.6V	108Mhz	8-Pin WSON
AS3004204-0108X0ISAY	4Mb	2.7 V to 3.6V	108Mhz	8-Pin SOIC
AS3001204-0108X0IWAY	1Mb	2.7 V to 3.6V	108Mhz	8-Pin WSON
AS3001204-0108X0ISAY	1Mb	2.7 V to 3.6V	108Mhz	8-Pin SOIC

#### Table 1: Avalanche P-SRAM Serial QSPI Product Support



## **Ordering Options**



Figure 1: Device Identification Decoder

#### 2. Package Content

The Avalanche P-SRAM<sup>™</sup> serial QSPI evaluation kit contains the following items.

- 1. STMicro NUCLEO-H743ZI2 board
- 2. Avalanche daughterboard populated with an Avalanche P-SRAM serial QSPI memory device
- 3. One USB cable type A/B

## **3.** STMicro Nucleo Motherboard Support

The Avalanche P-SRAM daughterboard is compatible with the following host:

• <u>STMicro Nucleo Series with UNO R3 compatible header</u>





Figure 2: Avalanche P-SRAM Serial QSPI SOIC-8

## 4. Getting Started

#### 4.1 Requirements

- A PC system with one available USB 2.0/3.0 port
- Windows 7/8/10 with 32/64-bit Operation System
- A STMicro NUCLEO-H743ZI2 motherboard
- USB 2.0 cables Type A/B





Figure 3: Device Manager USB COM Port Number

#### 4.2 Software Installations

1. Downloading the STMicro's STM32 ST-LINK utility. This software is a full-featured software interface for programming STM32 microcontroller required to program the STMicro Nucleo motherboard

Use the following link:

https://www.st.com/en/development-tools/stsw-link004.html

#### After installation an icon (see

• Figure 4: STM32 ST Link Desktop Icon) will appear on your desktop





Figure 4: STM32 ST Link Desktop Icon

- This software also installs the USB driver on the computer to allow the connection between the STMicro Nucleo motherboard and the PC
- 2. The STMicro Nucleo motherboard is already pre-loaded with the necessary Avalanche test program. However, for updates, please use the link below to download the latest Avalanche test program.

(http://www.avalanche-technology.com/).

## 4.3 Connecting the STMicro Nucleo Motherboard to PC

Perform the step-by-step instructions in the following order to configure and connect the STMicro Nucleo motherboard to your computer:

- 1. Attach the Avalanche P-SRAM serial QSPI daughterboard on top of the STMicro Nucleo motherboard (refer to *Error! Reference source not found.*)
- Connect the STMicro Nucleo motherboard to your computer's USB ports using one universal USB 2.0 cable (see *Figure 5: Nucleo Board with USB Connections*). The Red power LED and the Green activity LED on the STMicro Nucleo motherboard should go on (re-take picture of board with Red and Green LEDs ON)



Figure 5: Nucleo Board with USB Connections



3. For the first time installation, Windows should also install the USB driver on the computer by installing the STMicro Link. You can check to ensure the USB drivers have been properly installed by opening Windows Device Manager, and looking under "Ports (COM & LPT)". (see Figure 6: Device Manager) Windows should assign one COM ports # to the STMicro Nucleo motherboard. The COM port is called "USB Serial Device (COMxx).



Figure 6: Device Manager

4. If there are no COMxx ports assigned to the STMicro Nucleo motherboard, then remove both cables and re-insert the USB connectors from/into PC's USB ports for Windows to re-enumerate the USB port. If that doesn't solve the problem, you may need to re-install the USB drivers.



The eval kit is pre-programmed with the Avalanche Technology software application and firmware to be able to run the test right out of the box.

Follow the step-by-step instructions below to update the STMicro Nucleo motherboard with Avalanche latest test program:

- 1. Double-click the STM32 ST-Link icon on your desktop (
  - 2. *Figure 4: STM32 ST Link Desktop* Icon**)** to launch the STM32 ST-Link Utility program.
  - 3. Select "Target"  $\rightarrow$  "Connect". See Figure 7: STM Utility Window.



Figure 7: STM Utility Window

**NOTE**: Make sure only one Nucleo board is connected to the computer when programming the Nucleo board, otherwise the intended Nucleo board may not be programmed.

Select "Target" → "Program & Verify ... CTRL +P" to open an explorer window. See *Error! Reference source not found*.



5. Choose "Browse" button to go to the directory that you've saved the Nucleo Hex file. Select the file with \*.hex extension. Choose "Open". A sub-window will appear "Download [\*.hex] (see

Download [ STN	132N_x16ParallelMemTest_V1	00-Tsop-37nsF.hex ]	×
Start address	0x08000000		
File path	Z:\DVT\Ava test software\Nu	cleo\Parallel\X16 FMC\STM	Browse
Extra options	Skip Flash Erase	Skip Flash Protection ve	rification
Verification	• Verify while programming	◯ Verify after programming	
Click "Start" to p	orogram target.		
After program	ning ☑ Reset after programming	Full Flash memory Check	.sum
	Start	Cancel	

6. Figure 8: Download STM Utility Window).

Download [ STN	132N_x16ParallelMemTest_V10	00-Tsop-37nsF.hex ] X		
Start address File path	0x08000000 Z:\DVT\Ava test software\Nur	cleo\Parallel\X16 FMC\STM Browse		
Extra options	Skip Flash Erase	Skip Flash Protection verification		
Verification	• Verify while programming	O Verify after programming		
Click "Start" to p	program target.			
After programming				
	Start	Cancel		

Figure 8: Download STM Utility Window

- 7. Select "Start" to start uploading the \*.hex file into Nucleo board.
- Select "Target" → "Disconnect CTRL +D" to disconnect the Nucleo board from STM32 ST-Link Utility.

#### 4.5 Running Avalanche Test Program

You can use PuTTY program to setup the serial connection to communicate between the STMicro Nucleo motherboard and a computer via USB connections.

#### 4.5.1 Configuring PuTTY



Follow the step-by-step instructions below to configure the PuTTY UART terminal:



2. *Figure 9: PuTTY* lcon)



Figure 9: PuTTY Icon

- 3. On the "Category" pane, under "Connection" sub-category, select "Serial". Under "Flow control" pull-down menu, select "None" (see
  - 4. Figure 10: PuTTY Configuration 1)



Figure 10: PuTTY Configuration - 1

5. Under Category, select "Terminal", and check "Implicit CR in every LF" checkbox (see Figure 11: PuTTY Configuration - 2)





stegory:		
E Session	Options controlling the terminal emulation	
Logaina	Set various terminal options	
Terminal	Auto wrap mode initially on	
Reyboard	DEC Origin Mode initially on	
Features	V Implicit CR in every LF	
- Window	Implicit LF in every LR	
- Appearance	V Use background colour to erase screen	
Behaviour	Enable blinking text	
- Translation	Answerback to ^E:	
Selection	PuTTY	
Connection	Une desiders estimat	
- Data	Line discipline options	
- Praxy	Local echo:	
- Teinet	Local line editing:	
- Riogin	Auto O Force on O Force off	
Serial	Remote-controlled printing	
	Printer to send ANSI printer output to:	

Figure 11: PuTTY Configuration - 2

 Select "Session". Under "Connection Type", select "Serial" (refer to Figure 12: PuTTY Configuration - 3)

Session	Basic options for your PuTTY session			
- Logging Terminal - Keyboard - Bell - Peatures - Mindow - Appearance - Behaviour - Translation - Colours - Colours - Colours - Data - Proxy - Tennet - Rogin - SelH - Serial	Specify the destination you want I Serial line COM4 Connection type: Raw Teinet Ritogin Load, save or delete a stored ses Saved Sessions COM4 Default Settings COM4	to connect to Speed 115200 1 SSH Serial sion Load Save Delete		
	Close window on exit: Always Never	Only on clean exit		

Figure 12: PuTTY Configuration - 3

 In the "Serial line" box, type "COMx" where x is the COM port # that Windows has assigned to Nucleo board and can be on the Device Manager window (see *Figure 12: PuTTY Configuration - 3*) also (see *Figure 13: Device Manager*)





Figure 13: Device Manager

- 8. In the "Speed" box, type "115200" to set the baud rate (see Figure 12: PuTTY Configuration - 3)
- 9. In the "Saved Sessions" box, type "COMx" where x is the COM port # that Windows has assigned to Nucleo board (refer to Figure 12: PuTTY Configuration - 3)
- 10. Click "Save" to save the COMx configuration file (refer to Figure 12: PuTTY Configuration 3)
- 11. Click "Open" to launch PuTTY (refer to Figure 12: PuTTY Configuration 3)
- 12. The STMicro Nucleo motherboard and the Avalanche P-SRAM evaluation board are now upand-running. The Terminal Monitor window will display the main menu for tests available on the Avalanche P-SRAM device as indicated in *Error! Reference source not found.*.



Putty COM14 - Putty  $\times$ \_\_\_\_ Avalanche Technology ST Nucleo H7 QSPI Test Program ver.1.2.3 Clock Frequency Setting: 108MHz Test Menu a. Read Device ID b. Read Status Register c. Write Status Register d. Read Configuration Registers 1/2/3/4 e. Write Configuration Registers 1/2/3/4 g. SDR-Read Test h. SDR-Write Test i. SDR-Write-Read-Compare Test j. SDR-Read-Compare Test k. Reset Status & Configuration Registers to Factory Default Values 1. Exit Menu Selection ?

Figure 14: Nucleo Main Menu Run Window



# Appendix A

#### AS3xx201-108xxEVAL - Schematic









# **Appendix B**

#### AS3xx201-108xxEVAL – BOM

Qty	Footprint	Designator	Comment/Value
6	BR-603	BR1, BR2, BR3, BR4, BR5, BR6	Need to bridge with solder
7	0603 Capacitor 071713	C1, C3, C7, C11, C13, C16, C18	10n
5	0603 Capacitor 071713	C2, C5, C9, C15, C17	10μ
2	0603 Capacitor 071713	C12, C14	4.7μ
4	0603	C19, C20, C21, C22	No Load
1	SOT23 012105	D1	BAS40
1	SOT25 030205	IC1	74LVC1G07DBVR
1	Socket WSON Plastronics 08QN12T16050-M 020518	IC2	Avalanche P-SRAM WSON-8 Socket – No Load
1	652 SOP-1.27 8P	IC3	Avalanche P-SRAM SOIC-8 Socket – No Load
1	WSON-8 6x5 MM With Pad 061714	IC4	Avalanche P-SRAM WSON-8 Device – No Load
1	SOIC-8 Wide 071205	IC5	Avalanche P-SRAM SOIC-8 Device
2	Test Point 40x20 010819	IOREF, VMRAM	Test Point – No Load
1	2x10 Header	JP1	2x10 ML
1	2x8 Header	JP4	2x8 ML
1	2x14 Header	JP5	2x14 ML
1	2x6 Header 082710	JP6	2x6 ML
2	1x8 Header Arduino Stackable	JP11A, JP11B	Header 8-Pin
1	1x2 Header With Shunt 051914	JP12	3.3V Vcc Enable
2	0603	L1, L2	BLM185G121TN1D
1	LED 0805	LED1	Green
1	LED 0805	LED2	Red
1	0603 Resistor 071013	R1	33
7	0603 Resistor 071013	R2, R3, R4, R5, R18, R19, R20	22К



Qty	Footprint	Designator	Comment/Value
2	0603 Resistor 071013	R6, R12	2K
2	0603 Resistor 071013	R9, R11	100
2	0603 Resistor 071013	R13, R16	0
1	0603 Resistor 071013	R14	105K, 1%
1	0603 Resistor 071013	R15	30.9K, 1%
1	0603 Resistor 071013	R17	28.7K, 1%
1	0603 Resistor 071013	R21	100К
1	Switch TE PB 1825910-6 112915	S1	SWRST
1	TSSOP 20-Pin Translator	U1	TXS0108E – No Load
1	SOT223-6 Regulator 010419	U3	MCP1825T-ADJE/DC