



Gen 3 Space Grade Parallel x32 P-SRAM™ Development Kit User Guide AS3XXXB32

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Table 1: Revision History

Revision No.	Date	History
1.0	12/29/21	Initial Release
1.1	12/22/2022 01/12/2023 05/23/2023	Removed 64Mb & 256Mb Cosmetic Changes to Schematics Removed Dev. Kit's Non-Socketed Ordering Option Added 142-Ball FBGA Socket Ordering Info

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1. Overview

The Avalanche Gen 3 Space Grade Parallel x32 P-SRAM™ development kit enables the users to evaluate Avalanche parallel x32 P-SRAM™ product using a Lattice LCMXO3L/LF-6900C FPGA evaluation kit connected to Avalanche daughter board via Avalanche proprietary FPGA based Asynchronous SRAM interface. The Avalanche Gen 3 Space Grade Parallel x32 P-SRAM™ development kit communicates with the computer, and is powered by the host computer’s USB interface using a micro-USB cables type B connector.

2. Development Kit Ordering

Table 2: Development Kit Socketed Ordering

Part #	Description
AS3XXXB32	Gen 3 Parallel Kit – 142-Ball FBGA socketed daughter board (for MRAM*) with Lattice FPGA board

Note: * MRAM devices orderable separately

3. Ordering Options

3.1 Development Kit

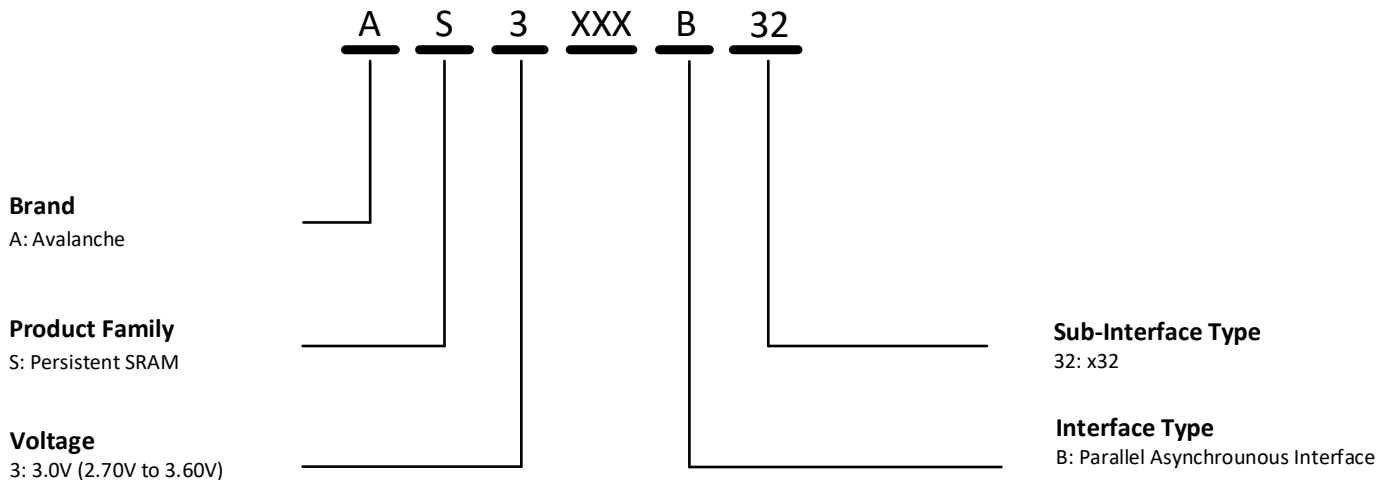


Figure 1: Development Kit Ordering Information

3.2 142-Ball FBGA Socket

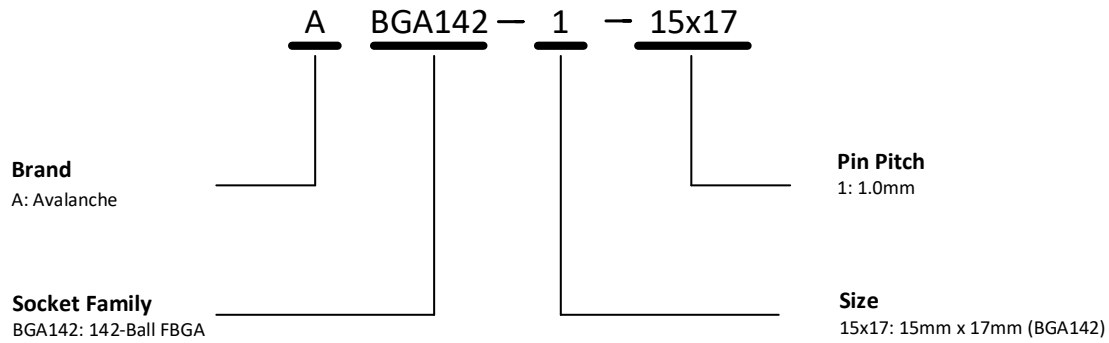


Figure 2: 142-Ball FBGA Socket Ordering Information

4. Development Kit Package Contents

1. A Lattice LCMXO3L-6900C/LCMO3LF-6900C FPGA board
2. An Avalanche daughterboard (3.5 x 3.5 inches) with a 142-Ball FBGA socket (MRAM device is orderable separately)
3. A micro-USB cable type B

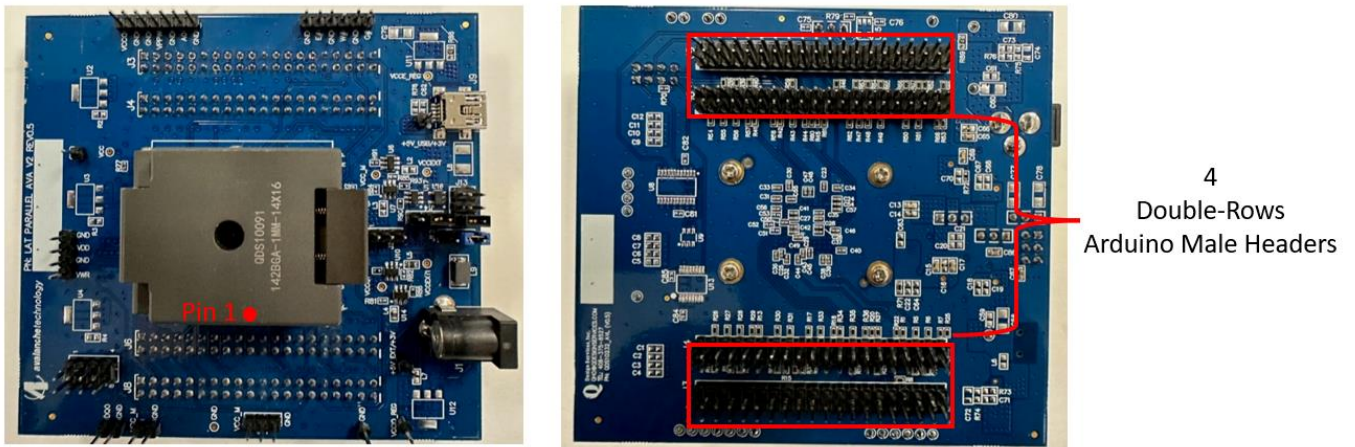


Figure 3: Avalanche Daughter Board (front and back) with 142-Ball FBGA socket

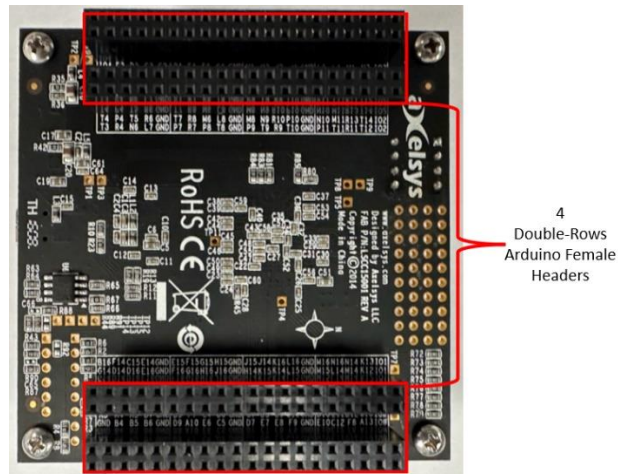


Figure 4: Lattice LCMXO3L/LF-6900C FPGA board (back side) with 4 Double-Rows Arduino Female Headers

5. Getting Started

The following steps are necessary to operate the development kit.

5.1. Requirements

- A PC system with one available USB 2.0/3.0 port
- Windows 10 with 32/64-bit Operation System
- FTDI USB Windows drivers
- Avalanche test software
- A Gen 3 Space Grade Parallel x32 P-SRAM™ Development Kit
- A USB Min-B cable

5.2. FTDI USB Drivers Installations

Communication between the Lattice LCMXO3 board and a PC via the USB connection cable requires installation of the FTDI USB hardware drivers. Loading these drivers enables the PC to recognize the Lattice board. Click [here](#) to download the drivers.

Note: first install the FTDI drivers and then connect the Lattice LCMXO3 board to the PC

5.3. Avalanche Test Software

Click [here](#) to download the software package in zip format. The zip file contains two files: “Parallelx32_test.exe” and “Config.txt”.

6. Running Avalanche Test Program

1. Turn on the Lattice board by connecting the Lattice LCMXO3 to the PC using the USB Mini-B cable. The PURPLE power LEDs on the Lattice board should stay on after connection.
2. Double-click on “Parallelx32_test.exe” to run the test

The Lattice LCMXO3 board is pre-loaded with proprietary Avalanche FPGA bitfile and an executable test program. The Avalanche test software consists of two files:

1. Config.txt
2. Dual_QSPI_Test.exe

The configuration file consists of six user-defined lines. Below is an example of a config.txt file:

- Def_port = 1
 - Use “1” as the default COM port.

- Run_test = y/n
 - y: automated test. The test starts automatically once the “Dual_QSPI_Test.exe” is invoked.
 - n: user selected option test. The user can start the test manually.
- Start_Address = 0
- Num_Words = 256
- Def_Pattern = 7
 - 7 = Incrementing Data Pattern

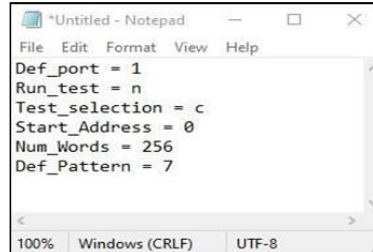


Figure 5: Config.txt

The development kit is now up-and-running. The Terminal Monitor window will display the main test menu as indicated below.

Functional Test Selection

- a: x32 Write Sequential
- b: x32 Read Sequential
- c: x32 Write Read Compare Sequential
- d: x32 Read Compare Sequential
- x: Exit

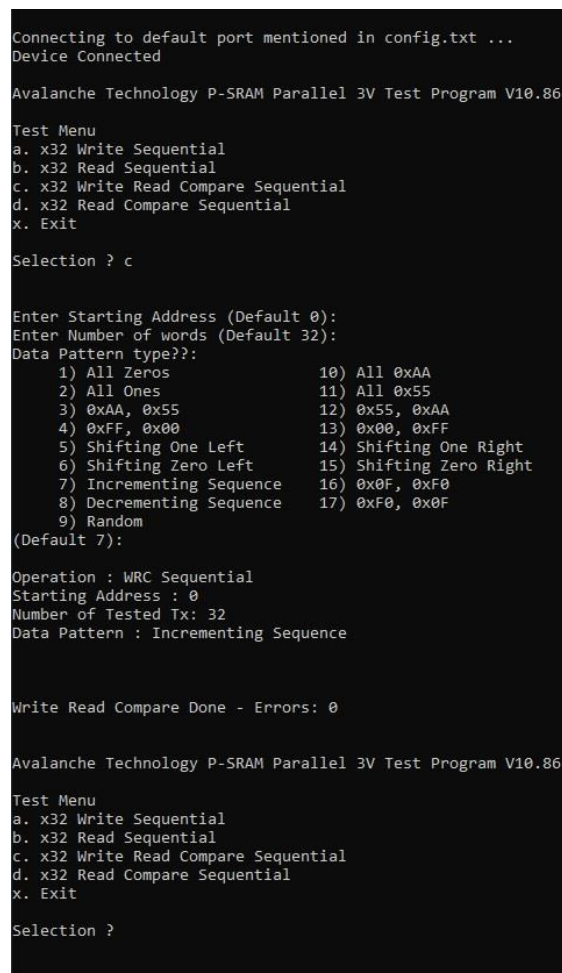
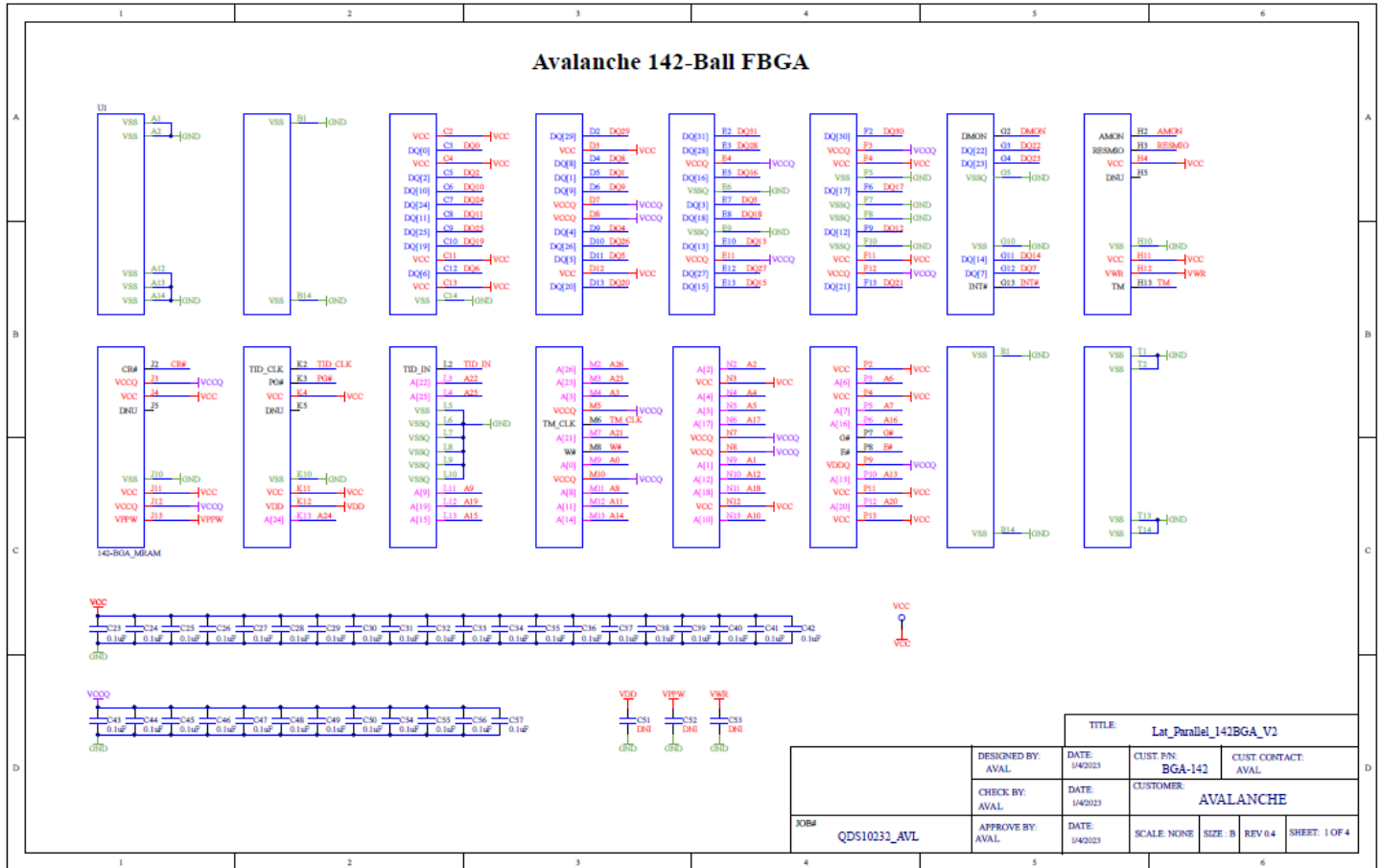
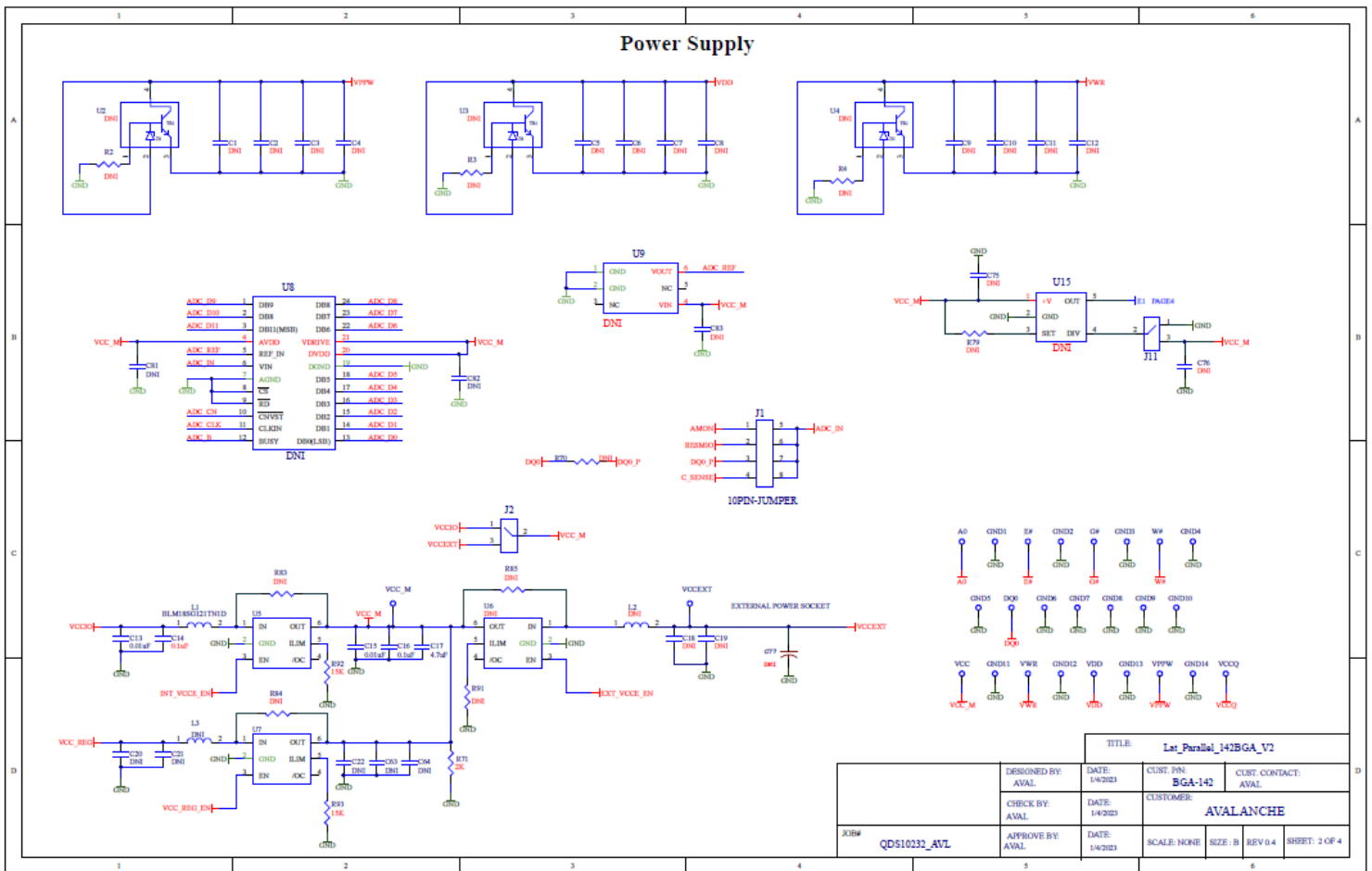


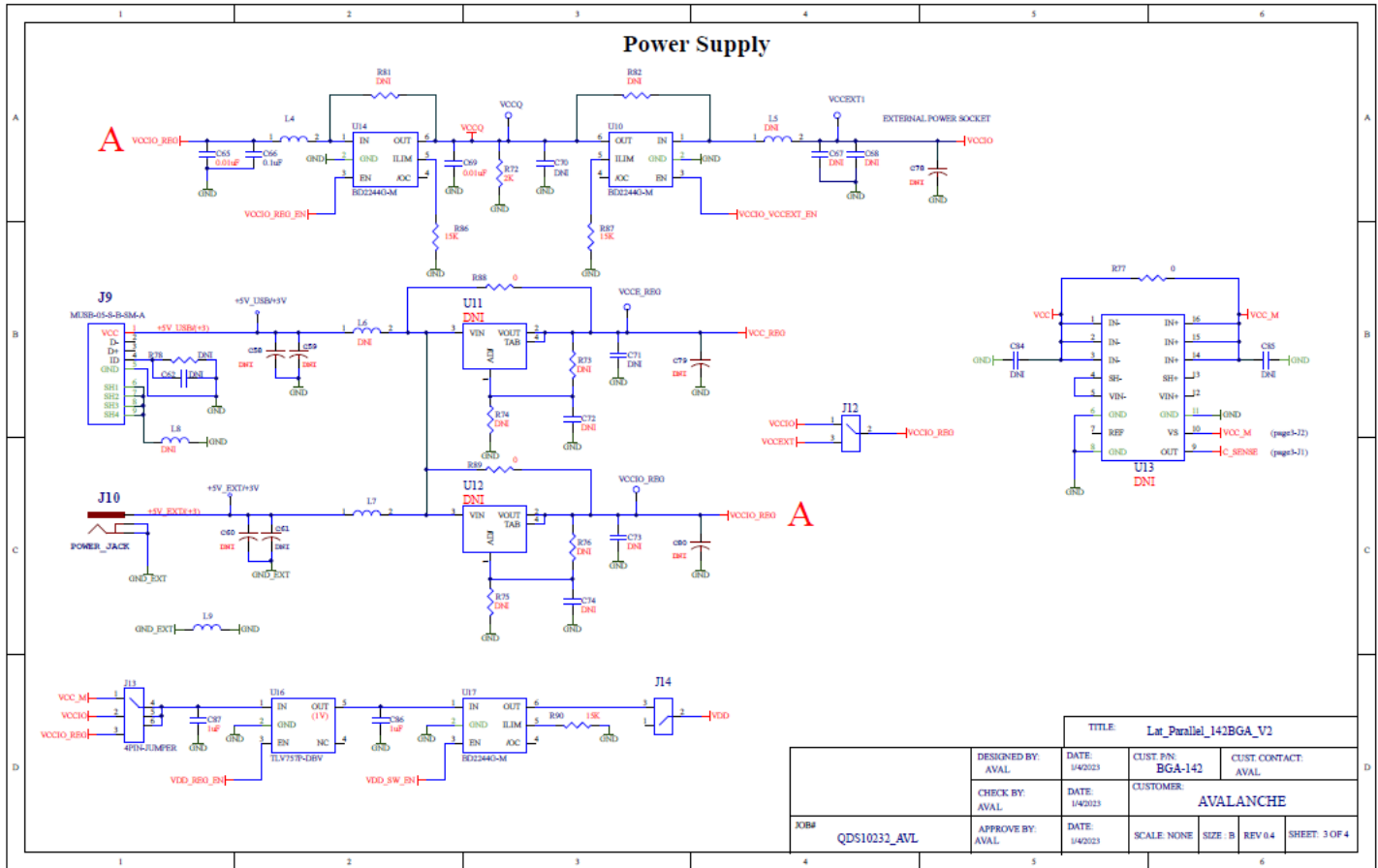
Figure 6: Test Menu

7. Schematics

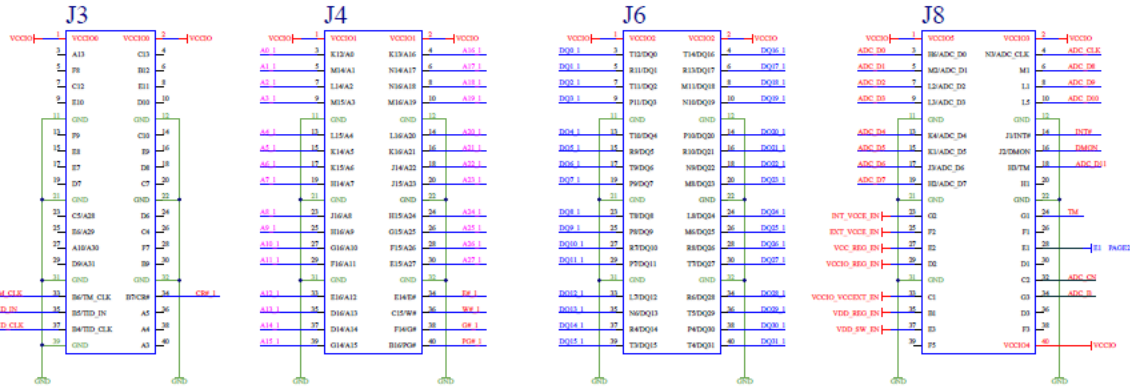
AS3XXXB32 - Schematic







142-Ball FBGA Connection to Lattice MACHO3 Development Kit



Source Termination 39 Ohms

FROM CONNECTOR	TO BGA	FROM CONNECTOR	TO BGA	FROM CONNECTOR	TO BGA	FROM CONNECTOR	TO BGA
A0 I	812	29 14	A0	D00 I	808	29 14	D00
A1 I	813	29 14	A1	D01 I	809	29 14	D01
A2 I	814	29 14	A2	D02 I	810	29 14	D02
A3 I	815	29 14	A3	D03 I	811	29 14	D03
A4 I	816	29 14	A4	D04 I	812	29 14	D04
A5 I	817	29 14	A5	D05 I	813	29 14	D05
A6 I	818	29 14	A6	D06 I	814	29 14	D06
A7 I	819	29 14	A7	D07 I	815	29 14	D07
A8 I	820	29 14	A8	D08 I	816	29 14	D08
A9 I	821	29 14	A9	D09 I	817	29 14	D09
A10 I	822	29 14	A10	D10 I	818	29 14	D10
A11 I	823	29 14	A11	D11 I	819	29 14	D11
A12 I	824	29 14	A12	D12 I	820	29 14	D12
A13 I	825	29 14	A13	D13 I	821	29 14	D13
A14 I	826	29 14	A14	D14 I	822	29 14	D14
A15 I	827	29 14	A15	D15 I	823	29 14	D15

TITLE: Lat_Parallel_142BGA_V2			
DESIGNED BY: AVAL	DATE: 14/2023	CUST. P/N: BGA-142	CUST. CONTACT: AVAL
CHECKED BY: AVAL	DATE: 14/2023	CUSTOMER: AVALANCHE	
APPROVED BY: AVAL	DATE: 14/2023	SCALE: NONE	SIZE: B REV: 0.4 SHEET: 4 OF 4

8. BOM

AS3XXXB32 – BOM

Qty	Value	Part
7	TP	+5V0, IOREF, RSTB, VCAP, VCC, VIN, VOUT
1		BR1
5	10nF	C2, C11, C13, C23, C25
2	4.7uF	C12, C14
4	NL	C19, C20, C21, C22
2	1uF	C24, C26
1	2X10_ML	CN7
1	2X8_ML	CN8
1	2X15ML	CN9
1	2X17ML	CN10
2	HDR2X35	CN11, CN12
1	CY14B101LA/NA_54PIN_TSOPX16	IC4
1	CY14B101LA/NA_54PIN_TSOPX16	IC5
2	3PIN_JUMPER	JP3, JP4
1	3.3V ENABLE	JP12
2	BLM18SG121TN1D	L1, L2
1	RED	LED2
43	39 1%	R1, R4, R7, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48, R51, R54, R57, R60, R63, R66, R69, R72, R75, R78, R81, R84, R87, R90, R93, R96, R99, R102, R105, R108, R111, R114, R117, R120, R123, R126, R129, R132, R135
80	DNI	R2, R3, R5, R6, R8, R9, R11, R19, R20, R22, R23, R25, R26, R28, R29, R31, R32, R34, R35, R37, R38, R40, R41, R43, R44, R46, R47, R49, R50, R52, R53, R55, R56, R58, R59, R61, R62, R64, R65, R67, R68, R70, R71, R73, R74, R76, R77, R79, R80, R82, R83, R85, R86, R88, R89, R91, R92, R94, R95, R97, R98, R100, R101, R103, R104, R106, R107, R109, R110, R112, R113, R115, R116, R118, R119, R122, R125, R128, R131, R134
6	120	R10, R121, R124, R127, R130, R133
1	2K	R12
2	0	R13, R16
1	105K, 1%	R14
1	30.9K, 1%	R15

Qty	Value	Part
1	28.7K, 1%	R17
1	MCP1825T-ADJE/DC	U3
43	39 1%	R1, R4, R7, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48, R51, R54, R57, R60, R63, R66, R69, R72, R75, R78, R81, R84, R87, R90, R93, R96, R99, R102, R105, R108, R111, R114, R117, R120, R123, R126, R129, R132, R135
80	DNI	R2, R3, R5, R6, R8, R9, R11, R19, R20, R22, R23, R25, R26, R28, R29, R31, R32, R34, R35, R37, R38, R40, R41, R43, R44, R46, R47, R49, R50, R52, R53, R55, R56, R58, R59, R61, R62, R64, R65, R67, R68, R70, R71, R73, R74, R76, R77, R79, R80, R82, R83, R85, R86, R88, R89, R91, R92, R94, R95, R97, R98, R100, R101, R103, R104, R106, R107, R109, R110, R112, R113, R115, R116, R118, R119, R122, R125, R128, R131, R134
6	120	R10, R121, R124, R127, R130, R133
1	2K	R12
2	0	R13, R16
1	105K, 1%	R14