



P-SRAM™ Parallel x32

Lattice FPGA Evaluation Kit

User Guide

AS3XXB32

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of Avalanche Technology Inc.

Avalanche Technology, Inc. does not assume any liability for infringement of any intellectual property rights (including but not limited to patents, copyrights, and circuit layout licenses) of Avalanche Technology, Inc. or third parties by or arising from the use of the products or information listed in this document. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of Avalanche Technology, Inc. or others.

Avalanche Technology, Inc. reserves the right to change products or specifications without notice. For updates or additional information about Avalanche Technology products, contact the Avalanche Technology office.

All brand names trademarks and registered trademarks belong to their respective owners.

©2022 Avalanche Technology, Inc.

Table 1: Revision History

Revision No.	Date	History
1.0	12/29/21	Initial Release

Contents

1. Overview.....	4
2. Test Kit Package Contents	6
3. Getting Started	7
3.1. Requirements	7
3.2. FTDI USB Drivers Installations	7
3.3. Avalanche Application Software	7
4. Connecting the Eval Kit to the PC.....	7
5. Running Avalanche Test Program	9
6. Avalanche Software Suite.....	9
7. Schematics.....	11
8. BOM.....	13

1. Overview

The Avalanche P-SRAM™ parallel x32 evaluation kit enables the users to evaluate Avalanche P-SRAM parallel x32 product using a Lattice LCMXO3LF-6900C FPGA connected to Avalanche daughterboard via Avalanche proprietary FPGA based Asynchronous SRAM interface. The P-SRAM parallel x32 Lattice FPGA Evaluation Kit communicates with the computer, and is powered by the host computer's USB interface using a micro-USB cables type B connector.

Avalanche P-SRAM Product Support

The Avalanche P-SRAM daughterboard can be populated with one of the following P-SRAM Parallel x32 devices:

Table 2: Avalanche P-SRAM Parallel Product Support

Part #	Density	Voltage	Organization	Package
AS3064MB32-045nX0IBC Y	64Mb	2.7 V to 3.6V	x32	142-Pin FBGA
AS3256B32-045nX0IBC Y	256Mb	2.7 V to 3.6V	x32	142-Pin FBGA
AS301GB32-045nX0IBC Y	1Gb	2.7 V to 3.6V	x32	142-Pin FBGA
AS304GB32-045nX0IBC Y	4Gb	2.7 V to 3.6V	x32	142-Pin FBGA

Ordering Options

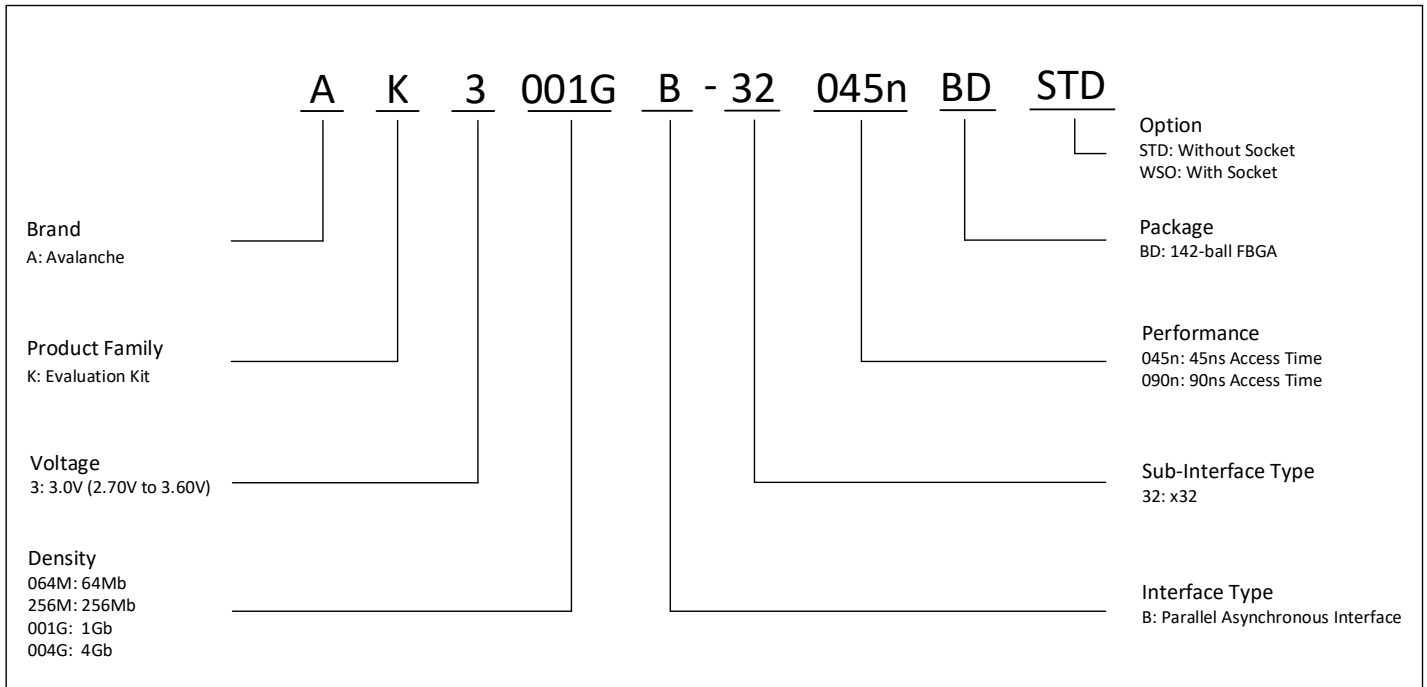


Figure 1: Eval Kit Ordering Information

2. Test Kit Package Contents

1. Lattice LCMXO3LF-6900C FPGA board
2. Avalanche daughterboard populated with an Avalanche P-SRAM parallel x32 memory device or a 142-FBGA socket
3. A micro-USB cable type B

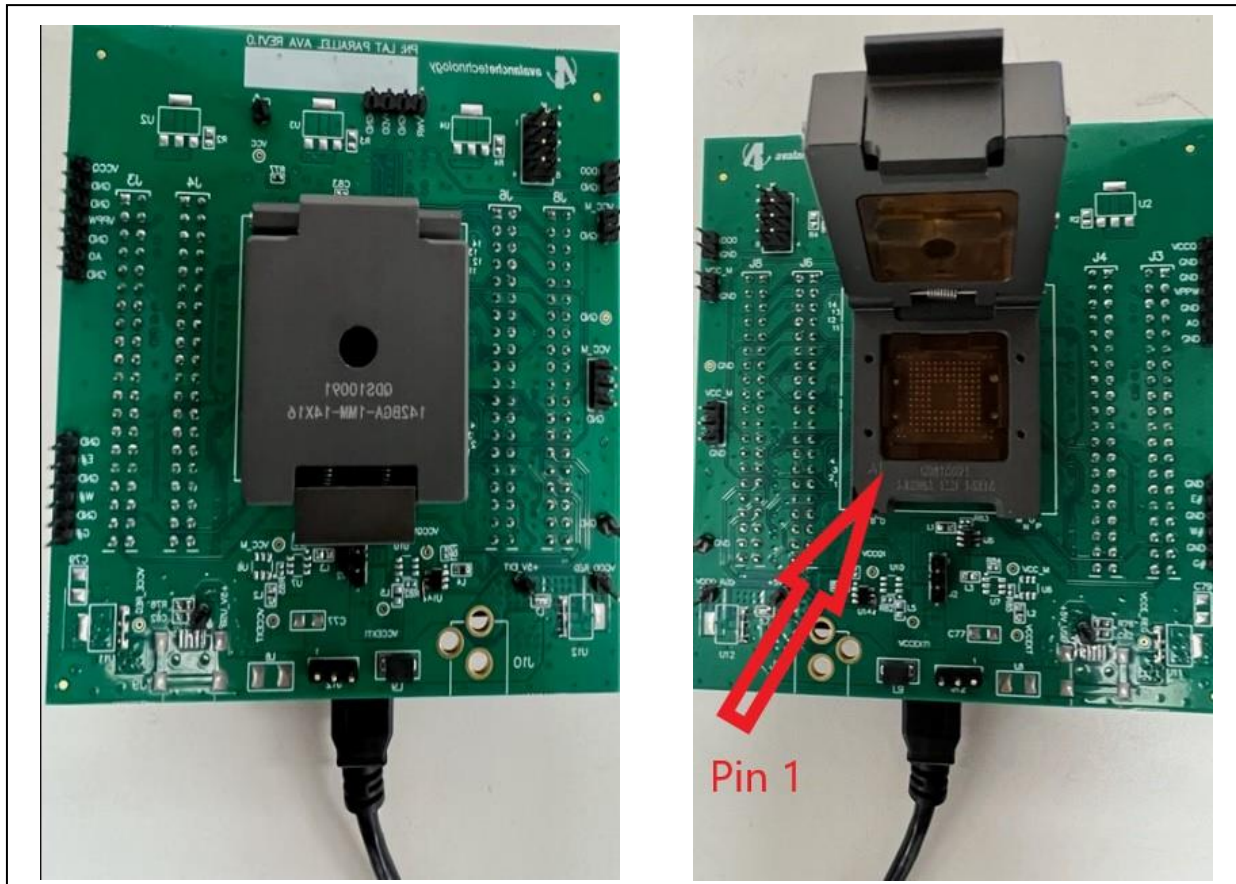


Figure 2: P-SRAM Parallel x32 Lattice FBGA Evaluation Kit

3. Getting Started

The following steps are necessary to operate the kit.

3.1. Requirements

- A PC system with one available USB 2.0/3.0 port
- Windows 10 with 32/64-bit Operation System
- P-SRAM Parallel x32 Lattice FPGA Evaluation Kit
- Single micro-USB cable Type B

3.2. FTDI USB Drivers Installations

The eval kit requires FTDI USB drivers to be installed. The USB drivers can be downloaded from this link:

<https://ftdichip.com/drivers/>

3.3. Avalanche Application Software

Download the software package in zip format “FBGA142_1GB.zip” that includes “MenuX32.exe” and “Config.txt” files from Avalanche Technology Ins website (<https://www.avalanche-technology.com>).

4. Connecting the Eval Kit to the PC

Perform the step-by-step instructions in the following order to configure and connect the eval kit to your computer:

1. Connect the eval kit to your computer’s USB port using a universal USB 2.0/3.0 cable. The PURPLE power LEDs on the Lattice motherboard and should go on after connection.
2. For first time installation, users should install the FTDI USB drivers on the computer by following these procedures.
 - In the “Type here to search” box of your windows 10 computer, type “Device Manager.”
 - Expand the “Universal Serial Bus controllers” tree
 - Select “Generic USB Hub”.
 - Right-click USB Root Hub and select Properties. Figure 3: Device Manager USB Hub Driver UpdateFigure 4: Device Manager USB Hub Driver Update.
 - Select “Update Driver Software...”.

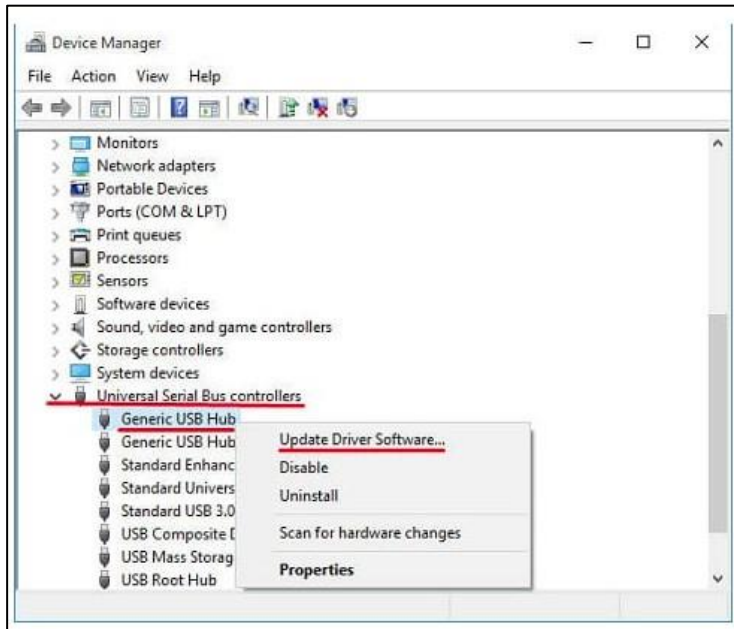


Figure 3: Device Manager USB Hub Driver Update

2.1. A screen comes up asking to search for drivers. Select “Search automatically for updated driver software.”

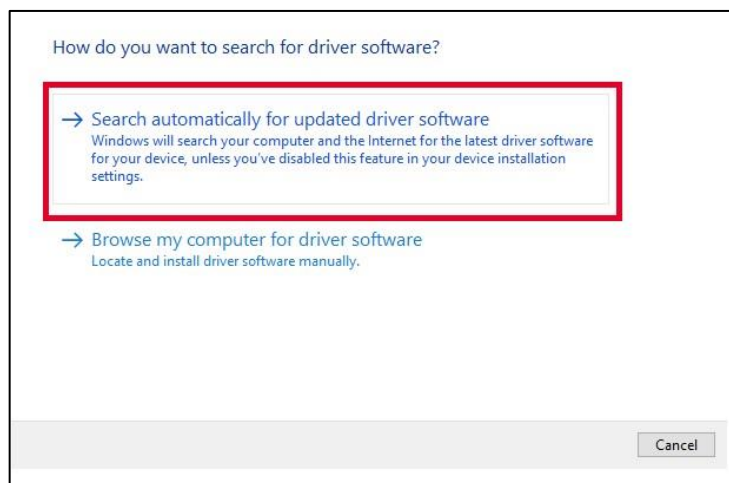


Figure 5: Automatic Update

- 2.2. After completing the steps mentioned above, wait for Windows to find, and install FTDI USB drivers.
3. If there are no COMxx ports assigned to the Lattice LCMXO3LF-6900C motherboard, then remove the USB cable and re-insert the connector from/into PC’s USB ports for Windows to re-enumerate USB ports. If that doesn’t solve the problem, you may need to re-install the USB drivers.

5. Running Avalanche Test Program

The Avalanche Technology software suite is needed to run the test program on the Lattice LCMXO3LF-6900C motherboard.

6. Avalanche Software Suite

The eval kit is pre-loaded with the required FBGA firmware and an executable test program. The “MenuX32.exe” opens a window for the user to select test options. The Avalanche test software consists of two files as follows:

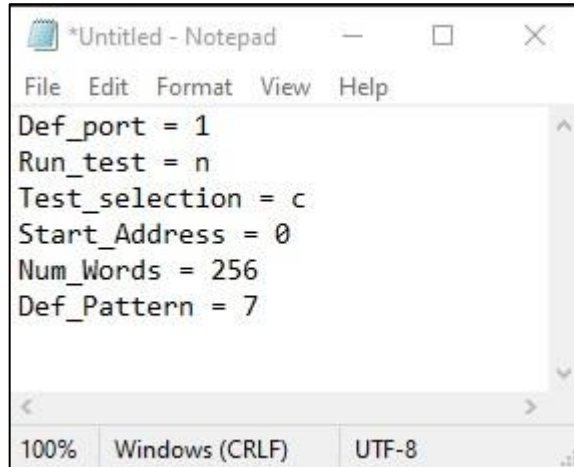
1. Config.txt
2. MenuX32.exe

The users can place this folder on their PC’s desktop or any other locations for easy access.

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 “Menu.py” is invoked.
 - n: user selected option test. The user can start the test manually.
- Test_selection = a/b/c/d/x
 - a: x32 Write only.
 - b: x32 Read only.
 - c: x32 Write-Read Compare.
 - d: x32 Read Compare.
 - x: Exit.
- Start_Address = 0x0
 - 0x0: starting address in either hexadecimal (hex), format (0x) or decimal. User can choose any location within the maximum memory space.
- Num_Words = from 0x20 to 0x20000000 (32-bit wide, up to 1Gb capacity)
 - For 1Gb: maximum number of words = 0x2000000
 - For 4Gb: maximum number of words = 0x8000000

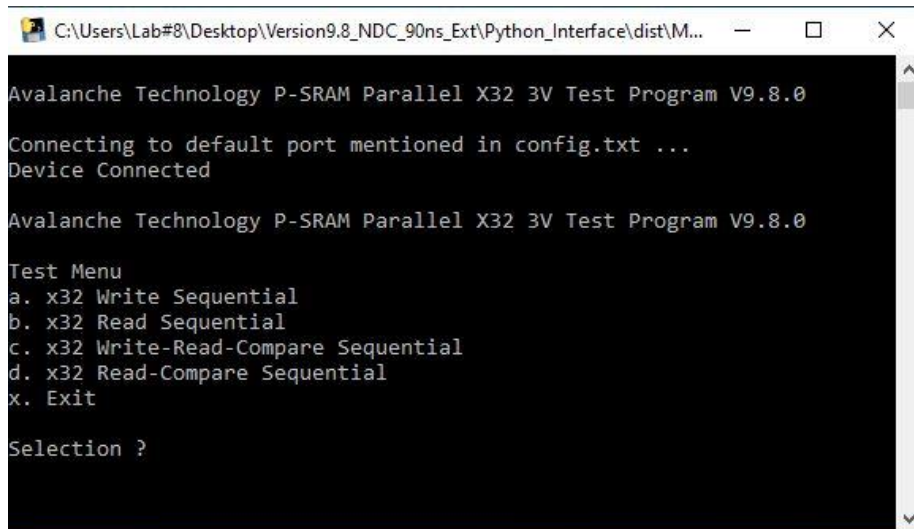
- Def_Pattern = 7
 - Test Data Pattern: 7 = Incrementing Data Pattern



```
*Untitled - Notepad
File Edit Format View Help
Def_port = 1
Run_test = n
Test_selection = c
Start_Address = 0
Num_Words = 256
Def_Pattern = 7
100% Windows (CRLF) UTF-8
```

Figure 6: Config.txt

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



```
C:\Users\Lab#8\Desktop\Version9.8_NDC_90ns_Ext\Python_Interface\dist\M...
Avalanche Technology P-SRAM Parallel X32 3V Test Program V9.8.0
Connecting to default port mentioned in config.txt ...
Device Connected

Avalanche Technology P-SRAM Parallel X32 3V Test Program V9.8.0

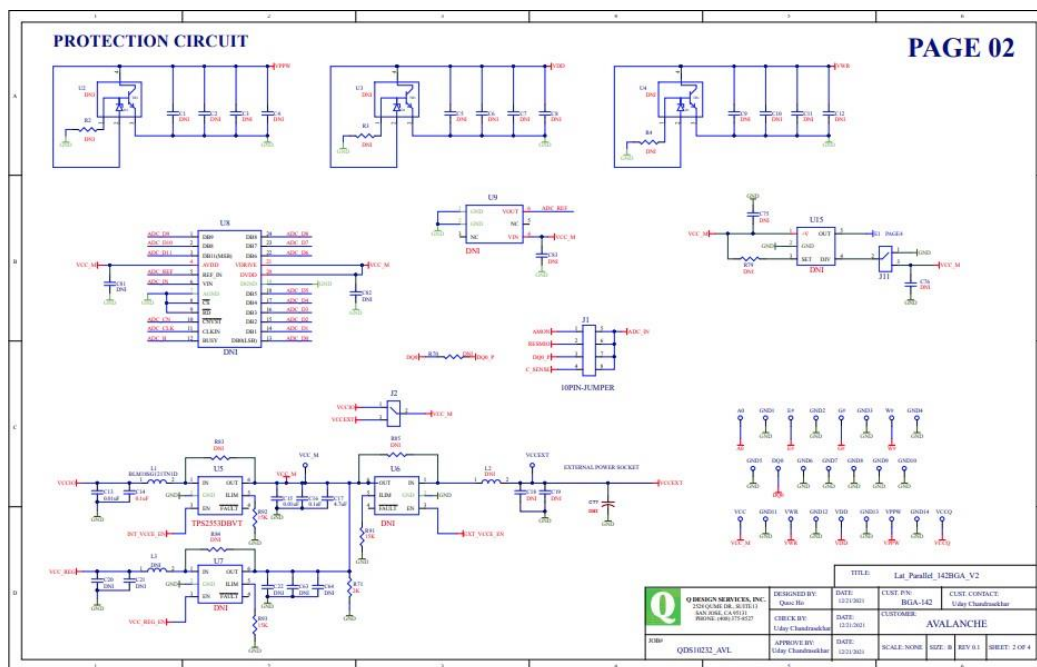
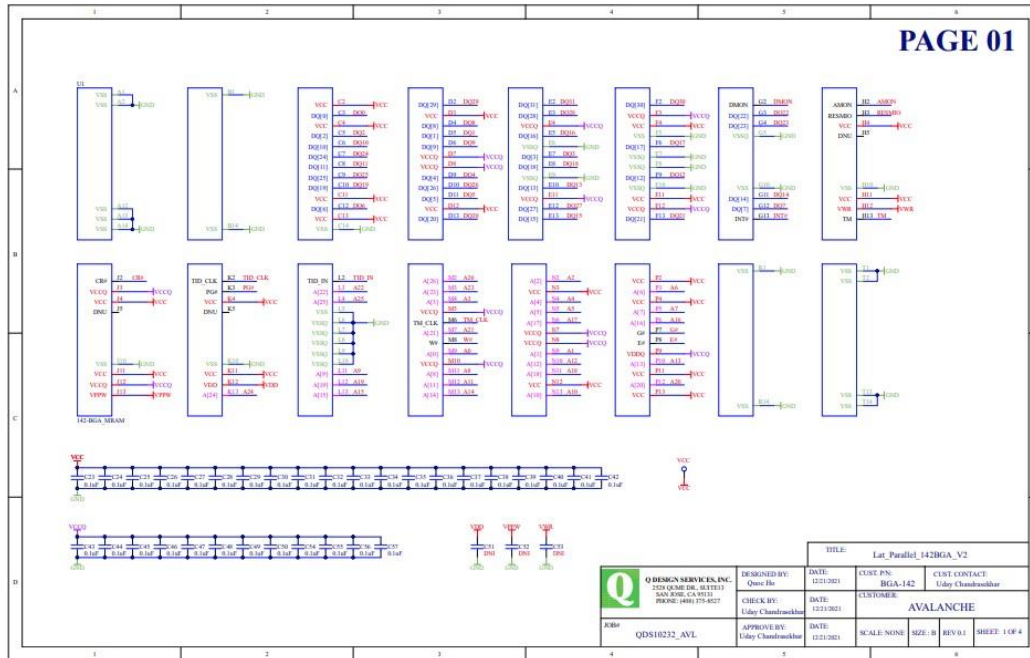
Test Menu
a. x32 Write Sequential
b. x32 Read Sequential
c. x32 Write-Read-Compare Sequential
d. x32 Read-Compare Sequential
x. Exit

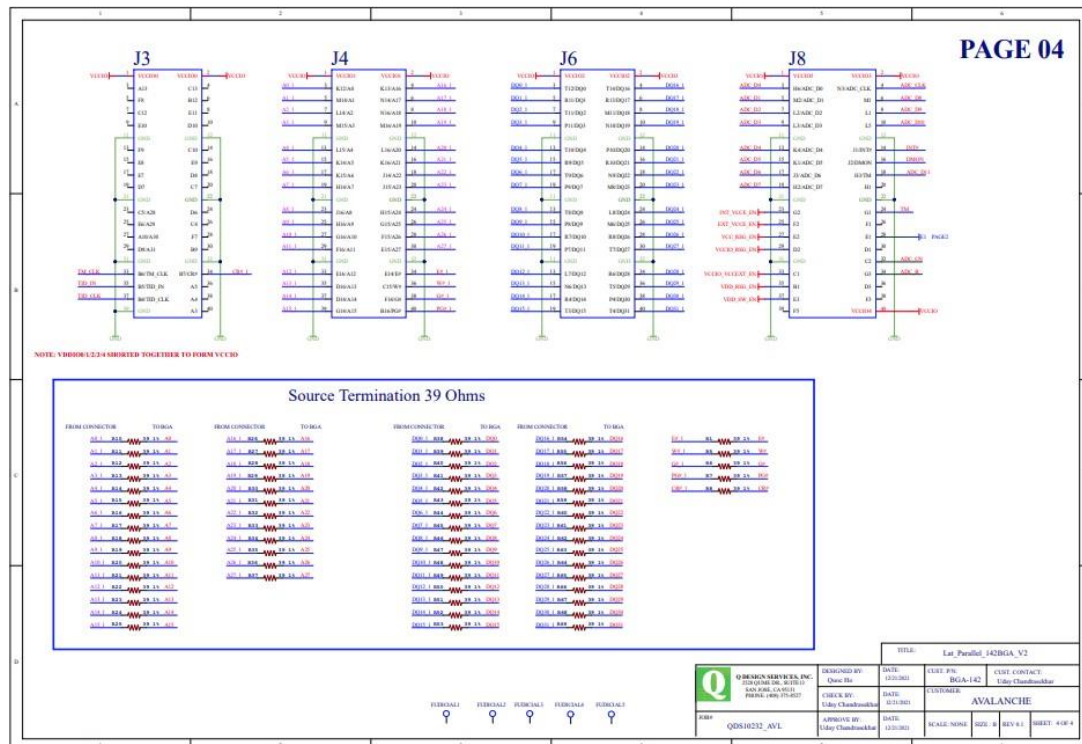
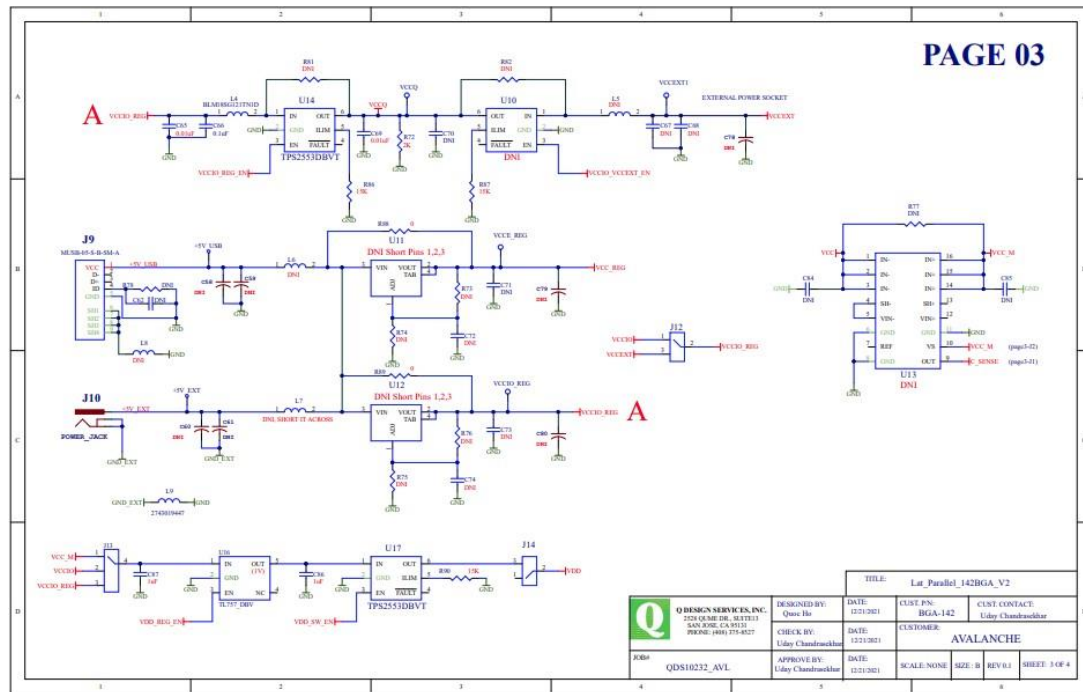
Selection ?
```

Figure 7: Test Menu

7. Schematics

AS3xxxB32EVAL - Schematic





8. BOM

AS3XXB32 EVAL – 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