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Doc# ATP-0922-0023, Rev 1.1.0

PulseRain M10 Board

Acceptance Test Procedure

Nov, 2017

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Observing ESD and Handling Precautions

To minimize the possibility of ESD-related damage, please wear ESD wrist strap at all time.

Prepare the Production Image and Tools

1. Goto https://github.com/PulseRain/Mustang/releases

   Get the latest release image. The flash image is under synth\output_files\flash_images\full_image.pof

2. Prepare an Altera USB-Blaster JTAG cable

3. Prepare a 9V DC Power Supply with 2 mm Jack

4. Prepare a microUSB cable

5. Prepare a microSD card, format it with FAT32 file system, and copy the files in
   https://github.com/PulseRain/M10Examples/tree/master/examples/BIST/audio
   to the microSD card's root directory

6. Prepare a wire (Both ends are male.)

7. Prepare a screw driver

8. Prepare a speaker with 3.5 mm jack

9. Prepare a Windows PC, install TeraTerm, and setup the TeraTerm with the .ini file from
   https://github.com/PulseRain/M10Examples/raw/master/extra/teraterm/TERATERM.INI

10. Prepare a smartphone or other devices that can generate DTMF tones. For iPhone, the App "Dialer" from "digitalsand.com" can be used.

11. Prepare product log

ATP Worksheet

Chip ID _____

MCU Revision _____

1. Visual Inspection

Observe the exterior of the M10 board,

Passing Criteria: No cosmetic defects P / F

2. Program FPGA Image

Connect USB Blaster to the JTAG port, Power on the board with 9V DC supply, open the Quartus Prime Programmer to program the FPGA image into the flash

Passing Criteria: FPGA image can be successfully programmed P / F

3. BIST

Power off the board, remove JTAG cable and DC power jack. Install the test microSD card. Set Jumper JP1 to 5V, and set JP6 to open. Connect IOREF and A0 with a wire. Connect the speaker jack to an external speaker. And then connect the board to a Windows PC through a microUSB cable. Open the TeraTerm.

a. Press the reset button, and watch the output on TermTerm

   Passing Criteria: The chip ID and MCU Revision show up on the terminal P / F

   Write down the chip ID and MCU revision to the production log or worksheet.

b. Observe the onboard general-purpose LED

   Passing Criteria: The blue LED is flashing, and the red and green LEDs are both on P / F

c. Press the push button, and use the screw driver to adjust the potentiometer

   Passing Criteria: The ADC value can have a dynamic range more than 4056 P / F

d. Press the push button again, and use the smart phone to generate 5 distinctive DTMF tones with highest volume and within 6-inch range

   Passing Criteria: The DTMF decoder has a successful rate no less than 80% P / F

   Passing Criteria: The audio file for the tones can be heard through the Speaker P / F