Explorer Board HAT

Test Procedure July 1, 2018

| Test Number	Test	GPIO18 Power to HAT	GPIO25 USB Power	GPIO16 Power to Battery	GPIO12 EEPROM PGM Enable	GPIO 13 +3.5V Enable	GPIO 26 +3.2V Enable	Display
Power On	USB Power Supply turned on	H Power Off	H Power On	H Batt Disconnected	H PGM Enabled	H +3.5V Off	H +3.2V Off	HAT not connected
Idle	Idle, Ready to Connect HAT	H Power Off	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Click Top Button to start testing
1	Button and Display Test 1	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	All Pixels on
2	Display Test 2	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Checker Board Pattern
3	Click Bottom Button	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Back to all Pixels on
4	Click Top Button	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Forward to Checker Board Pattern
5	Display Test 3	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Reversed Checker Board Pattern
6	Battery Charging Test, Charging LED Test	L Power On	H Power On	L Batt Connected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Test 6: Read amp meter and Battery voltage meter, Charging LED on
7	ADC Read Voltage Test	L Power On	H Power On	L Batt Connected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Test 7: Compare ADC voltage on Display to Battery voltage meter
8	Synchronous Boost Voltage Test	L Power On	L Power Off	L Batt Connected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Test 8: Read +5V voltage meter, +4.8 volts + or – 0.2 volts
9	Low Batt Voltage LED Test	L Power On	L Power Off	H, then this Batt Disconnected	L PGM Disabled	L, this first +3.5V On	H +3.2V Off	Test 9: Low Batt LED On
10	Synchronous Boost Low Voltage shut down	L Power On	L Power Off	H Batt Disconnected	L PGM Disabled	H, then this +3.5V Off	L, This first +3.2V On	Test 10: Low Batt LED Off
11	Bit Bang (Program) the RF Transceiver	L Power On	H, this first Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H, then this +3.2V Off	Test 11: RF Transceiver Programmed
12	RF Transceiver Test	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Test 12: Tested RF Transceiver

13	Program EEPROM	L Power On	H Power On	H Batt Disconnected	H PGM Enabled	H +3.5V Off	H +3.2V Off	Test 13: EEPROM Programmed
14	Verify EEPROM	L Power On	H Power On	H Batt Disconnected	L PGM Disabled	H +3.5V Off	H +3.2V Off	Test 14: EEPROM Verified
15	Go to Idle							

GPIO20 = Low when HAT Present

Buttons

Top Button   Start Tests and Go forward to next test
Bottom Button   Go back to previous test

Double Click Top Button
Double Click Bottom Button   Stop Testing go to Idle
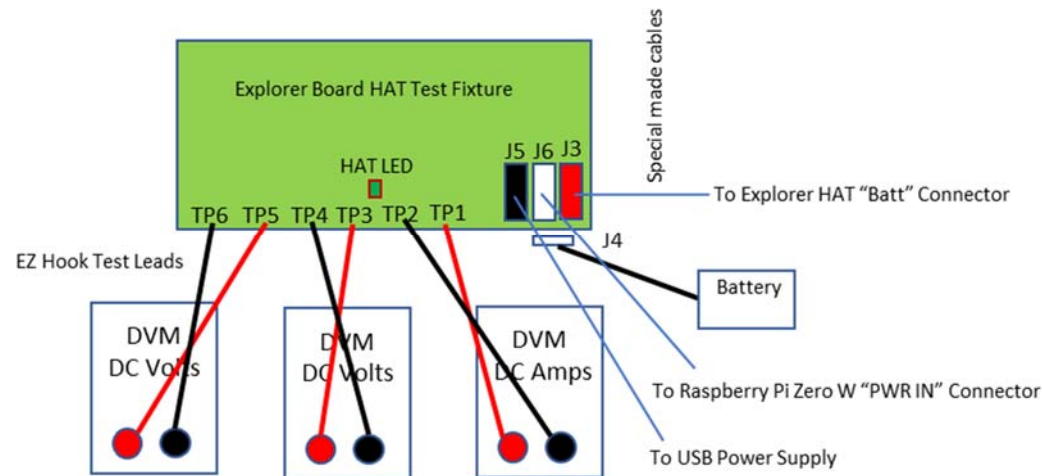
Test Set-up

1. Test Fixture and Raspberry Pi Zero W connected together
2. Connect the EZ Hook Leads between the Test Fixture TP1, TP2, TP3, TP4, TP5, TP6 and the three DVMs (see block diagram)
3. Connect battery to Test Fixture J4 (White Connector)
3. Connect the Cable between Test Fixture J3 (Red Connector) and Explorer Board HAT battery connector
4. Connect the USB cable between Test Fixture J6 (White Connector) and Raspberry Pi Zero W "PWR IN" connector
5. Connect USB Power Supply to Test Fixture J5 (Black Connector)
6. Wait for Raspberry Pi Zero W to power up (Green LED on Raspberry Pi Zero W stops blinking)
8. Wait for Green "HAT" LED to light, then Plug A Explorer HAT to test into Test Fixture
9. Click the Top Button to go to the first test

Test Equipment (Patrick Kelly and Jack Kelly will supply all items below expect for the three DVMs)

1. Rasberry Pi Zero W
2. Explorer Board HAT Test Fixture and standoffs
3. Three DVMs (for example: Fluke Model 115)
4. Lithium Ion Battery (Lithium Ion Polymer Battery - 3.7v 2500mAh, Adafruit ID 328)
5. USB 5V 2.4A Switching Power Supply with 20AWG MicroUSB Cable (Adafruit ID 1995,) modified with a 2 pin Molex connector
6. USB cable - A/MicroB - 1ft, modified with a 2 pin Molex connector
7. MicroSD Card with Test Program (Bryan Neilson will supply)
8. Battery Cable between Test Fixture and Explorer Board HAT, special made cable
9. Six EZ Hook Leads between Test Fixture and DVMs (EZ Hooks and Banana plugs)