ZAGG
Limitless Universal
Bluetooth Keyboard

	Revision History		
Revision	**Date**	**Notes**	**Released By**
01	12/24/2014	Initial Release	k.harward
02	03/25/2015	Updated Requirements	k.harward
03	04/01/2015	Updated Requirements	k.Harward
04	06/15/2015	Updated Requirements	O. Carlson

ZAGG

Table of Contents

ZAGG

3855 South 500 West Ste Q | Salt Lake City, Ut | 84115 | 801.506.7081

1   General Specifications

This specification is applied to the Bluetooth wireless keyboard for pairing with multiple devices.

General Product Information	
Product Type	Limitless Universal
Connection Type	Bluetooth Wireless
Keypad Features	Slim
Wireless Protocol	Bluetooth 3.0
Wireless Range	10M
Software Support (at release)	Apple iOS, Android, Windows
OS Support (at release)	iOS 6, 7, and 8
Indicator Lights (LED)	Under Caps Lock, above Power (for Pairing too)
Backlight	Yes
Battery Details	450mAh, 3.7V
Battery Life	730 days one hour per day use
Power Charge	Micro USB cable (TPE coated cable)
Power On Function	Power key on key frame will power on
Cradle & device(s) angle	Fixed position cradle with spacing and angle to fit two devices at 135 degrees from face of keyboard to device face.
Cradle length, width & depth	Cradle is to be a minimum of 275 mm in length, 13 mm wide, and 11 mm in depth.

Product Dimensions	

4

Product component	Width	Depth/ Length	Height	Weight
Keyboard	300 mm	202.5	13 mm (back) 8 mm (front, bezel)	533 grams
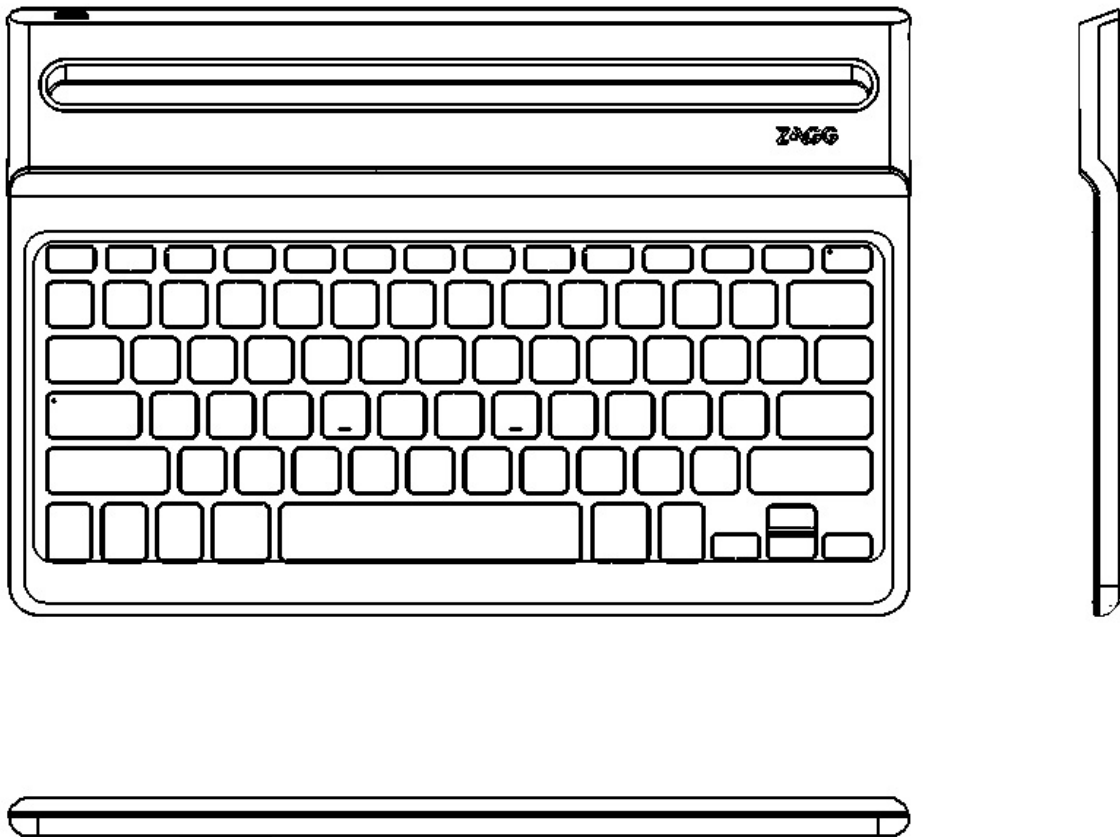
2 Mechanical Specification

2.1 Characteristics of Material

3855 South 500 West Ste Q | Salt Lake City, Ut | 84115 | 801.506.7081

Parts	Material	Color	Texture
Cover, Bottom, HF-3201GS	PC	White/Black	Bottom side: See CMF
Bezel, Keys, HF-3201GS	PC	White/Black	MT 11010 Texture
Top Cover,	PC	White/Black	MT 11010 Texture on the perimeter with a High gloss finish around the keys
Small Bottom Cover	PC	White/Black	High Gloss Finish
Rubber Foot	Rubber 50A	Black	
Cradle	PC	Black	Rubberized Paint

2.2 Packed - Including Packing

Product Dimensions		Tolerance: +/- 3 mm			
Package Spec.	Qty	Width	Length	Height	Weight
Gift box with handle	1	19 cm	30 cm	2.8 cm	693 grams
Carton (Inner)	5	30.5 cm	15 cm	21 cm	3.75 KGS
Carton (Outer)	10	32.5 cm	32 cm	23.8 cm	8.26 KGS

2.3 Detachability of Cable Pull Out

The cable entrance for corded devices can meet product specification. Function test will be performed before and after this test. Refer to the definition of related standard.

USB Implementers Forum. 2007-01-04. Micro USB connector mating force is less than 30N, un-mating force is 8+/-1N. Life test is 5000 cycles in this device.

2.4 Key Board Specification

2.4.1 Life Test

Standard key is 5 million cycles and Function key is 3 million cycles. (5 times/second, 65±8gf).

2.4.2 Max Keycap Depressing Force

To act on the center of the keycap with stand 5Kgf force for 1 minute.

2.4.3 Keyboard Height

3.20±0.20mm（normal key）

3.20±0.20mm（space bar）

2.4.4 Max Keycap Depressing Force

To act on the center of the keycap with stand 5Kgf force for 1 minute.

2.4.5 Keycap Strength

To act at "X" and "Y" axis with stand 1Kgf force for 5 sec.
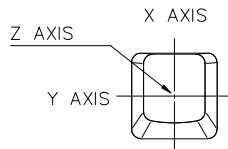
2.4.6 Keycap Spacing And Alignment

Clearance between keycaps (standard keycaps):ΔH (ΔV) -- ± 0.30 mm
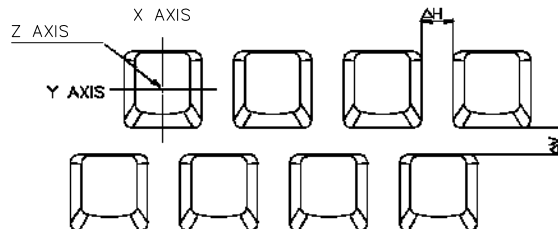
Alignment (keycap to keycap): Neighbor 0.4 mm max

In a row 0.8 mm max

Height alignment (keycap to keycap): Neighbor 0.4 mm max

In a row 0.8 mm max

Key slant (keycap to keycap): 0.6 mm max

Key X, Y Movement: Shall be ≦0.5mm for full amplitude on both X and y directions.

Key twisting: Normal key ±2.0 °

Fn Key   ±1.5 °
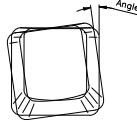
Space key   ±1.0 °

2.4.7   Key In Test Spec On The 4 Corners Of The Key Cap

Unit: mm (All Types)

A: Standard Key
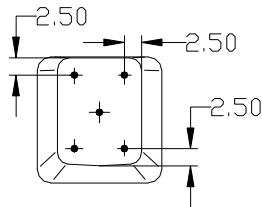
B: Space Bar
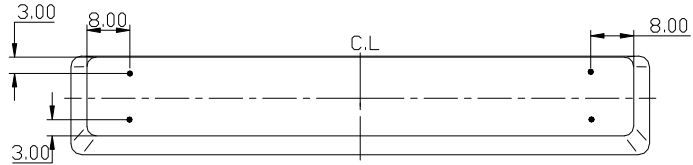
C. Enter Key
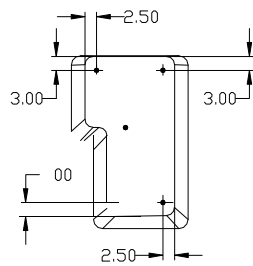
D: Long Types Key
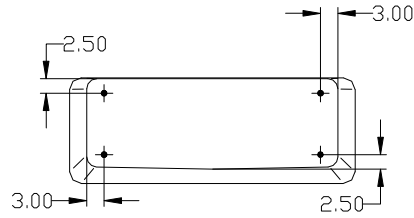
E: Small Key
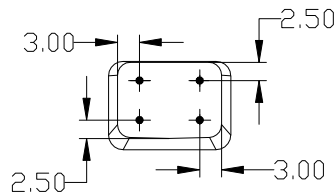
Key in Force (Center) $\geqslant$ 80g

2.5 Characteristics of Switches

2.5.1 Slide Switch
No slide switch

2.5.2 Tact Switch
No tact switch

2.5.3 Sleep Magnet Function
No Sleep Magnet.

2.6 Characteristics of Cradle

2.6.1 Cradle Dimensions
Cradle is 274 mm long, 12 mm wide, and 11 mm deep on the inside slot dimensions. The wall thickness will be approximately 1.8mm.

2.6.2 Cradle Material
The material for the cradle will be a hard plastic like PC or ABS. Then coated with a rubberized paint to give it a soft feel. We are evaluating a foam insert to accommodate different thicknesses of devices. The material will also have a

relatively high coefficient of friction to help hold the cradled devices.

3   Electrical Specification

3.1 Electrical Characteristics

1.1.1   Feature:

- Bluetooth V 3.0 specification.
- Bluetooth HID profile V 1.1 compliant.
- Frequency Range: 2.400G ~ 2.480GHz
- Peak Power consumption: 0.66 mA Max
- Built-in 3.7V, 450mAh Li-Polymer Battery, can be rechargeable.
- Sleep mode Power consumption: 0.033 mA Max
- Security Encryption: 128 bits
- Support AFH (Adaptive Frequency Hopping).
- Support Language: US, Europe, Asia
- Compatibility with iOS 6, 7, and 8
- FCC, CE, BQB, R&TTE, RoHS
- Active Range: around 10 meter
- Build-in Power on/off Key.
- RGB LED indicators for Battery Low alert , Recharge and Bluetooth Connectivity

1.2 Power Rating

	Items	Specifications
1	Operation Voltage:	Voltage supplied to device: 3.0VDC ~ 4.2VDC
2	Active Power consumption	0.75mA Avg
3	Standby Mode current	0.35mA Max
4	Sleep mode current	0.033mA Max
5	Bluetooth disconnect	Bluetooth keyboard will disconnect communication after 10 minutes. The keyboard will always stay paired so when coming out of hibernation it will automatically allow keyboard to work with device with limited time delay.

1.3 LED Indicator behavior

Press Fn + Left Control Key will indicate battery status by LEDs.

- Battery status description:

Battery Voltage	Percentage	LED Colour	Remark
3.8V ~ 4.2V	50% ~ 100%	Green	Flash 3 times. Each time flash 1 sec, stop 1 sec.
3.5V ~ 3.7V	25% ~ 49%	Yellow	Flash 3 times. Each time flash 1 sec, stop 1 sec.
3.25V ~ 3.4V	15% ~ 24%	Red	Flash 3 times. Each time flash 1 sec, stop 1 sec.
3.0V ~ 3.2V	0% ~ 14%	Red	Flash 3 time and flash 1 sec. every 2 Min.

- Power On, Charging, & Pairing:

Function	LED Colour	Remark
Power On	Green LED above power key	The GREEN LED will turn ON instantly when power key is pressed. The LED will turn ON for 2 seconds then turn OFF and the keyboard will automatically reconnect with the tablet. If pressed again GREEN LED will turn on 2 seconds then off indicating it is still ON.
Power Off	Red LED above power key	The RED LED will blink twice then turn OFF indicating the keyboard is OFF when the power key is pressed and held down for 3

		seconds. When power is turned OFF the keyboard with disconnect BT from the tablet.
Charging	Red LED above power key	RED LED stay ON until cell is full. When cell is full the LED will turn OFF
Low power	Red LED under power key	When battery reaches a critical low level (14%~0%) the back lightning will be disabled and a RED LED will flash three times, one flash sequence every 2 minute. (Cycle ON 1 second OFF 2 minutes) At 20% Back Light LED's will turn off.
Bluetooth Pairing	Blue LED under power key	Push and hold Pairing key for 3 seconds for pairing. A BLUE LED under power key will Flash when pairing. Flash will stop flashing when paired. Pairing times out after 60 sec.
Bluetooth channels	3 Channels	The first 3 function keys to the right of the ESC key select the specific Bluetooth channel

- Back Light :

Function	LED Colour	Remark
Back Light (future option)	N/A	Space/shim provided in current keyboard to allow Back Light panel in future version

- Caps Lock:

Function	LED Colour	Remark
Caps Lock ON	Blue LED under Caps Lock Key	LED Stay on until key is pressed again

- Tablet Bluetooth Display

Function	Name	Remark
Display in Bluetooth settings	ZAGG Limitless Keyboard	Zagg Limitless Keyboard Ch1, Ch2 or Ch3 will show in the display of Bluetooth devices l l havethe tablet detects

- OS Selection

Function	Name	Remark

Display in Bluetooth settings	ZAGG Limitless Keyboard	Zagg Limitless Keyboard Ch1, Ch2 or Ch3 will show in the display of Bluetooth devices the tablet detects

Android Devices: Fn + a
Apple Devices: Fn + i
Windows Devices: Fn + w

Note: Now the turning ON and OFF of the keyboard through the key frame is really only toggling between Hibernation Mode and Active Mode and disconnecting Bluetooth connection when in Hibernation Mode.
To perform a HARD RESET, a micro USB cable needs to be plugged into a 5V power source and then plugged into the keyboard. A GREEN LED under the power key will come on for 2 seconds then changes to RED indicating the PCBA has been reset.
For all flashing of LED's a flash cycle time of 0.5 second ON, 1 second OFF will be used.

3.2 RF Specifications
Simple data transmitter operation at 2.4GHz range

Modulation:	FHSS
Caps Lock ON:	Blue LED light
Voltage (Supply):	3.0V
Transmitter Output Power:	1.884 dBm
Receiver Sensitivity:	- 86.14 dBm
Range:	>= 10m (in no interference environment)
Auto paring:	Device starts auto pairing mode after power on, and leaves after 60 seconds.

RF IC Model for keyboard: Broadcom BT3GMD-B47P is a Bluetooth Human Interface Device (HID) module based on the Broadcom BCM20730 Bluetooth 3.0 specification basic rate-compliant stand baseband processor with an integrated 2.4GHz transceiver.

3.3 Bluetooth Module Block Diagram
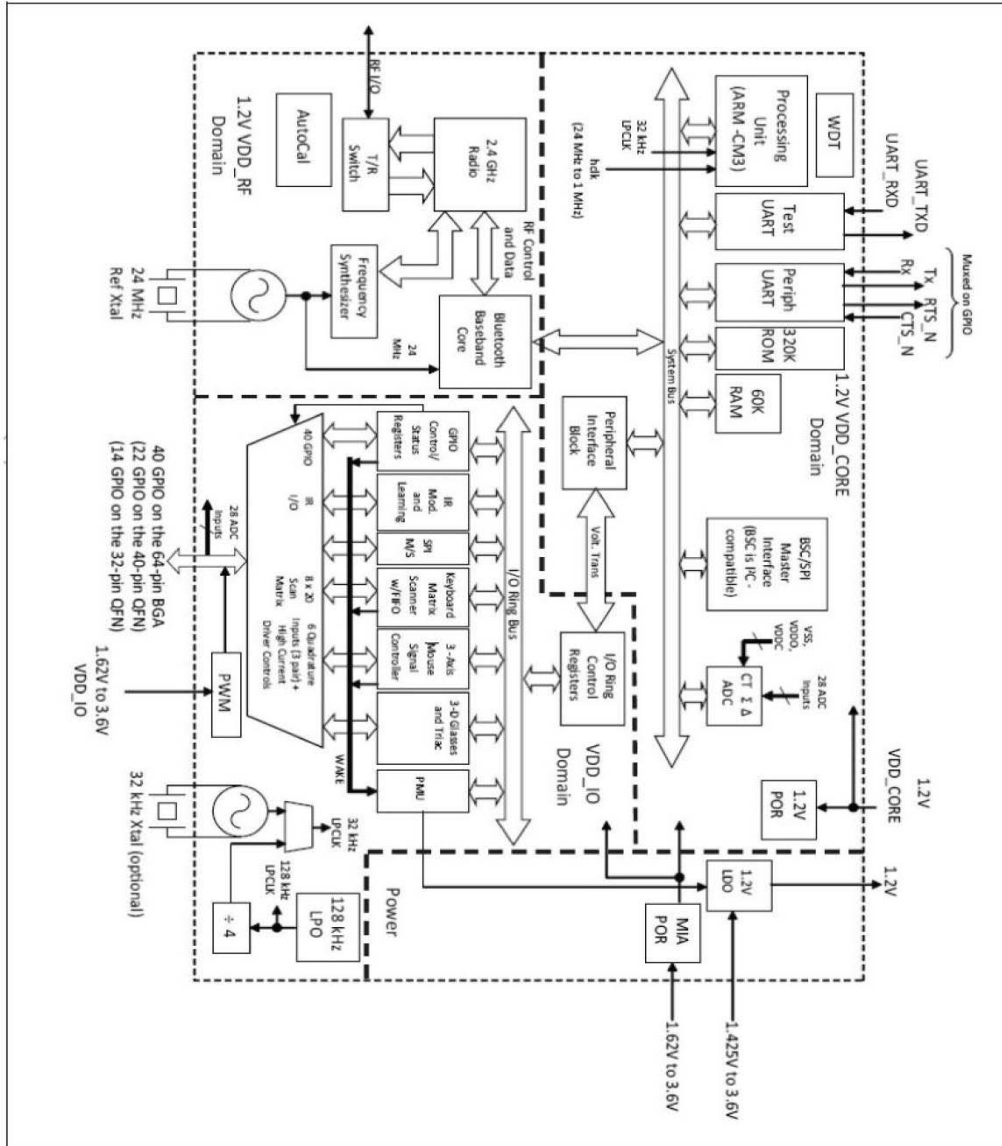
3.4 Sleep mode
Auto sleep if no typing for 10 minutes.

3.5 Keyboard layout

3855 South 500 West Ste Q | Salt Lake City, Ut | 84115 | 801.506.7081
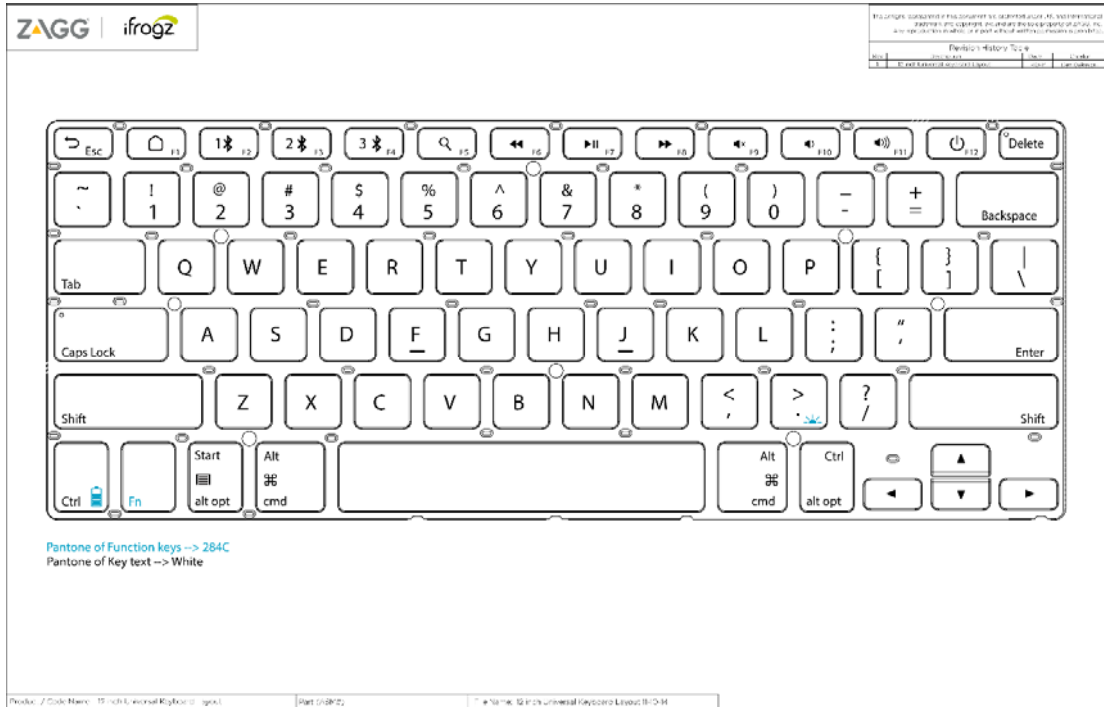
3.6 Fn Combination Key Function Descriptions

Function	icon	Usage ID	Remark	Test Result
Home				
Pairing Ch 1		**On board Hold three seconds**		
Pairing Ch 2		**On board Hold three seconds**		
Pairing Ch 3		**On board Hold three seconds**		
Search				
Return				
Apps Running				
Reverse				
Play/Pause				
Forward				
Mute				

15

Vol –				
Vol +				
Lock				
Power		**On board** **On push/Off hold three seconds**		
Forward Delete	**Fn+** delete	**Combination Right cursor arrow + Delete**		
CAPS LOCK	caps lock	**0x0039**	Turn ON BLUE LED	
Back Light SW	>	**Fn + Right Arrow = ON / OFF Back Light**		
BATT		**Fn+ Ctrl: to display Battery charge status.**		
Start	start alt opt			
Alt cmd	alt cmd ⌘			
Alt cmd	alt ⌘ cmd			
Ctrl alt opt	ctrl alt opt			

3.7   Bluetooth 3.0 12 inch Keyboard Key Matrix

12 inch Key Module

Keyboard Key Matrix for 9 inch and 12 inch 28 Pins 2015-05-05

Membrane Pin No.	Pin No.	11	12	13	14	15	16	17	18	19	20	21	22	23	1	2	24	25	26	27	28
Pin No.		C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14					
3	R0	Q #30	W #31	E #32	R #33	T #36	U #37	O #28	P #39		Up Arrow #78										
4	R1	Tab #29	Caps #43	F3 #4	T #34	Y #35	}] #41	F7 #8	{ [#40					Shift Left #56	Win/CMD Left #70						
5	R2	A #44	S #45	D #46	F #47	J #50	K #51	L #52	: ; #53	| \ #42				Shift Right #67		Win/CMD Right					
6	R3	Fn #1	< > K48	F4 #5	G #6	H #49	F6 #7		" ' #54	F11 #12	Left Arrow #15	ALT Left #71					VDD 3.3V	Caps Blue LED	Pairing Blue LED	Power ON Green LED	Power OFF & Charing RED LED
7	R4	Z #57	X #58	C #59	V #60	M #63	< , #64	> . #65	Back Space #28	Enter #55			Control Right #74								
8	R5			F5 #3	B #61	N #62		Space Bar #72	? / #66	F12 Pairing #13	Right Arrow #17	ALT Right #73									
9	R6	~ ` #15	F1 #2	F2 #3	% 5 #20	^ 6 #21	+ = #27	F8 #9	- _ #26		F9 #10	Down Arrow #16	Control Left #68								
10	R7	! 1 #19	@ 2 #17	# 3 #18	$ 4 #19	& 7 #22	* #21	(8 #23	) 9 #24	0 #25	F10 #11 Forward Delete Power #14					Fn #69					

Membrane Pin out assignment (Top view from left to right): Pin 1 to Pin 28

Note: Red number means Keyboard module Pin out number

3.8   Schematic Circuit
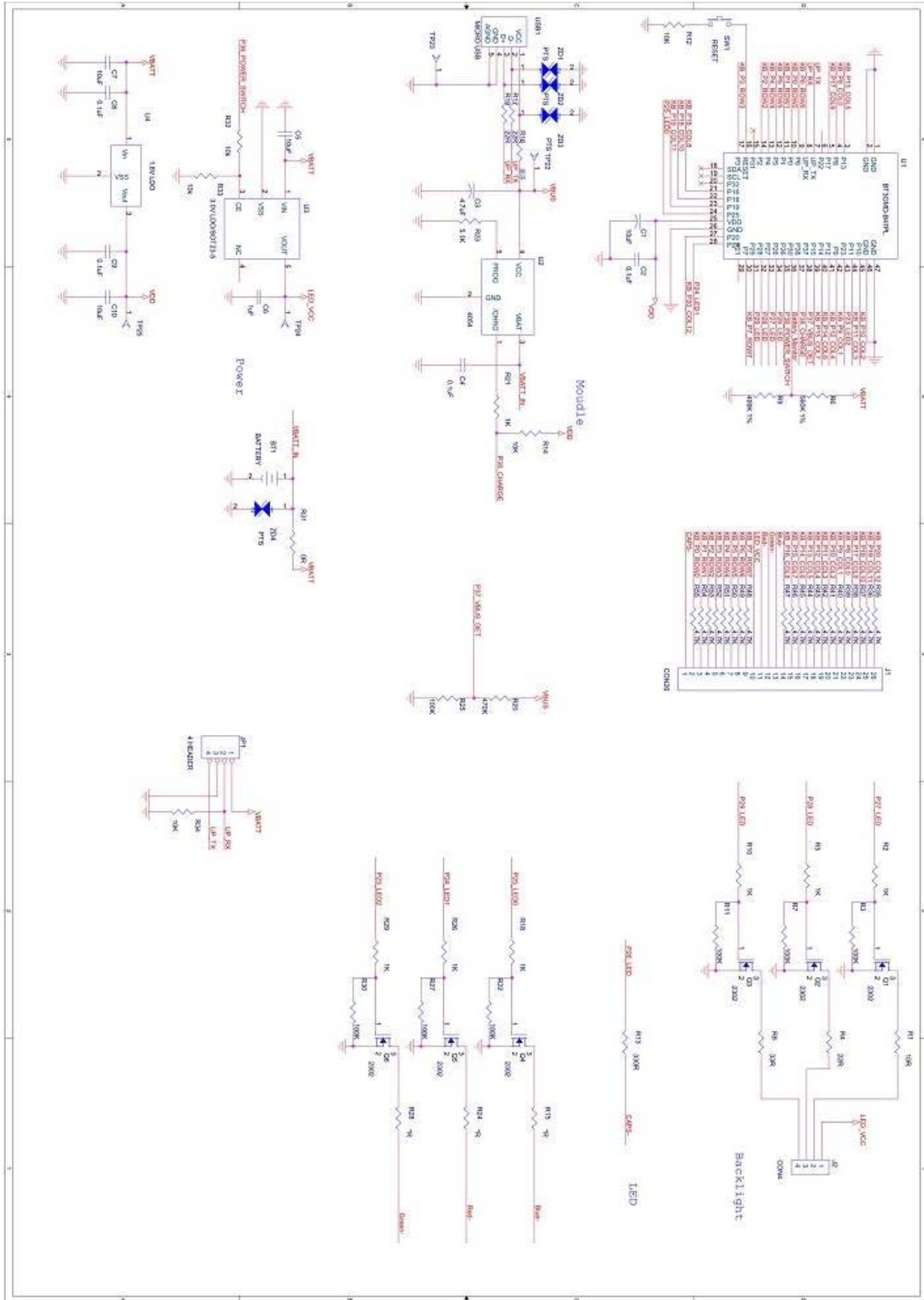
3.9 Pseudo N-Key Rollover Capability

'N' key roller is the numbers of keys that may be held depressed simultaneously and have the keyboard generate the appropriate code for each pressed and released key without keyboard interruption. The keyboard is capable of at least a pseudo 6-key rollover. All combinations of Ctrl, Alt and Shift keys are not ghost keys.

3.10   Free From Illegal Ghost key

Key matrix layout has been properly managed such that no ghost key occurs for any 3-key combination. The ghost key is defined as 3-key combination where a valid third key falls in the '#' pattern in the key matrix, formed by the proceeding valid 2-key combination. Normally in this case, the third key will be masked without sending any code because the third key and fourth key in this '#' pattern are confusing the microprocessor of three keyboard.

3.11   Compatibility

Operation System: iOS 8
Bluetooth 3.0 LE specification compliant.
Bluetooth HID profile V 1.1 compliant
VID/PID in firmware is 0a5c/8502

3.12   Battery Specification

3.14.1   Charging Specification

Charging current: 180mA

3.14.2 Battery Capacity

A fully charged battery is discharged using an analyzer to get its capacity. The charging and discharging is done 3 times. The average measured capacity should be at least 80% of original capacity.

3.14.3 Short time charging of Battery

The 30 minutes short time charging using the USB connected to a standard 110V outlet should provide a battery life of at least 20% of the rated capacity.

3.14.4 Charging Profile of Battery

The charging profile of the battery charged by a particular method using wired charger/laptop/wireless charger should be good. It includes the time taken to fully charge the battery, average charging rate, and the charge capacity after being charged for 10 hours. The charged percentage of the measured cycled capacity should be at least 80%.

3.14.5 Standby and Active time of Battery

Standby time should be a minimum of 1000 days. Active time should be a minimum of 730 days, 1 hour per day average.

3.14.6 Under Voltage and Over Voltage Protection in Battery

During high or low voltage condition applied to the battery accessory, the protection circuitry should be triggered. The voltage cutoff level should prevent damage to the accessory. This is to ensure the circuit will protect the user in the event that the battery is exposed to a high/low voltage from misuse or an incorrect charger being used.

3.15 Keyboard Module

Key matrix traces with switch contact fingers are laid out and routed on a 3 layers membrane sheet and scissor keycap as a key module. The contact resistance is less than 1000 ohm.

3.16 Key Functional Test

Refer to Key Layout and to use Bluetooth test program & fixture.

3.17 Bluetooth RF Power & Frequency Test

RF Power Range: -35dBm ~ -5 dBm
Frequency tolerance: +/- 75 KHz
Low Frequency: 2402 MHz
Middle Frequency: 2441 MHz
High Frequency: 2448 MHz

3.17.1 HID-Master / Slaves Roles

The Limitless Keyboard must be connected as slave to Bluetooth Master(s).

3.17.2 HID Discovery

The Limitless Keyboard must be available in discovery mode in order to connect to any host.

3.17.3 HID-Connectivity

The Limitless Keyboard must get connected automatically to Host after once it is discovered by the Host. Limitless keyboard has one to one pairing at each BT channel. Once connected, the Limitless Keyboard should not be discoverable by any other BT devices. With 3 channels of connectivity, the host will only be able to discover the keyboard when the specific channel previously paired to that host is selected.

3.17.4 Disconnection / Reconnection

The Limitless Keyboard should be able to disconnect from Host and should not initiate re-connection on its own but only make itself available for connection to the host by selecting the specific BT channel.

3.17.5 Bluetooth Keyboard – Out of Range / Idle

Out of Range/Link Loss –When Limitless Keyboard goes out of range the host should terminate the connection. Once the Limitless Keyboard is back in the range the host should be connected with keyboard automatically if the BT

channel selection key has not changed. Maximum timeout period TBD. In an Idle state Limitless Keyboard will remain in connection with Host.

3.18 EMI Test
- European Standard EN 55022: 2006 Class B.
- FCC/CFR 47 : Part 15 Class B
- Frequency Range of Test: from 30MHz to 1000 MHz

3.19 ESD TEST
- Basic standard: IEC 61000-4-2
- Generic standard: EN 55024:1998 + A1:2001 + A2:2003
- Performance Criteria: B
- Level: 2 for Contact discharge
- Tested Voltage: ± 8V for Air discharge, ± 4 KV for Contact discharge
- Temperature: 15-23 ºC
- Relative Humidity: 30-60 % RH
- Test Condition : Air ±8Kv, ±15Kv ESD
- Judgment Standard:
  ±8Kv No malfunction
  ±15Kv No deviation or destruction of component

3.20 EFT Test
- Basic standard: IEC 61000-4-4
- Generic standard: EN 50 082-1
- Performance Criteria: B
- Level: on Power Supply 3
- Test Voltage: on Power Supply ± 1 KV
- Temperature:15-35ºC
- Relative Humidity: 30-60 % RH

4   Environmental and Reliability Specifications

4.1 Acoustic Noise

Test Item	Specification	Test Equipment
Acoustic noise	Keyboard : Normal key Max: 50dBA, Space bar: Max:55dBA	

A = 38 +/- 13mm

B = 750 +/-13mm

C = 260 +/-13mm

D = 330 +/-13mm

Sound level meter: Point microphone toward the center-line of the spacebar on keyboard.

22

_ _
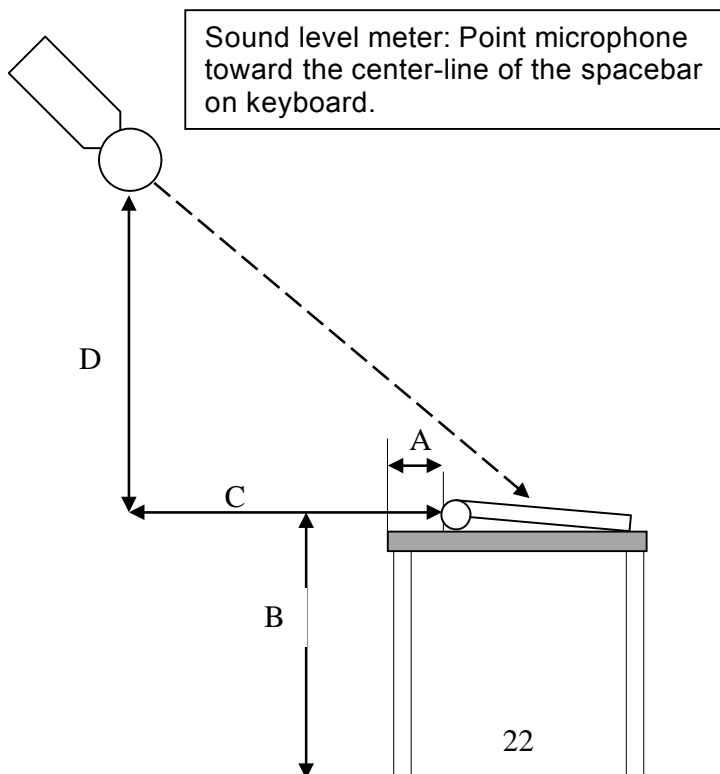
4.2 Temperature and Humidity Test

Test Item	Specification	Test Equipment
High Temp High Humidity Test	1. Test Condition: 50°C /95%, 120 hours 2. Judgment Standard: i) No malfunction ii) No decay inside of the product	Chamber
Storing in Low Temperature	1. Test Condition: -20°C, 96 hours 2. Judgment Standard: - No malfunction	Chamber

4.3 Heat Treatment Impact Test

Test Item	Specification	Test Equipment
Heat Treatment Impact Test	1. Test Condition: -40°C ~ 85°C, 2 hours /cycle, 30cycle 2. Judgment Standard: i) No malfunction ii) No decay or color change of PBA Soldering & component iii) No crack, dent, or change	Chamber

4.4 Vibration Test

Test Item	Specification	Test Equipment

| Vibration | 1. Sample size: 2 PCs
2. Condition: Sine sweep: 10HZ~ 500HZ~ 10HZ;
3. Sweep speed: 0.5 Octave/minute
4. Acceleration: 2G
5. Duration: 30 minutes per face.
6. Judgment Standard:
i) The mechanical appearance and inner structure should not be damaged after test.
ii) No functional failure should be found during and after the test. | Vibration machine |

4.5 Bare Unit Drop Test

Test Item	Specification	Test Equipment
Bare unit drop test	1. Test Condition : Drop at 100cm (39.37in) on wood surface, 5 times on each corner and 5 times on the top and bottom (Total 30 times with device) 2. Test Condition with tablet : Drop keyboard 50cm on wood surface, each corner 2 times and 2 times on the top and bottom (total 12 times) 3. Judgment Standard i) No malfunction (button, mechanical or electrical) ii) No deviation or destruction of component (No major cracks in plastic housing)	Drop machine

4.6 Packaged Box Drop Test

Test Item	Specification	Test Equipment
Packaged box drop test	10 drops from 1 meter to steel surface, No damage, function OK (Refer to ISTA_1A_2001 standards)	Drop test machine

4.7 Life Test

Test Item	Specification	Test Equipment
Keycap	Spec: Keyboard normal keys: 5 M cycles Function key: 3 M cycles	Life tester machine
On/Off Button	N/A	
Pairing Button	N/A	
Hinge Cycle Test	5000 cycles of hinge with tablet installed. No wear to tablet and torque of hinge cannot change.	

4.8 UV Test

Test Item	Specification	Test Equipment
UV Test	1. Test Standard: 15W UV , 20cm from Lamp 72 hours 2. Judgment Standard - No crack / dent / color change and ETC.	Drop test machine

4.9 Spillage Test

Test Item	Specification	Test Equipment
Spillage test	Unit shall be ON. The keyboard shall be functional after performing the liquid spill tests: Pour the liquid from a funneled system from a height of 3.0" above the keyboard over between the G, B, and H keys. The funnel should accurately dispense all the liquid at a rate of approximately 4 Oz (116 cc) per minute of elapsed time. The Keyboard shall remain idle for 60 seconds and then the keyboard shall be tilted to drain the liquid. Liquid for test: (1) 8.0 fluid oz. of hot coffee mixture (65C±5C) (Coffee mixture shall be prepared by adding 4.0 gm. of sugar and 2.0 gm. of non-dairy creamer to an 8.0 oz. cup of hot coffee.). (2) 1.0 fluid oz. of cold sugared Cola (15C ±5C) (3) 350cc of water (24±2°C):Don't shake keyboard after complete spilling water, Pour out water. Pass Criteria ● All keys on the keyboard are functional ● Liquid effectively drains from the specific keyboard liquid drain hole(s) Fail Criteria ● Liquid does not pass through keyboard and into the drain hole(s) and out the bottom of the keyboard ● Spontaneous characters appearing on the screen. ● Repeating keys (a repeating key is a key cap that is depressed and release once but continues to scroll the character more than once) Non-Functioning keys	Drop machine

4.10   Endurance Test

Test Item	Specification	Test Equipment
Endurance test/Static load test	● Cradle: There shall be no damage, when a load of 25N is applied in pressure direction for 15 seconds. ● Cradle: There shall be no damage, when a load of 25N is applied & released in pressure direction for 10,000 cycles. ● KB bezel and Bottom cover endurance: There shall be no damage, when a load of 25N is applied in pressure direction for 15 seconds. ● Rubber pad endurance: Rubber pad does not peel off when a load of 10N is applied on its surface.	Pull gauge.

4.11   Physical / Software compatibility check

Test Item	Specification	Test Equipment
Physical / Software compatibility check	Physical / Software Compatibility Test	

4.12   PLP – Product Liability Program

Test Item	Specification	Test Equipment
PLP	1. Electronic, Physical PL review, Manual/Package safe clause review	

4.13   Abrasion Test – Legend (1X key silk-screen printing)

Test Item	Specification	Test Equipment
Abrasion test-legend	1,250 cycles, 450g , CS-10F eraser, 50% legend line width missing or damaged	Fixture

4.14 Abrasion Test - Logo/ Icon

Test Item	Specification	Test Equipment
Abrasion test-Logo/Icon	200 cycles, 450g, CS-10F , 50% legend line width missing or damaged	Fixture

4.15 Abrasion Test – Painting (Outlook parts printing)

Test Item	Specification	Test Equipment
Abrasion test-painting	500 cycles, 1 kg, CS-10 abrasive wheel, substrate is first visible through the painted surface.	Abrasion machine

4.16 Chemical Resistance Test

Test Item	Specification	Test Equipment
Chemical resistance test	Supplier product spec. 12 chemicals per unit, room temperature exposure followed by 60°C/65% RH, 12 chemicals are Oil of Olay; Vaseline with 6.5% Alpha hydroxyl ; Jergen's Lotion; Eternity Body Lotion; Perfume; 99% Isopropyl Alcohol; 409 Spray Cleaner; Ammonia (Windex); Vegetable Oil, Artificial sweat; Coffee and Coke.	

4.17 Adhesion Test

Test Item	Specification	Test Equipment
Adhesion test	Per ASTM D-3359. must not exhibit paint flaking, peeling, or degradation	

4.18 Keycap Texture Endurance Test

Test Item	Specification	Test Equipment
Keycap texture endurance test	250,000 cycles, 200gm, CS-5 wear eraser, no visual change to surface finish	Abrasion test machine

4.19   Compression Test-Type 1A

Test Item	Specification	Test Equipment
Compression Test-Type 1A	Test 1Min load L = M x Jx(H-h)/ h x F	Compression test machine

4.20   Corrugated Box (Carton) Compression Test

Test Item	Specification	Test Equipment
Corrugated box (Carton) compression test	Minimum compression strength = ((BW x N) + EPW)) x SF BW = Individual Box Weight N = number of boxes in a column above the bottom box EPW = Empty Pallet Weight SF = Safety Factor = 5	Compression test machine

4.21   Compliance

	Items	Specifications
1	USB	Compliance of USB compliance program

4.22   Safety Standard

	Items	Specifications		
1	Regulation (Safety/EMC)	Safety / EMC	Country	Standard
		CE	U.S.A	EN301489, EN300328, IEC 60950-1
		FCC	U.S.A	FCC Part15 Subpart B / C, Class B
		RoHS	U.S.A	keyboard
		UL	U.S.A	Battery
		UN38.3	U.S.A	Battery
		CEC	California	CEC-400 Battery
		WERC	U.S.A	Battery
		Bluetooth SIG	U.S.A	Bluetooth Module

	MSDS	U.S.A	Battery
	Bluetooth Qualification Body	U.S.A	PCBA
	NAC or Mahindra	U.S.A	Complete keyboard

4.23 Environment Specification Items

	Items	Specifications			
1	Compliance to law regulation/ public standards	To be reflected in Product safety (environment) evaluation list To clarify the regulations to correspond to "Law/regulation control standard (product)" appendix "Regulation compliance list" and attach to product planning document or/and product specification document.			
2	Environmental label	To be reflected in environmental label check sheet			
		Destination	If compliance is required or not	Subject	Name
		WW	□	Main unit <Place to show logo>	International Energy Star program
		Europe	■	Main unit	RoHS
3	Compliance to customer's internal regulation etc. other than above	□Required ■Not required			

4.24 Appearance Specification

1. Appearance specification: Refer to SIP standard.

2. Corrosively: It is not seen the rust part to the appearance part. (Edge of sheet metal is included.)
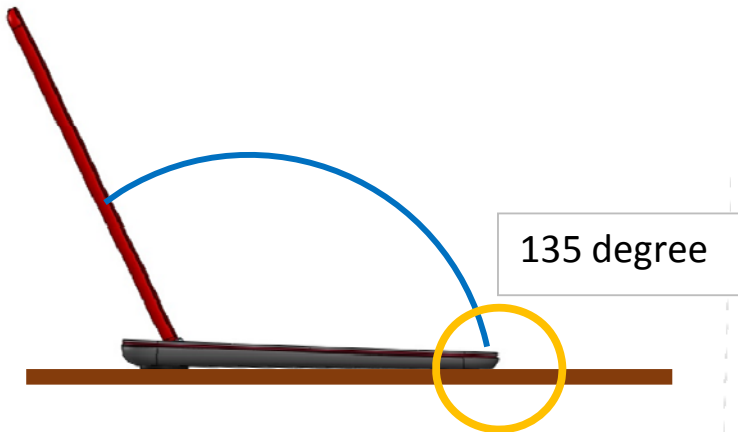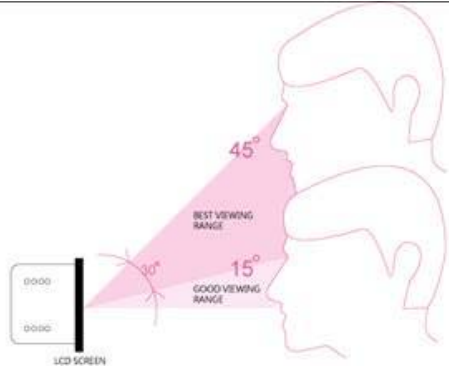
5 Patent

	Items	Requirement
1	General	There is no infringing of other company patent worldwide.

6 Veiw Angle

135 degree

7 Certifications

7.1 UL

UL - Underwriters Laboratories allows manufacturers of electrical and other safety equipment to use the UL mark only if they are under follow-up agreement by UL. This lets consumers identify products that meet quality criteria set by a company other than the manufacturer. The Accessory should be checked for the UL logo that follows electrical and safety standards for electrical devices and components. It should be on the Accessory.

7.2 CE Marking

The CE mark meaning "European Conformity" is a mandatory conformity mark for products placed on the market in the European Economic Area (EEA). The Accessory should be checked for the CE logo used in electronic devices, it should be on the Accessory or its packaging and on the manual provided with it.

7.3 FCC

The FCC Declaration of Conformity is a mandatory conformity mark for electronic equipment manufactured or sold in the United States. This marking certifies that the product meets standards of the Federal Communications Commission regarding electromagnetic interference.
The Accessory should be checked for the FCC logo, it should be on the Accessory or its packaging or on the manual provided with it.

7.4 BC

The Accessory should be checked for CEC certification which is the primary energy policy and planning agency. A circled "BC" mark is required for all products that have a rechargeable battery system under 20Wh. This logo should be on the Accessory or its packaging and the manual provided with it.

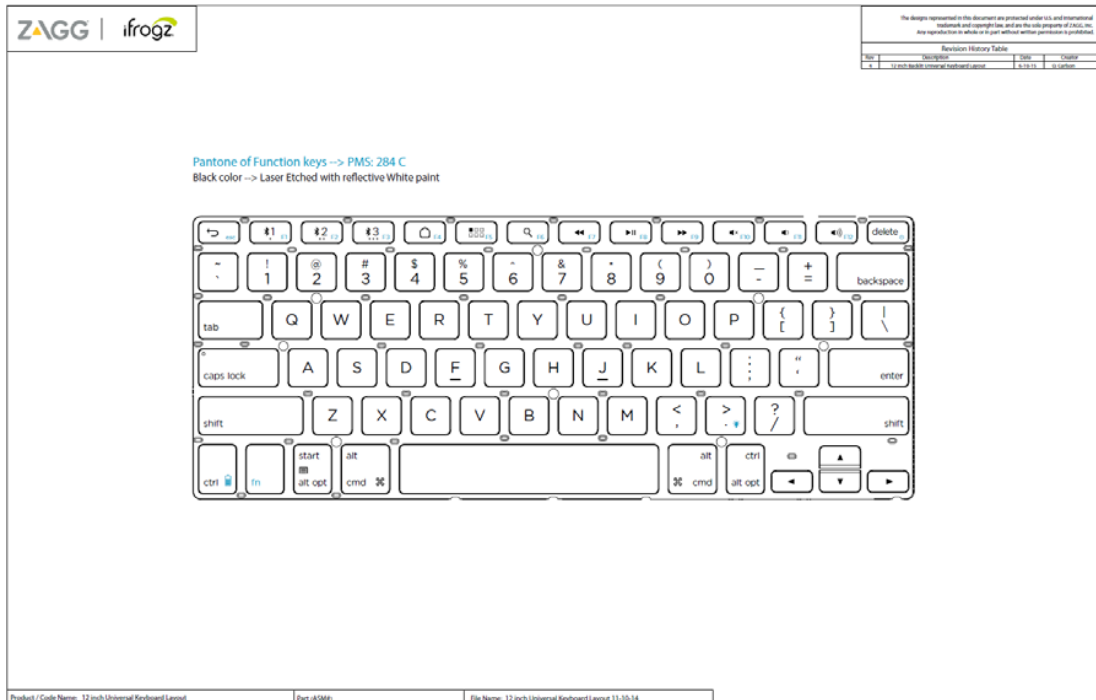## 8 Keyboard layouts for different languages

Non Back lite
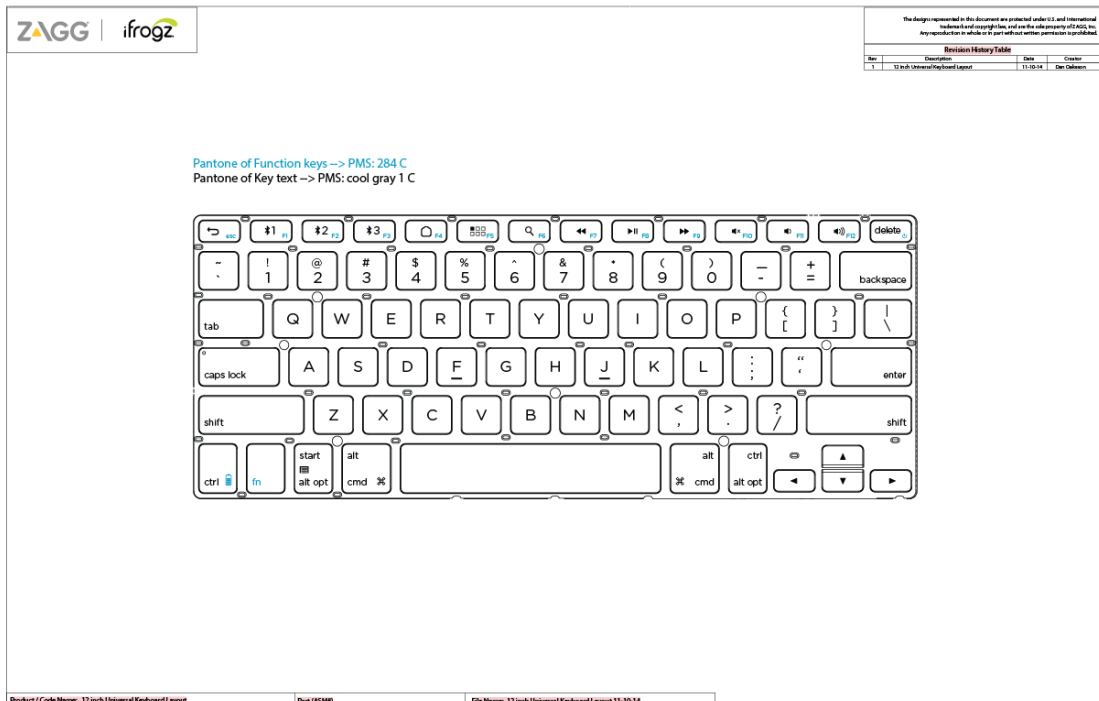
Back light

Windows – Fn Primary
Apple – option of Fn key primary
Samsung – option of Fn key primary

9 Acronyms / Definitions

California Energy Commission (CEC)	Bluetooth products typically include battery cells, battery charging circuitry and wall adapter. These must obtain CEC certification to be legally sold in California. California regulations extend by default to the entire United States Zagg doesn't procure specific product version for one State.
Apple certification	The Made for iPod, iPhone, and iPad (MFi) or Work with iPhone, or iPad logos are certification stamps indicating that an accessory has met all Apple required testing and licensing requirement. For a detailed description about the most current update of these programs vendors should refer to MFi Program under the Apple Developer program web page (https://developer.apple.com/programs/, https://developer.apple.com/programs/mfi/ and http://mfi.apple.com/faqs) or contact Apple directly.

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.