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2 INTRODUCTION

This document provides an overview of the OOKA GUI created to support the OOKA product development, servicing, and maintenance. It also guides the user through installing the OOKA GUI.

This revision of the OOKA GUI User Guide has been written for OOKA GUI version 6.0.0.

3 VERSION COMPATIBILITY

The table below details which versions of the GUI are compatible with which versions of the OOKA device firmware.

OOKA GUI Version	OOKA Device Firmware Version(s)
6.0.0	Phase 1 ("Ajman") Firmware v3.13
	Phase 2 ("Bandit") Firmware v1.0

4 INSTALLATION

1. Double click the OOKA GUI Setup v6.0.0.msi installer package.

ooka GUI Setup v6.0.0.msi

2. The Setup Wizard should appear.



3. Click Next, then select the location at which to install the OOKA GUI.

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OOKA GUI Setup		_		\times
Destination Folder Click Next to install to the default folder or cl	lick Change to cho	ose another.	¢	Ð
Install OOKA GUI to:				
C:\Users\Emma Rooney\AppData\Local\Ajma)nn			
	Back	Next	Cane	el

4. Click Next again, then click Install to begin installing the OOKA GUI

OOKA GUI Setup					3
Ready to install OOKA GUI				¢	5
Click Install to begin the installa settings. Click Cancel to exit the	tion. Click Back to revie wizard.	w or change any o	f your ir	nstallation	

5. If the GUI is installed successfully, the Setup Wizard will state that it has completed. Tick the *Launch OOKA GUI* box if it is not already selected. Click Finish to close the Setup Wizard.

🔁 OOKA GUI Setup	– 🗆 X
Ð	Completed the OOKA GUI Setup Wizard
	Click the Finish button to exit the Setup Wizard.
	Zaunch OOKA GUI.
	Back Finish Cancel

6. The Setup Wizard should close, and the OOKA GUI should open. Note that the selected Serial Port may differ to that shown below.

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COM6	6			×	Connec
Details	Safe Mode Reco	overy			
	Version:				
	Туре:				
	Hash: Branch:				
	Hardware:				
			Read		

5 CONNECTING TO AN OOKA DEVICE

- 1. Open the OOKA GUI application.
- 2. Click the drop-down menu below the 'Serial Port' text to select a connected OOKA device (note that the available COM Ports may differ to that shown below).

🕘 ооки	A GUI 6.0.0					×
Serial Port	:					
COM6					~	Connect
COM6						
Details	Safe Mode Re	ecovery				
	r					
	Version:					
	Type:					
	Hash:					
	Branch:					
	branch.					
	Hardware:					
			D = 1			
			Read			

- 3. Press the Connect button to connect to the OOKA device. When the device is connected, the Connect button will change to say 'Disconnect', and the fields on the Details tab of the GUI will be filled in.
- 4. The GUI will auto-detect whether the connected device is running a Phase 1 or Phase 2 application, or one of the two bootloader modes, and will use the appropriate serial speed and enable the appropriate functionality.

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	GUI 6.0.0						×
Serial Port:						~	Disconnect
Power	Time	Battery	Diagno	ostics	Reset	Seria	Monitor
Details	Update	e Test	Levels	Ac	celerometer	Ten	nperature
	Version:	0.1.0 Debug					
	Hash:	402d920)6				_
	Branch:	develop					
	Hardware:	OOKA 4	.0]
	Control:	2		NFC:	1		
	Button:	1		Ring:	1]
			Read				

6 OOKA GUI TABS AND USAGE

The table below shows which tabs are available for the different Build types of the OOKA device firmware.

	Debug	Release	Test	Secondary Bootloader	MCU Board Bring Up
Details	~	~	~	~	
Update	~	~	✓	~	
Test	~		~		
Levels	~		~		
Accelerometer	✓		✓		
Temperature	~				
Power	~				
Time	✓				
Battery	✓		✓		
Diagnostics	✓		✓		
Reset	✓		✓		
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	Debug	Release	Test	Secondary Bootloader	MCU Board Bring Up
Serial Monitor	√	~	✓		
Safe Mode Recovery	~	~		✓	
RF Test			✓		
EMC Test			~		

6.1 DETAILS

The Details tab provides information about the firmware that is currently running on the OOKA device, along with the device hardware version.

erial Port:							
LOM6					· · · · ·	~	Disconnec
Power	Time	Battery	Diagno	stics	Reset	Ser	ialMonitor
Details	Update	e Test	Levels	Accelerometer		Temperature	
	Version:	0.1.0					
	Type:	Debug					
	Hash:	402d920)6				
	Branch:	develop					
	Hardware:	OOKA 4	.0				
	Control:	2		NFC:	1		
	Button:	1		Ring:	1		
			Read				

- Version: The version of firmware running on the connected OOKA device.
- Type: The firmware build type running on the connected OOKA device.
- Hash: The Git commit hash of the firmware running on the connected OOKA device.
- Branch: The Git branch name of the firmware running on the connected OOKA device.
- Hardware: The hardware version of the assembled device (Phase 2 devices = "OOKA 4.0", Phase 1 production devices = "OOKA 3.0")
- Control, NFC, Button, Ring: The hardware revisions of these PCBs

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6.2 UPDATE

This tab is only available for Phase 2 ("Bandit") devices. This tab provides a means of updating the firmware that is running on a Phase 2 OOKA device.

COUKA G	JI 6.0.0						×
Serial Port:							
COM6						~	Disconnect
Power	Time	Battery	Diagno	stics	Reset	Ser	ialMonitor
Details	Update	Test	Levels	Acce	lerometer	Te	mperature
File: C:\	Jsers\Emma I	Rooney\Doc	uments				Browse
		[Drag and	drop firmw	are .bin	file]		

To update a unit a four-pin cable needs to be attached, and the DC charging cable needs to be inserted. Drag-and-drop the new firmware package onto the application or use the file browser, then press the "Start Update" button. The package must be one which includes the secondary bootloader (the binary file will have the name "bandit_code_production_board_BL_
build type>_v<version>.bin"). The unit will update.

At the start and end of update, the top ring will be lit up pink to indicate that the unit is currently running the Ooka loader.

For the rest of the update cycle, the unit appears off, and progress will be displayed on the "Update" tab in the Service Application (see images below). The other tabs in the Service Application disappear during the update, as the normal command set is temporarily unavailable. The unit may reset during the process.

An error may occur during the firmware update process. Please refer to Appendix A for a full list of the error codes that may be presented during an update.

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	COM6 GUI 6.0.0	~	Connect	Se	P OOKA G erial Port: COM6	UI 6.0.0					 > Disconnect
$(\cdot \cdot \cdot)$	Update				Power	Time	Battery	Diagnos	tics Reset	1,	SerialMonitor
				H	Details	Update	Test	Levels	Acceleromete	r	Temperature
	Initialize										
	Unlock					Initia	lize				
	Erase					Uni					
	Write					E	/rite				
	Verify					N1	nite				
	Decode					Dec	enty				
		Verifying flash memory.				Dec	U	pdate Comp	lete		•
-		Finish						Finish			

6.3 TEST

The Test tab allows testing of some device functionality and may be used to carry out parts of the Final Assembly Test of a device during manufacture.

me Batte odate Tes Red Green	ry Diag t Levels	nostics Accele	Reset erometer	Serial Tem	Disconnec Monitor perature
me Batte odate Tes Red Green	ry Diago it Levels	nostics Accele	Reset erometer	Serial Tem	Disconneo Monitor perature
me Batte odate Tes Red Green	ry Diagi t Levels	Accele	Reset erometer	Serial Tem	Monitor perature
odate Tes	t Levels	Accele	erometer :D 🗌 But	Tem tton LED	perature
Red 🗌 Green	Blue	Battery LE	:D 🗌 But	tton LED	
Button Status	Capsule D	oor			
	Button Status uction	Button Status 📕 Capsule D uction	Button Status 📕 Capsule Door 📕	Button Status 📕 Capsule Door 📕	Button Status 📕 Capsule Door 🔤 uction

- LEDs: Tick the boxes to turn on the LEDs. Untick the boxes to turn off the LEDs.
 - Red, Green, and Blue: ticking will light up the Top LED Ring the respective colours.
 - Battery LED: ticking will turn on the Battery Bar LEDs, with the bottom LED lit blue.
 - Button LED: ticking will turn on the Button Ring LEDs.
- Sound: Ticking the Buzzer box will turn on the buzzer to make a continuous single-pitch sound. Untick the box to turn off the Buzzer.
- Switches: The box to the right of the Button Status text indicates whether the button is pressed (green box) or not pressed (red box). The box to the right of the Capsule Door text indicates whether the Capsule Door is open (green box) or closed (red box).
- Tag Key: Select whether the Production or Test NFC key should be used.

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6.4 LEVELS

The Levels tab auto-updates with temperatures as measured/set on the device.

rial Port:						Discourse
DIVID	T	Dette	Dia		Devel	Disconn
Details	Update	Test	Levels	Acce	elerometer	Temperature
		Thermoco	ouple 1:	23.3	8 °	С
		Thermoco	21.2	9 °	С	
	В	attery Temp	erature:	19.7	5 °	С
	S	ystem Temp	erature:	29	٥	С
	,	Heater Targe	t Temp:	0	•	С

- Thermocouple 1, 2: The temperature of the heater as measured by the heater thermocouples.
- Battery Temperature: Temperature of the battery, measured by the sensor inside the battery pack.
- System Temperature: The temperature of the main control PCB, as measured by the accelerometer (on the main board).
- Heater Target Temperature: The temperature from the session Profile Stage that the heater is aiming to reach/maintain. This should be 0 if a session is not in progress.

6.5 ACCELEROMETER

The Accelerometer tab auto-updates with reading from the accelerometer.

DM6						V
Power	Time	Battery	Diagno	stics	Reset	SerialMonitor
Details	Update	Test	Levels	Acce	lerometer	Temperature
		Tilt:	None			
		X AXIS:	-0.968	375		
		Y Axis:	0			
		Z Axis	-0.03	125		

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- Tilt: The magnitude of the device tilt, classified as None, Small, or Large, by the device firmware.
- X, Y, Z Axis: The tilt values measured by the accelerometer.

A vertical device should have a tilt of 'None', with components X \approx -1, Y \approx 0, Z \approx 0.

The axes correspond to the below directions:



6.6 TEMPERATURE

The Temperature tab allows the user to read and set the temperature values in the device Profile to use in a Session. All values are displayed in degrees Celsius.

Р ООКА G	UI 6.0.0						×
Serial Port: COM6						\sim	Disconnect
Power	Time	Battery	Diagnos	tics	Reset	Seri	alMonitor
Details	Update	Test	Levels	Acce	elerometer	Ter	mperature
	SI	age One Te		200 🗘	Set		
	St	tage Two Ter		200 🗘	Set		
	Sta	ge Three Te		200 🗘	Set		
	St	age Four Te	mperature:		200 🗘	Set	
		Pause Ter		170 🗘	Set		
Transition Threshold Temperature: 180							
			Read				

When the GUI first opens, this tab will display some default values. Click the Read button to read the actual profile values as they are set on the device.

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To change the profile temperatures used by the device, change the appropriate temperature value, then click the 'Set' button next to the number that was changed. Note that clicking Set will only update the value that the Set button is next to. To change multiple temperature values, the user must click the Set button next to each of the values.

6.7 POWER

The Power tab allows the user to read and set the power percentage values in the device Profile to use in a Session. All values are displayed as Percentages.

ООКА GI	UI 6.0.0					×			
Serial Port:									
COM6					`	Disconnect			
Details	Update	Test	Levels	Accelero	meter	Temperature			
Power	Time	Battery	Diagno	stics R	eset !	SerialMonitor			
Power % t	Power % to use when Below or Above the Transition Threshold Temperature								
Stage	One Belo	w: S	90 🗘 Se	t Abov	e: 9	0 🔹 Set			
Stage	Two Belo	w: 9	90 🔹 Se	t Abov	e: 9	0 🔹 Set			
Stage Ti	hree Belo	w: 9	90 🔹 Se	t Abov	e: 9	0 🔹 Set			
Stage F	our Belo	w: 9	90 🗘 Se	t Abov	e: 9	0 🖌 Set			
P	ause	9	90 🔹 Se	t					
			Read						

When the GUI first opens, this tab will display some default values. Click the Read button to read the actual profile values as they are set on the device.

To change the profile powers used by the device, change the appropriate power value, then click the 'Set' button next to the number that was changed. Note that clicking Set will only update the value that the Set button is next to. To change multiple power values, the user must click the Set button next to each of the values.

6.8 TIME

The Time tab allows the user to read and set the duration values in the device Profile to use in a Session. All values are displayed in Seconds.

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erial Port: COM6						```	Di	isconne
Details	Update	Test	Levels	Acc	elerometer		Tempe	erature
Power	Time	Battery	Diag	nostics	Reset		SerialM	onitor
	2	Stage Two Stage Three Stage Four Pause	Time: Time: Time: Time:	3 3 3		Set Set Set		
			Read	d				

When the GUI first opens, this tab will display some default values. Click the Read button to read the actual profile values as they are set on the device.

To change the profile times used by the device, change the appropriate time value, then click the 'Set' button next to the number that was changed. Note that clicking Set will only update the value that the Set button is next to. To change multiple time values, the user must click the Set button next to each of the values.

6.9 BATTERY

The Battery tab auto-updates with battery-related measurements from the firmware.

DM6						~	Disconr
Details	Update	Test	Leve	ls Aco	elerometer	Ten	nperatur
Power	Time	Time Battery D		agnostics	Reset	Seria	alMonito
	Battery	/ Stage of Ch	arge	96	%)	
	Batter	y Charge Cu	rrent	0	m	A	

• Battery Voltage: The average battery voltage per cell, as measured by the device firmware, in Volts. Since there are 4 cells, the total battery voltage may be approximated by multiplying this number by 4.

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- Battery State of Charge: The battery voltage as a percentage of its total voltage. This is the value that is indicated by the Battery Bar LEDs on the front of the OOKA device.
- Battery Charge Current: The current that the battery is charging at, in milli-amps. This value should be 0 if the device is not charging.

6.10 DIAGNOSTICS

The Diagnostics tab auto-updates with the last error/exception codes raised by the OOKA device.

🕘 ООКА GI	JI 6.0.0					×
Serial Port:						
СОМЬ						Disconnect
Details	Update	Test	Levels	Acce	lerometer	Temperature
Power	Time	Battery	Diagno	stics	Reset	SerialMonitor
	Last	Displayed U Last E	lser Error Co	ode:	12	

- Last Displayed User Error Code: The error code of the last User Error that was displayed on the device.
- Last Exception Code: The error code of the last Exception that was raised by the OOKA device firmware.

Refer to document *EHR-0051-GD-1 Message API for Bandit Firmware v1.0.0* for information on what the error and exception codes mean.

6.11 RESET

The Reset tab enables the user to reset various parts of the device firmware back to their default states.

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OM6						✓ Dis	conn
Details	Update	Test	Levels	Acce	elerometer	Temper	rature
Power	Time	Battery	Diagnos	tics	Reset	SerialMo	onito
		Rese	t Profile to E	Default			
		Rese	et Profile to E set Profile to	Default Safe			

- Reset Profile to Default: This button will reset the loaded session profile back to the default values that are set by the firmware.
- Reset Profile to Safe: This button will reset the loaded session profile back to the 'safe' values that are set by the firmware. This corresponds to setting all the values to '0'.
- Reset Device State: This button will reset the OOKA device's UI back to its 'normal' operational state. This may be useful after using the Test tab to change parts of the UI.

6.12 SERIALMONITOR

The SerialMonitor tab displays a log of the most recent serial commands that have been sent by the computer and the OOKA device.

erial Port:						
COM6						V Disconnec
Details	Update	Test	Levels	Acce	lerometer	Temperature
Power	Time	Battery	Diagno	stics	Reset	SerialMonitor
17:36:35: > 17:36:33: > 17:34:13: > 17:34:08: > 17:34:01: > 17:32:41: > 17:32:19: > 17:29:31: <	>> RESET_ST >> RESET_T(>> RESET_T(>> RESET_T(>> RESET_T(>> RESET_T(>> RESET_T(>> RESET_T(<< - {C8}'?'	IORED_PRO D_INIT - {FF} D_INIT - {FF} D_INIT - {FF} D_INIT - {FF} D_INIT - {FF} D_INIT - {FF}	FILE - {BO-00 '?' '?' '?' '?' '?' '?')} "?"		
17:29:31: > 17:29:31: < 17:29:31: >	>> READ_TH << - {00} " >> READ_PA	IRESHOLD_1	TEMP - {95} - {9C} '?'	?'		

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Each line in the 'Serial Events' box shows the time at which the command was sent/received, the direction of travel of the data (>>> = PC to OOKA, <<< = OOKA to PC), and the data bytes sent/received (in hexadecimal format).

The user may log the serial commands sent/received to a file on the PC. To do so, select the folder path to save the log file to (next to the Browse button), then click Record Log. Only command data sent/received while the Record Log button is ticked will be saved to the file. The data will be visible in the created file after the Record Log button has been unticked.

6.13 SAFE MODE RECOVERY

See Section 7 Safe Mode Recovery.

6.14 EMC TEST

The EMC Test tab is only available when connected to an OOKA device running the Test firmware build. This tab enables the user to switch between EMC tests (Radiating/ Immunity) and control the buzzer, while monitoring the device status. It also provides an interface for viewing and logging data transmitted over the serial interface.



Radiating mode will set the device to continuously scan for RF tags, turn on the heater and button LEDs and pulse the top lid LEDs. The buzzer checkbox can be used to optionally sound the buzzer in the device. Bringing a tag within range of the NFC field when in radiating mode should result in the success counter incrementing.

Immunity mode is much the same as Radiating mode but sets the heater at a lower temperature to reduce the chance of physically destroying an NFC tag within the OOKA device's oven.

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6.15 RF TEST

The RF Test tab is only available when connected to an OOKA device running the Test firmware build. It enables the user to switch between Radio tests (Unmodulated/Continuous Scan) while monitoring the device status. It also provides an interface for viewing and logging data transmitted over the serial interface.

00147					
СОМЬ				, Y	Disconnec
Details	Update	Test	Levels	Accelerometer	Battery
Diagnostics	Rese	t S	erialMonitor	RF Test	EMC Test
 None Unmodulate Continuous Serial Events: 	d Scan			Read TimeOut Unmodulated:	:0 False
09:35:08: >>> 09:35:08: <<< 09:35:07: >>> 09:35:07: <<< 09:35:06: >>> 09:35:06: <<< 09:35:06: <<<	READ_TEST_ - {00-00-00- READ_TEST_ - {00-00-00- READ_TEST_ - {00-00-00- READ_TEST_	RADIO_ST. 00-00-00- RADIO_ST. 00-00-00- RADIO_ST. 00-00-00- RADIO_ST.	ATUS - {B8} '?' 00} " ATUS - {B8} '?' 00) " ATUS - {B8} '?' 00} " ATUS - {B8} '?'		^

In Continuous Scan mode, the device will repeatedly scan for tags, and increment the attempt, timeout and success counters accordingly. Bringing a tag within range of the NFC field when in Continuous Scan mode should result in the success counter incrementing.

In Unmodulated mode, the NFC field is turned on but the device does not check for tags.

7 SAFE MODE RECOVERY

The Safe Mode Recovery tab is available in the GUI before connecting to an OOKA device. It can be used to update/reflash the firmware onto the device to attempt to 'recover' it if the OOKA device persistently enters Safe Mode without obvious cause.

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OIVIO		v	Connect
Details	Safe Mode Recovery		
f the O by one	OKA hardware malfunc orange and three white	tions it will enter Safe Mode. This is indicated LEDs.	
Press th present	e power button to rese , the OOKA will re-ente	t the device. If the hardware problem is still r safe mode.	
For Pha Select a	se 2 OOKA, you can try Serial Port above, then	upgrading the firmware to fix the issue. use "Start Recovery" below.	•
		Start Recovery	

When the devices has encountered an error condition too many times, it enters Safe Mode, as indicated by one orange and three white LEDs. Pressing the power button will attempt to reset the error and restart the device, however if the error condition is still present, the device may reenter Safe Mode shortly thereafter. It may be that a new firmware version supports working around this error. If this is the case, you can use Safe Mode Recovery to flash this newer version.

When you select "Start Recovery" above, you will be prompted to press the power button to reset the OOKA. The GUI will set the service pin, meaning that the OOKA should enter the bootloader, making a firmware upgrade possibly.

TROUBLESHOOTING 8

ERROR CONNECTING TO DEVICE 8.1

You may observe the below error when attempting to connect to an OOKA device:

	P OOKA GUI 6.0.0	×		
	Serial Port:			
	COM6	* Connect		
	Details Safe Mode Recovery			
		Error connecting to device X		
	Version: Type: Hash:	Unable to find a device		
	Branch: Hardware: Read	OK		
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Check that:

- 1. The OOKA device is connected to the computer via the USB-Serial Cable
- 2. The Serial Cable has the correct orientation at the OOKA device-end
- 3. The OOKA device is awake (At least one of the battery bar LEDs on the front of the device will be lit if the device is awake). If the device is asleep, press the button on the front of the OOKA device, or connect the AC Adapter, to wake the device.
- 4. The intended firmware build has been flashed to the device (e.g. This error will occur if the device is running the MCUBoardBringUp firmware build as this build is not supported by the GUI. Debug, Test, Release, and Secondary Bootloader builds are all supported by the GUI and will not be the cause of this error).

8.2 DEVICE DISCONNECTED

You may observe the following "Device disconnected" error when using the GUI after the device has been connected (the specific command that timed out will vary):

(P OOKA GUI 6.0.0		×		
1	Serial Port:				
L	COM6	¥	Connect		
L	Details Safe Mode R	ecovery			
l					
ē					
	Version:	0.1.0			
	Туре:	Debug			
	Hash:	402d9206	Device	disconnected	×
	Branch:	develop			
	Hardware:	ООКА 4.0		Device disconnected.	
		Read		Command ReadStagePowerCommand timed out.	
				ОК	

Check that:

1. The OOKA device is awake (At least one of the battery bar LEDs on the front of the device will be lit if the device is awake). If the device is asleep, press the button on the front of the OOKA device, or connect the AC Adapter, to wake the device. To keep the device awake throughout GUI usage, the capsule door may be kept open so that the Top LED Ring flashes white.

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9 **REVISION HISTORY**

9.1 REVISION DETAILS

Revision	Author/Job Title	Summary
A	Emma Rooney / Associate Software Engineer	First Issue

9.2 CHANGES SINCE LAST REVISION

N/A

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APPENDIX A FIRMWARE UPDATE ERROR CODES

These error codes are shown when a firmware update fails, in the form "Error: EXXX", where XXX is the error number.

Code	Condition
1	Serial connection is not open when firmware upgrade operation starts. Reconnect and try again.
2	Device hardware version is not supported by the firmware update mechanism
3	At the start of every phase, the code double-checks that the devices is in the right mode. This error is raised if one of these checks failed, meaning that the device mode changed since the end of the previous phase
4	We tried to determine whether the device was in the application or secondary bootloader, but got a serial error which wasn't a timeout
5	We asked the device to enter a particular mode, but after a timeout it was not in that mode
6	We wanted to transition the device from one mode to another, but the device wasn't in the initial mode. This probably means that the device changed mode unexpectedly
7	We tried to send the USER_RESET command to send the device into the secondary bootloader, but got an error.
8	We tried to read the device UUID from the secondary bootloader in order to start transitioning to the primary bootloader, but the command timed out
9	We tried to read the device UUID from the secondary bootloader in order to start transitioning to the primary bootloader, but got an error sending the command
10	We tried to tell the secondary bootloader to enter the primary bootloader, but the command timed out

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11	We tried to tell the secondary bootloader to enter the primary bootloader, but got an error sending the command
12	We tried to tell the secondary bootloader to enter the primary bootloader, but it responded saying the CRC we sent was incorrect
13	We tried to tell the secondary bootloader to enter the primary bootloader, but it responded saying it was busy decoding the application
14	We tried to tell the secondary bootloader to enter the primary bootloader, but it responded with an unknown error
15	We tried to tell the primary bootloader to reset back into the secondary bootloader, but got an error
16	We tried to connect to the secondary bootloader after transitioning to it from the primary bootloader, but the connection failed
17	We tried to tell the secondary bootloader to launch the main application, but the command timed out
18	We tried to tell the secondary bootloader to launch the main application, but got an error sending the command
19	We tried to tell the secondary bootloader to launch the main application, but it responded with "Denied", which was unexpected
20	We tried to tell the secondary bootloader to launch the main application, but it responded saying it was busy decoding the application
21	We tried to tell the secondary bootloader to launch the main application, but it responded with an unknown error
22	We tried to tell the primary bootloader to erase flash, but blhost responded with an error

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23	We tried to tell the primary bootloader to program flash memory, but blhost responded with an error
24	We tried to read the firmware image back from the primary bootloader, but blhost responded with an error
25	We tried to verify the firmware image we'd read back, but the size of the image we read back did not match the size of the image which we wrote
26	We tried to verify the firmware image we'd read back, but it differed from what we wrote
27	We tried to tell the secondary bootloader to decode the application, but the command timed out
28	We tried to tell the secondary bootloader to decode the application, but got an error sending the command
29	We tried to tell the secondary bootloader to decode the application, but responded with "Denied", which was unexpected
30	We tried to tell the secondary bootloader to decode the application, but responded saying that it was busy decoding the application
31	We tried to tell the secondary bootloader to decode the application, but responded with an unknown error
32	We tried to read the decode progress from the secondary bootloader, but the command timed out
33	We tried to read the decode progress from the secondary bootloader, but got an error sending the command
34	We waited for the secondary bootloader to decode the application, but it timed out
35	We tried to start the firmware update operation, but the firmware type was Unknown

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36	We tried to determine whether the device was in the application or secondary bootloader, but got a firmware type of Unknown
37	We tried to send a serial command to the device at the very start of the upgrade to determine its mode, but the command timed out
38	We tried to send a serial command to the device at the very start of the upgrade to determine its mode, but got an error sending the command
39	At the very start of programming we check to see whether the device is in the same mode as when we initially connected. If not, we raise an error telling the user to try again (and force a disconnect/reconnect to re-fetch the mode)
40	We tried to start the firmware update without the charger plugged in
999	We got another, unknown and unexpected error

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