STAR CO Prospective Android App Specifications

I. *Product Objective:* This Android application is designed to allow the user to assign user defined lightshows and user defined graphics on our accessory based on general and specific incoming call, text, email, and notifications. The app must allow the user the ability to customize and set display screens per general incoming calls, texts, emails, and notifications. The app also must allow the user the ability to customize and set a lightshow per general or specific (contacts) incoming calls, texts, emails, and notifications. The app also must allow the user the ability to customize and set the accessory's displayed information for "widgets." The app must use USB to communicate and send display graphics and lightshow commands to the accessory's microcontroller in hexadecimal format. The app must be able to receive incoming calls, text, emails, and notifications from the user's phone as they happen and generate and send the necessary display screen and lightshow commands set via USB. The app must be able to receive USB commands from the accessory's microcontroller to change display screens and lightshows. The app must have a quality user interface that is simple to use, features a sleek design and aesthetics, and visually is comparable to the previous iOS app.

II. *Design Requirements*

A. *Physical Layout*

1. This app design will be designed for Android users, specifically the newest Samsung phones, and therefore should be designed for those current and specific screen resolutions and sizes.
2. All fonts and colors inside of the app should resemble our current iOS app default fonts and colors.
3. All graphics and icons in the app should be created with a single branding in mind.
4. This addition to the app should be uncluttered, straight forward, and user friendly.

B. *Software*

1. The app should always remain in the portrait orientation on the phone.
2. The application should display the original phone's contact list unaltered, only assigning a lightshow to a contact when the user determines.
3. The app should showcase the display's potential look. In this app, each "widget" will have a different display layout. We are expecting to have over 30 different "widgets" in the future. Therefore, design and layout for creating these layouts within the app will need to be simple and well organized.
4. Creation of these different "page" or "widget" layouts in the app will need to be simplistic. This is something that we would need to do in-house. Training on how to make display templates is a must.

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C. *Design Concerns*

1. *Compatibility:* This app must be designed for Samsung Android phones and therefore should be designed for those current and specific screen resolutions and sizes. (Our accessory will only be for phones, not tablets. Also, we will only develop for the latest Android phone models available).
2. *Reliability:* The app must send the display information and lightshow information correctly every time to the accessory. It must also function at a stable level without significant bugs or hindrances.
3. *Pricing:* This will be a free mobile application that comes in conjunction with a physical accessory. Additional display templates or color variations may be sold as in-app purchases.

D. *Process- Potential app flow chart (pressing the show number's button on Home Page will go to that #)*

1. Front Splash Page - The app should open to a page showcasing our logo animated (not shown).

2. Home Page- This is the page for navigation of the app. The user will be able to click on the icon or text to go into that specific section of the app. The "i" button will be a pop-up with information on how to navigate the app (We will need an app tutorial walkthrough to happen to first time users).

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The below pages will appear 4 times, one for each option: "Phone", "Messages", "Email", and "Notifications" from the "Home Page." Each one will have the same layout, but will have a different icon on the top of the page to signify which of the four options they are currently editing.

3. Display Page –This page will allow the user to change what is displayed on the accessories screen. By clicking on the "Numbers 1-4," "Text Options," or the "Color Icons" the "Edit Display Page" will appear. Clicking on "Custom" will allow the user to type in assign text, numbers, and limited characters. "Text Size" will be a 3-point slider that will allow the user to change the size of the text on the display. Clicking "Preview on Case" will save and send the display image (ID Packet 0) to the accessory to be shown on the display. Toggling the "On/Off" in the top right will set the display to "On" or Off" (if "Off" it will grey out the options on this page). Clicking the "Back Arrow" in the top left will direct the user back to the "Home Page" after saving. Sliding "Left" with your finger on the screen will direct the user to the "Lightshow Page" after saving.

4. Edit Display Page – This page will appear when the user clicks on "Numbers 1-4," "Text Options," or the "Color Icons" on the "Display Page." It will show all of the options available to replace the selected option. Clicking on the "+" icon will select that new option and will direct the user back to the "Display Page" after saving. Changing the "Color Selection Slider" color and then clicking "Back Arrow" in the top left or a "+"icon will direct the user back to the "Display Page" after saving. Clicking the "Back Arrow" in the top left will direct the user back to the "Display Page" after saving.

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5. Lightshow Page –This page will allow the user to change what lightshows appear on the accessories case. Clicking on the "Color Slider" will select a color to be assigned. Clicking on the "Lightshows Assigned" icon will cause the "Lightshows Assigned Page" to appear. Toggling the "On/Off" in the top right will set the lightshow to "On" or Off" (if "Off" it will grey out the options on this page). Clicking "Preview on Case" will save and the Lightshow (ID Packet 2) to the accessory to be shown on the LEDs. Clicking on an option of the "Lightshow" will set that lightshow to have that feature. Clicking "Get More Lightshows" will open up In-App Purchase options to be downloaded to the case. Clicking the "Back Arrow" in the top left will direct the user back to the "Home Page" after saving. Sliding "Right" with your finger on the screen will direct the user to the "Display Page" after saving.

6. Lightshows Assigned Page – This page will appear when the user clicks on the "Lightshows Assigned" icon on the "Lightshow Page" or the "Lightshow 4C Page." Clicking the "Back Arrow" in the top left will direct the user back to whichever page, "Lightshow Page" or the "Lightshow 4C Page", the user was previously on.

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7. Lightshows for Contacts Page – This page will pull in all of the users First Names and Last Names from their Phone's Contacts, save them, and display them in the app. Every time this page is opened it will sync and add or remove contacts as necessary. Clicking on a "Contacts Name" will cause the "Lightshow 4C Page" to appear. Clicking on any of the "Phone," Messages," or "Email" icons will toggle that icon individually between 'On" and "Off" and save and send these settings (ID Packet 3). Clicking the "Back Arrow" in the top left will direct the user back to the "Home Page" after saving.

8. Lightshow 4C Page - This page will allow the user to change what lightshows appear on the accessories LEDs. Clicking on the "Color Slider" will select a color to be assigned. Clicking on the "Lightshows Assigned" icon will cause the "Lightshows Assigned Page" to appear. Clicking "Preview on Case" will save and the Lightshow (ID Packet 2) to the accessory to be shown on the LEDs. Clicking on an option of the "Lightshow" will set that lightshow to have that feature. Clicking "Get More Lightshows" will open up In-App Purchase options to be downloaded to the case. Clicking the "Back Arrow" in the top left will direct the user back to the "Lightshows for Contacts Page" after saving.

9. Widgets Page – This page will allow the user to change what "widgets" appear and in what order they appear on the display. Toggling the "On/Off" for each widget listed will set it to "Display" or "Off," will move it to the bottom of the "Display" or "Off" list. Clicking on the "Three Lines" will allow the user to drag to rearrange the order of that option. Clicking on a Widgets "Text" will direct the user to the "Edit Widget Page." When the app receives from the accessory a command (ID Packet 1), it will need to navigate through the "widgets" as the command states. For example, if the command is button input left or slide input right, the app will need to generate the "widget's" display that is above it in the user set list and send that via USB (ID packet 0). Clicking the "Back Arrow" in the top left will direct the user back to the "Home Page" after saving.

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10. Edit Widgets Page - This page will allow the user to change what is displayed on the accessories screen. By clicking on the “Numbers 1-4,” “Text Options,” or the “Color Icons” the “Edit Display Page” will appear. Clicking on “Custom” will allow the user to type in assign text, numbers, and limited characters. “Text Size” will be a 3-point slider that will allow the user to change the size of the text on the display. Clicking “Preview on Case” will save and send the display image (ID Packet 0) to the accessory to be shown on the display. Turning the “Home Page” to “On” will turn the previous “Home Page” to “Off” and display the letter “H” next to that Widget on the “Widgets Page.” Clicking the “Back Arrow” in the top left will direct the user back to the “Widget Page” after saving.

11. Battery Page - This page is used to set the specific accessory’s battery settings and auto charge level. Once the page is opened, the app will send (ID Packet 4) to the accessory and receive (ID Packet 5) to populate the battery percentage and charging graphics. Clicking on any of the “Auto,” “On,” or “Off” text will visually toggle that option to the “On” position, the others to “Off,” and save and send these settings (ID Packet 4). Clicking on any of the “Percentages” or the “+” or “-“ icons will allow the user change the number assigned and will save and send all files (ID Packet 4). The “Battery Percentage” text and “Battery Charging” icon will change based on the information given by the accessory (ID Packet 5) when asked by the app (ID Packet 4). Clicking the “Back Arrow” in the top left will direct the user back to the “Home Page” after saving.

12. Back Design Page - This page is used to set the specific case look for viewing lightshows on the “Lightshow Page” and the “Lightshow 4C Page.” Clicking on a “Case” icon or “Text” will select a case to be assigned and will direct the user back to the “Home Page” after saving. Clicking the “Back Arrow” in the top left will direct the user back to the “Home Page” after saving.

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IV. External Accessory Protocol Requirements

-Language - The app will need to use USB protocol to send data in hexadecimal bytes to the accessory. It will also need to be able to interact with the phone and receive incoming call, text, email, and notification specifics, as it will be making and sending display changes based on these.

0. Display - This will be the packet sent to the accessory via USB from the app when a new screen needs to be displayed. The packet will consist of hexadecimal numbers sent in the following specific order. Each pixel must be sent in 16-bit hexadecimal format. The LCD screen resolution is 320 x 240, in 16-bit color, and will be sent from top left corner to the bottom right corner row-by-row. This packet will be 153,601 bytes in length. A new display screen will be sent whenever the app sees a new incoming call, text, email, or notification, or if the accessory asks for a new screen.

	Standard	App Set Display					
Variables:	ID	A	A	A	…	…	…
Names:	Display	First Pixel	Second Pixel	Third Pixel	…	…	…
Values:	0	255,0,0	0,255,0	0,0,255	…	…	…
Sent as:	0x00, 0xF800, 0x07E0,0x001F,…						

Display Packet Key	
Variable	Values and Names
ID	0
A	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)
A	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)
A	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)
…	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)
…	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)
…	HEX-(16-bit Hexadecimal value for the RGB value of that particular pixel.)

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1. Display Input - The accessory will send the following notification to the app via USB if it is requesting a new screen graphic to be created and displayed:

	Standard	Accessory User Input Received	
Variables:	ID	A	B
Names:	Input	Button Input	Slider Input
Values:	1	1	0
Sent as:	0x01, 0x01, 0x00		

Display Input Packet Key					
ID	1				
A	0-Null	1-Left	2-Middle	3-Right	
B	0-Null	1-Slide Left	2-Slide Right	3-Slide Up	4-Slide Down

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2. Lightshow – This will be the packet sent to the accessory via USB from the app when a Lightshow needs to be played (This will occur when the user selects “Preview Lightshow,” or when an incoming notification arrives). Below example is the first Lightshow saved.

	Stan.	App Set	Given Lightshow Information			App Set		
Variables:	ID	A	B	C	D	E	E	E
Names:	ID	Type	Repeat	Speed	Lightshow Pointers	Color A	Color B	Color C
Values:	2	0	5	10	00, 00	255,0,0	0,255,0	0,0,255
Sent as:	0x02, 0x00, 0x05, 0x0A, 0x00, 0x00, 0xFF,0x00,0x00,0x00,0xFF,0x00,0x00,0x00,0xFF							

Lightshow Packet Key						
Variable	Values and Names					
ID	2					
A	0-Normal	1-Fade	2-Blink	3-Alternate	4-Circle	5-Middle
	6-Corners	7-Rainbow	8-Custom			
B	#-(Number between 0-255 Given with Lightshow)					
C	#-(Number between 0-255 Given with Lightshow)					
D	#’s-(Two numbers between 0-255 Given with Lightshow)					
E	#’s-(Three numbers between 0-255 Determined by user in App if “8-Custom” is selected.)					

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3. Battery - This will be a set of numbers sent in the following specific order. Battery information can be set by the user.

	Standard	User Set Battery Information		
Variables:	ID	A	B	C
Names:	Battery	Status	Auto On	Auto Off
Values:	3	2	15	75
Sent as:	0x03, 0x02, 0x0F, 0x4B			

Battery Packet Key				
ID	3			
A	0-Off	1-On	2-Auto	3-Page Opened
B	#-(Number between 0-100 from Auto On Battery %)			
C	#-(Number between 0-100 from Auto Off Battery %)			

4. Battery Graphics - After the application sends the above packet, the application will receive the following packet via USB from the accessory:

	Standard	Accessory Set Battery Information	
Variables:	ID	A	B
Names:	Battery	Charging Status	Accessory Battery %
Values:	4	3	75
Sent as:	0x04, 0x03, 0x4B		

Battery Graphical Packet Key – (Received by APP)					
ID	4				
A	0-Off	1-On	2-Auto		
B	0-None	1-Micro USB charging Phone	2-Micro USB charging Battery	3-Micro USB charging Phone & Battery	4-Battery charging Phone
C	#-(Number between 0-100 representing Accessory's Current Battery Power Level %)				