Pack Display CDR

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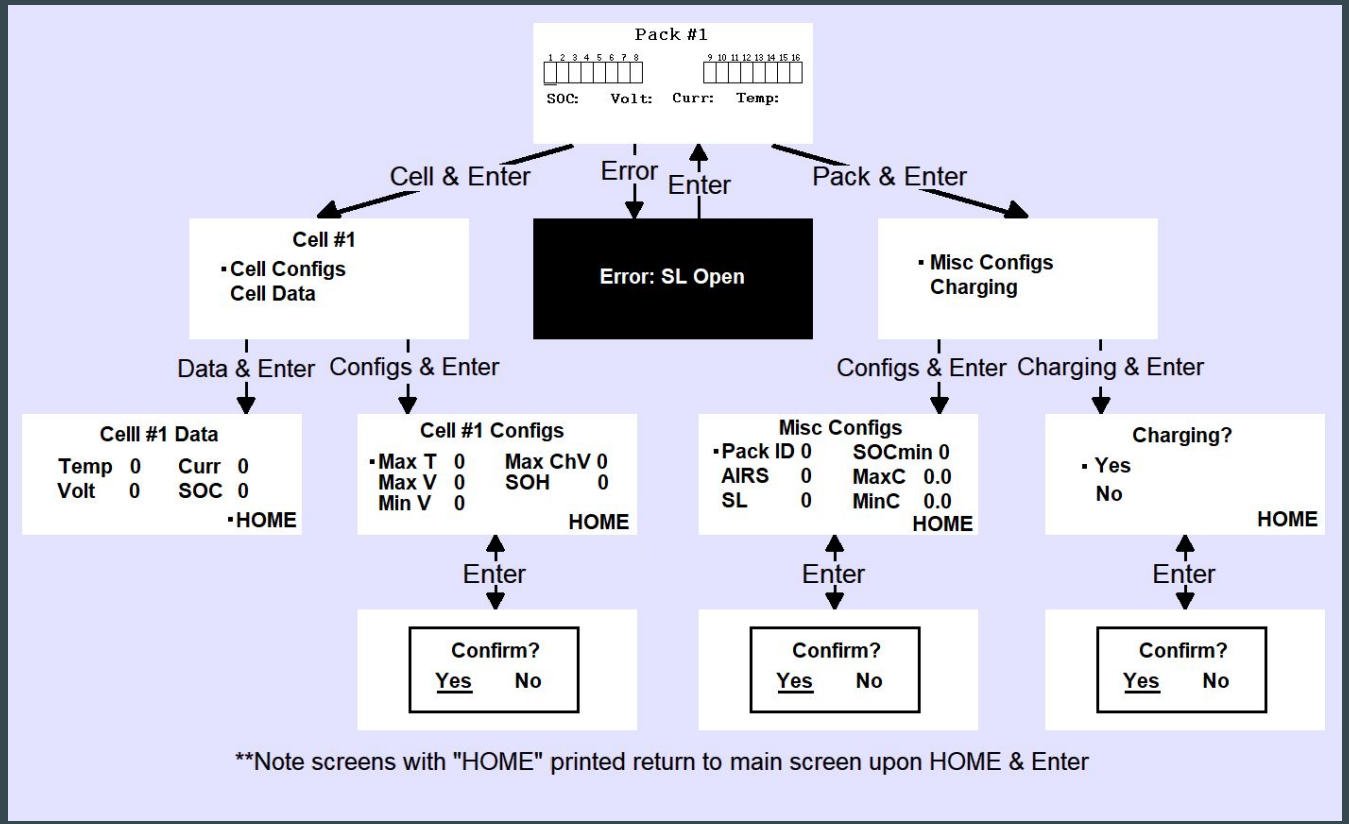
FSM


Pack #1
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
SOC: Volt: Curr: Temp:
Cell & Enter
Error
Enter
Pack & Enter
Cell #1
▪ Cell Configs
Cell Data
Error: SL Open
▪ Misc Configs
Charging
Data & Enter
Configs & Enter
Configs & Enter
Charging & Enter
Celll #1 Data
Temp 0 Curr 0
Volt 0 SOC 0
▪HOME
Cell #1 Configs
▪Max T 0 Max ChV 0
Max V 0 SOH 0
Min V 0
HOME
Misc Configs
▪Pack ID 0 SOCmin 0
AIRS 0 MaxC 0.0
SL 0 MinC 0.0
HOME
Charging?
▪ Yes
No
HOME
Enter
Enter
Enter
Confirm?
Yes No
Confirm?
Yes No
Confirm?
Yes No
**Note screens with "HOME" printed return to main screen upon HOME & Enter

How data is exchanged

Data is shared to and from the CAN Bus via firmware contained in Core1.

Data is received from the cells through I2C via firmware contained in Core1.

The firmware for the display is contained in Core0.

To exchange data between the cores, semaphores are used.

Data that is being exchanged includes: cell data, configuration parameters, faults (AMS & External)

How the configurations are stored

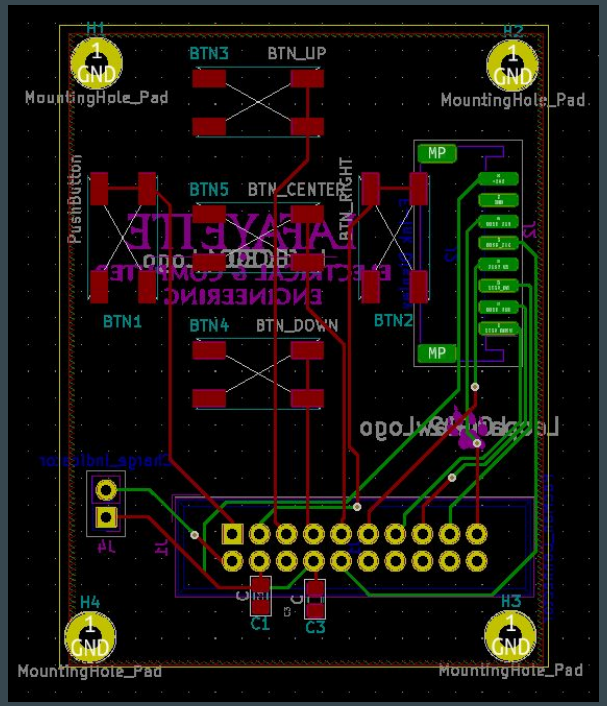
Misc Configurations

```
typedef struct
{
  String names;
  float value;
} Configurations;

Configurations configurations[] = {};

void listOfConfigs(){
  configurations[0] = {"id", 0};
  configurations[1] = {"sl", 0};
  configurations[2] = {"airs", };
  configurations[3] = {"max pack current", 250};
  configurations[4] = {"min pack current", 0};
  configurations[5] = {"soc", 50};
}
```

Cell Configurations

```
typedef struct
{
  int max_temp;
  float max_voltage;
  float min_voltage;
  float max_charge_voltage;
  boolean SOH;
} Cell_Configs;

Cell_Configs configs[NUM_CELLS];
```

Break Out Board and Physical Placement



Connor Designed this board which will hold the five buttons to be used with the display.

The E-Ink display will mounted onto a small panel that will be screwed into the larger outside panel for the pack. Jack has the details of this.

Summary

Main Screen: Updates real-time data, displays when cells are nearing configuration limits, indicates whether charging or not, can navigate to specific cell

Cell Data and Configuration Screens: Alter cell limits and view real-time data. If a cell is declared to be bad or nears config limits, this will show on the main screen.

Charge Screen: Indicate whether or not charging

Both Configuration Screens: select variable to change it (asterik appears), confirm changes (if not confirmed, last value returns)

Fault Screen: If there is a major fault, whole screen turns black with error displayed, signal is sent to Core1

Video Demo