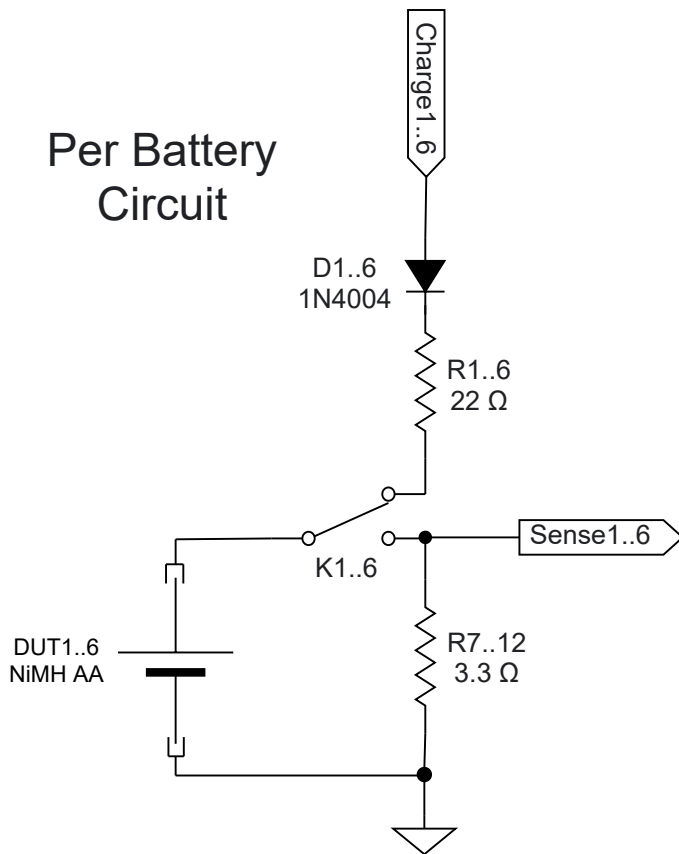
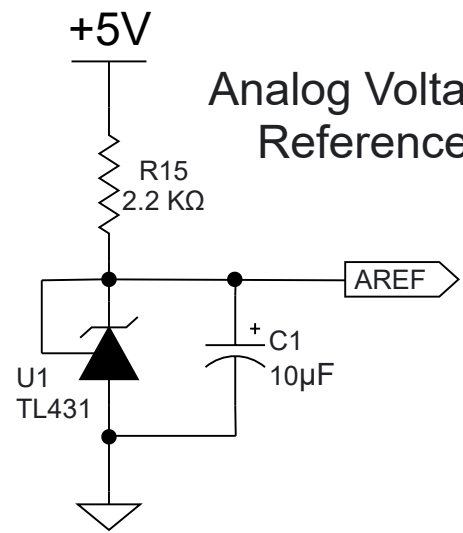


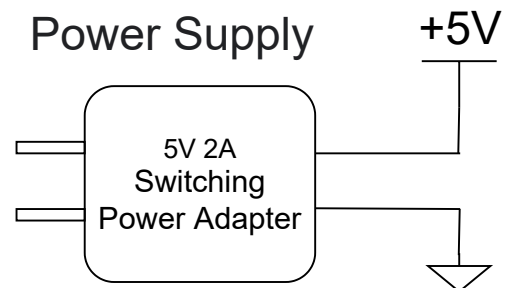
Per Battery Circuit



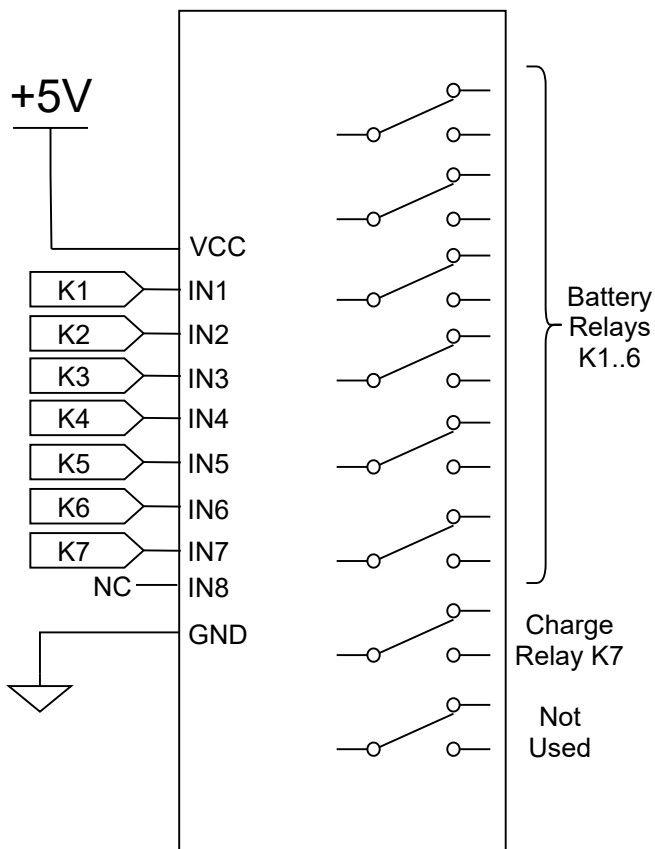
Analog Voltage Reference



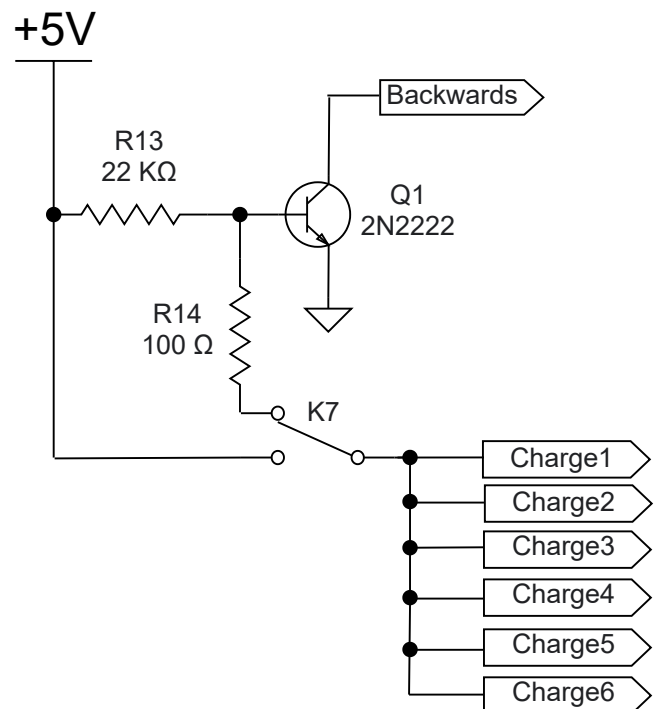
Power Supply



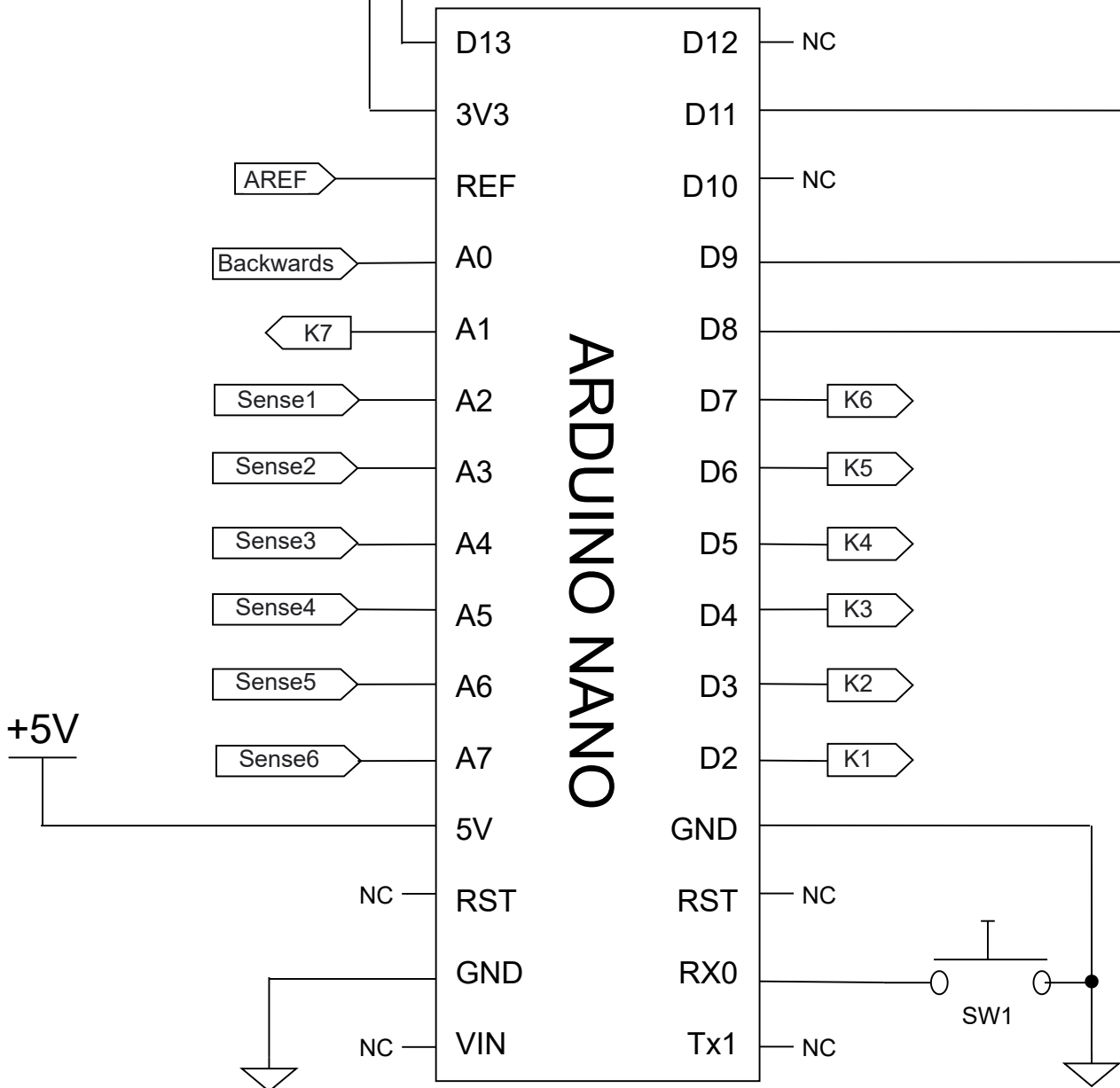
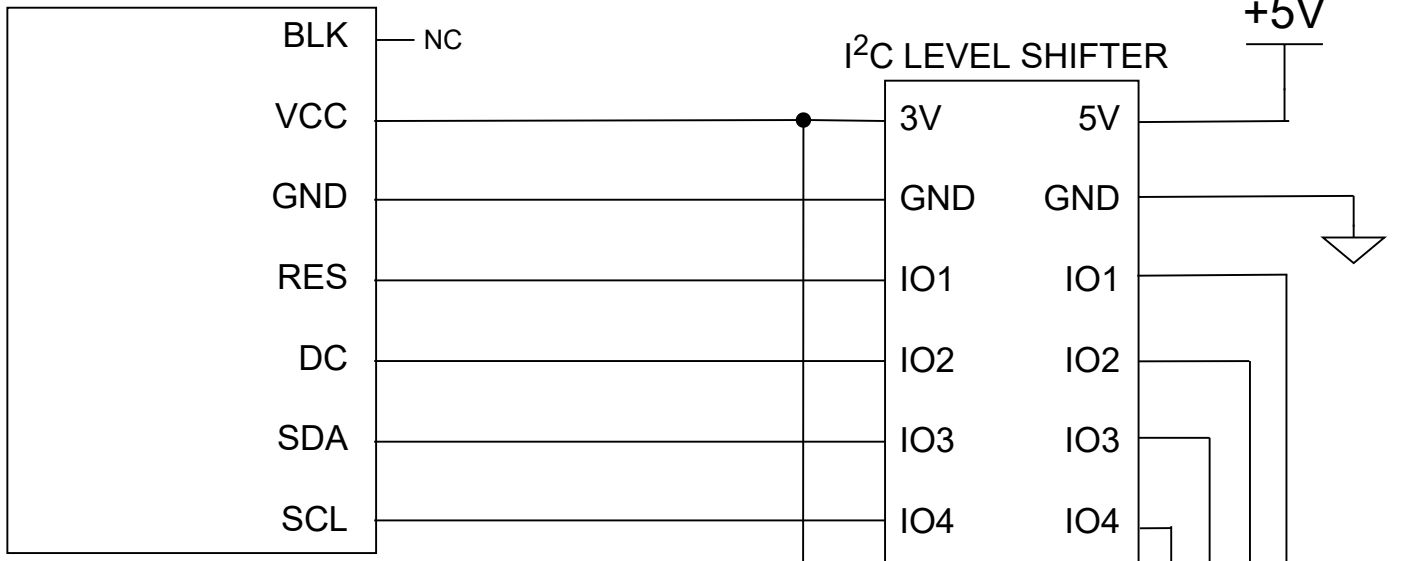
Relay Module



Charge Relay & Backward Battery Detector



240x240 1.3" IPS LCD



List of Electronic Materials

Component	Qty	Description
8 Relay Module	1	Generic 8-relay 5V coil module
Arduino Nano	1	Genuine or generic Arduino Nano
I ² C Level Shifter	1	4 Channel I ² C Voltage Converter
240x240 1.3" Display	1	ST7789 based 240x240 pixel IPS Colour Display, 1.3"
Battery Holders	3	2AA Battery Holders, good quality with heavy duty, low impedance contacts. Found on Ali Express as "SMT AA Battery Holder"
3.3Ω Discharge Resistor	6	Wirewound power resistors rated 5W. Purchase as a pack of 10 to get matching ones. Only need to dissipate less than 1 watt, but the 5W ones can do it easily without overheating.
22Ω Charge Resistor	6	Wirewound power resistors rated 5W. Only need to dissipate less than 1 watt but the 5W ones can do it easily without overheating.
TL431	1	2.5V Reference. Buy new or salvage out of almost any junked switching power supply
2N2222	1	Almost any NPN transistor would do, possibly with tweaking of R14 to get the right voltage threshold.
5V 2A Switching Power Supply	1	Salvage from an obsolete D-Link Router; most came with 5V, 2.5A power adapters
1N4004	6	1A Rated Rectifier Diode. Substitute any other rectifier diode that you have, needs to tolerate about 175mA of continuous current. Matching set preferred, so the "battery backwards" threshold is the same for all sockets.
Pushbutton Switch	1	Any normally open pushbutton switch
22KΩ Resistor	1	Generic 1/4W resistor
100Ω Resistor	1	Generic 1/4W resistor
2.2KΩ Resistor	1	Generic 1/4W resistor
10μF Electrolytic	1	Generic 10μF electrolytic capacitor. Only needs to tolerate 2.5V.