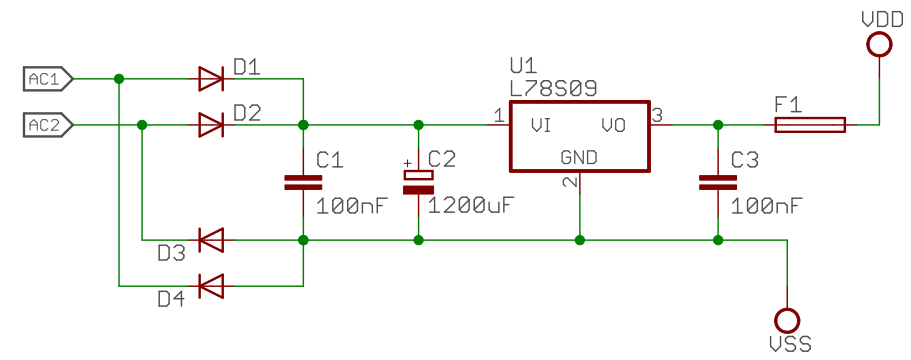


POWER SUPPLY

THE POWER SUPPLY INPUT TO THE CLOCK IS 12V AC. THIS IS RECTIFIED AND REGULATED DOWN TO 9V DC FOR DISTRIBUTION AROUND THE CLOCK.

NO OUTPUT CAPACITANCE IS PROVIDED AS PART OF THE POWER SUPPLY CIRCUIT. EACH BOARD WILL HAVE A SMALL SMOOTHING CAPACITOR ON IT.



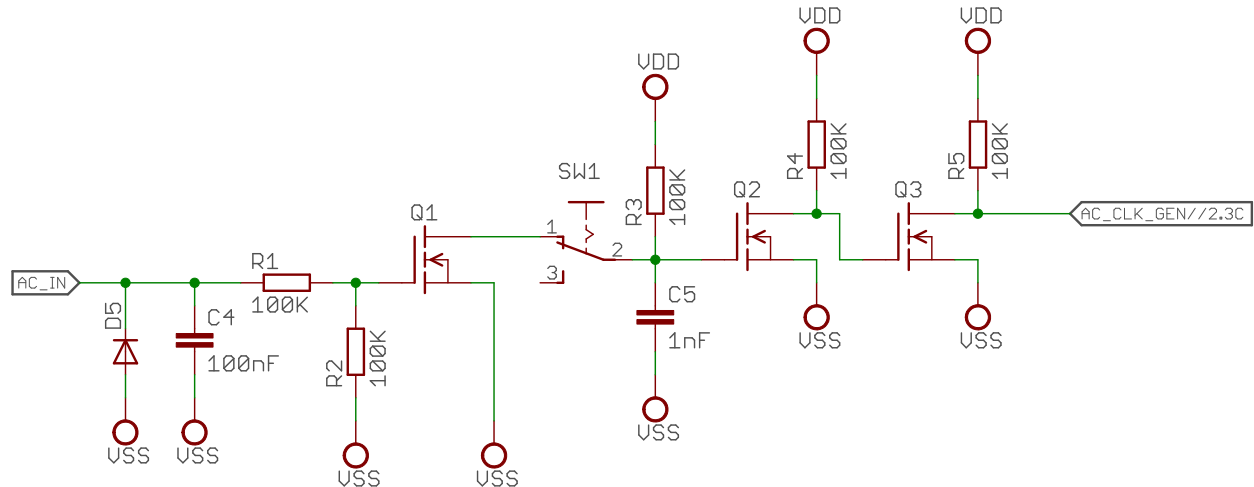
AC_CLK/ GENERATOR

THE AC_CLK/ GENERATOR IS A CIRCUIT THAT GENERATES AN OUTPUT SIGNAL THAT HAS SHARPER RISING AND FALLING EDGES THAN THE INPUT AC SINEWAVE.

THE INPUT AC SIGNAL IS DIODE CLAMPED TO THE NEGATIVE POWER SUPPLY RAIL, PREVENTING IT FROM GOING SIGNIFICANTLY BELOW 0 VOLTS. THIS IS THEN FED TO THE GATE OF A MOSFET THROUGH A VOLTAGE DIVIDER.

AS THE SINEWAVE RISES, THE MOSFET WILL EVENTUALLY TURN ON AND SHUNT THE CURRENT FROM R3 DOWN TO GROUND, DRAGGING THE OUTPUT LOW. AS THE SINEWAVE FALLS, THE MOSFET TURNS OFF AND THE OUTPUT GOES HIGH. TWO FURTHER MOSFETS INVERT THE SIGNAL TWICE, FURTHER REDUCING RISE/FALL TIMES OF THE SIGNAL.

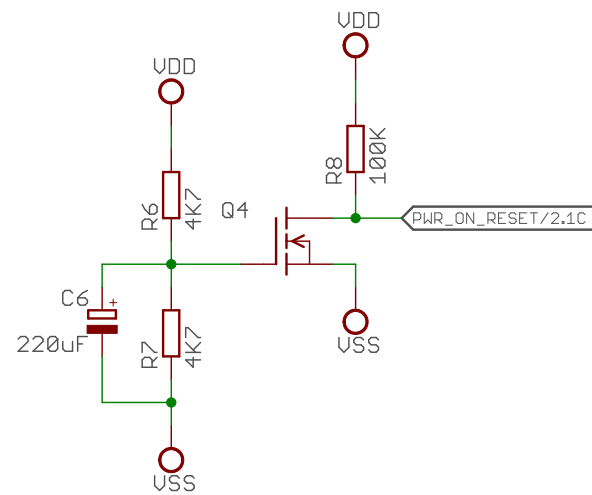
A SWITCH IS PROVIDED TO ALLOW THE MOSFET TO BE ISOLATED, THUS PREVENTING THE OUTPUT SIGNAL FROM BEING DRAGGED LOW. THIS PREVENTS THE PRESCALER FROM ADVANCING, ALLOWING THE CLOCK TO BE SET.



POWER ON RESET DELAY

AT POWER ON, THIS CIRCUIT OUTPUTS A HIGH SIGNAL FOR A BRIEF PERIOD OF TIME. ONCE THE CAPACITOR CHARGES THE GATE OF THE MOSFET TURNS ON AND THE OUTPUT GOES LOW.

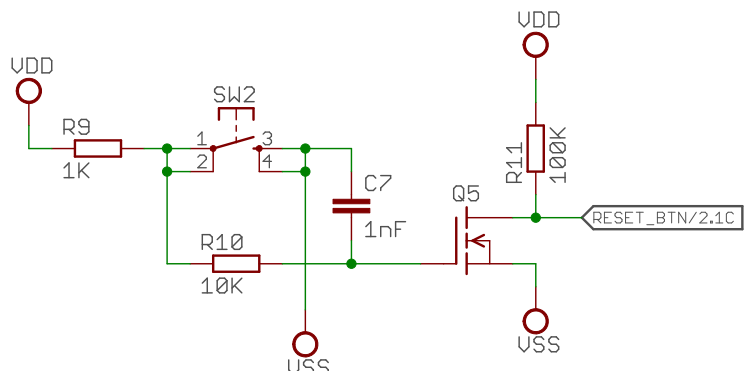
THIS FEEDS IN TO THE RESET MUX TO PRODUCE THE MCLR SIGNAL AND ENSURES THAT AT POWER ON, ALL COUNTERS ARE RESET TO ZERO COUNT.



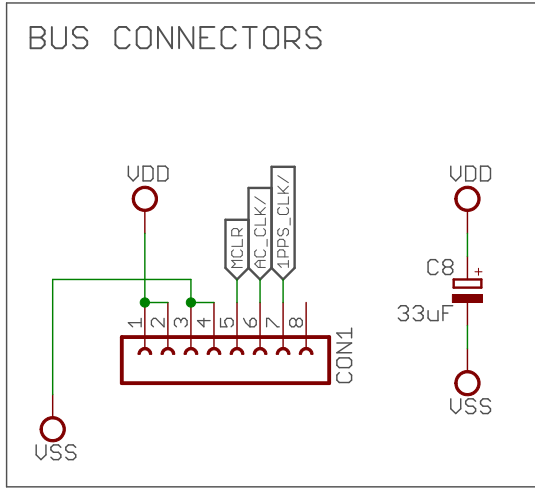
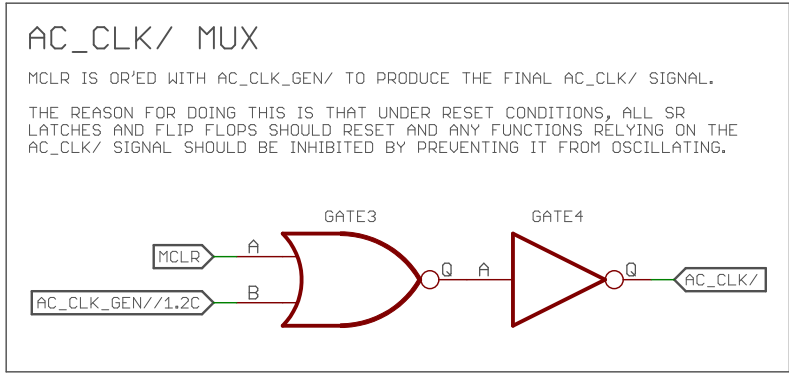
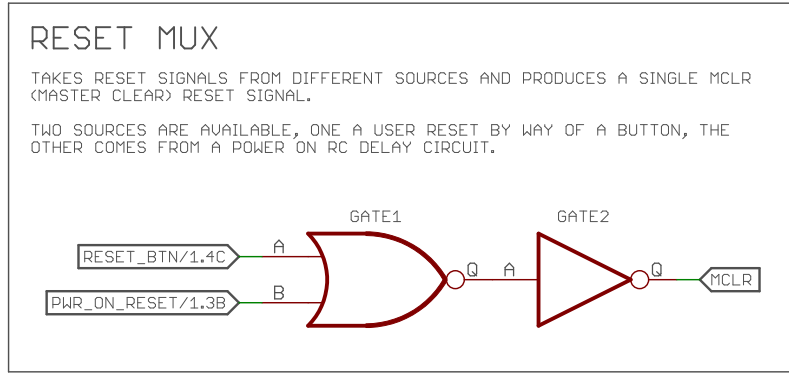
RESET BUTTON

THIS BUTTON IS TIED TO THE RESET_BTN INPUT OF THE RESET MUX, AND ALLOWS THE USER TO RESET THE ENTIRE CLOCK TO DEFAULTS.

MUCH OF THE COMPLEXITY IS DUE TO THE IMPLEMENTATION OF HARDWARE DEBOUNCING OF THE BUTTON.



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MAINS FREQUENCY PRESCALER AND 1PPS CLOCK GENERATOR

