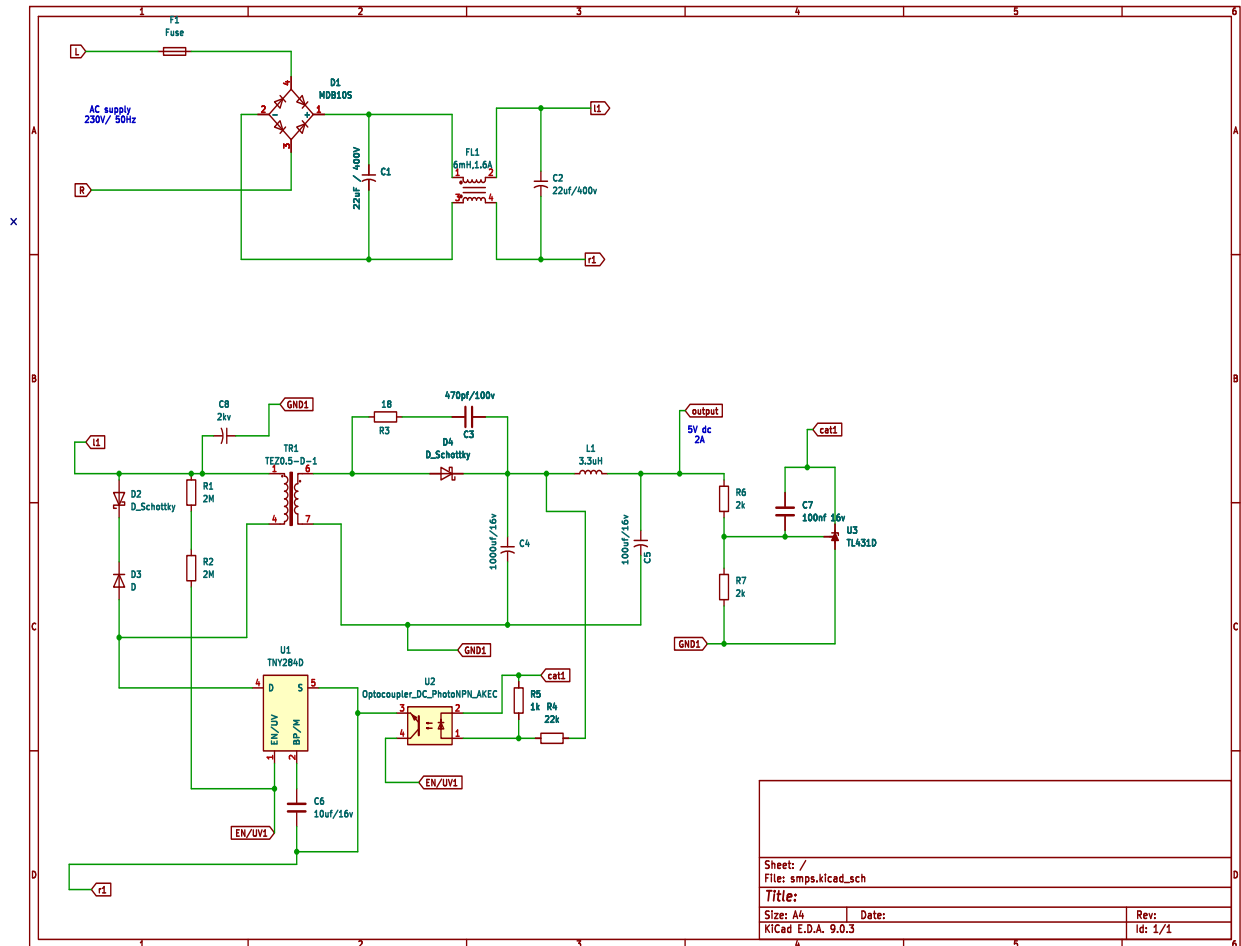


## Design a power adaptor circuit with 230V AC input and 5V DC, 2A Output

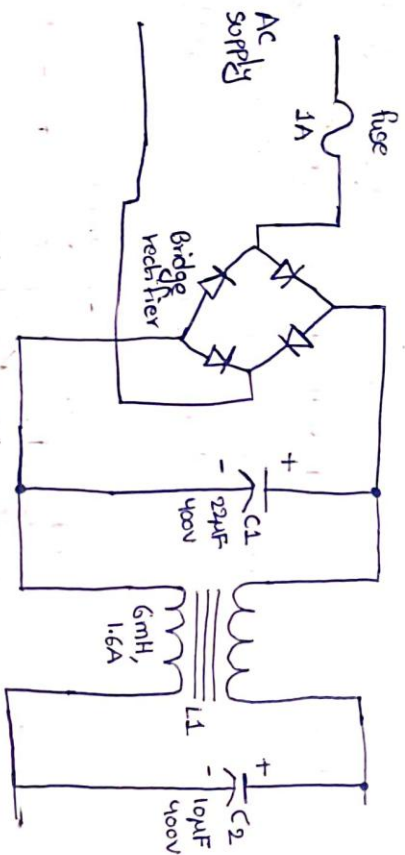
Circuit diagram:



Circuit explanation:

The circuit takes dangerous 230 V AC, converts it into high-frequency isolated DC via a flyback SMPS, and uses optocoupler feedback to regulate it to a safe 5 V, 2 A output.

## Section 1

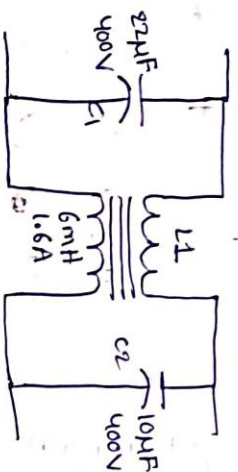


\* fuse provides protection from overcurrent

\* Bridge rectifier converts AC mains into pulsating DC

\*  $L_1$  (6mH choke, 1.6A): This is a choke  
 ↳ it blocks high-frequency noise  
 ↳ improves filtering by opposing sudden changes in current

## PI filter



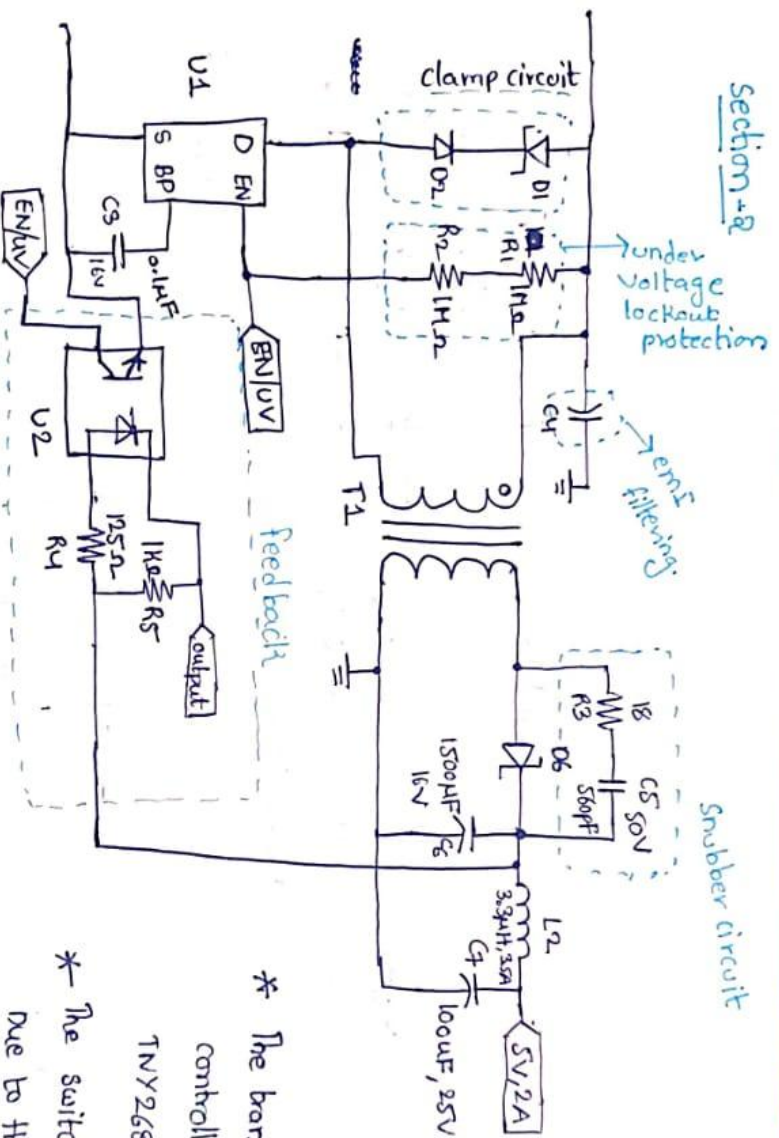
$C_1$  → smooths voltage

$L_1$  → reduces ripple current

$C_2$  → smooths voltage further

output will be ~310V with high frequency

## Section-2



T1 is ferromagnetic transformer  
comes with galvanic isolation

\* The transformer's primary side is controlled by the switching circuit TNV268PN.

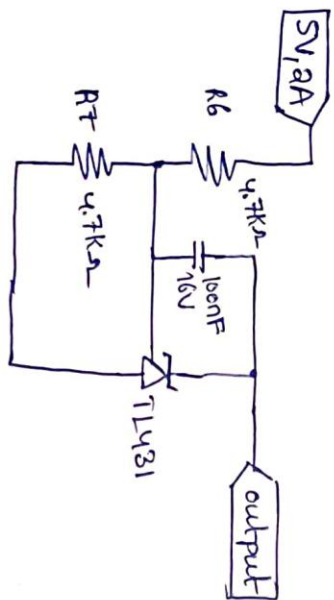
\* The switching frequency is 120-132 kHz. Due to this high frequency, smaller transformers can be used.

\* Under voltage lock out protection is done by sense resistor R1 and R2.

\* C4 is X-class capacitor, a voltage rating 2KV

- \* C3 is bypass capacitor
- \* U1 is TNV268PN
- \* D1 and D2 are the clamp circuit
- \* D1 is TVS diode
- \* D2 is ultra fast recovery diode

\* snubber circuit provided suppression of voltage transient over switching.



- \*  $R_6$  and  $R_7$  are voltage divider circuit from 5V output
- \* This divided voltage is fed into the REF pin of the TL431
- \* The TL431 has an internal reference voltage of 2.5V

So TL431 + op-amp is feedback loop.