Soft Start

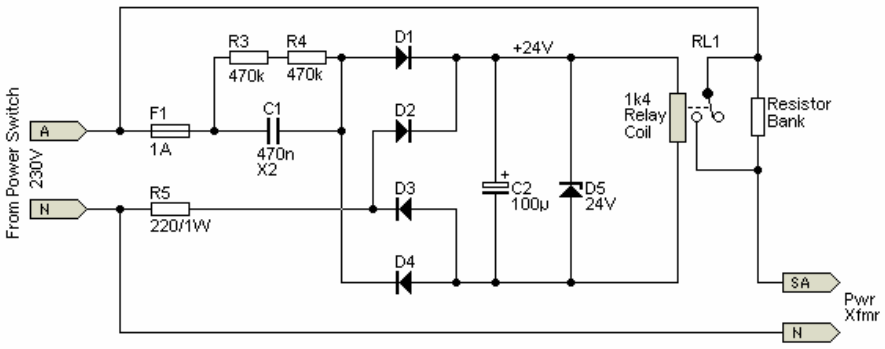
Rod Elliott

The circuit in Figure 6A is simplified even further, and variations of the theme are all over the Net. It relies only on the value of C2 for timing, and the relay coil gets a (relatively) slow voltage rise. Should C2 degrade (because it's next to the resistor bank for example), the timing will reduce as the capacitance reduces with age. The coil resistance of the relay you use is fairly critical. The resistance should not be less than 1k or either power supply won't be able to provide the necessary current. Many 24V relays have a coil resistance of 1.4k or more.

Any transformerless design involves multiple compromises, and the circuits shown are no different. Because of the capacitor feed (C1), the voltage rises relatively slowly. It takes around 120ms to reach 24V with 230V/ 50Hz mains, and about 90ms for 120V/ 60Hz with double the capacitance. Consequently, it is not possible to have the soft-start delay any less than this unless you can accept very high ripple on the 24V DC line. The circuit using an auxiliary transformer has no such limitation, as full voltage is reached after only a couple of mains cycles (~40ms at 50Hz, or 33ms at 60Hz).

The Figure 6/ 6A circuits are just two ways it can be done, but there are other possibilities of varying complexity. It's not feasible to show them all, and especially those that you may find elsewhere, some of which are a disaster waiting to happen. There are many I've seen on the Net that are definitely in the latter category - while they will (probably) all work when power is first applied, many (most?) have no provision to ensure that the storage cap is discharged, and it may take several minutes (or sometimes a great deal longer) after power-off before the circuit will actually provide soft start again. The idea of ensuring a quick reset doesn't appear to have been considered, so they are no more useful than a hot thermistor.

Any soft-start circuit that does not provide a reset time of less than 1 second is a liability, and should not be used. Ideally, the system would reset instantly, but this is unrealistic. In (what's laughingly known as) the real world, we should aim for a reset time of no more than perhaps 150ms, with 500ms being the (just tolerable) upper limit. It's not an easy compromise to get reliable delay and a fast reset in a simple circuit.

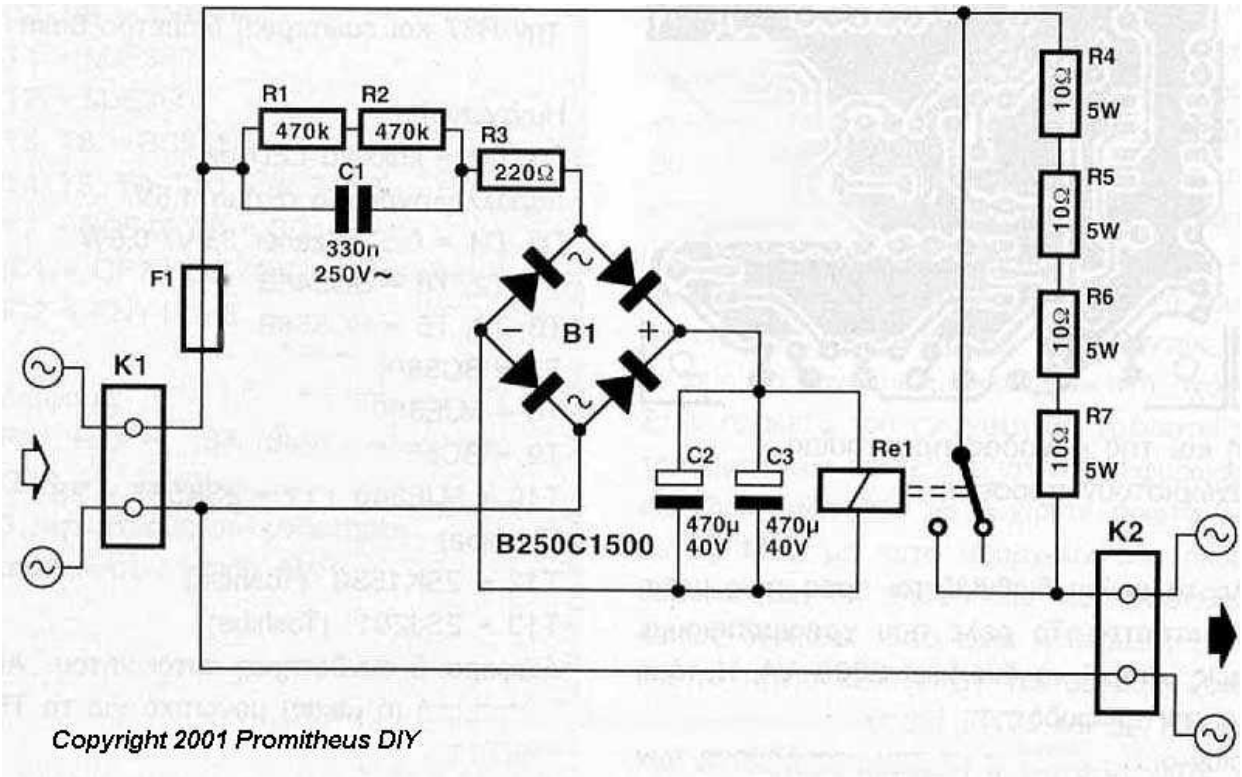


Soft Start for Power Supply

The circuit will limit the current through the supply wires to 5.5A for about 1.5sec. After that time the relay will close and the current flow won't be restricted anymore. This is a very interesting circuit if you have a large toroid with big electrolytic caps connected to the power supply, since these will act like short circuits for a small amount of time if they start charging.

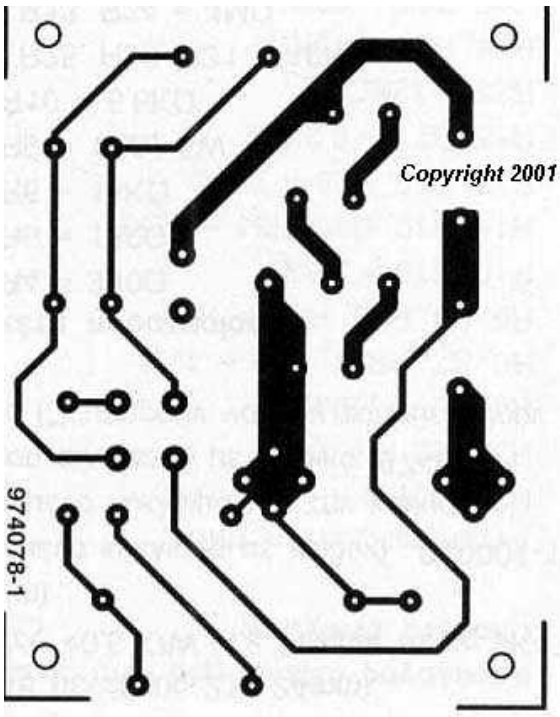
This unit is a delay unit that can be connected directly to the mains power supply. It´s not obligatory to use one but it is a good idea, specially if you have a big toroidal transformer larger than 300 VA.

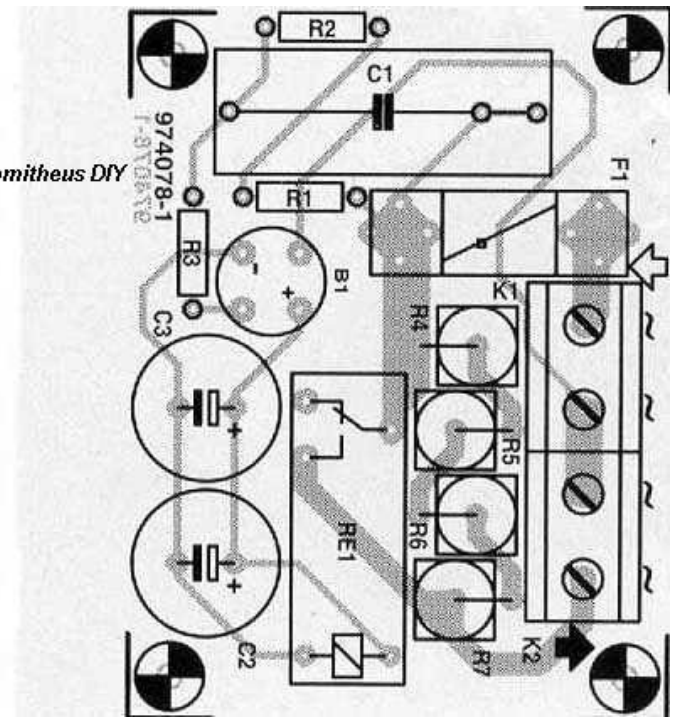
This unit has a delay circuit and for the delayed time the mains power is supplied through power resistors minimizing in this way the big inrush current due to big capacitors and big toroidal transformers in the power supply. When everything is stable it shorts the power resistors and supplies the mains power directly.



List of parts

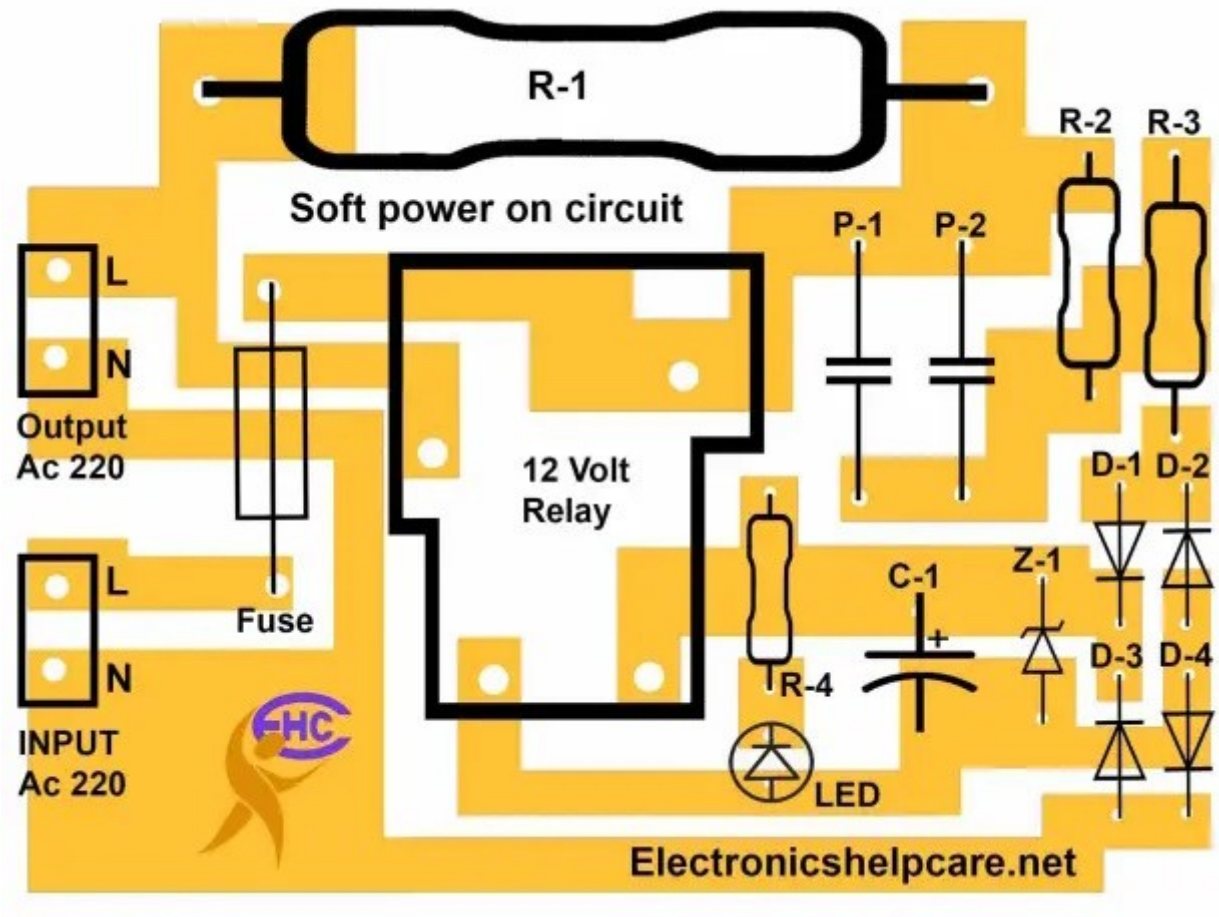
R1, R2	470K	0.25W 1% mf
R3	220R	0.25W 1% mf
R4, R5, R6, R7	10R	5W
C1	330n	250V (for direct mains connection)
C2, C3	470uF	40V electr.
B1	B250C1500	
Re1	24V	(250V-8A contact)
F1	Depends on the amp	





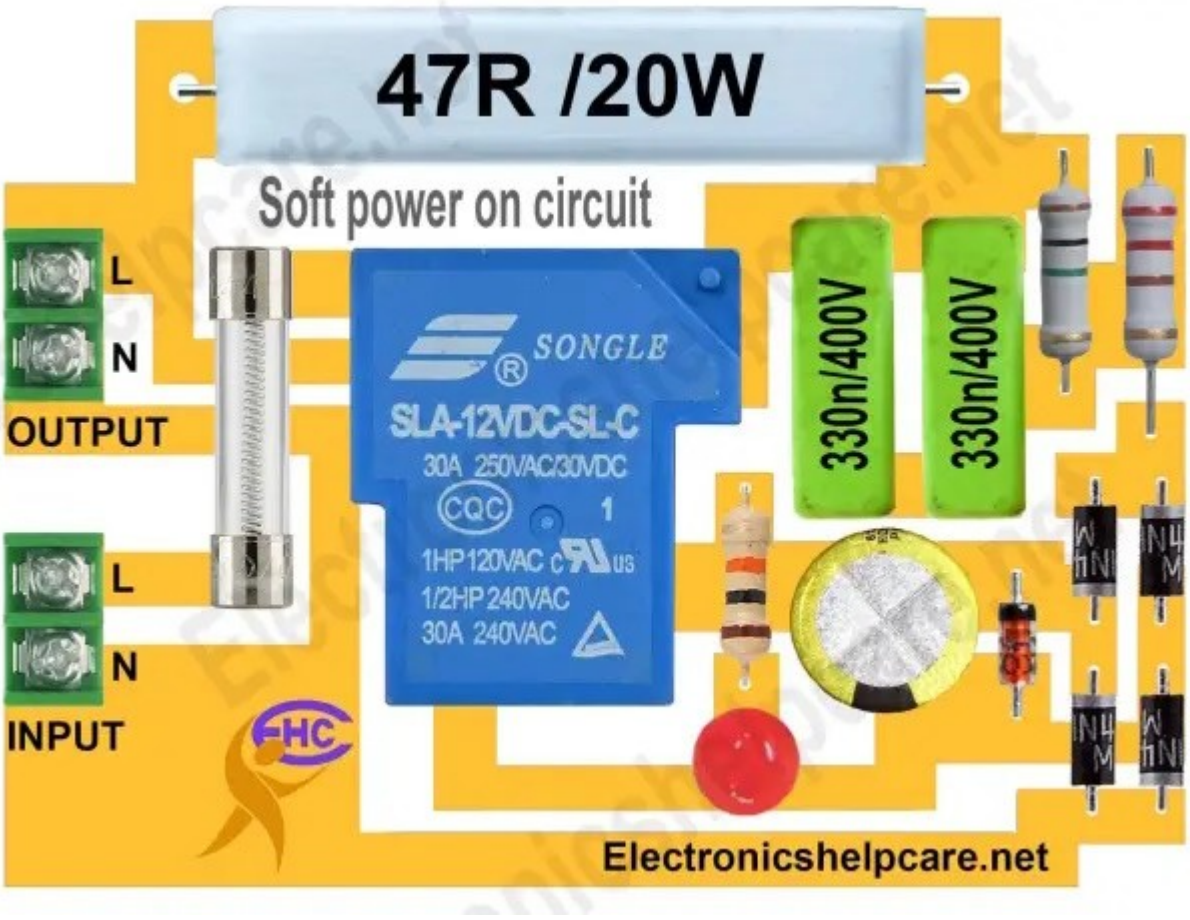
soft power on the circuit

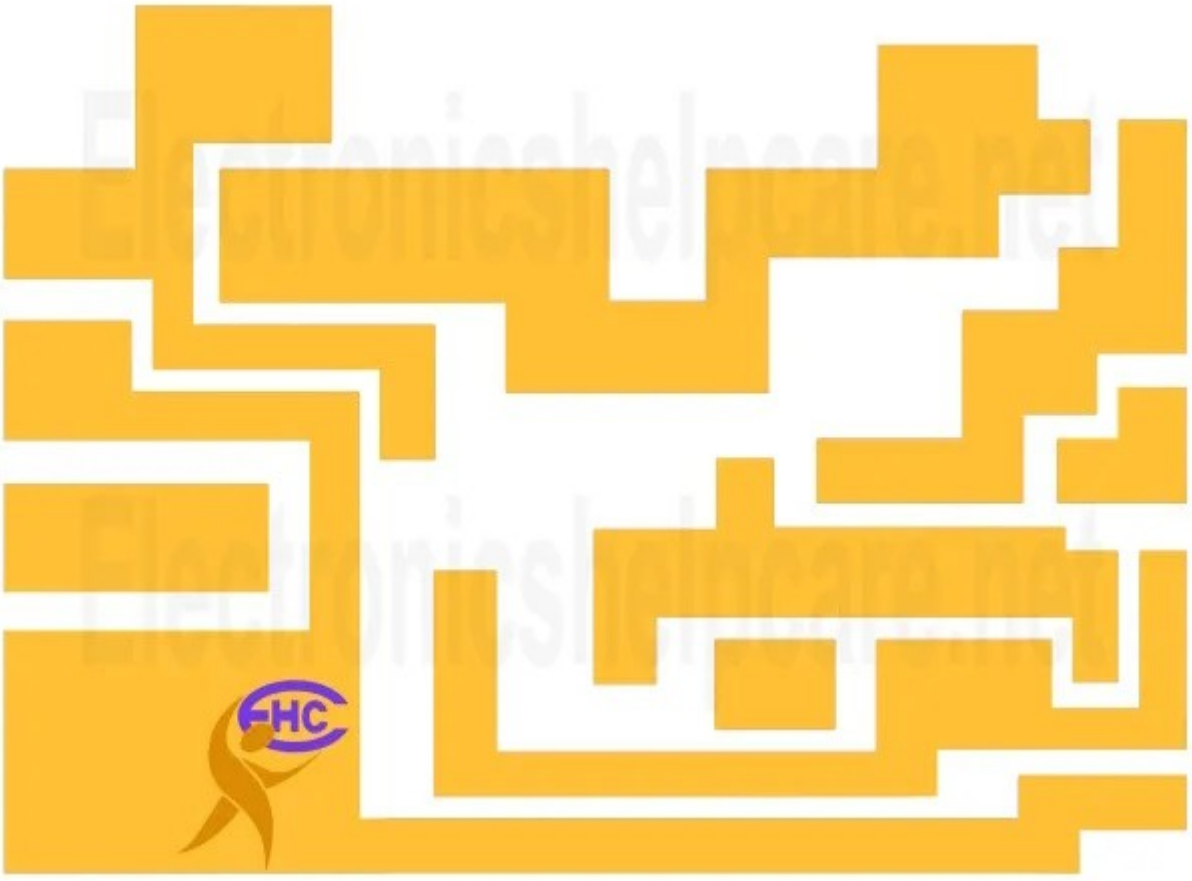
This is soft power on the circuit diagram for the amplifier needs this circuit for soft stater. this circuit switches on the amplifier in a soft mode. sometimes we can see some amplifier makes a noise when the amplifier is switched on. if we use this circuit then the amplifier can’t make a start sound. this circuit can help to switch on the amplifier in slow motion. input voltage is Ac 220. and output voltage also Ac 220.



Parts list

R1 =	47ohm/20watts
R2 =	1M/1watts
R3 =	220ohms/1watts
R4 =	10k
P1 =	330n/400volts
P2 =	330n/400volts
C1 =	2200uf/25volts
Z1 =	12volts
D1+D2+D3+D4 =	1N4007


47R /20W
Soft power on circuit
L
N
OUTPUT
L
N
INPUT
SONGLE
SLA-12VDC-SL-C
30A 250VAC/30VDC
CQC
1HP 120VAC
1/2HP 240VAC
30A 240VAC
330n/400V
330n/400V
FHC
Electronicshelpcare.net


FHC