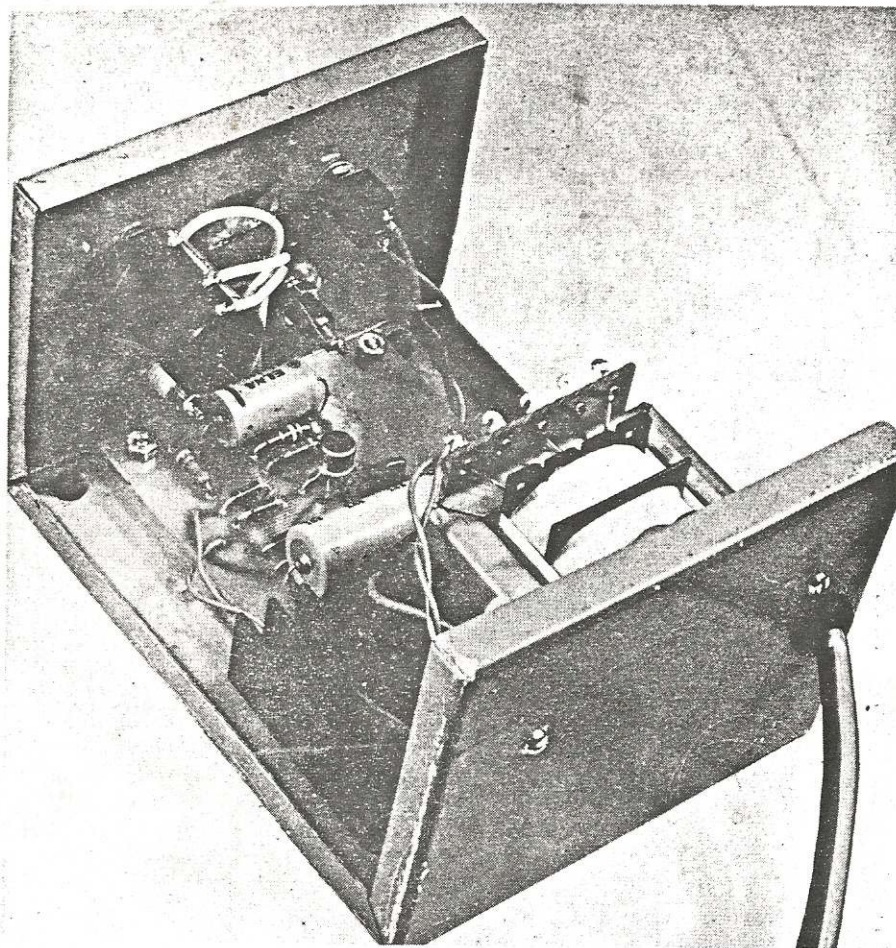


IC POWER



In our April 1972 issue we published constructional details of a dual power supply unit for the experimenter. Since then we have received a surprisingly large number of requests for a simple unit to power RTL and TTL logic circuitry.

Here then are details of a simple yet versatile power supply capable of delivering 1 amp up to 10 volts and ½ amp up to 15 volts.

The unit may readily be adapted to operate over other voltage and current ranges.

If required, refinements such as output voltage and current metering, variable current limiting etc. may be added to the basic circuit.

VOLTAGE REGULATOR IC

The control circuit of this supply is formed by the integrated circuit precision voltage regulator — shown as IC1 in Fig. 1. This IC is now produced by a number of companies including SGS, Fairchild and Motorola (respective type numbers are included in the parts list for this project).

The integrated circuit is a monolithic voltage regulator constructed on a single silicon chip using the planar epitaxial process. The device consists of a temperature compensated



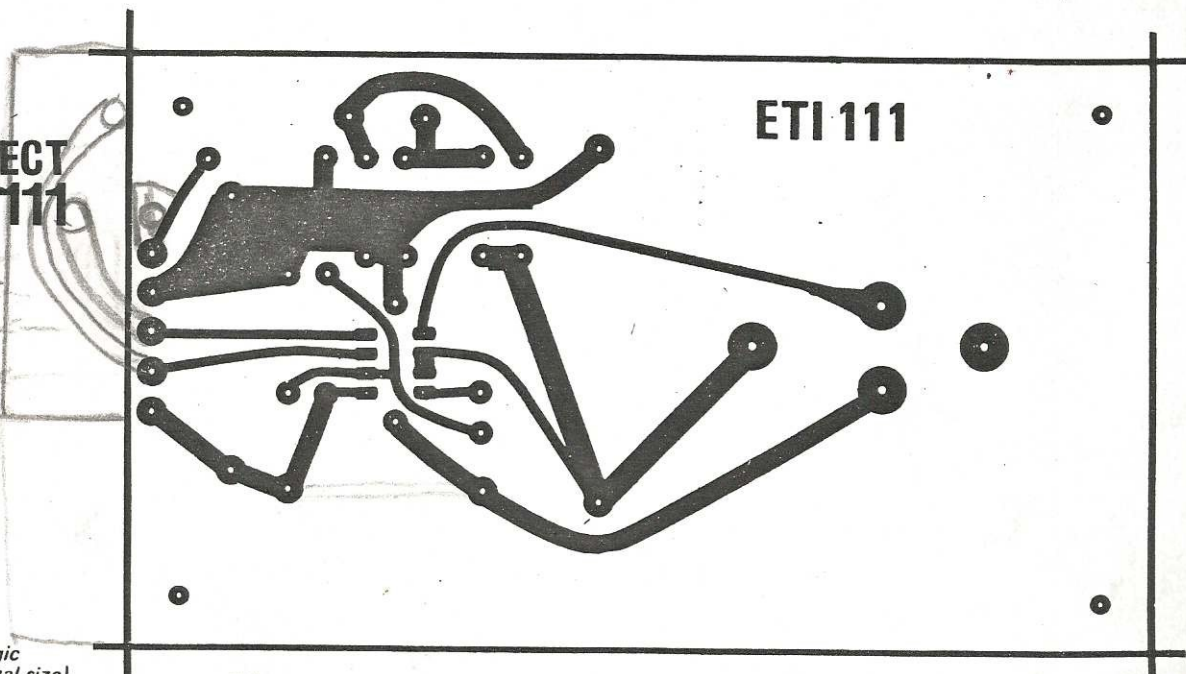
PROJECT
111

ETI 111

RA
0.5 x 10V
RV
w/le
g + v - c

24 x 141
0.62x

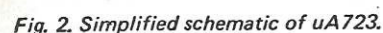
Foil pattern for logic
power supply (actual size).



$$V_{dc} = 1.41 \times V_{ac}$$

$$I_{dc} = 0.62 \times I_{ac}$$

$\{ R3 \quad 8200 \frac{1}{2} \text{ in}$
 $\{ R2 \quad 2400 \frac{1}{2} \text{ in}$
 $1.2 \text{ k}, 0.043 \text{ w}$



35

IC POWER SUPPLY

Fig. 3. Layout of components on circuit board.

0-15V -15V 0.6A
0-30V -

SPECIFICATIONS

Input Voltage	220-240V
Output Voltage	1.5V - 15V
Output current	1A at 10V ½A at 15V
Ripple	Approx. 5mv peak-to-peak (at 10V-1A)
Regulation	0-100mA = 4mV (10 Volt) 0-1.0A = 20mV (10 Volt)

also used for the electrical connection for the collector of the transistor.

The IC may be soldered directly into the circuit - ensure that the device is correctly orientated - and avoid excess heat. Recommended maximum lead temperature during soldering is 300°C.

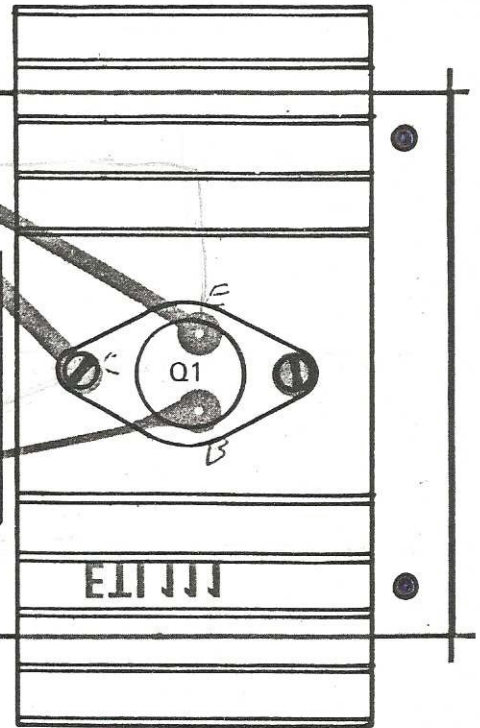
A load sensing resistor (RSC) is used to provide overload protection. In our prototype we used a short length of resistance wire cut to length to limit the current to the desired value. An interesting alternative is to substitute a 20 ohms 5 Watt wire-wound potentiometer for RSC. This enables the current limiting facility to be steplessly varied. With this feature the user can start experimenting with a very low current limit and then increase the current when the circuit is operating correctly.

The basic circuit described in this article can be modified to provide other ranges of voltage and current. The main design limitations are that the voltage across the IC must not exceed 40V and that the output current from the IC must not exceed 150mA, or 800mW of power.

Transistor Q1 (2N 3055) is capable of dissipating up to 115 watts but if power levels of this magnitude are envisaged then a second transistor should be added, in a Darlington pair configuration, to transistor Q1. This will reduce the loading on IC1. A larger heat sink will also be required.

INCREASED RIPPLE REJECTION

The integrated circuit chosen for this project has a typical ripple rejection of 74 dB. This is more than adequate for most applications. However by additional filtering at the non-inverting input (pin 3), the ripple can be even further reduced. A typical performance, using a 4.7µF capacitor across the non-inverting input and Vref is approximately 86 dB.



0.5Ω 1.2A.
100Ω 0.006A

6Ω - 100mA

RSC - TYPICAL VALUES

Value of RSC	Current Limiting
10 ohms	65mA
1 ohm	650mA
0.5 ohms	1.4A
0.2 ohms	3.2A

1N4005 - 1A 600V.
Diodes 0.62A each

PARTS LIST ETI 111

R1 OP.	resistor 470 ohm ½W 5%	2P
R2 OP.	resistor 390 ohm ½W 5%	2P 1.2K 0.043W
R3 OP.	resistor 470 ohm ½W 5%	2P 3.9K 0.148W
RSC OP.	see text 0.5 ohm	
RV1	potentiometer 5k linear	27P
D1-D4 32P	diodes EM401, 1N4005 or similar	19P RS.
Q1 40P.	transistor 2N3055	65P
IC1 76P.	integrated circuit uA723	55P. 20P. 20P.
	(or SGS L123, or MC1723CG)	81P RS
	(metal can-types)	
C1 18P.	capacitor 1000 µF 35V electrolytic	18P. RME.
C2 OP.	capacitor 0.1 µF 100V	
C3 OP.	capacitor 100 µF 25V electrolytic	
T1 3-92	transformer 240V primary 15-20V sec @ 1A	200 MARSHALLS.
OP	PC board ETI 111	25P
	on-off switch, terminals, knob, 3 core flex and plug, metal box approximately 4½ x 3½ x 6 etc.	24V 2A MTBAT 1330

METER £7.00

SPECIFICATION

INPUT VOLTAGE 240V.

OUTPUT VOLTAGE, TWO RANGES.

4V - 15V. ①

4V - 30V. ②

OUTPUT CURRENT, ① 640mA at 12V

70mA at 15V.

② 1.2A at 20V

400mA at 30V.

CURRENT LIMIT 0.006A - 1.2A.
