

TALKING ELECTRONICS®

THE LEARNING MAGAZINE

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Issue No 4.

6 LOW COST PROJECTS



- ★ Shoot Game
- ★ Star-Wars® Noises
- ★ Experimenter Deck

- ★ F.M. Wireless Mic
- ★ 4-Amp Power Supply
- ★ Metronome

TALKING ELECTRONICS

Editorial...

Vol.1 No.4

I am getting the exact response I had hoped for. Every day or so I get a jiffy bag in the post containing an assembled project. Generally they only require addition of text and detailed drawing which we have the capability of providing with super speed. Others need some circuit re-designing. The most encouraging part lies in the obvious thought behind them. They have all been a slight advancement of a project we have just presented in the magazine. This is not a simple copying approach but a logical progression. The very approach I am so earnestly attempting to introduce.

If you have an idea, even in partially finished form, let us know. We even supply 3-IC's Experimenter Boards to build them on. But don't let a moment go by. Get something done and you may even see your name in print. It's worth a lot more than money and you will be an encouragement to both yourself and other readers. This is your magazine as well as ours.

To my knowledge, we are the first magazine to produce digital electronics from ground level. Designing around chips is the only progressive approach. After all, where is the next generation to get their knowledge from if they don't have access to the basics now? Even so, we have only about 10 years for discrete chip designing. After that, all equipment will contain custom-designed chips or programmable chips...what an incredible future.

Colin Mitchell.

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-Craig Jones

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-Steven Babidge

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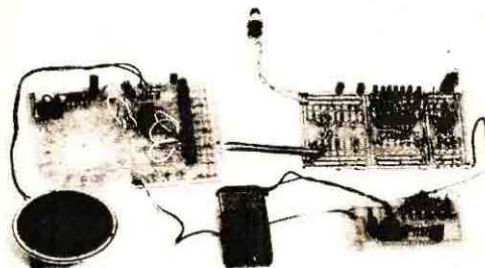
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Our Cover Photo:

Electronics is for everyone. André Switzer is an enthusiast, and has made a couple of our projects. Susan Frost just prefers the finished project. Both attended Sandringham Technical School. Photograph by Kevin Poulter.

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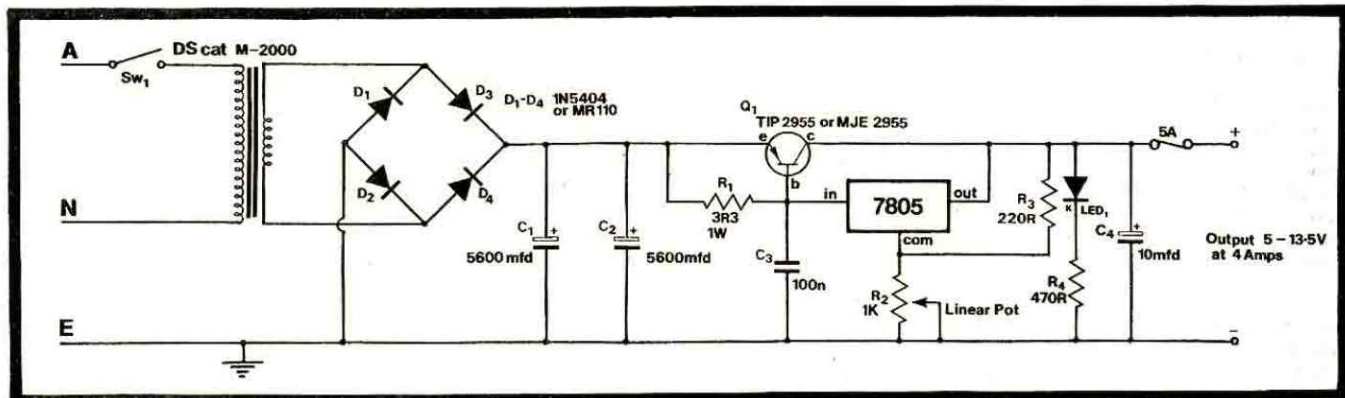


SHOOT GAME P.20

4 Amp Power Supply

David Tindall

3108



We have been asked many times for a 3 or 4 amp power supply for heavy-duty applications such as model railways, computers and 2-way radio base stations. This circuit, supplied by David Tindall, should fulfil these requirements. It is an extension of our 1 amp power supply in the last issue but by increasing the current to 4 amps we are unable to use most of the original components. Not only does the power transformer need to be up-rated, but the power diodes and electrolytics need to be changed. At the end of the article we have made suggestions on the practicality of doubling up the transformer and diodes to give up to 4 amps output. This will depend on the relative cost of a 1 amp transformer compared with a 6 amp version. Similarly a 6 amp bridge will work out cheaper than individual diodes. The current handling and limiting was originally handled by a 7805. Since this regulator is limited to 1.5 amp, the current handling has had to be transferred to a TIP 2955 transistor. We have still been able to use the 7805, this time it provides the control voltage for the power transistor. Since the shut-down capabilities of the 7805 are not available to us with this circuit configuration, we must include a fuse in the output line.

HOW THE CIRCUIT WORKS

The bridge rectifier and 5600mfd electrolytics smooth the AC to less than .1v ripple and it appears at the emitter of the TIP 2955 transistor at about 22v DC. This voltage would be quite suitable for model trains and any equipment containing an inbuilt regulator, however it does contain an annoying 100Hz hum which would make it quite unsuitable for power amplifiers. In addition it is present at 22v and little, if any, equipment is designed for this voltage. The remainder of the circuit will reduce the voltage to a specified level and improve the regulation considerably. The 3R3 resistor serves a dual purpose:

1. It keeps the TIP 2955 turned off, and
 2. It will supply current and voltage to operate the 7805 regulator as required.
- Suppose we set the adjustable pot to zero ohms. This will mean the common lead of the 7805 is grounded and it will deliver 5v to the output. How does it maintain this voltage up to 4 amps- as this is greater than the normal handling capacity of the 7805?

To follow the regulation process we will need to take the effects in slow motion.

Firstly we will describe the operation of the TIP 2955 without the 7805 in circuit. When the power is turned on, the 22v appears at the emitter of the TIP 2955. The transistor will be turned off since there will be no voltage drop in the 3R3 resistor and the base will be at the same potential as the emitter. Under this condition there will be no voltage at the collector output.

If we now add the 7805 regulator, it senses a voltage at its "in" terminal and attempts to provide a voltage which is 5v higher than its "common" terminal, at the "out" terminal. Since the "common" is connected to ground, in this discussion, it will attempt to supply 5v to charge the 10mfd electrolytic. Since the transistor is not providing any voltage itself to the output, the 7805 attempts to do this. In doing so, it puts a load on the "in" terminal, thus creating a voltage drop in the 3R3 resistor to turn the TIP 2955 on very slightly. The collector voltage rises to 5v and remains at this level.