TALKING ELECTRONICS®

THE LEARNING MAGAZINE

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Issue No 5.

4 DIGITAL PROJECTS

LM380 AMPLIFIER

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LED DICE

WITH REALISTIC 'TUMBLING' ACTION

TALKING ELECTRONICS

Editorial... Vol.1 No.5

I'm happy to say our policy is working. We have penetrated the market very successfully with the magazine and reached a large percentage of schools and radio clubs. From some of our mail we have become aware of one major omission in the social side of electronics. There is a growing need for electronics clubs catering for hobbyists interested in ELECTRONICS IN GENERAL. Up to now you had to be interested in amateur radio or CB or computers and these clubs tended to exclude a large percentage of experimenters. Radio clubs in schools or Scout groups cater for the young but we are finding older people (even retired) are wanting to add to their knowledge. And they have no-where to meet. Electronics has a jargon all of its own and words such as "pf, mfd, cap and tranny" must be spoken to understand how they are sounded. Most electronic hobbyists are gregarious. They like to discuss their interests. But to date they have been denied this opportunity. With our voice and coverage I hope we can rectify this. Our initial task is to generate interest in group meetings all over the country. Beginning by postal contact we would like you to write in to us so that we can organise a CLUB ROLL. This has proved popular with other hobby clubs and I hope it can work for us. Let's see what develops. Cheers,

Colin Mitchell.

Technical
-Craig Jones

Artwork
-Steven Babidge

Enquiries
10 Minute queries will be tackled on 550-2386

Our Cover Photo
A game of Monopoly is fun. It's a lot more fun when you play it with your own electronic dice. Our Photographer Kevin Poulter brought out his set from the back of the games cupboard when he heard we had a dice project this issue.

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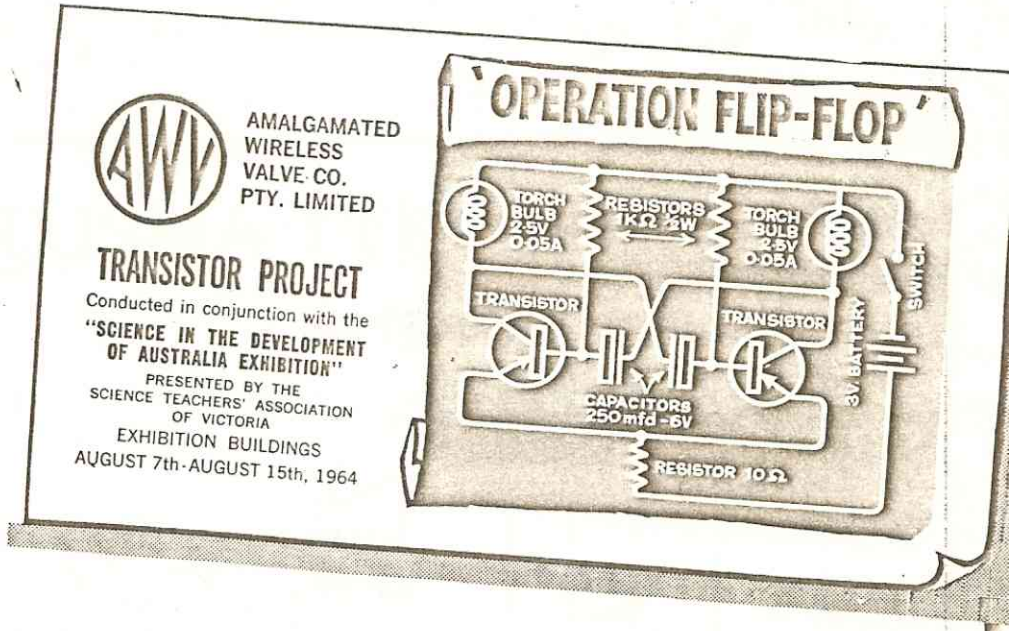
THE TRIGGER PULSE

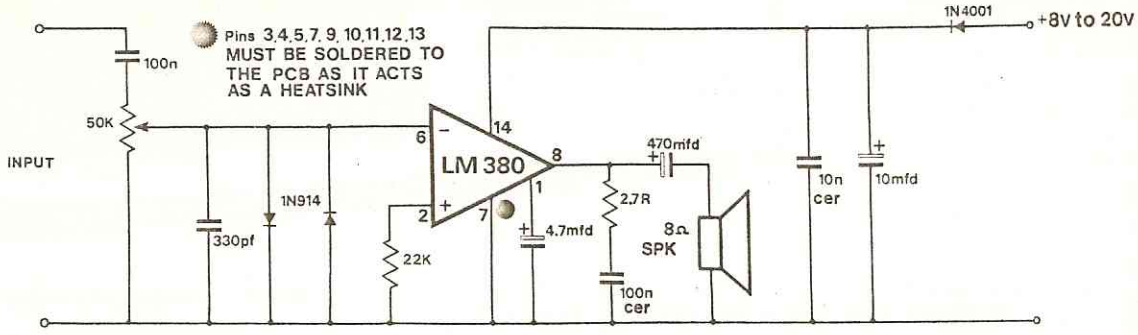


It possibly happens only once in a lifetime. Something completely unexpected occurs to change your course for the rest of your life.

It happened to me on 10th August 1964. I have a card to prove it. I was casually walking around the Exhibition Buildings taking notice of the highly sophisticated displays when I came across the AWV stand. FREE transistors were being given out. Now to give out such precious devices in those days was really a novel occurence. You see, transistors just a few years prior were costing about $3.30 for the simple equivalent to a BC 557. So when I saw TWO free transistors I was quite excited. It would be like micro-chips being handed out by Dick Smith at a grand opening. Not only were the transistors good, marked devices, but the accompanying card contained a suitable simple circuit diagram. Up to this time, most of the circuits I had built were centered around radios and amplifiers. This was the first time a flip-flop had been presented to me. This was the turning point of my whole career. The fact that transistors could be used for exciting self-contained projects to operate lamps and relays opened up a completely new horizon. The possibilities of electronics immediately expanded. I was very narrow in my thinking because electronics had never been properly explained. The thought of oscillators, flip-flops and trigger circuits became infinitely more challenging than radio. Not only were the circuits simpler and completely portable but they could be altered and adjusted to operate so many devices. No longer would I be tied down to pumping a speaker or clamping on a pair of headphones. After experimenting with the flip-flop for hours and hours, I went on to make up more complex circuits. Some of my early achievements included the control of venetian blinds to make them open and close automatically, according to the brightness of the day, actuating mechanisms to lock and unlock the back door to my workshop, water level monitoring and rain alarms to help mum with the washing (we didn't have a tumble dryer then),voice operated relays and burglar alarms and a few more of which I only have a brief recollection. The circuits were generally based on standard blocks called "building blocks". Most of these had names and what's more appropriate than naming them after the inventor. Thus we have such names as Hartley oscillator, Schmitt trigger and darlington pair. Some sectors of electronics haven't changed, others have altered radically. The introduction of Integrated Circuits has created the most noticeable change however building blocks are still with us and the designers names are still current. The fun and enjoyment of electronics is still solidly available. The chip has considerably increased the range and possibilities of electronics and makes former unreachable projects become economic.
Looking back, I think I can give a great deal of credit to AWV. I doubt very much if I would be so involved with electronics if it were not for this incident. Who knows, maybe a similar change of direction will occur for you. It could come from a career's night, a friend, school or even this magazine. If it hasn't quite clicked yet - be patient, at any time you could experience a current version of the excitement I felt way back in 1964.

SIMPLICITY AMPLIFIER

By R. Mellor



As the name implies, this amplifier is simplicity itself. It requires only 13 components around a single chip to deliver about 2 to 4 watts into an 8 ohm speaker. It can be connected to a 1 amp power supply as described in issue 3 or powered by a couple of lantern batteries. Ideally it should be operated on 20 volts and the ratings are all determined at this voltage. As you will see by the table, the power drops off appreciably with voltage and becomes almost transistor-radio power at 9 volts. If you intend to use the amplifier as a "bench amplifier" on 9 volts, it may be feasible to incorporate a 216 battery into the case and keep the whole unit very compact. From our knowledge of the life of a 216 battery, you will be looking at about only 10 to 15 hours life. This will be OK if you intend to use the amplifier for test purposes or for trouble shooting other amplifiers or testing pre-amplifiers. For any other applications, we strongly recommend a regulated power supply.

THE LM 380 IC

The amplifier is based on National's LM 380 dedicated operational amplifier. The printed circuit board may seem unusual with the large amount of copper still left on the board. This copper acts as a very efficient heat sink. The heat generated in the chip passes through the centre pins and into the copper. This idea is a great improvement over the heat fin required by most other IC's and it is cheaper, simpler and creates a more comact module.

We have not described a case for the amplifier as it will fit into a number of boxes. With a little squeeze, one of our testing staff managed to fit it into a casette case. This means it will take up very little room and can be put away like an audio tape. If you intend to use the amplifier as a piece of test equipment this compactness will be appreciated. Depending on the size of case you choose, the attachment of leads can be either via wire-wrap pillars or direct soldering. The other ends of the leads should be fitted with alligator clips, colour-coded according to their function. The board is designed to fit into a UB3 jiffy box and in this case the 50k trim pot would be replaced by a regular 50k pot and the switch mounted on the end of the box. If a self-contained bench amplifier is required, a speaker can be fitted into the box leaving just enough room for a 216 battery.

HOW THE CIRCUIT WORKS

The 100n capacitor blocks any incomming DC from biasing the LM 380. The signal is then fed to a 50k pot which picks off a percentage of the input signal via the wiper and acts as a volume control. The two input diodes render the input virtually destruction-proof. You can attach the amplifier to virtually any unknown signal source without damaging the LM 380. The diodes conduct at about .6 to .7 volt and shunt any high amplitude signals to earth. The 22k resistor connects the non-inverting input to earth - approximating the input pot in its mid position. Internal stabilization is prodived by the 4.7mfd electrolytic