THE WEST RAND AMATEUR RADIO CLUB

November 2009
Volume 10, Issue 5

ANODE

Inside this issue:

Editor's Comments	1
A Collection of Circuit Ideas	1

Editor's Comments

Volume 10, Issue 5
November 2009

http://www.amateurradio.org.za/

As Promised
In this issue I am going to fill it with "Circuit Ideas".

Lessons in Electronics
http://www.openbookproject.net/electricCircuits/

South African Amateur Radio Development Trust

62,000 broadband customers desert Tiscali
The company has claimed the departures were anticipated, and says its new "customer retention scheme" has improved confidence in the service and slowed departures, ahead of the deal's finalisation.

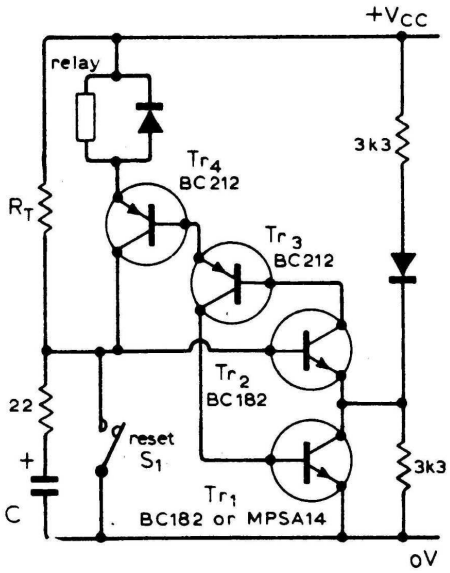
Don't Mess with Seniors

(continued on page 9)

A Collection of Circuit Ideas - 1

One-shot timer circuit

The circuit shown is a four-transistor configuration which is similar in operation to the well-known 555 device but, since the normal state is all transistors on, the circuit has a high degree of impulse noise immunity - thereby avoiding the occurrence of spurious timing cycles which are sometimes troublesome in i.c. timing circuits.



In operation, the voltage on the timing capacitor C rises until Tr2 begins to conduct which in turn causes Tr 3, Tr 4 and Tr, also to switch on. Regeneration in the circuit is caused by the interaction of Tr 2 and Tr 4, and the timing capacitor is discharged to about 0.6V by the operation of Tr 3 and Tr 1. The timing cycle is initiated either by the application of VCC or by the opening of Sp As in the 555, the timing period is Vcc independent as long as it is stable during the timing cycle.

J . L. Linsley Hood, Taunton, Somerset.

Contributors to Circuit Ideas are

(continued on page 2)

Special points of interest:

- Contact details on back page (corrected & updated)
- Ham-Comp Latest on web site.

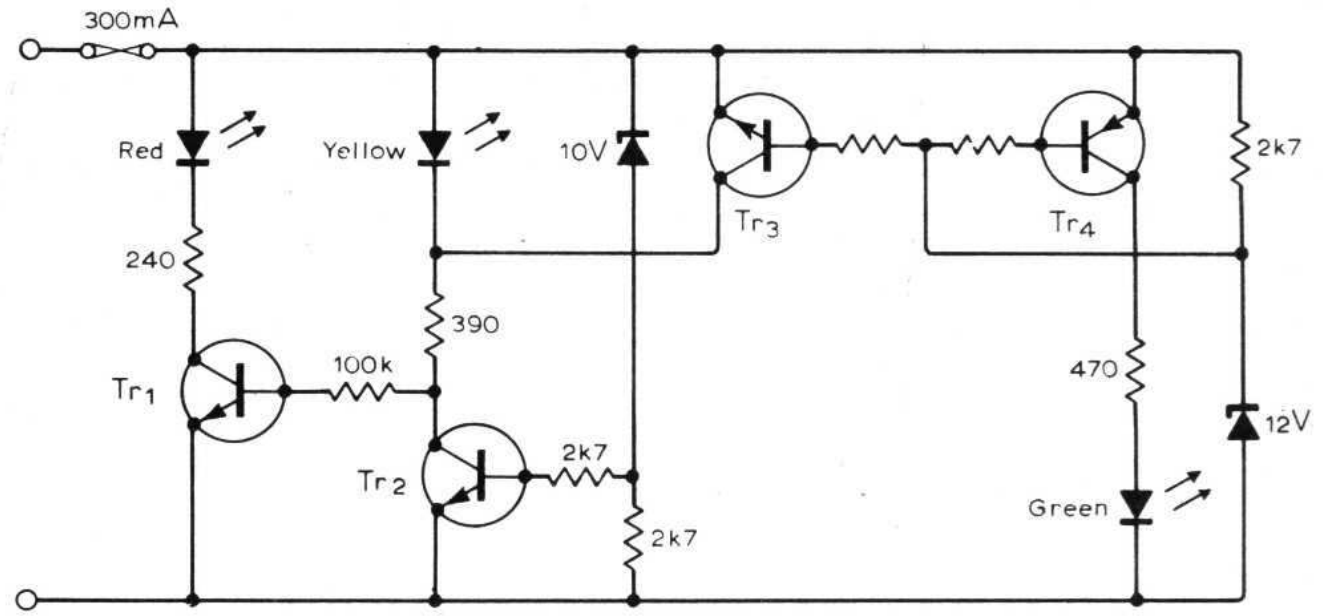
A Collection of Circuit Ideas - 1

(continued from page 1)

urged to say what is new or improved about their circuit early in the item, preferably in the first sentence.

can be easily modified for different voltages by changing the zener diodes.

S. C. Mathur Weybridge Surrey



Automotive voltage indicator

An indication of battery voltage is useful to the motorist for monitoring the battery's capacity to delivery current, and as a check on the efficiency of the dynamo or alternator. This circuit is a solid-state alternative to a moving coil meter. The table shows the outputs obtained over the critical range of 10 to 14V.

When the input is below 1OV, Tr 2, Tr 3, and Tr 4 are off and Tr 1 is turned on. As the voltage rises the 10V zener diode begins to conduct, Tr 2 receives base current and turns Tri off.

At approximately 1 IV both Tr, and Tr 2 are on, but at 12V only.'. Tr 2 is ory. Similarly, Tr 4 is turned on-as the voltage rises to 14V and the 12V zener conducts.

Transistor Tr 3 takes current from the yellow L. e.d. and turns it off while Tr 2 remains in conduction to keep the red L.e.d. off. The circuit

Bench power supply

The circuit shown provides 0 to 15V and a current up to 175 mA. Current limiting is provided by the 5.6-ohm. resistance and the diode D1. When the voltage across the 5.6-ohm resistance exceeds about 1.2V, the current source TY, produces less current and the output voltage is reduced.

The 15-k Ohm resistor from the emitter of Tr 1 provides feedback so as to reduce the current variations through the regulator diode. A 10% line voltage change therefore produces only a 2 mV + 0.0 1% change in V~. A full load current change produces a 1.5 mV output voltage change; and the output voltage recovers in 3 ps to within 10 mV of V out after a full load -current change. The three-transistor combination TY29

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A Collection of Circuit Ideas - 1

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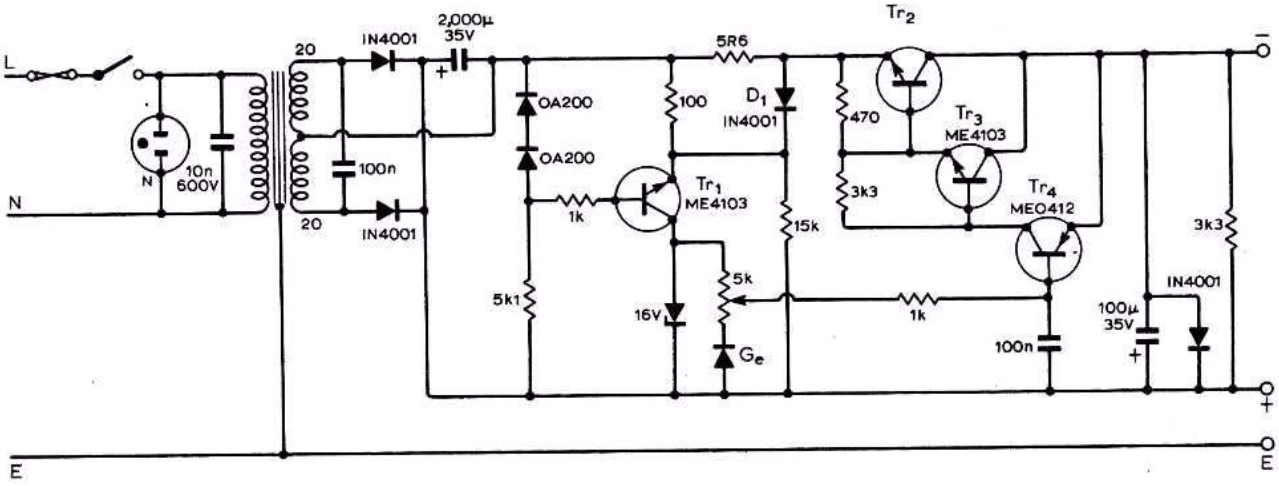
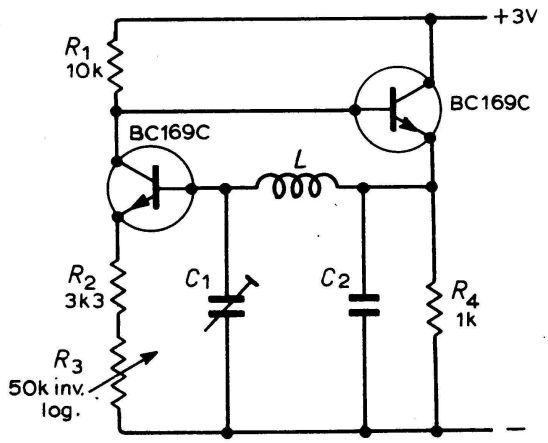


Tr, and Tr, therefore provides fairly high gain and wide bandwidth. Output impedance at 100 kHz is less than 0.3 ohm. Output voltage temperature coefficient depends on the regulator diode temperature coefficient, the base-emitter junction of Tr and, at, low voltage, the germanium diode. In this respect the circuit is inferior to conventional circuits and a coefficient of 12mV _+ 0.10/6/deg C is achieved. Output ripple voltage is greatly dependent on the Early effect in Tr4. Using the device shown a ripple of less than I mV is obtained. Charge storage spikes from the rectifier diodes are removed by the 100 nF capacitor across the transformer secondary.

J. A. Roberts, Merthyr Tydfil.



Good-tempered LC oscillator

Transistor oscillator circuits are prone to the Vices of squegging. operating at the wrong frequency. or just failing to oscillate if used in conjunction with "unsuitable" inductors or capacitors in the tuned circuit. The arrangement illustrated was derived from the Colpitts circuit to provide a simple way of checking the inductance of a collection of iron-cored inductors, but it can be used as a general-purpose oscillator circuit up to about 10 MHz. Feedback is negative at all frequencies at which the LC network does not provide phase inversion and voltage step-up, and the only time-constant is the inevitable one introduced by the tuning components and

(continued on page 4)

A Collection of Circuit Ideas - 1

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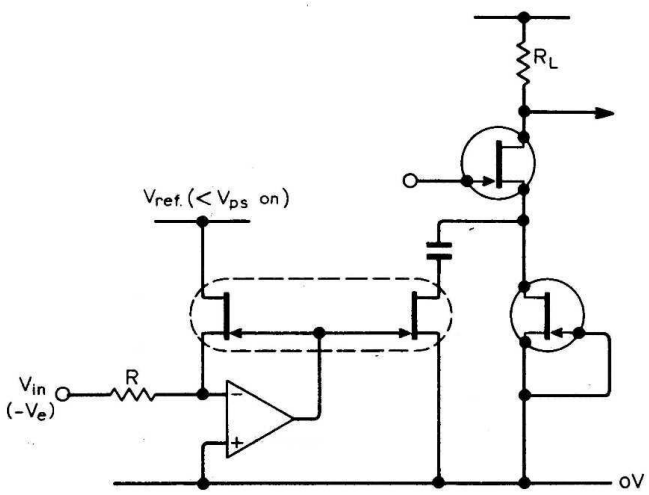
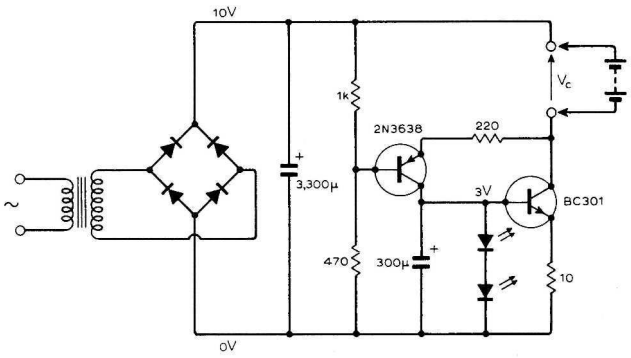
associated resistances. Capacitances Cl and C2 are effectively in series, and it is possible to make C2 much greater than Cl and so avoid curtailment of the tuning range. If waveform is un-



Linear Voltage Controlled Amplifier

This circuit is based on dual matched f.e.t's. and can be used in applications such as linear voltage controlled amplifiers and two-quadrant multipliers. The resistance of the f.e.t. in the feedback loop is adjusted automatically to source the current demanded by Vi, This resistance, and therefore the resistance of the other f.e.t., varies inversely with input voltage. The gain of the amplifier stage is given by RL/VfR * Vi, and is variable over about 80 dB.

B. Turneir & J. Custo, Tewkesbury, Glos.



Battery charger

The simple circuit shown is for charging four size D nickel cadmium cells in series at constant current and with automatic voltage limiting. The BC301 acts as a current source, its base voltage being stabilized at about 3V by two l.e.d's, which may also be used to indicate the charge condition. The 2N3638 provides voltage limiting by cutting off the BC301 when Vc approaches the voltage across the 1 kg. branch of the voltage divider. For the component values shown, charge current is 260 mA at low VC, 200 mA at Vc of 5V, and decreases to virtually zero at Vc of 6.5V.

N. H. Sabah, American University, Beirut.

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A Collection of Circuit Ideas - 1

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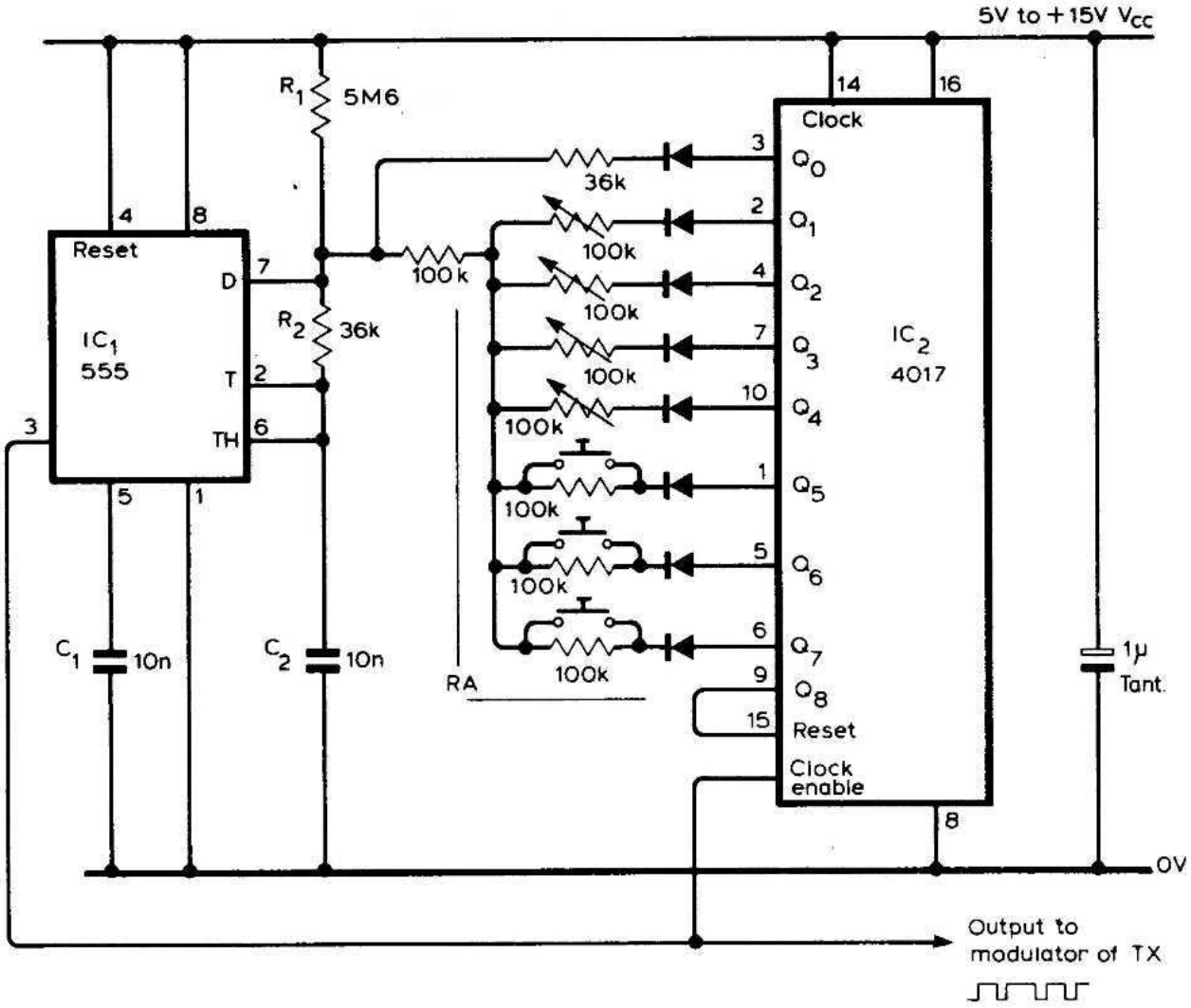

adio control encoder

A simple seven-channel radio control encoder can be built with two Lcs as shown. The circuit operates from 5 to 15 V at 2.5 to S mA and will provide an output current of up to 200 mA. The 555 is used in the astable mode with an off time of 0.25 mS and an on time between 1 and 2 mS except for channel 0 which produces a 0.5 ms sync. pulse.

The decade counter is clocked by the falling edge of the output and is reset when Q8 goes high. Resistor R1 ensures that the 555 oscillates at a low frequency if no outputs are selected. If proportional control is not required, resistors RAcan be fixed values. For a supply below 8V a Zener regulator should be used to prevent variations in pulse width.

S. Ingham Moseley Birmingham

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A Collection of Circuit Ideas - 1

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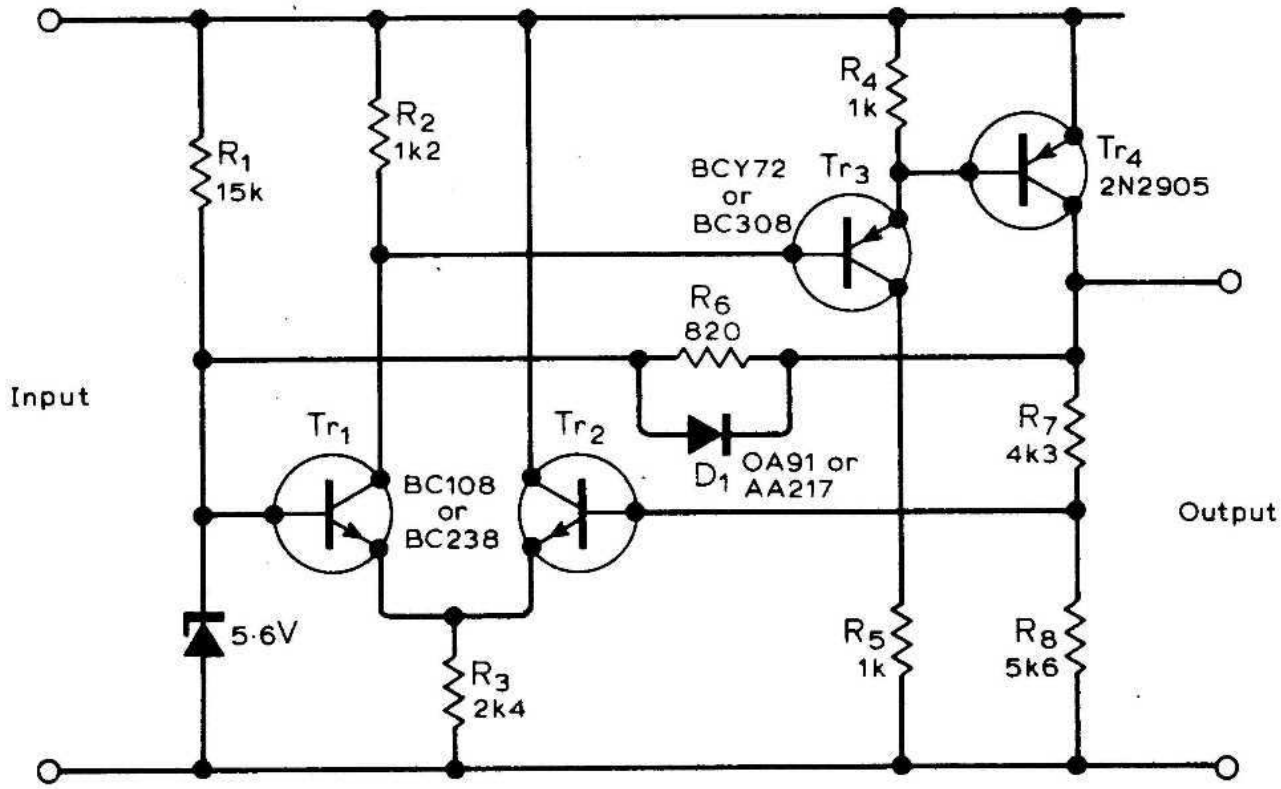

Germanium diode for regulator protection

Power regulator protection is a perennial problem and this circuit offers a simple and economical solution. Under normal conditions, DI is reverse biased by the voltage across R6 and does not affect the regulator operation. When the output is shorted, however, D, turns on and draws current through R, which removes the reference voltage across the zener diode. Because D, is a germanium type, Tr, is held off which also turns Tr 3 and Tr 4 off When the short is removed, the circuit recovers and resumes normal operation.

D. E. O'N. Waddington, St Albans, Herts.

Wireless World, March 1977

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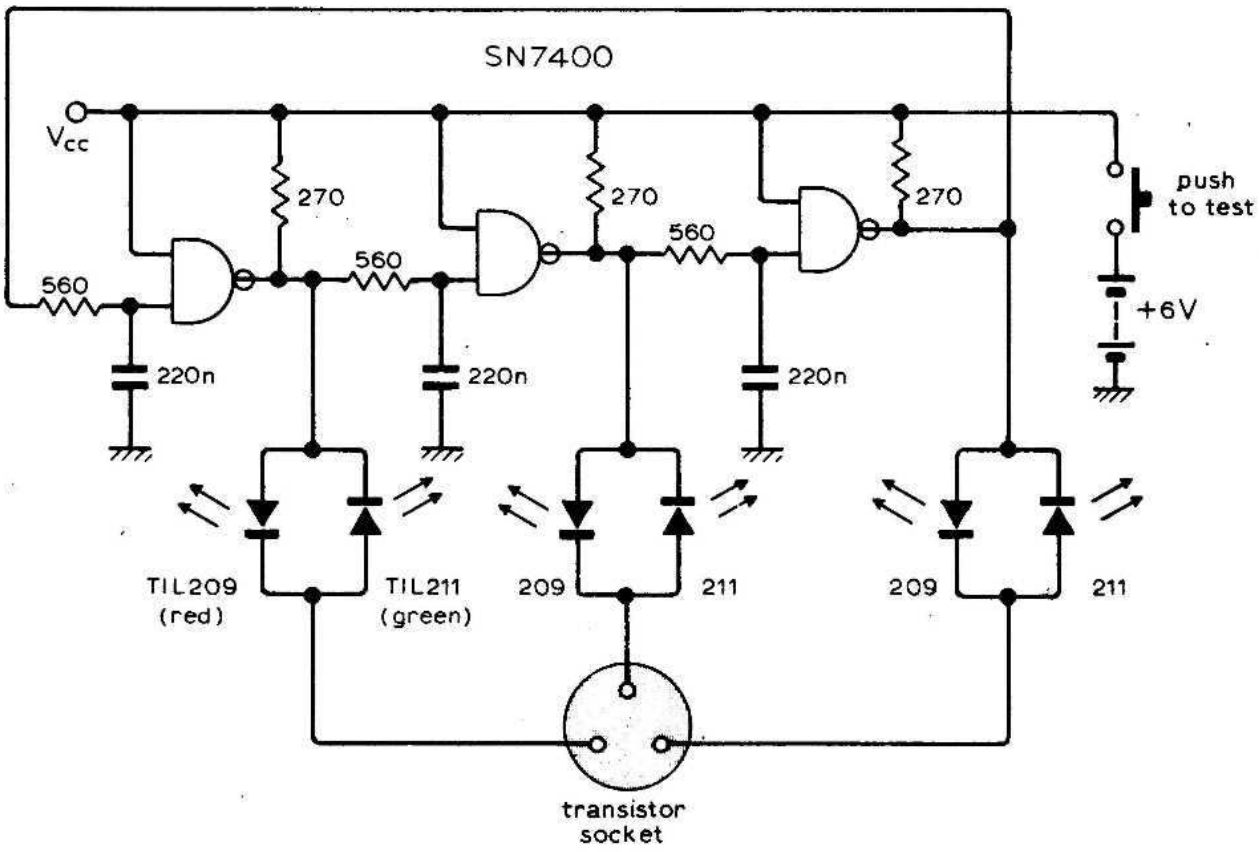
A Collection of Circuit Ideas - 1

(Continued from page 6)



Semiconductor tester

This circuit tests transistors and diodes for polarity, and short/open circuits in one measurement. The same tests using a multimeter would require at least four operations.

A three-phase waveform is derived from the low-frequency ring-of-three oscillator, and applied to the device under test via the L.e.d.s. The oscillator waveform enables each pair of device terminals to be forward, reverse and unbiased for one third of a cycle.

Current flowing into the device will turn the appropriate red L.e.d. on and current flowing out will turn on the green L.e.d. Thus, the position of the base lead and the polarity of a transistor may be deduced.

Voltage drop across the l.e.d's and device under test is typically 4.5V. A t.t.l. "1" will not source current at this voltage, so 270 Ohm resistors have been added to source and limit the diode current. Frequency of operation, defined by the CR network, is not critical, but the resistor should not exceed 1k2 for reliable operation. Oscillator frequency with the values shown is about 2 kHz.

N. E. Thomas, Balham, London.

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A Collection of Circuit Ideas - 1

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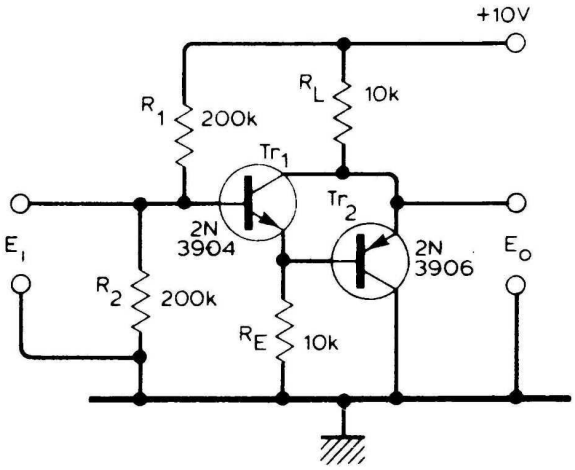


Unity gain buffer with wide frequency response

By d.c. coupling a n-p-n. common emitter stage with a p-n-p emitter follower stage sharing a common load resistor, a unity gain buffer is formed which offers a high input impedance, wide frequency response, low output impedance and low current consumption.

The 3 dB bandwidth is above 80 MHz and by selecting better transistors this can be extended. Care in minimising the lead inductance and stray capacitance will also improve this figure.

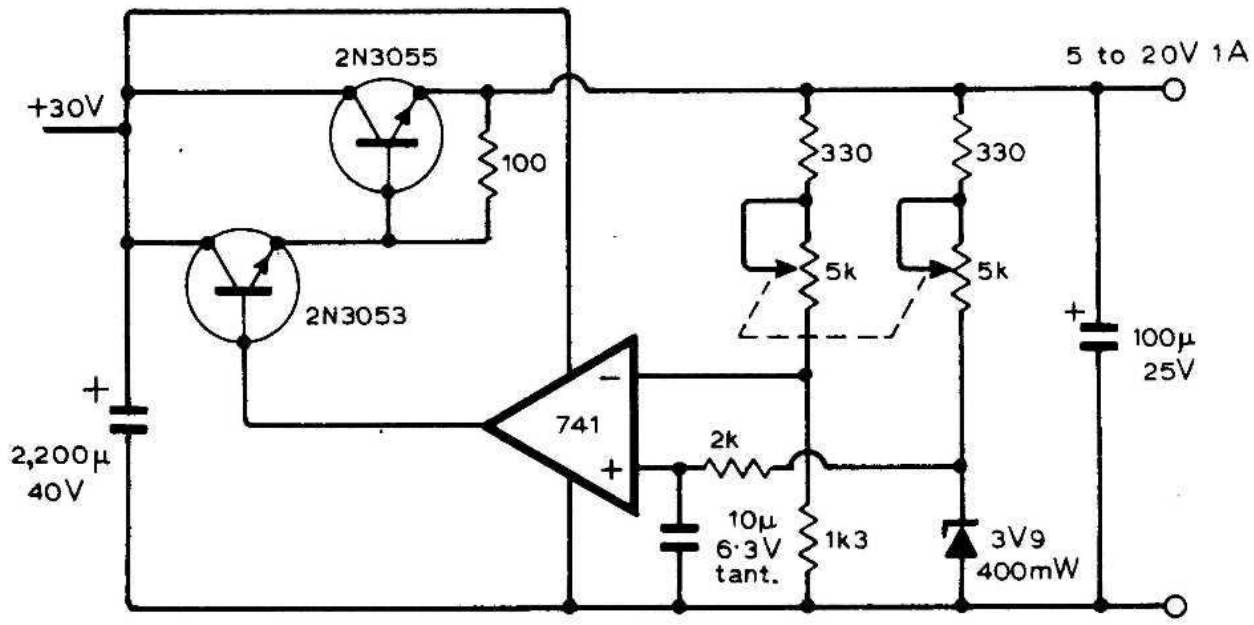
Current consumption is about a mA with a 10V supply. The circuit will operate from 3 to 30V without degrading its performance. It is important to select the correct input biasing resistors because they reduce the input impedance.

A. L. Equizabal Vancouver Canada

Variable power supply with zener stabilization

In regulated power supplies it is advantageous to feed the reference zener diode from the stabilized line. This is more difficult with a variable voltage supply; however, a simple solution to the problem is to use a dual linear potentiometer as in the circuit shown.

L. J. Baughan, CharIbury, Oxon.



Editor's Comments

(Continued from page 1)

"If you are a senior you will understand this one, if you deal with seniors this should help you understand them a little better, and if you are not a senior yet.....God willing, someday you will be.....

The $2.99 Special

We went to breakfast at a restaurant where the 'seniors' special' was two eggs, bacon, hash browns and toast for $2.99.

'Sounds good,' my wife said.. 'But I don't want the eggs.'

'Then, I'll have to charge you three dollars and forty-nine cents because you're ordering a la carte,' the waitress warned her.

'You mean I'd have to pay for not taking the eggs?' my wife asked incredulously.

'YES!!' stated the waitress.

'I'll take the special then,' my wife said.

'How do you want your eggs?' the waitress asked.

'Raw and in the shell,' my wife replied. She took the two eggs home and baked a cake.

DON'T MESS WITH SENIORS!!!
WE'VE been around the block more than once!"

JB 2009-11-08

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Roodepoort
1725

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Email: zs6wr.club@gmail.com
Web page: www.jbcs.co.za/ham_radio

Bulletins (Sundays at …)
11h15 Start of call in of stations
11h30 Main bulletin start

Frequencies
439.000MHz 7.6MHz split
Input: 431.4MHz (West Rand Repeater)
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

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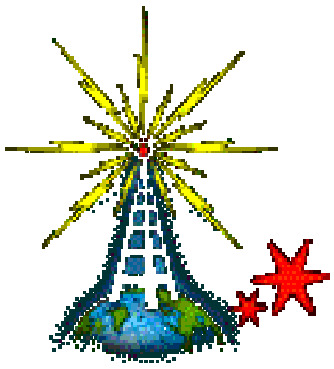
West Rand members - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

In July 2003, we re-published an Anode Compendium on CD. It has the issues from July 2000 until June 2005. This included the new Adobe reader. It has been updated, check with the chairman for details.



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