THE WEST RAND AMATEUR RADIO CLUB

August 2007
Volume 7, Issue 12

ANODE

Inside this issue:

Editor's Comments

Volume 7 Issue 12 - August 2007

Are you still a member?
Have you paid your subs?

Check out your status on the page at:

http://jbcs.dnsalias.net/ham_radio/index.php

If you haven't paid yet, please see the Treasurer (Craig) at the meeting tomorrow night (13th August)

New Slackware Linux

The latest release of my favourite distribution of Linux is version 12 of Slackware. This new release uses the 2.6.x kernel and "knows about" all the new hardware and old as well. It "talks to" the USB sticks without problems and even allows you to install from one as well. As with M$ Windows, it won't install from stiffy, as it is too large to fit on one or more 1.44MB disks.

What is an 'ionosonde' ?

A ionosonde, or chirpsounder, is a special radar for the examination of the ionosphere. An ionosonde is a shortwave transmitter tuneable through the whole shortwave range,

(continued on page 2)

The Simple TX TX

The perfect companion for the SupeRX receiver!

by Bruce 0. Williams WA6NC

Special points of interest:

- Contact details on back page (updated)
- Next Ham-Comp is at 13:00 on the 18th August.

Ever since 1 introduced the Simple SupeRX (see the April 1991 issue of 73), 1 meet QRPers looking for a companion transmitter at every hamfest 1 attend. The transmitter must have 2-3 watts output, provide reasonable performance and cost, and be suitable for portable or backpacking use with the SupeRX. It must also be able to operate on any band from 80 to 20 meters. And now it exists-the Simple Texas Transmitter (TX TX). It produces 1.5-2.5 watts on any one of four bands, is simple to build, and can be put on the air in about two hours.

After developing the Simple TX TX, 1 have a real sense of accomplishment. It only oscillates where it should, and it's not a particularly exotic design. It uses a basic oscillator/ driver/ amplifier scheme. There are a couple of improvements over the classic circuits, but by and large, it is a perfectly straightforward application of several proven circuits. Refer to Figure 1 for the schematic. Q 1 is a bipolartransistor Pierce crystal oscillator. A tuned output is desirable in a crystal oscillator to maximize power output and reduce harmonics. However, in the Simple TX TX, unlike

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Editor's rants and raves - comments

(continued from page 1)
which transmits on various shortwave frequencies pulses, whose echo's are analyzed by the means of radar.

An ionosonde is used for finding the best frequency for finding operation frequencies in the shortwave range. In Germany there is an ionosonde at Juliusruh.

Check out:
IONOSONDE STATIONS IN SOUTHERN AFRICA - A REVIEW OF CURRENT STATUS AND FUTURE PROSPECTS at
http://www.ips.gov.au/IPSHosted/INAG/uag-104/text/baker.html

Alternative Club Magazines

Take a look at some other South African radio club magazines. Tune your browser to:-

http://www.harc.org.za/newsletters/

Article Problem

One of the problems finding articles for the Anode, is the long list of articles we have already printed. We go back as far as August 2000. With 12 issues a year, that's nearly 100 issues.

This means I have to go back every time and-

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The Simple TX TX

(continued from page 1)
most circuits, the resonant circuit, TI, is in the emitter of the transistor. This provides the necessary stability and purity of the signal 1 wanted.

I tried the microminiature 10.7 MHz IF transformer in the collector circuit initially, and attempted to take the oscillator output from the secondary of the transformer, but discovered that the output of the oscillator was too low, requiring an additional stage to drive the final amplifier. With the resonant circuit in the emitter, the output of the oscillator, taken at the collector, is about 4 Vpp, and it does not exhibit the distorted sine wave that many crystal oscillators do.

The oscillator collector voltage is regulated at 5 volts by Ul, a subminiature 78L05 voltage regulator rated at 100 n.1A. Since the collector current of Q 1 is only about 10 mA, there is little stress on the regulator. Keying is accomplished by controlling the 12 volt input to the regulator via Q4. This arrangement creates a smooth keying characteristic, without clicks or other problems.

Q2 is a conventional buffer/driver. The 2N2222A is capable of driving the final amplifier to about 1.5 watts with 12.0 volts, and over 2.0 watts with a 13.5 volt supply. Q2 is keyed with the oscillator by Q4. T2 is a wideband balun transformer that drives a conventional class C final amplifier, Q3. Because of the nearly pure sine wave output of the oscillator, the output from the PA is clean and free from distortion.

The simple output filter (LI, C7 and C8) attenuates harmonics, but provides no impedance matching. It is taken directly from the ARRUs Solid State Design, a book by Wes Hayward W7ZOI and Doug DeMaw WIFB (1986). Because the output power is less than 5 watts, this filter provides sufficient filtering to meet FCC spectral purity requirements.

There are several good bipolar amplifiers available that could be used for Q3. The 2SC799 is readily available at low cost. It was commonly used as an output amplifier in CB rigs, and is capable of up to about 4 watts. Of course, the 2N3866, 2N4895, RCA 4013, or any of several other TO-5 configured transistors

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Editor's rants and raves - comments

(Continued from page 2)

check to see that the article I am putting in, is new to the Anode.

This has also meant I should list or put in a database the articles already published. Which would be nice to allow searching for that particular article of interest.

So over the last few months I have been researching "full-text" searches and how "Wikipedias" work. The MySQL database system has this function as part of their system.

So my problem now is to generate a list of articles and their titles with the issue number that they appear. This I intend to do by scripting a small program to search the files and folders that hold the Anode issues. At the very least this will allow the user/reader to find the article he wants to read.

{—}

High School Radio Club
wishes to make IRLP contacts on Fridays

From: "Mac" <vk2evb@hotmail.com>
Subject: High School Radio Club wishes to make IRLP contacts on Fridays
Date: 07 May 2007 07:16

Hi There, The Bishop Druit College Radio Club http://www.qsl.net/mm0axl/mncarg/bdc.html situated in the Mid North Coast of NSW Australia at Coffs Harbour are looking forward to making Local or DX IRLP contacts on Fridays 0315 - 0345 UTC.

Contacts will be on IRLP node 6625 via local repeater VK2RDO on 146.650Mhz.

The young people in the club have been experimenting with building simple FM radio receivers, and have been contemplating the design of plasma balls using ordinary light globes and car spark coils.

Contacts with interested parties or similar school electronic/radio groups would be great but unfortunately the club only has limited time during the local lunchtime period.

Also the Bishop Druit College French and German Language classes are interested in contacts Monday to Friday 0315 - 0345 UTC.

If interested and can help arrange a contact please email:

Gary VK2ZKT gryan@bdc.nsw.edu.au
or
Peter VK2EVB vk2evb@wia.org.au

{—}

Bulletin Readers
ZS6WR News reader list, 2007/8

Date, Reader, Name, Function
29-Jul-07, ZS6PVT, Phillip,
Repeater Management
5-Aug-07, ZS6BZF, John, Secretary
12-Aug-07, ZR6RON, Ron, Vice Chairman
19-Aug-07, ZS6C, Joop, Contests
26-Aug-07, ZS6ARQ, Romeo, Co-opted

2-Sep-07, ZS6GRL, Geoff, Co-opted
9-Sep-07, ZS6JNB, Willem, news reader
16-Sep-07, ZS6OUN, Stuart, Chairman
23-Sep-07, ZS6WWJ, Willem, SARL liaison
30-Sep-07, ZS6CRW, Craig, Treasurer

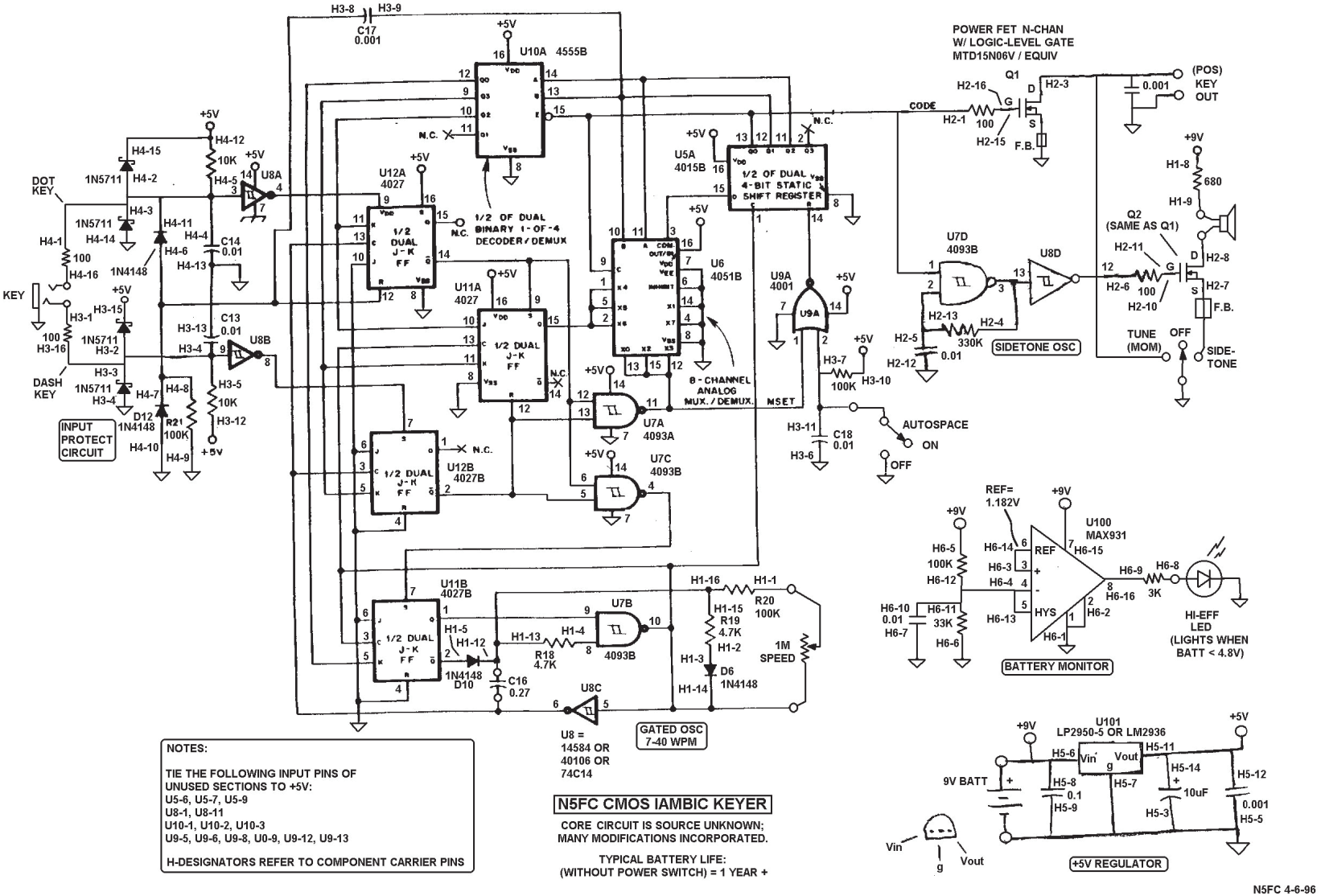
7-Oct-07, ZS6PVT, Phillip,
14-Oct-07, ZS6BZF, John,
21-Oct-07, ZR6RON, Ron,
28-Oct-07, ZS6C, Joop,

4-Nov-07, ZS6ARQ, Romeo,
11-Nov-07, ZS6GRL, Geoff,
18-Nov-07, ZS6JNB, Willem,
25-Nov-07, ZS6OUN, Stuart,

2-Dec-07, ZS6WWJ, Willem,
9-Dec-07, ZS6CRW, Craig,

(continued on page 9)

Wouldn't you like to build one of these?



IAMBIC KEYER

This design doesn't use a PIC. It does use readily available CMOS chips.

The Simple TX TX

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can be used. The MRF 472 and MRF 476 are also usable with a slight change in pinout.

The Simple TX TX design is very forgiving. You can substitute parts of different values for almost any of the components shown. The only critical parts are the 10.7 MHz transformer, T1, and the output filter components. I tried several different values for RFC 1 and RFC2, and the effect on performance was minimal.

Construction

I built the Simple TX TX prototypes using printed stripboard (see the table for sources of parts). This product is easy to use, and not expensive. So-called "ugly construction,--or what Zack Lau KH6CP/1 now calls 1 ground plane- construction, is another option. 1 personally have never had much luck with this approach, but 1 know of many home-brewers who do very well using this technique. However, a printed circuit board is available at a reasonable price (see the table). Figure 2 shows the etching pattern for the circuit board, and Figure 3 shows component placement. You can get a complete circuit board kit from MXM Industries. 1 recommend using the available printed circuit board, since it speeds construction and makes it difficult to---garf- up the circuit.

Start your construction by installing the power supply capacitors and keying circuit components, and the 5 volt regulator, U 1. Don't make the mistake of attempting to complete the entire transmitter before testing the individual circuits. Build one stage and check it out before going to the next. Troubleshooting the entire transmitter will drive you nuts, and there is a strong likelihood that you will damage some of the components in the process! After assembling the regulator and keying circuit, make sure that the output of U 1 is approximately 5 volts (typically 5.02 volts), and that the keying circuit operates properly. Only after this crucial step should you continue.

Install the components of the oscillator (R 1, R2, R8, T 1, C 1, RFC 1, Q 1, C2) and verify that the oscillator is operational before continuing to the buffer/driver, Q2. Tune T1 for the best sounding signal, not necessarily the signal with the most output. Check that when the oscillator is keyed there are no key clicks or other anomalies during keying. You can monitor the output of the oscillator on a ham band or general coverage receiver. If you have a frequency counter or oscilloscope, a small piece of component lead can be soldered into the board at TP 1 to allow confirmation of the proper signal. Don't be surprised if the frequency of oscillation is a little above the frequency indicated on the crystal (1-2 kHz). It's easy to tune the output of the oscillator to the frequency you desire later.

Extra Adjustment for 20 Meters

T1 is a microminiature (7mm) 10.7 MHz IF transformer. To make the transformer resonant on the particular band of interest, a padding capacitor must be added across the 3-pin primary. Different values for capacitor C1 for operation on the 80, 40, 30, and 20 meter bands, respectively, is given in the parts list.

Although the value for the padding capacitor is shown as 27 pF for 20 meter operation, some modification to T1 is also required. There is a small ceramic capacitor mounted in the base of the transformer. This capacitor must be carefully removed before you install the transformer on the circuit board.

Carefully break the capacitor in half, using a very small, sharp X-ACTO9 knife, and pull the two halves out. Do not try to pull the halves from the transformer base. First, carefully cut the leads connected to the halves, then remove the halves.

Check continuity between the two outboard pins

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The Simple TX TX

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on the 3-pin side of the transformer. If there is no continuity, the transformer must be replaced. With this capacitor removed, T 1 will be resonant at 20 meters with the addition of the 27 pF capacitor as C1.

The value of 39 pF for C2 limits the output of the Simple TX TX to about 1.5 watts with a 12 volt supply. If you wish to increase or decrease the output, some experimentation with C2 will be required. 1 found that if the value of C2 is as high as 100 pF, both Q2 and the output transistor will exhibit extreme heating, and shortly destruct! 1 found that the usable upper-limit value is about 51 pF.

Winding T2

T2 is a broadband transformer wound on a BN-43-2402 binocular balun core. I start winding T2 by putting the secondary 1-turn winding on first-1 turn of #24 enameled wire for operation on the 80, 40, 30, and 20 meter bands-then 1 wind the primary over the secondary.

The turns ratio for the primary winding varies with the particular band. For 80 and 40 meters, it's 5 turns of #28 enameled wire; for 30 meters, it's 4 turns of #28 enameled wire; and for 20 meters, it's 3 turns of #28 enameled wire.

The primary leads should come out of one end of the core, and the secondary leads out of the other end of the core. The balun core is extremely small, and the holes through the core are also small. If you have to use larger size wire, you may have problems getting all the turns on. You can use a larger balun core, of course, but some experimentation with turns and turn-ratios will be required. If you don't have a binocular type of core, a broadband toroidal transformer can be substituted. Solid State Design gives information for using toroidal cores as broadband transformers.

Output Filter

The final power amplifier, Q3, is a straightforward configuration which you may recognize as about standard for most QRP transmitters. The value of RFC2 is not very critical. 1 have tried values from 15 pH to 1 mH with little effect on performance. 1 found that the 1 mH value reduces the output a little, just because of the additional resistance of the winding in the higher value. Values from 25 to 100 pH will work fine. D 1 is a 36 volt zener diode that protects Q3 from damage in the event an antenna is not connected when the transmitter is keyed.

Testing and Operation

If you have followed my suggestions about assembling each stage separately, by the time you finish construction, the transmitter will be ready to use. A few preliminary tests are a good idea, however. NEVER test the transmitter without a dummy load (of at least a 5 watt rating). If you don't have a suitable dummy load, you can construct one by placing three 150 ohm, 2 watt resistors in parallel, or by using any number of combinations. Although 1 have a 10- 1000 watt dummy load, I generally use a small, calibrated SWR/wattmeter with a home-built dummy load. I find that my commercial dummy load/ wattmeter is poorly calibrated at low power levels, showing less than a watt when the actual power is over 1 watt. One sure way to get a good estimate of output power is with an oscilloscope.

It is essential, even at low power levels, to use a heat sink on the final amplifier. In fact, it may be a good idea to put a heat sink on Q2, since it does carry a heavy burden in this design. Although during tune-up the final amplifier may seem to be running cool, when it is mounted in a cabinet, the circulation of the cooling air may be impaired. In the same vein, be sure to install a ferrite bead, Z I, on the base lead of the final

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The Simple TX TX

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amplifier.

It is possible to YX0 the crystal a little by placing a capacitance across it. Don't expect too much of a shift, however. Maybe just 2-3 kHz. Remember that the tuning capacitor must be isolated from ground. 1 use a DPDT switch with a center OFF position, and connect the two center connections across the crystal. In the center OFF position, no capacitance appears across the crystal, and the frequency will be whatever the crystal generates. 1 placed two capacitors across the other two poles, so that if the switch is in one position, that capacitor controls the frequency, and if it's in the other position, the second capacitor controls the frequency. If you can't get the frequency where you want it with a fixed capacitor, there is room on the switch to mount a small variable capacitor to fine-tune it.

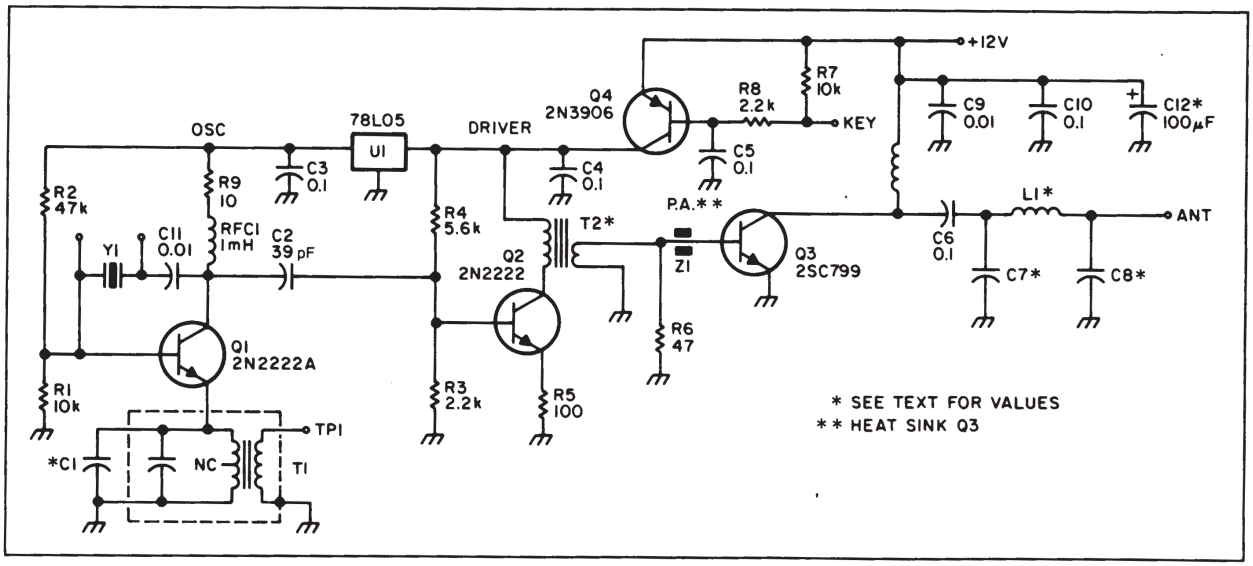

Figure 1. Schematic for the Simple TX TX.

Good luck with your Simple TX TX! The project is so simple that you should not experience any major difficulties. If the darned thing doesn't operate right off, check your wiring for solder bridges, and see that the components are in the right place. With the Simple SupeRX, no problems have been reported to me apart from two isolated part failures not the fault of the design. If you think you have a problem that 1 might be able to help you with, or if you just want to talk about it, please do not hesitate to write or even call.

You may contact Bruce 0. Williams WAWC at MXM Industries, Rt. 1 Box 156C, Smithville TX 78957. Please enclose an SASE.

Taken from 73 Amateur Radio Today *
December, 1991

T2 Values

Band	Primary	Secondary
80m	5T No. 28 enam.	1T No. 24 enam.
40m	5T No. 28 enam.	1T No. 24 enam.
30m	4T No. 28 enam.	1T No. 24 enam.
20m	3T No. 28 enam.	1T No. 24 enam.

Output Filter Values

Band	C7,C8	L1
80m	750 pF	21 T No. 24 on T-50-2
40m	470 pF	14 T No. 24 on T-50-2
30m	300 pF	12 T No. 24 on T-50-2
20m	210 pF	12 T No. 22 on T-50-6

Expanded Voltmeter

Several months ago 1 had a small circuit for expanding the range of a 0-50 uA meter to read 10-15 volts. It was a simple little circuit using a 10 volt zener diode and some resistors. This month I'll show you an expanded voltmeter that works even better.

The circuit may be built on a small perfboard or PC board. Make the board small enough to mount directly to the back of the meter. Use good quality parts for the meter; they will reflect higher accuracy.

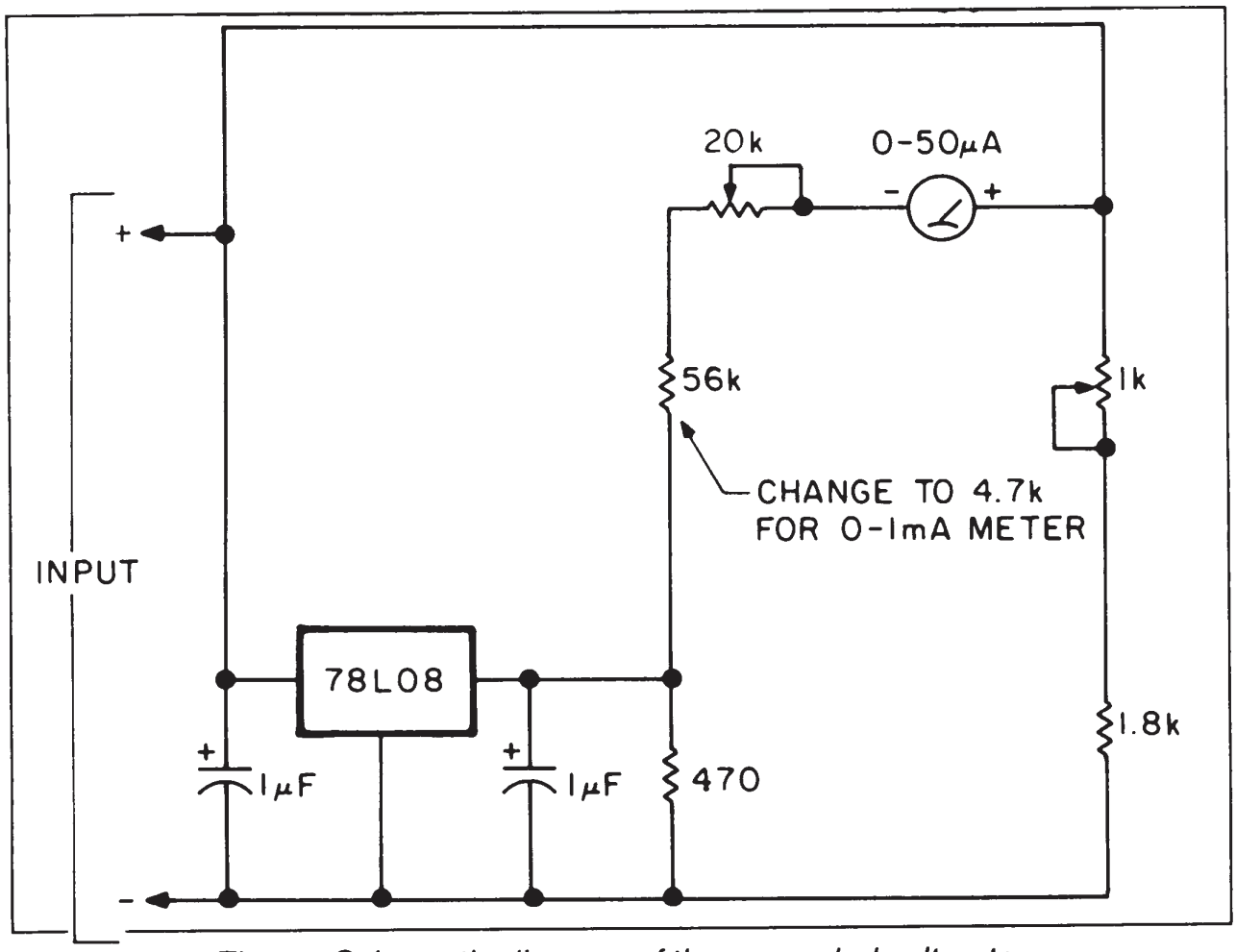

Figure. Schematic diagram of the expanded voltmeter.

Take a look at the schematic. The voltage reference this time is nothing more than an 8 volt regulator. An LM78L08, to be precise, and a resistive voltage divider. When coupled to a 0- uA meter, the range will be 10-15 volts. What makes this circuit a bit better is the ability to zero the meter p*osition* at exactly 10.0 volts on one end, and 15.0 volts on the other end. When using only the 10 volt zener diode, sometimes the meter would not fall to 10 volts, when in fact the battery voltage is 10 volts.

To calibrate the expanded voltmeter, adjust the 1000 ohm trimmer so that the meter reads zero with 10 volts at the input. Raise the input to 15 volts and set the 20k trimmer for full scale (15 volts); you might want to re-check the setting by running through them a second time. Be sure to use a good, high quality digital voltmeter when setting up the circuit. With a good digital meter for reference, you'll have resolution down to 0. 1 volt-or better.

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Expanded Voltmeter

(Continued from page 8)

1 used a 0-1 mA meter in place of the 0-50 liA meter. Doing this, 1 had to change the value of the 56k resistor in the voltage divider. 1 had to drop the resistor's value to 4.7k to get the meter to operate correctly. With the 0-1 mA meter, the circuit draws 27 mA from the battery you're checking.

73 Amateur Radio Today * December, 1991

Editor's rants and raves - comments

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16-Dec-07, ZS6PVT, Phillip,
23-Dec-07, ZS6BZF, John,
30-Dec-07, ZR6RON, Ron,

6-Jan-08, ZS6C, Joop,
13-Jan-08, ZS6ARQ, Romeo,
20-Jan-08, ZS6GRL, Geoff,
27-Jan-08, ZS6JNB, Willem,

3-Feb-08, ZS6OUN, Stuart,
10-Feb-08, ZS6WWJ, Willem,
17-Feb-08, ZS6CRW, Craig,
24-Feb-08, ZS6PVT, Phillip,

2-Mar-08, ZS6BZF, John,
9-Mar-08, ZR6RON, Ron,
16-Mar-08, ZS6C, Joop,
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27-Apr-08, ZS6WWJ, Willem,

4-May-08, ZS6CRW, Craig,
11-May-08, ZS6PVT, Philipp,
15-May-08, ZS6BZF, John,
25-May-08, ZR6RON, Ron,

1-Jun-08, ZS6C, Joop,
8-Jun-08, ZS6ARQ, Romeo,
15-Jun-08, ZS6GRL, Geoff,
22-Jun-08, ZS6JNB, Willem,
29-Jun-08, ZS6OUN, Stuart,

6-Jul-08, ZS6WWJ, Willem,
13-Jul-08, ZS6CRW, Craig,

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1725

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Email: **zs6wrmail@mweb.co.za**

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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SARL liaison	Willem	ZS6WWJ		marie.w@absamail.co.za

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.

We need your input! Email us articles, comments and suggestions please.
brockjk@gmail.com