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ANODE

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Editor's Comments

The birds woke me early this morning. I think they were playing hop-scotch on the guttering. They don't usually have any contribution towards the Anode. Our chairman (Dave ZR6AOC) has sent me a little snippet this week. But as usual I have trawled the library to find some interesting pieces. The SARL 2m band plan I have managed to translate from the portable document file. This appears on page 5, 6 and 7.

The 'early bird' meeting on the morning of the eclipse was supported by those shown below.

I bought the December Wireless World. Not to show off that I could afford it but to read some of the interesting articles. This magazine has been going for a very long time and has produced a vast number of amateur radio articles.

Mr Phil Reed, the new editor says :-
"As usual the great consuming public has been sold digital as better. Its true, that when CD's arrived the sound quality (to most people) was better. The media was a lot more resilient and portable and the hardware was quite cheap to produce, meaning that a low price player would sound better than its price equivalent in analogue"

Unfortunately as he goes on to say that was

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The Great Eclipse Meeting

The club had a get-together on the morning of the eclipse. Breakfast was early and clouds were supplied by the weather bureau.

Special points of interest:

- Contact details on back page

Editors Comments

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before data compression. Also it was usually audio not video. Now the video decoder that he has just invested in suffers "blocking" on fast moving objects and scene dissolves. Locally similar effects can be seen on Mnet (especially Cape Town at the end of the microwave link) and etv. Cell phones exhibit all of these symptoms and most times completely obliterate the speech. I suppose that's why the theme music on etv news sounds just like a cell phone "boinging"!

In the same magazine, Motorola announced a new chip set for AM/FM radios. This has an analogue front end and digital IF sub-system. It uses a digital signal processor to filter and demodulate AM, FM and FM stereo signals. It adjusts itself to get the best audio quality output, cuts adjacent station interference and holds onto stations longer in moving car radios. Will it be able to cut the grass? I wonder.

Also in this issue is an article about the modern impedance measurement techniques. This article says that the bridge is dead and the three terminal technique has replaced it. It does mean that you can measure L/R/C's in circuit with the circuit in operation. The use of a microprocessor means that the results can be displayed in convenient and appropriate form.

Spam costs businesses $13 billion

NEW YORK (AP) -- All those junk e-mail messages may promise instant wealth, but they can be quite painful to the bottom line.

A study to be released this week attempts to quantify the annual cost of spam: $8.9 billion for U.S. corporations, $2.5 billion for European businesses and another $500 million for U. S. and European service providers.

Marten Nelson, an analyst at Ferris Research, says that while most spam can be deleted in one second, occasionally

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RTTY Tuning the new Solution

[This simple tuning indicator whipped the competition and took first place in 73s Home-Brew 11 Contest.]

What is your favorite method to tune in a radioteletype (RTTY) signal quickly and accurately on an SSB receiver? A dual ellipse on an oscilloscope? Light-emitting diodes (LEDs) activated by mark and space filters? A signal-strength meter? By ear? Here is a new one that might make you change your mind.

Background/The Problem

When Teletype signals are sent through audio channels, they are usually conveyed by switching between two tones with a different timing pattern for each of the characters. During periods when no characters are being sent, a steady tone, called the "mark" tone, is present. The other tone is called the "space" tone. A device called a "terminal unit." (TU) extracts these two particular tones from any background noise and produces a digital signal suitable for a printer or computer.

If this audio signal is coming across a telephone line or an FM radio link, the frequencies of the tones at the receiving end will be the same as at the origin. However, there can be a problem when using an SSB receiver, because a slight mistuning will change the frequencies of the tones heard and the terminal unit will not work. Over the years, various methods have been devised to indicate when the proper tones are detected. Here is a new one.

A New Solution

The circuit displays its output with a row of 20 LEDs. Each one will light up when the strongest audio frequency present is within its particular range. The two with the pointers over them

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RTTY Tuning the new Solution

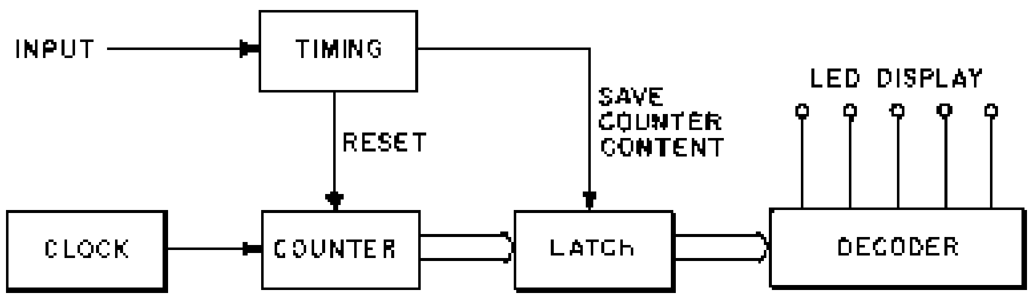

Fig. 1. Simplified block diagram.

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correspond to the mark and space tones. A constant mark signal is tuned properly when the LED under the left marker is lit. When characters are being received, the LEDs under both markers will be lit. If the tones are low in frequency, LEDs to the left of these positions will be lit. Higher frequencies activate LEDs farther to the right. It's as easy as tuning an FM broadcast receiver with a tuning meter!

Theory of Operation

The simplified block diagram in Fig. 1 illustrates the basic principle involved. Each time the input signal completes a cycle, the current content of the counter is captured in the latch. After a brief delay, the counter is reset and resumes counting for another cycle of the input signal. Meanwhile, a decoder is looking at the output of the latch and selects one of the LEDs based upon it.

For example, let's suppose we had a clock of 200 kHz and an input signal of 2 kHz. During each cycle of the input signal there would be 100 clock pulses, so the counter would contain 100 when the latch grabs the counter's output. If there was an LED corresponding to a count of 100, the decoder would cause it to light up until a different count was obtained from the counter. A higher frequency input would result in a shorter period, a smaller count, and a different LED.

Keeping this simplified model in mind, lets look at the actual circuit (Figs. 2 and 3) and see how it differs. Starting from the audio input on the left, the first thing you will notice is the 565 phase-locked loop. I initially tried some experiments with bandpass filters and a Schmidt trigger. This worked great with a nice clean waveform from a signal generator, but was pretty useless with a noisy signal from a sideband receiver. The phase-locked loop does a good job of following a signal through the noise and providing a nice clean square wave of the same frequency for later logic circuits. The two diodes before it provide protection against large signals that could damage the IC.

Next we have a couple of one-shots (IC2) to generate timing pulses at the end of each cycle. Four separate steps are involved: (1) Stop the clock so the count isn't changing during latching. (2) Capture the contents of the counter in the latch. (3) Reset the counter. (4) Restart the clock.

When the counter is reset, it is set to -3 rather than zero as you would probably expect. (See pins 9, 10, 1, and 15 of the counters.) This is to make the mark and space tones fall in the middle of the frequency ranges for the corresponding LEDs.

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Editors Comments

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someone is duped into clicking the message. It also takes time to track down legitimate messages mistakenly tossed by inaccurate spam filters.

Breaking down the costs

Figuring it takes 4.4 seconds on average to deal with a message, the messages add up to $4 billion in lost productivity for U.S. businesses each year. Another $3.7 billion comes from companies having to buy more powerful servers and more bandwidth as well as divert staff time. The rest is attributable to companies providing help-desk support to annoyed users. The costs are less in Europe because spam isn't as big of a problem, Nelson said. But in future calculations, Nelson said he may have to add the costs of wireless spam, a growing problem in Europe as text messaging gets more popular.

See you all at the meeting.

73
John

RTTY Tuning the new Solution

(Continued from page 3)
When the most significant bit of the count (IC5, pin 7) is 0 and the next bit (pin 6) is 1, the count is in the range of 64-127. This is the region where the display is enabled. If the counter content reaches 128, IC6 is disabled through pin 4 and counting stops. This prevents overflowing and a false display for a very low frequency input.

Under the latch (IC7), you will notice a 7485 magnitude comparator. Each time the latch is clocked, it compares the counts for the current and preceding cycles. When the low-order four bits are the same, the display is enabled for the next cycle. This blanks the display during changes, resulting in a much cleaner appearance and dimming with only noise present. High order bits could also be compared with another chip but I doubt it would have much effect because counts for consecutive cycles differing by a multiple of 16 are probably quite rare.

Construction and Adjustment

The LED displays and three decoder chips are mounted on a small piece of perfboard which can be installed on the front panel of a terminal unit. The rest of the prototype was constructed with wire wrapping for ease of modification during development. You can reduce the cost by using solder-tail sockets with point-to-point wiring or making a PC board.

With no input applied to the circuit, adjust R3 so that the LED just to the left of the center line is lit.

Power requirements are + and -12 volts at about 25 milliamps and 5 volts at about 350 milliamps.

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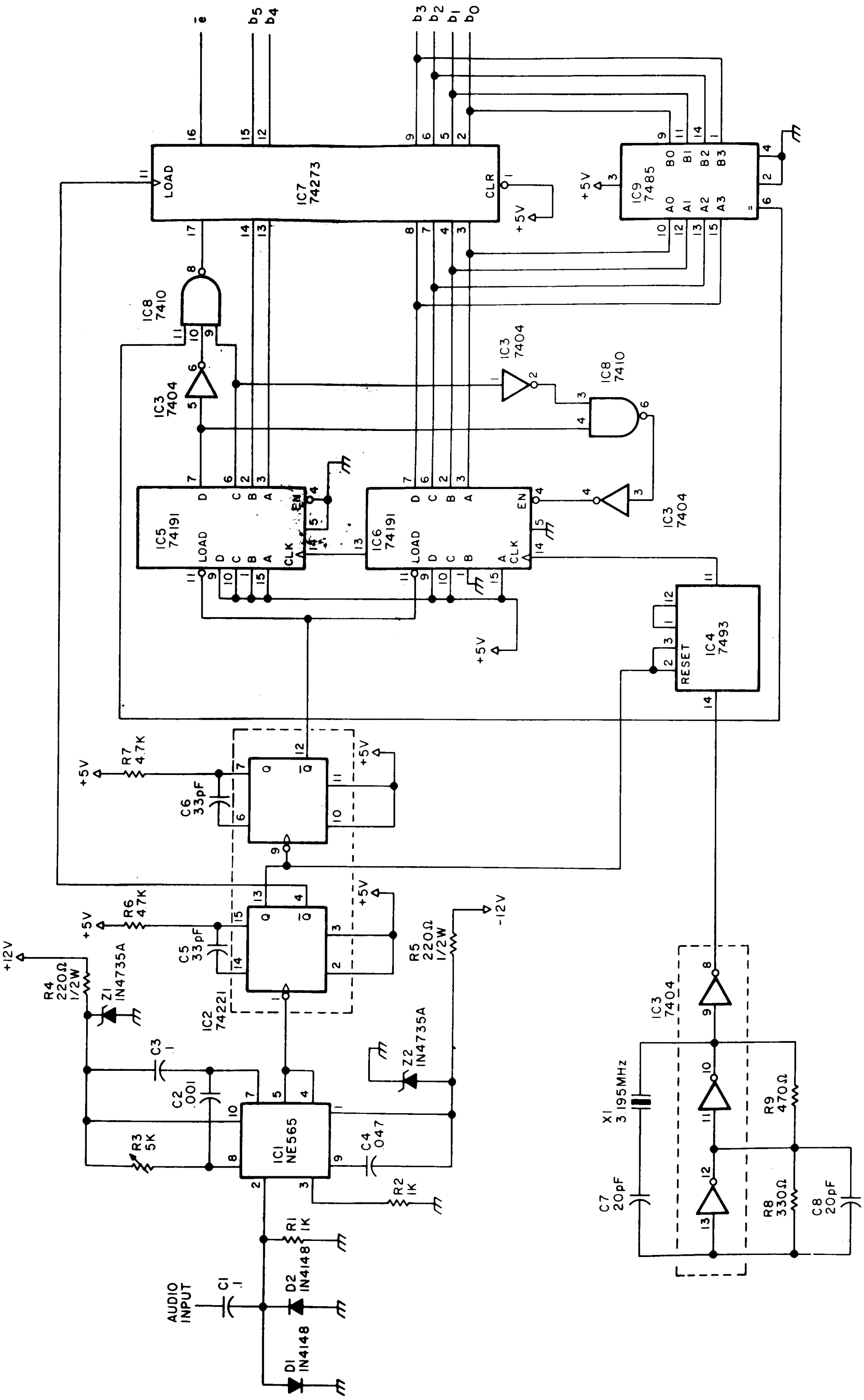

Fig. 2. Main circuit for tuning indicator.

RTTY Tuning the new Solution

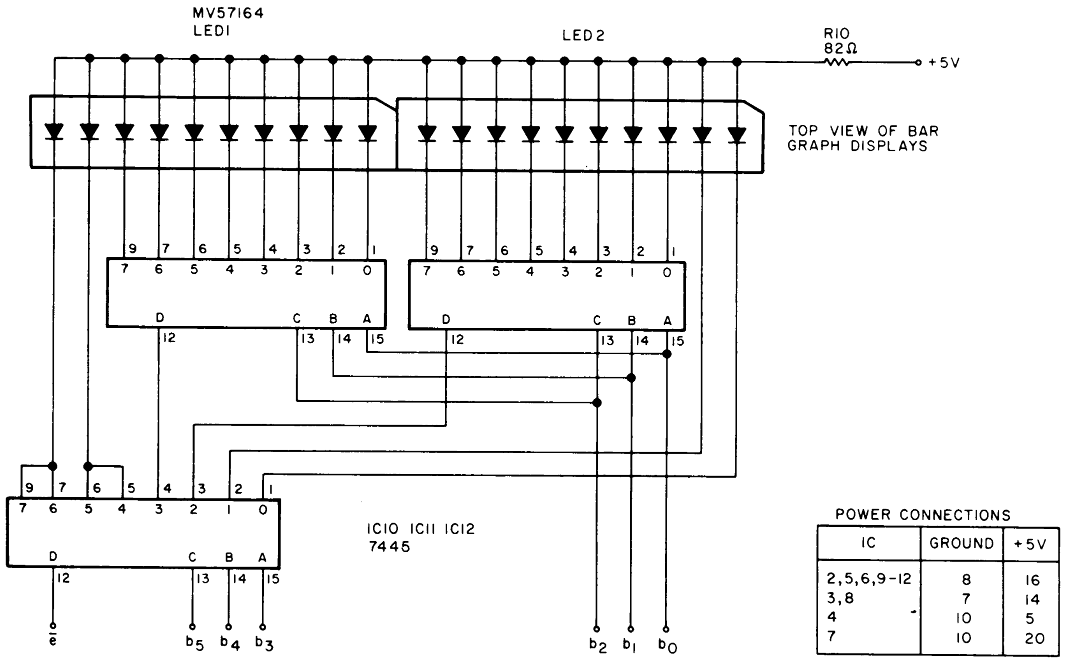

Fig. 3. Display portion of tuning indicator.

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Modifications

The crystal frequency and counter preset value shown in the schematic are for the standard RTTY tones of 2125 and 2295 but can easily be changed for a different pair of tones in the same neighbourhood.

Use and Conclusion

The circuit requires a minimum of 10 millivolts peakto-peak for good tracking of the input signal. Acceptable results can be obtained by connecting the tuning indicator directly to the receiverfs speaker, but a cleaner signal will produce a more pleasant display. If your terminal unit has a bandpass filter, connect this circuit after the filter, but before the limiter. If you don't have a bandpass filter, I suggest that you build one (see 73, September, 1977, page 38) or buy one such as the Flesher PS170. It's simple, inexpensive, and makes a big difference when trying to copy RTTY under noisy conditions.

For a couple decades, most people agreed that a dual ellipse pattern on a CRT was the best way to see when a RTTY signal was tuned in properly. Try this circuit and you might not be one of them anymore.

The only unusual components in this device are the 10-segment LED bar-graph displays. As indicated in the parts list, these are available at your local Radio Shack store. If there is not a Radio Shack in your part of the world, use 20 separate LEDs instead.

I happened to use a crystal in an HC6/L1 holder. If you don't mind the size and appearance of an FT-243 holder (like Novices used in the old days) you can save a couple of bucks by getting a crystal with only .01 % tolerance which is still more than adequate.

Everything else is quite ordinary and available from various dealers who advertise in the back of 73. The circuit is not at all critical and minor substitutions should not affect performance.

73 Magazine March, 1983

The SARL 2 metre band plan

Frequency and Usage	Segment	Notes
144.000 MHz		
EME	144.000-144.035	Moon bounce only (SSB/CW)
144.035 MHz		
CW only	144.050	CW Calling frequency
	144.100	MS CW ref frequency
	144.140 - 144.150	CW FAI working
144.150 MHz		
SSB & CW only	144.150 - 144.160	SSB FAI working
	144.175	Microwave talk-back
	144.195 - 144.205	SSB random MS
	144.250	Slow morse transmissions
	144.260	Emergency Comms. priority
	144.300	SSB calling frequency
	144.390 - 144.400	SSB random MS
144.400 MHz		
Beacons	144.400 – 144.490	
144.490 MHz		
Guard band	144.490	SAREX uplink
144.500 MHz		
All modes	144.500	SSTV calling frequency
Non-channelised	144.525	ATV talk-back
	144.525 - 144.575	Unattended data (BBS's)
	144.600	RTTY calling frequency
	144.625 - 144.675	Packet Radio
	144.700 – 144.800	Wefax & DX cluster transmissions
	144.775 - 144.800	Emergency Comms. priority
144.800 – 144.990 MHz	144.800 - 144.990	Digital modes (including unat-tended)
144.990 MHz		
Guard band		Guard band

The SARL 2 metre band plan

Frequency and Usage	Segment	Notes
145.000 MHz		145.000 MHz
FM Repeater inputs		FM – 3kHz dev maximum
	145.0000	RV48
	145.0125	RV49
	145.0250	RV50
	145.0375	RV51
	145.0500	RV52
	145.0625	RV53
	145.0750	RV54
	145.0875	RV55
	145.1000	RV56
	145.1125	RV57
	145.1250	RV58
	145.1375	RV59
	145.1500	RV60
	145.1625	RV61
	145.1750	RV62
	145.1875	RV63
145.200 MHz		
FM Simplex	145.200 (S8)	Paired with 145.800 - Manned space Comms.
	145.200 – 145.300	Hamnet priority use
	145.225 (S9)	Emergency Comms- Priority
	145.250 (S10)	slow morse transmissions
	145.275 (S11)	General use
	145.300 (S12)	RTTY AFSK
	145.300 – 145.550	FM Simplex
145.550 MHz		
	145.550 – 145.5875	APRS (12.5kHz channels)

The SARL 2 metre band plan

Frequency and Usage	Segment	Notes
145.600 MHz	Repeater outputs	FM – 3kHz dev maximum
	145.6000	RV48
	145.6125	RV49
	145.6250	RV50
	145.6375	RV51
	145.6500	RV52
	145.6625	RV53
	145.675	RV54
	145.6875	RV55
	145.7000	RV56
	1457125	RV57
	145.7250	RV58
	145.7375	RV59
	145.7500	RV60
	145.7625	RV61
	145.7750	RV62
	145.7875	RV63
145.800 MHz		
	145.800 – 145.990	Satellite working
145.990 MHz	Guard Band	
146.000 MHz	Band Edge	

The West Rand Amateur Radio Club
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Bulletins (Sundays at …)
11h15 Start call in of stations
11h30 Main bulletin start

Frequencies
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

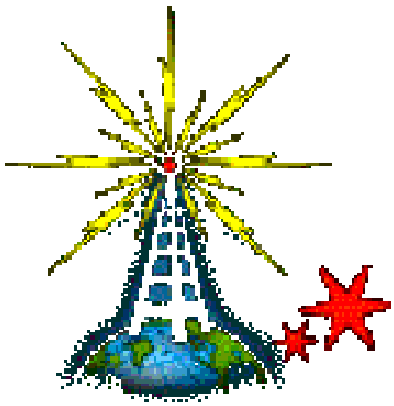
Chairman/Treasurer	Dave	ZR6AOC	475 0566 (H)	zr6aoc@mweb.co.za
Vice-Chairman/Events				
Secretary	John	ZS6FJ	672 4359 (A/H)	
Technical	Phillip	ZS6PVT	083 267 3835	
Technical	Greg	ZR6JDD	083 289 2072	gjarrett@webb.co.za
Member	Craig	ZR6CRW	795 1550 (H)	craig.woods@absamail.co.za

West Rand members input - 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 November 2001, we published an Anode Compendium on CD. It has the issues from July 2000 until November this year. This included IE5.5 and the new Adobe reader. It is soon to be updated, check with the vice-chairman for details.



We need your input! Email us articles, comments and suggestions please. john.brock@pixie.co.za