



# **FEEDBACK**

The Official Newsletter of the  
Georgian Bay Amateur Radio Club  
**October 2017**

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## **Minutes of GBARC Meeting 26<sup>th</sup> September 2017**

**Presentation** Frank VA3GUF gave a presentation on Baluns, a description of and a practical example which many in attendance built. Many good questions were asked and answered. Part 2 of this discussion will be at the November meeting which will be the final assembly and testing of the device. The power point presentation will be posted on the forum.

The meeting came to order at 7:49pm

### **Attendees (Executive)**

Frank VA3GUF, Tom VA3TVA, Bernie VE3BQM, Tom VA3TS, Doug VE3WRF, Bobby VE3PAV, Adam VE3IZS, Dieter VA3DST, Maureen VE3MIO, Scott VE3OSA, Greg VE3RQY, Rob VE3PCP, Jim VE3VEX

**Guests** Beth VanAalst

### **Do we have a Quorum-YES**

*A QUORUM SHALL CONSIST OF AT LEAST THREE FULL MEMBERS IN GOOD STANDING WHO ARE NOT MEMBERS OF THE EXECUTIVE COMMITTEE, PLUS AT LEAST THREE MEMBERS OF THE EXECUTIVE COMMITTEE. NO MOTIONS SHALL BE CONSIDERED OR VOTED ON AT A GENERAL MEETING UNLESS A QUORUM IS PRESENT.*

### **Minutes of Last Meeting**

Minutes of last meeting - included in the May Newsletter

### **Treasurer's Report** *Bernie VE3BQM*

Bernie reports a bank balance of \$xxxx.xx. Bernie also raised a motion to create a budget of \$475 to pay for our RAC insurance. Moved by Bernie VE3BQM, Seconded by Tom VA3TVA Carried

### **Old Business**

**GBARC Challenge** – Frank requested those submitting logs for the GBARC challenge have a means to do that on the website. (A forum titled “CANADA 150” exists and is a suitable place for those to store their logs). Beth Van Aalst volunteered to create a certificate as a commemorative for participants in the challenge.

**VE3OST Repeater** – this repeater is at the QTH of Tom VA3TVA at Woodford under test. A discussion followed regarding the current status and the proposed tower installation. Tom felt that he would have more time to accomplish this after thanksgiving. All are invited to use the repeater whenever possible and report any issues. 146.895- T 97.4.

## **New Business**

**Field Day** – The discussion involved our recent field day and what we could do to improve public awareness. Improved signage to better explain our reason for being there as well as a more welcoming atmosphere so that members of the public are encouraged to approach and ask questions. It was suggested that we have a public relations group to better explain our goals to the public as well as be in charge of getting the word out. *(I have included a list of contacts at the end of this newsletter. Perhaps someone or a group that would like to be our PR point of contact or even handle our social media accounts- editor)* We also discussed alternate locations while it was not decided upon, here is a list for consideration and further discussion at the next meeting. Grey Roots, Conservation Area, Victoria Park, Duncan McClellan Park, Kiwanis Field, Yatch Club, Marine Rail Museum Area etc

The club now has a reconditioned portable tower and TA33 beam for use at club events. It was also discussed that we should spend more effort on better antennas or perhaps an amplifier to make it easier to make contacts. There was a show of hands to show support for the idea of an amplifier.

**Forums** – It was requested that guest users be allowed to view images on the forum posts. *(this has been completed – editor)*

**ARES** – October 14<sup>th</sup> SET starting at 9:00am at the Owen Sound Fire Hall till 5PM. Objective to test communication capabilities with Ontario municipal sites and neighboring provinces, Quebec and Alberta. Comm's to other provinces are encouraged. Can only accommodate 3 people at a time, radio operator, logger and supervisor. Logging who and what you hear along with what contacts are made will be key during this event. All participants will get radio time. Will post info on the ARES forum shortly. Schedule your participation. Call the supervisor on the repeater to get access to the building for your shift. The info we gather during this event will be shared with Grey County in regards to improving the communications capabilities

November 15<sup>th</sup> (tentative), Test of equipment at the renovated Grey County building (Construction completion permitting). Have been asked to demonstrate the ability to transmit e-mail with HF radio. It was suggested that the software program called [WinLink](#) may be suitable for this. Members are encouraged to download this and experiment with it.

**Memberships** – Club membership renewals are due and can be remitted to Bernie VE3BQM at any time. Membership in RAC is also encouraged

**Breakfast 4 Nov** – Breakfast in November is scheduled for the first Saturday in November due to Remembrance Day the following week.

**JOTA** – Jamboree on the air is held on 21<sup>st</sup> of October from 2pm to 10pm. It takes place near Woodford, on Grey Road 18 at the Word for Life Camp. Doug VE3WRF is setting up 3 stations, hopefully all QRP to demonstrate “Camping Friendly Gear” to the scouts. Rob VE3PCP will also have a JOTA event in Tiverton at the same time.

**VE3MTF Estate** – Rob VE3PCP has some estate item from Frank VE3MTF in Kincardine. If you are interested contact Rob on the forum.

**TCA's** – Becky asked for the loan of TCA magazines to aid in her studies.

**Close** - 9:10pm Motion by Maureen VE3MIO, 2<sup>nd</sup>– Adam VE3IZS. Carried

**Next Meeting** - Professional Centre, Owen Sound. October 24<sup>th</sup> 2017

*Minutes taken by Tom VA3TS Secretary*

## Upcoming Events

### Scouts Jamboree on the Air

and **Jamboree on the Internet** will next take place on

**Saturday October 21st and Sunday October 22nd, 2017**



**Doug VE3WRF** reports that Everything a go for JOTA. We will be using the Arboretum (where we held FD 3 years ago). We have operators and equipment. Operation will be October 21st from 10:00 am until 4:00 pm.

**Rob Noakes, VE3PCP**, and his family Alicia and Justin, will be set up at the Lion's Hall in Tiverton, Ontario for the day of Saturday October 21, 2017. Rob's XYL, Alicia is the Girl Guide Leader for the 2<sup>nd</sup> Kincardine Girl Guides and they will be doing Jamboree on the Air at the Lion's Hall location for the day. As an added bonus, Rob has volunteered to run VA3RAC for October 20-22, 2017 for JOTA and to celebrate Canada 150.

Rob will be running on 80M and 40M with NVIS antennas and will also have mobile 40M and 20M antennas on the event trailer to cover those as well. On 2M, rob will be running a home brew 3 element yagi aimed at VE3RTE repeater in Paisley for the day as well.

VA3OSO, Carson plans on attending as well to demonstrate digital modes to the group.

They will also have a computer set up to demonstrate some online resources for Hams such as web receivers, reverse beacons, DX clusters etc.

The hall will be open to anyone wanting to stop by and join in on the activities.

I encourage any Hams that want to drop in and run VA3RAC for a time if they are able too.

## Newsletter Articles

Are you working on a project? Have an interest in something new? Something to get the word out? An agenda item for the next meeting? To include anything here in the newsletter, just send me what you have...thanks Editor

# Websites of Interest

Delta Loops for HF [http://www.w5sdc.net/delta\\_loop\\_for\\_hf.htm](http://www.w5sdc.net/delta_loop_for_hf.htm)

## Logic Gates with Discrete Components

Written by Hans Summers

Monday, 31 August 2009 21:33

I often use discrete component implementations of logic gates in my projects, often consisting of AND and OR gates made from diodes and resistors. I "invented" or "discovered" how to make these gates when I was about 14 and have been happily using them ever since.

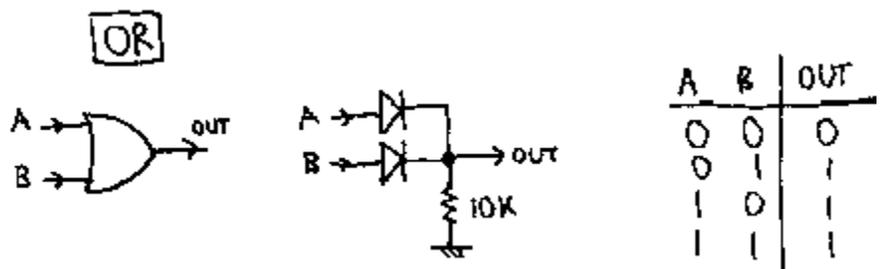
The reason I use these gates is often to save space: if all I need is one AND gate, for example to reset a counter, then I can easily implement it with 2 diodes and a resistor. It saves using a whole additional IC such as a 74HC08 containing four AND gates, of which I only need one. At other times, it can be convenient to be able to build a logic gate with as many inputs as I like. For example, a 7 input OR-gate is easily implemented just by adding more diodes to the basic 2-input gate. I might not have the IC's I would need in my junkbox, so I'd have to order them and wait for the delivery to arrive. But I'll always have resistors and diodes, so this is sometimes another reason for using logic gates made from discrete components.

There are disadvantages to these very simple logic gates too. The most noticeable is that the output current ability of the gates is low. It is determined by the resistor used, and by the current handling ability of the signals driving the gate inputs. If the discrete logic gate output is driving a high impedance IC input such as are found on the modern 74HC-series IC's, there is no problem. The 0.7V voltage drop across the diodes means that you cannot cascade the simple discrete component logic gates, because you may easily violate the input voltage logic level specifications of the IC's following the gate: the voltage will fall below what is recognised as a "1" for example. Finally, the discrete component implementations of logic gates might be slower than their "proper" IC equivalents. I do not currently know how much of a problem this is likely to be.

Now I'll try to explain the various types of gates which I commonly use.

### OR gate

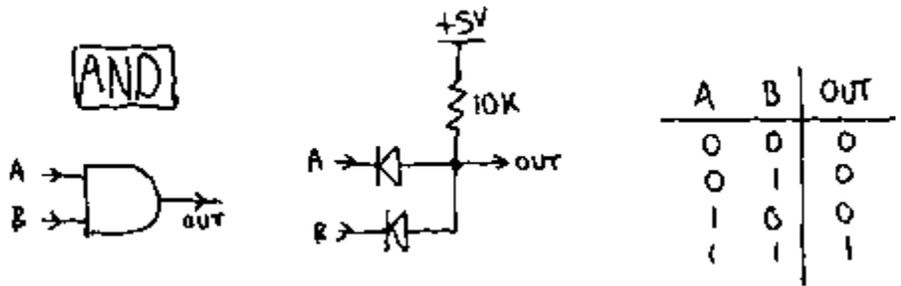
I'll start with this one because it is the easiest to understand. The easiest way to understand the operation of these gates is to consider the diode as a simple switch, which is closed (on) when the voltage on one side (the anode) is higher than the



other (the cathode). The current then flows in the direction of the arrow in the diode's circuit diagram symbol. In the diagram (right) I show the logic symbol, my discrete component implementation, and the truth table. In an OR gate, the output is "1" (high) if either of the inputs are "1". In this diagram, if either of the inputs has a "high" voltage, its diode will conduct and current will flow to the output. A "high" voltage will develop across the resistor, equivalent to the input voltage minus 0.7V drop, as is usual across silicon diode junctions. If both of the inputs are low voltage "0", then the diodes don't conduct. In this instance the gate's output is tied low by the 10K resistor.

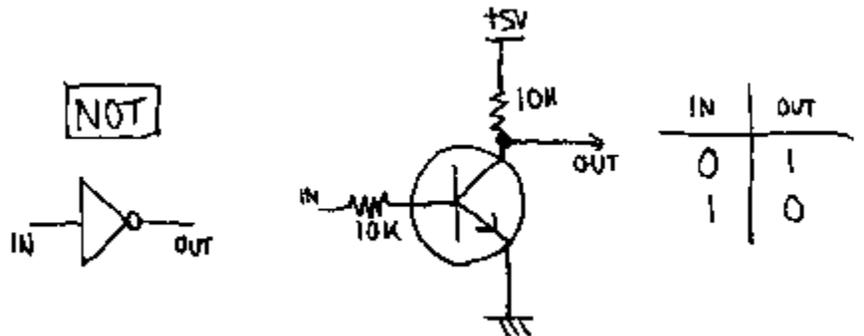
### AND gate

Now look at my AND gate. It's similar to the OR gate except that the diodes point in the other direction, and the resistor goes to +5V not ground. The output of an AND gate is "1" only if BOTH the inputs are "1". In my diode-resistor implementation, if either input is "low" voltage (logic "0") then the diode will conduct and the output is effectively shorted to ground. If both of the input voltages are "high" (logic "1") then neither of the diodes will conduct, so the output is not shorted to ground: it remains at +5V (logic "1") via the 10K resistor. This gives the desired result. Note that again, due to the silicon junction voltage, the actual "low" output voltage is 0.7V higher than the "low" input voltage.



### NOT gate (inverter)

You cannot implement an inverting function with diodes and resistors alone. You also now need a transistor, to provide the inverting action. There's nothing particularly special about the transistor to be used, almost any small signal NPN transistor will suit, since it's driven into saturation (unbiased). If the voltage presented to the base of the transistor is above 0.7, the transistor will conduct which drags the output to logic "0", low voltage. If the input voltage is logic "0", then the transistor does not conduct, and the resistor will just tie the output to +5V. You always need that 10K current limiting resistor in the base, or excessive base-emitter current will destroy the transistor.



### NAND and NOR gates

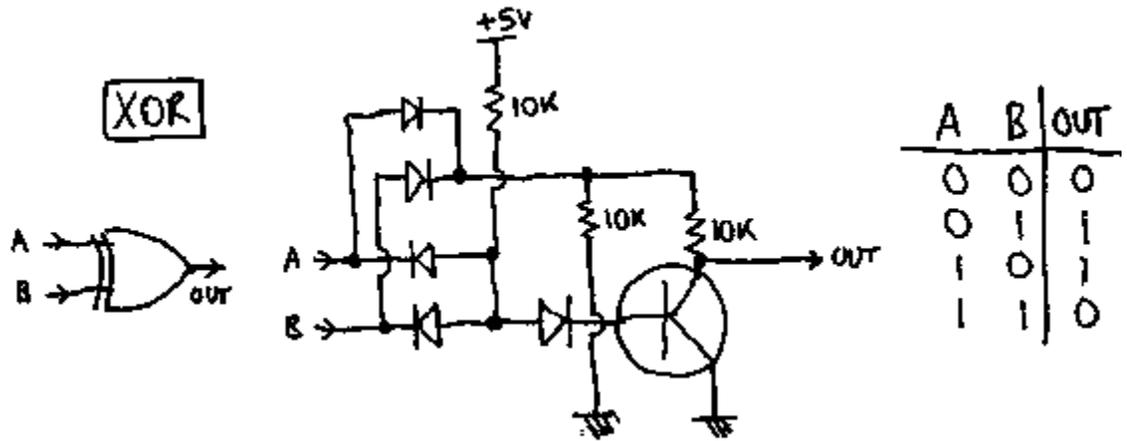
These are easy: just use AND or OR followed by a NOT (inverter). In the case of the NAND gate, the transistor's base resistor can be omitted since the maximum current is already limited by the 10K resistor in the

diode-resistor AND gate. The base resistor is still needed in a NOR gate.

### XOR gate

This one is a little more complicated. If we start off imagining an OR gate, that works for the first three of the possible

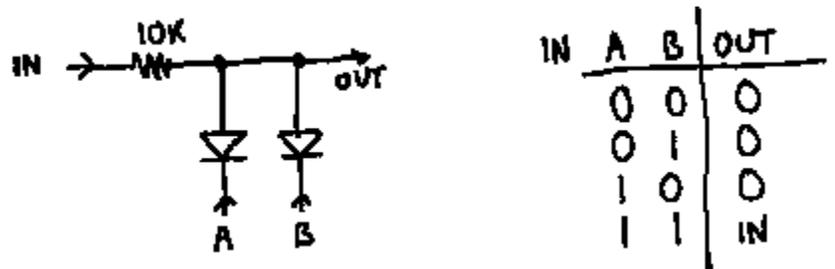
four states in the truth table. But not the final one, where both inputs are "1". So we need a way of forcing the output to zero. I accomplished this using a transistor as a switch, with its base driven by an AND gate on the two inputs. So that when both inputs are "1", the AND gate will activate the transistor, which will force the output to zero. So the XOR gate can be considered as an OR gate, plus an AND gate, plus a switch to zero the output. The additional diode in the base lead of the transistor is to create an additional 0.7V drop, without it the 0.7V of the AND gate output (even when one of the inputs is zero) would be enough to put the transistor into partial conduction.



### Signal gate

I like this one for gating incoming pulse trains. I use this circuit sometimes for frequency counter inputs for example. In the example to the right, the pulse is only allowed from IN to OUT when both the A and B inputs are "1". It's really just another kind of AND gate I suppose, effectively

having three inputs. But saves one diode compared to an AND-gate implementation as above. (Well, even a 2-input AND gate or OR gate can be reduced to a single resistor and a single diode, in that case - but somehow I prefer the more balanced approach with two diodes and a resistor). In the diagram to the right, the diodes could be reversed and the output would then be forced to "1" if either of A or B were a "1". This could be useful to drive a negative edge triggered counter clock input, for example.



### Other notes

1. Gates with more than two inputs: Easy! Just add more diodes, one for each input!
2. The 10K resistor: I have shown 10K for the purposes of illustration only. In reality resistance value needs to be chosen depending on the input resistance of the following circuit that needs to be driven by the output. It needs to be relatively small in comparison. If the gate is driving a single 4000-series CMOS or 74HC-series logic IC input, then the resistor could easily be made upwards of 100K or even 1M, depending on the application.

## XNOR gate

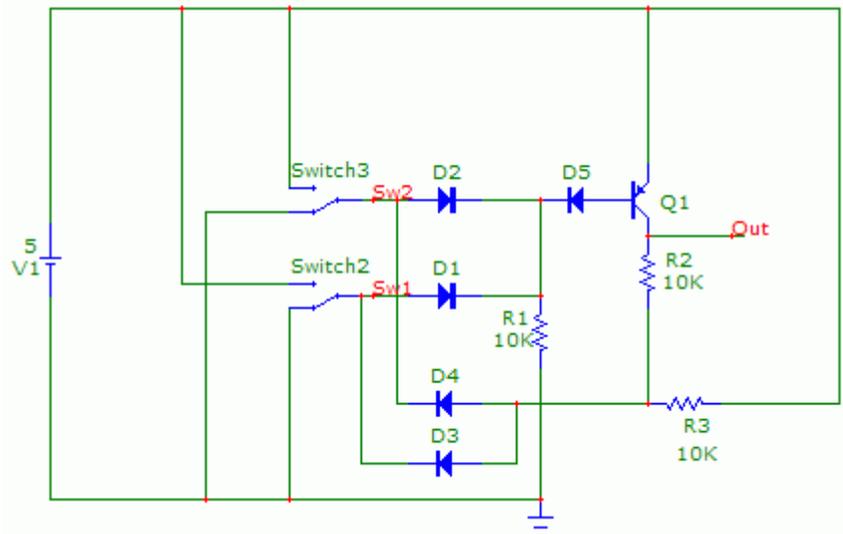
Many thanks to Harry Brunt, who took the time to write to me, with this interesting idea for an XNOR gate (like an XOR gate followed by an inverter). Harry writes:

*"I've just read your interesting article about making logic gates from diodes. I wanted to build a discrete XNOR gate using a minimum number of components (to avoid having to buy a quad XNOR IC for the sake of one gate). After messing around a bit with your XOR gate design, I found that by reversing the polarity of all diodes, substituting a PNP for the NPN transistor and swapping the earth for +V and vice versa, I obtained an XNOR gate - in fact the schematic is just a mirror image of the XOR gate. I've only tried it using SPICE so far, but I can't see why it wouldn't work in practice. I think making an XNOR gate using a single transistor is pretty neat!"*

The truth table for XNOR is:

A B Output

-----
0 0 1
0 1 0
1 0 0
1 1 1



## Club Dues

Dues can be paid at any meeting or by contacting our Treasurer [Bernie VE3BQM](#)

## Wednesday Evening Net

The 2 meter net is underway again Hosted by Rob VE3PCP. The net is at 7:30pm local time, with links to VE3OST in Woodford and VE3RTE in Paisley. VE3OSR is also reachable on Echolink on node 333014. Please mark your calendars and check in. Please consider being the net control station. It only takes a half hour or so and provides experience in net operations. Something anyone interested in ARES should do.

## Yaesu FT-2000 Sale

Maureen VE3MIO has an FT-2000 transceiver for sale. Includes the hand mic, power cord and manual. Contact [Maureen](#) for details.

