FEEDBACK

January 1999

The OFFICIAL Newsletter
of the
Georgian Bay Amateur Radio Club Inc.
P.O. Box 113, Owen Sound, Ontario N4K 5P1
GBARC meetings are held on the 4th Tuesday of every month except July and August at the Georgian Yatch Club, 2475 3rd Ave West, Owen Sound.
Breakfast meetings are held at the Rockford Esso at 9:00 a.m. on the 2nd saturday of the month and every 2nd Sat after that.
Nets 80 metre net on Sunday at 9:30 a.m. on 3.783 Mhz. Two metre net on Thursday at 9 p.m. on VE3OSR 146.94-Mhz.

MESSAGE from the PRESIDENT
Kim VE3DXE

Hello to all. I hope everyone got over Christmas alright. It can be a very busy time trying to visit with family and friends. Carl and I had a great Chrismas, it was quite for a change we went over to my parents in Meaford and had a big feast with them. All over for another year. I would like to thank everyone who attended the GBARC Christmas dinner. It was a great turnout. It seemed like everyone was having a good time, maybe we will have to have a get together in the summer too. Congratulations goes out to Carl Styan (VE3BY) for getting the 1998 " HAM of the YEAR" award. It's funny because after when we did the vote at the meeting , Carl asked me who got the award, I told him that just because he is my husband doesn't mean he should know before everybody else and he will have to wait until the dinner to find out. Nothing more was mentioned. He was surprised when he found out that the award was for him. Web page looks great Tom you have done an excellent job. I just have to get busy and send my reports to you. If anybody has anything they would like to add to the GBARC web page, send it to Tom VE3TSA.
Looking forward to seeing everyone at the meetings, have some great stuff coming up in the future. Until then 73's .... Kim Styan VE3 DXE.

Code Practise Night
Carl VE3BY

Code practice night. every Tuesday at the Yacht Club at 7pm, code practice every night at 8:30 pm (unless changed to 9 pm).Sat and Fri depending on schedule listen on 146.940 VE3OSR. The course out line can be e-mailed to those who can not attend Bring pens/pencils and lots of paper. no keys or oscillators required, unless your teaching. See you all around 7pm 73's Carl

The Essential Advanced:

Amplifiers by Brad Rodriguez, VE3RHJ

Here's what you need to know about transistors:

1. The base and emitter act like a diode. Electrons only flow one way (from emitter to base in an NPN transistor). To make current flow, you need a "forward" voltage of about 0.7 volts.

2. When current is flowing in the base, the transistor tries to make a proportional current flow in the collector. The ratio of collector-to-base current is called β (or sometimes h_{FE}). The transistor cannot generate voltage or current; it can only lower its resistance to let more current flow.
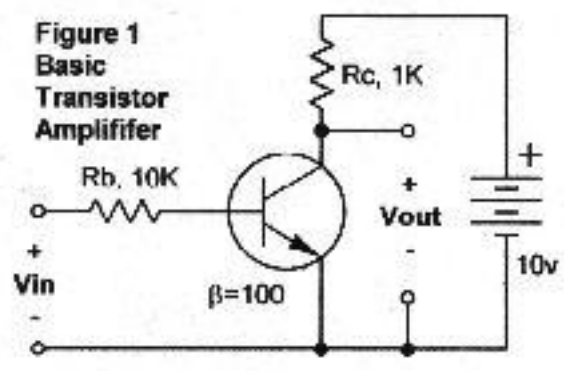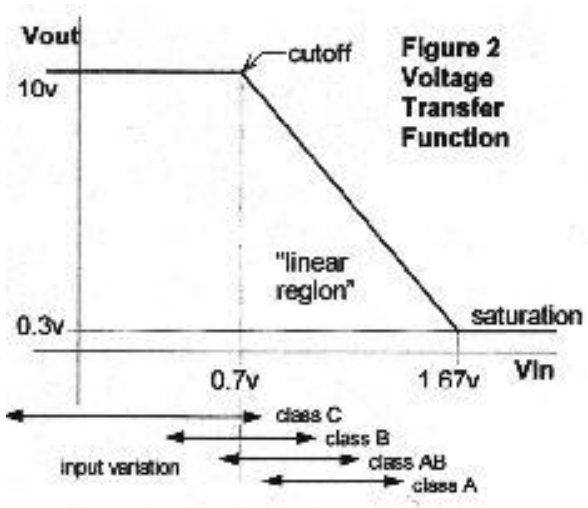
Figure 1
Basic
Transistor
Amplififer

Rc, 1K

Rb, 10K

Vout

10v

Vin

β=100

Figure 1 shows the essentials of a transistor amplifier. When Vin is less than 0.7 volts, no current flows in the base, and therefore no current flows in the collector. This is called *cutoff*. By Ohm's Law, zero current means the voltage drop across Rc is zero, so 10 volts appears across the transistor as Vout.

When Vin exceeds 0.7 volts, the excess voltage appears across Rb and current flows in the base. The transistor tries to make 100 times as much current flow in the collector. (This is a typical β for a small transistor.) As more current flows, the voltage drop across Rc increases, so Vout *decreases*. (Vout plus the Rc voltage drop must always equal 10v.)

When Vout gets down to about 0.3v, the transistor can't lower its resistance any further. It is said to be *saturated*. Increasing the base current beyond this point has no effect on the output. You can calculate the input voltage required for this: 0.3v across the transistor means 9.7v across Rc, therefore 9.7 mA through Rc and the collector, therefore 0.097 mA through the base and Rb, therefore 0.97v across Rb, plus 0.7v forward bias from base to emitter, gives 1.67v for Vin. The graph of output voltage vs. input voltage is called the *voltage transfer function* of the amplifier
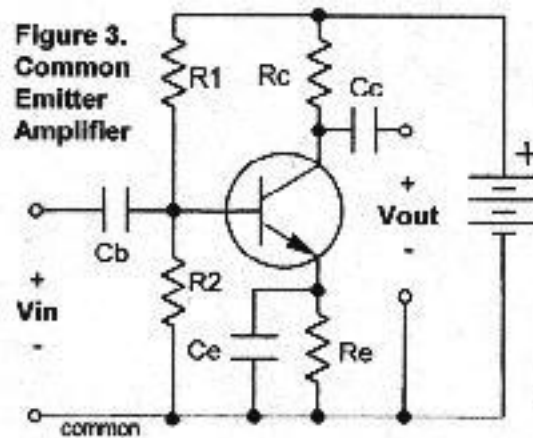
Vout

10v

cutoff

Figure 2
Voltage
Transfer
Function

"linear region"

0.3v

saturation

0.7v

1.67v

Vin

class C

class B

input variation

class AB

class A

(**Figure 2**).

Imagine an AC signal varying from -1v to +1v at the input. Only the very tips of the positive peaks (above 0.7v) will cause the transistor to conduct. For most of the AC cycle, the transistor is cut off. This is called *class C* operation.

Now add a small AC signal to a 0.7v DC signal. When the AC swings positive, the transistor will conduct; when negative, the transistor is cut off. When the transistor conducts for exactly half of the AC cycle -- 180° of the full 360° cycle -- it is called *class B* operation. The added DC is called the *bias.*

Adding more DC bias will let the transistor conduct for *more than half* (more than 180°) of the AC cycle; this is called *class AB*. Finally, enough DC bias will let the transistor conduct for the *entire* AC cycle; this is *class A*.

While the transistor is conducting (and not saturated), the output voltage will vary in proportion to the input voltage. This is the *linear* region (not to be confused with the linear amplifier you add to your rig!). Because more input voltage means less output voltage, it is an *inverting* amplifier. AC waveforms will be turned upside down at the output (or, to be precise, will be 180° *out of phase* with the input).

A practical transistor amplifier will have a few extra components, as in **Figure 3**. R1 and R2 provide the DC bias, and Cb blocks any DC in the input that might change the bias. Likewise, Cc blocks the DC component of the output voltage, passing only the AC. Re does two things: it makes the bias adjustment less sensitive to variations in the transistor β , and it prevents *thermal runaway* by cutting off the transistor if too much current flows. Re will reduce the amplifier gain, so Ce lets AC signals bypass Re. As far as AC is concerned, Re is short-circuited, so AC is amplified with full gain.

Observe that Rb is missing. Nonlinear devices like diodes and transistors present a *dynamic resistance* to small input variations (like the AC input signal). Typically a few thousand ohms, this is the *input impedance* of the amplifier. This *common emitter* amplifier -- so called because the emitter is common to Vin and Vout -- also has an *output impedance* of a few thousand ohms.
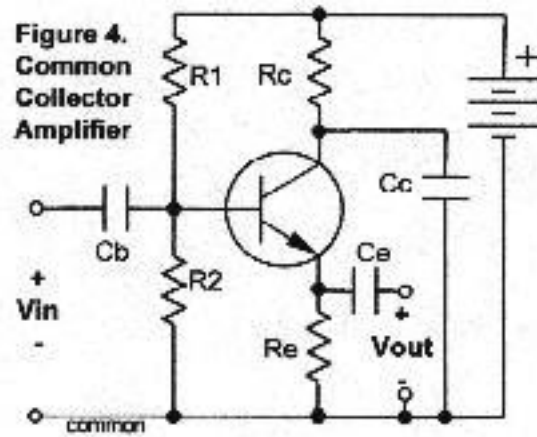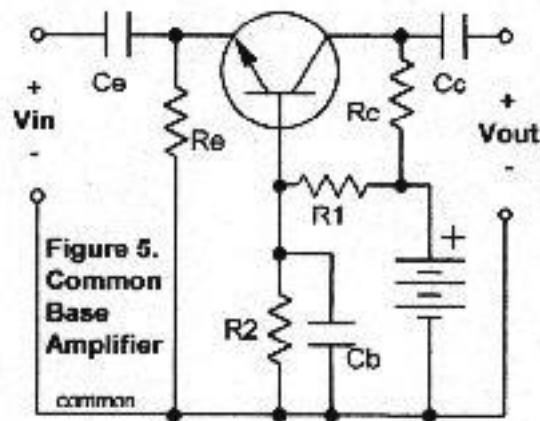
Figure 4. Common Collector Amplifier

Figure 4 shows a variation on this amplifier. Instead of bypassing the emitter to common, take the output signal from the emitter, and bypass the *collector* to common. This *common collector* amplifier is also called an *emitter follower*. Its advantage is that it has a very high input impedance, and very low output impedance. It is a *noninverting* amplifier: the output is *in phase* with the input.

Figure 5. Common Base Amplifier

Another variation is the *common base* amplifier of **Figure 5**. In this amplifier, the input signal is applied to the emitter, and the base is bypassed to common. If you trace the circuit, you'll see that this is identical to Figure 3, except that Cb is connected to common, and Ce is connected to the input. This amplifier offers a low input impedance and high output impedance. (Just remember: the emitter is always the point of low impedance, whether it is input or output.) This is also a *noninverting* amplifier, whose output is *in phase* with the input.

TRUE STORY

COMPUTER SALES ASSISTANT TO CUSTOMER: May I help you?... Yes ,well,I am having trouble with Wordperfect.

Clerk: What sort of trouble?

Customer:..Well,I was just typing along, and all of a sudden the words went away.

Clerk: Went away?..... Customer: They disappeared! ....

Clerk: Hmm!! So what does your screen look like now?

Customer...Nothing! ...Clerk: ...Nothing!! .....

Customer:...I's blank; it won't accept anything when I type!....

Clerk:...Are you still in WORDPERFECT,or did you get out? ...Customer: How do I tell?

Clerk:...Can you see the C:\prompt on the screen?....Customer:...What is a sea-prompt?...

Clerk:.... Never mind.Can you move the cursor around on th screen?....

Customer:..There isn't any cursor: I told you, it won't accept anything I type. ....

Clerk:...does your monitor have a power indictor? ...Customer:...What is a monitor? ....

Clerk:...It's the thing with the screen on it that looks like a TV.Does it have a little light that tells you when it's on?...Customer:....I don't know! ....

Clerk:...Well, then look on the back of the monitor and find where the power cord goes into it.Can you see that?....Customer:....Yes I think so. ...

Clerk:....Great! Follow the cord to the plug,and tell me if it's plugged into the wall. ....Customer:...Yes it is.....

Clerk:...When you were behind the monitor ,did you notice that there were two cables plugged into the back of it,not just one?...Customer:..No.....

Clerk:...Well, there are.I need you to lookback there again and find the other cable.....

Customer:...Okay,here it is.....Clerk:...Follow it for me ,and tell me if it's plugged securely into the back of your computer....Customer:...I can't reach....

Clerk:....Uh huh.Well,can you see if it is? ....Customer:..No......

Clerk:...Even If you maybe put your knee on something and lean way over? ....

Customer: ...Oh ,it's not because I don't have the right angle-it/s because it's dark.

Clerk:...Dark?....Customer: Yes the office light is off,and the only light I have is coming in from the window.

Clerk:...Well,turn on the office light then.....Customer:...I can't....Clerk:...No,Why not? ....

Customer:... Because there is a power outage.....

Clerk:...A power...A power outage? Aha! Okay,We've got it licked now. Do you still have the boxes and manuals and the packing stuff your computer came in?

Customer : Well, yes,I keep them in the closet.....

Clerk:...Good ! Go get them, and unplug your system and pack it up just like it was when you got it. Then take it back to the store you bought it from.....

Customer:...Really,Is it that bad? .....Clerk:...Yes I'm afraid it is. ....

Customer:...Well, all right then,I suppose.What do I tell them?

Clerk:...Tell them you're too stupid to own a computer.

Canada's Largest! Canada's Best!

A show for Amateur Radio, Scanner, Shortwave, and other communication entusiasts.

April 17, 1999, 0900 - 1400
Metro East Trade Centre, just north of Hwy 401 on Brock Road.
Just 15 minutes east of Toronto.

Contact: Ian Smith, VE3ITG

Over 40,000 sq ft of contiguous show area. Lots of paved parking and wheel chair accessible. Bank machine and food court on-site.

There is lots for the family to do in the area as well. Being on the doorstep of Toronto you can visit many attractions including the world famous CN Tower (the largest freestanding tower...what an elevator ride), Skydome, musicals, theatre, Toronto Zoo, etc.

So, come for the weekend, take in the sites, and enjoy the Hamfest. There is a public fleamarket in the same building so your family can enjoy that while you are in picking up your radio treasures!

Ontario DX Association
3rd Annual Ontario QSO Party

held the weekend of April 24-25th from 1800 UTC Saturday to 1800 UTC Sunday.

This is a very laid-back friendly contest where Ontario stations work everyone and stations outside Ontario work Ontario stations.

Complete info is on the Ontario DX Association website at:

We give out a certificate to the top station in every Ontario county, district, region amongst others. All folks have to do is get on the air that weekend and call "CQ Ontario QSO Party", give out a quickie signal report and your county to the stations you work. This year I'm hoping that we're able to activate all of the counties, districts and regional municipalities of Ontario....and receive entries as well!

73 de Bob Chandler VE3SRE
Contest Coordinator
Ontario QSO Party