

# Nacogdoches Amateur Radio Club

## 2019 CLUB OFFICERS

Pres: Jack York - KG5POU

Vice Pres: Bill Rascher - KT5TE

Sec/Treas: Army Curtis - AE5P

Visit our web site at

<http://w5nac.com/>

## MISSION STATEMENT

The Mission of the Nacogdoches Amateur Radio Club is to support and promote Amateur Radio by public service, offering training to unlicensed interested parties and licensed Amateurs, mutual support of other Amateurs, engaging events that promote Amateur radio to the general public and other Amateur radio operators, and continuing fellowship by regularly scheduled organized meetings and events and having fun.



## MAY MINUTES

The May meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on May 1st. **President Jack KG5POU** opened the meeting at 7:00 p.m. in the Lunch Room of Christ Episcopal School. Eleven members were present. Each person present introduced them self. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

**Army AE5P** gave a report on the K5T San Jacinto Day Special Event Station operation. A total of 472

contacts were made with 5 club members participating from their home stations. Band conditions were challenging to say the least.

Field Day 2019 has been confirmed for the new City/County EOC on FM3314 behind McCoys. **Jack KG5POU** is the FD Chairman. Current plans call for two HF stations each using an Icom IC-756 Pro-II, a Cushcraft tri-band yagi on the Green Monster push-up mast, a Butternut 40/80 vertical, and various wire antennas.

The ARRL June VHF Contest was discussed and 7 members expressed interest in making a group rove. **Army AE5P** will be contacting those members individually to confirm details. Others who wish

to participate should contact Army.

The annual Armed Forces Day cross-band communications test is scheduled for May 11.

Meeting closed at 7:51 p.m.

This month's book raffle of "International Antennas" from the RSGB via ARRL was won by **Don W5COX**.

#### Program:

**Army AE5P** with help from **Bill KT5TE** presented a program on RTTY that included on-air demonstrations.

## FROM THE PRESIDENT

### Modern Ham Radio - PART 2

While Morse code proficiency had always been one of the requirements for an amateur radio license, it is no longer a requirement in many countries, including the US. Although not mandatory, many amateurs still enjoy operating Morse code, or "pounding the brass." Amateur operators today communicate via Morse code, voice, pictures, video, and even digital data.

Ham operators can communicate with other hams around the world and even off it - many astronauts are also hams, and have been known to communicate with the more Earth-bound of us fairly often. ARISS, or the Amateur Radio on the International Space Station is a cooperative program between NASA and other international

amateur radio organizations which fosters education primarily through scheduled amateur radio contacts between the International Space Station and school classrooms around the world, giving kids the opportunity to speak directly to astronauts in space. Amateur radio satellites rebroadcast ham radio transmissions, but even without them signals can be bounced off the atmosphere to reach far beyond the visible horizon.

Meeting people from remote locations is a lot of fun, but a large part of ham radio is local. This is due in part to the nature of shortwave radio, as well as power requirements. Many hams carry handheld radios with them all day, tuned to their favorite repeater. Also common are radios in cars and work or hobby places. Next time you see a car driving down the road, sprouting antennas, with a weird license plate code - that's probably a ham. A

common occurrence during the warmer months is the hamfest, which is a flea market where hams buy and sell all sorts of parts, tools, radio equipment, antennas and other items.

While high power transmitters help when communicating around the world, they're not a requirement. World-wide propagation is governed primarily by sunspot and ionospheric activity as well as operating frequency and antenna efficiency, more so than by power alone. There are many hams that enjoy the challenge of communicating with hams thousands of miles away using a transmitter they built themselves which produces only milliwatts of power and fits in an Altoids mint tin or tuna can.

73 de Jack York

KG5POU

[gtjakco@yahoo.com](mailto:gtjakco@yahoo.com)

## FROM THE VP CHAIR

With countless irons in the fire anything dealing with amateur radio will have to take a back seat for the next few months.

I plan to work the VHF contests and field day. Maybe even a few Wednesday lunch meetings, but with all this rain and family stuff it will be a while before I'll see the light of day.

This is a good thing, there is no boredom here...

Until next month,

73, Bill KT5TE

[bill@watershipfarm.com](mailto:bill@watershipfarm.com)

## NOTES FROM OUR EC

Yes, it's that time again, when our thoughts turn to Hurricane Season. The 2019 edition officially begins 1 June. Like last

year, the season has unofficially already started, TS Andrea started the new season 20 May. The season runs until 30 November, 182 days, but who is counting, right?

The various forecasting agencies are predicting up to 16 named storms, 4-8 hurricanes, 2-4 which could be major hurricanes (Cat 3+). With all the rainfall we have already had, let's hope for a quiet non-impactful season.

What is on your checklist for the season? More batteries, annual on the generator(s), 3000 mile check up on the car? If we have to evacuate, do you have a place to fall back to? How prepared are you?

A reminder about net operations. Our nets start at 8:00 PM CT. This is our published start time for both ARES and SKYWARN. Don't always trust the clock on the repeater. All cell phones are GPS trained through the cell sites. The clocks on most computers are

fairly accurate too and can be trained to a time server. Bottom line, fire off the nets no earlier than the published start time.

The Neches River Rendezvous has been cancelled again. I spoke to Steve Glass the other day. It seems for the past few years, it's been more off than on. Bummer.

June 2019 completes 4 years that I have served as the EC for the club. Thank you to everyone that has checked in to the nets. Thanks to the hams who have stepped up as net control operators.

ARES/RACES Mondays,  
8:00 pm CT

SKYWARN Thursdays,  
8:00 pm CT

73 de John Chapman  
KC5MIB  
[jlchapman2@juno.com](mailto:jlchapman2@juno.com)

## VE TESTING

Our next VE testing is scheduled for **Wednesday June 19 at 7:00 p.m.** in the Lunch Room of Christ Episcopal Church School.

Applicants should bring a picture ID, the original and a copy of their current Amateur license, the original of any CSCE's and \$15 to cover the cost of the exam(s). Correct change is always very much appreciated. 73 de AE5P

email: [ae5p@arrl.net](mailto:ae5p@arrl.net)

## NEW HAMS

At our VE testing session May 15, we had five applicants. Todd KI5ELZ from Bossier City upgraded to General, as did Drake KG5SXW from Nacogdoches. Luke from Lufkin is now KI5EWW and Blake from Slocum is now KI5EWX.

Congratulations to all.

## TWO METER CLUB NETS

Remember to join us each week for the two meter nets sponsored by NARC. Each **MONDAY** is the **NARC ARES/RACES** net, at 8:00 p.m. on the club's 146.84 repeater (PL 141.3). Second, on **THURSDAY** evenings at 8:00 p.m. is the **Deep East Texas Skywarn Emergency Weather Net** on the 147.32 repeater (PL 141.3). Please join us for one or both.

## NEXT MEETING

The next meeting will be **Wednesday June 5th at 7:00 p.m.** in the Lunch Room of Christ Episcopal Church School.

## BOOK RAFFLE

Each month, we will have a current book on a topic of interest to Amateur Radio operators. Everyone present at the meeting

will receive one ticket. Additional tickets can be purchased at \$1 per ticket, or 6 tickets for \$5. A ticket will be drawn at the end of the meeting for the book of the month.

The book for June will be "Understanding, Building and Using Baluns and Ununs" by Jerry Sevick W2FMI You must be present at the meeting to win.

## STAYING INFORMED

So, you've got your new ham license. What now? What's happening out there you should know about as a ham?

There are all kinds of info available. The trick sometimes is finding it. Here are some tips to hopefully get you started in the right direction.

1. **Join ARRL.** The League is our National Organization for Amateur Radio and a

wonderful source of information.

2. **Join a local ham club** if you haven't already.

3. **Be an active participant in club activities.** Don't just sit there, get involved.

4. **Sign up for email reflectors.** The local reflector for NARC is W5NAC-Hamlist. You can join through the club website at

<https://w5nac.com/about/email-reflectors/> .

For NTX Section level news, check out the Section web site at <http://www.arrlntx.org/> and the Section email reflector at <https://groups.io/search?q=arrlntx> .

5. **Listen to podcasts.** Two excellent podcasts are "The Doctor is In" and "So Now What?"

both produced by ARRL.

6. **Check into and participate in club nets.** NARC has two 2 meter nets scheduled each week. Check into them regularly or better yet, volunteer to be net control.

7. **Get on the air and make contacts.** So many bands, so many modes, so many opportunities.

These are just a few for starters. There are many more. Want to be active? Try some of the suggestions above and get active. It's up to you.

## UPCOMING EVENTS OF NOTE

Mark your calendars for the following events coming up in the next few months. Full information on these events and much more can be found at <http://www.hornucopia.com/contestcal/contestcal.html>

Note that all dates shown here are local, CST dates while all contest logging uses UTC dates and times.

### HAMCOM 2019

June 7-8, 2019

<https://sites.google.com/hamcom.org/ham-com>

### ARRL JUNE VHF

June 8-10, 2019

<http://www.arrl.org/june-vhf>

### ARRL FIELD DAY

June 22-23, 2019

<http://www.arrl.org/field-day>

### IARU HF WORLD CHAMPIONSHIP

July 13-14, 2019

<http://www.arrl.org/iaru-hf-championship>

### CQ WW VHF

July 20-21, 2019

<http://www.cqww-vhf.com/>

### NAQP RTTY

July 20-21, 2019

<http://www.ncjweb.com/NAQP-Rules.pdf>

### NAQP CW

August 3-4, 2019

<http://www.ncjweb.com/NAQP-Rules.pdf>

### NAQP SSB

August 17-18, 2019

<http://www.ncjweb.com/NAQP-Rules.pdf>

### ARRL ROOKIE

#### ROUNDUP RTTY

August 18, 2019

<http://www.arrl.org/rookie-roundup>

### ARRL SEPT VHF

September 14-16, 2019

<http://www.arrl.org/september-vhf>

### CQ WW RTTY

Sept 28-29

<http://www.cqwwrtty.com/>

### TEXAS QSO PARTY

Sept 28-29, 2019

<http://www.txqp.net/>

### CQ WW SSB

Oct 26-27, 2019

<https://www.cqww.com/rules.htm>

### ARRL SWEEPSTAKES

#### CW

Nov 2-4, 2019

<http://www.arrl.org/sweepstakes>

### ARRL SWEEPSTAKES

#### SSB

Nov 16-18, 2019

<http://www.arrl.org/sweepstakes>

## Solid State Devices Part 8

by  
Thomas Atchison W5TV

As I mentioned in the previous note we can have amplifier circuits with other common leads. We will now consider a transistor circuit with a common base. The basic common base circuit is shown in Fig. 1.

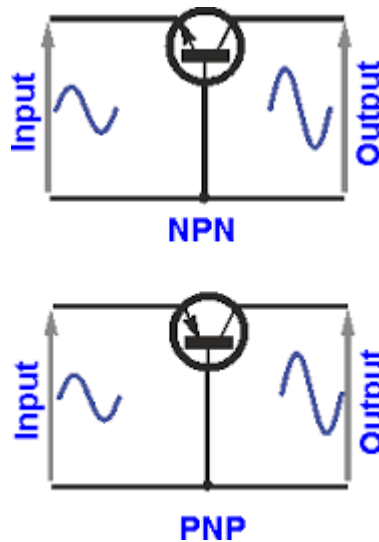


Fig. 1

Fig. 1 shows that the base is common to both input and output in this configuration. Also note that the output is in phase with the input. More on that later.

Now let's look at an NPN common base amplifier as we might see it wired. See Fig. 2.

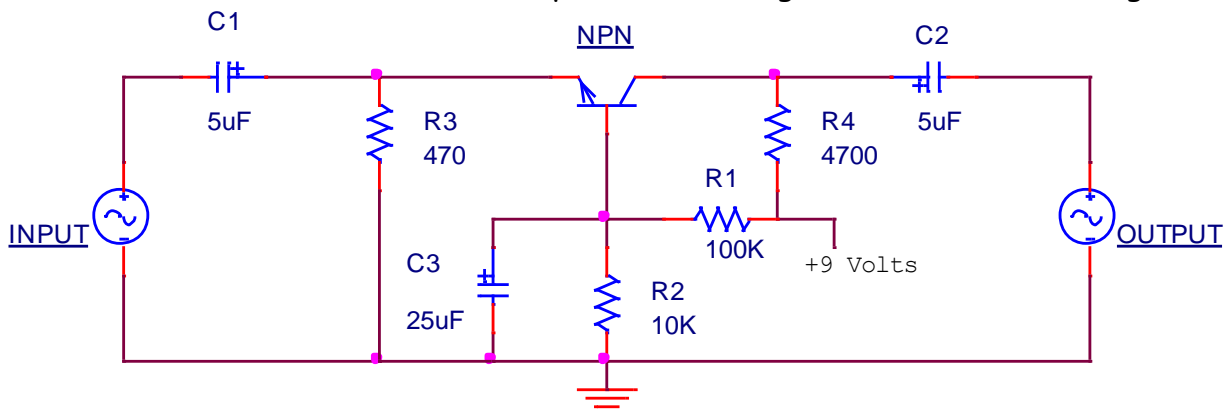


Fig. 2



The input voltage is applied to the emitter, with respect to the grounded base. The output is taken from the collector. Resistance R4 is in series with the collector power supply (9 volts). Since the base-emitter junction is a forward biased diode the input impedance,  $Z_{INPUT}$ , is low.

The output impedance,  $Z_{OUTPUT}$ , is high because the base/collector junction has a reverse bias voltage. That is, a reverse biased PN junction has a high impedance. Since the load resistor R4 is in parallel with the diode junction then its value determines the output impedance. That is, R4 is small relative to the diode junction so the output impedance ( $Z_{OUTPUT}$ ) is slightly smaller than R4. We will use R4 as an approximation of  $Z_{OUTPUT}$ .

The current gain of the amplifier is obtained by dividing the output current,  $I_{OUTPUT}$  by the input current,  $I_{INPUT}$ . We see that the output current is the same as the collector current i.e.  $I_{OUTPUT} = I_C$ . Also, the input current is the same as the emitter current i.e.  $I_{INPUT} = I_E$ . If we denote the current gain by  $G_I$  then we have

$$G_I = \frac{I_C}{I_E}$$

Recall from Solid State Devices 4 that

$$I_E = I_B + I_C$$

This means that  $I_E > I_C$  so  $G_I < 1$ . Thus a common base amplifier attenuates the current. We previously labeled this ratio  $\alpha$ . Typical values for  $\alpha$  range from 0.90 to 0.99.

The voltage gain of the amplifier is obtained by dividing the output voltage,  $V_{OUTPUT}$  by the input voltage,  $V_{INPUT}$ . That is

$$G_V = \frac{V_{OUTPUT}}{V_{INPUT}}$$



But  $V_{INPUT} = I_E(R3)$  and  $V_{OUTPUT} = I_C(R4)$  so

$$G_V = \frac{I_C R4}{I_E R3} = \frac{\alpha R4}{R3} = G_I \left[ \frac{R4}{R3} \right]$$

From this we see that the voltage gain is approximately equal to the ratio of the collector resistance to the emitter resistance. However, remember that the junction between the base and the emitter terminals is a PN-diode. This junction has a resistance called the dynamic emitter resistance which we will denote by  $r_i$ . For AC input signals this small signal resistance is given by

$$r_i = \frac{25mV}{I_E}$$

The  $25mV$  is the thermal voltage of the PN-junction and  $I_E$  is the emitter current. This relationship was discovered by William Shockley, one of the discoverers of the transistor effect at Bell Laboratories.

As  $I_E$  increases, the emitter resistance will decrease by a proportional amount. Since the resistances  $r_i$  and  $R3$  are in parallel and  $R3$  is generally much larger, the voltage gain changes dynamically with different levels of emitter current. Because the two resistances,  $r_i$  and  $R3$  are in parallel and  $R3 \gg r_i$  then the effective resistance is approximately  $r_i$ . This means the voltage gain is given by

$$G_V \approx \alpha \frac{R4}{r_i} \approx \alpha \frac{I_E R4}{25}$$

For example, if  $I_E = 1mA$  then the dynamic impedance would be

$$Z_{INPUT} = \frac{25mV}{1mA} = 25\Omega$$

If  $\alpha = 0.95$  then the voltage gain would be

$$G_V = \frac{(0.95)(4700)}{25} = 178.6$$

It can be shown that the power gain,  $G_P$  is given by

$$G_P = (G_I) (G_V)$$

Since the current gain is slightly less than 1 then the power gain is slightly less than the voltage gain.

For example, suppose the current gain is 0.95 and the voltage gain is 178.6 as in the example above. Then the power gain is

$$G_P = 0.95(178.6) = 169.7$$

That is, the output power will be about 169 times greater than the input power.

Since the voltage gain of the common base amplifier depends on the ratio of two resistive values then there is no phase inversion between the emitter and the collector.

The common base amplifier is used when a low input impedance and a high output impedance are required. It is also useful if you need an amplifier with no phase inversion. It is popular in integrated circuits and in VHF and UHF rf amplifiers.

**Reference:** *Understanding Basic Electronics*, First Edition by Larry D. Wolfgang, WR1B, published by the American Radio Relay League, 2002.

## TECHNICAL QUESTION FOR JUNE

Editor's note: This month we continue a new column where we challenge our members with a technical question. The closest correct answer sent to AE5P from a current dues paying NARC member will be eligible for a special prize. The prize will be awarded at the upcoming meeting. You must be present to win. Members are limited to winning once per calendar year.

This month we again base our technical question on the wonderful column done each month by Dr. Tom, W5TV. In this month's column, Dr. Tom presents an analysis of the common base transistor amplifier and for the specific case described, shows the power gain is 169.7.

The question then is what is this power gain expressed in dB?

Hint: Google is your friend.