September 2021 **Volume 09-2021**

Nacogdoches Amateur Radio Club

2021 CLUB OFFICERS

Pres: Bill Rascher – KT5TE

Vice Pres:Steve Bartlett–WB5IDY

Sec/Treas: Army Curtis - AE5P

Visit our web site at

https://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.

AUGUST MINUTES

The August meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on August 4th. **President Bill KT5TE** opened the meeting at 7:00 p.m. in the Nacogdoches City/County Emergency Operations Center off FM 3314. Self-introductions were made by members and guests present. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

Discussion on several contests held since the previous meeting.

A club roving pack participated in the CQ VHF Contest. N6RH, KI5FIQ, KI5RAT, KD5GEN and AE5P all played in this two band contest; 6M and 2M only. 'Wolfie' KI5MHB participated from the K5QE contest station where he was the 'voice of 6 meters'.

Members also participated in Parks on the Air (POTA) and the IARU contest.

Mike W5NXK won a copy of 'Grounding and Bonding' in the book raffle.

Meeting closed at 8:04.

Program/Show and Tell presented by Bill KT5TE, showing off his new Elecraft K4 HF transceiver. This latest offering from Elecraft has

so many features it should not take much over a year to learn them all. Congratulations Bill. It's a beautiful radio.

FROM THE PRESIDENT

Are your schedules for September, October, and November full? Every weekend for the next few months I have two or more items on the calendar, and that doesn't take into consideration my commute back and forth to St. Louis, MO to be with my Uncle. The little KX3 needs to be setup in the travel trailer so I can participate in a few radio events on these trips up north. The truck does have a Yaesu FT-857D permanently setup for VHF/UHF contest roving, so maybe I'll keep an eye out for special events while traveling.

My plan is to find a suitable antenna to permanently mount on the trailer. Then run a coax to the dining table where I'll setup the KX3. If you have an antenna suggestion be sure to get with me at our next meeting, September 1st.

Hope to see you at the meeting...

73, Bill KT5TE

bill@watershipfarm.com

FROM THE VP CHAIR

Tech Tips

Generators

As hurricane season approaches, it is time to pull out your "genny" and blow off the spider webs. Way too many folks try to start their generator for the first time after the power is out only to find things are all gummed up. A quick oil change, new fuel and a 30 minute test run are now in order. Always use gas with a stabilizer unless you intend on draining the tank when finished. It pays!!

After the ice storm of the century, many folks decided they needed a generator, or maybe a bigger generator! What size and type of generator you need is determined by your load requirements. Running your AC unit takes a big boy. Running two LED lights in your living room requires very little power.

Whole house generators with automatic transfer switches are expensive. They also require significant fuel sources that are not always feasible. Smaller portable generators under 5 kW can provide extension cord access to multiple fixtures in your house, but are a bit messy with all the cords running through windows and doors.

There is a solution that is in between these two options which involves a medium size portable generator (usually gasoline powered) but with connectivity to your whole house.

We are running a 8.7 kW gasoline powered generator (7 kW normal) that back feeds into our electrical service panel via a specialized 30 amp plug and a 10 gauge cord. Since the generator can produce two legs of 120v (phase shifted 180 degrees) we can power both busses in the panel and also utilize 240 volts if we need to run a bigger appliance. Unlike a limited circuit manual transfer switch, this option powers the entire panel which means you are responsible for understanding the loads of each circuit you may engage. If you try to run more than the genny can do, it will die and possible damage the circuitry.

We also upgraded to an inverter generator, which I highly recommend. This type of generator holds a steady 60 Hz regardless of the load and emits a clean sine wave from a built-in inverter. I burned out a coffee pot and an expensive dimmer panel using a regular generator which can stress sensitive electronic devices. The other advantage of an inverter generator is the ability to throttle down when loads are low, saving gas and diminishing noise levels. As a result, they are a bit more fuel efficient.

The generator plug (Reliance Raintight Generator Power Inlet Box — 30 Amp, Model# PB30) connects to my 200 amp service panel via a 10 ga 4-wire Romex line that is wired to a double 30 amp breaker. The breaker switches the generator on or off to the panel.

For safety purposes, the main breaker **MUST BE OFF** so that you do not energize the power lines and harm a lineman. An interlock kit is required which physically stops the 30 amp generator breaker from engaging until the main breaker if off. These are easy to install in a few minutes. Use a MET Labs listed interlock device. Interlocks are sold for each specific panel brand and model and cost about $60 (geninterlock.com).

Generator power cords are easily made from parts found at big box stores or over the internet. The 30 amp connector on each generator is a standard NEMA L14-30 plug.

To engage the system, I turn off the main breaker, turn off all other circuit breakers, start the generator and plug in to

the inlet, then flip the generator breaker on. I turn on one circuit at a time, engaging only the ones I need. Electric water heaters and dryers should probably not be used. Mine will run the AC, but only if I have disconnected most of the other high loads.

Now, we have internet, TV, coffee, a cold fridge and best of all …. My CPAP at night! No more extension cords.

Check out your generator before the next storm. Be safe.

73

Steve, WB5IDY

bartlett.steve58@gmail.com

NOTES FROM OUR EC

It's 26 Aug as I write this. August is almost over and Labor Day, the unofficial start of Autumn, is just around the corner. We have recorded 4.4 inches of rain to date and had a little last night. It has been either hot or raining or sometimes both.

It's half time in the 2021 Hurricane season. NOAA has refined their 2021 outlook with 15 - 21 named storms, 5 Hurricanes and 3 Major Hurricanes. So far, there have been 8 named storms, with 3 hurricanes. None have had any impact to our region of the Gulf. There are 3 depressions working, one in the middle Atlantic, one in the eastern Atlantic off the coast of Africa and one in the Caribbean (TD9).

The National Hurricane Center 5 day model for TD9 seems to put the center of the path on the border between Arkansas and Mississippi on the Mississippi River. Land Fall expected Sunday/Monday along the Louisiana Gulf Coast. My go to page, Mike's Weather page, doesn't have a link up to the other models. Please keep your spare radio tuned to the NWS weather station or check the NHC web page for more up to date information.

We still have the second half of the season to go and of course the usual fall weather outlook. Robert KD5FEE posted a note from the NWS to the W5NAC mail list. The NWS will have 4 on-line Skywarn classes, 2 via Facebook. Please check into those if you need a refresher, need to recertify or want to get certified as a storm spotter.

Tornadoes know no season, if the conditions are right you can experience one. And we have had our share of ugly storms not always producing tornadoes. As always check in to our nets and I'll listen for you there.

73 de John Chapman KC5MIB
kc5mib@arrl.net

VE TESTING

The August VE session saw three applicants. **David Roach KI5FUO** from Milam and **NARC member Jason 'Wolfie' Burrows KI5MHB** from Center upgraded to General. **Todd Roberts KI5ELZ** from Bossier City upgraded to Extra. Congratulations to all three.

Many thanks to VE's **Ralph N6RH, Mike AA5HH, Mike W5NXK, Robert KD5FEE** and **Army AE5P**.

Remember that we give VE tests the third Wednesday of EVERY month. For the latest information always check the club website at:

https://w5nac.com/ve-testing/

73 de AE5P.

email: ae5p@arrl.net

TWO METER CLUB NETS

Please join us each week for the two meter nets sponsored by NARC. All stations are welcome to check into the nets.

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

Our next meeting will be Wednesday September 1st at the City/County Emergency Operations Center off FM3314. Meeting starts at 7:00; doors open at 6:30. Come early for a little socializing before the meeting.

We will have our monthly book raffle, with everyone present receiving a raffle ticket without charge. One ticket will be drawn and the winner will be given a book on a ham radio subject.

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.

ARRL September VHF Contest
Sept 11 – 12, 2021
http://www.arrl.org/september-vhf

Texas QSO Party
Sept 18 – 19, 2021
http://www.txqp.net/

CQ WW RTTY
Sept 25 – 26, 2021
http://www.cqwwrtty.com/

CQ WW SSB
Oct 30 – 31, 2021
http://www.cqww.com/rules.htm

ARRL Sweepstakes CW
Nov 6 – 7, 2021
http://www.arrl.org/sweepstakes

ARRL Sweepstakes SSB
Nov 20 – 21, 2021
http://www.arrl.org/sweepstakes

CQ WW CW
Nov 27 – 28, 2021
http://www.cqww.com/rules.htm

Check out the many contests listed on the Contest Calendar link shown here. There are many State QSO parties and 'Parks-On-The-Air' events that may be just right for you. Check 'em out.

Frequency Modulation

by

Thomas Atchison W5TV

Many of us use frequency modulation (FM) on 2 meters. I want to talk a bit about what FM is and how it works. When we push the transmit button and talk into the microphone how does the voice information get from my transmitter to a receiver so it can be understood by someone? The operational word here is modulation. The radio signal is altered (modulated) by my voice when I speak. That modulated radio signal is an electromagnetic wave that travels to the receiver through space and the receiver demodulates the signal to extract my voice from the radio signal. My voice is then routed to a speaker where it can be understood by the other person.

Frequency modulation is one way of combining a voice with a radio frequency so the above can be done. In this case, the audio signal from my voice varies the frequency of the RF signal in such a way that the information (audio signal) can be recovered at the receiving end.

When you push the microphone button to talk, your FM transmitter emits a range of several thousand hertz of different frequencies and not just the singular frequency value to which you have tuned the transceiver. The displayed frequency is a reference value called the **carrier frequency**. With FM the emitted signals will vary in frequency both higher and lower than the carrier frequency by several thousand hertz. The full range of the frequencies emitted is called the **bandwidth** of the signal. For example, suppose you tune your 2 meter FM transceiver to 146.52 MHz and you speak into the microphone. Suppose the transmitter emits signals representing the modulated audio of your voice from 146.526 MHz down to 146.514 MHz. Then the bandwidth of your signal would be **146.526-146.514=0.012MHz=12KHz.**

Specifically, frequency modulation is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave. The difference between the frequency of the carrier and its center frequency is varied according to the amplitude of the audio signal as shown in Fig. 1.

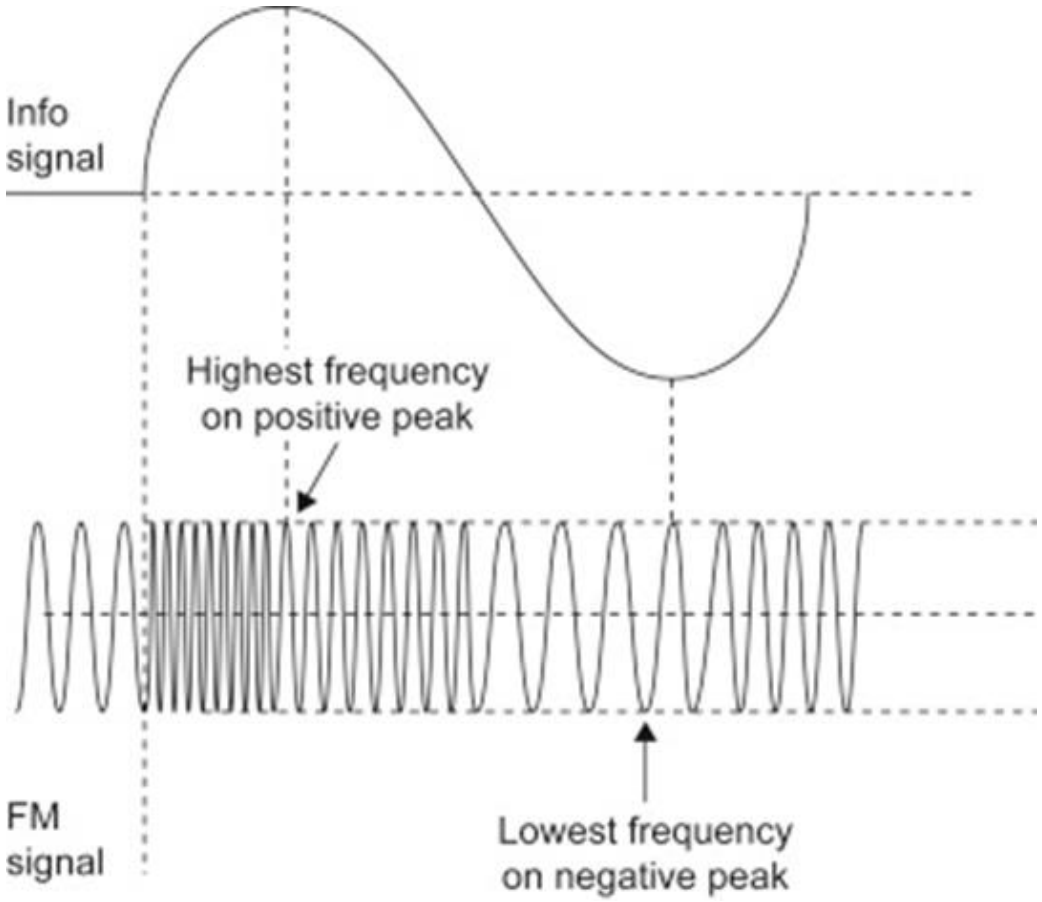

Fig. 1

Frequency deviation is the amount of frequency shift each side of the unmodulated carrier frequency which occurs when the transmitter is modulated. It is usually measured in kilohertz. When a symmetrical modulating signal is applied to the transmitter, equal deviation each side of the resting frequency is obtained during each cycle of the modulating signal. The total frequency range covered by the FM transmitter is sometimes called the **swing**.

Frequency deviation is important because it determines the bandwidth the FM signal will occupy in the spectrum. Less deviation means that more channels can fit into the same amount of frequency spectrum. In amateur radio we use narrowband FM with a deviation of ±5 kHz. The channel spacing is dependent upon location. In the United States it can be 15, 20, or 30 kHz depending on the region. The ±5 kHz means that the deviation can range from 5 kHz above the carrier frequency to 5 kHz below the carrier frequency. In this case the swing is 10 kHz.

The following diagram shows frequency modulation (FM) compared to amplitude modulation (AM) (Fig. 2).

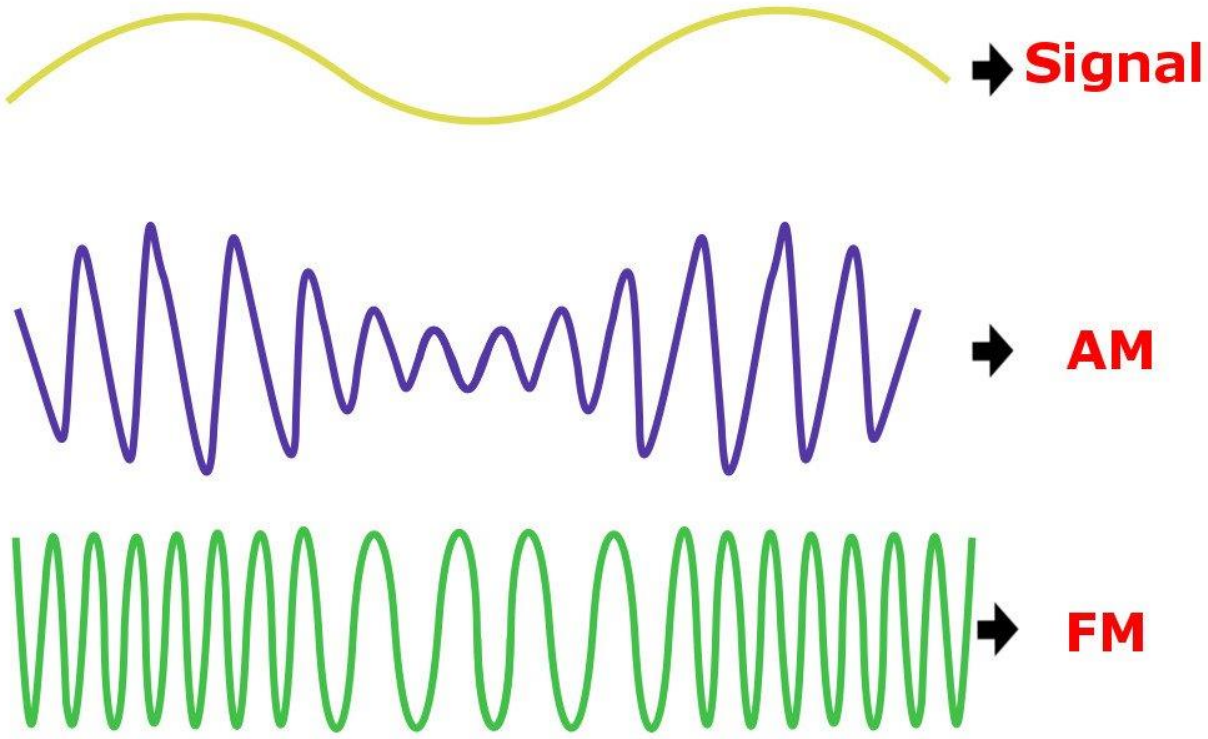

Fig. 2

The **modulation index** of an FM signal is the ratio of the deviation to the audio modulating frequency, when both are expressed in the same units.

For example, if the deviation is ±5 kHz and the modulating frequency is 2 kHz, then the modulation index would be

$$\frac{5\,kHz}{2\,kHz} = 2.5$$

The **deviation ratio** is the ratio of the peak frequency shift obtained under full modulation to the maximum audio frequency to be transmitted. For example, if the maximum audio frequency to be transmitted is 3 kHz and the peak frequency shift is 5 kHz, then the deviation ratio would be

$$\frac{5\,kHz}{3\,kHz} = 1.67$$

The noise-suppression capabilities of FM are directly related to the deviation ratio. As the deviation ratio is increased, the noise suppression becomes better if the signal is stronger than the noise. But, as the noise approaches the signal in strength low deviation ratios allow communication to be maintained in many cases whereas high deviation ratios will not.

Since all the modulating information is carried as frequency variations and no amplitude changes are required, the signal can be passed through a limiter stage. This not only removes the major source of noise which is amplitude noise, but it also removes the major changes in signal strength resulting from mobile operation. This makes FM a good choice for mobile operation. We may talk about limiters in a later article.