



THE COMMUNICATOR



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HAM RADIO AND AMATEUR TV

ATV 101

This article will not deal with the video part of the TV signal but only with the RF part. It will not deal with HDTV or stereo sound either. It will deal with the RF parts of the old-fashioned TV signal only.

Amplitude and Frequency Modulation

There are two basic types of RF - AM and FM. There are others but they will not be dealt with here. FM will be dealt with very briefly in passing.

Difference between AM and FM

AM consists of a constant frequency carrier modulated by mixing audio (as in the standard AM radio band) or video (as in television) or, in a few cases, both. The amplitude of the result varies with the input signal.

This mixing results in three outputs: the carrier itself and two sidebands - upper and lower - which carry identical mirror images of the modulating signal. For example, assume an AM station on 1000 KHz. When an audio frequency - say 1000 Hz - is mixed with the carrier we get the original 1000 KHz and 1000 KHz minus 1000 Hz (999 KHz) and 1000 KHz plus 1000 Hz (1001 KHz). In the case of AM radio the frequencies can be up to about 5000 Hz or more.

In the case of television the modulating signal will be a band of frequencies up to about 4 MHz wide. Therefore, the video signal created could be up to 8 MHz wide - carrier minus 4 MHz and carrier plus 4 MHz. Color and audio can increase this up to 9 MHz wide. More on this later. FM varies the carrier frequency itself and the amplitude

W7ASC ADAW Column

The C.A.R.L. General license class is over. We had 12 finishing up, 4 students passed the General written test Sat 9/2. A reminder to those that might be interested: the next Tech class starts Saturday Oct. 7th. Contact me for details.

The following is from Rick, KA0KZB. Rick usually brings a very interesting collection of items to the License classes. An excellent way to reduce that collection of stuff (W7ASC has back issues of QST available for visitors/kids showing interest in Amateur radio).

A sorrowful aspect of this hobby: easy availability of 'estate sales'. More aptly put: 'estate-give-aways'. Truth hurts; we're a bunch of OLD gentlemen astute at gathering technologic do-dads over MANY years. Most in America have no idea, much less interest, in what we hold value in. I have supervisors (plural) that describe me at the 'fringes' of society for what I collect. I work for a government communications contractor.

I have something to pass along. While I'm still alive I've started to pass out, gratis, those things I hold dear to my heart- 'jewels' of finds I have amassed with diligence. Not radios, per-say. Things that make radio life easier: adaptors foremost. Show me a Ham that doesn't have a collection of N-BNC-SMA-TNC-UHF-miniUHF-APC-SMB-SMA-Pomona-Audio-what-have-you male and female varieties and I'll show you a station that is dark.

I don't stand on a street corner passing these things out. I go to classes. Any license class I hear about and can make the time for. If they're in a class they have brochures to their eyeballs. They are interested. GIVE THEM a N-BNC adaptor (or something similar, don't take no for an answer). SHOW them hardline (I have a collection of 12'' samples- long sordid story), twin lead, power supplies, antennas, isolators, attenuators,

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SUPERSTITUTION AMATEUR RADIO CLUB
General Meeting Minutes
August 15, 2006

Mike KA9E called meeting to order at 19:04

Attendees introduced themselves.

Dianne KD7DJE read Treasurer's report. Approved. Motion Larry AD7GL, 2nd Steve KY7W.

Myrna KN7M read minutes. Approved with change of frequency to "449.200" and "on" added before "the web site" Motion Steve KY7W, 2nd Larry WB7CRK.

Club Hamfest: Volunteer list of duties being sent around. Write your name in spaces where you can work.

Jim K7MY commented on the City of Mesa requirements about electricity, coffee, food. Possibility that a vendor may be easier for the food.

TD N7ISR reported the 501c3 is done. Project took 8 months. Will be effective July 8, 1977 - that is starting at the time the Club had its first 501c3. Amended Articles of Incorporation need to be published in the newspaper. Much applause thanking TD for his continuing work on this.

Mike KA9E requests suggestions of what is needed/useful for the Club. Money can now be sought with possible tax benefit for donors.

Christmas Committee, Gene WA7TSG and Jo Wilson. Start looking for gift donations now.

Dianne KD7DJE is checking roster; then to Rod K7RLB for more proofing. Then it will be printed for distribution.

Larry WB7CRK gave WEB report. Please notify him of any suggestions, praise and especially any mistakes.

Mike KA9E gave repeater report. Kerchunking seems to be all gone - 900 mhz backbone problem. Drop out of repeater: Give time for both repeaters to reset. First double beep is not enough.

New hospital is about 4 stories high. Contact is being made to check feasibility of the Club putting a repeater there. IRLP node already licensed. Considering putting it on the 449.600.

Plaque awarded to Neil K9ZSR thanking him for all his efforts and successes for 14 years as the Technical

Committee Chairman.

Dan N0FPE donated a PA system with 35 watt amplifier to the Club.

Program by Rick W7STS, ARRL Arizona Section Emergency Coordinator, about ARES Registration. Web site for registration is www.az-rrl.org/secure. This will be the source of HAMS for major ARES call out.

Meeting adjourned at 20:50. Motion Larry WB7CRK, 2nd Brian KC5CAY

Submitted by
Myrna KN7M, Secretary

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remains the same. The modulating signal can be as high as 100 KHz since an FM radio channel is at max, 200 KHz wide - as opposed to 10 KHz for AM radio.

Types of Amplitude Modulation

There are several types of AM - Double Sideband with Carrier (commonly known as AM radio), Double Sideband with reduced or suppressed carrier (which is rarely used), Single Sideband with carrier (rarely used), Single Sideband with reduced - or usually suppressed - carrier (known as SSB), Vestigial Sideband with carrier (VSB - as is used in American TV), and Independent Sideband with carrier.

I dare say that we are all familiar with SSB since almost all ham HF operation is of this type. The carrier and one sideband are suppressed.

Independent Sideband has different information on each sideband - unlike "regular" AM which has, as described above, the same information in mirror image on each sideband.

Television uses VSB. A full 9 MHz wide signal is created but all of the lower side band (LSB) except for 1.25 MHz below the video carrier is truncated. Thus, all that is left is a vestige - hence the term "vestigial" - of the LSB. Some LSB must be left so that the TV receiver can lock on to the carrier. As been said above - the LSB information is a mirror image of the USB information so no information is lost.

Except for the two ATV channels at the band edges - 421.25 MHz and 1241.25 MHz where VSB is mandatory - VSB is not required for HAM TV. VSB filters are expensive.

Audio in TV and HAM TV

Standard American TV has separate video and audio transmitters 4.5 MHz apart with the audio transmitter "above" the video transmitter. HAM TV uses one of two methods for audio transmission: subcarrier audio or on-carrier audio.

On-carrier audio is probably the older of the two methods stemming

from the use - early on - of converted UHF commercial two-way radios. The radios were modified to run wideband video and the video was AM'ed on to the carrier. The audio was left basically unchanged.

As equipment was designed and built specifically for HAM TV a separate 4.5 MHz FM subcarrier was used. The audio is carried on the FM subcarrier and then the resultant FM signal is AM'ed on to the video carrier. The TV receiver cannot tell the difference. Because DSB is used and we don't usually use the VSB filters the ATV signal is a little over 9 MHz wide. As in American TV the color information is generated in the video source itself so no external circuitry is required. Up until about ten years ago some new ATV transmitters were still available with on-carrier sound but it is not used much out west.

If there are any questions, additions or corrections feel free to contact me directly.

Bil Munsil
K1ATV HAM TV
Mesa AZ
wmunsil@cox.net

CABLE VS HAM Freqs

In case you have wondered how the cable TV channels relate to the ham VHF/UHF bands - or even if you haven't - here's a neat little chart:

Cable Channel	Cable Freqs	Ham Freqs
18	144-150	144-148
24	222-228	222-225
57	420-426	420-450
58	426-432	
59	432-438	
60	438-444	
61	444-450	

Video carriers are 1.25 MHz above the lower edge of the channel. Color subcarriers are approximately 3.58 MHz above the video carriers. Audio subcarriers are 0.25 MHz below the upper edge of the channel.

Enjoy
K1ATV

HamTV

Editor's Note: (Retyped from the Desert Leaf article in the December 2003 issue written by Bill Norman.) WITH PERMISSION!

When the Aspen Fire took a fiery scimitar to the top of Mt. Lemmon last summer, it also did a job on Bil Munsil's special brand of TV reception. He hopes earnestly to recover it soon, when heat-ravaged communications towers are rebuilt on the mountain.

Munsil is one of a relatively rare breed (fewer than 10,000) of electronic gadgeteers in the U.S. known as Amateur TV (ATV) or Ham TV operators. Their much more familiar brethren, Ham radio operators, number more than 700,000.

The two have much in common, including a common if sometimes perhaps unfair characterization as brainy techno-geeks who sport pen-clustered rubber pocket protectors, spend much of their time hunched over chattering widgets in small, equipment-packed rooms and converse in scientific jargon incomprehensible to most of mankind. In its defense, Ham radio, in addition to being fun, has proved invaluable in providing communications links during emergencies, when normal telephone/radio/TV have been knocked out of commission by natural or manmade disruptions. The late Sen. Barry Goldwater employed a formidable Ham radio station operation in Phoenix for decades. During the Vietnam War in the 1960s and '70s, Goldwater helped relay radio conversations between troops in Southeast Asia and their families back home.

Ham TV enthusiasts believe they can augment the effectiveness of such other-than-usual communications.

A prime difference between the two hobbies/pursuits, contends Munsil, is his belief that, "Hams should be seen as well as heard." He and other ATVers accomplish their visual goal essentially by adding a video camera (camcorder) and TV monitor to the basic equipment utilized by their amateur radio relatives.

Once their gear is hooked up and activated – and it may be contained in

a moving automobile, at a remote hilltop campsite, or a hotel convention center – the Ham TV crowd can send and receive video signals from almost anywhere they wish.

Within certain limitations.

From his home in east Tucson, with a 10-watt, 12-volt direct current system, Munsil can transmit/receive video for a maximum range of about 15 miles. Intervening hills, mountain ranges and other competing airwave transmissions can act as barriers.

However, with the assistance of comm towers and signal repeaters as he utilized on top of the Catalinas, Munsil often could boost the range of his signals to at least 100 miles (well northwest of Phoenix). And if linked to other repeaters in other locales and states, he and other ATVers in Tucson could interact with much of the Southwest and southern California. They hope to expand their ATV coverage more when replacement and new repeaters get built on assorted mountain heights in the western U.S.

Getting started in HamTV needn't be overly expensive, Munsil says. A first-time operator who already owns a TV set and video camera would need to buy only a basic transmitting/receiving device (transceiver) and an antenna to mount on the roof. Initial outlay? Several hundred dollars.

In addition, in order to navigate the airwaves legally, ATVers must possess at least a Technician Class operator's license issued by the Federal Communications Commission. Applicants must pass a 40-50-question exam to get it. The license is free, but a testing fee of about \$10 applies. Local Ham radio clubs offer free training to bone up for the exam.

In Tucson, Munsil estimates perhaps a dozen people own Ham TV equipment in differing degrees of sophistication. He says the majority of them likely aren't as ardent as he in his hobbyist's enthusiasm – some limit their usage to demonstrations for potential user groups such as Boy Scouts and emergency response agencies – but he believes Ham TV would appeal to many people who haven't been exposed to it.

John Clor, former chairman of the communications team for the American

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HAMTV from Page 4

Red Cross chapter here, has had occasion to examine the merits of Ham TV first-hand. He says he believes one of its most fruitful applications would be in capturing video of disaster scenes, particularly of people's homes, immediately after fires, floods and their havoc-wreaking kin strike. By being able to quickly relay the true extent of damage back to the Red Cross from the damage sites, he says, the agency would be best prepared to send appropriate types of aid.

Clor isn't overly enamored of the technical skills needed to set up and operate Ham TV, but he recognizes its potential in the hands of people who can make it work. And he, too, rues the loss of the ATV repeater on Mt. Lemmon. "Our [Red Cross] communications responsibilities extend essentially from Phoenix all the way south to the border," he said. "The short, point-to-point abilities of ATV operators communicating one-on-one aren't workable in a geographic range that big." Repeaters that together can boost signals over hundreds of miles in all directions are the ticket, he says. Upon encountering the massed piles of electronic equipment in Munsil's home (and on the roof), the casual observer might think there's enough equipment on hand to send and receive TV among most of the world's continents. That's not the case, but the man undeniably enjoys pattering with his electronics.

Visually somewhat similar to a large amiable teddy bear, Munsil, 59, says he's known among his pals as "Mr. ATV," which suggests the degree of his enthusiasm and involvement.

One of Bil's favorite ATV demo devices is what he calls the Helmet Cam. It's a kid's plastic sorta-hardhat with a transceiver hidden under the top, and a stubby antenna protruding through. When Bil is finished with the project, the Helmet Cam also will sport a small battery-powered videocam mounted on its bill. The user will be able to stroll wherever he/she wishes - the park, supermarkets, busy street intersections, dog shows - and transmit live images back to a TV monitor located somewhere within 15 miles or

so.

And about that name with only one L. Munsil (official first name William) is also a fan (and some-time instructor) of Esperanto...a combination of tongues and dialects that advocates believe qualify it as a universal language. One of the rules: keep it simple. *People, can't we just get along?*

For some one-on-one information about HamTV, contact Munsil via e-mail at wmunsil@cox.net. A major manufacturer of HamTV gear is PC Electronics in California. Its website is www.hamtv.com.

MEETING HOUSE

The Superstition Amateur Radio Club Meets at the Mesa Community College, at Southern and Dobson in Mesa.

Our meeting room is in the basement of the Clock Tower, center of Campus.

CALENDAR OF EVENTS

BOARD MEETING

PLACE: VILLAGE INN
POWER ROAD AND MAIN STREETS IN MESA
TIME: 6:30 PM, SECOND TUESDAY OF THE MONTH
DATE: 12 SEPTEMBER 2006

GENERAL MEETING

PLACE: MESA COMMUNITY COLLEGE AT SOUTHERN AND
DOBSON STREETS
ROOM:
TIME: 7 PM, THIRD TUESDAY OF THE MONTH
DATE: 19 SEPTEMBER 2006

VE TESTING

PLACE: MESA UTILITIES OFFICE, 640 NORTH MESA DR.
TIME: 6:00 PM, THIRD MONDAY OF THE MONTH
DATE: 18 SEPTEMBER 2006

FUTURE MEETING LOCATIONS

SEPTEMBER: TBD
OCTOBER: TBD
NOVEMBER: TBD

2006 OFFICERS

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Secretary: Myrna Cross, KN7M
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Net Control Station

Wednesdays: KG7FA, John
147.12 MHz Repeater at 8:00 PM
Thursdays: (Various)
14.265 MHz at 7:30 PM

Amateur Radio Newslines both nights: Provided by

Classifieds

This space available for advertising items for sell or items wanted to purchase. Also advertise your expertise or the need for help in solving problems. This is limited to Amateur Radio needs.

Who We Are

The Communicator is published monthly by the Superstition Amateur Radio Club, Inc. (SARC), and is e-mailed to all club members.

Please notify the editor if you do not receive your newsletter, have a change of address, or have found an error. Please direct all submissions to the editor.

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Club Repeater: WB7TJD/R
147.120 MHz(+), 162.2 Hz PL
449.60 MHz(-), 100.0 PL
Club Web Site: www.wb7tid.org

LINKS

[ARRL Southwestern Division](#)
[ARRL Arizona Section](#)
[Arizona Repeater Owners Frequency Coordination Committee](#)
[Tucson Amateur Packet Radio](#)

NEEDED!

We need your article for the Newsletter. Write us about your most embarrassing situation relating to Ham Radio. Send photos as well.

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circulators, mics and such. GIVE them away if, in your heartfelt opinion, there is a need. What is it doing at your house, sitting in a plastic bucket?

It takes time (trees need time to grow), now I feel like Johnny Appleseed in the middle of Ohio. I tell them I've given them a start, something to take away and start their own collection. They come back with stories of 'conquest', most times it's with something I've given them. I've provided some insight to the value of technology and how it might be used in other (Amateur Radio) matters. Something a brochure cannot do.

Look around your shack- discover your buckets of debris and be honest; are you going to use that or is your XYL

going to end up giving it away? Give a 'Newbie' something useful (even if they don't realize it yet) and yourself a restful nights sleep.

We are now back to the regular 2 shifts. Volunteers are needed for W7ASC! Spread the word at your Ham Club. Call Bob at 480-961-1109 and volunteer now. A Volunteer sign-up page is available at www.w7asc.org

-73 de KG7QJ Bob B.
kg7qj@cox.net 480-961-1109

Weekly Nets

(Updated March 2005)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1800 – AZ Desert 10-10 2000 - ECOM 2100 – 2100 Net	0700 - Drivetime 0900 - West Valley 1930 - Mon Swap 1930 – Smart 2100 - 2100 Net	0700 - Drivetime 0900 - West Valley 1900 – Scottsdale 1900 – SKYWARN 6 1930 – AM 2-meter 2000 – Sheriff Posse 2100 - 2100 Net	0700 - Drivetime 0900 - West Valley 1900 – SKYWARN 2 1900 – Thunderbird 2000 – SARC 2100 - 2100 Net	0700 - Drivetime 0900 - West Valley 1930 – SARC 2100 - 2100 Net	0700 - Drivetime 0900 - West Valley 2100 - 2100 Net	0815 – Mercury 2100 - 2100 Net

NET Definitions

AM 2-meter net	144.45	AM Simplex	7:30 pm MST	Vertical polarized antennas
Az. Desert 10-10	28.445		6:00 pm MST	
Drivetime Net	147.120	+600	7:00 am MST	
Mon Swap Net	146.940	-600	7:30 pm MST	Linked to Smith Peak, Yuma, & San Diego
ECOM Training Net	145.51	Simplex	8:00 pm MST	
ECOM Training Net	147.06	+600	8:00 pm MST	
Mercury Net	146.72	-600	8:15 am MST	
Scottsdale ARC	147.180	+600	7:00 pm MST	
Sheriff Posse Net	448.825	-5.0	8:00 pm MST	
SKYWARN 2	442.80	+5.0	8:00 pm MST	(Sector 2)
SKYWARN 6	146.74	-600	8:00 pm MST	(Sector 6)
Smart Net	147.16	+600	7:30 pm MST	Mt. Lemmon Tucson
Superstition ARC	147.120	+600	8:00 pm MST	
Superstition ARC	14.265		7:30 pm MST	
Thunderbird ARC	146.70	-600	7:00 pm MST	Linked to 446.15
Thunderbird ARC	446.15	-5.0	7:00 pm MST	Linked to 146.70
West Valley Net	147.300	+600	9:00 am MST	
2100 Net	147.360	+600	9:00 pm MST	Mt. Ord & linked to Flagstaff

"NO-CODE"

AMATEUR RADIO

LICENSE CLASSES

FALL 2006

Starting Saturday, October 7th, 10:00AM to 1:00PM at Mesa Community College (Southern & Dobson in Mesa)

Based on the NEW Technician License question pools as of July 1st , 2006

Instructors: Bob Burlison, KG7QJ, Rick Checketts, KA0KZB, Robert L. Strauss, W7JTR, and Larry Randall, KA7UIH Amateur Radio licensees and operators.

Saturdays Oct 7th – Nov 18th 10:00am to 1:00pm

Seven 3-hour sessions Fee \$23**

VE test at Superstition Hamfest Saturday Dec 2nd

**To register call MCC Community Education at 480-461-7493
Section NC 500 0770**

**Required text "Ham Radio License Manual" (1st edition), will be available from the instructors at the first class for \$20. The fee for the FCC Amateur License test is \$14 and can be paid by cash or check at the VE Test session Dec 2nd.

SIGN UP TODAY for the MCC No-Code Technician license classes. Earn your Amateur Radio license in just 8 weeks. The classes are planned to prepare you for the "No-Code" FCC Amateur Radio Technician license. Class material is based on the ARRL book "Ham Radio License Manual" (1st edition) containing the **NEW Technician license question pools as of July 1st, 2006**

"Hams" with the Technician no-code FCC Amateur Radio license have privileges on all Amateur frequencies above 50 MHz. With the "No Code" license you can operate SSB or FM voice, Amateur TV, Packet, Satellite, IRLP, and many other modes. One of the more popular modes is FM voice operation on the 2 Meter VHF and 70-cm UHF bands.

Technician licensees can help their communities by assisting in Public Service events, search and rescue, and as communication links in times of disaster.

Note: Morse code and Technician frequency privileges will be changing in 2006. We will keep you posted.

The **No-Code Technician amateur radio license testing session** will be **Saturday, Dec 2nd, 2006 at the MCC. Superstition ARC Hamfest.** Other testing opportunities will be announced. If you are interested in getting an Amateur Radio license or getting back in to Amateur Radio, contact MCC Community Education at 480-461-7493 or 461-7494.

See Class Outline on Back.



The Maricopa County Community College District is an EEO/AA institution.

8/31/2006



OT

SEMINARS

Free Admission
Free Parking

Free Overnight (RV/Trailer space)
Camping / Parking - No Hook-ups