



MT PLEASANT HIGH SCHOOL

AMATEUR RADIO CLUB

Lesson Plan #1

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AMATEUR RADIO CLUB LESSON PLANS

INTRODUCTION

Helping newcomers is one of ham radio's oldest traditions. After all, we are all "amateurs," learning and training together. Even Extra Class Licensed amateurs never stop learning and experimenting. Nearly every ham has mentored or *Elmered* another ham at one time or another. You will likewise, at some point, more likely than not, mentor an amateur.

Your manual for Technician Class License is located at the below URL:

http://w2sbp.weebly.com/uploads/6/5/5/8/6558719/the_arrl_ham_radio_license_manual.pdf. You may copy this link and paste it into the address bar of your search engine, -OR-, simpler, you might want go to our "Home Page" and at the bottom, there is a link to the above URL. Just double click on the picture of the manual and it will open. Download the manual and print it.

The above manual is a free and valuable source of information which should be kept, read and studied for your FCC License Test. One of my former students located this valuable resource link and provided it to us. The ARRL also gave us permission to download, share and use this manual for educational purposes. So as not to duplicate the efforts of the editors of this ARRL manual, I will summarize our mission.

In conjunction with the text You will receive supplements in the form of handouts as well as a web site which will contain both. It will have all the

Lesson Plans and Supplements.

You DO NOT HAVE TO BE A TECHNICAL GURU, or an expert operator to get your license. As you progress through the material, you will encounter some basic science about radio and electricity. There will be a simple bit of math here and there. When we get to the rules and regulations, you'll have to learn some new words and maybe memorize a few numbers.

Like any activity that has been around for a while, such as sailing or flying radio has a special jargon of its own. Now, drawing your attention to our first meeting. I will be slinging around quite a bit of ham jargon, and showing you a lot of strange looking items. Naturally, unless you had been exposed to these strange sounding terms, you probably will not understand what in the world I am talking about, but however, being very attentive, and wanting to learn more you will become familiar with the above.

You will be surprised when you begin using the radios how this language is understood and shared by the amateur community world wide. You might not speak Spanish, Italian, Greek, French or even Japanese, but using these universal terms, you will be able to hold a 'QSO', (a conversation), and at the same time, make a valuable contact.

Now a word, hi hi (that's Ham talk for LOL) about CW or Morse code. You will learn that CW is short for Constant Wave, and simply be turning on an off the transmitter with a telegraph 'Key' you will create dots and dashes. These dots and dashes make up letters, pro-words and numbers. Collectively, it's called Morse code. Morse is still quite popular in Amateur Radio, because all of s signal's energy is concentrated in a single on-and-off signal. Morse works very well in the presence of interference or when signals are weak.

While amateur RADIO got its start long ago as a collection of tinkerers in basements and backyard "shacks" (a name still used to identify your radio room), it has grown to become a worldwide communications service. Tinkerers are still with us, of course, creating new and useful ways of putting radio to work. Unlike many other types of radio communications, you are allowed - NO-encouraged to build and repair your own equipment, from the radio itself to the

antennas and any accessories you can think of. Hams call this build-it-yourself ethic “home brewing” and are proud to use equipment and accessories they built themselves. Hams have been responsible for numerous advances, for example, in the state of antenna art, most commercial antenna were developed by Amateurs.

“IF YOU LIKE TO KNOW WHAT’S UNDER THE HOOD” , i.e., how it works, you’ll find many like minded friends in ham radio.

In this club, you will be taking licensing classes, we the instructors will guide you though the material. We will help you with the hands on activities and the safe and correct use of the equipment. Help us, your instructors by letting us know if you need more assistance,. We want you to learn thoroughly, so don’t hold back on your questions. At the end of each lesson plan (if time permits) we will give a short oral quiz of the material to help you reinforce your knowledge. Be sure you understand the material before moving on to the next session. It is a lot easier to learn the material section-by-section than by rushing ahead. You'll remember it more clearly.

Before closing with the exam prep, a special mention should be made of two fun gatherings. First are the "Hamfests" which are flea markets for us “propeller heads” Where radio equipment, both new and used, are offered for sale. The hamfests are located around the country and are fun to attend.

Lastly, a word about ARRL Field Day, this event is held on the forth full weekend of June every year. Investigate these events on the Web or the ARRL website and attend one, you will be very surprised.

Now to the exam. No matter what element you are working toward, Technician, element 2; General, element 3 or Extra Class, element 4, there is a question pool with the actual questions to be used on the exam along with the correct answer(s). But it's not that easy to get the question pool and memorize the answers. For Technician element 2, the question pool is hundreds of questions and only 35 will be selected for your actual test. The best way is to study, learn and understand the theory, formulas, applications, rules and practice that govern your license.

When you are ready to "sit" for your test, we will give you the location of the nearest test site. Around test time, we will hold some Mark Tests, so you will know how they work. It is our future goal to provide testing right here at Mt. Pleasant High School. To hold a valid FCC exam, it requires three Volunteer Examiners, (VE's), to proctor a FCC examination. We will have the three required VE's to hold the test here at Mt. Pleasant High School when time is right. There are no set dates for the tests. We, the VE's, select the time. So when your ready we will hold the test.

Thank you for your time and attention, we remain

Respectfully,

Your instructors

HEY THERE'S MORE KEEP PAGING DOWN



MT. PLEASANT HIGH SCHOOL RADIO CLUB

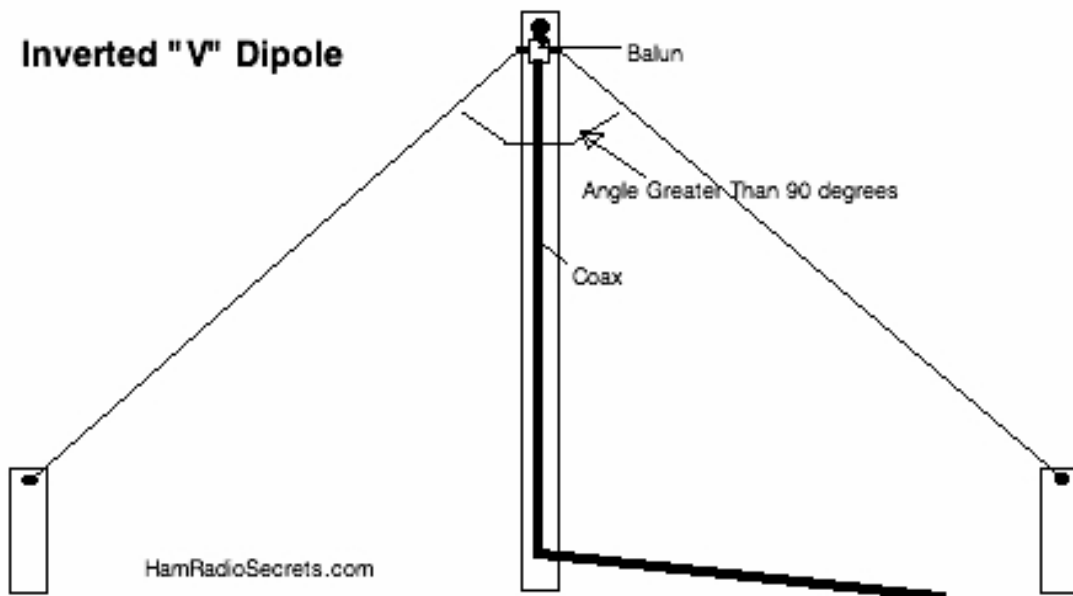
AMATEUR RADIO CLUB LESSON PLAN #1

1. TERMINOLOGY SERIES #1

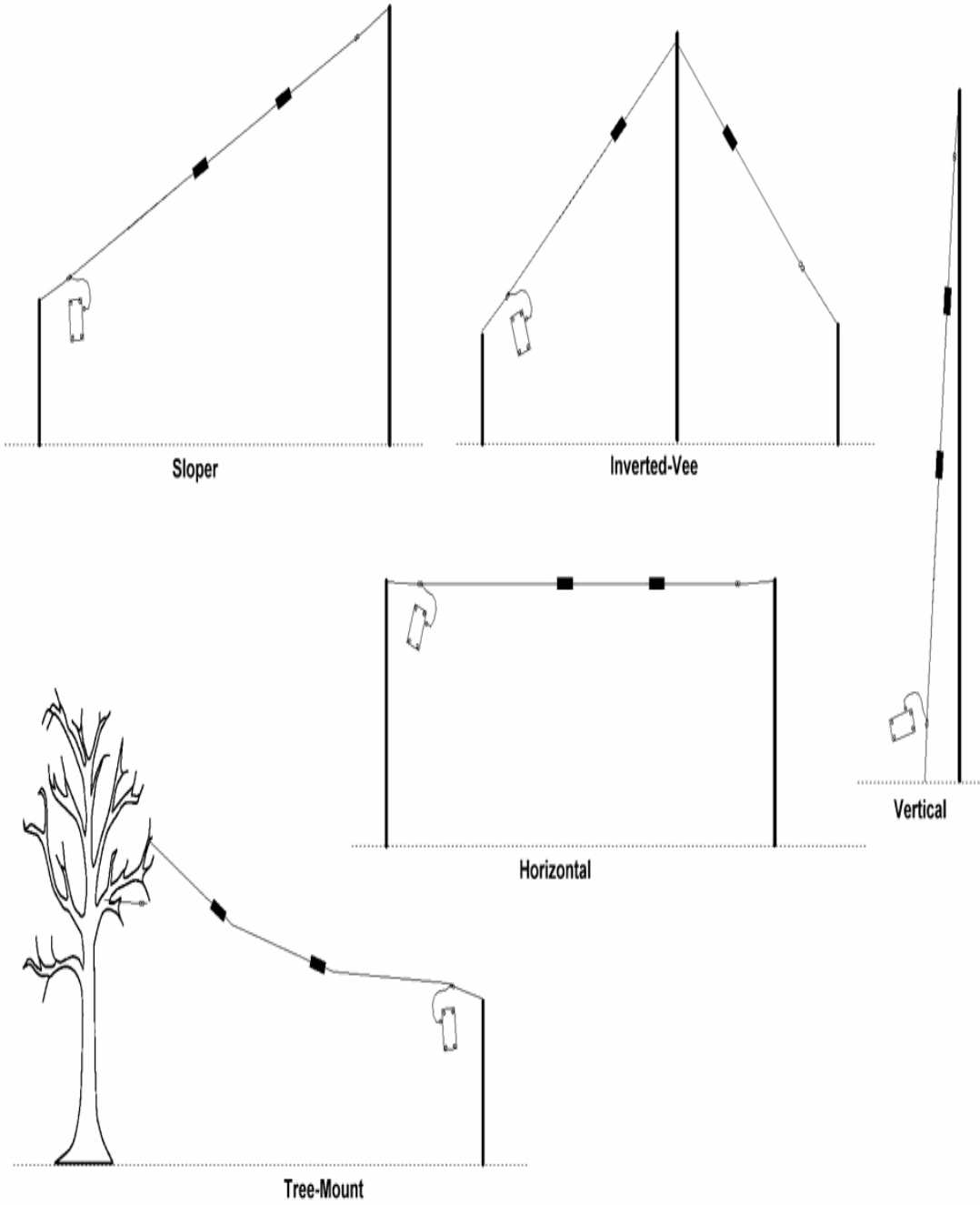
Not all terminology will be in alphabetical order. It is the goal to provide that terminology that mirrors the use of the equipment and training. You may refer to the Text Manual if you wish, however, the explanation of particular terms sometimes are confusing. We will not only describe the term but present a picture of the item if appropriate to assist in understanding the terms.

ANTENNA: A Device that connects to a transmitter or receiver that radiates or receives radio frequency energy.

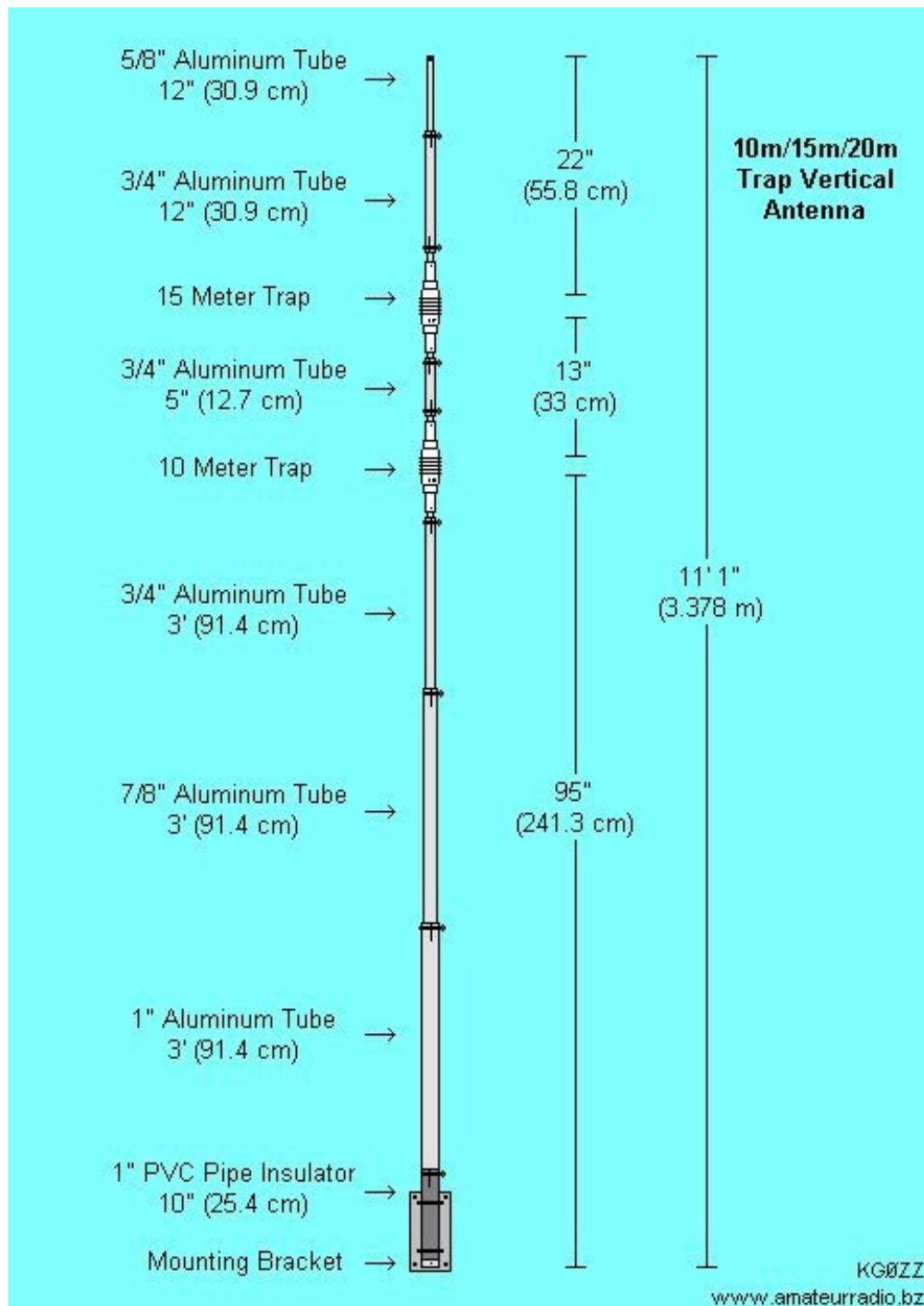
Inverted 'V' Dipole



Various Dipole Configurations



Vertical Antenna (OUR ANTENNA ON THE ROOF) - Cushcraft R-5 Vertical)
OUR ANTENNA IS 17' Tall on top of a 10' Mast



A Beam Antenna on a Tower



*** NOTE:**

All of the above antennas are designed for HF radio Frequency from 1.8-30 MHZ

Following are VHF or UHF antennas:

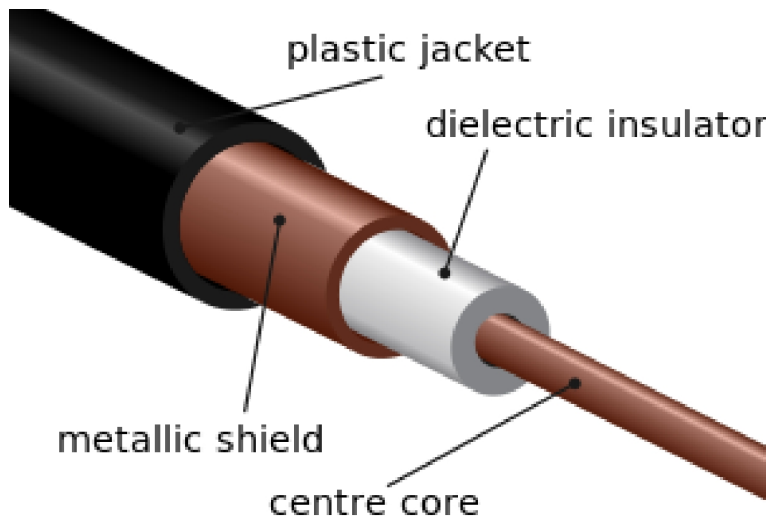
Base VHF Antenna



Portable Hand Portable HandHeld ("RUBBER DUCK")



COAX FEED LINE OR COAXIAL CABLE:



Coax cable comes in several sizes from the larger feed line of RG-8 to the thin RG-58 however they all no matter the size are constructed the same. It is important to select the appropriate cable for the amount of RF radiation which will be applied from the transmitter.

C O A XCONNECTOR KNOW AS A PL-259



The coax connector will accept the larger RG-8 cable however, thinner coax such as RG-8x or RG-59 will require reducers or adapters



Occasionally two lengths of Coax feed line or you might have to splice together a second section of Coax to reach your radio so one would use a connector shown below



I have spent quite a bit of time and space on Antennas and Feed Lines because, the singularly will determine the efficiency of your radio. A properly constructed Antenna properly “tuned” to the resident frequency you will transmit/receive can make or break your ability to communicate with other stations.

The feed line must be cut to the appropriate length so to reduce loss. We will speak about db loss and how to compensate for it with an ANTENNA TUNER a/k/a IMPEDANCE MATCHING NETWORK

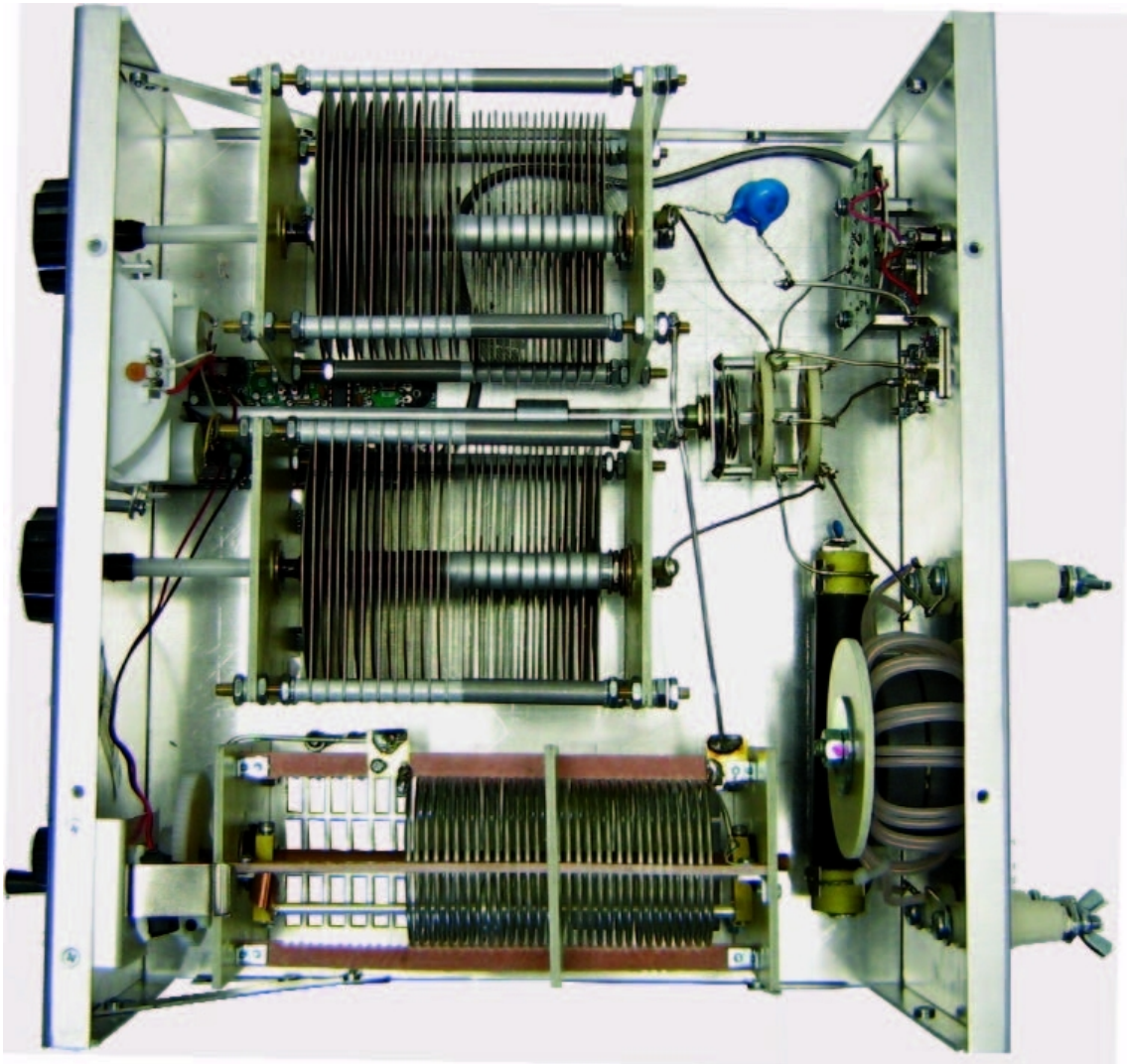
ANTENNA TUNER or IMPEDANCE MATCHING NETWORK:



Above is a picture of a typical antenna tuner or matching tuner

It is used to adjust the radio's impedance to the the actual length of the antenna, such as a DiPole if cut to one frequency and used on another, this device will correct the impedance to "Match" the correct electrical impedance.

Inside Tuner Induction coils lengthens or shortens the feed line and matches the antenna to the resonant frequency so that there will be no reflective RF energy. A properly adjusted Antenna Tuner will give a match of 1:1 so there will be just "FORWARD" RF and no "REFLECTED" RF energy. Why is that important? If your transmitter is not matched to your antenna, and your transmitter indicates FORWARD power of 100 Watts and the REFLECTED power indicates 80 Watts, your effective output maybe is only 20 Watts and the RF might be TOO high for your transmitter to even allow you to continue.



RF ENERGY:

Energy from RF currents in conductors can radiate into space as electromagnetic waves (radio waves). I can't show you RF since it is invisible. However, be aware, one can get burned if the RF energy is strong enough and a person comes in contact with the RF voltages. See, *RF Burn* in Text - Chapter 10.

HF AMPLIFIER:

A device or piece of equipment used to amplify an RF signal. The FCC has limited radio amateurs to a maximum RF output power of 1,500 Watts.



Above is a typical Amplifier which will increase power from 75 Watts RF output from the radio to 1000 Watts RF to your antenna

VHF AMPLIFIER:

Like its HF counterpart, the VHF Amplifier does the same job, it amplifies the RF output power to the antenna in the VHF environment. Please note that the FCC has limited power to 200 Watts output on certain VHF frequencies. Just because your equipment is capable of exceed the permitted output, you as the licensed operator is restricted by the FCC rules.



Above is a picture of a typical VHF amplifier which will boost the power from 5 Watts output to 100 Watts RF

2. MORSE CODE

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A ● —
B — ● ● ●
C — ● — ●
D — ● ●
E ●
F ● ● — ●
G — — ●
H ● ● ● ●
I ● ●
J ● — — —
K — ● —
L ● — ● ●
M — —
N — ●
O — — —
P ● — — ●
Q — — ● —
R ● — ●
S ● ● ●
T —

U ● ● —
V ● ● ● —
W ● — —
X — ● ● —
Y — ● — —
Z — — ● ●

1 ● — — —
2 ● ● — — —
3 ● ● ● — —
4 ● ● ● ● —
5 ● ● ● ● ●
6 — ● ● ● ●
7 — — ● ● ●
8 — — — ● ●
9 — — — — ●
0 — — — — —

MORSE CODE

Learning the "Code" is easy but like the times tables, you have to memorize the letter conversion to dots and dashes. Eventually, they will sound like music and you will remember whole words instead of trying to copy down the letters as you hear the code.

A	• - (Dit Dah)
B	- ... (Dah Dit Dit Dit)
C	- • - • (Dah Dit Dah Dit)
E	• (Dit)
F	• • - • (Dit Dit Dah Dit)
G	- - • (Dah Dah Dit)

You should memorize these letter and commit them to memory, just like you did when studying the times tables. There is no short cut to memorization. It is time consuming, but like the multiplication tables, you can immediately recall their products. If you want, we can practice these letters in the Lab.

Morse Code is not require for an Amateur Radio License. However, you will develop pride in knowing the code. If you choose to venture into the military, knowing the Morse Code is very helpful in selecting your AIT assignments.

3. PURPOSE FOR HAM RADIO AND THE FCC

Amateur radio, also known as ham radio, describes the use of radio frequency spectrum for purposes of non-commercial exchange of messages, wireless experimentation, self-training, private recreation, radiosport, contesting, and emergency communication. The term "amateur" is used to specify "a duly authorized person interested in radio electric practice with a purely personal aim and without pecuniary interest;" (either direct monetary or other similar reward) and to differentiate it from commercial broadcasting, public safety (such as police and fire), or professional two-way radio services (such as maritime, aviation, taxis, etc.).

The amateur radio service (amateur service and amateur-satellite service) is established by the International Telecommunication Union (ITU) through the Radio Regulations. National governments regulate technical and operational characteristics of transmissions and issue individual stations licenses with an identifying call sign. Prospective amateur operators are tested for their understanding of key concepts in electronics and the host government's radio regulations.

Radio amateurs use a variety of voice, text, image, and data communications modes and have access to frequency allocations throughout the RF spectrum. This enables communication across a city, region, country, continent, the world, or even into space. In many countries, amateur radio operators may also send, receive, or relay radio communications between computers or transceivers connected to secure virtual private networks on the Internet.

Amateur radio is officially represented and coordinated by the International Amateur Radio Union (IARU), which is organized in three regions and has as its members the national amateur radio societies which exist in most countries. According to an estimate made in 2011 by the American Radio Relay League, two million people throughout the world are regularly involved with amateur radio. About 830,000 amateur radio stations are located in IARU Region 2 (the Americas) followed by IARU Region 3 (South and East Asia and the Pacific Ocean) with about 750,000 stations. A significantly smaller number, about 400,000, are located in IARU Region 1 (Europe, Middle East, CIS, Africa).

In the United States, the amateur radio spectrum and for that matter all communication signals (other than CD and FRS radio which does not require licensing), controls who, when and where one could use the airwaves.

In the United States, amateur radio licensing is governed by the Federal Communications Commission (FCC) under strict federal regulations. Licenses to

operate amateur stations for personal use are granted to individuals of any age once they demonstrate an understanding of both pertinent FCC regulations and knowledge of radio station operation and safety considerations. Applicants as young as five years old have passed examinations and were granted licenses. December 2012 marked one hundred years of amateur radio operator and station licensing by the United States government.

Operator licenses are divided into different classes, each of which corresponds to an increasing degree of knowledge and corresponding privileges. Over the years, the details of the classes have changed significantly, leading to the current system of three open classes and three grandfathered (but closed to new applicants) classes.

4. LICENSING ELEMENTS AND TESTING

The Federal Communications Commission (FCC) is charged with administering all of the radio signals transmitted by US radio stations. The FCC also coordinates these transmissions with other countries as part of the International Telecommunication Union (ITU). While you may not need a license to use an FRS or CB radio, the vast majority of radio users must have a license or be employed by a company that has a license.

Today, amateurs give and grade the exams ourselves under the guidance of a Volunteer Examiner Coordinator (VEC). There are currently 14 different clubs or organizations recognized as VECs by the FCC. These make up the National Conference of Volunteer Examiner Coordinators (NCVEC). The NCVEC elects representatives to write the questions used for the license exam *question pool*. The representatives make up the Question Pool Committee. There is one question pool for each class of amateur license.

Each VEC also certifies Volunteer Examiners (VE) who actually administer the exam sessions. The VEC then handles the paperwork for each license exam and application. That doesn't mean you won't sweat a little bit, but the examination process is not as imposing as it seems. The result of passing the exam is an *operator license* (or "ticket" granted by the FCC after it receives the necessary paperwork from the VEC that administered your exam session. The

license also specifies a call sign that becomes your radio identity. There are three classes of license being granted today: the Technician, General and Amateur Extra. The exam for each of the three license classes is called an *element*. Passing each of the elements grants the licensee more and more *privileges* allowed by the FCC' Amateur Service rules.

Below are the current elements available to Amateur Radio operators. IF you passed other elements before the FCC changed the licensing scheme, those privileges are still honored as being "grandfathered" in. Hence, if you had an "Advance Amateur License" your privileges are still in effect, but restricted to the band plan as outlined in the frequency allocations chart.

<u>LICENSE CLASS</u>	<u>ELEMENT</u>	<u>QUESTIONS</u>	<u>PRIVILEGES</u>
Technician	2	35 Questions 26 to Pass	VHF, UHF Some HF
General	3	35 Questions 26 to Pass	VHF, UHF & Most HF
Amateur Extra	4	50 Questions 37 to Pass	All Amateur Privileges

5. US CALL SIGNS AND CALL SIGN REGIONS

The FCC has designed or re-designed US Call Signs based upon geographical location. Initially, once a Ham received his/her ticket in Region 1 moved to Region 6, the Ham would have to change the call sign.

Today, once the call sign is issued, it will remain with your station unless or until you change it or it expires after a term of 10 years.

Amateur Radio Callsigns in the United States

	Class	Size	Format	Letters	Example
Group A	Amateur Extra Class	Four characters	1-by-2	K, N, or W plus two letters	W1AW
			2-by-1	AA–AL, KA–KZ, NA–NZ, or WA–WZ plus one letter	AB0C
		Five characters	2-by-2	AA–AL plus two letters	AD0EC
Group B	Advanced Class	Five characters	2-by-2	KA–KZ, NA–NZ, or WA–WZ plus two letters	NZ9WA
Group C	Technician or General Classes	Five or six characters	1-by-3	K, N, or W plus three letters	N1NJA
			2-by-2 (location specific)	KL, NL, or WL; NP or WP; KH, NH, or WH, plus two letters	KL5CD
Group D	Novice, Club, and Military Receptions Stations; and sequentially to Technician or General	Six characters	2-by-3 (Novice or Club)	KA–KZ, WA–WZ plus three letters	KA2DOG
			2-by-3 (Sequential)	KA–KZ plus three letters	KN0WCW

Source: [FCC Callsign information](#)

The call district assignments are as follows (note that a station may not actually be located in the district indicated by the numeral in the stations's callsign) :

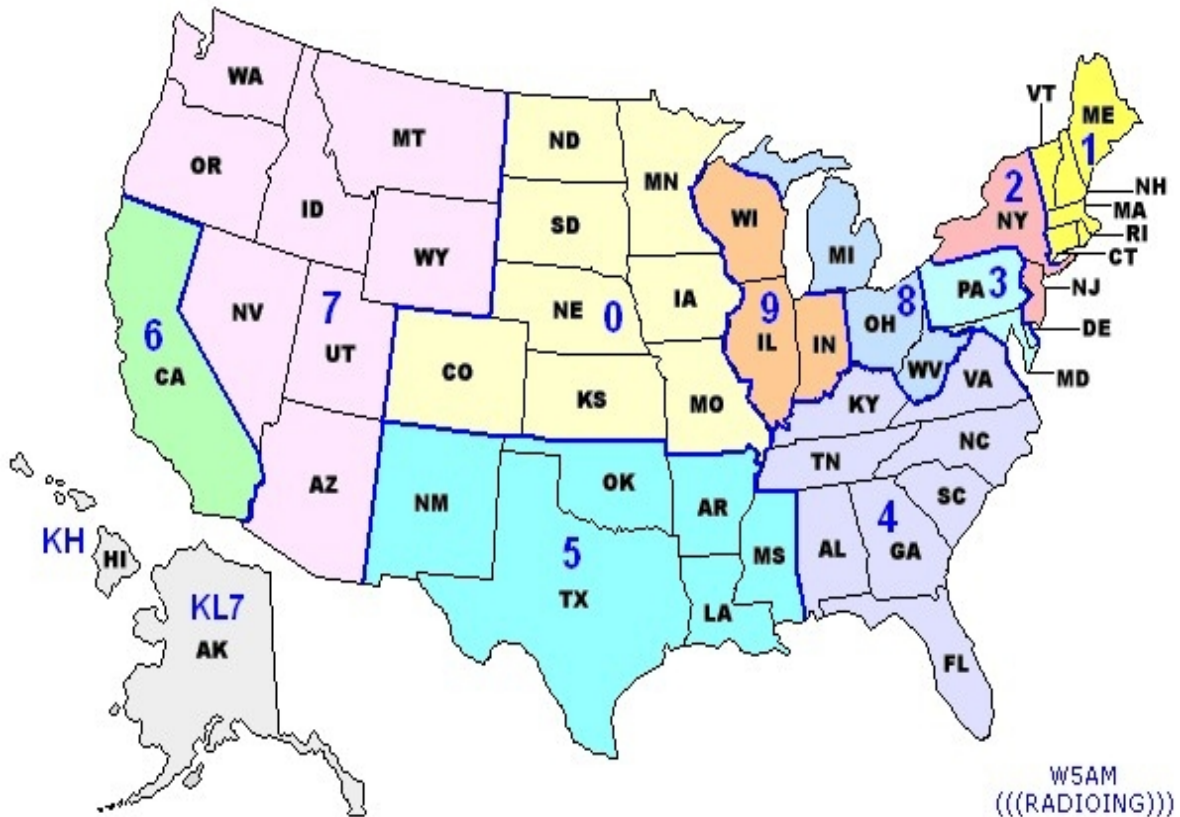


Callsign regions, including all 50 States and a partial showing of territories.

District Numeral States and Territories

- 1 1 [ME, NH, MA, RI, CT, VT](#)
- 2 2 [NY, NJ](#)
- 3 3 [PA, DE, MD, DC](#)
- 4 4 [KY, VA, TN, NC, AL, GA, SC, FL](#)
- 5 5 [NM, TX, OK, AR, LA, MS](#)
- 6 6 [CA](#)
- 7 7 [WA, OR, ID, MT, WY, NV, UT, AZ](#)
- 8 8 [MI, OH, WV](#)

Similar to the Federal Reserve regions, the FCC has provided amateurs with a map delineating the call Regions.



6. US CALL SIGNS BY LICENSE CLASS

The FCC has assigned call signs with prefix a number (representing your initial license Region location) and a suffix.

Each call sign has a one letter prefix (K, N, W) or a two letter prefix (AA-AL, KA-KZ, NA-NZ, WA-WZ) and a one, two, or three letter suffix separated by a numeral (0-9) indicating the geographic region. Two letter prefixes that are designated for regions 11-13 are not available in regions 1-10. Certain combinations of letters are not used. When the call signs in any regional-group list are exhausted, the selection is made from the next lower group. The groups are:

Group A - Amateur Extra Class

Primary stations licensed to Amateur Extra class operators.

Region	Prefix	Letters in Suffix
1-10	K, N, or W, and two letter suffix;	2
two letter prefix with first letter	A, N, K, or W	1
two letter prefix with first letter	A	2
11	AL, KL, NL, or WL	1
12	KP, NP, or WP	1
13	AH, KH, NH, or WH	1

Group B - Advanced Class

Primary stations licensed to Advanced class operators.

Region	Prefix	Letters in Suffix
1-10		
Two letter prefix with first letter	K, N, or W	2
11	AL	2
12	KP	2
13	AH	2

Group C - General, Technician, and Technician Plus Classes

Primary stations licensed to General, Technician, and Technician Plus class operators.

Region	Prefix	Letters in Suffix
1-10	K, N, or W	3
11	KL, NL, or WL	2
12	NP or WP	2

13	KH, NH, or WH	2
----	---------------	---

Group D - Novice, Club, and Military Recreations Station
Primary stations licensed to Novice class operators, and for club and military recreation stations.

Region	Prefix	Letters in Suffix
1-10	Two letter prefix with first letter	K or W
11	KL or WL	3
12	KP or WP	3
13	KH or WH	3

Geographic Region-based Numerals

Region	States & Other Areas	Numeral
1	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont	1
2	New Jersey and New York	2
3	Delaware, District of Columbia, Maryland and Pennsylvania	3
4	Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee and Virginia	4
5	Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma and Texas	5
6	California	6
7	Arizona, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming	7

8	Michigan, Ohio and West Virginia	8
9	Illinois, Indiana and Wisconsin	9
10	Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota	0
11	Alaska	0-9
12	Caribbean Insular areas:	
	Navassa Island	1
	Virgin Islands	2
	Commonwealth of Puerto Rico except Desecheo Island	3 or 4
	Desecheo Island	5
13	Hawaii and Pacific Insular areas:	
	Baker or Howland Island	1
	Guam	2
	Johnston Island	3
	Midway Island	4
	Palmyra or Jarvis Island	5
	Kingman Reef	5 followed by suffix letter K
	Hawaii except Kure Island	6 or 7
	Kure Island	7 followed by the letter K

American Samoa

8

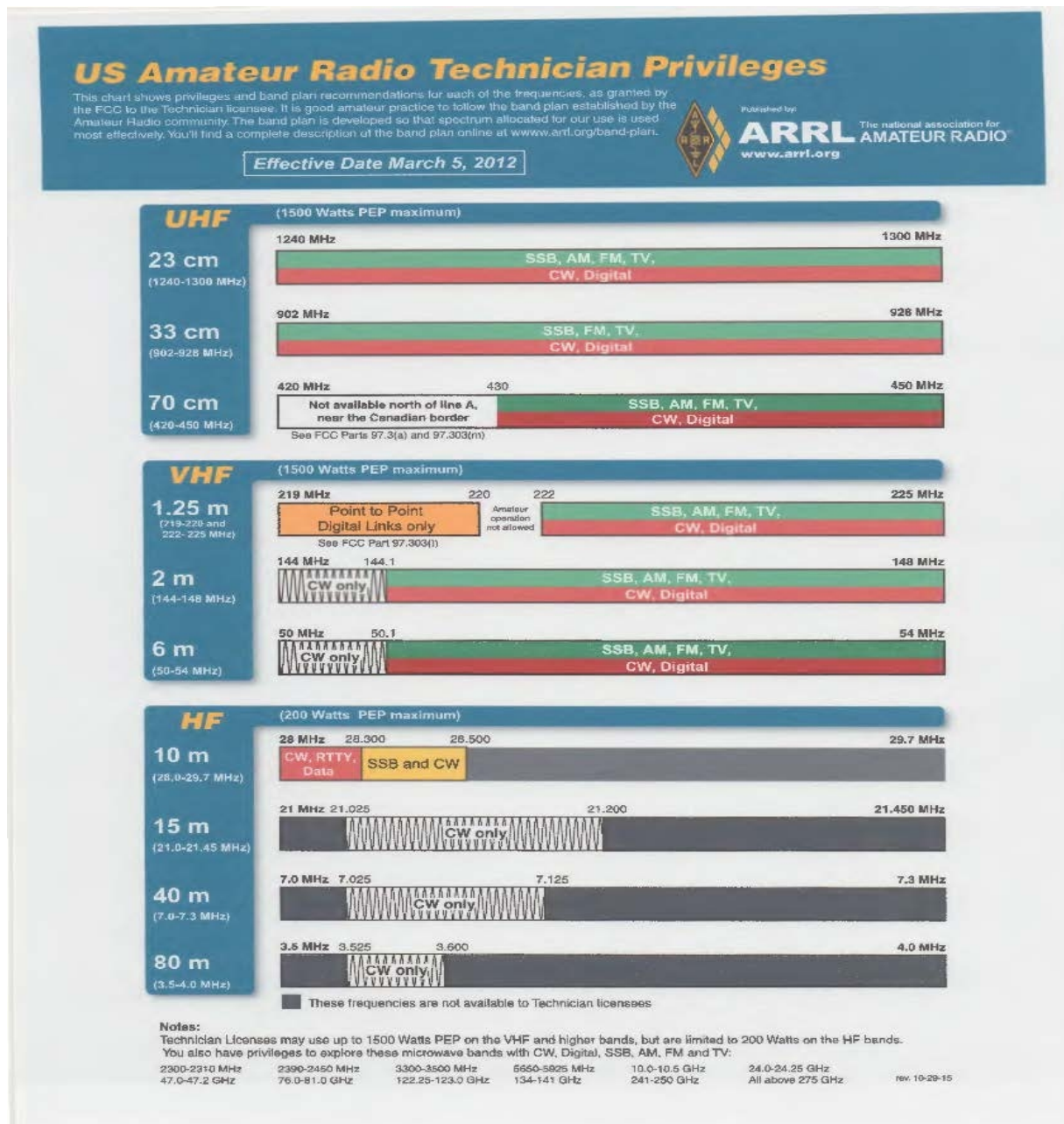
Wake, Wilkes, or Peale Island

9

Commonwealth of Northern Mariana Islands

0

7. US AMATEUR BAND PRIVILEGES



US Amateur Radio Bands

ARRL The national association for AMATEUR RADIO

US AMATEUR POWER LIMITS
 FCC 97.311: An amateur station must use the minimum transmitter power necessary to carry out the desired communications. No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <http://utc.usa.org/utc-database-amateur-modification-process/>. You need only register once for each band.

2,200 Meters (135 kHz)

135.7 kHz - 137.8 kHz | 1 W EIRP maximum | E, A, G

630 Meters (472 kHz)

472 kHz - 478 kHz | 5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP | E, A, G

40 Meters (7 MHz)

7.000 - 7.300 MHz | 100 W and FCC region 2 west of 110° west or below 30° north | E, A, G, N.T. (200 W)

10 Meters (28 MHz)

28.000 - 29.700 MHz | E, A, G, N.T. (200 W)

160 Meters (1.8 MHz)

1.800 - 2.000 MHz | Avoid interference to radiolocation operations from 1.900 to 2.000 MHz | E, A, G

80 Meters (3.5 MHz)

3.500 - 4.000 MHz | E, A, G, N.T. (200 W)

60 Meters (5.3 MHz)

CW: 5332, 5348, 5356.5, 5373, 5405 kHz | USB: 5330.5, 5348.5, 5357.0, 5371.5, 5403.5 kHz | E, A, G, N.T. (100 W)

30 Meters (10.1 MHz)

10.100 - 10.150 MHz | Avoid interference to fixed services outside the US | 200 Watts PEP | E, A, G

20 Meters (14 MHz)

14.000 - 14.350 MHz | E, A, G

17 Meters (18 MHz)

18.068 - 18.168 MHz | E, A, G

15 Meters (21 MHz)

21.000 - 21.450 MHz | E, A, G, N.T. (200 W)

12 Meters (24 MHz)

24.890 - 24.990 MHz | E, A, G

6 Meters (60 MHz)

50.1 - 54.0 MHz | E, A, G, T

2 Meters (144 MHz)

144.0 - 148.0 MHz | E, A, G, T

1.25 Meters (222 MHz)

219.0 - 225.0 MHz | E, A, G, T, N (25 W)

70 cm (420 MHz)

420.0 - 450.0 MHz | E, A, G, T

33 cm (902 MHz)

902.0 - 928.0 MHz | E, A, G, T

23 cm (1240 MHz)

1240 - 1300 MHz | E, A, G, T, N (5 W)

KEY

- █ RTTY and data
- █ phone and image
- █ CW only
- █ SSB phone
- █ USB phone, CW, RTTY, net, data
- █ Fixed digital message forwarding systems only

E = Amateur Extra
 A = Advanced
 G = General
 T = Technician
 N = Novice

*Geographical and power restrictions may apply to all bands above 420 MHz. See The ARRL Operating Manual for information about your area.

ARRL We're At Your Service

ARRL Headquarters
 180 Mill St. | Newington, CT 06111
 email: arrl@arrl.org

Publication Order Department
 180 Mill St. | Newington, CT 06111
 email: order@arrl.org

Membership/Cancellation Dept.
 180 Mill St. | Newington, CT 06111
 email: membership@arrl.org

Gift Shop / Amateur Radio
 180 Mill St. | Newington, CT 06111
 email: shop@arrl.org

License: 984-944-0000 | email: arrl@arrl.org

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*****NOTE:** These band descriptions will be available at the classroom as handouts, since the reproduction on line is somewhat poor and when you open your station these items will be a quick reference in your "Shack".

8. INTRODUCTION TO 2 METER (VHF) AND 220/440 (UHF)

The 2-meter amateur radio band is a portion of the VHF radio spectrum, comprising frequencies stretching from 144 MHz to 148 MHz in International Telecommunication Union region (ITU) Regions 2 (North and South America plus Hawaii) and 3 (Asia and Oceania)[1] and from 144 MHz to 146 MHz in ITU Region 1 (Europe, Africa, and Russia).[2][3] The license privileges of amateur radio operators include the use of frequencies within this band for telecommunication, usually conducted locally within a range of about 100 miles (160 km).

The physical design of 2 Meter radios range from “Base” stations to mobile stations (automobile or in the field) and “Hand Held” radios commonly referred to as HT’s. Here a few examples:

Typical “Base Station” found in Ham Shacks for VHF communications. Some radios have “Dual Band” capabilities, where they can send and receive on two frequencies like UHF and VHF. One of the radios we will use has HF, UHF, VHF, 6 Meter and Satellite capabilities.



Below is a photo of four different HT portable radios from different manufacturers. You will become familiar with some of the names like Yaesu, Kenwood, Alenco, Motorola, Icom. All of the HT's shown have "Rubber Duck" antennas.



The last radio can be used for mobile (automobile installation), Field Day activity or even used as a Base Station in your shack. These radios need a power supply like a car battery, AC to DC Power supply for home use or any form of 12 VDC (Volts DC Current) to operate them. Remember too, the radio will only perform when the battery is at full charge. Your RF signal depends on the "electric gas" of your battery - no gas no go, hi hi.

Typical mobile VHF radio. This is a single mode (VHF ONLY) radio and is not dual band, but the price is also very reasonable. This radio was manufactured by Yaesu.



At this point I will show you a power supply for home use to power your portable radios if they run on 12VDC current.



9. TROUBLE WE WITH THE VHF RADIO

VHF and UHF radio communications is rather simple. You would set the radio to a frequency key the mike and begin announcing your intentions.

Beware, if you want to “hit” the repeater in your area, you have to set the radio to the appropriate offset based on the Repeater Frequency you intend to use, they are called “INPUT” They are published in the Repeater directories. The CTCSS tones or the PL are also published as Notes in the Directory.

The reason for all the special attention is simple. Suppose you had a few repeaters in the area operating on the same frequency. What would happen when you keyed your radio? Yep, you would trigger all the repeaters no matter if you could hear someone on them or not. So, to prevent this from happening, the trustee of the repeater will set and publish the CTCSS tones so that only those radios programed to open that repeater will trigger it.

A repeater is a piece of equipment which receives on its input and transmits the same sounds on the output frequency. Here is an example of a repeater.



This equipment is placed (usually) in a building located at the highest geographical point in the area and is attached to an antenna (usually) on top of a 100' tower. In our area we have two popular repeater stations first is located in Cranston, RI and known as the Cranston Repeater located found at 146.700 MHz with an offset input of - 600 KHz and has no CTCSS tones. The second area repeater is located in North Scituate, RI and is known as the Scituate repeater and is found operating on 146.760 MHz with a - 600 offset input and has a PL of 67

So even though your radio is strong enough to reach the Scituate repeater, if your CTCSS and Offset Inputs are not programmed properly, the repeater will ignore your signal.

Let suppose that your radio is properly programmed and you are using your HT while traveling.. Remember, VHF and UHF are line of sight type communications. If your signal doesn't see the repeater, it won't key it. More importantly, let's further assume you have established a contact with another Ham and you are having a "QSO" (In Ham Speak this is known as a conversation), but your signal or the other Ham's signal becomes choppy (in and out, so to speak) this is known as a "Picket Fencing" and it will only get worse the further from the repeater you travel. Once outside the useful area of the repeater, you will not be able to use that repeater, so open your directory and find a local repeater where you are traveling.

Well that's it for Lesson Plan #1. Read about the items we spoke of. Get used to listening to the radio to get an idea of the operating skills and the jargon. See you in the LAB which is our Radio Room, 73's (That means thanks and good luck).

73's de Ed NN1ES

PS, (de) is always used to identify who the caller is. Example W1AW de NN1ES, would mean hey, Amateur with the call W1AW I am calling and this is (de) NN1ES calling. Likewise if someone is trying to get communicate with me they would say NN1ES de W1AW calling. You only use the (de) when using CW or Digital. When using voice you would simply say, "W1AW this is NN1ES"