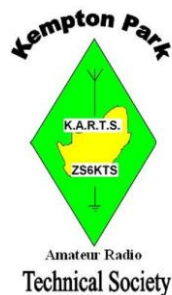




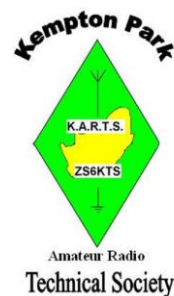
South African Radio League

HF Assessment

Preparation Guide



Acknowledgement



This document was designed and developed by the Kempton Park Amateur Radio and Technical Society.

All credit goes to the following people who put in a great effort in compiling this document.

They are;

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The Radio Amateur's Code (Paul Segal, W9EEA - 1928)

1 - The amateur is considerate

He never knowingly uses the air in such a way as to lessen the pleasure of others

2 - The amateur is loyal

He offers his loyalty, encouragement and support to his fellow radio amateurs, his local club and his national association, through which amateur radio is represented

3 - The amateur is progressive

He keeps his station abreast of science. It is well-built and efficient. His operating practice is above reproach

4 - The amateur is friendly

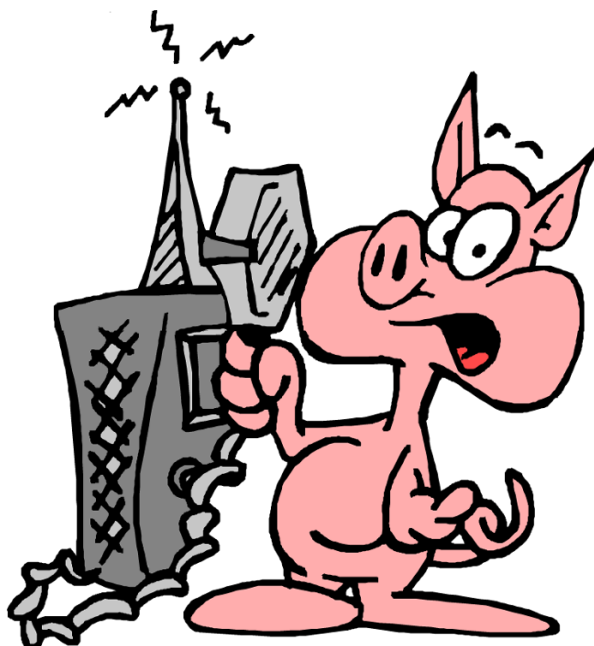
Slow and patient sending when requested, friendly advice and counsel to the beginner, kindly assistance, cooperation and consideration for the interests of others; these are the marks of the amateur spirit

5 - The amateur is balanced

Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school or his community

6 - The amateur is patriotic

His knowledge and his station are always ready for service of his country and his community



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HF ASSESSMENT PREPARATION GUIDE

This guide contains the basic information that will be required by students preparing for the HF assessment. During the HF assessment, the student will be required to:

- (1) Identify the different components
- (2) Demonstrate the correct setting-up of a HF station.
- (3) Make a contact, using a transceiver.
- (4) Complete the necessary log entry as required, after having made a HF contact.

Where aspects of the HF assessment are covered under the official Class A or Class B manual, those will be excluded from this preparation guide.

1. HF ASSESSMENT OBJECTIVES

After completing this HF Assessment you will be able to;

- Safely connect a power source to the transceiver.
- Connect a suitable antenna to a transceiver.
- Check the SWR and making adjustments to an antenna if necessary.
- Use an antenna tuner to adjust the SWR. Identify and use the basic dials and controls on a HF transceiver.
- Identify and use the input and output connectors on a HF transceiver.
- Switch ON the transceiver and check for correct operation.
- Tune to a busy frequency and clarify the signal.
- Give a signal report.
- Tune to a frequency, call CQ and make a contact.
- Make a logbook entry.
- Close down the radio station.

2. STATION COMPONENTS

Amateur radio stations range from very simple setups to more complex and advanced systems. Below is a list of the most common station equipment:

The Transceiver (Radio)

The transceiver is commonly referred to as the radio. It consists of a combined receiver and transmitter.



Transceiver (Radio plus transmitter)

The Linear Amplifier

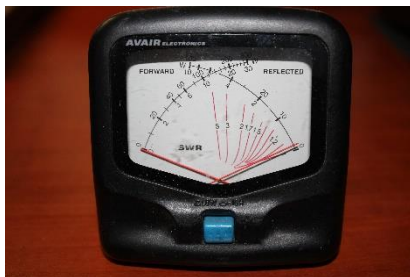
This is added to a radio station to provide a stronger transmitted signal. It is not a critical item for the beginner and not all radio amateurs use them or find them to be necessary. The linear amplifier provides an amplified version of the signal fed into its input. The term "linear" means that the output signal is a replica of the waveform of the signal fed into its input, except that its amplitude is greater.



Linear amplifier

SWR Meter

The SWR meter is a useful part of your equipment, especially when constructing new antennas and during the installation and tuning of new antenna installations. The SWR meter gives an indication of how well the antenna is working. If the feed line to the antenna is damaged or the antenna itself is not tuned correctly or faulty, the SWR meter will alert you to a problem with your antenna system.



Cross needle SWR meter



Homebrew SWR meter

Dummy Loads

The purpose of this device is to allow you to carry out adjustments to your radio without actually transmitting a signal on the air. A dummy load simulates an antenna, but does not radiate.

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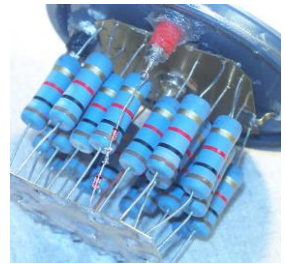
Dummy loads usually have 50-ohm impedance with a SWR of 1:1.



Dummy load



Oil filled can dummy load



Homebrew

dummy load

Antenna Tuners

Antenna tuners are very handy when you would like to transmit on a frequency but your antenna is not cut to resonate on that frequency or the impedance between the transmitter and feed line is not correct. The antenna tuner is connected between the transmitter and the antenna. The antenna tuner transforms the impedance at the feed line input to a value that the radio can handle. (Usually 50 ohm). If the antenna is cut to resonance and is designed to match the impedance of the transmitter and feed line, an antenna tuner is not required.



Automatic antenna tuner.



Manual tuner



Homebrew tuner

3. RADIO DIALS & CONTROLS

These are some of the dials you may encounter. Always consult your radios manual for clarification on the functions pertaining to your transceiver.

MIC Gain Control

(Microphone Gain Control)

The MIC Gain control adjusts the audio level of the microphone. The MIC Gain control is used in conjunction with the ALC level. Microphone gain can be adjusted during USB, LSB and AM operations. Gain is increased through the clockwise rotation of this control.

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CAR (Carrier level Control)

The Carrier level control is used to adjust the output power. This control sets the carrier level during CW, FM and AM operations. When transmitting in the CW mode, adjust this control so that the ALC meter pointer is within the ALC zone.

SQL (Squelch) Control

The squelch control is used during receive. The function operates on all modes. This control is used to eliminate atmospheric noise and receiver static noise during periods of no signals. Slowly rotate the control clockwise to the point where the ambient noise just disappears, and the speaker shuts off.

This point is known as the squelch threshold point. Now you will only hear output from the speaker when an incoming signal is present. For weak signal reception this control should be set fully counterclockwise.

IF SHIFT Control (does not function in FM and AM modes)

The IF SHIFT control allows you to shift the IF passband of the receiver without changing the actual center frequency of the receiver. The control is useful when there is interference near your center frequency.

RIT/XIT Control (CLARIFIER) (Receive Increment Tuning)

When the transmit frequency of the distant station drifts a little bit during the QSO, but you do not wish to alter your transmit frequency to compensate, you may wish to make use of the RIT control function.

This control allows the shifting of the receive frequency without shifting the transmit frequency. This control is also useful for *pileups* when a DX station is transmitting a little above or below his/her receive frequency. This control is commonly known as the Clarifier.

RF Gain Control

This control adjusts the receiver *sensitivity*. For normal receiver performance and maximum gain, this control should be in the full clockwise (full open) position.

If you are having trouble copying the desired signal, make a note of the station's peak S-meter reading.

Then adjust the RF control counter-clockwise (closing) so that the meter needle is stationary at this level. Now, all signals that are less than the desired signal will be attenuated, such as static noise, etc., making the completion of the QSO easier.

If the incoming signal pegs the S-meter at maximum you can also reduce the transceiver gain by counterclockwise (closing) rotation of the RF Gain control.

The S-Meter pointer will always advance upscale as the RF Control is rotated counterclockwise, as a visual reminder that the gain of the radio has been reduced.

AF Gain Control (VOLUME)

Turn this knob to increase or decrease the volume of the loudspeaker.

PROC (Processor) Switch

The Processor allows you to effectively utilize the available output power. Effective transmit power output will increase when the PROC switch is turned ON during USB, LSB or FM mode operations.

Note: *When the speech processor function is used in the USB or LSB mode, it is possible to over-drive the transmitter. An easy way to check for excessive modulation is to monitor the ALC meter. If the needle moves past/beyond the ALC zone, then you are over modulating. Reduce the MIC Gain control setting until the needle remains in the ALC zone during voice peaks.*

The purpose of the PROC (Processor) is to permit the peaks of an SSB signal to be limited in amplitude, so as to enable an increase in the mean output power of the transmitter and thus improving the relative signal level at a distant receiver. This function can also involve processing the audio in the transmitter, known as compression.

AT Tune Switch

When this switch is turned ON with the AUTO/THRU switch placed in the AUTO position, the automatic tuner will be engaged and the tuner will try to match the antenna. The transceiver will then commence transmission until tuning is completed. The “on air” indicator lamp needs to be monitored. It is good manners not to tune-up on a busy frequency but to tune-up a few kHz up or down from any incoming transmission.

AUTO/THRU Switch

AUTO: The auto antenna tuner is used during transmit.

THRU: The auto antenna tuner is not used during transmit.

ALC/PWR/SWR meter switch ALC meter

Use to monitor the drive level in USB and LSB modes. The purpose of an ALC control (also

refer to the PROC switch) is to prevent over-driving the linear amplifier stages, especially the final amplifier. (Use the MIC Gain Control to adjust)

PWR meter

Use to monitor the output power.

Note that this meter is a peak reading meter, not an average reading meter.

SWR meter

Used to indicate the Standing Wave Ratio of the antenna and feed line connected to the ANT Connector when the AUTO/THRU switch is in the THRU position.

4. REAR & FRONT PANEL CONNECTORS ANT jack

Connect your antenna to this M-type (SO-239) connector. Latest radios may be fitted with and N-type where handhelds may have BNC or SMA connectors.

GND jack

Connect a GROUND wire to this connector.

DC Input

Connect DC power to these connectors.

KEY

Connect a Morse code key to this connector.

EXT SP (External speaker)

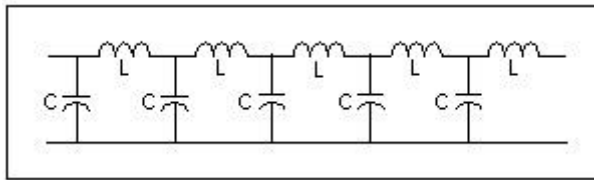
Connect an external speaker to this connector.

5. TRANSMISSION LINES (Feed lines)

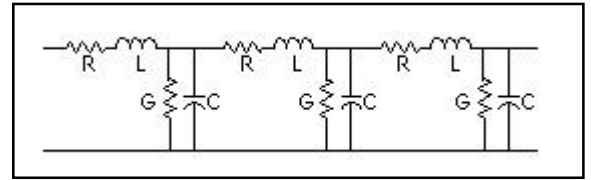
Transmission lines are often referred to by radio amateurs as feed lines. Regardless of whether you are operating at HF, VHF or UHF, the quality of your feed line is critical to your station. The feed line is the RF power conduit between your radio and your antenna. All the energy you generate travels to the antenna through the feed line. By the same token, all the signals picked up by your antenna must reach your radio through the same feed line.

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The problem with any feed line is that it isn't perfect—it always loses a certain amount of the energy. To complicate matters, all feed lines are not created equal. The amount of loss at any frequency will vary considerably from one type of feed line to another.



Circuit model of a lossless feed line.



Circuit model of a lossy feed line.

The most common type of feed line is *coaxial cable*, or simply *coax*. It is called coaxial because there are two circular conductors positioned “co-axially” (on the same axis), one inside the other. The inner conductor is usually called the “centre conductor.” It is surrounded by a solid or multistranded outer conductor commonly called a “shield.” The shield is usually surrounded by an insulating plastic jacket. There is also insulating material between the centre conductor and the shield. This material can be hard plastic, foam plastic or even air.

A popular type of feed line for HF use is ladder line. In fact, at HF frequencies it is the most common feed line for random-length dipoles and other antenna designs. Ladder line consists of nothing more than two wires in parallel separated by insulating material.

For base stations in particular, always buy the lowest-loss coax you can afford. Since you'll probably be using your feed line for several years or longer, you want something that can support your changing interests. For instance, 100 feet of LMR-400 is overkill quality for a station that only operates on the 40-metre band. But if you someday want to switch to 440 MHz, you'll be glad that you already have a low-loss feed line in place! (Extract from ARRL – Feed lines)

The lower the power loss in the feed line the more efficient the feed line will be in carrying the RF power to the antenna.

Definition:

In communications and electronic engineering, a **transmission line** is a specialized cable or other structure designed to carry alternating current of radio frequency, that is, currents with a frequency high enough that their wave nature must be taken into account.

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[Type here]

Types of transmission lines:

The most commonly used transmission lines in amateur radio are;

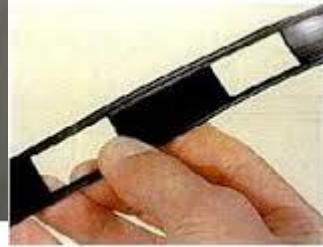
- Coaxial lines (unbalanced)
- Twin (balanced) lines
- Window (balance) lines



Coaxial cable



Ladder line



Window line

Balanced and unbalanced feed lines:

Coaxial lines come in different sizes with different characteristics suitable for different applications. They consist of an inner core insulated from a shield by insulating material and finally covered by a UV resistant jacket. Most coaxial cables used for amateur radio has a characteristic impedance of 50 or 52 ohm and is an unbalanced feed line suitable for direct connection to transceivers. The white TV cable has a characteristic impedance of 75ohm. Look for the identification of the cable printed on it every metre apart. Here are some examples;

[Type here]

Unbalanced Feed lines:

RG58/U: The outside diameter of RG-58 is around 5 mm. Plain RG-58 cable has a solid center conductor. The RG-58A/U features a flexible 7- or 19-strand center conductor.



Although not the best transmission line with regards to losses, it is still widely used. Mostly for HF. Should not be used for VHF/UHF on SSB communication as losses are too high.

RG213: (See picture above) The outside diameter of RG 213 is around 10.3 mm and is a lot less flexible than RG 58. RG 213 is preferred to RG 58 as it has far less losses than RG 213.

LMR 400: This 50 ohm impedance cable will work very well for VHF / UHF transmission lines due to its low loss factor. On the down side it is more expensive and quite a stiff cable to work with. The outside diameter is 10.29 mm.



Balanced Feed lines:

Twin lines: (See picture above). These feed lines consist of two similar wire conductors spaced approximately 40 to 120 mm apart in a parallel configuration. These can easily be homebrewed. This type of feed line provides the least losses and would have an impedance of around 300 to 600 ohm. Being a balanced feed line with a high impedance, it is important to have a balun installed before the transceiver.

Window lines: (See picture above) The window lines is similar to the twin lines. You will find these type of cables used in the G5RV / ZS6BKW antennas. These are normally commercial manufactured feed lines. The most common ones are the old TV strip antenna. Today we find two types with different impedance ratings. One is the 300 ohm and the other

[Type here]

is the 450 ohm. Both are balanced feed lines and need to be matched with a balun to the transceiver.

6. **COAXIAL CONNECTORS:**

These connectors are used to facilitate the connection of the cables to transceivers or other radio equipment. There are many different types of coaxial connectors on the market and it can become quite confusing. We will look at those most commonly used by radio amateurs. Each type of connector will have different configurations. The ones that are shown below are just some of the connector configurations. Connectors are designed to accommodate different types of coaxial cables.

The most commonly used connector is the so called PL259 shown below also referred to as a UHF connector.



UHF Connector Male (PL 259)

The female connector for the PL 259 is known as a SO 239 (see picture below). Most transceivers make use of such a connector. This one is in the panel mount configuration.



UHF Panel mount Connector Female (SO 239)

[Type here]

[Type here]

Many amateurs today prefer to use the N-type connectors. They are of better quality in the sense of being somewhat water proof. They are similar to the PL 259 and SO 239. See picture below.



N-Type connectors

Other connectors often used are the BNC connectors. They are often found on handheld radio sets and surveillance security systems. They are smaller in size than the previous mentioned connectors.



BNC Connectors

More modern handheld radios use the SMA connectors. They are small screw on connectors that are very efficient.



SMA connectors

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Where the feed lines need to be joined a barrel connector comes in quite handy. The most common one is the one used where two PL 259 connectors are on the ends of the two feed lines to be connected.



Barrel connector for PL 259s

A last word on connectors. Connectors are very important as they are the link between the antenna and the other components that make up the radio station. Losses in transmission power will occur if these are not of a high quality, are not fitted to the feed line correctly and are not protected against rain. This could result in damage to your radio equipment. Too many connectors in the feed line also leads to some power losses.

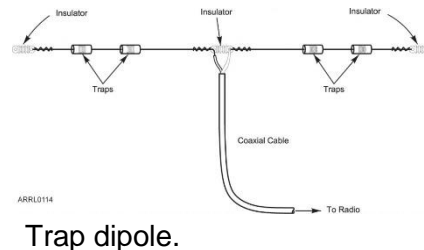
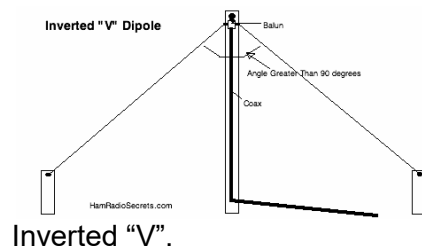
7. ANTENNAS (Aerials)

There are different types of antennas. These can be classified in the following categories;

- a) Wire antennas
- b) Traveling wave antennas
- c) Reflector antennas
- d) Microstrip antennas
- e) Log-Periodic antennas

We will only focus on some of these to allow you to identify them.

a) Wire antennas:



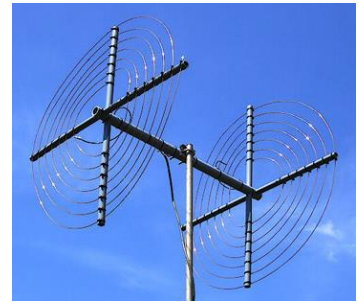
b) Traveling wave antennas:



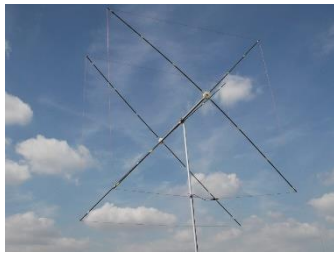
A 3 element Yagi



Helical

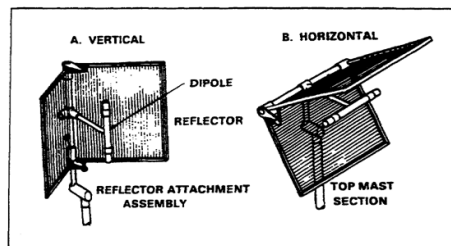


Spiral



Quad

c) Reflector antenna:

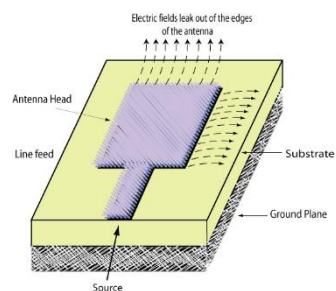


Corner reflector

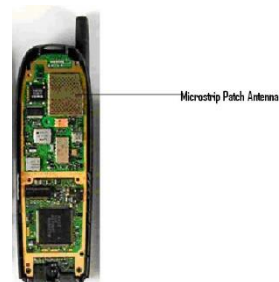


Parabolic (Dish)

d) Microstrip antennas:



Microstrip



Microstrip antenna in cellurphone.

e) Log-Periodic antennas:



There are other designs for specific use that we do not cover for the HF assessment.

8. Safety in the Shack

There are two safety considerations to bear in mind when setting up a radio shack – electrical safety and RF safety.

You will no doubt be using radio equipment that is mains powered, and you will probably use 12 V supplies that can supply up to 25 A or more. Mains electricity can kill you and that innocuous looking power supply could easily cause a fire if a short circuit occurs and you don't have adequate safety precautions, such as a fuse.

Also, you will be producing radio frequency (RF) energy, which should be treated with respect.

Let's deal with each of these in turn.

Electrical safety

Firstly, every family member in your house should know how to turn the power off in your station. In the event of an emergency, and where you are still in contact with an electrically-live appliance, it could make the difference between life and death.

The wiring for your shack should ideally be controlled by one master switch and everyone in the house should know where it is. A fire extinguisher, suitable for use on electrical fires, is also a good investment.

All wires carrying power around your station should be of the proper size and quality for the job. Also, all equipment should be connected to a good earth.

When working on equipment you should, if possible, ensure that it is switched off and unplugged. Any capacitors should be discharged as they can store charge for a considerable time.

If you must work on live equipment only do so if you know what you are



doing. Also, keep one hand in your pocket at all times and all metal jewelry should also be removed. Avoid bodily contact with any earthed object to prevent you becoming the return path for any voltage source to ground.

If possible do not work on equipment when alone and always make sure that you have the correct tools for the job.

RF Safety

Radio Amateurs should be concerned about two aspects of RF safety when planning a station and its associated antennas.

Physical contact with antennas and parts of the station, which may be RF 'hot' and where there is a risk of RF burn or electric shock, must be a primary consideration.

This might include feeders to the antennas, or ungrounded metallic objects within the station or nearby.

Always arrange your antennas and feed lines so that they cannot be touched. This may mean re-routing them or putting them out of harm's reach.

The second aspect is safety near the antennas in the so-called "near field".

This is the region where the distance from a radiating antenna is less than the wavelength of the radiated energy.

This implies that on the lower HF bands, say on 160 metres (Top Band), the near field could extend a considerable distance from the antenna.

However, in practice such an antenna would also be physically large, and would result in the incident power being widely distributed over a large area. For resonant dipoles there is a significant magnetic field near the feed, and a high E field near the antenna tips – both of these need to be considered as a safety consideration.

Every radio amateur should always ensure that persons in or near the station are not within the near-field safety zone recommendation of the antenna when transmitting.

But what is that zone? This is complex and you need to read the document "RF Safety and the Radio Amateur" mentioned above.

If you read nothing else, there is a rough rule of thumb.

For example, if you use a dipole, and 400 Watts, take the frequency in MHz, and use that spacing in feet (ft.). That is, on 14 MHz a spacing of 14 ft. is required as a safety distance. Or ... If you use a beam with a gain of 9 dB, and a transmit power of 100 W, take the frequency in MHz, and use that spacing.

As you can see the higher you go in frequency the further you must keep away from transmitting antennas.

9. BASIC RADIO STATION SETUP

1. Start by thoroughly inspecting all the equipment that you intend using during transceiver operations. Ensure that the equipment is clean, dry and serviceable. Equipment will include the antenna, feed line, connectors, power cables, fuse holders, transceiver and the power supply/battery.
2. Consider safety and position the equipment accordingly. People and animals should stay clear from the antenna during transmission. The antenna supporting cords/ropes should also be positioned safely so as to avoid injury. There should not be any open wiring or positioning of equipment that could potentially cause a short circuit. Potential heat generation and adequate ventilation for the transceiver and power supply should also be considered.
3. Ensure that all power sources, the power supply and the transceiver are switched OFF.
4. Now connect the antenna to the transceiver.
5. Connect the power cables to the power supply. Ensure that positive and negative connectors are correctly identified. Also make sure that the correct voltage is set on the power supply, if applicable.
6. Connect the power supply cables to the transceiver. This cable must have a FUSE installed. The applicable instruction manual for both the power supply and transceiver will dictate what load the fuses on both the power supply and transceiver should be able to carry.
7. Ensure that the transceiver is in the RECEIVE mode.
8. Switch Power supply ON first, then switch Transceiver ON.

10. CONNECTING A POWER SOURCE

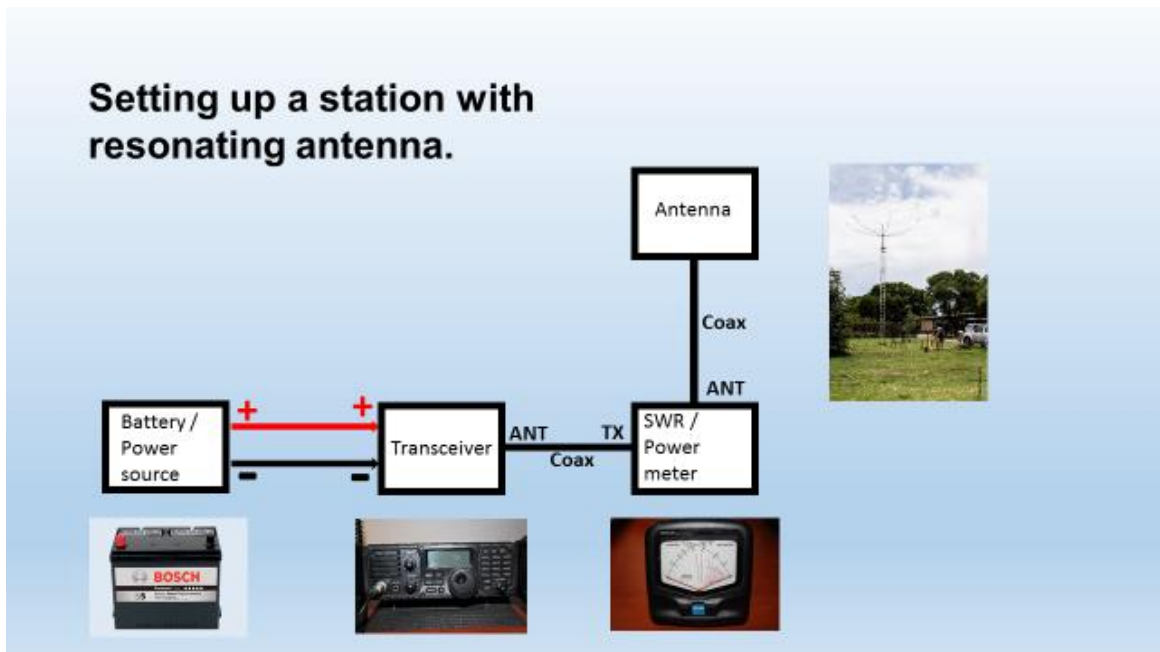
1. Do the connections first before applying power. The **RED** DC power lead connects to the POSITIVE (+) DC terminal,

and the **BLACK** DC power lead connects to the NEGATIVE (-) DC Terminal. Get this wrong and you will pay dearly. Especially if your radio does not have polarity protection built in.

2. Power Supply ON first, then Radio ON.
Radio OFF first, then Power Supply OFF.

Note:

- *The Power Supply must be capable of delivering sufficient amperes of current.*
- *The fuse holder must always be connected close to the power supply\battery.*
- *Ensure that the DC power cable is capable of carrying the required load - at least #12 AWG (4 mm). (That's why vehicle battery jumper cables are so thick).*
- *DC Power leads must preferably be kept as short as possible.*



11. CONNECTING AN ANTENNA

1. For safety reasons, keep the antenna earthed when not in use.
2. Connect the antenna to the ANT connector at the rear of the radio. Always use 50 ohm (= unbalanced) coaxial cable .
(This is only applicable to the specific transceiver that will be used during the training) Losses in coaxial lines increase as the frequency

increases.

(Small diameter cables tend to have higher losses than larger diameter cables.

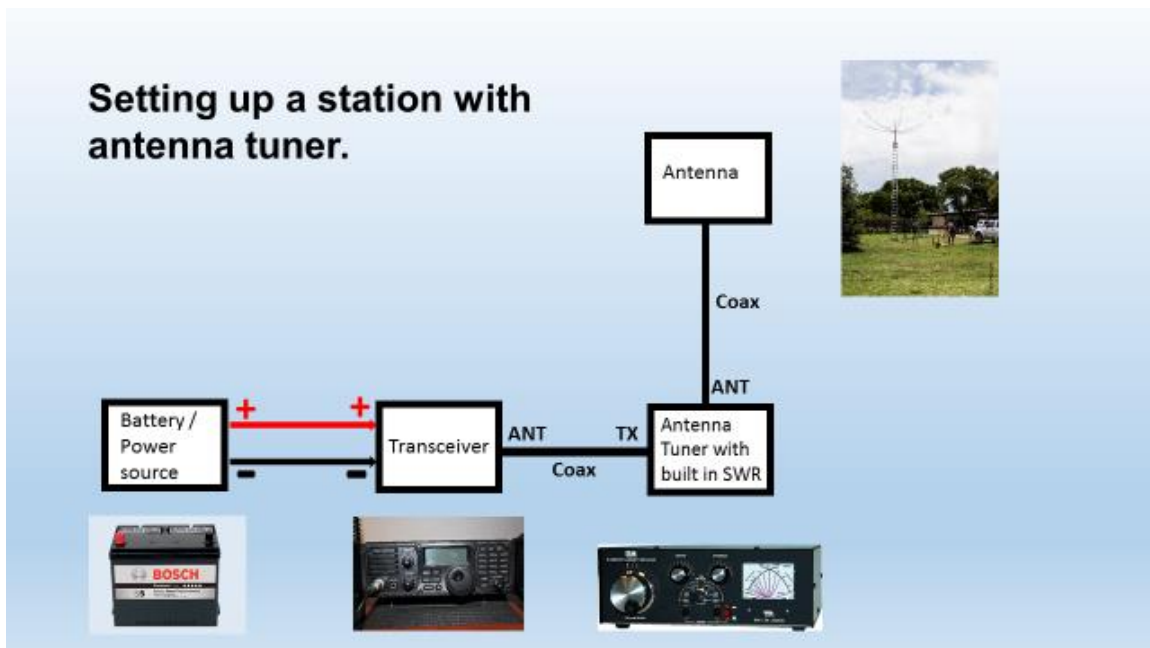
Also, the shorter a coaxial cable, the less the loss)

Locate antennas away from outdoor power lines.

Ground your antenna support structure due to the risk of lightning strikes.

Install lightning arrestors in the antenna coaxial cable.

Disconnect the coax cable at the antenna, or earth the coax cable when you notice an approaching electric storm.



Never try to disconnect the coax cable during an electric storm.

Stay away\remain clear of antennas and coax cables during electric storms. Remember that antennas may also build up static electricity.

12. RECEIVE Procedure (1)

1. Power switch - OFF
2. Standby switch - REC
3. SQL Control - Full open (Fully counterclockwise)
4. RF Gain Control - Full open (Fully clockwise)
5. AF Gain (Volume) - Full closed (Fully counterclockwise)
6. RIT switch - OFF (clarifier centered)

13. RECEIVE Procedure (2)

1. DC Power - ON

2. Transceiver POWER switch - ON

The meter will illuminate and a frequency will appear in the display.

3. Set BAND switch for desired band.
4. Select desired MODE with mode switch.
5. Adjust AF Gain Control/Volume.
6. Slowly turn tuning dial/VFO until the desired signal can be heard.

14. TRANSMIT Procedure

1. Confirm correct frequency\mode.
2. Turn power setting to LOW.
3. Set meter switch to ALC.
4. Press microphone PTT.
5. Speak into microphone and adjust the MIC gain control so that the meter deflection does not exceed the ALC zone on voice peaks.

10.1 Microphone:

An extremely important factor in your outgoing transmission is the quality of your voice transmission. Thus: Know how to use your radio's microphone.

1. Know what you are going to say - before you push the mike button; in other words, engage your brain before you put your mouth in gear.
2. Hold the PTT (transmit button) down for at least one second - before beginning to speak, to ensure that the first part of your message is not cut off.
3. TALK ACROSS THE FACE OF YOUR MICROPHONE about five centimetres away from your mouth and not into it. This technique makes the communications more understandable.
In other words, hold the face of the microphone almost at a right angle to your face.
4. Speak slowly, distinctly, clearly, and do not let your voice peter out at the end of words or sentences. Give each and every word equal force. For some people this takes a lot of practice and a conscious effort, but do it.
5. Under stress, many operators have a tendency to talk too fast:

ACCURACY FIRST, SPEED SECOND.

6. At times, radio conditions are poor and words must be overly exaggerated to be understandable. In general, speak very slowly and distinctly to carry through any static and weak signals. *Don't shout. Speak clearly instead. Shouting may feel emotionally satisfying, but it causes distortion and makes you hard to understand. Contrary to the opinion of some, shouting does not increase the range of any radio known to mankind.*

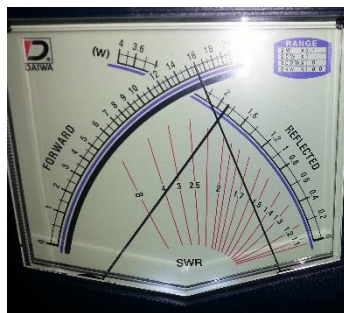
15. CONNECTING A SWR METER

Select correct frequency range on the meter and identify correct ports.

1. Connect the coax from the transceiver to the TX connector.
2. Connect the antenna cable to the ANT connector.

16. MEASURING SWR

1. Set FUNCTION switch to CAL.
2. Turn CAL knob fully counterclockwise to the MIN position.
3. Set the transceiver to transmit on AM, CW or FM. Then press and hold PTT and turn CAL knob clockwise until the needle is on the CAL mark. (Totally around to the right hand side).
4. While the transceiver is on transmit, set the FUNCTION switch to SWR. (the needle will now indicate the SWR of the antenna)
5. Below 5 watts, read the **L (low)** scale. Above 5 watts, read the **H (high)** scale



Not very good SWR 2.1: 1



Good SWR 1: 1

To obtain a more reliable SWR reading, the SWR reading should be measured against the reflected RF power reading, by using this formula:

$$\text{SWR} = \frac{(\text{Forward RF} + \text{Reflected RF})}{(\text{Forward RF} - \text{Reflected RF})}$$

Use the following comparison:

SWR	1,0	1,1	1,2	1,5	2,0	2,5	3,0
Reflected RF	0	0,22	0,8	4	11,1	18,4	25,0

Note: If the SWR meter reading and the calculated SWR differ considerably, the *calculated* SWR should be used.

Other reasons for high SWR readings:

- Position of the antenna.
- Antenna not assembled correctly.
- Water in antenna or feed line.
- Feed line - check.
- 'Dry joints' - check soldered joints.

17. MEASURING REFLECTED RF POWER

The **L (low)** measuring scale indicates the RF reflected power.

Reflected RF power indicates the antenna's propagation deficiency.

1. Set the FUNCTION switch to POWER.
2. Set the POWER switch to REF.
3. Set the RANGE switch to higher W than being transmitted.
4. Set the transceiver to transmit (Press PTT). This will indicate reflected RF power.
5. If no reading is observed then set the RANGE switch to a lower power range.

18. RF FIELD EXPOSURE

It is advisable that you do some supplementary reading on the dangers of RF exposure and ensure that you introduce the necessary safety precautions. Only the most basic measures are covered in this manual.

It is advisable to locate your antenna as far away as possible from people and animals, to reduce their exposure to RF. Avoid transmitting while someone is touching or standing near any antenna. While transmitting, never stand in front of a directional antenna, especially in the case of 430 MHz directional antennas, as it will cause heating of human tissue and may cause other undesirable medical effects.

Connecting a linear amplifier: Before using a linear amplifier ensure that all equipment connected at the output of such amplifier (SWR meter, antenna tuner AND antenna) can handle the maximum output power of the amplifier.

Note: *When operating radio equipment, always refer to the applicable user manual and the accompanying safety considerations covered in the user manual.*

19. OPERATING PRACTICES FOR RADIO AMATEURS

(Refer to the "Radio Amateurs Code - Paul Segal - W9EEA - 1928)

Amateur Radio is a fascinating hobby with many facets that can be practiced by all amateurs alike.

All the different things that make up this hobby culminate in contacting other persons with the same basic interest and, above all, the contacts made will contribute towards friendship and goodwill to each other. In these times of stress and strife, we all need to make friends more than ever before, and we can only promote goodwill by being on our best behavior whenever we pick up the microphone, the Morse key or use a computer in Amateur Radio. Politeness is the key to good operating.

In the same way that we have Traffic rules for road usage, and the Law of the Land for the good of the community, similarly there are Regulations and Operating Procedures governing our hobby, designed for us to obey - in order to make it easier to live with our fellow man. The Regulations are the Law, and the Operating Procedures are mutually agreed "rules". Both are designed so as to make our hobby such a pleasure.

IARU (International Amateur Radio Union) Regional Band Plans have been worked out to help all users of the Amateur Bands to share out the available space to best effect. Always obey them!

The observance of the guidelines in this book will help to keep Amateur Radio something we can be proud of and our compliance with these rules will ensure that we can all enjoy our hobby without any detriment to others.

Operating procedures vary according to whichever band is in use and what is happening on that band, at that time. A local contact on 2 m will be different from one with a "DX-pedition" station on 20 metres.

Many new Radio Amateurs start with telephony (Phone) yet they use the Q-code

which is meant for Morse code (CW) use, and not for Phone. On phone there is little point in saying "there is some QRM on your signal" instead of simply saying "there is some interference on your signal". Many new Licensees seem to think that they should use the Q-Code simply because they are Radio Amateurs.

However, there is a case for using Q-Codes on telephony if the operators do not share a common language. When they both converse in the same language, there is little point in using signals designed and intended for Morse code (CW) use.

As a prelude to becoming a *Ham*, people should serve a basic training as a Short-wave Listener, both on the Broadcast bands and Amateur Radio bands, and gain some knowledge which will help them considerably when going on the air for the first time. Today, there is a tendency for new Radio Amateurs to come straight into Amateur Radio, never having heard an Amateur contact being made before obtaining their licenses, and they are therefore unfamiliar with basic procedures.

HOW TO OPERATE ON AMATEUR BANDS

Once you have written your RAE there is more time to get acquainted with Ham Radio, before you actually get your license/call sign, as this may take several weeks. If you have joined the S.A Radio League you will have a Call Book, so get busy and look up any stations in your call area. Look for any stations located near you and then go along and introduce yourself to the operator of that station and ask him for assistance by way of listening to other amateurs, or even to learn Morse code. This will help you get the "feel of amateur radio".

Once you have been issued with a license, it is essential that you know how to operate your equipment and how to operate on the Amateur Bands, before attempting to go on the air. It is essential that you listen to amateurs making contacts, to learn how these are conducted. Get help if you are unsure of your equipment and how to operate it, as mistakes can be very costly these days.

Don't take chances with your equipment. Please remember to use only sufficient power to make the contact properly. Excessive use of power can very often cause more problems than the use of such power may justify.

In order to conduct a QSO with other radio amateur stations it is essential that you know and understand certain "codes". The RST system is internationally recognized and has definitions intended to convey something to the distant listener. Many

amateur transceivers have "S" meters, which are intended to give signal strength readings, but they are not all calibrated to a specific standard.

Thus, meter readings mean different things on different radio sets. It is, for instance, common to find that a perfectly audible signal hardly moves the "S" meter needle and a Novice will therefore give a signal report of S0 or S1, which misleads the other station. The value of "S" units is really what you hear, and should be used as such. It might be that the signal mentioned above, warranted a report of "S3" meaning "weak signals", rather than "S1" meaning "faint signals barely perceptible". A meter indicating S5 may well be very loud and an S9 report would be in order.

R S T CODES		
Readability	Signal Strength	Tone (CW)
R1 Unreadable	S1 Faint signals, barely perceptible	T1 Extremely rough hissing note
R2 Barely readable	S2 Very weak signals	T2 Very rough AC note, no trace of musicality
R3 Readable with difficulty	S3 Weak Signals	T3 Rough, low pitched AC note, slightly musical
R4 Readable with no difficulty	S4 Fair signals	T4 Rough AC note, moderately musical
R5 Perfectly readable	S5 Fairly good signals	T5 Musically modulated note
	S6 Good signals	T6 Modulated note, slight trace of whistle
	S7 Moderately good signals	T7 Near DC note, smooth ripple
	S8 Strong signals	T8 Good DC note, just a trace of ripple
	S9 Extremely strong signals	T9 Purest DC note

Give honest reports at all times. Do not try to make the other fellow feel good by

giving an inflated or incorrect report.

INTERNATIONAL PHONETIC AND LETTER WORD PRONUNCIATION

A	Alpha	<i>Al-Fah</i>	N	November	<i>No-Vem-Ber</i>
B	Bravo	<i>Brah-Voh</i>	O	Oscar	<i>Oss-Cah</i>
C	Charlie	<i>Char-lee</i>	P	Papa	<i>Pah-Pah</i>
D	Delta	<i>Dell-Ta</i>	Q	Quebec	<i>Kwee-Beck</i>
E	Echo	<i>Eck-Oh</i>	R	Romeo	<i>Row-Me-Oh</i>
F	Foxtro	<i>Foks-Trot</i>	S	Sierra	<i>See-Air-Rah</i>
G	Golf	<i>Golf</i>	T	Tango	<i>Tan-Go</i>
H	Hotel	<i>Hoh-Tell</i>	U	Uniform	<i>You-Nee-Form</i>
I	India	<i>In-dee-Ah</i>	V	Victor	<i>Vik-Tor</i>
J	Juliet	<i>Jew-Lee-Et</i>	W	Whiskey	<i>Wiss-Key</i>
K	Kilo	<i>Key-Loh</i>	X	X-ray	<i>Ecks-Ray</i>
L	Lima	<i>Lee-Mah</i>	Y	Yankee	<i>Yang-key</i>
M	Mike	<i>Mike</i>	Z	Zulu	<i>Zoo-Loo</i>

Emission Modes	
NON	Continuous, unmodulated carrier - as previously commonly used for radio direction finding (RDF) in marine and aeronautical navigation.
A1A	Signaling by keying the carrier directly (aka CW or OOK) - as currently used in amateur radio. This is often, but not necessarily, Morse code.
A2A	Signaling by keying a tone modulated onto a carrier so that it can easily be heard using an ordinary AM receiver - as used for station indents of some NDB transmissions. This is usually, but not exclusively, Morse code. (An example of modulated continuous wave).
A3E	AM speech communication - as used for aeronautical VHF communications.
F3E	FM speech communication - as used for marine and many other VHF communications.
J3E	SSB speech communication - as used on HF bands by marine, aeronautical and amateur users.
A3E or A3EG	Normal AM broadcast - as found on public LF and MF bands.
F1B	FSK telegraphy, such as RTTY.
F2D	Data transmission by frequency modulation of a radio frequency carrier with an audio frequency FSK subcarrier. Often called AFSK/FM.
F8E or F8EH	Normal FM stereo broadcast - as found on public VHF band, and as the audio component of broadcast television transmissions.
G1B	Packet radio <i>PSK31 (BPSK31)</i> .
C3F or C3FN	Broadcast analogue television video signals.

[Type here]

Note: *There is some overlap. So a signal might legitimately be described by two or more designators. In such cases, there is often a traditionally preferred designator.*

Examples of Emission Mode types	
Morse	A1A, A1B, J2A, J2B, F1B, G1B
Speech	A3E, J3E, F3E, G3E
Data (packet)	<i>A2D, AID, J2D, FID, F2D, G1D, G2D</i>
RTTY	A2D, J2D, F2D, G2D
Facsimile	A2C, J2C, F2C, G2F
FSTV	C3F, A3F, J3F, F3F, G3F
SSTV	A2F, J2F, J3F, F2F, F3F, G2F, G3F

[Type here]

International “Q” Codes		
QRA	What is the name (or call sign) of your station?	The name (or call sign) of my station is....
QRB	Tell me your distance from me.	My distance is.....
QRG	Tell me your exact frequency.	My frequency is.....
QRH	Is my frequency varying?	Your frequency is varying.
QRI	What is my transmission tone?	Your tone is.....
QRK	Are you busy?	I am busy, please wait.
QRM	Do you have interference?	I have interference.
QRN	Do you have static?	I have static.
QRO	Can you increase power?	Shall I increase power?
QRP	Can you decrease power?	Shall I decrease power?
QRQ	Can you send faster?	Shall I send faster?
QRS	Will you send slower?	Shall I send slower?
QRT	Will you stop sending?	Shall I stop sending?
QRU	Do you have any traffic for me?	No traffic for you.
QRV	Are you ready?	I am ready.
QRW	Please inform	I will inform
QRX	When will you call again?	I will call again.
QRZ	Who is calling this station?	You are being called by
QSA	Give my signal strength please.	Your signal strength is
QSB	Are my signals fading?	Your signal is fading.
QSD	Your keying is bad.	Is my keying bad?
QSK	Please break in.	Can I break in?
QSL	Will you confirm contact?	I will confirm contact.
QSN	Did you hear?	I did hear.
QSO	Can you make contact?	I will make contact.
QSP	Will you relay to?	I will relay to
QSY	Change to Frequency.	Changing to Frequency.
QTH	What is your position?	My position is
QTR	What time is it?	The time is
QUA	Have you news of?	I have news of....
QUM	Resume normal working.	Resuming normal working.

Fun Q Codes	
OC	Old Chap
7 3 (Seven, Three)	Best Regards
8 8 (Eight, Eight)	Hugs and Kisses
XYL	Wife
YL	Young Lady
OM	Old Man
Ham Shack	The room the radio is in
HI	Laugh in Morse code
LID	Someone who is a poor operator

These are great for chatting!

LISTEN FIRST

The elementary rule for the transmitting Ham is **"listen first"**. It is only by listening that you can get some idea of basic facts, such as what propagation is like on a band and whether a particular frequency is in use. Remember, a frequency may sound clear to you but a weak distant station may be using the frequency. Listening at various times builds up an understanding of how conditions vary at different times of the day, night and year. By listening, you can hear actual contacts and learn the normal procedures, remembering to only learn and use the correct procedures.

For a basic contact, there are two options - either to reply to a CQ call, or to call CQ yourself. CQ is the internationally used call for "I seek you", i.e. a general call to anyone listening that you wish to have a contact. For the beginner it is better, at first, to reply to calls from other stations in order to be sure that your transmitter and antenna are working as they should. Few things are more frustrating to the newcomer than to call CQ and not receive any replies and assume his signal may not be getting out

Speak clearly and slowly, especially when giving your call sign. If the person to whom you are talking does not speak your language very well, try to use simple words and phrases. Slang words may confuse them. Use the standard International Phonetics as provided in this book.

MAKING A CONTACT IN TELEPHONY (PHONE or VOICE)

It is essential that procedures are adhered to, as they are the basis of Telephony (Voice=Phone) contacts, AND Morse (CW) contacts - it is just the mode used, which changes. Procedures apply to all bands. Once again, please do NOT use Q-codes when communicating by Phone - unless there is a language difficulty. Laugh if you wish to do so but do not use "Hi" as laughter on phone contacts.

a) Before calling for another station on a clear frequency:

Listen and ascertain that the frequency is not in use. This means listening for more than just a couple of seconds - listen for at least as long as one would expect an average transmission to last, for the type of activity on the band. Just to be sure, say *"Is this frequency in use?"*. Only proceed if no reply is received.

b) A typical "local" contact - South Africa and surrounding countries:

"CQ, CQ, CQ, this is ZS5XYZ, - Zulu Sierra Five X-ray Yankee Zulu, CQ, CQ, CQ, this is ZS5XYZ calling CQ and standing by for a call."

The CQ is said up to three times in one transmission. If there is no reply try again. You do not need to send your call sign three times.

c) Seeking a Foreign contact (Outside the above area - DX):

"CQ DX, CQ DX, CQ DX, this is ZS5XYZ - Zulu Sierra Five X Ray Yankee Zulu calling CQ DX and standing by for a call."

Local operators should not answer this call because you are looking for foreign stations - DX. Do not call "CQ DX" more than three times at each attempt, and do not give your call sign more than three times in each call. Repeat as often as necessary or until a contact is made.

d) Seeking a specific station:

Let us assume that W6FR is a specific station that you wish to contact:

"W6FR, W6FR, W6FR, this is ZS5XYZ, Zulu Sierra Five X-Ray Yankee Zulu calling and standing by."

[Type here]

Once that station has answered your call you may then proceed to greet the caller and give him your particulars as follows:

"W6FR this is ZS5XYZ. Good Morning (afternoon/night) OM, (unless the name is known). The name here is Rob, Romeo Oscar Bravo, and I am located in Durban - South Africa. W6FR this is ZS5XYZ".

Wait for his reply and make notes of what his replies are. You cannot remember everything. Make notes. The use of the term Old Man in Ham Radio is not derogative. You do not know his name so cannot use it. The term OM or Old Man is used internationally when a name is not known.

When he puts it over to you he may give you a signal report (RST) and the weather or other information. You can then reply with his signal report, your weather and time of day and any other pertinent information.

The ice has now been broken!

You can then continue the contact in the way you desire. Remember, if you just establish contact, exchange reports and leave it at that it is possible that the other party will simply do likewise, and sign off, asking you to QSL. If you wish to pursue the contact ask some questions which need a reply. I suggest you prepare a list to be used until you are familiar with amateur radio conversations (QSOs). Please remember that if you wish to QSL (exchange cards), say so. If you do NOT wish to QSL, say so. QSL cards may be mailed directly to the other station or sent via a QSL Bureau. The SARL has a

Bureau for members. Be specific about how you wish to QSL. Some stations only QSL via a QSL manager who handles the mail for them. Get the correct information. Most QSL Cards to a Manager must be sent directly and not via the local QSL Bureau. If you do not follow QSL instructions, you may not receive QSL cards in return and your card may never reach the correct destination.

Remember that you are required to give your call sign as frequently as required by the Regulations (once each over) and preferably at the end of the over, e.g. "W6FR from ZS5XYZ".

[Type here]

[Type here]

e) Answering a CQ Call transmitted by another station:

Listen carefully and get the Call Sign of the other station. Write it down. If that station is putting out a general CQ then wait until he stands by. Answer with your Call Sign once or twice, as stated previously, and then listen. Do not call for long as he may have answered someone else. Often you cannot hear the other station due to many factors.

Do not answer calls made for a specific area but which is not your area. In other words, if a station is calling "CQ *Italy*" he does not want African stations but only Italian stations to reply. Wait for your turn. Once you have made contact write down ALL the relevant information directly into your Station Log Book and you won't forget to enter it.

f) Contacting a station already in contact with another station:

If the station you wish to call is already in contact with another station, wait until he has finished his QSO - unless you know both stations and wish to join with them - and take care not to interrupt the trend of the QSO by butting in.

SIGNING-OFF PROCEDURE

When signing-off with any station you should thank the other station for the contact, mention about QSL cards and the method you intend using to get the card to or from him, give him "good wishes" and a final "good-bye". Note that "good-bye and good wishes" is indicated by the numbers "7 3" when using Morse code. When this expression is used on phone, it should not be said as "73s" but as "7 3"(Seven, Three).

Here is an example of signing off:

"W6FR this is ZS5XYZ. Marv, thanks for the most pleasant contact, I hope to meet you again soon. W6FR this is ZS5XYZ off and clear and listening for your final."

The final courtesy of a QSO is the QSL card sent away to the other station. (If this was agreed on).

MAKING A MORSE CODE OR CW CONTACT

[Type here]

[Type here]

Using CW the procedure is exactly the same but the "language" used is slightly different and you have to be careful. Do not transmit at speeds faster than you can receive. Speeding up the initial procedures can result in the answering station sending at that speed. Likewise, do not answer a transmitting station at his speed unless you can copy at that speed - call or answer at your own normal sending and receiving speed. A good operator at the other end will slow down for you.

Local Call:

"CQ CQ CQ de ZS6XYZS6XYZS6XYZ AR K".

"de" means "from", and the "ARK" means the other station may begin transmitting.

Foreign Call:

"CQ DX, CQ DX, CQ DX de ZS6XYZS6XYZS6XYZ AR K"

Then would follow:

"W6FR de ZS6XYZ GM/A/E (his time)... (his name if he gave it) es tnx fer call. My name is Jack es QTH Durban. Ur RST 599 with QSB. Hw copy? AR W6FR de ZS6XYZ KN "

Note: *That once contact is established KN is sent at the end of each transmission to indicate that only the station being talked to should answer.*

"ZS6XYZ de W6FR GE (remember time differences) es mny tnx fer rpt. Name hr es Marv es QTH California. Ur sigs 599 with QRM. Tx hr is wid 100W to dipole at 20 metres. Wx hr is fine. AR ZS6XYZ de W6FR KN"

At the end of each station's last transmission, the letters VA or SK should be sent after the call signs. This means the contact has ended.

GENERAL INFORMATION

Learn good procedures - they are the mark of a good operator and no one really likes to listen to a poor or mediocre operator. Make yourself a good operator and you

[Type here]

[Type here]

will feel proud about yourself.

Remember, whatever band you are using, your conversation is NOT private and thousands of listeners could be listening to you. Some may not be friendly to Amateur Radio for some or other reason.

Don't behave in such a way that a poor opinion of amateurs is confirmed in the minds of any listeners. Never talk about Politics, Race, Religion, Sex or any other matter which may be offensive to the person to whom you are talking or to other persons. These are argumentative subjects and can cause problems.

If you saw two complete strangers talking to each other in the street, you would not butt into their conversation. The same applies when you are on the air, except during nets when you may announce your call sign during breaks, and then wait to be invited in.

Never tune up your transmitter on the air. Use a dummy load first and then do the final adjustment on the air, quickly.

WHAT TO DO AFTER FINISHING A CONTACT

This depends on the situation after the last contact is completed, as well as the situation on the frequency in use.

If you answered another station's call and have signed off with that station, it is good manners to move off "his" frequency to another frequency to make another call. If, however, it was "your" frequency then you can call again.

Please don't stand on your "rights" to a frequency. Use common sense. If the other station is a "rare" or DX station then it is courteous to leave the frequency. If not, then another "CQ" call may be made as soon as the frequency is clear.

HOW TO USE A REPEATER

A repeater is an unmanned VHF or UHF station usually located on a HIGH SITE such as the top of a hill or a tall building. Very often there are several repeaters on one HIGH SITE. Repeaters are designed to relay the weak or strong signals from Mobiles (vehicles) or Hand-Held transceivers over a far greater area than would normally be possible without it. In fact the mobile stations coverage area becomes

[Type here]

[Type here]

that of the repeater.

VHF radios such as the two metre band has a 12,5 kHz separation between frequencies and must be set to a “narrow” filter. UHF frequencies such as 430 MHz, have a 25 kHz separation. In the case of UHF frequencies the filter in the radio must be set to “wide”.

The repeater consists of a receiver (the Input) and a transmitter (the Output) and some control gear known as "the logic". With the aid of special filters, it is able to transmit and receive at the same time.

Unlike most types of operating, you will need to transmit on one frequency (the Input frequency) and receive on a different frequency (the Output frequency). Amateur Radio 2 metre repeaters have the Input frequency 600 kHz lower than the Output frequency.

Standard Repeater Input / output Offsets	
Band	Offset
6 metres	-600 MHz
2 metres	-600 kHz
70 centimetres	-7,6 MHz

What is a PL or CTCSS Tone?

PL, an acronym for Private Line, is Motorola's proprietary name for a communications industry signaling scheme called the Continuous Tone Coded Squelch System, or CTCSS. It is used to prevent a repeater from responding to unwanted signals or interference. Tone Squelch is an electronic means of allowing a repeater to respond only to stations that encode or send the proper tone. In other words, if a repeater is set up to operate only when a PL tone of say, 136,5 Hz is heard by its receiver, then it will allow the transmitting station access. If your station, (your mobile, base or hand held) does not transmit the tone that the repeater

[Type here]

receiver has been programmed for, when you key up, then the receiver of the repeater does not hear you and will not be usable by your station until you set the proper tone in your radio to be transmitted when you key your mic. Any modern station may be set up to transmit this unique low frequency tone that allows the repeater to operate. If a repeater is "In PL mode" that means it requires a CTCSS tone (PL tone) to activate the repeater.

These repeaters were once called closed repeaters.

TABLE OF COMMON CTCSS TONES (in Hz)				
67,0	94,8	131,8	171,3	203,5
69,3	97,4	136,5	173,8	206,5
71,9	100,0	141,3	177,3	210,7
74,4	103,5	146,2	179,9	218,1
77,0	107,2	151,4	183,5	225,7
79,7	110,9	156,7	186,2	229,1
82,5	114,8	159,8	189,9	233,6
85,4	118,8	162,2	192,8	241,8
88,5	123,0	165,5	196,6	250,3
91,5	127,3	167,9	199,5	254,1

To conserve the repeater's power the repeater remains in the receive mode until the transmitter is switched on when required for use (Accessed). To 'access' a repeater, make sure that your receiver and transmitter are on the correct frequencies, then say "ZS4XYZ on frequency" or "ZS4XYZ standing by for a call". Do NOT say "ZS4XYZ listening" and release the PTT button (Press to talk) and then expect someone to come back to you. You simply said 'you were listening' and you did not ask for a contact.

If correctly accessed, the repeater will have relayed your signal. If no one replies to your call, it will drop out after a few seconds.

It is important to realize that you are listening to the repeater's transmitter, relaying whatever signals it can hear, be it yours or someone else's. You are not hearing the mobile station directly, so it is no good giving a signal report in the usual way. Reports are limited to estimating how strong the mobile is at the repeater's receiver. The Input.

There are three levels: "Full quieting" means that there is no background noise, "Smooth noise" means that there is a little hiss on the signal, and "Rough Noise" means that it is difficult to understand the station because of background noise. These reports are only useful, however, if the repeater has a strong signal to you.

It is often a good idea to listen on the input frequency to check whether a station can be heard without the aid of the repeater. It is not good practice to use a repeater when a direct contact (Simplex) can be made and the repeater is very active. Move to a simplex frequency and leave the repeater open for other, not so fortunate stations, to use.

Each repeater is shared by hundreds of operators, so transmissions must be kept short - preferably not longer than two to three minutes - and a pause of a few seconds should be left before transmitting, so as to allow any other stations to make short or urgent calls. Every repeater has its own characteristics. The Golden Rule is: "Listen carefully - before transmitting".

Remember not to shout into the microphone and to get the correct position of your mouth in relation to YOUR microphone, for best speech quality. Do some tests with a good operator.

Using high power does not necessarily help. Remember that no matter what enters the repeater, the output power remains the same - the power is pre-set for the repeater output. High power can also cause problems when used in the vicinity of other repeaters. Use only enough power to access the repeater you are using, well. Remember that when using Satellites you are communicating via a repeater that is programmed for a shut down if excessive power is used into the Satellite. In all cases of repeater use only sufficient power to make the contact properly

CODE OF PRACTICE FOR REPEATER OPERATION

Before attempting to transmit, ensure that:

1. Your transmitter and receiver are on the correct frequency.
2. Your peak deviation is correctly set.
3. Check that you will only access the repeater that you wish to use. This is especially important when conditions are very good.
4. Listen to the repeater before you transmit to make sure that it is not in use. If you hear a local station you wish to call, listen on the input frequency to see whether the station is within simplex range before calling.

5. Unless you are specifically calling a particular station, simply announce that you are on frequency and available for a call. One announcement is usually sufficient. If you are calling a specific station give that stations' call sign followed by your own call sign e.g. "ZS2XYZ from ZS2ABC".

6. Once contact is established:

1. At the end of each over give **his call sign first** followed by your call sign e.g. "ZS2XYZ from ZS2ABC."
2. Change frequency to a simplex channel (frequency) at the first opportunity especially if you are operating a fixed (base) station and wish to have a long conversation with the station.
3. Keep your overs short and to the point.
4. Do not monopolize the repeater as others may want to use it.
5. Do not call "break break". In emergencies call "ZS4XYZ with traffic".
6. If your signal is very noisy into the repeater, or if you are only opening the repeater squelch intermittently, finish the contact and try later when you are putting a better signal into the repeater.
7. If the repeater is busy, emergency calls may be made by tail-ending during the one to three second break and announcing:
 1. That you have emergency traffic, and
 2. Which facilities you wish a station to provide.

In "risk of life or emergency" situations, this will normally require a telephone call by the other station to the Emergency Services such as Police or ambulance etc. Do not reply to an emergency call if you cannot provide the service requested.

Only you can determine what an "emergency" is. Use your common sense. Imagine these two scenarios.

1. A woman and two small children in a car breaks down in a public street not far from a service station in a built up area. This is not an Emergency situation in its normal context.
2. The same woman breaks down on a highway where there are no houses, service stations or anyone to turn to for assistance and where she is vulnerable to possible attack. This is an Emergency situation.

In the same sense: If a vehicle breaks down in the middle of an off ramp from a freeway during a non-peak period - it is no emergency. If the same situation occurs at peak hour times this could be construed as an emergency because if it is not cleared

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it may cause a massive build-up and possible accident.

No hard rules can be laid down in this regard but, YOU MUST USE YOUR COMMON SENSE AND TREAT EACH CASE ON ITS MERITS.

Once again, if you are not in a position to go to the assistance of the emergency caller directly, leave the call to a station that has a telephone available or other facilities. Time taken up when you cannot be of useful assistance may cost a life.

We have only really glanced over the entire subject of Operating Procedures because there are always special cases to be considered. These must be looked at logically and in a gentlemanly way, and then the answer should be obvious to you. Nothing in this world ever "entitles" you to do any act or thing which impinges on the rightful pleasures of other users of the radio spectrum, or is an act which, if done to you, you would find objectionable.

Do the right things and Ham Radio will be pleasurable and you will enjoy it.

Make yourself a good operator and be proud of it!

Source(s): Ethics and Operating procedures for the Radio Amateur. By J. Devoldere and M.Demeuleneere. **HF Assessment Preparation Guide** by Nico ZS6SNH - 2008 **The Amateur's Code** by Paul Segal, W9EEA, in **1928**
International Code for Radio Emission Modes by VK3KBC (www.radcomms.net)

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*"The big lesson. The people who make a difference in your life are not the ones with the most credentials, the most money, or the most awards. They are the ones that care."
Michael Dlouhy*

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