

THE PROGRAMME:

Part 1

HOW RADIOS WORK

AM/SSB RADIOS. FM/VHF RADIOS

USE OF A RADIO

THEORY

PRACTICE, SUMMARY, Q AND A

Examinations are done by nationally appointed authorities.

Part 2

INTRODUCTION TO GMDSS SRC USING GMDSS CLASS D VHF RADIOS PRACTICE, SUMMARY, Q AND A.

During practice sessions you will be assessed as to how competent you are becoming.

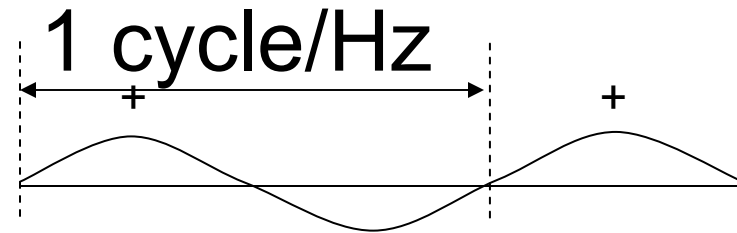
For the RYA SRC certificate, a written test is done at the end of Part 2. Other authorities do separate examinations.

Part 1.

Marine Voice Radios

HOW RADIOS WORK

a. Batteries provide 'DC', '+v'/'-v'. Electric current flows from one terminal, the 'positive', to the 'negative' when a circuit is 'on'.



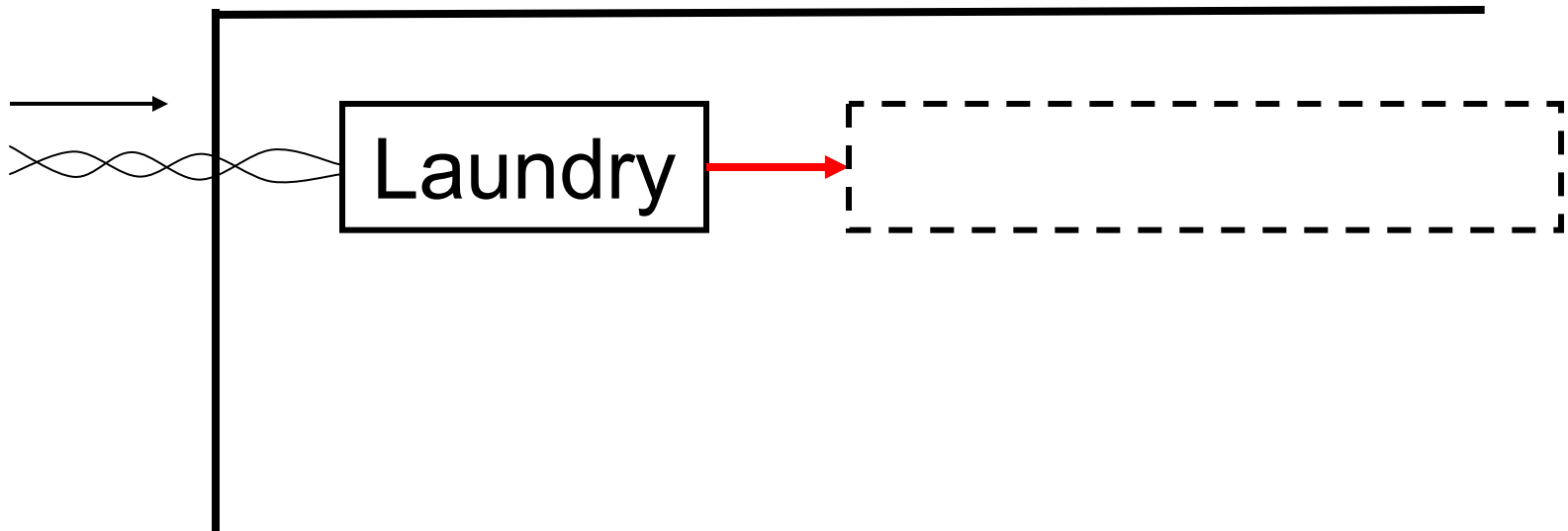
b. Generators 'AC'

The direction of current flow is constantly changing; it starts slowly, speeds up, slows down, stops then starts again in the opposite direction. Each repetition is a cycle. Frequency is cycles/second, or Hertz, Hz.

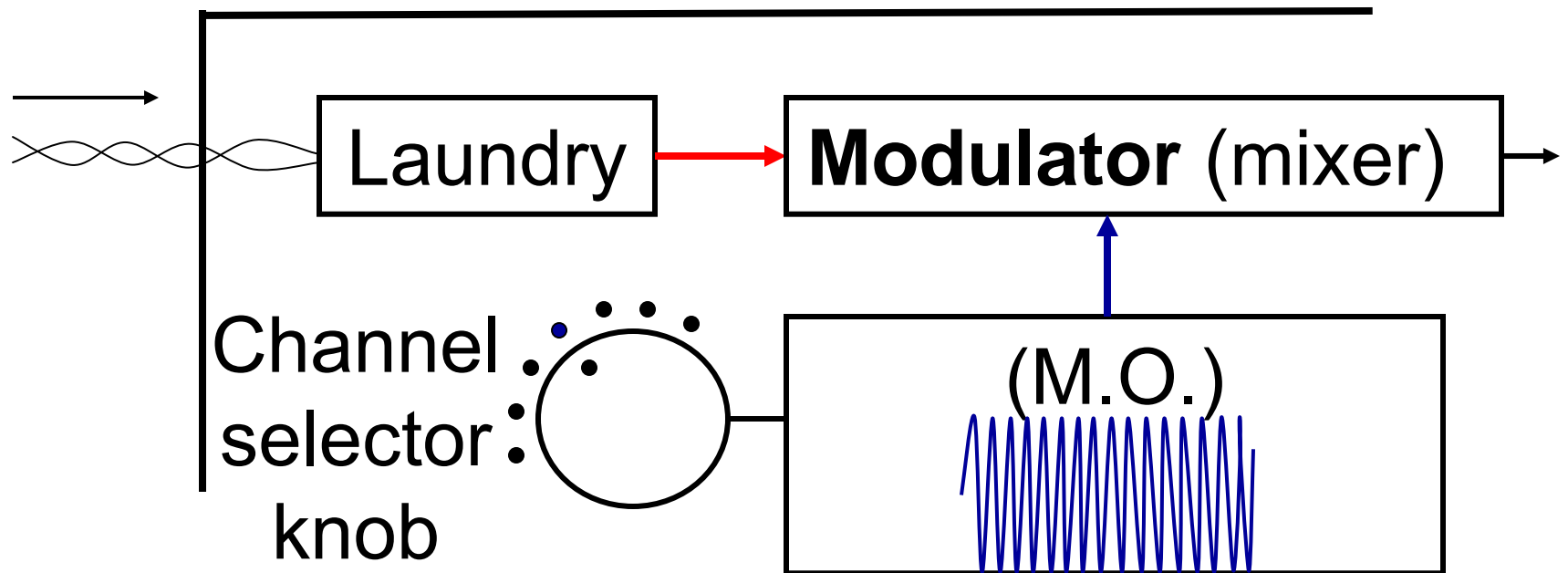
Voice audio air vibrations are passed into a 'mic' (microphone). A mic converts the same changing audio frequencies sounds to identical electronic vibrations (AC) for passing into the radio. The simplest mic contains many very small pieces of carbon. As the vibration enters the mic, the pressure changes on the carbon granules cause a change in the electrical resistance, and current flow. It becomes the same as the audio input.

THE RADIO

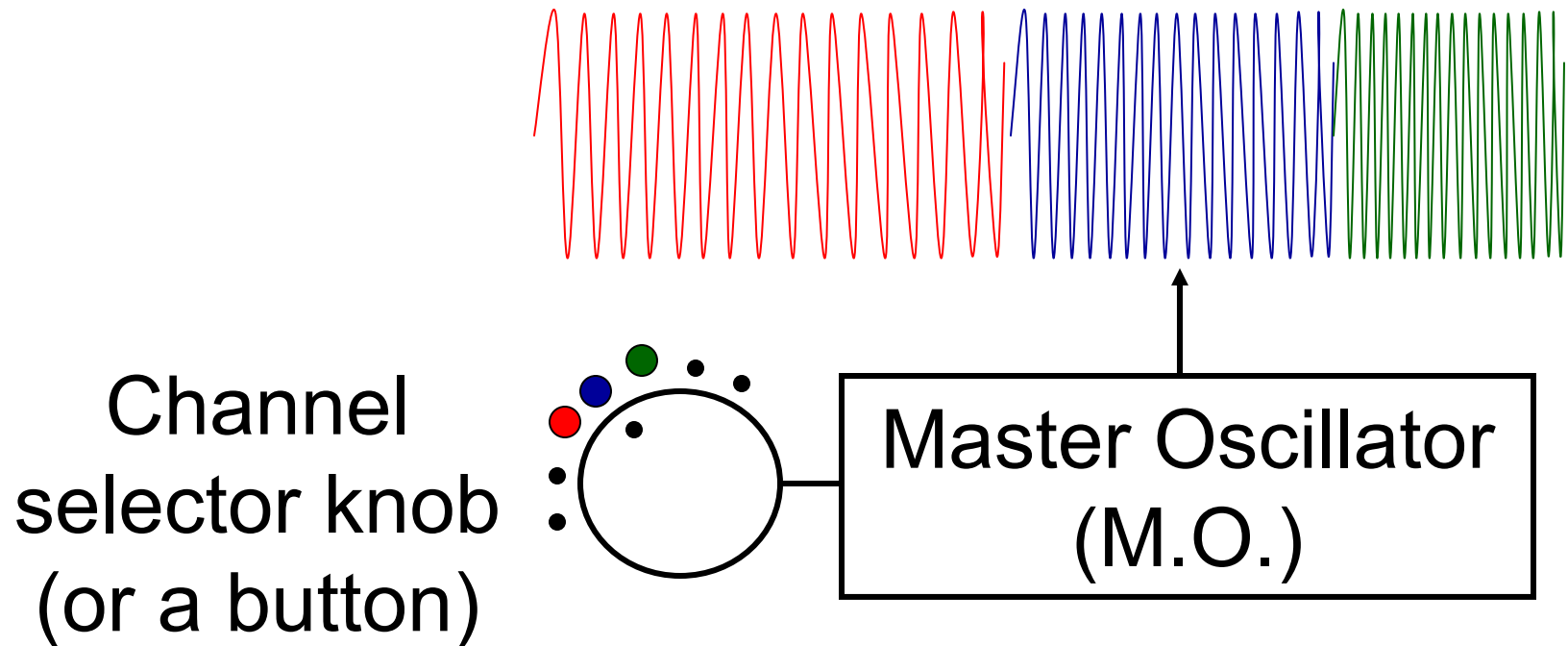
The audio input from the 'mic' goes into the radio's 'laundry', a clean-up phase – excess sounds are removed and **cleaned sounds** are levelled for processing.



The **Modulator** combines the **cleaned audio input** to the “**carrier frequency**” selected by the channel selector. The output is the sum of the two, and other combinations not required are filtered off.



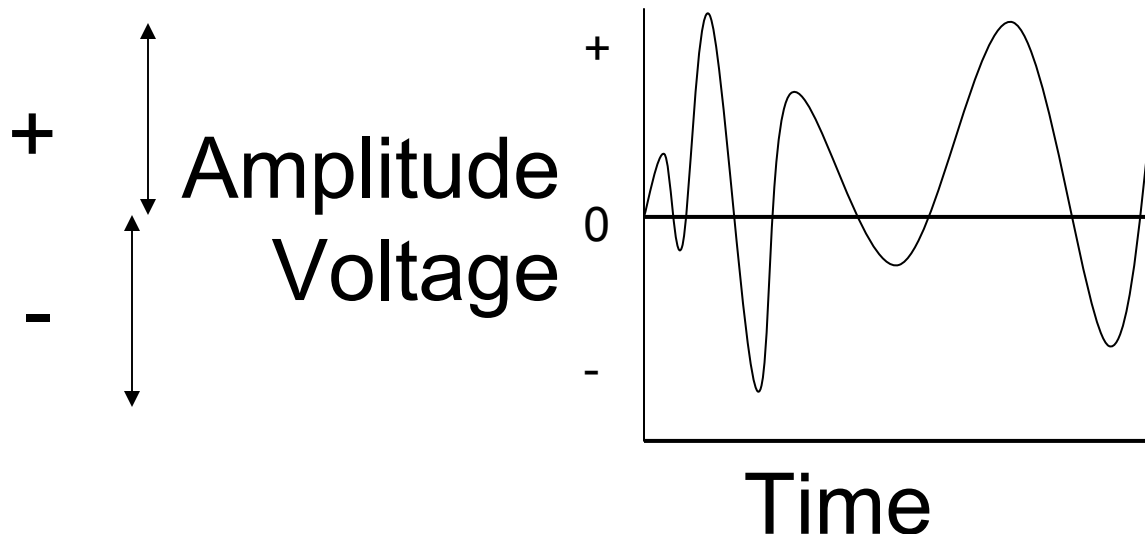
The M.O. – **Master Oscillator** – can be regarded as a transport factory. It makes carrier frequencies determined by the choice of a channel number. Each channel number relates to a frequency.



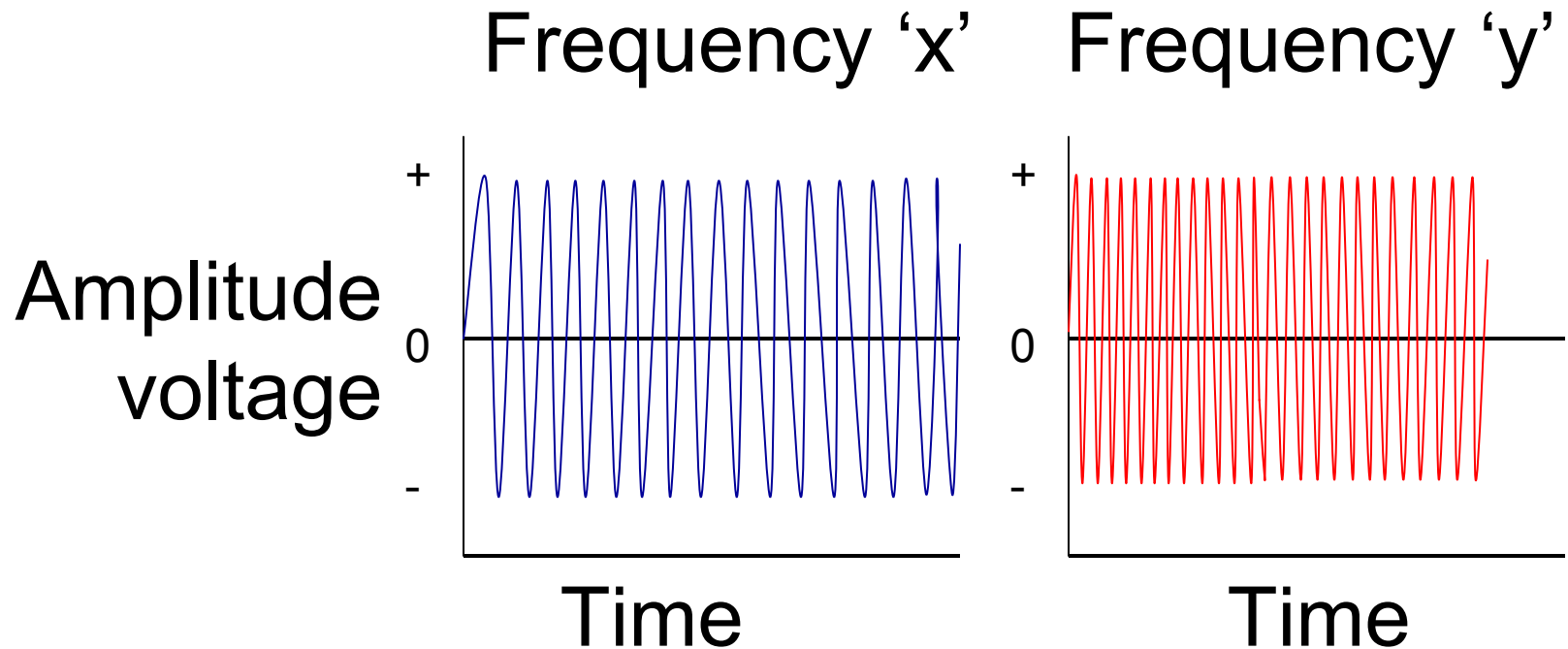
Modulating is combining the two frequencies, audio input and carrier, by –

1. **A.M.** – amplitude modulation. The changing amplitude and frequency of the audio input voltage

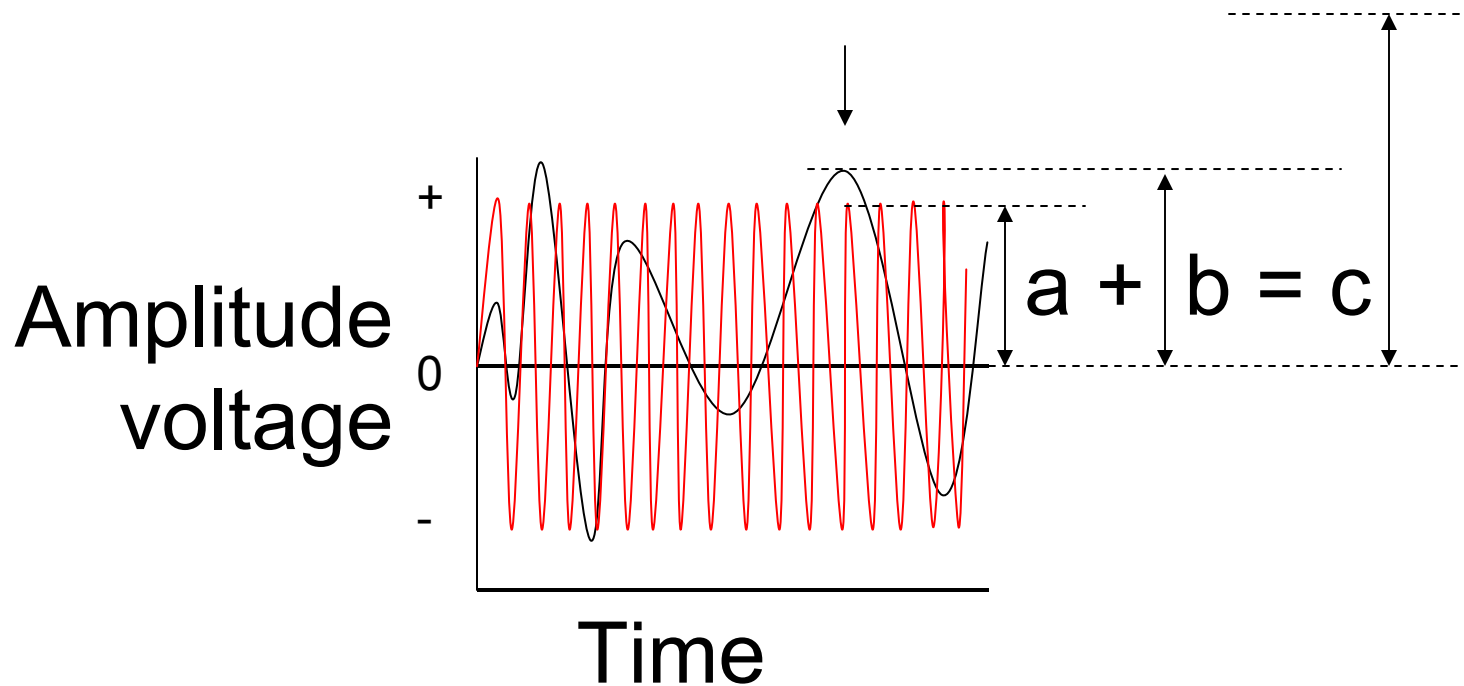
An Audio input example:



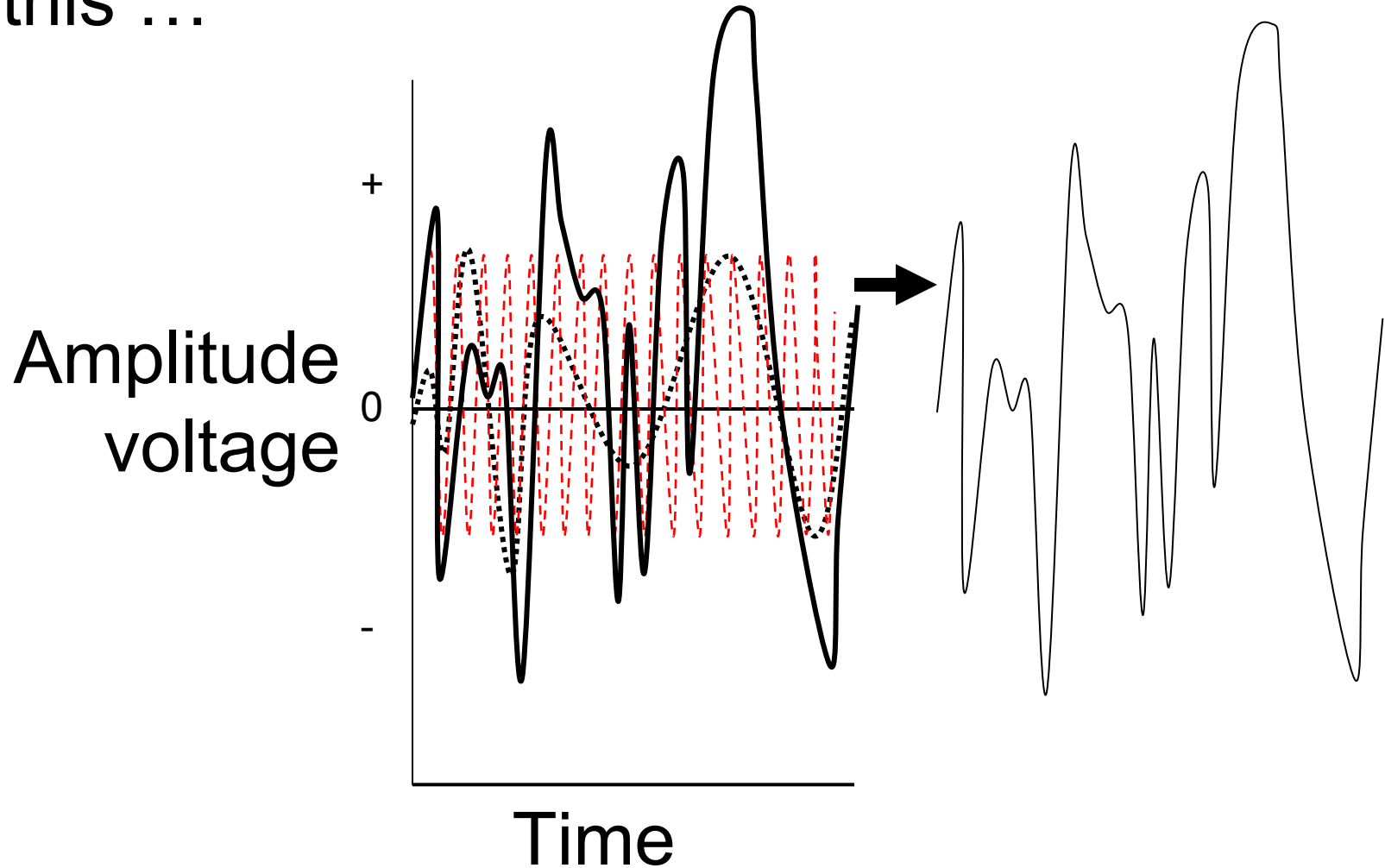
... is added to the amplitude of the carrier frequency selected by channel selecting



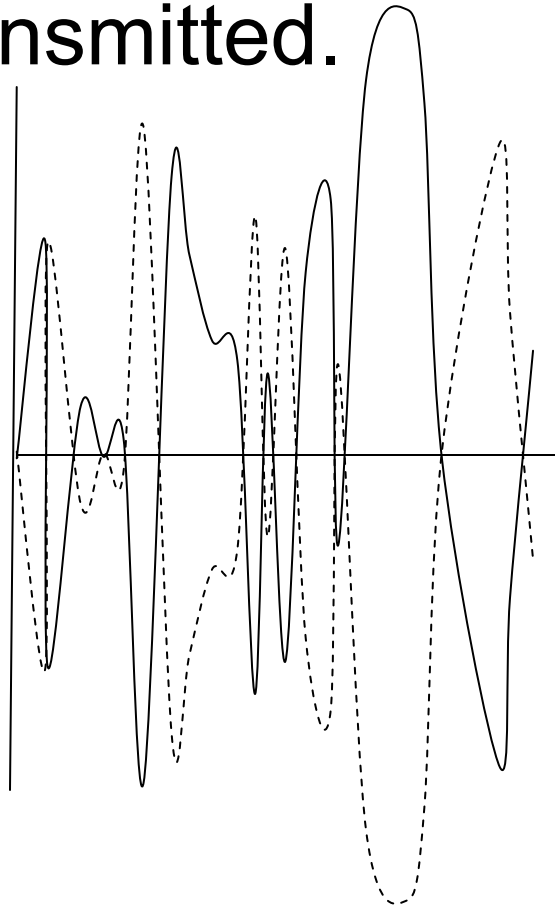
By superimposing the audio over the carrier, we can easily imagine the sum of the two amplitudes moment by moment ...



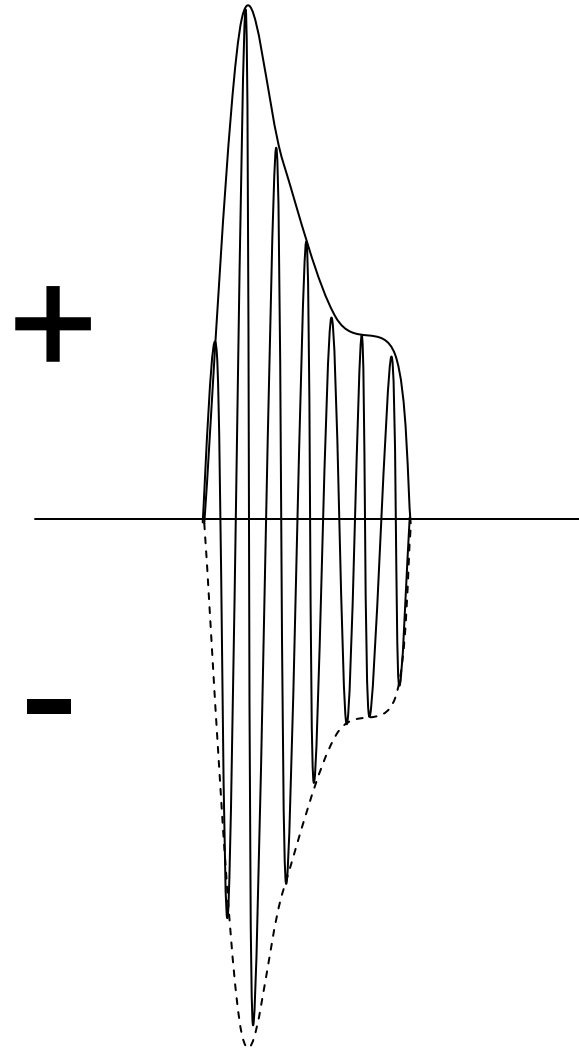
The result of the added amplitudes looks like this ...



The modulated frequency makes a mirror image copy of itself, 'loops' or 'envelopes' – this is the **AMPLITUDE MODULATED, A.M.**, signal to be transmitted.

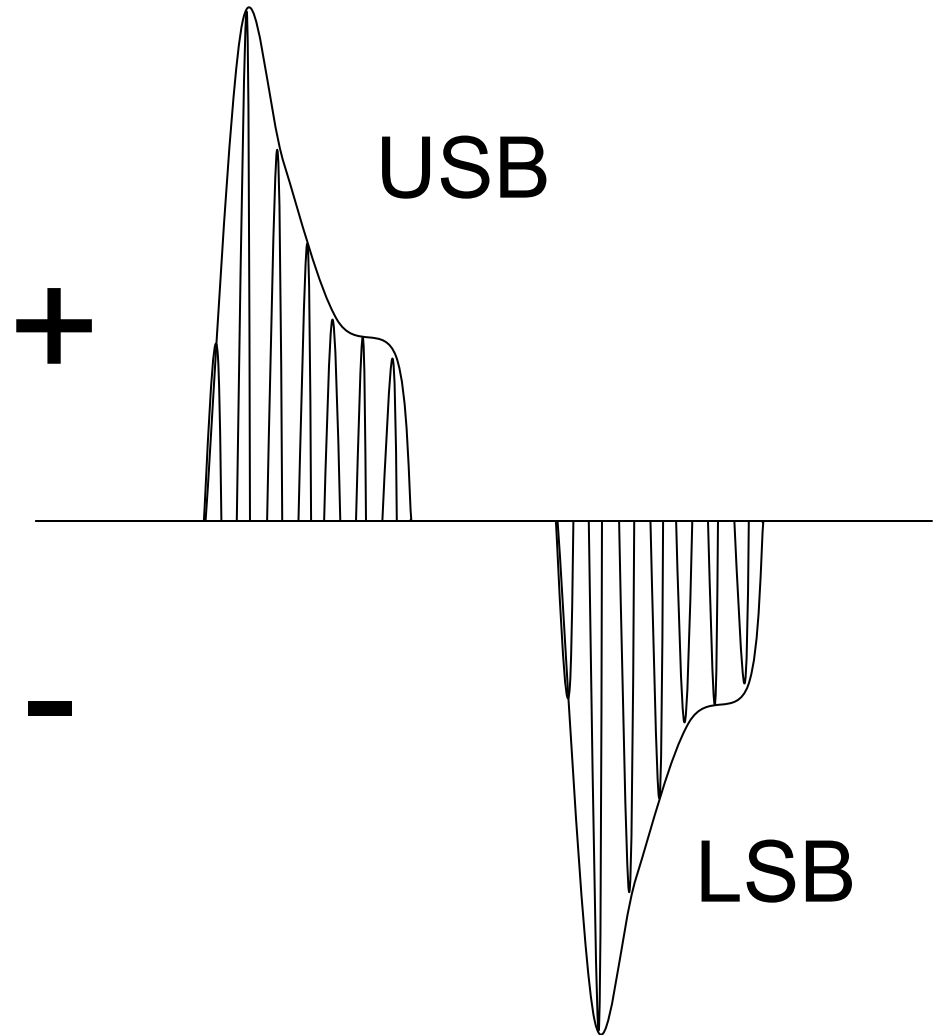


Each 'loop' or 'envelope' contains the carrier frequency. There is the "+" (top/upper) side and the "-" (bottom/lower) side of the A.M. signal. This is called a **DOUBLE SIDE BAND** signal, DSB.



SIDE BANDS

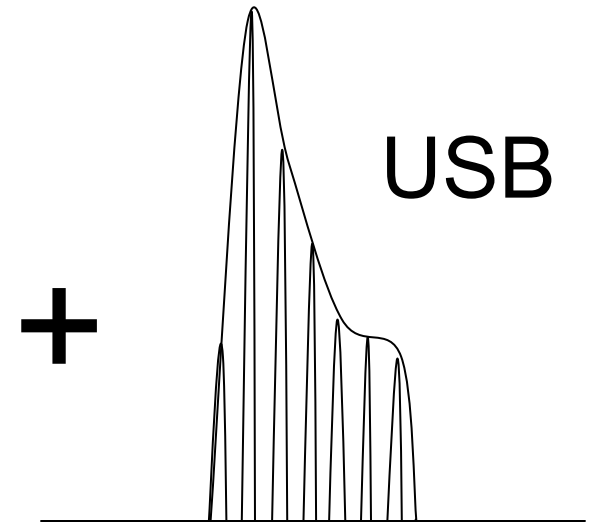
If one side, the top or bottom is filtered off, we are left with a **SINGLE SIDE BAND** signal, SSB. We either have the **UPPER SIDE BAND**, USB, or the **LOWER SIDE BAND**, LSB.



The big advantage to using an SSB is that all the available power to transmit the signal is **not** halved to send two identical sides – DSB (identical less the fact one is upside down to the other).

CLASS OF EMISSION H3E

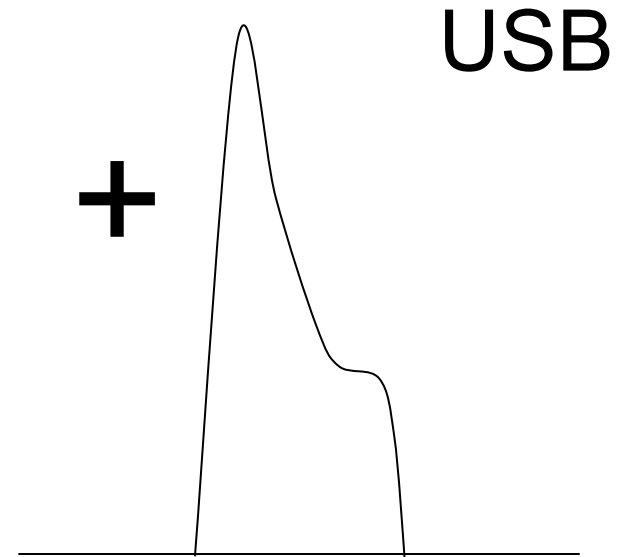
Marine SSB radios use the USB. The “Primary call, answer, and DISTRESS frequency, 2.182 MHz, has the carrier inside the modulated SSB – it is called **Class of Emission “H3E”**.



CLASS OF EMISSION J3E

When changing to any other frequency, the carrier is filtered out – it is called

**Class of Emission
“J3E”.**

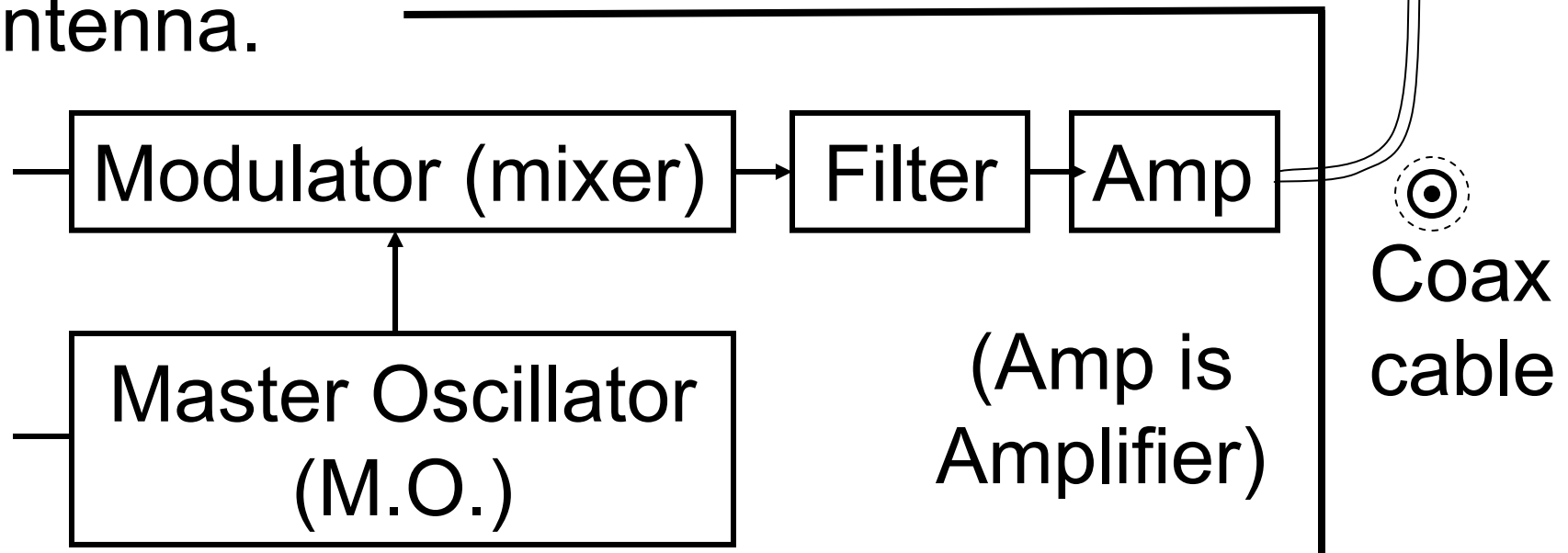


The reason why there is a difference is based on the fact that old A.M. radios used at homes could monitor and hear, only a bit distorted, H3E transmissions on 2,182 MHz – if a DISTRESS call, there was more chance of someone hearing it.

Other frequencies using J3E did not need to be heard, and could not be, by non-marine radio user people. All available radio transmitting power can then be used to send the modulated signal with maximum power.

Once modulated, the signal is filtered to remove any unwanted components, then sent to a power amplifier before going out to the antenna.

Aerial =
ANTENNA



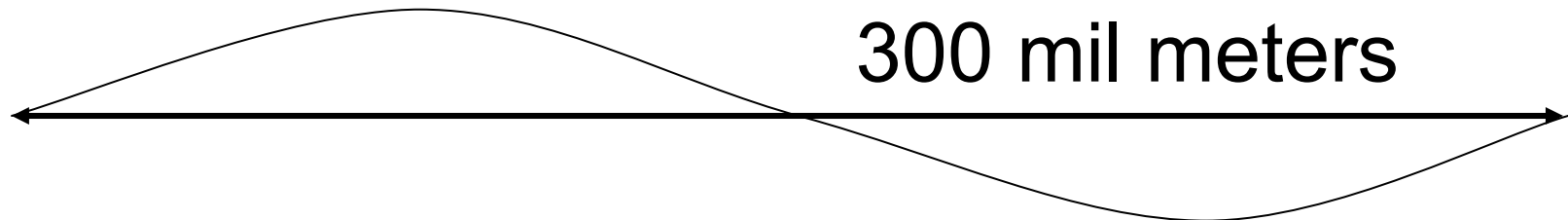
ANTENNA LENGTH

The length of an efficient antenna is one or a set fraction of, the **WAVELENGTH**.

Wavelength depends on the frequency.

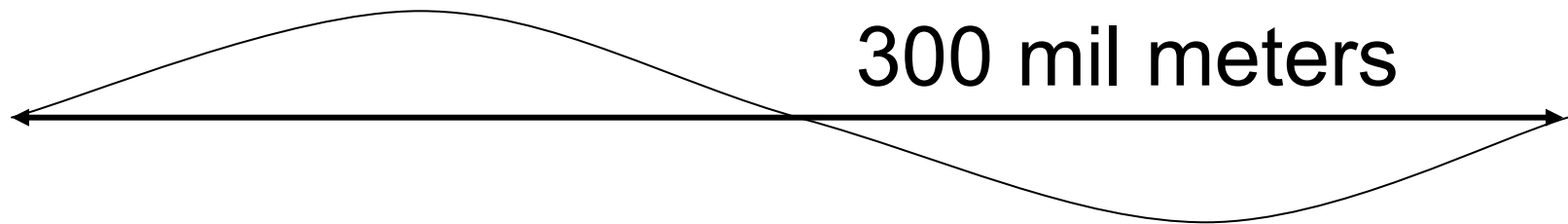
The speed of a radio wave through the air is, as near as can be determined, 300 million meters per second.

So a frequency of 1 cycle/second or 1 Hz has a wavelength of 300,000,000 m:

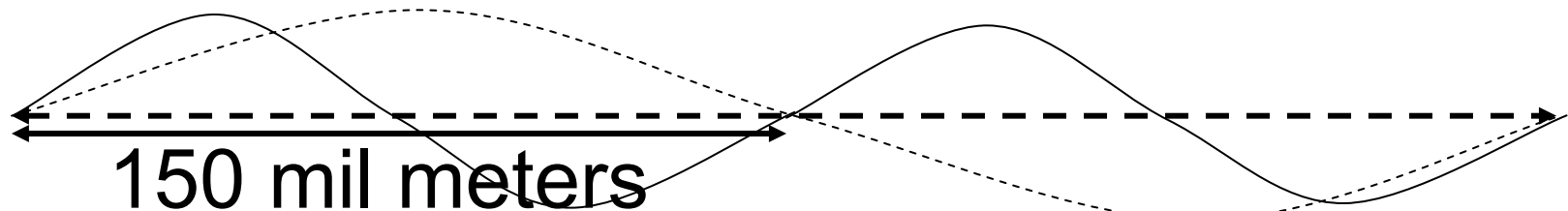


As the frequency increases, so the wavelength decreases:

Frequency of 1 Hz (1 cycle per second):



Frequency of 2 Hz (2 cycles per second):



Frequencies' groups or ranges, called BANDS, needing different antennas are as follows:

Audio Frequencies, AF, (sound)

30 Hz to 30,000 Hz (30 KHz)

Very Low Frequencies, VLF, (radio) – same as AF but electronic.

Low Frequencies, LF, 30 – 300 KHz

Medium Frequencies, MF, 0.3 – 3.0 MHz

High Frequencies, HF, 3.0 – 30.0 MHz

Very High Frequencies, VHF, 30 – 300 MHz

Ultra High Frequencies, UHF, 300 – 3.0 GHz

Super High Frequencies, SHF, 3.0 – 30.0 GHz

The SSB (MF and HF) Call, Answer, and DISTRESS frequency is 2.182 MHz.

For this MF frequency the wave length is:

$$\begin{aligned} & 300,000,000 \text{ m} \\ & \div \underline{2,182,000 \text{ Hz}} \\ & = 137.488543 \text{ m} \end{aligned}$$

For a power efficient (range) antenna on that frequency the antenna should be 1 wavelength, 137.49 m long. This is just NOT practical! It needs to be far too long.

The next option is $0.75 \times \text{Wavelength}$:

So $137.49 \text{ m} \times 0.75 = 103.12 \text{ m}$.

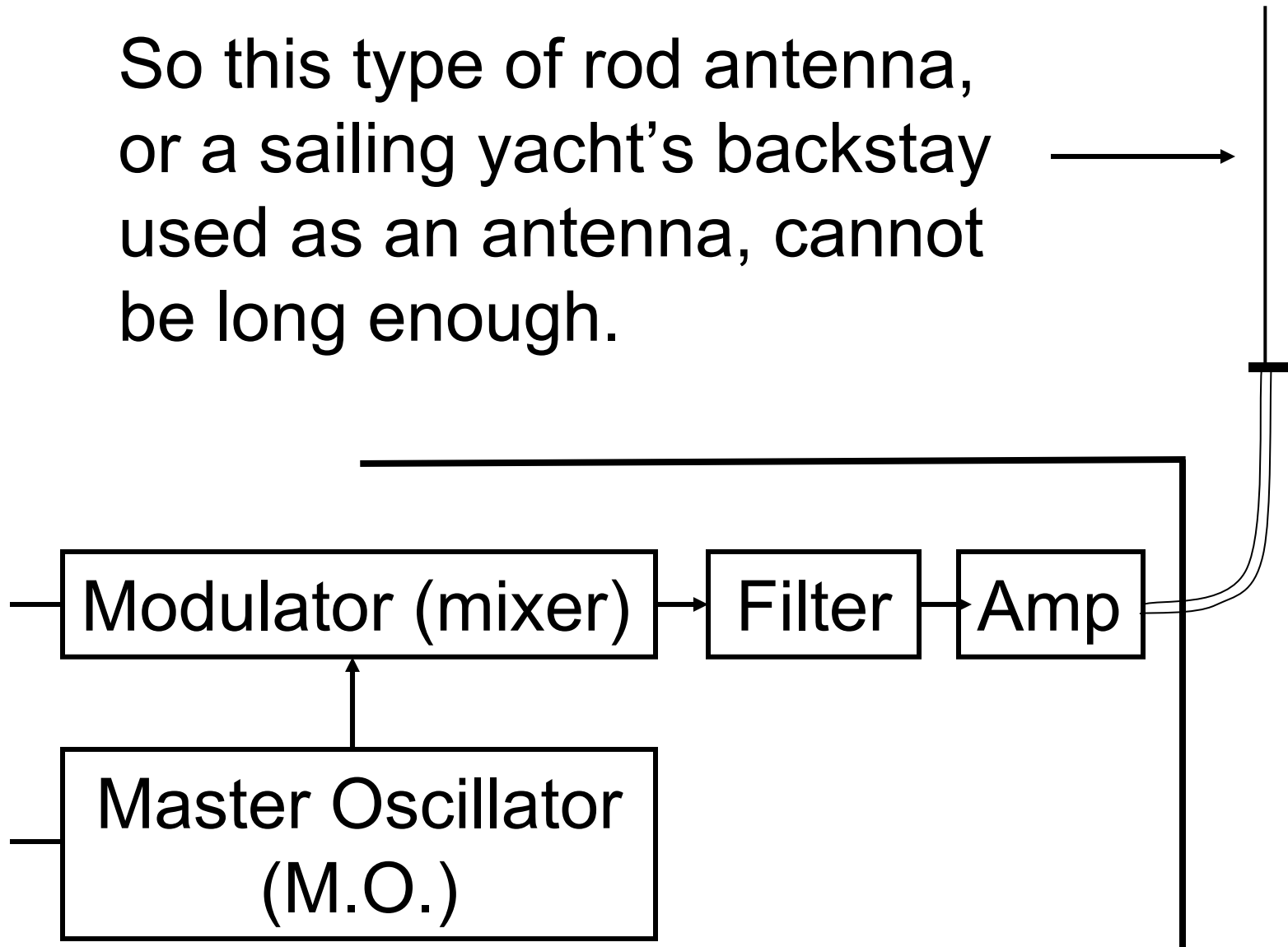
Still too long.

Or half the wavelength = 68.74 m .

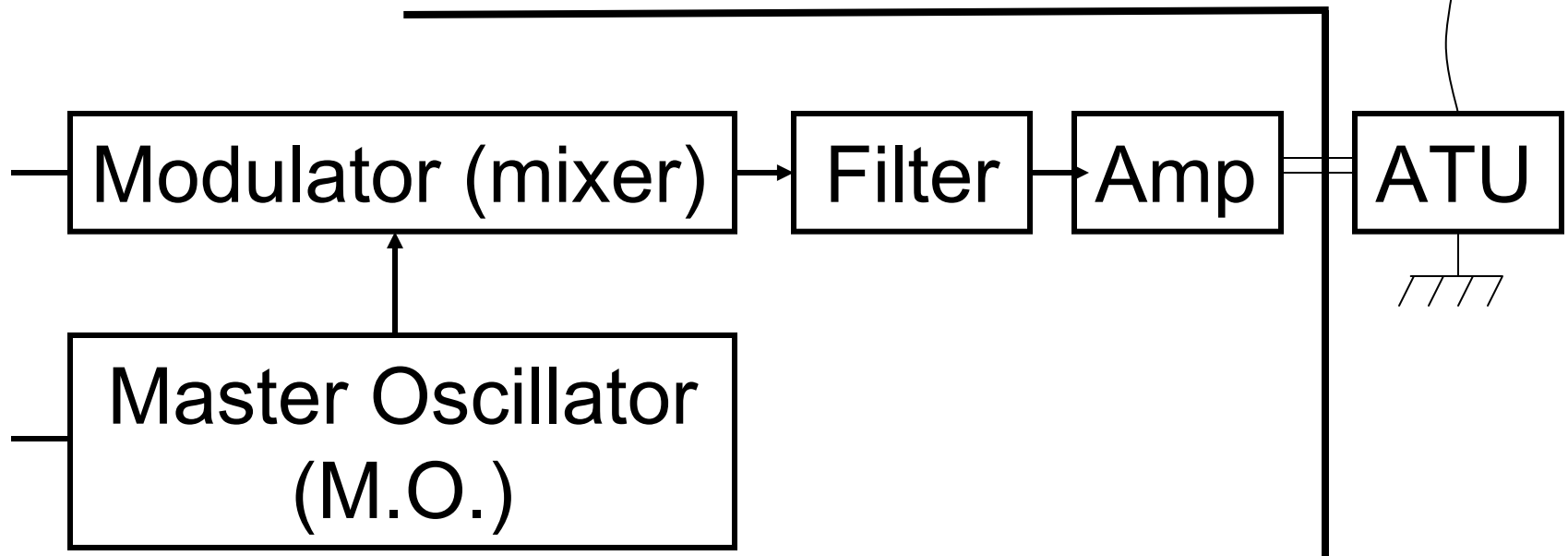
STILL too long!

And when we change to the second call frequency, 4.125 MHz the wavelengths and therefore antenna lengths, as above, should be 72.72 m , 54.52 m , and 36.35 m . ALL are too long, especially for yachts, no matter what length the yachts are.

So this type of rod antenna, or a sailing yacht's backstay used as an antenna, cannot be long enough.



An electronic adjuster, an Antenna Tuning Unit, ATU, is used to make a shorter antenna be *electronically* length correct for any MF or HF frequency .



So the SSB's MF 2.182 MHz and the HF 4.125 MHz antenna lengths required change from 137 m to 72 m. There are many other frequencies and therefore lengths required. The ATU makes one antenna electrically the correct length required for any frequency selected.

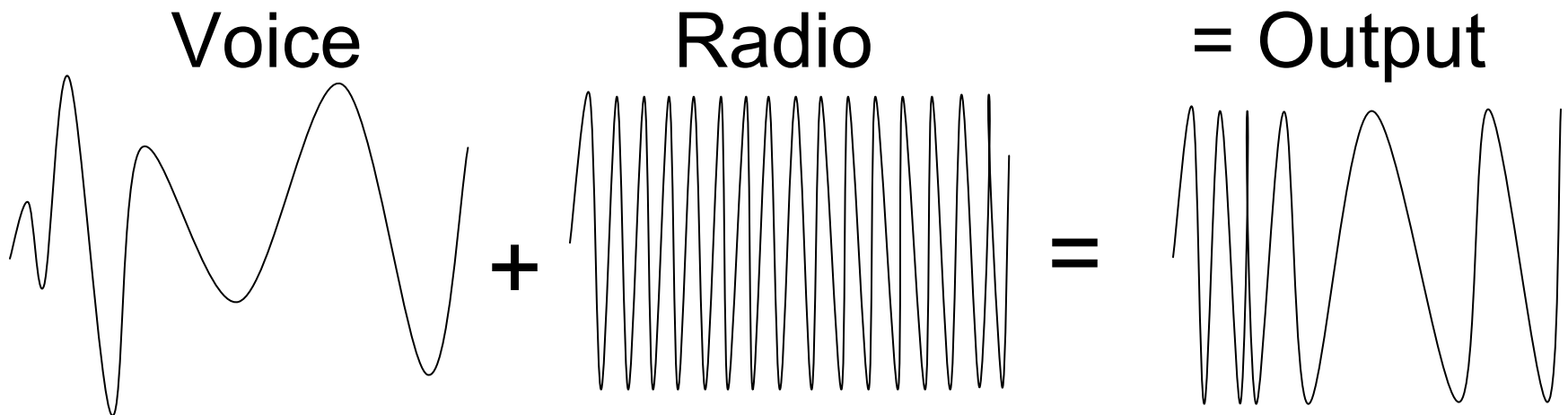
When the frequency changes a large amount, the antenna length required changes by a large amount. This is not practical.

Therefore SSB radios need to have an ATU.

2. 'F.M.'

Frequency Modulated VHF Radios

A better, clearer, and later version of modulation is F.M. – Frequency Modulation. When adding the frequency of the audio input signal to the frequency of the radio's carrier frequency, we get a varying frequency signal.



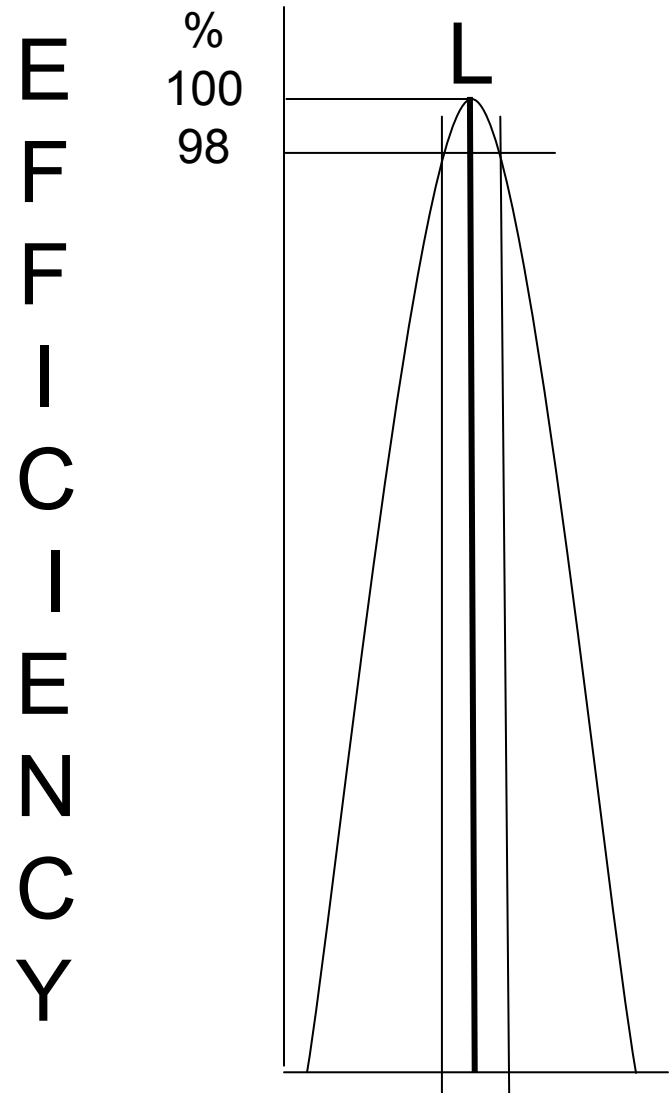
Marine **VHF radios' antenna** requirement does not need an ATU (Antenna Tuning Unit) as for SSB's. When changing from Channel 60 (156.025 MHz, "A") to another channel (e.g. 88, 157.425 MHz, "B") the wavelength change required is from 1922.77 mm to 1905.66 mm.

The maximum wavelength change required is therefore 17.11 mm.

If the antenna length is made to be half way between the maximum and minimum, at worst the antenna will be 8.5 mm short or long from the required wave length.

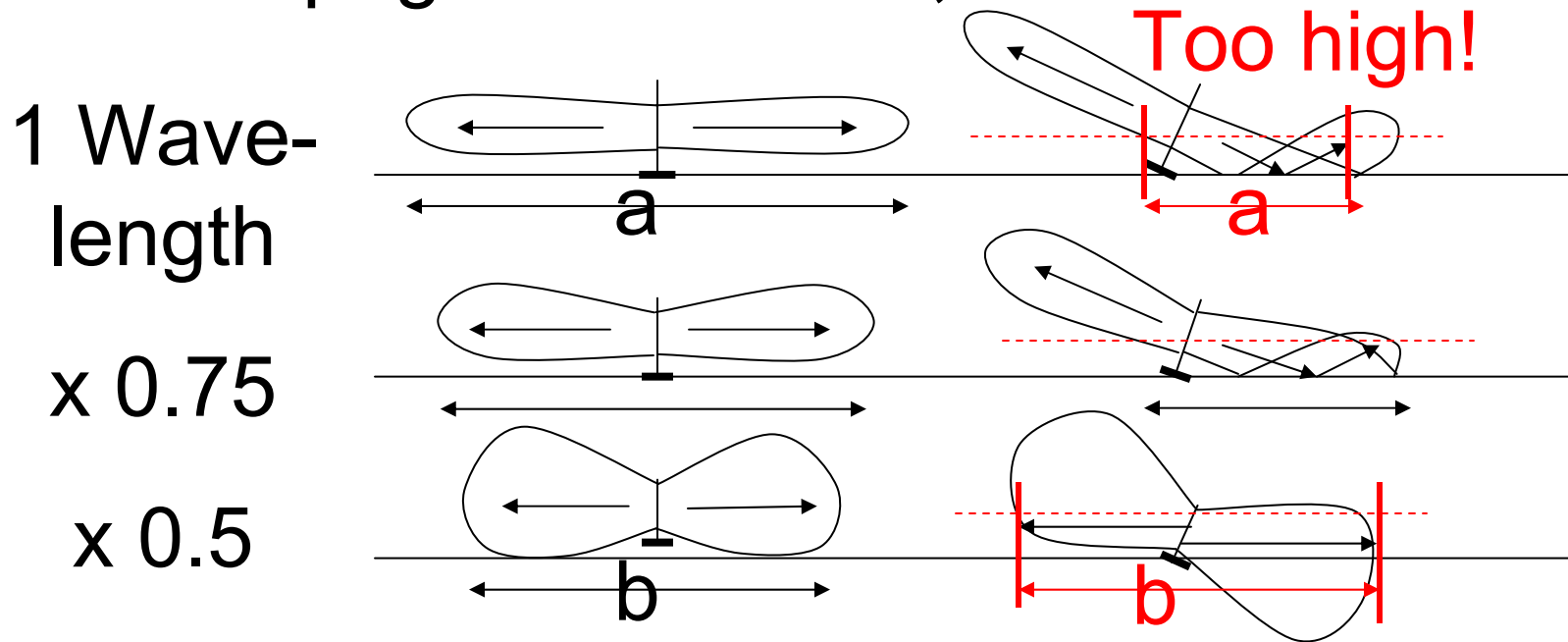
If the antenna used is a half wavelength, the maximum length error would be only 4.25 mm. Antenna lengths suit frequencies close to the designed length – the efficiency remains high for frequencies close to the design length ...

For Marine VHF radios, a fixed length antenna, L, is 98% or more efficient for all channels, from frequencies A to B, used to transmit on a vessel's radio.



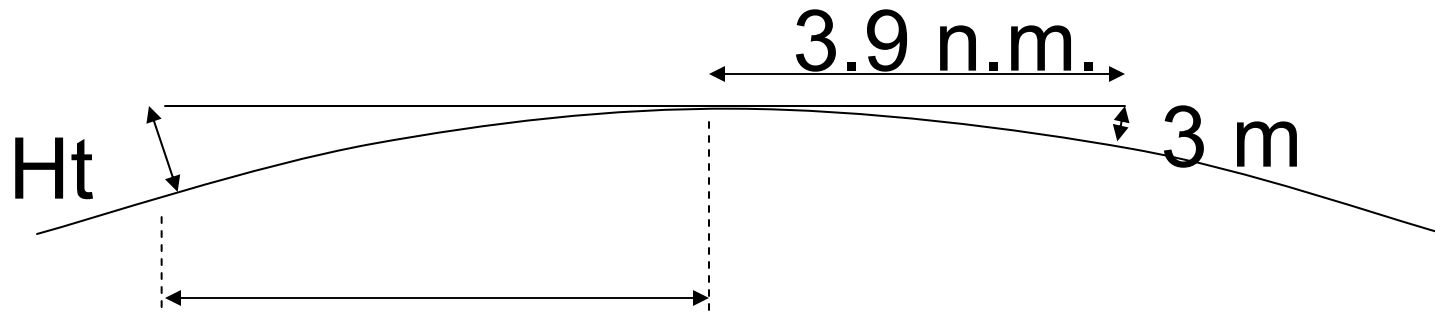
Frequencies A B

Our VHF antenna can be 1 wavelength, or 0.75, or 0.5 of a wavelength. For sailing yachts that heel a substantial angle, the latter wavelength antenna is required although the distance the signal can go when upright will reduce, a becomes b:



The range (distance) for marine VHF

voice communications, like light rays, depends on the height of the antennas over the curved earth shape:



$$\begin{aligned} \text{Horizon distance} &= 2.25 \times \sqrt{\text{height (m)}} \\ &= \dots\dots\dots \text{n.m.} \end{aligned}$$

So 'height', 'horizon distance' and the voice*
'communications range' examples are:

From Height	10 m,	20 m,	30m,	50 m,
Horizon (n.m.)	7.1	10	12.3	15.9
To eye Height	3 m,	5 m,	7 m,	10 m.
Horizon (n.m.)	<u>3.9</u>	<u>5</u>	<u>5.9</u>	<u>7.1</u>
Range (n.m.) =	<u>11</u>	<u>15</u>	<u>18.2</u>	<u>23</u>

*"DSC" range is 10% to 20%
more than the voice range.

Medium Frequencies (M.F.) signals from a SSB radio, or a NavTex transmitter using frequencies of 490 KHz and 518 KHz, do follow the earth's curvature so the range of such a signal depends on the power used.

Typically a NavTex signal covers an average range of 300 n.m. This changes from day to night, being shorter around twilight and longest by day.

(NavTex gives navigation and weather forecast info. See page 16 of RYA VHF book.)

ITU – the International Telecommunications Union, **allocated bands of frequencies** to a variety of user organisations. Marine VHF band of frequencies is from 156.0 MHz to 162.0 MHz. See RYA book, pages 38/39.

IMO – International Maritime Organisation **allocated channels/frequencies** to a variety of applications. Channels 16 and 70 are allocated to SOLAS – the Safety Of Life At Sea organisation. They are used for **DISTRESS** and similar communications.

Some channels are **SIMPLEX** – the transmit (Tx) and receive (Rx) parts of the radios use the same frequency. One radio can transmit while the other receives; then they change to reply. “PTT” is *press to talk*, therefore release to receive.

Semi DUPLEX appears to be the same as SIMPLEX although the two frequencies differ.

DUPLEX uses 2 frequencies simultaneously like a cell/mobile phone; PTT stays ‘on’.

Channels allocated are:

	UK	Int'l
Intership	6,8,72,77	6,8,9,10, ++
Bridge to bridge		13
Port Operations (Low power/on board only)		11,12,14 15,17
Call*, Answer, DISTRESS		16

*Use others to call when possible.

Small Craft Safety and Traffic info		67
HMCG weather	10,23,73,86	23-28
DSC (<i>DO NOT</i> use for voice)		70
Marinas	80	
HMCG Rescue	0	(Not on our radios)

In UK Small Craft Yacht Clubs Race Management use **channel M** (also known as **P1**), and **M2** for races control.

In South Africa channel 6 is also for race control, and 71 is used for vessels to make contact to/with onshore services, e.g. in Cape Town V & A Swing Bridge office.

Public Correspondence channels for 'at sea' linking to telephones on land world wide, are:

**1 to 5, 7, 23 to 28,
60 to 66, 78, and 81 to 88**

However, if using any Satellite telephone system, you dial and use the equipment like a normal telephone – no limited range and good quality sound 24 hours every day.

SO LET'S USE A RADIO

A radio consists of a **Tx/Rx** (transceiver – transmitter and receiver), a coaxial cable connecting to an antenna, a mic, a built in loudspeaker, batteries, and cables.

The radio station must also have a License with call sign allocated, a Log Book, pen, back-up light, Mayday summary, info on channels to be used, and times/channels of Coast Guard/Coast Station routine radio messages e.g. weather forecasts or bulletins.

Types of Calls and Calling Stations:

a. Calls

DISTRESS

Urgency

Safety

Public correspondence

Port Operations Service

Ship movement services

Intership

On Board

b. Calling Stations

Ship/vessel

Coast Guard

Port control

Pilots/Pilot boats

Aircraft

Rescuers' 'RCC'

(Rescue

Coordinating

Centre)

Pre-use actions:

Check all connections; antenna, cables, etc.

Check battery voltage (not less than 11,5 V)

Know what is to be said – make notes in advance if necessary.

Use higher speech **PITCH**, a little louder **VOLUME**, and speed (**RATE**) 20 words/min

Check the use of buttons and knobs:

ON, OFF, VOLUME, SQ, DIM, DW, E, SCAN, 1/25 (low/high power), soft keys, numbers, and red lid over DISTRESS.

Use low power as a preference when possible.

Irrespective of what radio make and model you use, read the manual issued with it. It will explain how to take actions to switch on, set Squelch, select a channel, set backlighting, set Dual Watch, use of a microphone PTT button (Press To Talk), set the MMSI, create a MMSI directory for frequently contacted vessels, position and time recording, how to act for Distress and all other calls, and many more items.

If attending my course

For SIMRAD radios, see the user book pages 11,12, 14 (item 2.5), 20 to 24 and 27.

For Icom IC-M421 radios, see the user book pages 2 and 4 to 46.

For any other make, use the operator's book.

Routine Calls

(Intership, Ship to Shore, and Shore to Ship.)

Decide what is to be said and to whom.

Unless seen to be different in an Almanac or Sailing Directions book, a port's name to be called is "(Place name) Port Control" and a Coast Station "(Place name) Radio" - in some countries the coast station is "(Place name) Coast Guard".

Port control is only concerned about activities and vessels moving within the port boundary.

Other subjects, whether within or outside the port boundary, e.g. weather forecasts or telephone links, are dealt with by the Coast Station, or the Coast Guard who also have a control authority over all vessels beyond the port boundary.

If not calling a port or coast station, you will be calling another vessel. What is its name or call sign?

Choose a conversation channel. Listen, is it in use? If yes, select one not in use or wait until it is free. Change back to a calling channel (e.g. a Port Station using channel 12, or while racing, channel 6 or M2).

When the call channel is also not in use, with the mic about 3 inches/10 cms in front of your mouth, start the call:

“Hello

(name or call sign) **abc, abc, abc,**

(You can repeat UP TO 3 times)

**this is yacht 123 (can, UP TO 3 times),
OVER”**

OVER means:

- a. I am releasing the PTT button so please press yours and reply now,
- b. anyone else listening, do not use this channel until we are finished using it – you will know when we say “OUT”.

A Reply:

“Yacht 123, this is abc, abc, OVER”

Now tell abc what channel to change to for the conversation:

“Change to channel 6, OVER”

Neither of you change to channel 6 until abc acknowledges ‘channel 6’:

“Channel 6, OUT”.

OUT means you end now – others can use this channel now.

When changed to channel 6:

“Hello abc, abc, this is yacht 123, OVER.”

“yacht 123, abc, OVER”

“What time is ... , OVER”

“It will be at 14 30 Universal Time, OVER”

“Thank you. OUT”

After OUT, both revert back to their call channel (e.g. if in a harbour using channel 14, or in a UK Marina, channel 80, or if outside all other areas, channel 16).

Procedure Words:

Say again, Say again all before/after,
Repeat, Word before/after,
Read back, I read back, correct,
Wrong, Correction,
I spell, in numbers,
Request Radio check, Radio check,
Received, Station calling, Text, Traffic, Wait
Avoid unnecessary repetition/repeating.

The Phonetic Alphabet

A Alfa,

B Bravo,

C Charley,

D Delta,

E Echo,

F Foxtrot,

G Golf,

H Hotel,

I India,

J Juliet,

K Kilo,

L Lima,

M Mike,

N November,

O Oscar,

P Papa,

Q Quebec,

R Romeo,

S Sierra,

T Tango,

U Uniform,

V Victor,

W Whiskey,

X X-ray,

Y Yankee,

Z Zulu.

Numerals must be well pronounced.

Garbled calls:

1. **“Hello Yacht 123 (you), OVER”**. Reply as **“Station calling Yacht 123, this is yacht 123, say again you vessel’s name or call sign, OVER”**.
2. **“Hello (no name or call sign stated) , this is Motor Vessel 456, 456, OVER.”** Since you do not know who is being called, ignore the call. Anyone not knowing to ignore this could be one of very many doing the same wrong thing – answering.

Now practice using a VHF radio for
Routine Calls before proceeding.

The DISTRESS Message

The skipper/captain must decide – is it a “grave and imminent danger” situation to one or more people or your/any vessel?

Set channel 16, listen, is it clear? When not in use, start:

“MAYDAY, MAYDAY, MAYDAY” – the word Mayday MUST be repeated three times. Then “This is” and your vessel’s name or call sign is also repeated 3 times.

“MAYDAY, MAYDAY, MAYDAY,

This is

**Yacht 123, Yacht 123, Yacht 123, call sign
Hotel Tango 6 Mike Quebec” (HT6MQ)**

(Including the call sign is recommended but
not essential.)

Now once only we repeat ...

“MAYDAY, Yacht 123”

Then we start the text – our position is top
priority ...

“MAYDAY, Yacht 123”

This is then followed, in this order, by

a) **“My position is ...** (Lat/Long from chart or a GPS, or direction/place name/distance),

b) The reason for making a Mayday call e.g. **“Sinking”**, then

c) the type of help required,

d) ended with any other relevant info, then

“I require immediate assistance” OVER”

The Example:

**“MAYDAY, MAYDAY, MAYDAY,
Yacht 123, Yacht 123, Yacht 123, call sign
Hotel Tango 6 Mike Quebec,
MAYDAY, Yacht 123”**

**My position is 33°50' South, 18°15' East.
Sinking.**

**Five adults on board, abandoning ship to
liferaft with VHF on channel 16, *EPIRB*,
and *SART*. Have red flares and orange
smoke ready for use.**

I require immediate assistance. OVER”

E.P.I.R.B. – an Emergency Position
Indicating Radio Beacon

It is a transmitting radio for sending an emergency report via satellites, stating the name and position of the vessel in distress.

S.A.R.T. – a Search and Rescue
Transponder

is activated by receipt of a searching radar's signal, sending back to that radar, a line on the screen showing the direction to go from the search radar vessel or aircraft, to the SART.

If the Mayday was sent in error

If after sending a Mayday message, it is realised the reason is incorrect and that it is not a justified distress signal, call again to cancel:

All stations, ... x 3, this is Yacht 123, ... x 3, position ... (as quoted in the distress message), distress message sent in error. Cancel the distress message from Yacht 123. Out.

Any person on a vessel under way hearing this call on channel 16, or by DSC on channel 70, **MUST** get ready to acknowledge by voice on channel 16 having received the Mayday call. Listen, when you get a chance send:

“MAYDAY, Yacht 123, This is Motor Yacht 789. Received* Mayday, OVER”

If they need to they will communicate to talk to you. *If the Mayday initiator was a foreign person struggling with English, say **“Romeo”** 3 times instead of “Received” once.

After sending an acknowledgement, one must send an **'E.T.A.' message** (estimated time of arrival at your position) – let them know where you are coming from and how soon you will be there:

**“Mayday, Yacht 123,
this is Motor Yacht 789,
my position is ... (e.g. WNW of you)
and course to you 100°True at 9 knots,
Echo Tango Alfa at 14.15 local time (or
universal time). OVER”.**

If, when you are sending these messages you discover you are the only one acknowledging, it may be you are closer to a coast station and therefore you should stay where you are and act as a relay:

“MAYDAY RELAY, ... x 3

This is Motor Yacht 789, ... x 3”,

Now the text is as received ...

“Mayday Yacht 123, my position is ...”

NB: The rest of message is as received.

A coast station will then use you as a relay to be in contact with the vessel in distress.

Once a Mayday message has been initiated, channel 16 becomes exclusive to vessels and coast stations involved in the rescue.

NO ONE ELSE MAY USE CHANNEL 16 UNTIL THE RESCUE IS COMPLETE AND THE CONTROL STATION SAYS IT IS FINISHED.

Vessels under way when hearing the distress call **MUST** assist, or, when not interfering, ask the coast/control station to be relieved of any responsibility for a valid reason.

Seelonce Mayday, Seelonce Distress

While the rescue is in progress, if another vessel arrives within radio range and is unaware of the situation, when calling on channel 16, the control station will tell them to not use this channel by saying: “**Mayday, yacht 123, this is** (control station) **Seelonce Mayday, OUT**”. If you as a vessel involved hear the innocent call, send “... **Seelonce Distress** ...”

Prudonce

If the situation lasts a long time and other vessels are affected by not being able to make contacts using channel 16, and if there is not much happening over the radio, the control station can allow others to use the channel. For a few seconds only they may use channel 16 to arrange contact on another channel:

**“Mayday Yacht 123, this is ... (x 3),
Prudonce, OUT”.**

Seelonce Feenee

When the whole distress situation is ended, and anyone can now use channel 16, permission is granted by the control station:

Mayday yacht 123,

All stations ... x 3,

this is ... x 3,

Mayday Yacht 123. Time 17.30 Bravo.

Seelonce feenee. OUT".

Now practice Mayday using the radio before proceeding.

Urgency Messages

When in a serious situation which does not constitute a distress, we use an Urgency message instead of a Mayday.

The text of the initial call is the same as a distress, but use the term “**Pan-Pan**” instead of Mayday.

Once anyone replies, tell them a channel number for a conversation then change to that channel, as done in routine calls.

Now do a practice Pan-Pan message before proceeding.

Safety Messages “Securité”

Whenever it is necessary for a coast station or a vessel underway to inform other vessels of a navigation warning or serious change in a weather forecast, a general call is made using the term “Securité”.

“Securité, Securité, Securité, all stations (x 3), this is (x 3), listen on channel ... for navigation warning. I repeat OUT”. The same call is then done on the specified channel and the text is then read, ended OUT.

Now do a practice safety call
before proceeding.

Direction Finding

When a rescue vessel is looking for you, they may ask you for an indication of your direction from them. You will be asked to send three 10 seconds 'beeps' (silent transmissions):

“Mayday, rescue vessel xyz, this is Yacht 123, ... (10 seconds silence but PTT pressed) , Yacht 123 ... (repeat it), Yacht 123, ... (and again) ..., Yacht 123, OVER”.

Now send a direction finding message before proceeding.

Now practice all messages:

Routine

Distress

Urgency

Security

Direction finding

NavTex

Information is received as a fax or can be read on a LCD screen. It is sent out on frequencies 490 KHz and 518 KHz for a range of about 300 n.m. The range will vary as weather and time of day/night changes.

Repeated or updated weather and safety/navigation warnings information is recurring every 4 hours. The actual time from each transmitting station is listed in applicable tables.

Regulations

A vessel or operator must:

1. Have a radio license with a call sign
2. Have a Log Book with a radio section, or a Radio Log Book.
3. Have a user's Radio Operator certificate.
4. Apply secrecy and privacy.
5. Not use bad language, illegal statements.
6. If having passengers making calls via a radio, have an AAIC – Account Automatic Identity Code.

Practice Radio Use

Routine calls, Distress, Urgency and Safety calls, and Direction finding calls.

Test Questions

See questions in books like:

a. The radio course book, or on the CD, “SAILING”, that book is scanned in, or

b. other courses books e.g. the RYA book VHF G26/02, page 8, Question 4, 5a and b, 6, and 8 to 15. (Other questions are for use when studying the use of a GMDSS VHF radio.)

Part 2.

Use of VHF SRC (DSC) Radios.

For the RYA SRC (GMDSS Class D) certificate,

1. see the RYA Radio book G22/02, and the operators' manual that is supplied with a GMDSS Class D VHF radio.

2. Obtain (buy software) and click on "VHF DSC TUTOR" and once understood, play with "VHF DSC SIMULATOR".

Why GMDSS DSC Radios?

The purpose of the GMDSS radios is to ensure a faster, more reliable way of making contact with one or more radio stations being called.

DSC radios use channel 70 for all digital calling (non-voice) and acknowledging of incoming calls, but acknowledging any DISTRESS messages can only be done by Coast Guards, coast stations, or ships with Class A DSC radios.

When using a DSC marine radio ...

1. **MMSI's**: each MMSI (Maritime Mobile Station Identity) is a 9 digit identity, like a telephone number.

The first three digits identify the country.
However, if:

the first digit is 0, it is for a group of vessels that can all be called at once.

the first two digits are 00, it is a Coast Guard/coast station.

the 4th digit is 9, it is a hand held radio.

When using a DSC radio, if the MMSI that is allocated has not already been entered, read the radio handbook for the entering procedure ... do NOT make an error.

Once a vessel's own MMSI has been entered, it cannot be changed unless the radio is sent to the technical agents.

MMSI's with one or two '0' (zeros) as the first digit(s) or a '9' as the fourth digit can be changed by the operator.

2. The Vessels' Position. DSC radios have the facility for being connected to a GPS. When sending an emergency type of call, the vessel's accurate position is automatically sent. If no GPS is connected, the user/operator should enter the vessel's position as Latitude and Longitude and while making way (moving), re set the position frequently, never more than 4 hours intervals; the more frequently, the better.

3. Types of calls

Distress Have the radio on channel 70 for sending and receiving alerts for digital (not voice) messages. Read the radio's manual – open the red button cover, press and release, select the reason, e.g. sinking, on fire, etc., then press 'E' to enter it, then the red button and hold it in for 5 seconds – the count down is shown. It is then transmitted in second, like a short e-mail.

The radio is then changed to channel 16 – wait 15 seconds then read out the Mayday message as for non DSC radios. Stay on channel 16.

One difference in the read text is after the call (Mayday ... x 3, this is ... x 3) we use “Mayday, Yacht abc, **MMSI 234721654**” then continue as shown for non-DSC radios where the call is only using voice.

Urgency unlike if just using a channel 16 voice call, when using channel 70 it is also for 'Mayday Relay' messages.

Select 'Urgency', the GPS or the entered Latitude and Longitude will supply your position as part of the message, add any other available items you may be able to include, then press 'Send'.

Change to channel 16, and after 15 seconds, read out the message and continue as if using a non-DSC radio.

Securite' and Routine calls messages are selected as required. Enter 'All Stations' for Securite', or for Routine to one, an MMSI from the radio's directory, or enter a MMSI number. For Securite' messages the verbal transmission will be initially on channel 16 from where the caller informs all those listening what channel the information will be transmitted on. For Routine, enter a conversation channel number. When receiving the acknowledgement, change to that channel and call verbally.

The Radio's Manual

DSC radios have many settings and actions that must and can be made by the operators. To achieve them all, one must have and read the manual issued with the make of radio – they achieve the same result but how it is done varies depending on the model, just as a Mercedes car is different from a Ford lorry although both can go from A to B!

Now look in the **Marine Radio** book in the “**Sailing**” **CD** and see the many, many questions and answers.

If the aim is to get the RYA SRC certificate, see the RYA book “VHF Radio Short Range Certificate, Syllabus and Sample Exam Questions”, G26/02, and see the questions not already answered before starting Part 2. Find the answers either in this presentation or a radio’s manual and you will be ready to be qualified.

Good Luck!