

OPERATING AND PROCEDURES

AGENDA

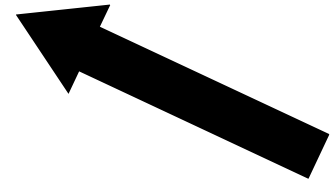
- 1. PHONETIC ALPHABET**
- 2. NUMBERS**
- 3. VOICE OPERATING PROCEDURES**
- 4. HF / UHF / VHF / BAND PLANS**
- 5. TUNE UPS, TESTING, DUMMY LOADS**
- 6. CW OPS, PROCEDURAL SIGNS / PROWORDS**
- 7. “Q” SIGNALS**
- 8. R.S.T. CODES - READABILITY, STRENGTH, TONE**
- 9. EMERGENCY OPERATING PROCEDURES**
- 10. RECORDING KEEPING, CONFIRMATION, MAPS, CHARTS, ANTENNA ORIENTATION**

PHONETIC ALPHABET

- Use words to represent letters
- First letter corresponds to the letter
- Prevents confusion on a radio, “B” can sound much like “D”

■ “B” ■ “BRAVO”
■ “D” ■ “DELTA”

VICTOR
ECH
3ØHREE
ECHO
MIKE
OSCAR



THIS IS A CALL SIGN

PHONETIC ALPHABET

A	Alpha	B	Bravo	C	Charlie
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

NUMBERS

- Spell out numbers greater than 9
- Some numbers are pronounced differently to avoid confusion

0 ZEE-ROE

1 WUN

2 TOO

3 THU-REE

4 FOWER

5 FIFE

6 SIX

7 SAY-VEN

8 ATE

9 NINER

10 WUN - ZEE-ROE

11 WUN- WUN

VOICE OPERATING PROCEDURES

UHF / VHF CHANELIZED

Main purpose of repeaters is to **increase the range of mobile and portable stations**

Two frequencies involved: #1 for Receive, #2 for Transmit. Or, you receive on one frequency and transmit out on the second frequency i.e. **“DUPLEX”**

Calling via repeater **say the call sign of the desired station and then yours**
i.e. VE3EOT THIS IS VA3SUG

Pause between transmission to **listen to or allow anyone else who wants to use the repeater**

Transmissions should be short to **allow for emergency use of repeaters** (don't tie them up)
switch to a simplex frequency if distance or time allows

To break into a conversation (non-emergency) on a repeater, **wait for a pause and say your call sign. “contact”** although used is **NOT proper procedure**

“AUTOPATCH” a device to allow telephone calls via a station or radio (repeater)

Repeater **“TIME OUT”** timer limits the amount of transmit time via a repeater



An Autopatch is a feature of a repeater to access an outgoing telephone connection. Users with a transceiver capable of producing Dual-tone multi-frequency or touch tones (DTMF) can make a telephone call via public telephone system.

VOICE OPERATING PROCEDURES

"Continuous Tone-Coded Squelch System" CTCSS or "Private Line" PL Tone, a sub-audible tone added to a carrier which causes a repeater to accept a signal

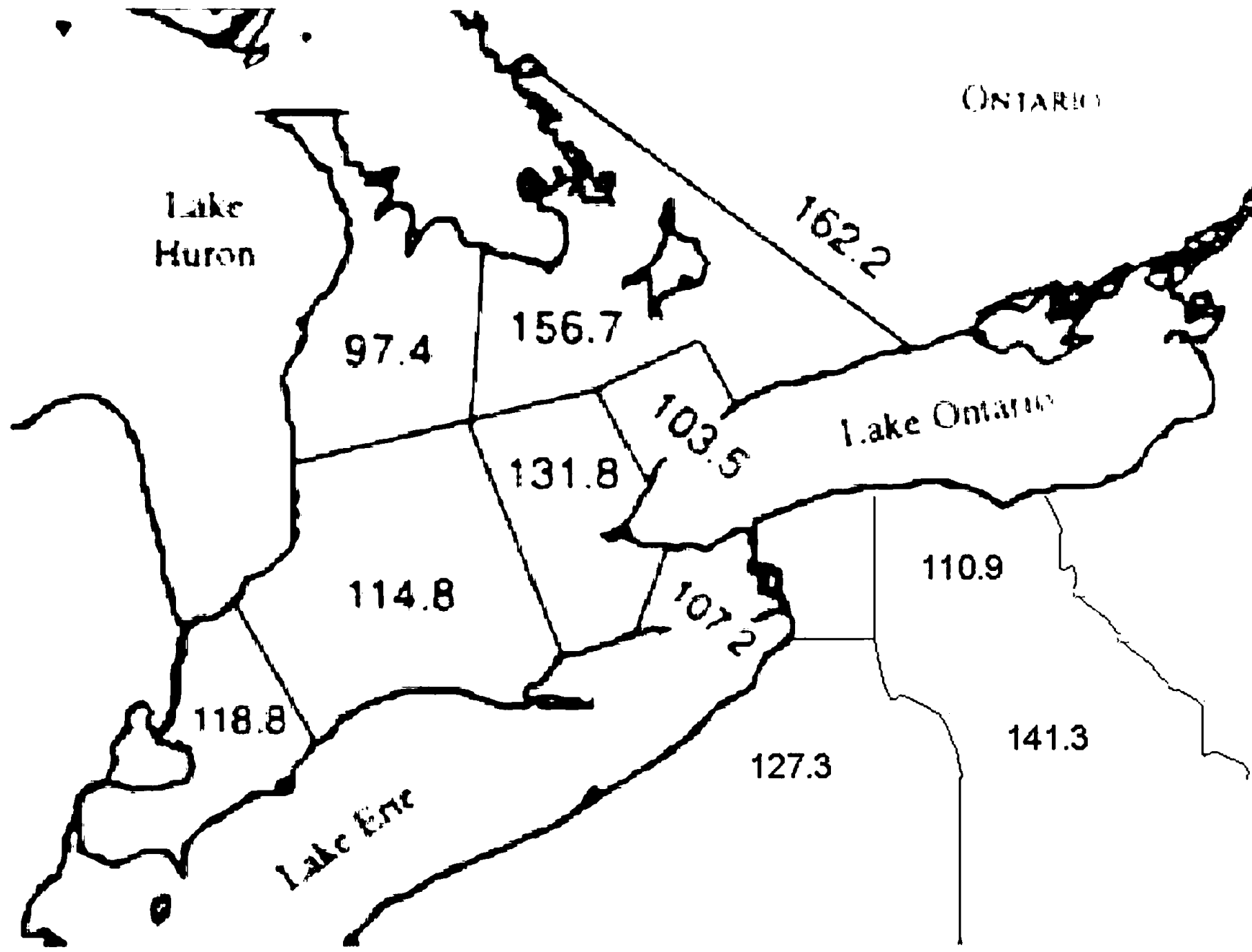
2 Meter FM Repeaters use one frequency for transmit and one for receive (duplex operation), **The difference between the frequencies (or offset) is usually 600 kHz.**

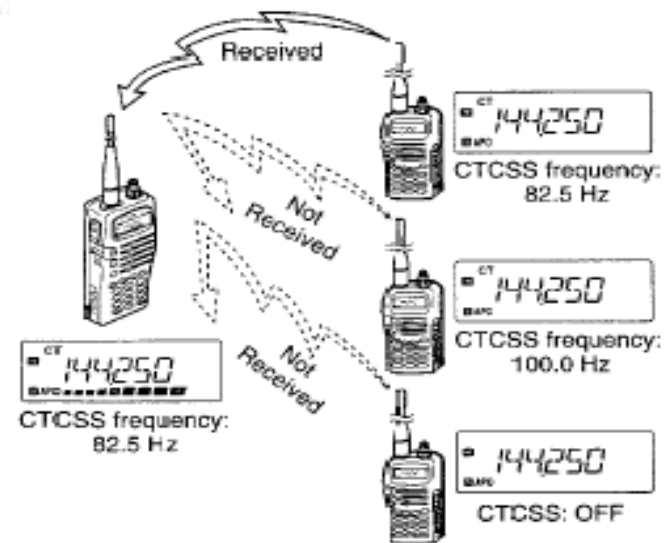
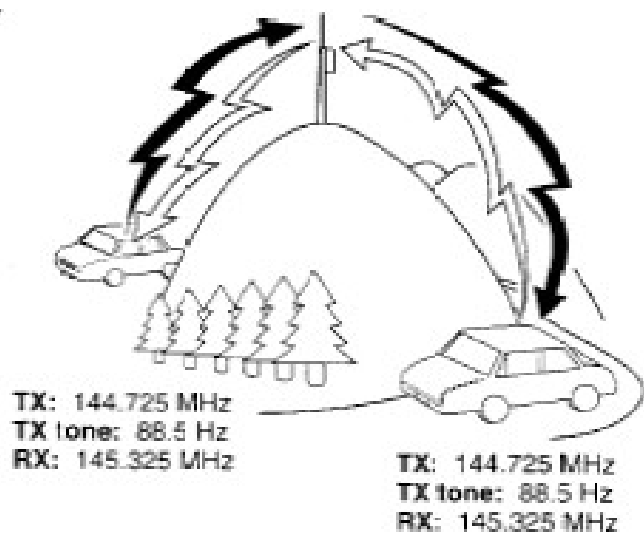
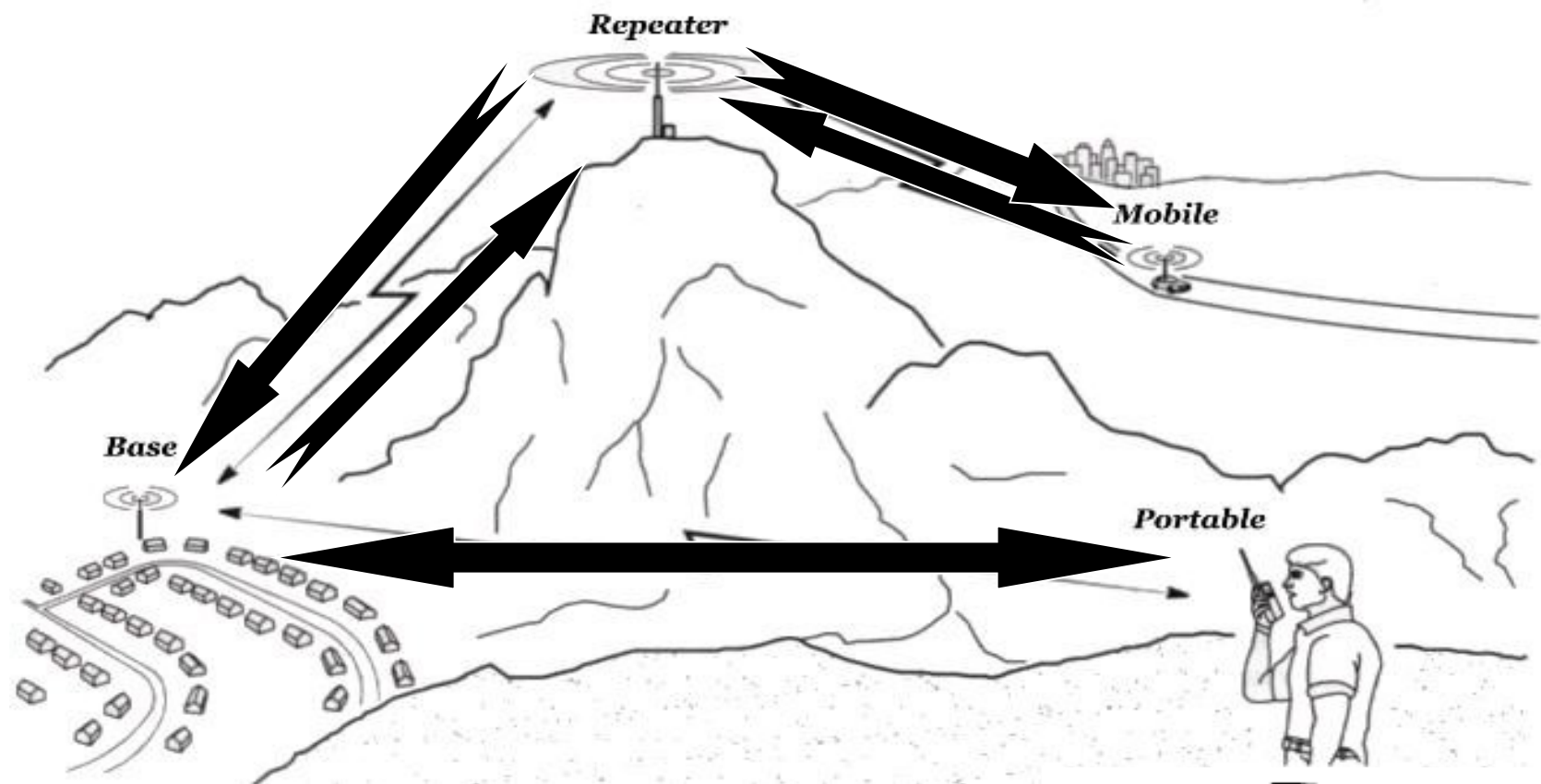
*i.e. if the repeater output was on **146.940 MHz**, then an operator could reliably assume that setting the input frequency **600 KHz** lower to **146.340 MHz** would allow him to communicate on this frequency.*

<u>BAND</u>	<u>OFFSET</u>
10 meters -	100 KHz
2 meters -	600 KHz
222 MHz -	1.6 MHz
70 centimeters -	5 MHz
33 centimeters -	12 MHz
23 centimeters -	12 MHz

To properly ask some ones location, you simple ask them **"what is your location, where are you"**

CONTINUOUS TONE-CODED SQUELCH SYSTEM" CTCSS (OR PL PRIVATE LINE) TONE





VOICE OPERATING PROCEDURES

HF / UHF / VHF SIMPLEX

”**SIMPLEX**” operation is transmitting and receiving on the same frequency

Switch to simplex from repeaters when possible or if distance and situation permits

Local communications should use VHF and UHF to **reduce and free up interference on HF Bands**

Do not tie up repeaters unnecessary

If you can hear the station you are talking to **on “reverse” or the “input” frequency of the transmitter, you could and should use simplex**

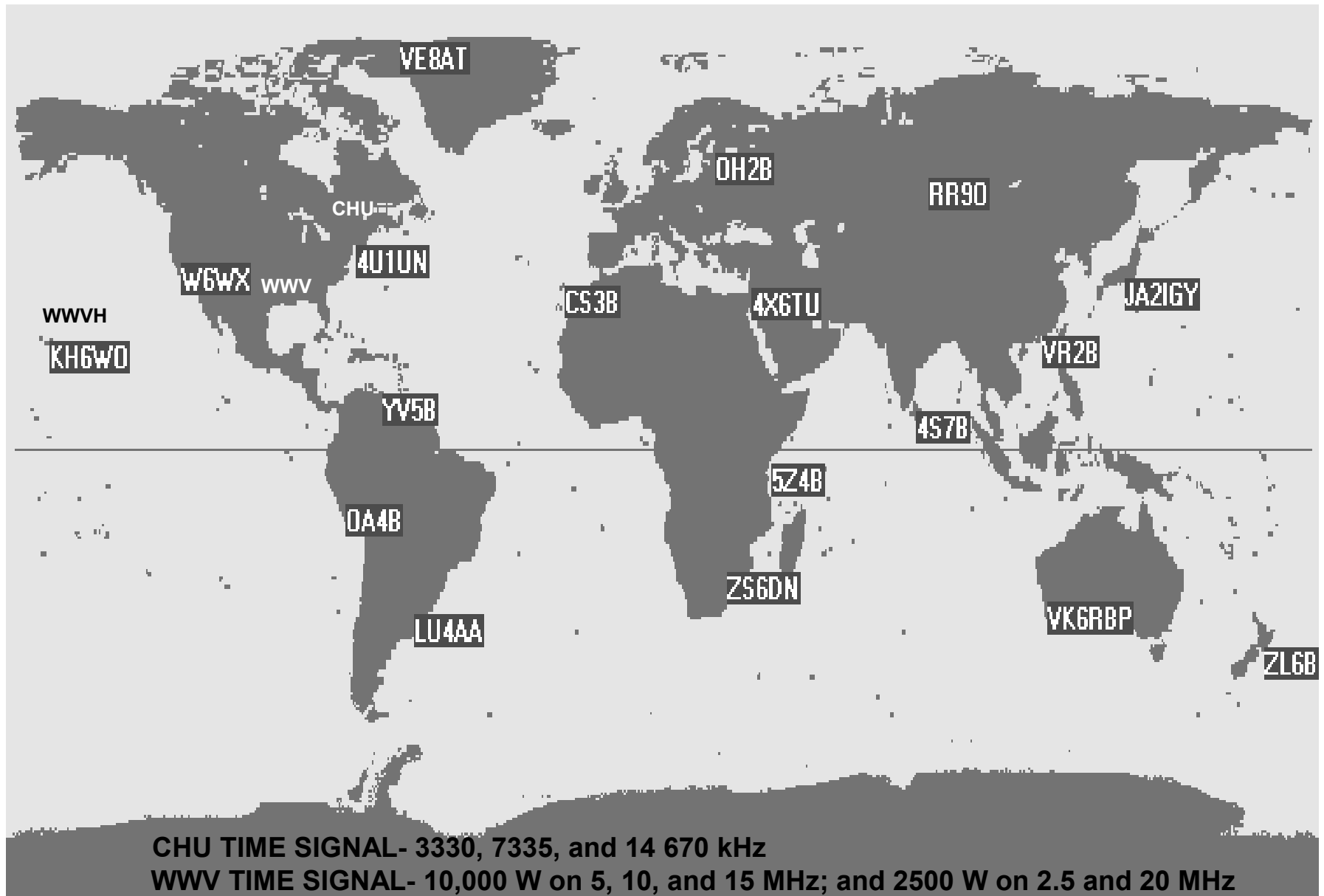
If operating simplex on a repeater frequency don’t try to change the repeater frequency because you can’t, **change to another frequency**

To find out if band conditions are open in a specific area or distant location, you should **listen for a Beacon signal from that area, a foreign broadcast, or TV station on a nearby frequency**

To call a station, **Say “CQ” Three times and then your call** *i.e. CQCQCQ This is VA3EOT, VA3EOT, VA3EOT*

To answer, say the other stations call sign once followed by your own Phonetically
i.e. VA3EOT this VICTOR ALPHA THREE SERIA UNIFORM GULF (VA3SUG)

BEACONS LOCATIONS WORLDWIDE





CANADIAN BAND PLAN

Lower side band is
used for 3755Khz
phone

HF LSB

CW & DIGITAL MODES ONLY

Upper side band is used
for 20 meters phone

HF USB

ENOUGH BW TO HAVE FM PHONE

VHF

UHF

The HF Band Plan is a voluntary,
gentleman's agreement,
intended for the guidance of and
observation by Canadian Radio
Amateurs.

**A guideline for using different
operational modes within an
amateur band.**

Frequency (MHz) Lower edge	Frequency (MHz) Upper edge	Maximum Bandwidth
1.8	2.0	6 kHz
3.5	4.0	6 kHz
7.0	7.3	6 kHz
10.1	10.15	1 kHz
14.0	14.350	6 kHz
18.068	18.168	6 kHz
21.0	21.450	6 kHz
24.890	24.990	6 kHz
28.0	29.7	20 kHz
50.0	54.0	30 kHz
144	148	30 kHz
220	225	100 kHz
430	450	12 MHz
902	928	12 MHz
1,240	1300	Not Specified
2,300	2,450	Not Specified
3,300	3,500	Not Specified
5,650	5,925	Not Specified
10,000	10,500	Not Specified
24,000	24,050	Not Specified
24,050	24,250	Not Specified
47,000	47,200	Not Specified
75,500	76,000	Not Specified
76,000	81,000	Not Specified
142,000	144,000	Not Specified
144,000	149,000	Not Specified
241,000	248,000	Not Specified
248,000	250,000	Not Specified

CANADIAN HF BAND PLAN

160 Metre Band - Maximum bandwidth 6 kHz

1.800 - 1.820 MHz - CW
 1.820 - 1.830 MHz - Digital Modes
 1.830 - 1.840 MHz - DX Window
 1.840 - 2.000 MHz - SSB / band modes

80 Metre Band - Maximum bandwidth 6 kHz

3.500 - 3.580 MHz - CW
 3.580 - 3.620 MHz - Digital Modes
 3.620 - 3.635 MHz - Packet/Digital Secondary
 3.635 - 3.725 MHz - CW
 3.725 - 3.790 MHz - SSB / side band modes
 3.790 - 3.800 MHz - SSB DX Window
 3.800 - 4.000 MHz - SSB / wide band modes

40 Metre Band - Maximum bandwidth 6 kHz

7.000 - 7.035 MHz - CW
 7.035 - 7.050 MHz - Digital Modes
 7.040 - 7.050 MHz - International packet
 7.050 - 7.100 MHz - SSB
 7.100 - 7.120 MHz - Packet within Region 2
 7.120 - 7.150 MHz - CW
 7.150 - 7.300 MHz - SSB / wide band modes

30 Metre Band - Maximum bandwidth 1 kHz

10.100 - 10.130 MHz - CW only
 10.130 - 10.140 MHz - Digital Modes
 10.140 - 10.150 MHz - Packet

20 Metre Band - Maximum bandwidth 6 kHz

14.000 - 14.070 MHz - CW only
 14.070 - 14.095 MHz - Digital Mode
 14.095 - 14.099 MHz - Packet
 14.100 MHz - Beacons
 14.101 - 14.112 MHz - CW, SSB, Packet
 14.112 - 14.350 MHz - SSB
 14.225 - 14.235 MHz - SSTV

17 Metre Band - Maximum bandwidth 6 kHz

18.068 - 18.100 MHz - CW
 18.100 - 18.105 MHz - Digital Modes
 18.105 - 18.110 MHz - Packet
 18.110 - 18.168 MHz - SSB / wide band modes

15 Metre Band - maximum bandwidth 6 kHz

21.000 - 21.070 MHz - CW
 21.070 - 21.090 MHz - Digital Modes
 21.090 - 21.125 MHz - Packet
 21.100 - 21.150 MHz - CW and SSB
 21.150 - 21.335 MHz - SSB / wide band modes
 21.335 - 21.345 MHz - SSTV
 21.345 - 21.450 MHz - SSB / wide band modes

12 Metre Band - Maximum bandwidth 6 kHz

24.890 - 24.930 MHz - CW
 24.920 - 24.925 MHz - Digital Modes
 24.925 - 24.930 MHz - Packet
 24.930 - 24.990 MHz - SSB / wide band modes

10 Metre Band - Maximum band width 20 kHz

28.000 - 28.200 MHz - CW
 28.070 - 28.120 MHz - Digital Modes
 28.120 - 28.190 MHz - Packet
 28.190 - 28.200 MHz - Beacons
 28.200 - 29.300 MHz - SSB / wide band modes
 29.300 - 29.510 MHz - Satellite
 29.510 - 29.700 MHz - SSB, FM and repeaters

CANADIAN VHF/UHF BAND PLAN





HF Band Plans



During a wide area emergency, ARES Ontario and the NTS will use 3.742 MHz and 7.153 MHz, adjusted for QRM, for province wide voice communications.

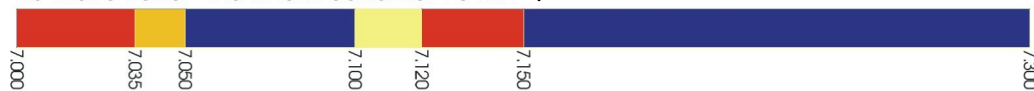
160 Metre Band - Maximum bandwidth 6 kHz



80 Metre Band - Maximum bandwidth 6 kHz



40 Metre Band - Maximum bandwidth 6 kHz



30 Metre Band - Maximum bandwidth 1 kHz



20 Metre Band - Maximum bandwidth 6 kHz



17 Metre Band - Maximum bandwidth 6 kHz



15 Metre Band - Maximum bandwidth 6 kHz



12 Metre Band - Maximum bandwidth 6 kHz



10 Metre Band - Maximum bandwidth 20 kHz



TUNE UPS, TESTING, DUMMY LOADS

A dummy load is a device used to simulate an electrical load, usually for testing purposes in place of an antenna

Tuning into a dummy load will shorten transmitter tune up time on air and avoid interference to stations on frequency.

On air interference can be avoided by using a dummy load to test transmissions, or loading up procedures.

Using a **dummy antenna will allow tuning without causing interference**

TUNE UPS, TESTING, DUMMY LOADS



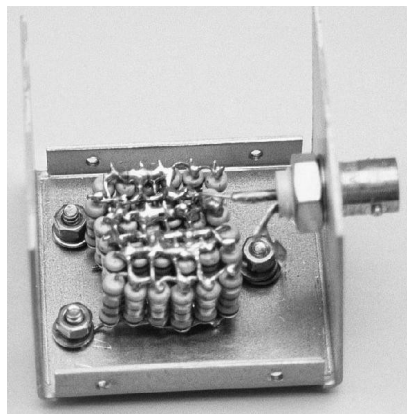
Cantenna dummy load suitable up to 30 MHz and up to 1 kW



A dummy load capable of dissipating four times the legal limit (6 kW) for 2 to 3 minutes and legal limit (1500 watts)

The "dummy load" is an indispensable accessory for any radio amateur. Using a dummy load, transmitter adjustments can be made "off-the-air" so that no unnecessary interference is generated on the ham bands.

Dummy loads are an easy useful project that just about anyone with moderate soldering skills can build.



25 Watt dummy Load
"HOME BREW"

A very simple and effective dummy load can be made from several resistors, a connector, and a small metal plate or piece of PC board stock.

TUNE UPS, TESTING, DUMMY LOADS

If propagation or band conditions change during a contact and you notice increasing interference **you should move to a different frequency**

Before transmitting you should **always listen to ensure the frequency is not occupied**, you should also ask if the frequency is in use.

During a contact you find you have a extremely strong signal into your contact station, one adjustment you might consider **is to turn down your output power to the minimum necessary.**

TUNE UPS, TESTING, DUMMY LOADS

When selecting a single side band (SSB) phone transmitting frequency, the **minimum separation between you and a contact in progress is 3 kHz** to avoid interference.

If your a net control station on a daily HF net and your normal frequency is occupied you should conduct the **net 3 to 5 KHz** away from the normal net frequency

If a net is about to begin on the frequency your on, as a courtesy to the net, you should **move to another frequency**

CW OPS, PROCEDURAL SIGNS / PROWORDS

LISTEN FIRST to ensure the frequency is **NOT** in use

CW or Morse code is sent at **any speed you can reliably receive.**

CW Transmitting frequency should be between **150-500**
Hz for minimum interference

Full Break-in Telegraphy = **incoming signals received**
between transmitted Morse code “signals” (or dots)

(This enables the other station to “break-in” while you are still sending)

CW OPS, PROCEDURAL SIGNS / PROWORDS

CQ = Calling any station

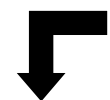
-“CQ CQ CQ DE VE3EMO VE3EMO VE3EMO”

-CQ Three time your call sign three times

To answer or reply

-“VE3EMO VE3EMO DE VA3SUG VA3SUG K”

DE = from (like the French “from” or “of”)



K = any station transmit, or go ahead, or over to you

CW OPS, PROCEDURAL SIGNS / PROWORDS

DX = Long distance

73 = Best wishes / Good Bye (not 73's)

AR = End of message

BT = (or TV), Break in the text

SK = End of transmission

RST = Readability, Strength, Tone - Signal report

“Q” SIGNALS

The Q-code are a list of signals abbreviating a detailed question or answer.

The Q code is a standardised collection of three-letter message encodings, all starting with the letter "Q",

Agreed upon by the International Telecommunication Union (ITU), is used worldwide on radiotelegraph.

Abbreviations are given the form of a question when followed by a question mark. i.e. “QTH?” what is your location?

“Q” SIGNALS

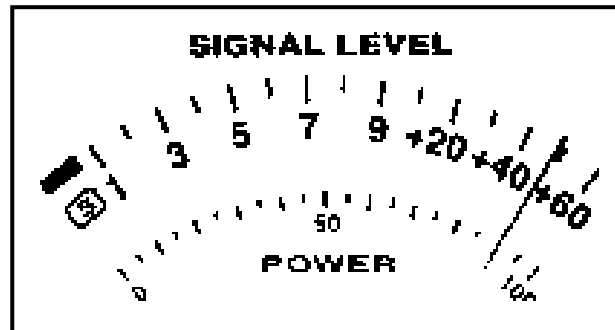
- **QRL** “Is this frequency in use?” (*or are you busy?*)
- **QRM** “I’m being interfered with” Man Made (e.g. jamming)
- **QRN** “I’m troubled by static” Non Man Made interference
- **QRS** “Send more slowly”
- **QRX** “I will call you again”
- **QRZ** “Who is calling me?”
- **QSO** “A contact is in progress” (i.e. *thanks for the QSO*)
- **QSY** “Change frequency” (*QSY to 14.210*)
- **QTH** “My location is” *My QTH is Toronto*
- **QSL** “I acknowledge” *I understand, Roger ...*
- **QRT** “Stop sending” *I’m QRT for the day (finished, done)*

RST SIGNALS

Readability, Strength, Tone

A short way to describe or give a signal or reception report (i.e. radio check) based upon your “S” meter reading and what you actually hear.

An “S” meter is used to measure relative signal strength in a receiver



Poor Good

RST = READABILITY	1-5
SIGNAL STRENGTH	1-9
TONE	1-9

RST SIGNALS - READABILITY

A qualitative assessment of how easy or difficult it is to
correctly copy the information being sent

- 1 Unreadable
- 2 Barely readable, occasional words distinguishable
- 3 Readable with considerable difficulty
- 4 Readable with practically no difficulty
- 5 Perfectly readable

RST SIGNALS - STRENGTH

An assessment of how powerful the received signal is at the receiving location

- 1 Faint signal, barely perceptible
- 2 Very weak
- 3 Weak
- 4 Fair
- 5 Fairly good
- 6 Good
- 7 Moderately strong
- 8 Strong
- 9 Very strong signals

RST SIGNALS - TONE

Used only in Morse code and digital transmissions
therefore omitted during voice operations

- 1 Very rough and broad
- 2 Very rough, very harsh and broad
- 3 Rough, tone, rectified but not filtered
- 4 Rough note, some trace of filtering
- 5 Filtered rectified, but strongly ripple-modulated
- 6 Filtered tone, definite trace of ripple modulation
- 7 Near pure tone, trace of ripple modulation
- 8 Near perfect tone, slight trace of modulation
- 9 Perfect tone, no trace of ripple or modulation of any kind

RST SIGNALS

AN RST OF 599 BEST READING *i.e.* “you’re 59”

- 11 = Unreadable and barely perceptible
- 57 = Perfectly readable, moderately strong
- 33 = Readable, some difficulty, weak in strength
- 59 **plus 20db** = Signal strength is 20 db’s over strength 9 *i.e.* “your 20 over 9”
- RST of 459 = Quite readable, fair strength, perfect tone (tone is usually used for CW)
- RST of 579 = Perfectly readable, moderately strong, perfect tone
- An increase of power **4 times** will raise you “S” meter by **ONE “S” unit**
- Thus to raise the meter from **S8 to S9** you power on a transmitter would need to increase power **4 times**

EMERGENCY OPERATING PROCEDURES

MAYDAY or SOS precedence over all calls!!!

***REAL EMERGENCIES ONLY, IT IS ILLEGAL TO
KNOWNLY TRANSMIT A FALSE DISTRESS
SIGNAL!***

URGENCY (PAN-PAN) Say three time, safety for a person, vehicle, aircraft, vessel, residence etc is threatened. ***"Pan-Pan, Pan-Pan, Pan-Pan this is VE3EOT with"***

SECURITY (Securitay) Weather warnings, aids to navigation, used mostly in or by maritime situations. ***"Sécurité, Sécurité, Sécurité. All ships, all ships, all ships this is VA3XMJ"***

EMERGENCY OPERATING PROCEDURES

If you need immediate emergency assistance, the appropriate voice signal is “MAYDAY” and the appropriate Morse code signal is “SOS”

Used only in a life threatening situation to you or some one else

Derived from the French venez m'aider, meaning "come [to] help me, venez" is dropped, thus MAYDAY.

The Proper way to say is to say “MAYDAY” several times
I.E. “MAYDAY MAYDAY MAYDAY this is VA3NSC”

For CW “SOS” ...--- ...

If your using a repeater and you want to interrupt a conversation with a distress call, you say “BREAK” twice and then you call sign ***i.e. break break this is VA3SUG with emergency traffic***

EMERGENCY OPERATING PROCEDURES

During a contact you hear a distress call or break in, you:

- A. ACKNOWLEDGE THE STATION IN DISTRESS
- B. DETERMINE THEIR LOCATION "QTH"
- C. ASK WHAT ASSISTANCE IS NEEDED

If you hear a distress call and can not assist, you maintain watch on the frequency until certain that assistance is forthcoming to the caller

If you are in contact with a station and you hear a emergency call, on your frequency you:

- A. STOP YOUR CONTACT
- B. TAKE THE CALL

EMERGENCY OPERATING PROCEDURES


- HAVE BACK UP POWER TO USE YOUR STATIONS IN AN EMERGENCY AND NOT BY COMMERCIAL AC LINES
- HAVE SEVERAL SETS OF BATTERIES FOR HANDHELDS
- DIPOLE ANTENNAS ARE A GOOD CHOICE FOR PORTABLE AND OR EMERGENCY HF STATIONS

RECORDING KEEPING, CONFIRMATION, MAPS, CHARTS, ANTENNA ORIENTATION

QSL CARDS & STATIONS LOGS

QSL CARD IS WRITTEN PROOF OF COMMUNICATIONS BETWEEN TWO AMATEURS, TODAY THERE IS ALSO E-QSL VIA THE INTERNET.

QSL CARDS ARE A SIGNED POST CARD LISTING THE DATE TIME FREQUENCY MODE AND POWER

		AMATEUR RADIO STATION				
QSO WITH		CONFIRMING QSO				
DAY MO YR		UTC	FREQ	RST	MODE	
<input type="checkbox"/> SPECIAL CALL		<input type="checkbox"/> PSE QSL	<input type="checkbox"/> TKS QSL	<input type="checkbox"/> 73		



WD2K

Dave Watrous
542 Peacedale Road
Schodack Landing NY 12156
Rensselaer County FN-32

Confirming	Day	Month	Year
Mhz	RST		2-way

QSL Pse Tnx

RECORDING KEEPING, CONFIRMATION, MAPS, CHARTS, ANTENNA ORIENTATION

STATION LOGS AND QSL CARDS ARE ALWAYS
KEEP IN UTC (UNIVERSAL TIME COORDINATED /
FORMERLY GREENWICH MEAN TIME - GMT. GMT
IS BASED ON THE LOCATION / MERIDIAN THAT
RUINS THROUGH GREENWICH ENGLAND.

RECORDING CONTACTS AND KEEPING
STATION LOG BOOKS IS NO LONGER
REQUIRED BY INDUSTRY CANADA

DXtreme Station Log - Multimedia Edition (4W3DX)

File Edit Search Modules Outgoing QSL Audio Incoming QSL Reports Tools Help

Station Log | Station Information | *Verification Status | Comments - Station + QSO | User Defined Fields

Station Log

Call sign: 4W3DX DX: 8541.95 nm
City: Dili S/P:
County: Dili Grid:
Entity: Timor-Leste
IOTA: OC-148 Continent: Oceania
Timor Island (Main Island Only)
CQ Zone: 28 Name: Thor

Frequency, Band, and Mode
Freq: 14002 kHz Band Meters
Mode: CW Continuous Wave

Signal Quality and Audio
Sent: 599 Received: 599
File: 4w3dx

Equipment Used
Rig: IC-746PRO Icom IC-746PRO
Ant: 2-El PV 20-Meter 2-El Phased Verticals
Acc: MFJ-969 MFJ-969 Antenna Tuner
Pwr: 100 100 Watts

Date and Time
Date: Jan 01 2005 Start: 11:54
End: 11:54

Click the OK button to save the log entry. Jan 01 2005 16:20

TO SET YOUR CLOCK TO GMT TIME
LISTEN TO EITHER CHU CANADA, WWV
OR WWVH TIME SIGNALS IN THE
UNITED STATES

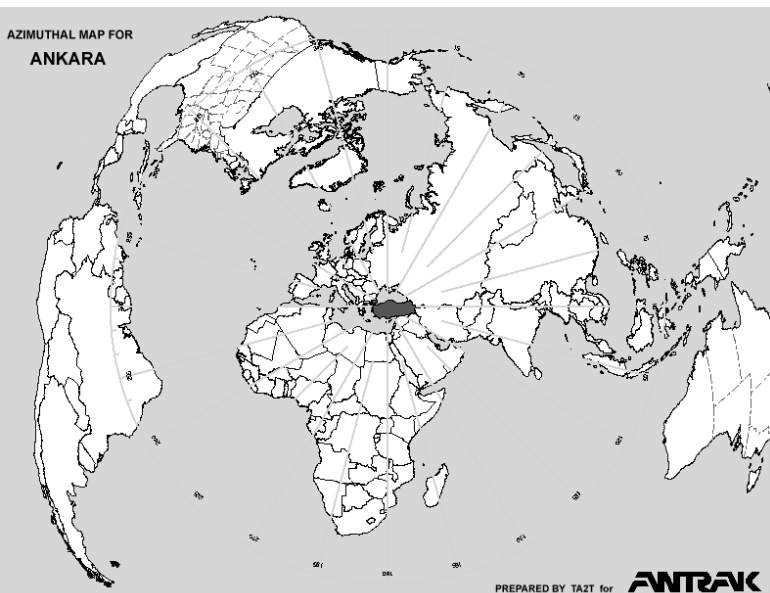
DATE TIME	STATION CALLED	CALLED BY	HIS FREQ. OF DIAL	HIS SIGNAL TEST	MY SIGNAL TEST	FREQ. MHz	EMIS- SION TYPE	POWER INPUT WATTS	TIME OF ENDING QSO	OTHER DATA	NAME	QSLs
10/15/71												
0130	WA4VPL	X	14	-	-	14	A3A	180	0150	Ann - Mel Jones		
0130	W8IBU	X	3.5	559	359	3.527	AZ	180	0585	John, Westchester, Ohio	RZ	
10/20	W8USE	ORX				14.330	A	180			CW	
1735	X	W9HPP	210	589	579	21052	A1	170	1749	MT	LEN JZ	
2230	W8PHSS	X	6.3	119	019	6.3	119	2259		AK		
2410	CE	WSEHM	14			14	110	2424		W8PFR - GREVE CHORE, MISSOURI - Steve	19	
2427	CE	X	21				X	2439		CE20X - CHILE - Ernesto		
10/16/71												
1830	DJ1BP	X	21				A1	180		NO GO	More	
1900	2E1GDS	X	21				A2A	180		Jamboree Stn - Zambie		
1908	CE	X	7				"	"				
1910	WASTE	X	7	59	59	7	"	"	1918	Clyde -	San Antonio	
10/17/71												
0208	VE3FME	X	7.174	559	559	7.174	A1	180	0225	BRETT ESSEX, ONT.	THUR	
10/18/71												
0345	W3AKG		14.28	58	58	14.28	A3A	180	2355	Manning, Pittsburgh Pa		
10/21												
2100	W8PHSS	X	14.28				A3A	180	2131			
10/22												
1713	W9HPP	X	21	579	569	057	A1	170	1731		JW	
10/24/71												
0056	KY6PMR	X	21.359	5940	59	21.359	A3A	180	0056	SPECIAL NAVY STN.	THUR	
0133	EA4415	X	14.043	339	339	14.043	A1	180	0153	MIKE - MADRID, SPAIN	THUR	
0209	F2IQ	X	14.046	579	579	14.046	A1	180	0220	BOB - MILANO, ITALY	THUR	
10/25	CE	WA4TMP	21	589	599	21	A1	180				
2046	CE	W8KHS	21				A1		2030	DAVE Ridgeville Ohio	RZ	
		W4UBT	21			579	21	A1	2110	JIM, ROANOKE, VA.		

AZIMUTHAL MAPS

THE MOST USEFUL MAP TO USE WHEN ORIENTING A DIRECTIONAL HF ANTENNA TOWARDS A DISTANT STATION / CONTACT IS A AZIMUTHAL MAP

A AZIMUTHAL MAP IS PROJECTED OR CENTRED ON A SPECIFIC LOCATION AND IS USED TO DETERMINE THE SHORTEST PATH BETWEEN THE CENTRED AND DESIRED LOCATIONS OF CONTACT.

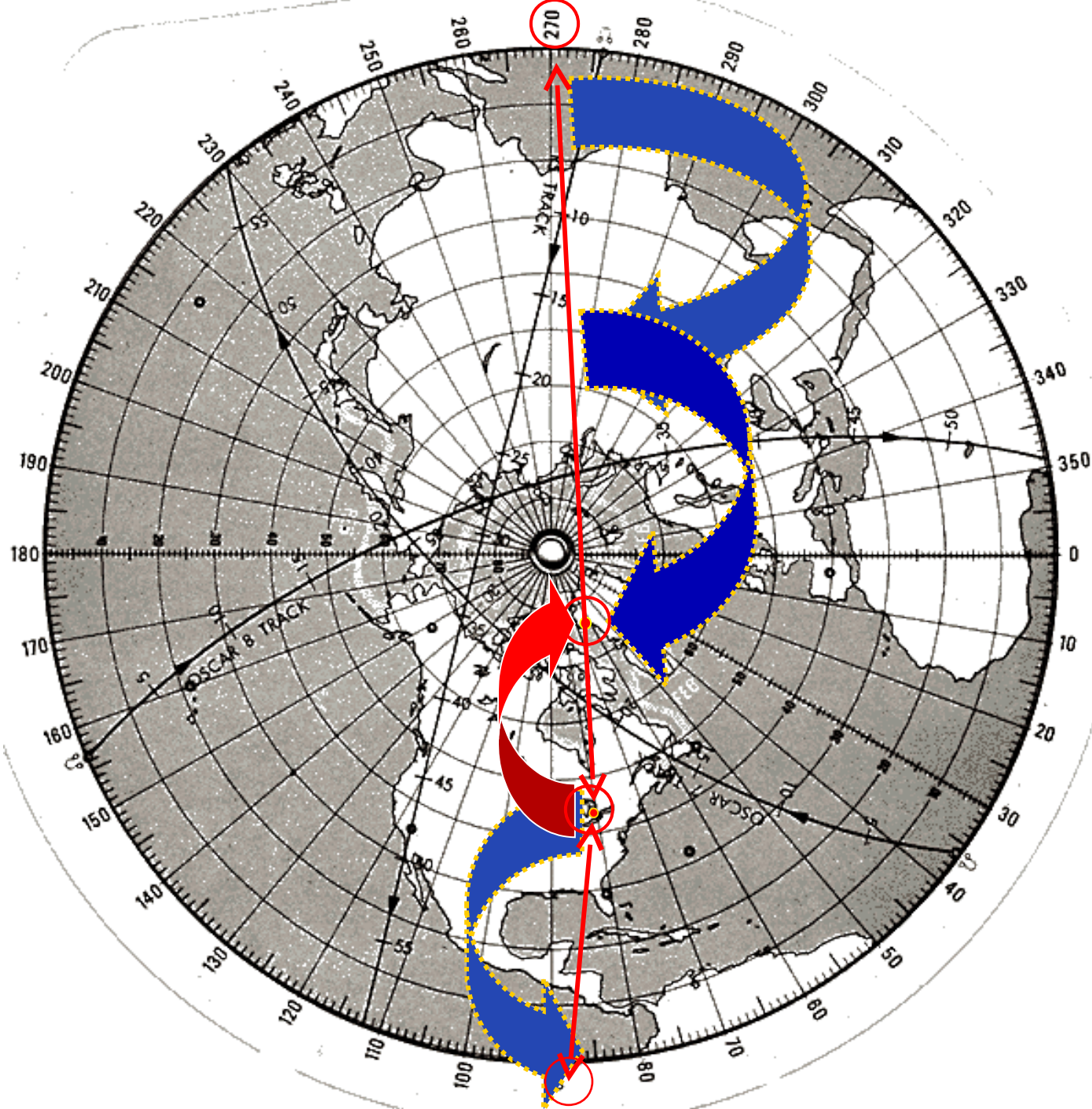
A AZIMUTHAL MAP WILL ALSO SHOW A COMPAS BEARING FROM YOUR LOCATION TO ANY POINT ON THE MAP AND WILL ASSIST IN ANTENNA PLANING AND POINTING.



LONG PATH

A DIRECTIONAL
ANTENNA POSITION
180 DEGREES
(REVERSE BEARING)
FROM THE SHORTEST
PATH IS REFERRED
TO LONG PATH.

IF LISTENING TO
LOCAL STATIONS
MAKING CONTACT
WITH DISTANT
STATIONS (I.E. DX
NEW ZEALAND) BUT
YOU CAN NOT HEAR
THE DX STATION, TRY
POINTING YOUR
ANTENNA IN A LONG
PATH DIRECTIONS
(BEAMED 180
DEGREES) AND
LISTEN FOR
INCOMING STATIONS.



QUESTIONS ????

