

# QUICK GUIDE

The most used codes, terms, and abbreviations  
in amateur radio practice

Amateur Radio Q-codes

The 92 code

International Morse Code

International Phonetic  
Alphabet (Spelling)

The RST System

Ham Radio Terms  
and Abbreviations

Morse Code Abbreviations

February 2022

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**Title of Documentation** Quick Guide  
The most used codes, terms, and abbreviations in amateur radio practice

**Type of Documentation** Technical Information

**Purpose of Documentation** This document contains useful information about Amateur Radio Q-Codes, International Morse Code, International Phonetic Alphabet (Spelling), the RST System and Ham Radio Terms and Abbreviations.

Record of Revisions	Description	Release Date	Notes
	Quick Guide   The most used codes, terms, and abbreviations in amateur radio practice	14.02.2022	First edition, R01

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**Published by** ACOM Ltd.  
Bulgaria | Bozhurishte 2227  
Sofia-Bozhurishte Industrial Park | 6 Valeri Petrov Str.  
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## 1. GENERAL INFORMATION

Congratulations on using ACOM HF Power Amplifiers.

ACOM is pleased that you have chosen one of our products, and we will endeavor to provide you with the information and support you need to enjoy your purchase for many years.

### 1.1. Introduction and Description

This document includes helpful information for radio amateurs about:

- Amateur Radio Q-Codes
- International Morse Code
- International Phonetic Alphabet (Spelling)
- The RST System
- HAM Radio Terms and Abbreviations.

### 1.2. Owner Assistance

If assistance is needed, you should contact your local dealer first. If necessary, your dealer will contact ACOM for additional guidance.

If you still have an issue you need to discuss with one of ACOM's specialists, the contact information is as follows:

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## 2. AMATEUR RADIO Q-CODES



**Understanding Q-codes:**  
 Q-Codes (also called Q-Signals) are three letter combinations that begin with the letter Q that CW\* operators use in place of common phrases. When followed by a question mark, the Q-signal turns into a question.

\* The abbreviation CW refers to a Morse transmission using a radio signal and coming from the fact that it uses a Carrier Wave, or Continuous Wave that is interrupted.

Originally intended for use only by radiotelegraph operators, Q-codes have become a permanent part of the hobby's jargon, and many hams use them on phone as well as in face-to-face conversations.

The original Q-signals were created in the early 1900s by the British Postmaster General for use by British ships and coast stations. They proved to be so useful, however, that radio operators worldwide began using them.

At the Second International Radiotelegraph Convention in London in July 1912, the delegates adopted a list of 45 different Q-codes. Many of these Q-codes are no longer used. But, many, such as QTH, QSY, QRM, and others, are still used today more than 100 years later.

Code	Used as a Question	Used as an Answer or Statement
QRA	What is the name of your station?	The name of my station is _____.
QRG	Will you tell me my exact frequency?	Your exact frequency is _____ kHz.
QRH	Does my frequency vary?	Your frequency varies.
QRI	How is the tone of my transmission?	The tone of your transmission is _____. (1 - Good, 2 - Variable, 3 - Bad)
QRJ	Are you receiving me badly?	I cannot receive you; your signal is too weak.
QRK	What is the intelligibility of my signals?	The intelligibility of your signals is _____. (1 - Bad, 2 - Poor, 3 - Fair, 4 - Good, 5 - Excellent)
QRL	Are you (Is the frequency) busy?	I am (The frequency is) busy, please do not interfere.
QRM	Is my transmission being interfered with?	Your transmission is being interfered with _____. (1 - Nil, 2 - Slightly, 3 - Moderately, 4 - Severly, 5 - Extremely)
QRN	Are you troubled by static?	I am troubled by static _____. (1-5 as under QRM.)
QRO	Shall I increase power?	Increase power.
QRP	Shall I decrease power?	Decrease power.
QRQ	Shall I send faster?	Send faster ( _____ WPM).
QRS	Shall I send more slowly?	Send more slowly ( _____ WPM).

*Continued*

Code	Used as a Question	Used as an Answer or Statement
QRT	Shall I stop sending?	Stop sending.
QRU	Have you anything for me?	I have nothing for you.
QRV	Are you ready?	I am ready.
QRW	Shall I inform _____ that you are calling him?	Please inform _____ that I am calling him.
QRX	When will you call me again?	I will call you again at _____ hours.
QRZ	Who is calling me?	You are being called by _____.
QSA	What is the strength of my signals?	The strength of your signals is _____. <i>(1-Scarcely perceptible, 2-Weak, 3-Fairly Good, 4-Good, 5-Very Good)</i>
QSB	Are my signals fading?	Your signals are fading.
QSD	Is my keying defective?	Your keying is defective.
QSK	Can you hear me between you signals and if so, can I break in on your transmission?	I can hear you between my signals, break in on my transmission.
QSL	Can you acknowledge receipt?	I am acknowledging receipt.
QSO	Can you communicate with _____ direct or by relay?	I can communicate with _____ direct (or by relay through _____).
QSP	Will you relay to _____?	I will relay to _____.
QST	-	Here is a broadcast message to all amateurs; use voice mode.
QSX	Will you listen to _____ (call sign(s) on _____ kHz (or MHz))?	I am listening to _____ (call sign(s) on ... kHz (or MHz)).
QSY	Shall I change to another frequency?	Change to another frequency.
QSZ	Shall I send each word or group more than once?	Send each word or group twice (or _____ times.)
QTC	How many messages have you to send?	I have _____ messages for you.
QTH	What is your location?	My location is _____.
QTR	What is the correct time?	The time is _____.

Table 2-1 | List of Amateur Radio Q-codes



### 3. THE 92 CODE



Almost as soon as telegraphers began sending messages, they realized that they were sending the same messages over and over. Often, these messages were meant for other operators to facilitate the handling of messages. For example, one operator might ask another operator, "Are you ready?" meaning "Are you ready to receive a message?".

Instead of sending these messages over and over, operators developed a shorthand for common messages. To save time, they would send a number instead of the complete message. For example, the number 1 meant "Wait a minute". "Are you ready?" was shortened to the number 6. This code was standardized in 1857, and published in that year's National Telegraphic Review Operator's Guide.

Nowadays, most of these codes are no longer used. But, some codes, such as 73 (Best Regards) or 72 (Best Regards, used by QRP operators with less than 5 W output power), and others, are very popular and used widely today.

Interesting fact is a today use of code 30. The 92 Code defines 30 as "no more" or "the end". You often can find this code, written as "-30-", at the end of press releases. It signals whoever is reading the press release that they've reached the end.

## 4. INTERNATIONAL MORSE CODE



**Understanding Morse-code:**  
 Morse code is a system uses dashes and dots to represent the letters, punctuation, and digits. The principle of Morse code consists of 5 rules as follow:

- The length of a dot is one unit;
- The length of a dash is three unis;
- The space between parts of the same letter is one unit;
- The space between letters is three units;
- The space between words is seven units.



Created in the 1830s by Samuel F.B. Morse, this code revolutionized long-range communications. In its heyday, Morse code was a common, standardized method of communication used by the military, amateur radio operators, translators and others and gave anyone the ability to converse directly with someone over great distances, using as little bandwidth as possible.

Because Morse proficiency is not required these days, many amateurs today don't bother learning the skill. However, there are specific devices that can help send and receive Morse code messages that are still in use today.

Letter	Morse code
A	.-
B	-...
C	-.-.
D	-..
E	.
F	..-.
G	--.
H	....
I	..
J	.-.-.-
K	-.-
L	.-...
M	--
<i>Continued</i>	

Letter	Morse code
N	-. .
O	---
P	. --- .
Q	-- . -
R	. - .
S	...
T	-
U	. . -
V	. . . -
W	. - -
X	- . . -
Y	- . - -
Z	- - . .

Table 4-1 | International Morse code / Letters

Digit	Morse code
1	. - - - -
2	. . - - -
3	. . . - -
4	. . . . -
5	. . . . .
6	- . . . .
7	- - . . .
8	- - - . .
9	- - - - .
0	- - - - -

Table 4-2 | International Morse code / Digits

Punctuation mark	Morse code
. dot	.-.-.-
, comma	--..--
? question	..--..
' apostrophe	.----.
! exclamation	-.--
/ slash	-...-
( left parenthesis (KN - over to you only)	-.-.-
) right parenthesis	-.-.-
& and symbol (AS - wait)	.-...
: colon	---...
; semicolon	-.--.
+ addition (AR - end of transmission)	.-.-.
- subtraction	-.....-
* (x) multiplication	-...-
/ (: ) division	---...
= equal	-...-
/ fractional number, slash	-...-
- dash	-.....-
_ underscore	..--.-
" quotes	.-...-
<b>SK</b> end of contact	...--
\$ dollar symbol	...--
@ e-mail [at] symbol	.-.-.-

Table 4-3 | International Morse code / Punctuation marks

## 5. INTERNATIONAL PHONETIC ALPHABET (SPELLING)



**Understanding International Phonetic Alphabet:**  
 The Radio Alphabet, also known as the "International Phonetic Alphabet", uses spelling words to represent letters.



Amateur radio operators are required to identify themselves over the air by their alphanumeric call signs, so it's no wonder that many hams may know one another only by the call sign instead of an actual name or handle.

However, identifying the call signs correctly can be a challenge, especially when the letters in a call sign sound similar to one another. For instance, the letter "M" sounds similar to the letter "N", "B" may sound like "D", and so forth. This can be particularly troublesome if the transmission is weak or encounters a lot of interference.

To avoid confusion and clarify communications, amateurs use the phonetic alphabet spelling of call signs, operator, and geographical names etc. It was not a unique concept, as phonetic alphabets were already in use by the British military during World War 1, but it was not worldwide standard.

The first known international alphabet was established by the International Telecommunications Union (ITU) in 1926. The ITU made various changes to the alphabet during the next twenty years until a version was adopted by the International Civil Aviation Organization (ICAO) in 1956. The phonetic alphabet in use today is now a universally recognized standard. However, you will hear amateurs using non-standard words as well.

Letter	Phonetic word	Pronunciation
A	Alpha	<i>al-fah</i>
B	Bravo	<i>brah-voh</i>
C	Charlie	<i>char-lee</i>
D	Delta	<i>dell-tah</i>
E	Echo	<i>eck-oh</i>
F	Foxtrot	<i>oks-trot</i>
G	Golf	<i>golf</i>
H	Hotel	<i>hoh-tell</i>
I	India	<i>in-dee-ah</i>
J	Juliet	<i>ew-lee-ett</i>
K	Kilo	<i>kee-loh</i>
L	Lima	<i>lee-mah</i>
M	Mike	<i>mike</i>
<i>Continued</i>		

Letter	Phonetic word	Pronunciation
N	November	<i>noh-veh-ber</i>
O	Oscar	<i>oss-cah</i>
P	Papa	<i>pah-pah</i>
Q	Quebec	<i>keh-bee</i>
R	Romeo	<i>row-me-oh</i>
S	Sierra	<i>see-air-ah</i>
T	Tango	<i>tang-go</i>
U	Uniform	<i>you-nee-form</i> or <i>oo-nee-form</i>
V	Victor	<i>vik-tah</i>
W	Whiskey	<i>wiss-key</i>
X	X-ray	<i>ecks-ray</i>
Y	Yankee	<i>yang-key</i>
Z	Zulu	<i>zoo-loo</i>

Table 5-1 | International Phonetic Alphabet / Letters (Spelling)

Digit	Phonetic word	Pronunciation
0	Zero	<i>zee-ro</i>
1	One	<i>wun</i>
2	Two	<i>too</i>
3	Three	<i>tree</i>
4	Four	<i>fow-er</i>
5	Five	<i>fife</i>
6	Six	<i>six</i>
7	Seven	<i>sev-en</i>
8	Eight	<i>ait</i>
9	Nine	<i>nin-er</i>

Table 5-2 International Phonetic Alphabet / Digits (Spelling)

## 6. THE RST SYSTEM



**Understanding RST system:**  
 The RST system is used by amateur radio operators, shortwave listeners, and other radio hobbyists to exchange information about the quality of a radio signal being received.

- R: Readability;
- S: Signal Strength;
- T: Tone.

The code is a three-digit number, with one digit each for conveying an assessment of the signal's readability, strength, and tone.



The code was developed in 1934 by Amateur radio operator Arthur W. Braaten, W2BSR, and was similar to that codified in the ITU Radio Regulations, Cairo, 1938.

Readability	Meanings
1	Unreadable
2	Barely readable, occasional words distinguishable
3	Readable with considerable difficulty
4	Readable with practically no difficulty
5	Perfectly readable
Signal Strength	Meanings
1	Faint signals, barely perceptible
2	Very weak signals
3	Weak signals
4	Fair signals
5	Fairly good signals
6	Good signals
7	Moderately strong signals
8	Strong signals
9	Extremely strong signals
<i>Continued</i>	



Tone	Meanings
1	50/60 Hz AC, very rough and broad
2	Very rough AC, very harsh and broad
3	Rough AC tone, rectified but not filtered
4	Rough tone, some trace of filtering
5	Filtered rectified AC. 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

Table 6-1 | The RST System

If the signal has the characteristic steadiness of crystal control, add the letter **X** to the RST report. If there is a chirp, the letter **C** may be added to so indicate. Similarly for a click, add **K**. The above reporting system is used on both CW and voice, leaving out the "tone" report on voice.

## 7. HAM RADIO TERMS and ABBREVIATIONS



This section contains general definitions of popular amateur radio terms and abbreviations. Not all of them may apply to your specific radio equipment. Please, read your equipment's documentation for details.

A	
ACC	ACCessory
Adaptive filter	Digital filter associated with Digital Signal Processing.
Adjacent-channel interference	When a receiver is tuned to a specific frequency and interference is received on a nearby frequency.
AF	Audio Frequency
AFC	Automatic Frequency Control. Automatically compensate frequency drift.
AFSK	Audio Frequency Shift Keying, a form of digital signaling.
AGC	Automatic Gain Control. Automatically optimize receiver amplifier gain.
ALC	Automatic Level Control. Limits RF drive level to power amplifier during transmit to prevent distortion or to regulate the output constant.
AM	Amplitude Modulation
Amplifier	A device used to increase the output power of a device.
AMSAT	AMateur SATellite
AMTOR	AMateur Teleprinting Over Radio. A form of RTTY, radio teletype.
ANF	Automatic Notch Filter
ANL	Automatic Noise Limiter. Eliminates impulse and static noise peaks.
ANT	ANTenna
Antenna ground system	Term used for a RF reference potential for some types of antennas. Most unbalanced or asymmetrical antennas need a good RF ground (see also <b>Counterpoise system</b> ).
Antenna impedance	The input impedance of an antenna. Although an antenna's impedance fluctuates with the frequency of operation, an antenna should be close to 50 Ω for most rigs.
Antenna matching	When the antenna's impedance at resonance is at optimum performance for your transmitter output or receiver input circuit.
Antenna tuner	Device used to match an antenna impedance to the optimum one for a transmitter or receiver.
APC	Automatic Power Control
<i>Continued</i>	

A	
ARES	Amateur Radio Emergency Service ARES is a public-service organization of the ARRL.
ARRL	The American Radio Relay League The National Association for Amateur Radio in the USA.
ASCII	American National Standard Code for Information Interchange A seven-unit digital code for the transmission of teleprinter data.
ASEL	Antenna Switch
ATT	ATTenuator. A network designed to reduce the signal level.
ATU	Antenna Tuner Unit
ATV	Amateur Television. See also <i>FSTV, SSTV</i> .
Auto patch	Used in repeater operation for telephone interconnect.
Average power	The average amount of energy per unit of time, often simply called "power". It is measured on simple power meters. See also <i>PEP</i> .

B	
Backscatter	Radio signals reflected back from ionized patches in the ionosphere.
Backstay	Rigging to support the mast in maritime mobile installations, usually insulated for HF antenna purposes.
Balun	A RF transformer used to change an unbalanced input to a balanced output and vice versa. It may or may not transform the impedance
Band	A range of frequencies.
Bandwidth	A measure of the width of a frequency range.
Bank	See <i>Memory bank</i> .
BCD	In computing and electronic systems, binary-coded decimal (BCD) is a class of binary encodings of decimal numbers where each digit is represented by a fixed number of bits, usually four or eight.
BCI	BroadCast Interference
Beacons	Radio transmitters used for propagation research, found on specific frequencies.
BFO	Beat Frequency Oscillator
BNC	Bayonet Neill-Concelman. A miniature quick connect/disconnect type of RF connector.
BPF	BandPass Filter
bps	In computer science, the rate at which data is transferred - bits per second (bps) or Bytes per second (Bps)
Bunny hunt	Finding hidden transmitters, sometimes called "T HUNTING" and "Fox Hunting".
Busy lockout	Inhibits transmit on a frequency in use.

C	
Call sign	Sequence of letter and numbers used to identify a radio station and issued by the countries licensing bureau.
Carrier	An unmodulated signal.
Carrier frequency offset	= Carrier Shift. Distance between mark and space of the carrier for RTTY or similar communications.
CAT	Computer Aided Transceiver
CBR	Cross Band Repeater. A repeater which receives incoming signal and retransmits different bands - e.g., receives 144 MHz bands and re-transmits 430(440) MHz bands.
CCW	Counter ClockWise
CH	Channel. Sequence of memory positions where frequency and related information is stored.
CI-V	Icom company computer Control Interface allows multiple radio control simultaneously.
Clipping	Overdriving an amplifier circuit, causing the signal to drop out on voice peaks. (AKA: Flat topping a signal)
Contesting	An event where radio amateurs compete for sport supremacy.
Conversion	The process of changing signal frequency, power, etc.
Coronal hole	Sunspot activity that may lead to enhanced VHF and 10-meter propagation.
Counterpoise system	A conductor or system of conductors used as earth or ground substitute in antenna systems.
CPU	Central Processing Unit
CQ	Radio communications term: a general call, to anyone who receives it.
Crossband repeat	A mode in many dual band radios where a radio transmits on one band, a crossband repeater transmits the received signal on another band, which is heard back by the radio on the other band.
CTCSS	Continuous Tone Coded Squelch System. Adds a continuous sub-audible low frequency tone to the transmitted carrier. Receivers set for the same low frequency tone can decode signal to hear the audio.
CW	<ul style="list-style-type: none"> <li>• Carrier or Continuous Wave</li> <li>• ClockWise</li> </ul>
CW filter	Used to narrow the IF passband to improve reception selectivity in crowded band conditions.

D	
D-RATS	Multi-platform integrated tool for communicating digital information, developed for First Responders, using D-STAR radios.
D-STAR	Digital Smart Technologies for Amateur Radio, an open protocol.
Data communications	Transfer of data between two or more locations.
dBd	Antenna gain as compared to an ideal half wave dipole antenna.
dBi	Antenna gain as compared to an isotropic antenna.
dBm	Unit of RF power as compared to 1 mW (0 dBm = 1 mW).
DC	Direct Current
DCS	Digital Coded Squelch, a method of silencing radios until a specific string of tones are received to open the audio stage. An alternate to CTCSS.
Deviation	A measurement for an FM signal for the maximum frequency changes on either side of the carrier frequency.
DHCP	In computer science, the Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on Internet Protocol (IP) networks for automatically assigning IP addresses and other communication parameters to devices connected to the network using a client-server architecture.
Digital communications	Information sent digitally, which may be decoded as voice, data, and/or video.
Dipole	Symmetrical antenna, with a bi-directional radiation pattern.
Distress call	Signals a life-threatening situation. Most commonly referred to as an SOS or MAYDAY call.
Distress frequency	A frequency or channel specific for use in distress calling. Radiotelephone distress frequencies are 2.182 MHz and 156.8 MHz. Survival craft use 243 MHz. Maritime distress frequencies are the same, while general aviation frequencies are 121.5 MHz.
DNS	In computer science, the Domain Name System (DNS) is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. Most prominently, it translates more readily memorized domain names to the numerical IP addresses needed for locating and identifying computer services and devices with the underlying network protocols. By providing a worldwide, distributed directory service, the Domain Name System is an essential component of the functionality of the Internet.
Doppler shift	The change in frequency of a wave in relation to an observer who is moving relative to the wave source. It is named after the Austrian physicist Christian Doppler, who described the phenomenon in 1842. Common in satellite communications, where signals may vary up or down in frequency, as the satellite approaches and departs from view.
<i>Continued</i>	

D	
Downconverter	A device to take higher frequencies, and lower them to appear at a lower frequency, for reception.
Downlink (↔ Uplink)	Frequency that repeater or satellite transmits on to a user.
DSP	Digital Signal Processor. Used to improve the signal to noise ratio for clearer and more legible communications. Relatively new to the ham radio.
DTCS	Digital Tone Coded Squelch. A Selective call system.
DTMF	Dual Tone Multi-Frequency (= touch-tone). Used for transmit/receive numeric information such as phone number, PIN, remote radio control commands, etc.
Dualwatch	Monitoring two signals simultaneously.
Dummy load	A non-radiating 50 Ω load.
Duplex	An operation mode in which parties can communicate with one another in both directions. Full duplex does it simultaneously using different transmit and receive frequencies. See also <i>Half duplex</i> .
Duplexer	A device which divides transmit and receive signals.
Duty cycle	The ratios of transmit to receive time.
Dx'pedition	Trip to foreign land or rare entity to operate ham radio.

E	
E layer	The ionospheric layer usually responsible for most 10 meter and 6-meter skywaves over 1500-mile paths. Appears especially in summer season.
EMC	Electromagnetic Compatibility - a measure of a device's ability to operate as intended in its shared operating environment while, at the same time, not affecting the ability of other equipment within the same environment to operate as intended.
EEPROM	Electrically Erasable and Programmable Read Only Memory
EME	Earth Moon Earth, also known as moon bounce, is a radio technique where amateur radio operators operate via signals reflected from the Moon. Making a signal path from an earth-bound station, reflected off the moon, back to another earth-bound station.
EMI	Electromagnetic Interference or Electromagnetic Immunity - see <i>EMC</i> . Can be caused by an electromagnetic disturbance that affects the performance of a device. Sources of EMI can be environmental, such as electrical storms and solar radiation but more usually will be another electronic device or electrical system. If the interference is in the radio frequency spectrum it is also known as radio frequency interference or RFI.

F	
F connector	A type of UHF connector found on 440 MHz and 1.2 GHz antenna circuits.
Fading	Periodic variation of the received MF- or HF-signal strength due to multipath propagation. It can be slow, fast, and selective.
Feed point	Where the coaxial cable or ladder line joins an antenna.
Filter	A circuit designed to pass or stop only the desired frequency(s).
FM	<ul style="list-style-type: none"> <li>• Frequency Modulation</li> <li>• FM broadcast</li> </ul>
Foldback	A circuit to limit power output when the transmitter senses elevated SWR or temperatures.
FSK	Frequency Shift Keying
FSTV	Fast Scan TV. Graphics (and audio) communication using TV broadcast signals, requires a wide bandwidth.
Full duplex	An operation mode, which transmits and receives on different frequencies at the same time, as a telephone communication.
Fuse	An intentional weak link to guard against overload.
FW	In computing, firmware (FW) is a specific class of computer software that provides the low-level control for a device's specific hardware. Firmware, such as the BIOS of a personal computer, may contain basic functions of a device, and may provide hardware abstraction services to higher-level software such as operating systems. For less complex devices, firmware may act as the device's complete operating system, performing all control, monitoring and data manipulation functions.

G	
GaAs FET	Sensitive transistor, found in VHF/UHF receiver amplifiers, with a low noise floor.
Gateway	In computer science, the gateway (GW) is a network node that serves as an access point to another network, often involving not only a change of addressing, but also a different networking technology. More narrowly defined, a router merely forwards packets between networks with different network prefixes. In a home or small office environment, the default gateway is a device, such as a router, that connects the local network to the Internet. It serves as the default gateway for all network devices.
Ground Plane	A type of vertical omni-directional antenna.
Ground Wave	Electromagnetic wave which closely follows Earth's surface, particularly over water, as a result of the wave's interaction with the terrestrial surface.
Grounding	Electrical connection to the earth.



H	
Ham	A licensed radio operator who enjoys the hobby and service of radio communications.
Harmonic	Multiple of a fundamental frequency.
Half duplex	Half-duplex is the standard in radio communications: One speaks, everyone listens.
Heat sink (heatsink)	A passive heat exchanger that transfers the heat generated by an electronic device to a fluid medium, often air or a liquid coolant.
HF	High Frequency. The International Telecommunication Union (ITU) designation for the range of radio frequency electromagnetic waves (radio waves) between 3 and 30 MHz. Normally, 1.8 MHz band also included.
HPF	High Pass Filter
HTTP	In computer science, the Hypertext Transfer Protocol (HTTP) is an application layer protocol in the Internet protocol (IP) suite model for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web, where hypertext documents include hyperlinks to other resources that the user can easily access, for example by a mouse click or by tapping the screen in a web browser.
HW	Electronic Hardware which consists of interconnected electronic components.
Hz	The Hertz (symbol: Hz) is the unit of frequency in the International System of Units (SI) and is defined as one cycle per second. It is named after Heinrich Rudolf Hertz (1857–1894), the first person to provide conclusive proof of the existence of electromagnetic waves. Hertz are commonly expressed in multiples: kilo Hertz ( $10^3$ Hz, kHz), Mega Hertz ( $10^6$ Hz, MHz), Giga Hertz ( $10^9$ Hz, GHz), Tera Hertz ( $10^{12}$ Hz, THz).

I	
IC	Integrated Circuit
IF	Intermediate Frequency. Internally converted frequency for amplification and other signal processing.
IF shift	A function that electronically shifts the IF from a center frequency to reduce interference.
IMD	Inter-Modulation Distortion.
Inverter	An electrical device that converts direct current, DC, to alternating current, AC. Can be a source of noise.
IP address	In computer science, the Internet Protocol address (IP address) is a numerical label such as 192.0.2.1 that is connected to a computer network that uses the Internet Protocol for communication. An IP address serves two main functions - host or network interface identification and location addressing. IP addresses are written and displayed in human-readable notations, such as 192.0.2.1 in IPv4, and 2001:db8:0:1234:0:567:8:1 in IPv6. Network administrators assign an IP address to each device connected to a network. Such assignments may be on a static (fixed or permanent) or dynamic basis, depending on network practices and software features.
IRLP	Internet Radio Linking Project, allowing ham operators to join in on a party line, with the internet connecting repeaters together.
IT	Information Technologies

J	
JT65	A weak signal digital communication mode, primarily used on HF and 6 m, for weak signal and EME type contacts (moon bounce, meteor scatter).

K	
Knife edge	The refraction of a signal over tall buildings and mountains.

L	
LAN	In computer science, the local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building. Ethernet (cable) and Wi-Fi (wireless) are the two most common technologies in use for local area networks.
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Low Frequency. 30-300 kHz range signals.
Li-Ion	Lithium Ion. Rechargeable battery which has better capacity than Ni-Cd, Ni-MH, etc., no memory effect after repeated non-full charge/discharge cycles.
Logging software	A software for computer log of contacts.
LPF	Low Pass Filter
LSB	Lower Side Band

M	
MAC address	In computer science, the media access control address (MAC address) is a unique identifier assigned to a network interface controller (NIC) for use as a network address in communications within a network segment. As typically represented, MAC addresses are recognizable as six groups of two hexadecimal digits, separated by hyphens, colons, or without a separator. MAC addresses are primarily assigned by device manufacturers, and are therefore often referred to as the burned-in address, or as an Ethernet hardware address, hardware address, or physical address.
Maritime mobile	Amateur radio operation from aboard a marine vessel.
MARS	Military Affiliate Radio Service
Memory bank	A set of memory channels organized into a group.
Memory effect	Rechargeable batteries such as Ni-Cd and Ni-MH types may be temporality getting less capacity as a result of repeated non-full charge/discharge cycles. It is called so since rechargeable batteries lose capacity as if "memorize" wrong full capacity level at less than full charge. Li-Ion batteries are free from this effect.
MF	Medium Frequency. 300 kHz - 3 MHz range signals.
MIC	MICrophone
Mobile	In a vehicle, or other type station no fixed at a specific location.
Modulation	Method of adding information to a radio frequency carrier.
MT63	A weak signal, digital communications mode, being used in MARS net traffic.
MUF	Maximum Usable Frequency, the highest frequency that may return a skywave back to earth.

N	
NB	Noise Blanker. A receiver function reducing pulse-type noises.
NBFM	Narrow Band FM
Ni-Cd	Nickel-Cadmium
Ni-MH	Nickel-Metal Hydride
Notch filter	Sharp and narrow rejection filter for elimination of interfering signals
NR	Noise Reduction. DSP feature reduces unwanted signal noise.
NTP	In computing and electronic systems, the Network Time Protocol (NTP) is a protocol used to synchronize computer clock times in a network. It belongs to and is one of the oldest parts of the TCP/IP protocol suite. The term NTP applies to both the protocol and the client-server programs that run on computers. NTP uses Coordinated Universal Time (UTC) to synchronize computer clock times with extreme precision, offering greater accuracy on smaller networks - down to a single millisecond in a local area network and within tens of milliseconds over the internet. NTP does not account for time zones, instead relying on the host to perform such computations.
NVIS	Near Vertical Incidence Skywave, a method of lowering a dipole, or an angled vertical, to enhance a high elevation of signal radiation and reception.

O	
Offset frequency	Frequency difference between transmits and receives.
Ohm	The ohm (symbol: $\Omega$ ) is the SI derived unit of electrical resistance, named after German physicist Georg Ohm.
Optoisolator	An opto-isolator (also called an optocoupler, photocoupler, or optical isolator) is an electronic component that transfers electrical signals between two isolated circuits by using light. Found also in tuning knob circuits, where an LED shines through an interrupter to signal a data pulse.
OS	In computer science, the operating system (OS) is system software that manages computer hardware, software resources, and provides common services for computer programs. For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and frequently makes system calls to an OS function or is interrupted by it. Operating systems are found on many devices that contain a computer - from cellular phones and video game consoles to web servers and supercomputers.
OSC	OSCillator
Oscillator	An electronic oscillator is an electronic circuit that produces a periodic, oscillating electronic signal. The heart of all radios.

P	
PA	Power Amplifier
PACTOR	Digital radio modulation used mostly on the HF bands for digital messaging.
Parawatch	= Dualwatch
PBT	PassBand Tuning. A receiver function to reduce interference by electronically narrowing the IF bandwidth.
PC	A personal computer (PC) is a multi-purpose computer whose size, capabilities, and price make it feasible for individual use. Personal computers are intended to be operated directly by an end user, rather than by a computer expert or technician.
PEP	Peak Envelope Power. RF power at modulation crest.
Photovoltaic	Solar cell, converting photons to electricity.
PLL	Phase Locked Loop. A control system that generates an output signal whose phase is related to the phase of an input signal. Used to synthesize various frequencies a radio will operate on.
PSK31	A type of radio-teletype using Phase Shift Keying with a very narrow bandwidth as an efficient way of communicating.
PTT	Push To Talk, also known as press-to-transmit, is a method of having conversations or talking on half-duplex communication lines, including two-way radio, using a momentary button to switch from voice reception mode to transmit mode.
PWR	PoWeR

Q	
Q	Response of a circuit over a specific bandwidth. Also, Ham Slang for a contact, or QSO.
QRP	Low power operation. QRP means power 5 to 1 watts, QRPp means power below 1 watt to 100 milliwatts and QRPpp means any power below 100 milliwatts.

R	
Reflected power	The portion of the generated power that is not coupled into the load (antenna) and that returns back to the transmitter due to an impedance mismatch.
Refraction	Radio waves are bent back to earth, via the ionosphere, by refraction.
Repeater	Radio systems, which receive incoming signal and re-transmit it for extended communication area. Normally put on geographically high locations for VHF/UHF hand portables.
RF	Radio Frequency
RF ground	Connection of RF equipment to earth ground or RF counterpoise.
RFI	Radio Frequency Interference or Immunity
RJ-45	In telecommunications and computers, the RJ-45 (standardized Registered Jack) is a type of cable connector which is mainly used in the computer networks. Ethernet cables with RJ-45 connectors are also called RJ-45 cables. These RJ-45 cables feature a small plastic plug on each end, and the plugs are inserted into RJ-45 sockets of the Ethernet devices. RJ-45 is the most known and popular connector type in the IT world.
RIT	Receiver Independent Tuning. Fine-tuning receive frequency only without changing transmit frequency.
RS-232	In telecommunications and computers, the RS-232 (Recommended Standard 232) is a standard for serial communication transmission of data. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pinout of connectors. The RS-232 standard had been commonly used in computer serial ports and is still widely used in industrial communication devices.
RTTY	Radio TeleTYpe is a telecommunications system of teleprinters connected by radio rather than a wired link.
RX	Receive

S	
S/N, SNR	Signal to Noise ratio
SAR	Search And Rescue - the search for and provision of aid to people who are in distress or imminent danger.
Safety (RF)	RF exposure limits to minimize human over exposure to RF signals from a nearby antenna.
Scan	Continually sweeping frequencies looking for signals.
Scan Edge	End and start frequencies for a scanning range.
Scratch Pad Memory	Temporary frequency memories for quick access.
Semi Duplex	An operation mode in which transmits and receives is accomplished on different frequencies alternatively. Semi-duplex is also known as "crossband operation".
Sensitivity	Indicates how weak a signal the receiver can detect.
Simplex	Simplex-connection can only send signals to the receiver. It will not receive a return signal.
SMA	Sub-Miniature connector. Type of antenna connector, used in VHF/UHF.
SNMP	In computer science, the Simple Network Management Protocol (SNMP) is an Internet Standard protocol for collecting and organizing information about managed devices on IP networks and for modifying that information to change device behavior. SNMP is widely used in network management for network monitoring.
SP	SPEaker
Split	An operating mode in which the transmit and receive frequency is different.
SQL	SQUELch. A function muting audio output for set conditions.
SSB	Single Side Band
SSTV	Slow Scan TV. Graphics communication using narrow bandwidth.
Subnet mask	The subnet mask is used by the TCP/IP protocol to determine whether a host is on the local subnet or on a remote network.
SWL	Short Wave Listener
SWR, VSWR	Standing Wave Ratio is a measure of impedance matching (often called Voltage SWR or VSWR). Checking the SWR is a standard procedure in a radio station. Measuring SWR at the transmitter output can reveal problems in either the antenna or the transmission line.



T	
TCXO	Temperature Compensated Crystal Oscillator. It does not need a thermostat oven unlike an OCXO - the Oven Controlled Crystal Oscillator.
TNC	<ul style="list-style-type: none"> <li>• Terminal Node Controller. Modem for data communication.</li> <li>• A type of antenna connector.</li> </ul>
TOT	Time Out Timer. Time limiting function for continued repeater or other operations.
Towers	Antenna support structures.
Transverter	A device similar to a downconverter, but used for both receive and transmit.
TS	Tuning Step. Incremental steps.
TSQL	Tone SQuelch. Squelch function using subaudible tones, selective call.
TVI	TeleVision Interference
TX	Transmit

U	
UHF	Ultra High Frequency. 300 MHz - 3 GHz range signals.
UHF connector	Sometimes called SO-239 jack and PL-259 plug, for coaxial cable, on VHF.
Uplink (↔ Downlink)	Frequency that user transmits to the repeater or satellite.
USB	<ul style="list-style-type: none"> <li>• Upper Side Band</li> <li>• Universal Serial Bus</li> </ul>
UTC, GMT	Universal Time Coordinated. An astronomical time based on the Greenwich meridian (zero degrees longitude).

V	
VCO	Voltage Controlled Oscillator, found in the PLL section of the modern radio.
VFO	Variable Frequency Oscillator
VHF	Very High Frequency. 30 - 300 MHz range signals.
VOX	Voice Operated transmission. A function that automatically switches the transceiver to transmit when you talk into the microphone.
VSC	<ul style="list-style-type: none"> <li>• Voice Scan Control</li> <li>• Voice Squelch Control</li> </ul>

W	
Waveguide	The carrier of microwaves from radio to antenna, and back.
Weather Alert	NOAA broadcast station transmitting alert signals.
WFM	Wideband FM
WPM	Words per minute

Y	
Yagi	A type of Directional antenna, named also "Yagi-Uda antenna" after the inventor Shintaro Uda, 1926.

## 8. MORSE CODE ABBREVIATIONS



Morse code abbreviations are used to speed up Morse communications by foreshortening textual words and phrases. Morse abbreviations are short forms representing normal textual words and phrases formed from some (fewer) characters borrowed from the words or phrases being abbreviated.

Abbreviation	Meaning	Type of abbreviation
AA	All after (used after question mark to request a repetition)	operating signal
AB	All before (similarly)	operating signal
ADRS	Address	operating signal
ADS	Address	operating signal
AGN	Again	operating signal
$\overline{\text{AR}}$	End of transmission	operating signal
$\overline{\text{AS}}$	Wait	operating signal
BK	Break (to pause transmission of a message, say)	operating signal
BN	All between	operating signal
C	Yes; correct	operating signal
CFM	Confirm	operating signal
CK	Check	
CL	Closing (I am closing my station)	operating signal
CQ	Calling ... (calling all stations, any station)	operating signal
CQD	All stations distress (used preceding SOS to let all operators know of an impending distress signal)	operating signal
CS	Call sign (used to request a call sign)	
DE	From (or "this is")	operating signal
DX	Distance (sometimes refers to long distance contact), foreign countries	
FM	From	operating signal
FWD	Forward	
II	I say again	
K	Invitation to transmit	operating signal
$\overline{\text{KN}}$	Over to you; only the station named should respond (e.g., W7PTH DE W1AW KN)	operating signal
LID	Poor operator	

*Continued*



Abbreviation	Meaning	Type of abbreviation
MSG	Prefix indicating a message to or from the master of a ship concerning its operation or navigation	
N	No; nine	
NIL	I have nothing to send you	
NR	Number follows	operating signal
OK	Okay	operating signal
PLS	Please	
PPR	Paper	
PSE	Please	
PX	Prefix	
R	Received as transmitted (origin of "Roger")	operating signal
RPT	Report / Repeat please / I repeat as follows	
RST	Signal report format (Readability-Signal Strength-Tone)	operating signal
SFR	So far (proword)	
SIG	Signature	
$\overline{SK}$	Out (prosign), end of contact	operating signal
SK	Silent Key (a deceased radio amateur)	
SVP	Please ( <i>French</i> : "S'il vous plaît")	
TU	Thank You	
W	Word / Words	
WA	Word after	operating signal
WB	Word before	operating signal
WC	Wilco	operating signal
WD	Word / Words	
WX	Weather / Weather report follows	
Z	Zulu time i.e., UTC	operating signal
73	Best regards	92 Code
88	Love and kisses	92 Code

Table 8-1 | Morse code Abbreviations



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ACOM Quick Guide Brochure | First Edition, Revision 01 | February 2022.

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