

LEARNING MADE EASY



4th Edition

Ham Radio

for
dummies[®]
A Wiley Brand



Become an amateur operator
and get your FCC license

Learn must-know tips for building
and using your ham station

Communicate during
emergencies or disasters

H. Ward Silver

*ARRL Handbook Editor and
CQ Contest Hall of Fame Member*



Ham Radio

4th Edition

by H. Ward Silver

for
dummies[®]
A Wiley Brand

Ham Radio For Dummies®, 4th Edition

Published by: **John Wiley & Sons, Inc.**, 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

Copyright © 2021 by John Wiley & Sons, Inc., Hoboken, New Jersey

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at www.wiley.com/go/permissions.

Trademarks: Wiley, For Dummies, the Dummies Man logo, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and may not be used without written permission. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE
--

CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002. For technical support, please visit <https://hub.wiley.com/community/support/dummies>.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this

material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2021934046

ISBN 978-1-119-69560-8 (pbk); ISBN 978-1-119-69576-9 (ebk); ISBN 978-1-119-69561-5 (ebk)

Ham Radio For Dummies®

To view this book's Cheat Sheet, simply go to www.dummies.com and search for “Ham Radio For Dummies 4e Cheat Sheet” in the Search box.

Table of Contents

[Cover](#)

[Title Page](#)

[Copyright](#)

[Introduction](#)

[About This Book](#)

[My Assumptions about You](#)

[Icons Used in This Book](#)

[Beyond the Book](#)

[Where to Go from Here](#)

[**Part 1: Getting Started with Ham Radio**](#)

[**Chapter 1: Getting Acquainted with Ham Radio**](#)

[Exploring Ham Radio around the World](#)

[Tuning into Ham Radio](#)

[Radiosport — Competing with Ham Radio](#)

[Communicating through Ham Radio Contacts](#)

[Citizen Science and HamSCI](#)

[**Chapter 2: Getting a Handle on Ham Radio Technology**](#)

[Getting to Know Basic Ham Radio Gear](#)
[Building a Basic Ham Radio Station](#)
[Communication Technologies](#)
[Understanding the Fundamentals of Radio Waves](#)
[Dealing with Mother Nature](#)

Chapter 3: Finding Other Hams: Your Support Group

[Finding and Being a Mentor](#)
[Interacting in Online Communities](#)
[Joining Radio Clubs](#)
[Exploring the ARRL](#)
[Taking Part in Specialty Groups](#)
[Attending Hamfests and Conventions](#)

Part 2: Wading through the Licensing Process

Chapter 4: Understanding the Licensing System

[Getting Acquainted with the Amateur Service](#)
[Learning about Types of Licenses](#)
[Getting Licensed](#)
[Receiving Your New Call Sign](#)

Chapter 5: Preparing for Your License Exam

[Getting a Grip on the Technician Exam](#)
[Finding Study Resources](#)
[Locating Your Mentor](#)

Chapter 6: Taking the Exam

[Types of Exams](#)
[Finding an Exam Session](#)
[Registering with the Universal Licensing System \(ULS\)](#)
[Getting to Exam Day](#)

Chapter 7: Obtaining Your License and Call Sign

[Completing Your Licensing Paperwork](#)

[Finding Your Call Sign](#)
[Picking Your Own Call Sign](#)
[Maintaining Your License](#)

Part 3: Hamming It Up

Chapter 8: Receiving Signals

[Learning by Listening](#)
[Using Your Receiver](#)
[Receiving Signals](#)

Chapter 9: Basic Operating

[Understanding Contacts \(QSOs\)](#)
[Casual Conversation — Ragchewing](#)
[Making Repeater and Simplex Contacts](#)
[Digital Voice Systems](#)
[Casual Operating on HF](#)

Chapter 10: Public Service Operating

[Joining a Public Service Group](#)
[Preparing for Emergencies and Disasters](#)
[Operating in Emergencies and Disasters](#)
[Providing Public Service](#)
[Participating in Nets](#)
[Digital Message Networks](#)

Chapter 11: Operating Specialties

[Getting Digital](#)
[DXing — Chasing Distant Stations](#)
[Taking Part in Radio Contests](#)
[Chasing Awards](#)
[Mastering Morse Code \(CW\)](#)
[QRP \(Low Power\) and Portable Operating](#)
[Operating via Satellites](#)
[Seeing Things: Image Communication](#)

Part 4: Building and Operating a Station That Works

Chapter 12: Getting on the Air

- [What Is a Station?](#)
- [Planning Your Station](#)
- [Choosing a Radio](#)
- [Choosing an Antenna](#)
- [Supporting Your Antenna](#)
- [Station Accessories](#)
- [Remote Control Stations](#)
- [Upgrading Your Station](#)

Chapter 13: Organizing a Home Station

- [Designing Your Station](#)
- [Building in RF and Electrical Safety](#)
- [Grounding and Bonding](#)

Chapter 14: Computers in Your Ham Station

- [What Type of Computers Do Hams Use?](#)
- [What Do Ham Computers Do?](#)
- [Keeping a Log of Your Contacts](#)
- [Confirming Your Contacts](#)

Chapter 15: Operating Away from Home

- [Mobile Stations](#)
- [Portable Operating](#)

Chapter 16: Hands-On Radio

- [Acquiring Tools and Components](#)
- [Maintaining Your Station](#)
- [Overall Troubleshooting](#)
- [Troubleshooting Your Station](#)
- [Troubleshooting RF Interference](#)
- [Building Equipment from a Kit](#)
- [Building Equipment from Scratch](#)

Part 5: The Part of Tens

Chapter 17: Ham Radio Jargon — Say What?

[Spoken Q-signals](#)
[Contesting or Radiosport](#)
[Antenna Varieties](#)
[Feed Lines](#)
[Antenna Tuners](#)
[Repeater Operating](#)
[Grid Squares](#)
[Interference and Noise](#)
[Connector Parts](#)
[Solar and Geomagnetic Activity](#)

Chapter 18: Technical Fundamentals

[Electrical Units and Symbols](#)
[Ohm's Law](#)
[Power](#)
[Decibels](#)
[Attenuation, Loss, and Gain](#)
[Bandwidth](#)
[Filters](#)
[Antenna Patterns](#)
[Standing Wave Ratio \(SWR\)](#)
[Battery Characteristics](#)
[Satellite Tracking](#)

Chapter 19: Tips for Masters

[Listening to Everything](#)
[Learning How It Works](#)
[Following the Protocol](#)
[Keeping Your Axe Sharp](#)
[Practice to Make Perfect](#)
[Paying Attention to Detail](#)
[Knowing What You Don't Know](#)
[Maintaining Radio Discipline](#)
[Make Small Improvements Continuously](#)
[Help Others and Accept Help from Others](#)

[Index](#)

[About the Author](#)

[Connect with Dummies](#)

[End User License Agreement](#)

List of Tables

Chapter 3

[TABLE 3-1 Hosts and Directories for Ham Radio Reflectors](#)

[TABLE 3-2 Regional General-Interest Events](#)

[TABLE 3-3 Themed Conventions](#)

Chapter 4

[TABLE 4-1 Privileges by License Class](#)

[TABLE 4-2 Relative Populations of U.S. License Classes](#)

Chapter 7

[TABLE 7-1 Call Signs Available by License Class](#)

Chapter 8

[TABLE 8-1 Activity Map for the HF Bands](#)

[TABLE 8-2 Day/Night HF Band Use](#)

Chapter 9

[TABLE 9-1 ITU Standard Phonetics](#)

[TABLE 9-2 Common Q-Signals](#)

[TABLE 9-3 Reporting Signal Quality](#)

[TABLE 9-4 VHF/UHF CW and SSB Calling Frequencies](#)

[TABLE 9-5 Repeater Channel Spacings and Offsets](#)

Chapter 11

[TABLE 11-1 Digital Mode Software Resources](#)

[TABLE 11-2 RTTY Resources](#)

[TABLE 11-3 APRS Resources](#)

[TABLE 11-4 Popular DX Awards Programs](#)

[TABLE 11-5 Popular Contests for Beginners](#)

[TABLE 11-6 Contest Calendars](#)

[TABLE 11-7 Popular Contest Logging Software](#)

[TABLE 11-8 North American QRP HF Calling Frequencies](#)

[TABLE 11-9 QRP and Portable Operating Resources](#)

Chapter 12

[TABLE 12-1 Relative Cost Comparisons](#)

[TABLE 12-2 Relative Cost and Loss of Popular Feed Lines](#)

[TABLE 12-3 Tower Manufacturers](#)

[TABLE 12-4 Antenna Tuner Manufacturers](#)

Chapter 16

[TABLE 16-1 Common Adapters](#)

List of Illustrations

Chapter 1

[FIGURE 1-1: The FlexRadio Systems Maestro combines traditional operating contro...](#)

[FIGURE 1-2: Students from the New Jersey Institute of Technology club \(K2MFF\) o...](#)

Chapter 2

[FIGURE 2-1: A typical mobile FM station and a handheld transceiver with some co...](#)

[FIGURE 2-2: A typical HF \(shortwave\) station and a station set up to use digita...](#)

[FIGURE 2-3: As a radio wave travels, its fields oscillate at the frequency of t...](#)

[FIGURE 2-4: The radio spectrum extends over a wide range of frequencies and wav...](#)

Chapter 3

[FIGURE 3-1: QST, On The Air, QEX, and NCJ cover nearly every aspect of ham radi...](#)

[FIGURE 3-2: The world-famous W1AW station in Newington, Connecticut.](#)

[FIGURE 3-3: Derek Cohn \(WBØTUA\) had a blast while activating his first Park On ...](#)

[FIGURE 3-4: These young hams from Europe, Africa, and Asia gathered in Bulgaria...](#)

[FIGURE 3-5: CQ Communications publications cover just about every style and int...](#)

[FIGURE 3-6: University of Washington students designed and built HuskySat-1, la...](#)

[FIGURE 3-7: Sean Kutzko \(KX9X\) shows that satellite operation can be easy!](#)

[FIGURE 3-8: The QRP ARCI publishes this excellent quarterly magazine featuring ...](#)

Chapter 4

[FIGURE 4-1: ITU region map showing the world's three administrative regions for...](#)

[FIGURE 4-2: Hams are allocated "bands" of frequencies across the radio spectrum...](#)

Chapter 7

[FIGURE 7-1: The ARRL VEC version of a CSCE form.](#)

[FIGURE 7-2: The NCVFC Form 605 that is filed with the FCC. This version was rel...](#)

Chapter 8

[FIGURE 8-1: The 80 meter band sub-band plan showing the privileges for each cla...](#)

[FIGURE 8-2: Handheld \(left\) and mobile \(right\) transceivers for the VHF/UHF ban...](#)

[FIGURE 8-3: Drake R-4C \(left\), top of the line 1970s analog receiver. The Kenwo...](#)

[FIGURE 8-4: The *SDRuno* receiving software simultaneously showing several 20 met...](#)

[FIGURE 8-5: The DXMAPS website displays contacts as soon as they are reported. ...](#)

[FIGURE 8-6: Repeater directories are available online, as books, or as apps for...](#)

[FIGURE 8-7: AM, USB, and LSB signals. Following the usual convention, the USB s...](#)

[FIGURE 8-8: The OpenSPOT2 hotspot communicates locally on the 70 cm band and ov...](#)

[FIGURE 8-9: The fldigi display with received text and a waterfall-style signal ...](#)

Chapter 9

[FIGURE 9-1: The basic repeater system.](#)

[FIGURE 9-2: Repeater input and output frequency pairs.](#)

[FIGURE 9-3: Repeater allocations on the five primary VHF/UHF bands \(frequencies...\)](#)

[FIGURE 9-4: An RT Systems setup table.](#)

[FIGURE 9-5: The basic IRLP system. The EchoLink system is very similar.](#)

[FIGURE 9-6: An overview of the D-STAR system.](#)

[FIGURE 9-7: An overview of the WIRES-X system.](#)

[FIGURE 9-8: An overview of the DMR system.](#)

[FIGURE 9-9: The general operating conventions on the HF bands.](#)

[FIGURE 9-10: A PSK31 QSO using DigiPan software.](#)

Chapter 10

[FIGURE 10-1: A typical personal go kit.](#)

[FIGURE 10-2: An ICS-213 General Message form.](#)

[FIGURE 10-3: Winlink mailbox stations using WINMOR as of September 2020.](#)

[FIGURE 10-4: Elements of a typical AREDN network.](#)

Chapter 11

[FIGURE 11-1: The *WS/T-X* windows during FT8 operation on 20 meters.](#)

[FIGURE 11-2: RTTY tuning indicators of the MMTTY software.](#)

[FIGURE 11-3: WA1LOU's position reported by APRS.](#)

[FIGURE 11-4: The WB8ELK Skytracker balloon tracked via APRS.](#)

[FIGURE 11-5: An azimuthal-equidistant map centered on the Midwestern United Sta...](#)

[FIGURE 11-6: DX QSL cards from \(clockwise from upper left\) Reunion Island, Soma...](#)

[FIGURE 11-7: Participating in a contest can result in an attractive certificate...](#)

[FIGURE 11-8: Special events and achievement award certificate.](#)

[FIGURE 11-9: My paddle-key combo and the venerable straight key.](#)

[FIGURE 11-10: The FT-817 and KX3 are two popular commercial QRP HF radios.](#)

[FIGURE 11-11: KB8UIP enjoys activating peaks on the VHF bands for the Summits O...](#)

[FIGURE 11-12: Competitors in a direction-finding meet use lightweight portable ...](#)

[FIGURE 11-13: Pictures typical of those sent via amateur radio image modes.](#)

Chapter 12

[FIGURE 12-1: \(a\) A FlexRadio Maestro control console; \(b\) Icom IC-7300 standalo...](#)

[FIGURE 12-2: FM radios: \(a\) A Yaesu FT-7900A mobile and \(b\) a Kenwood TH-D74A h...](#)

[FIGURE 12-3: An HF beam antenna for 20 through 10 meters \(a\) and a dual-band VH...](#)

[FIGURE 12-4: Loops and dipoles are simple and effective HF wire antennas.](#)

[FIGURE 12-5: Different types of feed lines.](#)

[FIGURE 12-6: Mounting a rotator on a mast and on a tower.](#)

[FIGURE 12-7: A simple configuration for a remotely controlled station.](#)

Chapter 13

[FIGURE 13-1: Three popular arrangements of monitors with radios.](#)

[FIGURE 13-2: Station desk and chair ergonomics should be arranged for operator ...](#)

[FIGURE 13-3: A tabletop station built around laptop and tablet computers.](#)

[FIGURE 13-4: A simple, uncluttered layout is effective for long periods of oper...](#)

[FIGURE 13-5: A station with two main transceivers for high-performance contest ...](#)

[FIGURE 13-6: Adding a second monitor provides more information to the operator....](#)

[FIGURE 13-7: *Grounding and Bonding for the Radio Amateur* by the author shows yo...](#)

[FIGURE 13-8: Proper bonding for RF signals with a safety ground.](#)

[FIGURE 13-9: Metal sheeting under equipment helps control RF picked up from you...](#)

Chapter 14

[FIGURE 14-1: The *PowerSDR* software's operator interface showing a received CW s...](#)

[FIGURE 14-2: A typical paper log sheet showing basic information.](#)

[FIGURE 14-3: \(a\) *DXLab Suite* is a general purpose logging program; \(b\) N3FJP's](#)

[FIGURE 14-4: One of my QSL cards.](#)

Chapter 15

[FIGURE 15-1: The FT-891 transceiver is designed for mobile and portable operati...](#)

[FIGURE 15-2: This folding bicycle-mobile station was built by Christian Bravo, ...](#)

[FIGURE 15-3: Most mobile radios have detachable lightweight control heads or fa...](#)

[FIGURE 15-4: \(a\) A Hamstick-type mobile antenna mounted on the NØAX mobile alon...](#)

[FIGURE 15-5: W6PNG operated this portable station from the Golden Gate National...](#)

[FIGURE 15-6: The author operating from a campground on Emerald Island, NC.](#)

[FIGURE 15-7: \(a\) Chuck Greeno, WA7BRL, using a Buddipole portable dipole antenn...](#)

[FIGURE 15-8: Members of the St Charles Amateur Radio Club \(KØØA\) during the Fie...](#)

Chapter 16

[FIGURE 16-1: A set of tools needed for routine ham station maintenance.](#)

[FIGURE 16-2: The common types of crimp terminals.](#)

[FIGURE 16-3: The common types of RF connectors and adapters.](#)

[FIGURE 16-4: Power connectors used for ham radio equipment.](#)

[FIGURE 16-5: Audio and data connectors.](#)

[FIGURE 16-6: Use these tools for building or repairing electronic equipment.](#)

Chapter 18

[FIGURE 18-1: \(A\) Signal bandwidth example and \(B\) a filter bandwidth example.](#)

[FIGURE 18-2: Filter types, showing the responses of low-pass, bandpass, and hig...](#)

[FIGURE 18-3: Antenna patterns: \(a\) Azimuthal pattern and \(b\) Elevation pattern.](#)

Introduction

You may have come across ham radio in any number of ways. Did you browse a ham radio website, see a social media post about ham radio, or watch a YouTube video? Maybe you have a teacher, friend, or relative who enjoys ham radio. You could have seen hams on your newsfeed providing communication after natural disasters like hurricanes or during wildfires. Maybe you saw them helping out with a parade or race or you encountered a Field Day setup, ham radio's nation-wide "open house." Maybe you saw someone operating in a park or on a mountain-top trail. Wherever you find it, ham radio has room for an amazing number of activities and lots of hams just like you!

The traditional image of ham radio is of a room full of vacuum tube radios, flicking needles, Morse code keys, and enormous microphones, but today's hams have many more options to try. Ham radio has been changing rapidly! Although the traditional shortwave bands are certainly crowded with ham signals hopping around the planet, hams use the Internet, lasers, and microwave transmitters and traveling to unusual places high and low to make contact, even to and from the International Space Station and bouncing signals off the moon!

Simply stated, ham radio provides the broadest and most powerful wireless communications capability available to any private citizen anywhere in the world. Because the world's citizens are craving ever-closer contact and hands-on experiences with technology of all sorts, ham radio is attracting attention from people like you. The hobby has never had more to offer and shows no sign of slowing its expansion into new wireless technologies. (Did I say wireless? Think *extreme* wireless!)

About This Book

Ham Radio For Dummies, 4th Edition, is meant to get you started in ham radio and answer some of your many questions. If you've just become interested in ham radio, you'll find plenty of information here on what the hobby is all about. I will explain how to go about joining the fun by discovering the basics and getting a license. Many resources on ham radio's technical and operating specialties are available, but this book introduces them briefly so you can get up to speed as quickly as possible. It is true that a ham radio license is really a license to learn!

Some readers have asked for more license exam study information. That would make this a very thick book! There are plenty of great study guides out there, both online and in print, for all three license classes so I don't overlap with them. Material is available with lots of background information or in question-and-answer formats. There are flash cards, too! Just do an online search for "ham radio exam study guide" and you'll find lots of choices.

If you've already received your license, congratulations! This book helps you change from a listener to a doer. Any new hobby, particularly a technical one, can be intimidating to newcomers. By keeping *Ham Radio For Dummies* handy in your station, you'll be able to quickly understand what you receive on the airwaves. I cover the basics of getting equipment connected properly and the fundamentals of on-the-air behavior. Use this book as your bookshelf ham radio mentor, and soon, you'll be making contacts with confidence.

You can read this book in any order. Feel free to browse and flip through the pages to any section that catches

your interest. The sidebars and icons are there to support the main story of each chapter, but you can skip them and come back to them later.

The book has five parts. [Parts 1](#) and [2](#) are for readers who are getting interested in ham radio and preparing to get a license. [Parts 3](#) and [4](#) explain how to set up a station, get on the air, and make contact with other hams. [Part 5](#) is the Part of Tens (familiar to all *For Dummies* readers), which presents some tips and suggestions for you to get the most out of ham radio. In the online website for this book there is an extensive glossary and a handy supplement to help you with some of the basic math ham radio uses.

Within this book, you may note that some web addresses break across two lines of text. If you're reading this book in print and want to visit one of these web pages, simply enter the address exactly as it's noted in the text, pretending that the line break doesn't exist. If you're reading this book as an e-book, you've got it easy; just click the web address to be taken directly to the web page.

My Assumptions about You

In writing this book, I made some assumptions about you. You don't have to know a single thing about ham radio or its technology to enjoy *Ham Radio For Dummies*, 4th Edition, and you definitely don't need to be an electronics expert to enjoy this book.

But I ask two things of you:

- » You have an interest in ham radio.
- » You can get online.

Due to the broad nature of ham radio, I couldn't include everything in this book. (Also, if I'd done that, you wouldn't be able to lift it.) But I steer you in the direction of additional resources, that will help you get more out of this book with current information and more explanations.

Icons Used in This Book

While you're reading, you'll notice icons that point out special information. Here are the icons I use and what they mean.



TIP

This icon points out easier, shorter, or more direct ways of doing something. Tips also let you know about topics that are covered on the license exam.



REMEMBER

This icon goes with information that helps you operate effectively and avoid technical bumps in the road.



**TECHNICAL
STUFF**

This icon signals when I show my techie side. If you don't want to know the technical details, skip paragraphs marked with this icon.



WARNING This icon lets you know that some regulatory, safety, or performance issues are associated with the topic of discussion. Watch for this icon to avoid common gotchas.

Beyond the Book

In addition to what you're reading right now, this book also offers free access-anywhere information at www.dummies.com. This includes two appendixes: a comprehensive glossary and some tutorials on “radio math” that are part of ham radio. There is a long list of short entries and tips on topics like tuning, troubleshooting, ways to operate, suggestions for building gear, and many more. You can access these at www.dummies.com/go/hamradiofd4e.

The website also includes a handy Cheat Sheet that includes a summary of your Technician (and soon-to-be General) class license privileges, common Q-signals and repeater channel info, a list of Go Kit gear, and some handy online resources for you. Just search for *Ham Radio For Dummies Cheat Sheet* in the Search box.

Where to Go from Here

If you're not yet a ham, I highly recommend you find your most comfortable chair and read [Parts 1](#) and [2](#) to discover the basics about ham radio and solidify your interest. If you're a licensed ham, browse through [Parts 3](#) and [4](#) to find the topics that interest you most. For a bit of fun and interest, turn the pages of [Part 5](#) for tips and bits of know-how that will help you along your way.

For all my readers, welcome to *Ham Radio For Dummies*,
4th Edition. I hope to meet you on the air someday!

Part 1

Getting Started with Ham Radio

IN THIS PART ...

Get acquainted with ham radio — what it is and how hams contact one another.

Find out about the basic technologies forming the foundation of ham radio.

Discover how hams communicate across town and around the Earth by using the natural world.

Be introduced to the various types of ham communities: on the air, online, and in person.

Chapter 1

Getting Acquainted with Ham Radio

IN THIS CHAPTER

- » Meeting hams around the world
 - » Becoming part of ham radio
 - » Making contact via ham radio
 - » Contributing to science with ham radio
-

Ham radio invokes a wide range of visions. Ham radio operators (or *hams*) are a varied lot — from go-getter emergency communicators and radiosport competitors to casual chatters to workshop tinkerers. Everyone has a place, and you do too.

Hams employ all sorts of radios and antennas using a wide variety of signals to communicate with other hams across town and around the world. They use ham radio for personal enjoyment, for keeping in touch with friends and family, for public service, and for experimenting with radios and radio equipment. They communicate by using microphones, computers, cameras, lasers, Morse keys, and even their own satellites.

Hams meet on the air, online, and in person, in groups devoted to every conceivable purpose. Hams run special flea markets and host conventions large and small. Some hams are as young as 6 years old; others are centenarians. Some have a technical background, but most do not; it's not necessary to enjoy ham radio. One

thing that all these diverse people share, however, is an interest in radio that can express itself in many ways.

This chapter gives you an overview of the world of ham radio and shows you how to become part of it.

HAM: NOT JUST FOR SANDWICHES ANYMORE

Everyone wants to know the meaning of the word *ham*, but as with many slang words, the origin is murky. Theories abound, ranging from the initials of an early radio club's operators to the use of a meat tin as a natural sound amplifier. Of the many possibilities, the following theory seems to be the most believable.

"*Ham*: a poor operator" was used in telegraphy even before radio. The first wireless operators were landline telegraphers who brought with them their language and the traditions of their much older profession. Government stations, ships, coastal stations, and the increasingly numerous amateur operators all competed for signal supremacy in one another's receivers. Many of the amateur stations were very powerful and could effectively jam all the other operators in the area. When this logjam happened, frustrated commercial operators would send the message "THOSE HAMS ARE JAMMING YOU." Amateurs, possibly unfamiliar with the real meaning of the term, picked it up and wore it with pride. As the years advanced, the original meaning completely disappeared.

Exploring Ham Radio around the World

Although the United States has a large population of hams, the amateur population in Europe is growing by leaps and bounds, and Japan has an even larger amateur population. With more than 3 million hams worldwide, very few countries are without an amateur (see the nearby sidebar "[Where the hams are](#)"). Ham radio is alive and well around the world. Listen to the ham radio

frequency bands on a busy weekend and you'll see what I mean!

Hams are required to have licenses, no matter where they operate. (I cover all things licensing in [Part 2](#) of this book.) The international agency that manages radio activity is the International Telecommunication Union (ITU; www.itu.int/en). Each member country is required to have its own government agency in charge of licensing inside its borders. In the United States, hams are part of the Amateur Radio Service (www.fcc.gov/wireless/bureau-divisions/mobility-division/amateur-radio-service), which is regulated and licensed by the Federal Communications Commission (FCC). Outside the United States, amateur radio is governed by similar rules and regulations.



REMEMBER Amateur radio licenses in America are granted by the FCC, but the licensing exams are administered by other hams acting as volunteer examiners (VEs). (I discuss VEs in detail in [Chapter 4](#).) Classes and testing programs are often available through local clubs (see the section “[Clubs and online groups](#),” later in this chapter).

WHERE THE HAMS ARE

The International Amateur Radio Union (IARU; www.iaru.org) counts about 160 countries with a national radio society. Counting all the hams in all those countries is difficult, because in some countries, amateur stations and operators have separate licenses. The United States alone had more than 760,000 hams as of 2020 — the most ever. You may not be surprised to hear that China has the fastest-growing amateur population; Thailand and India aren't far behind.

Because radio signals know no boundaries, hams have always been in touch across political borders. Even during the Cold War, U.S. and Soviet hams made regular contact, fostering long personal friendships and international goodwill. Although the Internet makes global communications easy, chatting over the airwaves with someone in another country or participating in a planet-wide competition is exciting and creates a unique personal connection.



TECHNICAL
STUFF

Since the adoption of international licensing regulations, hams have operated in many countries with minimal paperwork. For example, CEPT, the international treaty that enables countries to recognize one another's amateur licenses, allows hams licensed in their home countries to operate within any other CEPT country. The ARRL provides a lot of useful material about international operating at www.arrl.org/international-regulatory.

Tuning into Ham Radio

Your interest in ham radio may be technical, you may want to use ham radio for public service or personal communications, or you may just want to join the fun. These are all perfectly valid reasons for getting a ham radio license.

THE RADIO IN YOUR POCKET

You already use a radio to transmit all the time, although you probably don't think of it that way. Your mobile phone is actually a very sophisticated, low-power portable radio! You don't have to have a license to use it, of course; the phone company takes care of that. Nevertheless, your phone is really a

radio, transmitting and receiving radio waves that are very similar to some of the radio waves that hams use. As you find out more about ham radio, you'll also find out more about radio waves in general, and you'll begin to look at your mobile phone in a whole new light.

Using electronics and technology

Ham radio lets you work closely with electronics and technology (see [Chapter 2](#)). Transmitting and receiving radio signals can be as much of an electronics-intensive endeavor as you like. By digging into the technology of ham radio, you're gaining experience with everything from basic electronics to cutting-edge wireless techniques. Everything from analog electronics to the latest in digital signal processing and computing technology is applied in ham radio. Whatever part of electronic and computing technology you enjoy most, it's all used in ham radio somewhere ... and sometimes, all at the same time!

In this section, I give you a quick look at what you can do with technology.



REMEMBER You don't have to know everything that there is to know. I've been a ham for almost 50 years, and I've never met anyone who's an expert on everything. A ham radio license is a license to learn!

Design and build

Just as an audiophile might, you can design and build your own equipment or assemble a station from factory-built components. All the components you need are widely available. Some of the original do-it-yourself (DIY) makers, hams delight in *homebrewing*, helping one another build and maintain stations. In software-defined radio (SDR) equipment, computer code is the new