

Portable Shortwave Radio Guide

VERSION 4 ©2011



The information below is not guaranteed to be free of errors.

1. INTRODUCTION

This guide will help you pick a top shortwave radio. Most radios are not worth purchasing. This includes image-laden single-conversion radios that lack SSB (ex. [KA105](#), [FR600](#), [YB-300PE](#), [ATS-404](#), [E10](#), and [CCRadio SWP](#)) and drifty analog-tuned radios with digital frequency-counter displays (ex. [KA008](#), [ETFR](#), [GM400](#), [G1100](#), [PT-50](#), [DE1104](#), [S350DL](#), and [S450DLX](#)) and analog dial radios. My picks are show in **green**; negatives in **yellow**; and deal-breaking negatives in **red**.

2. DUAL-CONVERSION, PLL-SYNTHESIZED, SIDEBAND-SELECTED AM

The charts only show dual-conversion (for gain distribution and image rejection) and PLL-synthesized (for stability and memories) radios. You can minimize selective fading distortion and select the cleaner AM sideband (for reduced adjacent interference) using **SIDEBAND-SELECTED AM**.

For **SIDEBAND-SELECTED AM** select: AM-mode (slow AGC), a narrow filter (3 or 4 kHz), and offset tune by plus (**USB**) or minus (**LSB**) *nearly half* the filter's bandwidth (1 or 2 kHz). You will notice a boost in audio fidelity. Ex. WWCR at 4840 kHz is USB tuned at 4842 kHz and LSB tuned at 4838 kHz. Under *normal* selective fading **SIDEBAND-SELECTED AM** works well; and during heavy fading it is *superior* (there is no lock to be lost) to production portables having Synchronous-AM.

Radio	RF	BW	Step	SSB	Cost	Size	Mem	Knob	Rech
KA11	FAIR	1	5 kHz	NO	\$50	13	1000	NO	NO
DE1105	FAIR	1	1 kHz	NO	\$60	13	1000	WHEEL	YES
G6 Aviator	FAIR	1	1 kHz	10 Hz	\$70	18	700	WHEEL	\$8
KA1101	GOOD	2	5 kHz	NO	\$65	19	20	NO	YES
PL-450	GOOD	2	1 kHz	NO	\$67	21	500	YES	YES
KA1102	GOOD	2	1 kHz	YES	\$69	22	133	NO	YES
DE1103	GOOD	2	1 kHz	YES	\$72	31	268	YES	YES
DE1121^{MP3}	FAIR	2	1 kHz	POOR	\$105	34	400	YES	YES
PL-600	FAIR	2	1 kHz	POOR	\$70	40	500	YES	YES
PT-80	FAIR	1	1 kHz	POOR	\$148	52	18	WHEEL	NO
G4000A	GOOD	2	1 kHz	POOR	\$88	60	40	NO	NO
ATS-909X^{DSP}	GOOD	2	1 kHz	40 Hz	\$245	62	352	YES	\$8
ATS-505P	FAIR	1	1 kHz	POOR	\$103	65	18	YES	NO
RP2100	GOOD	2	1 kHz	\$52	\$112	229	30	YES	\$8
Satellit 750	GOOD	2	1 kHz	YES	\$260	610	600	YES	NO

RF (radio and audio performance), BW (bandwidths), Size (in cubic inches)

Mem (shortwave memories), Rech (recharge system and batteries)

Kaito imports Degen radios; for example, the [KA1103](#) and [DE1103](#) are interchangeable.

*The **CCRadio SW** is the [RP2100](#). The **Tecsun S-2000** is the [Satellit 750](#).*

*Quality control on the **Grundig Satellit 750** and **Grundig G6 Aviator** is not good.*

*The discontinued **ATS-606AP**, **ATS-818ACS**, **E5**, **G5**, and **SW35** are not recommended.*

The [KA1102](#) is a small and lightweight radio with good audio, decent SSB, and "automatic tune scanning" (ATS). Its ATS will automatically populate 20 memories with stations it finds. The radio is good on FM and its buttons are backlit. SSB is only available when in "Page 9" memories.

The **DE1103** is a top modern DXing portable with good whip sensitivity and good immunity to external antenna overload. Its “*pause and continue*” scanning helps to find stations. The knob can be used to step through the memories. The radio does well on FM and its buttons are backlit. Ergonomics are not stellar. The radio has no 5-kHz tuning knob step and the tuning knob doubles as a volume control (press “VOL” then turn the dial; or type a volume number then press “VOL”).

The **RP2100** is easy-to-use and sensitive. It has a big knob, display, and 5 Watts of audio. The unit has no numeric keypad, no SSB (\$52 extra), and only 10 memories per 10 MHz segment.

3. SIDEBAND-SELECTABLE SYNCHRONOUS AM

SAM detectors insert a carrier that maintains phase with the incoming carrier; to help with carrier dropouts. No detector can recover audio lost in a sideband dropout. Distortion is primarily reduced via *bandwidth limiting* (audio phasing can suppress an entire sideband) and a *slow AGC*.

Diode detection of AM is forgiving of local oscillator instability: the carrier, akin to being a BFO, moves with the sidebands in perfect “synchronization”. During carrier dropouts, signals will appear over-modulated; but, with normal modulation, a diode distorts less than a SAM detector.

Radio	RF	BW	Step	SSB	Cost	Size	Mem	Knob	Rech
G3	FAIR	2	1 kHz	YES	\$150	30	700	YES	\$8
PL-660	GOOD	2	1 kHz	YES	\$110	43	1400	YES	YES
SW7600GR	GOOD	1	1 kHz	YES	\$145	45	100	NO	NO

The **DE1106**, possibly similar to the G3, was not available in the US.

Quality control on the **Grundig G3** is not good.

The SW7600GR **holds lock** slightly better than the PL-660 and much better than the G3.

The **SW7600GR** is a *well-built* radio with SAM, good sensitivity, good FM, a slick antenna, and great SSB due to its audio phasing. Sony includes a wind-up antenna (**AN-71**) and a quality carrying case. The audio is a little *tinny* (hollow) sounding and an AC adapter will run about \$20.

4. SILICON LABS Si4734 BASED DSP

The Si4734 is an innovative low-IF DSP receiver chip made by **Silicon Labs**. I have written five articles on this chip. Unfortunately, some makers are not properly programming the chip. The Si4734 has 5 digital filters (*1, 2, 3, 4, and 6 kHz*), an on-chip s-meter, and it automatically tunes its input. **The Si4734 does not decode SSB.** Good SSB helped distinguish the radios chosen above.

Radio	RF	BW	SM	SSB	Cost	Size	Mem	Knob	Rech
DE15	FAIR	1	LIKELY	NO	\$41	6	100	NO	YES
DE1125 ^{MP3}	FAIR	1	LIKELY	NO	\$64	6	100	YES	YES
DE1123 ^{MP3}	FAIR	1	LIKELY	NO	\$49	6	100	NO	YES
PL-360	GOOD	1	YES	NO	\$58	13	250	WHEEL	YES
PL-606	GOOD	4	YES	NO	\$53	13	250	WHEEL	\$4
PL-380	GOOD	5	LOW	NO	\$53	18	250	WHEEL	YES
PL-300WT	FAIR	1	YES	NO	\$55	18	200	WHEEL	YES
G8	FAIR	1	YES	NO	\$50	18	200	WHEEL	NO
PL-310	GOOD	5	YES	NO	\$53	22	200	YES	YES
PL-390	GOOD	5	LOW	NO	\$66	29	250	WHEEL	YES

SM (soft muting): can cause a weak station's audio to drop off or decrease.

Only the **PL-380**, **PL-310**, and **PL-390** have a numeric keypad.

The **PL-390** is a good Si4734-based radio. It has all five digital filters, minimal *soft muting* (can attenuate DX), and a numeric keypad. The AT/ETM makes finding stations simple. The *line in jack* can be used to play other devices through the dual speakers. The display shows signal-to-noise ratio (dB), signal strength (dBU), and temperature. Tuning step size is *1-Khz*. The **PL-380** is the PL-390's smaller sibling with one speaker, no *line in jack*, and no *antenna jack*. The **PL-310** is a popular radio: it is sensitive and has a tuning knob. The PL-310 does have heavier soft muting. **Silicon Labs is now the leader in shortwave technology.** And **Tecsun** has a keen eye for ergonomics.

5. MISCONCEPTIONS AND TIPS

You can hear distant stations (DX) using portables, such as those I recommend. A \$500 tabletop is not needed; but they do work well, especially on SSB. Using **SIDEBAND-SELECTED AM** you can program listen (SWL) without a SAM detector. In 2003, I proved that an **\$11 Sony ICF-S10MK2** and Radio Shack Loop could detect **94%** of what an **ICOM R75** and Quantum QX Loop could (on MW). DX varies moment to moment and catches often depend upon timing, location, operator skill, luck, and the antenna. I routinely use single-transistor (and triode) radios to DX.

Your first upgrade, before a tabletop, should be the antenna. In urban locations **tape 25 feet of wire wrap** (nearly invisible) high up on your wall. Another option is to build a **tuned loop**. Loops reduce mixer energy and can be rotated to stop local noise. *When tuning SSB on a radio without an USB/LSB switch, try offset tuning by 1 to 2 kHz (USB upward, LSB downward)*. The stock speakers on portables are not optimal. Earphones or headphones can greatly enhance the radio's audio. If possible, buy radios from US dealers so that a problem can be returned easier.

6. PORTABLE SHORTWAVE RADIO PICKS

I recommend the **KA1102, DE1103, SW7600GR, PL-390, and PL-380**. Schematics for the first three are available on the internet. The KA1102 is a great little radio for shortwave listening. The DE1103 is the winner of many modern portable DX contests. The SW7600GR is built to last, and has a good synchronous detector and SSB. The PL-380 and PL-390 are DSP radios with five digital filters, an easy-tuning-mode (finds stations for you), a good display, superb FM, and top-notch ergonomics. You can offset tune these two DSP radios by up to an entire filter bandwidth. **Tecsun and Silicon Labs are revolutionizing MW, SW, and FM radio: the PL-390 is sure to please.**

 <p>Kaito KA1102 SWL, small, lightweight <i>no knob</i></p>	 <p>Sony SW7600GR SAM, high-quality, SSB <i>hollow sound</i></p>	 <p>Tecsun PL-380 DSP, 5 filters, ETM <i>no SSB</i></p>
 <p>Degen DE1103 SW DX champion <i>ergonomics not ideal</i></p>	<p><i>If I could own only two:</i></p> <p>DE1103 <i>Degen & Kaito</i></p> <p>PL-390 <i>Tecsun & Silicon Labs</i></p>	 <p>Tecsun PL-390 DSP, 5 filters, ETM, FM DX <i>no SSB</i></p>

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