

"Team AT Sprinters" Invades the August 2012 NAQP CW

Did you have to dig a bit deeper to complete that exchange during the August North American QSO Party CW? If so, you may have encountered the invasion of the AT Sprinters. These operators got together as a team on an ad hoc basis to put their low-cost, low-power radios to the test under contest conditions. These rigs cost about \$100 to \$200 apiece, and, depending upon the model, cover from one to six bands at 3 W to 5 W out. Steven Weber, KD1JV (<http://kd1jv.qrpradio.com/>), designed all of them, although most no longer are available new. Besides being a technically oriented ham, Steven likes to hike the Appalachian Trail and operate ham radio during down times. When overnight hiking, weight is of utmost importance. Steven has an uncanny ability to shrink things down. Most of his rigs fit inside an Altoids breath mints tin (at least one contest friend suggested we rename ourselves "Team Altoids").

When average hams look at one of these rigs, they're often incredulous. "You actually make contacts with that?" is a frequent reaction. We usually explain that the rig contains a superhet receiver with a four-pole crystal IF filter, a direct digital synthesis VFO, electronic memory keyer and full-break-in keying. They share many features typically found in much larger, more expensive radios. While it's a good bet that none of these rigs could compete with the Elecraft K3 or other contest-grade transceiver, they can provide useful communication — plus a lot of fun in the bargain. With the aid of a hand-held computer, some of these sets are even able to run digital modes, such as PSK31.

Appreciation Party Sunned, Elbowed Out

Several aficionados of these rigs had attempted an on-air AT Sprint appreciation party, but a solar flare partially washed out the event. Further complicating matters was competing activity from the NAQP RTTY scheduled for the same weekend. After reading some grousing on the reflectors about the poor turnout and the difficulty of making contacts under such conditions, I figured, "Why not try these rigs in a 'typical' contest?" The NAQP CW was coming up in a few weeks, so I solicited volunteers for teams of ops who owned KJ1DV-designed

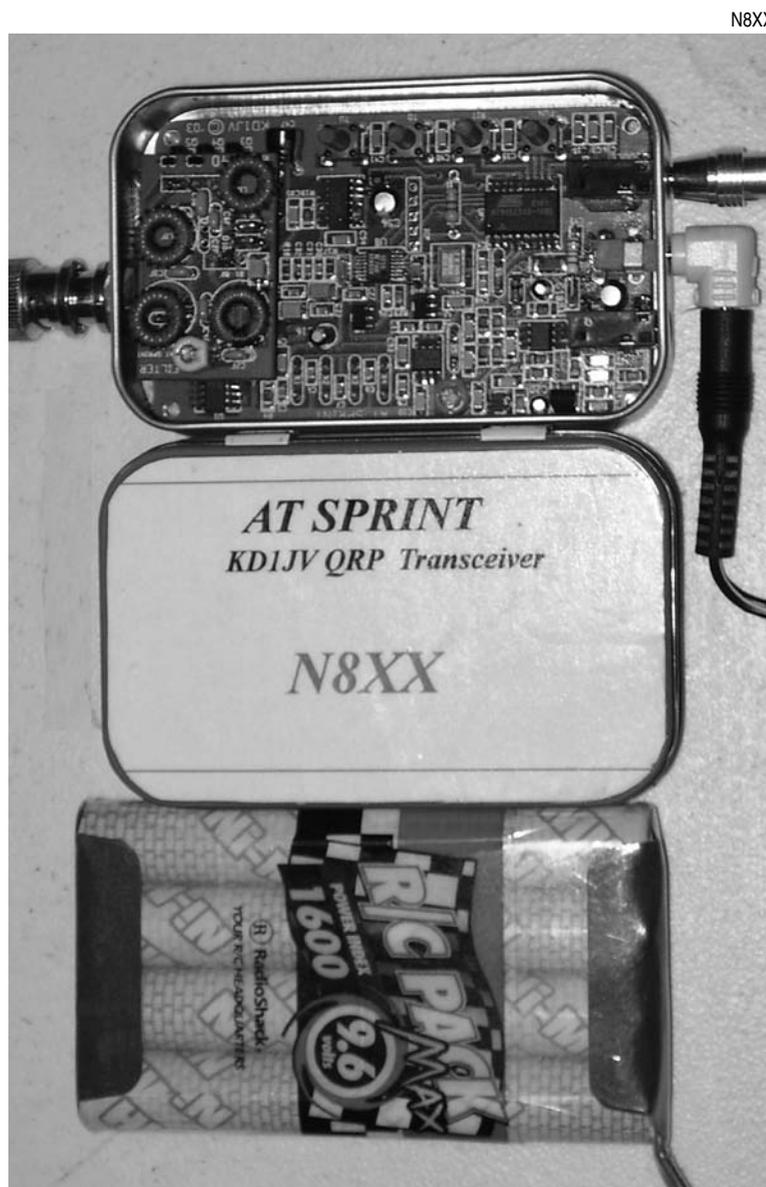
radios. Lo and behold, six volunteers came out of the woodwork. The event was a *go!*

So, why would anyone be nuts enough to use such "minimalist" rigs for contesting? And, why would these folks volunteer for a team in a contest? The participants themselves say it best. Dale, WC7S, who owns

the greatest variety of these rigs, wrote the most complete critique.

Dale, WC7S

"Considering Hank's suggestion to form a team of AT Sprinters took a huge amount of thought and weighing of the situation.



N8XX

Figure 1 — The original edition AT Sprint (c 2003). It covers 40, 30 and 20 meters with plug-in filter modules and puts out 3 W with a 9 V supply and 5 W with a 12 V supply. The IF filter is 350 Hz wide. The radio draws about 55 mA in receive with no signal, and about 400 mA in transmit at 3 W output.

Table 1**How we did in the NAQP**

Call Sign	QTH	Team	Rig	Antennas	Claimed Score
WC7S	WY	2	Tri-Bander, AT Sprint (II, III and 3 B.1)	Doublets, vertical	17,264
N8XX	MI	2	AT Sprint (original version)	80 meter inverted V	11,025
NS7E	MN	1	AT Sprint 3 B.1	Windom @ 45 feet	6681
AA4GA	GA	1	AT Sprint 3 B.1	80 meter doublet	5217
W0EA	IA	1	Mountain Top Radio	Doublet @ 45 feet	1575
N6OSB	CA	2	AT Sprint 3 B.1	Doublet	16

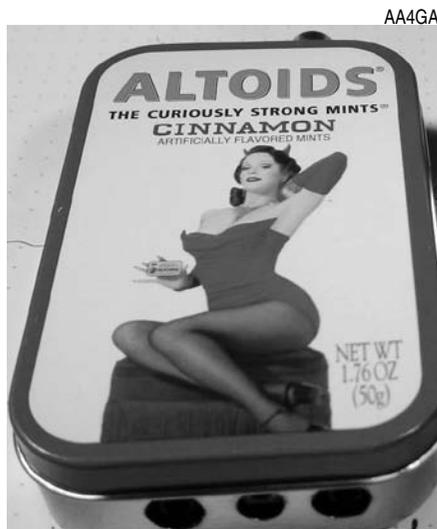


Figure 2 — The AT Sprint 3 B.1 in a rare-find Altoids tin. This rig covers all bands from 80 through 15 meters with plug-in filter modules. The IF filter bandwidth is 500 Hz. The power output is 2.5 W with a 9 V supply, and 4.5 W at 12 V. In receive with no signal it draws 35 mA. In transmit, it consumes 460 mA at 9 V, 610 mA at 12 V. The radio's PA over-current detection kicks in at 820 mA.

My answer arrived on Hank's screen, with absolutely no trees being harmed, in less than 5 minutes. *'Why not?'* In a contest environment, with all wire antennas and a radio that takes up less space than *The ARRL Handbook* and is powered by a 9 V battery? Sure, especially in a contest limited to 100 W stations. That would keep everyone listening and not hurt anyone's ears. How about setting up a number of [these radios] to compare them...with my "big" rigs. The computer was pressed into service for logging, and a supply of 9 V batteries was fully charged. Having already optimized all of the radios, the KD1JV Tri-Band CW Transceiver (Tri-Bander) was chosen to be the opener on 20 meters. With a digital dial, RIT, smooth QSK, and low battery consumption, it proved to be the workhorse on 40 and 20.

"The original AT Sprint in the Zamboids tin (an artfully painted Altoids copy) with its band-opening 2 W held its own, with a short run on 20 at a rate of one per minute for 10 minutes. My overall rate during the entire event was lower on 20, not "hanging high" above the digital crowd.

"With less power than it takes to power

your bathroom nightlight, the AT Sprint II, in its stylish black case with white lettering, looked great while holding its own on 40. The AT Sprint 3 B.1 in a red Altoids tin was impressive on 15, even though the band didn't really come alive. I heard the same stations with the AT Sprint 3 B.1 as I did when I checked the band a few minutes later with an Elecraft K2. I did not spend a lot of time on 15. A quick foray to 40 with the Tri-Bander and a Mountain Topper — an Altoid-sized two-bander — revealed that 40 was noisy. Yes, a noise limiter would be advantageous, but riding the volume control worked well on the Tri-Bander. That would be the one disadvantage of the little radios — the effective limit to audio output, with static crashes being the worst offenders. With the proper set of headphones correctly placed in *front* of your ears, not directly on or into them as with ear buds, the problem becomes much less of an issue.

"Summary = *Fun!* What a blast! Working more than 200 contacts with less than 3 W and antennas below 50 feet, on batteries, using radios that fit in your shirt pocket is a real kick! Thanks to a great designer,

A Brief Overview of the KD1JV QRP Transceivers

Steve Weber, KD1JV, designed the first AT Sprint in 2003. When subsequent versions evolved, it became common to call this the AT Sprint Original Version. Only 50 of these were kitted and offered — what we'd now call beta testing.

The follow-on rig was the AT Sprint II, which came in a specially designed, painted and labeled case. It offered a newer version of the DDS chip for a VFO, which had more onboard memory, plus it drew less current. So, the idling receive draw was 35 mA, as opposed to 55 mA for the original AT Sprint.

After the AT Sprint II, the nomenclature is mix. The successor to the AT Sprint II was the AT Sprint III. When an updated version of the AT Sprint III was developed, however, the nomenclature switched from Roman to Arabic numerals, so it became the AT Sprint 3 A — hence, the AT Sprint 3 A and AT Sprint 3 B ("AT Sprint 3 B.1" is an informal designation for an incremental upgrade of the AT Sprint 3 B).

In terms of functionality, the AT Sprint 3 series radios are essentially the same with minor tweaks. They put out 3 W at 9 V, and 5 W at 12 V. The AT Sprint 3 and 3 A cover 80 through 20, and the 3 B series added 15 meters. Most folks who follow Steve's kits gravitate to the latest versions, which is why the AT Sprint 3 B.1 is listed so often.

There is an AT Sprint 4 and 4 B, but no one used one of these for the NAQP.

Most people who stumble across references to the KD1JV rigs and decide they want one subscribe to the http://groups.yahoo.com/group/at_sprint/ reflector and diligently look for a post where someone is selling an AT Sprint. These usually go within hours, sometimes minutes.

The KD1JV Tri-Band CW Transceiver (aka "Weber Tribander") is a bit different from the above radios. The board comes with surface-mount parts already installed, and the user only has to fit through-hole components. It is kitted and sold by Doug Hendricks, KI6DS (www.qrpkits.com). Many people find this radio easier to build than the AT Sprints, which all use surface-mount parts. The user picks any three ham bands, 80, 40, 30, 20, 17 or 15 meters, when ordering.

The Mountain Topper Radio is a specialized radio with RF specs very similar to those of the AT Sprint 3 B.1, but it's designed with components for two bands, which the builder chooses when putting the rig together. These are switch-selectable, eliminating the need to carry extra band modules and saving space and weight — both important factors when mountain-topping or hiking.

KD1JV. Also, hats off to Doug Hendricks for kitting the Tri-Bander so nicely.

"I've already spent some spare time considering what it might be like to do the ARRL November Sweepstakes with 3 W. There is a real thrill to popping through a pileup with 3 W, making one call, logging the Q, and leaving the higher-power ops still calling. Stay tuned, pull your keys up snug, and hang on. This will be a fun ride!"

Lee, AA4GA

"I was at a North Georgia QRP meeting talking to Chuck, WA6LTV, about his many AT Sprint rigs, and he mentioned, 'Maybe we can make a QSO with our AT Sprints sometime,' which got the wheels turning in my head: Why not an AT Sprint QSO Party? I ran the idea by Dale, WC7S, because he has a lot of experience with Steve's rigs, and, more important, is a great cheerleader for the QRP foxhunts. I knew Dale would be up for helping out with the AT Sprint QSO Party — and he was. But since conditions were so horrible for the AT Sprint QSO Party, when Hank suggested forming an AT-S team for the NAQP, I was all for it!"

TJ, WØEA

"I used the Mountain Topper. My antenna is a 100 foot doublet up 32 feet and fed with 450 Ω window line. I joined the team, because I was really surprised by the fantastic performance of the rig after building it. I never thought a radio that fit in an Altoids tin could be considered a *real* radio; the darn thing doesn't even have a volume control. Boy, was I wrong. Steve really maxes out these designs to the *n*th degree, getting every usable feature into them yet retaining the tiny size. Imagine if it were built with the smaller variety of surface-mounted parts. You could fit it in a matchbox! As far as contest performance, I did not find the NAQP to be as busy as it had been in January, but I still made plenty of contacts. Even with the audio-derived AGC and 500 Hz filter, I experienced little overload or crunching. All in all, I was even more impressed with the radio after the contest. Now, to find a suitable antenna tuner, so I can take it to the park, where it really belongs!"

Arthur, NS7E

"This was my very first contest! Dale, WC7S, said it would be fun, and it sure was! Only two stations did not answer my call (due to QRP?). I had a lot of fun participating in this, and I'm looking forward to doing it again."

Gabriel, N6OSB

"I'm not sure if my four contacts are noteworthy, but here I love my AT Sprint III, and I enjoy any chance I get to use it.

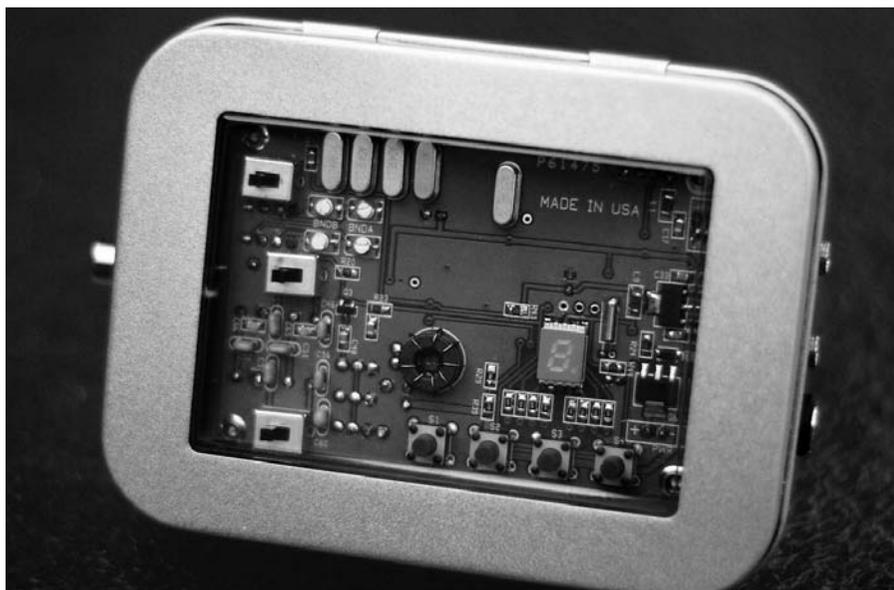


Figure 3 — The Mountain Topper is a two-bander (selectable when ordering), with RF specifications similar to those of the AT Sprint 3 B.1. This rig is perfect for hams who enjoy activating Summits on the Air (www.sota.org.uk). It's super light, yet versatile. This particular unit has been built into a custom case with a clear plastic top.

WC7S



Figure 4 — The AT Sprint II covers 80, 40, 30 and 20 meters. It has a direct digital synthesizer VFO and covers a 150 kHz range. The superheterodyne, single-conversion receiver has a 4.9512 MHz IF. The FET RF power amplifier puts out up to 5 W with 12 V, 2.5 W at 9 V, and 900 mW at 6 V. Output is consistent on all bands.

The opportunity to use our AT Sprints in a contest sounded like a great idea. For the NAQP I knew I wouldn't be able to participate much due to prior commitments, and I made only a handful of contacts. But I still enjoyed what time I could and hope I can participate again as part of a contest team. Next time I hope to be free for the weekend and to be able to make a major contribution to the team."

NØEVZ originally volunteered as our

seventh team member but had to drop out for personal reasons. Few of our scores are likely to make the Top 10 in the QRP category, but they suffice to show the versatility of these little radios. If you're out and about on business or pleasure, consider taking along one of these rigs, or one of similar design, do some hamming, and maybe even participate in a contest.

NCJ