

## Classic Radio

# Ameco 2-Meter Converters

In the 1960s, the 2-meter band was hopping. It was easy to acquire VHF receive capability by using your existing HF receiver with an inexpensive receive converter that converted VHF signals to HF signals, such as the then-popular line of Ameco Nuvistor VHF-to-HF receiving converters.

### Ameco Background

Ameco (American Electronics Company) began selling ham equipment such as transmitters, converters, telegraph keys, and preamplifiers in the 1950s and continued through the '70s. Today, Ameco is a division of Milestone Technology in Colorado, which still carries a few Ameco-branded items.

Ameco converters were available in three factory-wired models (\$49.95), and three kit-form models (\$34.95). We'll be focusing on the 1962 CN144W for 2 meters (see Figure 1), which used the Nuvistor tubes (see Figure 2), and the Model PS-1 Power Supply, which was sold separately as a wired and tested version (\$11.50) or a kit version (\$10.50).

### 2-Meter Converters

Along with a choice of input frequencies, these converters were available with a choice of three IF output frequencies: 7 – 1 MHz, 14 – 18 MHz, or 28 – 30 MHz. The IF bandwidth covered 4 MHz on 6 and 2 meters, and 5 MHz on 220 MHz. By using a converter, all the features of the communications receiver are retained, such as AGC control, RF gain, and filters. I used my Ameco 2-meter converter with my Hammarlund HQ-100A receiver at an IF frequency of 7 – 11 MHz.

These converters are not limited to one IF output. They could cover any



The CN144 Converter and the PS1 power supply connected. [Harold Kramer, WJ1B, photo]

frequency between 0.5 and 35 MHz. Ameco touted in their advertisements that the IF output could be easily changed by replacing a plug-in crystal and, in certain cases, by making some simple circuit modifications. The 7 – 11 MHz frequencies worked best with most inexpensive novice receivers, because it was their most RF sensitive range. With ham-band only receivers, the output frequency needed to be in the 10-meter band in order to obtain necessary bandwidth. Accessories for these converters included the PS-1 power supply and the Model CSB Converter Selector Box, which was used to switch any

one of four converters into a single receiver.

The converters themselves were distinctive. They were long and narrow, with dimensions of  $6\frac{3}{4} \times 2 \times 2\frac{1}{2}$  inches. This allowed them to be conveniently placed on top of a receiver. Rather than a conventional steel chassis, both the power supply and the converters had what Ameco called a "satin copper" two-piece chassis. There was a hole on each side of the chassis that was evidently used to adjust internal tuning slugs; although these adjustments were not mentioned in the operating instructions.

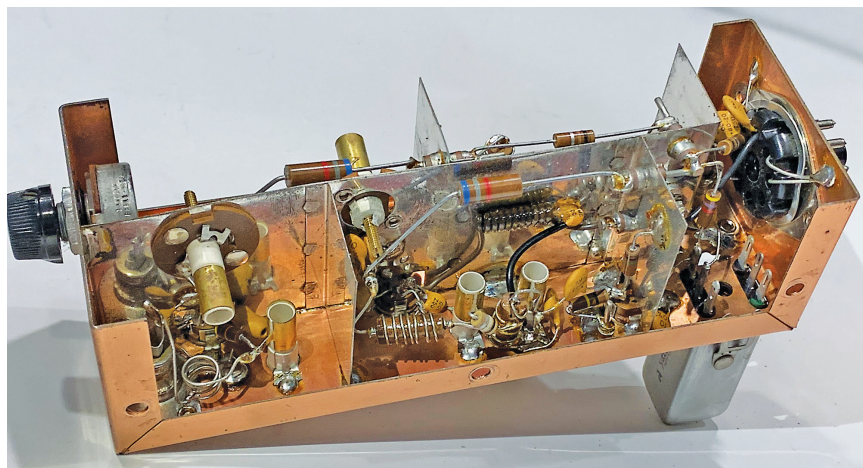
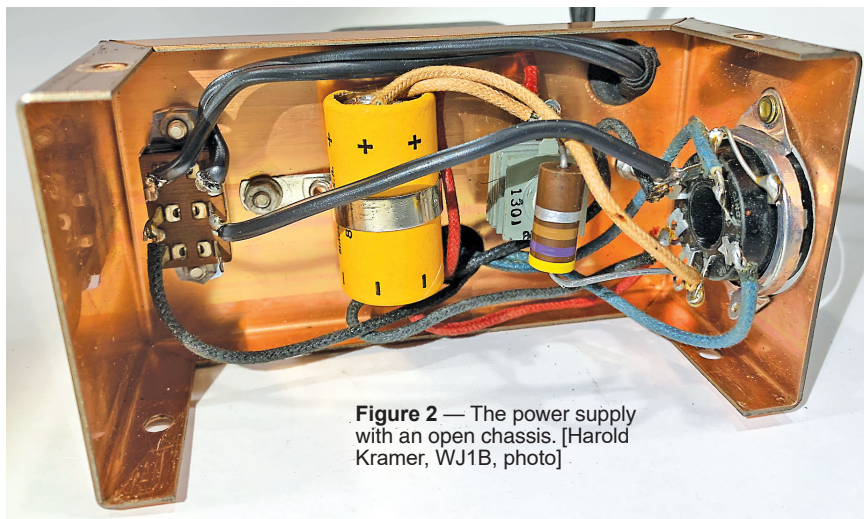
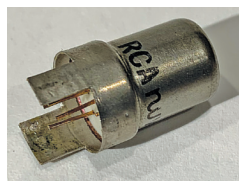


Figure 1 — The CN144 circuitry. [Harold Kramer, WJ1B, photo]



**Figure 2** — The power supply with an open chassis. [Harold Kramer, WJ1B, photo]



**Figure 3** — The 6CW4 Nuvistor tube. [Harold Kramer, WJ1B, photo]

Another unusual feature was that the 50  $\Omega$  input and output connectors were “auto radio plugs,” which were used to connect a car radio to its antenna. They also took up less room on the chassis. A procedure for attaching coax cable to these connectors was included in the operating instructions.

## External Power Supply

The converters had no internal power supply. Ameco provided a matching model PS-1 power supply. The power supply measures 2.5  $\times$  4.3  $\times$  6.7 inches, and it also had a copper chassis (see Figure 2). The PS-1 had a female octal tube socket, and the CN converter had the matching male octal socket, so that the PS-1 plugged directly into the converter without any cables. It is a clever design that allowed rapidly moving a single power supply from device to device, as needed.

The PS-1 was a linear power supply with a selenium half-wave rectifier and a single pi-network for filtering the B+.

There was no voltage regulator, no fuse, and no ground pin on the AC plug. It would not be considered safe by modern standards. It could be configured to run B+ or B– voltages, depending on an internal tap. According to Ameco, the power supply provides 6.3 V at 0.855 A for the filaments, and 100 – 125 V dc at 25 mA for the plates. The converters could be rewired for 12 V filaments for mobile or portable use. Ameco also suggested that power for the converter could be taken from a separate receiver, because many vacuum-tube receivers had accessory sockets for powering external devices. The operating instructions even included a hand-drawn schematic of a voltage regulator circuit, using an OB2 regulator tube for use with a receiver accessory socket.

## Nuvistor Tubes

A schematic diagram of the converter was not supplied. Ed Tilton, W1HDQ (SK), wrote in the September 1962 issue of *QST*’s “Product Review” notes that “the first and second neutralized RF amplifiers are 6DS4 Nuvistors in cascade.” He also noted that “the RF gain was controlled by a knob on the front of the converter by varying the cathode resistor in the second RF amplifier.”

Ameco’s instructions noted that the second RF amplifier was followed by another 6DS4 Nuvistor mixer, for a total of three Nuvistor tubes. A conventional 6J6 tube served as the crystal-controlled oscillator and multiplier. The instructions also stated, “The converter has excellent internal shielding and bypass components and provides high sensitivity and maximum rejection of spurious, unwanted signals.”

The three different models have almost identical parts layouts with only some small variations due to component size differences. Ameco claimed 45 dB average gain, –3.0 db noise on 2 meters, along with better than 70 dB image and spurious rejection. The *QST* review had no quantitative data to verify these claims.

With their Nuvistor tubes, these Ameco converters were state of the art in the early ‘60s. Nuvistor tubes were developed by RCA, and they are small metal and ceramic vacuum tubes that are the size of a thimble (see Figure 3). They are only  $\frac{1}{8}$  inches high, and they have tiny pin connectors at their base, along with two alignment tabs. While most Ameco converters use 6DS4 Nuvistors, some converters use 6CW4 Nuvistor tubes that were an earlier version of the 6DS4.

## VHF Operating

According to the RCA specifications sheet, Nuvistors “have excellent performance and low noise in the VHF and UHF range.” RCA also claimed they “had high reliability, and high resistance to nuclear radiation, shock, and vibration.” They also used a special RCA dark heater that operated as much as 350 Kelvin below conventional tube heaters. .

These relatively inexpensive, high-performance converters got many operators using VHF without having to purchase a separate VHF receiver. For many of us, this VHF experience early in our amateur radio careers created a lifelong interest in VHF operating.