Many new ham rigs are small enough and light enough to operate from nearly anywhere. But what about their power supplies? When are THEY going to "lighten up"? The answer, says, WB2AMU, is now.

CQ Reviews:

The Alinco DM-330MV Switching Power Supply

BY KEN NEUBECK,* WB2AMU

Power supplies have always been taken for granted among hams. We just hook up our radios and amplifiers to them and never give them a second thought until they fail.

Perhaps my most vivid memory involving an amateur radio power supply was when I took my Kenwood PS-50 with me on a vacation trip to Hawaii in order to power my TS-440s radio. While the radio was portable enough to carry in a hard-shell case on board the aircraft, the 30-pound power supply was put in the checked luggage, making it quite heavy. I could see the limo driver groan as he tried to lift the bag into the car for the ride to the airport. How many more portable-radio operations could have been conducted by hams if the power supply was light enough to just carry along?

In recent years a new class of power-supply design has been developed and is known as *switching-mode power supplies*. By using an integrated circuit that generates a pulse-width modulated signal, the power supply is switched on and off at a very high rate. This type of power-supply design is able to run cooler than previous designs, as there is a significant reduction in heat dissipation. In addition, there is a tremendous savings in the weight, as smaller transformers can be used in lieu of those big iron-core jobs. Because of all these benefits, switching power supplies are widely used in both aircraft and computer equipment.

I remember the first time I saw a lightweight switching-power-supply design for electronic aircraft equipment. I was amazed by the number of major reliability problems associated with the conventional non-switching designs that were solved by a lighter design with fewer components. Typically, the larger power-supply components in electronic equipment were the first components likely to break while operating in the high-vibration aircraft environment. The newer switching-mode power-supply design used in many commercial applications is now making its way into amateur radio.

Now one would think that all should be well with this weight reduction for the amateur radio power supply. Well, not quite. Associated with the design of switching-mode power supplies is a condition known as *switching noise*, commonly known as *hash noise*, that is a function of the switching frequency (typically in the 100 kHz range). Hash noise tends to show up in the lower HF bands, such as 80 and 40 meters, and can make receiving signals very difficult. Some manufacturers have been able to make suitable suppression circuits. Alinco has come up with a unique solution to this particular condition, which we will discuss later, in its DM-330MV switching power supply. First, let's look at the unit's basic features.

Front view of the DM-330MV shows the various switches and the dual-function meter. The switching for the meter between current and voltage is on the immediate right of the meter.

Basic Features

- Dual-function meter for displaying voltage or current in amps
- Output current capability: 32 amps maximum, 30 amps continuous

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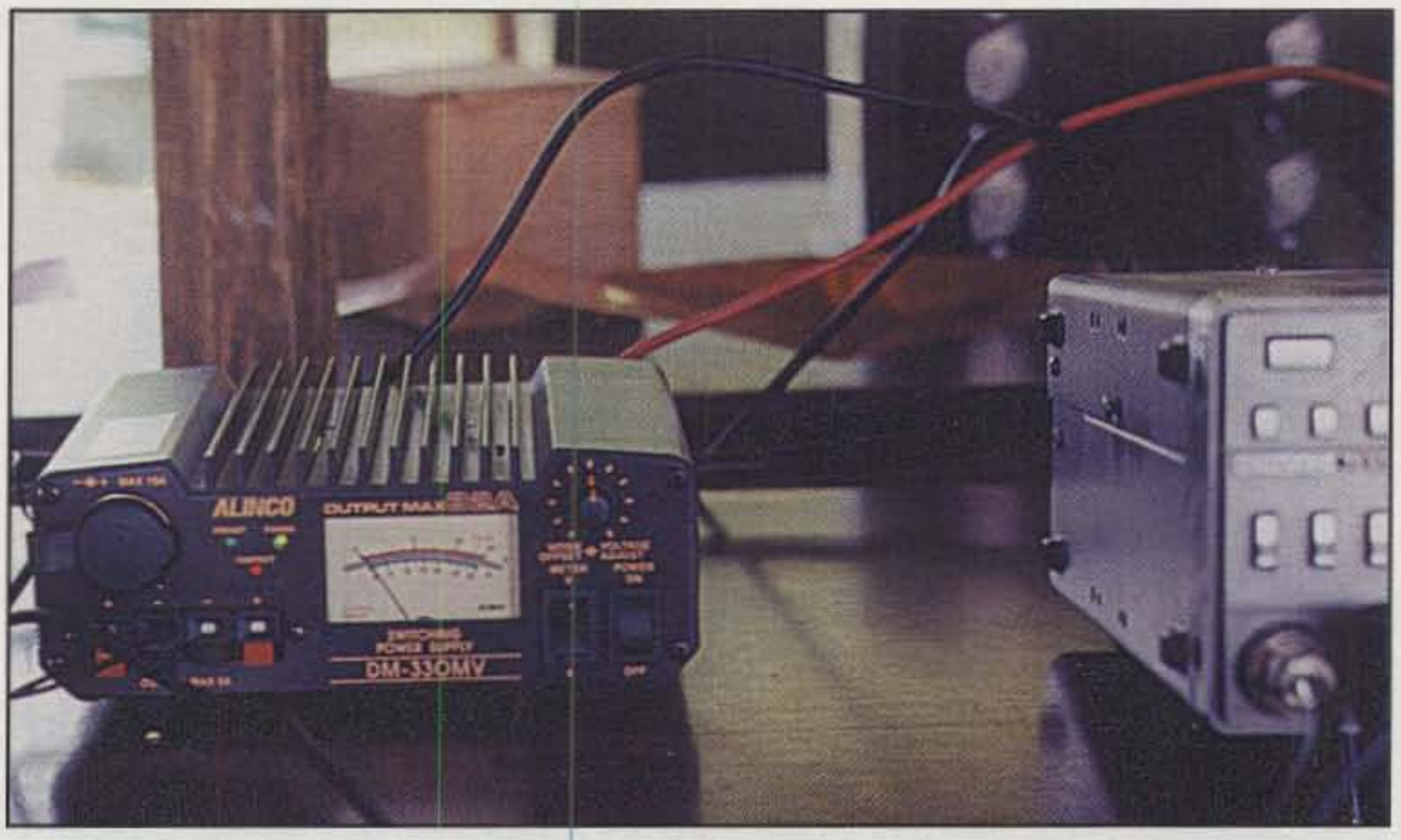
• Output voltage: 5 to 15 VDC variable with a notch setting at 13.8 volts
• Input voltage 120 VAC (220 VAC possible with adjustment of switch)
• Dimensions: Approximately 7 inches by 6 1/2 inches by 2 1/2 inches
• Weight: 4.5 pounds
• Protection features:
1. Short circuit protection
2. Automatic current limiting over 32 amps (When this is activated, an indicator light is illuminated on the front panel.)
3. Over-temperature protection (provided by rear-panel cooling fan that comes on automatically when needed)

There are a few ways to hook your amateur radio transceiver or amplifier to the DM 330V power supply. The inputs are:
• 10 amp maximum rated cigarette-lighter adapter input (on front panel)
• 5 amp maximum rated clip on inputs (two pairs of +/– on the front panel)
• 32 amp maximum rated output terminal posts (on rear panel)

Other features include a preset voltage value that allows one to set a nominal operating voltage and save the preset value. The preset voltage is stored by turning the preset switch to the preset position and adjusting the voltage to the desired output level. When this function is selected, the voltage-adjustment control on the front panel will be deactivated to protect from overvoltage. With the preset function activated, the preset voltage will be supplied regardless of the current voltage setting.

Another feature is that the front-panel meter can read either current (amps) or voltage, selected by a switch on the front panel. The unit also has a remote-control terminal input on the rear panel.



Imagine a power supply that weighs less and is smaller than the transceiver. This was the case during Field Day at W2AMC, where the DM 330MV was dwarfed by the TS-670 radio on the right!

In this close-up view of the front panel, the three LED indicators for PRESET, POWER, and PROTECT can be seen to the left of the meter. The cover on the left is over the cigarette-lighter-type jack input (10 amp max), and the inputs on the bottom are set at 5 amps max.

This allows you to connect a remote-control unit (with the power supply turned off) and remotely control the output voltage.

The power supply has the heat sink located on the top of the unit. Therefore, in order to get the maximum effect of the heat sink, it would appear that this unit should not have other equipment stacked on top of it when it is used in the shack.

Operation

We put the Alinco 330MV through its paces during the summer of 2000, using it for 6 and 10 meter operation at home as well as at Field Day, where it powered the 6 meter station at W2AMC, the Peconic ARC on eastern Long Island. One of the tests we performed was to run a few devices from the same power supply at one time. For example, we hooked up a TS-670 transceiver (that drew about 4 amps) to the front clips, and a Mirage A1015G 6 meter amplifier (18–20 amps) to the rear terminal posts. The DM 330 MV was able to handle both devices at the same time, and the combined current could be read on the front panel, with the meter in current mode.

During Field Day, the DM 330MV was used for long periods of time, operating up to eight hours without a break. Again, both the basic transceiver and amplifier were hooked up to the same power supply. The radio ran cool, and I did not notice the supply's fan kicking on at all during Field Day. No hash noise was noticed during Field Day or during home use on 6 meters.

The rear of the unit contains the over-temperature fan on the left and a set of 32 amp maximum rating terminal posts. The real panel has a jack for remote-control input along with the preset function. The unit uses an 8 amp fuse.

Special Feature

During home use (using the same radio), we did notice hash noise from the power supply throughout the 80 and 40 meter bands. Now this is where Alinco's unique feature comes into play. There is a special tuning circuit that allows one to *move* the hash noise up or down several kHz. It does not eliminate the noise, but it *relocates* it. Thus, any hash noise that is on top of a desired radio signal can be moved away. This feature will work fine for casual use on 40 and 80, but it may be cumbersome for contest work, where one has to search around on the band for contacts.

Summary

My overall opinion of the Alinco switching power supply is very favorable. At less than 5 pounds, it fits the need for portable operations and for a small, cool power supply for the base station. The only drawback I see is that those hams who enjoy contesting on 40 and 80 meters will constantly be using the hash tune knob to move the noise away from contest stations. However, for operations above 10 MHz—both portable and home—this power supply will meet just about all the needs of most hams.

The street price of the DM330 MV power supply is $200. There are no accessories needed.

I wish to express my thanks to Evelyn Garrison, WS7A, and Katsumi Nakata, KE6RD, of Alinco for their help in getting me technical information on the power supply. ■