

Product Review

RM Italy BLA600 500 W HF and 6-Meter Linear Amplifier

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The RM Italy BLA600 is a compact, solid-state desktop linear amplifier that puts out 500 W on all amateur bands from 160 to 6 meters, except for the 60-meter channels. The amplifier uses an NXP/Freescale MRF6VP5600H 50 V LDMOS device and will deliver full output with 25 W or less drive on the HF bands, and 40 W or less on 160 and 6 meters. Its internal linear power supply can operate from a 120, 230, or 240 V ac line.

The BLA600 is highly automated, including near-instantaneous automatic band switching, based on the measured exciter frequency. Transmit-receive switching makes use of PIN diodes, resulting in near-instantaneous and quiet switchover that is able to support high-speed CW break-in. A nice feature is that it has three antenna outputs that can be selected manually or memorized on a band-by-band basis.

Hooking It Up

The BLA600 is very straightforward to interconnect to your station. All that is required is to connect the **GROUND** terminal to your station ground; the RF input (**RTX**) to your transceiver's output; a keying cable with a phono plug to the **PTT** socket,



and up to three antennas (**ANT1**, **ANT2**, **ANT3**). Another phono jack is provided for the optional **ALC** output, which can be used as a safety measure to prevent overdriving.

The amplifier comes with an ac line cord, but you must provide and install a connector that matches your station outlet. The amplifier is shipped configured for 120 V ac operation, but the DX Engineering website offers detailed downloadable instructions for setting the line voltage to

230 or 240 V ac. It involves removing a plate on the rear panel and connecting a number of wires to the appropriate push-on terminals. Also, make sure that the fuse matches your ac supply voltage.

There is no provision to make use of the band data available from many transceivers, but the amplifier will respond to a single CW dit or voice syllable of output from the transceiver, measuring the input frequency and switching the band (and antenna, if memorized). The band (and antenna) can also be set manually using front-panel buttons. Plan your installation carefully, and have a friend available — although it's compact, this amplifier weighs 47 pounds.

Navigating the Front Panel

The attractive black front panel of the BLA600 has grilles for ventilation on either side with a row of buttons

Bottom Line

The RM Italy BLA600 is a competent, medium-power, 160-to-6-meter, solid-state linear amplifier that can provide a significant boost to the typical 100 W (or even lower-powered) HF transceiver. It is easy to install and interface with most any equipment.

Table 2
RM Italy BLA600, Rev 1.94, serial number 0090917

Manufacturer's Specifications	Measured in ARRL Lab
Frequency range: 1.8 to 54 MHz.	160-, 80-, 40-, 30-, 20-, 17-, 15-, 12-, 10-, 6-meter amateur bands.
Power output: 500 W PEP ±1dB.	HF, as specified; 50 MHz, 480 W.
Driving power required: 80 – 10 meters, 20 – 25 W; 160 and 6 meters, 30 – 40 W.	As specified.
Spurious and harmonic suppression: HF, >45 dB; 6 meters, >60 dB.	HF: 60 dB (typical); 56 dB worst case (10.1 MHz). 50 MHz, 67 dB. Meets FCC requirements.
Third-order intermodulation distortion (IMD): Not specified.	3rd/5th/7th/9th order products, dB below PEP at full output: 14 MHz, –30/–36/–53/–59 dB. 50 MHz, –30/–37/–53/–60 dB.
Transmit-receive switching time: Not specified.	Unkey to key, 4 ms; key to unkey, 3 ms.
Primary power requirements: 120 V ac, 10 A; 230 V ac, 6 A; or 240 V ac, 5 A.	
Size (HWD): 5.5 × 12.9 × 17 inches (including protrusions); weight, 47.5 lbs.	

along the bottom. The right end of the row has a power **ON/OFF** button, with the **STANDBY/OPERATE** button on the left end. In between are individual buttons for each band, with illuminated green band indicators above each button. Above the row of buttons on the left is an LCD multimeter with four menu-selectable indicators and two large bar graph indicators for relative power output (**POWER**) and standing-wave ratio (**SWR**).

Just below the multimeter are its controls, an **ENTER** (right arrow) key, + and – keys, and a **NAVIGATE** (down arrow) key. The two rows of 16 characters default into four info blocks. In the default mode, with the amplifier in **STANDBY** mode, the top row indicates mode (**STANDBY** or **OPERATE**) and antenna number (**ANT:#**). The bottom row shows drive power (**PIN:**), and transistor heatsink (**T1**) or exhaust (**T2**) temperature (**T1: ##°C**). With the amplifier in **OPERATE** mode, the lower line can also display drain current and voltage.

Meter selections are made using the four buttons below the display, which can also be used to make other set-and-forget selections, such as setting of ALC parameters, temperature units (°C or °F), display brightness

and contrast, break-in on or off, and meter displays during **STANDBY** mode. In between, on the left side are an error/fault indicator († in a roadside triangle) and a transmit indicator (**TX**), both of which are illuminated red if active.

Operating Impressions

I used the BLA600 with a FLEX-6400M (also reviewed this month) and my usual Elecraft K3/100. Both provide phono jacks with a **PTT** output signal, making interfacing easy. For my antennas, I had a dummy load in position one, my triband plus 6-meter Yagi in position two, and an Elecraft KAT500 500 W automatic antenna tuner with my remaining antennas in position three. After making a few simple connections, I was on the air with 500 W.

This setup worked well and was easy to use. Both transceivers can remember power output settings on each band, so I didn't have many overdrive fault problems. The amplifier only went into alarm if I was using the antenna tuner and didn't remember to set the tuning first at low power. The amplifier followed my keying in both voice and CW modes flawlessly.

The manual does not indicate any limits on duty cycle, so I had to see what it would do. With the amplifier connected to my trusty old Heathkit Cantenna high-power dummy load, I fed it a RTTY signal on 12 meters, while monitoring the heatsink temperature and listening for the fan to change intensity. I set the **POWER** indicator to the top of the green range. It started with the lowest transmitting fan speed and a temperature of 27 °C. At 3 minutes of continuous operation, the fan went up a notch and the temperature indicated 42 °C. After another few minutes, we were at 46 °C and the fan went up another notch. After 10 minutes of key-down, the temperature hit 55 °C, and I don't believe the fan increased any further. I stopped at that point, thinking that 10 minutes would be a long transmission, even for a RTTY ragchew.

At no time was the fan noise objectionable, and it stayed well below the high speed that it demonstrates during its self-test at turn-on. After 10 minutes of not transmitting, the heat-sink temperature was down to 28 °C, and the fan was running at its usual minimum transmit speed. In another 7 minutes, the temperature was back to its starting point of 27 °C, and the fan went back to its usual **STANDBY** mode. Based on this exercise, I would have no qualms about pushing this amplifier for digital modes, contesting, or any other typical high duty-cycle Amateur Radio application.

There were a few things that I had to get used to working around. The instructions said that to memorize an antenna setting for a band, "press the **NAVIGATE** key for 3 seconds." At first, I thought that this function didn't work, but eventually, I found that it required a press of 30 seconds, not 3 seconds, to engage. Not a big deal, but DX Engineering indicates that RM Italy has fixed this in firmware in current production units. (There is no mention in the manual of a process

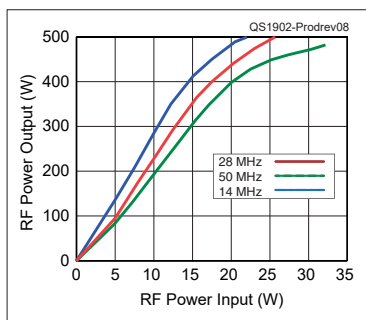


Figure 8 — RM Italy BLA600 input power versus output power.



Rear panel of the BLA600, showing available connections. See text for details.

for owners to update firmware in the field, nor is there a USB or serial jack on the rear panel.)

The **POWER** indicator, a colorful bar graph that is the dramatic focus of the display, shows an informative green/yellow/red of increasing height as the power output increases — but there is no indication of actual power output, nor an indication in the manual of what the target should be. After a bit in the red, the amplifier goes into **FAULT** mode and a cycle of the **OPERATE/STANDBY** switch is required to reset to normal operation.

Without an accurate external power meter, there is no way to know if 500 W is the top of the green, the middle of the yellow, or the bottom of the red. Also, say you want to use the BLA600 to increase your power on 30 meters to the 200 W maximum. It's difficult to know where 200 W is on this scale.

The manual suggests that while the output can be pushed beyond 500 W, it will have less distortion if kept at 500 W or below. That's borne out in ARRL Lab testing, as the linearity starts to fall off between 400 and 500 W (see Figure 8).

The SWR bar graph display doesn't seem to indicate the same SWR level at different power outputs, so it may be more of a reflected power indicator. The amplifier will go into fault mode if the SWR reaches about

2.5:1 to 3:1, but I found the trip point to be dependent on what the power is set to. It makes it a bit tough to check your antenna tuner settings, especially because the display does not indicate power or SWR while in **STANDBY** mode.

Neither of these concerns are really show-stoppers for me, but I would be more comfortable if the multimeter selections provided for numerical values of output power and SWR.

In terms of acoustic output, while the amplifier is not quite silent, it isn't very noisy. There is a constant just-audible noise level while the power is on. A variable-speed cooling fan comes on (and off) at a low level with keying. It is not terribly loud, and can almost be used as a sidetone monitor while operating CW. The fan can get much louder — it goes through each step as part of the start-up self-test — but I never heard it go above the low level during my normal operations.

The amplifier switches the output to Antenna 1 at power-off. This provides a nice safety feature if Antenna 1 is used for a dummy load — helping with lightning protection and my usual arrangement for that reason. The only problem with this approach is that if you want to listen to see if the bands are open, you can't tell unless the amplifier is turned on. (I'm used to an amplifier with a single

output and external antenna switching that can be used with the amplifier or just the transceiver by itself.) Having multiple antenna outputs is a useful feature, but it's worth thinking about as you arrange your antennas.

Documentation

The BLA600 comes with a well-written, 27-page *User Manual*. It provides clear instruction on how to set up and interconnect the amplifier to your station equipment and describes all the options and metering choices. It even includes a section on using non-matched antennas with an antenna tuner (not supplied, nor available from RM Italy). Along with the well-illustrated line voltage adjustment instructions from DX Engineering, it provides everything you need to move up a notch to 500 W operation.

The one thing not included in the manual is a schematic diagram. Arguably, it is certainly not needed in order to set up and run the amplifier, but I still find it nice to know what's in the box — and it certainly can be helpful if troubleshooting is required.

Manufacturer: RM Italy Costruzioni Elettroniche. **US distributor:** DX Engineering, 1200 Southeast Ave., Tallmadge, OH 44278, www.dxengineering.com. **Price:** \$2,499.99.