

# BLA350 PLUS

Solid State Compact HF 300W Linear Amplifier



## User Manual

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**Costruzioni Elettroniche srl**

<http://www.rmitaly.com>



## **Introduction**

The RM Italy BLA350 Plus is a fully automatic compact 300W HF linear Amplifier, that builds on the success of the previous model. It now features a hardware protection circuit for output impedance mismatch that is lightning fast ensuring the safety of the power transistors in the event of high VSWR on the antenna connector. The RF deck has been improved as have the output band filters. Frequency coverage is from 1.8MHz to 30MHz covering the following bands, 160, 80, 40, 30, 20, 17, 15, 12 and 10m Amateur radio bands. It utilises two 50V MACOM MRF 150 MOSFET Transistors in Push Pull configuration, (Class AB). It may be used on all narrow band modes of transmission e.g. SSB,AM,FM, CW, RTTY, FT8 etc. It features a dual MCU controlled variable speed cooling system, a large analogue output power meter and a 2 line 16 character LCD display that displays the amplifiers operating parameters, such as frequency, filter selection, temperature and allows quick navigation of the amplifiers menu system. Attention to correct operation and operating the amplifier within its operating capabilities will ensure optimum performance and many years of trouble free use.

## **Specifications**

<b>Operating Frequency:</b>	<b>160,80,40,30,20,17,15,12,10m Amateur radio bands 60m band with reduced harmonic attenuation No Tx &lt;1.5MHz &amp; &gt;30MHz</b>
<b>Operating Modes:</b>	<b>SSB,CW,AM,FM,RTTY,Data All narrow band modes</b>
<b>Input Power:</b>	<b>1-12W max</b>
<b>Output Power:</b>	<b>300W max</b>
<b>Harmonic Output:</b>	<b>&gt;-50dBc</b>
<b>Drain Voltage:</b>	<b>48Vdc</b>
<b>Drain Current:</b>	<b>15A max</b>
<b>Input Impedance:</b>	<b>50 <math>\Omega</math> unbalanced</b>
<b>Output Impedance:</b>	<b>50 <math>\Omega</math> unbalanced</b>
<b>RF Transistor:</b>	<b>MACOM MRF150 Matched Pair</b>
<b>Amplifier configuration:</b>	<b>Class AB Push-Pull</b>
<b>Cooling:</b>	<b>Temperature regulated forced air cooling</b>
<b>Microprocessor:</b>	<b>Microchip PIC 18F4620</b>
<b>Metering:</b>	<b>Output Power, H/S Temperature, Band in use, Amplifier state</b>
<b>Protection:</b>	<b>Input Power, Filter Error, VSWR, Temperature, Frequency</b>
<b>I/P—O/P Connections:</b>	<b>UHF SO-239 (Low loss Teflon insulator), PTT input - RCA / Phono, ALC output - RCA / Phono.</b>
<b>AC Power:</b>	<b>207-244Vac 3.5A max</b>
<b>Dimensions:</b>	<b>355 x 155 x 270mm (Width x Height x Depth)</b>
<b>Weight:</b>	<b>13.5kg</b>
<b>Supplied Accessories:</b>	<b>AC Power cord</b>

# **NON RESONANT** **ANTENNA TUNING WARNING!!!!**

When using the BLA350 Plus amplifier together with a non resonant antenna and either a manual or automatic antenna tuner it is very important the following precautions are taken.

The correct sequence for connection would be Transceiver, BLA350 Plus Amplifier, VSWR/ Power meter, ATU and Antenna

If using a transceiver with a built in ATU this function should be disabled if possible or operated in through mode as the input to the BLA350 amplifier is 50 Ohms. The internal ATU can no longer tune the antenna.

Tuning of a non resonant antenna should always and only be performed at low power. Most antenna tuners have a particular power rating and usually this maximum power rating is quoted under tuned conditions. With the amplifier connected in line this should be done with the amplifier either off or in stand by mode. Once an acceptable match has been provided equal to 1.5:1 or better the amplifier may then be operated and the tuner may then be adjusted slightly to optimise the match. If this method is not followed and the antenna is tuned with the amplifier running at full output the high impedances possible during the tuning process can cause damage to the amplifiers output transistors and should be avoided at all costs. Failure to follow this procedure may well result in damage to the amplifier that is not covered by the warranty

## **Quick Start Guide**

1. Connect the RTX input connector ( ) to the transceiver with a 50 ohm patch cable.
2. Connect the ANT output connector ( ) of the BLA350 Plus to VSWR/Power meter and ATU if required or directly to the antenna if resonant at the operating frequency desired.
3. Connect the PTT output cable from the transceiver to the PTT input ( ) of the BLA350 plus. (BLA350 Plus PTT input is Active Low).
4. Make sure the ON / OFF switch ( ) is set to OFF, Switch ( ) MAN (Manual) / AUT (Automatic) is set to 'AUT' and that switch ( ) Stby (Standby) / AUT (Automatic) is set to Stby.
5. Connect the AC power cord to the amplifier ( ) and household AC outlet .
6. Make sure that the amplifier is OFF ( ) or in Standby mode ( ).
7. Adjust the transceivers output to 10W, if capable of more than 10W output.
8. Test that the antenna connected is correct or tuned for the current frequency selected. If necessary match the antenna to the desired frequency with the ATU. This must be done with the amplifier switched off or in standby mode.
9. Switch the Stby / ON switch ( ) to ON.
10. Now when the PTT on the transceiver is pressed the amplifier will switch to TX, indicated by the front panel LED ( ) and an indication of the output power ( ).

# Front / Rear Panel Description

## Front Panel



1. **LCD Display** - displays amplifiers operating parameters and menu system
2. **Standby / On** - In standby the amplifier does not amplify the incoming signal. Menu adjustments can be made in this mode
3. **OK /SSB** - Menu setting conformation and SSB RTX delay 'on' / 'OFF', if the amplifier is used in VOX mode
4. **SET** - Menu Switch
5. **AUT / MAN** - Auto or manual band filter mode
6. **BAND** - Manual band filter selector
7. **MAIN** - primary AC 'ON' / 'OFF' switch
8. **Output Power Meter**
9. **ON** - Amplifier active LED
10. **TX** - Amplifier in Transmission LED
11. **Warning** - Alarm LED. Illuminates when there is an alarm condition, excessive temperature / antenna SWR etc.
12. **MAN** - When manual filter selection is selected this LED will illuminate

## Rear Panel



1. **ANT** - SO239 Antenna Output connector
2. **RTX** - SO239 Transceiver input connector
3. **ALC** - ALC output level adjustment
4. **ALC** - ALC output connector RCA / Phono socket
5. **PTT** - PTT Input Connector RCA / Phone socket (Active Low)
6. **IEC European AC input socket**
7. **AC Fuse receptacle** (2x4A (230Vac) 5x20mm, Fast, glass fuses)

## INSTALLATION

Carefully remove the amplifier from its shipping carton and inspect for any damage. The amplifier should be installed in a place that allows good ventilation and provides a suitable base to support it. Failure to allow for good ventilation will cause the amplifier to overheat and shut down prematurely. Air is drawn into the amplifier from both the underside and top cover of the amplifier so do not place any objects underneath or on top of the amplifier that may restrict these intakes.

A short 50 ohm patch lead should be used to connect the output of the transceiver to the RTX input ( ) on the rear panel. The length of this cable is not critical but should be as short as practically possible. The ANT output ( ) SO239 connector should be connected to a resonant antenna suitable for the band being used. ( If the antenna is not resonant the output should be connected to a SWR / Power meter and then to a suitable Antenna Tuning Unit (ATU/AMU). Verify that the antenna / ATU being used is suitably rated for the power output of the amplifier. (The VSWR of the antenna should not change very much from low or high power use).

If the antenna requires matching for the transmission frequency this should always be carried out at low power before the amplifier is switched to Operate mode.

The amplifier may be used with or without the PTT input ( ) connected to the transceiver however the default state of the BLA350 plus is that the PTT must be connected in order to amplify the signal. It is always recommended especially for SSB and CW modes that the PTT connection is made, however if the transceiver has no PTT output facility then the amplifier may be used without. See VOX menu, page 7.

The BLA350 plus may also have its ALC output ( ) connected to the transceiver in order to regulate the input power supplied to the amplifier. See ALC menu.

The output power of the drive radio, if no ALC connection is made to the transceiver , must be reduced manually on the transceiver to 10W, if the transceiver is capable of more power.

### **Connection to the AC supply.**

The BLA350 plus features an internal power supply and can operate from the mains AC network with a voltage between 200 and 250Vac 50/60Hz. Before connecting the BLA350 plus to the AC network verify that the AC voltage is in accordance with that which is printed on the rear panel of the BLA350 Plus.

The use of the BLA350 Plus with an AC line voltage outside of that stated may result in permanent damage. The warranty does not cover damage sustained from this condition or from the use of incorrect fuses.

The BLA350 must be connected directly to the AC network with the supplied AC cable, The use of adapters, extension cords should be avoided.

### **Ground:**

It is beyond the scope of this manual to provide a definitive guide into the controversial subject of RF grounding, as it is a subject all to itself and very much

depends on how the equipment is connected and the type of antenna used. There are both arguments both for and against the stereotypical RF station ground. In addition to this is that lightning and static protection for the antenna is an additional subject in itself, however this should be kept external to the building and will not be covered here. There are many good articles about correct station grounding both online and in all of the usual publications on Ham Radio from the ARRL and RSGB etc. As output power increases this becomes much more of a safety factor and should not be ignored!

The classical RF ground consists of a series of ground rods driven into the ground over a suitably large area, connected together with heavy gauge wire / copper strap and situated as close as possible to the radio installation, to which every piece of equipment has a heavy gauge wire or strap connecting it to RF ground. If using copper particular attention should be made to the fact that copper corrodes and as it does, loses its conductivity properties so a certain amount of maintenance will be required. Copper braid stripped from coaxial cable is not a good idea, if the cable is left intact with both the centre conductor and outer insulation present it may be utilised as a single conductor for ground connections but removing the braid will make for a poorer RF conductor and will allow corrosion to commence. There are many ready made copper braids that are manufactured especially for this use.

The distance of the RF ground to the radio installation and also the length of the individual connections from equipment to the RF ground are very important and depend on the frequency in use. They must be made as short as practically possible and much less than a 1/4 of a wavelength. At 10m this may already present problems as 1/4 of a wavelength is 2.6m (28.5MHz). If you have a 1/4 wavelength ground connection this will in fact present a high impedance and will impede the flow of RF to ground.

Antenna type, (Balanced or unbalanced), fed with coaxial cable or balanced feeder, proximity of the antenna to the radio installation, Antenna tuners and BALUNS etc. All have an effect on system performance and safety. Typical examples are unbalanced antennas that cause RF to return back along the outside of the coaxial cable screen and thus the equipment connected to it. One possible cause of 'RF in the shack'. And can create many different issues, such as tingling to the lips when touching a metal microphone grille, or a tingling sensation when touching the CW key or metal equipment chassis, rebooting computers, RF distortion on the transmitted audio, etc .

Just because your station functions or appears to function with out any of the above issues at low power, doesn't mean that these problems are not present or that the problem is with the power amplifier.

Never ever use a metal gas pipe as your station ground connection! Cold water pipes are often not suitable either.

## **Warning**

Dangerous high voltages exist inside the amplifier and as such we recommend that the cover only be removed by qualified service technicians. Before removing the cover from the amplifier it is essential that the AC power cable, coaxial cables to the antenna and transceiver are disconnected. If during operation it is noticed an abnormal noise or odour, switch off the amplifier immediately and check all of the connecting cables and if necessary return to an authorised service centre for testing. Do not subject the amplifier to physical shock, high humidity, dusty environments or excessive heat. Periodically clean any accumulated dust from the amplifier especially around the ventilation grilles / fan intakes. Do not exceed more than 14W on the input to the amplifier. Excessive drive may cause damage and invalidate the warranty.

# Operation

## CW Operation

The BLA350 Plus utilises conventional relays for RX / TX switching and so due to the finite switching time, (20ms), 'CW Full Break-In' may not be used. It is recommended that the PTT cable from the transceiver is connected to the amplifier and that the 'CW delay' on the transceiver is adjusted accordingly so that when the key is pressed there is a predetermined delay to allow the BLA350 Plus RTX relay to switch from RX to TX before RF appears on the input.

## Initial settings

If required it is necessary to tune the antenna before utilising the amplifier. This may be carried out with the BLA350 plus either switched off, (Switch ), or in 'Standby' mode, (Standby displayed on the LCD display) ().

The output power of the transceiver should be adjusted to a suitable level 10W or the ALC connection made between the transceiver and BLA350 Plus and adjusted accordingly. See ALC menu. Set the front panel controls in the following positions:

MAIN ON/OFF	OFF
Stby / ON	OFF
LPF Selector	Any position
AUTO / MAN	AUTO

## Standby

Switch the power switch MAIN, () to ON. The LCD display, () and Output Power meter () backlight will illuminate. In this mode the BLA350 Plus is in Standby mode and will not switch to TX (Amplify the incoming signal from the Transceiver), if the transceivers PTT is pressed.

The LCD Display shows:

S t a n d b y	A u t o
T : 2 8 ° C	B : 1 0 - 1 2 m

The first row indicates the state of the amplifier, (Standby), and the status of the Low Pass Filter selection, either Auto or Manual. The second row shows the current temperature of the amplifiers heat sink close to the RF Transistors, and the currently selected filter. If the switch AUT / MAN, () is set to MAN then it is possible to change the filter selection manually using the band selector switch ().

## MENUS

When the amplifier is in Standby mode, it is possible to access the BLA350 plus settings menu. Press briefly the OK () switch. It is now possible to access all of the menus by repeatedly pressing OK until the desired menu item is located.

To enter a specific menu press briefly the SET () switch. To exit a menu item without saving any changes press the Stby / ON () switch to ON and then if required back to Stby. Or press the OK, () switch repeatedly until the ESC menu is displayed and then press SET. To change any parameters press the SET () switch. To save any modification to the menu parameters press OK, () immediately after a modification is made. An asterisk '\*' is displayed on the LCD display to indicate the currently active parameter.



## ALC

```
M E N U
A L C   S e t u p
```

If the ALC connection is made between the BLA350 Plus amplifier and the transceiver this menu is used to adjust the output power of the transceiver to that required for the BLA350 Plus. (10W)

To begin set the trimmer on the rear panel ( ) to about mid travel, using a small flat bladed screw-driver.

```
N o w   a d j u s t   A L C
P o t - I N   0 1 0 . 0 0
```

Briefly press the SET switch ( ) and the LCD display will indicate, as shown above, the current input power. ALC adjustment should be made in either CW or FM mode to provide a constant carrier that will enable easier adjustment of the drive level. (The transceiver initial power level may be set to full power if not more than 100W). Transmit with the transceiver and at the same time rotate the ALC trimmer on the rear panel of the BLA350 plus until the power is set to 10W then press briefly the 'OK' switch ( ). At this point when the ALC cable is connected.

The BLA350 Plus will regulate the output power of the transceiver to 10W or whatever input power has been set in the ALC menu. Do not exceed 15W input for the BLA350 plus.

Note: It is recommended to test the input power after ALC adjustment on various bands to make sure that the output power of the transceiver remains at the set value. On some transceivers the power will change despite the ALC voltage remaining constant. If the change from band to band is excessive it may be better to not use the ALC connection and regulate the output power of the transceiver manually directly on the transceiver.

## Temp

```
M E N U
T e m p
```

This menu allows the unit of temperature, Celsius / Fahrenheit to be selected. Press SET ( ) to enter the menu and SET ( ) to alternate between Celsius and Fahrenheit then press OK ( ) to save and exit the menu.

## Int. VOX

```
M E N U
I n t . V O X
```

Int., (Internal), VOX when enabled allows the BLA350 Plus to be used if the transceiver does not have a PTT output. There are two Options 'Disabled' and 'Enabled'. The BLA350 Plus default setting is 'Disabled' from the factory. It is recommended that for CW and SSB that the external PTT input is utilised. If Int. VOX is enabled see also menu SSB Delay below.

## SSB Delay

```
M E N U
S S B   D e l a y
```

Allows the delay time from TX to RX to be set when using the BLA350 Plus internal VOX. When using SSB this avoids the amplifier returning to RX state between pauses in speech.

```
M E N U   S S B   D e l a y
5 0 0 m s                               *
```

The default setting is 500ms, (0.5sec), cycle through the choices 0,100,250,500,750 and 1000ms by pressing the SET, ( ), switch and select the selected choice by pressing the OK, ( ) Switch.

## Fan Speed

```
M E N U
F a n   S p e e d
```

The cooling fans operate in conjunction with the heat sink temperature. It is possible to change the way this occurs and hence the operating of the fan when in use:

### **Quiet Mode**

In this mode, ON, the fans only operate when the temperature reaches 40°C. When set to, OFF, (the default setting), the fans are continually running at low speed until the temperature increases to 55°C at which point they will increase in speed.

### **Max Speed**

When set to ,ON, the fans will run at maximum speed for 5 seconds, this helps to clean any accumulated dust from the heat sink. It is suggested this function is carried out periodically.

### **Man Setting**

```
M E N U   F a n   S p e e d
M a n .   S e t t i n g       5
```

It is possible to adjust the speed of the fans when the heat sink temperature reaches 55°C. There are 9 levels which relate to 20% and 80% of the maximum speed. The default setting is 5.

## Dimmer

M E N U D i m m e r
------------------------

Adjust the brightness of the LCD back light between two levels, **High** and **Low**. Default Setting is High.

## Info

Selecting this menu displays the current version of the firmware.

## Default

P u s h   O K   T o R e s t o r e   D e f a u l t
--

This menu allows the user to return all parameters back to factory default setting. Press OK, ( ), to restore default settings.

## ESC

Press OK, ( ), to exit the menu system and return the amplifier to Standby.

## OPERATE

Switching Stby / ON, ( ), to ON, switches the amplifier to Operate mode and the amplifier is now active.

O p e r a t e   A u t o T : 2 8 ° C      B : 1 0 - 1 2 m
---

To use the amplifier it is sufficient to position the switch AUT / MAN, ( ), to AUT (Automatic band filter selection), Ensure that the PTT, ( ), is connected from the output of the transceiver to the input of the BLA350 Plus and that there is a suitable antenna connected to the ANT, ( ), output connector. In this mode all of the functions of the amplifier are fully automatic, When the PTT is pressed on the transceiver, the amplifier will automatically measure the input frequency and set the low pass band filter accordingly. If the operator changes the operating frequency the amplifier will automatically change the band filter if required.

## LCD Display ( )

O p e r a t e   A u t o T : 2 8 ° C      B : 1 0 - 1 2 m
---

The first row of the display shows the state of the BLA350 Plus amplifier: Whether in Standby or Operate mode and whether the band filters are in Auto or Manual selection mode. The second row shows the temperature of the heat sink and the currently selected Low Pass Filter.

## Analogue Power Meter ( )

Displays the output power in Watts RMS.

## Front Panel LED's

### ON ( )

Illuminates GREEN in Operate mode indicating that the amplifier is ready to use.

### TX ( )

Illuminates RED when the amplifier is in Transmission.

### Warning ( )

Illuminates RED indicating that there is a problem with the amplifier and the LCD Display (1) will report the nature of the error.

### MAN ( )

Illuminates YELLOW when the user has selected manual filter selection. In this condition the user must select the correct output filter. Failure to do so will result in an error if the currently selected filter is not suitable for the transmission frequency.

## Front Panel Controls

All of the front panel controls should only be operated when the amplifier is not in transmission.

### Stby / ON ( )

Switches the amplifier between Standby, (Stby), and Operate, (ON), modes.

### OK / SSB ( )

When in Standby mode pressing this switch the menu list is accessed. Press repeatedly to cycle through the menus. In Operate mode selects if the SSB Delay is active or not when the Internal VOX is activated. (No external PTT connected). When active the letter 'S' is shown on the LCD display in the top right hand corner.

O p e r a t e   A u t o      S T : 2 8 ° C      B : 1 0 - 1 2 m
--

### SET ( )

This switch is active only in Standby mode. It is used to change parameters in the menu system.

### AUT / MAN ( )

Allows the user to change between Automatic or Manual Low Pass Filter selection. In manual mode the filter is selected by rotating ( ) to the desired filter.

### MAIN ON / OFF ( )

AC mains power switch. When the amplifier is not in use this should be set to OFF.

## Protection

The BLA350 Plus features several protection circuits that will protect the amplifier from damage. These include: Excessive input power, Excessive transistor temperature, Excessive output VSWR and incorrect filter selection.

Should one of the above conditions occur the amplifier will automatically disable operation, returning the amplifier to Standby mode and will sound an audible alarm at the same time as showing the error message on the LCD display. The Warning ( ) LED will also be illuminated.

### **Excessive Input Power**

If the input power from the transceiver is about 13W the red warning LED ( ) will illuminate and the LCD display will return the following message.

```
P o w e r   T R X   >   1 3 W
T : 2 8 ° C       B : 2 0 - 3 0 m
```

If the input power increases above 15W the amplifier will shutdown, an audible error tone will be emitted and the Warning LED ( ) will remain illuminated. The LCD display will return the following message:

```
E r r o r   P o w e r   T R X
T : 2 8 ° C
```

It will be necessary to reset the amplifier, this can be done by switching the amplifier back to Standby and then back to Operate using switch ( ).

### **Over Temperature**

The temperature at the point of contact between the transistors and heat sink regulates the speed of the cooling fans.

At between 65°C and 74°C fan speed is high. When the temperature increases to 75°C the amplifier will sound the over temperature alarm, The fan speed will run at maximum, an audible tone will be emitted and the warning LED ( ) will be illuminated.

If the temperature increases above 80°C the amplifier will shutdown, the audible warning will continue and the alarm LED will remain illuminated. The amplifier will return to normal operation automatically when the temperature drops below 60°C. It is recommended that under this condition the BLA350 Plus is not switched off, as the cooling fans will cool the amplifier down much faster.

```
O V E R   T E M P !
T : 8 3 ° C
```

### **Excessive VSWR**

The BLA350 Plus measures both the forward and reflected power at the antenna output and also at the input to the low pass filters. The antenna VSWR protection features a lightning fast hardware protection circuit. However both protection circuits are also monitored by the microprocessor.

The amplifier will protect itself if the wrong band filter is selected or if the antenna VSWR is excessively high.

The amplifier operates at its best when the antenna VSWR is below 1.5:1. If the antenna VSWR increases from 1.5:1 to 2.0:1 the amplifier can still be used however the reflected power will be dissipated by the transistors which will cause more heat to be generated.

If the antenna VSWR increases about 2.0 to 2.5:1 the amplifier will protect itself by shutting down and returning to Standby state. An error tone will be emitted, the warning LED ( ) will be illuminated and the LCD Display will show the following error message:

```
E r r o r   S W R   >   3 . 0
T : 2 8 ° C
```

To reset the amplifier it is necessary to switch it OFF and back ON again with MAIN ON / OFF switch ( ).

### **Filter Error**

The Low Pass Filters are controlled and monitored by the microprocessor in order to verify that the correct filter is selected. If the user incorrectly selects a low Pass Filter in manual mode the amplifier will signal a warning and protect itself by shutting down and returning to Standby state. An error tone will be emitted, the warning LED ( ) will be illuminated and the LCD Display will show the following error message:

```
H a r m .   S W R   >   3 . 0
T : 2 8 ° C
```

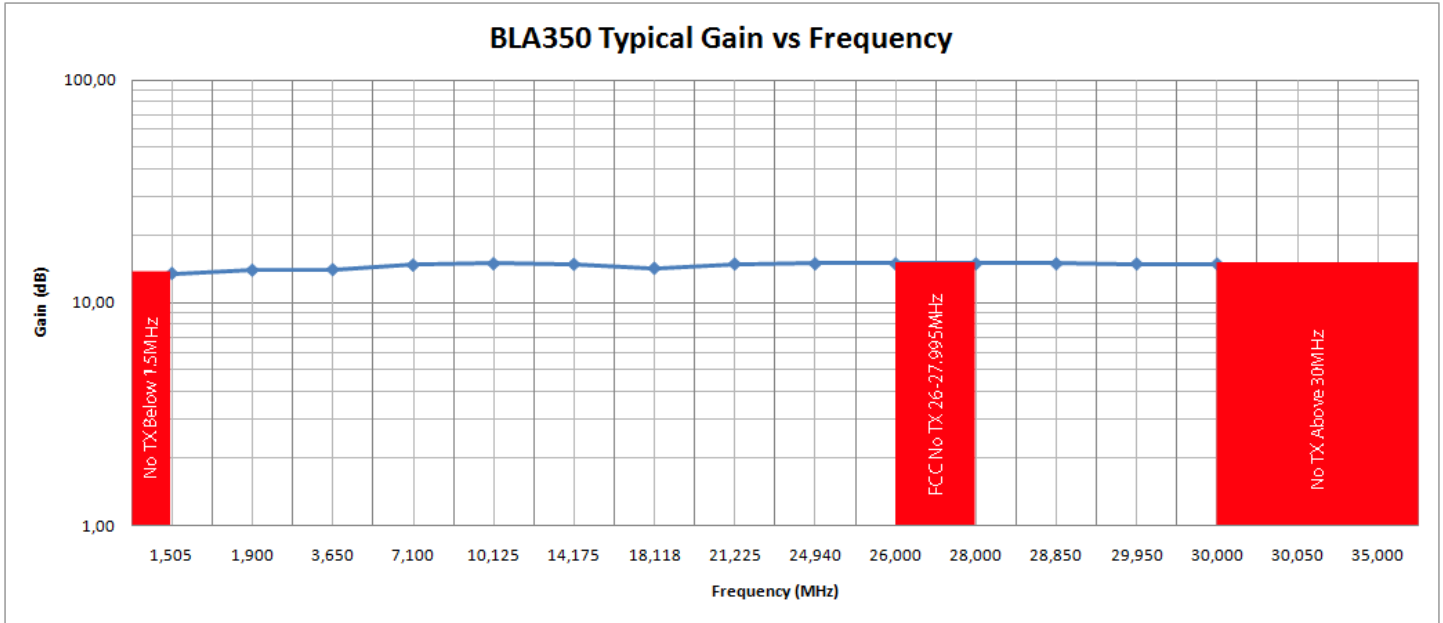
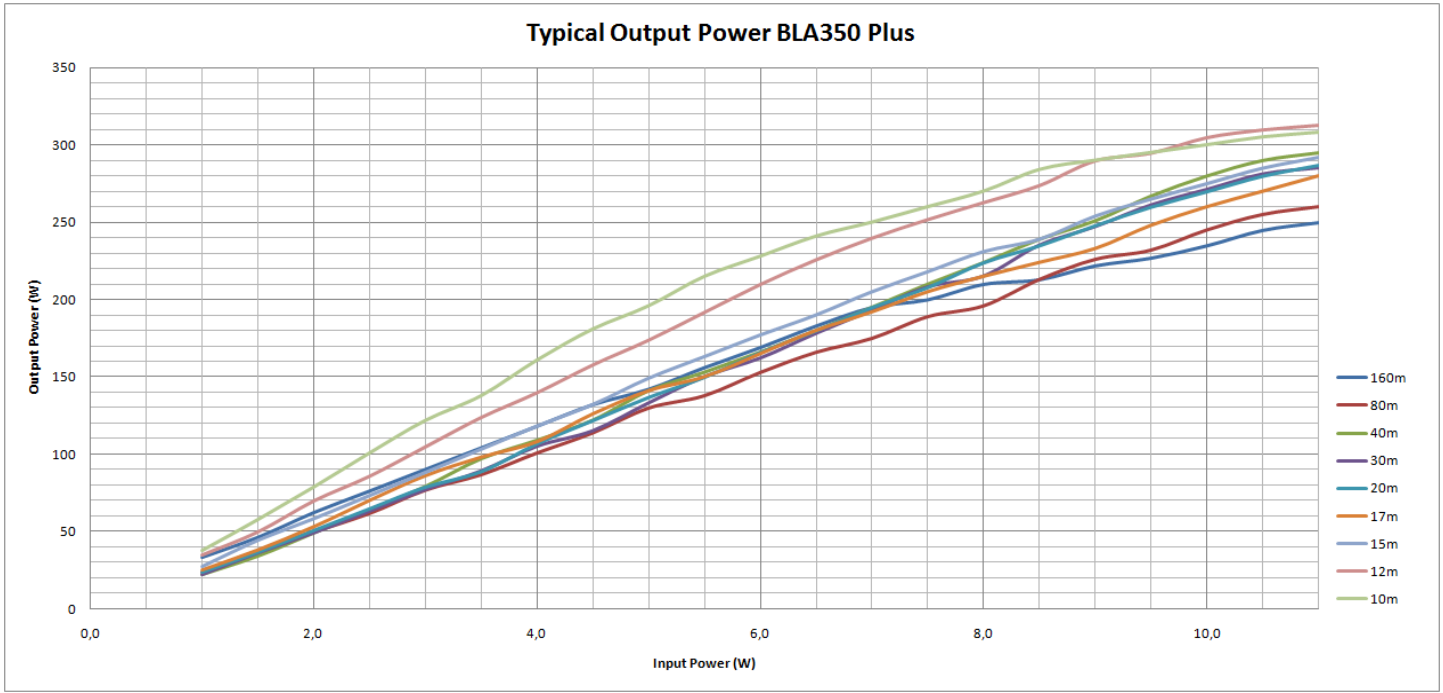
To reset the amplifier it is necessary to switch it OFF and back ON again with MAIN ON / OFF switch ( ).

### **Error Frequency**

If the input frequency to the BLA350 Plus is outside of the specified limits the amplifier will shutdown, the amplifier will be returned to Standby condition, an audible alarm will sound, the warning LED ( ) will illuminate and the LCD display will show the following error message:

```
E r r o r   F r e q u e n c y
T : 2 8 ° C       3 0 . 2 M H z
```

The figures below show the typical performance of the the BLA350 Plus amplifier. However due to component tolerances and AC supply voltage each amplifier will show some small variation compared to the data shown below.



Protection	Cause	LCD Display	Reset	LED	Note
Excessive I/P POWER	Input Power >13W	Power TRX >13W	No Action	⚠ *	Reduce TX Power / Adjust ALC Correctly
	Input Power >15W	Error Power TRX	Stby / ON	⚠	
Excessive TEMP	Temperature >80°C	Over Temp!	Automatic <60°C	⚠	Check ventilation of Amplifier
TXCR in TX when amplifier is switched on	TXCR IN TX at Amp Switch On	Error RF Input	Automatic	⚠	Stop Transmission
Excessive VSWR	Antenna VSWR >2.5:1	SWR >3.0	Stby / ON	⚠	Check Antenna VSWR
Harmonic VSWR	Filter Input VSWR >3.0:1	Harmonic SWR >3.0	Stby / ON	⚠	Incorrect Filter or Antenna VSWR
Error Frequency	TX Freq. <1.5MHz or >30MHz	Error frequency	Stby / ON	⚠	Check TX Frequency

\*LED Flashing

## **Warning: Transmit Time.**

High duty cycle modes such as FM and data modes, (RTTY / FT8 etc.), operate the amplifier at full power all of the time, unlike modes like SSB and CW that are either intermittent or only reach peak output for very short times. These high duty cycle modes will run the amplifier much harder and generate more heat in the same amount of time. It should be noted that the amplifier although capable of being used with these modes, should not be used continuously. We recommend that the transmission time should not exceed a couple of minutes in order to avoid excessive transistor junction temperature. The exact time for transmission in these modes will of course depend on numerous factors such as, the ambient temperature, how good the ventilation surrounding the amplifier is, if there is sufficient space for freely flowing air to circulate etc. If the ambient temperature is high this will reduce the total time in transmission. Common sense should be exercised if the heat sink temperature is high then sufficient time should be allowed for it to cool down before resuming transmission. For high duty cycle modes the amplifier may also be used at less than maximum output power by reducing the input drive level. This will reduce dissipation and also allow the amplifier to be used for longer periods.

## **Input Drive and Power output.**

The BLA350 Plus should give full output power with approximately 10-12W of drive. Excessive input power should be avoided and the amplifier always used in a responsible manner. If excessive input power is used the amplifier will signal an error and above 15W input it will return an alarm signal and block transmission. It is important to understand that accidental input of 100W from the transceiver should be avoided and may cause damage to the amplifier!!!!

## **Maximum Output Power Considerations.**

All amplifiers have a maximum output and this occurs shortly after gain compression where by Pin no longer produces a proportionate increase in power output. The amplifier should always be operated at a point below its saturated output. Trying to extract every last watt by overdriving the amplifier will NOT actually help your signal be stronger, you will in fact cause higher levels of distortion which will make your signal less intelligible at the distant receiver station.

Running the amplifier a little under maximum output power will allow the amplifier to run cooler and make it more reliable for many years of use.

As an example consider the following situation.

1 'S' point on a receiver is usually approximately calibrated at 6dB so for example the difference between S5 and S7 is 2 'S' points so 12dB.

The difference between 10W and 300W is about 14.8dB which is a big increase to your signal if using the same antenna. Now let's say for example you run the amplifier at a moderate 250W by reducing the input drive. The difference between 300W and 250W is less than 1dB which when you compare this to 6dB for 1 'S' point is actually very little and as the amplifier is not running at maximum power will generate less heat, and produce a cleaner output with less distortion that will actually make a difference at the distant receiver.

## **Warranty.**

**RM Costruzioni Elettroniche srl** Guarantees that this product is free from manufacturing defects both components and workmanship for a period of time specified by the law. The warranty commences on the date of purchase. Any work undertaken for the warranty must be carried out by RM Costruzioni Elettroniche srl or an authorised service centre. The costs of transportation, duties and insurance between the client and RM Costruzioni srl or the approved service centre are the responsibility of the client.

The warranty must be requested to the distributor or reseller where the amplifier was originally purchased.

In the case where the original distributor or reseller no longer exists or deals with RM products, RM Costruzioni Elettroniche srl will communicate the nearest distributor or reseller to use, or in the instance where this is not possible or convenient, RM Costruzioni Elettroniche srl will honour the warranty directly. If any repairs are carried out outside of an approved service centre this will void the warranty and RM Costruzioni Elettroniche srl will not be responsible for any incurred charges. The warranty will only be honoured if the amplifier has been used for its intended purpose as described in this user manual, that the amplifier is returned with its original purchase receipt, returned in its original packing container, that the serial number is readable, unchanged and that the warranty seals remain intact.

The warranty does not cover the MOSFET power transistors or any aesthetic damage.

Any change to the warranty either by local law or that made by the distributor or reseller directly with the client will be the sole responsibility of the distributor or reseller and not by RM Costruzioni Elettroniche srl. In the event of any argument between parties resulting in legal action. It will be agreed to be settled in a court of law in Bologna (Italy).

The purchase of this product assumes that the client has accepted the terms and conditions of this warranty.