

ACOM



ACOM 1010 HF Linear Amplifier

User's Manual

Installation, Operation
and Maintenance

OUTSTANDING HF POWER PRODUCTS

July 2023

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Title of Documentation ACOM 1010 HF Linear Amplifier
User's Manual
Installation, Operation and Maintenance

Type of Documentation User's Manual

Purpose of Documentation This manual explains Installation, Operation and Maintenance of the ACOM 1010 HF Linear Amplifier.

Record of Revisions	Description	Release Date	Notes
	ACOM 1010 User's Manual	12.2004	First edition
	ACOM 1010 User's Manual	-	Second edition
	ACOM 1010 User's Manual	03.03.2016	Third edition
	ACOM 1010 User's Manual	28.08.2020	Fourth edition
	ACOM 1010 User's Manual	10.12.2020	Fourth edition, R02
	ACOM 1010 User's Manual	19.07.2021	Fourth edition, R03
	ACOM 1010 User's Manual	20.07.2023	Fourth edition, R04

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Published by ACOM Ltd.
Bulgaria | Bozhurishte 2227
Sofia-Bozhurishte Industrial Park | 6 Valeri Petrov Str.
GPS coordinates: 42.748616° | 23.209801°
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Note This manual has been printed on chlorine-free bleached paper.

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1. GENERAL INFORMATION

Congratulations on purchasing one of the finest HF amplifiers in the world today.

ACOM is pleased that you have chosen one of our products, and we will endeavor to provide you with the information and support you need to enjoy your purchase for many years.

We urge you to read all of the following materials before you embark on operating your new amplifier.

1.1. Introduction and Description

This manual explains:

- Installation
- Operation and
- Maintenance

of the ACOM 1010 HF linear amplifier.

The ACOM 1010 is a self-contained linear amplifier that covers all amateur bands, from 1.8 through 29.7 MHz. It provides over 700 W PEP of output power (or 500 W in continuous-duty operation) with less than 60 W of drive.

The amplifier is designed to tolerate SWR levels of up to 3:1 throughout its operating range, and tuning is simplified by ACOM's exclusive True Resistance Indicator (TRI). Also, a built-in antenna selector switch with two outputs is included to provide instant choice of antennas. Importantly, a variety of system parameters are continuously monitored and available to the operator to assure safe and efficient amplifier operation.



1.2. To the Reader of this Manual

This document is written for the technically qualified users who will use the ACOM amplifier.

To ensure your safety in accordance with safety standards, read this manual carefully and follow the steps described in it.

Everyone who will use the amplifier must read this manual, and follow the instructions in it, and other accompanying ACOM documentation (see Section **1.5 Additional Documentation**), and consider also the appropriate safety precautions.

Informational notes

Observe the informational notes provided in this manual to ensure reliable and efficient operation of the amplifier. In this manual, you will find the following informational notes:



The information symbol highlights operating procedures or practices that may improve equipment reliability and/or personnel performance, or to emphasize a concept.



*The book symbol represents a **cross reference** to external documentation, e.g., other ACOM manual.*

Symbols and fonts used for marking text

In this manual the following symbols and fonts are used for marking text:

Format	Meaning
Orange bold text	Identifies all internal links in the document between Sections, Figures, Tables , etc. for your convenience.
BOLD TEXT IN CAPITAL LETTERS	Identifies the connectors, switches, and button names and labels.
TEXT IN CAPITAL LETTERS	Identifies the amplifier operating modes, menu names, etc.

1.3. Product Features

- **Easy to operate**
The plate-load True Resistance Indicator (TRI) is an ACOM innovation that provides quick and precise tuning, typically in less than 10 seconds. The AUTO-OPERATE function will return the amplifier to the OPERATE mode automatically after each protection trip, saving time and avoiding manual switching.
- **Antenna tuner as an option**
The amplifier does not need an external antenna tuner as long as the antenna's SWR is 3:1 or lower.
- **User-friendly and durable**
This amplifier is both user-friendly and self-monitoring. It is designed to safely withstand up to 240 W of reflected power, up to 100 milliseconds of drive spikes (RF "tails" after a PTT or KEY release), and even operator tuning errors. It is also capable of operating at more than half its designed output power at only 75% of nominal line (mains) voltage. Because it can tolerate deep voltage drops (down to zero for 10 milliseconds) and 15% line voltage spikes, it is particularly suited for use in portable environments, such as field days and DXpeditions.
- **LED bar-graph display**
The upper LED bar-graph always reads peak forward power (except for the service functions) while, the lower LED bar-graph is for the reflected power. LED warning indicators are provided for abnormal conditions of grid 1, grid 2, and plate parameters.
- **Antenna selection**
Two antenna outputs are selectable on the front panel of the amplifier.
- **Efficient tuning**
Antenna matching can be achieved in less than 10 seconds and at a quarter of nominal output power, which produces lower risk of interference to other stations and greater safety to the amplifier components.
- **Transceiver-independent**
The amplifier operates without special signaling from the transceiver. It needs only "ground on TX" and 60 W RF drive power to operate at full output power.
- **Broadband input matching**
Broadband input matching circuitry offers excellent loading characteristics for the driving transceiver, from 1.8 MHz to 30 MHz.
- **Single tube operation**
A single Svetlana 4CX800A (GU74B) high-performance ceramic-metal tetrode with plate dissipation of 800 W (forced air cooling, grid-driven) is used for maximum efficiency.
- **Permanent monitoring and protection of the plate and grids currents**
The Bias Optimizer minimizes heat dissipated by the tube, assuring tube longevity.
- **High voltage protection**
The Design of the high-voltage power supply eliminates the danger of turn-on transients affecting sensitive devices connected to the same line (mains) circuit. Moreover, the amplifier can be configured for 8 different nominal line voltages: 100, 110, 120, 200, 210, 220, 230, or 240 VAC, 50 or 60 Hz.

1.4. Product History and Documentation Validity

The ACOM 1010 amplifier serial production started in November 2004. The production has continued to these days without functional changes and with hardware improvements only.

This manual refers to the ACOM 1010 amplifiers Production Version with Release Date 03.2016 and describes the operating possibilities of all amplifiers produced till the publishing date of this manual.

This manual is valid till a new manual is issued.

Production Version Release Date	Notes
11.2004	Basic design (Front panel in Brown color);
03.2016	Basic design (New front panel design Black color);

Table 1-1 | Production versions history



Figure 1-1 | Production Version Release Date 11.2004



Figure 1-2 | Production Version Release Date 03.2016

1.5. Additional Documentation

For further important information, please, refer to the following documentation:



- *ACOM 1010 Brochure.*

The documentation is available for download at www.acom-bg.com.



If you need User's manual for ACOM 1010 Production Version Release Date 11.2004, please, see our document

- *ACOM 1010 User's Manual | November 2004.*

The documentation is available for download at www.acom-bg.com.

1.6. Product Identification

Every ACOM product features an ID (identification) label/plate. On this label, you can find data identifying the device. Which product identification data are important?

- Model designation - The model designation is the name of the device;
- Serial Number - Most products have their own serial number. The serial number is a consecutive number for unique identification of products with the same model designation. It serves to ensure traceability of a product after it has been put in circulation, e.g., to find the date of invoice that is required to determine guarantee and warranty periods. The term serial number is mostly abbreviated to SN or S/N.

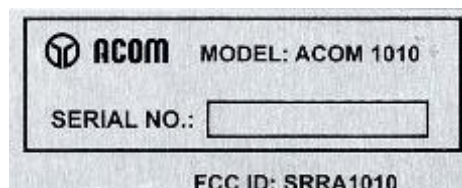


Figure 1-3 | ID (identification) label/plate, example

1.7. Equipment Supplied

The ACOM 1010 amplifier is shipped as package, consisting of:

Nr.	Package Contents	Pcs.
1	Amplifier ACOM 1010	1
2	Power supply cable, approx. length 1.5 m	1
3	Quality Inspection Certificate (hard copy)	1

Table 1-2 | Package contents



The User's Manual is available as PDF-file only.
The latest version of the User's Manual is available at www.acom-bg.com.

1.8. Owner Assistance

If assistance is needed, you should contact your local dealer first. If necessary, your dealer will contact ACOM for additional guidance.

If you still have an issue you need to discuss with one of ACOM's specialists, the contact information is as follows:

ACOM Ltd.
E-mail: support@acom-bg.com
Bulgaria | Bozhurishte 2227
Sofia-Bozhurishte Industrial Park | 6 Valeri Petrov Str.
GPS coordinates: 42.748616° | 23.209801°



Including the ACOM equipment's model name, serial number, and a detailed problem description in your service assistance request is mandatory. Without this information, we cannot proceed with your request, or the proceeding will take longer.

1.9. Safety Considerations, Explicit Definitions

The ACOM 1010 HF Linear Amplifier is a Safety Class I unit regarding protection against electric shock. The third grounding lead of its mains cord (which is colored yellow with two green stripes) and the ground stud on the rear panel of the amplifier (marked **GND**, see *Figure 2-5 | Rear panel - Connections*, Pos. (a)) must be connected to the station's grounding system for safe operation.

The amplifier is designed to meet international safety standards and complies with CE safety and electromagnetic compatibility requirements, as well as FCC regulations.

This User's Manual contains information, warnings (signal words **Danger**, **Warning**, **Caution** and **Notice**) and instructions, related to hazards, that should be followed by the user in order to ensure safe operation and to keep the amplifier in a safe working condition at all times.



The safety instructions contained in this User's Manual feature specific signal words (**Danger**, **Warning**, **Caution** or **Notice**) and, where required, a safety alert symbol, in accordance with actual standards ISO 3864 or ANSI Z535.

The EXPLICIT DEFINITIONS described below apply to this User's Manual:

⚠ DANGER

These notes call attention to a procedure or instructions which, if not correctly performed, will result in serious personal injuries and even death.

⚠ WARNING

These notes call attention to a procedure or instructions which, if not correctly performed, could result in serious personal injuries and even death.

⚠ CAUTION

These notes call attention to a procedure or instructions which, if not correctly performed, could result in minor or moderate personal injuries.

NOTICE

These notes call attention to a procedure or instructions which, if not correctly performed, could result in property damage or equipment damage not exclusively to the amplifier but also to connected equipment.

PRECAUTIONS:**⚠ DANGER**

For safe operation, the amplifier's grounding stud on the rear panel (marked **GND**, see *Figure 2-5 | Rear panel - Connections*) should be connected according to the applicable standards and local regulations for electric safety, fire safety and lightning protection, in all cases the radio station is equipped with outdoor antenna(s)!

⚠ DANGER

NEVER underestimate the danger of lightning!

To prevent accidents, connection/disconnection to the grounding and antennas should only be carried out in clear, quiet, and sunny weather when there is no danger of lightning and static discharges.

⚠ DANGER

The amplifier works with high voltages up to 3000 V, which are LETHAL!

For your safety, pull the amplifier power plug out of the mains wall outlet and WAIT AT LEAST 30 minutes EACH TIME BEFORE you remove the cover of the amplifier. Do not touch any part inside while the amplifier is open because some residual voltages may still be present.

⚠ DANGER

Never allow anyone, ESPECIALLY CHILDREN, to push or put anything into holes in the case - this will cause electric shock. NEVER TOUCH AN ANTENNA or antenna insulators during transmission or tuning - this may result in an electric shock or burn. NEVER EXPOSE the amplifier to rain, snow, or any liquids. AVOID placing the amplifier in excessively dusty environments or in direct sunlight. DO NOT OBSTRUCT AIR INTAKE (bottom) and EXHAUST (top cover) areas of the amplifier. Keep a minimum clearance distance of 50 cm (20 inches) above the exhaust opening.

⚠ WARNING

Do not undertake on your own repairs or changes in hardware or software of the amplifier in order not to endanger your or other's health and life and not to damage the amplifier and the equipment connected with it, not covered by warranty. The manufacturer is not liable for another's actions and responsibility shall be assumed by the doer.

⚠ WARNING

To avoid damage (not covered under warranty) read the Section **2 INSTALLATION** of this User's Manual carefully. If you have any doubts about the installation, operation, or safety of the amplifier, please, consult your dealer.

⚠ WARNING

NEVER operate the equipment if you notice an abnormal odor, sound, or smoke. Immediately turn off the power and contact your dealer for assistance (see Section **1.8 Owner Assistance**).

⚠ WARNING

To be in compliance with the RF exposure requirements, please, read Section **6.3.c) RF Exposure Information**.

2. INSTALLATION

2.1. Unpacking and Initial Inspection



Before you install your amplifier, thoroughly read this manual.

First, carefully inspect the cardboard carton and its contents for physical damage. ACOM ships amplifiers in highly protected containers, but it cannot assure that mistreatment by shippers will not occur. If damage is evident, notify your dealer immediately. Delay may void the carrier's warranty.

⚠ CAUTION

The packaged weight is about 20 kg and is recommended to be handled by two persons.



Keep all packing materials for possible future amplifier shipment (see Section [6.4.4 Returning to the Service Provider](#)).

2.1.1. Cardboard carton unpacking

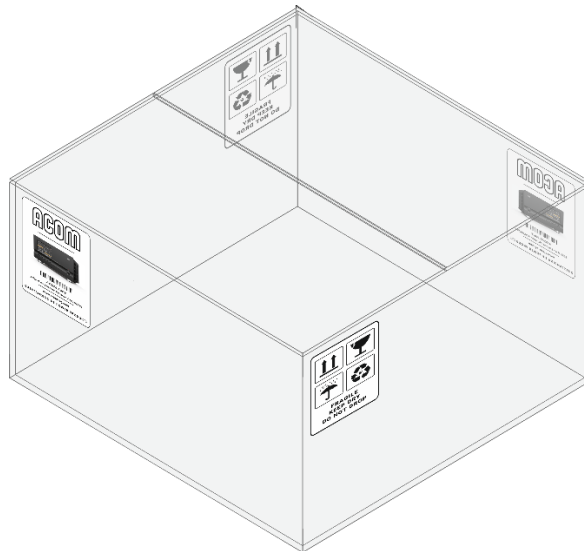


Figure 2-1 | Packaging carton (outside view)



Please, note that the unpacking procedure described below may vary due to different packing solutions.

Unpack the amplifier as described below:

- Open the cardboard carton (see *Figure 2-1 | Packaging carton (outside view)* and *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 1);
- Take out the top secure element (see *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 2);
- Open the internal cardboard carton (see *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 3);
- Take out the amplifier using handles of the middle secure element (see *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 4);
- Take out the amplifier (Pos. 8) from the middle secure element and remove top, bottom, and sides flat secure elements (see *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 5, 6 and 7);
- Continue with the instructions in Section **2.1.2 Internal transport protective element removing**.

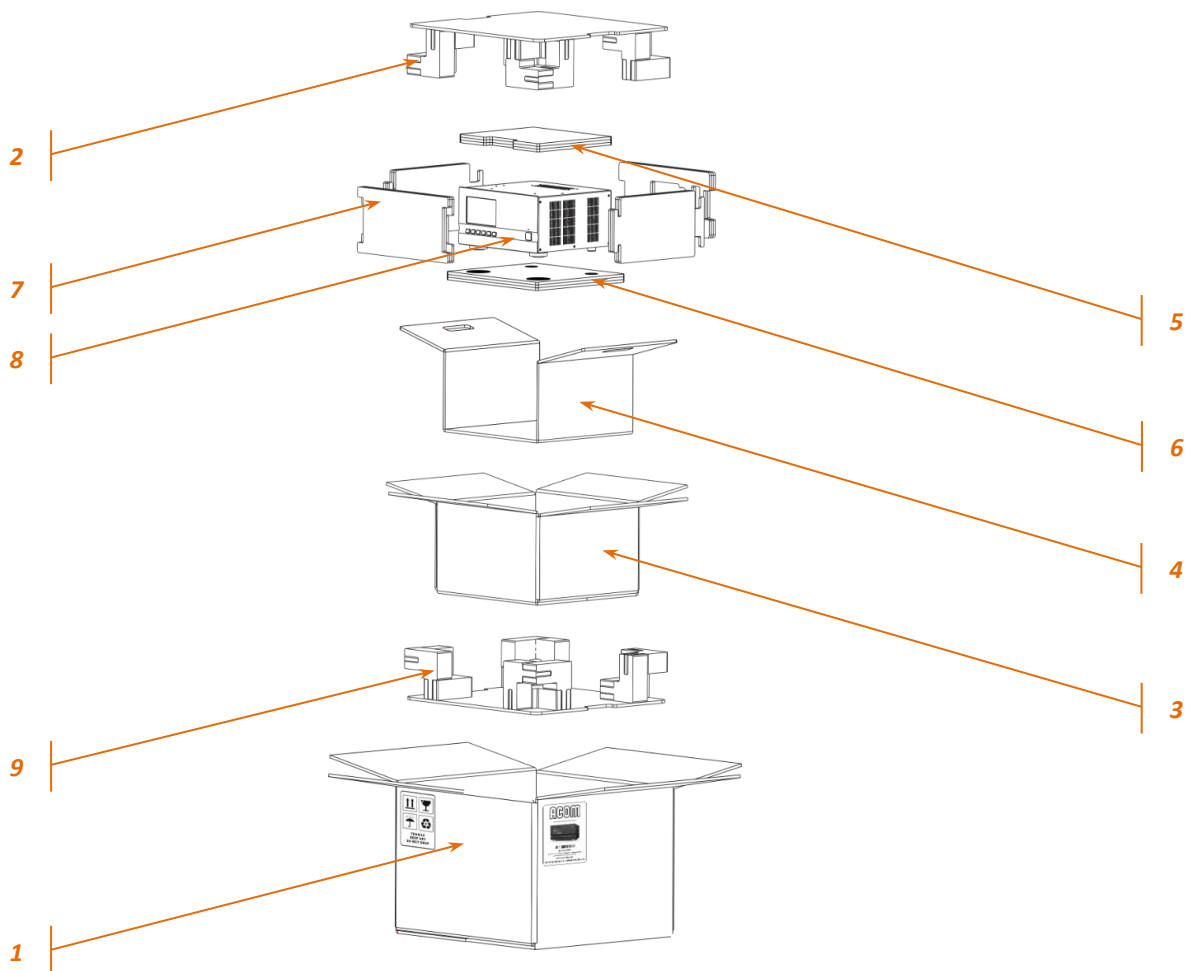


Figure 2-2 | ACOM 1010 packaged in a cardboard box



It is not necessary to take out the bottom secure element.
(See *Figure 2-2 | ACOM 1010 packaged in a cardboard box*, Pos. 9)

2.1.2. Internal transport protective element removing

The ACOM 1010 amplifier is supplied with an internal protective element for tube protection during transport.

NOTICE

Removing the protective element before the first use of the amplifier is necessary. Do not leave the protective element inside the amplifier. This will damage the amplifier (not covered by the warranty).

To remove the protective element, follow the instruction below:

- Remove the amplifier top cover by unscrewing the screws holding it. The screws are located at left, right, top, and rear sides of the amplifier. The suitable screwdriver is Philips #2 (PH2).

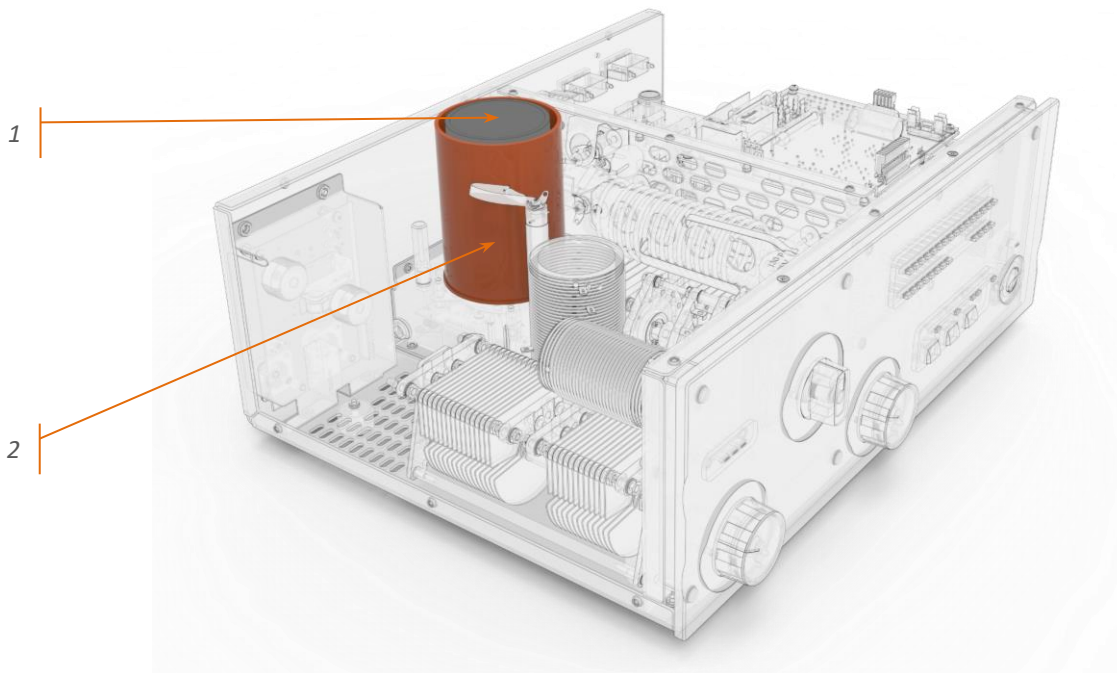


Figure 2-3 | ACOM 1010 without top cover

The internal protective element (see [Figure 2-3 | ACOM 1010 without top cover](#), Pos. 1) is a plastic cylindrical component located inside the exhaust hot air chimney (see [Figure 2-3 | ACOM 1010 without top cover](#), Pos. 2).

- Pull out the protective element upward as shown in [Figure 2-4 | ACOM 1010 Internal transport protective element removal](#);
- Reassemble the amplifier top cover;
- Now, the amplifier is ready for installation.

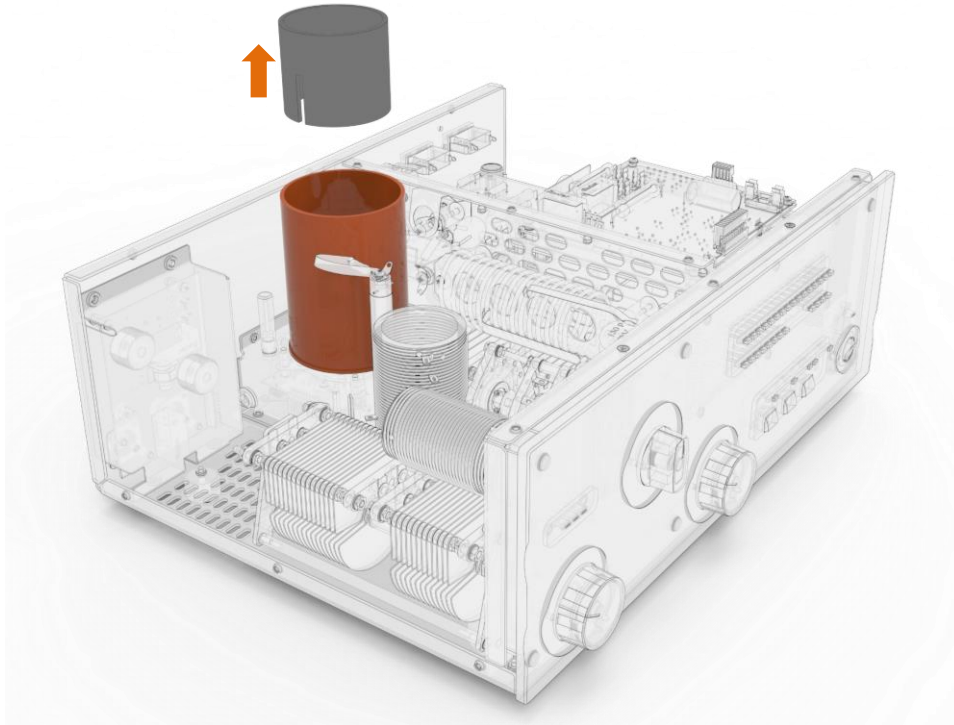


Figure 2-4 | ACOM 1010 Internal transport protective element removal



Please, note that the color of the protective element may vary.

2.2. Amplifier Location Selection

⚠ CAUTION

The weight of the unit is about 17 kg, which should preferably be handled by two persons.

Position the amplifier near the place where it will be used. You will need an easy access to the command knobs and indicator's area, as well as to the rear panel cabling.

NOTICE

The ACOM 1010 is forced air cooled.

Do not under any circumstances obstruct the air intake (bottom) and exhaust (top cover) areas of the amplifier. Keep a minimum clearance distance of 50 cm (20 inches) above the exhaust opening.

No temperature-sensitive devices should be located above the exhaust hot air area. This means that the amplifier should not be located under a shelf or other structure that could impede the free movement of air away from the amplifier.

No magnetic-field sensitive devices (such as microphones) should be located next to the right side of the amplifier because its power transformer is located there. It is advisable to position the amplifier to the right of your transceiver.

NOTICE

Do not leave accidental paper, cloth, or other lightweight pieces around and under the amplifier. They may be drawn in by the cooling air stream and block the vents. This will lead to overheating and accelerated material aging, not covered by the warranty.

2.3. Line Voltage Selection

NOTICE

To avoid damage, which will not be covered under your warranty, check carefully to be certain that the voltage for which the amplifier is set corresponds to your mains nominal voltage.



See Section **5.3 Fuse Replacement** for correct fuse rating and mains voltage range selections.

Normally, the amplifier is supplied set for a nominal line voltage of 240 V. If your mains voltage is not 240 V, you must contact your dealer for instructions (see Section **1.8 Owner Assistance**).

The only exception to this is if the unit has been custom ordered, in which case the voltage selection will be noted in Quality Inspection Certificate (part of delivery, see **1.7 Equipment Supplied**).



The amplifier power supply can be configured for 8 different nominal line voltages: 100, 110, 120, 200, 210, 220, 230, or 240 VAC, 50 or 60 Hz.

2.4. Connections

Please, see **Figure 2-5 | Rear panel - Connections**.

Connection to your station must be accomplished in the order described below, before you apply mains voltage to the amplifier.

⚠ WARNING

Installation of the equipment must comply with local and national electrical codes. The applicable standards and local regulations shall prevail if there is a difference in the requirements, and if they contain more or stricter requirements than the minimum for installation stated in our documentation.

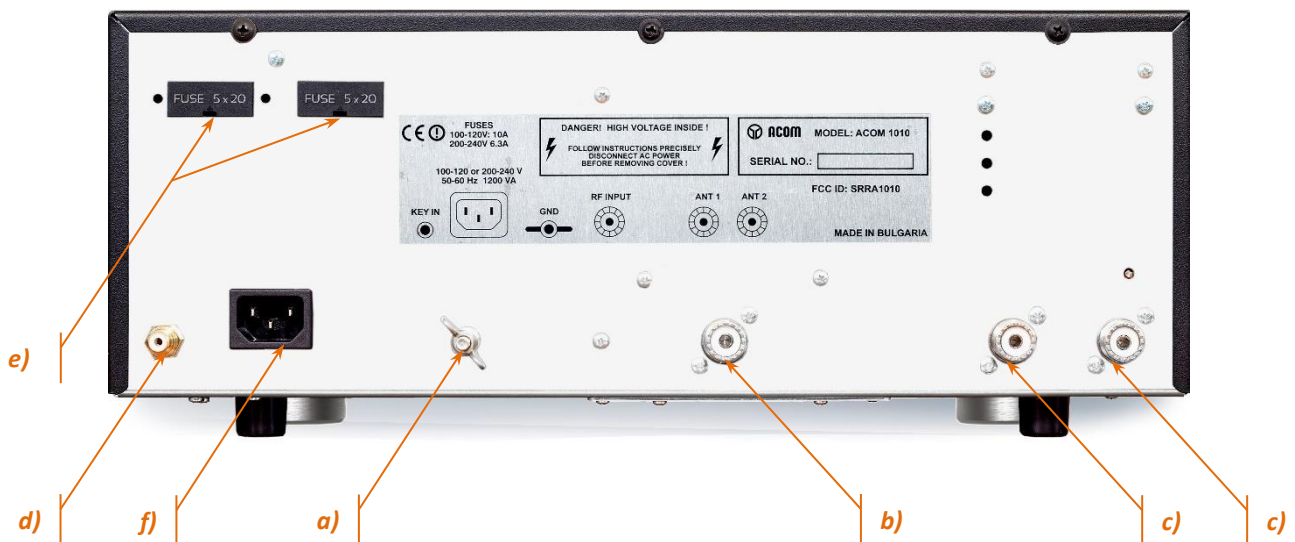


Figure 2-5 | Rear panel - Connections

a) **GND** stud for grounding



Before you connect the amplifier to external grounding, you should advise with a licensed electrician and confirm such kind of connection is allowed by your national standards and regulations for electric safety, fire safety, and lightning protection.

Simultaneous connection to the earth grounding and protective earth may be inadmissible or may fall under special requirements in some countries!

⚠ DANGER

Never use the gas installation for grounding. This can cause an EXPLOSION!

⚠ DANGER

Do not use the steam-heating or water-supply network pipes for grounding! You may expose to dangerous voltage not only yourself but also other people using the same installation.

⚠ WARNING

This amplifier needs to be grounded.

When installing or replacing the unit, the ground connection must always be made first and disconnected last.

Note that the grounding system may have to withstand currents over 15 A with insignificant voltage drop on it. Therefore, it may be necessary to improve it considerably, i.e., to become less resistive, with heavier leads and lower-resistive ground path.

Use a green and yellow ground wire to connect the wing-nut grounding stud of the amplifier (on the rear panel, marked **GND**) to the station's grounding system (see [Figure 2-5 | Rear panel - Connections](#), Pos. (a)).

The grounding leads should be at least 4 mm² (AWG 11 or SWG 13).

⚠ WARNING

HIGH VOLTAGE!

To avoid disaster, the amplifier installation and connection to the grounding and to the antenna should be carried out only in serene quiet and sunny weather, when no risk for thunders or atmospheric electricity activity exists. Not only a direct lightning hit but also nearby strokes, as well as electricity induced by storm-clouds or a dusty wind can cause voltages in either the antenna or the cables you are installing, that are dangerous for life!

Do not begin installing the amplifier before you have prepared a proper and safe lightning grounding installation! Never use the amplifier unless it is grounded to guard you against lightning strokes! Do not use casual ground connections!



If no other data is available, in order to avoid conduction of a lightning strike with all resulting consequences - death, injury, fire, equipment damage, destruction, etc., please, read and understand clearly:



- *ACOM 04AT User's Manual*

Pay particular attention to **Appendix 1 – Lightning Protection** in the downloaded manual.

The documentation is available for download at www.acom-bg.com.

For details and recommendations on the grounding and RF counterpoise system concerning the electromagnetic compatibility see also Section **3.3 Elimination of electromagnetic compatibility (EMC) problems**.

b) **RF INPUT** connector

Connect a suitable coaxial cable from the transceiver output to the amplifier **RF INPUT** SO-239 connector (see [Figure 2-5 | Rear panel - Connections](#), Pos. (b)), using PL-259 plug.

NOTICE

In order to avoid a damage, turn off your transceiver's internal antenna tuner.

c) **ANT1** and **ANT2** connectors

NOTICE

If this is the first time you will use a power amplifier in your station, pay attention to the coaxial cable type from the amplifier's output to the antenna. It must handle the increased power safely, particularly on the 10-meter band. It is suggested that, at a minimum, RG8X (including RG8MINI, RK50-4-11, RK50-4-13) or, even better, RG213 (including RK50-7-11) coaxial cable be used.

Connect a suitable coaxial cable with a PL-259 plug from the amplifier output **ANT1** or **ANT2** (see [Figure 2-5 | Rear panel - Connections](#), Pos. (c)) to the antenna selector or tuner, or to the antenna for the respective frequency band.

d) **KEY-IN** connector

This is the amplifier's input for receive/transmit control from the transceiver.

The transceiver controls the amplifier from receive mode into transmit mode (RX/TX) by grounding of the **KEY-IN** input.

Run a shielded cable from the "ground on transmit" socket or terminal on your transceiver to the amplifier **KEY-IN** connector (see [Figure 2-5 | Rear panel - Connections](#), Pos. (d)). The **KEY-IN** connector uses a standard RCA phono plug.



Voltage on the **KEY-IN** connector does not exceed 12 V and the current is below 6 mA.



Your amplifier will not work if **KEY-IN** input is not connected properly.

Transceiver producers give different names to this output and they are for instance TX-GND, SEND, T/R-LINE, PTT, etc. Some transceivers require that "ground on transmit" is implemented via a software command, or by changing the setting of a switch on the rear panel, or interior of the transceiver. Check your transceiver's manual.

e) Main fuses

Please, see [Figure 2-5 | Rear panel - Connections](#), Pos. (e).

NOTICE

Make sure you check whether the main fuses installed in your amplifier correspond to your local mains nominal voltage. If the occasion should require replacement of the mains fuses, replace them as described in Section [5.3 Fuse Replacement](#)!

⚠ WARNING

If your amplifier is only fitted with one line (mains) fuse, it is suitable for European Community ONLY. Your dealer will check that your amplifier is correctly fused before it is shipped to you. Customers should check with a qualified electrician if the amplifier is to be used outside the country in which it was purchased.

f) The IEC 320 Power inlet

Please, see [Figure 2-5 | Rear panel - Connections](#), Pos. (f).

Due to the different standards in different countries, the mains plug is supplied and mounted by the dealer. He connects to the mains cord end a standard mains supply plug which meets the Safety Class I unit standard in your country. The ground lead of the amplifier's power cord is colored yellow with two green stripes and the blue and brown leads are active. When the amplifier is to be used with only one mains fuse, it is connected in series with the brown lead, which must be the active. If you have any doubts about the correct way of connecting the wires, consult your dealer.

g) Preparation of wall outlet

⚠ WARNING

Before connecting the amplifier to your mains supply using a licensed electrician, check that the supply is correctly wired, and is adequate for the current drawn by the amplifier (up to 6.3 A from 200/240 VAC mains and up to 10 A from 100/120 VAC mains). Make certain that the grounding lead is connected properly and that it has a cross section not less than the cross section of the phase conductor in the wall outlet for the amplifier.

It is preferable that you use the wall outlet closest to the source. The installation leads should be at least 1.0 mm² (AWG 17 or SWG 18) at operating 200-240VAC and 1.5 mm² (AWG 15 or SWG 17) at 100-120VAC (recommended values if there are no stricter requirements by your local standard).

Check that the panel fuse has a free capacity for the additional load from the amplifier as specified in Sections [5.3 Fuse Replacement](#) and [6.1.i\) Mains Power Consumption](#). If you connect the amplifier to a different mains outlet, be sure that you check it, too.

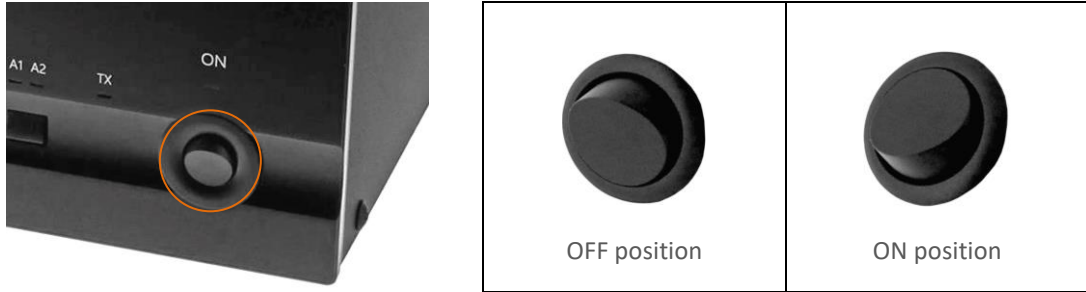


Figure 2-6 | Power rocker switch in OFF or ON position

Make sure the main Power switch (marked "ON", see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1) on the front panel is in OFF position (see [Figure 2-6 | Power rocker switch in OFF or ON position](#)) and insert amplifier's mains plug into the wall outlet prepared for it. The amplifier remains switched off (with the "ON" indicator dark).

3. POWER ON, CONTROLS, AND INDICATORS

NOTICE

Do not turn the amplifier on for at least 2 hours after unpacking it in the room where it will be used. Pay particular attention when you move it from a very cold into a warm place - condensation is likely and this could result in damage to the high voltage circuits. In such a case, wait at least 4 hours. A similar effect can occur after a rapid warming of the operating room (for instance after switching on a powerful heater in a cold shack).

NOTICE

To avoid any damage (not covered by the warranty), check carefully to be certain that the voltage for which the amplifier is set corresponds to your mains nominal voltage (see Section [2.3 Line Voltage Selection](#)).

NOTICE

To avoid any damage (not covered by the warranty), never connect, or disconnect cables while power is applied at either end of the cable.

Hot-plugging is technically incorrect and is a bad practice to connect or disconnect any piece of equipment while it is powered on. Make sure the device is switched off before connecting or disconnecting any cable.

3.1. Power On

After following all instructions in Section [2 INSTALLATION](#), you may turn on the main power switch (marked "ON") on the front panel (see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1 and [Figure 2-6 | Power rocker switch in OFF or ON position](#)). The green LED indicator above the switch will illuminate.



Figure 3-1 | Front panel - Display and Controls

3.2. Front Panel

a) POWER button

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1.

When the amplifier is turned ON, the green LED indicator above the switch is illuminated continuously (see [Figure 2-6 | Power rocker switch in OFF or ON position](#) for the correct position).

b) Upper LED bar-graph

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 2.

You will note that the upper LED bar-graph always reads peak forward power, except for the service functions (see Section [5.6 Service Functions](#)). The 800 W scale resolution is 50 W. Note also that levels below 50 W may be not detected.

c) Lower LED bar-graph

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 3.

The lower LED bar-graph will indicate reflected power up to 240 W. The scale resolution is 30 W.

d) OPER button

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 4.

The **OPER** button alternatively switches between the OPERATE and STANDBY modes once the amplifier has completed its 150-second warm-up period (see Section [4.2 Changing OPERATE and STANDBY Modes](#)).

e) RTTY button

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 5.

The **RTTY** button reduces the output power of the amplifier to 500 W (see Section [4.3 RTTY Mode](#)).

f) A1-A2 button

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 6.

The button labeled **A1-A2** (see Section [4.4 Antenna Change](#)) changes the antenna output to either **Antenna 1** or **Antenna 2**, according to the operator's choice. It is the operator's responsibility to connect suitable antennas to the **ANT1** and **ANT2** connectors (see [Figure 2-5 | Rear panel - Connections](#), Pos. (c)).

g) TX LED

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 7.

The red TX LED illuminates whenever the **KEY-IN** input is keyed (closed to ground), i.e., when the transceiver goes into the transmit mode (see Section [2.4.d\) KEY-IN connector](#)).

h) BAND, LOAD, and TUNE knobs

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 8.

The **BAND** knob controls the band switch, and **LOAD** and **TUNE** are used to adjust the respective variable air capacitors in the amplifier's output circuit. The settings of these three controls must be adjusted at each band change as well as when an antenna is changed.

i) LOAD TRI LED indicators

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 9.

The three LED indicators located above the knob **LOAD** are called the "TRI tuning indicator" and they are used to achieve antenna impedance matching during a re-tune procedure (see Section [4.5 Tuning](#)).

NOTICE

Do not switch the **BAND** switch knob while transmitting with the amplifier! Hot switching (while transmitting) will eventually destroy the band switch, not covered by the warranty!

j) CAUTION LED indicators

Please, see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 10.

There are three warning yellow LED indicators and one fault red LED indicator located in the bar-graphs area. The following describe the error conditions and the correct responses (except for the service functions - see Section [5.6 Service Functions](#)):

- **G1** - when illuminated, a control-grid overload condition exists.
Reduce the drive power for safe operation;
- **G2** - when illuminated, a screen-grid overload condition exists.
Reduce the drive power and/or refresh the tuning for safe operation (see Section [4.5 Tuning](#));
- **IP** - when illuminated, a plate current overload condition exists.
For safe operation reduce the drive power and/or refresh the tuning (see Section [4.5 Tuning](#));
- **F** - when illuminated, the amplifier automatic protection has tripped.
If **F** is accompanied with one of the G1, G2, or IP condition indicators, the cause of the protection trip will be evident. When F alone is illuminated, check the keying wiring (see Section [2.4.d\) KEY-IN connector](#)). See Section [4.6 The Auto-Protection System](#) for details about the auto-protection system.

3.3. Elimination of electromagnetic compatibility (EMC) problems

If you use an amplifier for the first time in your shack, you may need to make some improvements in the setup. It is possible you might experience tingling from metallic objects due to the stronger radiated RF field. It could affect the operation of your station or systems outside, if they are too sensitive - typical examples are the microphone, CW keyer, computer keyboard or mouse, as well as TV receivers, Hi-Fi devices, intercom or telephone setups and others.

For instance, induction of RF currents into the microphone, CW keyer or computer keyboard, may lead to distortion in the peaks or relaxation oscillation in SSB mode, "sticking" or breaking off the dots or dashes from a Morse keyer, or garbling computer screen images.

For the elimination of such problems, we recommend that you take the following general measures:

- Minimize the radiation from the feed lines by reducing the common mode currents in them, improve the balance of antennas and feedlines;

- In case you use asymmetric antennas (GP and similar) install as many radials as practical (use a well-developed counterpoise system);
- Add current chokes on the coaxial feeders;
- Place as far away as possible (also by height) the radiating elements of antennas from the premises, where the affected devices are located; in this sense, asymmetrical antennas without a separate feeder (Long Wire, Windom, and similar) may cause more interference because their radiating element begins immediately from the shack (part of it is the feeder itself);
- If the use of asymmetrical directly fed "wire" antennas is inevitable, use mainly half wave or half wave multiple lengths - they have a high input impedance, operate respectively with a small current in the feed point, and in the grounding of the shack; thus you can reduce the strength of the disturbing RF fields more than 10 times (at the same radiated power) compared to the case with quarter-wave and odd multiple to quarter-wave antennas of this class - you should avoid them because they have a low input impedance and operate with a large RF current in the grounding system and in the power supply network respectively, i.e. they create stronger disturbances (RFI);
- Improve the RF grounding system: use the shortest and widest possible metal strips for the connections to ground and between the different gear in the shack; connect one or more counterpoises (sized for the problematic band) to the feeder shield at the point, where it enters the building, and the same point - with the possibly shortest and widest connections - to the grounding system: this is a very efficient measure, in particular if the shack is located on a high floor above ground;
- To reduce the RF impedance of the grounding connections sheet metal stripes instead of flexible braids are to be preferred;
- Thread ferrite beads or snap-in ferrites with medium permeability (800-4000) over the power cord, the coaxial feeder and the signal cables leading to the affected devices (TV, etc.); besides the size, consider the frequency range in which the offered ferrites are effective - normally they are optimized for suppression of interferences on HF (with larger permeability), with medium permeability for HF-VHF or with low permeability - only the VHF range. The latter are ineffective for HF;
- Whenever possible use shielded cables and ground their shields at both ends;
- The addition of even quite simple low pass L/C or R/C filters directly to the disturbed inputs or outputs of the devices is very effective, provided it is practically applicable.

Last but not least, bear in mind that the benefit of the above measures is two-fold.

Firstly - they reduce the interferences from your transmissions to the ambient environment and secondly - they reduce the background noise floor for your reception.

Practically, with no great efforts, implementing the above measures, you can reduce the receive background noise floor with one or more S-units across the different bands. This will allow you not to miss weaker stations, which will hear you because of your increased transmission power.

And third, but very important: the EMI environment at your station will become safer for you and those close to you.

4. OPERATION

Operation of the amplifier is simplified due to the TRI (True Resistance Indicator) tuning aid, AUTO-OPERATE function, and Automatic Protection System, so you will be able to begin using the amplifier immediately after the installation.

However, to make full use of amplifier's potential and to fully configure it to your local conditions, we recommend that you thoroughly read the following information.

4.1. Turning ON and OFF

In order to turn on the amplifier, press the power switch marked "ON" (see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1) to ON position (see [Figure 2-6 | Power rocker switch in OFF or ON position](#)).

The LED indicator above the switch will glow green and the audible cooling fan will start.

Following a series of automatic self-tests, the **OPER** LED will begin to flash green and will continue to do so during the 150-second warm-up period. Throughout this period, the amplifier will remain in the STANDBY mode, and the transceiver may continue to be used.

Also, during this period (STANDBY mode status), the **A1-A2** button may be pressed to change antennas, i.e., between the antennas connected to the **ANT1** and **ANT2** outputs (see [Figure 2-5 | Rear panel - Connections](#), Pos. (c)). Switching between the antennas does not affect the warm-up process.

NOTICE

To avoid damage not covered under warranty, do not change the antenna output during a transmission, i.e., never press the **A1-A2** button when transmitting.



When you intend to have a short operating break, it is better to leave the amplifier in STANDBY mode instead of turning it off. Tube life is shortened by repeatedly turning on and off the tube heater supply. However, if you unintentionally power-off the amplifier, it is best to switch it on again immediately. When the pause is short (up to one minute) and the cathode is still warm, the warm-up period is shortened significantly, which reduces the waiting time and prolongs the tube's expected life.

After the warm-up period is complete, the **OPER** LED stops flashing and remains illuminated green.

In order to turn off the amplifier, press the power switch marked "ON" (see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1) to OFF position (see [Figure 2-6 | Power rocker switch in OFF or ON position](#)).



When the amplifier is powered off, it is a purely passive network between **RF INPUT** and **ANT 1** (even if ANT 2 was selected in OPER or STANDBY modes).

When the amplifier is powered off, the amplifier RF bypass path presents a SWR less than 1.1 thanks to a careful impedance compensation in the frequency range between 1.8 and 30 MHz.

4.2. Changing OPERATE and STANDBY Modes

The **OPER** button changes between two modes. When the green light above the button is illuminated, the amplifier will remain ready to operate, even automatically returning from STANDBY after a high-drive protection trip. That is, after a protection trip, e.g., from an overdrive event, the amplifier will normally shift to the STBY mode for several seconds, but it will automatically return to the OPER mode after that. This is the AUTO-OPERATE feature.

Alternatively, the **OPER** button may be depressed manually to go to and remain in the STBY mode, such as when you leave the station for a while. The green LED goes off and the AUTO-OPERATE function is suppressed temporarily. Pressing the **OPER** button again restores the AUTO-OPERATE feature.



When the amplifier is in STANDBY mode, it presents a purely passive network between **RF INPUT** and either **ANT 1** or **ANT 2**, if selected by the operator.

In STANDBY mode, the amplifier RF bypass path presents a SWR less than 1.1 thanks to a careful impedance compensation in the frequency range between 1.8 and 30 MHz.

4.3. RTTY Mode

Select the RTTY mode to operate continuous-duty modes such as RTTY, SSTV or other data modes. The LED indicator above the **RTTY** button illuminates and the amplifier operating parameters are changed to reduce tube dissipation. In the RTTY mode, the amplifier output power is reduced to a maximum of 500 W. There is no need to re-adjust tuning when changing between RTTY and normal modes.

NOTICE

In order to avoid any damage (not covered by the warranty), do not change modes during transmission. That is, do not change to or from RTTY or any other mode when transmitting.

4.4. Antenna Change

By pressing the **A1-A2** button, the amplifier output is switched between the two corresponding antenna outputs, **ANT1** and **ANT2**. The lights above the button indicate the current antenna selection.

NOTICE

To avoid damage (not covered by the warranty) do not change antennas while transmitting. Do not transmit into an antenna output if it is not connected to an antenna or a dummy load via a suitable coaxial cable with a PL-259 plug (see Section [2.4.c\) ANT1 and ANT2 connectors](#)).

4.5. Tuning



Tuning is possible only in the OPERATE mode.

a) Preliminary information

Tuning the amplifier involves a procedure of matching the impedance of the currently used antenna and transmission line to the amplifier tube's optimum characteristic load resistance. This will ensure maximum plate efficiency and optimum RF gain at nominal output power, with minimal distortion and spurious output.

Note that REFLECTED POWER readings depend on the antenna and transmission line impedances only, and not on amplifier tuning. If the load impedance is not a nominally resistive 50-Ohms, the REFLECTED POWER indicator will always show a reading, no matter what the tuning settings.

Proper tuning is always necessary, however, and will allow you to operate at a high-power level, without distortion or any danger to the amplifier.

Note also that the real OUTPUT POWER presented to the load (the antenna and transmission line) is equal to the difference between the FORWARD and REFLECTED power readings. For instance, with a 2.5:1 SWR, readings of 800 W and 150 W FORWARD POWER and REFLECTED POWER respectively, the real OUTPUT POWER is 650 W. At very high SWR levels, such as when no antenna is connected or a badly mismatched antenna is used, the FORWARD and REFLECTED readings will be almost equal, while the real OUTPUT POWER (the difference between them) will be nearly zero.

The amplifier can operate safely if the following rule is obeyed:

"REFLECTED POWER < 250 W".

Also, impedance matching capability is assured for loads presenting a SWR of up to 3:1. Nevertheless, for some loads and bands, matching is possible at even higher SWR levels, but the drive power must be reduced to prevent the REFLECTED POWER from exceeding 250 W. Failure to comply with these guidelines will cause the protection circuits to trip.

For example, if the antenna SWR were 5:1, the maximum attainable forward power would be 540 W, 240 W of reflected power, and real output to the antenna and transmission line of only 300 W. In the event, your antenna cannot be adjusted to produce a lower SWR, an external antenna tuner may be deployed.

NOTICE

At elevated SWR levels, high voltages and high currents are distributed along the coaxial cable to the antenna, risking internal arcing and heat generation, and likely damage to the cable and any antenna switches that may be used. It is recommended that SWR levels of more than 3:1 not be permitted with coaxial cable above 14 MHz.

It is highly advisable to re-adjust amplifier tuning when antennas have been changed.

Update tuning periodically, even if you have not changed band or antenna, in particular when a significant change in the environment occurs (snow, ice, newly appeared or removed massive objects, alien wires nearby etc.) that would cause significant changes in the antenna impedance.



If you use more than one antenna per band, it is necessary that you select the proper antenna BEFORE to perform the tuning procedure outlined below.

NOTICE

Do not switch the **BAND** switch knob while transmitting with the amplifier! Hot switching (while transmitting) will eventually destroy the band switch, not covered by the warranty!

NOTICE

When tuning, never apply continuous drive longer than one minute without pausing for at least one minute to allow the tube to cool.

It is recommended that for initial tuning a free frequency in the middle of the band be selected (make sure the frequency is not being used by others so that you do not make QRM). First, with **no transceiver power applied**, select the band. Then use [Table 4-1 | Approximate tuning preset](#) in order to achieve an approximate preset for both **TUNE** and **LOAD** capacitor knob settings:

Band, MHz	LOAD Knob Dial	TUNE Knob Dial
1.800 - 2.000	47 - 71	54 - 32
3.500 - 4.000	34 - 56	51 - 33
7.000 - 7.300	32 - 39	36 - 30
10.100 - 10.150	62 - 63	50 - 48
14.000 - 14.350	37 - 41	38 - 31
18.068 - 18.168	41 - 43	50 - 48
21.000 - 21.450	59 - 62	16 - 10
24.890 - 24.990	50 - 52	49 - 46
28.000 - 29.700	63 - 69	23 - 10

Table 4-1 | Approximate tuning preset

b) Tuning Procedure

- (1) Once the antenna and band have been selected (and the **TUNE** and **LOAD** adjustments have been initially set as indicated in **Table 4-1 | Approximate tuning preset**), apply between 10 and 20 W of continuous (key down CW) drive signal.
- (2) Look at the upper LED bar-graph (FORWARD POWER) and adjust the **TUNE** (right hand) capacitor for maximum FWD indication.
- (3) Watch the three TRI LED indicators above the **LOAD** (left hand) knob and turn it in the indicated direction to center the green light.
- (4) Increase the drive power to get the desired nominal output; then repeat steps (2) and (3), always peaking output with the **TUNE** adjustment.



No light on the TRI indicator means that the tuning is too far off. To correct this, turn the **LOAD** and **TUNE** knobs around the table-suggested positions until the TRI indicator illuminates.



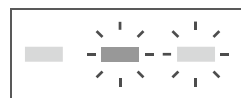
No light:
Use TUNE knob for max. Power to get any marker.



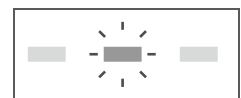
Tuning is a far left:
Turn LOAD knob to the right to get the inside markers.



Tuning is a far right:
Turn LOAD knob to the left to get inside markers.



Marker inside:
Turn LOAD knob slightly left to center it.



LOAD is tuned:
Turn TUNE knob to peak Forward Power.

Figure 4-1 | Using TRI tuning aid

The TRI indicator will not illuminate until at least 20 W of forward power (output) is achieved. In the event successful matching cannot be accomplished, check the **BAND** switch position and antenna selection. Then check the antenna SWR at the same drive frequency.

c) Tuning hint

A benefit of TRI is that the knob positions are virtually independent. The plate-load resistance decreases to the right and increases to the left of the TRI center. A centered tuning indication corresponds to the proper **LOAD** capacitor tuning, which presents an optimum load resistance to the tube.

If the **LOAD** knob is turned to the left with a centered TRI, there will be more gain, but less linearity. When available drive power is insufficient or when less output but better efficiency is needed, e.g., for RTTY and SSTV, this may be desirable. Tuning to the right of the center would lead to the opposite result, i.e., less gain and more power attainable. Of course, this requires more drive power, more plate current, and more plate heat, which shortens tube's-expected life.

Off-center tuning may also be used to compensate for line (mains) voltage variations in order to maintain tube efficiency. In that case, tune to the left when line (mains) voltage is high, or tune to the right if it is low. However, where there is more than a 10% difference from the nominal line (mains) voltage, the voltage selector inside the amplifier should be changed (see Section **2.3 Line Voltage Selection**).

4.6. The Auto-Protection System

When any abnormal amplifier condition is detected, the risk will be evaluated automatically and either of two degrees of protection will be applied by the controller.

Degrees of protection:

a) **First degree of protection - An illuminated LED warning**

These include the yellow LED warnings described in Section **3 POWER ON, CONTROLS, AND INDICATORS**, i.e., "**G1**" (grid 1), "**G2**" (grid 2), and "**IP**" (plate). Operation may be continued but the amplifier is likely to proceed to the second degree of protection, the trip.

b) **Second degree of protection - A trip to the STANDBY mode**

The red "**F**" (fault) LED illuminates and the amplifier automatically goes to the STANDBY mode for several seconds. Also, the green **OPER** LED goes off. The amplifier will indicate the reason for the protection trip:

- If one of the yellow (**G1**, **G2**, **IP**) warning LEDs is illuminated along with the red "**F**" LED, a current limit has been exceeded and drive power must be reduced or retuning is necessary (see Section **4.5 Tuning**);
- If the last red LED of the reflected-power bar-graph is illuminated together with the red "**F**" LED, the reflected-power limit has been exceeded and the drive must be reduced or the antenna SWR must be improved;

- If all three LEDs of the TRI indicator above the LOAD knob are flashing simultaneously together with the red "F" LED, the tuning is not adjusted correctly or the antenna impedance has changed and retuning is required (see Section [4.5 Tuning](#)).

Fault information normally remains on the display for several seconds while the amplifier is in the STANDBY mode. The auto-operate function will attempt to return the amplifier to the operate mode automatically as described in Section [4.2 Changing OPERATE and STANDBY Modes](#). If the protection trips repeatedly, the user must attend to the cause of the trip, which is typically too much drive or antenna mismatch.

NOTICE

If all LEDs in the bar-graph area are flashing simultaneously, you must immediately switch off the amplifier to avoid damage.

5. MAINTENANCE

DANGER

Both the mains voltage and the high voltages up to 3000 V inside the amplifier are LETHAL! For your safety, pull the amplifier power plug out of the mains wall outlet and WAIT AT LEAST 30 minutes EACH TIME BEFORE you remove the cover of the amplifier. Do not touch any part inside while the amplifier is open because some residual voltages may still be present.



If no indicator glows upon switching the amplifier ON, the main fuse(s) may have blown (see Section [5.3 Fuse Replacement](#)).

5.1: Periodic Maintenance

Periodically (but at least once per year) check all connections, contact cleanliness and the tightening of all connectors, in particular the coaxial ones.

Check the integrity of the cables, in particular when they are laid on the floor. Check also if the cables are secured well in the area where they come out of the connector body.

Pay particular attention to the mains plug and the wall outlet (see Sections [2.4.f\) The IEC 320 Power inlet](#) and [2.4.g\) Preparation of wall outlet](#)). If you have any doubts consult with a qualified electrician.

Periodically check the SWR of the antennas and if this changes over time. Problems could occur more often in poor weather conditions - rain, snow, strong wind etc.

5.2. Cleaning

CAUTION

Do not use any solvents for cleaning. They may be dangerous to you and damage amplifier surfaces, paint, and plastic components.

Do not open the amplifier. Cleaning of the amplifier outer surface can be done with a piece of soft cotton cloth lightly moistened with clean water.

Also, clean (as much as possible from the outside, without opening the amplifier) all ventilation apertures on the cover and the chassis, including the ones on the bottom.

DANGER

Never push or put anything into holes in the case - this will cause electric shock.

5.3. Fuse Replacement

DANGER

If replacement of fuses is necessary, first pull out the amplifier mains plug from the mains outlet and wait for at least 30 minutes!

NOTICE

For replacement, only use standard fuses from the types recommended below.

The two Primary Mains Fuses of the amplifier are located on the rear panel (see [Figure 2-5 | Rear panel - Connections](#), Pos (e)). They are fuses of the "F" type (fast-acting / quick-acting / fast blow / quick blow), European size 5x20 mm, ceramic or glass body cartridge.

The fuses must be rated for a current corresponding to your mains nominal voltage:

- 6.3 A / 250 V for operation from 200-240 VAC;
- 10 A / 250 V for operation from 100-120 VAC.

Suitable fuses are:

- For 200-240 VAC mains nominal voltage, e.g.:
 - EATON Bussmann, PN: S-501-6.3-R (ceramic body cartridge);
 - Littelfuse, PN: 021706.3 (glass body cartridge).
- For 100-120 VAC mains nominal voltage, e.g.:
 - EATON Bussmann, PN: S-501-10-R (ceramic body cartridge);
 - Littelfuse, PN: 0217010 (glass body cartridge).



If, after Primary Mains Fuses replacement, the device does not operate normally, we recommend repair, performed only by a trained service technician.

Contact your ACOM dealer for assistance (see Section [1.8 Owner Assistance](#)).

Besides the primary fuses, on the HV PCB and on the MAINS PCB (inside the amplifier) there are three fuses.

WARNING

Do not replace fuses located inside the amplifier.

Blown internal fuses can be a symptom of a more serious problem, which should be resolved beforehand. A fault of this type will not occur under normal operating circumstances.

⚠ WARNING

Replacing internal fuses is a complex and potentially dangerous operation. For this reason, we recommend this work be carried out only by a trained service technician.

Contact your ACOM dealer for assistance (see Section **1.8 Owner Assistance**).



Unauthorized replacement of inside fuses infringes the warranty conditions!

They are fuses of the "T" type (time-lag / slow-blow), European size 5x20 mm, ceramic (or glass) body cartridge, as follow:

- 1 x 0.8 A, 250 V (located on MAINS PCB);
- 1 x 2 A, 250 V (located on HV PCB);
- 1 x 5 A, 250 V (located on MAINS PCB).

Suitable fuses are:

- 0.8 A, 250 V, e.g.:
 - EATON Bussmann, PN: S505-800-R (ceramic body cartridge);
 - Littelfuse, PN: 0218.800 (glass body cartridge);
- 2 A, 250V, e.g.:
 - EATON Bussmann, PN: S505-2-R (ceramic body cartridge);
 - Littelfuse, PN: 0218002 (glass body cartridge);
- 5 A, 250 V, e.g.:
 - EATON Bussmann, PN: S505-5-R (ceramic body cartridge);
 - Littelfuse, PN: 0218005 (glass body cartridge).



Besides specific national standards, the principal fuses standard applied worldwide is IEC 60127.

5.4. Tube Replacement

A single 4CX800A (GU74B) high-performance ceramic-metal tetrode manufactured by Svetlana is employed in the amplifier.

⚠ DANGER

Tube replacement is a complex and potentially dangerous operation that involves adjustment of the plate idling current and is Life-threatening! For this reason, we recommend this work be carried out only by a trained service technician.

Contact your ACOM dealer for assistance (see Section **1.8 Owner Assistance**).

5.5. Simplified Schematic Diagram

Please, see [Figure 5-1 | Simplified schematic diagram](#).

The 4CX800A (GU74B) Svetlana high performance ceramic-metal tetrode (V1) with plate dissipation of 800 W is grid-driven. The input signal from the RF INPUT jack is passed through a broadband input matching circuit, which consists of components on the INPUT PCB and includes the drive-power swamping resistor Rsw. This circuit tunes out the input capacitance of the tube. The swamping resistor Rsw is a termination load for the matching circuit and can dissipate up to 80W of RF drive power. It also eliminates any tendency toward oscillation by the tube, ensuring excellent RF stability of the amplifier.

The cathode resistor Rc creates DC and RF negative feedback, thus stabilizing gain and equalizing frequency response. The combination Lp1-Rp1 in the plate circuit is a VHF/UHF parasitic suppressor. DC plate voltage is fed through chokes RFC1-RFC2 and the capacitor Cb3 blocks it from the output. The output tank, comprised of LP1, LP2, LL, CP1-CP3, and CL1-CL4, forms a classic Pi-L network and suppresses harmonic frequency emissions. This circuit is switched and tuned by S1A-S1C and the air variable capacitors CP1, 2 and CL1, 2. The output signal is fed through the antenna relays K1 and K2 in the WATTMETER PCB. The WATTMETER PCB also includes a high-pass filter for frequencies below 100 kHz, and it prevents the plate supply from reaching the antenna.

The plate RF voltage is monitored through the capacitor Ca and together with the RF WATTMETER is the main source of information for the control circuit of the amplifier in evaluating tuning quality. The control circuit is based on the ATMEGA-8L micro-controller from Atmel. All voltages are delivered from the line (MAINS) and HV PCBs. The currents of the control grid, screen grid, and the plate, as well as the reflected power and tuning quality, etc. are continuously monitored by the micro-controller. Many software-derived protections are based on this information.



Detailed electrical schematic diagrams are available from ACOM or from your dealer on request.

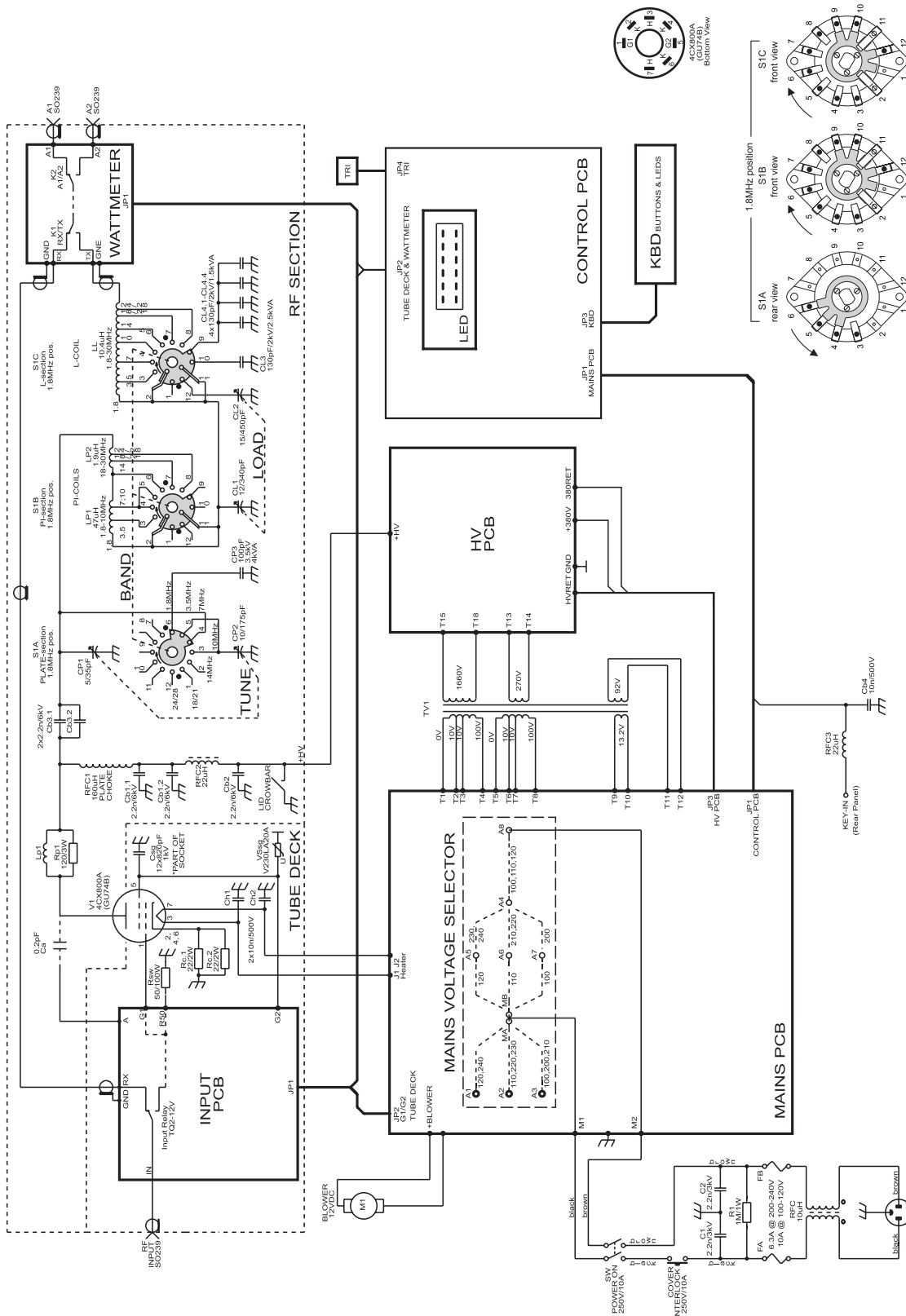


Figure 5-1 | Simplified schematic diagram

5.6. Service Functions

By pressing the **OPER** and **RTTY** buttons simultaneously, the upper LED bar-graph is switched to the SERVICE mode, which is indicated by both red bar-graph lights and the yellow **G1** light illuminating. Pressing the **OPER** and **RTTY** buttons together again will select additional service measurement functions. Pressing them a final time will return the amplifier to the normal operating mode. These steps are detailed below:

- a) Press the **OPER** and **RTTY** buttons together. The two red lights on the right side of the upper bar-graph will illuminate to confirm that the amplifier is in the service mode. The yellow **G1** light will also illuminate. The upper bar-graph should show a grid 1 current reading no higher than 5 mA (5 LEDs illuminated);
- b) Pressing the **OPER** and **RTTY** buttons once again will now illuminate the yellow **G2** light. This provides an approximate reading of grid 2 voltage. The scale is 30 V per a LED lighted. The upper bar graph should show a voltage reading within the range of either 270-300 Volts (9-10 LEDs illuminated) for RTTY or 210-330 Volts (7 to 11 LEDs illuminated) for SSB and CW;
- c) Pressing the **OPER** and **RTTY** buttons yet again will illuminate the yellow **IP** light. This provides an approximate reading of combined plate current and grid 2 current. The reading should be no higher than 500 mA (10 LEDs illuminated) for RTTY or 600 mA (12 LEDs illuminated) for SSB and CW. The scale is 50 mA per a LED lighted;
- d) Pressing the **OPER** and **RTTY** buttons a final time will restore the upper bar-graph to its normal function of indicating peak forward power.



The Auto-Protection System will continue to operate in the SERVICE mode.

In case it is necessary to ship the amplifier, please, see Section **6.4 Storage and Shipment**.

6. SPECIFICATIONS

6.1. Parameters

- a) Frequency Coverage*
- All amateur bands in the 1.8-29.7 MHz frequency range;
 - Extensions and/or changes on request;



* Extensions or changes of the frequency coverage are possible on request.
** Please, refer the applicable region band plans and laws for specific allocations and limitations.

- b) Power Output
- 700 W PEP or 500 W continuous carrier;
- c) Intermodulation Distortion
- Better than 35 dB below rated output;
- d) Hum and Noise
- Better than 40 dB below rated output;
- e) Harmonic Output Suppression
- Better than 50 dB below rated output;
- f) Input and Output Impedance
- Nominal value: 50 Ohm unbalanced, UHF (SO-239) type connectors;
 - Input circuit: broadband, SWR less than 1.3, 1.8-30 MHz continuously (no tuning, no switching);
 - Bypass path: SWR less than 1.1, 1.8-30 MHz continuously, 200 W maximum;
 - Output (antenna) impedance matching capability: SWR up to 3 or higher;
- g) RF Gain
- 11 dB typically, frequency response less than 1 dB (50-70 W drive power for rated output);
- h) Mains Power Supply Voltage
- 85-132 VAC / 170-264 VAC (100, 110, 120, 200, 210, 220, 230 & 240 V nominal taps, +10% -15% tolerance), 50-60 Hz, Single phase;
- i) Mains Power Consumption
- 1200 VA at rated output;

- j) Safety and Electromagnetic Compatibility
 - Complies with CE safety and electromagnetic compatibility requirements, as well as with the US Federal Communications Commission (FCC) regulations;
- k) Size & Weight (operating, excluding connected cables)
 - WxDxH: 402x315x166 mm, 17 kg (15.9x12.4x6.6 inches, 37.5 lbs.);
- l) Operating Environments
 - Temperature range: 0 to +50 degrees Celsius (32 °F to 122 °F);
 - Relative air humidity: up to 95% @ +35 degrees Celsius (95 °F);
 - Height above sea level: up to 3050 m (10000 ft) without output deterioration.

6.2. Functions

- a) Antenna Impedance Matching Process
 - Plate-load True Resistance Indicator (TRI) aided;
- b) Two antenna outputs selectable by a button on the front panel
- c) Protections
 - Cover interlock for operator's safety;
 - Inrush power-on current limited to the nominal consumption;
 - Control grid, screen grid, and plate currents;
 - T/R sequencing;
 - Antenna relay contacts, including RF power induced in antenna from another nearby transmitter;
 - Antenna matching quality;
 - Reflected power;
- d) LED bar-graphs for forward peak power and reflected power
- e) Service visualization of grid 1 DC current, grid 2 DC voltage, and plate DC current
- f) Tube
 - A single Svetlana 4CX800A (GU74B) high-performance ceramic-metal tetrode with plate dissipation of 800 W, grid driven, forced air-cooling.

6.3. Regulatory Requirements

a) European conformity



CE mark (Conformité Européenne)

This symbol explains that "CE" marked ACOM product meets the essential requirements of the Radio Equipment Directive, 2014/53/EU, and the restriction of the use of certain hazardous substances in electrical and electronic equipment Directive, 2011/65/EU.

b) US Federal Communications Commission (FCC) regulations

FCC ID: **SRRA1010**

FCC ID number

The FCC ID number explains that market ACOM product complies with the US Federal Communications Commission (FCC) regulations.



The FCC ID number can be checked at www.fcc.gov/oet/ea/fccid.

FCC ID numbers consist of two elements:

- A grantee code (for example **SRR**), and
- An equipment product code (for example **A1010**).

c) RF Exposure Information

⚠ WARNING

Using the ACOM 1010 amplifier, antennas must be operated at certain minimum distance between the radiator and any person's body.



This unit (ACOM 1010 amplifier) complies with the FCC RF Exposure limits for an uncontrolled environment.



To comply with CFR Title 47 Part 97.13(C) and the Guidelines and Limits for Human Exposure to RF electromagnetic fields adopted by the FCC, you should evaluate your Radio Station Facilities as described in OET BULLETIN 65 plus SUPPLEMENT B - Additional Information for Amateur Radio Stations.



OET BULLETIN 65 plus SUPPLEMENT B can be found at:

- <https://www.fcc.gov/bureaus/oet/info/documents/bulletins/oet65/oet65.pdf>;
- <https://www.fcc.gov/bureaus/oet/info/documents/bulletins/oet65/oet65b.pdf>.

In addition to the above guidelines, please, see Section **3.3 Elimination of electromagnetic compatibility (EMC) problems**.

6.4. Storage and Shipment

6.4.1. Storage Environment

The amplifier may be kept packed in a dry, ventilated, and unheated location (with no chemically active substances such as acids or alkalis) within the following environment ranges:

- Temperature range: -40 to +70 degrees Celsius (-40 °F to 158 °F);
- Humidity: up to 75% @ +35 degrees Celsius (95 °F).

6.4.2. Shipping Size and Weight

- WxDxH: Approx. 580x460x340 mm, 20.0 kg (22.9x18.2x13.4 inches, 44.1 lbs.);



Please, contact ACOM (see **1.8 Owner Assistance**) for shipment details.

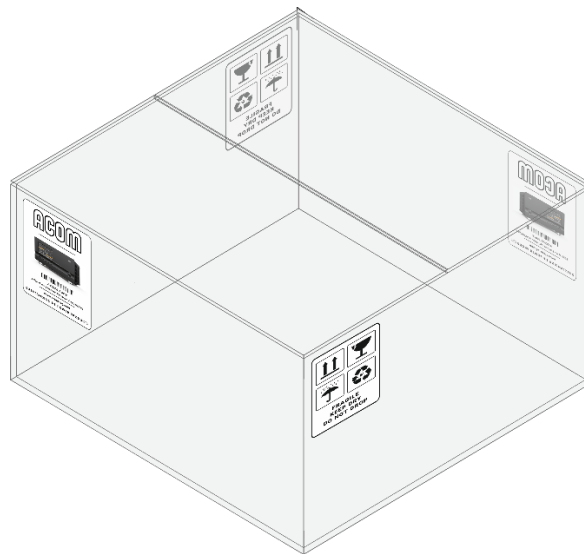


Figure 6-1 | Packaging cardboard box

6.4.3. Transportation

All types of transportation may be used, including storage in an aircraft baggage compartment at up to 12000 meters (40000 ft) above sea level.

6.4.4. Returning to the Service Provider

This document section contains general information on packing and shipping an amplifier for diagnostics and repair.

NOTICE

Should it be necessary to ship the amplifier, use the original packing as described below.

NOTICE

Before shipping the amplifier, you should contact your local dealer first.

Your dealer can have a specific shipment requirement, e.g., a different shipping address. It is the sole customer's responsibility to ensure the commutator and all accessories are properly packaged to avoid any shipping damage.



If transporting for diagnostics and repair, you may not need to ship some cables or accessories. Please, consult with your dealer first.

Prepare the amplifier for shipping as described below:

- Switch off the amplifier via Power Switch (see [Figure 3-1 | Front panel - Display and Controls](#), Pos. 1); Make sure the Power Switch is in OFF position (see [Figure 2-6 | Power rocker switch in OFF or ON position](#));
- Pull the amplifier's line (mains) plug out of the outlet;
- Do not disconnect **GND** connection;
- Disconnect all cables (except **GND** connection) from the rear panel of the amplifier;

⚠ DANGER

Remove the **GND** connection last (see [Figure 2-5 | Rear panel - Connections](#), Pos. (a)) and wait 30 minutes for safety.

- Pack the amplifier in its original cardboard carton. Please, follow the instructions in section [2.1 Unpacking and Initial Inspection](#) but in reverse order;
- Seal the amplifier carton with heavy duty, 2-inch-wide self-adhesive tape;

- Finally, the external strapping needs to be added over the amplifier carton. Either plastic or metal bands can be used;
- Now, the amplifier is ready for shipment.



Basic shipping insurance is provided by the customer when sending in an amplifier - you can verify the amount covered by the shipping company by looking on their website. If you are shipping the amplifier, full/upgraded coverage is available as a suggested option.



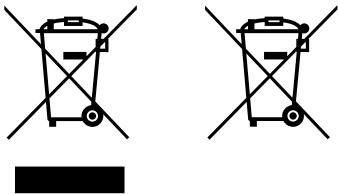
For alternative shipping instructions, please, contact your local dealer.

6.5. Information on Disposing and Recycling of Old Electrical and Electronic Equipment



The information in this section is applicable for countries that have adopted separate waste collection systems.

ACOM products cannot be disposed as household waste.



Waste electricals

This symbol (crossed-out wheeled bin) explains that you should not place the electrical item in the general waste.



Waste electricals

This symbol (three green arrows going in a triangle with electrical plug in the center) means that according to local laws and regulations this product should be sent for recycling.

Old electrical and electronic equipment and batteries should be recycled at a facility capable of handling these items and their waste byproducts.

Contact your local authority for details in locating a recycle facility nearest to you.

Proper recycling and waste disposal will help conserve resources whilst preventing detrimental effects on our health and the environment.



Ultimate disposal of this product should be handled according to all national laws and regulations.

This manual is for electronic distribution mainly.
If you have it on paper and you no longer need it, please, recycle it!

The latest versions of our User's Manuals are available at
www.acom-bg.com

Dealer/Partner's address:

ACOM



📍 ACOM Ltd.

Bulgaria | Bozhurishte 2227
Sofia-Bozhurishte Industrial Park | 6 Valeri Petrov Str.
GPS coordinates: 42.748616° | 23.209801°

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ACOM 1010 User's Manual | Fourth Edition, Revision 04 | July 2023.