

# ACOM



## ACOM 1400S

1.8-54 MHz

Linear Power Amplifier  
with Touch-Screen Remote Control

User's Manual

Installation, Operation  
and Maintenance

**OUTSTANDING HF POWER PRODUCTS**

April 2025

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**Title of Documentation** ACOM 1400S 1.8-54 MHz Linear Power 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 1400S 1.8-54 MHz Linear Power Amplifier.

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	ACOM 1400S User's Manual	20.12.2024	First edition, R01
	ACOM 1400S User's Manual	24.04.2025	First edition, R02

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## 1. GENERAL INFORMATION

Congratulations on purchasing one of the finest solid-state 1.8-54 MHz linear 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 1400S 1.8-54 MHz solid-state linear power amplifier.

The ACOM 1400S is a state-of-the-art linear power amplifier that covers all amateur bands from 1.8 through 54 MHz and provides 1200 W output power (PEP or continuous carrier) with up to about 50 W of RF drive power.

It features a Remote Control Unit model R06 (abbr. RCU hereinafter) with the operating information shown on a multi-functional, high resolution color touch screen. All indicators and controls (except the primary mains switch and power indicator) are accessible via the touch screen RCU, as well as, all command input to the RCU is menu-driven.



## 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 and security 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
<b>Orange bold text</b>	Identifies all internal links in the document between <b>Sections, Figures, Tables</b> , etc. for your convenience.
<b>BOLD TEXT IN CAPITAL LETTERS</b>	Identifies the connectors, switches, and button names and labels.
TEXT IN CAPITAL LETTERS	Identifies the amplifier operating modes, menu names, messages, etc.

### 1.3. Product Features

- **Easy to operate**  
The overall operation of ACOM 1400S is extremely simplified: the touch screen menus are intuitive and easy to follow, and no special skill is required from the operator when changing frequency bands.
- **User-friendly automatic control**  
When connected to a transceiver with CAT capability, the amplifier will track the operating frequency, and will change bands accordingly.  
Even if not CAT connected, the amplifier monitors the input signal frequency through the built-in frequency counter and automatically switches bands.
- **High resolution color display with Touch screen**  
Amplifier status indications are explained via detailed text displayed on the RCU 7" high-resolution color touch screen. All indicators and controls (except the primary mains switch and power indicator) are accessible via the RCU's touch screen, as well as, all command input to the RCU is menu-driven.
- **Transceiver-independent**  
Compatible with all transceiver models - does not need any special signals: "ground on transmit" and RF drive power is sufficient.
- **LDMOS transistor technology**  
The final PA stage uses a rugged 65 V LDMOS transistor for heavy operation modes.
- **Broadband input circuit**  
Broadband input circuit, providing a perfect transceiver load with SWR below 1.2 (typically 1.1), without retuning throughout the whole frequency range from 1.8 to 54 MHz.
- **Intelligence**  
Takes care of itself during operation via continuously working protection circuits in all modes.  
The operator can monitor more than 10 parameters of the amplifier in operation.
- **Easy maintenance**  
Detailed data (55 parameters) about each of the last 28 hard-fault protection trips is stored in the amplifier's memory.
- **Remote control capabilities**  
Remotely controlled via the Internet through an integrated Web interface and an Ethernet LAN port (RJ45 connector), located on the RCU rear panel.
- **Compact and lightweight construction**  
Convenient for expeditions and field operation due to the extremely compact and lightweight construction and the built-in switching-mode power supply (SMPS) that operates with extended mains voltage range of 90-264 VAC (output power reduced to about 600 W PEP if operated at 90-132 VAC mains), with no internal switch over. The consumed current is purely sinusoidal, Power Factor Corrected (PFC) and inrush limited. This makes the operation from unstable mains and generators easy and trouble free.
- **Electromagnetic compatibility**  
Perfect electromagnetic compatibility (EMC) with both highly sensitive devices and the powerful devices in the radio station (receivers, computers, other amplifiers) exceeding the standard EMC requirements due to the used PFC and built-in radio-frequency filters.

### 1.4. Product History and Documentation Validity

The ACOM 1400S amplifier serial production started in December 2024.

This manual refers to the ACOM 1400S amplifier 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
12.2024	Basic design;

Table 1-1 | Production versions history

### 1.5. Additional Documentation

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



- *ACOM 1400S Brochure;*
  - *ACOM L-PROT 2000 User's Manual;*
  - *ACOM 04AT User's Manual;*
  - *ACOM 06AT User's Manual;*
  - *ACOM CAT cables Technical Information.*
- The documentation is available for download at [www.acom-bg.com](http://www.acom-bg.com).

### 1.6. Product Identification

Every ACOM product features an ID (identification) label/plate. The ID label is usually on the rear side of the device. 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.

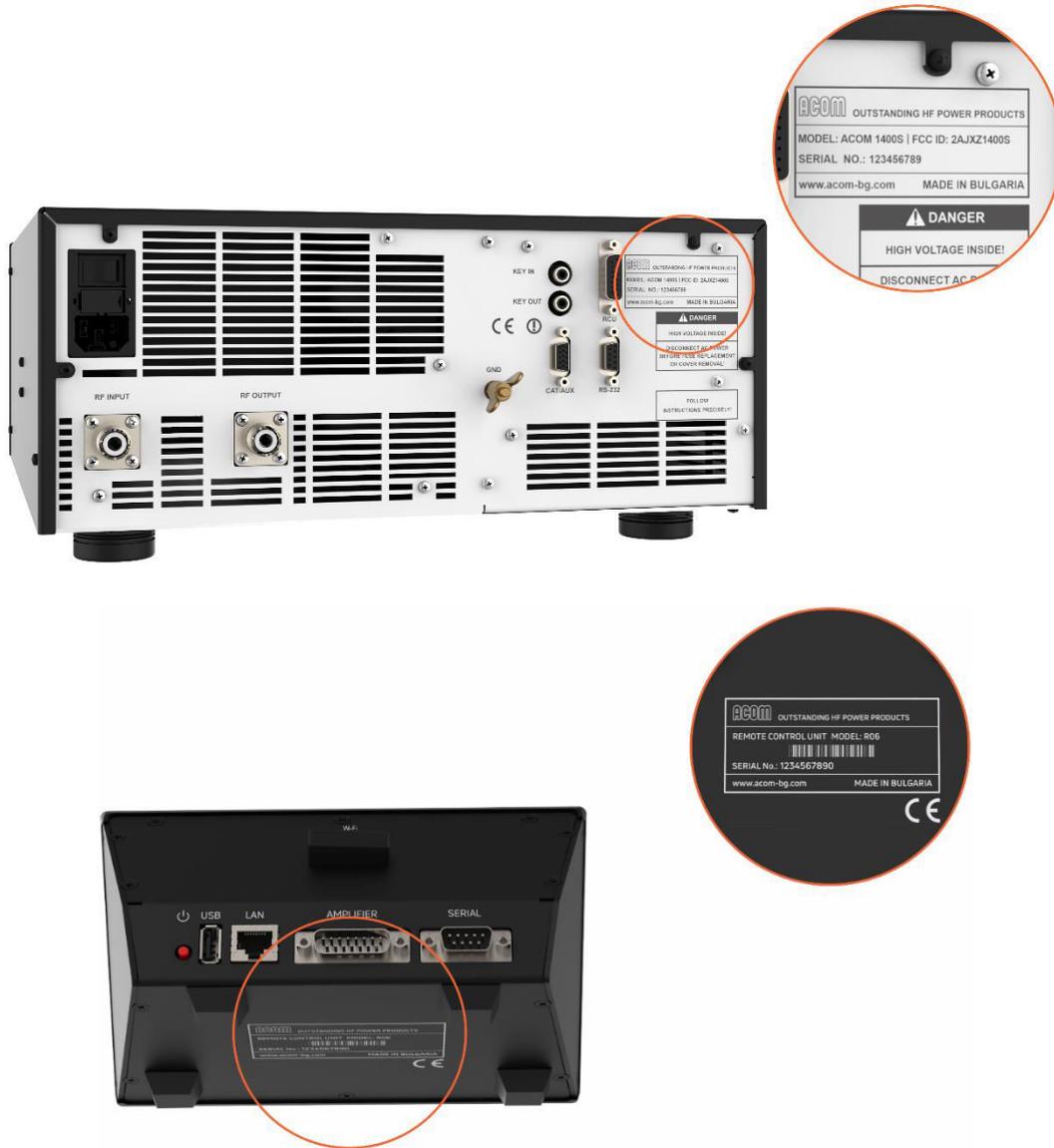


Figure 1-1 | ID (identification) label/plate, example

The serial number can be seen in the menu SELECTION -> SERVICE -> ABOUT too.

**1.7. Equipment Supplied**

The ACOM 1400S amplifier (including Remote Control Unit model R06) is shipped as package, consisting of:

Nr.	PACKAGE CONTENTS	Pcs.
1	Amplifier ACOM 1400S (unit only)	1
2	Remote Control Unit with Touch Screen (model R06)	1
3	Cable (ACOM 1400S to RCU R06 connection), 1.5 m	1
4	Power supply cable, approx. length 1.8 m with free cable end	1
5	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](http://www.acom-bg.com).

**1.8. Optional Equipment**

There are several individual purchase options available. They are:

Nr.	OPTIONAL EQUIPMENT
1	ACOM L-PROT 2000   Lightning Protector
2	ACOM 06AT   Automatic Antenna Tuner and Switch
3	ACOM 04AT   Remote Automatic Antenna Tuner and Switch

Table 1-3 | Optional equipment



Figure 1-2 | ACOM L-PROT 2000 lightning protector



Figure 1-3 | ACOM 06AT automatic antenna tuner and switch (shown with 1400S amplifier)



Figure 1-4 | ACOM 06AT automatic antenna tuner and switch



Figure 1-5 | ACOM 04AT remote automatic antenna tuner and switch



The ACOM 04AT and 06AT automatic antenna tuners with four-way antenna switches are designed to work with our transistor (solid-state) amplifier series, including the ACOM 1400S (see Section **4.3 Operating with an External Antenna Tuner**).

Using the ACOM 06AT or 04AT with an ACOM 1400S amplifier is highly recommended.

### 1.9. 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.

Web-site: [www.acom-bg.com](http://www.acom-bg.com) -> **Support** page

E-mail: [support@acom-bg.com](mailto: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.

### 1.10. Safety Considerations, Explicit Definitions

The ACOM 1400S linear power 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 2-7 | Amplifier 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 the CE safety and electromagnetic compatibility requirements, as well as the 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** and **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 2-7 | Amplifier 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 when 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**

Both the mains voltage and the high DC voltage up to 500 V inside the ACOM 1400S amplifier are LETHAL!

For your safety, pull the amplifier power plug out of the mains wall outlet and WAIT AT LEAST 3 minutes EACH TIME BEFORE you remove the cover of the amplifier.

**⚠ 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 COOLING ducts or vents. Keep a minimum clearance distance of 10 cm (4 inches) to any other devices or objects.

**⚠ WARNING**

To avoid damage (not covered under warranty) read the Section [2 INSTALLATION](#) of this User's Manual carefully. Installation of the equipment must comply with local and national electrical codes.

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 [1.9 Owner Assistance](#)).

**⚠ 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 be in compliance with the RF exposure requirements, please, read Section [8.3.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. Your dealer is obliged to contact the transport company and request the necessary actions according to the insurance policy. Delay may void the carrier's warranty.



The ACOM shipping conditions always include insurance for the transported goods.

But ACOM can not be related in any way to the shipping conditions from our dealers to you. In case of problem the only responsible company is your local dealer and the carrier.

### ⚠ CAUTION

The packaged weight is about 22 kg and is recommended to be handled by two persons.



Keep all packing materials for possible future antenna tuner shipment (see Section [8.4.4 Returning to the Service Provider](#)).

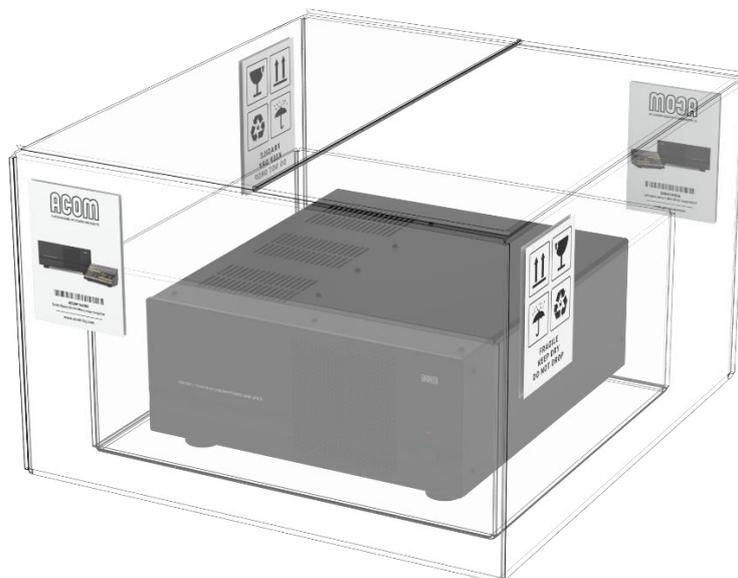


Figure 2-1 | Packaging carton (outside view)

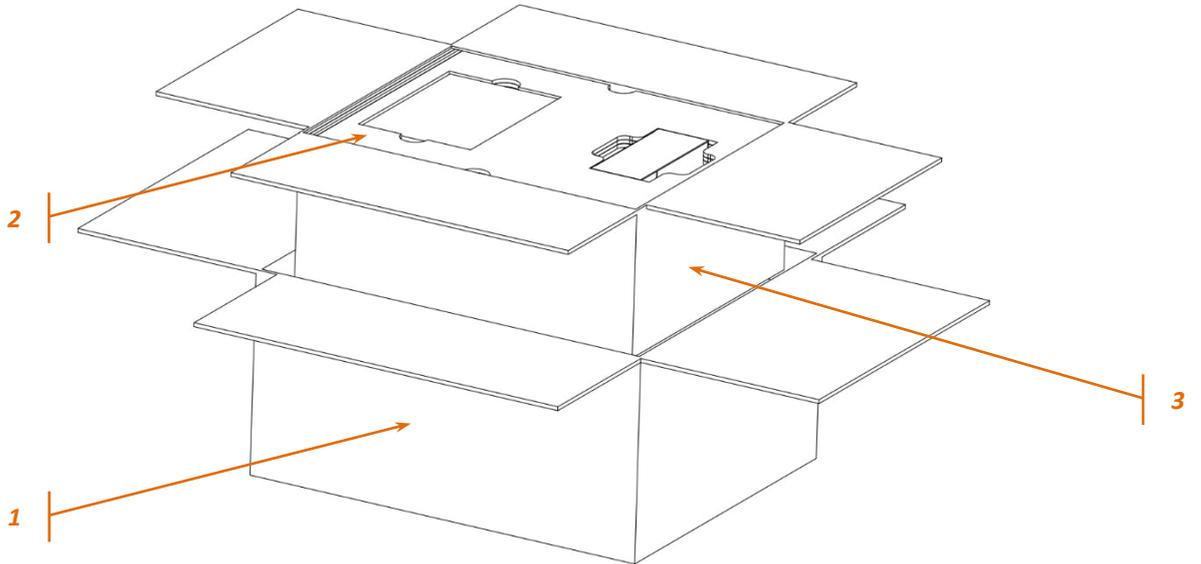


Figure 2-2 | Cardboard carton with internal cardboard carton (inside view)

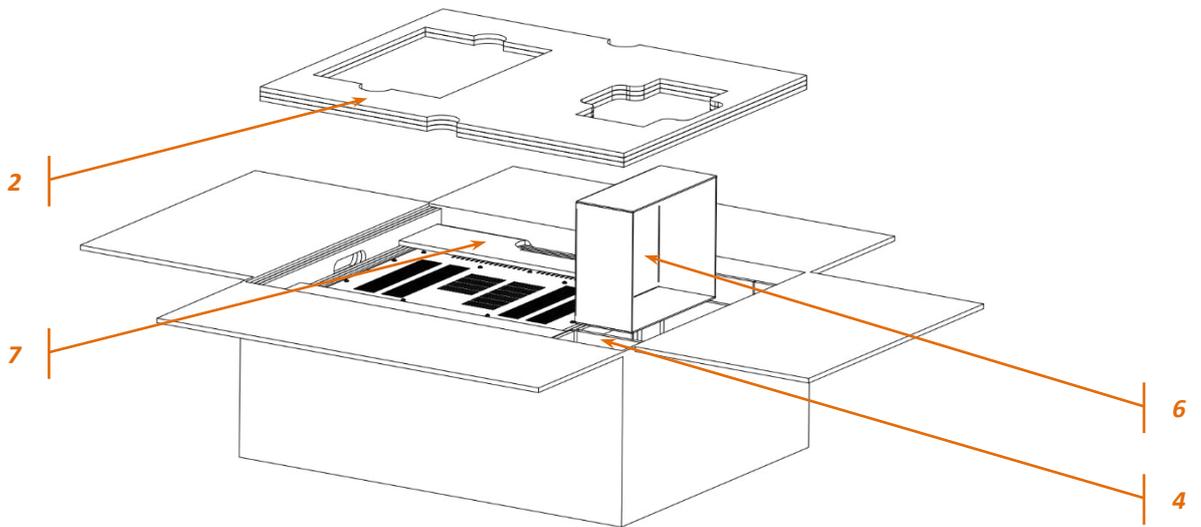
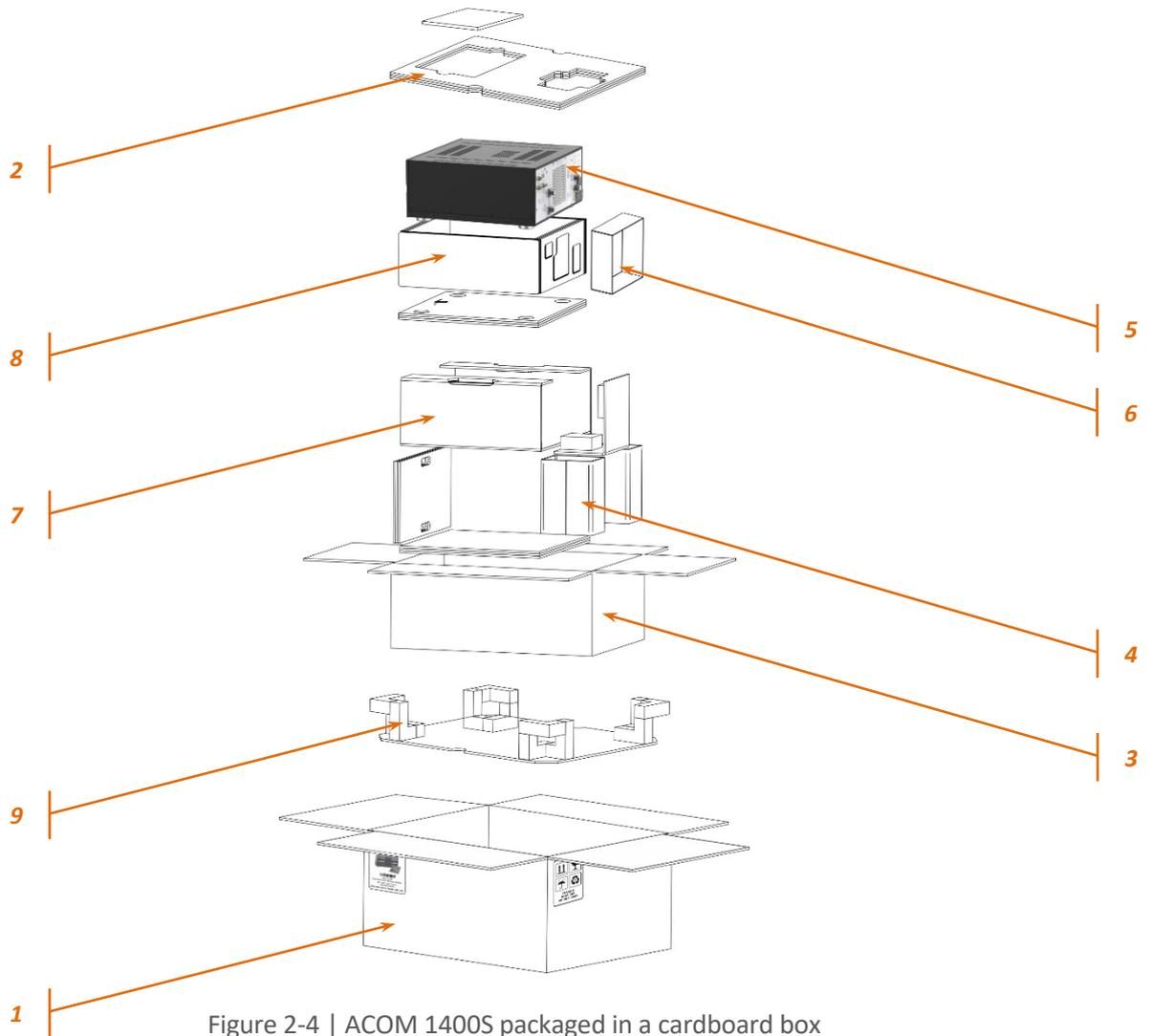


Figure 2-3 | Internal cardboard carton (inside view)



Unpack the amplifier as described below:

- Open the cardboard carton  
(see [Figure 2-2 | Cardboard carton with internal cardboard carton \(inside view\)](#), Pos. 1 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 1);
- Open the internal cardboard carton  
(see [Figure 2-2 | Cardboard carton with internal cardboard carton \(inside view\)](#), Pos. 3 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 3);
- Take out the top secure elements  
(see [Figure 2-2 | Cardboard carton with internal cardboard carton \(inside view\)](#), Pos. 2 [Figure 2-3 | Internal cardboard carton \(inside view\)](#) , Pos. 2 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 2);
- Take out the Remote Control Unit model R06  
(see [Figure 2-3 | Internal cardboard carton \(inside view\)](#), Pos. 6 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 6);
- Take out the cables  
(see [Figure 2-3 | Internal cardboard carton \(inside view\)](#), Pos. 4 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 4);
- Take out the amplifier using handles of the middle secure element  
(see [Figure 2-3 | Internal cardboard carton \(inside view\)](#), Pos. 7 and [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 7);
- Remove the amplifier's surrounding securing elements  
(see [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 8);
- Now, the amplifier is ready for installation  
(see [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 5).



It is not necessary to take out the bottom secure element.  
(See [Figure 2-4 | ACOM 1400S packaged in a cardboard box](#), Pos. 9)

## 2.2. Amplifier Location Selection

### ⚠ CAUTION

The unit's weight (RCU excluded) is about 15 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 rear panel cabling.

### NOTICE

The ACOM 1400S is forced air cooled. Keep a minimum clearance distance of 10 cm (4 inches) to any other devices or objects.

The exhaust air can reach 65 °C (150 °F) and if the surrounding devices are sensitive to heating from outside or use forced air cooling themselves, increase the distances accordingly.



Figure 2-5 | Amplifier – Front view

### 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.



Figure 2-6 | RCU model R06 - Front panel with touch screen

For ergonomic operation you can place the RCU on your desk, near to your transceiver. Please, have in mind that the length of a connecting cable between ACOM 1400S and RCU R06 is approx. 1.5 m.

### 2.3. Line Voltage Selection

The ACOM 1400S amplifier is supplied with built-in switching-mode power supply (SMPS).

The amplifier operates in an extended mains voltage range of 100-240 VAC,  $\pm 10\%$  (90-264 VAC limiting values), with no internal switch over. The consumed current is purely sinusoidal, Power Factor Corrected (PFC) and inrush limited. This makes the operation from unstable mains and generators easy and trouble free.



Thanks to the built-in SMPS, the ACOM 1400S has no mains line voltage selector to take care of!

#### NOTICE

You will have to reduce the output power to about 600 W PEP if the amplifier is operated at 90-132 VAC mains supply voltage.



See Section **7.2 Fuse Replacement** for correct fuse rating.

## 2.4. 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.

### 2.4.1. Connections on Amplifier rear panel

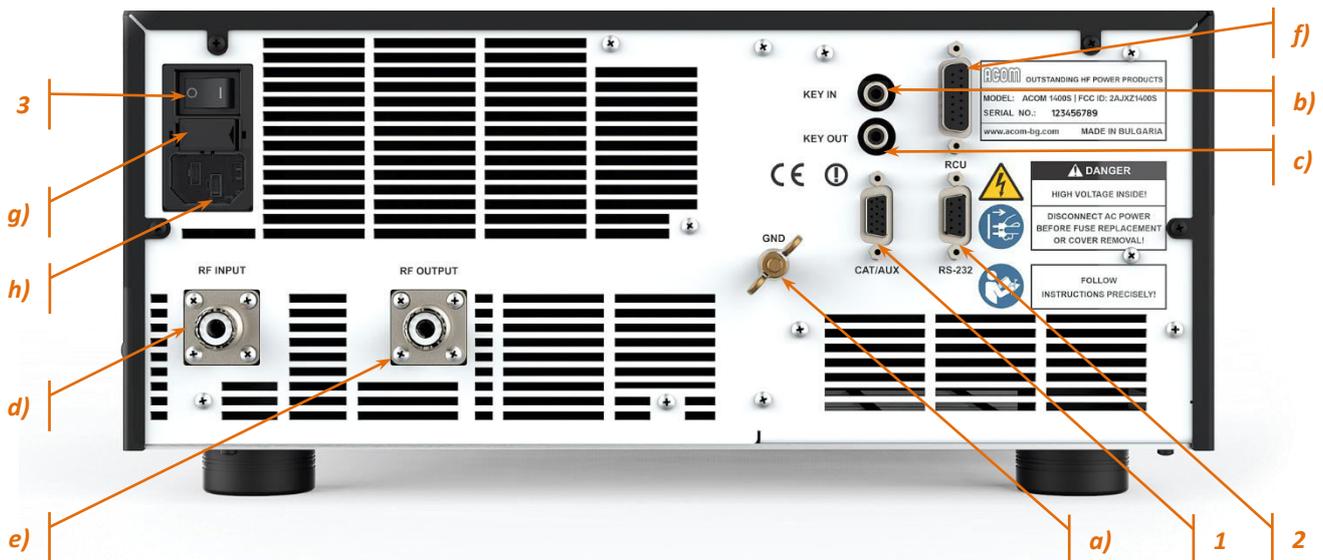


Figure 2-7 | Amplifier rear panel - Connections

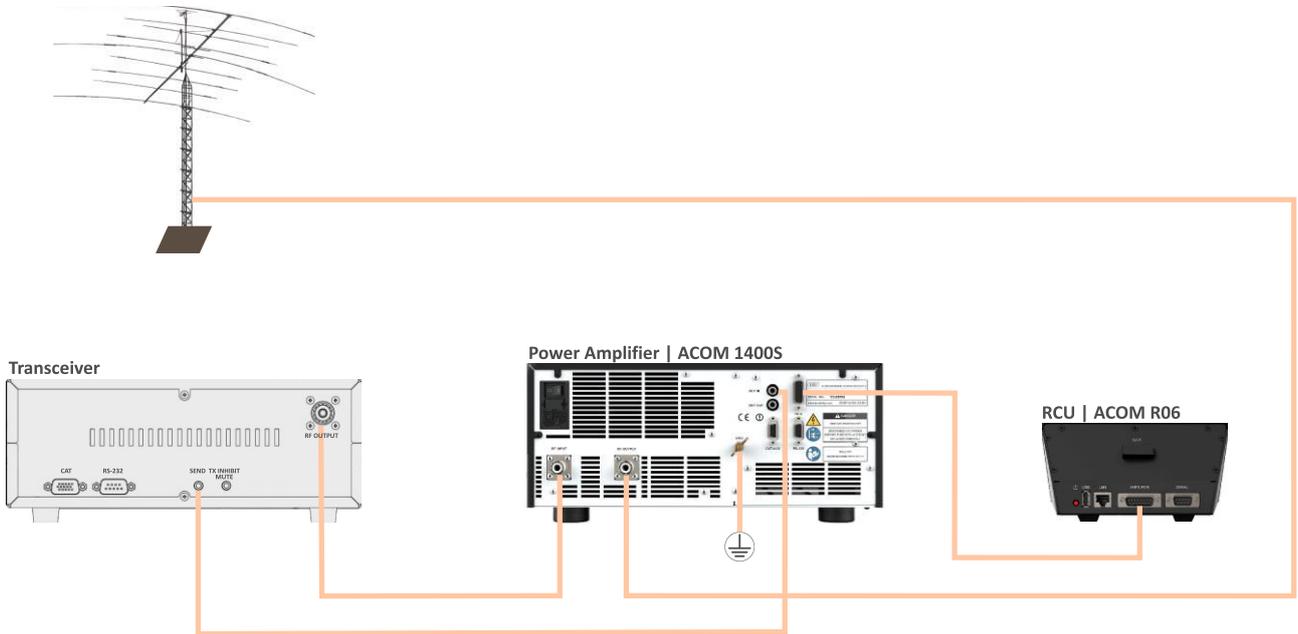


Figure 2-8 | Minimum connections diagram

a) **GND** stud for grounding

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (a).

**i** 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 pipes 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 2-7 | Amplifier rear panel - Connections](#), Pos. (a))

The grounding leads should be at least 4 mm<sup>2</sup> (AWG 11 or SWG 13).



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 L-PROT 2000 User's Manual*
- *ACOM 03AT User's Manual*

Pay particular attention to Sections **2-3 Remote Unit Installation** in the downloaded manual;

- *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](http://www.acom-bg.com).

For details and recommendations on the grounding and RF counterpoise system concerning the electromagnetic compatibility see also Section **3.6.f) Elimination of electromagnetic compatibility (EMC) problems**.

### b) **KEY IN** connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (b).

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

The transceiver switches 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" connector or terminal on your transceiver to the amplifier rear panel **KEY IN** connector. The **KEY IN** connector uses a standard RCA phono plug.



The switching voltage presented from amplifier **KEY IN** connector to the transceiver "ground on transmit" output does not exceed 12 V (positive to the ground). The closed-circuit current is below 6 mA (see Section **8.1.j) Receive / transmit control**).



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.

c) **KEY OUT** connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (c).

This is the amplifier's transmit-enabling control output to the transceiver.

The **KEY OUT** connector provides an extra control signal from the amplifier to the transceiver. It can be used for improving the receive/transmit (RX/TX) switching safety.

### NOTICE

**KEY OUT** is a low-power open-drain output, make sure that the signal voltage coming from the respective transceiver connection does not exceed 50 VDC (open circuit) and the closed-circuit current is below 20 mA.

If your transceiver has a suitable input that disables transmission unless grounded externally, we recommend that you connect it with a shielded cable terminated in a Phono (RCA) connector to the **KEY OUT** connector of the amplifier.



ACOM 1400S will operate normally with **KEY OUT** unconnected if your transceiver has no such input.

Transceiver producers give different names to this input and they are for instance TX-INHIBIT, MUTE, LINEAR, etc. Check your transceiver's manual.

d) **RF INPUT** connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (d).

Connect a suitable coaxial cable from the transceiver output to the amplifier **RF INPUT** SO-239 connector, using PL-259 plug.

### NOTICE

In order to avoid a damage (not covered by the warranty), turn off your transceiver's internal antenna tuner.

e) **RF OUTPUT** connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (e).

**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- and 6 meters bands. We recommend that you use RG213 cable or better. Check the same for the antenna switch and tuner, as well as the whole antenna system (especially multi-band trap antennas).

Connect a suitable coaxial cable with a PL-259 plug from the **RF OUTPUT** to the antenna switch or tuner, or to antenna for the respective frequency band.



The ACOM 04AT and 06AT automatic antenna tuners with four-way antenna switches are designed to work with our transistor (solid-state) amplifier series, including the ACOM 1400S (see Section [4.3 Operating with an External Antenna Tuner](#)).  
Using the ACOM 06AT or 04AT with an ACOM 1400S amplifier is highly recommended.



We recommend coordinating, with ACOM, the use of non-ACOM antenna tuners for connection to **RF OUTPUT**.  
ACOM, as an Original Equipment Manufacturer, keeps the right to refuse the guarantee claims if non-suitable equipment is used.

f) **RCU** connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (f).

Connect the ACOM 1400S - RCU R06 connection cable (part of delivery – see Section [1.7 Equipment Supplied](#), Pos. 3) from the connector **RCU** to the connector **AMPLIFIER** located on the RCU rear panel (see [Figure 2-10 | RCU model R06 rear panel](#), Pos. (i)).



Figure 2-9 | ACOM 1400S - RCU R06 connection cable

ACOM 1400S amplifier Rear panel		Connecting cable					ACOM RCU R06 Rear panel	
RCU connector							AMPLIFIER connector	
<p>D-sub connector, 15-pin, female (Rear panel front view)</p>	1   DISP_REMOTE_TX	<p>D-sub connector, 15-pin, male (Connector front view)</p>	1	————	1	<p>D-sub connector, 15-pin, female (Connector front view)</p>	1   DISP_REMOTE_TX	<p>D-sub connector, 15-pin, male (Rear panel front view)</p>
	2   DISP_CPUREM_RX		2	————	2		2   DISP_CPUREM_RX	
	3   RCU_POWERON		3	————	3		3   RCU_POWERON	
	4   DISP_CPU_TX		4	————	4		4   DISP_CPU_TX	
	5   +24 V		5	————	5		5   +24 V	
	6   BTN1		6	————	6		6   BTN1	
	7   GND		7	————	7		7   GND	
	8   +5 V		8	————	8		8   +5 V	
	9   DISP_REMOTE_RX		9	————	9		9   DISP_REMOTE_RX	
	10   DISP_CPUREM_TX		10	————	10		10   DISP_CPUREM_TX	
	11   DISP_CPU_RX		11	————	11		11   DISP_CPU_RX	
	12   +24 V		12	————	12		12   +24 V	
	13   +24 V		13	————	13		13   +24 V	
	14   GND		14	————	14		14   GND	
	15   GND		15	————	15		15   GND	
Housing	Housing	Cable shield	Housing	Housing				

Table 2-1 | ACOM 1400S - RCU R06 connection cable wiring



Please, have in mind that the length of a connecting cable between ACOM 1400S and RCU R06 is approx. 1.5 m (part of delivery – see Section **1.7 Equipment Supplied**, Pos. 3).  
 If you need a longer cable, you can assemble it yourself, but consider that the maximum allowed cable length is 6 m.

g) Main fuses

Please, see **Figure 2-7 | Amplifier rear panel - Connections**, Pos. (g).

**NOTICE**

If occasion should require replacement of the mains fuses, replace them as described in Section **7.2 Fuse Replacement!**

h) The IEC 320-C14 (IEC 60320-C14) Power inlet

Please, see **Figure 2-7 | Amplifier rear panel - Connections**, Pos. (h).

Due to the different standards in different countries, the mains plug for the amplifier power supply cable 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.

The power supply cable (a part of delivery) is in-factory assembled with power plug IEC 60320-C13 and with free cable end at other side (3x1.0 mm<sup>2</sup>, length 1.80 m (suitable cables are AWG 16 or SWG 18)).



	Wire name	Description	Colors
ACOM amplifier	N	Neutral	Blue
	L	Line, Active, Live	Brown
	G or PE or E	Ground (Protective Earthing conductor)	Yellow - Green

Table 2-2 | Power cord connections

If you have any doubts about the correct way of connecting the wires, consult your dealer.

### 2.4.2. Connections on RCU rear panel

Please, see [Figure 2-10 | RCU model R06 rear panel](#).



Figure 2-10 | RCU model R06 rear panel

#### i) **AMPLIFIER** connector

Please, see [Figure 2-10 | RCU model R06 rear panel](#), Pos. (i).

Connect the end of the ACOM 1400S to RCU connecting cable (part of delivery - see [1.7 Equipment Supplied](#)) as described in Section [2.4.1.f\) RCU connector](#)).

### 2.4.3. 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 10 A from 200/240 VAC). 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 1.5 mm<sup>2</sup> (AWG 15 or SWG 17) at operating 200-240 VAC (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 Section Specifications [8.1.h\) Mains Power Consumption at Full Output Power](#). If you connect the amplifier to a different mains outlet, be sure that you check it, too.

## 2.5. Connecting to External Devices (transceiver, computer, etc.)

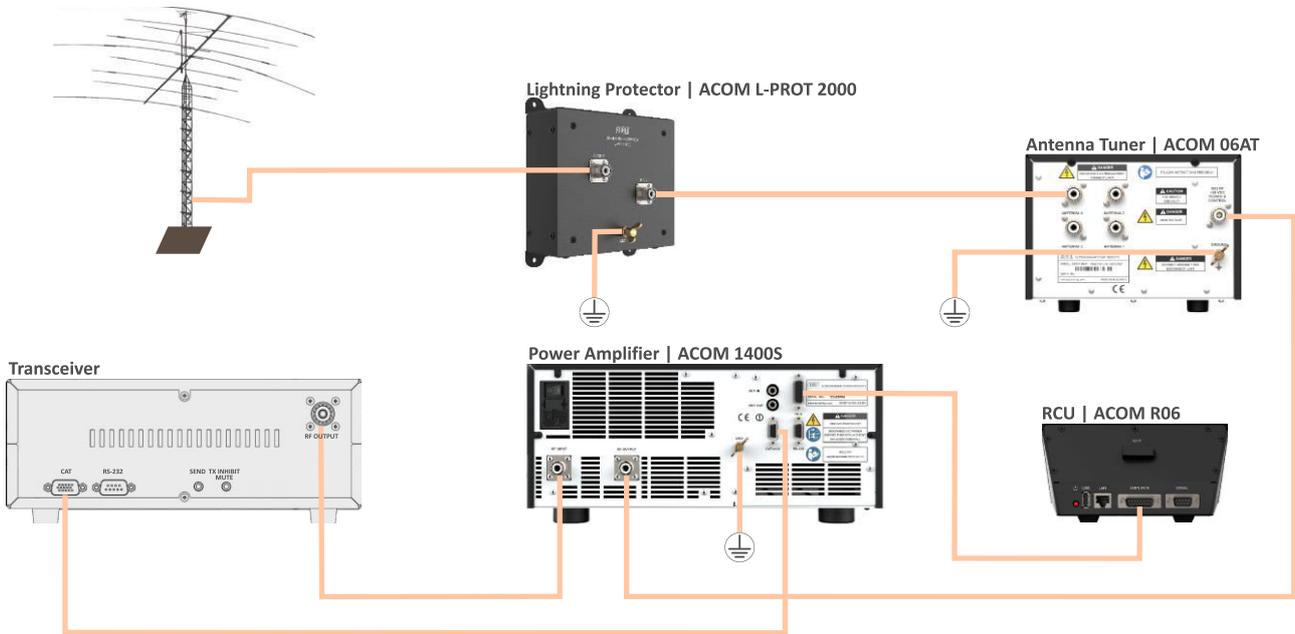


Figure 2-11 | Recommended connections diagram (sample)

### a) Amplifier's **CAT/AUX** interface connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 1.

**CAT/AUX** interface is used for connecting and operating with various transceiver models (see [Table 2-3 | Signals and pin out of the CAT/AUX connector](#) below and the respective menu in [Section 5.3 Menu CAT SETTINGS](#), [Table 5-1 | Transceiver interface type and command set selection](#), and [Figure 5-6 | Menu CAT SETTINGS](#)).

Most of the modern transceivers can be connected by CAT to the ACOM 1400S. This will allow the amplifier to track the transceiver frequency without any transmission and change the bands automatically when in OPERATE mode.

The CAT connection cable can be ordered separately from a third-party supplier or home-brewed according to [Table 2-3 | Signals and pin out of the CAT/AUX connector](#) and the transceiver's manual.

### NOTICE

The CAT connection requires a cable made especially for the ACOM 1400S and your transceiver. Using an inappropriate cable may cause a serious damage to the amplifier and your transceiver!



If you need cable wiring diagrams, please, see our document

- **ACOM CAT cables Technical Information.**

The documentation is available for download at [www.acom-bg.com](http://www.acom-bg.com).



Note that some of the connections - to the transceiver's BCD band data outputs and Band Voltage outputs do not provide an exact frequency data, but only band data. Those connections cannot be used when ACOM 1400S works together with ACOM 04AT or 06AT because the tuner needs to know the exact frequency, not only the band.



The **CAT** connector also carries:

- The KEY IN and KEY OUT lines, which can be used instead of using separate cables for those functions from the transceiver to the sockets of the same names;
- The ON RMT signal for the Remote Power On the amplifier.

The use of these lines/signals depends on your transceiver and how you want your amplifier to operate.

CAT/AUX interface	Pin Nr.	Pin name	Description	Specification
<p>D-sub connector, 15-pin, 3-row, female (Rear panel view)</p>	1	RxD	Receive Data	TTL input
	2	RxD	Receive Data	RS-232 input
	3	TxD	Transmit Data	RS-232 output
	4	TxD	Transmit Data	TTL output
	5	GND	Ground	0 Volt
	6	BAND voltage	Analogue input	0 to +8 V
	7	Band data 0	Bit 0	TTL input
	8	Band data 1	Bit 1	TTL input
	9	Band data 2	Bit 2	TTL input
	10	Band data 3	Bit 3	TTL input
	11	ON RMT	Remote Pwr On	+4.5 to +15 V / 3 mA max
	12	Debug mode	CPU only Pwr input	+8 to +15 V / 0.4 A
	13	KEY-IN	Tx request	Less than +12 V / 6 mA
	14	KEY-OUT	Tx Ready	O.C. output, up to +50 V / 20 mA
	15	GND	Ground	0 Volt

Table 2-3 | Signals and pin out of the CAT/AUX connector

b) RCU's **SERIAL** interface connector

Please, see **Figure 2-10 | RCU model R06 rear panel**, Pos. 4 and **Table 2-4 | Signals and pin out of the RCU's SERIAL connector**.

RCU SERIAL interface will be used for connecting and operating various station components that cannot be supported by amplifier's CAT/AUX connector - transceivers, rotators, etc.

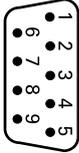
SERIAL interface	Pin Nr.	Pin name	Description	Specification
 D-sub connector, 9-pin, male (Rear panel view)	1	-	Not connected	-
	2	RxD	Receive Data	RS-232 input
	3	TxD	Transmit Data	RS-232 output
	4	-	Not connected	-
	5	GND	Ground	0 Volt
	6	-	Not connected	-
	7	RTX	Request To Send	RS-232 output
	8	CTX	Clear To Send	RS-232 input
	9	-	Not connected	-

Table 2-4 | Signals and pin out of the RCU's SERIAL connector

c) Amplifier's **RS-232** interface connector

Please, see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 2.

This connector may remain unused until you decide to control the amplifier remotely (see Section [6.2 Remote Control via RS-232 interface](#)).

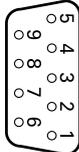
RS-232 interface	Pin Nr.	Pin name	Description	Specification
 D-sub connector, 9-pin, female (Rear panel view)	1	-	Not connected	-
	2	TxD	Transmit Data	RS-232 level output
	3	RxD	Receive Data	RS-232 level input
	4	-	Not connected	-
	5	GND	Ground	0 Volt
	6	DSR	Remote Power On	RS-232 level input
	7	-	Not connected	-
	8	CTS	Remote Power On	RS-232 level input
	9	-	Not connected	-

Table 2-5 | Signals and pin out of the RS-232 connector

d) RCU's **LAN** Ethernet interface connector

Please, see **Figure 2-10 | RCU model R06 rear panel**, Pos. 5 and **Table 2-6 | Signals and pin out of the RCU's LAN socket**.

This connector (RJ45 type) may remain unused until you decide to control the amplifier remotely via your local network or via Internet.

You can use Ethernet interface (cable connection) to connect the amplifier to your local network or to Internet (see Section **6.1 Remote Control via Ethernet Interface**).

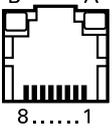
LAN interface	Pin Nr.	Pin name	Description	Colors (T568A pin assignment)
 RJ45 socket, 8-pin, female (Rear panel view)	1	Rx+	Receive Data	White - Green
	2	Rx-	Receive Data	Green
	3	Tx+	Transmit Data	White - Orange
	4	Unused	-	Blue
	5	Unused	-	White - Blue
	6	Tx-	Transmit Data	Orange
	7	Unused	-	White - Brown
	8	Unused	-	Brown

Table 2-6 | Signals and pin out of the RCU's LAN socket



You can order standard Ethernet cable with suitable length from your local IT store.

e) RCU's **Wi-Fi** device interface

Please, see **Figure 2-10 | RCU model R06 rear panel**, Pos. 6.



The Wi-Fi interface is a functionality under development and will be available in future firmware versions.

f) RCU's **USB** interface connector

Please, see **Figure 2-10 | RCU model R06 rear panel**, Pos. 7 and **Table 2-7 | Signals and pin out of the RCU's USB type A connector**.



The USB interface is a functionality under development and will be available in future firmware versions.

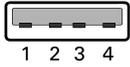
USB interface	Pin Nr.	Pin name	Description	Colors	
 <p>USB A connector, 4-pin, female (Rear panel view)</p>	1	V <sub>BUS</sub>	+5 V	Red or	Orange
	2	D-	Data-	White or	Gold
	3	D+	Data+	Green	
	4	GND	Ground	Black or	Blue

Table 2-7 | Signals and pin out of the RCU's USB type A connector

### 3. FIRST POWER-ON, CONTROL SYSTEM, AND INITIAL CHECK

#### 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), 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.

After following all instructions in Section 2 **INSTALLATION**, check whether the amplifier's rear panel mains rocker switch (marked **O/I**) is turned **OFF** (see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 3). Then:

- Insert amplifier's power supply cable to the amplifier's IEC 320-C14 power inlet (see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (h));
- Insert power supply cable plug into the wall outlet prepared for it. The amplifier remains switched off.



Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts

### 3.1. Low Energy STANDBY Mode of the Power Supply

Now you can turn on the amplifier's mains rocker switch (see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 3). This will activate only the low-energy STANDBY mode of the amplifier power supply and the red LED on amplifier's front panel will light up (see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (a)), as well as the red LED on RCU's front panel will light up also (see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (b)), while the amplifier's main power supply is still off and the RCU display is dark (see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (c)).

### 3.2. RCU Remote Control Unit

#### a) **POWER** button (marked with symbol )

Please, see [Figure 2-10 | RCU model R06 rear panel](#), Pos. 8.

When the amplifier's rear panel mains rocker switch is turned on, push and hold the **POWER** button located on the RCU rear panel for 1-2 seconds to start the amplifier up.

In order to turn off the amplifier, push the same button to go back to low-energy STANDBY mode.

#### b) **LED** indicator

Please, see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (b).

When lit red and the RCU screen is dark (see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (c)), the amplifier is in low-energy STANDBY mode and may be turned on by pushing the **POWER** button.

When you want to fully disconnect the mains power, switch off also the amplifier's rear-panel rocker switch (see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 3). The RCU's front-panel red LED should go off and the **POWER** button located on the RCU rear panel will become inoperative.

#### c) Touch screen

Please, see [Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts](#), Pos. (c).

The Remote Control Unit model R06 is equipped with 7" touch screen which features a high resolution, 24-bit color display showing the operating information.

All indicators and controls (except the primary mains switch and power indicator) are accessible via the RCU's touch screen, as well as, all command input to the RCU is menu-driven.



#### Touch screen precautions:

- The touch screen may not properly work when the protection film is attached;
- Touching the screen with your finger nails, sharp topped object and so on, or touching the screen hard may damage it (not covered by the warranty);
- Popular touch screen operations such as flick, zoom in (pinch in) and zoom out (pinch out) cannot be performed on this device.

Please, note that RCU R06 is delivered with protection film stucked on the display. The protection film must be carefully removed before using RCU R06 for first time.

The touch screen display may have cosmetic imperfections that appear as small dark or light spots. This is not a malfunction or defect, but a normal characteristic of the display.

### 3.3. Initial Turning On

In order to start up the amplifier, push and hold the RCU's rear panel **POWER** button for one or two seconds. After pressing the power button, you will hear two short beeps, indicating that power on sequence is started. About ten seconds later (boot sequence) the touch screen will flash and show the basic screen with the amplifier information (see [Figure 3-2 | Basic screen](#)).

The amplifier may start in either STANDBY or OPERATE mode depending on AUTO OPERATE user settings (see Section [4.1.c\) AUTO OPERATE user settings](#)).

### 3.4. Basic Screen

The basic screen of the RCU is most suitable for monitoring the operation of the amplifier in real time. It also controls frequently used functions of the ACOM 1400S. This includes touch change of OPERATE / STANDBY mode and bands, selection of monitored parameters, as well as access to user settings and service functions.

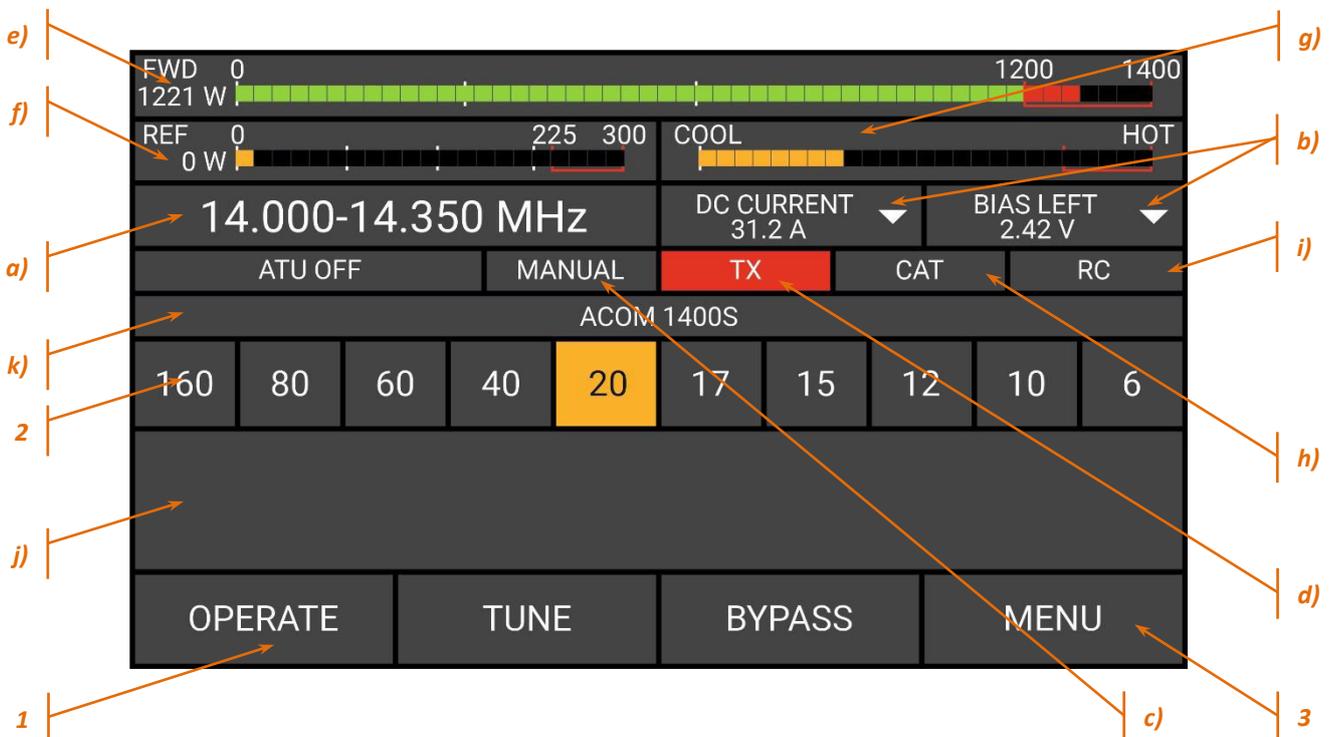


Figure 3-2 | Basic screen

The following information areas are to be distinguished on the basic screen:

- a) Information area for the frequency band

Please, see **Figure 3-2 | Basic screen**, Pos. (a).

The edges of the currently selected BAND are displayed. If the amplifier doesn't receive any operating frequency data from CAT or via RS-232, it will switch to the last used band.

It changes automatically in case the amplifier is sent a signal in a frequency range, different than the one currently selected. However, it is recommended to manually change to the intended range using the band-selection buttons (see **Figure 3-2 | Basic screen**, Pos. 2).

- b) Operating values

Please, see two parameter panels on **Figure 3-2 | Basic screen**, Pos. (b).

Any two selected parameters will be shown here. Each of them displays the value of a selected parameter. The parameter to be displayed can be chosen by touching either panel and selecting a parameter from the drop-down list. As the list is longer than the screen space, it can be scrolled by dragging with a finger. To avoid confusion, the panel for which a parameter is being chosen is highlighted while the drop-down list is visible. The wanted parameter is chosen by a single touch.

Once a new parameter is selected, the list closes automatically. The list can also be closed without selecting a new parameter by touching the **BACK** button (see **Figure 3-3 | Basic screen - Operating values**) or by touching the highlighted panel.

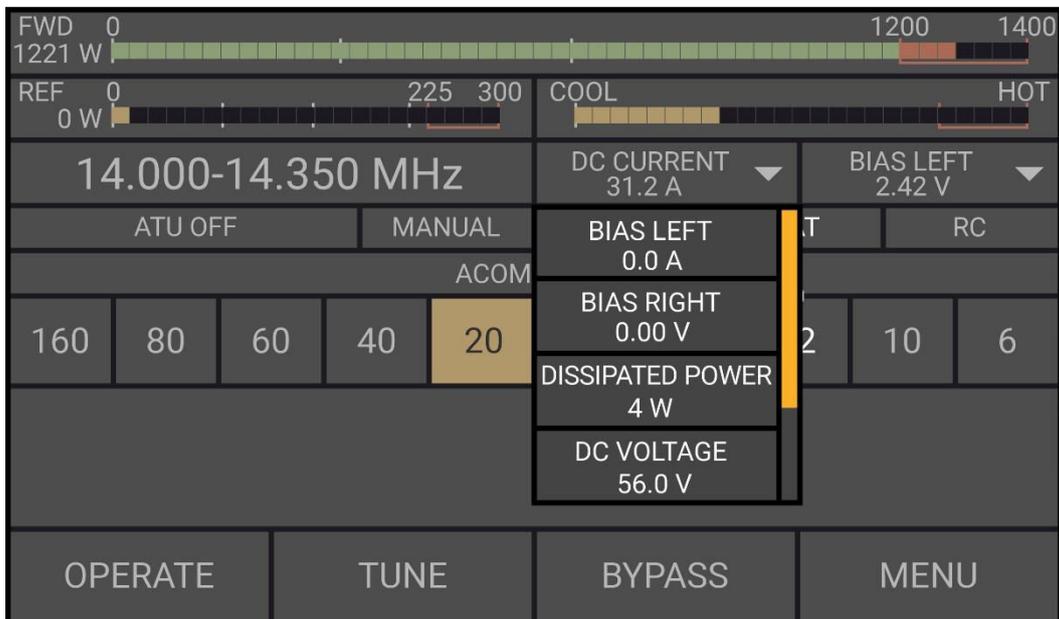


Figure 3-3 | Basic screen - Operating values



The measured values shown in both parameter panels are indicative only.

The ACOM amplifier is not a measuring instrument in the sense of a calibrated (laboratory) instrument, i.e. the measured values can not be used as a reference or compared with any other measured values from calibrated (laboratory) instruments.

c) AUTO OPERATE indicator

Please, see **Figure 3-2 | Basic screen**, Pos. (c).

This indicator represents the state of the AUTO OPERATE setting in the USER PREFERENCES menu (see Section **4.1.c) AUTO OPERATE user settings**). Green color indicates that AUTO OPERATE is set to ON and dark grey color indicates that AUTO OPERATE is set to OFF.

d) RX/TX status indicator

Please, see **Figure 3-2 | Basic screen**, Pos. (d).

RX/TX indicator displays the current operating mode of the amplifier:

- Receiving (RX) / Green light color;
- Transmitting (TX) / Red light color;
- Service (SVC) / Dark grey color.

The indicator will flash frequently if switch over request is rejected by the amplifier controller.

The service menus can be accessed either directly through the RCU touchscreen or through the web interface. If any service menu is open via the web interface, the RCU RX/TX indicator will show (SVC).

e) Forward power bar-graph and digital readout

Please, see **Figure 3-2 | Basic screen**, Pos. (e).

Displays the forward power fed into the antenna.

f) Reflected power bar-graph and readout

Please, see **Figure 3-2 | Basic screen**, Pos. (f).

Displays the power reflected from the antenna. Entering the red zone is not allowed.

g) PA temperature bar-graph

Please, see **Figure 3-2 | Basic screen**, Pos. (g).

This bar-graph shows the temperature of PA module as COOL-HOT status. Entering the red zone is not allowed.

h) CAT interface information

Please, see **Figure 3-2 | Basic screen**, Pos. (h).

CAT indicator lights green when CAT interface has been activated. When CAT is deactivated, this field is shaded.

i) REMOTE CONTROL information field

Please, see [Figure 3-2 | Basic screen](#), Pos. (i).

Flashing green the REMOTE CONTROL represents RS-232 port dataflow.

j) Alarm messages area

Please, see [Figure 3-2 | Basic screen](#), Pos. (j).

Any status or alarm messages (either WARNING or SOFT FAULT) appear on yellow background and are flashing frequently in order to attract the operator's attention (see [Figure 4-5 | Appearance of an alarm message](#)). In cases where more than one messages need to be displayed at the same time, they are being automatically toggled every few seconds.

The WARNING messages appear only temporarily (for about three seconds), afterwards the indication is restored automatically (see Section 4.4.a) First protection level - WARNING).

The SOFT FAULT messages appear in the same field but they remain on the screen until the AUTO OPERATE time is elapsed (see Section [4.1.c\) AUTO OPERATE user settings](#)) or until the operator pushes any button.

k) Call sign area

Please, see [Figure 3-2 | Basic screen](#), Pos. (k).

As its name suggests this field can be used to display the User's callsign, however, any custom text can be set in the USER PREFERENCES menu.

### 3.5. Control System - Buttons and Menus

1) The **OPERATE/STANDBY** button is used for manual (local) control.

Please, see [Figure 3-2 | Basic screen](#), Pos. 1.

The button **OPERATE/STANDBY** switches over the amplifier between OPERATE and STANDBY modes, and serves as an indicator of the current state;

2) The ten band-selection buttons are used for direct manual (local) control.

Please, see [Figure 3-2 | Basic screen](#), Pos. 2.

These ten buttons are used to select the desired band and are labeled in meters. Currently selected band is highlighted and upon selecting one, the FREQUENCY indicator (see [Figure 3-2 | Basic screen](#), Pos. (a)) changes its value to reflect the change.

3) The **MENU** button provides access to the amplifier's settings and service functions.

Please, see [Figure 3-2 | Basic screen](#), Pos. 3.

For more details on the control system and use of the menus see Section [5 MENUS - SETTINGS AND SERVICE FUNCTIONS](#).

### 3.6. Test Transmission

To make sure that you have installed the amplifier correctly, make a test transmission as described below. Repeat these tests for each band and antenna to be used, as well as after installing a new or repaired antenna, antenna switch, tuner, and / or the connecting cables.

a) Check of RF bypass path of a non-driven amplifier

For this check the amplifier must be completely installed and connected according to Section **2 INSTALLATION**, but not powered by the mains, i.e., the main rocker switch on the rear panel (see **Figure 2-7 | Amplifier rear panel - Connections**, Pos. 3) must be turned off. In any case the red LED on amplifier's front panel (**Figure 3-1 | Amplifier and RCU Front panels - Controls and Readouts**, (Pos. (a))), as well as the red LAD on RCU's front panel must be dark for this test.

First, check if the transceiver's reception is normal. If you observe a significant worsening of reception, first check for a problem in the coaxial connections to the amplifier (see Sections **2.4.1.d) RF INPUT connector** and **2.4.1.e) RF OUTPUT connector**, and **Figure 2-7 | Amplifier rear panel - Connections**, Pos. (d) and (e)). Be sure to connect to the amplifier output an antenna having good SWR in the band being tested.

Provided the reception is normal, prepare the transceiver as follows:

- Select a continuous carrier mode (CW, RTTY, FM);
- Switch the microphone off (decrease the mic gain), disable FSK;
- Reduce the output power control to a minimum;
- Select a suitable indication so that you can watch the RF power and SWR at the transceiver output;
- If the transceiver has a built-in antenna tuner - switch it off.

Now in RECEIVE mode select a frequency which is not occupied at the moment and press shortly the PTT or TX key while watching the transceiver output power and the SWR readings. If either the power or SWR at the transceiver output are too high (over 5 W or SWR over 2) release the key and check for the reason as follows:

- Check again whether the power control is set at minimum;
- Check whether the frequency is within the operating range of the selected antenna;
- Check the good working order of the coaxial cables, connectors, and feed lines from the transceiver antenna jack through the amplifier bypass path (RF INPUT - RF OUTPUT), the antenna switch or external tuner (if there is one) to the BALUN transformer, and the antenna itself.

If the power and SWR are as expected, transmit again and while watching the power and the SWR readings, increase transceiver power gradually from minimum to maximum (but not more than 200 W, in order to not overload the RF by-pass circuit of the amplifier).

If SWR remains below 2 (preferably below 1.5) at the last test, decrease the power from the transceiver to minimum again and continue with the next check-up.

b) Check-up in STANDBY mode

Turn the amplifier on, as described in Sections [3.1 Low Energy STANDBY Mode of the Power Supply](#) through [3.4 Basic Screen](#) (see [Figure 3-2 | Basic screen](#)).

Make sure that the amplifier is in STANDBY mode. Push the **OPR/STB** button if needed to change to STB.

Repeat receive and transmit tests the same way you just did with the amplifier turned off but in STANDBY mode now. During these tests note also whether the forward and reflected power bar graph and digital readout (see Sections [3.4.e\) Forward power bar-graph and digital readout](#) and [3.4.f\) Reflected power bar-graph and readout](#)), show respective RF power presence. If the reflected power exceeds the forward power, verify that the input and output coaxial cables to the amplifier are not interchanged (see Sections [2.4.1.d\) RF INPUT connector](#) and [2.4.1.e\) RF OUTPUT connector](#), and [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (d) and (e)),



The power indication accuracy is optimized around the 1200 W level and usually it is unreliable below 50 W.

c) Entering OPERATE mode

Entering the OPERATE mode the transceiver receiving should not suffer. If it worsens and besides the indicator RX changes into TX although the transceiver is in receive mode, check the control cable connected to the **KEY-IN** input (see Section [2.4.1.b\) KEY IN connector](#) and [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (b)) for a short circuit. A wrong connection to the transceiver could cause the same problem.

d) Test transmission with the amplifier

If not readily set by CAT, switch the amplifier to the same band as the transceiver and antenna.

Set the transceiver to a continuous carrier mode and minimum power. In OPERATE mode choose a free frequency and push the PTT or CW key briefly, while watching the amplifier's behavior:

- RX mode must change to TX;
- The reflected power must read below 20 W;
- The forward power must read between 30 and 160 W with minimum drive power from the transceiver (between 1 and 5 W);

If the above test goes normally, push briefly the PTT once again, this time watching the transceiver's SWR reading (i.e., the input SWR of the amplifier) - this must be below 1.2.

If the SWR to the transceiver is higher than 1.2, check the coaxial cable between transceiver's output and amplifier's input socket (see Section [2.4.1.d\) RF INPUT connector](#) and [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. (d)).

e) Setting of drive level and typical operation

After successfully passing of the above tests push PTT or CW key for several seconds, watching the forward and reflected power. Increase the drive power until the forward power bar graph and digital readout reach 1200 W.

Upon reaching 1200 W forward power check the following parameters (continuous carrier operation):

- The reflected power must not exceed ~110 W (for SWR 2) or better still to be below 40 W (for SWR 1.5);
- PA DC CURRENT must be between 32 and 36 A. It is normal that the current varies within these limits when changing operating frequency and antenna impedance;
- PA DC VOLTAGE must be within 48-52 V;
- The transceiver's SWR reading must be below 1.2.

Enter the MEASURE menu and check:

- The drive power from the transceiver must be between 30 and 50 W;
- PA BIAS, must be between 2.0 and 2.6 V (typically 2.4 V);
- PA TEMPERATURE, which must be between the ambient and 80 °C (176 °F), depending on the power level and the duration of transmission.

f) Elimination of electromagnetic compatibility (EMC) problems

If you use powerful 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, 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 antenna feeders by reducing the common mode currents in them, and improving the balance of antennas;
- 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 at 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 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 preferred;
- Thread ferrite beads or snap-in ferrites with medium permeability (800-4000) over the power cord, the 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

### 4.1. Change of Modes RX/TX and OPERATE/STANDBY; AUTO OPERATE User Settings

#### a) STANDBY mode



In STANDBY mode, as well as, when the amplifier is powered off, receiving and transmitting (no more than 200 W) with the transceiver is done via RF bypass path through **RF INPUT** to **RF OUTPUT** of the amplifier.

In STANDBY mode, as well as when the amplifier is powered off, the transceiver's RF power is not amplified, the control **KEY IN** input does not affect the operation, and the **KEY OUT** output follows the **KEY IN** input unconditionally (see Sections [2.4.1.b\) KEY IN connector](#) and [2.4.1.c\) KEY OUT connector](#)). The bands cannot be changed neither manually nor by CAT or remotely.

#### b) OPERATE mode

In OPERATE mode the receive-transmit (RX/TX) direction is controlled by the **KEY IN** input:

- At open **KEY IN** (OPERATE/RX mode), the transceiver receives the signals from the antenna through the same RF by-pass path between **RF INPUT** and **RF OUTPUT** as with amplifier turned off or in STANDBY mode;
- At grounded **KEY IN** ((OPERATE/TX mode) the RF drive is amplified and fed to the antenna through the **RF OUTPUT** connector.



The transceiver must send a "Ground on transmit" signal to the amplifier **KEY IN** input at least 25 ms before sending the RF drive signal to the amp's **RF INPUT**. This time (25 ms or more) is necessary for the amp's relays to switch safely from receive to transmit status. Read your transceiver's manual for instructions.

Otherwise, the protection system will read "HOT SWITCHING ATTEMPT" and will trip off.

In OPERATE mode the **KEY OUT** output (see [2.4.1.c\) KEY OUT connector](#)) follows the **KEY IN** input only after all conditions for safe transmission have been found good by the amplifier control unit. When used, the **KEY OUT** output duly disables transmission while the amplifier is not ready.

The two modes OPERATE and STANDBY may be changed in either way:

- Manually (locally) - by pressing the **OPR/STB** button alternatively (see [Figure 3-2 | Basic screen](#), Pos. 1);
- Automatically at a SOFT FAULT protection trip - when the AUTO OPERATE user setting is activated (see Section [4.1.c\) AUTO OPERATE user settings](#));
- By a remote-control command.



Access to the OPERATE mode can be locked in the CONFIGURATION menu, USER PREFERENCES, the OPERATE ACCESS user setting (see Section [5.1 Menu USER PREFERENCES](#) and [5.1.c\) OPERATE ACCESS](#)).

#### c) AUTO OPERATE user settings

AUTO OPERATE user setting can be turned on/off by the operator in the USER PREFERENCES menu (see Section [5.1 Menu USER PREFERENCES](#) and [Figure 5-2 | Menu USER PREFERENCES](#)) or by a remote control command.

When the AUTO OPERATE user setting is OFF, the two modes OPERATE and STANDBY can be changed alternatively by the **OPR/STB** button or by a remote-control command. At a SOFT FAULT protection trip, the amplifier will revert to STANDBY mode and wait for the operator to return it to OPERATE mode by pressing the **OPR/STB** button.

When AUTO OPERATE is ON (see Section [5.1 Menu USER PREFERENCES](#)), the amplifier will start up in OPERATE mode as soon as you turn it on. At a SOFT FAULT protection trip, the amplifier will also revert to STANDBY mode, but will return automatically to OPERATE mode in about 4 seconds.

Even at AUTO OPERATE on, the operator can revert to and remain in a STANDBY mode manually by the **OPR/STB** button or by a remote command. The next **OPR/STB** button push or remote command will switch the amplifier to the OPERATE mode and restore the normal operation of the AUTO OPERATE user setting.

## 4.2. Band Change, Standard and Expanded Frequency Coverage

When connected to a transceiver with CAT, the amplifier will change frequency bands automatically, following the transceiver's operating frequency changes.

Without CAT connection, the bands can be changed either manually or automatically (by the built-in frequency counter).

The bands are changed manually via the ten band-selection buttons (see [Figure 3-2 | Basic screen](#), Pos. 2 and Section [3.5 Control System - Buttons and Menus](#), Point 2).

For an automatic band change via the built-in frequency counter, make a quite short pre-transmission (100 ms is enough – a SW dit, or a sound on SSB) and release the PTT for a moment before the main transmission.

If the new frequency is out of the amplifier's frequency range (see Section [8.1.a\) Standard Frequency Coverage](#)), the transmission request will be denied and the following fault message will appear on the screen:

"FREQUENCY OUT OF RANGE"



The amplifier specifications are guaranteed within the bands listed in Section [8.1.a\) Standard Frequency Coverage](#).

### 4.3. Operating with an External Antenna Tuner

**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 [2.4.1.e](#)) **RF OUTPUT connector**).

At antenna SWR over 1.5:1, it is advisable you use an external tuner.

The ACOM 06AT Automatic Antenna Tuner and Switch (see [Figure 4-2 | ACOM 06AT automatic antenna tuner and switch](#)), and ACOM 04AT Remote Automatic Antenna Tuner and Switch (see [Figure 4-3 | ACOM 04AT remote automatic antenna tuner and switch](#)) and are designed to work with ACOM transistor (solid-state) amplifier series.

ACOM 06AT and 04AT tune antennas having SWR up to 3:1 automatically, thus providing an optimum load for the amplifier within 5 seconds with improved harmonic suppression at that. The four-way antenna switch is controlled automatically or from the amplifier's RCU touchscreen panel.



Figure 4-1 | ACOM 06AT automatic antenna tuner and switch (shown with 1400S amplifier)

ACOM 06AT tuner is designed for indoor use only! It can be located up to 100 m (330 ft) away from the shack, using a single coaxial cable.



Figure 4-2 | ACOM 06AT automatic antenna tuner and switch

The ACOM 04AT can be installed both in the shack and in a remote location (even out in the open, close to the antennas). It can be distanced up to 100 m (330 ft) from the amplifier, using a single coaxial cable.



Figure 4-3 | ACOM 04AT remote automatic antenna tuner and switch

The connection of ACOM 06AT or 04AT tuner will make accessible specific features on the amplifier's RCU display that provide a transparent operation by following frequency and antenna selection changes in less than 50 ms.

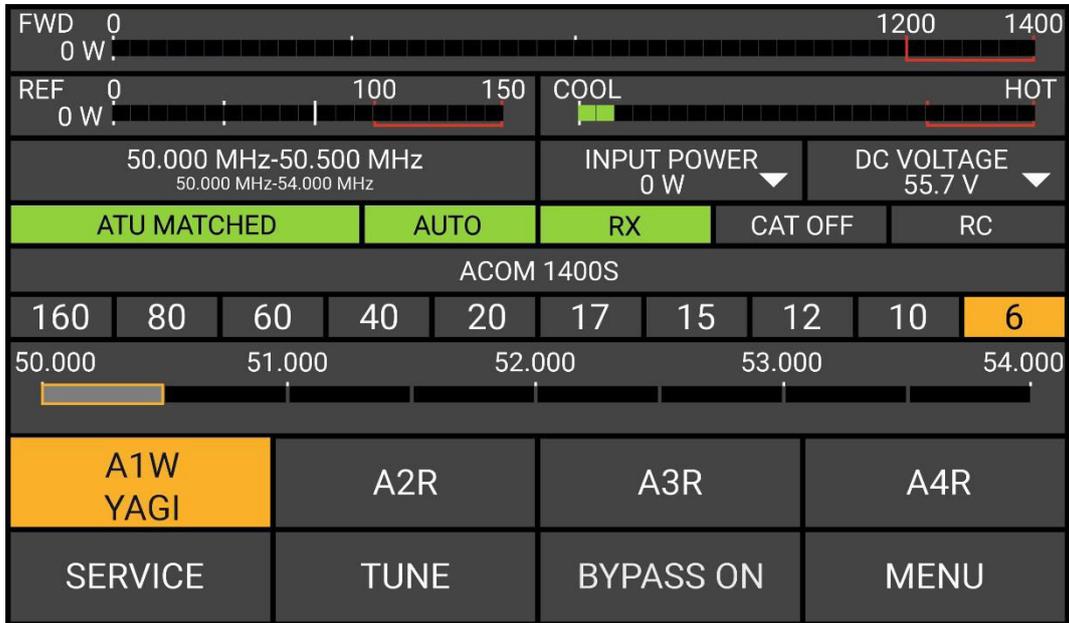


Figure 4-4 | Amplifier screen with ACOM antenna tuner installed



The operation of ACOM S-series amplifiers (solid-state devices) with ACOM 04AT and 06AT are described in detail in the respective User's Manual:

- *ACOM 04AT User's Manual;*
- *ACOM 06AT User's Manual.*

The documentation is available for download at [www.acom-bg.com](http://www.acom-bg.com).



Pay particular attention to Sections **3.2 Indications, controls and menus**, and **4.2 Tuner Assignment and Unassignment** in the downloaded manual for details on ACOM 04AT or 06AT control from amplifier front panel.



We recommend coordinating, with ACOM, the use of non-ACOM antenna tuners for connection to **RF OUTPUT**. But the use of non-ACOM antenna tuners is not recommended.

ACOM, as an Original Equipment Manufacturer, keeps the right to refuse the guarantee claims if non-suitable equipment is used.

### 4.4. Automatic Protection System

The ACOM 1400S control unit (see Section 7.3 *Using the Fault Codes (signatures) for Diagnostics*) keeps track of most amplifier analogue and logic signals in all modes.

Those are the receive/transmit control signal, the output relay contact state and switching times, the RF drive frequency and drive power (the input power), the final transistors DC current and DC voltage on the drains as well as, the gates bias voltage and the heat sink temperature, the main power-supply components temperature, the RF output forward and reflected power, and others. Some derivative parameters, as the power gain, the antenna SWR, and others, are watched too.

In the event a parameter limit is violated, the amplifier will assess the risk and will trigger one of the three levels of protection, as described in items (a) to (c) below. Every event is accompanied by a warning text on the screen (see Figure 4-5 | *Appearance of an alarm message*). A sound alarm will be also produced, if set on in the USER PREFERENCES menu (see Section 5.1 *Menu USER PREFERENCES*).

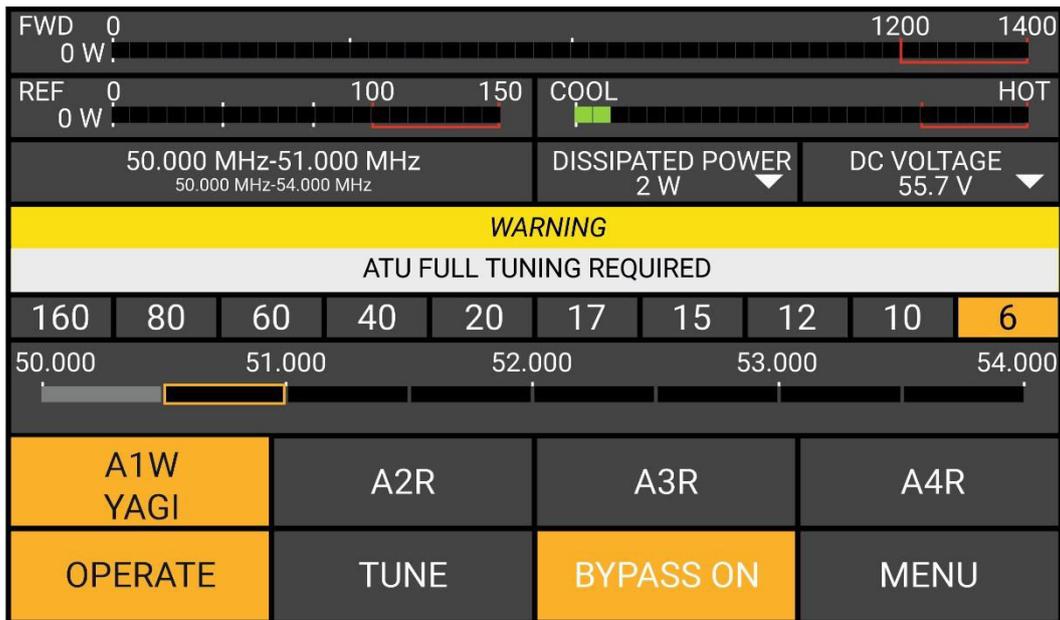


Figure 4-5 | Appearance of an alarm message

a) First protection level - WARNING

The first (most forgiving) protection level is a WARNING. When a value watched by the control unit approaches the protection threshold, the transmission is not interrupted, but a message appears - for example:

- "DRIVE POWER TOO HIGH"
- "DRAIN CURRENT TOO HIGH"
- "REFLECTED POWER 120 W"

or another (see Figure 4-5 | *Appearance of an alarm message*).

You can continue to transmit in these conditions, but you may take some measures, for example, to reduce a bit the drive power from the transceiver. The warnings remain on the screen for at least three seconds so that they can be read through and will disappear after the reason has dropped off.

b) Second protection level - SOFT FAULT

The second protection level is a SOFT FAULT - when a value exceeded the safe level, but does not put the amplifier in a danger of a failure.

At the second level (SOFT FAULT) the amplifier reverts to STANDBY mode for four seconds or permanently if the AUTO OPERATE user setting had been activated (see Section [4.1.c\) AUTO OPERATE user settings](#)). A respective message is shown on the screen, for example:

"EXCESSIVE REFLECTED POWER"

"EXCESSIVE DRAIN CURRENT"

and others, accompanied by a sound alarm (unless the sound had not been muted - see Section [5.1 Menu USER PREFERENCES](#)).

Unlike those for a WARNING, the SOFT FAULT messages remain on the screen and persist until the operator pushes any button - in order to confirm that the message is read - or until the OPERATE mode is resumed automatically if the AUTO OPERATE user setting is active (see Section [5.1 Menu USER PREFERENCES](#)).

A SOFT FAULT calls for fast and simple correcting actions by the operator, such as, for example, reducing the drive power, improving of load SWR through retuning the antenna tuner, antenna change, etc.

c) Third protection level - HARD FAULT

The third and most serious protection level is a HARD FAULT. The amplifier will be turned off automatically to avoid possible further damages.

When a HARD FAULT protection trips off, the data about the fault is stored in the memory and the front panel screen is blanked. There is also a sound alarm - a series of "F" sent in CW.

If the reason for tripping the protection is not obvious, you can try to turn on the amplifier. If the amplifier allows this after the fault, a fault message will appear with information about the reason for the latest automatic shutdown (for example, overheating of the power supply unit or of the PA stage).

After pushing any button, the fault message will disappear, and if there are no further problems (for example, the overheated unit has already cooled down), the amplifier operation will be restored. In the event a threshold is still violated, a new message will appear on the screen, or the protection will trip again immediately after the recovery attempt.



If the problem persists, please, contact your dealer (see Section [1.9 Owner Assistance](#)).

At each HARD FAULT shutdown, the amplifier stores diagnostic data, concerning the controls and values, time stamp, and others. Your dealer or his service may ask you to copy or take a picture on the data from the amplifier's RCU screen or download it by RS-232 interface and store it in a computer file (see Section [5.4 Menu FAULTS LOG](#)).

## 5. MENUS - SETTINGS AND SERVICE FUNCTIONS

By pushing the **MENU** button (see *Figure 3-2 | Basic screen*, Pos. 3), the user invokes the MENU SELECTION screen (see the figure below). Each menu can be selected by a finger touch. Close the MENU SELECTION screen by touching the **BACK** button. The choices are described in the Sections below.

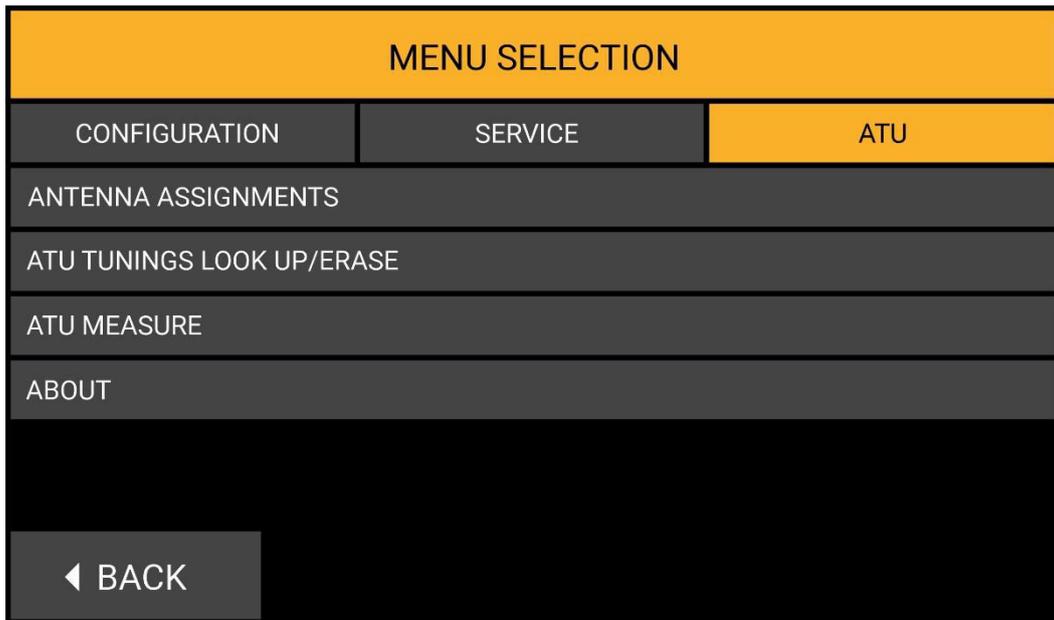


Figure 5-1 | Menu SELECTION

The ATU menu is shown only when ATU 04AT or 06AT is connected to the amplifier.

### 5.1. Menu USER PREFERENCES

The first choice from MENU SELECTION screen (see [Figure 5-1 | Menu SELECTION](#)) is the menu USER PREFERENCES:

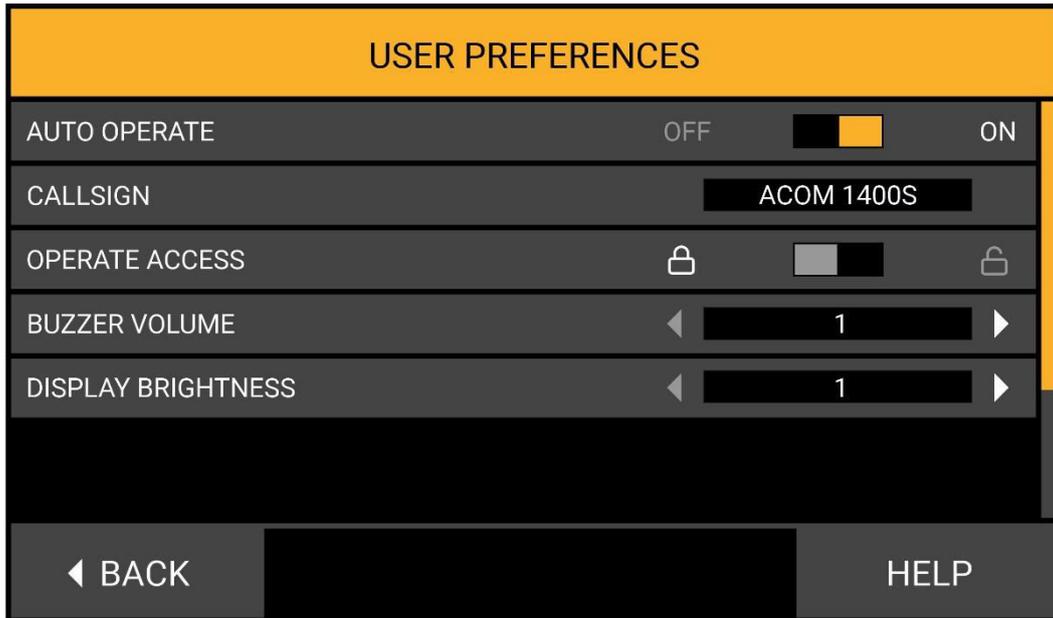


Figure 5-2 | Menu USER PREFERENCES

#### a) AUTO OPERATE

The AUTO OPERATE user setting is described in Section [4.1.c\) AUTO OPERATE user settings](#). The amplifier may start in either STANDBY or OPERATE mode depending on this ON or OFF setting (see Section [3.3 Initial Turning On](#)).

Upon triggering a WARNING during amplifier operation, a message is displayed and the amplifier is switched automatically to STANDBY mode. When AUTO OPERATE is set to ON, the amplifier will automatically be switched back to OPERATE in a few seconds.

#### b) CALLSIGN

If entered here, a call sign (or another text) will be displayed on the Basic screen (see [Figure 3-2 | Basic screen, Pos. \(k\)](#)) and will be included in the FAULT LOG file generated by the amplifier (see Section [5.4 Menu FAULTS LOG](#)). The call sign (or another text) will not replace ACOM 1400S logo on the startup screen.

To enter or edit the call sign text, the text area needs to be touched. This will open the virtual keyboard - see the figure below:



Figure 5-3 | Virtual keyboard

c) OPERATE ACCESS

When the OPERATE ACCESS user setting is locked, the amplifier remains in STANDBY and cannot be switched to OPERATE unless unlocked in the same menu. Passwords are not used - this is only a simple protection against possible child actions, or involuntary switching to OPERATE mode. While locked, the STANDBY/OPERATE button is disabled if not in OPERATE mode.

d) BUZZER VOLUME

BUZZER VOLUME user setting is used to set the volume of the built-in buzzer. Values from 1 to 5 can be set for volume control.

e) DISPLAY BRIGHTNESS

DISPLAY BRIGHTNESS user setting is used to set the brightness of the screen. Values from 1 to 10 can be set for brightness control.

f) INTERFACE SKIN

The interface of ACOM 1400S is skinnable - it supports various visual skins (styles). The INTERFACE SKIN control can be used to suit the interface appearance your taste. Please, note that all screenshots in this User's Manual are from the Default/Classic skin - see **Figure 5-4 | Classic skin interface - time proven and ergonomic** see below:

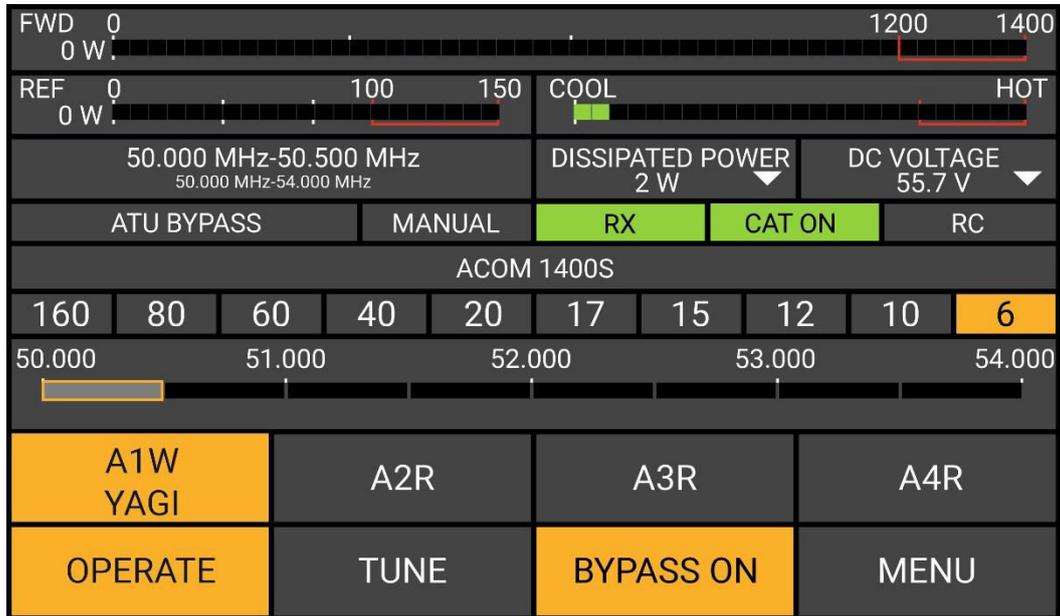


Figure 5-4 | Classic skin interface - time proven and ergonomic

### 5.2. Menu AMP SERVICE (Amplifier Service Functions)

The menu AMP SERVICE (see [Figure 5-5 | Menu AMP SERVICE](#)) is accessible from the MENU SELECTION screen (see [Figure 5-1 | Menu SELECTION](#)) at RX mode only.

**NOTICE**

The AMP SERVICE menu is used for checking and adjustment of the zero-signal (idle) drain current of the final transistors and for testing some functions and circuits of the amplifier when serviced. We recommend these procedures are carried out only by a trained service technician!

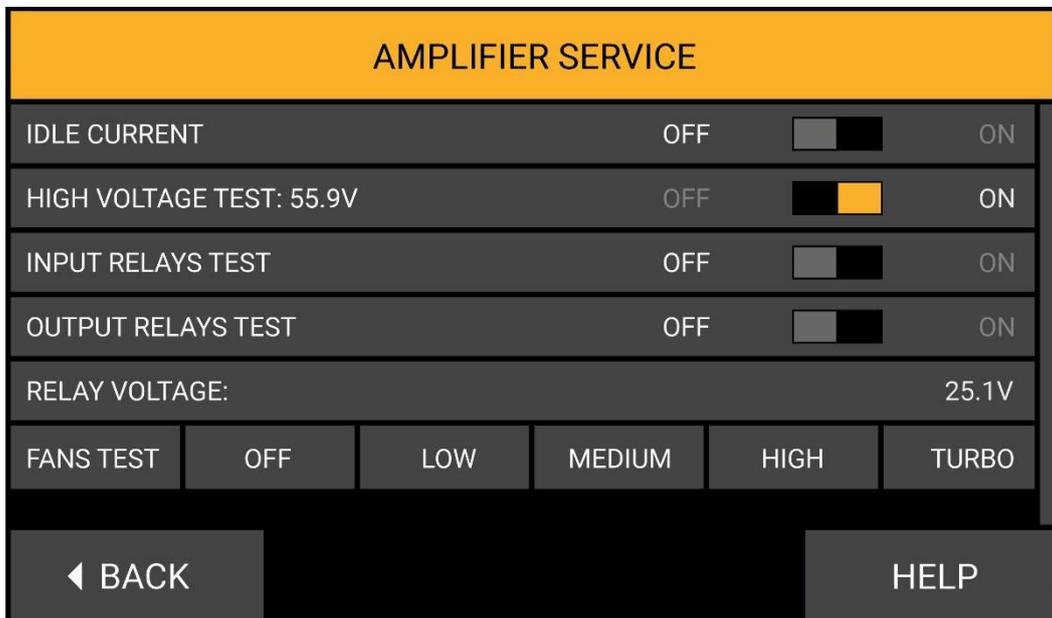


Figure 5-6 | Menu AMP SERVICE

The inactive functions are greyed out and the active are red. When leaving a function submenu, it is turned off and deactivated automatically. At pressing the **BACK** button all service functions are turned off, and the MENU SELECTION screen comes back (see [Figure 5-1 | Menu SELECTION](#)). At consecutive pushing of the **BACK** button, the basic screen returns (see [Figure 3-2 | Basic screen](#)).



If, the device does not operate normally and you need an amplifier servicing, we recommend repair, performed only by a trained service technician.  
Contact your ACOM dealer for assistance (see Section [1.9 Owner Assistance](#)).

### 5.3. Menu CAT SETTINGS

The menu CAT SETTINGS (see [Figure 5-6 | Menu CAT SETTINGS](#)) is accessible from the MENU SELECTION screen (see [Figure 5-1 | Menu SELECTION](#)).

The CAT settings are accessible only in RX mode. The amplifier will automatically switch to SERVICE mode when entering the CAT SETTINGS menu and switch to STANDBY mode upon exiting.

After a CAT cable is connected between the transceiver and amplifier (see [2.5 Connecting to External Devices \(transceiver, computer, etc.\)](#)), the correct settings for the transceiver have to be set via this menu. If there is no CAT connection, OFF has to be selected as INTERFACE type.

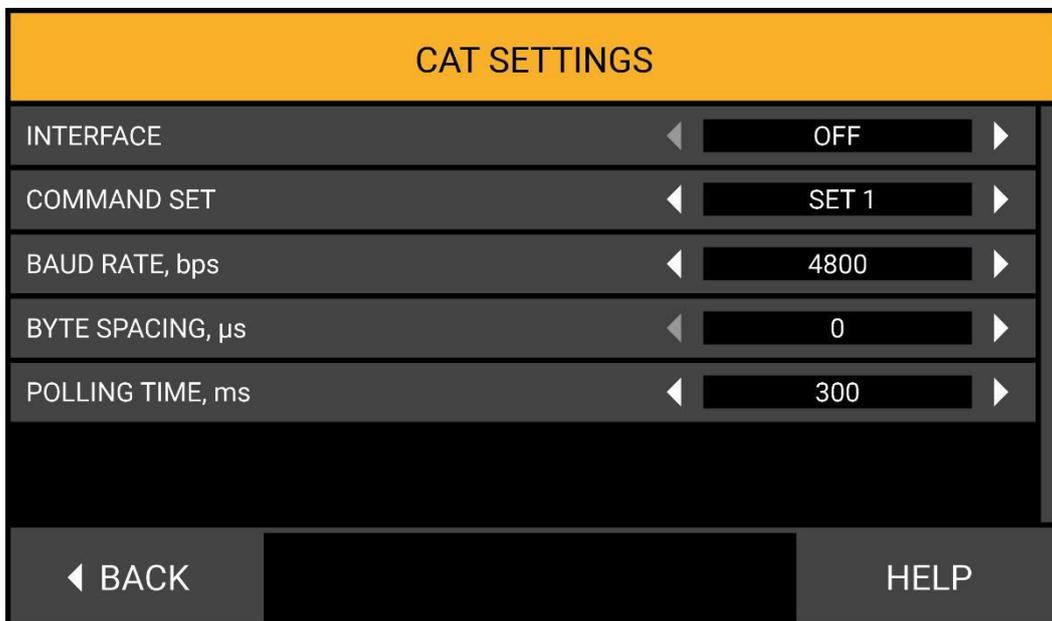


Figure 5-7 | Menu CAT SETTINGS

To setup the CAT interface, first the type of INTERFACE needs to be selected (see [Figure 5-6 | Menu CAT SETTINGS](#)):

- RS-232 (serial band data, RS-232 levels);
- TTL (serial band data, TTL levels);
- BCD (parallel band data);
- VOLTAGE (analog band data).

If the amplifier **CAT** port is connected to the transceiver via either BCD or VOLTAGE output, select the respective interface type and push the **BACK** button. The other items and values will be ignored with such a selection.

If the CAT cable is plugged into the transceiver's serial port (RS-232 or TTL), select the INTERFACE and COMMAND SET according to [Table 5-1 | Transceiver interface type and command set selection](#). The baud rate has to be set to the same value as the transceiver's. The byte spacing and polling time may be left unchanged.

**NOTICE**

If there is no CAT connection, but CAT INTERFACE is selected (activated) an error message will be displayed when you change the band.

The different transceiver brands and models have a great variety of controls and settings of their CAT interfaces. For maximum flexibility and clarity, they are divided into several groups (SETs). In order to select the COMMAND SET and protocol parameters (BAUD RATE, BYTE SPACING, and POLLING TIME) suitable for the transceiver being used, see [Table 5-1 | Transceiver interface type and command set selection](#).

The BAUD RATE specifies the data transfer rate in number of bits per second (communication speed with the transceiver). This parameter is valid only for serial (RS-232 or TTL) CAT interface. The selection should match the baud rate selected in the respective transceiver's menu.

The BYTE SPACING introduces a pause with a specified duration (in microseconds) between the bytes within a message sent to the transceiver. This parameter is valid only for serial (RS-232 or TTL) CAT interface. The default byte spacing duration is zero (0 μs). The parameter should be increased only if communication problems appear with the transceiver.

The POLLING TIME specifies how often (in milliseconds) the amplifier checks the transceiver for a new frequency (the pause between messages sent to the transceiver). This parameter is valid only for serial (RS-232 or TTL) CAT interface. Default duration is 500 ms. Its concerns the re-tune time of the amplifier. If too short time is selected communication could suffer with some transceivers.

Transceiver	Interface	Command set
ELECRAFT K3, K3C, K4	RS-232 (8N1)	SET 5
ICOM (Connection to the CI-V REMOTE socket/jack)	TTL (8N1)	SET 1
ICOM (Connection to the RS-232 port or RS-232 port on CT-17 (CI-V level converter))	RS-232 (8N1)	SET 1
KENWOOD TS-2000, 480, 590, 890, 990 and similar	RS-232 (8N1)	SET 5
YAESU FT(FTDX)-101, 10, 450, 950, 991, 1200, 2000, 3000, 5000, 9000, and similar	RS-232 (8N2)	SET 2
YAESU FT-1000MP	RS-232 (8N2)	SET 4
YAESU FT-817, 857, 897	TTL (8N2)	SET 3

Table 5-1 | Transceiver interface type and command set selection



Under CAT interface control, the amplifier follows the VFO "A" frequency changes only. The ACOM 04AT and 06AT automatic antenna tuners follow the frequency of the amplifier.



If your transceiver has more than one VFO, as well as in SPLIT mode, use VFO "A" for transmission and for tuner control. If the amplifier frequency does not change over the CAT interface, make sure you are using VFO "A" on the transceiver, as the amplifier CAT interface only uses VFO "A" data.

### 5.4. Menu FAULTS LOG

The menu FAULTS LOG (see [Figure 5-7 | Menu FAULTS LOG](#)) is accessible from the MENU SELECTION screen -> SERVICE menu (see [Figure 5-1 | Menu SELECTION](#)).

This function dumps on the screen the information stored in the amplifier's memory about the last 28 HARD FAULT protection trips. The information may be also downloaded in a plain-text format file through the RS-232 port and a computer using a standard terminal emulating program (TTY).

Also, in FAULTS LOG reading mode the amplifier can save the file to USB memory stick (see Section [2.5.f\) RCU's USB interface connector](#)).



Saving a faults log file to USB memory is a functionality under development and will be available in future firmware versions.

Please, see Section [7.3 Using the Fault Codes \(signatures\) for Diagnostics](#).

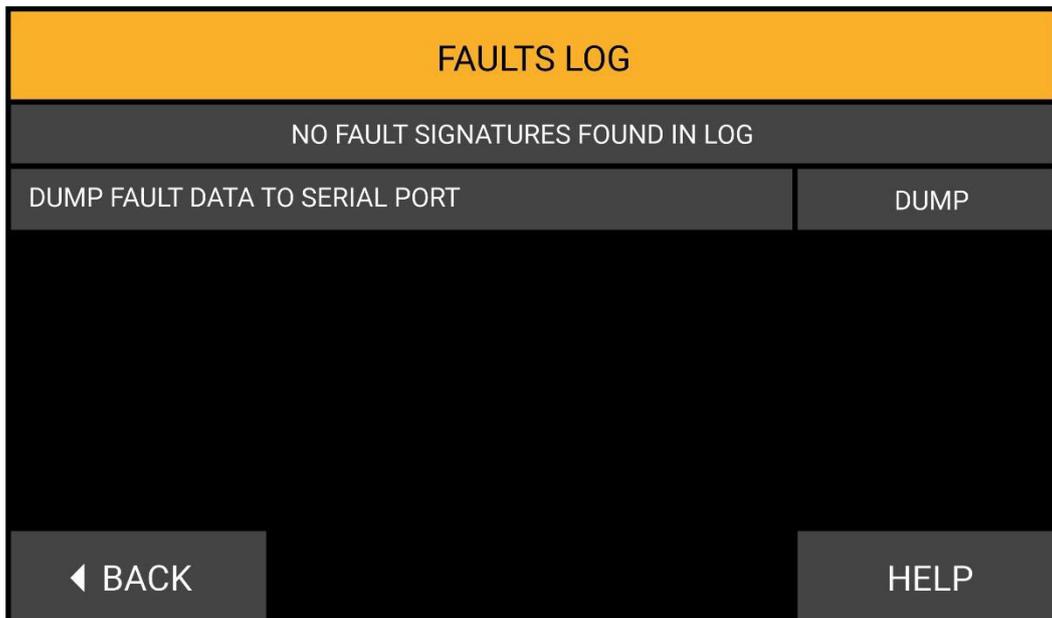


Figure 5-8 | Menu FAULTS LOG

In the Log-file title individual information about the amplifier and the options is given: model, user call sign, serial number, revisions of the hardware, firmware, bootloader, and number of worked hours.

Further on, the downloaded file contains detailed information about 55 parameters, operating frequency, and what event has tripped the protection.

## 5.5. Menu RESTORE DEFAULT SETTINGS

The menu RESTORE DEFAULT SETTINGS (see [Figure 5-8 | Menu RESTORE DEFAULT SETTINGS](#)) is accessible from the MENU SELECTION screen (see [Figure 5-1 | Menu SELECTION](#)).

Two different factory-reset options are available (see [Figure 5-8 | Menu RESTORE DEFAULT SETTINGS](#)):

- **RESET USER PREFERENCES TO FACTORY DEFAULTS**  
Resets User Preferences (the settings from [5.1 Menu USER PREFERENCES](#)) to their factory default values.

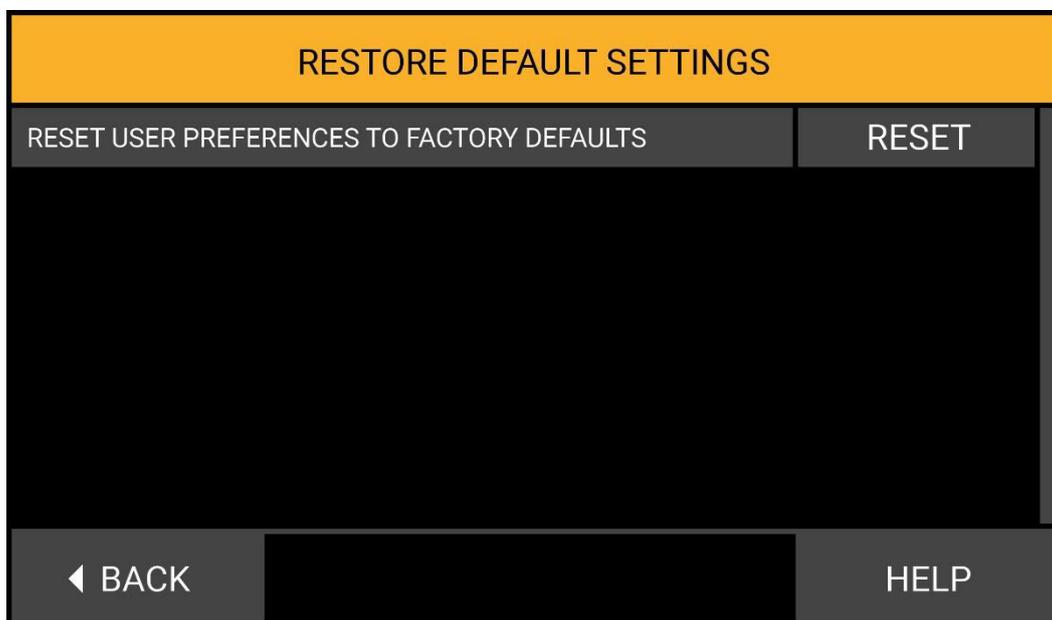


Figure 5-9 | Menu RESTORE DEFAULT SETTINGS

To reset a setting, touch the corresponding **RESET** button. This will invoke a confirmation screen with **RESET** and **CANCEL** buttons. Touch again **RESET** button to confirm resetting and return to the FACTORY RESET menu or touch **CANCEL** button to return to FACTORY RESET menu without resetting.

### 5.6. Menu NETWORK SETTINGS

The menu NETWORK SETTINGS (see *Figure 5-9 | Menu NETWORK SETTINGS*) is accessible from the MENU SELECTION screen (see *Figure 5-1 | Menu SELECTION*).

This menu is used to set the parameters for LAN (Local Area Network) network connection.

NETWORK SETTINGS			
NETWORK MODE	WI-FI	ETHERNET	DISABLED
IP ADDRESS ASSIGNMENT	MANUAL		DHCP
IP ADDRESS	192.168.1.42		
SUBNET MASK	192.168.1.42		
GATEWAY	192.168.1.42		
<div style="display: flex; justify-content: space-between; align-items: center;"> <span>◀ BACK</span> <span>MENU</span> </div>			

Figure 5-10 | Menu NETWORK SETTINGS

Available network parameters:

- NETWORK MODE  
This parameter is used to choose between:
  - ETHERNET wired (cable) connection (see *2.5.d) RCU's LAN Ethernet interface connector*);
  - Wi-Fi (wireless) connection (see *2.5.e) RCU's Wi-Fi device interface*);
  - DISABLED network connection (in this selection, all other fields are hidden until either ETHERNET or Wi-Fi is selected).
- IP ADDRESS ASSIGNMENT  
This parameter is used to selects the method to set the IP (Internet Protocol) address, subnet mask and gateway of the chosen network interface. There are two possibilities:
  - MANUAL  
If MANUAL is selected, the fields IP ADDRESS, SUBNET MASK, GATEWAY and DNS are enabled, and the user is able to set their values, using the on-screen virtual keypad that pops up once they are touched (see *Figure 5-10 | Virtual keypad*);

- DHCP (Dynamic Host Configuration Protocol)
  - If DHCP is selected, the fields IP ADDRESS, SUBNET MASK, GATEWAY and DNS are disabled and cannot be edited, however they remain visible so the user is able to review the settings.
- IP ADDRESS
  - This parameter is used to set the IP address for ACOM 1400S in your LAN network. This parameter is disabled when DHCP is selected in parameter IP ADDRESS ASSIGNMENT.
- SUBNET MASK
  - This parameter is used to set the Subnet Mask address for ACOM 1400S in your LAN network. This parameter is disabled when DHCP is selected in parameter IP ADDRESS ASSIGNMENT.
- GATEWAY
  - This parameter is used to set the Gateway address for ACOM 1400S in your LAN network. This parameter is disabled when DHCP is selected in parameter IP ADDRESS ASSIGNMENT.
- DNS (Domain Names System)
  - This parameter is used to set the DNS address for ACOM 1400S in your LAN network. This parameter is disabled when DHCP is selected in parameter IP ADDRESS ASSIGNMENT.

If Wi-Fi is selected in parameter NETWORK MODE, two additional fields appear:

- SSID (Service Set Identifier)
  - Here you can enter the ID (name) of the wireless network you are connecting the device to;
- NETWORK KEY
  - Here you can enter the required by the wireless network key/password (if any).

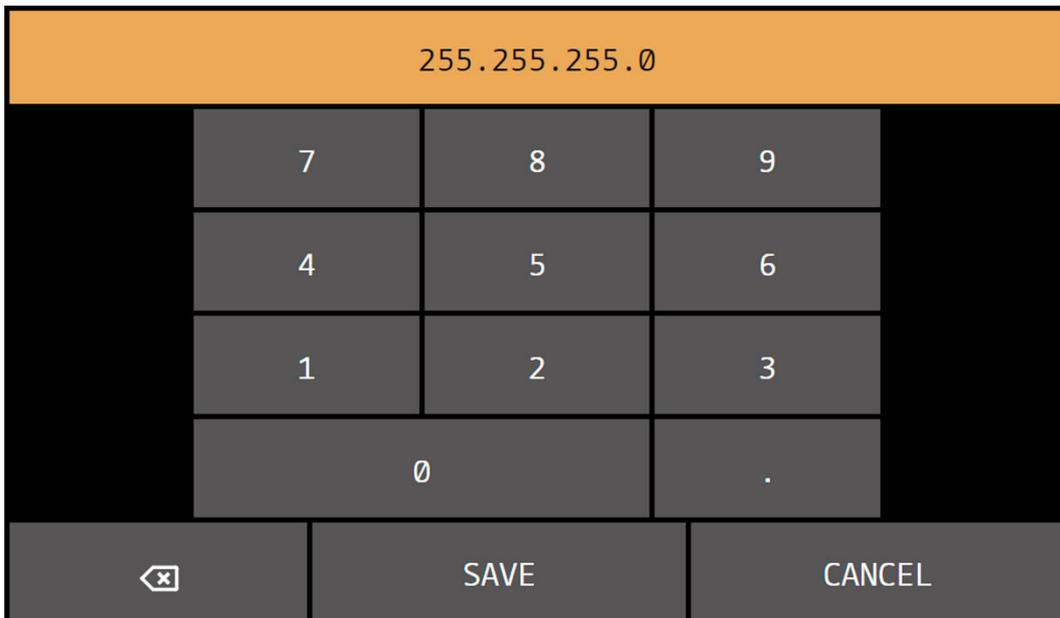


Figure 5-11 | Virtual keypad

The virtual keypad functions similarly to the virtual keyboard with the addition of real-time checking the validity of the entered IP address format. For example, it will not allow the value of an octet to be above 255 and will not allow a fifth octet.



For details on NETWORK SETTINGS and how to connect ACOM 1400S to your LAN network, please, contact a local IT professional or your Internet provider.

**5.7. Menu UPDATE**

The menu UPDATE is accessible from the MENU SELECTION screen (see *Figure 5-1 | Menu SELECTION*). This menu is used for updating the firmware of the amplifier (see *7.4 Firmware Update*).

**5.8. HELP information**

You can find **HELP** button in many of the amplifier's menus. This is a context sensitive information and when the button is touched will display the help information for the particular menu.

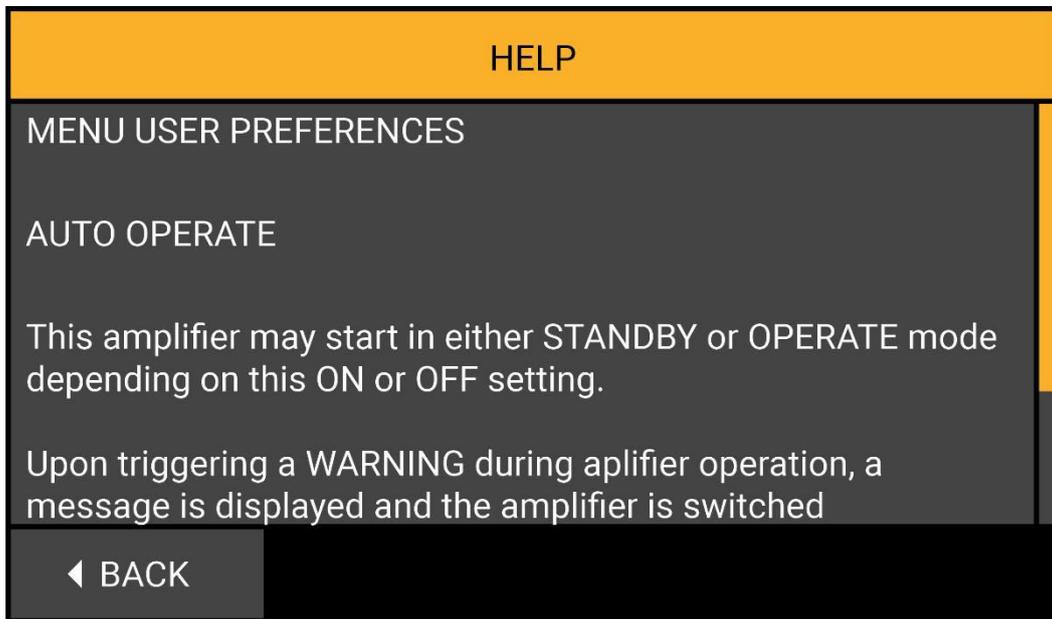


Figure 5-12 | HELP information

## 6. REMOTE CONTROL

Remote control of the ACOM 1400S is provided through the built-in Ethernet or RS-232 interfaces.

### 6.1. Remote Control via Ethernet Interface

As standard, the ACOM 1400S is equipped with an Ethernet interface and integrated Web-based user-interface facilitating its usage in Remotely Operated Stations.

Remote control of ACOM 1400S via Ethernet interface is provided by built-in:

- Cable Ethernet interface (see [Figure 2-10 | RCU model R06 rear panel](#), Pos. 5);
- Wireless (Wi-Fi) Ethernet interface (see [Figure 2-10 | RCU model R06 rear panel](#), Pos. 6).

Your ACOM 1400S needs to be connected to your LAN network, as your PC (or tablet, or smartphone), to establish a connection between both devices, i.e., the IP address of your amp should be, for example, 192.168.1.10 if your PC IP address is, for example, 192.168.1.5.



For details on NETWORK SETTINGS and how to connect ACOM 1400S to your LAN network, please, contact a local IT professional or your Internet provider.

When the amplifier is connected to your LAN network, its IP address (see [Figure 6-1 | Web-interface running in web browser on a PC](#), Pos. 1) can be used to access its web-interface in an any web browser, running on a device (PC, smart phone, or tablet) connected to the same LAN network.

The IP address of ACOM 1400S can be seen and changed in the NETWORK SETTINGS menu (see [5.6 Menu NETWORK SETTINGS](#)).



The amplifier's visualization through web-interface is identical to amplifier's "standard" user interface when operated locally. Through amplifier's web-interface you have a full access to all menus and functionalities of ACOM 1400S.

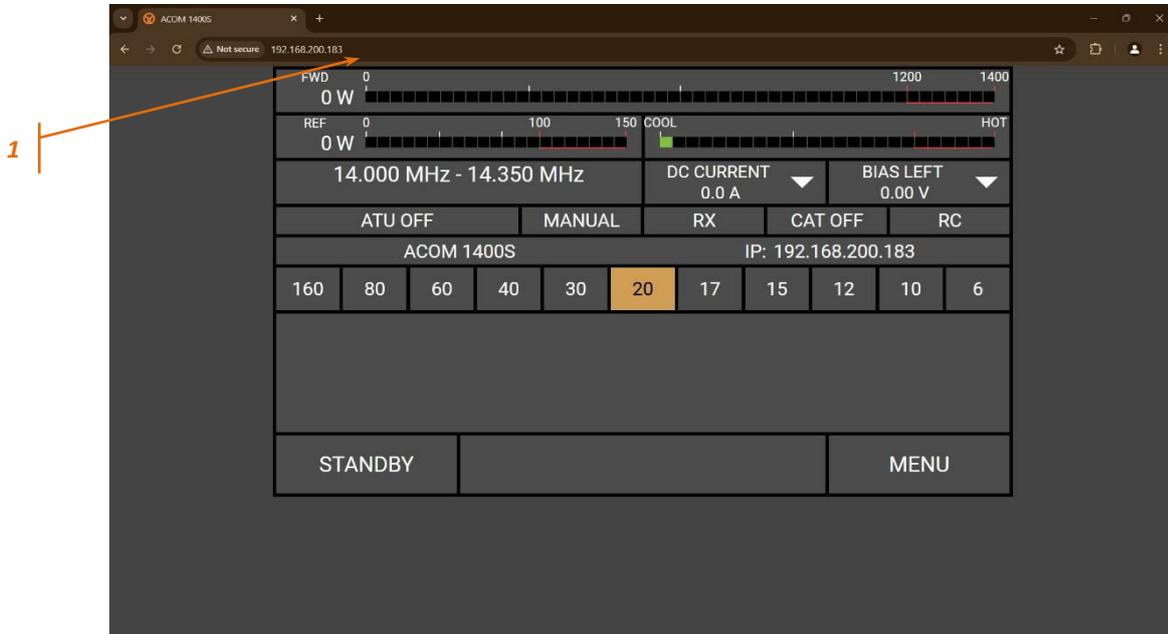


Figure 6-1 | Web-interface running in web browser on a PC

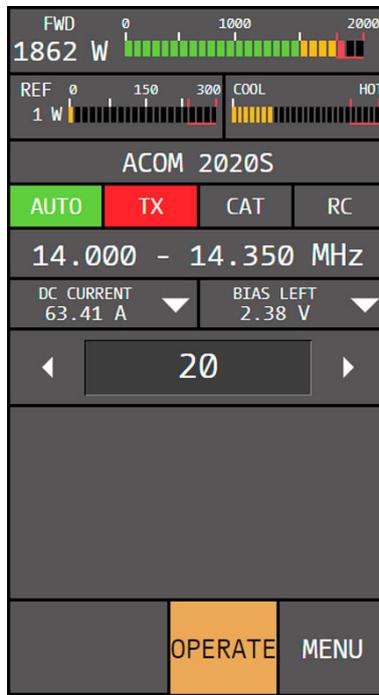


Figure 6-2 | Web-interface running in web browser on a smart phone



Use of other remote-control devices or third-party software is solely the customer's responsibility.

ACOM can not be related in any way to any questions about the functionality of such devices or software in any radio system which includes our products.

## 6.2. Remote Control via RS-232 interface

The ACOM 1400S may be controlled remotely by the RS-232 port.

For cable connection, please see Section [2.5.c\) Amplifier's RS-232 interface connector](#) and [Table 2-5 | Signals and pin out of the RS-232 connector](#).



For ACOM 1400S RS-232 interface protocol, please, contact your dealer (see Section [1.9 Owner Assistance](#)).

## 7. MAINTENANCE

### DANGER

Both the mains voltage and the high DC voltage up to 500 V inside the ACOM 1400S amplifier are LETHAL!

For your safety, pull the amplifier power plug out of the mains wall outlet and WAIT AT LEAST 3 minutes EACH TIME BEFORE you remove the cover of the amplifier.

### CAUTION

The unit's weight is about 15 kg, which should preferably be handled by two persons.



If no indicator glows upon switching the amplifier ON, the main fuse(s) may have blown (see Section [7.2 Fuse Replacement](#)).

### 7.1. Periodic Maintenance

#### 7.1.1. Outside 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 surfaces 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 front panel, rear cover and the chassis, including the ones on the top and the bottom.

### DANGER

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

RCU's touch screen cleaning:

- If the touch screen becomes dusty or dirty, wipe it clean with a soft, dry cloth;
- When you wipe the touch screen, be careful not to push it too hard or scratch it with your finger nails. Otherwise, you may damage the screen.

### 7.1.2. Periodic Checks

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 [2.4.1.h](#)) *The IEC 320-C14 (IEC 60320-C14) Power inlet* and [2.4.3](#) *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.

### 7.1.3. Air Filters Cleaning

ACOM 1400S has two air filters.

Clean the air filters periodically and more often in a dusty environment, but at least once per year.

- PA (Power Amplifier module) air filter
- PS (Power Supply module) air filter

#### DANGER

Both the mains voltage and the high DC voltage up to 500 V inside the ACOM 1400S amplifier are LETHAL!

For your safety, pull the amplifier power plug out of the mains wall outlet and WAIT AT LEAST 3 minutes EACH TIME BEFORE you remove the cover of the amplifier.

#### CAUTION

The air filters may be too dusty - be careful how you clean them so that you DO NOT INHALE (BREATHE IN) neither spill the dust over! Wrap them, for instance, in a wet cloth before cleaning!

## 7.2. 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 3 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 2-7 | Amplifier rear panel - Connections](#), Pos. (f)). They are fuses of the "F" type (fast-acting / quick-acting / quick blow), European size 5x20 mm, ceramic (or glass) body cartridge.

The fuses must be rated for:

- 10 A / 250 V.

Suitable 10 A fuse is:

- Littelfuse, PN: 0217010.H (glass body cartridge);  
This fuse can be ordered from:
  - DigiKey ([www.digikey.com](http://www.digikey.com)), PN: 0217010.MXBP-ND;
  - Farnell ([www.farnell.com](http://www.farnell.com)), PN: 1191761;
  - Mouser ([www.mouser.com](http://www.mouser.com)), PN: 576-0217010.



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 [1.9 Owner Assistance](#)).

Besides the primary fuses, there are internal fuses inside the amplifier.

## ⚠ WARNING

Do not replace internal 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.

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 [1.9 Owner Assistance](#)).



Unauthorized replacement of inside fuses infringes the warranty conditions!



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

### 7.3. Using the Fault Codes (signatures) for Diagnostics

The data of the last 28 HARD FAULT protection trips is stored in the amplifier memory (see Section [5.4 Menu FAULTS LOG](#)).

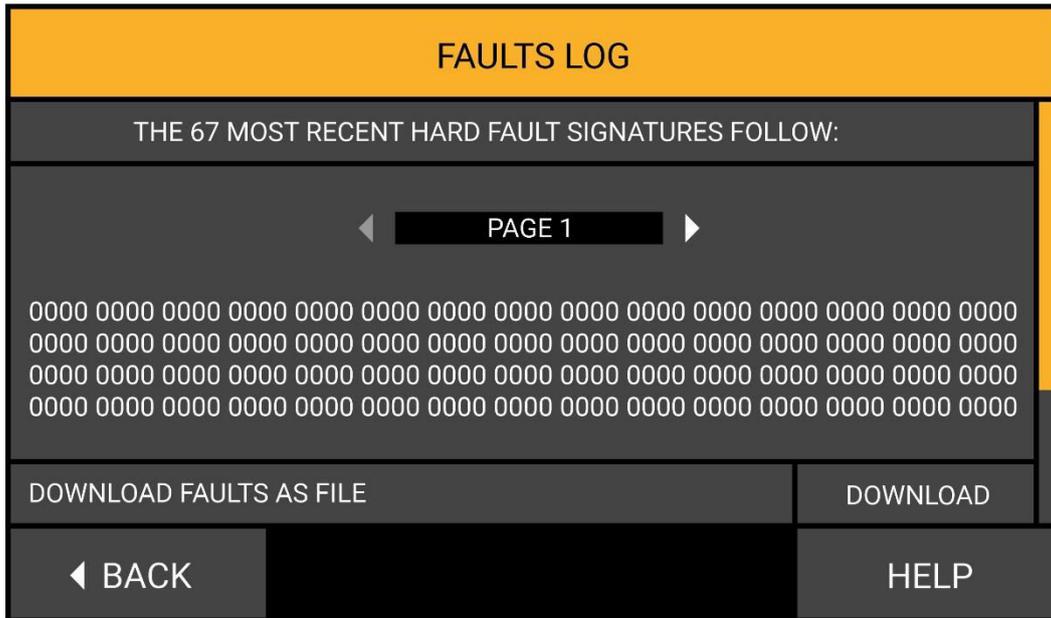


Figure 7-1 | Menu FAULTS LOG

The data can be downloaded from ACOM 1400S memory through the RS-232 port and stored in a computer file even if the amplifier cannot be turned on after a serious fault - only external power has to be fed to the Control unit in either of the following ways:

- 8 to 15 V DC voltage applied to the "DEBUG mode" input (see [Table 2-3 | Signals and pin out of the CAT/AUX connector](#)) of the CAT/AUX port. The power supply has to be capable to provide 0.4 A of current;
- If the Control board has already been taken out of the amplifier, it can be powered directly with +5 V (0.4 A) and the fault log downloaded via the RS-232 port.

In the FAULT LOG reading mode (see Section [5.4 Menu FAULTS LOG](#)), the Control board automatically transmits the data from the memory through the RS-232 interface (see Section [2.5.c\) Amplifier's RS-232 interface connector](#)). Depending on the number of fault events stored in the memory, the transmission may take between 0.5 and 12 seconds. A pause of 6 seconds follows, then transmission starts again. The data can be read in a plain-text format with a computer, using a standard terminal emulating program (TTY).

You can send the recorded file to your dealer or to ACOM accordingly.

To decode the downloaded hexadecimal data, you have to use the **ACOM Hard Faults Signatures Converter** (Excel file) for your amplifier model, distributed by ACOM free of charge. You can download it from [www.acom-bg.com](http://www.acom-bg.com).

#### 7.4. Firmware Update

The firmware update procedure is fully automatic and is done through the Internet (your 1400S amp must first be connected to the Internet).

The firmware update procedure is started via the menu UPDATE, accessible from the MENU SELECTION screen -> SERVICE -> UPDATE.

## 8. SPECIFICATIONS

### 8.1. Parameters

- a) Standard Frequency Coverage
- 1.800 - 2.000 MHz (160 m band)
  - 3.500 - 4.000 MHz (80 m band)
  - 5.020 - 5.455 MHz (60 m band)\*
  - 7.000 - 7.300 MHz (40 m band)
  - 10.100 - 10.150 MHz (30 m band)
  - 14.000 - 14.350 MHz (20 m band)
  - 18.068 - 18.168 MHz (17 m band)
  - 21.000 - 21.450 MHz (15 m band)
  - 24.890 - 24.990 MHz (12 m band)
  - 28.000 - 29.700 MHz (10 m band)
  - 50.000 - 54.000 MHz (6 m band)\*



\* Please, refer the applicable regional band plans and laws for specific allocations and limitations.

- b) Rated Output Power
- 1200 W  $\pm$ 0.5 dB, PEP or continuous carrier, without mode limitation, at 200-264 VAC mains;

### **NOTICE**

You will have to reduce the output power to about 600 W if the amplifier is operated at 90-132 VAC mains supply voltage.

- c) Intermodulation Distortions (IM3)
- Better than 31 dB below rated PEP;
- d) Harmonic and Parasitic Emissions Output Suppression
- -60 / -70 dB or less (HF/50 MHz band);
- e) Input and Output Impedances
- Nominal value: 50 Ohm unbalanced, UHF (SO-239) type connectors;

- Input circuit: Broadband, SWR below 1.2 (1.1 typically), 1.8-54 MHz continuous range without retuning or switching;
  - RF bypass path SWR - below 1.1, 1.8-54 MHz;
  - Acceptable SWR at the output load (the antenna): up to 3 with proportional power reduction and up to 1.5 for full output power;
- f) RF power gain
- 14 dB  $\pm$ 1 dB (typically 50 W for 1200 W output power);
- g) Mains Power Supply Voltage
- 100-240 VAC,  $\pm$ 10% (90-264 VAC limiting values), 50-60 Hz, Single phase;
- h) Mains Power Consumption at Full Output Power
- Power factor of 0.95 or higher;
  - Up to 2500 VA at rated output from 200/240 VAC mains supply;
  - Up to 1350 VA at 600 W output from 100/120 VAC mains supply;
- i) Mains Power Consumption in Low Energy (Waiting) Mode
- Less than 1 VA;
- j) Receive / transmit control
- **KEY-IN** input - Phono RCA jack.
    - Voltage applied to the transceiver keying output - up to +12 V;
    - Closed-circuit current flow to the transceiver keying output - up to 6 mA;
  - **KEY-OUT** output - open-drain, Phono RCA jack.
    - Output resistance: not more than 120 Ohm;
    - The maximum allowable open-circuit voltage coming from external devices connection: +50 V;
    - Maximum allowable closed-circuit current flow by external devices: 20 mA;
  - Minimum required time of sequencing between sending a request for transmitting (**KEY-IN** "ground on transmit" signal) and applying RF drive power at **RF INPUT** connector for safely switching receive to transmit: 25 ms.
- k) High resolution 7" color display with Touch screen
- 155x90 mm, 1024x600 pixels, and 24-bit color
- l) Safety and Electromagnetic Compatibility
- Complies with CE safety and electromagnetic compatibility requirements, as well as with the US Federal Communications Commission (FCC) regulations;
- m) Size & Weight (operating, excluding connected cables and opened tilt foot bar)
- Amplifier, WxDxH: 372x418x170 mm, 14.6 kg (14.7x16.5x6.7 inches, 32.2 lbs.);

- Remote Control Unit, WxDxH: 179x118x86 mm, 0.730 kg (7.1x4.7x3.4 inches, 1.6 lbs.);
- n) Operating Environments
- Temperature range: -10 to +40 degrees Celsius (14 °F to 104 °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.

## 8.2. Functions

- a) Frequency control directly by CAT from the transceiver
- b) Remotely controlled via Internet through integrated Web interface and built-in Ethernet RJ45 port and Wi-Fi adapter, or via RS-232 interface
- c) Remote POWER ON by DSR/DTR and CTS/RTS lines on the RS-232 port or by built-in Ethernet port
- d) Remote POWER ON / TURN OFF by DC voltage impulse or continuous DC voltage on CAT/AUX port ON\_RMT input.

### 8.3. 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: **2AJXZ1400S**

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](http://www.fcc.gov/oet/ea/fccid).

FCC ID numbers consists of two elements:

- A grantee code (for example **2AJXZ**), and
- An equipment product code (for example **1400S**).

- c) RF Exposure Information

**⚠ WARNING**

Using the ACOM 1400S amplifier, antennas must be operated at certain minimum distance between the radiator and any person's body.



This unit (ACOM 1400S 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 **3.6.f) Elimination of electromagnetic compatibility (EMC) problems.**

## 8.4. Storage and Shipment

### 8.4.1. 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).

### 8.4.2. Shipping Size and Weight

- WxDxH: Approx. 568x710x381 mm, 22.0 kg (22.4x28.0x15.0 inches, 48.5 lbs.).



Please, contact ACOM (see [1.9 Owner Assistance](#)) for shipment details.

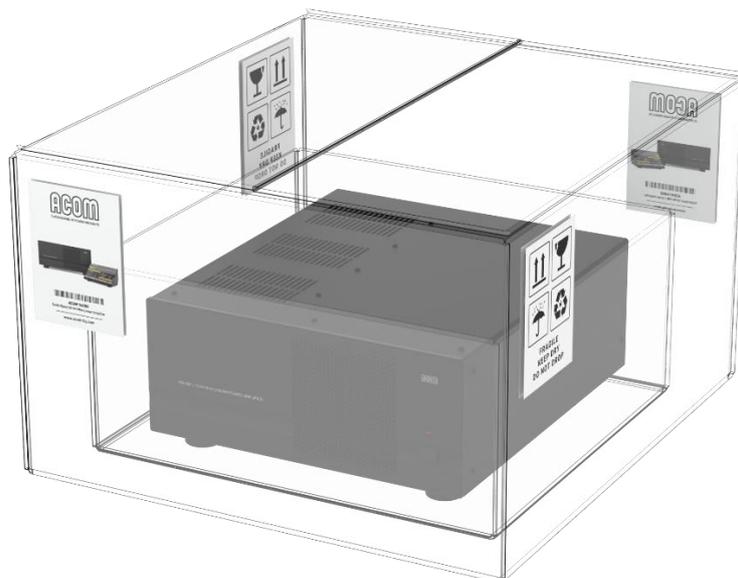


Figure 8-1 | Packaging cardboard box

### 8.4.3. 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.

#### 8.4.4. Returning to the Service Provider

This document section contains the 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 Main Power Rocker Switch (see [Figure 2-7 | Amplifier rear panel - Connections](#), Pos. 3); Make sure the Main Power Rocker Switch is in OFF 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 2-7 | Amplifier rear panel - Connections](#), Pos. (a)) and wait 30 minutes for safety.

- Pack the RCU in its original cardboard carton;
- Pack the amplifier in its original cardboard carton and add ACOM 1400S to RCU connection cable in a separate inner box (see [Figure 2-9 | ACOM 1400S - RCU R06 connection cable](#));
- Add the RCU carton into the amplifier carton;
- 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.

**8.5. 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.



## NOTES

A series of horizontal dotted lines provided for taking notes.



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](http://www.acom-bg.com)

Dealer/Partner's address:

# ACOM



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