HF + 6 m LINEAR AMPLIFIER

ACOM700S

OPERATING MANUAL

ACOM
Outstanding HF Power Products

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1. GENERAL INFORMATION

1-1. Inroduction and description

This manual describes the installation, operation, and maintenance of the HF+6m solid-state linear power amplifier ACOM 700S.

ACOM 700S is a state-of-the art linear amplifier, covering the amateur bands from 1.8 to 54MHz with 700W output power (PEP or continuous carrier) with less than 40W of drive. The amplifier operating information is shown on a multi-functional, high resolution color display. ACOM 700S may by controlled either by the six front panel buttons or remotely – via an RS232 port.

NOTE

ACOM 700S is designed to work with the ACOM 04AT Remote Automatic Antenna Tuner. The connection of ACOM04AT will make accessible the features that are inactive onthe amplifier display when ACOM 700S operates without
ACOM 04AT. The operation of ACOM 700S with ACOM 04AT
is described in the ACOM 04AT Operation Manual.

1-2. Owner assistance

If technical or operating assistance is needed, please contact your local dealer first. In the unlikely case of you needing further information, you may get in touch with ACOM via: fax (+ 359 2 920 96 56), telephone (+359 2 9209780), e-mail (acom@acom-bg.com, acom@mail.orbitel.bg) or by post (blvd. Nikola Mushanov 151, 1330 Sofia, Bulgaria). Website: www.acom-bg.com.

1-3. Equipment supplied and options

The amplifier is supplied in a single box including:

- amplifier ACOM 700S;
- power cord;
- this manual with a CE declaration of compliance;
- four pieces of spare fuses

1-4. Features

- 5“ high resolution color display (108x65mm), 800x480 pixels, and 24-bit color.
- The final PA stage uses a rugged LDMOS transistor - BLF188XR.
- Compatible with all transceiver models available on the market - does not need any special signals: „ground on transmit“ and less than 40W of RF drive power is sufficient.
- Broadband input circuit, providing a perfect transceiver load with SWR below 1.2:1 (typically 1.1:1), without retuning throughout the whole frequency range from 1.8 to 54MHz.
- The overall operation of ACOM 700S is extremely simplified : the screen menus are intuitive and easy to follow, no special skill is required from the operator when changing frequency bands.

- 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.

- Remotely controlled by RS232 port.

- 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.

- 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 93-265VAC, with no internal switch over. The consumed current is purely sinusoidal, Power Factor Corrected (PFC) andinrush limited. This makes the operation from unstable mains and generators easy and troublefree.

- 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.

1-5. Safety considerations, explicit definitions

The ACOM 700S linear amplifier is a Class I apparatus regarding protection against electric shock, i.e. the third grounding lead of its mains cord (colored yellow with two green stripes) and the grounding stud on the rear panel, marked GND (Fig. 2-1), must be connected to the grounding system of the shack for safe operation.

The ACOM 700S amplifier is designed to meet international safety standards and complies with the CE electromagnetic compatibility requirements, as well as the FCC regulations.

This operating manual contains precautions, cautions, and warnings that MUST BE COMPLIED TO by the user to ensure safe operation and maintaining of the ACOM 700S amplifier in a safe working condition.

PRECAUTIONS:

The EXPLICIT DEFINITIONS described below apply to this operating manual:

W A R N I N G **notes call attention to a procedure which, if not correctly performed, could result in personal injury or fire hazard by electric shock or lightning.**

C A U T I O N notes call attention to a procedure which, if not correctly performed, could result in equipment damage, not only in the ACOM 700S amplifier.

N O T E notes call attention to a procedure which, if not correctly performed, could result in inconvenience.

W A R N I N G **HIGH VOLTAGE!**

Both the mains voltage and the high DC voltage up to 500V inside the ACOM 700S amplifier are LETHAL! For your safety, disconnect the power plug from the mains and WAIT AT LEAST three minutes EACH TIME, BEFORE removing the cover of the amplifier.

W A R N I N G **HIGH VOLTAGE!**

NEVER ALLOW, ESPECIALLY CHILDREN, to insert anything into holes in the case - this may cause ELECTRIC SHOCK!Never touch an antenna or antenna isolators duringtransmission or tuning - this may result in an electric shockor burn. Never expose the amplifier to rain, snow or anyliquids. Avoid placing the amplifier in excessively dustyenvironments or in direct sunlight. DO NOT OBSTRUCTCOOLING ducts or vents.

W A R N I N G

Do not undertake repairs or changes in hardware or firmware of your ACOM 700S amplifier. Doing so will endanger your or others' health or life, or damage the amplifier and theequipment connected to it. Such repairs or changes arenot covered by the warranty and may void the warranty. Themanufacturer is not liable for any such repairs or changes.Any such repairs or changes are sole responsibility of theperson or persons engaging in them.

C A U T I O N

To avoid damage (not covered by the warranty) please read the INSTALLATION - Section 2 of this operating manual carefully. If you have any doubts or questions regarding the installation, operation or safety of the ACOM 700S amplifier, please consult your dealer immediately.

2. INSTALLATION

2-1. Unpacking and Initial Inspection

C A U T I O N

Before you commence installing the ACOM 700S amplifier, please read this manual thoroughly. Carefully inspect the shipping carton and its contents as described below for missing items (S. 1-3) or mechanical damages. If anything is missing or is damaged (scratched, bent, crushed or something is rattling inside or moving freely when turning the amplifier over, **notify your dealer immediately!** Delaying this notification may infringe the warranty conditions of the carrier.

N O T E

Keep the original packing for possible future transportation.

Unpack and inspect carefully the contents of the cardboard carton for possible transportation damages. On the amplifier, check-up the chassis, front panel, display, buttons, rear panel connectors, main power switch and fuses.

2-2. Amplifier operating location selection; cooling.

Locate the amplifier close to the place where will be used. You will need an easy access to the rear panel for connecting cables, and of course, to the buttons and screen on the front panel.

The ACOM 700S is forced air cooled. Locate the amplifier so that there are no objects or other devices closer than 10cm (4”). The exhaust air can reach 65ºC (150ºF) and if the surrounding devices are sensitive to heating from outside or use forced air cooling themselves, increase the distances accordingly.

C A U T I O N

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

2-3. Connecting the amplifier in the shack

W A R N I N G

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 and local electrical code, safety rules, and regulations in force. Simultaneous connection to the earth grounding and protective earth may be inadmissible or may fall under special requirements in some countries!

W A R N I N G

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

W A R N I N G

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.

C A U T I O N

Bear in mind that the grounding installation may have to withstand emergency currents over 15A with minimal voltage drop on it. Therefore it may be necessary to improve its conductivity using heavier leads and lower-resistance grounding path. The grounding lead should be at least 4mm^2 (AWG 11 or SWG 13).

For details and recommendations on the grounding and RF counterpoise system concerning the electromagnetic compatibility see also S. 3-6(f).

a) GND stud - First connect the grounding stud of the amplifier (located on the rear panel and marked GND – Fig. 2-1) to the grounding system of the shack.

b) KEY-IN jack - amplifier 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 output of your transceiver, providing “ground on transmit”, to the KEY-IN input on the amplifier rear panel (RCA PHONO jack – Fig. 2-1). Use a standard RCA PHONO plug for connection to the amplifier.

Transceiver manufacturers give different names to this output, for example: TX-GND, SEND, T/R LINE, RELAY, and others. In some transceivers “ground on transmit” output should be activated by a menu or via changing a switch on the rear panel or inside the transceiver. See instructions in your transceiver manual.

N O T E

Voltage on the KEY-IN jack does not exceed 12V and the current is below 6mA. See also S. 8-2(a).

N O T E

Your amplifier will not work if the KEY-IN input is not connected correctly. If you experience any difficulty consult your dealer.

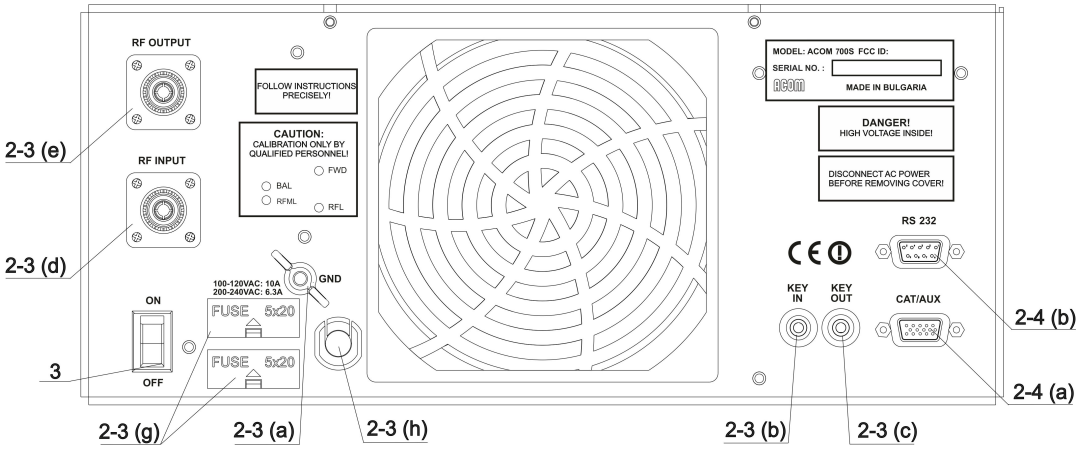


Fig. 2-1 Rear panel connections

c) KEY-OUT jack - transmit-enabling control output from amplifier to the transceiver.

The KEY-OUT jack on the rear panel provides an extra control signal from the amplifier to the transceiver. This can be used for improving the receive/transmit (RX/TX) switching safety.

C A U T I O N

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

If your transceiver has a suitable input, that disables transmission unless grounded externally, we recommend this to be connected to the KEY-OUT jack of the amplifier. Use shielded cable terminated with a standard RCA PHONO plug.

The transceiver manufacturers give different names to this input, for example: TX-INHIBIT, MUTE, LINEAR, and others. Check the manual of your transceiver. Approach your dealer for details. If your transceiver has no such input, do not worry – ACOM 700S will operate normally with KEY-OUT unconnected.

d) RF INPUT - Connect a coaxial cable with a PL-259 plug from the transceiver output (antenna jack) to the amplifier RF INPUT jack.

C A U T I O N

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

e) RF OUTPUT - Connect a suitable coaxial cable with a PL-259 plug from the RF OUTPUT on the rear amplifier panel to the antenna switch, tuner or antenna intended for the respective frequency band.

C A U T I O N

If you use an amplifier for the first time in your shack, pay serious attention to the size of coaxial cable from your amplifier output to the antenna. The cable must be capable of handling the increased power safely, particularly on the 10m and 6m bands. This warning applies equally for the antenna switch, tuner, and the whole antenna system, especially when using multi-band trap antennas.

We recommend using RG213 or better. Consult your local coax cable supplier.

f) Preparation of the mains outlet for the amplifier, requirements for the installation and the mains voltage.

C A U T I O N

Before connecting your amplifier to the power grid, be sure that the outlet is correctly wired and is capable of providing the required current i.e. (up to 10A from 200/240VAC mains and up to 16A from 100/120VAC mains). Also make sure that the grounding lead is connected properly in the outlet, intended for the amplifier. If subsequently you connect the amplifier to a different outlet, check it as well.

It is preferable to use the mains outlet closest to the source. Make sure that the respective fuses and voltage, of your power mains match the ACOM 700S amplifier's specifications (see S. 8-1(g)).

g) Main fuses.

C A U T I O N

Make sure you check whether the main fuses installed in your amplifier correspond to your local mains nominal voltage and if necessary replace them as described in Section 7-2!

h) Power cord inlet. Due to different mains standards in different countries, the ACOM 700S is delivered without a power plug for the mains cable. You dealer might be able to provide the correct Safety Class I plug. The ground lead of the power cable is colored yellow with two green stripes. If you have any doubts about the correct way to connect these wires, consult your dealer.

2-4. Installing options and connecting to external devices (transceiver, computer, etc.)

a) CAT/AUX interface – used for connecting and operating with various transceiver models (see table 2-1 below and the respective menu in S. 5-3, table 5-1 and Fig. 5-3).

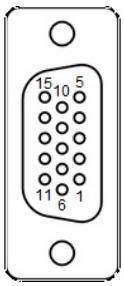
Most of the modern transceivers can be connected by CAT to the ACOM 700S. This will allow the amplifier to track the transceiver frequency without any transmission and change the bands automatically when in Operate mode. The cable can be supplied optionally, ordered separately or home brewed according to table 2-1 and the transceiver's manual.

The CAT connection requires a cable made especially for the ACOM 700S and your transceiver. Wiring diagrams of such cables can be found at 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 700S works together with ACOM 04AT because the tuner needs to know the exact frequency, not the band.

Table 2-1 shows the signals and the pin out of the CAT/AUX connector - rear panel of the amplifier.

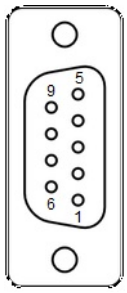
Table 2-1

CAT/AUX interface	PIN NO.	PIN NAME	DESCRIPTION	SPECIFICATIONS
 Rear panel view	1	RxD	Received Data	TTL input
	2	RxD	Received Data	RS232 input
	3	TxD	Transmitted Data	RS232 output
	4	TxD	Transmitted Data	TTL output
	5	GND	Ground	0 Volt
	6	BAND voltage	Analogue input	0 to +8V
	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 + 15V / 3mA max
	12	Debug mode	CPU only Pwr Input	+8 to + 15V / 0.4A
	13	KEY-IN	Tx Request	Less than +12V / 6mA
	14	KEY-OUT	Tx Ready	O.C. output, up to +50V / 20mA
	15	GND	Ground	0 Volt

b) RS232 port. Table 2-2 shows signals and pinout of the RS232 port on the amplifier's rear panel.

This connector may remain unused until you decide to control the amplifier remotely.

Table 2-2

RS 232 interface	PIN NO.	PIN NAME	DESCRIPTION	SPECIFICATIONS
 Rear panel view	1	-	Not connected	-
	2	TxD	Transmitted Data	RS232 level output
	3	RxD	Received Data	RS232 level input
	4	-	Not connected	-
	5	GND	Ground	0 Volt
	6	DSR	Remote Power On	RS232 level input
	7	-	Not connected	-
	8	CTS	Remote Power On	RS232 level input
	9	-	Not connected	-

3. INITIAL POWER ON AND OPERATION

C A U T I O N

Do not turn the amplifier on at least two hours after unpacking it and installing in its final operating position. Pay special attention whenever the amplifier is moved from a very cold place to a very warm one because condensation may develop on the inside resulting in damage to the high voltage circuits of the amplifier. Under these circumstances, do not turn the amplifier on for at least 4 hours. A similar effect could occur following a rapid warming of the room, such as winter usage of a powerful electric heater.

After following all instructions in Section 2 INSTALLATION, check whether the rear panel mains switch is turned off. Then plug the amplifier in the mains outlet.

3-1. Low energy standby mode of the power supply

Now you can turn on the mains switch on the rear panel. This will activate only the low-energy stand-by mode of the amplifier power supply and will light up the red LED above POWER button, while the main power supply is still off and the display is dark.

3-2. Front panel - controls and readouts

a) POWER button. When the rear panel mains switch is turned on, push and hold 1-2 seconds to start the amplifier up. When the amplifier is turned on, push to turn it off (back to standby mode).

b) LED indicator above the POWER button. When lit red and the screen is dark, the amplifier is in standby mode and may be turned on by pushing the POWER button.