



OUTSTANDING HF POWER PRODUCTS



ACOM 1010

HF Linear Amplifier

User's Manual

Installation, Operation
and Maintenance

August 2020

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

Type of Documentation User's Manual

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

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1. GENERAL INFORMATION

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

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

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

1.1. Introduction and Description

This manual explains:

- Installation
- Operation and
- Maintenance

of the ACOM 1010 HF linear amplifier.

The ACOM 1010 is a self-contained linear amplifier that covers all amateur bands, from 1.8 through 29.7MHz. It provides over 700W PEP of output power (or 500W in continuous-duty operation) with less than 60W of drive. The amplifier is designed to tolerate VSWR levels of up to 3:1 throughout its operating range, and tuning is simplified by ACOM's exclusive True Resistance Indicator (TRI). Also, a built-in antenna selector switch with two outputs is included to provide instant choice of antennas. Importantly, a variety of system parameters are continuously monitored and available to the operator to assure safe and efficient amplifier operation.

1.2. Owner Assistance

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

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

ACOM Ltd.

E-mail: support@acom-bg.com

Bulgaria | Bozhurishte 2227

Sofia-Bozhurishte Economic Zone | 6 Valeri Petrov Str.

GPS coordinates: 42.748616° | 23.209801°

1.3. Equipment Supplied

The ACOM 1010 amplifier and this User's Manual are shipped in a cardboard carton.

1.4. Features

- Easy operation. The plate-load True Resistance Indicator (TRI) is an ACOM innovation that provides quick and precise tuning, typically in less than 10 seconds. The auto-operate function will return the amplifier to the OPERATE mode automatically after each protection trip, saving time and avoiding manual switching.
- No tuner needed. No external antenna tuner is required as long as the antenna VSWR is 3:1 or lower. The amplifier will perform the functions of an antenna tuner, enabling you to change antennas faster and use them over wide frequency ranges.
- A durable amplifier. This amplifier is both user-friendly and self-monitoring. It is designed to safely withstand up to 240W of reflected power, up to 100 milliseconds of drive spikes (RF "tails" after a PTT or KEY release), and even operator tuning errors. It is also capable of operating at more than half its designed output power at only 75% of nominal line (mains) voltage. Because it can tolerate deep voltage drops (down to zero for 10 milliseconds) and 15% line voltage spikes, it is particularly suited for use in portable environments, such as field days and DXpeditions.
- LED bar-graph display. The upper LED bar-graph always reads peak forward power (except for the service functions) while the lower LED bar-graph is for the reflected power. LED warning indicators are provided for abnormal conditions of grid 1, grid 2, and plate parameters.
- Antenna selection. Two antenna outputs are selectable on the front panel of the amplifier.
- Efficient tuning. Antenna matching can be achieved in less than 10 seconds and at a quarter of nominal output power, which produces lower risk of interference to other stations and greater safety to the amplifier components.
- Transceiver-independent. The amplifier operates without special signaling from the transceiver. It needs only "ground on TX" and 60W RF drive power to operate at full output power.
- Input matching. Broadband input matching circuitry offers excellent loading characteristics for the driving transceiver, from 1.8MHz to 30MHz.
- Single tube operation. A single Svetlana 4CX800A (GU74B) high-performance ceramic-metal tetrode with plate dissipation of 800W (forced air cooling, grid-driven) is used for maximum efficiency.
- Permanent monitoring and protection of the plate and grids currents. The Bias Optimizer minimizes heat dissipated by the tube, assuring tube longevity.
- High voltage protection. Design of the high-voltage power supply eliminates the danger of turn-on transients affecting sensitive devices connected to the same line (mains) circuit. Moreover, the amplifier can be configured to accommodate any of 8 nominal line voltages between 100 and 240V, 50 or 60Hz.
- Band inclusion. The amplifier can be shipped with 10 and 12-meter capability disabled as required by the Federal Communications Commission (FCC), for United States users. Contact your dealer about enabling those bands.

1.5. Safety Considerations, Explicit Definitions

The ACOM 1010 HF Linear Amplifier is a Safety Class I unit. The grounding lead (yellow with 2 green stripes) of the power cable and the ground stud on the rear panel of the amplifier (marked GND) must be connected to the station's grounding system for safe operation.

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

This User's Manual contains information, precautions and indications for cautions and warnings which must be followed by the user to ensure safe operation and to keep the ACOM 1010 in safe operating condition.

The EXPLICIT DEFINITIONS described below apply to this operating manual:



DANGER

These notes call attention to a procedure which, if not correctly performed, could result in serious personal injuries and even death, fire hazard, electric shock and/or in substantial material damage.



WARNING

These notes call attention to a procedure which, if not correctly performed, could result in injuries and equipment damage, not only in the ACOM products, but also to other systems.



NOTE

These notes call attention to technical tips, as well as to important information for better understanding of ACOM products.

ORANGE TEXT as LINKS

marks all internal links in the document between Sections, Figure, Tables, etc. for your convenience.

PRECAUTIONS:



DANGER! HIGH VOLTAGE!

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

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



DANGER! HIGH VOLTAGE!

Never allow anyone, ESPECIALLY CHILDREN, to push anything into holes in the case - this will cause electric shock. NEVER TOUCH AN ANTENNA during transmission - this may result in an electric shock or burn. NEVER EXPOSE the amplifier to rain, snow or any liquids. AVOID placing the amplifier in excessively dusty environments or in direct sunlight. DO NOT OBSTRUCT AIR INTAKE (rear panel) and EXHAUST (top cover) areas of the amplifier. Keep a minimum distance of 10cm (4 inches) to the intake and 50cm (20 inches) to the exhaust.



DANGER

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



WARNING

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

2. INSTALLATION

2.1. Unpacking and Initial Inspection



NOTE

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

Keep all packing materials for possible future amplifier shipment.

2.2. Line Voltage Selection



WARNING

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

Normally, the amplifier is supplied set for a nominal line voltage of 240V. If your mains voltage is not 240V, you must contact your dealer for instructions. The only exception to this is if the unit has been custom ordered, in which case the voltage selection will be noted in the Table of Individual Data (see [Table 2-1 ACOM 1010 Individual Data](#)).

AMP SN:	<input style="width: 95%;" type="text"/>
Tube SN:	<input style="width: 95%;" type="text"/>
Voltage Selector Position	<input style="width: 95%;" type="text" value="VAC"/>

Table 2-1 ACOM 1010 Individual Data

2.3. Amplifier Location Selection

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

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

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

DO NOT UNDER ANY CIRCUMSTANCES OBSTRUCT the AIR INTAKE (bottom) and EXHAUST (top cover) areas of the amplifier. Keep a minimum clear distance of 50cm (20 inches) above the exhaust opening.

2.4. Connections

Before applying line (mains) voltage to your amplifier, follow the steps listed below in the order they are presented.



WARNING

Note that your grounding system may have to handle a current of more than 15 Amperes. This requires an adequately sized and well-maintained conductor of at least 4mm² (AWG 11 or SWG 13). If this is not the case at your operating location, you should make the necessary changes using a licensed electrician.

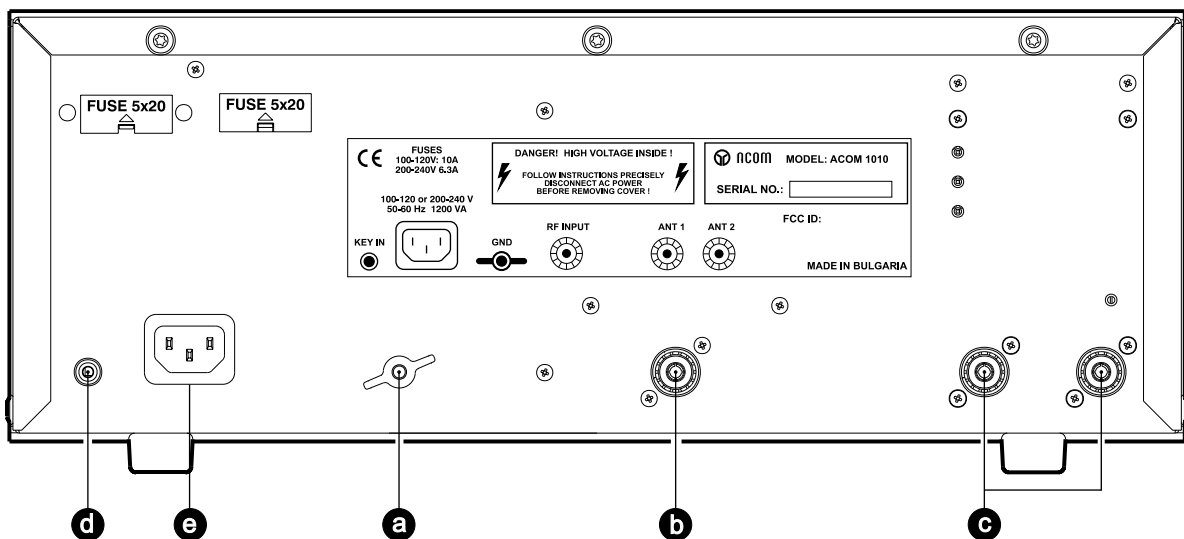


Figure 2-1 Connections

- a) Connect the station's grounding system to the wing-nut ground stud of the amplifier (on the rear panel, marked **GND**, see *Figure 2-1 Connections*).
- b) Connect a suitable coaxial cable between the transceiver output to the amplifier (rear panel) RF **INPUT** SO-239 connector, using PL-259 connector.

**W A R N I N G**

The coaxial cable from the amplifier's output must be capable of handling the amplifier's output power safely, particularly on the 10-meter band. It is suggested that, at a minimum, RG8X (including RG8MINI, RK50-4-11, RK50-4-13) or, even better, RG213 (including RK50-7-11) coaxial cable be used.

- c) Connect a suitable coaxial cable from the antenna to the appropriate amplifier output (on the rear panel, marked **ANT1** or **ANT2**), using a PL-259 plug.
- d) Run a shielded cable from the "ground on transmit" socket or terminal on your transceiver to the amplifier rear panel **KEY-IN** socket. The **KEY-IN** socket uses a standard RCA phono plug.

**N O T E**

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

Transceiver producers assign different names to their "ground on transmit" output terminals, e.g. TX- GND, SEND, T/R-LINE, etc. Some transceivers may require that "ground on transmit" be implemented by a software command, or by changing the setting of a switch on the rear panel or inside the transceiver. Check your transceiver's manual for more information on keying amplifiers.

- e) Preparation of the wall outlet for the amplifier.

**W A R N I N G**

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

Due to different line (mains) standards in different countries, the dealer will provide the correct Safety Class I plug for your location. 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.

**W A R N I N G**

Before connecting the amplifier to your line (mains) supply, be sure that the line (mains) supply is correctly wired and is capable of providing the required current, i.e., up to 5A from 240V and 10A from 120V. As discussed earlier, it is very important that the ground lead is adequately sized and properly connected.

The Power Switch on the front panel must be in the OFF position. Only then should you insert the amplifier's line (mains) plug into the appropriate wall outlet. At this time the amplifier remains switched off.

3. POWER ON, CONTROLS AND INDICATORS



DANGER

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).



WARNING

To avoid damage (not covered under warranty) carefully check that the voltage for which the amplifier is set corresponds to your mains nominal voltage (see Section [2.2 Line Voltage Selection](#) and [Table 2-1 ACOM 1010 Individual Data](#)).

After following all instructions in Section [2 INSTALLATION](#), you may now turn ON the main power switch on the front panel (see [Figure 3-1 ACOM 1010 Display and Control](#)). The green LED indicator above the switch will illuminate:



Figure 3-1 ACOM 1010 Display and Control



NOTE

Note that the upper LED bar-graph always reads peak forward power, except for the service functions (see Section [5.5 Service Functions](#)). The 800W-scale resolution is 50W. Note also that levels below 50W may be not detected.

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

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

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

The button labeled **A1-A2** (see Section [4.4 Antenna change](#)) changes the antenna output to either antenna 1 or antenna 2, according to the operator's choice. It is the operator's responsibility to connect suitable antennas to the **ANT1** and **ANT2** connectors on the rear panel of the amplifier.

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

The **BAND** knob controls the band switch, and **LOAD** and **TUNE** are used to adjust their respective variable air capacitors in the amplifier's output circuit. The settings of these three controls must be changed at each band change as well as when an antenna is changed. The three LED indicators located above the knob **LOAD** are called the "TRI tuning indicator" and they are used to achieve antenna impedance matching during a re-tune procedure (see Section [4.5 Tuning](#)).



WARNING

To avoid damage not covered by the amplifier's warranty, do not turn the **BAND** switch while transmitting. Switching while transmitting is called "hot switching" and it will cause irreparable damage to the band switch.

There are three warning LED indicators and one fault LED indicator located in the bar-graphs area. The following describe the error conditions and the correct responses (except for the service functions – see Section [5.5 Service Functions](#)):

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

4. OPERATION

Operation of the amplifier is simplified through ACOM's innovative TRI tuning aid, Auto-Operate function, and automatic protection systems. To make full use of the amplifier's potential and to configure it to local conditions, the following information should be read carefully.

4.1. Turning ON and OFF

In order to turn on the amplifier, press the power switch **ON** at the bottom-right corner of the front panel. The LED indicator above the switch will glow green and the audible cooling fan will start. Following a series of automatic self-tests, the **OPER** LED will begin to flash green and will continue to do so during the 150-second warm-up period. Throughout this period, the amplifier will remain in the standby mode, and the transceiver may continue to be used. Also, during this period, the **A1-A2** button may be pressed to change antennas, i.e. between the antennas connected to the **ANT1** and **ANT2** terminals on the rear panel of the amplifier. Switching between the antennas does not affect the warm-up process.



WARNING

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



NOTE

When you intend to have a short operating break, it is better to place the amplifier in the standby mode rather than turning it off. Tube life is shortened by repeatedly turning it on and off.

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

4.2. Changing Operate and Standby Modes

The **OPER** button changes between two modes. When the green light above the button is illuminated, the amplifier will remain ready to operate, even automatically returning from standby after a high-drive protection trip. That is, after a protection trip, e.g. from an overdrive event, the amplifier will normally shift to the **STBY** mode for several seconds, but it will automatically return to the **OPER** mode after that. This is the Auto-Operate feature. Alternatively, the **OPER** button may be depressed manually to go to and remain in the **STBY** mode, such as when you leave the station for a while. The green LED goes off and the Auto-Operate function is suppressed temporarily. Pressing the **OPER** button again restores the Auto-Operate feature.

4.3. RTTY Mode

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



WARNING

To avoid damage not covered under warranty, do not change modes during transmission. That is, do not change to or from **RTTY** or any other mode when transmitting.

4.4. Antenna change

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



WARNING

To avoid damage (not covered under warranty) do not change the antenna during transmission.

4.5. Tuning

Tuning is possible only in the **OPER** mode.

a) Preliminary information

Tuning the amplifier involves a procedure of matching the impedance of the antenna and transmission line to the amplifier tube's characteristic load resistance. This will ensure maximum plate efficiency and RF gain at nominal output power, with minimal distortion and spurious output. Note that **REFLECTED POWER** readings depend on the antenna and transmission line impedances only, and not on amplifier tuning. If the load impedance is not a nominally resistive 50-Ohms, the **REFLECTED POWER** reading will always show a reading, no matter what the tuning settings.

Proper tuning is always necessary, however, and will allow you to operate at a high power level, without distortion or any danger to the amplifier. Note also that the real OUTPUT POWER presented to the load (the antenna and transmission line) is equal to the difference between the **FORWARD** and **REFLECTED** power readings. For instance, with a 2.5:1 VSWR, readings of 800 W and 150 W **FORWARD POWER** and **REFLECTED POWER** respectively, the real OUTPUT POWER is 650W. At very high VSWR levels, such as when no antenna is connected or a badly mismatched antenna is used, the **FORWARD** and **REFLECTED** readings will be almost equal, while the real OUTPUT POWER (the difference between them) will be nearly zero.

The amplifier can operate safely as long as the **REFLECTED POWER** is LESS THAN 250W. Matching is assured for loads presenting a VSWR of up to 3:1. Nevertheless, for some loads and bands, matching is possible at even higher VSWR levels, but the drive power must be reduced to prevent the **REFLECTED POWER** from exceeding 250W. Failure to comply with these guidelines will cause the protection circuits to trip. For example, if the antenna VSWR were 5:1, the maximum attainable forward power would be 540W, 240W of reflected power and real output to the antenna and transmission line of only 300W. In the event your antenna cannot be adjusted to produce a lower VSWR, an external antenna tuner may be deployed.

**DANGER**

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

It is advisable to adjust amplifier tuning when antennas have been changed, snow has fallen, new objects are in the near field of the antenna, etc. Such changes may affect antenna impedance.

**NOTE**

If you use more than one antenna on a band, the proper antenna **must** be selected prior to performing the tuning procedure outlined below.

**WARNING**

To avoid damage not covered under warranty, do not switch the **BAND** switch knob while transmitting. As discussed above, hot switching will damage the amplifier's band switch!

**WARNING**

Also, never apply drive longer than one minute continuously without pausing for at least one minute to allow the tube to cool.

It is recommended that for initial tuning a frequency in the middle of the band be used. First, with no transceiver power applied, select the band. Then use (see [Table 4-1 Approximate tuning preset](#)) to achieve an approximate preset for both **TUNE** and **LOAD** capacitor knob settings:

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

Table 4-1 Approximate tuning preset

b) Tuning Procedure

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



NOTE

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



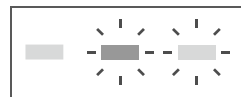
No light:
Use TUNE knob for max. Power to get any marker.



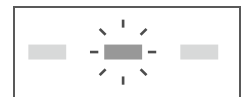
Tuning is a far left:
Turn LOAD knob to the right to get the inside markers.



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



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



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

Figure 4-1 Using TRI tuning aid

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

c) Tuning hint

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

If the **LOAD** knob is turned to the left with a centered TRI, there will be more gain, but less linearity. When available drive power is insufficient or when less output but better efficiency is needed, e.g. for RTTY and SSTV, this may be desirable. Tuning to the right of the center would lead to the opposite result, i.e. less gain and more power attainable. Of course, this requires more drive power, more plate current, and more plate heat, which shortens tube's-expected life. Off-center tuning may also be used to compensate for line (mains) voltage variations in order to maintain tube efficiency. In that case, tune to the left when line (mains) voltage is high, or tune to the right if it is low. However, where there is more than a 10% difference from the nominal line (mains) voltage, the voltage selector inside the amplifier should be changed (see Section [2.2 Line Voltage Selection](#)).

4.6. The Auto-Protection System

When any abnormal amplifier condition is detected by the auto-protection microprocessor, the risk will be evaluated automatically and either of two levels of protection will be applied:

- a) The first degree of protection consists of an illuminated LED warning. These include the yellow LED warnings discussed earlier, i.e., "**G1**" (grid 1), "**G2**" (grid 2), and "**IP**" (plate). Operation may be continued but the amplifier is likely to proceed to the second degree of protection, the trip.
- b) The second degree of protection is a trip to the standby mode. The red "**F**" (fault) LED illuminates and the amplifier automatically goes to the standby mode for several seconds. Also, the green **OPER** LED goes off. The amplifier will indicate the reason for the protection trip:
 - If one of the yellow (G1, G2, IP) warning LEDs is illuminated along with the "**F**" LED, a current limit has been exceeded and drive power must be reduced or retuning is necessary;
 - If the last red LED of the reflected-power bar-graph is illuminated together with the "**F**" LED, the reflected-power limit has been exceeded and the drive must be reduced or the antenna VSWR must be improved;
 - If all three LEDs of the TRI are flashing simultaneously together with the "**F**" LED, the tuning is not adjusted correctly and most likely the antenna impedance has changed and retuning is required.

Fault information normally remains on the display for several seconds while the amplifier is in the standby mode. The auto-operate function will attempt to return the amplifier to the operate mode automatically. If the protection trips repeatedly, the user must attend to the cause of the trip, which is typically too much drive or antenna mismatch.

**W A R N I N G**

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

5. MAINTENANCE

If no indicator glows upon switching the amplifier ON, the main fuse(s) may have blown (see Section [5.2 Fuse Replacement](#)).

5.1. Cleaning



WARNING

Do not use solvents for cleaning as they may be dangerous to you and damage amplifier surfaces and plastic components.

Do not open the amplifier. Cleaning the amplifier outer surface may be safely accomplished by using a piece of soft cotton cloth lightly moistened with clean water

5.2. Fuse Replacement



WARNING

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



WARNING

For 120VAC operation, the fuses should be rated at 10A; for 240VAC operation, the fuses should be rated at 6.3A. If it is necessary to replace the line (mains) fuses, use only those that are permitted under local safety codes.

The two primary line (mains) fuses in the amplifier are located on the rear panel (see [Figure 2-1 Connections](#)). They are of the fast (quick blow) type, European size 5x20mm. Use 10A for 100-120VAC operation or 6.3A for 200-240VAC operation.

Suitable types are:

- For 120V: 10A, 250V, 5x20mm, fast (quick blow), LITTELFUSE 0217010; Wickmann 1942100000
- For 240V: 6.3A, 250V, 5x20mm, fast (quick blow), LITTELFUSE 021706.3; Wickmann 1931630000.

Besides the primary fuses, there are also fuses located on the HV PCB and on the MAINS PCB (inside the amplifier). They are European size 5x20 mm, 0.8A, 2A and 5A, time lag (slow-blow) type.

Suitable types are:

- HV PCB: 2A, 250V, SLOW BLOW (Time Lag), 5x20mm; LITTELFUSE 0218002; Wickmann 1951200000
- MAINS PCB: 5A, 250V, SLOW BLOW (Time Lag), 5x20mm; LITTELFUSE 0218005; Wickmann 1951500000
- MAINS PCB: 0.8A, 250V, SLOW BLOW (Time Lag), 5x20mm; BUSSMANN type S504-800mA.

These latter fuses must not be replaced by the user. Replacing these internal fuses is potentially dangerous and must be done only by a trained service technician. Contact your ACOM dealer for assistance (see Section [1.2 Owner Assistance](#)).

5.3. Tube Replacement

A single Svetlana 4CX800A (GU74B) high-performance ceramic-metal tetrode is used in the amplifier. Replacement is a complex and potentially dangerous operation that involves adjustment of the plate idling current. This should not be attempted by the user. Contact your ACOM dealer (see Section [1.2 Owner Assistance](#)).

5.4. ACOM 1010 Simplified Schematic Diagram

Please, see [Figure 5-1 ACOM 1010 Simplified Schematic Diagram](#).

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

The cathode resistor R_c creates DC and RF negative feedback, thus stabilizing gain and equalizing frequency response. The combination L_{p1} - R_{p1} in the plate circuit is a VHF/UHF parasitic suppressor. DC plate voltage is fed through chokes RFC1-RFC2 and the capacitor C_{b3} blocks it from the output. The output tank, comprised of L_{P1} , L_{P2} , L_L , C_{P1} - C_{P3} , and C_{L1} - C_{L4} , forms a classic Pi-L network and suppress harmonic frequency emissions. This circuit is switched and tuned by S_{1A} - S_{1C} and the air variable capacitors C_{P1} , 2 and C_{L1} , 2. The output signal is fed through the antenna relays K1 and K2 in the WATTMETER PCB. The WATTMETER PCB also includes a high-pass filter for frequencies below 100 kHz, and it prevents the plate supply from reaching the antenna.

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

***N O T E***

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

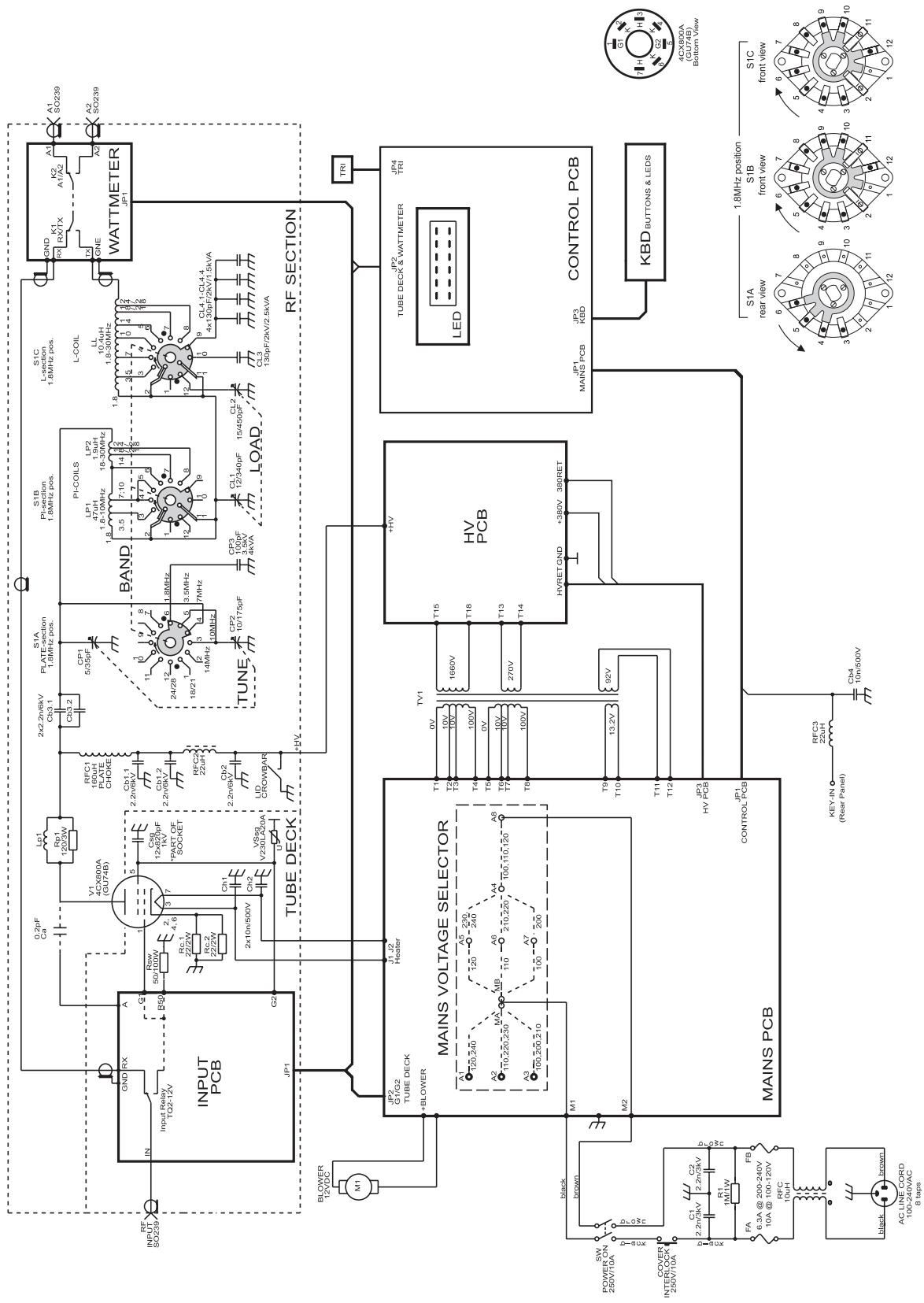


Figure 5-1 ACOM 1010 Simplified Schematic Diagram

5.5. Service Functions

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

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



N O T E

The auto-protection system will continue to operate in the service mode.

6. SPECIFICATIONS

6.1. Parameters

- a) Frequency Coverage: All amateur bands in the 1.8-29.7MHz frequency range. Extensions and/or changes on request;
- b) Power Output: 700W PEP or 500W continuous carrier;
- c) Intermodulation Distortion: Better than 35dB below rated output;
- d) Hum and noise: Better than 40dB below rated output;
- e) Harmonic Output Suppression: Better than 50dB below rated output;
- f) Input and Output Impedance:
 - Nominal value: 50 Ohm unbalanced, UHF (SO-239) type connectors;
 - Input circuit: broadband, VSWR less than 1.3:1, 1.8-30MHz continuously (no tuning, no switching);
 - Bypass path: VSWR less than 1.1:1, 1.8-30MHz continuously, 200W maximum;
 - Output (antenna) impedance matching capability: VSWR up to 3:1 or higher;
- g) RF Gain: 11dB typically, frequency response less than 1dB (50 to 70W drive power for rated output);
- h) Primary Power: 85-132V/170-264VAC (100, 110, 120, 200, 210, 220, 230 & 240V nominal taps), +10% -15% tolerance), 50-60Hz, single phase, 1200VA;
- i) Complies with CE safety and electromagnetic compatibility requirements as well as FCC-regulations (10 & 12m band locks provided);
- j) Size & Weight (operating): WxDxH: 402x315x166mm, 16kg (15.83x12.4x6.5 inches, 35.3lbs.);
- k) Operating environments:
 - Temperature range: 0 to +50 degrees Celsius;
 - Humidity: up to 95% @ +35 degrees Celsius;
 - Height: up to 3000m above sea level without output deterioration.

6.2. Functions

- a) Antenna Impedance Matching Process: aided by a plate-load True Resistance Indicator (TRI);
- b) Two antenna outputs selectable by a button on the front panel;

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

6.3. Storage and Shipment



WARNING

Should it be necessary to ship the amplifier, use the original packing as described below. Switch off the amplifier, pull the line (mains) plug out of the outlet, disconnect all cables from the rear panel of the amplifier (remove the ground connection the last), and then pack the amplifier in its original carton.

- a) Acceptable 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;
 - Humidity: up to 75% @ +35 degrees Celsius;
- b) Shipping Size and Weight: WxDxH: 535x445x270mm, 19kg (21x17.5x10.6 inches, 41.9lbs.);
- c) All types of transportation may be used, including storage in an aircraft baggage compartment at up to 12000 meters above sea level.

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www.acom-bg.com

Dealer/Partner's address:

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