USER'S MANUAL

1200W AUTOMATIC LINEAR AMPLIFIER

Model: HAL1200 *Atlantic*

A - Introduction

Thank you for purchasing the HAL 1200 Atlantic.
(Automatic Transistorized Linear Amplifier No Tune Inside Computerized).
This compact and lightweight desktop HF + 50MHz linear power amplifier has a maximum input power of 2.4 KW.
Our solid-state broadband power amp technology makes it the smallest and lightest in the industry.
Typical output power is 1200W PEP/SSB with the drive power of 25-35 W.
The built-in band decoder will allow you forget about the band setting, without any data connection to the transmitter, or when the amplifier is connected to the modern radio through these cables band data as Yaesu BAND DATA, Icom CI-V, Kenwood RS-232C or IF-232, Elecraft BAND OUT.

B - Cautions

B-1 Unpack the amplifier, check the fan guard at the rear panel Fan to see if there is any damage caused by the physical shock during the transportation. Fan blades must be free to rotate when powered.
The amplifier is cooled by forced airflow. Several inches of clearance on the top and the rear wall are necessary to allow for smooth air intake into the fan.

B-2 Keep the amplifier out of direct sunlight, in a cool dry environment.

B-3 Internal high voltages, (AC, DC and RF), are present at all times, ON AIR or OFF. Internal access should be limited to avoid injury.

B-4 Turn off the AC main power immediately upon any unusual sounds, sights or odors. Check readings the display for Warning messages, the fuses and all cable connections around the amplifier. Please notify the dealer or the factory of any problems.

B-5 For your safety, do not operate the amplifier without adequate grounding. A proper ground connection will result in peak performance and stability, in addition to reduced RF strays or noises.

B-6 To eliminate the RF interference to such home appliances as TV, FM radio, telephone sets, etc., it is recommended that clamp-on ferrite cores be inserted at both ends of the remote control cable, coaxial jumper cable, and antenna cables, as needed. Also, a common mode AC line filter (near the AC outlet), and in-line low pass filters on the antenna coaxial cable, (as necessary), are recommended.

B-7 The amplifier has fast acting sophisticated protection circuits controlled by the latest microprocessor technology. Please note, however, any such actions that cause the same fault to occur repeatedly, will lead to failure of the valuable final power MOSFET transistors.

B-8 Before checking into the amplifier, always disconnect the mains power supply, with the power disconnected, press the power switch to "POWER" to ON, be sure to wait a minute to allow the high voltage discharge DC , return the switch to OFF.
The internal potentiometers for RF power detector, protection circuits, MOSFET bias voltage circuit, etc., are precisely adjusted at the factory, and should not be altered. Doing so, would require readjustment with precision measuring instruments.

B-9 The primary power supply is for AC from 100 to 260 V operation. Be sure to verify your AC line voltage before you plug the AC power cord into the outlet.

B-10 Before powering on the amplifier, be sure to connect a dummy load (50 ohms, 1500 W min.) or a well-adjusted antenna to the output terminal. Operating without any load will cause extreme stress to the RF power MOSFET's, although protection circuits should work under critical conditions.

B-11 Required drive power is slightly less than 30 W to obtain the full 1200 W output. Do not attempt to operate with excessive drive from a high power transceiver. Transmitting high drive RF (over 70 W) into the amplifier will void the warranty.

B-12 Keep the copper/aluminum heat sink and air openings free from dust and blockages. Periodic cleaning will prevent degraded cooling efficiency.

B-13 For long continuous operation in RTTY/FM modes, it is recommended you reduce the RF drive levels by 20% to 30% lower output than CW/SSB modes.

B-14 To prevent damage to the precision electronic components, avoid extreme physical shock to the amplifier. If factory service is required, the amplifier must be shipped using the original box and packaging materials.

C - Features

C-1 Our solid-state broadband design engineers worked to make the HAL 1200 Atlantic, the lightest and most compact 1200 W HF amplifier in the industry.

C-2 The amplifier is equipped with a newly developed band decoder. The amplifier's decoder whit the microprocessor, on detecting RF input, changes bands automatically without any external connection, or as the data signal is received from the connection of the associated HF transceiver's frequency bands.

C-3 The amplifier's main PA section includes 4 high power MOSFET SD2933 by ST Microelectronics, resulting in 1200 W PEP (SSB max.). The amplifier's broadband characteristics require no further tuning once the operating band is selected.

C-4 The amplifier has no output ALC, because by the microprocessor, controls the input attenuation, to keep the linear region between 20 to 45 W of drive.

C-5 To ensure a clean RF emission, were used filters LPF of the fifth order Cauer.

C-6 With the unique duct structure design and the powerfull blower fan, the copper/aluminium heat sink block for RF PA module (and other components), are effectively cooled. The fan's quiet operation allows for even the weakest DX signals to be heard.

C-7 The amp utilizes an advanced 16 bit MPU (microprocessor) to run the various high speed protection circuits such as OverDrive, High antenna SWR, OverHeating PA , in the event of erroneus Band Change, etc.

C-8 A bright, backlit LCD display, in graphical and numerical displays the input power, output power and reflected power simultaneously, as well as various status data and warning messages.

D - Specifications

Frequency : 1.8 ~ 54 MHz
all amateur bands including WARC bands
Automatic Band Change
(only PTT/TXGND Signal), or
with dedicated connection for the most common
Transceivers Yaesu, Kenwood, ICOM, Elecraft .
Mode : SSB, CW, RTTY
RF Drive : 20 ~ 45 W (30W typ.)
(automatic selection: NO ALC)
Output Power : 1200W PEP / 1000W CW (typ.) - HF
600W PEP / 500W CW (typ.) - 6 meters Band
Drain Voltage : 50 V
Drain Current : 40 A max.
Input Impedance : 50Ω (unbalanced)
Output Impedance : 50Ω (unbalanced)
Final Transistor : SD2933 x 4 (MOSFET by ST Microelectronics)
Harmonics : -50 dB (<)
IMD3 : -34 dB (typ.)
Output Filters : LPF CAUER of 5th order
(160m, 80m, 40m, 30/20m, 17/15m, 12/10m, 6m)
Cooling Method : Forced Air (Fan)
MPU : HITACHI/Renesas 16bit
DISPLAY : LCD FSTN 20x4 Backlight;
at Real Time:
- Band
- Type of Automatic Band Change
- Temperature of Power Section
- Status (Ready, StandBy, On Air,
Protect, Warning, ...)
- Warning of Protection
- Announcement for Attenuator Insertion
- Input Power (Graphic/Numeric)
- Output Power (Graphic/Numeric)
- Reflected Power (Graphic/Numeric)

at StandBy, Menu:
- Start (StandBy/Ready)
- AutoBand (Automatic/CAT)
- Temperature (Celsius/Fahrenheit)

PROTECTIONS: - Over Drive
- Output Power Limiter
- High SWR (SWR > 2:1)
- Over Temperature
- Fault of PA Fuses
- In the event of erroneus Band Change

Input/Output Connectors: UHF SO-239 Teflon

AC Power : AC 100 ~ 260 V / 16 ~ 10 A max.

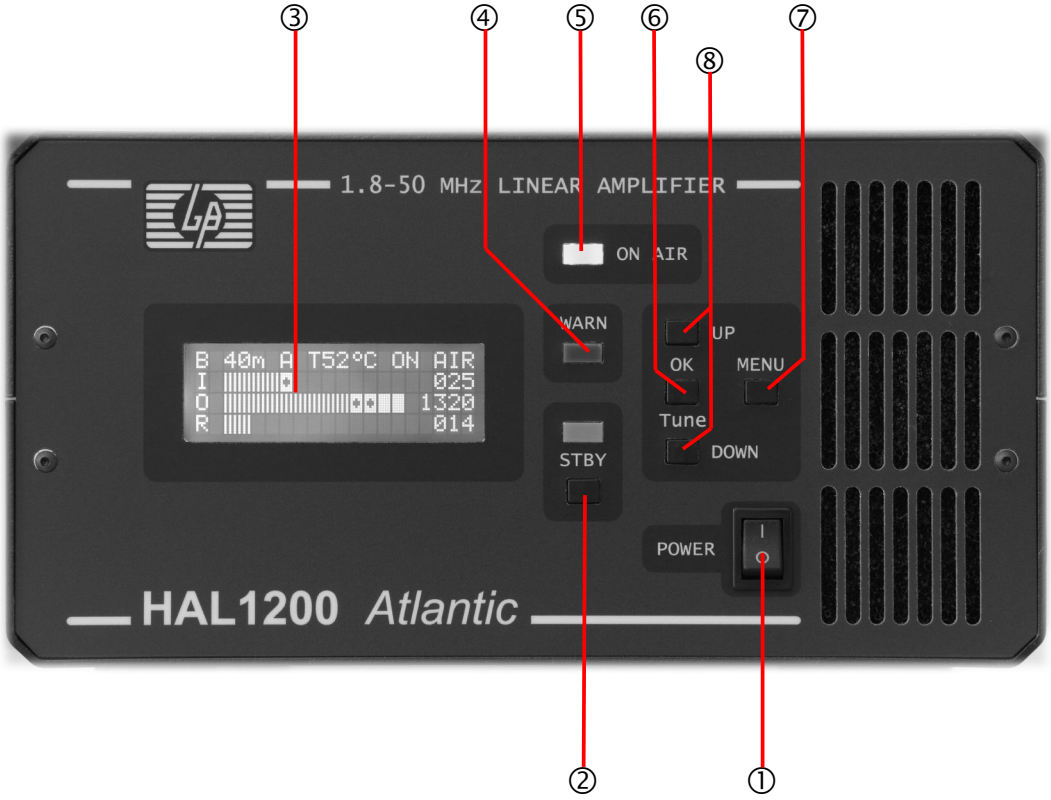
Dimension : 261 x 334 x 153 mm (W x D x H)

Weight : Approx. 9 kg.

Accessories : AC Power Cord x 1
: Spare Fuse 10 A x 1 (for AC 230V line)
: Spare Fuse 16 A x 2 (for PA)

Only for KIT version : Fuse Holder x 1 with Fuse 10A x 1 (for AC 230V line)

E - Front Panel Description



① **POWER** Main power switch to turn AC power ON (**I**) and OFF (**O**).
Display lights when turned on.

② **STBY** STAND-BY/OPERATE key and annunciator Yellow LED.
At STAND-BY mode, the Yellow LED is ON, RF signal pass through.
At OPERATE, (READY) the amplifier is ready to go into ON AIR (TX) mode, the yellow LED is OFF.

③ **BACKLIGHT LCD DISPLAY.**

④ **WARN** Warning Red LED annunciator.
Blinking for Warning, ON at PROTECTED Status (amp. Stopped).

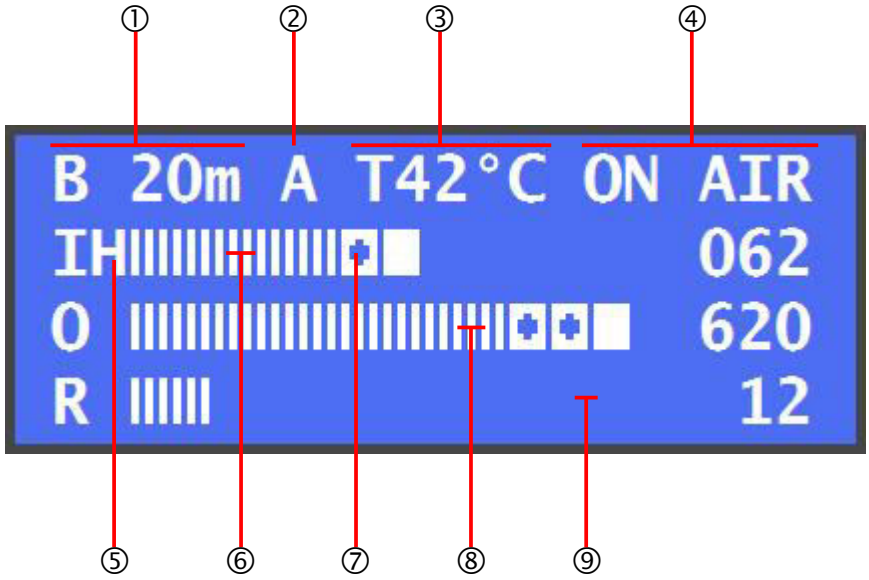
⑤ **ON AIR** Green LED annunciator.
Lights when the amplifier is in transmit (TX) mode.

⑥ **OK** OK Key; in operating mode, and in the event of an alarm Warning or Protection, confirms the reading of the message displayed , Resetting the alarm status and turns OFF the Red LED indicator ; in menu mode, confirm your selection.

⑦ **MENU** Menu Key, enter into the setup menu .

⑧ **UP / DOWN** Keys; in operating mode, selecting HALF or FULL Power Output ; in menu mode, to navigate the menu.

F - Display Description



① **B** Selected band and operational.

② Type of change automatic band selected and active :
A= Internal automatic band decoder, **Y**= Yaesu Band Data,
K= Kenwood CAT RS232 or IF232, **I**= Icom CI-V, **E**= Elecraft Band Out .
S=Semi-automatic with the help of the inner decoder bandwidth.

③ Temperature of Power Amplifier device, (Celsius or Fahrenheit) .

④ Status message: **STBY**=Stand-By , **READY**=Operate, **ON AIR**= TX,
PROTEC=Stopped for protection, **HI-TEM**=High Temp PA,
for Semiautomatic: **SET B**=Selected Band, **W Band**=Check Band.

⑤ **H** Signaling of insertion of the input attenuator, in line "**I**" or in line "**R**" ;
in line "**O**" signaling the setting of HALF Power Output.

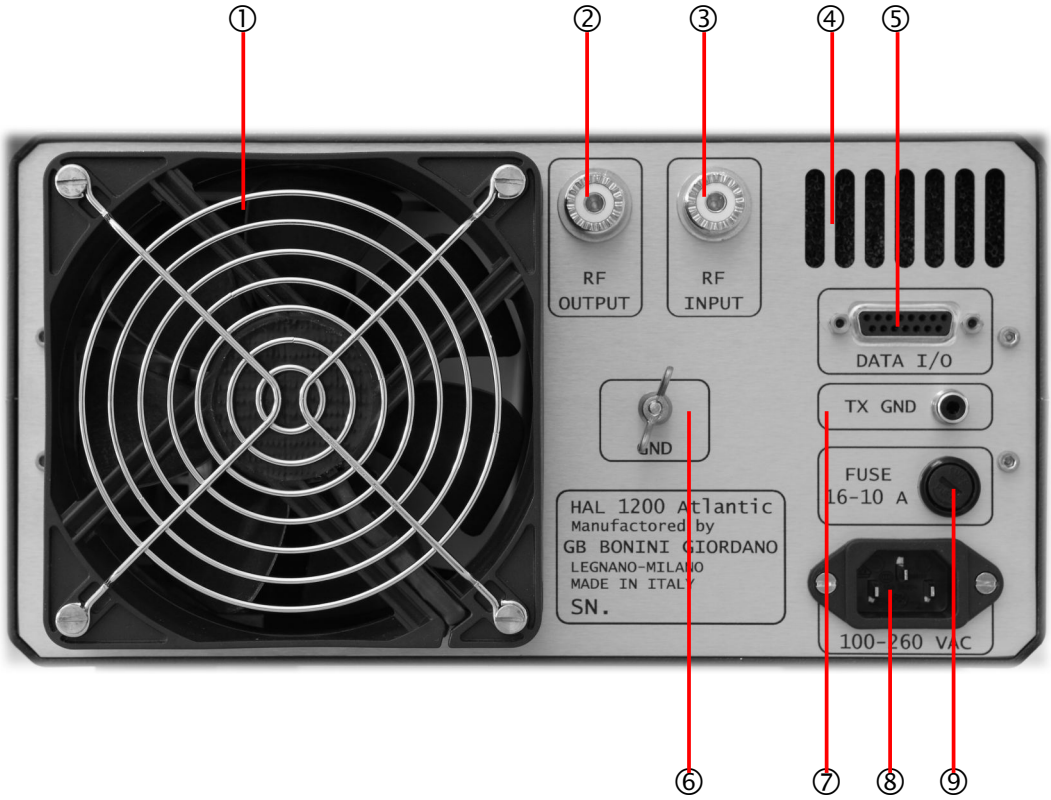
⑥ **I** Display line of the input power in graphical and numerical.

⑦ ◘This symbol indicates the optimum power drive. (about 25W).

⑧ **O** Display line of the output power in graphical and numerical.

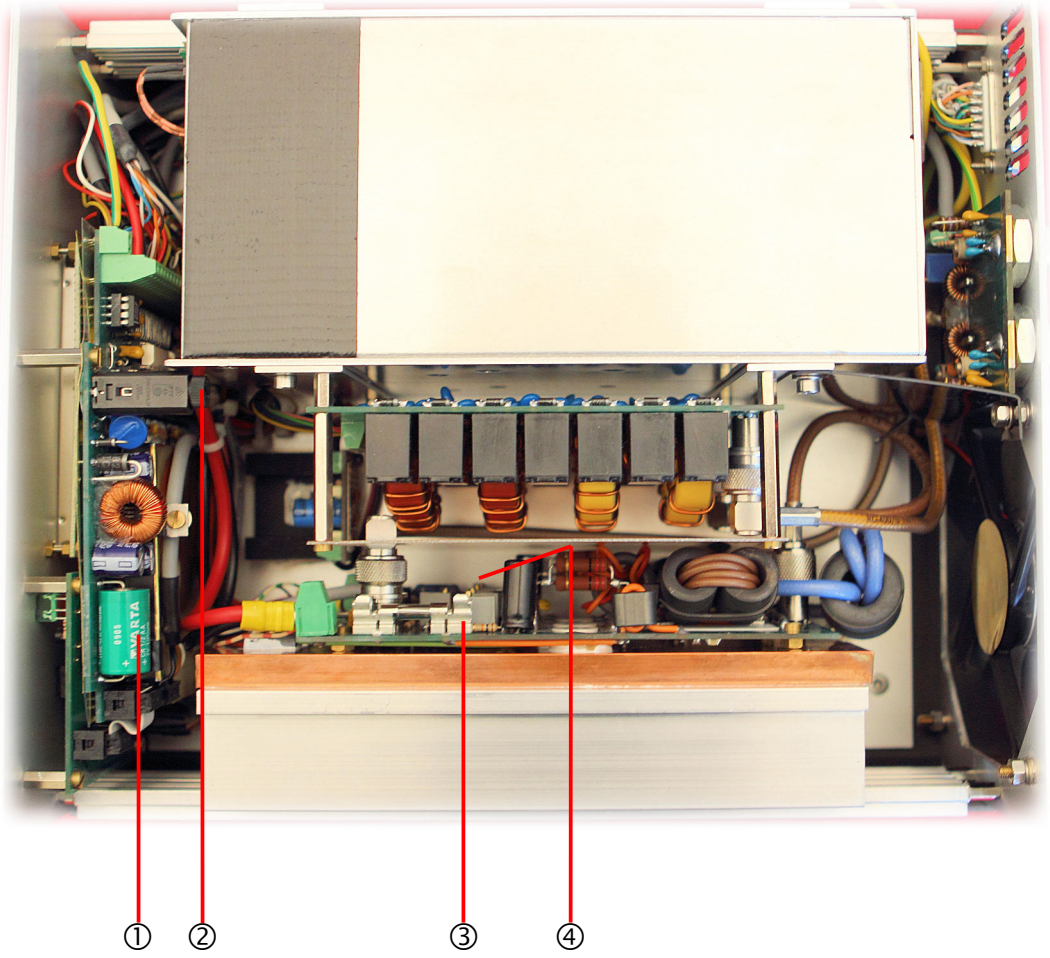
⑨ **R** Display line of the reflected power in graphical and numerical.

G - Rear Panel Description



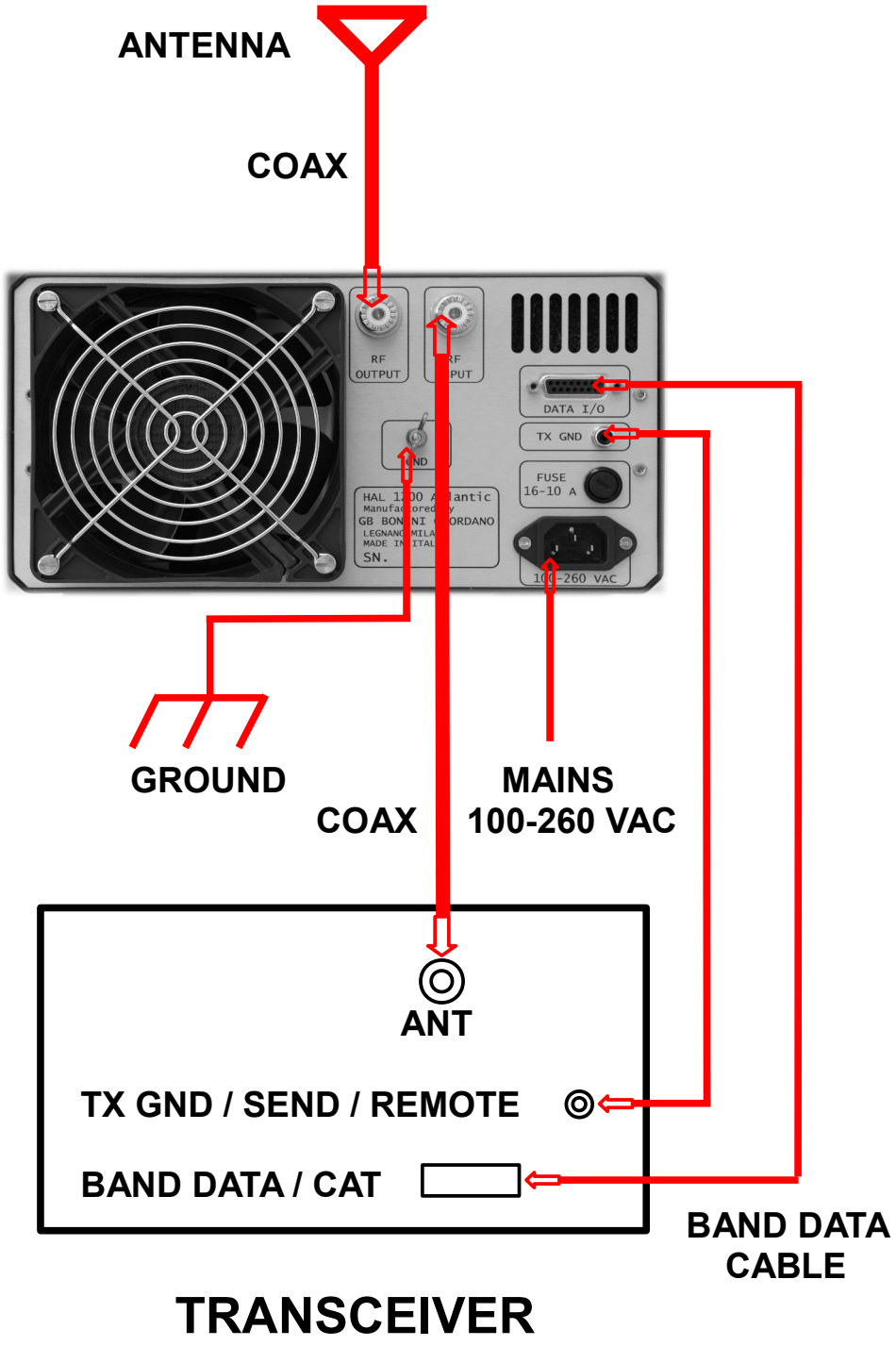
① Fan with safety grill.
② **RF OUTPUT** RF Output Connector. Connect the coax cable to the antenna.
③ **RF INPUT** RF Input Connector. Connect the coax jumper cable from the transceiver.
④ Ventilation hole.
⑤ **DATA I/O** D-Sub Female (15pin) Socket.
Connect the data communication cable HAL <> Transceiver.
⑥ **GND** Ground Terminal.
⑦ **TX GND** RCA Jack. Connect the control cable from the TX GND terminal (SEND, REMOTE etc.) of the transceiver. Electrical conditions are 24 VDC of open voltage at receive mode (RX), and short current of 15 mA at transmit mode (TX).
⑧ **100-260 VAC** AC Mains Socket. Socket for the AC power cord.
⑨ **FUSE 16-10 A** Fuse for AC Mains. (230 V / 10 A glass fuse. (5 x 20)).

H - Inside Top View



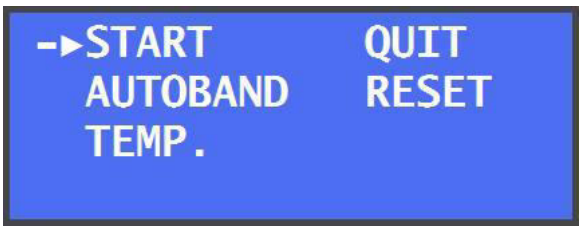
① Control Unit Backup Battery. (15 Years of life).
② Control Unit Fuse. (250 V/1,6 A glass fuse 5 x 20).
③ Power Amplifier Module Fuse #1. (250 V/16A glass fuse 5x20 or 6.3x32).
④ Power Amplifier Module Fuse #2. (250 V/16A glass fuse 5x20 or 6.3x32).
(bottom)

I - Connection



L – Setup

Connect AC cord, turn ON the **POWER** (AC mains) switch, display lights. Runs the Soft-Start and the Self-Test, then display the operation screen; push **MENU** key, you see the following menu :



Selected with the **UP** / **DOWN** keys, moving the pointer arrow on the required function and confirm with **OK** key. In this way, you enter the submenus and / or perform the function or selection.

Selection; STANDBY, READY: At power on the amplifier starts in STANBY or READY status.

Selection; AUTOMAT: Automatic band change with internal decoder, only the connection to **TX GND** is required.
(the band change is performed automatically, with a minimum of 10W RF power input, each time you start the transmission: carrier or speaking)

YAESU BD : Automatic Band Change with the connection to BAND DATA Yaesu.

KENWOOD : Go to Kenwood Interface SubMenu.

ICOM Automatic Band Change with the connection CI-V Icom. (Serial RS232 9600bps, 1start, 8chrs, 1stop, no parity)

ELECRAFT : Automatic Band Change with the connection to BAND OUT Elecraft.

SEMIAUT : Semiautomatic band change with the help of the internal decoder,
only the connection to the TX GND is required.
(from StandBy mode), status **STBY**, send a carrier, (CW, FM, ..) with a minimum of 10W power,
runs the Change Band,
status changes in **SET B**, switch to Operate,
READY state, the Band Selected is maintained for all successive transmissions.
To change to a new band, you have to return to Standby mode, **STBY** , and repeat the procedure;
the band is changed ONLY once at the first valid carrier. (In **SET B** does not change).

Selection; IF 232C : Automatic Band Change is executed with the connection with special cable (HK02), to transceivers Kenwood equipped with interface IF-232.
(Serial TTL 4800bps, 1start, 8chrs, 2stop, no parity)

RS 232 : Automatic Band Change is executed with the connection with standard serial rs232c cable to transceivers Kenwood.
(Serial RS232 9600bps, 1start, 8chrs, 1stop, no parity)

Selection; CELSIUS, FAHRENHEIT : select the temperature display of the PA in Celsius or Fahreneit.

Selection; QUIT : Return to previos screen.

Selection; RESET :
Select this option if and only if you are having malfunctions of the software screening program.
All Data and Settings will be lost.
The tracks stored in the case of diagnostic assistance will no longer be available.

M - Operation

M - 1 Connect AC cord and coax cables as illustrated in section *Connection*. Connect the cable from **TX GND** to TX GND or the remote terminals of transceiver, where it is marked “SEND” or “REMOTE”. These terminal pins are shorted to ground when the transceiver is in TX/ON AIR mode. If these connections are not made, the amplifier will not go into TX (amplification) mode. As a side note, this **TX GND** terminal shows 24 VDC when open, and draws 15 mA when shorted.

M - 2 Keeping the **POWER** (AC mains) switch off, check the SWR of your antenna by keying the transceiver to TX mode (CW or RTTY mode). Monitor the SWR with an external SWR/Power meter. If SWR is 1:1.8 or higher at band center, the antenna has to be adjusted for lower SWR.. As an alternative, an antenna tuner may be inserted; **but beware!**
DO NOT EVER RUN THE TUNING OF THE ANTENNA WHEN THE AMPLIFIER IS IN TRANSMISSION (ON AIR - Green LED lit).
(The tuner of the transceiver must ALWAYS be excluded).

M – 3 Turn the **POWER** switch on. Check that your configuration is made comply with the connections. (See Section *Setup* and Section *Band Data Cable Connection*, for more details of various band data cables).
Verify that the Yellow LED **STBY** is lit, indicating the STAND-BY mode, otherwise press the button below to go to STAND-BY mode, the LED is light.
Keying (with PTT or Send) the transceiver to TX mode in CW or RTTY mode, adjust the output power at about 20-30W; displayed on the line **“I”** of the display. This is the optimum power drive. To make it easier this adjustment, graphically, on the line **“I”** symbol appears ◘

M – 4 Press the key **STBY** to switch from Stand-By mode to Operate/**READY,** the yellow LED turns OFF.
The AMP is READY TO WORK.

M - 5 With the power drive level to nearly 20-40W to achieve maximum carrier output power of 1000W (CW) from the amplifier. If you change to SSB mode, peak voice power will reach approximately 1200-1250W. For high duty cycle transmissions like RTTY, SSTV, or FM modes, it is recommended you reduce the drive power by 20-30 % compared with SSB/CW.

M – 6 With the driving power from 45W to 65W, are automatically inserted in the input some attenuators, to prevent distortion of the amplification, for this reason, in some cases,
the output power can be lower than with an optimal drive.
This case is indicated by an "**H**" after the letter indicating the line "**I**" input power.

M – 7 In any case, when using the transceiver in SSB mode, you can overdrive the amplifier resulting in a distorted output signal. This can occur if you speak too loud or if you set the microphone gain too high or when using the speech processor in an inadequate way.
Speak into the microphone properly to reduce the possibilities of splattering into the neighborhood.

M – 8 Protection circuits may work during operation depending on the conditions. If the protection circuit has stopped the amplifier, the cause of this event is displayed in the last line of the display.
(See, Section *Protection & Safety* for more details).

To reset, press the **OK** button.

N - Protection & Safety

HAL1200 Atlantic is equipped with various protection circuits, handled by the 16-bit microprocessor .
The microprocessor controls three (3) levels of security and protection.
First level (min) : the anomaly is handled automatically and in some cases is reported.
Second level (med) : the anomaly is handled automatically, is indicated by a message on the display and the red LED **WARN** blinks.
Third level (max) : protection stops the amplifier, displays a message with the cause of the shutdown, the red LED **WARN** lights steady, the amplifier is placed in STAND-BY.
The table below summarizes these protections and recovery mode, if this is possibile .

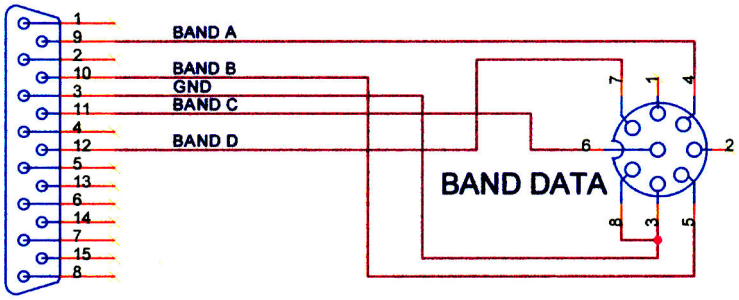
Protection & Level	Message Displayed	Event Condition	Signaling	Reset
Over Drive L1		PW In > 50W	H in line "**I**"	Auto > end TX
Over Drive L2	OVER DRIVE !	PW In > 60W	**WARN** blinks H in line "**I**"	Push key **OK**
Over Drive L3	STOP FOR OVER DRIVE !	PW In > 70W	**WARN** lights H in line "**I**"	Push key **OK** Push key **STBY**
Over Power L1		PWOut > 1300W	H in line "**O**"	Auto > end TX
Over Power L2	OVER DRIVE/OUT !	PWOut > 1450W	**WARN** blinks H in line **"O"**	Push key **OK**
Over Power L3	STOP OVER DRIVE/OUT !	PWOut > 1600W	**WARN** lights H in line **"O"**	Push key **OK** Push key **STBY**
High SWR L1		PW Ref > 82W	H in line "**R**"	Auto > end TX
High SWR L2	HIGH-SWR	PW Ref > 96W	**WARN** blinks H in line **"R"**	Push key **OK**
High SWR L3	STOP FOR HIGH-SWR	PW Ref > 138W	**WARN** lights H in line "**R**"	Push key **OK** Push key **STBY**
Over Temp L1		PA Temp > 40℃	Fan speed 2	
Over Temp L2		PA Temp > 50℃	Fan speed 3	
Over Temp L2	**HI-TEM** in line "**B**"	PA Temp > 70℃	**WARN** blinks Fan speed 3	Auto > end TX
Over Temp L3	STOP FOR OVER TEMP	PA Temp > 75℃	**WARN** lights Fan speed 3	Push key **OK** Push key **STBY**

Protection & Level	Message Displayed	Event Condition	Signaling	Reset
Out of HAM Bands (L3)	OUTBAND / DATA CAT ERR	Out of HAM band	**WARN** lights **OUT** in line “**B**”	Push key **OK** Push key **STBY**
AUTOBAND Data Error (L3)	OUTBAND / DATA CAT ERR	BandData Cable Setup Mismatch	**WARN** lights **OUT** in line “**B**”	Push key **OK** Push key **STBY**
SEMIAUT BAND Error (L2)	W BAND	Band Selected /Used Mismatch	**WARN** blinks Msg in line “**B**”	Auto > end TX
Band Change ERROR (L3)	UNEXPECTED ERROR	Change Band Wrong	**WARN** lights	Push key **OK** Push key **STBY**
External Connections	UNEXPECTED ERROR	External Wiring Incorrect	**WARN** lights	Push key **OK** Push key **STBY**
FAULT	UNEXPECTED ERROR	MOSFET FAULT	**WARN** lights	Switch OFF **POWER**
Fuse #1 PA blown	FUSE #1 PA = FAULT	Fuse #1 PA FAULT	**WARN** lights	Switch OFF **POWER**
Fuse #2 PA blown	FUSE #2 PA = FAULT	Fuse #2 PA FAULT	**WARN** lights	Switch OFF **POWER**

O - Band Data Cable Connection

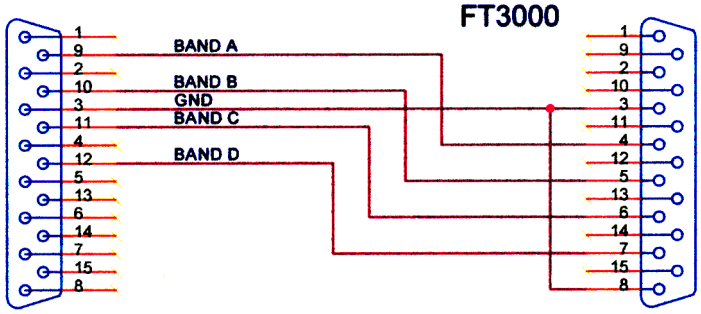
This section describes the various types of connection cables that allow the Data communication with the modern transceivers of the houses, YAESU, KENWOOD, ICOM, ELECRAFT.
Thus, the Automatic Band Change, takes place already currently receiving, (RX).
For proper operation of the connections, is necessary in any case, make the correct configuration (see Section Setup) from dedicated menu, **AUTOBAND**. (Type of cable connected to the connector DATA I / O must match what is set in the menu **AUTOBAND)**.
Always turn off AC powers of both the amplifier and the transceiver when you connect this data cable.

YAESU BAND DATA CABLE



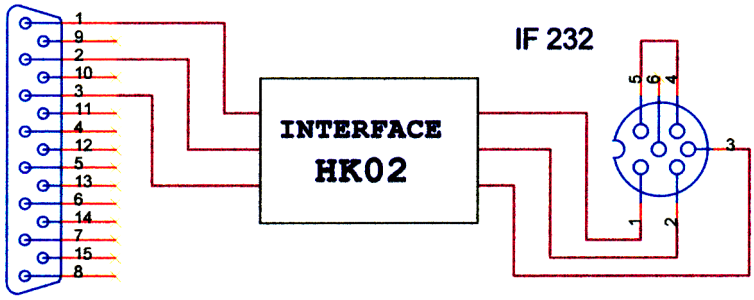
D 15 MALE SOLDER SIDE **DIN 8P**

YAESU BAND DATA CABLE



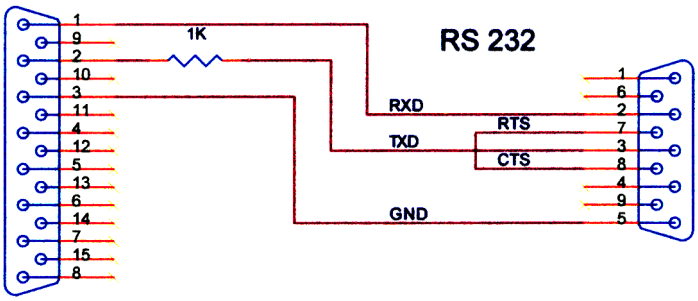
D 15 MALE SOLDER SIDE **D 15 MALE**

KENWOOD IF232C INTERFACE CABLE



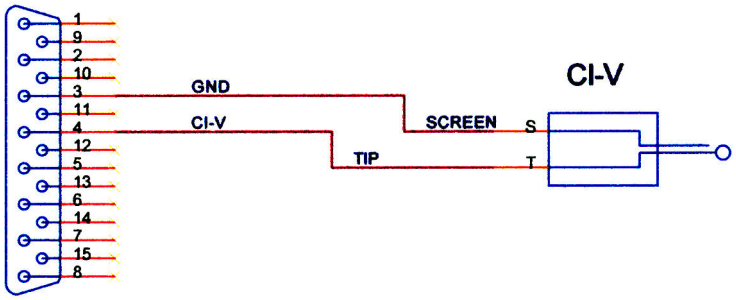
D 15 MALE SOLDER SIDE **DIN 6P**

KENWOOD RS232C CABLE



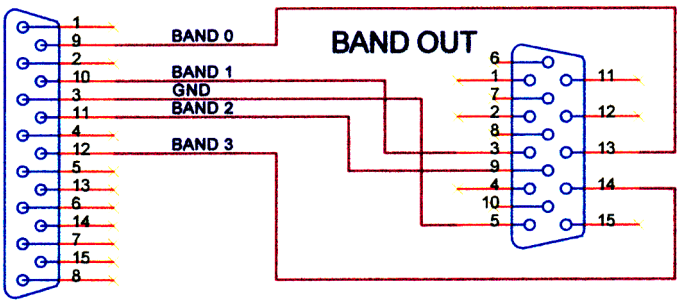
D 15 MALE SOLDER SIDE **D 9 FEMALE**

ICOM CI-V CABLE



D 15 MALE SOLDER SIDE **JACK PLUG 3.5mm MONO**

ELECRAFT BAND OUT CABLE



D 15 MALE SOLDER SIDE **D 15 HD MALE**

GB *Hardware & Software*
Via XXIX Maggio, 229 – 20025 LEGNANO (Italy)
Tel. +39 0331.50.59.40
e-mail : info@gbhs.it
website: http://www.gbhs.it