

SPert1200DeLuxe

The 1200W "SPert1200DeLuxe" transistor amplifier is a linear amplifier and is designed to work in amateur radiocommunication systems, on all KF bands, with all emissions, in the range from 1.5 to 30 MHz and 50 MHz.

It is made in a compact, metal housing, containing such basic modules as:

1. Power amplifier board on one transistor LDMOS BLF188XR 1400W.
2. A plate of seven seven-element low-pass filters.
3. Systems of measurement of incident and reflected power with a system of protection against mismatch or lack of connection of the antenna. An additional measuring system before LPF filters prevents damage to the transistor due to possible damage to the filter.
4. TRX decoding system for bands:
 - in BCD code (Yaesu, Elecraft and others)
 - voltage for ICOM
 - voltage for FT-817
 - CAT decoder for Kenwood
 - OTRSP protocol,
 - manual band switching.
5. Ventilation system with PWM driver in three modes, selected by the user:
 - 50%
 - maximum
 - hysteresis
6. Microprocessor amplifier controller with color LED display and rotary encoder, for setting all parameters of the amplifier ..
7. USB interface for controlling and controlling parameters via a computer.
8. Circuit arrangement.
9. Switching power supply 53.5V 56A inside the amplifier.

Basic parameters of the amplifier:

- Output power max. 1200W for CW, SSB, digital emissions,
- Control power about 15-25W, selected by the ALC system,
- Menu in three languages (Polish, English, German), constantly expanded,
- Possibility to control the power up to 5W (up to full power) after selecting the appropriate option in the menu,
- 50 Ohm input and output impedance,
- Efficiency of 73-75%,
- Maximum SWR on output 1: 2.2 for 1200W and higher for lower power,
- Automatic band switching, with the possibility of manual switching,
- ALC voltage from 0 to -9V,
- Dimensions: 270x195x300 mm (width x height x depth),
- Weight 10 kg.

The amplifier has an ALC circuit, which not only serves to control the output power from the transceiver, but is also an important element of protecting the amplifier against damage during operation.

The front panel of the amplifier has a color LED display, which displays information on the output power level (in numerical form and in the form of a bar graph) and

with the current level of reflected power. At the bottom of the display there is information about the band switching system and the currently selected sub-range. The heat sink temperature indicator is shown in the lower right corner.

Possible alarms are displayed legibly on a red background and contain a brief description of the reason for the operation. Each alarm is signaled in parallel by an acoustic signal, depending on the settings in the menu.

The QRO switch is used to change the amplifier's operation mode from BY-PASS to QRO. In BY-PASS mode, the amplifier is bypassed, the output power from the transceiver is routed directly from the INPUT jack to the OUTPUT jack.

The first connection procedure should look like this:

1. First, connect the grounding terminal of the amplifier to the earthing system. Before connecting any devices to the input or output of the amplifier, their housing (ground) must also be grounded. It's about equalizing the potentials on the masses of all devices. This will prevent possible damage to the amplifier due to the static currents flowing between the devices at the time of connection.

It is unacceptable to ground equipment if the electrical installation uses a shock protection system in the form of zeroing.

2. Connect the TRX output to the INPUT input of the amplifier.
3. Connect the power supply to the amplifier. The socket for 230V ~ power supply is located on the back of the housing.
4. Connect the antenna or antenna switch to the OUTPUT output of the amplifier if you use multiple antennas. The active antenna should have the appropriate standing wave ratio for the range selected in the transceiver (less than 1: 2).
5. Connect the control cable to the amplifier's sub-circuits to the appropriate output on the transceiver and to the amplifier's input. The control cable for the indicated transceiver model is supplied with the amplifier. Some transceivers do not have an ALC input in the jack to connect to the amplifier. You should then connect the transceiver ALC socket to the amplifier's ALC socket using a 2xCHINCH cable. The ALC circuit is crucial in protecting the amplifier from damage, so avoid working without an ALC connected. For QRP transceivers, the connection of the ALC circuit is of little importance. The power of the amplifier is controlled by changing the output power of the transceiver.
6. Turn on the transceiver's power supply making sure that it is not switched to transmit and turn on the amplifier's power with the POWER switch on the front panel of the amplifier. After two seconds, the power supply should start, and the welcome message should appear on the display of the amplifier. The amp is tested at this point, the fan speed is switched on for a while, then the message goes out and the amplifier is ready for operation.
7. In the menu of the amplifier, select the item "Interface" and set the communication system (Icom, BCD etc.). For Yaesu transceivers set "BCD". Check if changing the bands in the transceiver immediately changes the subrange of the amplifier. All subranges should be decoded correctly. This is the condition to go to the next step of starting the amplifier. Of course, for hardware, eg "home made", you must select the manual switching mode of subranges in the "Interface" tab. In such a case, it is important to ensure that the amplifier's sub-set is correctly positioned in relation to the transceiver.
8. Set the encoder with the minimum power by turning it counterclockwise until the minimum bar graph appears.
9. In the transceiver, set RTTY or FM emission, check if the power regulation is at a minimum
10. Press PTT on the transceiver. The amplifier should switch to transmit (TX indicator on) and the display should show small output power (from a few to several hundred W, depending on the transceiver model)
11. Gently increase the control power from the transceiver, controlling the output power of the amplifier on the LED display. The lack of power amplifier output and control power of the transceiver after reaching several dozen watts, indicates the ALC amplifier's proper operation.

12. Set the transceiver's power regulator to about 50% (25% for 200 watt transceivers). From this moment, the output power of the amplifier is adjusted by turning the encoder under the display. Turning the encoder to the right (towards MAX) increases the power from the minimum to the full power of the amplifier. Exceeding the allowable control power from the transceiver or output from the amplifier, results in the protection being triggered (lighting of the corresponding alarm message on a red background) on the display. At the moment, the amplifier switches to the BY-PASS system, PTT turns off and the power from the radio is transferred directly to the antenna. At this point, you must switch the transceiver to receive and reduce the control power.

13. The ALC level set in this way allows you to adjust the transceiver's control power to obtain the amplifier's output power that is of interest to you.

14. Calibration of pre-setting power. We operate the amplifier up to 500W or 1000W, putting the carrier for a moment (RTTY, FM). We turn off broadcasting. We enter the menu in the "calibration" tab and select the value of the power we have just given (500 or 1000W). We select the appropriate value and leave the "menu". In this way, we have calibrated the bargraph of the initial setting of the power of our amplifier, which always appears after turning the knob of the encoder in the RX position of the amplifier.

15. After turning the encoder under the display while the amplifier is in RX mode, it pre-selects the power we want to use for broadcasting. There will be a bar graph on which we set the value of the output power we are interested in. The power can be changed smoothly also during transmission.

Amplifier protection circuits:

1. The system of protection against too much control power from the transceiver. This system will work when we exceed the defined control voltage threshold. This will ignite the alarm and display in the red background "Input Power is too high". You should then go transceiver to receive, reduce the power of cheese and go back to broadcasting. Proceed again with the message "Output Power is too high" (output power too high).

2. The system protecting against excessive standing wave ratio - greater than 1: 2.3 for 1200W power. The system will work if the antenna is too weakly fitted, the antenna will be connected from another band or if there is no connection of any antenna to the amplifier output. The consequence of the protection being triggered will be lighting up the red board and displaying the message "SWR is too high" (SWR is too big). If for a full power the reflected wave is too big and causes the protection to operate, you can move the threshold of its activation reducing the power of the amplifier. It should then be checked if the right antenna is connected or if there is any antenna connected at all. After eliminating the cause of a large SWR, you can continue working.

3. Thermal protection system. Will work after exceeding the temperature of the heat sink level of 75 degrees C. Then the control of the amplifier will be removed, the red board will light up, and on its background the message "Temperature is too high" (temperature is too high). At this moment, the fans run at the maximum speed. The automation disables the PTT control of the amplifier, the power from the radio passes BY-PASS to the antenna. It will be possible to reconnect the amplifier after the heat sink has cooled down to below 75 ° C. Such a situation can practically happen with long digital

broadcasting and poorly adjusted antenna. In such case, the amplifier's power should be reduced by using the ALC / POWER REG potentiometer to the level in which there will be no overheating.

The amplifier is not adapted to QSK operation. When working on telegraphy, use the SEMI-BK function, never with FULL-BK. The commutation circuit is not adapted to quickly switch the transmission / reception between individual elements of the Morse sign. Failure to observe this rule may result in damage to the amplifier.

Using the settings in the Amplifier Menu:

The menu is entered by pressing and holding the encoder knob 2s. In each case, by turning the encoder we choose the function that interests us, by short pressing the knob we select the selection, and leave the settings by selecting "exit" in the lower right corner and briefly pressing the knob.

When selecting the manual control of the amplifier subrange switch, after a short press of the encoder, a list of sub-ranges of the amplifier will appear, from which we select the band we are interested in and validate on general principles.

Installation of the program to control the amplifier:

The amplifier is adapted to control almost all of its parameters and to view these parameters through a computer, using a USB socket on the front panel. The control program is free, you can download it from our website. The program does not require installation. The "SPert_control" file should be copied to any directory, preferably to your desktop. Clicking on the file will open the program.

Before installing the program, connect the amplifier to the computer via the USB cable provided. The installation of the virtual port should be automatic, without the need for special drivers. It is necessary to observe in the computer system under which COM number a virtual port has been installed. This port number should be set in the program and click the "Open port" button. If everything is OK, the amplifier should be connected, which can be observed the most quickly after the appropriate amplifier temperature appears in the program window. From now on, you can monitor the amplifier on the computer and with its display in parallel. The program can change its most parameters available in the menu of the amplifier. During transmission almost immediately on the computer screen, bargraph indications and possible alarms will be displayed.

DB15 CONNECTOR ON THE REAR WALL OF AN AMPLIFIER (TRX CONNECTION): AD PINS

- 1 - BASS A (Yaesu) except FT-817
- 2 - BAND BASS B (Yaesu) except FT-817
- 3 - BASS CASS (Yaesu) except FT-817
- 4 - BASS D (Yaesu) except FT-817
- 5 - BAND (ICOM) (FT-817)

6 -TX COM (Kenwood) (OTRSP)

7 - RX COM (Kenwood) (OTRSP)

8 -

9 - PTT (Yaesu) (ICOM) (Kenwood)

10 - ALC (Yaesu) (ICOM) (Kenwood)

11 - 8V (ICOM)

12 -

13 - GND (ICOM) (Yaesu)

14 - GND COM (Kenwood) (OTRSP)

15 -

PIN DISTRIBUTION OF DB9 CONNECTORS ON THE REAR WALL OF THE AMPLIFIER:

1 - shorted with pin 6 for PA without AT

2 - COM RX (Kenwood) (OTRSP)

3 - COM TX (Kenwood) (OTRSP)

4

5 - COM GND (Kenwood) (OTRSP)

6 - shorted with pin 1 for PA