Crescend P2-RTK-450
Power Amplifier User Manual

1. General Information

The P2-RTK-450 is a AB class power amplifier (PA), intended to work with UHF RTK positioning systems, amplifying phase modulated signals.

PA has the automatic gain control (AGC) loop. The gain value is set up in the factory.

PA is protected against the load mismatch and overheating. It is also protected against excessive DC power supply voltage and DC voltage reversed polarity (for short time). PA has a current limiter, which threshold goes down in the case of overheating.

PA provides LED indication of normal and alarm modes, as well as the combined alarm signal.

PA contains an externally controlled by-pass line, activated either when the power supply voltage is removed, or when the special pin “SH/D” is pulled to the ground.

There is a forced air cooling system, working when the unit is in the amplifying mode.

The general parameters of RTK-450 in the normal operation mode are listed below:

Frequency range of operation (f), MHz . . . . . 450 - 470;
Input power (Pin), W . . . . . 0.4 – 2.0;
Input return loss, dB, not less than 10;
Gain in the normal operation (G), dB, nominal 11;
Bypass insertion loss, dB, not greater than 1.0;
DC power supply voltage (Vsup), V
- nominal 13.8;
- working range . . . . . 12.0 – 17.0;

DC current (Io), A, not greater than
- in amplifying mode 6.5;
- in quiescent mode 1.8;
- in by-pass mode 0.002;

Working ambient temperature range, ºC . . . . . -30 to +60;
Threshold of overheat protection activation: heat sink temperature, ºC . . . . . + (85 $\pm$ 5);
RF connectors . . . . . 50 Ohm, N (F);
DC connectors . . . . . screws # 6-32 AWG.

2. Construction

The unit is intended for installation in a standard 19” cabinet rack, where it takes 4U (7.0”) in the vertical direction. Its depth does not exceed 5”.

There are four LED at the front panel that indicate the status of unit operation.

There are two N connectors, DC block, four pins (filters) and two ground poles at the rear of chassis. Also, the fan is placed over the heatsink at the rear.

3. Installation

Unit installation shall provide proper air access to the unit; no obstacle for air is allowed closer than 3" from fan. Unit shall be protected against the direct solar light and precipitation. The air inlets and outlets should be checked every 30 days and cleaned if necessary. If the equipment is operated in a severe dust environment, it should be checked and cleaned more often. If dust and dirt are allowed to accumulate, the cooling efficiency will be diminished. Using either compressed air or a brush with soft bristles, loosen and remove accumulated dust and dirt from the air inlet panels.

Check that the fans are running smoothly. A slow running or noisy fan may indicate an imminent fan failure. Heat is one of the biggest factors in reducing the reliability of the amplifier. Ensure the fan has access to cool and clean airflow within the rack.

Copper wires # 12 AWG shall be use in DC power line. Wires shall be crimped to ring terminals. Pre-tinning of crimps is recommended.

Use # 18 or # 20 AWG wire for unit status monitoring circuit. Connect this wire to the pin "ALARM".

Use # 18 or # 20 AWG wire for forced switching to by-pass mode circuit. Connect this wire to the pin "SH/D".

Make sure all connections are constructed and implemented properly with best practices.

Make sure that DC power supply voltage and RF source frequency and power are in the mentioned above limits and that the DC polarity is correct before applying DC power to the amplifier.

Notes:
- The reversed DC polarity protection circuit may not operate longer than 0.3 sec;
- Input power shall not exceed 3 W in the working frequency range and shall not exceed 0.3 W out of the specified frequency range of operation.

4. Operation

Green LED "DC ON" is on and fan is running when DC power supply voltage is applied to the unit, its value does not exceed 17 V and pin "Sh/D" is not connected to the ground.

Red LED "LOW OUTPUT" is on if gain is less than 6 dB or input power is less than 0.1 W.

Red LED "HIGH VSWR" is on when the load VSWR exceeds 2:1.

Red LED "HIGH TEMP" is on when the heat sink temperature reaches $+(85 \pm 5)^{o}C$.

The voltage at filter "ALARM" is about 0.5 V less than power supply voltage during normal operation and drops to 0.3V or less when any of mentioned above red LEDs turn on. If a 2 kOhm resistor is connected between this filter and the ground, a TTL compatible output is created.

When switching the PA to the by-pass mode, the resistance between pin "SH/D" and ground shall be less than 100 Ohm, or, if a transistor key is used, the voltage drop on the key shall not exceed 0.2 V. The current, coming out from pin "SH/D" does not exceed 1.7 mA.

5. FCC RF Exposure Requirements

CAUTION: This transmitter must be restricted to work related operations in a Controlled RF exposure environment. All qualified end-users of this device must have the knowledge to control their exposure conditions and/or duration, and the exposure conditions and/or duration of their passengers and bystanders, to comply with the General Population / Uncontrolled MPE limit and requirements.

Vehicle – Antenna Installation Instructions

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 0.95m from all persons, must not be co-located or operating in conjunction with any other antenna or transmitter, and must not exceed an antenna gain of 3 dBi with a minimum cable loss of 1.5 dB.

Population/Uncontrolled Exposure environment:

· Persons should be allowed no closer than 0.95m per the example above.

Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.

IC RSS-GEN, Sec 7.1.2 Warning Statement- (Required for Transmitters)

ENGLISH:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

FRENCH:

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée quivalente (p.i.r.e.) ne dépassepas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

IC RSS-102, Sec 2.6 Warning Statements

ENGLISH:

The applicant is responsible for providing proper instructions to the user of the radio device, and any usage restrictions, including limits of exposure durations. The user manual shall provide installation and operation instructions, as well as any special usage conditions, to ensure compliance with SAR and/or RF field strength limits. For instance, compliance distance shall be clearly stated in the user manual.

The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

FRENCH:

Le demandeur est tenu de fournir des instructions appropriées à l'utilisateur de l'appareil de radio, et des restrictions d'utilisation, y compris les limites de durée d'exposition. Le mode d'emploi doit fournir installation et de fonctionnement des instructions, ainsi que les conditions d'utilisation particulières, pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF. Par exemple, la distance de conformité doit être clairement indiqué dans le mode d'emploi.

Le manuel d'utilisation de dispositifs destinés à un usage contrôlé doit également contenir des informations sur les caractéristiques de fonctionnement de l'appareil, les instructions de fonctionnement pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF; informations sur l'installation et le fonctionnement des accessoires pour assurer le respect SAR et / ou les limites d'intensité de champ RF, et les informations de contact où l'utilisateur peut obtenir des informations sur l'exposition canadienne de radiofréquences et la conformité. Autres renseignements connexes peuvent également être inclus