

Driver

Operating Manual

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1 Operating Precautions

- Driver amplifiers contain components such as GaAs transistors that are sensitive to ElectroStatic Discharge (ESD).
- While handling and to prevent any ESD risk, we recommend the use of anti-static gloves or to wear a **grounded wrist strap**, with a **1 MΩ resistor** between the strap and ground.



Fig. 1

- We also recommend unpacking or packing in an Electrostatic Protected Area (EPA).

1.1 Unpacking procedure:

- 1) Drivers are conditioned in dissipative ziplock bags.



Fig. 2

- 2) When opening the bag, use ESD protection equipment mentioned above to avoid any ESD risk.
 - 3) When unpacking, handle the driver by its metal body only. **Do not handle it by its RF connectors or DC pins which are delicate parts.**
 - 4) Remove the black flexicaps from the RF connectors right before setting up.
 - 5) Remember to keep the original box if you need to store the driver or send it back to us.
- When the driver is not being used, put on the flexicaps and put the driver into a locked dissipative bag.

1.2 Thermal dissipation:

- **Driver amplifiers naturally produce heat when power is supplied.** To avoid excess heat stress that may cause permanent damage to the device, ixblue provides heat-sink kits that are specifically designed to match our drivers. Refer to your driver's datasheet on our website.
- Heat-sink kits includes the heat-sink part, 2 or 4 fixing screws and, in the case of a large heat-sink, thermal conductive paste.



Example of heat-sink kit

Fig. 3

- Heat-sink mounting procedure:
 - Clean all parts with alcohol-soaked paper to eliminate any residual dust.
 - Use a size appropriate screwdriver to mount the driver on the heat-sink part (if provided, apply thermal paste to the heat-sink surface mating with the driver).
 - For “H”-shaped heat-sink, mount the driver so that the RF connectors are placed at the centre of the heat-sink (see picture below).

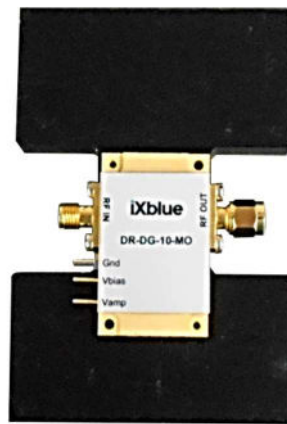


Fig. 4

- Please comply to all electrical and environmental maximum ratings listed on the driver's datasheet or Acceptance Test Report.

2 Instructions before use:

- 1) Remove the black flexicaps from the RF connectors.
- 2) Clean the metal body, outer part of RF connectors, and DC pins with alcohol-soaked paper to eliminate any residual dust.
- 3) If provided, mount the driver on ixblue heat-sink as described previously or on an adequate cooling element. You can use thermal paste between the heat-sink and the driver housing to increase thermal conductivity.
- 4) Clean the inner part of RF connectors with dry air before mating with other components.

2.1 RF connectors:

- ixblue drivers are fitted with three types of RF connectors, based on the operating frequency range and driver bandwidth:
 - SMA / 3.5 mm coaxial connectors, compatible with K type / 2.92 mm coaxial connectors:
 - > Frequencies up to 18 GHz
 - K type/ 2.92 mm coaxial connectors, compatible with SMA / 3.5 mm coaxial connectors:
 - > Frequencies up to 40 GHz
 - V type / 1.85 mm coaxial connectors, compatible with 2.4 mm coaxial connectors:
 - > Frequencies up to 65 GHz
- By convention, each driver comes with a female gender connector on its input port and a male gender connector on its output port.

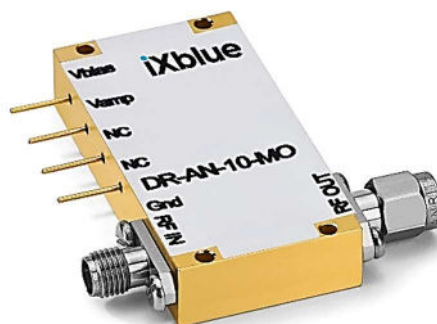


Fig. 5

- Proper torque on the connector improves measurement repeatability and extends connector life. Use a torque wrench with a 0.9 N.m (8 in-lb) torque setting.



Fig. 6



Coaxial connectors are delicate parts:

Do not apply excessive mechanical effort.

Respect torque wrench values and handle properly.

2.2 DC pins:

- DC pins are gold-plated pins which are used for power supply and control voltage (except the GND pin which is not gold-plated). Please comply to all minima/maxima voltages listed on the Acceptance Test Report.
- To connect DC pins, you can use electrical wires with minigrabbers (left picture below) or specific parts such as 0326 or 0367 series pins receptacle from Mill-Max Manufacturing Corp. (right picture below). Accepted diameter for DC pin: 0.56-0.81 mm and 1.14-1.65 mm for GND pin.



Minigrabber



Mill-Max 0326 series pins receptacle

Fig. 7

- Alternatively, DC pins can be soldered using the following procedure:
- DC pins soldering procedure:

- Remove the heat-sink from the RF driver before soldering to avoid drawing heat away.
- For golden DC pins, using a heat gun is not recommended to avoid excess heat that may cause damage on the driver chips. If soldering is necessary, we recommend the use of a 0.5 to 0.8 mm diameter copper wire previously stripped and wrapped around the pin. Then solder the wire to the pin with a 330°C to 350°C soldering iron equipped with a small clean soldering tip and a 0.23 mm diameter tin solder.
- For GND pin, fixed to the metal case, a bigger soldering tip and a 0.5 mm diameter tin solder would be necessary, as well as a longer period of heating.

**DC pins are delicate parts:**

Do not apply excessive mechanical effort (torsion) or thermal stress as described in the procedure above.

3 Set-up:

- Before assembly, ensure that all RF sources and power supply units are disabled. The basic set-up is as followed:

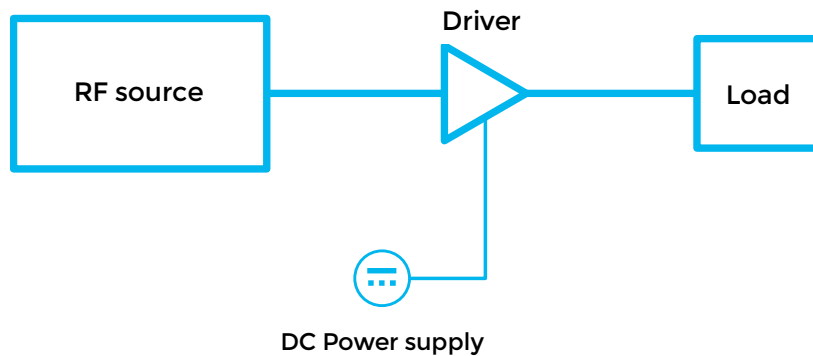


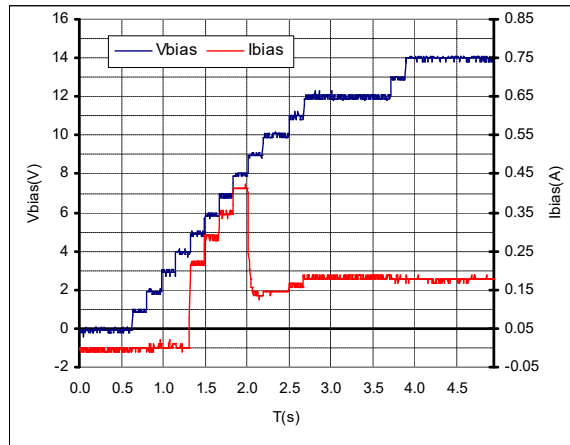
Fig. 8

- Ensure that RF cables and other equipments / instruments are discharged before connection to the driver input and output ports. Proper ESD precautions must always be followed before connection and during handling, testing and operation.
- A visual inspection of the RF connectors should always be performed before coupling. Make sure the male pins are straight and centered, and female socket is concentric to avoid any damages.
- Ensure that input and output ports of the driver are connected to a 50 Ohm load before supplying DC power.
- Connect power supply unit to the driver. V_{bias} voltage is used to supply power and V_{amp} , V_{xp} are used for signal control and optimization/adjustments. Please comply to all minima/maxima voltages listed on the Acceptance Test Report.
- Set the maximum driving current provided on the Acceptance Test Report on your power supply unit.

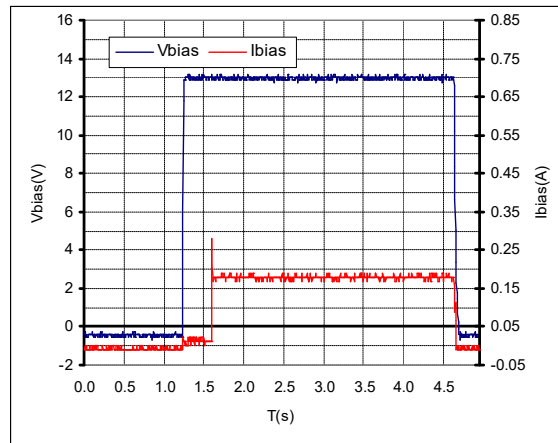
Note: Any standard DC power supply with current monitoring and ON / OFF switch is acceptable.

- Power supply operating sequence:

- Make sure that the DC set-up connections (power supply and grounds) is correct.
- Set the Driver supply voltage on your power supply unit, output OFF.
- Set the control voltages to 0 V.
- Switch ON the power supply. Using a **voltage step** instead of a voltage ramp is recommended to avoid inrush current (see below).



Ramp start up



Step start up

Fig. 9

- Enable RF source.
 - Depending on your application, adjust DC voltage applied to V_{amp} or V_{xp} .
 - Check regularly the current draw on the power supply unit.
- For unbiasing, reverse the sequence.