

1 DX-1d DESCRIPTION

1.1 RF Section

The RF section occupies the right hand side of the DX-1d (looking from the top - front). See picture in 1.1.

RF Switch and tuned circuits

At the front of the amplifier are two variable capacitors, for plate and load tuning. A 9-position ceramic switch is employed for the 9 operating bands. Next to the switch is the 40 to 160 metre tank coil. The silver plated, large diameter copper tube is the 10 to 30 metre tank coil.

RF Sub-chassis

The 4CX800A tube is positioned on a separate RF sub-chassis. All the connections to the tube, except for the plate, are under this sub-chassis. A 9-way heavy duty connector is used for the outside connections. The fan blows air into this sub-chassis, which is forced out through the ventilation fins of the tube. The air temperature is sensed by a sensor placed above the tube. The sensor must stay in a position close to horizontal. Make sure you are not pushing it down, too close to the tube, as high voltage exists between them. The plate is connected to the RF network and to the choke supplying the 2100VDC voltage to the plate of the 4CX800A tube.

1.2 Mains transformer

The transformer is the heart of the amplifier, a high performance type, designed to reduce the size and weight. It is built with a generous reserve of power, handling easily the DX-1d requirements in continuous operation. The primary can be wired for 120V, 200VAC, 220VAC, 230VAC or 240VAC operation. *See Figure 2.* There are several secondary windings, as follows:

- Filament supply
- Low voltage supply to the controller board
- QSK module supply
- Bias supply
- Screen grid supply
- High voltage supply

1.3 H. V. Power Supply

A full wave bridge rectifier and filter converts the high voltage AC into high voltage DC with a huge reserve capacity of 58 microfarads.

1.4 Soft start module

At power up, the mains power is gradually applied to the transformer by the soft start module. The power is gradually applied over a time of about 5 seconds, avoiding the high inrush current typical for such big loads.

1.5 Sensor module

A small metal box positioned at the output of the DX-1d. It detects the forward and reverse power, for measurement and display.

1.6 Antenna relay / QSK module

In the standard DX-1d, the antenna relay is controlled by the transceiver, via the control board. It switches the antenna between the transceiver, during reception, and amplifier, during transmission. It is also used to bypass the RF from the transceiver, directly into the antenna, when the amplifier is in standby mode, or during special conditions like overdrive, bad SWR or other error conditions.

When the QSK option is installed, this is a module with two very fast, high power vacuum relays, and the control circuitry. The purpose of QSK is to allow very fast switching between transmit and receive, during digital communications. See Annex 1 showing oscilloscope displays of fast switching times and contact bounce-free operation of the QSK module.

1.7 Display board

This board has a number of inputs where various voltages are connected. The board converts these voltages into a "moving LED" type of display. Two of these displays have flashing light indication (I_{G2} and plate current).

1.8 Controller board

The brain of the amplifier is the Controller Board. The following circuitry is part of this board:

- Bias voltage regulator, also incorporating a sensitive grid current detector for overdrive detection. Adjustable pre-bias, removes the distortion at the beginning of the word, when EBS is activated.

- Screen voltage regulator, with adjustable voltage and adjustable current limiting, for tube protection.
- Overdrive protection and timer - based on detecting grid current, it initially gives visual warning and, at higher level of overdrive, it cuts off the amplifier for 2 seconds. It ensures a clean signal, making it virtually impossible to overdrive the DX-1d
- SWR detector and timer - switches the amplifier to bypass mode for about 3 seconds when high SWR is detected. Adjustable SWR level. Factory adjusted to about 2.6: 1
- EBS - the Electronic Bias Switch - senses the presence of RF input power and turns on the bias to start transmission. Factory adjusted for about 0.5W. When the input power exceeds this limit, the plate current starts flowing. When there is no speech, even for a very short time, the tube dissipation is cut to a low value, as set by the pre-bias adjustment.
- Interlocking, timer for filament warm-up
- Relay control: ready relay, SWR relay, over-drive relay, antenna relay
- QSK switching control
- Display control: Ig2 measurement and display, SWR cut-off display, overdrive warning display, READY display, FAULT display
- Logic circuitry, low voltage supply to the various electronic circuits