

A New Method of Mounting and Feeding a Gunn Element Using a BNC-Connector

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The following article is to describe a new method of mounting the active element in a 10 GHz transceiver. The Gunn element is held with the aid of a flange BNC-connector through which the operating DC-current is also fed. This technology represents a simple, mechanical solution and means that construction can be made using simple tools – hand-drill, fret-saw, and files – and using readily available parts (Figure 1).

DIODE-MOUNT USING A BNC-CONNECTOR

Figure 2 shows a drawing of the complete Gunn-oscillator; a cross section of the diode mount is given in Figure 3.

The Gunn-element (7) is held at the centre of the waveguide (5) with the aid of the grub screw (10), collar (6), and the BNC-connector (1). Two brass plates (4) and (8) are hard-soldered to the waveguide, so that this is strengthened enough to accept the grub screw, and the mounting screws (2). Four threads are cut in plate (4) for mounting the BNC-flange connector, and this must be done before soldering.

Since the grub screw possesses a hardened cutting edge, it is necessary for it to be softened firstly, using some form of flame (cigarette lighter is sufficient!). It is possible after this, for a hole to be drilled at the centre to accept the pin of the Gunn diode. The tubular piece (6) can be soft-soldered directly to the BNC-connector.

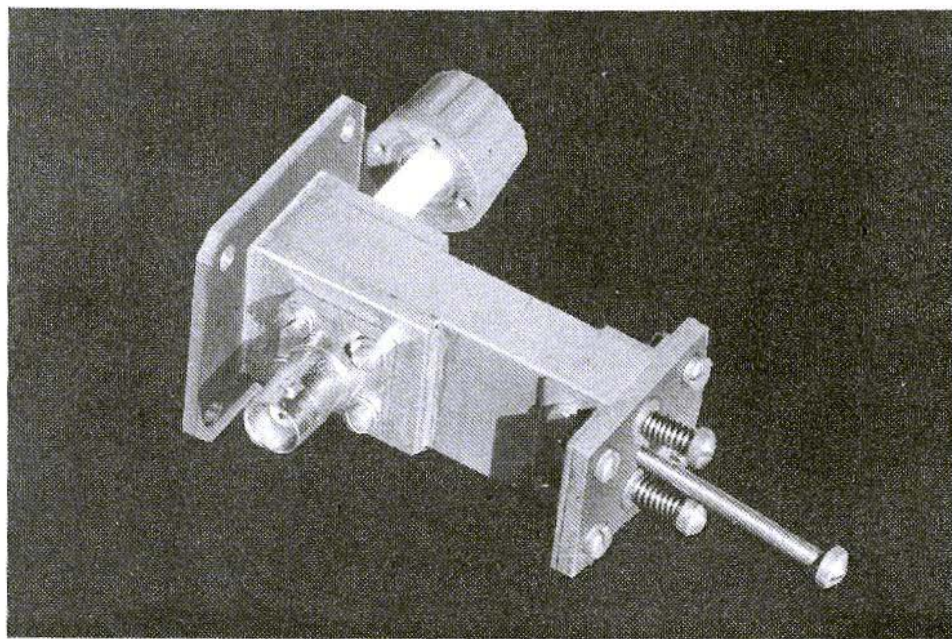


Fig. 1: Gunn-oscillator using a BNC-connector for mounting and feeding the Gunn-element

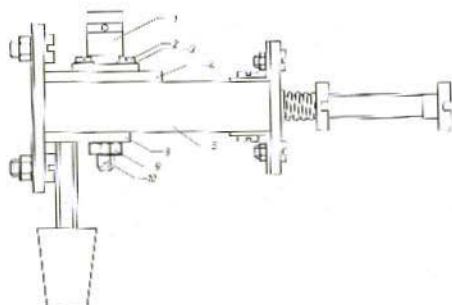


Fig. 2: The complete Gunn-oscillator described by the author

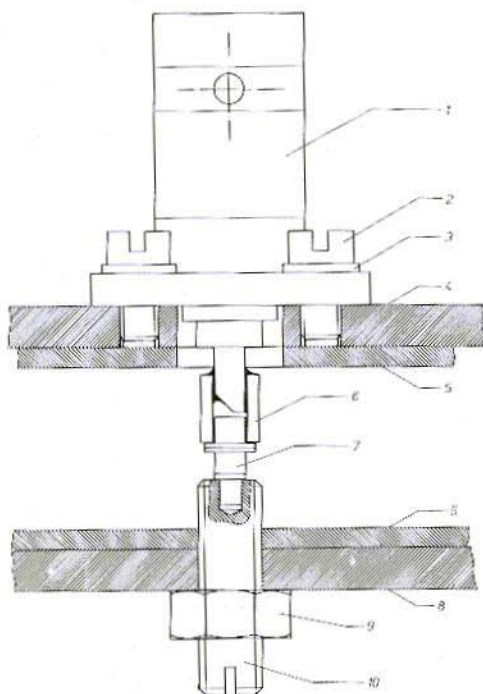


Fig. 3: Cross-section showing the new type of diode mount

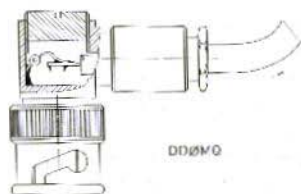


Fig. 4: The Gunn-oscillator is by-passed to prevent parasitic oscillation using a capacitor in the BNC-connector.

COMPONENTS (Figures 2 and 3)

- (1) 50 Ω BNC-flange connector type UG-290 A/U
- (2) Cylinder-headed screw, brass, M 2.5 x 6 mm
- (3) Washer M 2.5; outer diameter 6.0mm; 0.5 mm thick
- (4) Brass plate 4 mm thick; same width as waveguide; length as required by the construction
- (5) Waveguide R 100 (WG-16)
- (6) Brass tube, outer diameter 3.0 mm; inner diameter 1.7 mm; Length appr. 5 mm. Available at model shops
- (7) Gunn element, e.g. type DGB 6844 A (15 mW), available from the Publishers
- (8) Brass plate, 4 mm thick, dimensions according to construction
- (9) Hexagonal nut M 4 (brass)
- (10) Grub screw with slot for screwdriver, and cutting edge M 4 x 10 mm

BY-PASSING THE GUNN OSCILLATOR

All Gunn-oscillators must be by-passed for frequencies lower than the operating frequency in order to avoid parasitic oscillation. This is made at the DC-voltage line. Values of 10 and 100 nF are usually used. The author found that a value of 3.3 nF was sufficient. This low capacitance value ensures that the higher modulation frequencies are not limited.

Since there are no possibilities for mounting this capacitor within the described oscillator, it was mounted in a right-angle BNC-connector, as shown in **Figure 4**. This means that the by-pass capacitor is very close to the Gunn-element, and that the interconnection to the modulator and power supply can be made in a coaxial manner.