

THE SENSITIVITY OF MY 10GHz ATV receiver outstrips anything achievable with amateur means; this is made possible by the use of a satellite TV component called an LNB (Low Noise Block), which is satellite TV parlance for a down converter with a low-noise pre-amplifier. **Fig 1.**

THE RECEIVER

THOUGH NOT DESIGNED FOR amateur frequencies, my Sharp model BSCH86ZOO 10GHz LNB still has useful gain in the 10.3 - 10.5GHz part of our band; it drops off rapidly below that.

With the LNB's local oscillator at 10.0GHz, a 10.5GHz signal is converted to 500MHz. As a very sensitive receiver for that frequency I use an AOR AR-3000 multimode scanner.

Its 45MHz IF was brought out and fed to an FM TV decoder which is a 45MHz adaptation (originally 65MHz) of one described by DF4PN in *cq-DL* 11/89. Its output, 1V p-p of composite video, and sound, are then applied to the SCART connector of the TV receiver.

The coax carrying the signal down from the LNB to the scanner carries DC up: 15V to power the LNB and 18V to activate the antenna polarization switch contained in the LNB. DC is blocked from the scanner by a 10pF ceramic capacitor and fed into the coax through a choke of 6 turns, 4mm diameter of 0.4mm enamelled wire.

RESULTS

ON FM WIDE-BAND PHONE, the first results surpassed our fondest hopes. The combination of a 60cm off-set dish, LNB and scanner outperformed our conventional Schottky diode system by several tens of decibels.

On ATV, I have made a QSO with Serge, FC1JSR, a distance of 135km. Perfect colour pictures. At 50km, I could even receive without an antenna! For comparison, the best AM ATV QSO was with HB9SLV over a distance

Michel Vonlanthen, HB9AFO, assembled an ultra-sensitive **10GHz FM ATV receiver**. He recently took it to the top of the Puy de Dome in central France, 1465m ASL, where F/HB9AFO/P received perfect pictures from FC9JSR/P (20W from a TWT) atop Mont Blanc, 3842m ASL, a record distance of 303km. A simple companion **transmitter** has only four components! The descriptions appeared in the *Swiss Old Man* of 9/92.

of 74km, but that was P2 and barely decodable. The stability of the 10GHz YIG oscillator in the LNB is good enough for NBFM reception. I have not tried SSB or CW, but a pure carrier does produce a beat note.

A satellite TV receiver, minus the LNB, can be used for 1.2GHz ATV as it covers 0.95 - 1.95GHz. As these receivers are intended to work off an LNB, their noise performance is not the best and a low-noise pre-amp is indicated. The picture quality is perfect, however. [According to G4AYT the 300-500MHz FM output of an LNB receiving a 10GHz ATV signal can be fed directly into a domestic (AM) TV set; slope detection provides recognizable pictures, or sound, though not both at the same tuning - *G4LQI*]

Numerous 1255MHz experiments have convinced me of the superiority of FM over AM ATV. Once the FM demodulation threshold has been surpassed, the picture is unconditionally stable, even in the presence of noise. Also, the span between nothing and a perfect picture is but a few dB, while on AM this is at least 40dB. This was borne out by my experience on Puy de Dome. On the top, reception varied P0 - P5, the latter for extended periods. Only 50m lower, there was no reception at all. The only disadvantage of FM is bandwidth, 20 - 30MHz of it, [half as much is used in the UK - *G4LQI*] but in the 23cm or 3cm band there is room to spare. We use the same FM standard as satellite TV.

THE SIMPLEST ATV TRANSMITTER

TO BE QRV ON 10GHz QUICKLY, I use an oscillator, **Fig 2**, which I had built a few years

ago. The first modulator was identical to the one I use on 23cm, but I was not satisfied with it and after several simplifications I arrived at the 'minimum' version of **Fig 3**.

Being an experimental arrangement, the modulator is directly connected to the oscillator, ie without a buffer. This makes the connecting cable part of the oscillator circuit: change its length and the transmitter frequency changes. My tests show that it works perfectly, though. Using a horn antenna with an aperture of 7cm (15dB gain) a P5 colour picture was received 5km away.

The 10GHz transmitter is a Gunn diode oscillator. The iris, a standard flange with a central 7.8mm dia round hole instead of a rectangular opening, controls the loading of the oscillator by the horn antenna: **Fig 4**. The diode was bought at Birkett's in England for less than £3. With my Gunn diode a 6.5V supply gives the best result. I have not measured the output but estimate it between 5 and 10mW.

The trick of modulating the diode is to directly connect the video signal to the voltage divider which controls the output voltage of the LM309K regulator. The 82Ω resistor provides proper loading for the camera and setting the regulator to 6.5V is the only adjustment required.

With only four components, this must be the world's simplest FM TV transmitter: a case for the *Guinness Book of Records*?

The modules are bolted together by means of standard flanges. They make a 10GHz Meccano from which many other combinations can be assembled.

Four of us are QRV on 10GHz FM ATV: FC1JSR, HB9SLV, HB9RKR and HB9AFO. We can go to mountain tops at short notice. Ask us for a sked.

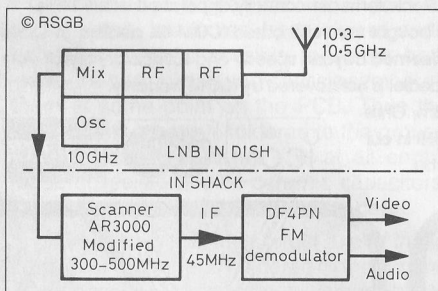


Fig 1: The 10GHz FM ATV receiving system

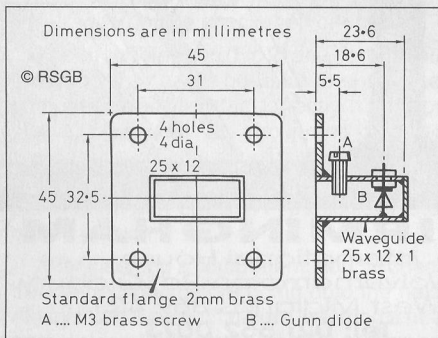


Fig 2: The Gunn diode 10GHz oscillator

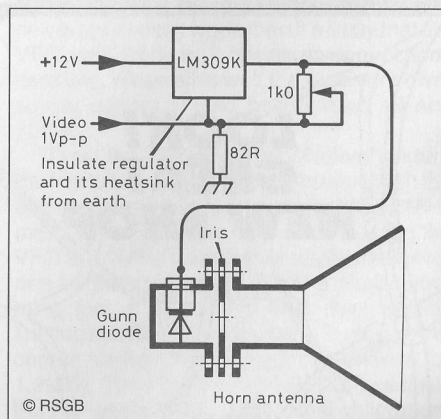


Fig 3: Frequency modulating the 10GHz ATV transmitter

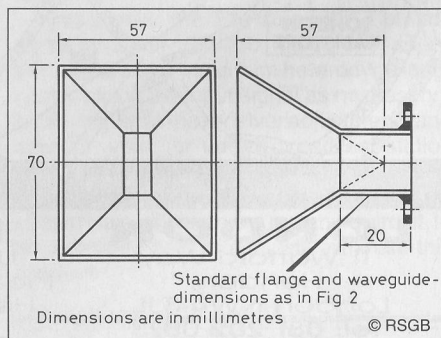


Fig 4: This simple horn antenna has 15dB gain