

The Bodger's Guide to 24GHz beacons



Dr John C Worsnop G4BAO
RadCom GHz Bands Columnist
RSGB Propagation Studies Committee
www.g4bao.com

Building 24GHz Beacons

Why are GHz bands beacons so important?

- **The GHz bands are low usage bands by most Amateur standards – This is DANGEROUS to their future**
 - Invaluable propagation markers
- **The threat to our bands from commercial interests is real**
 - Beacons establish a permanent presence on the band
- **Technical Challenge**
 - Making anything that can operate 24/7 in all weathers is a challenge
 - More so at the GHz bands where not only the antenna but the equipment needs to be outdoors

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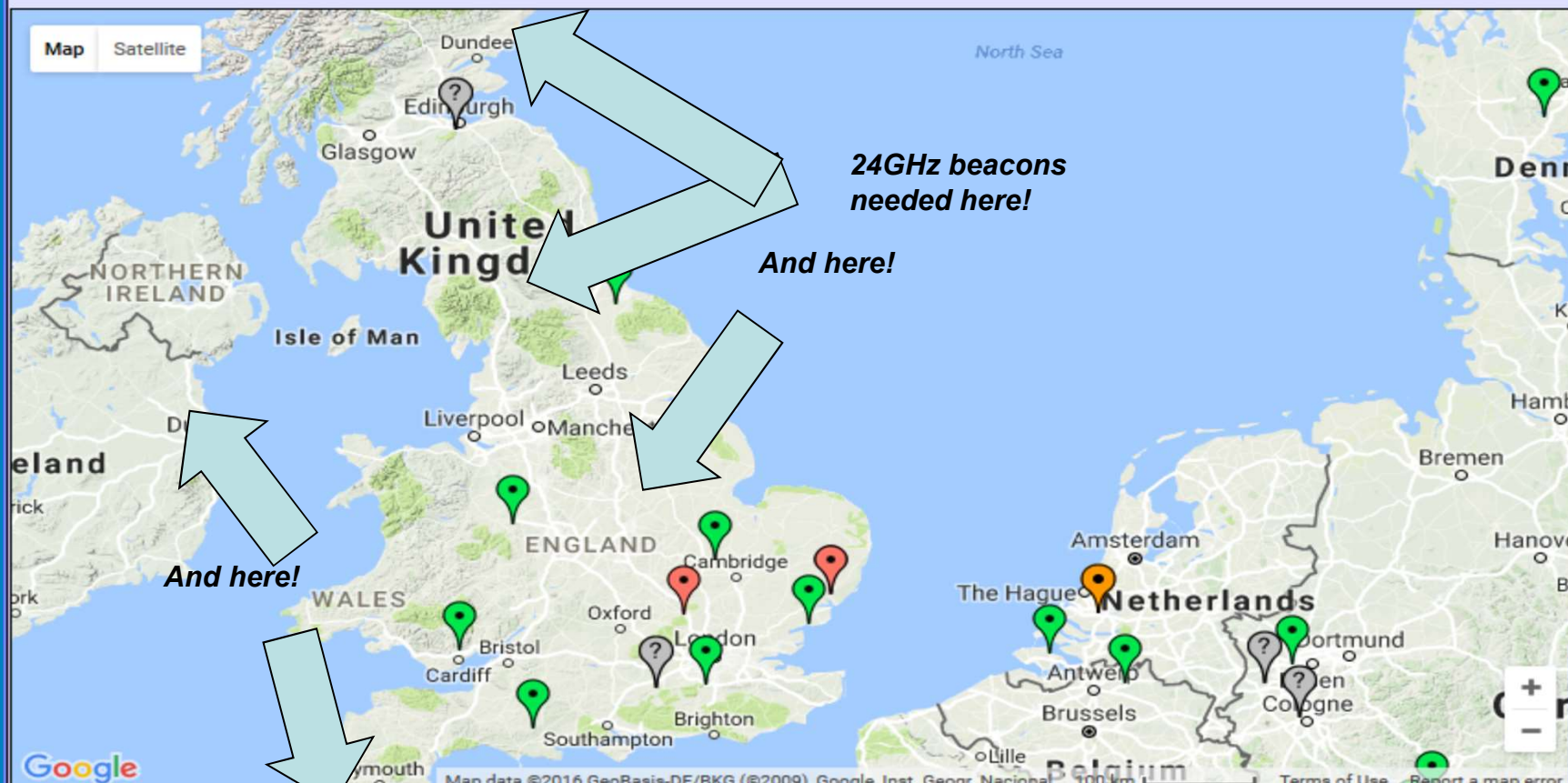
Why are GHz bands beacons so important?

BEACONSPOT.eu BEACONS

Beacon map for 24048MHz - 24050MHz

Click on any beacon marker for info. The marker colour shows the status:-
Operational, **Online off spec**, **Offline**, **Planned**, or ? **Uncertain**..

View as a list in [Frequency order](#) OR in [Callsign order](#) OR [Date last spotted order](#)



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Current UK 24GHz beacon Status

GB3AMUI IO81jn	Operational
GB3CAM IO82wi	Operational
GB3DUN IO91sv	Site access lost
GB3FNM IO91of	Unknown
GB3MAN IO83wo	Site lost – looking for new site
GB3MHZ JO02pb	Rebuild in progress
GB3PKT JO01mt	Operational
GB3SCK IO80uu	Operational
GB3SEE IO91vg	Operational
GB3ZME IO82rp	Operational
Personal beacons	
GM8BJF IO85jv	Unknown
M0DTS IO94il	Unknown

BEACONSPOT.eu BEACONS

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Why bother to get a GB call with all that admin and delays?

- **The beacon becomes very visible to Ofcom**
- **It can operate (legally) unattended and 24/7**
- **Delays? – not on 24GHz.**
 - One of our few exclusive bands
 - The GB3PKT 24GHz application took 3 days to be approved



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What's your beacon for?

- **Fully featured beacon for remote stand alone (GB3XXX) use**
- **Personal beacon for testing paths**
 - Absolute Frequency accuracy not essential
- **In-shack low power accurate frequency signal source**



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What's your beacon for?

- **In-shack low power accurate signal source**
 - This can be really simple!
 - **LNB mixer diode across an SMA connector**
 - Hit with +10 to +20dBm
 - at accurate submultiple of 24GHz
 - Radiates nicely at 24GHz



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What ready – made options are available?

- **DB6NT “MKU 24 BAKE” unit**
 - Was an all in one low power 24GHz beacon with crystal source.
 - No 24GHz source on the website these days ☹
 - Maybe still available surplus?

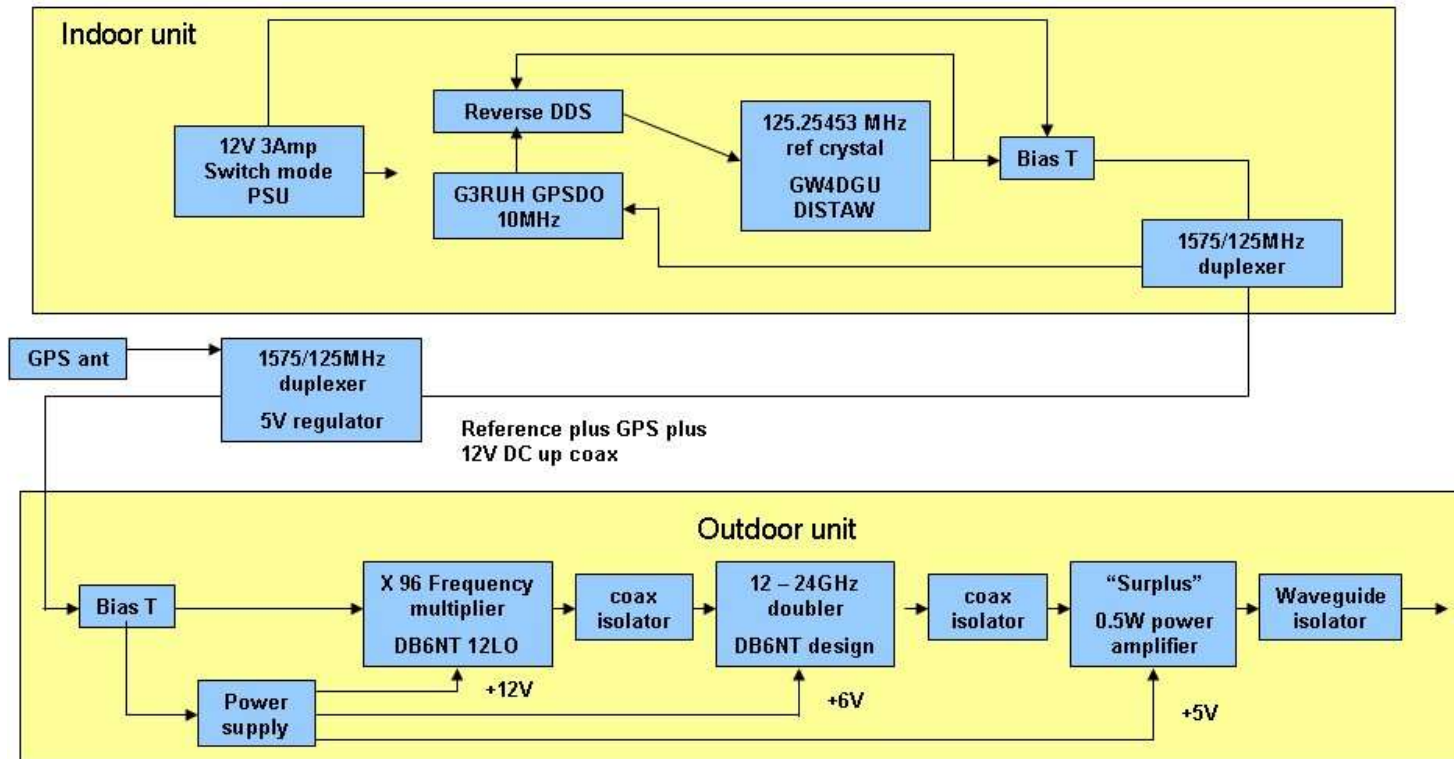


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Technology options

- “80’s style” VHF locked Oscillator + Multiplier

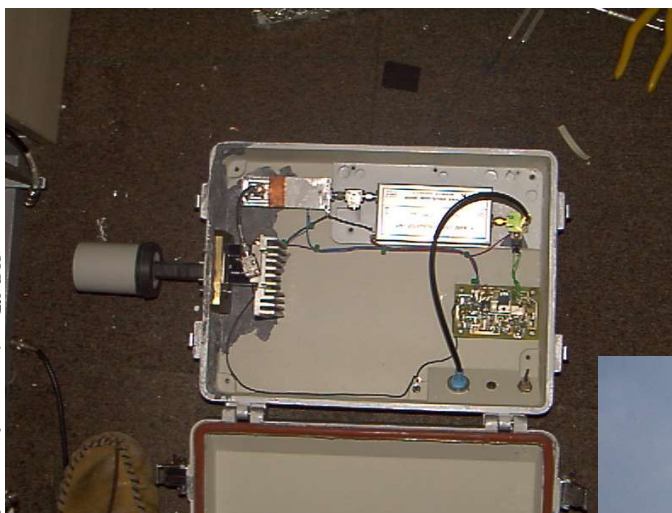
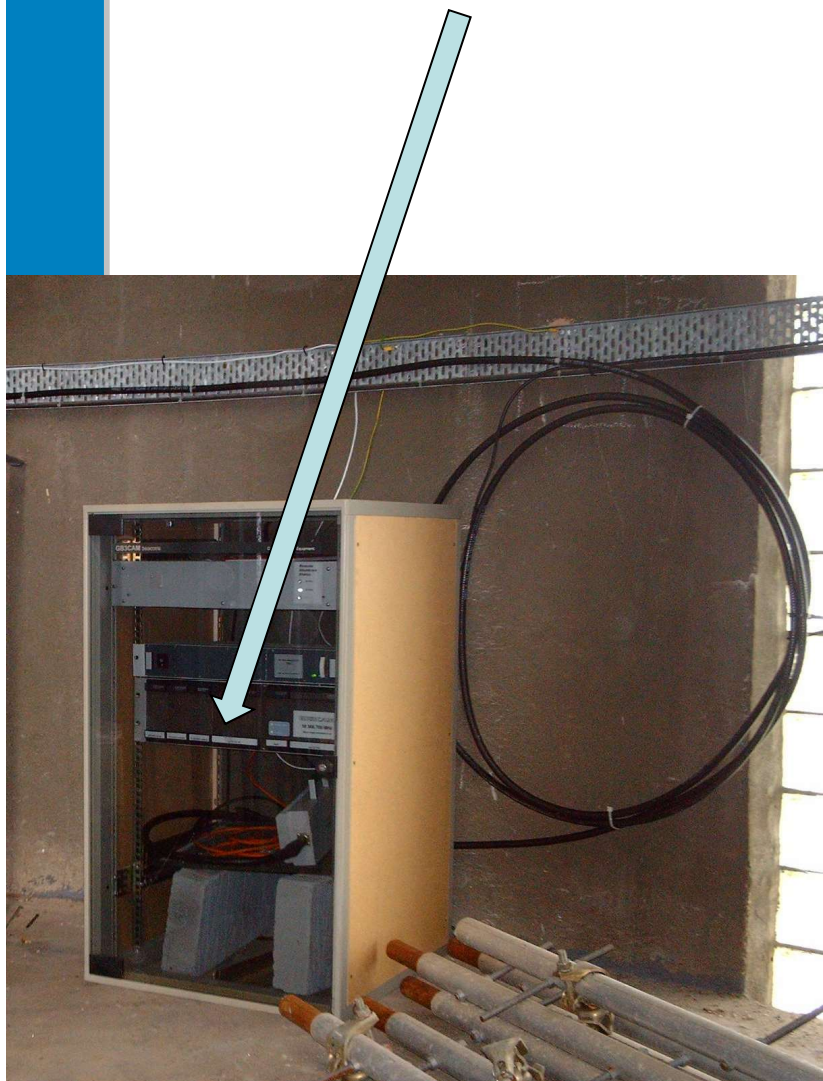
GB3CAM 24GHz System Block Diagram



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Technology options

- GB3CAM 24GHz indoor and outdoor units unit

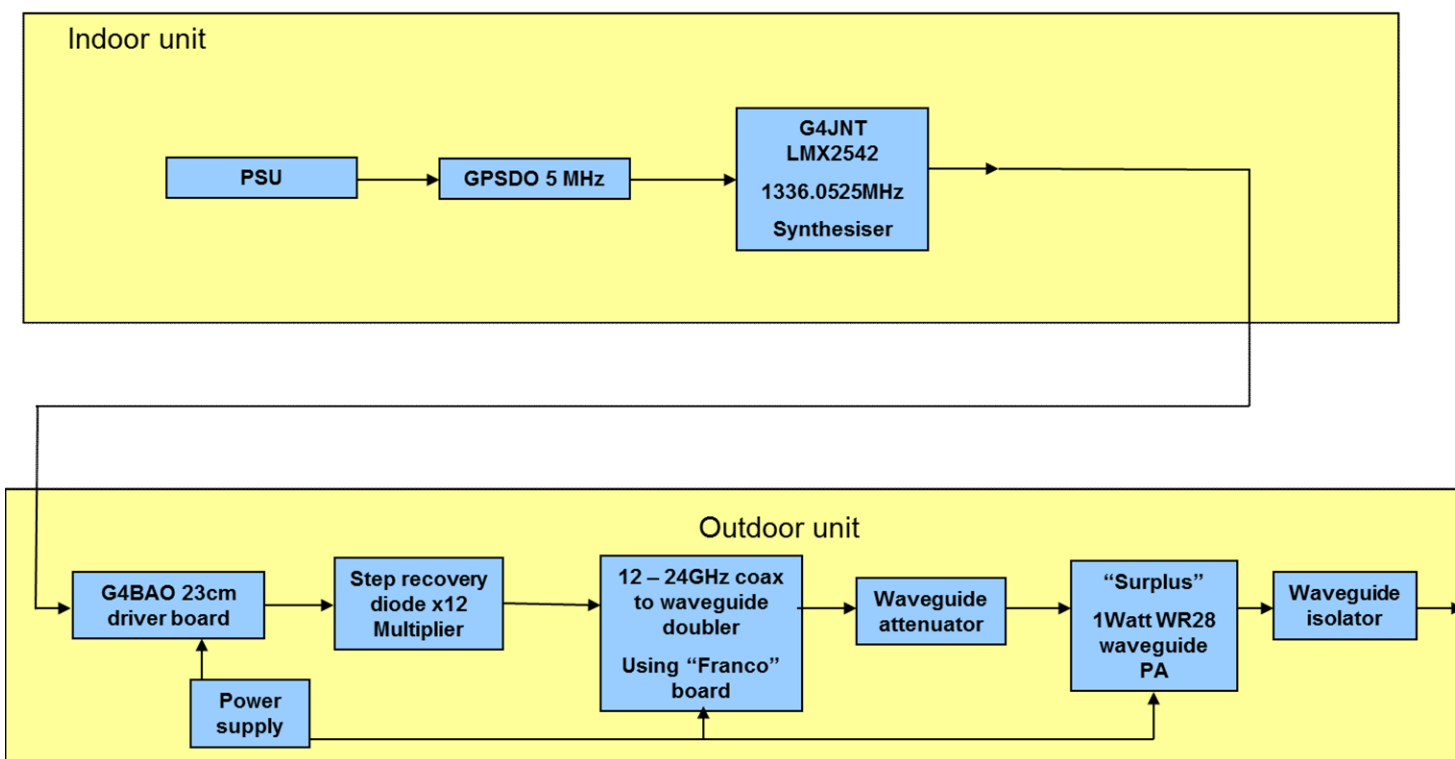


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Technology options

- “21st Century” SHF synthesiser + Multiplier

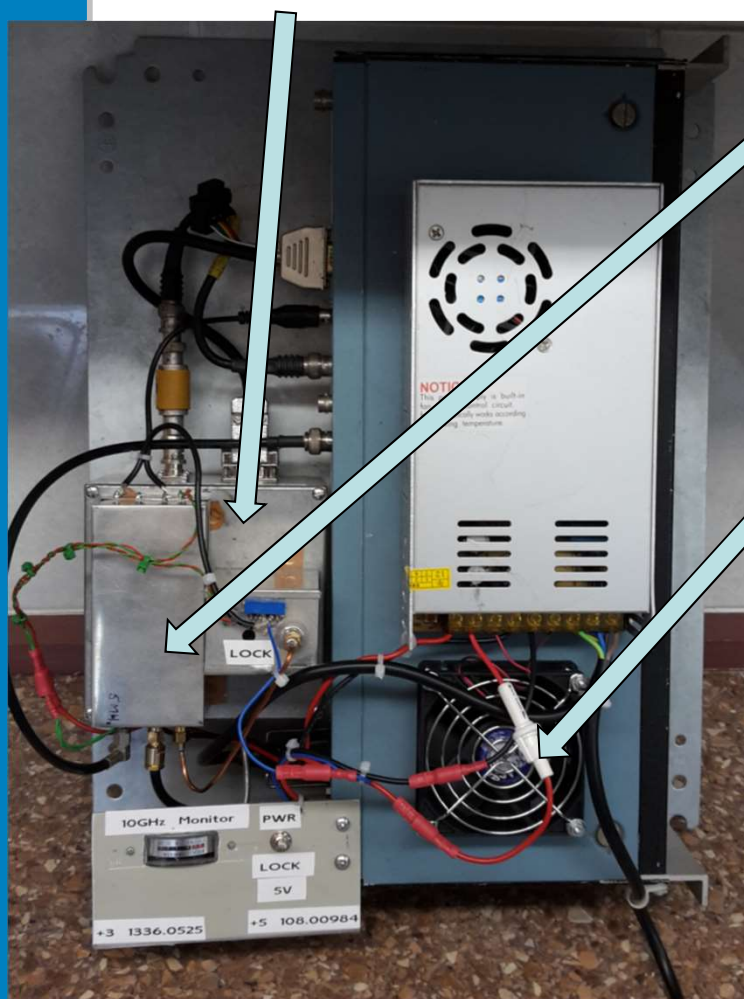
GB3PKT 24GHz System Block Diagram



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Technology options

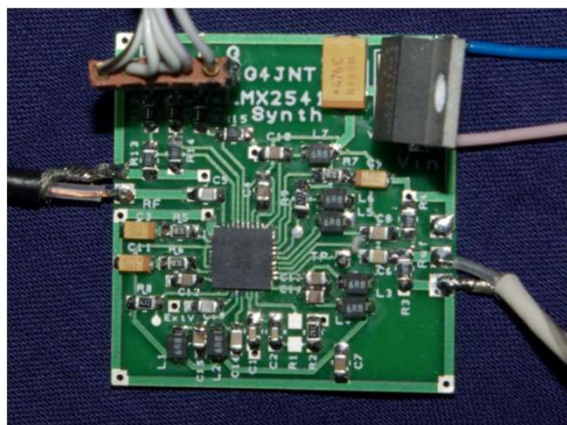
- GB3PKT indoor and outdoor units unit
- 24GHz G4JNT source 10GHz RDS Source GPSDO + PSU



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Technology options

- LMX2541 from G4JNT at 3GHz



- X4 multiplier to 12GHz
- Using overdriven Franco Boards?
- Cheap waveguide doubler made from a Franco Board

VHF COMMUNICATIONS 1/2005



Gerrard Galve, F6CXO

Franco's Finest

Inexpensive 12 to 24GHz doubler described by F6CXO

Franco Rota runs an RF component supply company in Italy called R F Elettronica. His main objective is to sell bulk components such as SMD parts to the electronics industry. He attends some radio rallies in Europe and often has interesting items for sale that can be used or adapted by radio amateurs for use on the amateur bands. This is the third article of a regular series that will describe one of Franco's products with details of its use by radio amateurs. If you require more details about the products you can contact VHF Communications or Franco - rf.elettronica@tiscalinet.it

1.0

Introduction

Franco sells the circuit board shown in Fig 1 for €3, it was featured in issue 3/2004 when it's use as a 10GHz preamplifier was described. The circuit board was initially purchased to salvage the 4 x NE32584's. It was then examined and it is quite rare to find satellite boards with pre-amplifiers so well aligned and so suitable for modifications. After some initial operations using them as inexpensive 10GHz pre-amplifiers, I had the idea of testing these circuits in a 12/24GHz doubler.

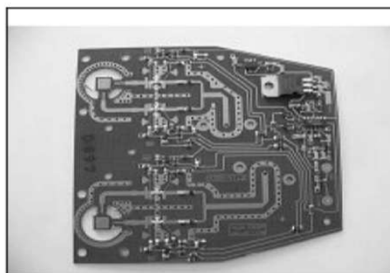


Fig 1: Picture of circuit board used.

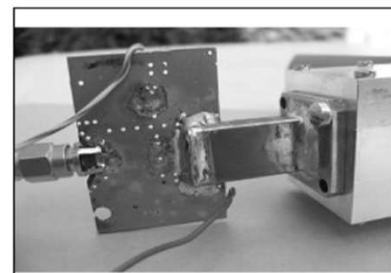


Fig 2: Picture of waveguide fitted to PCB.

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Technology options

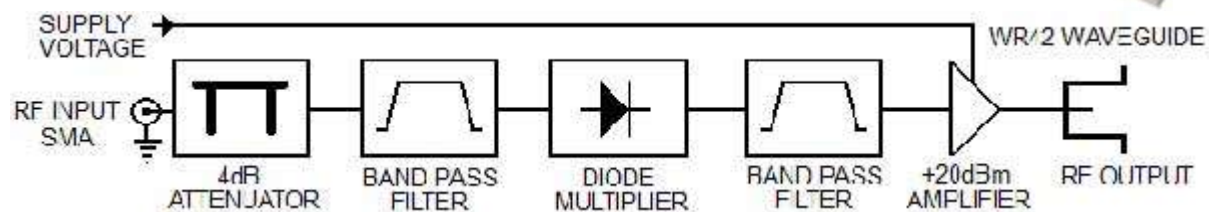
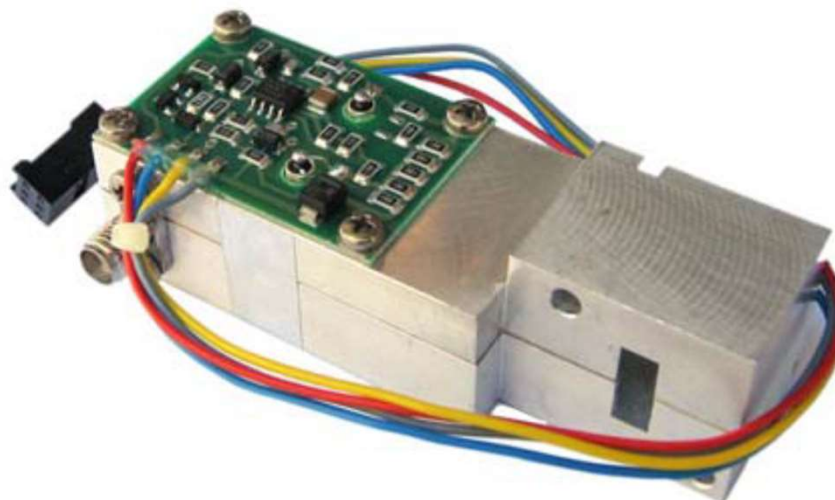
- Ceragon Elcom Synthesizer + Doubler
- ADF4350/1 4.4GHz development board Mult x6



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Technology options

- Complete waveguide doubler from Franco – 100mW on 24GHz
- <http://www.rf-microwave.com/en/shop/0/427-multipliers/5657-MTP-12-24.html>
- €118



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What's the procedure to get an NoV?

- **Apply online at**
 - <https://www.rsgblicensing.org.uk/beacon1-secure.php>
- **Need to declare:-**
 - Applicant details
 - Beacon call and band
 - Site details
 - Location: inc NGR, Lat Long, QRA, Address
 - Owner
 - Access details
 - 4 Closedown operators
- **The ETCC does the rest!**

Building 24GHz Beacons

Why Bother?

- **The threat to our bands from commercial interests is real.**
- **It really is “Use them or lose them”**
- **Don’t want to talk to anyone?**
 - at least build a beacon!
- **Want better Broadband on your phone?**
- **Don’t care about your bands?**
- **Don’t waste time and effort and let’s give them back to Ofcom to use for more mobile Internet**

Acknowledgements and References

- **Andy G4JNT** for endless support via **Skype**
- Those nice people at **Ofcom** for letting us have so much spectrum for free
- **Murray G6JYB** and his **RSGB** team for tireless and apparently unsung efforts to hang on to our **GHz** bands

This presentation will be available on www.g4bao.com in due course

The screenshot shows the G4BAO.COM website. The main content area features a welcome message and a featured article titled "1.3GHz 2.5 Watt driver board kits". The article includes a photo of a circuit board and text about kits for a 2.5Watt driver amplifier. The sidebar on the right contains a "Visitors" widget showing a list of countries and their respective visitor counts, and a "FLAG COUNTER" widget. The left sidebar has navigation links such as "Home", "About me", "My Equipment", "Projects", "Related links", "Downloads and Bodger's Guides", "For Sale", and "Backscatter".