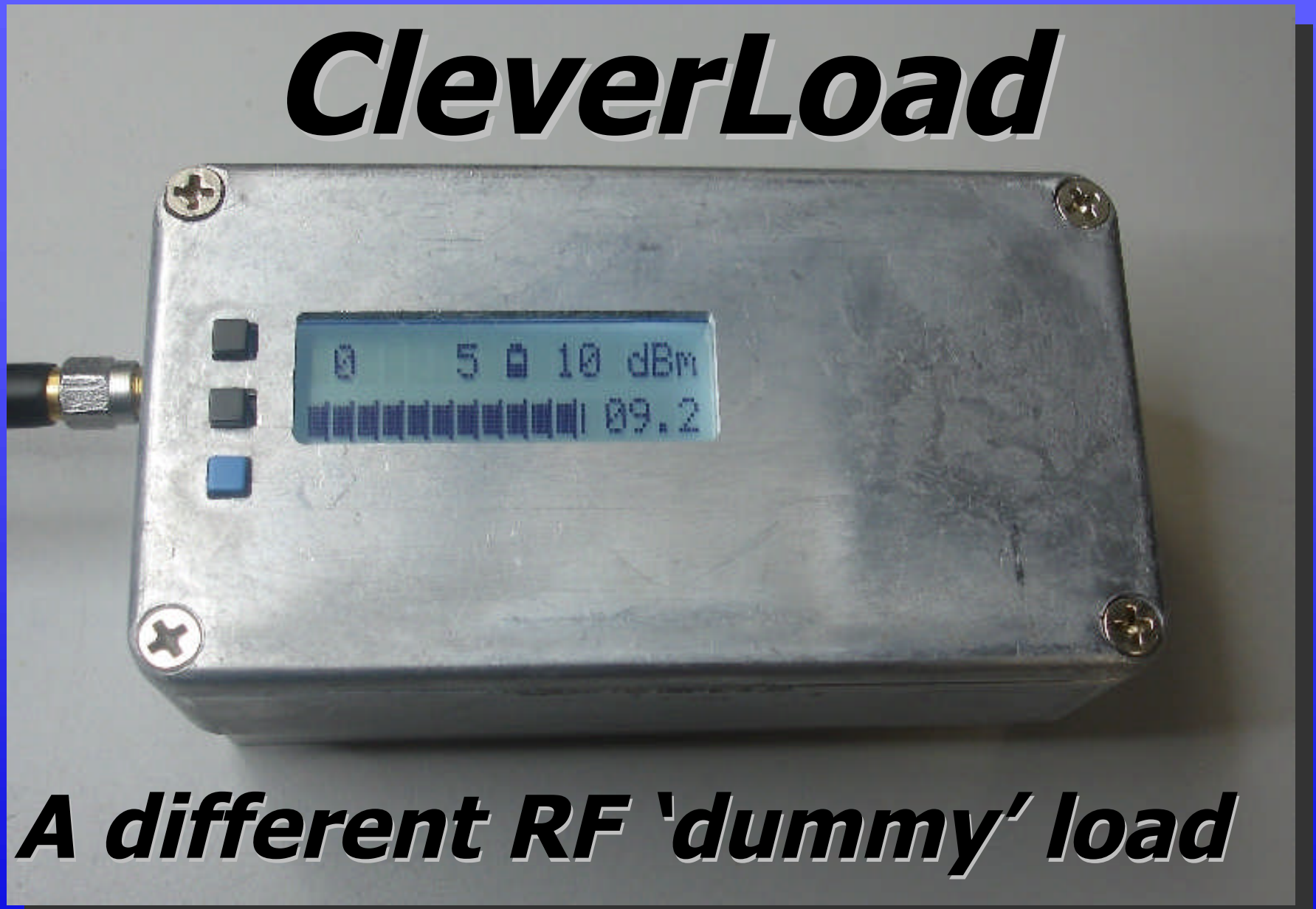
CleverLoad



A different RF 'dummy' load

A Different Dummy Load

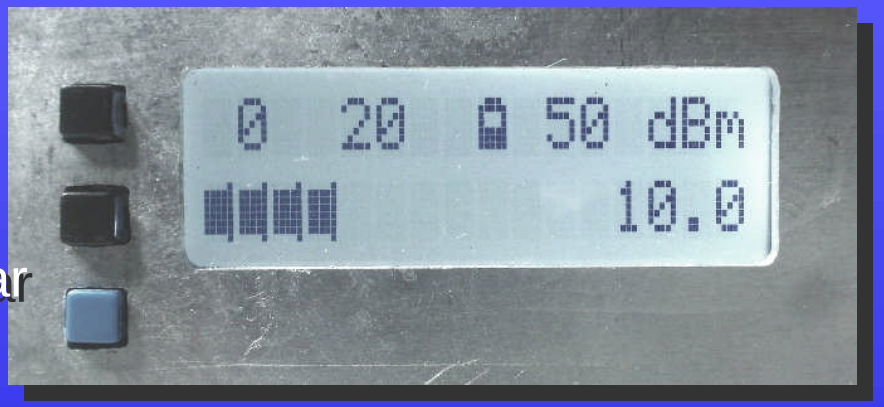
CleverLoad Key Features

- Integrates a 50 ohm load and power meter
- Measures true RMS power from -10 dBm to +44 dBm
  - Range 100uW to 30W
- Displays dBm or Watts – user selectable
- Power measurement accuracy 0.25dB
- Frequency response <0.25 dB 2 MHz to 1,300 MHz
  - <0.5 dB down to 300 kHz
- Display readout shows bargraph and numeric values

Display Readout Modes

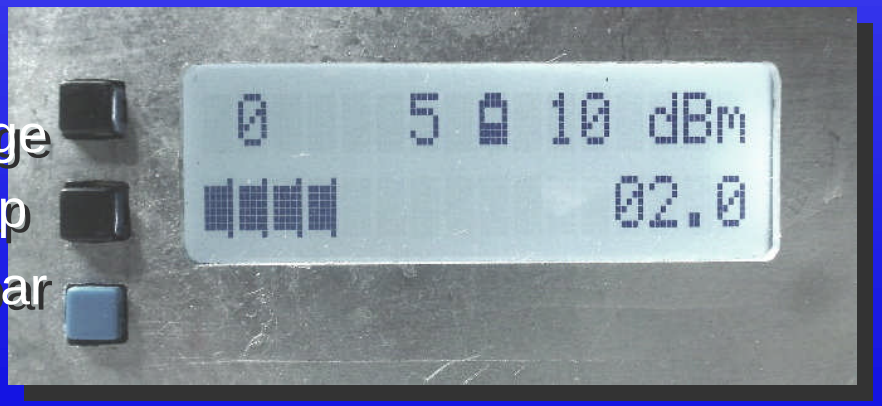
Full Range

- 60 dB range -10to +50 dBm
- Bargraph increments 1dB / bar



Auto Range

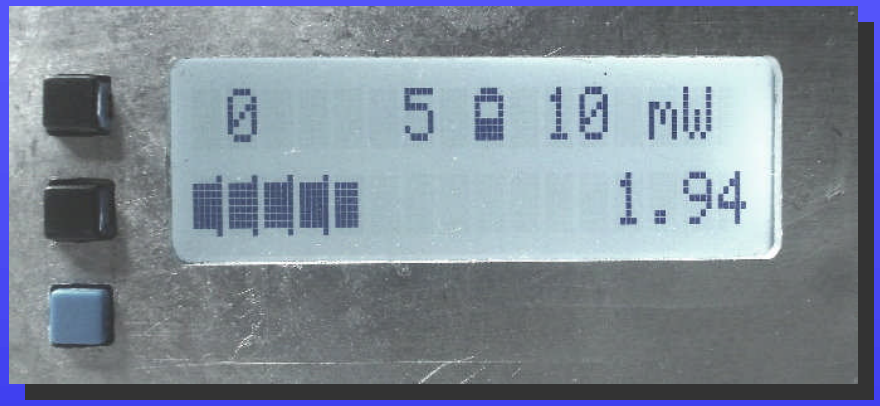
- Auto ranges over a 60dB range
- 12dB per range allows overlap
- Bargraph increments .2dB / bar



Display Readout Modes

Watts

- Bargraph always reads in dBm
- Press Sw2 momentarily to change numeric readout to Watts



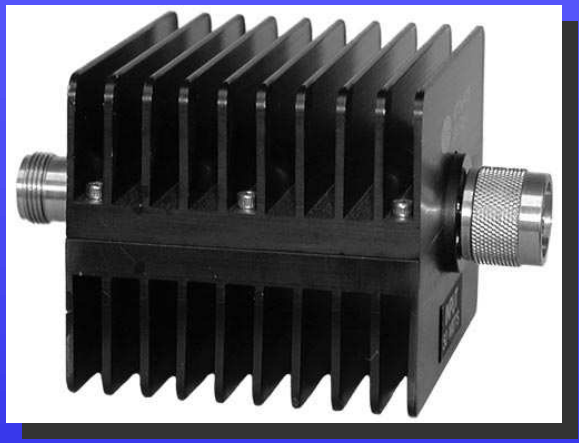
LoRf

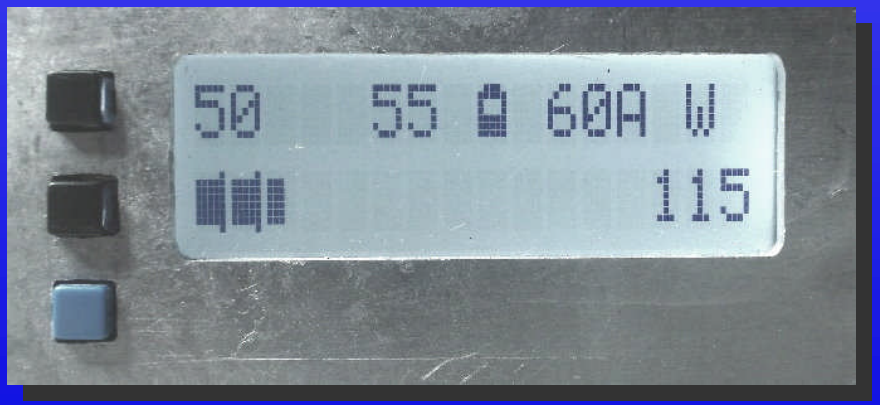
- When Pin < -10 dBm unit displays LoRF screen
- Time, Date, & Temperature

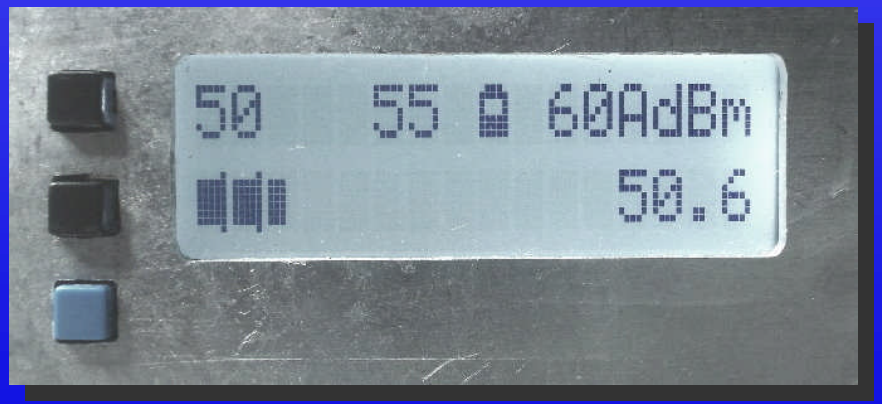
Extend Pwr Measure Range

External Attenuator

- Measure power up to 69.9 dBM
- 'A' preceding dBm or Watts indicates the meter is in attenuator mode
- Attenuator value set in utilities menu
  - Any value from 2.0 to 40.0 dB
- Displayed readings automatically adjust
  - Works in either full range or auto range



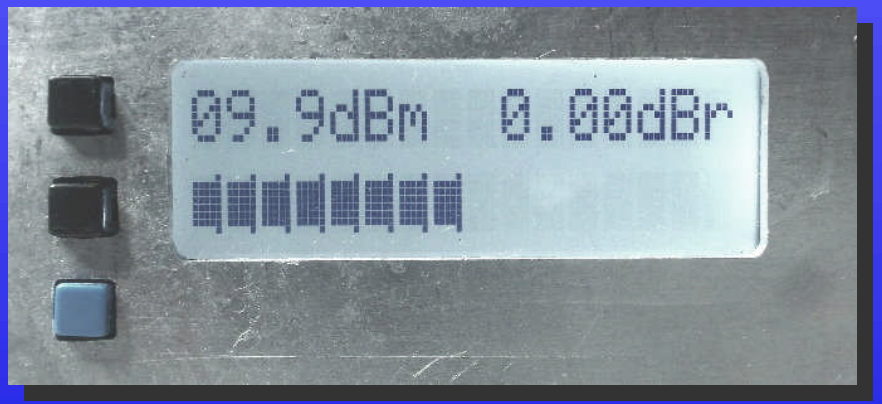




Peaking Measurement Mode

Relative Power Measurement

- +/- 3 dB range
- Displays power in to .1dBm resolution and simultaneously displays a bargraph and relative power to .01 dB resolution
- Bargraph resolution 0.075 dBm per bar
- Mode can auto range or remain fixed user selectable
- Mode offers a re-centering feature



Additional Features

Soft off power switch

- User selectable off timer 2min to 59min

Flexible Power Seamlessly switches between

- Internal battery
- USB cable
- External supply any voltage between 5 & 15V

Battery Level Indicator Icon

- Empty, Half, Full and external supply

Sixteen display backlight levels

Remembers operating mode when re-powered

- Housekeeping info saved external EEPROM

Additional Features

Thermal Alarm

- Over threshold display flashes alarm and shows temp.

Low Current Consumption

- Less than 30mA while measuring with backlight on

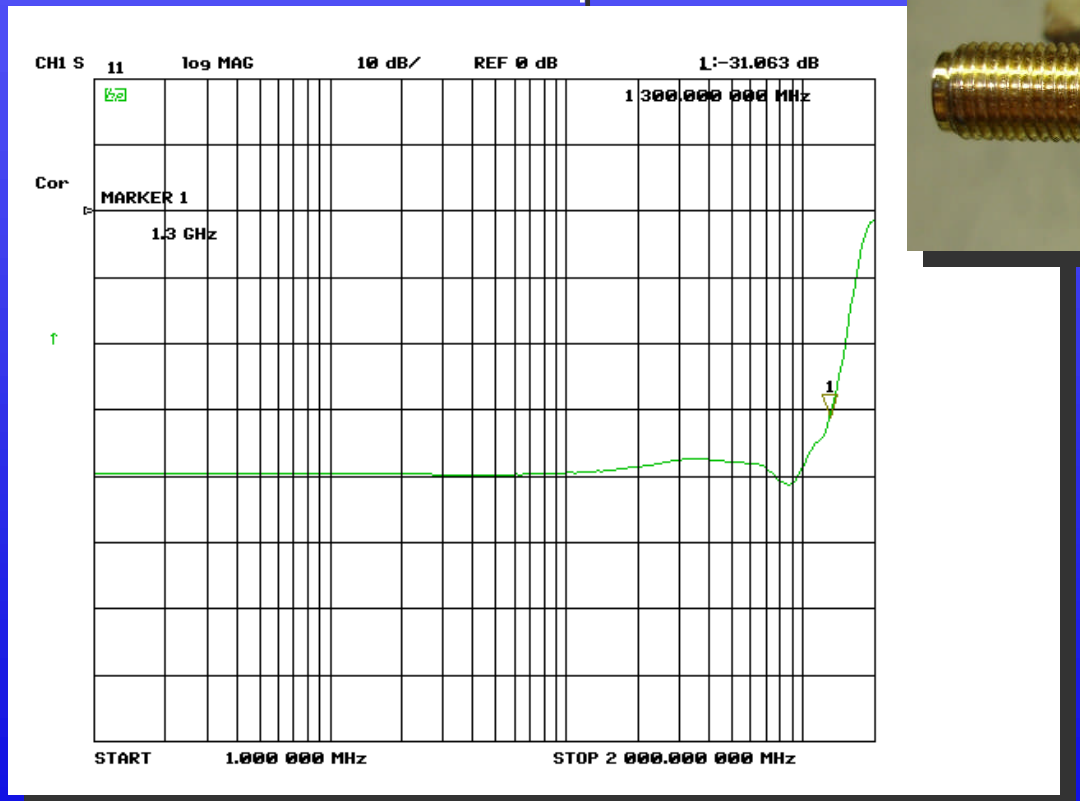
Datalog capability

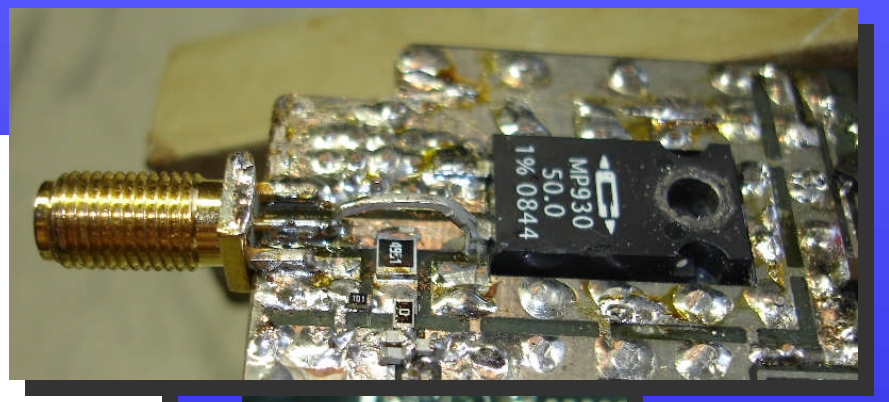
- Up to 2000 entries
- Timed interval user selectable
- Very low power datalog mode to conserve batteries

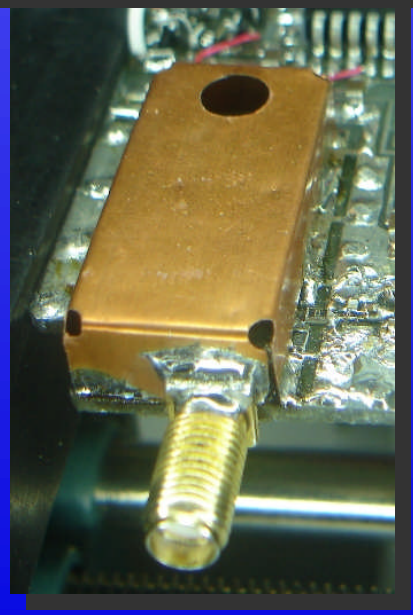
Challenges

Taming the load resistor for 1.3GHz operation

- >30dB return loss & about 40dB at lower frequencies

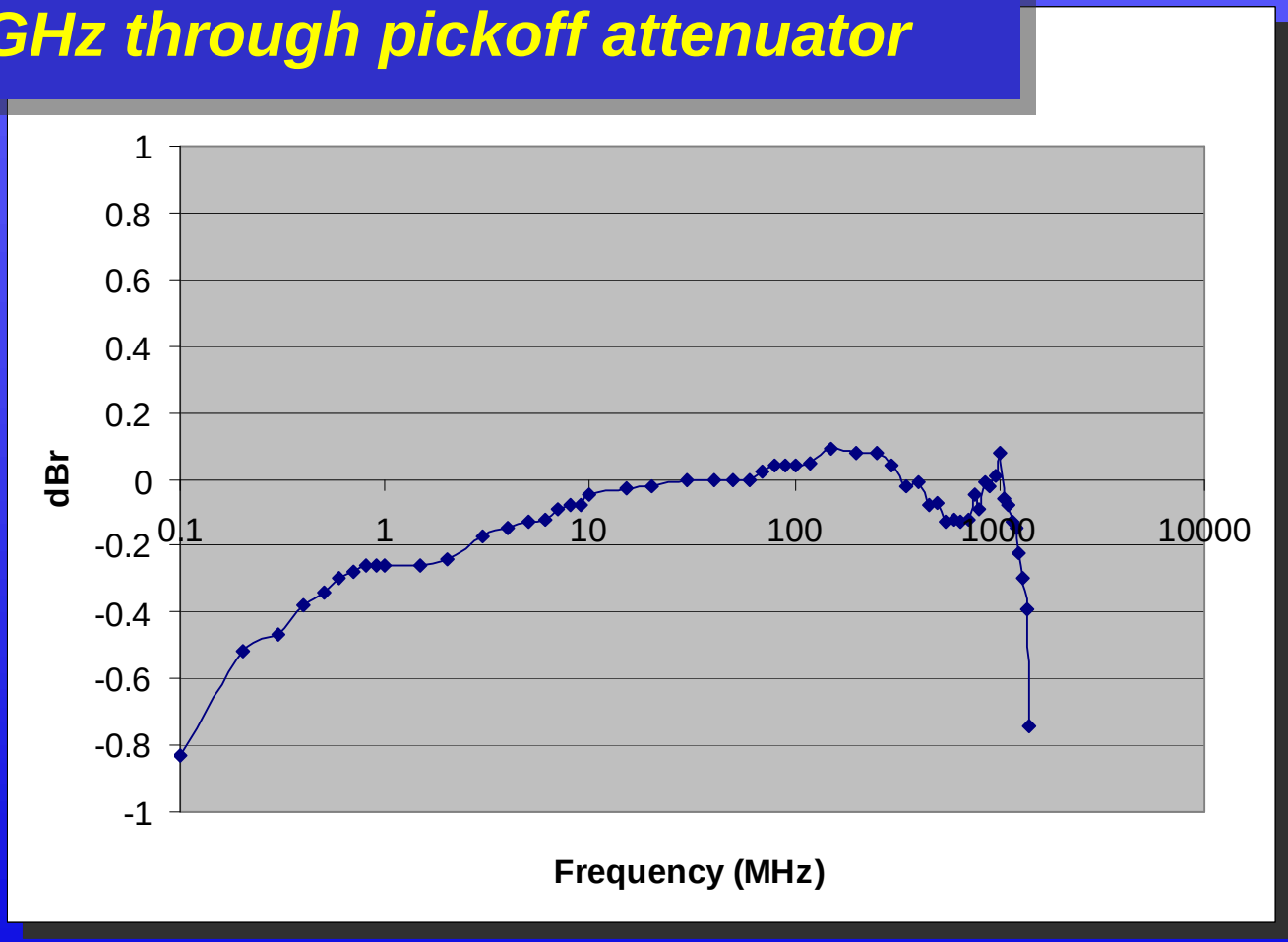






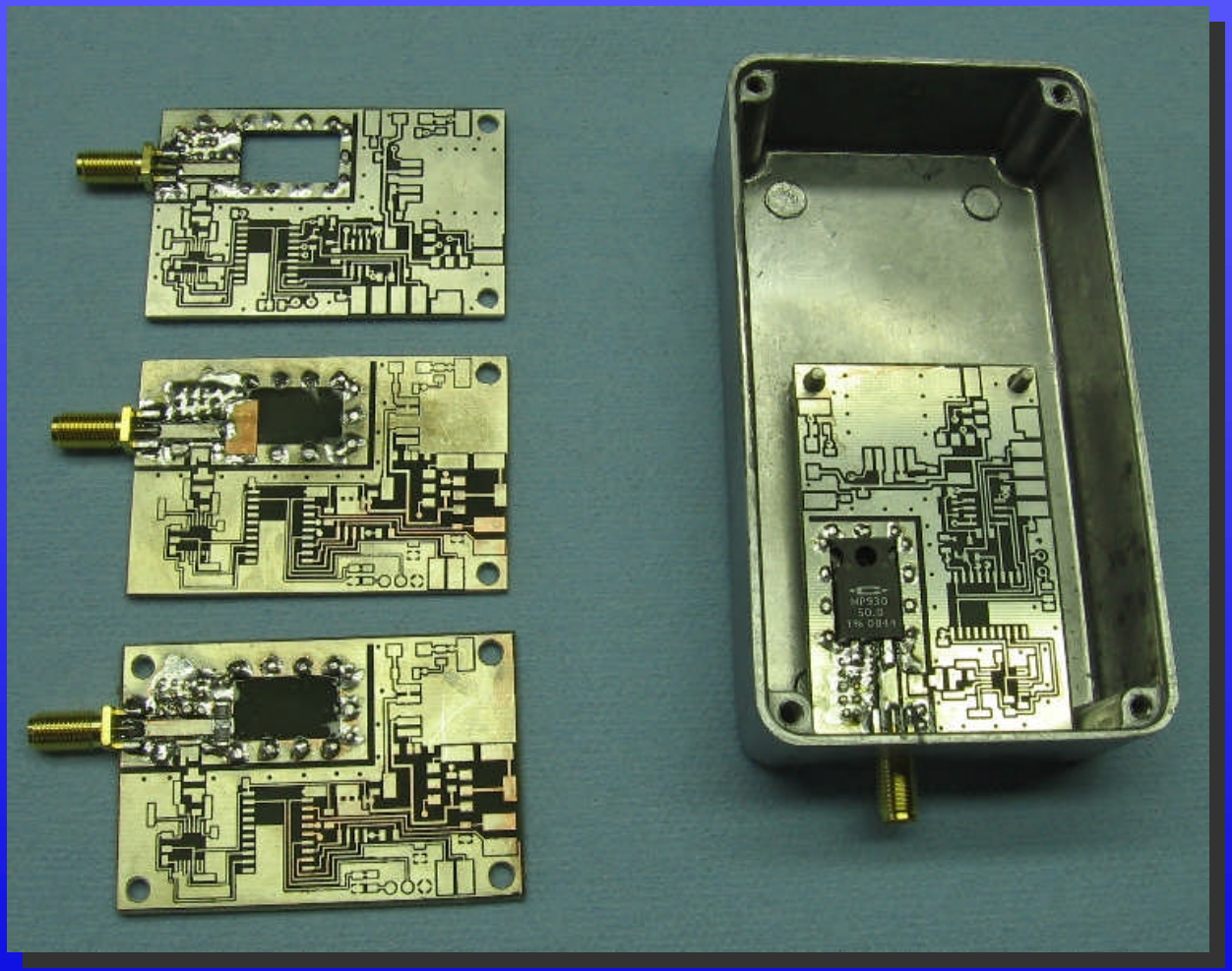
Challenges

Achieving flat frequency response to 1.3GHz through pickoff attenuator



Challenges

First attempt at 50ohm Coplanar waveguide on FR4



Challenges

dBm to Watts conversion over an 80dB range

- Watts = 10^((dBm-30)/10)
- Not easy to do exponents with a PICAXE!

Bargraph display

Auto ranging algorithm

Extending range to -10 dBm