Analysis of the 12 GHz prescaler "teil12-100-1000" from DG0VE

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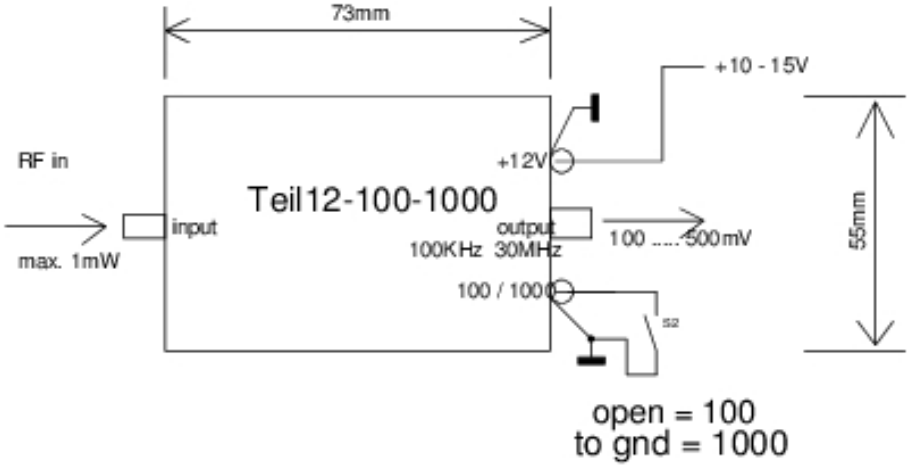
Hello,

Recently I refurbished an old frequency counter and now wanted to extend its frequency range to the 3cm ham radio / KU band. Thus, I was looking for a suitable prescaler which divides the input signal by 100 or 1000.
I decided for the 12 GHz prescaler "teil12-100-1000" from Roberto Zech DG0VE, who sadly passed away last year.

The prescaler is specified to work in the range typ. 0.2-11 GHz (min 0.1 GHz, max. 12 GHz).
The scaling ratio can be switched between :100 and :1000 by a control input which needs to be grounded when :1000 shall be used. A typical input level of -25 dBm is specified in the range 1 … 11 GHz and a maximum input level of 0 dBm.

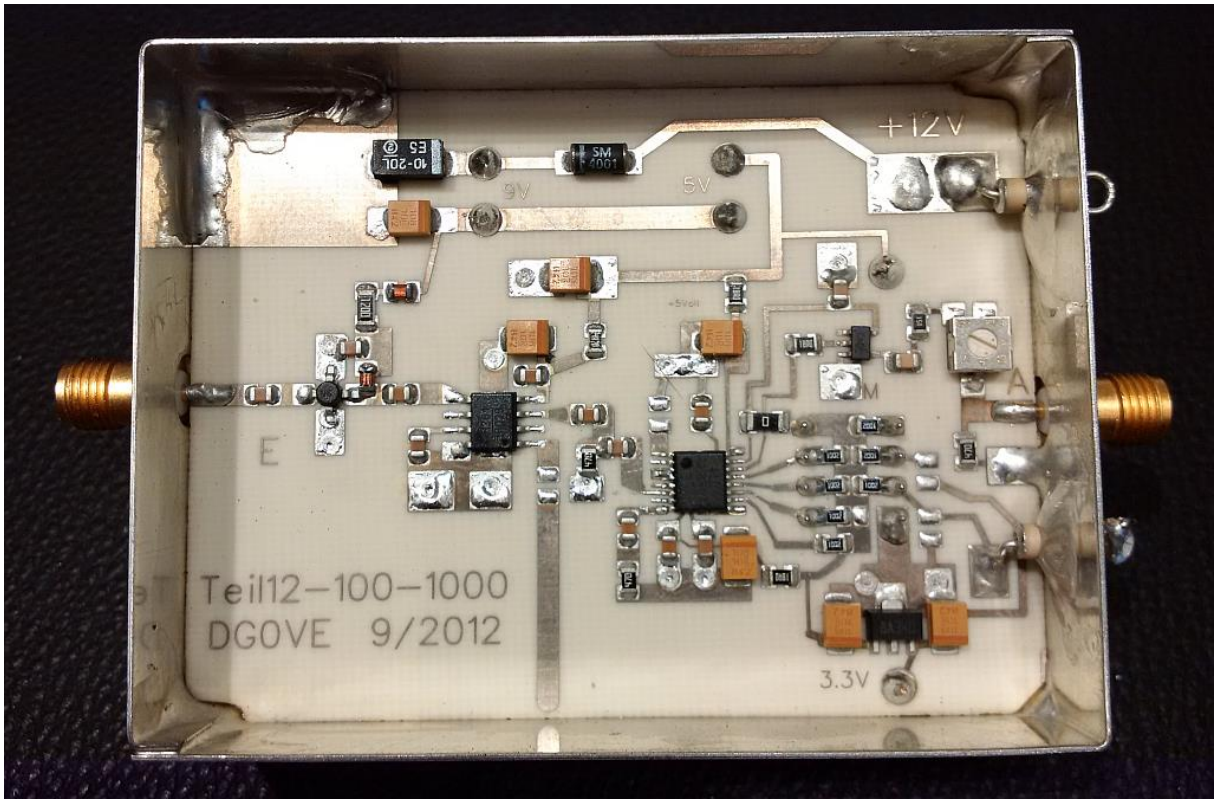
The supply voltage range is +9…+20V with a typical current consumption of 160 mA.

The module has SMA jacks at input and output and is housed in a tin-plated cabinet.

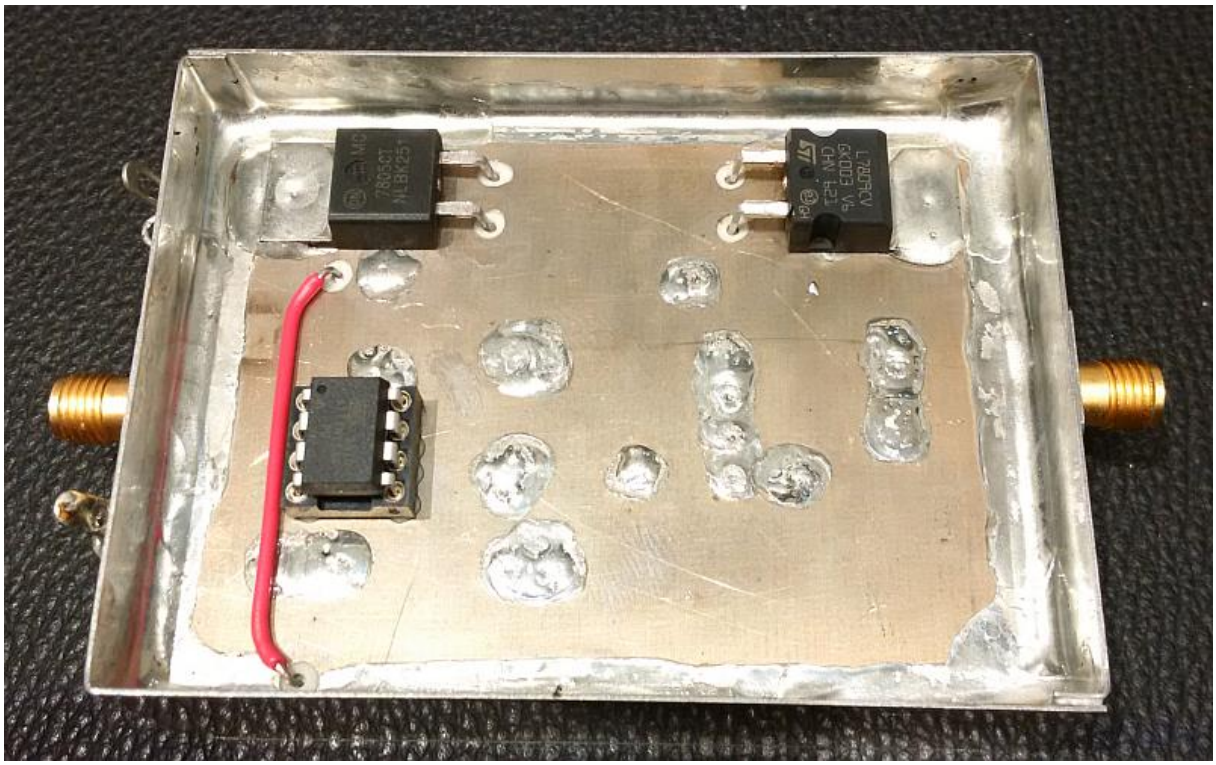


Here are some pictures of this prescaler:

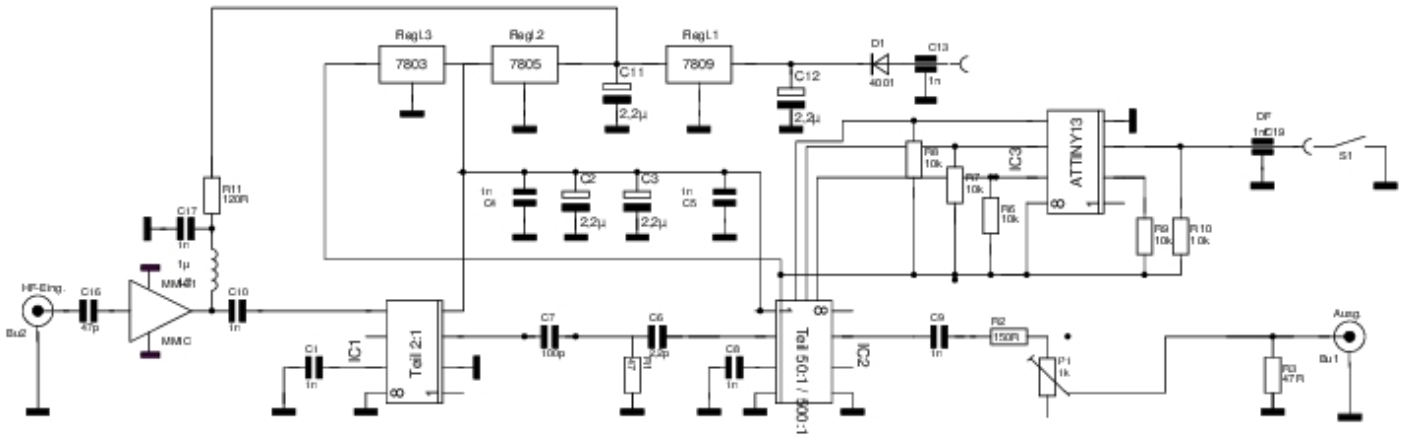
The prescaler is housed in a tin-plated cabinet with high quality SMA connectors



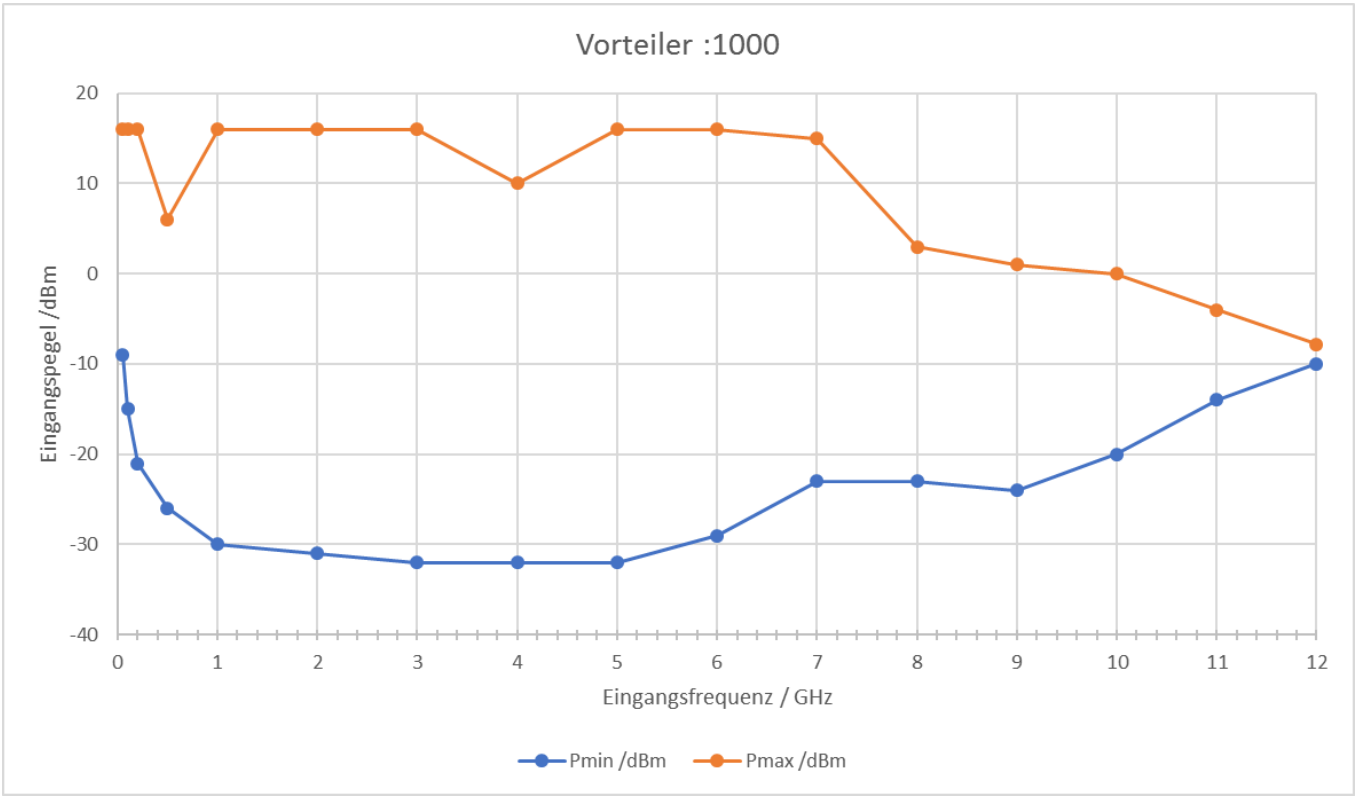
Top side of the professional PCB with the RF components


Bottom side of the PCB with 9V and 5V voltage regulators as well as the ATTINY13 Microcontroller

Here is a schematic of the “teil12-100-1000” prescaler.



I was interested to explore the dynamic range of the prescaler, i.e. the minimum and maximum input level as a function of input frequency. I first measured this using the division ratio :1000.



The curve shows the typical dynamic range of such a prescaler. Between 1 and 6 GHz the dynamic range is more than 40dB, then decreases to 20dB at 10 GHz and then further degrades to mere 2dB at 12 GHz.

In the mode :100 my prescaler works only up to 6 GHz and stops immediately, when increasing the input frequency beyond this. I would be interested to hear from others whether they observe the same behaviour.

I always appreciate feedback. Please send it to the Email address below.

Best regards

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