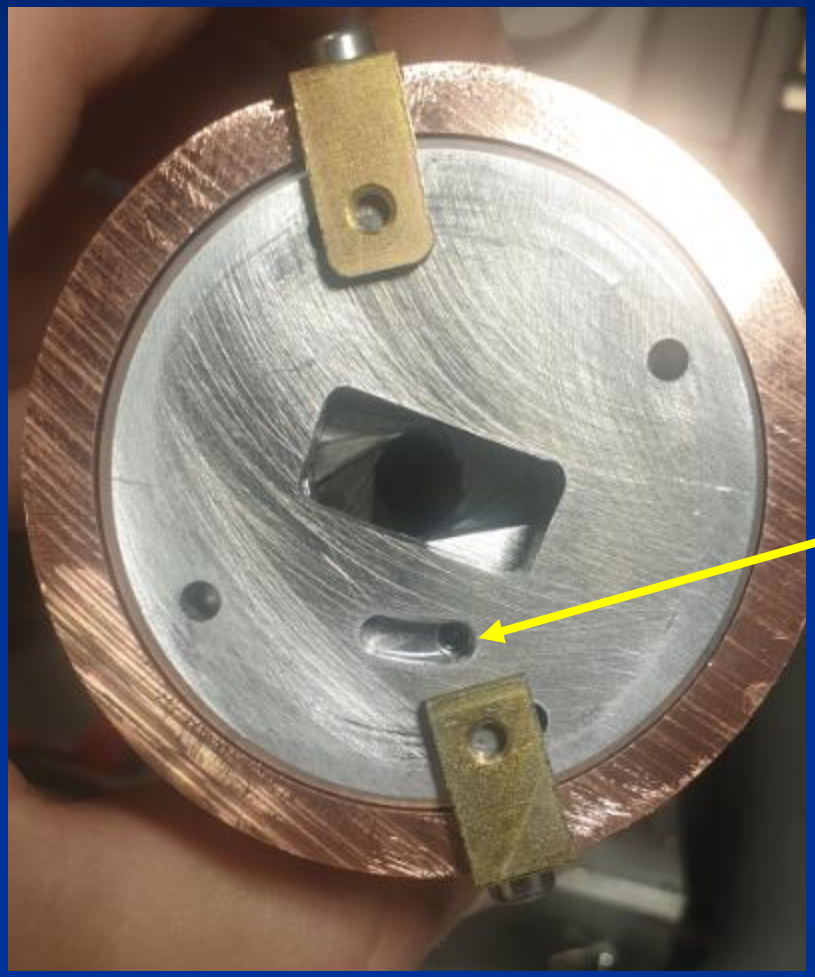
Practical realization of the 10 GHz Polarizer

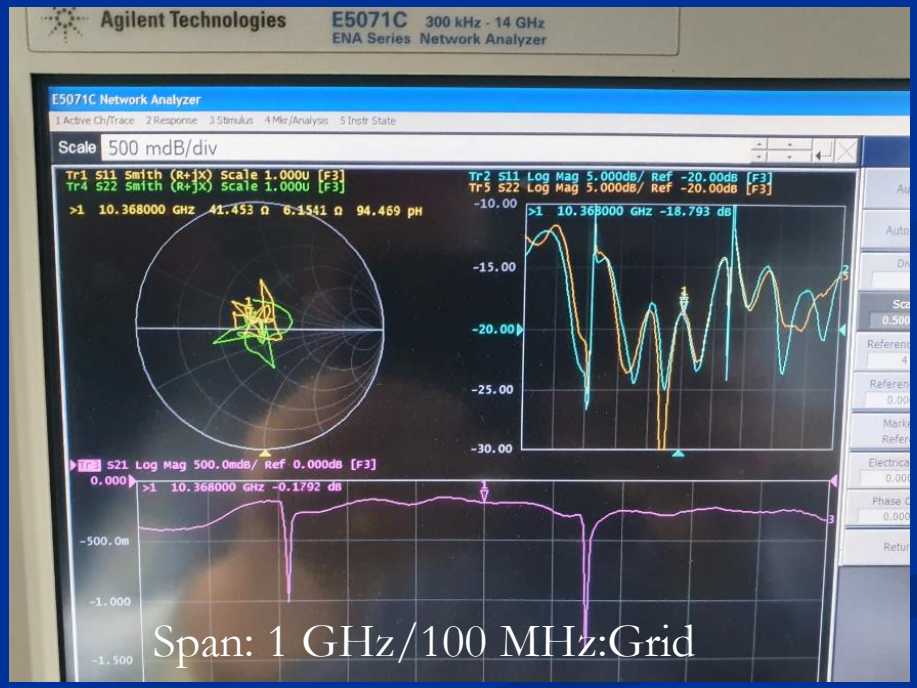


It may look good – however the results were poor…

Driver screw, 25 deg. per disc

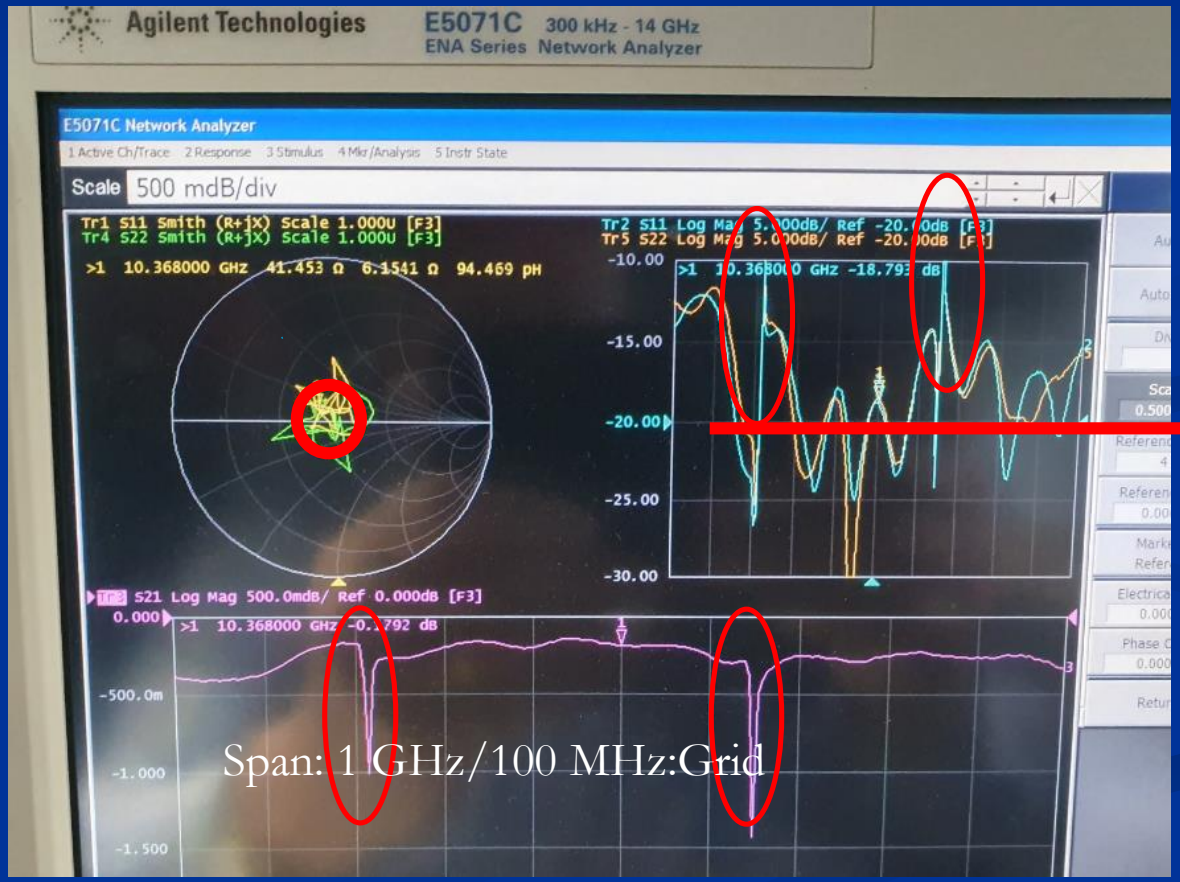
Practical realization of the 10 GHz Polarizer

WR-75 flange (prior to solder WG)



Practical realization of the 10 GHz Polarizer

Very bad match, extremly narrow band, inaceptable insertion loss ***Failed!***



S11- 20 dB failed

S12 failed

Advise needed!

Second attempt: A truely seasoned microwave professional:

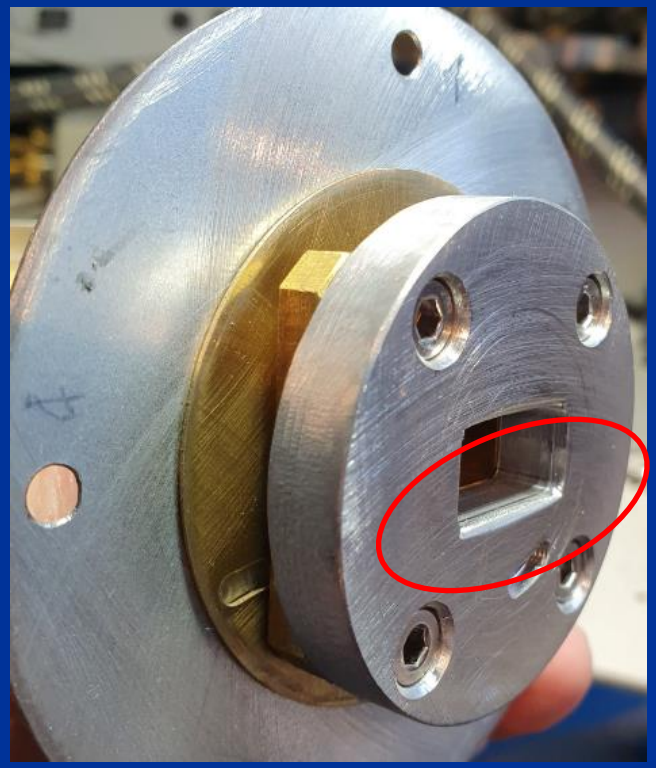
René, HB9MPU (@ time 88) (now 91)
(former head of final testlab @ STR)

All edges inside a WG create diffusion of the RF and deflection from the straight path.
This creates different path-lengths and thus phase errors
These corrupt a good match, and cannot be corrected. The result is a wild up-and-down of return loss which obviously impacts the insertion loss.

The long edges inside the WG have to be rounded

Practical realization of the 10 GHz Polarizer

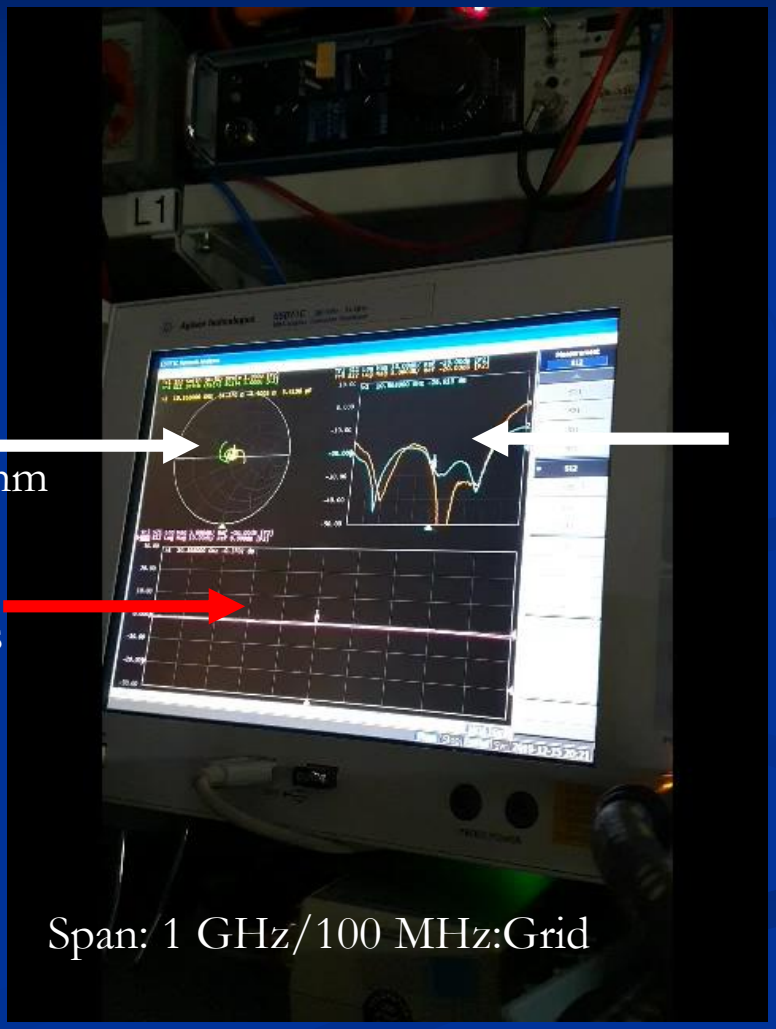
The long edges inside the WG have to be rounded



Practical realization of the 10 GHz Polarizer

S11, S22
Impedance
approx.50 Ohm

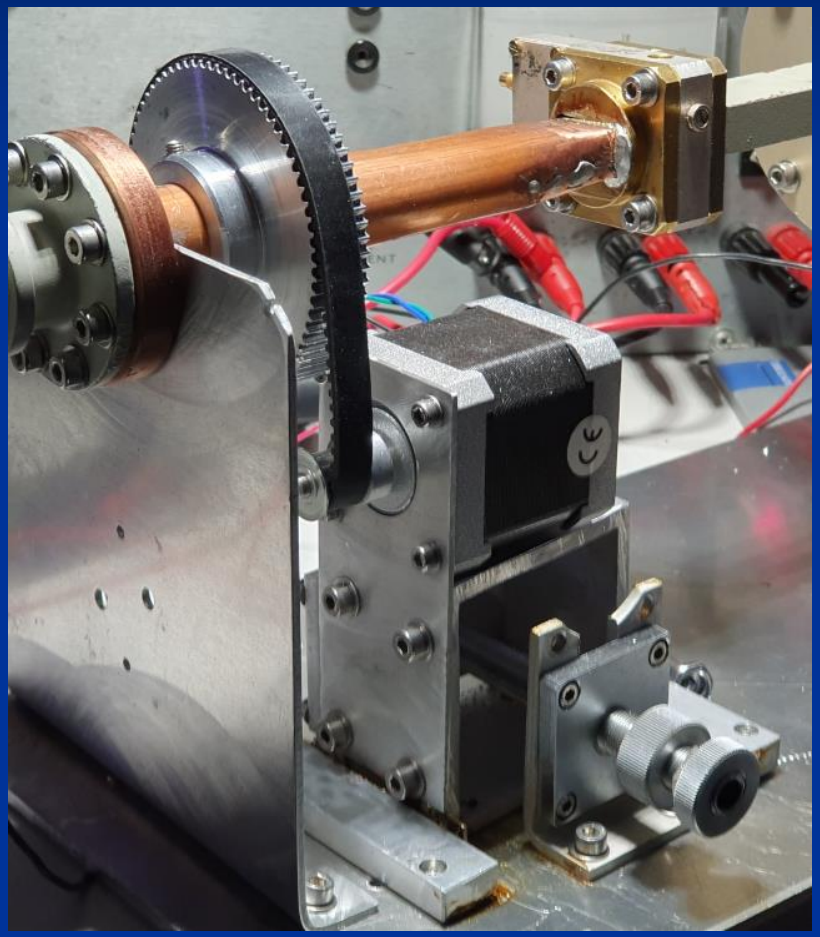
S12, S21
Insertion loss
<= 0.3 dB

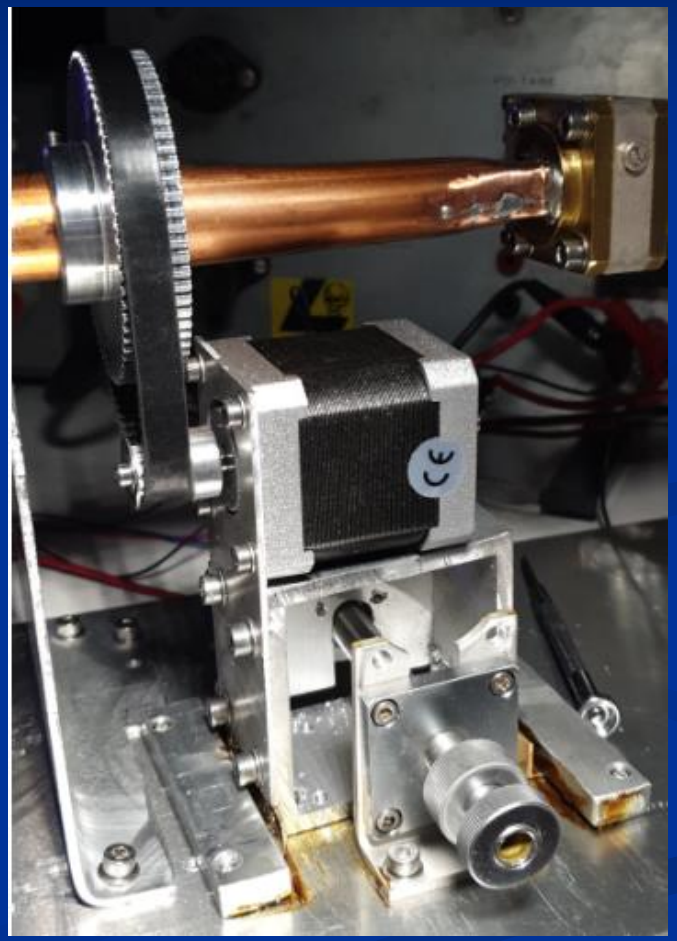


S11, S22
Return loss
>= -20dB

Feed unit for offset dish

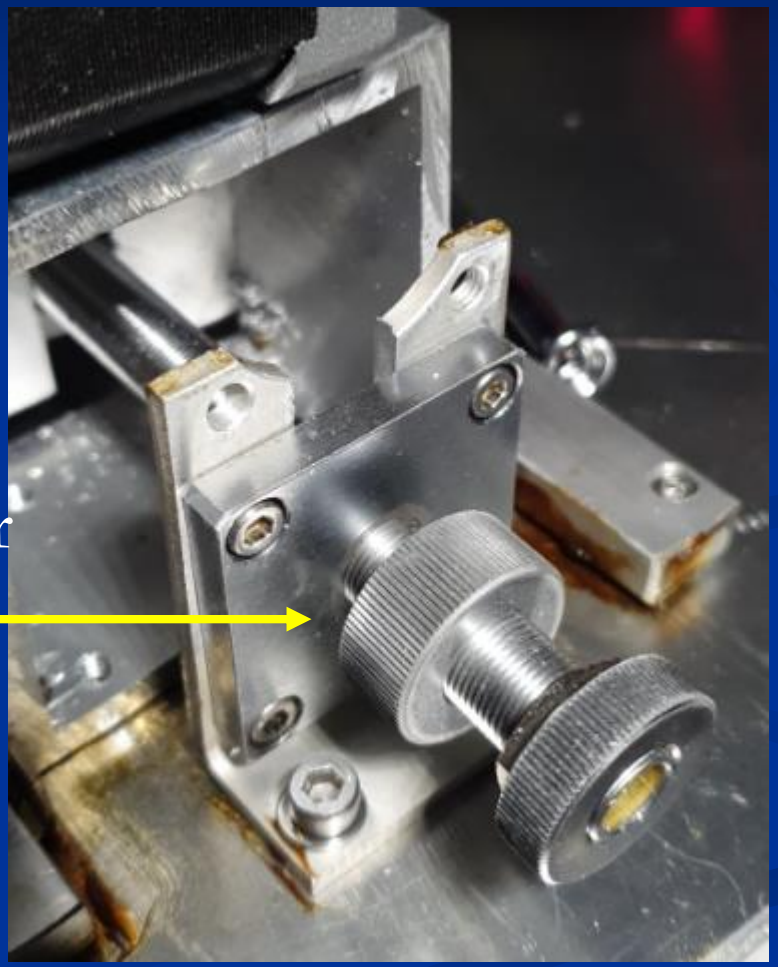
StepMotor, Control and display of Polarization angle



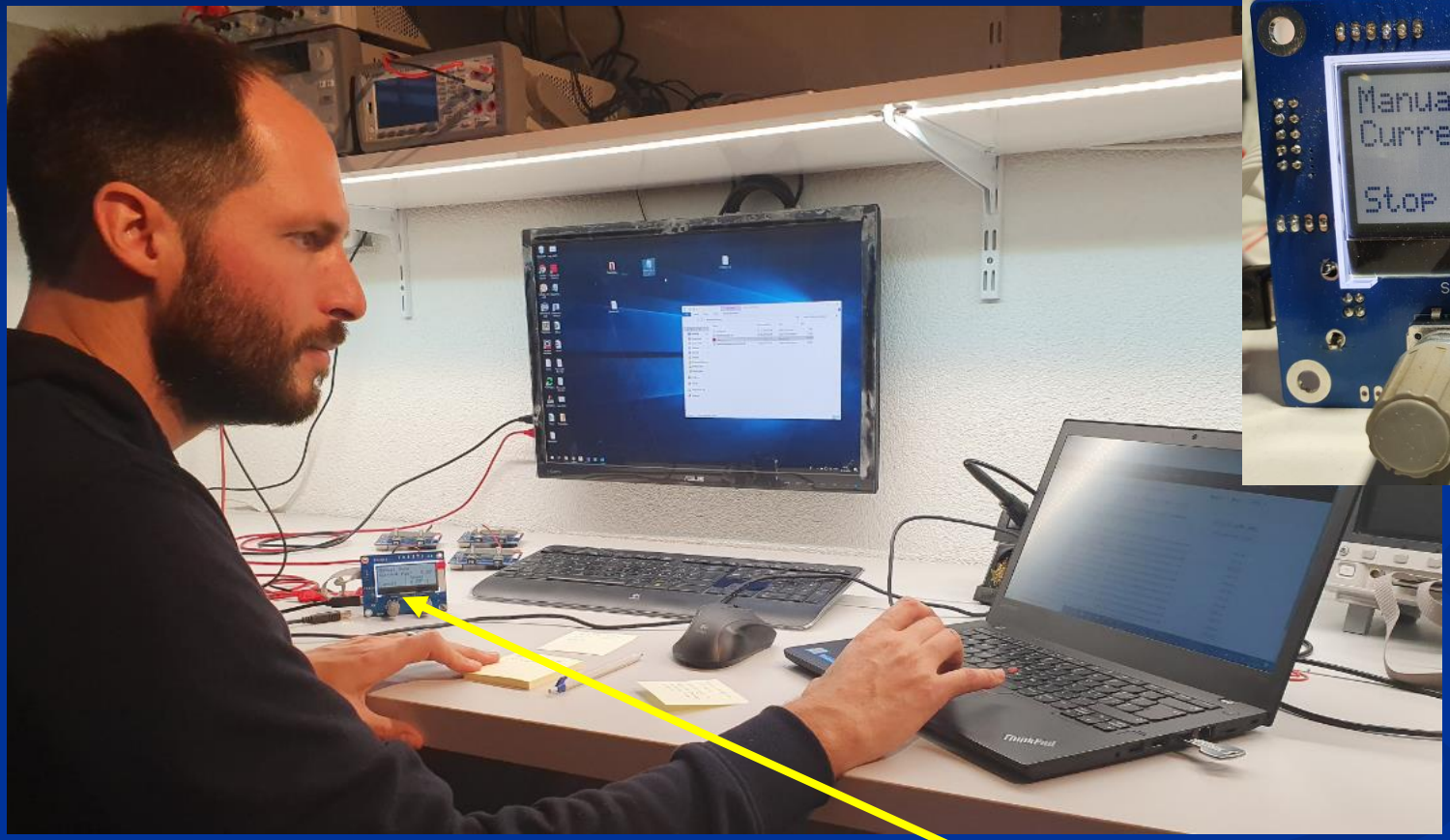


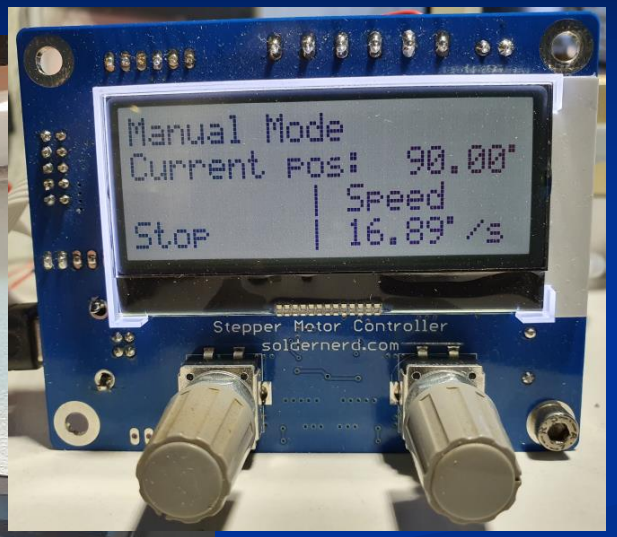
StepMotor, belt adjustment

Precision thread of an
obsolete UHF band-pass filter



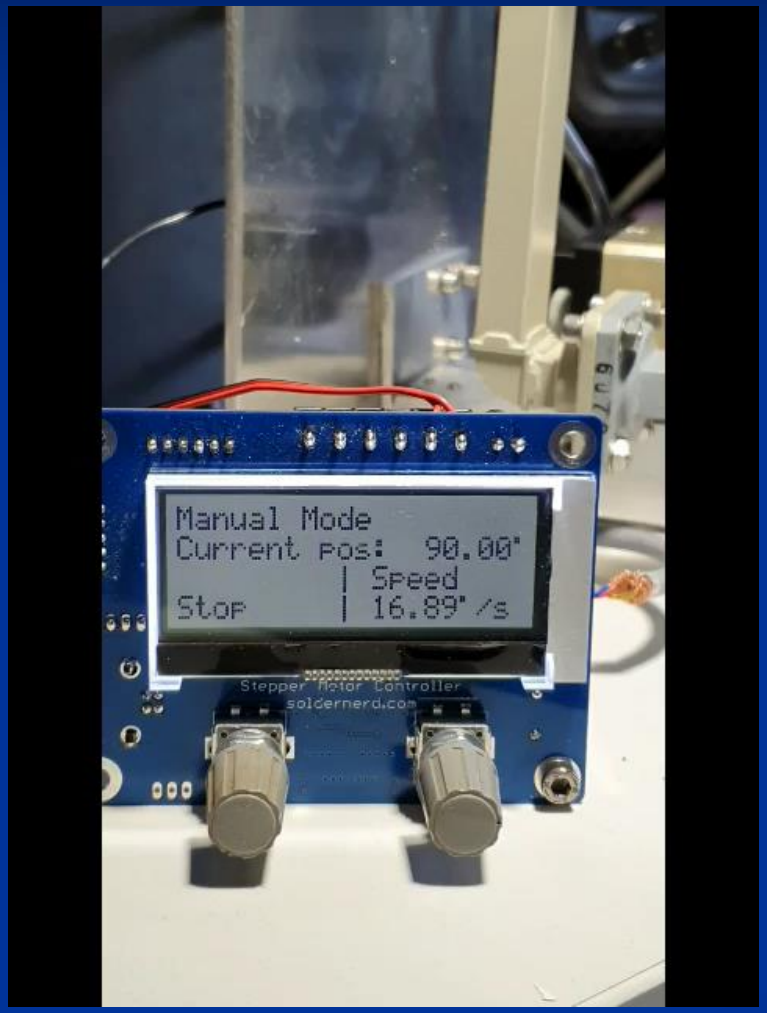
StepMotor, Control and display of Polarization angle

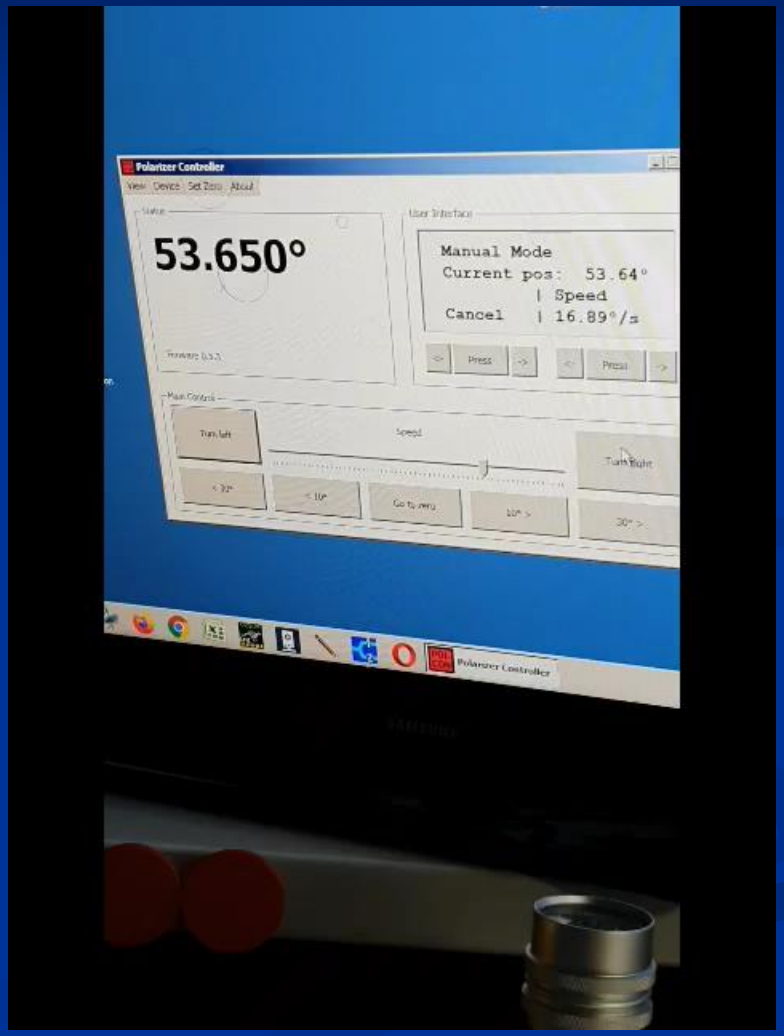




Lukas Fässler, HB9TKO. He developped the Control unit

StepMotor, Control and display of Polarization angle





Conclusions

- The mechanical polarizer failed to satisfy
- The loss in RX mode was unacceptable by 0,3dB
- Major issue was limited RX-performance
- ***There must be a more efficient way of rotatable lin. polarization***

New Attempt

- Rotating WG Switch incl. LNA
- **«bend&twist» flexible TX-line**
- Same control HW/SW

New Attempt

TX acceptable loss

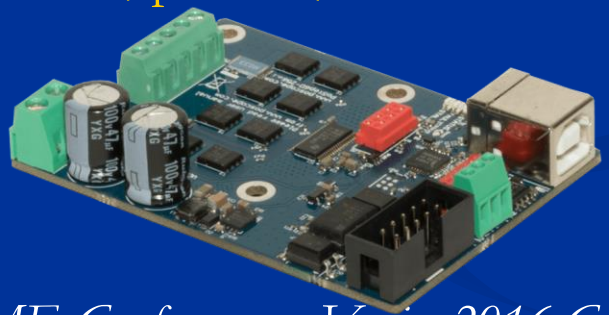
References

StepperController Desktop Software:

- https://github.com/soldernerd/RotaryTableApp
  lfaessler(at)gmail.net
  Populated with Display Euro 125 + postage

Motor driver:

- https://planet-cnc.com/product/motordriver-6-0a-256/



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- *Experiences with Circular Polarisation on 10GHz Charlie Suckling (e-mail: charlie@sucklingfamily.free-online.co.uk)*

Questions? Observations?