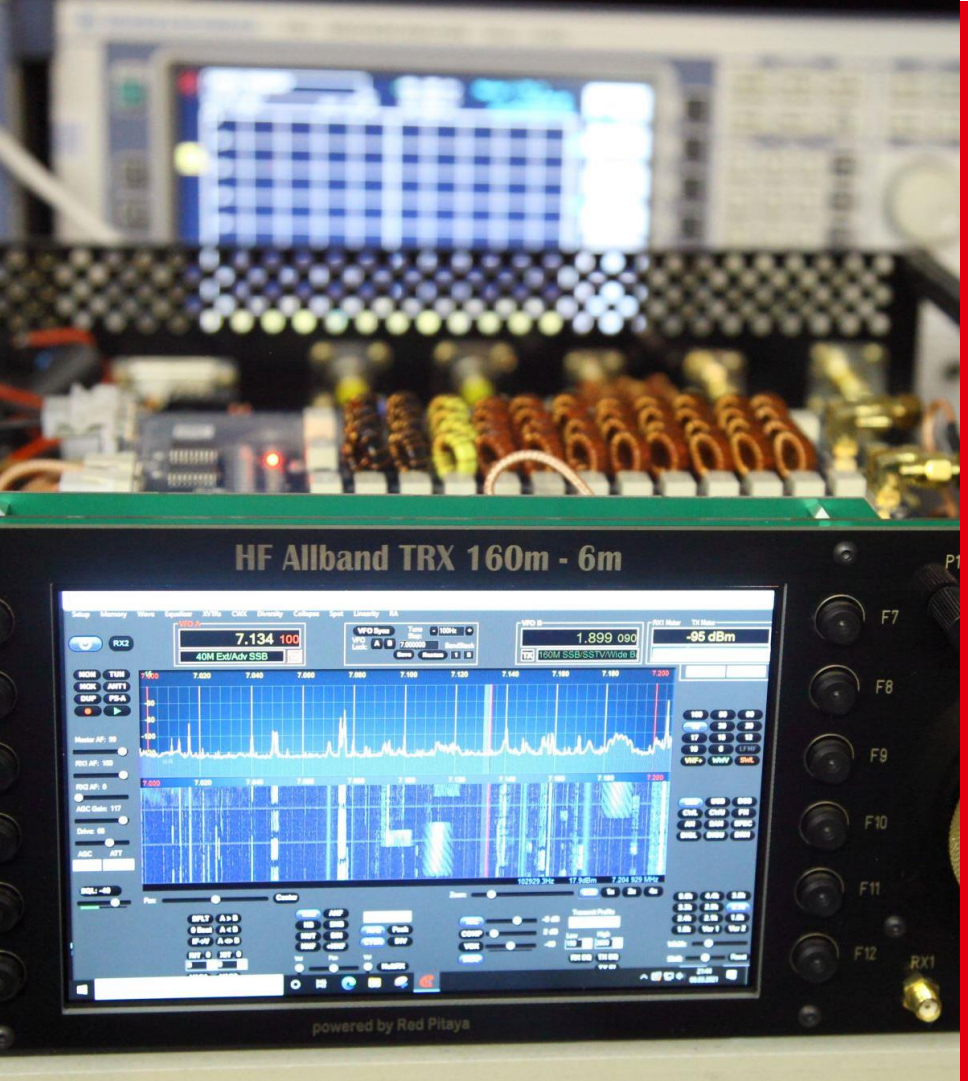


CHARLY 25 STATUS & UPDATE 2024/2025

ERWIN RAUH	DL1FY
EDWIN RICHTER	DC9OE
MARKUS GRUNDNER	DG8MG
MARKUS GROßER	DL8GM

CHARLY 25 STATUS / UPDATE 2024 / 2025

00 Opening & Welcome

01 Project Team / 10 Years Charly 25

02 Existing HW Status – what we got

03 New Stuff - PA current / future

04 Next Generation Charly TRX

05 High End Charly TRX

06 SW activities

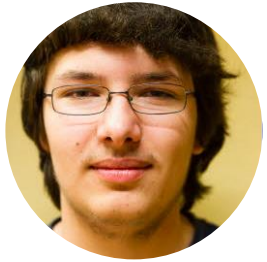
07 Charly 25 @ HAM RADIO 2025

SDR Transceiver Project Team

active since 2014!

Edwin Richter
DC9OE

Markus Grundner
DG8MG



Markus Großer
DL8GM

Erwin Rauh
DL1FY

Existing HW Status

what we got…..

1. *Status*

- *Stable & reliable HW*
- *Very flexible modular set up*
- *Open Source SW (Thetis)*
- *Excellent technical performance*
- *160 to 6m @ 20W*
- *A full blown Multi Media capable W11 PC*

Challenges:

- *Availability of parts (industry wide challenge)*
- *Does not lend itself to volume production*
- *Was meant to be a DIY product (and will continue to be)*
- ***Has become an out of the box mainstream product to a large extent***

Existing HW Status

what we got…..

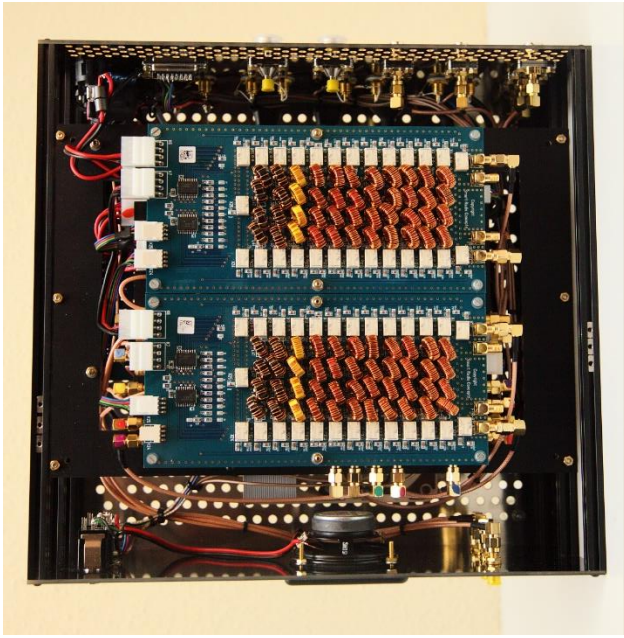
Next Steps:

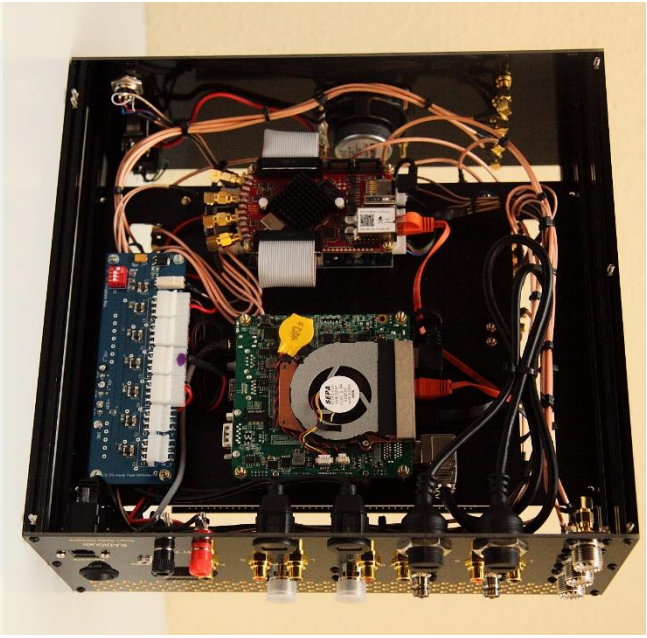
- *Request for add. features (eg. 4m and 2m)*
- *Increased Output Power (eg. 100W)*
- *Easier producability & manufacturability*
- *Flexibity to react to parts situation in the market*
- *Lower Production Cost*
- *Higher volume*

Update Requests…

Existing HW Status

what we got…..



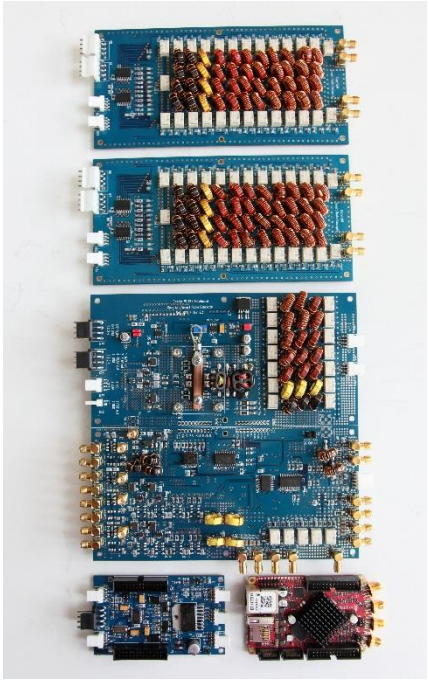


Existing HW Status

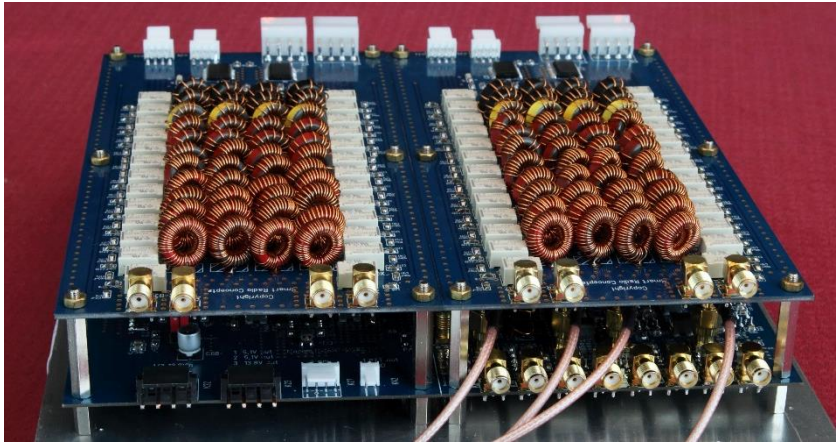
what we got…..

RX Preselector Boards

TRX-Mainboard



Codec Board STEMlab 125-14
SDRlab 122-16

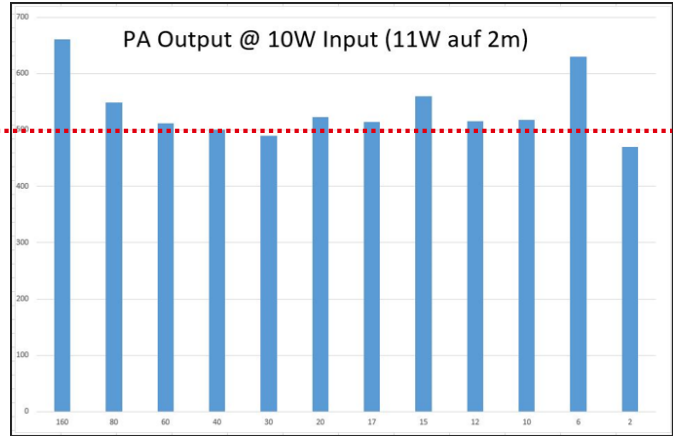


New Stuff – PA curent/future

what is in the pipe….

Status

- *A stable/reliable and very broadband 300W power board has been developed*
- *630m* to 2m – about 18dB of gain (* reduced output @ 630m)*
- *A sandwich approach is currently being tested (water cooled)*
- *2 Boards provide >=500W of Output (@10W Input)*

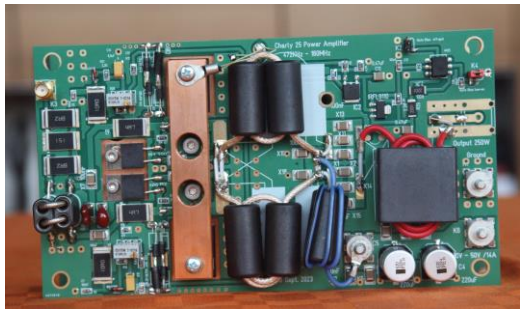


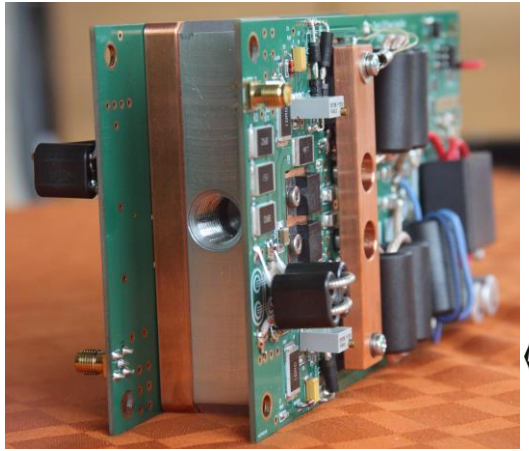
500W

160m to 2m
With 10W of input
(11W on 2m)

😂

.. The boards love 160m & 6m for whatever reason….



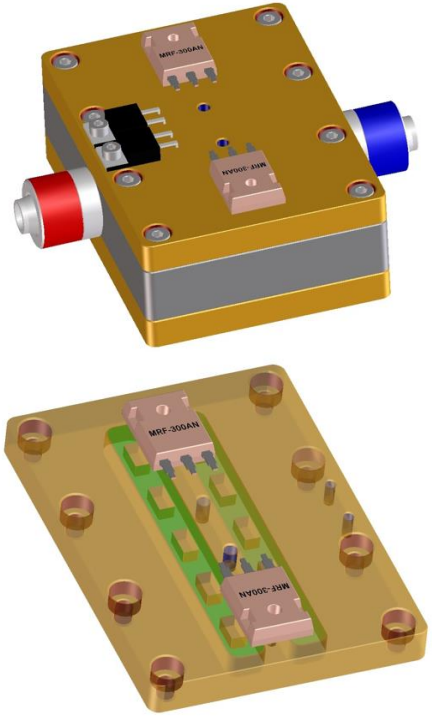


New Stuff – PA curent/future

what is in the pipe….

Status continued ….

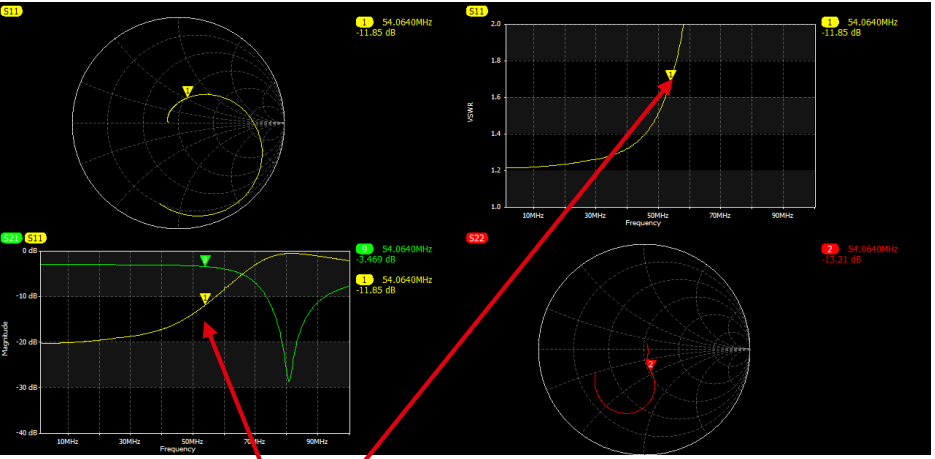
- *The architecture developed is reliable, extremely broadband and will therefore be kept for all future projects*
- *A lot of work has been put into the enhancement of standard Splitter & Combiner architectures (architectures available on the market will only work to 6m in the best case and with poor SWR)*
- *The water cooling system Günther/DK6ET designed for us will support higher levels of output power and will make our designs low noise & reliable as well*
- *Using modern 65V Transistors will allow us to reach > 500W levels per PA Module in future*



New Stuff – PA curent/future

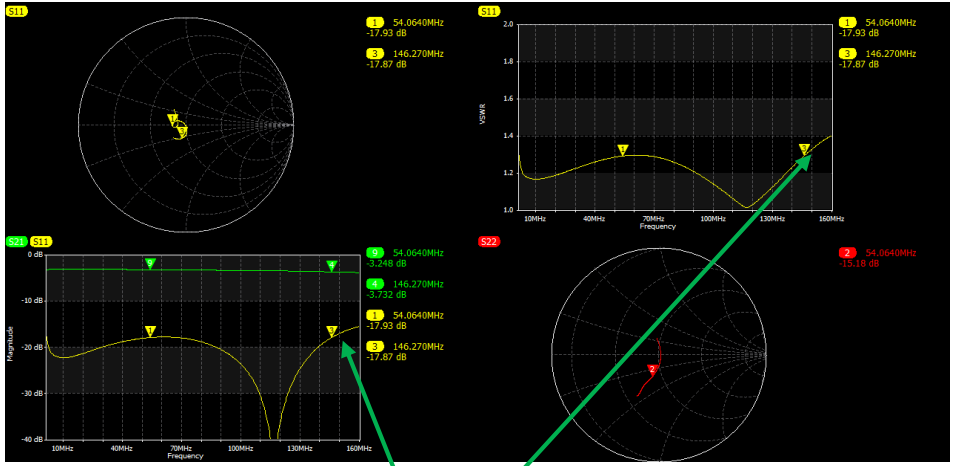
what is in the pipe….

A typical standard combiner



50MHz

Combiner modified to allow for 4m & 2m



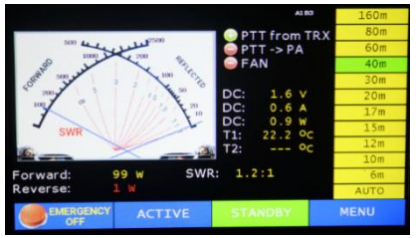
146MHz

New Stuff – PA curent/future

what is in the pipe….

Next Steps ….

- *We are working on a 500W Power Amplifer for 630m to 2m*
  - *2 PA Modules*
  - *Water cooled*
  - *Same size as Charly 25 TRX*
  - *With 7“ touch display as user interface*
  - *STM Architecture (commercial board)*
  - *SW based on work from DJ0ABR*
- *The experience gained on Splitters and Combiners will allow us to investigate and design a **4 port splitter/combiner** for broadband operation (up to 2m)*



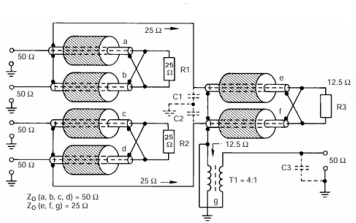


Figure 8A

AN749 Design © Motorola
To be enhanced for broadband operation - above design was limited to 10m…..

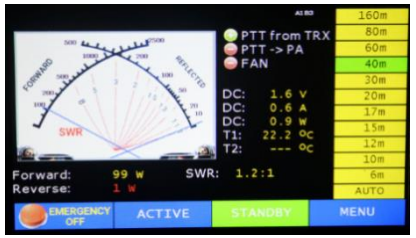
New Stuff – PA curent/future

what is in the pipe….

Next Steps ….

- *As mentioned before - using modern 65V Transistors will allow us to reach > 500W levels per PA Module in future combining them with a 4-port Combiner architecture and with Günthers cooling system will allow us to reach*

very high output levels (>1500W CW)



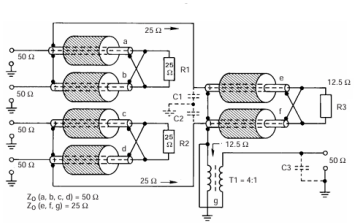


Figure 8A

AN749 Design © Motorola
To be enhanced for broadband operation - above design was limited to 10m…..

New Stuff – Charly 25 TRX

what is in the pipe….

Next steps

- *With various generations of transceivers being developed over the recent years, we are aiming for an update of our latest model*
- *The following improvements are in the pipe:*
  - *More bands 4m & 2m as part of its standard configuration*
  - *More output power (100W)*
  - *All boards to be renewed for easier production*
  - *300W DC/DC converter for 13,8V to 28V (enables us to use our modern PA/TL design - the 300W Board used @100W will be* ***non - destroyable at any SWR …..***
  - *USB accessible from the Frontpanel*

Final version

Prototype #3

Prototype #2

Prototype #1

New Stuff – High End Charly 25 TRX

The Space Commander

Technical Specs

Based on 10 years of experience in SDR HW&SW development we plan for a new, future proof model, able to meet the challenges of the time to come

Mechanics

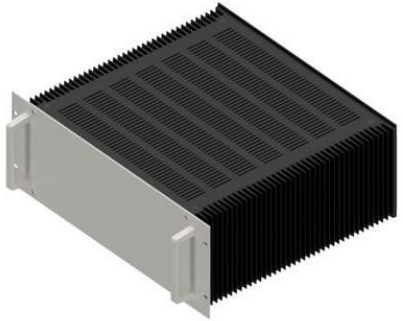
- *The mechanical part will be based on a high quality 19“ case designed and produced by Fischer Elektronik*

User Interface

- *We will use a 10“ Touchpanel as user interface plus additional buttons for easy usage*

Power

- *Power Supplies required will be built in*
- *We will use high quality power supplies software controlled & certified for medical designs – specified for 80Vac to 264Vac and hence compatible with any power grid in the world*



New Stuff – High End Charly 25 TRX

The Space Commander

Technical Specs

TX

- *Depending on options installed (VHF/UHF/SHF) - output power will be either 500W or 1KW for all bands.*
- *Frequency range will be 630m* to 2m in the standard setup. (*630m limited in output by semiconductor limitations)*
- *Predistortion coupler included*
- *10MHz Reference IN/Out*

RX

- *2 Channel RX from <50KHz to 148MHz*
- *10MHz Reference in/out*

New Stuff – High End Charly 25 TRX

The Space Commander

Technical Specs

Options available

- *Transverter for 70cm minimum 50W out*
- *Transverter for 23cm minimum 50W out*
- *Transverter for 13cm minimum 50W out*
- *RX 739MHz for Es‘hail / Oscar 100 and other 10GHz receive applications*
- *We will support any future SHF Band required for Space communication (eg. Lunar Gateway)*
- *GPS Stabilization*

New Stuff – High End Charly 25 TRX

Software activities

Work to be done

Power amplifier

With commercial STM based control board and 7“ Touchpanel

- *Frontpanel SW*
- *Graphic design (TouchGFX framework)*
- *HW control*
  - *SWR measurement*
  - *PA protection*
  - *Power Supply control*

Thetis

Develop a migration tool to adopt standard Thetis towards Charly 25 HW (speed up migration)

Adopt Thetis to actual Charly 25 HW

Add additional features to standard Thetis (eg. Automatic RX diversity)

Charly 25 – Ham Radio 2025

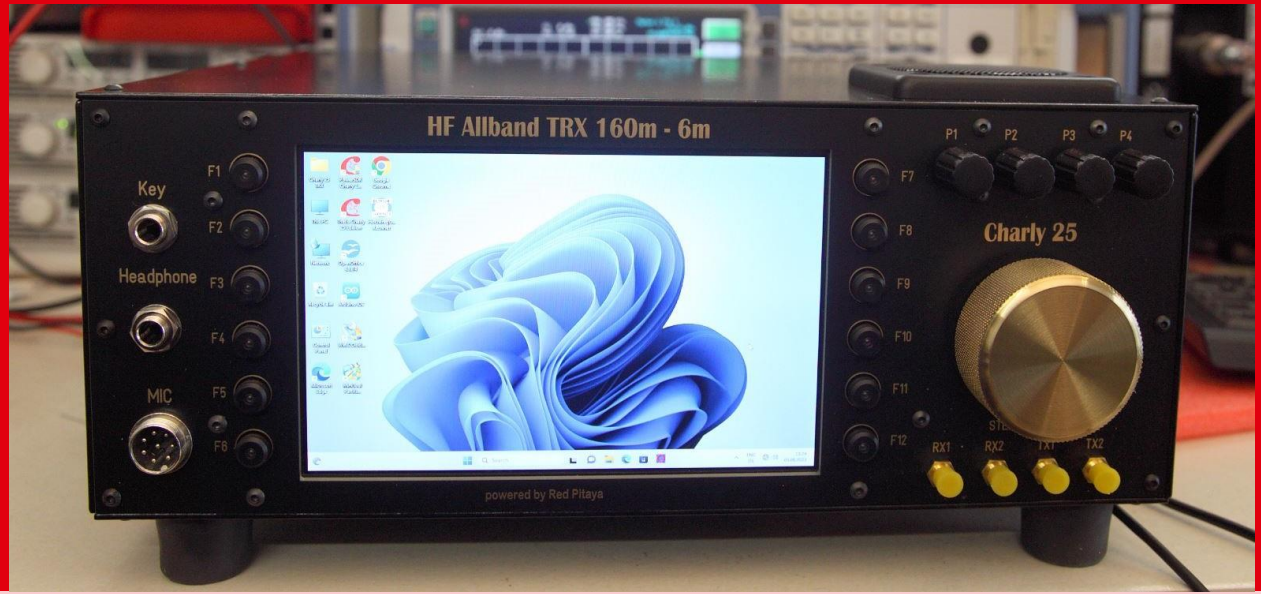
We will be back next year with more products to come

- happy to demonstrate our latest developments -

Many Thanks for your Time


Q
&
A

THANK YOU.



State of the Art SDR-Technology – Eigenbau machts möglich !