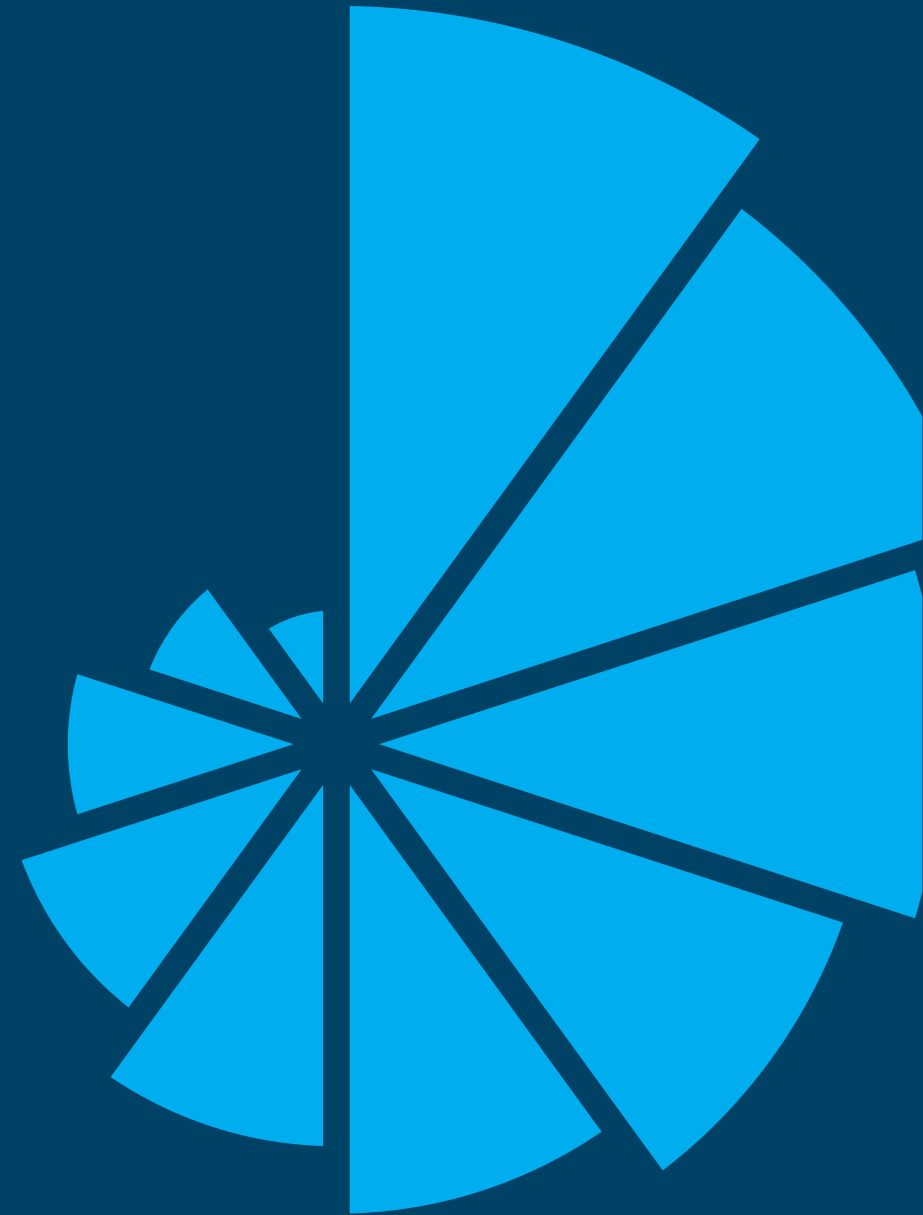


# Elenos Group Webinar:

## The RF Supercomputer



# Webinar Schedule

- The Million Dollar Question
- Why a RF Supercomputer?
- Algorithms, Algorithms, Algorithms
- Prior Technology – the History
- OK, let's finally see it
- Some Spec's
- What have we achieved – i.e. what qualifies it as a **RF Supercomputer**?
- Your Questions



Your host:  
Chuck Kelly  
VP Market Development



Special Guest:  
Morten Simonson  
CTO – Elenos Group



*Remember, watching this webinar qualifies for ½ credit towards SBE certification under Category 1.*



# The Million Dollar Question



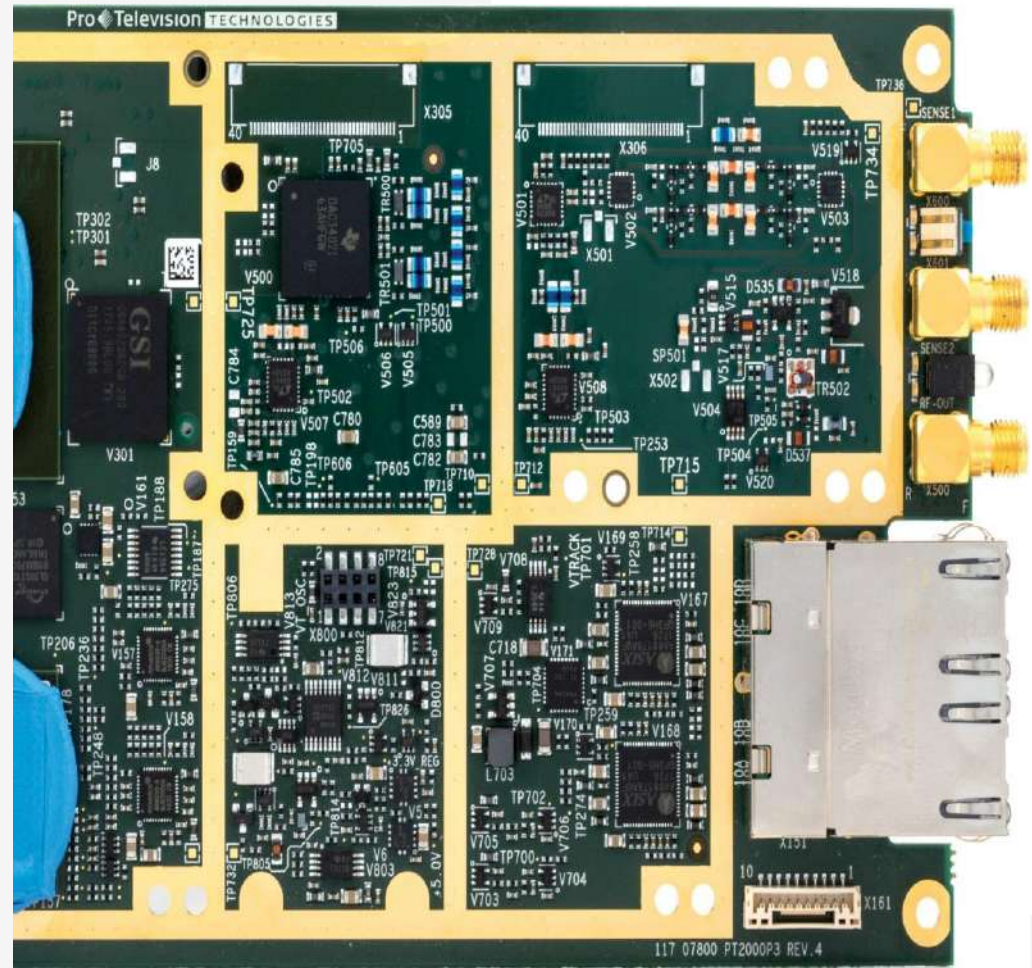
# Why an RF Supercomputer?

- More complex transmission modes
- Reduced PA linearity
- IP STL links
- SFN's require precise timing
- Remote monitoring and control
- Eventual move to IP v6
- Things we haven't even thought of yet



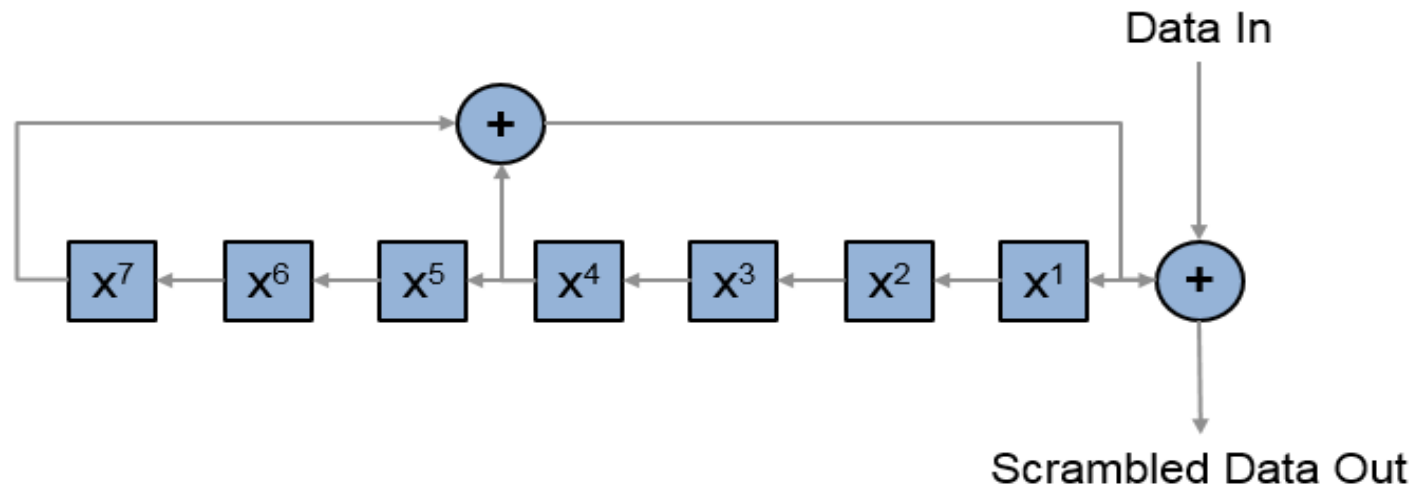
# Why a RF Supercomputer?

- Ever increasing pace of change
- Traditional hardware just doesn't do it
- We needed a single hardware platform that could do it all



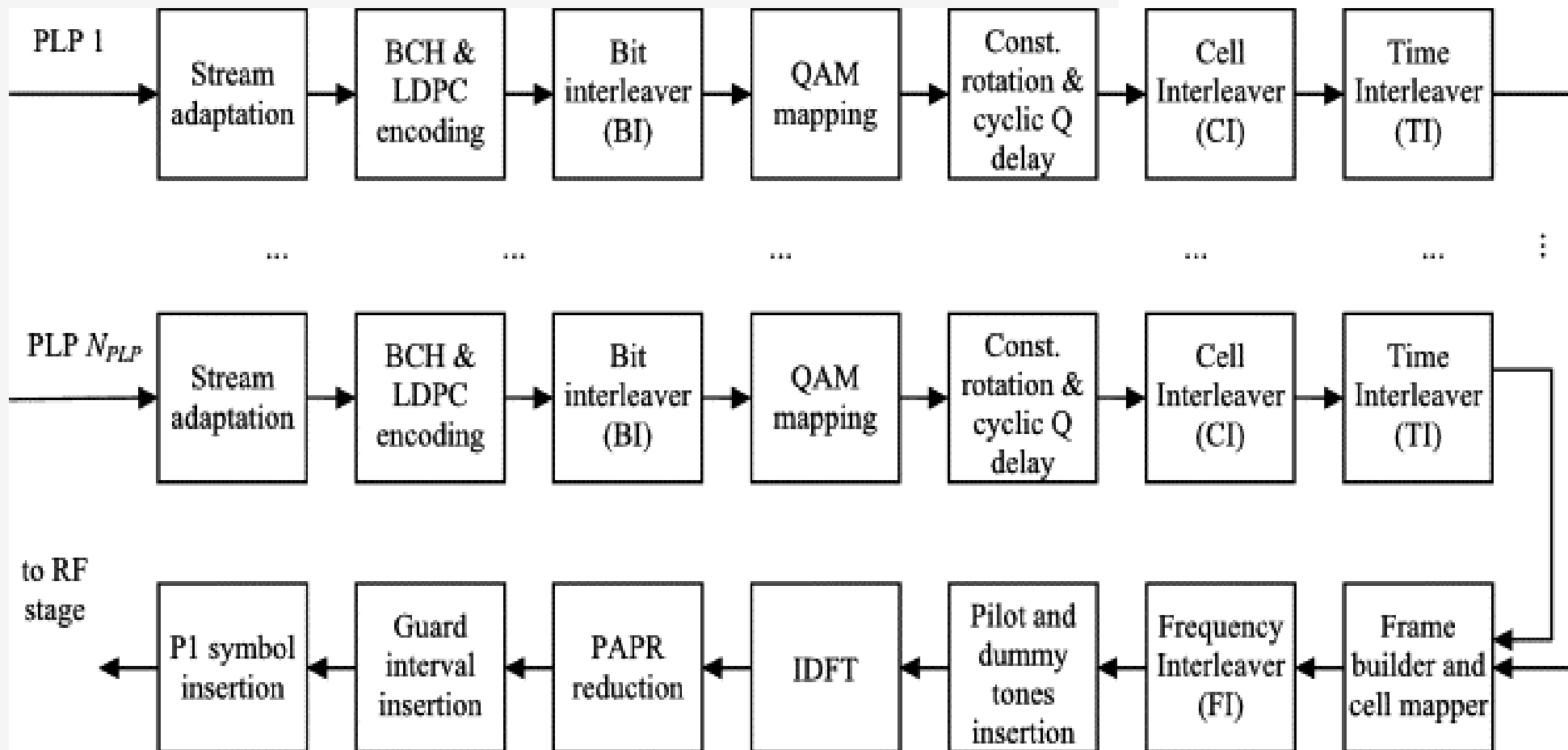
# Algorithms, Algorithms, Algorithms

- A simple scrambler (“whitens” data – de-correlates transmission-symbol from data content):



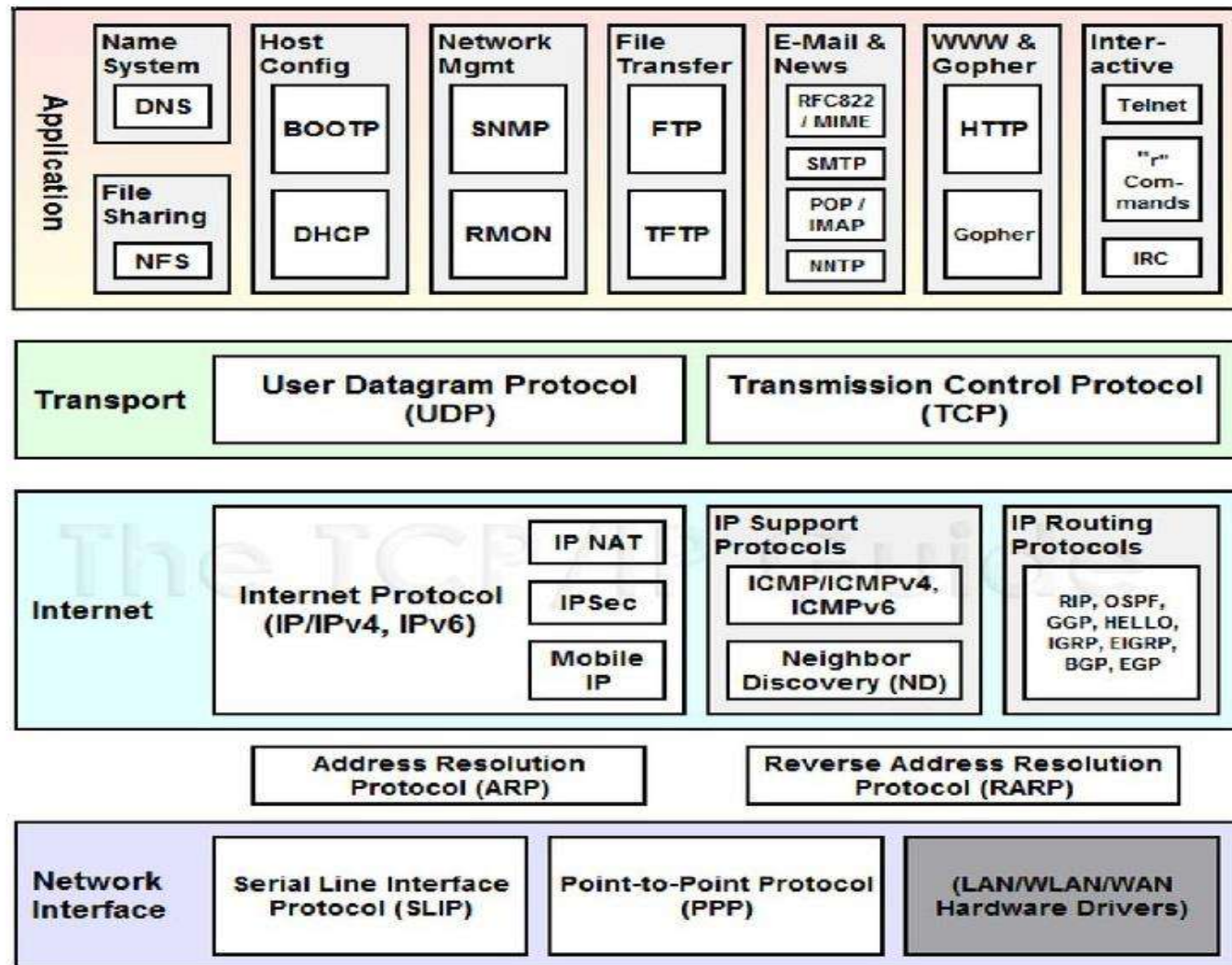
# Algorithms, Algorithms, Algorithms - II

- But there are MANY blocks :



# Algorithms, Algorithms, Algorithms

The IP protocol stack in itself is very complex and very dynamic in its nature.





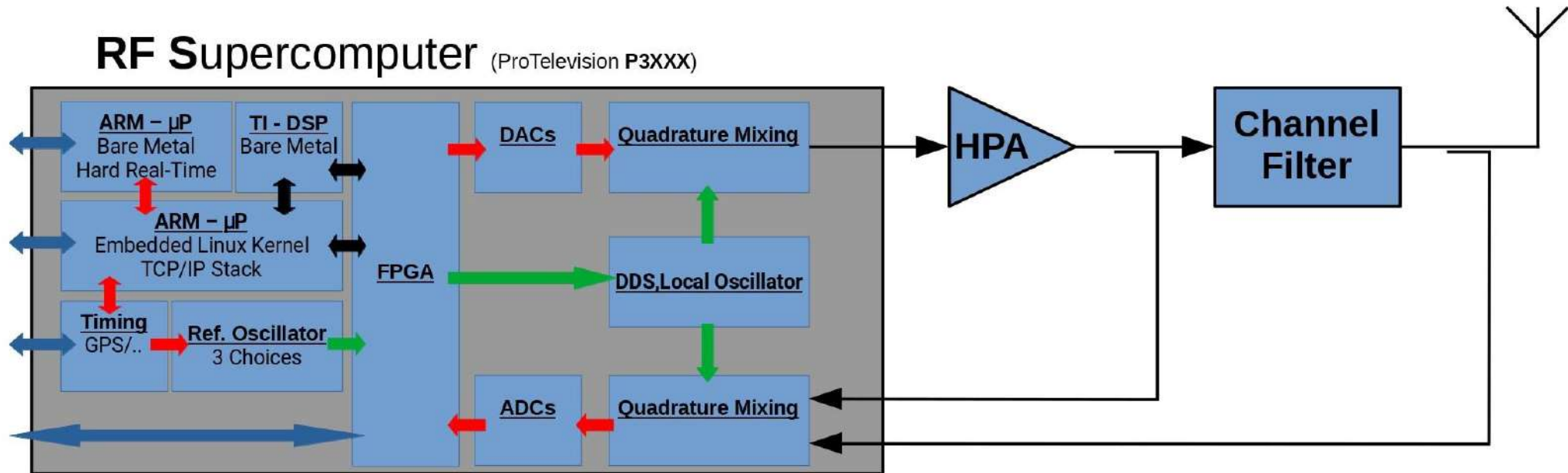
# Prior Technology – The History

- 1964: Analog Modulator, dedicated hardware.
- 1999: First Digital Modulator (10 DSP in Parallel).
- 2001: Second gen. Digital Modulator (Own ASIC).
- 2005: Third gen. Digital Modulator (Own ASIC, FPGA).
- Current Digital Platform: **RF Supercomputer!**



# OK, Let's finally see it

## RF Supercomputer (ProTelevision P3XXX)



- ↔ Internal Bus, Direct Memory Access
- ↔ Internal Bus
- ↔ External I/O, Analog/digital/IP/GPS Antenna/...
- ↔ Analog Timing Reference Signal (L.O./...)
- ➔ Analog Timing Reference Signal (L.O./...)



# Some Specs

- 16 layer printed circuit board
- 2200+ electronic components
- 5 Ethernet ports with individual MAC addresses
- 100% Synchronous Design
- Radio Frequency Output from 30MHz to 760MHz, 1Hz steps
- Single supply voltage (5 to 50 V)
- Fully (remote) firmware upgrade
- Software Defined
- Build-in GNSS (optional: GPS, Glonass, Galileo & BeiDou)
- Onboard webserver control / monitoring (no FLASH Or Java)
- 3 different levels of Reference Oscillator (holdover duration)
- Currently supports: DVB-T/H/T2, ATSC legacy/3.0, ISDB-T/Tbb  
(with remux), Analog PAL/NTSC, DAB/TDMB/DAB+, ..)



# The ProTelevision/Elenos Group RF Supercomputer is:

- A programmable hard real-time processor
- A programmable Linux real-time, multi-threaded processor
- A programmable DSP
- A large programmable FPGA
- A powerful combination!
- Super fast interconnections via DMA
- Smart programming to spread the work around
- One integrated board of programmable power
- Fast time to market as hardware is already done
- Reuse of code from one product to all
- Improvements in one product flows to all
- Engineers use their minds for innovation



# Let's look at the web interface

The screenshot displays the web interface for the PT3040 A-TV Modulator. The interface is divided into several sections:

- Block Diagram:** A central diagram showing the signal flow from INPUT (Video, SDI, Audio) through MODE (PAL, G), PRE-CORRECTION (Linear, Clipping, Non-Linear), and OUTPUT (ALC, RF Output). It also includes a REFERENCE section with GNSS, 10MHz, and 1PPS inputs.
- Configuration Panels:**
  - Video:** Switching (Primary: Video 1, Secondary: Video 2, Policy: Only Primary), Effective Policy (Only Primary), Switch Delay (5 sec), Video (Man. Gain: 0.00, White limit: 90, Sync Level: 27, Residual Carrier: 10), Video CTRL (Video Carrier: ON).
  - Mode:** Video Standard (G), Color Encoding (PAL).
  - RF Output:** Output Status (Normal), Output Mute (checkbox), Min. Ramp-up Delay (800 ms), RF Alarms (Level Out of Range: Ok, ALC Range: Ok), Settings (Frequency: 474000000 Hz, Frequency Offset: 0 Hz, Spectrum Polarity: Inverted, Level: 0.00 dBm, RF Output Filter Control: Enabled), Cable Compensation (RF Output Level, Mode: None).
- System Information:** A SYSTEM button and a timestamp of 18:13:37.



# Key points for review:

- The ProTelevision/Elenos RF Supercomputer is powerful
- It is programmable for any known RF TV/Radio modulation
- It operates from 30MHz to 760MHz
- Includes GNSS timing receiver
- Allows advanced PAPR for improved efficiency
- Includes powerful signal analysis which facilitates precorrection
- Integrated webserver for monitor and control
- Field updatable for technological advances / new protocols
- Designed to be fed by IP or other inputs
- The RF Supercomputer is or will be the basis of ALL Elenos, Itelco and BE transmitters



# Your Questions?

*We'll try to answer them all here, but if we can't we'll email you.*





# Thank You



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We know how valuable your time is, and we are honored that you chose to spend time with us.

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[www.elenosgroup.com/webinar/](http://www.elenosgroup.com/webinar/)

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