

ULTIMATE™ UHF SOLID STATE TRANSMITTER

Introduction

- The Thomson ULTIMATE range of solid state UHF TV transmitters are specifically designed for:
 - Analog (NTSC) 500W to 60kW peak of sync
 - Digital (ATSC / DVB-T) 125 W to 20kW rms



ULTIMATE Features

Integrated Dual exciter configuration

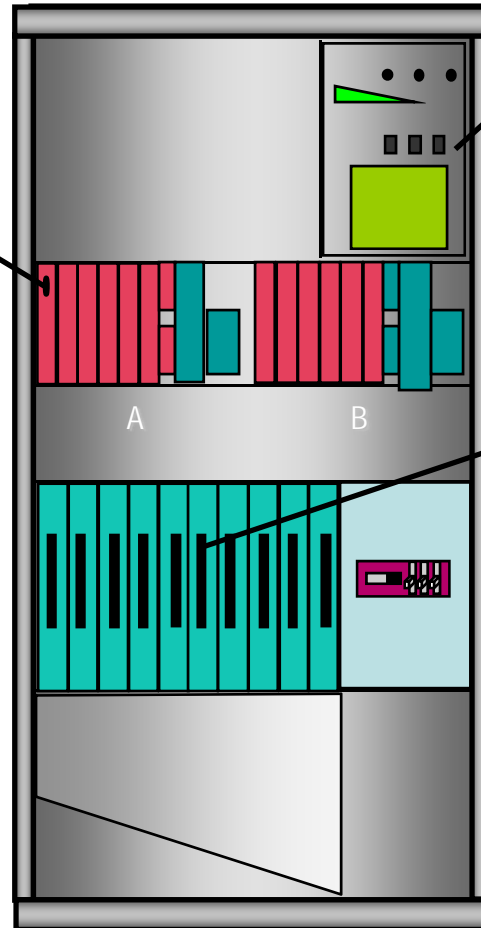
- Analog or digital dual exciters
- Automatic switch over
- Internal redundancy
(1 PS for each exciter)
(1 synthesizer for each exciter)

Cooling

- Air or liquid

Power supply

- 1 PS for every 2 amps
- Hot-swappable modules
- Directly plugged in the PA
- Self-diagnostics
- Individually protected
- Power Factor Correction



Control Panel

- Color touchscreen display (digital)
- Easy to use control, maintenance & troubleshooting screens
- Memory for logging tx events
- Hardwired buttons for basic control

Amplification chain

- Broadband amplifier
- All PAs operate in parallel
- Hot swappable modules
- Directly plugged into output combiner
- Self-diagnostics
- Individually protected

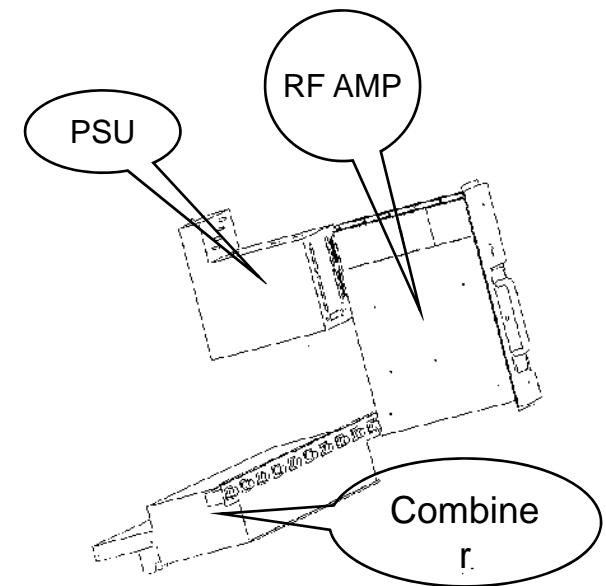
Compact size

Additional ULTIMATE Features (Digital TXs only)

- VSWR fold back (maintains constant Reverse Power)
- Web based remote Graphic User Interface (GUI)
- Internal blower option
- System Characteristics OUTlook (SCOUT) option
- Easy upgrade path from low power to high power

The ULTIMATE Difference

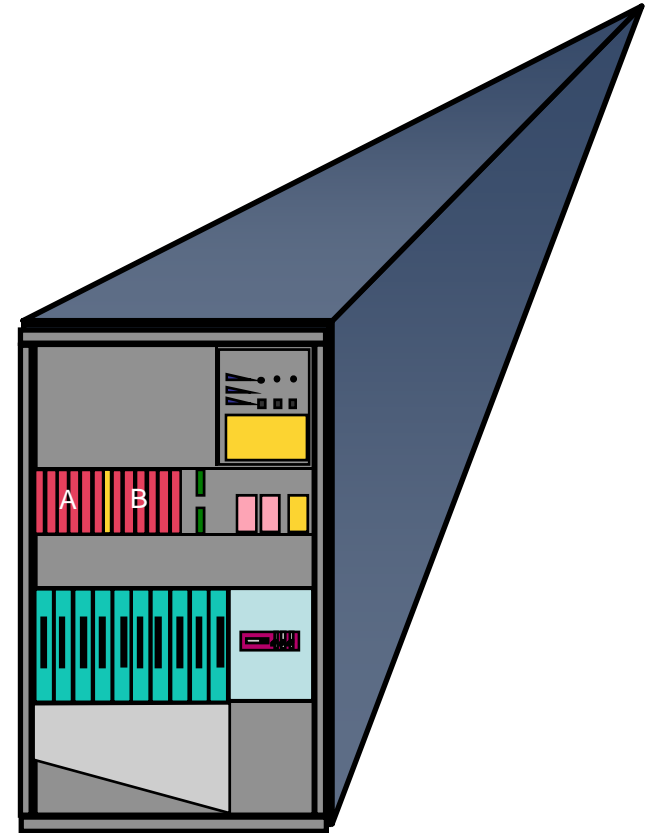
- Intelligent Transmitter with Digital Adaptive Pre-correction (DAP) - best performance in the industry (digital standard only)
- Broadband LDMOS RF amplifier module covers all digital and analog UHF channels (NO Circulators)
- All PA's operate in parallel for best redundancy (NO Driver Modules)
- Liquid or Air-cooled (ultra reliability with liquid cooled)
- Regulated and Power Factor Corrected switching power supplies eliminate the need for automatic voltage regulator and reduce harmonics
- Cable-less amplifier, PS, and combiner module interconnect reduces RF signal losses
- Compliant with international quality and safety recommendations (CE, IEC-215, ETS 300-385)



Reliability & Redundancy

On-Air availability is Increased

- UPS option for CPU
- Basic backup local control (On / Off / Reset)
- Ultra low device junction temperatures (120 C - liquid cooling)
- **Redundant configurations**
 - Parallel cabinets
 - Main / alternate transmitters with auto changeover
 - Main / alternate pumps (liquid cooling)
 - Main / alternate blowers (external only for air cooling)
- **Internal redundancies**
 - Main / alternate exciters
 - Amplifiers – all parallel configuration
 - Power supplies - one power supply per two amps
 - Synthesizers - 1 per exciter
 - CPU has own PS



Easy Maintenance & Reduced Operating Costs

- Digital adaptive precorrection - less set up time needed because DAP performs pre-corrections automatically and maintains stable performance (digital TxS only)
- High efficiency broadband LDMOS amplifier - only one module design covering entire UHF range
 - reduces spare parts inventory
- Hot swappable modules – amplifier, power supply and exciter modules
- Color Man-Machine Interface (MMI) with easy to use control, monitoring & troubleshooting screens (digital TxS only)
- SCOUT low cost Tx performance measurement system option (digital standards only)
- Potential liquid cooling benefits – see next slide

Why Liquid Cooling?

- Less frequent cooling system maintenance – annually requires only one system flush vs. frequent, multiple air filter changes
- Ultra reliability due to reduced device junction temperatures
- Lower annual electricity costs due to reduced air conditioning requirements
- Significantly lower noise level
- Smaller footprint versus air cooling
- Sump tank / pump assembly can be mounted outside
- Capable of operation under more hostile environments (temperature, altitude, dust conditions)

Transmitter Assemblies

TX Main assemblies:

System Control / Exciter / HPA
(.125 - 6kW ATSC air, .125 - 7.5kW liq.)

Slave HPA (1 or 2)
(>6 - 20kW ATSC air, >7.5kW liq.)

Unitized RF System

Unitized Pump/Sump Tank Assy
(liquid cooled only)

Sub-assemblies:

Analog or Digital Exciter

Power Amplifier Module

Power Supply Module

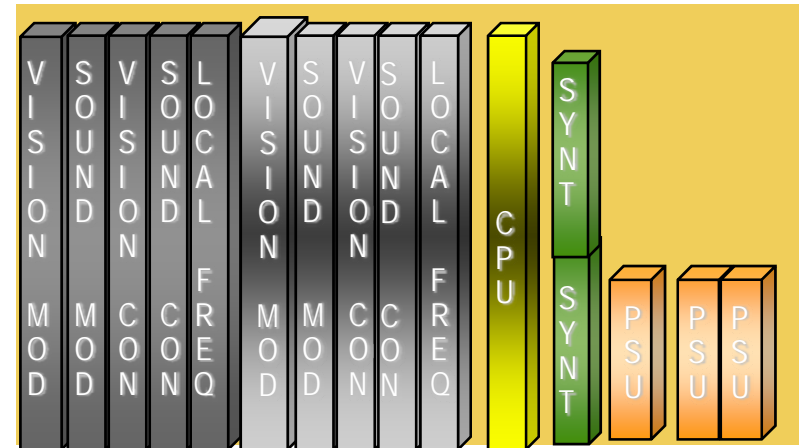
Patented PA Combiner

Color Control Panel

Load Bank Assy

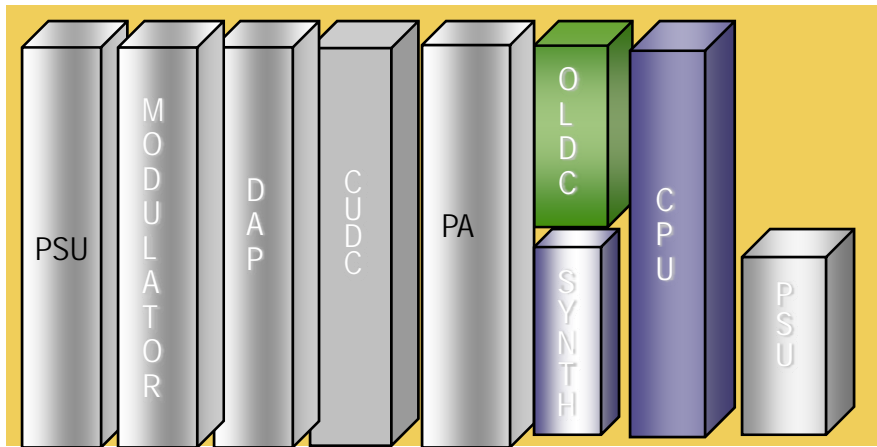
Analog Exciters

- All vision and sound standards available
- High level of IF precorrection
- Fully microprocessor controlled
- Hot-pluggable modules
- Automatic switchover (dual drive)
- Internal redundancy for synthesizer, power supplies



DUAL DRIVE CONFIGURATION

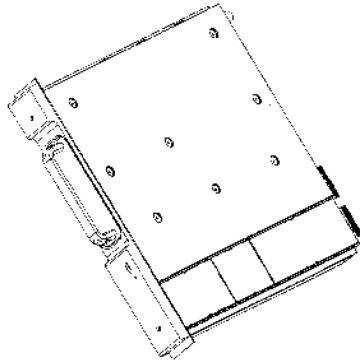
Digital Exciters



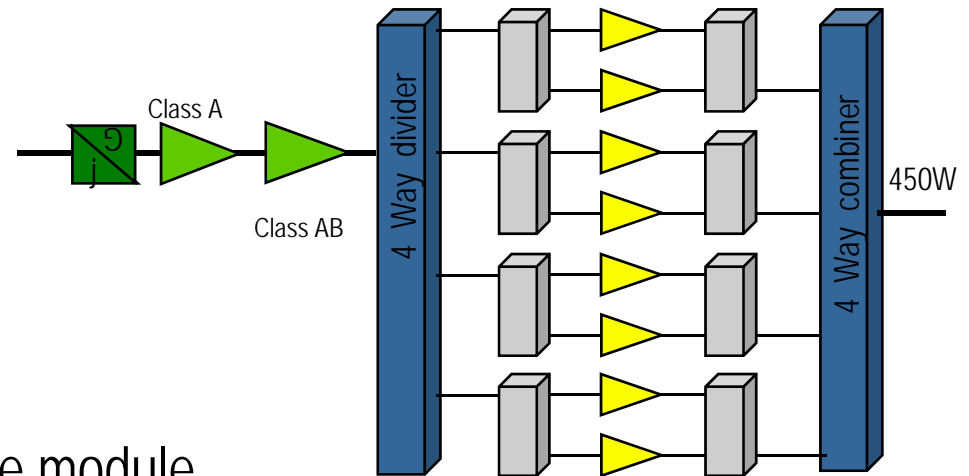
SINGLE DRIVE CONFIGURATION

- ATSC and COFDM standards
- Digital adaptive pre-correction (DAP)
- Fully microprocessor controlled
- Hot-pluggable modules
- Automatic switchover (dual drive)
- Internal redundancy for synthesizer, power supplies
- Separate PS for CPU
- High Quality CUDDC for better Fwd to Rev signal isolation
- Integrated on line modulator (OLMC) & demodulator (OLDC) for precise performance measurements

Power Amplifier Unit



450 W rms or 1.8 kW peak of sync @ 32V



Gain = 60 dB

16 parallel final class AB devices

- LDMOS Technology
- Fully broadband with only one module
- No circulators
- Hot-swappable while on air
- Same module for digital and analog service (visual or aural)
- Individually protected (VSWR, Over - Drive, Temperature, Current, & Voltage)
- Self-diagnostics fault status LED

Power Supply Unit 6.4 KW @ 32V

Supply: Three phase mains

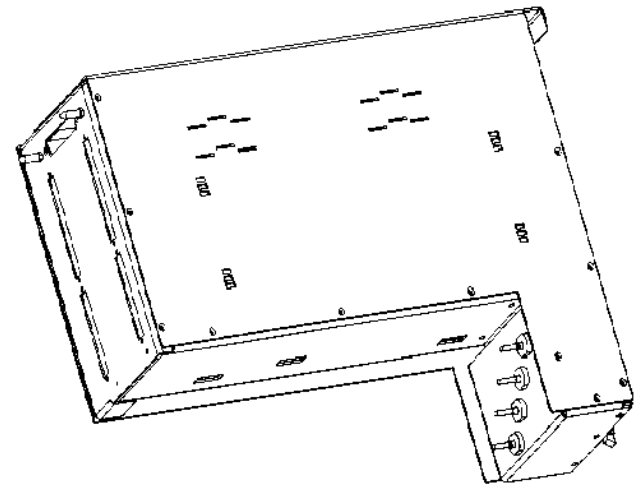
208V - 400V

+/- 15%

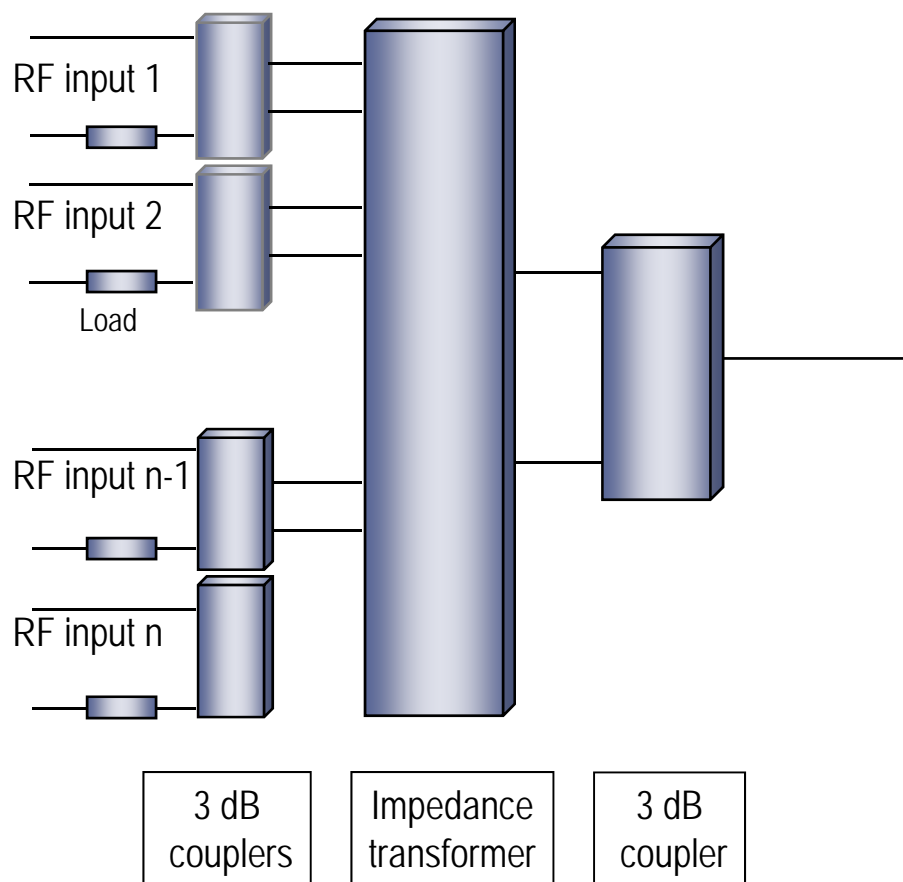
480V

+10% / -15%

- Air or Liquid Cooled
- Hot-swappable while on air
- Individually protected (Over voltage, Over temperature, Over current)
- Power Factor Correction
- Self diagnostics fault status LED
- No transformer for mains supply
- CE Compliant for EMC compatibility

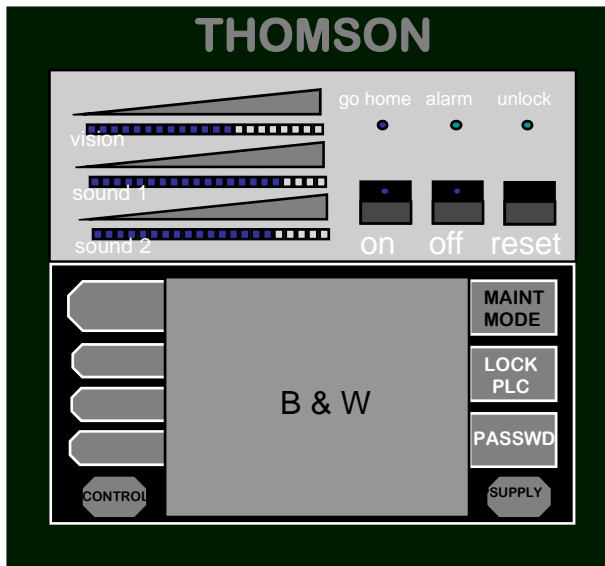


Power Amplifier Combiner & RF Filters

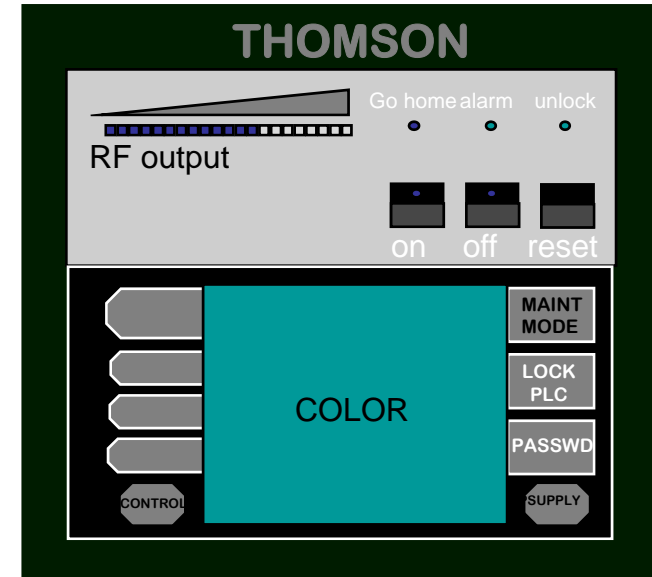


- Thomson patented UHF combiner
 - low loss < 0.3 dB
 - Isolation between RF Inputs > 25 dB
- Digital Output mask filter
 - High performance band pass filter per FCC requirements
 - Unitized design w/ patch panel & loads
- Analog Diplexer
 - Low loss coaxial cavity technology

Control Panel & Man Machine Interface



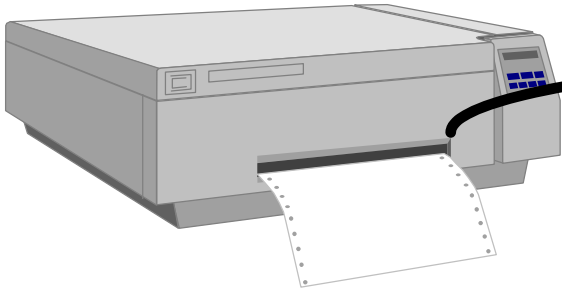
Analog



Digital

- Simplicity is the key for the MMI operation:
 - Discrete keys for : ON, OFF, & RESET commands
 - LED indicators for : Alarms, Go Home, Unlock
 - Bar graphs for metering:
 - Analog - Visual, Aural 1, Aural 2 Fwd Power
 - Digital - RF output
- Color touch screen for use of control, status, and password protected maintenance modes (digital Tx's only)

Remote Control Capability



Down load all TX information to a PC or a Printer (500 events)

- Event change order
- Failures
- Status change



Works with standard hard wired parallel interface

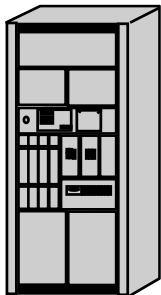


Also works with Thales web Based remote GUI via PC and RS232

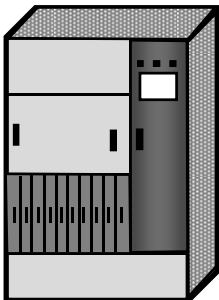
ULTIMATE Analog Transmitter Configurations

(air cooled)

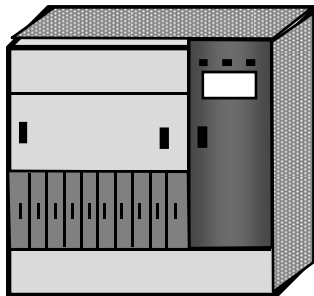
0.5 KW, 1 KW & 2KW



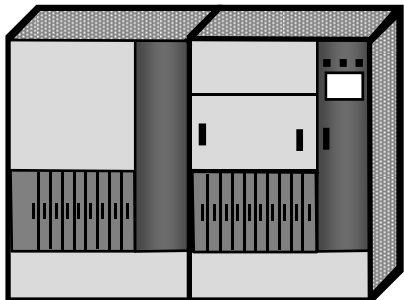
5 KW & 10 KW



15 KW

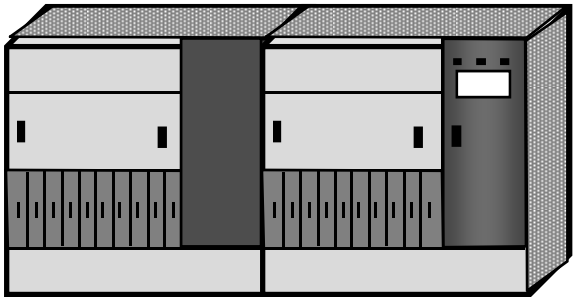


20 KW

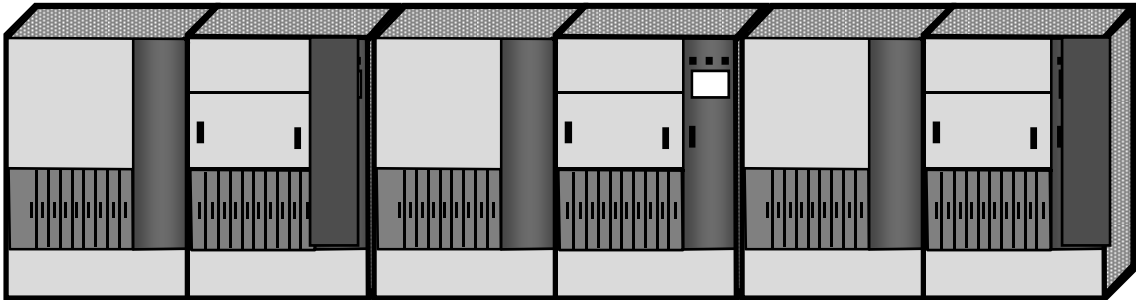


40 KW

30 KW



60 KW



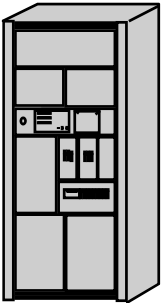
ULTIMATE Analog TV transmitters Sub-systems

Peak Power	Exciter	RF Amplifiers (V+S)	PSU	No. Cabs	Air Cooling	Diplexer
.5 kW	1	1	1	1	internal	common mode
1 kW	1*	1**	1***	1	internal	common mode
2 kW	1*	2	1***	1	internal	common mode
5 kW	1*	4+2	3	1	external	1
10 kW	1*	8+2	5	1	external	1
15 kW	1*	12+2	7	1	external	1
20 kW	1*	16+2	9	2	external	1
30 kW	1*	24+4	14	2	external	1
40 kW	1*	32+4	18	4	external	1
60 kW	1*	48+8	28	6	external	1
	* second exciter optional					
	** second RF amplifier optional					
	*** second PSU optional					

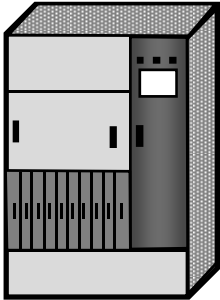
ULTIMATE Digital Transmitter Configuration

(air cooled)

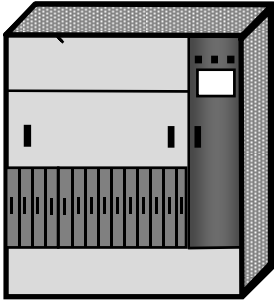
0.125, 0.25, 0.5
1.25 & 1.5 kW



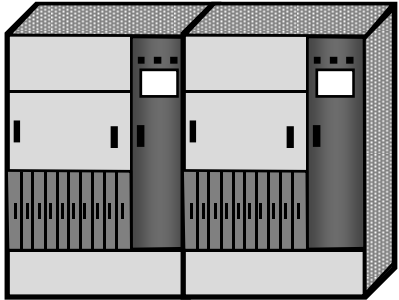
2.5 kW, 3 kW & 4kW



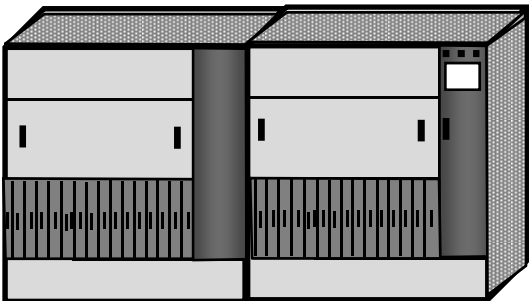
5 kW & 6kW



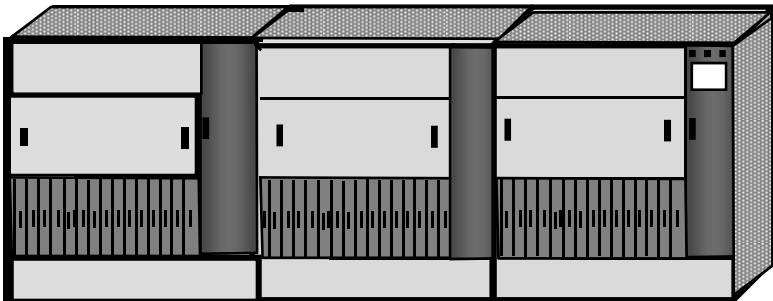
7kW & 8kW



10 kW & 12 kW



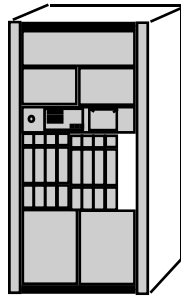
15 kW



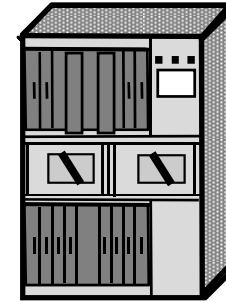
ULTIMATE Digital Transmitters Configurations

(liquid cooled)

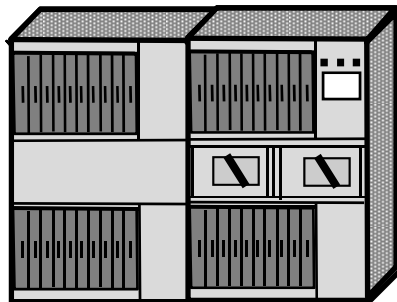
0.125 kW, 0.25 kW, 0.5kW, 1.25 kW
1.5 kW, 2.5 kW, 3 kW



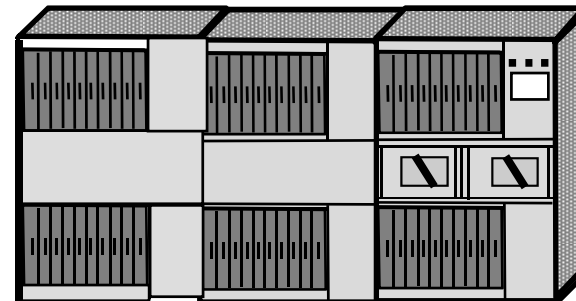
4 kW, 5 kW, 6 kW, 7 kW, & 8 kW



10 kW, 12kW & 15kW



20kW



ULTIMATE ATSC TV Transmitters Sub-systems

RMS Power	Exciter	RF Amplifiers	PSU	No. Cabs	Air Cooled	Water Cooled
.125 kW	1*	1	1	1	internal	ext heat exchgr
.25 kW	1*	1	1	1	internal	ext heat exchgr
.5 kW	1*	2	1**	1	internal	ext heat exchgr
1.25 kW	1*	3	2	1	internal	ext heat exchgr
1.5 kW	1*	4	2	1	internal	ext heat exchgr
2.5 kW	1*	6	3	1	external	ext heat exchgr
3 kW	1*	8	4	1	external	ext heat exchgr
4 kW	1*	10	5	1	external	ext heat exchgr
5 kW	1*	12	6	1	int or ext	ext heat exchgr
6 kW	1*	16	8	1	int or ext	ext heat exchgr
7 kW	1*	18	10	1	int or ext	ext heat exchgr
7.5 kW	1*	20	10	1	int or ext	ext heat exchgr
10 kW	1*	24	12	2	int or ext	ext heat exchgr
12 kW	1*	32	16	2	int or ext	ext heat exchgr
15 kW	1*	36	20	2	int or ext	ext heat exchgr
20 kW	1*	48	24	3	N/A	ext heat exchgr
* second exciter optional			** second PSU optional			

ULTIMATE Features Recap

- Intelligent ATSC transmitter with Digital Adaptive Pre-correction (DAP)
- Low maintenance and low operating expenses
- Multiple areas of redundancy
- Air or Liquid cooled (ultra low transistor junction temperatures with liquid cooling)
- Compact size
- Cable-less module interconnect to reduce RF signal losses
- Hot-swappable modules (amplifiers, power supplies, exciter modules)
- Broadband LDMOS amplifiers (no narrowband circulators)
- Power factor corrected PSs to reduce AC harmonics
- Easy to use color Man-Machine Interface (MMI)
- Remote control options: PC software via RS232, SNMP or standard hard wired interface
- Easy upgrade path to higher power