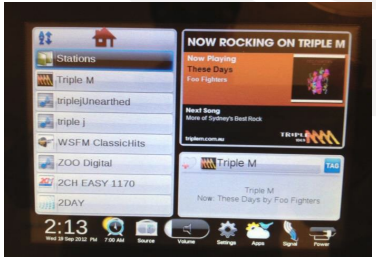
GATESAIRCONNECT VIRTUAL events

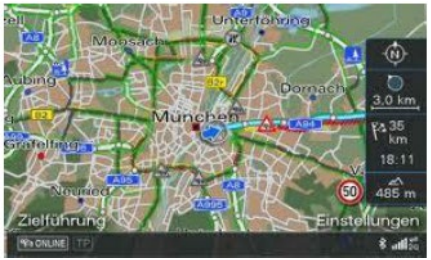
DAB: COMPLETE SOLUTIONS FOR TOTAL NETWORK DEPLOYMENT

CONNECTING WHAT'S NEXT

WHY DAB

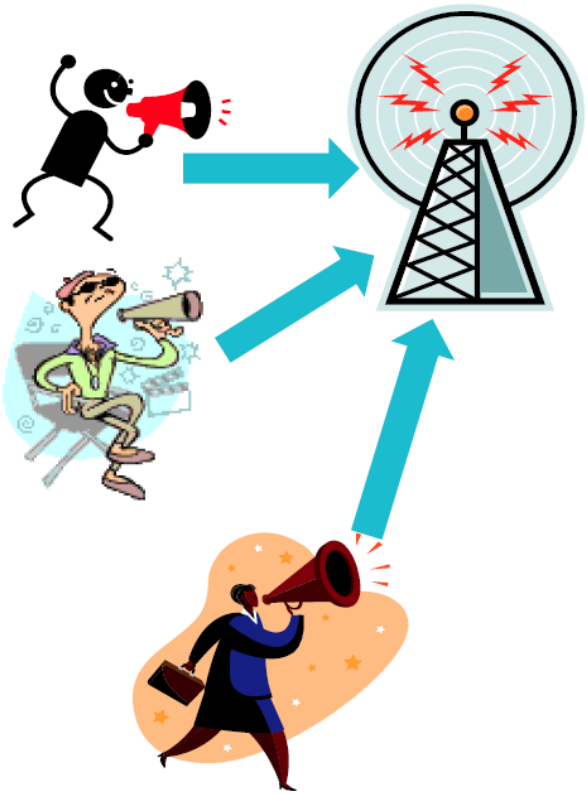
- The DAB system provides spectrum and power efficiencies
  - Provides for many services
  - Reduces Energy consumption
- Superior audio quality
- Data Services for mobile, portable and fixed receivers
  - Expand brand portfolios
  - Station logo and brand recognition
  - Program Associated Data
  - Traffic information





DAB STRUCTURE

- Multiple different radio stations transmit on the same frequency
- Various different radio stations use the same transmitter
- Multiple different radio stations share the cost of the single transmission
- Most cost-effective method to deliver content



ENSEMBLE STRUCTURE

An Ensemble will typically carry multiple services from multiple radio networks, for example:

	Stations (services)	Capacity used
• Radio network 1	2	128kbps
• Radio network 2	4	256kbps
• Radio network 3	3	192kbps
• Radio network 4	9	576kbps
	Total 18 stations	**1152kbps**

- Each network can have their own allocated capacity on the ensemble
  - No other network has access to that capacity

- Each network can **reconfigure** their allocated capacity anytime without impacting the other networks' services
  - **Pop-up services** change their name and sometimes bit rate regularly

DAB+ AUDIO ENCODING

Many combinations to allow the most cost effective delivery of different audio content types

HE AAC+ V2 audio encoding table combinations

Sampling rate (kHz)	SBR on	Sub-channel data rates (kbps)					
		Stereo		Parametric Stereo		Mono	
		Min	Max	Min	Max	Min	Max
48	no	24	192	-	-	16	176
24	yes	24	136	24	48	16	64
32	no	24	192	-	-	16	168
16	yes	24	136	24	48	16	64

Coding Technologies / Dolby AAC+ implementation

ERROR CORRECTION CHOICES

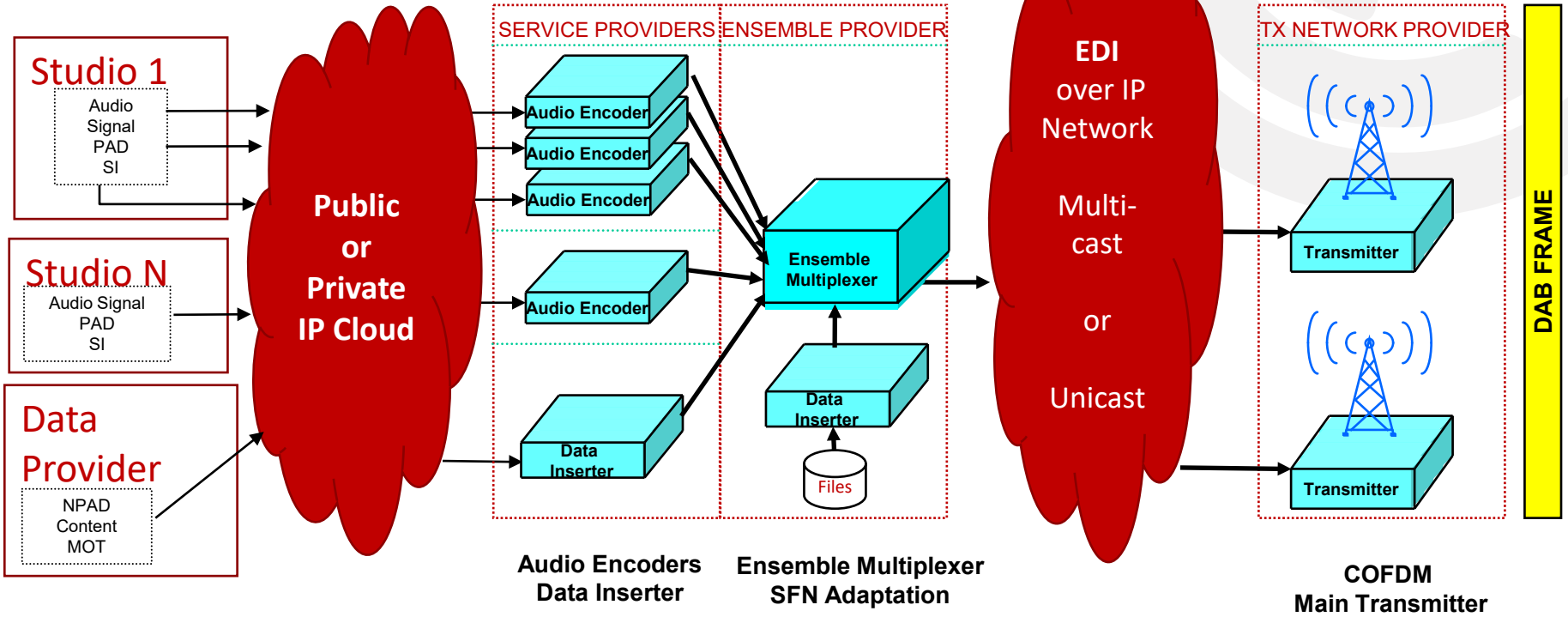
Forward Error Correction (FEC) codes are applied per sub-channel

Comparative performance

FEC Code	Code Rate	Capacity (kbps)	Number of 64kbps channels	Approximate power required relative to 3A
1A	1/4	576	9	-3 to -6dB
2A	3/8	864	13	-2 to -3dB
3A	1/2	1152	18	0
3B	2/3	1536	24	+3dB
4A	3/4	1728	27	+6dB

Payload capacity and transmit power can be traded
Stronger FEC protection = lower capacity BUT lower power for the same coverage area

STRUCTURE OF A DAB NETWORK IN PRACTICE



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MAXIVA VAXT DAB PRODUCT FAMILY

GATESAIR RADIO PRODUCT FAMILY

DAB

Low Power

VAXT 80/150
Ultra Compact

Air Cooled

VAX 300/450

VAX 550/750

VLX Liquid Cooled

VAX 1.2kW - 13.6kW

VLX 3.8kW - 45.6kW

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MAXIVA VAXT DAB ULTRA COMPACT SERIES

80 watts to 750 watts

DAB ULTRA-COMPACT VHF MODELS / POWER LEVELS

1RU Models

80 W

150 W

2RU Models

300 W

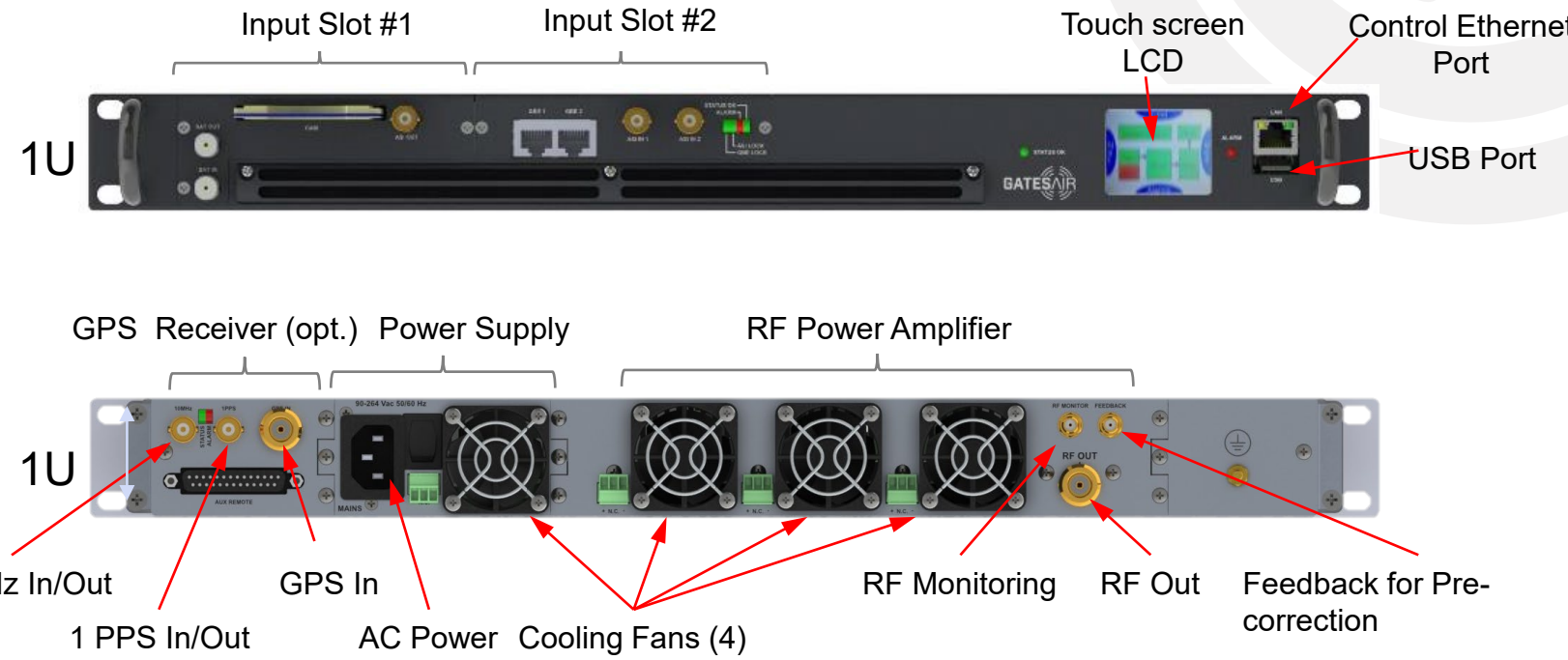
450 W

3RU Models

550 W

750 W

FRONT AND REAR OF 1RU ULTRA-COMPACT



DAB ULTRA-COMPACT MODELS - SUMMARY

KEY FEATURES

- High-efficiency Doherty PA's
  - VHF BIII is a single broadband design 170-240MHz
- ETI and EDI inputs
  - Additional input board options
  - 2 – EDI plus 2-ETI
  - 4 – ETI inputs
- Adaptive pre-correction circuits with MER $\geq$ 33dB
- Configurable as: Transmitter, On-channel SFN Gap-Filler, or Transposer
- Modular design, PA and Power Supply plug-in and can be replaced in a few minutes.

INPUT CARDS

FRONT PANEL

Note that one or two input cards can be used, for flexibility

RF In
(For Transposers, Gap Fillers)

2 x EDI + 2 x ETI
Or
4 – ETI
(For Transmitters)

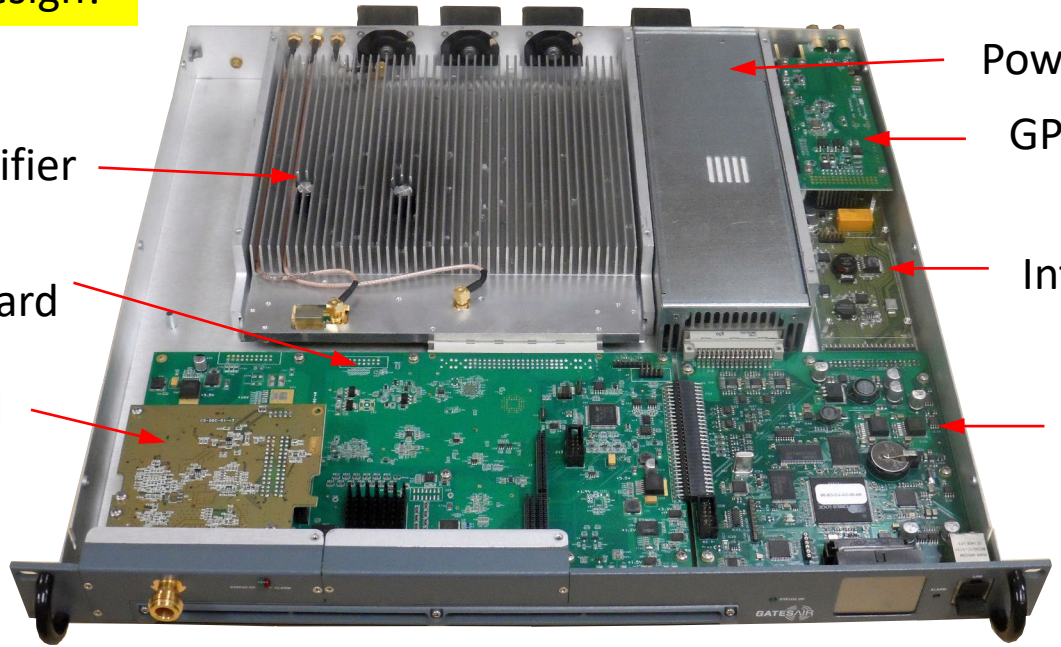
Touch screen LCD

USB Port

Control Ethernet Port

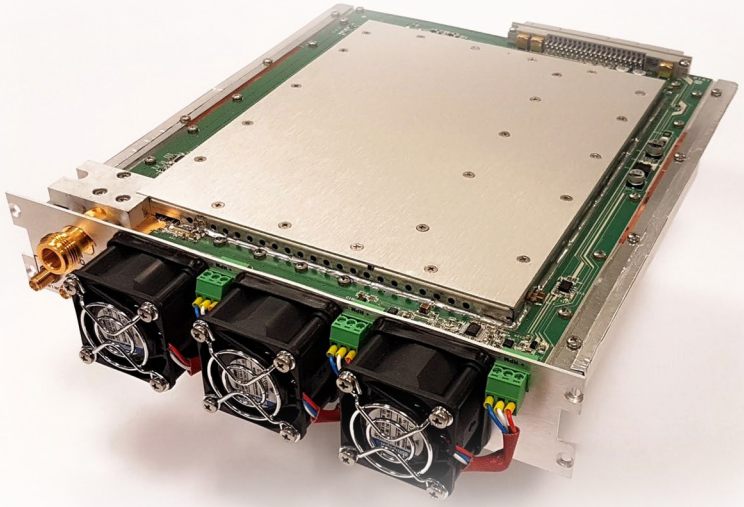
UNDER THE HOOD - WHERE ARE THE CABLES?

"No Cable" Design!



PA MODULE

- Plug-in PA Module Assembly
- Complete unit is easily removed and replaced in a few minutes



VAX OP SERIES

- Separate Exciter/Driver + PA Module
- Available output power: 300W to 2,000W
- Adaptive pre-correction circuits with MER > 33dB
- Same input interfaces options as 1RU
- Embedded RF Switch Over matrix for Dual Redundant Exciters
- Hot Swappable Power Supplies

MAXIVA DAB AIR-COOLED VAX-OP SERIES

Maxiva Air-Cooled VAX-OP VHF Series

300W to 1.2kW

2+1 RU / 3+1 RU

1.5kW – 1.9kW

3.5+1 RU

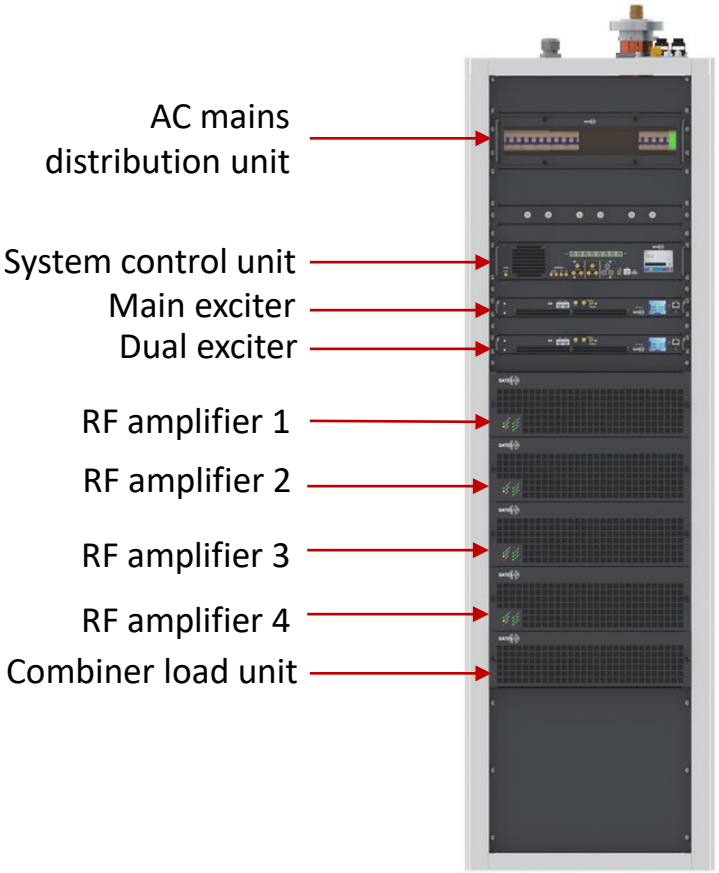
Same PA used in racked systems

3kW – 13.6kW

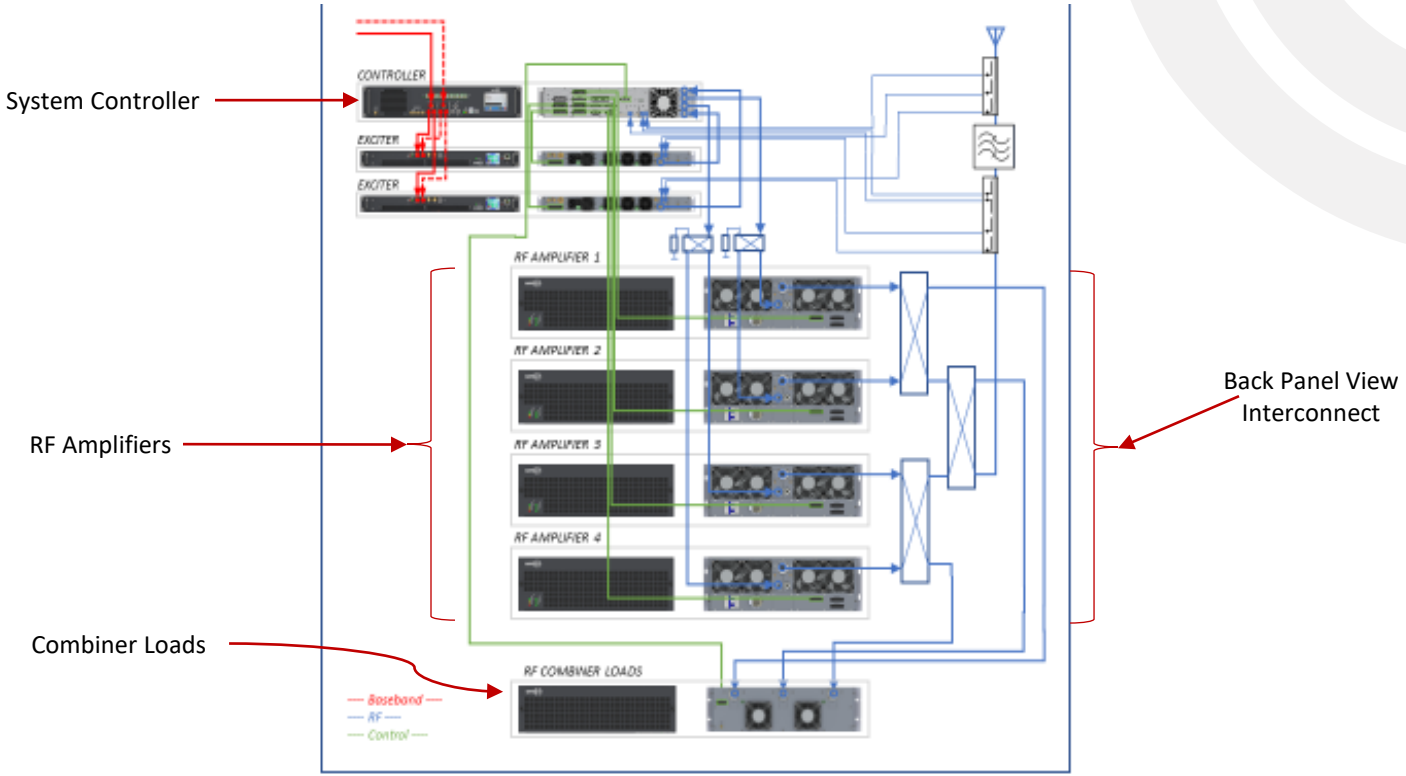
2, 3, 4, 6 and 8 PA Systems in 36RU Rack

- Same 1RU exciter/driver and same input option cards as Ultra-Compact
- Available with single-drive or dual-drive (option)
- Multiple PA systems include a 36RU rack (single PA systems - rack optional)
- GPS/GLONASS option

VAX-OP-6000-R36



BLOCK DIAGRAM – 4 RF AMPLIFIERS



Maxiva DAB Liquid-Cooled VLX-OP Series

KEY FEATURES

- High Efficiency (Broadband PA's)
- Low consumption Pump and Heat Exchanger (pump + heat exchanger + external fans = 535W)
- Dual Redundant Pumps standard
- Coolant reserve tank (8 liters) for automatic liquid refilling, reduces on-site maintenance
- Liquid Cooled Control Unit: level (liquid + refilling), pressure, temperature, pump status, etc.
- Very small external heat exchanger with 24V power, 2 fans or 4 fans
- Heat Exchanger automatic reverse fan rotation feature to remove debris (user settable timing)

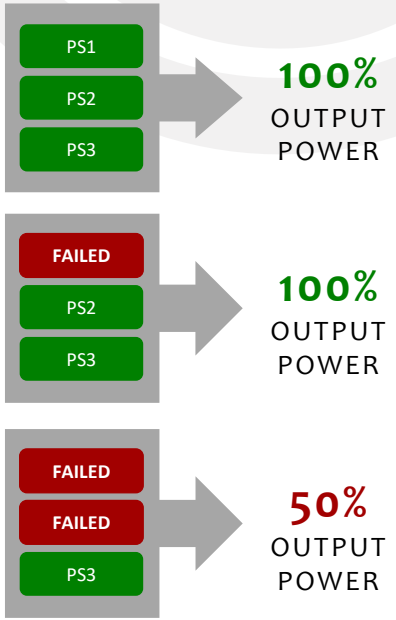
MAXIVA LIQUID-COOLED VLX-OP SERIES

Maxiva Liquid-Cooled VLX-OP VHF Series

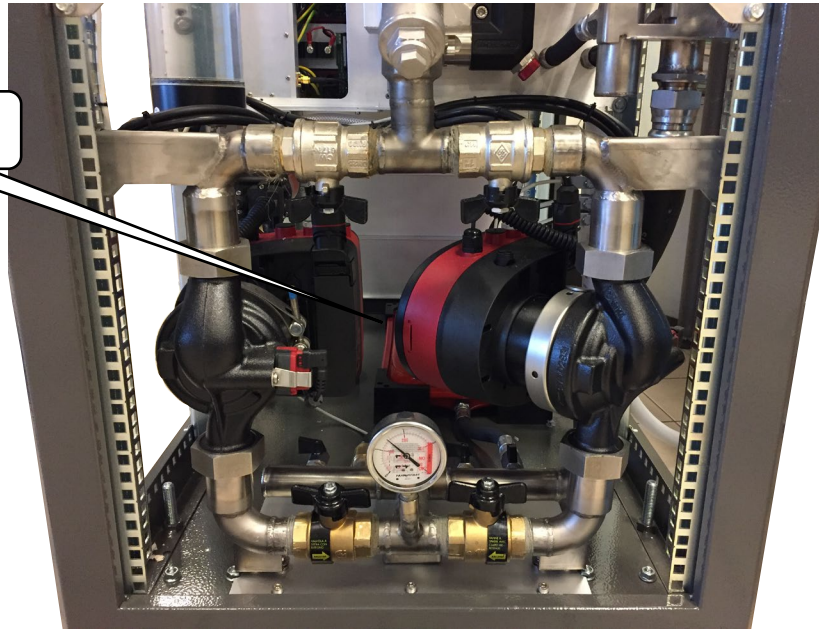
Single Rack Systems

- **15.2 kW** 8 PA's
- **11.4 kWz** 6 PA's
- **9.5 kW** 5 PA's
- **7.6 kW** 4 PA's
- **5.7 kW** 3 PA's
- **3.8 kW** 2 PA's

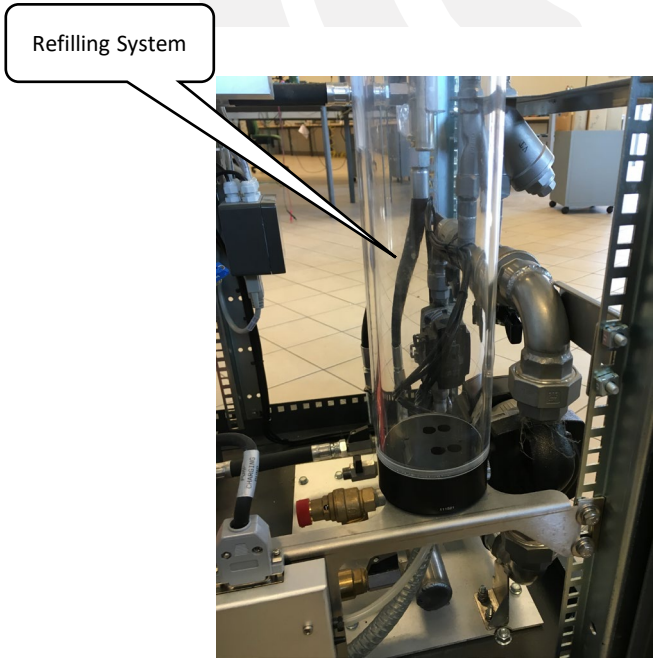
VLX-OP (6 PA's)



VLX-OP LIQUID-COOLING SYSTEM



Lower portion of liquid-cooled Tx Rack

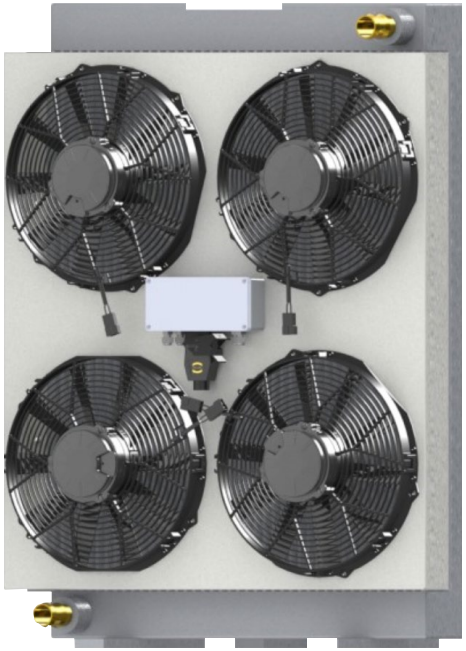


Automatic Liquid Refilling System (8 litres capacity)

VLX-OP HEAT EXCHANGERS

Fans 24V DC
Speed-controlled

Programmable
auto-reversing to
clear debris



61 cm W x 80 cm H x 26 cm D
(24” W x 31.5” H x 10.2” D)

72 cm W x 96 cm H x 27 cm D
(28.3” W x 37.8” H x 10.6” D)

VLX-OP LIQUID-COOLED (BAND III MODELS)

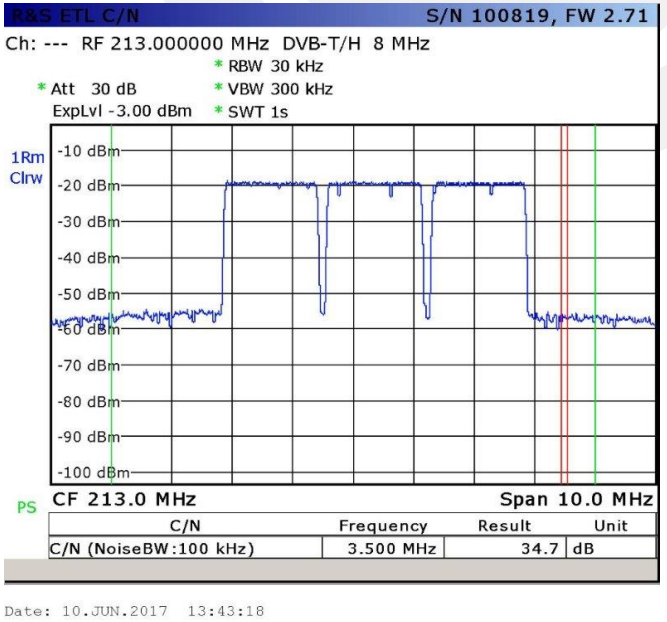
Model Digital	Power DAB	# PA's	# Internal Pumps	# Heat Exchangers	Rack Info	RF Output Connector
VLX-OP-1900-R36	1,900W	1	2	1	1 x 36RU	7/8"
VLX-OP-3800-R36	3,800W	2	2	1	1 x 36RU	1-5/8"
VLX-OP-5750-R36	5,700W	3	2	1	1 x 36RU	1-5/8"
VLX-OP-7600-R36	7,600W	4	2	1	1 x 36RU	1-5/8"
VLX-OP-9500-R42	9,500W	5	2	1	1 x 42RU	3-1/8"
VLX-OP-11400-R42	11,400W	6	2	1	1 x 42RU	3-1/8"
VLX-OP-15200-R42	15,200W	8	2	2	1 x 42RU	3-1/8"
VLX-OP-19000-R42	19,000W	10	2	2	2 x 42RU	3-1/8"
VLX-OP-22800-R42	22,800W	12	2	2	2 x 42RU	3-1/8"
VLX-OP-30400-R42	30,400W	16	2 x 2	4	2 x 42RU	3-1/8"
VLX-OP-38000-R42	38,000W	20	2 x 2	4	4 x 42RU	4-1/2"
VLX-OP-45600-R42	45,600W	24	2 x 2	4	4 x 42RU	4-1/2"

MULTICARRIER DAB+ 240W TOTAL POWER

MULTICARRIER DAB+ TRANSMITTER

MultiCarrier DAB Transmitter:

- Allows up to 3 DAB+ Carriers to be generated or re-transmitted through a single amplifier
- Advanced pre-correction and linear broadband amplification
- Unique solution ONLY available from GatesAir
- More economic than standard solutions
- More compact
- Less expensive to operate, lower power consumption



MULTICARRIER DAB+ TECHNICAL SPECIFICATIONS

- Compact 1U rack 19 "chassis.
- Output power up to 240W rms total
- Common RF amplification.
- Wide Band VHF BIII Doherty Amplifier technology with high efficiency.
- Supported Modulations: DAB / DAB + / T-DMB.
- Multi-carrier modulation (3 channels), for adjacent and non-adjacent frequencies.
- Adaptive pre-correction circuits.
- Built-in high-stability GPS / GLONASS receiver (Optional).
- Hot swappable amplifier and power supply.
- Input interface: 3 ETI inputs.
- SNMP, Web interface and Touch Screen display.
- USB service interface for up-grade / download.

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N+1 SYSTEMS

GateSwitch

GateSwitch for N+1 Applications

GateSwitch line of N+1 redundancy controller

3 Models Available:

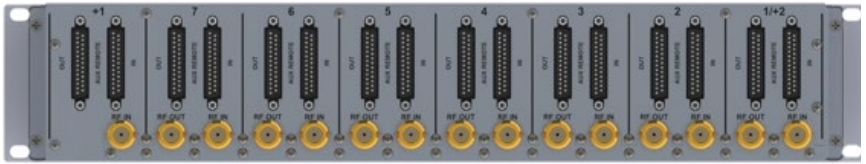
- **GateSwitch 2E/2U/3U Series**
  Control for larger systems up to 7+1 units
- **GateSwitch 4000 Series**
  Control for medium-sized systems up to 4+1 units
- **GateSwitch 2000 Series**
  Control for smaller 1+1 and 2+1 systems

GATESWITCH 2/3 SERIES

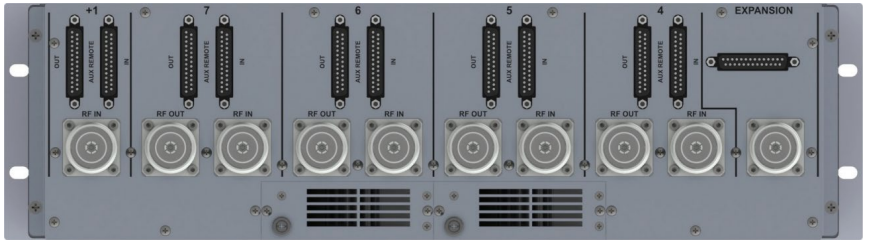
2/3 Series:

- GATESWITCH 2E - 7+1 External RF switches
  - RF output power switching based on external relays

- GATESWITCH 2U - 7+1 Internal 80W switches
  - Internal switches



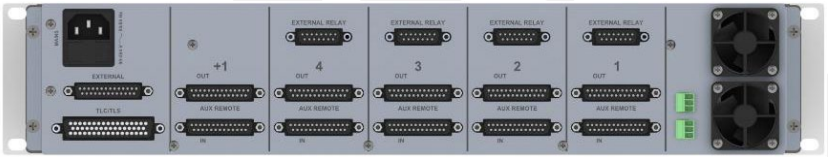
- GATESWITCH 3U - 4+1 Internal 350W switches
  - Internal switches



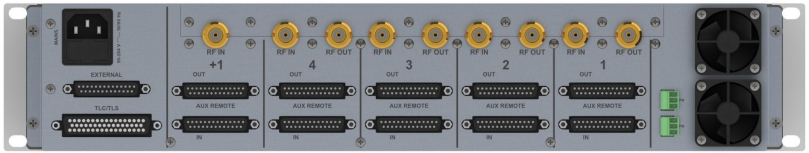
GATESAIR 4000 SERIES

4000 Series:

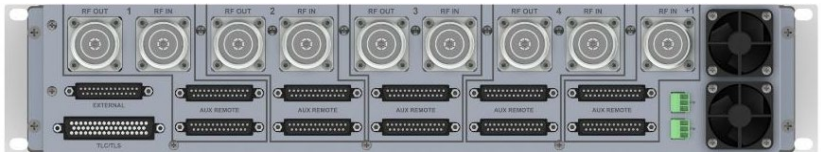
- GATESWITCH 4000 - 4+1 External RF switches
  - RF output power switching based on external relays



- GATESWITCH 4080 - 4+1 Internal 80W switches
  - 80W internal switches
- GATESWITCH 4130 - 4+1 Internal 130W switches
  - 130W internal switches



- GATESWITCH 4350 – 4+1 Internal 350W switches
  - 350W internal switches



GATESWITCH 2000 SERIES

2000 Series:

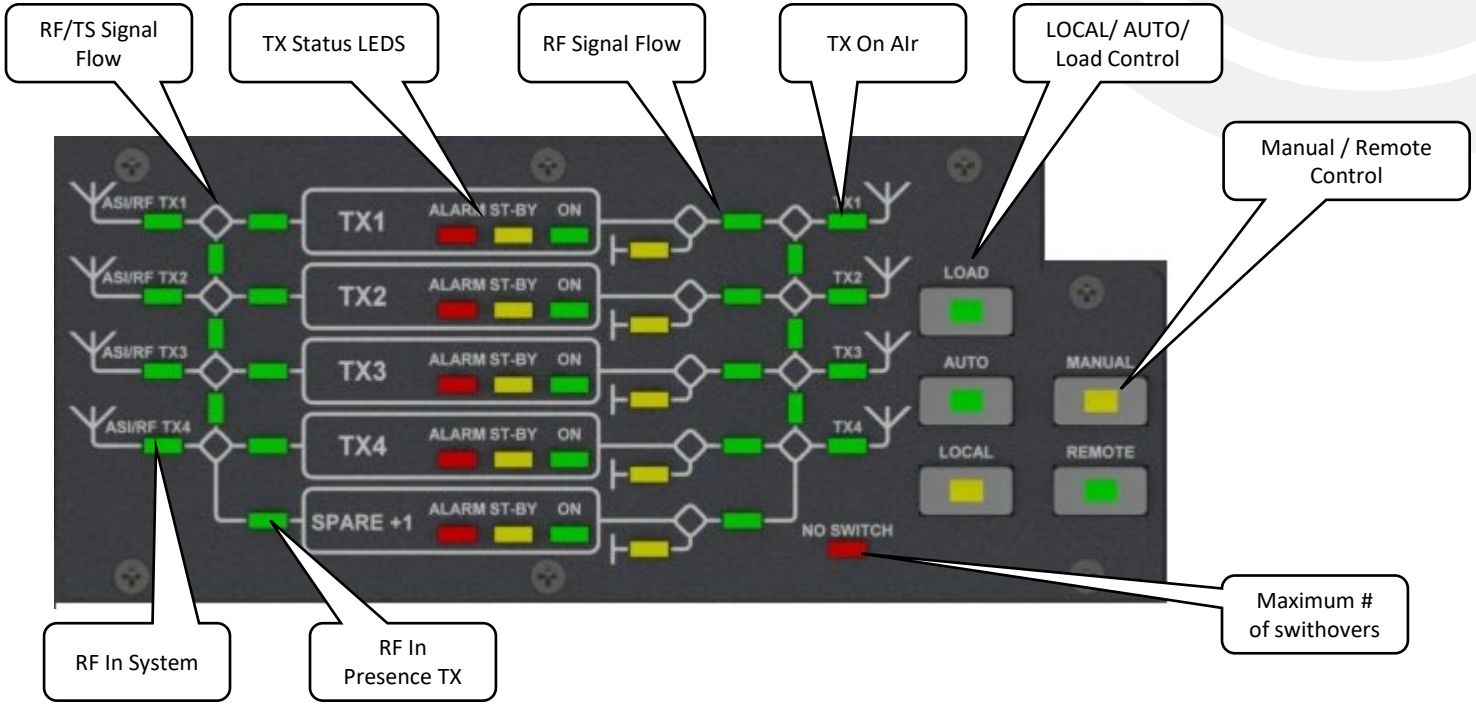
- GATESWITCH 2350 - 1+1 Internal RF switches
  - 350W internal switches

- GATESWITCH 2130 - 2+1 Internal RF switches
  - 130W internal switches

- GATESWITCH 2000 – 2+1 External switches
  - RF output power switching based on external relays

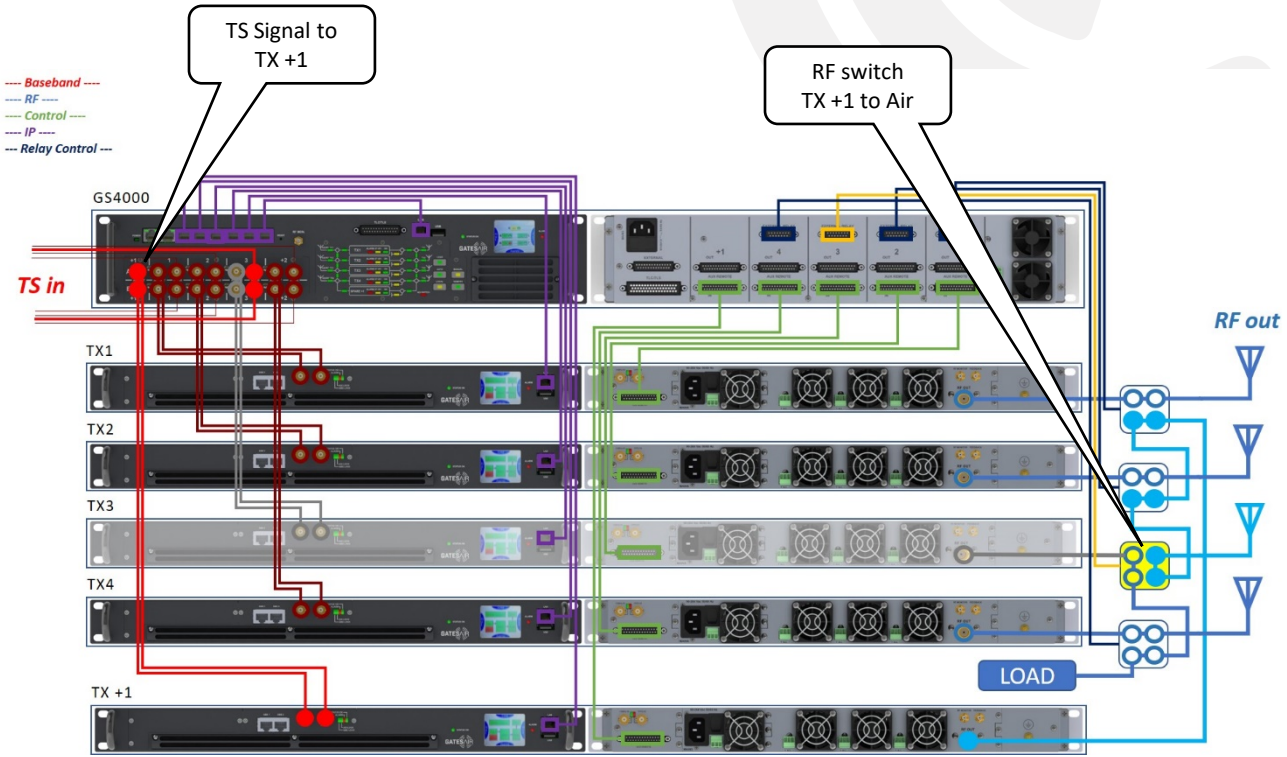
4000 SERIES FRONT PANEL

Front Panel Status on 4000 series



GATESWITCH 4000 LAYOUT – 4+1

- Illustration of +1 redundancy
- TX 3 is off-line, Transport stream (RED) is rerouted for TX3 to +1 spare
- RF coax switch relay (BLUE) positions to put +1 TX to air



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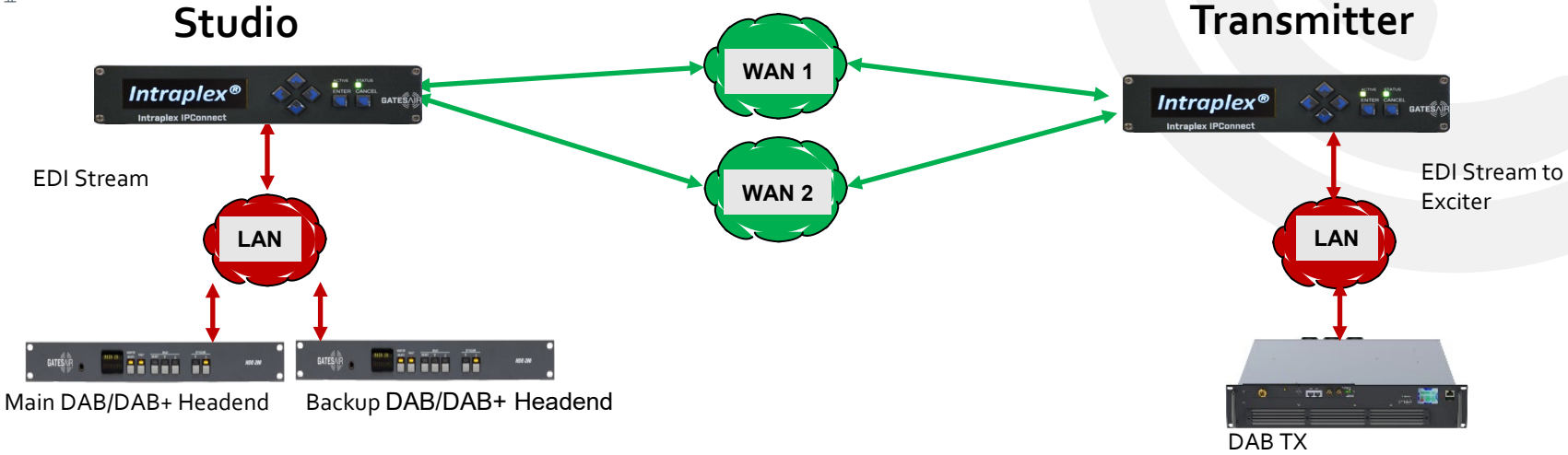
TRANSPORT STREAM

IP Connect

IPCONNECT APPLICATION



- IPConnect provides “Hitless” protection using Intraplex® Dynamic Stream Splicing technology for EDI streams
- IPConnect intercepts the streams from the Headend and reliably tunnels it to one or more exciters
- IPConnect works with unicast, multi-unicast and multicast topologies
- IPConnect also monitors and provides automatic failover between Main and Backup Headend at the Studio side

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THANK YOU

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