WAVE ONE

REBROADCAST RECEIVER

KEY FEATURES

- Silence Detector with selectable thresholds and Automatic Switch with 3 priorities
- Customizable Baseband profiles
- Integrated Stereo and RDS Coders
- Integrated Digital DDS Modulator with up to +20dBm output level
- Integrated Audio Processor as option
- L/R, Analog MPX, AES/EBU (up to AES192 for MPX over AES) input
- Integrated FM/DAB/HD Radio Receiver with signal analysis
- AES67, Web Radio and MPXoverIP input
- Analog MPX and Digital MPXoverIP output
- Satellite and/or Terrestrial receivers as option
- CAM Slot for encrypted signal as option
- ASI input/output as option
- 10MHz, 1pps input or GNSS receiver for SFN operation as option
- uSD card reader for audio backup
- Test tone generator
- Headphones Jack on front panel for local monitoring of the Audio Signal
- User friendly local control with on-board display
- Remote monitoring and control via WEB GUI, SNMP
- 3G/4G Router with SMS notifications up to 6 phone numbers and VPN support
- Remote Firmware upgrade available
- Redundant power supply as option
- 19” 2U Rack chassis

Wave One is **the most complete rebroadcast receiver** in the industry.

You can receive from **any of the available inputs** and output with **Analog or Digital MPX** and/or use the embedded **DDS FM Modulator** to drive an FM amplifier.

Wave One can optionally demodulates two **DVB-S/S2** (up to 128kS/s) or **Terrestrial** (DVB-T/T2, ISDB-T/Tb) signals with **seamless switching** between the receivers.

The equipment has an **integrated RDS Coder** and you can even set and decode a data PID from the Satellite stream with RT+ data for dynamic RDS function

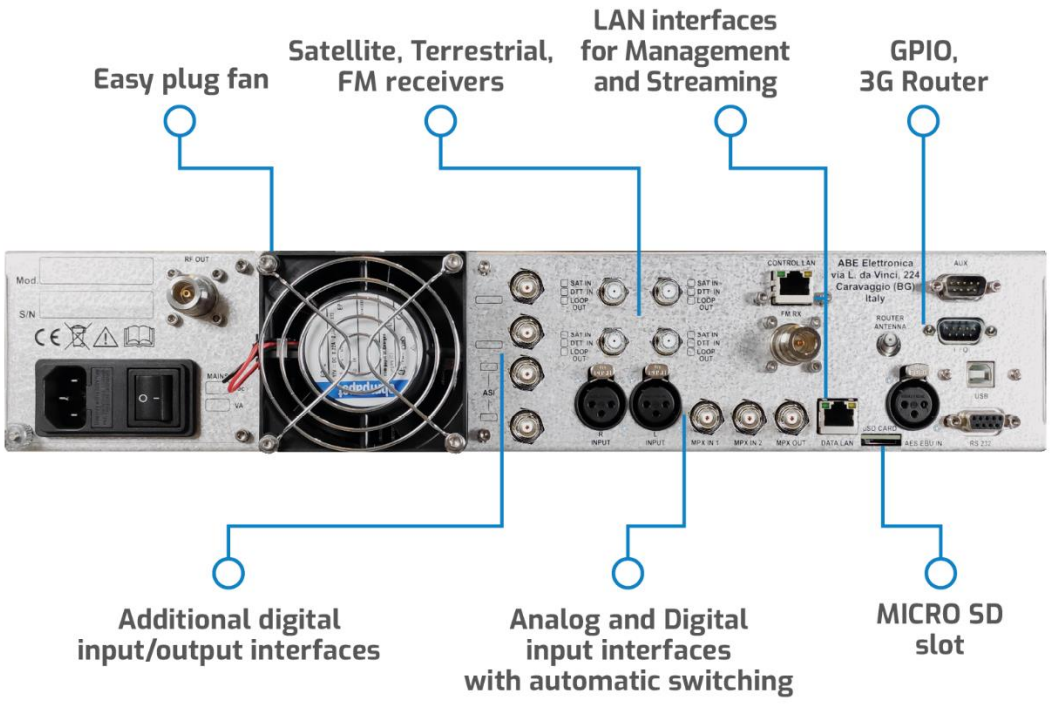
Wave One integrates an **Automatic Input Switch** with **Silence Detector**.

You can create the **MPX structure** of the three available profiles by combining the various sources. The MPX structure is composed by Audio source, RDS source (from Analog/Digital MPX, satellite/terrestrial stream or locally generated) and additional service (e.g.: SCA/DARC).

PROFILES

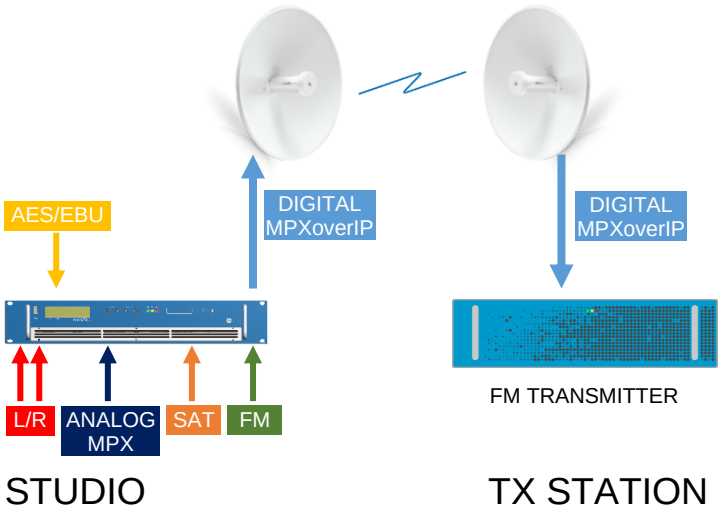
PRIORITY	AUDIO	RDS	60 KHz TO 100 KHz
1	SAT/DTT	SAT/DTT	MPX
2	L - R	Local	MPX
3	MPX	MPX	MPX

The embedded **Oversampled Soft Clipper** with band limiter allows the limitation of the modulation peaks without perceiving an annoying distortion effect, without interfering with the stereo, RDS/RBDS subcarriers and without decreasing the perceived audio volume.

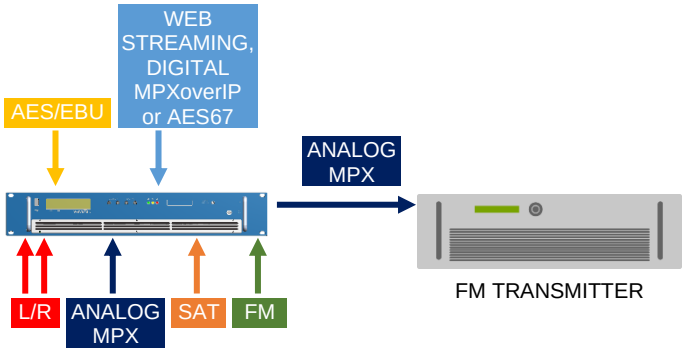


WAVE ONE AVAILABLE USES

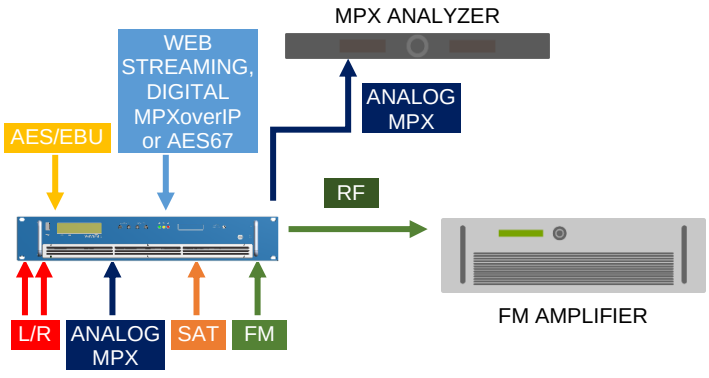
WAVE ONE FOR MPXoverIP LINK



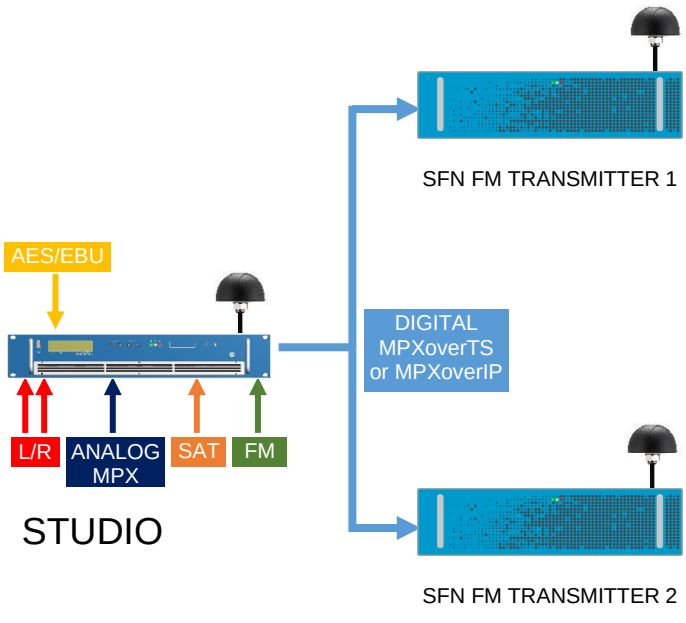
WAVE ONE AS MPX GENERATOR



WAVE ONE AS MODULATOR



WAVE ONE - SYNC FOR SFN NETWORK



RF OUTPUT	
Output frequency range	87.5 to 108MHz in 1Hz steps
Class of emission and Frequency deviation	F3E – Standard: ± 75kHz peak deviation – Max: ±200kHz peak deviation
Frequency stability	In the temperature range -5 to +45°C: ≥ ±1ppm; in one year (aging): ≥ ±1ppm Option: GNSS synchronizer (GPS + GLONASS) with oven oscillator for better than 0.1Hz precision and stability
Output Level	-15 to +20dBm
Output connector and impedance	N female 50Ω, other on request
Spurious and harmonic suppression	<-85dBc, compliant with ETSI and FCC specification

INPUT INTERFACES	
Analog L/R	2x XLR female (Balanced; impedance 600Ω/10KΩ selectable). L; R or L+R:
MPX/SCA/RDS	2x BNC female (Unbalanced; impedance 50Ω/10KΩ selectable)
AES/EBU	XLR female (Balanced; impedance 110Ω). automatic sample rate selection up to 192kHz forAES192 (MPX over AES)
Ethernet	RJ45, Ethernet 10/100 base T (Icecast 2 streaming, AES67 and MPX over IP)
Micro SD Card slot	Cards up to 32GB; Supported format: MP3; AAC-LC; AAC-HE; MPEG1 L2; WMA; FLAC; Ogg Vorbis
Radio Receiver	FM/DAB/HD Radio receiver - BNC female 50Ω Note: for FM rebroadcast application it is suggested to use an input filter
ASI	BNC female 75Ω
Satellite receiver	F female 75Ω. L-Band input with LNB power supply control. DVB-S/S2 low symbol rate (up to 128kS/s)
Terrestrial receiver	F female 75Ω. VHF/UHF input. DVB-T/T2, ISDB-T/Tb demodulation

OUTPUT INTERFACES	
MPX output/19 kHz	BNC female 50Ω connector
ASI	BNC (female) 75Ω
MPX over IP	RJ45, Ethernet 10/100 base T

AUDIO PERFORMANCES	
Pre-emphasis	0, 50 or 75 µs selectable
Mono / Stereo Audio bandwidth	20Hz to 15kHz
Audio amplitude/frequency response flatness	≥ ±0.15dB (30Hz to 15 kHz - including pre-emphasis)
MPX bandwidth	Up to 100kHz (according to the filter selected)

FM S/N ratio	80dB (typ. below 100% deviation at 400Hz)
Distortion (THD)	≤ 0.05% (typ. 0.012%)
Stereo crosstalk attenuation (30Hz to 15kHz)	≥ 50dB (typ. 70dB)
Asynchronous AM S/N ratio	≥ 55dB below equivalent 100% AM @ 400Hz measured with 75µS de-emphasis (no FM modulation)
Synchronous AM S/N ratio	≥ 50dB below equivalent 100% AM @ 400Hz measured with 75µS de-emphasis (FM ±75kHz peak deviation with 1kHz tone)

EMBEDDED FEATURES & FUNCTIONS

Encoders	Stereo MPX (ITU-R Recommendation 450). RDS/RBDS.
Digital Audio processing	Soft Clipper with band limitation. This function allows modulation peaks limitation (within certain limits) without perceiving the annoying distortion effect, without affecting the mono or stereo transmission bandwidth, without overmodulating but maintaining a high emission volume. This function is made inside a FPGA (Field Programmable Gate Array) with a high oversampling real time processing. Full multi-band hi-performance audio processor as option
Isofrequency option (IsoWave)	Exceptionally accurate Isomodulation/Isofrequency generation with timestamp and network delay sync. Adjustable additional latency in 0.1µs steps. Require GNSS (GPS+GLONASS) synchronizer and oven oscillator options
Audio test mono/stereo generator	From 20Hz to 15kHz
Audio Monitoring	Stereo jack 3.5 mm for headphones on the front panel to monitor input signals and the RF output signal (using the embedded FM receiver).

LOCAL & REMOTE CONTROLS

Web Server	HTML5 - Manage all the main equipment parameters. Access is protected by username/password
SNMP Agent	Version 2. Send alarms, read and set parameters. MIB file downloadable from web GUI
Clonation	Store the complete configuration on a USB key and load it in other units
Event Logger	Stores over 5.000 events with time, date and description The event Log can be downloaded through the web server
Remote control interface	RJ45 connector - Ethernet 10/100 Base-T (SNMP - web server) 3G/4G Router with SMS notifications up to 7 phone numbers and VPN support
Firmware upgrade	Remote and local upgrade supported

LOCAL & REMOTE CONTROLS

AC Input voltage	85 to 264Vac single phase, other on request
Operative temperature	-5°C to +45°C @MSL
Maximum operative humidity	95% non-condensing
Housing	19" 2U Rack drawer
Weight	8Kg

SOFTWARE OPTIONS

S-AM-UN	Audio monitor for input or on-air signal + test tone generator	Included in S-FULL-UN
S-SD-UN	Micro SD card slot	
S-AES-UN	Digital AES/EBU & AES192 (MPX over AES) inputs	
S-FMRX-UN	FM receiver input (for regenerative FM repeater/ translator)	
S-SWI-UN	Automatic input switching (n.3 MPX profiles – audio/ RDS)	
S-RDS-UN	Static RDS coder	
S-IP-UN	IP input (Icecast2 streaming & AES67)	
S-DMPX-UN	Digital MPX over TS & Digital MPX over IP in/out	
S-ISO-UN	SFN/ Isofrequency operation	

HARDWARE OPTIONS

H-HS	High Stability (±50Hz)
H-SAT	Embedded Satellite receiver demodulator. DVB-S/S2 (L-band input) Low Symbol Rate with loop through
H-SATDTT	Embedded Satellite and Terrestrial receiver demodulator. DVB-S/S2 (L-band input) and DVB-T/T2 and ISDB-T (VHF/UHF band input)
H-SATDTT2	Second Redundant Embedded Satellite and/or Terrestrial receiver demodulator with seamless switching
H-3G; H-4G	2G/3G or 3G/4G modem router for remote connection/telemetry and SMS
H-I/O	GPIO interface with n.3 isolated clean contact out, n.4 optoisolated in, n.4 analog out (0 to 5V), RF filter for router
H-ASI	ASI T.S. input (or output) interface
H-REF	10MHz and 1pps inputs
H-GNS	High stability reference oscillator GNSS (GPS + GLONASS) locked, oven clock 10MHz + 1pps outputs
H-AGNS	GPS/GLONASS receiving antenna (gain 26dB typ.) + 15 meters cable
H-AP-PRO-L	Audio Processor card with professional software license & Advanced Dynamics (Auto EQ & dynamic ratios), bass effects, dual multiband processor (up to 9 bands), AGC, compressor and advanced composite clipper, RDS coder
H-AP-PRO	H-AP-PRO-L + Declipper & Natural Dynamics

The software-based audio processor can be integrated in any Wave Unit, from low and medium compact versions to high power line. **H-AP-PRO Audio Processor** offers outstanding audio quality and comes with many unique features.

FM Composite Clipper

Up to 140% audio level at 100% modulation gives 2-3 dB extra headroom for highs. Improve your audio, being the loudest and cleanest station on the dial!

Stereo & RDS Coder

Built-in stereo and RDS encoder
RT+

Advanced Dynamics & EQ

Increases the dynamics for music that lacks dynamics. Adjusts the spectrum without compression, making it possible to generate a very consistent sound without sounding compressed

Dehummer

Improves the sound of MPEG2/MP3 style lossy compressed files, removing unwanted constant sounds, such as a 50/60 Hz hum from bad cables

Better FM reception

Improves stereo reception area up to 30Km

Declipper & Natural Dynamics

Repairs clipped audio, removes distortion
Restores Natural Dynamics

Delossifier

Improves the sound quality of MPEG2/MP3 style lossy compressed files

All specifications contained in this document may be changed without prior notice