ANYWAVE

MARBLE SERIES

PRODUCT BROCHURE

LOW/MEDIUM POWER AIR COOLED SOLID STATE UHF/VHF TV TRANSLATOR / TRANSMITTER

Introduction

The new Anywave ***MARBLE*** series of Air Cooled UHF/VHF TV transmitters provides the broadcaster with the latest state-of-the-art digital transmitter design, which provides the highest level of performance available anywhere, yet in an extremely compact package. The power capability of these forced air cooled Solid State transmitters/translators ranges from 300W ATSC (240W OFDM) to 2200W ATSC (1760W OFDM) (power level before filter). They operate across all worldwide TV standards including ATSC, ATSC 3.0, DVB-T, DVB-T2, ISDB-T and DTMB. The ***MARBLE*** series incorporates the powerful correction capabilities of the ACT 5X+ or 9X digital exciter platforms. In addition, the products offer many unique features not available anywhere else in the industry.

Key Facts

- ✓ Multi-standard capability: ATSC, ATSC 3.0, DVB-T, DVB-T2, ISDB-T, DTMB, and analog
- ✓ Broadband – covers UHF from channel 14-36, VHF band I and band III also available
- ✓ Modular for better reliability and ease of maintenance
- ✓ Latest Power Amplifier LDMOS Technology – implements asymmetrical Doherty design (both UHF and band III VHF) for exceptional efficiency, ruggedness, and cool operation
- ✓ Industry-leading adaptive linear and non-linear correction – Anywave's own exciter
- ✓ Simple and Efficient Front-to-Back Air Cooling
- ✓ LCD Touch Screen Control System (available on higher power units)
- ✓ Remote control via Web Browser and SNMP

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FEATURES

- ✓ ATSC Transmitter or an RF Translator (every modulator includes an RF input and built-in receiver/demodulator)
- ✓ Full Band UHF or VHF Operation
- ✓ Powerful Adaptive Digital Pre-Correction (ADPC™). Anywave exciters are used by leading RF power transistor manufacturers to specify their device performance with superior results to other well known brands (ask us for details).
- ✓ Real time measurement and display of Receive Signal Strength (RSSI) and Received Signal to Noise Ratio (RSNR) in an RF Translator operation
- ✓ Real time measurement and display of the Transmit Signal Shoulder levels (IMD), the Transmitted Signal to Noise Ratio (TSNR) and the Transmitted Power Percentage (FWD %)
- ✓ Supports ATSC 1.0 and easily upgraded to ATSC 3.0

<u>Options</u>

- ✓ Performance and Quality Measurement (PQM) Graphical User Interface
- ✓ TSID/PSIP editor
- ✓ Static Picture Feature
- ✓ ASI Loop Thru
- ✓ Transport Stream over IP (TSoIP) input
- ✓ Built-in GPS receiver

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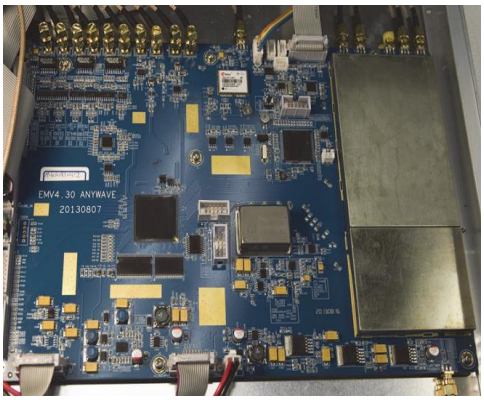
EXCITER CHASSIS & DISPLAY

The Anywave Exciter includes a back lit 40 x 2 LCD display. Multiple menus allow the real time measurements of transmitted and received frequency, output power level and input selection. The exciter/translator also measures and displays the key transmitter parameters of Intermodulation Distortion (IMD) often known as “shoulders” and the Signal to Noise Ratio (SNR) of the final transmitted signal output.

The main menu also includes a built-in power meter reading of the transmitter output power in percentage that can be easily calibrated from the front panel. The exciter also has an overheat alarm with its own temperature display, GPS information that includes the receivable satellites, clock accuracy and time.



The exciter obtains very high reliability due to the integrated design; a single board containing both analog and digital circuits, stud type connectors for long term reliability, and no connector directly connected to chassis. The exciter includes a single rugged and shielded AC/DC power supply.

A solid chassis of just 1 RU, with a low profile all aluminum structure, solid construction, well grounded for excellent RF shielding and light weight at less than 10 LBS.

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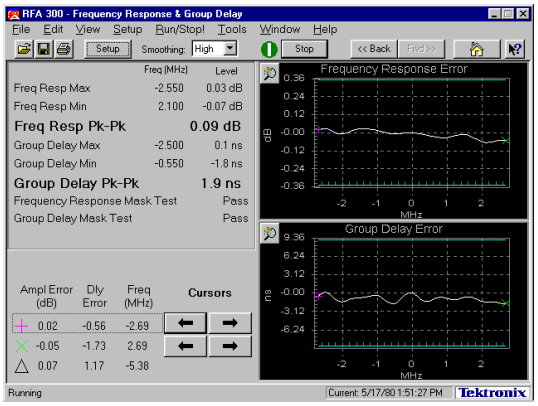
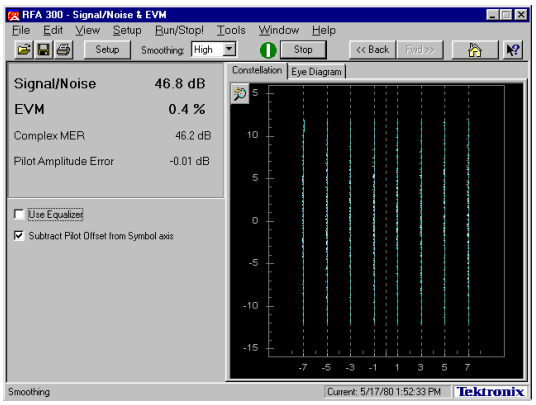
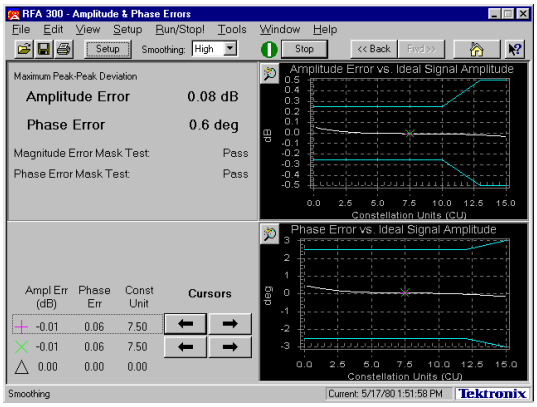
PERFORMANCE



Group Delay < 2 nS



SNR > 46dB



In-band flatness < ±0.08 dB
Phase Error < 0.7 degrees

Innovative DDRF™ (Direct Digital RF) broadband automatic balancing technology achieves near perfect RF performance with shoulder levels up to -55 dB and out of band spurious up to -60 dB, all based on an ultra low noise floor.

Powerful ADPC™ with linear and non-linear pre-correction obtaining up to 15 dB shoulder improvements, up to 10 dB MER (SNR) improvements and an in-band flatness of <±0.5 dB

Continuous measurement and display of SNR and IMD during correction.

Feedback Signal Strength (FSSI) detection and display with protections on too strong, too weak, and level varying feedback signals.

LDMOS transistors that are operated at their optimum bias characteristics providing the most linear output and hence reducing distortion.

Patented AIM™ (Adaptive Impedance Match) technology ensures impedance matching at RF Output, which realizes significant improvement in in band performance.

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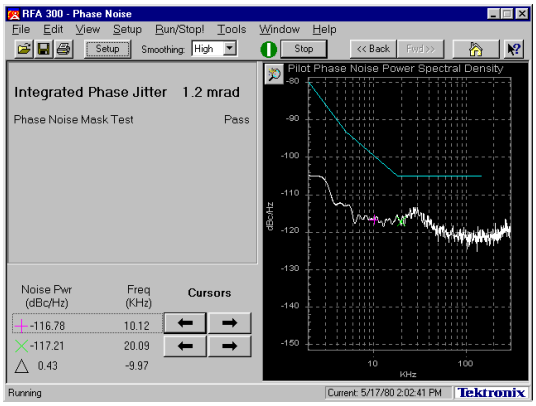
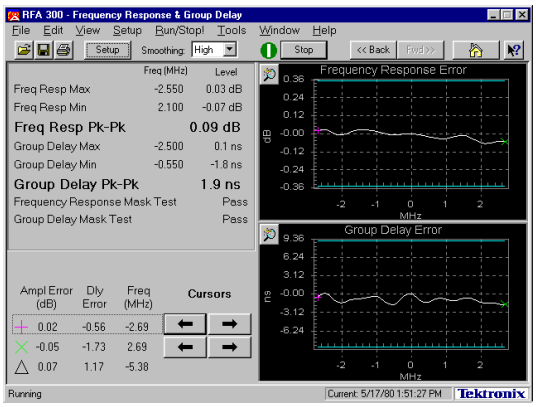
PERFORMANCE



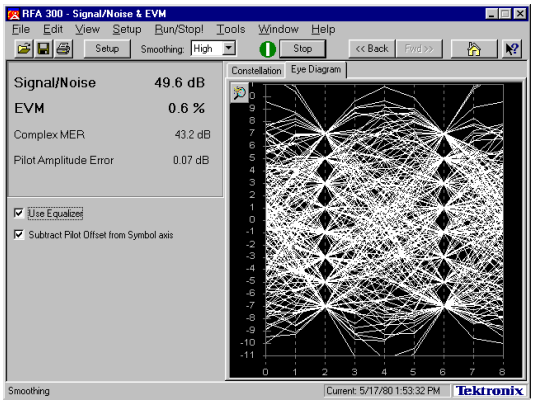
Phase Jitter < 110 dB @ 20KHc

Digital ultra-wideband phase noise processing technology automatically detects, tracks and compensates phase noise to achieve superior phase noise performance.



Frequency response flatness < 0.09dB

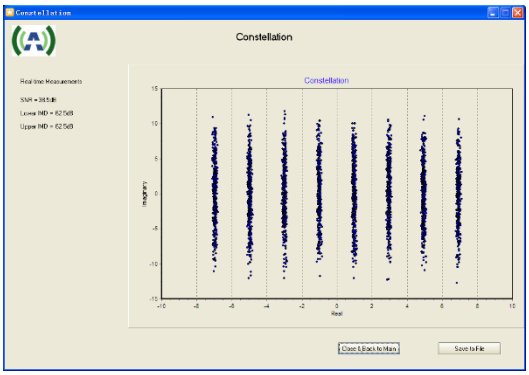
Independent feedback for adaptive SWR optimization function maximizes emission signal quality after the transmitter band-pass filters (BPF). System level AGC (Auto Gain Control) function includes both RF and DC AGC feedback obtaining a stable output power and performance.

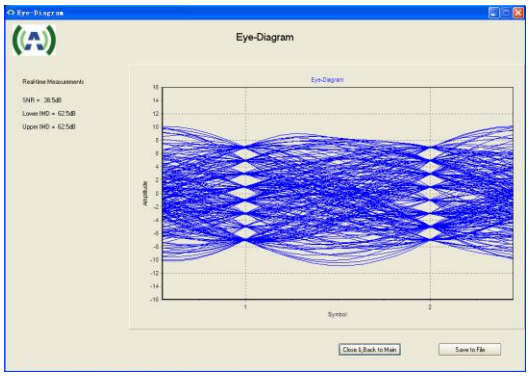


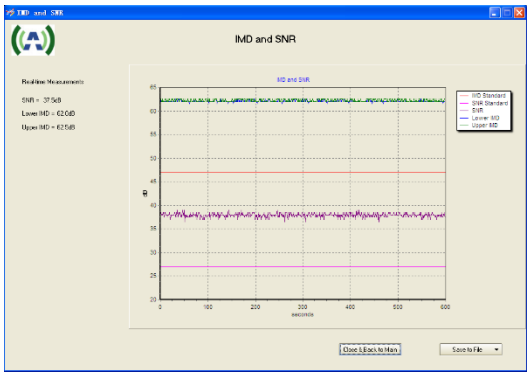
EVM < 0.7 %

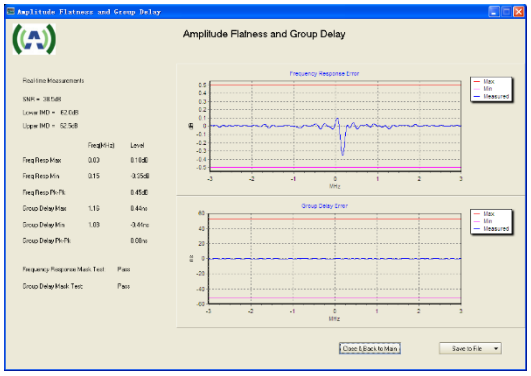
The transmitter includes a digital ultra-wideband noise processing technology that automatically detects and compensates phase noise to achieve unparalleled performance.

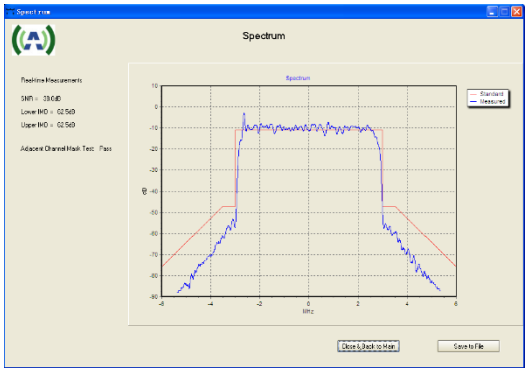
OPTION: PERFORMANCE AND QUALITY MONITORING OPTION

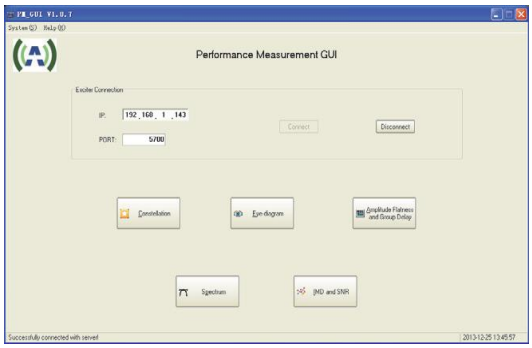








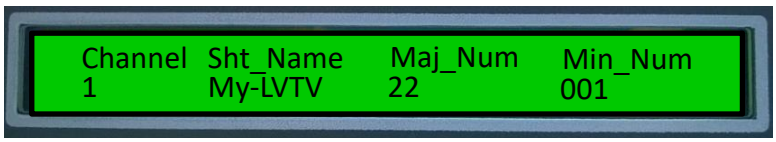


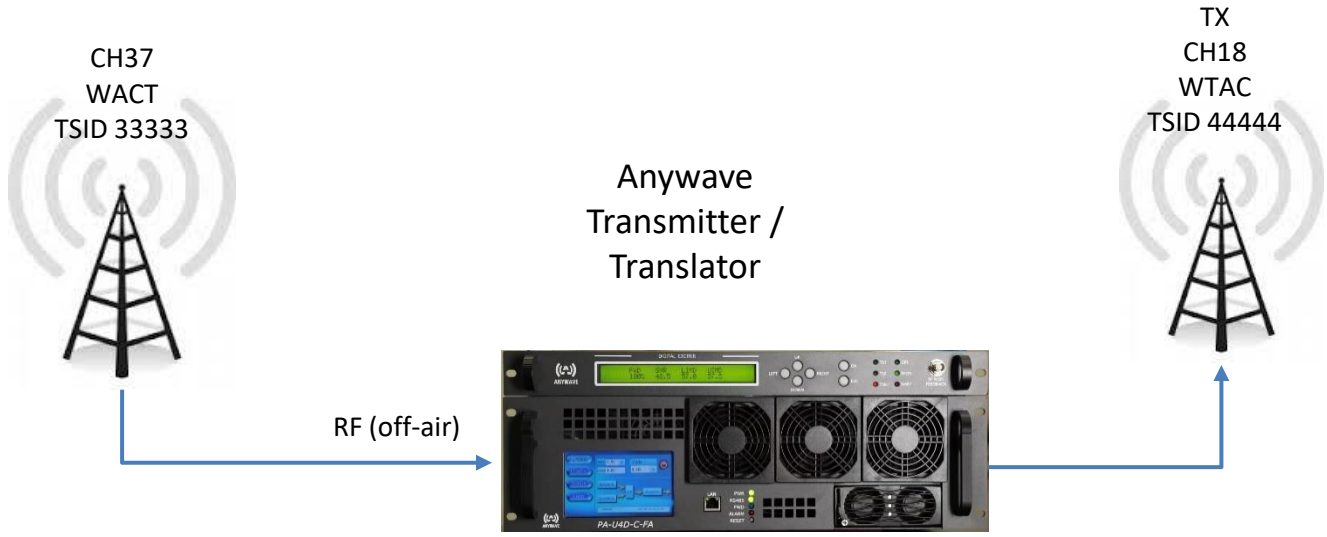


Constellation, “Eye” Diagram, Group Delay, Phase, Amplitude Frequency Response, SNR, Shoulders (IMD), Frequency Response Max/Min., Frequency Response Peak to Peak, Group Delay Max/Min. and Group Delay Mask Test

OPTION: PSIP & TSID EDIT OPTION

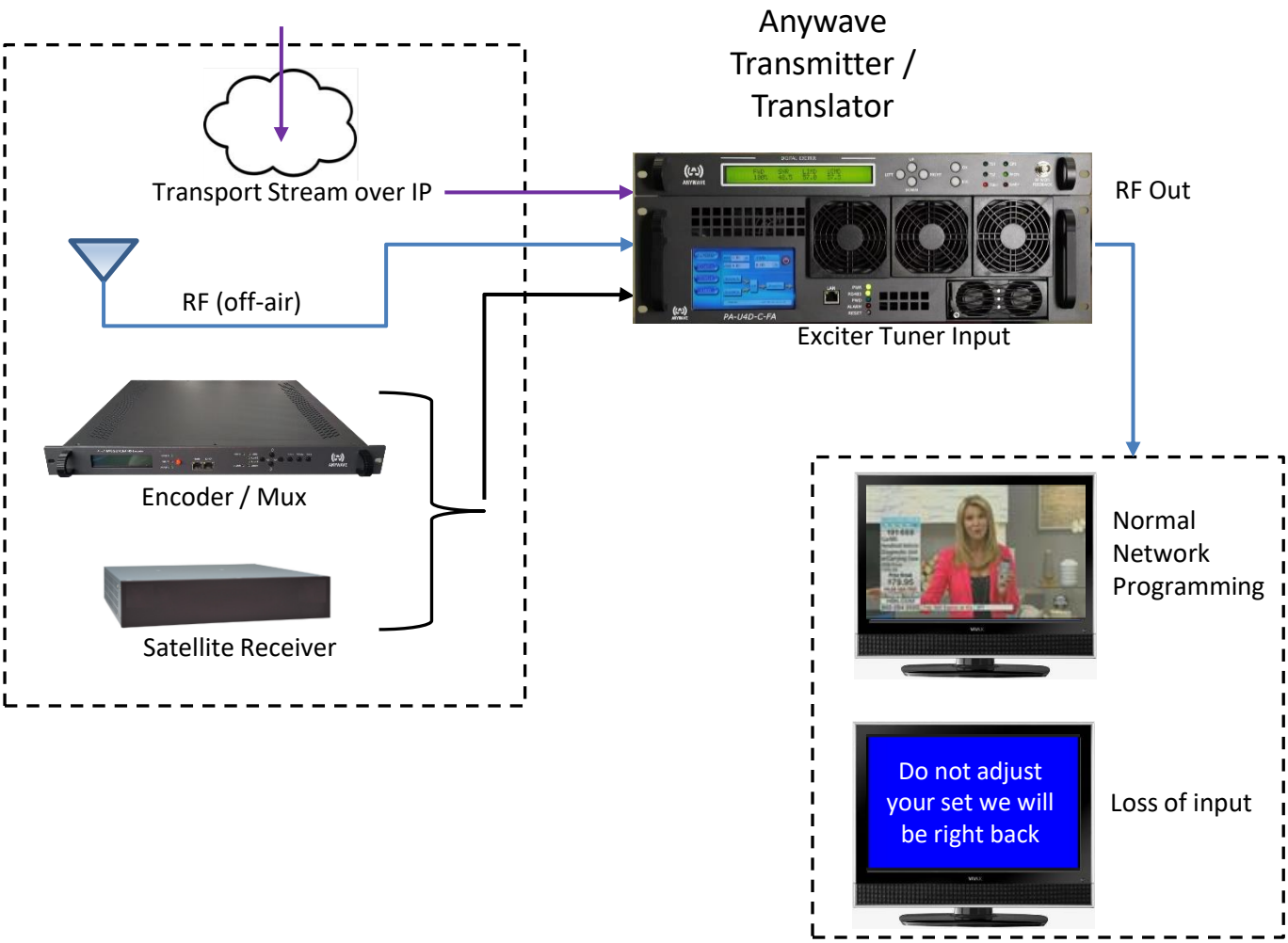
The translator has real time detection and display of the original TSID & PSIP information. If desired, the exciter/translator can modify the contents of the PSIP table including channel number, short name, major channel and minor channel and the TSID information of the input stream. It will pass through all Dynamic PSIP Guide information without damaging any data. The PSIP edit functions can be employed on the either the ASI (exciter) or the RF Tuner (translator) inputs.





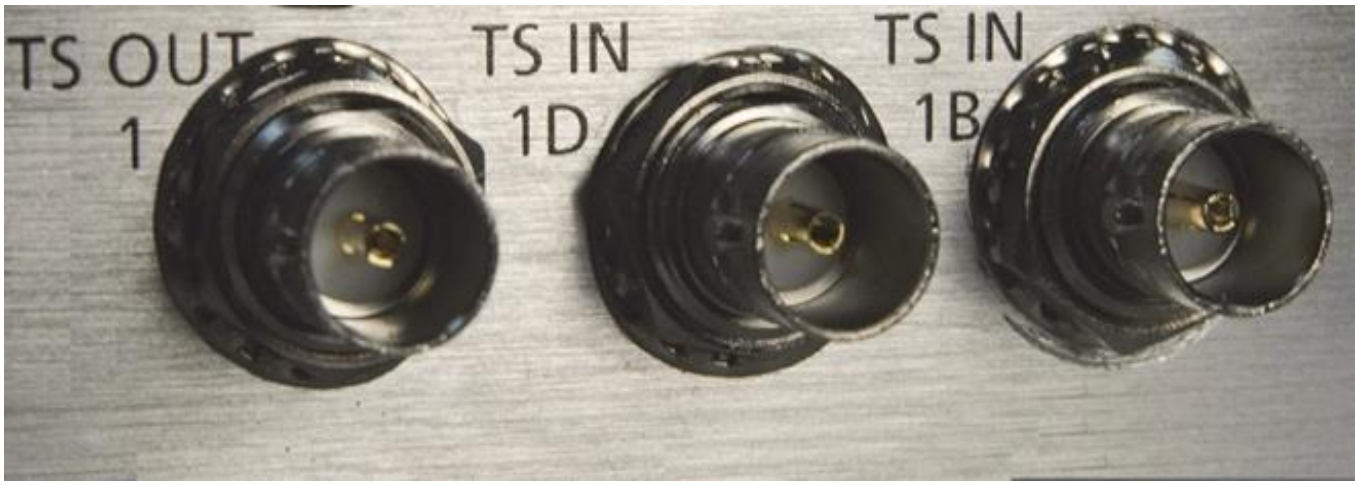
OPTION: STATIC PICTURE FEATURE (SPF)

The Static Picture is displayed on loss of ASI or RF Tuner input. Upon the failure of all inputs it will continuously loop a fully compliant Transport Stream (TS). The option provides a viewer message instead of blue screen. Without SPF, if you lose input signal, you potentially lose customers. With SPF, this means you can legally stay on the air, even without an input signal.



OPTION: ASI LOOP THROUGH

If the Anywave exciter is operated in the translator mode (RF Tuner), an RF receiver antenna is connected to the RF Input port of the exciter and the exciter can then be tuned to any VHF or UHF incoming channel. The RF Tuner demodulates the signal down to an ASI baseband output, and can be configured to be connected not just to the modulator board inside the exciter, but also can be fed to the back of the exciter to the ASI output port. This allows a TV network to monitor the incoming signal on a ASI test system or ASI transport stream reader without additional demodulators.



OPTION: +10dB RF Output

The Anywave exciter has an output range of -25dBm (3 µW) to +5dBm (3.16 mW). If greater output power is required an external power amplifier can be obtained. However, if only a small amount of additional power is required, the exciter can be fitted with a larger output amplifier and can provide up to +15dBm (31.6mW).

OPTION: TSoIP

The TSoIP module inside the Anywave exciter/translator enables the Exciter to receive a transport stream through an IP network. The TSoIP module converts the IP stream to ASI and feeds the corresponding ASI stream back out the exciter rear panel TSoIP Out BNC connector.

Welcome to TS_NET interface!					
	IP	MASK	GATE	MUTI	MISC
Default	192.168.001.200	255.255.255.000	192.168.001.001	235.100.001.001	
Options	***.***.***.***	***.***.***.***	***.***.***.***	***.***.***.***	

OPTION: GPS

The Anywave exciter/translator can include a built in GPS receiver for SFN or MH deployment. It has the option of a built in powered antenna port, with antenna presence detection. The exciter provides the GPS reception status: number of satellites, clock accuracy etc. the TOD for distribution over satellite (delay > 1 s) and a 10 MHz and 1PPS input and output to feed a multiplexer: making it unnecessary to have a stand alone GPS for a multiplexer. Its frequency and 1PPS can be held for many hours even with complete GPS disruption.

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KEY EXCITER SPECIFICATIONS

Frequency: VHF/UHF in steps of 1 Hz, spectrum shifting up to ± 50 kHz

Level: -25 dBm ~ +5 dBm in steps of 0.05 dB

Level Stability: < ± 0.1 dB

Frequency Stability: < 0.5 x 10^{-7}

Symbol Rate: 10.762238 MHz

MER: > 40 dB

Amplitude Flatness: < 0.5 dB

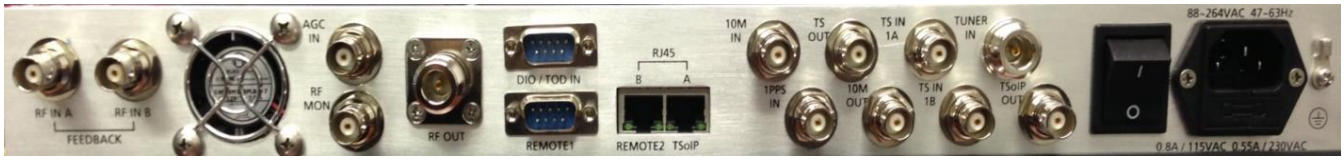
Shoulder Level: < -60 dB @ ± 500 KHz

Out of Band Spurious: < -60 dB

Pilot Amplitude Error: < ± 0.1 dB

Return Loss: > 15 dB

Phase Noise: < -107 dBc/Hz @ 20 kHz



Exciter Rear Panel

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Marble Series Specifications

(Power ratings before bandpass filter)

MARBLE Series - UHF				
Standard	All (1)			
Output Power (RMS) ATSC	300	600	1200	2200
Output Power (RMS) COFDM	240	480	960	1760
Output Connector	"N"	"N"	7-16 DIN	7-16 DIN
Band	UHF			
Height (inches/mm)	3.5/89		5.3/133	6.13/156
Width (inches/mm)	19/480			
Depth (inches/mm)	19.0/482		21.33/542	26.54/674
Weight(LBS/Kg)	32/14.3	51/23.1	65/29.4	86/39
AC input frequency	50/60 Hz			
AC input voltage	120 VAC Single ϕ		240 VAC Single ϕ	
Consumption - W	750	1500	3000	5500
Current rating - A	6.3	12.5	12.5	22.9

(1) Standards include ATSC, ATSC 3,0, DVB-T, DVB-T2, ISDB-T, CMMB, and DTMB

MARBLE Series - VHF I			
Standard	All (1)		
Output Power (RMS) ATSC (2)	250/200	500/400	1000/800
Output Power (RMS) COFDM (2)	200/160	400/320	800/640
Output Connector	7-16 DIN	7-16 DIN	7-16 DIN
Band	VHF Band I		
Height (inches/mm)	8.7/222		
Width (inches/mm)	19/480		
Depth (inches/mm)	16.7/423		
Weight(LBS/Kg)	58/26.3	75/34	88/40
AC input frequency	50/60 Hz		
AC input voltage	240 VAC Single ϕ		
Consumption - W (2)	1140/910	2270/1820	4550/3640
Current rating - Max - A	4.8/3.8	9.5/7.6	19.0/15.2

(1) Standards include ATSC, ATSC 3,0, DVB-T, DVB-T2, ISDB-T, CMMB, and DTMB
(2) Power Levels CH2,3,4 / 5,6

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Marble Series Specifications

(Power ratings before bandpass filter)

MARBLE Series - VHF III			
Standard	All (1)		
Output Power (RMS) ATSC	350	700	1400
Output Power (RMS) COFDM	280	560	1120
Output Connector	7-16 DIN	7-16 DIN	7-16 DIN
Band	VHF Band III		
Height (inches/mm)	8.7/222		
Width (inches/mm)	19/480		
Depth (inches/mm)	16.7/423		
Weight(LBS/Kg)	72/32.6	80/36.2	96/44
AC input frequency	50/60 Hz		
AC input voltage	240 VAC Single ϕ		
Consumption - W	880	1750	3500
Current rating - Max - A	3.7	7.3	14.6

(1) Standards include ATSC, ATSC 3,0, DVB-T, DVB-T2, ISDB-T, CMMB, and DTMB
Specification details subject to change without notice

Cost Effective 100%

Reliable 100%

Scalable 100%

Dependable 100%

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