

UHF-Band 10W DVB-T/H Transmitter/Repeater

Model: DTX 10U

Product Features

- 470 MHz - 860 MHz Broadband Transmitter/Repeater
- LDMOS Power Amplifier provides 10 Watt output for broadcast of DVB-T/H waveforms
- Linear and Non-linear Digital Pre-correction
- SFN and MFN support
- Touch screen display for real time user interface
- Remote control and self monitoring via Ethernet and RS485 interfaces
- Built in web server accessible through RJ45 connector with Internet Explorer
- Remotely manageable via SNMP
- GbE Transport Stream Input based on Pro-MPEG Forum CoP #3
- Occupying only 2 RU of standard 19" cabinet space



Optional Features

- Integrated GPS Receiver
- Integrated DVB-S/S2 Receiver
- Integrated DVB-T/H Receiver
- Adaptive Pre-correction (coming soon)

Product Description

The DTX 10U is a compact, solid-state transmitter, designed for digital terrestrial television broadcasting over a UHF frequency range of 470 MHz to 860 MHz.

The DTX 10U converts an input MPEG-2 transport stream to a COFDM modulated IF signal. The IF signal is then converted to an RF signal at the required transmit channel frequency within the UHF band. Finally, the RF signal is amplified to a digital average output power level of 10 Watts. The power level stability at the transmitter's RF output is maintained by an internal automatic level control loop.

The transmitter's operational parameters are monitored and controlled by an embedded system controller that can be accessed from the front panel touch screen LCD or by using one of the remote control interfaces (Ethernet, SNMP, USB or RS232).

With the addition of an integrated DVB-S/S2 Receiver/Demodulator or DVB-T/H Receiver/Demodulator, the DTX 10U can be configured as a terrestrial repeater. The input data stream is received and re-broadcast as a COFDM waveform.

All of the transmitter's components are enclosed in a standard 19" rack mount chassis, occupying only 2"RU" of cabinet space. The transmitter is forced air cooled using four compact high performance fans, which are installed on the transmitter enclosure front panel.

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Product Description

The Universal Modulator receives the ASI or GbE transport stream, performs input data processing, generates a COFDM IF output and provides signal synchronization. The modulator also contains a pre-corrector module for both linear and non-linear output signal correction.

The Upconverter with RF Output converts the modulator IF output to the required RF channel frequency. The upconverter covers an entire UHF frequency range of 470 MHz to 860 MHz in steps of just 1 Hz.

The Power Amplifier (PA) is the final amplification stage for the transmitter's output signal. The power amplifier is built using LD-MOS transistor technology, which provides high efficiency and excellent reliability. The PA employs its own microcontroller, which monitors the operation parameters of the PA, provides protection against abnormal operation conditions and communicates with the system controller.

The Output Coupler measures the forward and reverse output power levels and reports data to the PA Controller.

The System Controller monitors and controls the entire transmitter system and also provides local and remote interfaces for all the command and status functions.

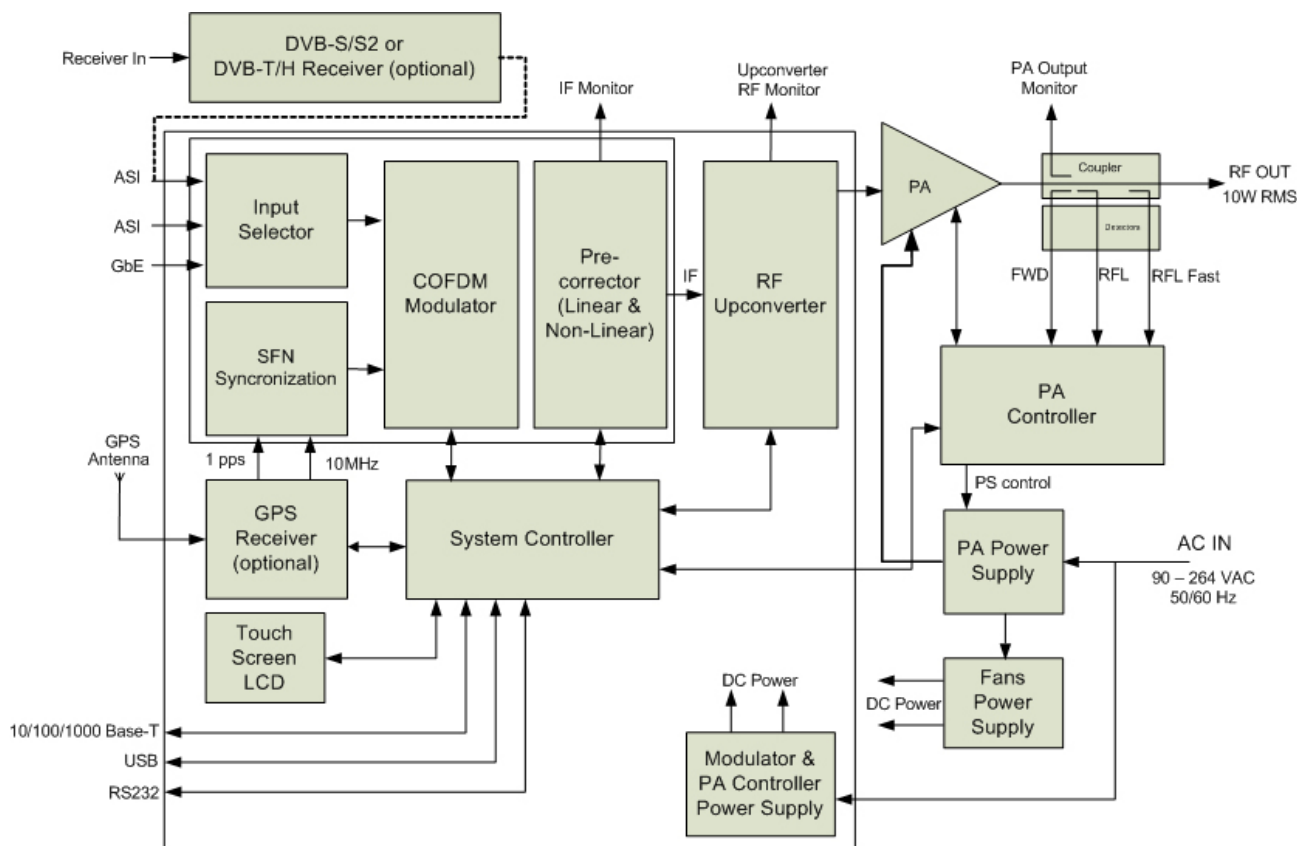
The Linear and Non-linear Digital Pre-correctors are used to maximize the performance of the transmitter in which the modulator is installed.

The characteristics of the linear and non-linear pre-correction curves are set by means of an easy to use and highly intuitive graphical user interface: the UBS Corrector GUI software package (Windows compatible).

The DVB-S/S2 Receiver/Demodulator receives a satellite signal and outputs an ASI transport stream.

The DVB-T/H Receiver/Demodulator receives a terrestrial signal and outputs an ASI transport stream.

Block Diagram (specifications are subject to change without notice)

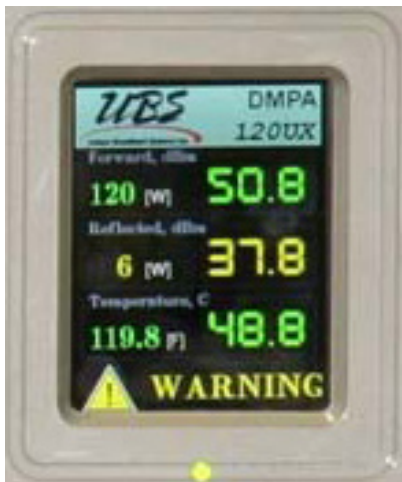




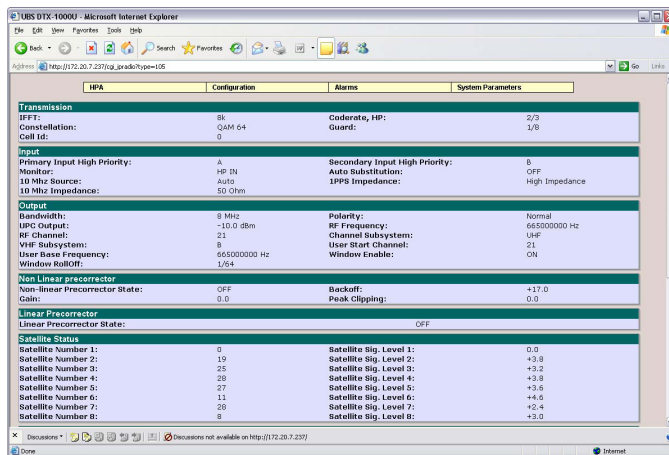
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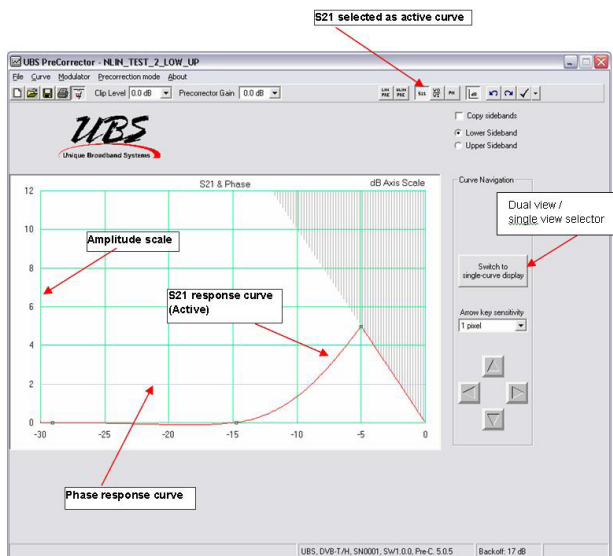
Control Interfaces (specifications are subject to change without notice)



Touch Screen LCD



Web GUI



Non-Linear Pre-Corrector - Dual View, S21 (active) and Phase



Figure 4-15 Curve Calculation

Linear Pre-Corrector Screen

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Product Specifications (specifications are subject to change without notice)

DVB-T/H Modulator Signal Processing

Supported Modes	IFFT: 2k, 4k, 8k
Guard Intervals	1/4, 1/8, 1/16, 1/32
Code Rates	1/2, 2/3, 3/4, 5/6, 7/8
Constellations	QPSK, 16-QAM, 64-QAM
Hierarchical Modes	Alpha - 1, 2 and 4 for 16-QAM and 64-QAM
Network Mode	SFN and MFN
Bandwidth	8 MHz, 7 MHz, 6 MHz, 5 MHz
Input	MPEG-2 Transport Stream
MER	≥ 50 dB (measured on RF Upconverter monitor port)

Modulator Inputs

DVB-ASI	IN-A, IN-B	2x BNC (F), 75 Ω
GbE Transport Stream		Protocol: Pro-MPEG CoP #3 Connector: RJ45
10 MHz		Connector: BNC (F), 50 Ω Frequency: 10 MHz Level: 100 mV - 3 Vpp (Note 1)
1 pps		Connector: BNC (F), 50 Ω Frequency: 1 PPS Level: TTL Trigger: Positive transition (Note 1)

Modulator Outputs

DVB-ASI	OUT-A, OUT-B	2x BNC (F), 75 Ω
IF Output		BNC (F), 50 Ω
RF Monitor		Connector: SMA (F), 50 Ω Level: 30 dB below RF output
Reference Monitor		Connector: BNC (F), 50 Ω Frequency: 10 MHz Level: 2 Vpp

Note 1: The "10MHz" and "1pps" are inputs, except in the units equipped with internal GPS receivers, where they become Monitoring Outputs (high impedance).

Power Amplifier RF Output

RF Output Connector	N-type (F), 50 Ω
Operating Frequency Range	470 MHz - 860 MHz (Note 2)
Frequency Setting Accuracy	1 Hz step over entire operation range
Frequency Stability	1ppm internal, or in accordance with external GPS accuracy
Phase Noise SSB	100 Hz: < -80 dBc/Hz 1 kHz: < -85 dBc/Hz 10 kHz: < -95 dBc/Hz 100 kHz: < -120dBc/Hz
Digital Average Output Power	10 Watts
Output Power Set Point Range	10 dB
Output Power Level Accuracy	≤ ±0.25 dB
Output Level Stability vs. time	≤ ±0.25 dB/24 hrs max.
In-band IMD	≤ -27 dBc
Spectral Regrowth	≤ -30 dBc (at rated output power, without pre-correction) ≤ -36 dBc (at rated output power, with pre-correction)
Output Spurious Level	≤ -60 dBc
Output Harmonics	≤ -60 dBc (with output filter)
Out-of-Band Emissions	Compliant to FCC Part 27 [27.50(F)] requirements when using external mask filter
RF Monitor	SMA (F), 50 Ω

Note 2: The DTX 10U is designed to support the entire UHF range of 470 MHz to 860 MHz, however, each DTX 10U is factory configured and aligned to operate on a specific RF channel. The RF output frequency is indicated on a label placed near the RF output connector and it is also displayed on the control modulator front panel.



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Control Interfaces

Front Panel	Touch screen LCD
USB	Interactive CLI commands
Alarm Relay	Dry Contact Alarm relay Triggered by any major alarm Contact available on the RS232 connector
RS232 Interface	Connector: 9-pin SUB-D Male Command protocol: Interactive CLI commands
RS485 Interface	Connector: 9-pin SUB-D Female
Web Interface	Internet Explorer 6.0+ Ethernet 10/100/1000 Base-T 2 Connectors: RJ45
SNMP Control Interface	Ethernet 10/100/1000 Base-T 2 Connectors: RJ45 MIBs are provided

Pre-Correction

Non-Linear Pre-Correction

Curve Formats	S 21 and VO/M
Amplitude Scale	Linear and Logarithmic
Correction Points	Max. 256, user-defined position
Gain Correction	Max. 12 dB, subject to available headroom
Phase Correction	-6 to +30 degrees, subject to available headroom

Linear Pre-Correction

Correction Points	61
Point Spacing	1/60 of nominal spectrum BW
Amplitude Correction	±10 dB
Amplitude Resolution	0.01 dB
Group Delay Correction	±2000 ns
Group Delay Resolution	1 ns
Peak Power Clip Level	+17 dB to +7 dB (peak power relative to average RMS level)

Power Supply

Voltage	90 - 264 VAC
Frequency	50/60 Hz
Power Consumption	max. 250 Watts

Mechanical

Size	2 U of 19" wide cabinet
Dimensions (W x H x D)	483mm x 89mm x 527mm (19.0" x 3.5" x 20.75")
Weight	17 kg (37 lbs.)

Environmental

Operating Temperature	0° C to +50° C (+32° F to +122° F)
Storage Temperature	-30° C to +70° C (-22° F to +158° F)
Relative Humidity	max. 95%, non condensing
Cooling	Forced air

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Product Specifications for Option Features (specifications are subject to change without notice)

DVB-S/S2 Receiver

Connector	F-type (F), 75 Ω
Frequency Range	950 MHz - 2150 MHz
Input Signal Level	-65 dBm to -25 dBm
LNB Voltage	12 to 18 VDC
LNB Current	Two selectable output current limits: 450 mA / 750 mA
LNB Communication	Integrated DisEqC controller
Data Rate	1 - 45 Mbps

Multistandard Demodulation

Legacy DVB-S and DIRECTV	QPSK
DVB-S2	QPSK, 8PSK DVB-S2 Pilot processing

Multistandard Decoding

Legacy DVB-S and DIRECTV	<ul style="list-style-type: none"> • Viterbi soft decoder rate 1/2 • Puncture rates 1/2, 2/3, 3/4, 5/6, 6/7, 7/8 • Outer Reed-Solomon decoder as for DVB-S system • Energy dispersal descrambler
DVB-S2	<ul style="list-style-type: none"> • LDPC and BCH decoder as for DVB-S2 requirements • Supported rates: 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, as for DVB-S2 standard

DVB-T/H Receiver

Input Connector	F-type (F), 75 Ω
Frequency Range	470 MHz - 860 MHz
Level	-80 dBm to -20 dBm

Demodulation and Decoding

Supported Modes	IFFT: 2k, 4k, 8k
Guard Intervals	1/4, 1/8, 1/16, 1/32
Code Rates	1/2, 2/3, 3/4, 5/6, 7/8
Constellations	QPSK, 16-QAM, 64-QAM
Hierarchical Modes	Alpha - 1, 2 and 4 for 16-QAM and 64-QAM
Bandwidth	8 MHz, 7 MHz, 6 MHz, 5 MHz

Transport Stream Monitor (DVB-S/S2 or DVB-T/H Receiver)

Signal	MPEG-2 Transport Stream
Connector	BNC (F), 75 Ω

GPS Receiver

Input Connector	F-type (F), 75 Ω 5 Vdc biased
Recommended Antenna	Bullet III GPS antenna - Trimble model no. 57860-10 or equivalent
Receiver Architecture	L1 1575.42 MHz
12 Parallel Channels	C/A code (1.023 MHz chip rate) Code plus carrier tracking (carrier aided tracking)
Tracking Capability	12 simultaneous satellite vehicles
Acquisition Time (Time To First Fix, TTFF)	< 15 seconds typical TTFF-hot (with current almanac, position, time and ephemeris) < 150 seconds typical TTFF-cold (no stored information)
Positioning Accuracy	< 5 m, 1 - sigma < 10 m, 2 - sigma
Timing Accuracy	< 2 ns, 1 - sigma < 6 ns, 6 - sigma
Holdover Time	±1 usec during 2 hours
10 MHz Output Signal	Internally connected to the modulator input Level: 10 dBm ±2.5 dBm, sine wave Harmonic Level: -40 dBc max. Phase Noise: 1 Hz: < -80 dBc/Hz 10 Hz: < -115 dBc/Hz 100 Hz: < -135 dBc/Hz 1 kHz: < -145 dBc/Hz 10 kHz: < -155 dBc/Hz 100 kHz: < -155 dBc/Hz
1PPS Output Signal	Internally connected to the modulator input Level: TTL