

### A Precision Reference Generator with 8 Universal Outputs and a PTP option



The DXD series from Brainstorm is designed to ease the transition to IP. The **DXD-8 Universal Clock**, a precision multi-format reference generator generates up to 4 independent video syncs and audio clocks simultaneously. With the PTP option, it acts as a bridge between an IP infrastructure and legacy A/V equipment.

#### FEATURES

- **Flexibility and easy integration**
  - Synchronizes to a legacy reference, a PTP network or a GPS clock
  - 8 Universal Outputs: WC, AES, Video Sync, 10MHz
- **Reliability**
  - Dual power sources w/ auto switch-over for redundancy
  - Multiple references with shock-free transitions when required
  - Battery back-up for internal TOD clock
- **Upgradable**
  - PTP
  - Internal GPS Receiver
  - OCXO Oscillator

#### REFERENCE GENERATOR WITH UNIVERSAL OUTPUTS

The DXD-8 generates up to 4 independent sync pulses and clocks simultaneously and routes them to the 8 BNC universal outputs. **Universal Outputs** offer great flexibility compared to dedicated outputs as they can be configured for any of the generated legacy reference signals. This includes all standard SD and HD video sync formats (Black Burst and HD tri-level sync), word clock and AES-3id (at rates from 32 to 384 KHz, plus all the necessary pull-up/down, including 24:25 conversions, even VSO) and 10MHz.

A high-accuracy internal crystal oscillator (TCXO) provides a very stable frequency reference (+/- 1ppm). External legacy signals can also be used as reference: Word Clock, AES, Video Sync (SD & HD) and 10MHz. The generated signals have extremely low jitter. The output rates are independent from the reference rate which means that any rate can be extracted from any reference such as 59.97 from 25FPS for example.

#### NETWORK SYNC (1588 PTP)

PTP is available as a firmware option. With the PTP option, the DXD-8 complies with IEEE 1588 PTP V2 and can be either a PTP master or slave Clock. PTP (Precision Time Protocol), defined in IEEE 1588, has been broadly adopted by manufacturers as a network synchronizing standard, which means that the DXD-8 can work in a number of systems. PTP profiles supported by the DXD-8 include AES67 and SMPTE 2059.

As a PTP slave, the DXD-8 synchronizes its internal clocks to the PTP Grandmaster while generating the different sync pulses and clocks. Alternatively it can itself fulfill the function of Grandmaster either locked to the GPS signal (option) or to its internal oscillator.

The DXD-8 has one Gigabit Ethernet port (RJ45).

#### GNSS / GPS

A GNSS/GPS receiver can be installed as an option in the DXD-8 and provide the highly accurate and stable GPS clock as a timing source. Multiple DXD's in remote locations will be locked to each other and in phase once they are GPS referenced.

#### RESILIENCE & REDUNDANCY

When using an external reference, a second source can be connected as fallback in case of failure. If the external reference becomes unusable, the DXD-8 continues generating, locked either to the alternate source or to the internal oscillator and re-locks to the reference when it reappears. These transitions occur smoothly and gradually with no sync shock to the system.

The internal time-of-day clock is battery backed-up to keep it running while power is off.

Two external 12VDC power supply can be connected to the DXD-8. It can operate with either of these power sources and they can both act as a back-up for the other with auto switch-over in the event of a failure.

#### REMOTE CONTROL

All functions and settings can be monitored and altered via a web browser.



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## OPTIONS

- **PTP** (software): With the PTP option installed, the DXD-8 can be a PTP master or slave.
- **OCXO** (hardware): An oven-controlled-oscillator (OCXO) is available providing greater long-term time and TOD accuracy (+/-10ppb, which is less than +/-10 frames per year). The greater accuracy is also useful in GPS systems where extended GPS dropouts may be expected.
- **GNSS/GPS Receiver** (hardware): An internal GNSS/GPS receiver can be installed. This option includes an SMA antenna input connector. (Antenna not included.)

## DXD-8 Universal Clock Specifications

### REFERENCE GENERATOR

Generates simultaneously up to 4 different rates in any of these formats:

- Word clock - rates from 32 to 384 KHz
- AES - rates from 32 to 96 KHz
- Video sync:
  - NTSC/PAL black burst
    - 525/29.97/30i
    - 625/23.98/24/25i
  - HD tri-level sync
    - 720/23.98/24/25/29.97/30/50/59.94/60P
    - 1080/25/29.97/30i
    - 1080/23.98/24/25/29.97/30sF
    - 1080/23.98/24/25/29.97/30/50/59.94/60p
- 10MHz

### UNIVERSAL OUTPUTS

8 outputs - in 4 pairs  
BNC - 75Ω  
Output signal: any of the generated legacy references

### OSCILLATOR

TCXO: +/- 1ppm  
OCXO: +/-10ppb (option)

### EXTERNAL SYNCHRONIZATION SOURCES

Word clock  
AES  
Video sync (Black Burst or HD tri-level sync)  
10MHz  
GPS (Option)  
PTP (Option)

### UNIVERSAL INPUTS

2 BNC input connectors (75Ω) accept the following:

- Word clock
- AES
- Video sync (Black Burst or HD tri-level sync)
- 10 MHz

### REMOTE CONTROL

Web browser

### PRESETS

10 presets can be programmed for quick recall

### DISPLAY

2.4" TFT LCD - 240 x 320 resolution

### POWER

12 VDC @ 60A  
Dual inputs with auto switch-over for redundancy

### DIMENSIONS

19" x 1.75" x 8"

### PTP (option)

Complies with IEEE-1588 V2  
Unicast / Multicast operation  
Configurable as a Grandmaster, slave or Boundary clock  
1 Gigabit Ethernet port (RJ-45)

### GPS (option)

The DXD-8 can be fitted with an Internal GPS receiver. The option includes an SMA antenna input.