# TimeLord

## REFERENCES

**V-488.00B** GPS receiver system

**Off-Air Receivers**
GPS system includes active Antenna which must have 80% view of the sky, Receiver/Interface which must be located within about 6m of the antenna (mini coax provided) - remote powered by the Timelord - 25m cable included. Timekeeping accuracy to within 50µS of UTC

**V-484.02** MSF (Rugby) receiver

GMT/BST receiver - omni-directional high sensitivity wallmount in IP65 ABS case. Timekeeping accuracy to within 30mS of UTC

**V-484.03** DCF (Frankfurt) receiver

CET/CEST receiver - omni-directional high sensitivity wallmount in IP65 ABS case. Timekeeping accuracy to within 30mS of UTC

**Internal** timebase (free-run mode)

High stability quartz crystal oscillator. Timekeeping accuracy to within about 0.1 seconds per day, 18-22C

OFF AIR RECEIVERS should be ordered separately

## OUTPUTS

LTC Longitudinal Timecode Output
VITC Vertical Interval Timecode Output
VITC Lines
Timecode Time / Date Formats

**SMPTE / EBU Timecode**
Balanced 600R on XLR-3M at nominal -6dBu
1V composite on BNC
Selectable from lines 16-31. Factory preset to lines 17 & 19
EBU or SMPTE - Time only, Time / Date for Timecode Clocks and Tine / Date for use with Timecode / User-Bit video inserters

Ident Message

Up to 9 lines of 20 characters plus Time and Date (numerical and text formats) adjustable font size and text positions

**Serial Time/Date Data**

Serial data signals
Serial data format
Serial data messages
Repetition rate
Serial "on-time" signal

RS-232 and RS-422/RS-485 on D-9F connector
7/8 bit, even,odd or no parity, 1200 - 9600 baud
Date and/or time in various formats
1 sec, 1 min, 5 mins, 1 hour, 24 hours or on request
RS232 level signal every second

**482 Time and Date Code**

Time Date code for V-400A digital displays
Number of digital displays

15 managed time zones for single twisted pair on screw terminals
Up to 50 clocks / multi-zone displays on up to1km cable

**IRIG**

Optional IRIG output

IRIG-B (B123), IRIG-E (E123), Afnor NFS 87-500, NEMA 911, IEEE 1344 (see manual regarding IEEE 1344 extensions implemented)

## FRONT PANEL

LED Clock Display
Parameter Setup

**Controls and Indicators**
HH:MM:SS / DD:MM:YY switchable with Locked to Off-Air LED
Time / Date / Time Zones (15) / Serial Data via 4x pushbuttons
Timecode via serial port using setup program supplied

LED Indicators

10 LEDs to show PAL, NTSC, Serial I/P OK / not OK, Timecode Date Mode (1,2,3), Video OK / not OK, Timecode O/P

## ACCESSORIES

Cables
Software Utilities

**Included**
IEC Mains power cord, RS-232 serial cable, Receiver Head - ClockLok software for running on computers to lock their internal clocks to the TimeLord serial tine data output
SchedulePak Programmable Timer package for running on Windows 98 PC to provide GPI relay trigger outputs
Timecode / Character Inserter setup package

## PHYSICAL

| | |
|---|---|
| Dimensions | 173 x 49 x 178mm (WxHxD) |
| Weight | 2.5Kg |
| Power | 90-263VAC 47-63Hz fused T315mA Slo-Blo |

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VORTEX
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Time

# Atomic-Locked Master Time Source — TIMELORD

WWW.VTX.CO.UK


## DESCRIPTION

**The TimeLord Atomic-locked Master Time Source** provides everything required for accurate timekeeping within a broadcast and professional AV environment. It solves the difficult problem of generating accurate video-referenced EBU and SMPTE timecode that can be used in the video domain, generating both LTC and VITC Longitudinal and Vertical interval timecodes with video character insertion.

**There are 15 internal time zones** with individual seasonal daylight saving information already programmed for the next hundred years or so, and the logic is battery-backed in case of mains failure. The 482 Time/Date code output is used to reference digital clocks, day/date and multi-zone displays from the established V-400A series.

**The TimeLord may be synchronized** to an off-air atomic reference, automatically maintaining the correct time throughout the year. GPS (satellite), MSF (Rugby) or DCF (Frankfurt) receivers are available. The GPS system consists of an active antenna plus receiver/interface whilst the MSF and DCF receivers are housed in ABS IP65 boxes.

**The Serial time data output** is designed for locking computer servers and timestamping applications, providing accurate time and date information in numerous data formats.

# Timelord Time Data OUTPUTS

### SERIAL TIME DATA

Serial time data output is provided at both RS232 and RS422/485 levels with front panel selection of the the transmission format which may be 7 or 8 bit; odd, even or no parity; 1200, 2400, 4800 or 9600 baud data rates. The data repetition rate may be set to regularly transmit at intervals of one second, one minute, five minutes, one hour or 24 hours, or on request from the synchronized device.

The data content may be selected from a number of the pre-programmed formats commonly-used in computer networks, machine control and security time-stamping equipment. For information concerning data compatibility with specific equipment, please contact Vortex Communications. More than 30 formats are included as standard and additional custom formats can be implemented on request. In addition, a 1pps “on time” signal is produced at RS232 data levels.

### OUTPUT FOR DIGITAL DISPLAYS

Up to 50x V-400A series digital and multi-zone displays can be driven from the 482 multi-zone time data output. Literally hundreds of types of display are available with Red, Green, Yellow, Blue and dual-colour with character sizes from 10mm to 220mm high, 7-segment and dot-matrix.

### GPI RELAY CONTACT OUTPUTS

The changeover relay (30V DC 500mA contacts) may be programmed to trigger every 5 seconds, 1 minute, 1 hour or 24 hours at a specfic time of day. Alternatively it can be programmed as an “alarm” relay, triggering on power failure, loss of reference or logic error. Additionally, the SchedulePak programable PC timer package to provide timed GPI relay contact closures is included as standard

### IRIG OUTPUTS

**An IRIG interface is optionally available for the TimeLOrd**, providing time data output in IRIG-B, IRIG-E, Afnor NFS 87-500, NEMA 911 and IEEE 1344 formats.

### EBU / SMPTE TIMECODE OUTPUTS

Both balanced LTC Longitudinal Timecode and VITC Vertical Interval timecode are produced plus an on-board character generator allows accurate time / date video insertion with ident message if required. Up to 9 lines of 20 characters are possible with multiple ident messages, each of which may be individually positioned on the screen. These can be inserted together with time / timecode, date and user-bit information. The font size is also adjustable.

There is a strict relationship between the time data within the timecode signal and the various 4-field and 8-field sequences in the video signal and unless timecode conforms to this relationship exactly, Broadcast servers and editing systems.

The TimeLord video input should be fed with a suitable reference signal, ideally station Black and Burst from the Master SPG Sync Pulse Generator. This signal is used to reference the generated EBU or SMPTE timecode outputs to the video signal, adjusting the timecode to meet EBU and SMPTE specifications.

A software setup program is provided to download setup and ident message information to the TimeLord, including the selection of VITC lines which may also lie outside field blanking. This is particularly useful for modern VTRs which do not preserve the VBI Vertical Blanking Interval.

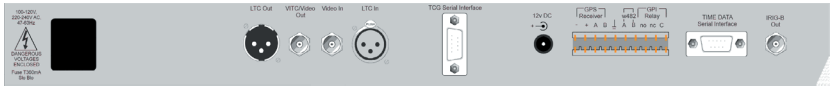
### ANALOGUE CLOCKS (with Hands)

An intelligent dual impulse driver rack may be connected downstream of the TimeLord to provide seconds, half-minute or minutes impulses (24V bi-phase) to drive up to around 50 analogue clocks. Daylight savings changes are automatically followed and initial setup of the is straightforward. Internal batteries keep clocks running in case of mains failure and provision is made for automatic catch-up if the batteries can no longer keep the clocks showing accurate time.



# Timelord Master Time Source


▼ *TimeLord Master Time Source - 1U rackmount - Front Panel*



▼ *TimeLord Master Time Source - 1U rackmount - Rear Panel*

# How the Timelord works - a note on Timecode

**The TimeLord** lets customers use their existing SPG sync pulse generator and yet provides accurate time-of-day timecode generated, locked to both an atomic reference and to video.

The PAL video signal follows an 8-field sequence (4-frames) whilst the NTSC sequence consists of 4-fields (2-frames) which then repeats. It is possible to deduce from the time bits in each timecode number, the type of video frame to which it refers (1,2,3,4 in PAL-SECAM / 1,2 in NTSC). Counting starts from frame 00:00:00:01 which is a video frame-1 The sync word in the timecode data mustalso occur within 1 bit of vertical sync - that is within 1/80th of a frame - so that one frame of timecode refers precisely to one frame of video.
When locked to an off-air reference such as GPS, the atomic clock provides absolute time information to the TimeLord. Unless the station SPG happens to be producing the correct frame of video at that time and that the vertical interval happens to line up with the sync word the timecode outut has limited use for video applications. Station automation systems and editing controllers are often upset by discontinuities and ambiguities in timecode data which is why correct video locking is essential.

**There are of course** ways to lock the SPG oscillator to the same time / frequency source (GPS for example) and Vortex has high stability disciplined oscillators available for this if required. These include very long phase-locked loops to ensure that no jitter from the off-air signal is passed onto the SPG video output as can occur in some cases. Even with an externally-locked oscillator, however, the relationship between the vertical interval and timecode is unlikely to be correct and a discontinuity will still occur if there happens to be “leap second” which introduces a 1-second jump in time which does not correspond to a whole number of video frames.

**The TimeLord** always generates EBU/SMPTE timecode locked to reference video. The time information from the atomic source is adjusted to the nearest correct value to ensure that that the timecode output matches the SPG reference. The timecode output, which is referenced to external video, will drift compared to the off-air reference over time. Once this becomes more than 3 frames the TimeLord recognizes the offset and allows the timecode output to re-synchronize to the atomic reference but at a pre-determined time - 3am for example - downloaded to the TimeLord from using setup program. Of course, daylight savings changes occur immediately. If the SPG happens to be locked to the same off-air reference (eg GPS), this drift will not occur and the TimeLord will not have to re-adjust the timecode output except when leap seconds occur. Even with a free-running broadcast Master SPG such as the Vortex SPG-100SP or SPG-100XP which have ovened oscillators, this drift will be very slow and resynchronization will only need to occur after a number of days or even weeks.