

# T1600

## 16 Channel Hybrid Mobile DVR

**With optional solid-state drives, all connections on one face, cable management, and a ruggedized enclosure, the T1600 has been designed specifically for on-vehicle installation and deployment.**



The latest evolution of Synectics' T-series recorder, T1600 16-channel, analogue DVR with hybrid IP capability, has been designed to meet the exacting demands of the mobile industry. With optional solid-state drives, on-board accelerometer, and a ruggedized enclosure the T1600 has been designed specifically for on-vehicle installation and deployment.

T1600 offers superior image quality and frame rate capability, configurable at up to D1 resolution on each analogue camera simultaneously. Differential video inputs increase image quality by removing interference and allow the use of standard CAT5 cable and RJ45 crimp connectors.

T1600 interfaces to PAL/NTSC cameras making it well suited for deployment on new and existing vehicles with legacy camera equipment. Being a hybrid recorder IP HD cameras can be deployed to capture exceptional quality images for areas of specific interest, such as front-road cameras.

A highly reliable device in a wide range of environmental conditions, the unit is designed to comply with EU standards for railway applications, in addition to all

current mobile equipment standards for road vehicles relating to EMC, shock, vibration and temperature.

Available with 1TB storage on a single disk, T1600 can record up to 10 days of footage in typical conditions. Optional upgrade to 2TB dual disks offers the ability to increase the retention period or the storage of higher frame rates or resolutions.

Synectics' proprietary File System (SFS) recording ensures a higher data throughput, lowers energy use, reduces disk wear and provides a level of protection from tampering and unauthorised viewing.

Optional solid state drives maximise resilience against recording loss during incidents, this ensures crucial evidence is captured even in high-shock and vibration situations. An integrated accelerometer detects changes in G-forces usually associated with accidents and abnormal incidents and captures this information along with the audio and video to provide a total

situational overview. In addition, location data, from an integrated<sup>1</sup> or external GPS receiver<sup>2</sup>, can be synchronised and recorded with the video. T1600 can also interface with standard vehicle communications systems such as iBUS and IBIS. Electrical vehicle signals such as braking, indication, reverse and door open, can be logged as data for search and review at a later point.

Designed for effective cooling without fan assistance T1600 is protected against dust and dirt ingress. Industry standard connectors located on one face of the unit allow simple access for service checks. No custom breakout cables are required, which, along with integrated cable management, facilitate a tidy installation. Being designed to accept a wide range of voltages ensures compatibility with all standard vehicle electrical systems.

<sup>1</sup> Integrated GPS available using an antenna

<sup>2</sup> Serial data from an external GPS receiver mounted on the vehicle

# Specifications

CAMERA	
Video Inputs	Up to 16 Analogue Cameras or 12 Analogue + 3 IP Cameras
Analogue	PAL / NTSC
Inputs	Up to 16
Connectors	RJ45 with Video, Audio and 12V DC Camera Power
Termination	Differential Video 75Ω
Protection	Transient and Over Voltage Protected
Input to Ethernet latency	<100ms
IP	External PoE switch recommended to connect multiple IP cameras to the T1600
Inputs	Synectics IP Cameras
Streams per Input	2 – 1 HD for Recording and 1 SD for Display
Maximum Frame Rate	HD Stream 1080P: up to 25/30 fps SD Stream D1: up to 25/30 fps
RECORDING	
Disks	Caddy can be fitted with capacity for two 2.5" SATA disk drives or one 2.5" disk drive and one solid state back up drive <sup>3</sup>
Disk Size	Choice of Disk Sizes Available
Resolution	Analogue CIF / 2CIF / D1
Resolution	IP Camera Determined by Camera Stream Resolution
Frame Rate	Up to 25 / 30 fps Per Channel
Recording System	Synectics File System for lower energy use and maximum recording efficiency, integrity and security
Recording Disk Write Cycle	1 Second
VIDEO COMPRESSION	
Compression	Selectable H.264 AVC High Profile / Main Profile (MPEG4 part 10)
Data Rate	Max 5Mbps Per Stream HD Max 2.5Mbps Per Stream SD Maximum Total Throughput for all Connected IP Cameras 16Mbps
GOP Structure	I & P with Configurable Length
MONITOR OUTPUTS	
	2 Channels Independently Configurable
Analogue	Composite PAL/NTSC BNC 75Ω
	On Screen Display Image Flip for Rear View
Digital	One Channel Presented both as HDMI and VGA
Display Format	All Monitor Outputs Configurable as Full Screen, 2x3 and 4x4 Views
AUDIO	
Inputs	4 Mono Channels on RJ45 Video Input Connectors
Input Level	1V RMS
Protection	Transient and Over Voltage Protected
Compression	G.711
Sampling Rate	8K / 16K Configurable

**OPERATION**

Connectors	CAN 2.0	Communications Interface	Terminal Block
	iBUS	Communications Interface	RJ45 AUX Port
	USB 2	For Firmware Upgrading	2 Ports
	GPS	NMEA Serial From Vehicle Built In	Terminal Block Antenna
	16 x Alarms In	Opto Isolated Contact Closure or Voltage Driven (Programmable Thresholds 0-28V DC)	Terminal Block
	4 x Alarms Out	Change Over Relay Contacts 30V DC 1A Max)	Terminal Block
	Status	Ignition / Power / Recording / System	4 Tri-Colour LEDs
	Ignition	9VDC On / 7V DC Off	Terminal Block
	1 x RS232	Diagnostic Port	D9F
	1 x RS485	Reserved for Future	Terminal Block
	1 x RS232	Reserved for Future	Terminal Block
Security	Secure Hard Disk Removal	2 Key Switches	
Events	Inbuilt Tri-Axis MEMS (Accelerometer)		
	Comprehensive Health Reporting		
	Comprehensive Event Recording		
	Comprehensive Data Recording (Allows GPS Search Facility on Client)		
	WLAN Health-Check and Data Download (Requires WLAN Access Point)		
	Vehicle Signal Overlay on Video Playback		
Programmable Shutdown Timer			

**ENVIRONMENTAL**

Environment	IP30, Optional IP53
Cooling	Fanless Cooling for No Dirt Ingress
Operating Temperature	0°C to +55°C Ambient (32°F to 131°F)
Storage Temperature	-40°C to +100°C (-4°F to 212°F)
Humidity	80% Atmospheric Non-Condensing
Reliability	Design has undergone Highly Accelerated Life Testing (HALT) heat and vibration cycling
	Shock and Vibration Tested with random 3 axis vibration up to 20 G RMS
Certifications and Approvals	EMC EN50155 Class A VCA e-Marked Type Approval Number E11/10R-048412

**NETWORK**

Interface	10/100/1000 BaseT
Protocols Supported	RTP/RTSP / TCP/IP / UDP / IGMP / SNMP / HTTP / NTP
Password Levels	Administrator / Super User / User
Supported Internet Browsers	Internet Explorer 10/11 / Chrome / Firefox

GENERAL	
PSU Input	12-36V DC
Consumption	45W Typical
Camera Power Supply	16 Channels of 12V DC, 6W via RJ45 with Poly Fuse Protection
Monitor Power Supply	12V DC 6W via Terminal Block with Poly Fuse Protection
Dimensions	95(H) x 300(W) x 245mm (D) HxWxD (3.75 x 11.81 x 9.65 in) Excluding Connectors
Weight	6.5kg (14.3lb) (Complete Boxed) 4.7kg (10.4lb) (Unit Only, No Cover Plates or Side Brackets)

OPTIONS / ADDITIONAL FEATURES	
Solid State Backup Drive <sup>3</sup>	SATA SSD Fitted in Drive Caddy
USB3 Drive Caddy Reader	Allows Recordings Made on Recording Drives to be Accessed Via a PC
Synergy 3 Transport	Software Required to Playback Recordings from the T1600 and to Export Evidence
Synxplorer (Version 1.2.0.16 or Later)	T1600 Device Discovery on Network
Synectics Device Search (Version 2.0.0.2 or Higher)	Synectics HD IP Camera Discovery

PART CODE	
T1600	16 Channel Hybrid DVR
T1600-8	8 Channel Hybrid DVR
SY9450	USB Drive Caddy Reader

<sup>3</sup> Optional