

**DECLARATION OF DESIGN AND PERFORMANCE**

**VRDV-4010-01-DDP**



Name and Address of Manufacturer:	Real-Time Vision Ltd. 21 Hornsby Square, Southfields Industrial Estate Laindon, Essex. SS15 6SD United Kingdom www.Real-Time-Vision.com
Description:	Digital video Recorder – MPEG II Standard Designed for rugged, high quality airborne video recording applications. Long recording times (4.5 Hours) Using industry standard FLASH storage cards
Identification (Drawing/Part Number):	VRDV-4010-01-yy PAL VRDV-4010-51-yy NTSC Where yy designates the I/O configuration – see ICD for definition
Modification Standard (Issue)	Mod Strike 0
GA, Drawing or MRI Reference:	VRDV-4010-xx-yy-GA
Weight and Overall	Mass: 0.75KG
Dimensions:	Height: 38mm Width: 146mm Depth: 155mm (not including connectors)
Electrical Power Requirements:	Aircraft 28V DC supply





VRDV-4010-01
SHEET 3 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

### APPLICABLE DOCUMENTS

REFERENCE	TITLE	REV	DATE
VRDV-4010-xx-yy-ICD	Interface control Drawing	B	10 Nov 2005
VRDV-4010-xx-yy-GA	GA, Drawing or MRI Reference:	B	18 June 2005
VRDV-4010-xx-yy-ATP	Acceptance Test Procedure for Digital video recorder	B	10 Nov 2005
VRDV-4010-xx-yy-OPS	Operator Manual	A	10 Jan 2005
VRDV-4010-xx-yy-DDP	Declaration of design and performance	-	- see cover
RTCA DO-160D	Environmental Conditions and Test Procedures for Airborne Equipment	D + Ch 1 Ch 2 Ch 3	Jul 1997 Dec 2000 Jun 2001 Dec 2002
MIL-STD-461E	EMI: conducted emission/ conducted susceptibility	E	
MIL-STD-3009	NVG interface and performance requirements (derived from MIL-L-85762A)		February 2001
STANAG 3350 AVS	NATO Military Agency for Standardisation (MAS)  Standardisation Agreement– Analogue Video Standard for Aircraft System Applications	Edition 4	30 <sup>th</sup> October 1995



VRDV-4010-01
SHEET 4 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

### EUROCAE/ED-14D /RTCA DO-160D compliance statement

DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment Issued July-29-1997 Superseded DO-160C, Changes 1, 2 & 3 Prepared by SC-135 Standard procedures and environmental test criteria for testing airborne equipment for the entire spectrum of aircraft from light general aviation aircraft and helicopters through the "Jumbo Jets" and SST categories of aircraft. The document includes 25 Sections and three Appendices. Examples of tests covered include vibration, power input, radio frequency susceptibility, lightning, and electrostatic discharge. Coordinated with EUROCAE, RTCA/DO-160D and EUROCAE/ED-14D are identically worded.

DO-160D is recognized by the International Organization for Standardization (ISO) as de facto international standard ISO-7137.

This unit has been designed to meet the environmental conditions specified in RTCA/DO-160D, dated as indicated below.

Section	Compliance
4 - Temperature & Altitude	Category A1 This unit is considered satisfactory for operation up to an altitude of 25,000 feet un-pressurised.
5 - Temperature Variation	Category C Within the range 0°C-50°C
6 - Humidity	-
7 - Operational Shocks & Crash Safety	Category B Operation 6g 11/ms Non operation 15g/11ms
8 - Vibration	Category R+U (equiv: DO-160C Helicopter -Test curve 'N', 1.5g p-p)
9 - Explosion Proofing	N/A Category A Equipment located within the passenger cabin.
10 - Waterproofing	Category W
11 - Fluid susceptibility	-
12 - Sand & Dust	Category D
13 - Fungus Resistance	N/A Category F
14 - Salt Spray	N/A Category X
Sections described below, which address the EMC requirements for aircraft, are called up in the Advisory Circular Joint (AC)/ Advisory Material Joint (AMJ) 20.1317 and the User Guide. They describe detailed test EMC requirements and test methods for each of the phenomena listed:	
15 - Magnetic Effect	Category A The unit has no perceivable effect when mounted within 460mm (18") of an aircraft magnetic compass
16 - Power Input	Category B
17 - Voltage Spike	Category A
18 - Audio Frequency	-
19 - Induced Susceptibility	Category Z
20 - RF Susceptibility (Radiated & Conducted)	Category U
21 - RF Emission	Category B
22 - Lightning Induced Transients	Not considered
23 - Lightning Direct Effects	Not considered
25 - Electrostatic discharge	-
24 - Icing	Category X



VRDV-4010-01
SHEET 5 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

### DESIGN STATEMENT

The VRDV-4010, flash disk digital video recorder, described herein has been designed using techniques, common parts and practices gained from the design and testing to RTCA DO-160 of other recorders in the series. The principle areas of similarity are:

#### Housing construction

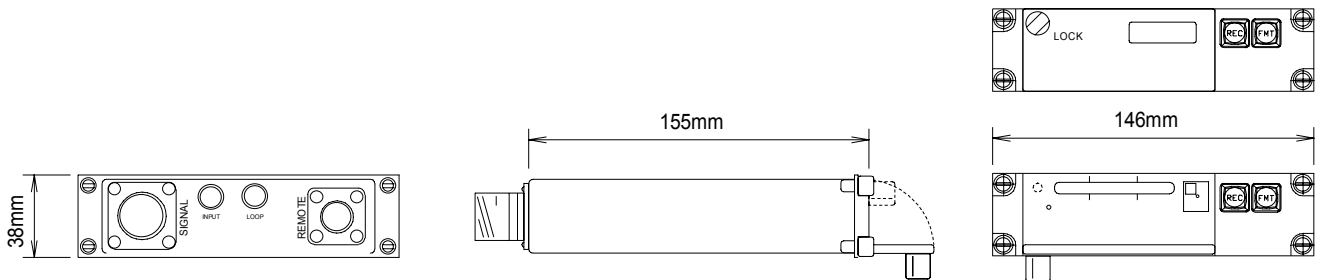
The housing is constructed from machined and folded aluminium. The case has a groove around the perimeter that matches the perimeter of the cover. A hinged door protects the card slot which may be unlocked and opened to remove the card(s)

#### Component retention

All major components and assemblies are secured to the chassis using a combination of metal and insulating nylon screws.

Components that may become loosened by vibration, such as plug in components and links, are secured using non-conductive silicon sealant or epoxy.

Screws secure the bottom case cover which is retained in a groove.





VRDV-4010-01
SHEET 6 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

### General Description

This specification applies to the flash disk digital video recorder model VRDV-4010-01 and its variants. The digital video recorder has been optimised for aircraft operation typical in airborne surveillance applications.

This Recorder contains:

- Power input filter, power supply module and control card
- Video processing and control electronics
- PCMCIA card slot writer
- Control and front panel assembly

The VRDV-4010 is a high quality, rugged, MPEG II format recorder with a compact and practical design that can be installed horizontally or vertically.

- Typically 4 hours NTSC and PAL recording using 8Gb flash card
- Solid state recording (no moving parts)
- Optional wired serial remote, or remote control from any AVDU series LCD video display
- Horizontal or vertical operation
- Composite, Y/C, RGB input

The VRDV-4010 is designed for recording edit ready clips directly to its integrated flash card memory from any composite video source...while you're flying. Drive technology eliminates the lengthy "capture" and digitisation process in preparing evidential presentations. Clips are instantly accessible by your computer based Non Linear Editing System (NLE) for report preparation and archiving. The output may also be transferred to disk or tape.

- Real-time MPEG-2 compression video & audio recorder
- Records to removable PC-Card (PCMCIA) flash disk, playable on a PC / laptop.
  - Flash cards available separately
- Up to 4 hours of high quality recording (using a 8Gbyte card).
- Optional line & mic level, stereo audio recording.
- Rugged, small and light weight with no moving parts.
- Optional "Burnt in" on-screen date and time
- Utility to archive to Tape or DVD disk viewable on consumer DVD players.

The unit is a highly compact digital video recorder designed especially for airborne or covert applications. The system utilises broadcast standard MPEG-2 video compression to record high quality real-time video and audio to a PC flash card. Once a recording has been made, the flash disk may be removed and played on a PC or laptop using a standard media player application. The unit is housed in a small and rugged enclosure, ideal for covert installations. The system is DC powered and has optional audio inputs at microphone or line level. As it is small and contains no moving parts the unit is capable of operation where normal VCRs are not. Recordings made in harsh environments, such as continual shock and vibration over extended temperatures, are now possible. The unit includes an internal onscreen display generator so date and time may be burnt onto the recorded video if required. The data on the flash disk may also be encrypted so that only users with a correct passcode / key are able to view the pictures. A PC software utility is available to allow archiving of the recordings directly to a DVD disk which can then be viewed on either a PC or a consumer market DVD player.



VRDV-4010-01
SHEET 7 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

Outline Specifications:	
Disk interface	PC card (PCMCIA)Compact Flash via adapter
Video:	
Video standards supported	PAL (NTSC in development)
Video compression	MPEG-2
Video input / output levels	1 Vpp 75 ohm
Digitising resolution (PAL)	8 bit Y/UV, 720 pixels by 576 lines
Audio:	
Number of channels	2 (stereo)
Compression	MPEG1 level 2
Input level	Mic / line (adjustable)
Mic bias	3.3 V
Power-up to record time	< 2 Seconds
Record time	High quality:30 min / Gbyte - Medium quality:1 hour / GByte

The growing use of several different tape formats creates a need for an airborne video recorder that can record directly to storage without the need for a wide range of cassettes. The current economy mandates that any upcoming video recorder be affordable and suitable for both nonlinear editing (NLE) and long duration recording applications. The new VRDV-4010 provides a unique tapeless solution, it also records from both NTSC and PAL video standards.

Generating industry compatible, broadcast quality MPEG II files for playback onto any compatible PC or laptop. The longer recording capability, rugged storage and higher quality of the solid state recording system allows the VRDV-4010 to provide economical video transfers to mass offline storage and archive such as CD or DVD. Using the new higher capacity flash cards, over 4 hours of recording time may be obtained from an 8Gbyte card. The VRDV-4010 features 48kHz audio that is locked with the video.

When two units are used in line, auto recording is enhanced by the VRDV-4010 "automatic start" feature, which triggers the recorder to automatically begin recording five minutes prior to the space runout of another compatible VRDV-4010. Its native 28-volt DC power source even allows the deck to be used for fieldwork or to be powered directly from an aircraft power supply or battery. The deck is designed for horizontal or vertical mounting.



VRDV-4010-01
SHEET 8 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

DESIGN AND PRODUCTION	
Components, materials and processes	Standard parts are used wherever possible. As a general rule, the use of non-approved components is avoided. Where this is not possible, components are selected to meet the conditions of the particular specification of the equipment.
Metallic materials	Metallic materials used for manufacturing the equipment are consistent with the grades selected by the national and international aviation standards. The materials used are adequately protected against corrosion of any origin by using only qualified methods that are sufficiently efficient considering the environmental conditions to be found on the aircraft.
Flammable materials	Materials employed in the equipment design and manufacturing do not promote combustion. In event of fire the metallic and glass construction of the case does not sustain nor support combustion and no hazardous quantities of toxic or noxious (e.g. smoke) products will be distributed in the crew / cargo compartments.
Finishing	Equipment external surfaces are finished Matt Black
Interchangeability	All parts built with the same part number (P/N) or drawing number are functionally and dimensionally interchangeable with each other.
Identification and marking	Information on the equipment identification label is as follows: <ul style="list-style-type: none"> <li>• Manufacturer's name</li> <li>• Item description</li> <li>• Part Number</li> <li>• Serial Number</li> <li>• Date of Manufacture</li> <li>• Identification Firmware revisions (where applicable)</li> </ul>

Outline showing dimensions with and without Dzus rail mountings (non standard horizontal pitch)



VRDV-4010-01
SHEET 9 of 20
Issue No..B
MoD ref.. -

## DECLARATION OF DESIGN AND PERFORMANCE

### Safety

#### Sharp Edge Requirements

There are no sharp edges or comers on the display assembly that could cause injury.

#### Materials

##### Toxicity

There are no carcinogenic materials used anywhere in the unit. Where toxic materials are used, they will be reviewed and approved by the responsible ADT Toxicologist.

##### Flammability

All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process. The PECs (Panel Electronic Circuit) boards will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board where appropriate.

##### Capacitors

Where polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

##### Hazardous Voltages

Any point exceeding 42.4 volts meets the requirement of the limited current circuit. The current through a 2K $\Omega$  resistance is less than 0.7 x f (kHz) mA.

#### LIMITATION OF LIABILITY

The manufacturer's liability for damages to customer or others resulting from the use of any product supplied hereunder shall in no event exceed the purchase price of said product.

#### IMPORTANT USAGE NOTE

This equipment is for use by developers and integrators, the manufacturer accepts no liability for damage or injury caused by the use of this product. It is the responsibility of the developer, integrators or other user of this product to:

- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- Check power settings to all component parts before connection.

#### Disclaimer

Real-Time Vision reserves the right to make changes to this document and the product which it describes without notice. In addition, Real-Time vision. shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, and use of this product.

This product shall not be used for or in connection with equipment that requires an extremely high level of reliability, such as life critical systems, nuclear power control equipment and medical or other life support equipment. Real-Time Vision. takes no responsibility for damage caused by improper use of this product which does not meet the conditions for use specified in this specification sheet.