

**Pace Xcom
UK**

Confidential

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**SPECIFICATIONS OF DTVA-UK
DIGITAL TV ADAPTER
UK Terrestrial Version (COFDM)**

DTVA-UK Specifications

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FA0612

1 GENERAL SPECIFICATIONS

The Digital Television Adapter (DTVA) product range provides very low cost Set-top Box with basic functionality in a small factor size, with Conditional Access capability and Electronic Program Guide.

The DTVA is highly configurable to fit specific customer needs.

The DTVA-UK is dedicated to terrestrial reception.

The DTVA-UK is made from three parts, interconnected with a cable:

- A pluggable power supply
- An interconnection box, with all the user connectors
- A customizable box that houses the main electronics.

The package of the main box is fully customizable (dimensions, color and material) if required.

The DTVA-UK supports reception and processing of digital television, sound and data services, in compliance with the 'DVB System'. The DVB specifications include the MPEG-2 compression and multiplexing system (ISO/IEC 13818), the baseline modulation schemes for cable (ETS 300 429) and the DVB SI System (ETS 300 468).

The software of the DTVA-UK can be completely downloaded through the aerial stream. The DTVA-UK is part of a family of scalable designs that can be used in different markets.

2 CONDITIONAL ACCESS

Xcom has developed a specific SW module for Conditional Access; in this literature it can be called the CA module, CAM or SW multicrypt.

Several embedded Conditional Access are implemented in the DTVA family.

The DTVA-UK has an embedded version of MEDIAGUARD for the UK market.

3 HARDWARE OF DTVA-UK

The various parts making the DTVA-UK are:

- One plastic box, which houses all the main electronics
- One switching power supply 85-265V AC, plugable into the mains socket.
- One motherboard:
 - DTT 2K/8K demodulator
 - MPEG2 Audio/Video decoder
- One connection box - this box contains all the connectors

3.1 Mother board MPEG2 Audio/video

This board uses the LSI Logic chipset SC20xx devices (SC2000/10).

The board includes:

- 2 MB of FlashEeprom
- 8 MB of SDRAM on CPU bus
- 2 MB of SDRAM on Audio / Video decoder bus
- This SDRAM is dedicated to the MPEG decoding.
- The bitmap used by the OSG is located into the CPU SDRAM.

The SC20xx Single-Chip Source Decoder is a very complex chip since it merges the following functionality:

- CPU 32-bit TinyRISC MIPS EZ4102 @ 108 MHz
- Instruction (16 KB) and data (8 KB) caches
- 2xSDRAM controllers
- Transport Stream Demultiplexer: 32 PIDs filters, 32 hardware data filters are available for the 30 general purpose PIDs. Each filter includes a 12-byte match pattern and a 12-byte mask that provides filter-matching criteria.

The TS input sustained rate is up to 100 Mb/s

- DVB descrambler: up to 12 pairs of 64 bit keys
- Audio/Video Decoder: Main Profile@Main Level,
- Maximum data rate for video is 15 Mb/s,

- Audio decoder is compliant with the MPEG2 layer I and II (up to 384 Kb/s).

Sampling frequencies are 16 kHz, 24 kHz, 32 kHz, 44 .1 kHz and 48 kHz.

- The A/V decoder accesses dedicated SDRAM device in order to ensure the best performances. Post processing filters for image resizing and positioning including Letterbox. Variable horizontal and vertical scaling

• Graphics/video processing with overlay, alpha blending, and block move features a.k.a. OSG. The OSG subsystem provides a 5-plane display architecture and a high performance 2-D block move engine:

- The OSG uses data from the system memory to construct Still, OSD and Cursor planes.

- An alpha per-pixel engine allows generating per-pixel alpha blending for the Still and Video planes.

- 2, 4 or 8 bit/pixel palette-based OSD modes
- 16 and 32 bit/pixel direct color OSD modes
- anti-flicker filter
- PAL encoder provides CVBS and RGB/YPbPr analog video signals:
- 625 line displays
- Slow switching (pin 8)
 - 0v TV mode
 - 6v 16/9 (Widescreen) AV mode
 - 12v 4/3 AV mode
- Fast Blanking (pin 16)
 - 0v CVBS Video
 - 2v RGB Video + CVBS (Synchro)
- Macrovision copy protection
- Audio DAC provides stereo analog audio
- Asynchronous serial I/O (up to 115 200 baud) for development/test only
- 1 InfraRed port
- Full size smart card reader interface.

The demodulator section is compliant with ETS 300 744:

- It ranges from 470 to 862 MHz (UHF Channels 21 to 69)
- Input level varies from - 75 to - 20 dBm
- Bandwidth is 8 MHz

The demodulator section includes:

- DVB-T compliance
- A QAM 64 demodulator up to 31Mbit/s
- 2K or 8K FFT size
- A Forward Error Correction decoder:
- ReedSolomon outer code (204/188)

3.2 Front panel

The front panel of the box provides:

- An Infrared receiver
- One red/green light (LED) - this LED informs about the receiver status:
 - Incoming stream Locked
 - IR RCU feedback

3.3 Smart Card Reader

The smart card reader provides a guide to insert the card and an electrical interface to comply with ISO 7816 functional specifications ('hot-plugging' of the smart card is forbidden).

3.4. Remote Control Unit

The RCU uses Infrared modulation to send the code keys to the DTVA-UK.

There are 34 remote control function keys. When a key is pressed there is a blink on the red/green LED located on the front panel (visual feedback).

3.4 Interconnection module

This module is connected to the main power and to the main box. It features the aerial (IEC 169-2 connector) and a SCART connector – PAL CVBS, RGB & Audio

4 SOFTWARE

DTVA-UK uses VxWorks5.3 from Wind River Systems as RTOS. This choice was made because "easiness" to port new software for potential increased future functionality.

Software for a typical "Set-Top Box", providing a simple User Interface, Interactive Digital Text and room to store up to 1000 TV channels, runs in flash EEPROM.

Xcom provides an Electronic Program Guide (native) based on Event Information Table (EIT) Present/Following/Schedule, Actual and Others according to ETS 300 468.

4.1. Software update

The complete DTVA-UK software (including OS) can be updated via a terrestrial broadcast stream.

The download protocol allows filtering according to software release, hardware platforms, etc.

The downloading requires minimal user intervention.

4.2 Main features

DTVA-UK software is modular and can be tailored to specific needs.

Main modules are:

- Channels (video and radio) handling, with 8 customizable favourite lists (zaplists)
- Audio channels handling - languages and mono/stereo/left/right
- Channels information - banner with service name, present/following, favourite list name, time, channel attributes
- DVB sub-titling
- CA Module – supporting Mediaguard.
- Channels scan.
- Electronic Program Guide - present/following, schedule, actual and others; up to 5-days (broadcasted information dependant)
- Protection modules - parental code, Macrovision support.
- PPV support

The OSD is based on a 256 colors OSG and supports English, Gaelic and Welsh languages.

4.3 Interactive Digital Text (Broadcast dependant)

- Information, News, Reviews, Weather, etc.
- Challenging puzzles & quizzes
- Programme-related enhancements
- Full TV Guides

5 SPECIFICATIONS

Due to continued product improvement, the specifications are subject to change without prior notice.

5.1 General

Operating voltage: from 85 to 265 V
Power consumption: 8 W max
Standby consumption: < 1 W
Weight: < 1.2 kg (packaging dependant)
Dimensions: packaging dependant.
Multilingual OSD languages

5.2 Digital Tuner

Frequency range: 470-862 MHz for digital DVB-services
Input impedance: 75 Ohms
I.F. input level: -75 to -20 dBm
Channel bandwidth: 8 MHz (for digital signals).
Symbol rate range: up to 31 Mbit/sec

5.3 Video outputs

Level CVBS: 1V peak-peak (+- 5%) into 75 ohm
Level RGB: 0,7V peak-peak (+- 10%) into 75 ohm
Frequency range: 5 Hz to 5 MHz
Signal-to-noise ratio: > 50 dB

5.4 Audio outputs

Levels: 0 dBm out for 0 dBm in; max. 1,1 V rms into 10 K.
Frequency response: 20 Hz to 20 kHz, <+/- 2dB at > 44.1 kHz sampling rate
Dynamic range: >60 dB
Mode: mono, dual mono or stereo

5.5 Connectors

Mains input
Aerial antenna input: IEC 169-2.
SCART Output – PAL CVBS, RGB & Audio

5.6 Operating/storage conditions

Operating Temperature range: 0°C to 35°C, in residential environment, with air inlets not obstructed and at least 10 cm free upper area.

Storage Temperature range: -10°C to 60°C

Relative Humidity: 25 to 93%, non-condensing humidity (conforming with CEI 68-2-1, 68-2-2, 68-2-3)

Shock and vibrations for transportation - conforms to CEI 68-2-29 (acceleration of 10 g for 16 ms).

5.7 European specifications

The DTVA-UK is EC compliant (European Directive 89/336/CE for the EMC and 72/23/CE for safety)