Unique Broadband Systems Ltd.

DVB-T/H / DTMB SFN Adapter

Model: DVS 4010E

Product Features

- *SFN time and frequency synchronization*
- *Serial ASI selectable inputs and outputs*
- *Bit rates adjusted with transmission mode*
- *Rear panel monitoring ports for TS and sync output*
- *Supports hierarchical mode (DVB-T/H)*
- *MIP or SIP insertion (DTMB)*

Description and Application

Overview

For the operation of digital terrestrial TV networks, DVB-T/H or DTMB (software selectable), where several transmitters broadcast the same programs on the same RF channel frequencies (Single Frequency Networks), the transmitters require precise frequency and time synchronization. The frequency (10 MHz) and time (1 pps) reference signals can be easily obtained from a GPS receiver at each transmission site.

The UBS DVS 4010E SFN Adapter fulfils the task of inserting "synchronization marks" in a DVB or DTMB transport stream (MIP or SIP insertion) in full accordance with DVB-T/H and DTMB standards.

The basic functions performed by the DVS 4010E SFN adapter are:

- Inserts a megaframe initialization packet (MIP or SIP) into an MPEG transport stream
- Adjusts the bitrate of the transport stream to be synchronous with an external reference, and in accordance with the chosen COFDM transmission mode
- Provides signaling/mode data for the control of individual transmitter modulators

Compliant with DVB standards: EN 300 744 and TS 101 191

Compliant with DTMB standards: GB20600-2006,

GY/T 229.1-2008

MIP Insertion (DVB-T/H or DTMB mode)

MIP insertion occurs once per megaframe, with a time interval dependent on the selected guard interval.

The MIP indicates when the first packet in a mega-frame (Synchronization Time Stamp, STS) begins transmitting.

The time reference is an external 1 pulse per second signal, easily obtained from a GPS receiver.

SIP Insertion (DTMB mode only)

SIP insertion occurs once per second and is synchronized with the 1PPS signal from a GPS receiver. The SIP contains the transmission parameters for the modulator and the SFN maximum delay.

Bitrate Adaptation

The DVS 4010E is provided with two serial (ASI) inputs that accept an MPEG transport stream according to DVB recommendations (188 or 204 byte packets). The output may be configured as either 188 or 204 byte packets, however, for 204 byte packets, there is no RS encoding and the last 16 bytes are dummy bytes. In DTMB mode, only 188 byte packets are supported.

Note: the maximum bitrate has to include the inserted MIP or SIP, which means the input net bitrate must be slightly lower than the maximum.

The SFN Adapter removes null packets from the input signal and inserts MIP or SIP packets. New null packets are then added to produce a precise output bitrate, which is required for the selected transmission mode (dependent on code rate, constellation and guard band). The maximum allowable net bitrate is governed by the selected transmission mode. As the transport rate is modified, the SFN adaptor performs PCR re-stamping.

Control

The DVS 4010E is controlled locally, with a display and push buttons, or remotely, using the serial RS232 and/or RS485 ports.

All mandatory system parameters, as defined in the ETSI or DTMB standards, may be set from the remote interface.

An Ethernet (10/100 Base-T) interface is also available for remote control and remote software upgrade.

Head Office - 400 Spinnaker Way - Vaughan - Ontario - Canada - L4K 5Y9 - Tel: **905 669 8533** - North America Toll Free: **1 877 669 8533** - **www.uniquesys.com** - Email: **sales@uniquesys.com**

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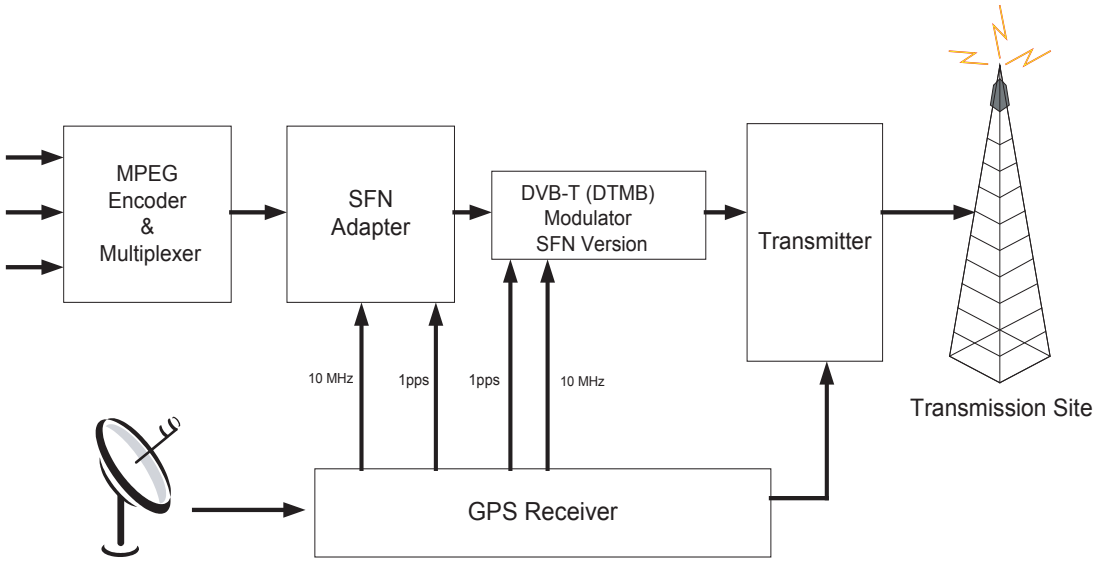

Description and Application

Alarms

One alarm circuit is provided and may be "armed" for a number of conditions important for correct operation. The alarm output is via floating contacts on the rear panel and the alarm information is also available via remote control.

Web Interface

The web interface allows remote control of the DVS 4010E via Ethernet (TCP/IP). The system is based on a Web server mounted inside the DVS 4010E. The Web pages stored on the Web server are designed as a complete graphical user interface (GUI) for testing the status and setting the parameters of the SFN adapter.

The Web Interface concept is popular because remote control of this system only requires a standard PC with a network interface card (NIC) and a Web browser (Microsoft Explorer 6.0).

Hierarchical Mode (DVB-T/H mode)

Hierarchical modulation allows simultaneous transmission of two MPEG-2 transport streams. The compromise between data rate and ruggedness can be set differently between the two virtual channels.

6 MHz Bandwidth (DVB-T/H mode)

In addition to the standard 8 MHz and 7 MHz BW, the DVS 4010E will also support transmission with a 6 MHz bandwidth that is intended for applications in North and South America, Korea, Japan and elsewhere, where the 6 MHz channel raster is standard.

5 MHz Bandwidth (DVB-T/H mode)

DVS 4010E will also support transmission with a 5 MHz BW, recommended when the DVS 4010E operates in the DVB-H mode.

SNMP

This feature allows remote control of the DVS 4010E in accordance with SNMP protocol (Get, Set and SNMP traps). This remote control option is intended for system solutions where it is desired to integrate the control of a range of SNMP compliant equipment in a common management system.

Modes of Operation

DVB-H - This mode allows the modulator to generate a DVB-H COFDM signal, in accordance with the ETSI DVB-H standards.

DVB-T - This mode allows the modulator to generate a DVB-T COFDM signal, in accordance with the ETSI DVB-T standards.

DTMB - This mode allows the modulator to generate a DTMB signal, in accordance with DTMB standards.

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DVB-T/H / DTMB SFN Adapter

Model: DVS 4010E

Product Specifications | Signal Processing (specifications are subject to change without notice)

	DVB-T/H Mode		DTMB Mode
Input monitoring	• Transport stream presence • Clock recovered (serial input) • Input Data overflow • Sync 188 byte presence • Sync 204 byte presence (+16 dummy bytes or RS coded packet)	**Input monitoring**	• Transport stream presence • Clock recovered (serial input) • Input Data overflow • Sync 188 byte presence
Supported Modes	IFFT: 2K, 4K, 8K	**Supported Modes**	IFFT: 3780, Single Carrier
Guard Intervals	1/4, 1/8, 1/16, 1/32	**Guard Intervals**	945, 595, 420 symbols
Code Rates	1/2, 2/3, 3/4, 5/6, 7/8	**Code Rates**	0.4, 0.6, 0.8
Constellations	QPSK, 16-QAM, 64-QAM	**Constellations**	QPSK, 4-QAM-NR, 16-QAM, 32-QAM, 64-QAM
Network Mode	SFN and MFN	**Frame Duration**	500 us, 571.43 us, 666.67 us
Channel Bandwidth	8 MHz, 7 MHz, 6 MHz, 5 MHz	**Sub-Carrier Spacing**	1.5 kHz, 1.75 kHz, 2 kHz
Hierarchical Mode	Alpha - 1, 2 and 4 for 16-QAM and 64-QAM	**Time Interleaver**	240, 720 symbols
Max Delay (data)	0 - 1.0 sec, resolution 100 ns	**Network Mode**	SFN and MFN
Signal Substitution	Output transport stream is replaced with null packets and MIP in case of input data loss	**Channel Bandwidth**	8 MHz
		Max Delay (data)	0 - 1.0 sec, resolution 100 ns
		Signal Substitution	Output transport stream is replaced with null packets and MIP (or SIP), in case of input data loss

Product Specifications (specifications are subject to change without notice)

Signal Inputs

MPEG-2 Transport Stream	2 ASI inputs: BNC (F), 75 ohm (software selecable)
Clock Reference **(10 MHz Reference from GPS receiver)**	Connector: BNC (F) Frequency: 10 MHz ±2 ppm Level: 100 mV - 3 Vpp Impedance: 50 ohm, AC coupled
Time Reference **(1 PPS signal from GPS receiver)**	Connector: BNC (F) Frequency: 1 PPS Amplitude Level: TTL Trigger: Positive transition Impedance: 50 ohm

Transport Stream Output

Connectors	2 ASI outputs: BNC (F), 75 ohm

Monitoring Output

Sync Output	Connector: BNC (F), 50 ohm Level: TTL (High coincides with MIP or SIP packet)

Control Interfaces

Front Panel	LCD display and cursor/ execute keys
RS232	Connector: 9-pin SUB-D Male Protocol: Approximated SCPI
RS485 (electrical)	Connector: 9-pin SUB-D Female, on request
WEB Interface **SNMP Control Interface** **Telnet**	Connector: RJ45 Ethernet 10/100 Base-T

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Alarms

Connector	9-pin SUB-D Female, with relay contacts
Alarm Sources	Loss of sync Loss of data Loss of serial clock regeneration Loss of reference: 10 MHz, 1pps

Power Supply

Voltage	90 - 250 VAC
Frequency	47 - 63 Hz
Power Consumption	max. 50 VA

Mechanical

Size	1 U of 19" wide cabinet
Dimensions (W x H x D)	432mm x 44mm x 432mm (17.5" x 1.75" x 17.0")
Weight	6 kg (13 lbs.)

Environmental

Operating Temperature	5°C to 45°C (41°F to 113°F)
Storage Temperature	-30°C to 70°C (-22°F to 158°F)
Relative Humidity (operating/storage)	max. 90%
Cooling	Temperature controlled fan to assist natural convection

Electromagnetic Compatibility

Electromagnetic Interference	Complies with the CENELEC requirements for radiation and immunity EN 55022 and EN 55024

Safety

In accordance with IEC 60950

Compliance

Compliant with DVB standards: EN 300 744 and TS 101 191

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