



MB International srl

R&D High Quality Laboratory appointed by Italian MURST
Ministry of University, Research, Science and Technology



ZERØ ΔELAY

The Revolution in Video Compression Technology

On display @ IBC 2004



ZERO DELAY[®]-Technology

5 TO 16 MILLISECONDS TOTAL VIDEO COMPRESSION & DECOMPRESSION LATENCY

ZERO DELAY[®] is the **new compression technology designed by M.B. International** to implement compressed digital video links with a delay comparable to analog solutions, while maintaining full broadcast quality, both in Standard definition, and High definition.

Encoding-decoding process uses proprietary algorithms, optimized for the processing time parameter, while preserving high video quality for broadcasting and telecom use.

The design goal was to achieve a compression latency that can be compared to what people is used in analog video: ZERO DELAY[®] total latency (encoding plus decoding) is **lower than 1 video field**.

ZERO DELAY[®] has been designed with HDTV and progressive scan in mind, to give professional broadcasters the optimal tool for digital wireless cameras and digital contribution links.

Technology

ZERO DELAY[®] is a field based or a multi-frame based compression system.

It is very suitable also for HDD (Hard Disk Drives) or flash memory recording and playback, allowing smooth slow motion and field based editing.

Fast movements will not be affected by compression, resulting in the best quality for shooting wireless camera sport events.

ZERO DELAY[®] is available in many video formats, 480 (525), 576 (625), 720, 1080 (50 & 60 Hz).

Together with MB International ZERO DELAY[®] wireless multi-channel audio links, live events coverage will benefit of a completely new studio setup.

ZERO DELAY[®] evaluation system is composed of:

- the encoder board
- or the encoder- COFDM transmitter board
- the decoder board.

For OEM customers, custom design is available.



Application fields

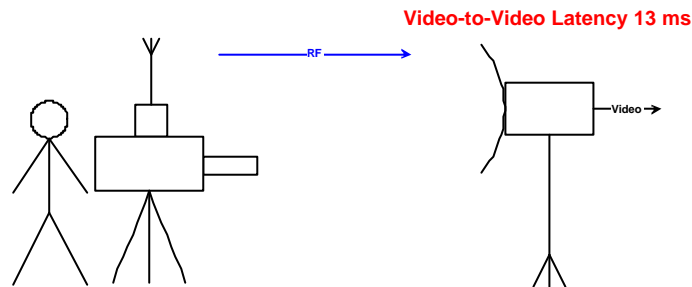
ZERO DELAY® technology has been designed for every application where broadcasting video quality needs to be compressed in the smallest amount of time; ZeroDelay allows live pictures transmission like in an analog world.

ZERO DELAY® technology is suitable for:

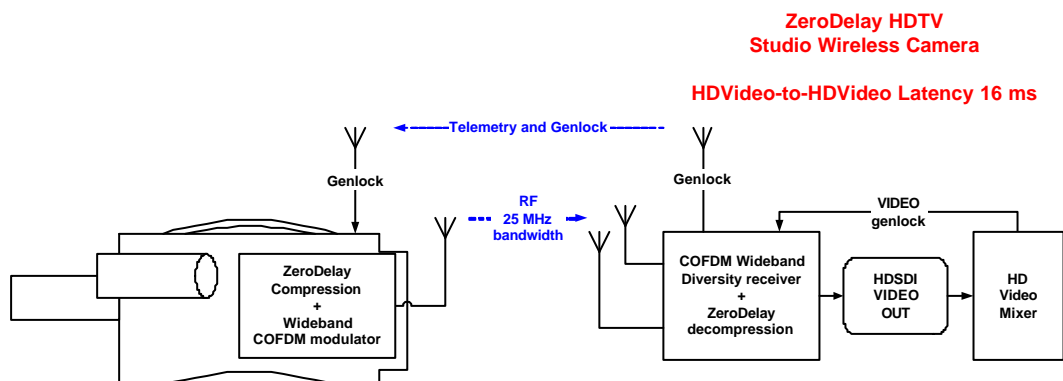
- Broadcasting
 - Studio wireless camera links
 - Studio wireless monitors
 - Outdoor broadcast wireless news
 - Digital video contribution links (Studio-to-studio)
 - Upgrading SDI (270 Mbps) studio connections to HDTV
- Industrial and security
 - Wireless video feedback for robotics
 - Security and military “live” video compression

Application Examples

News / Robotics / Security

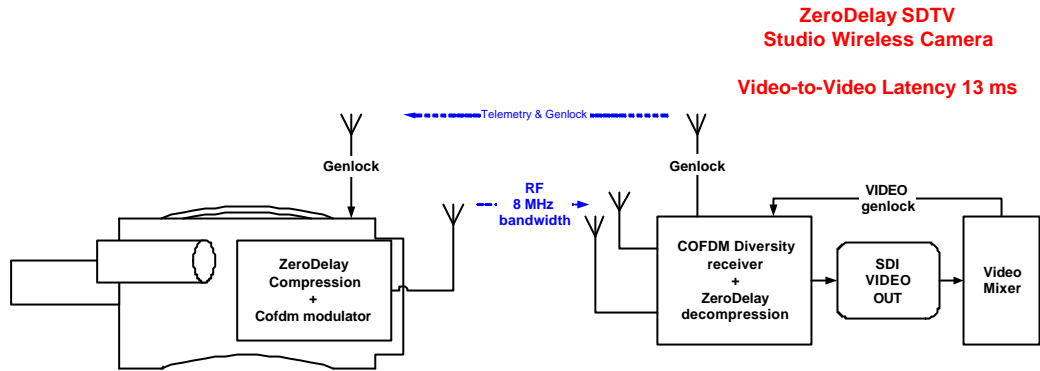


HDTV Studio Wireless Camera





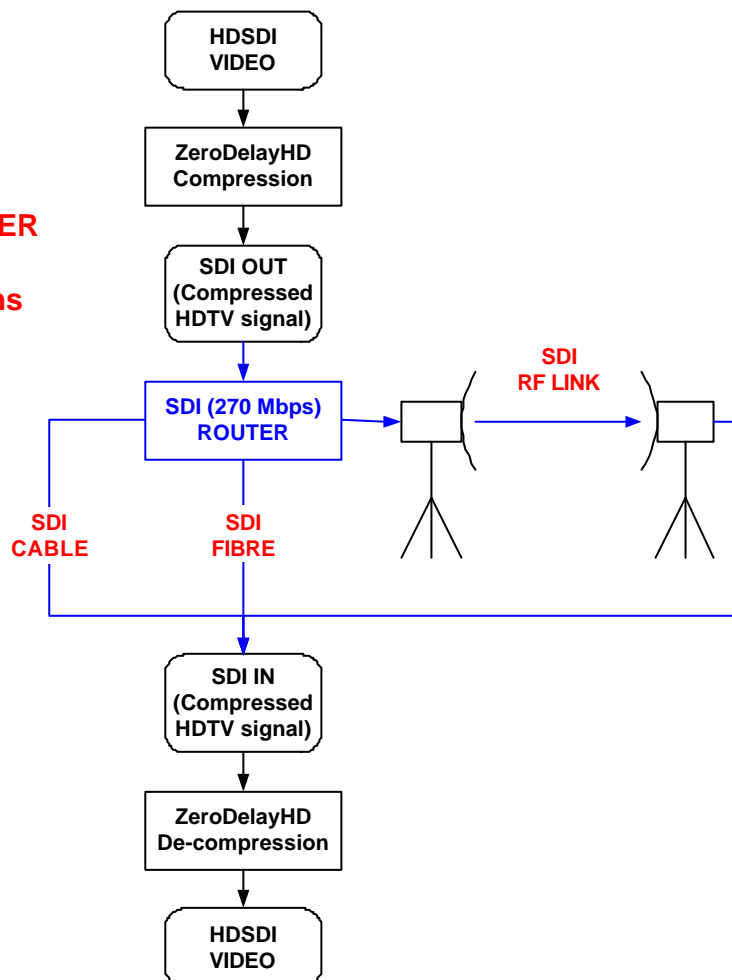
SDTV Studio Wireless Camera



HDTV to SDI Transparent Adapter

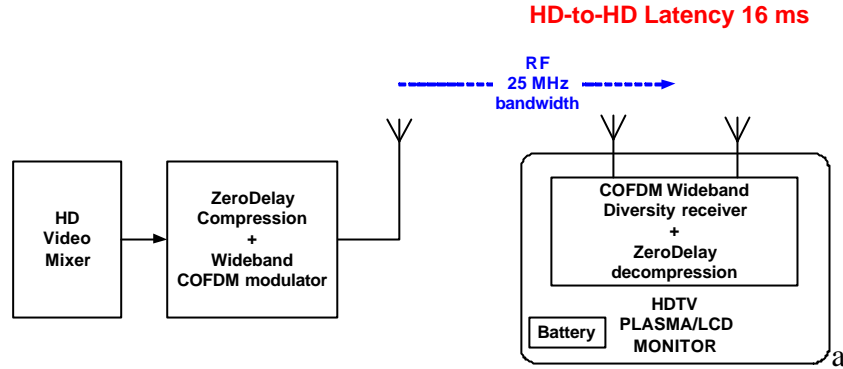
**ZeroDelay HDTV
Transparent SDI ADAPTER**

HD-to-HD Latency 16 ms

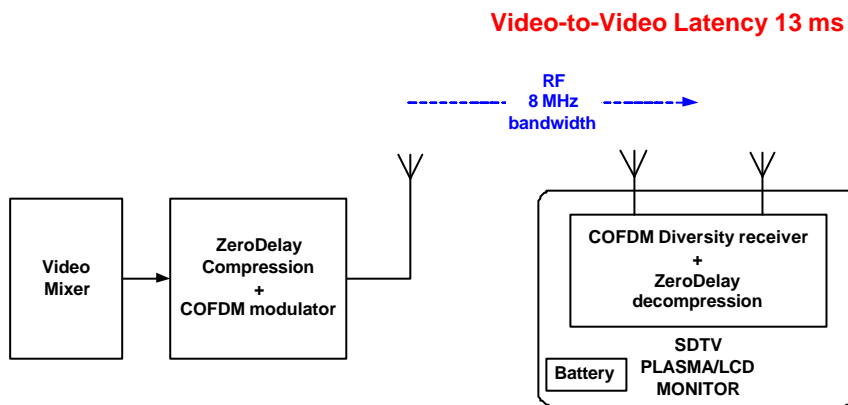




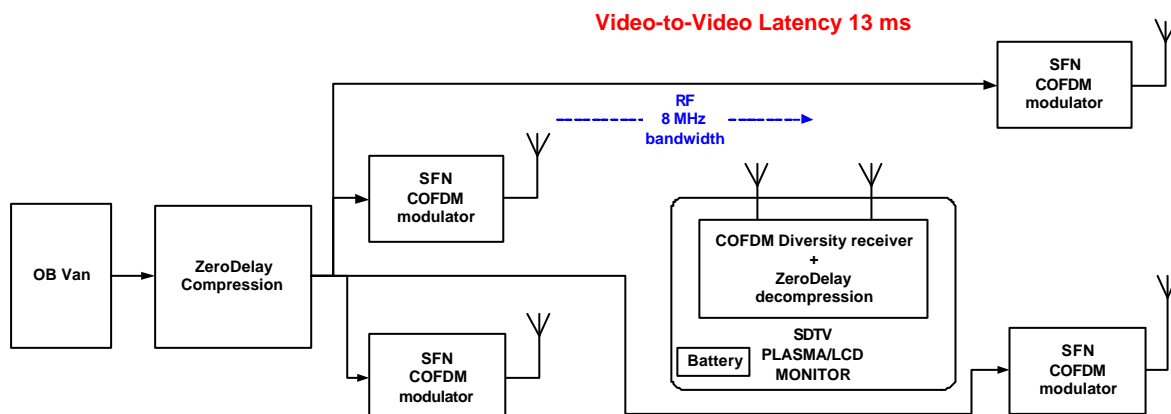
HDTV Wireless Monitor layout



SDTV Wireless Monitor layout



Large Area Wireless Monitors layout





ZERO DELAY® System Performances

- **Video input / output**
 - 576I @ 25 Hz
 - 480I @ 30 Hz
 - 480P @ 30 Hz
 - 720I @ 30 Hz
 - 720P @ 30 Hz
 - 1080 I @ 25 Hz
 - 1080 I @ 30 Hz
- **Bit-rates**
 - From 10 to 250 Mbps
 - Constant Bit Rate for Wireless
 - Constant quality (VBR) for disk recorders

Picture quality Matrix:

The numbers in the matrix show the bit-rate for a lossless video compression, and are the result of visual tests on grade 1 monitors using an uncompressed SDI / HDSDI video source.

Standard Definition (PAL/NTSC)

ZERO DELAY®	Horizontal Video resolution	Vertical Video resolution	Frame Rate	Bit rate
576 I ½ D1	360 pixels	576 lines	25 Hz	10 Mbps
576 I 2/3 D1	480 pixels	576 lines	25 Hz	18 Mbps
576 I full D1	720 pixels	576 lines	25 Hz	24 Mbps
SDI Transparent	720 pixels	576 lines	25 Hz	50 Mbps

High Definition (HDTV)

ZERO DELAY®	Horizontal Video resolution	Vertical Video resolution	Frame Rate	Bit rate
480 I ½ D1	360 pixels	480 lines	30 Hz	10 Mbps
480 I 2/3 D1	480 pixels	480 lines	30 Hz	20 Mbps
480 I full D1	720 pixels	480 lines	30 Hz	24 Mbps
480 P full D1	720 pixels	480 lines	60 Hz	27 Mbps
720 I	720 pixels	720 lines	30 Hz	34 Mbps
720 P	720 pixels	720 lines	60 Hz	60 Mbps
1920 I	1920 pixels	1080 lines	60 Hz	75 Mbps
HDTV P Transparent	Up to 720 pixels	Up to 720 lines	50/60 Hz	Up to 250 Mbps
HDTV I Transparent	Up to 1920 pixels	Up to 1080 lines	50/60 Hz	Up to 250 Mbps



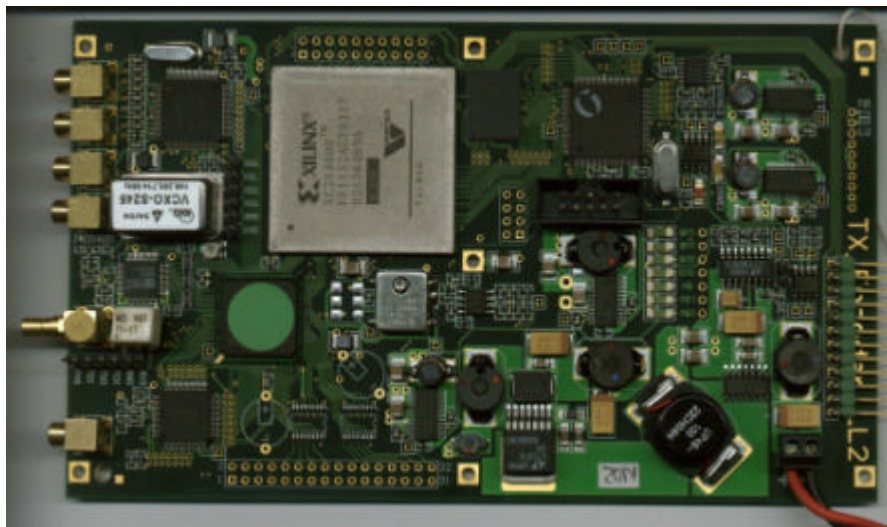
- **Total Latency**
 - Encoder: 5 ms
 - Video-to-Video: 8 ms to 20ms
- **Locking time**
 - ≤ 20 ms
- **Power consumption**
 - Encoder: 2 watts
 - Decoder: 6 watts
 - Encoder-Transmitter: 5 watts

ZERO DELAY[®] Encoder-Transmitter evaluation board

The zerODelay transmitter evaluation board is already equipped with a 8 MHz COFDM modulator and IF or VHF output.

COFDM modulator MER is better than 42 dB.

Dimensions are: 170 mm x 90 mm






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HDTV Encoder-Transmitter COFDM options:


The  encoder-transmitter can be equipped with Wideband COFDM modulator with IF or VHF output and variable bandwidth:

- 8 MHz
- 12 MHz
- 16 MHz
- 20 MHz
- 25 MHz

 is a registered trademark of M.B. International srl

About M.B. International

M.B. International, based in Bollate (Milano), Italy, is a leading provider of digital solutions in the digital broadcasting, and security markets. With 30 years of expertise in broadcasting, and more than one-decade expertise in developing digital signal processing technologies, M.B. International has pioneered digital terrestrial television and digital terrestrial radio. M.B. International proficiency in integration delivers major benefits for OEM customers, including greater capabilities within each product generation, reduced system costs, and shorter time to market. M.B. International-based digital radio and television transmitters have received worldwide recognition for excellence. With headquarters and operation in Italy, M.B. International may be contacted at www.mb-international.com or at +39 02 3820 4043.

ZeroDelay  is a trademark of M.B. International.

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