

# Nexperia IBO2525-X Intelligent Bolt-On Solution

## Add-on digital reception reference design with embedded MHP 1.0.2

Philips Semiconductors' latest Intelligent Bolt-On Solution (IBO+) offers a complete system solution for digital terrestrial reception and decoding and supports the latest MHP application technology (MHP1.0.2) for European countries (e.g. NorDig countries, Germany, France, Italy, Spain). IBO+ is a high performance solution that allows easy integration with an analog TV broadcast receiver.



### Key features

- Add-on module plus IBOLink interface enables digital terrestrial (DVB-T) functionality to be simply added to an analog broadcast receiver
- IBOLink provides easy integration with analog TVs and delivers fast time-to-market
- Easily extendable to accommodate satellite and cable front-ends and PVR functionality
- Digital Video Processing software (DVP) enables digital reception and MHP middleware supports Xlet applications
- Includes Comprehensive Application Suite and User Interface, i.e. Zapper (channel selector), ESG and Navigator
- Hardware architecture based on PNx8526 (Home Entertainment Engine), offering high performance digital MPEG decoding and multimedia applications
- Supports DVB Free-to-Air services
- Common Interface Module enables decryption of multiple services to support multiple countries, markets and services with a single generic module (Embedded CA optional).
- Available as reference design or complete ready-built and tested solution.

Semiconductors

Philips Semiconductors' Intelligent Bolt-On (IBO+) system solutions dramatically cut product evaluation, development and production times for TV set makers wishing to enter the digital television market. The latest IBO2525-X system solution for DVB allows TV set makers to follow a straightforward migration path from analog to digital hybrid TV receiver design, shortening time-to-market significantly for new European DVB iDTV products. As a complete hardware and software product solution, it comprises a fully functional digital TV receiver and supports MHP Interactive Profile applications.

The IBO2525-X, available as a DVB ready-to-use design, is built around Philips Semiconductors' enhanced PNx8526 Nexperia Home Entertainment Engine.

This highly integrated chip combines MPEG decoding and powerful graphic capabilities to support all core functions needed for today's interactive digital broadcast MHP or MHEG applications.

Philips Semiconductors' IBOLink interface allows TV set makers to easily integrate the IBO+ system solution with an analog broadcast receiver. The IBOLink hardware has options to enable proper signal interfacing between the IBO2525-X module and analog TV broadcast receiver, while the IBOLink software offers a standard or customizable protocol that can be easily integrated into any existing TV software stack.

IBO2525-X offers embedded MHP Interactive Profile support.

A special dedicated support program can also be requested to include customer-specific features (e.g. customization of User Interface).

**With the Nexperia Intelligent Bolt-On Solutions a new era of product evaluation, development, and production is started to help shorten time-to-market for digital television products.**

# PHILIPS

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## Add-on digital reception reference design with embedded MHP 1.0.2



### Specification

#### Description

- Intelligent Bolt-On system solution for adding digital video broadcast (DVB) reception functionality to an analog broadcast TV receiver

#### DVB broadcast reception and MPEG decoding

- DVB-T, MP@ML profile, MHP Interactive Profile support

#### Communication and signal link

- Philips IBOLink hardware and software interface

#### Main components in DVB-T reference design

- PNx8526 Programmable source decoder
- PNx8510 High performance video/audio back-end
- TDA10046 COFDM channel decoder
- TD1316L All-Band Hybrid Tuner (UHF/VHF)
- Memory 64 MBytes SDRAM, 16Mbytes NAND, 2Mbytes NOR, 2 x 64bit EEPROM



IBO2525-X Bolt-on Module

### Specification

#### Description

- Philips MHP 1.0.2 middleware (interactive profile)
- Embedded software stack supports full DVB functionality
- Resident MHP applications: Zapper (for channel selection), ESG (now/next program guide), Navigator (offering application and set-up selection).
- Personal JAVA™ version 2.1 Application Environment
- Generic User Interface (options for customization)
- IBOLink interface command support.
- External modem support
- Software download and common interface (profile 2) support
- Copy protection signalling

External connections on reference design	
SPDIF out	Cinch connector, output only
UART	1 x Connector, external HW modem interface (DB9 M, RS232c)
40 Pin IDE	1 x Flat cable connector, IBOLink communication inc. I <sup>2</sup> C. Optional 2nd IDE connector for future extensibility (e.g. PVR)
Single slot PCMCIA	Common interface and local software download
IEEE1394 x 2	1 x Assembled and 1 x print foot only
Tuner / Downconverter	DVB-T tuner and demodulator



MHP 1.0.2. Middleware

Source		Description
Control	Input/output Input Output	I <sup>2</sup> C Reset Interrupt
Digital A/V	Output Output	ITU 656 Digital video (single channel, TV output) I <sup>2</sup> S Digital audio (single channel, TV output)
Analog A/V	Output Output	Main: video, graphics, DVB sub-titles, teletext, audio (L/R) VCR: video, DVB sub-titles (equal to Main), audio (L/R)

IBO2525-X Hardware interface (IBOLink)

## Key features – Reference Design

### Hardware features

#### Signal reception:

- Digital reception: DVB-T (TDA10046; with impulse noise suppression)  
E-Book: Germany, Spain, France, Italy, Benelux  
NorDig II v1.0: Scandinavia  
D-Book<sup>1)</sup>: VHF/UHF, 7 & 8 MHz  
MPEG decoding with optimised error correction
- Digital source (HDD): 1 Connector (IDE, 40-pin)

#### Video system

- Analog video output: PAL, SECAM (50Hz)  
Output: RGB, YC, CVBS
- Digital video output: ITU656 (8 bits)

#### Sound system

- Analog audio output: MPEG-1, MPEG-2 (layer 1, 2) is transcoded into PCM L/R baseband audio  
AC-3 is transcoded into PCM L/R baseband audio
- Digital audio output: SPDIF output  
MPEG-1, MPEG-2 (layer 1, 2) (according to IEC 60958)  
AC-3 (according to IEC61937)

<sup>1)</sup> MHEG specification of IBO+ is also available

#### OSD/Graphics features

- Graphics resolution: 720 x 576 pixel
- 8-bit CLUT: 256 out of 16 million
- Graphic accelerator: optimized L2D graphics sub-system

#### Control features

- Menu language: supporting local languages (English, French, German, Portuguese, Spanish, Turkish, Norwegian, Swedish, Danish, Finnish)
- Test mode: accessible via IBOLink (using IBOLink commands)
- Factory/Service mode: accessible via IBOLink (using IBOLink commands)
- Common interface: single PCMCIA slot, mechanical slide type (no ejector)
- IBOLink interface: hardware/software link between analog/digital.

### Software features

#### Software

- Nexperia Platform Software SNX8526-1AB/01
- DVB-T free-to-air
- MHP: MHP 1.0.2, Interactive profile
- Application suite with generic user interface: Zapper, ESG (Now/Next), Navigator & set-up
- SI based ESG
- DVB Common Interface: single-socket support (DVB-CI, Cryptoworks tested)
- DVB sub-titles: on main and VCR output
- DVB teletext: re-insertion
- MHEG-5: optional, if generic MHEG design is required

#### Interactivity, protection

- Hayes modem protocol: via UART, protocol V90
- Terrestrial SW download option or SW download using flash data via PCMCIA.
- Copy Protection data (Macrovision) provided via IBOLink to analog chassis

#### Miscellaneous

- Reference design mechanical dimensions: 235mm x 125mm x 60mm
- Power consumption: power 12V, power consumption <15 W
- Tuner
- Shielding

# Nexperia IBO2525-X Intelligent Bolt-On Solution

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### IBO2525-X Intelligent Bolt-On System Solution

Reference hardware design based on PNX8526/PNX8510 chipsets, supporting DVB-T broadcast reception; PCMCIA; Common Interface, IBOLink interface hardware

**DVB-T/MHP Software. Integrated, embedded IBO2525-X software**  
MHP Interactive Profile with resident applications (Zapper, ESG, Navigator & set-up); embedded IBOLink interface software.

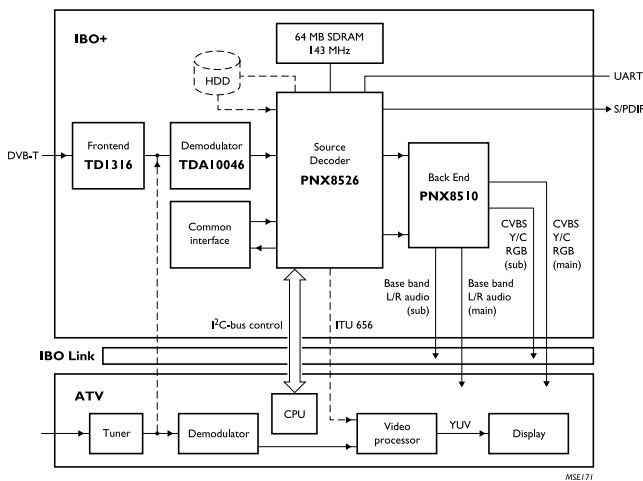
**MNX8526-1AABAA/1**

**MHP Compiled Version**

**MNX8526-1AABAB/1**

**MHEG Compiled Version**

Philips Semiconductors offers a wide range of commercial options, allowing the IBO2525-X system solution to be used in volume production. Please contact your local Philips Semiconductors Regional Sales Office for further details.



Component/typenumber	Description
PNX8526	Programmable source decoder with integrated peripherals
PNX8510	Complementary IC for PNX8526 to deliver analog output
Memory	SDRAM (64Mb) system and graphics memory NAND-Flash (16Mb) non-volatile application memory NOR-Flash (2Mb) boot manager, software download and diagnostic software I <sup>2</sup> C EEPROM (2 x 64 kbit for User & Board Settings & 1 x 256 kbit for front-end DSP software)
Common Interface	Profile 2
Tuner TDA1316L	VHF/UHF tuner
COFDM demodulator TDA10046	2K/8K Carrier hierarchical

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SCS 77

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