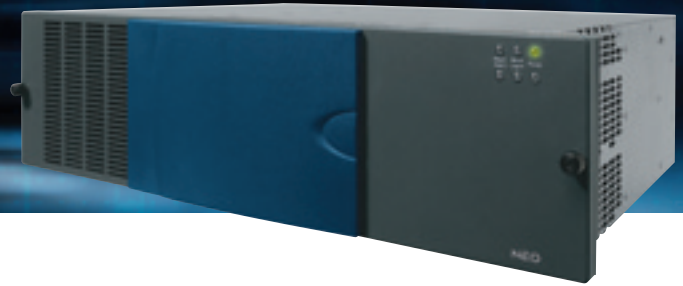


NEO[®]

NEO[®] Wings:
HDTV sidebar content insertion
and up-conversion system.



The transition from an SDTV to an HDTV marketplace requires broadcasters to operate in a hybrid environment containing both SDTV and HDTV content. Broadcasters must continue to develop strategies to handle SDTV and HDTV content in a means that is transparent to the consumer.

One differentiator between conventional SDTV and HDTV content is the aspect ratio used in each of the formats. Traditionally, NTSC content in North America has been created in a 4:3 aspect ratio. Integration of this content into an HDTV environment requires additional processing including:

1. Aspect ratio conversion of the SDTV 4:3 content will be required.

2. Up-conversion of the SDTV content to HDTV will be required.

A typical strategy is to up-convert the SDTV content to HDTV as a center-cut 4:3 image (Figure 1); however, this type of aspect ratio conversion leaves the outer edges of the 16:9 HDTV image (or “sidebars”) unused. Broadcasters realize that this unused space is extremely valuable and presents an opportunity to both insert additional content and generate incremental revenue. This additional content can include:

1. Commercial content
2. Static or animated background graphics
3. “Stock ticker” data display
4. Public service announcements

Application: Up-conversion of SDTV 4:3 program video with insertion of content into the sidebar area of the up-converted HDTV 16:9 program content.

Application Requirements of an HDTV Sidebar Insertion System Include:

1. High-density packaging. As insertion of HDTV sidebar content may be required in different applications — including mobile and newsroom environments — the system should occupy minimal rack space to simplify installation and system integration requirements.
2. Remote configuration. The system should be remotely configurable to simplify configuration by an operator as requirements change.
3. Optional self-contained storage. Sidebar content may be looping playback of animated graphics, and having self-contained storage significantly simplifies operational workflow.
4. Cost-effectiveness. A cost-effective system enables capital and operational costs to be quickly offset by new commercial content revenue.
5. High-performance up-conversion. The system should provide integrated, high-quality, motion-adaptive HDTV up-conversion for both SDTV program video and SDTV sidebar video.
6. Seamless channel branding. The system should be able to seamlessly “channel brand” the program video once sidebar video has been inserted.

Figure 1 — 16:9 HDTV Image

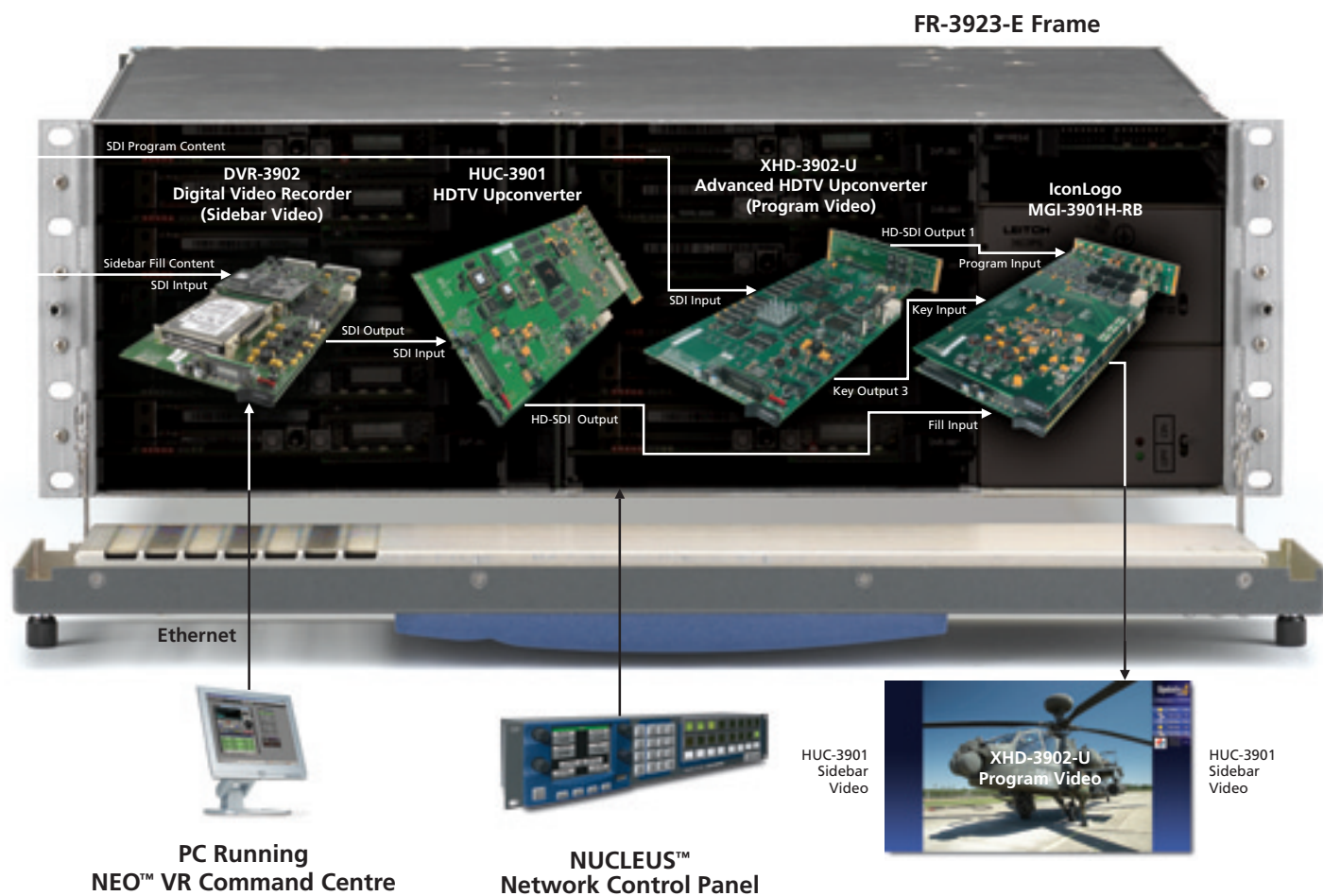


Solution

NEO® Wings: HDTV sidebar content insertion and up-conversion system comprises the following components:

1. **XHD-3902-U** Advanced, broadcast-quality, HDTV up-converter
 - High-performance, motion-adaptive, HDTV up-conversion of program video
 - 2x1 protection switch for reliable, on-air up-conversion
 - Fully configurable aspect ratio converter
 - Key channel output linked to integrated aspect ratio converter.
 - Transcoding of closed captioning between HDTV and SDTV
2. **HUC-3901** HDTV up-converter
 - Up-conversion of SDTV sidebar video content
 - User-configurable aspect ratio converter
3. **DVR-3901** Modular disc recorder
 - Over 8 hours of high-quality, self-contained storage
 - IP-based control with NEO® VR Command Center control application
 - Clip management
 - Playlist creation
 - Configuration of DVR-3901 operational parameters
 - Loop playback for animated backgrounds
4. **MGI-3901H** IconLogo logo inserter
 - HDTV keyer
 - Logo inserter
5. **NUCLEUS** Network control panel
 - Real-time network control panel
 - Store up to 8 presets per device
 - Operator-assigned "Unity" preset
 - High-resolution color display

Figure 2 — NEO® Wings HDTV Sidebar Content Insertion System



Up-conversion of SDTV video and insertion of sidebar video content is a multi-step process (Figure 2).

1. Up-conversion of SDTV Program Video

The **XHD-3902-U** Advanced, HDTV up-converter is used to up-convert the incoming SDTV program video to HDTV (720P or 1080i). The XHD-3902-U's integrated aspect ratio must be configured as a 4:3 image in order to have the correct center-cut aspect ratio and allow insertion of sidebar video content in the XHD-3902-U's 16x9 HDTV output.

The XHD-3902-U also generates a key channel output that corresponds to the current setting (in this case 4:3) of its integrated aspect ratio converter (ARC). This key output will be used downstream by the MGI-3901H IconLogo logo inserter and HDTV keyer.

2. Up-conversion of SDTV Sidebar Video

The HUC-3901 HDTV up-converter is used to up-convert SDTV content for insertion into the HDTV sidebars of the program video (in this application, this is the up-converted SDTV video from the DVR-3901 modular disc recorder). The HUC-3901's onboard ARC should be configured to output a 16x9 image. Sidebar video content should be formatted such that content to be visible is positioned in the sidebar area of the 16x9 image. Content in the 4x3 center portion of the HUC-3901's HDTV output will be masked by the 4:3 program video from the XHD-3902-U.

3. Storage of Sidebar Video Content (optional)

SDTV video to be up-converted and then inserted into the HDTV program video can be stored on the NEO® DVR-3901 modular disc recorder. This is an efficient, cost-effective solution for content such as animated graphics or backgrounds that are in a constant loop-playback state. Management of this content can be accomplished through the NEO® VR Command Center control application.

4. Inserting up-converted HDTV sidebar content into up-converted HDTV program video.

The MGI-3901H IconLogo logo inserter's onboard HDTV keyer is used to key the HDTV sidebar video content (from the HUC-3901) into the sidebar portion of the up-converted 16x9 program video with 4x3 center-cut content (from the XHD-3902-U).

The up-converted sidebar video content from the HUC-3901 is fed to the MGI-3901H's external fill input, while the up-converted program video from the XHD-3902-U is fed to the MGI-3901H's program video input. The XHD-3902's key channel output is fed to the MGI-3901H's key channel input.

The XHD-3902-U's key channel output will provide a key signal that corresponds to the XHD-3902-U's 4:3 center-cut output. This will precisely position the HDTV sidebar video content into the HDTV program video's sidebars.

5. Real-Time Control

The entire HDTV sidebar content insertion system can be controlled using the NUCLEUS network control panel. Custom configuration settings can be created to provide operators with real-time control and monitoring.

The ability to cost-effectively insert sidebar content in an HDTV program stream is becoming an increasingly common requirement. HDTV sidebar content insertion provides a unique, aesthetic element to existing HDTV program content and also a potential source of additional revenue with the insertion of commercial content.

Configuration Settings

XHD-3902-U (Up-convert Program Video)

1. OutputStdSet set to 1080i_59.94*
Use outputs 1 or 2.
2. VidKeying set to KeyBckgnd. This sets HD-SDI outputs 3 and 4 to output a key signal rather than additional copies of up-converted program content.
3. Use outputs 1 or 2 for the MGI-3901 Fill inputs and outputs 3 or 4 for key outputs.
4. ARCPreset: 4:3

DVR-3901 (SD Sidebar Video):

1. CTRL_PORT set to UDP (to facilitate Ethernet communication with PC running Command Center). DVR's default IP is 192.168.100.250 and can be changed from the card edge.
2. Install NEO® VR Command Control Center on PC to control DVR-3901.

HUC-3901 (Upconvert SD Video from DVR-3901) OutStd: 1080i*

Aspect: Set to 16:9 anamorphic

MGI-3901H IconLogo (Downstream keyer)

External Key preset must be loaded in order to key sidebar video over program video.

Genlock

Where applicable, all products to be genlocked to house sync.

* For applications other than 1080i, 59.9Hz, substitute appropriate HD standard and frame rate.



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