Stretch®

Extending the Possibilities

Intelligent Encoder SDK

The Stretch Intelligent Encoder Software Development Kit (SDK) is a complete video processing solution optimized for the Stretch S6000 family of software configurable processors. Designed specifically to take advantage of the application acceleration made possible by the S6000 family, the SDK delivers unequaled performance to a wide variety of applications including IP cameras, IP video streamers, and digital video recorders.

At the heart of the encoder is a multi-stream, multi-CODEC engine capable of H.264, MPEG4, and MJPEG encoding. The encode capabilities are complemented by an embedded video analytics engine that monitors the video stream within user-defined regions of interest. The tight coupling of these two software-defined engines allows the Intelligent Encoder to change characteristics based on a scene's requirements. Frame rate, resolution, and compression parameters can all be automatically adjusted to optimize the encoded stream's bit rate for the characteristics of the captured video. When set in constant quality mode, the Intelligent Encoder is able to adjust the stream's bit rate to maintain constant image quality. The result is a dramatic reduction in the bit rate for scenes containing low motion while maintaining video quality in scenes containing high motion. In surveillance applications, this can significantly reduce network bandwidth and storage requirements.

The Intelligent Encoder was designed with flexibility in mind. A common command set is used to interface to the installed CODECs, letting users select the appropriate CODEC for their application. This "plug-in" capability ensures that the Intelligent Encoder will support both current and future compression standards.

In addition to its video analytic capabilities, the Intelligent Encoder also performs de-interlacing and chroma decimation when interfacing to interlaced video sources.

A comprehensive application programming interface (API) provides an intuitive way to configure the Intelligent Encoder's functions, and ensures rapid integration of third-party applications. The API also provides the means to specify privacy regions or regions of interests on which to focus the built-in analytics.

Key Features

- H.264, MPEG4, and MJPEG encoding
- Embedded video analytics
  - Blind, motion, and night detection
  - Scene change detection
  - Video loss detection
- Rich API structure for intelligent stream control
- Multi-stream support
- Flexible resolution configurable in real time
  - QCIF up to 5 megapixels
- Intelligent frame rate adjustment based on activity level
  - Selectable resolution and frame rate on a per stream basis

STRETCH ADVANTAGES

> Automatic bit rate management using intelligent video analysis

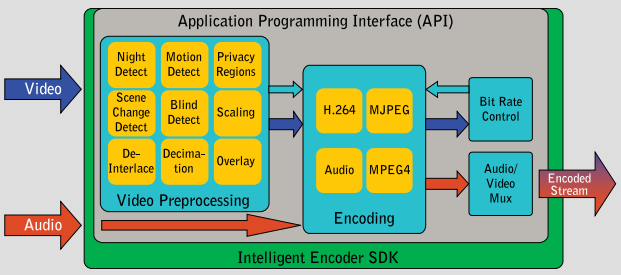
> Multiple CODEC support—video and audio

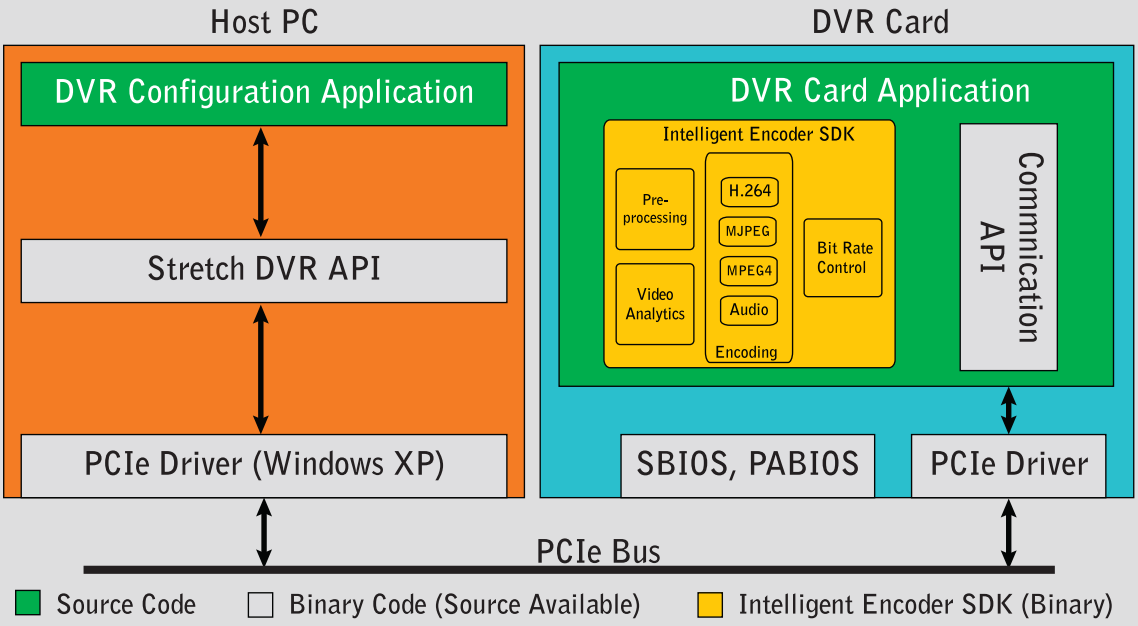
> Selectable resolution and frame rate on a per stream basis

> Single- or multi-stream support

> High quality at low bit rates

Intelligent Encoder SDK





Example Application: Intelligent Encoder SDK Used in DVR Cards

- Analytics-driven bit rate management
- Watermarking and captioning
- Video stream preprocessing, including de-interlacing
- User-defined privacy regions and regions of interest
- Audio encoding

The Stretch Intelligent Encoder is capable of performing H.264, MPEG4, and MJPEG compression with simultaneous audio encode. On S6100 and S6105 devices, the H.264 encoder supports 30fps streams with resolutions up to 1.3 megapixels. When H.264 encoding D1 streams at 30fps, only 25% of the available processing resources are used. The remaining processing power is available for third-party applications such as video analytics. The Intelligent Encoder's rich API and modular design allows for easy third-party application integration and fast time-to-market.

Built-in preprocessing functions come standard in the Intelligent Encoder SDK, and include de-interlacing, chroma decimation, and scaling. Blind, motion, night, scene change, and video loss detection are also conducted on the video stream as part of standard video analysis and preprocessing. Thresholds set within the video preprocessing engine can be used to trigger alarms or to adjust encode parameters to maintain an optimum encoded bit rate.

Capabilities of the Intelligent Encoder include:

- Audio Video Coding
  - H.264, MPEG4, and MJPEG support
  - Inter- and intra-frame prediction in 4x4 and 16x16 modes
  - Hierarchical motion estimation
  - H.264 motion search block sizes down to 8x8
  - CAVLC and CABAC
  - In-loop deblocking filter
- Preprocessing
  - De-interlacing
  - Color space conversion
  - Chroma decimation
    - 4:2:2 to 4:2:0 conversion for video compression
  - Input stream scaling
    - x2 and x4 in X- and Y-axis for analytics and motion estimation
- Stream Analysis
  - Selection of privacy regions
  - Selection of regions of interest for integrated:
    - Blind detection
    - Motion detection
    - Night detection
    - Scene change detection
    - Video loss detection

Reference Design Support

Stretch uses the Intelligent Encoder SDK in reference design kits for two IP Cameras and multiple PCIe DVR cards. The Stretch S6105 and S6106 IP Camera Reference Design Kits demonstrate the Intelligent Encoder SDK in single-stream applications. The Stretch PCIe DVR board products demonstrate the Intelligent Encoder SDK in multi-stream and multiprocessor applications, encoding up to 16 channels of full D1 H.264. All reference designs are available in both evaluation and full version kits. Full version reference design kits include a distribution license for the Intelligent Encoder.

Ordering Codes

- Intelligent Encoder Distribution License SDK:
  - Base Package – SW-DIS-INT_ENC_BASE
  - H.264 Baseline Encoder – SW-DIS-H264BPENC_PLUGIN
  - MPEG4 Encoder – SW-DIS-MPEG4ENC_PLUGIN
  - H.264 Baseline Decoder – SW-DIS-H264BPDEC_PLUGIN
  - MPEG4 Decoder – SW-DIS-MPEG4DEC_PLUGIN
- Software Design Tools – SW-LIC-IDE

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