Ittiam Broadcast Solutions

Ittiam's Broadcast Solutions for Original Equipment Manufacturers (OEMs) include high quality Codecs and production ready Software System SDKs for applications in Contribution, Distribution and Multiscreen Delivery. Available for licensing as integrated SDKs, together with Ittiam’s neonCaster Hardware Platform, these solutions enable OEMs to significantly shorten time to market for their products.

Software SDKs

Ittiam’s System Software solutions for broadcast are based on a Media Framework that provides configurable pipelines for various applications. The framework utilizes an efficient scheduler to maximize efficiency of operation across multiple devices and cores.

The System Software solutions are licensed in SDK form with well defined APIs which can be used by OEMs to build end applications.

Included in the SDKs for specific broadcast applications are other necessary middleware components such as a TS mux, TS demux, protocol stacks for delivery over IP, streaming and HTTP use cases and parsers and creators for offline content access and delivery.

The SDKs leverage Ittiam’s Broadcast grade Codecs, which employ advanced algorithms for motion estimation and rate control to ensure high quality video encoding. Efficient implementations and targeted optimizations on Texas Instruments SoCs enable high densities while maintaining VQ.

neonCaster Gen II

The neonCaster Gen II Hardware Platform is a configurable and scalable platform for high performance, high density broadcast applications. With support for multi-channel HD encoding and transcoding, this platform can realize a range of applications in the broadcast market.

neonCaster Gen II Platform employs a flexible multi-module architecture which can be leveraged to create differentiated, cost-effective broadcast solutions. At the core of the architecture is the Netra Processor Module (NPM) which is based on Texas Instrument’s DM816x (Netra) Processor. NPM interfaces with different I/O Boards to meet Audio/Video interface requirements of the end product. The Platform is intended to be housed in a 1 RU system.

The neonCaster Gen II Platform is offered along with Board Support Package (BSP), Codecs, Media Framework and middleware integrated as SDKs for various use cases. Optional offerings include Custom Application, I/O Board and ready-to-manufacture Hardware Design License.

neonCaster package

neonCaster HW (NPM + I/O Board)
Board Support Package
Standard SDKs:
• Multi-channel Encoding
• Multi-channel Transcoding
• Multi-channel Decoding
Premium SDKs*:
• Adaptive Bit-rate Transcoding
• Low Latency Streaming
*More info provided on request
neonCaster Gen II NPM Specifications

Processing Power
TMS320DM816x - 1.2/1.35GHz ARM Cortex A8
- 1.0/1.125GHz C674x DSP

Memory Capacity
1GByte (Optional 2GByte) DDR3 SDRAM (for TMS320DM816x)
256MByte NAND Flash (for TMS320DM816x)

Data/Communication Interfaces*
2x Gigabit Ethernet 1x Control, 1x Data

Expansion Interfaces
240-pin BTB Conn - Digital Audio/Video, Ethernet*, TSIF, signals
120-pin BTB Conn - PCIe x2, GPIO signals
60-pin BTB Conn - 1x SATA, 1x USB, Analog Video signals

Power Input
+12V DC - DC Jack or via 120/240-pin BTB Conn

Power Consumption
15W

Dimensions**
3.5” x 5.5” x 0.87/0.71” (90 x 140 x 22/18 mm)

Temperature Range
0°C to +40°C (Operating)
-25°C to +70°C (Storage)
* Accessible on-board or via 240-pin BTB Conn
** with/without on-board RJ45 connectors

neonCaster advantage

The power of neonCaster Gen II Platform lies in the flexibility with which various multimedia applications can be realized around the extremely powerful Netra Processor Module (NPM).

The NPM by itself can be used for several applications that use just the IP interfaces. For very high density variants of such applications, multiple NPMs can be mounted in a single 1RU system.

For other applications with specific interface requirements, custom I/O Boards can be designed that are optimized for both cost and form factor. NPM can be leveraged to create multiple products by designing appropriate variants of the I/O Boards.

Ittiam neonCaster Gen II NPM (Netra Processor Module)
# neonCaster Gen II I/O Board Specifications

## AV/Stream Inputs
- **1x 3G-SDI**: 1080p60 4:2:2 8/10 bit (max) + 4x Stereo Audio
- **Loop-through output**
- **1x ASI**: Transport stream
- **Loop-through output**

## AV/Stream Outputs
- **2x 3G-SDI**: 1080p60 4:2:2 8/10 bit (max) + 4x Stereo Audio
- **1x 1080p60 4:2:2 8 bit (max) + 4x Stereo Audio**
- **1x HDMI**: 1080p60 4:2:2 8 bit (max) + 1x Stereo Audio
- **1x ASI**: Transport stream

## GenLock Support
- **1x GenLock Input with Loop-through output**

## Data/Communication Interfaces*
- **2x Gigabit Ethernet**: 1x Control, 1x Data

* Accessible via NPM or I/O Board

## Storage Interface
- **1x SATA**
- **1x USB 2.0**

## Power Input
- **+12V DC**
- **- DC Jack**

## Power Consumption
- < 12W

## Dimensions
- 12” x 4.5” x 0.91” (304.8 x 114 x 23 mm)
- 12” x 8” x 1.03” (304.8 x 203.2 x 26 mm) (with NPM)

## Physical/Mechanical
- 1RU Rack mountable
- **Temperature Range**
  - 0°C to +40°C (Operating)
  - -25°C to +70°C (Storage)

---

## SDKs – Example Work Flows

### Transcoder SDK
1. Uncompressed Digital Audio / Video (Multi-channel) → **Encode**
   - **H.264 + AAC-LC**
   - **MPEG2 + MP12/AC3**

2. **De-multiplex** → **Audio / Video Decode** → **Video De-interlace / Scale (Optional)** → **Audio / Video Encode** → **Packetize** → **MPEG-2 TS over Ethernet (UDP/IP) or ASI**

### Encoder SDK

### Decoder SDK

### Adaptive Bit Rate Transcoder SDK

1. **MPEG-2 TS (MPTS/SPTS) over Ethernet (UDP/IP) or ASI** → **De-multiplex** → **Audio / Video Decode** → **Video De-interlace / Scale / Compose** → **Uncompressed Digital Audio / Video (Multi-channel)**
### Specification

<table>
<thead>
<tr>
<th>System Input</th>
<th>Encode SDK</th>
<th>Transcode SDK</th>
<th>Decode SDK</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G-SDI / Composite # / Component # / Buffer*</td>
<td>MPEG2-TS over IP / ASI* / Buffer*</td>
<td>MPEG2-TS over IP / ASI* / Buffer*</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Output</th>
<th>Encode SDK</th>
<th>Transcode SDK</th>
<th>Decode SDK</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG2-TS over IP / ASI* / Buffer*</td>
<td></td>
<td>3G-SDI / HDMI / Composite Output# / Component Video#</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video Format</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG2 MP@HL ; H.264 HP@L4.3 ; Up to 15Mbps</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video Resolutions</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1080p up to 60fps ; 1080i up to 30fps ; 720p up to 60fps ; NTSC, PAL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audio Format</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG1 Layer 2 ; AAC-LC/HE-V1*/V2* ; Dolby AC3*</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Mode 1</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HD Encode (up to 1080p60)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Mode 2</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 HD Encode (up to 1080i30)#</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Mode 3</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 SD Encode (PAL/NTSC)#</td>
<td></td>
</tr>
</tbody>
</table>

* Optional software feature available on request (not part of standard SDK); # Requires custom I/O board with NPM

### System Features
- Dynamic configuration of channels
- AV synchronization
- Ability to handle packet losses effectively
- Effective processor utilization
- Quick command response times
- User configurable AV resolution and formats

### Reliability
- Production tested and proven
- Proven to work over multitude of open and closed networks
- Interoperability tested with a host of industry standard video playback systems

### Standards Compliance
- MPEG2 Video Encoding / Decoding: ISO/IEC 13818-2
- H.264 Video Encoding / Decoding: ISO/IEC 14496-10
- MP12 audio Encoding / Decoding: MPEG-2 Audio Layer III ISO/IEC 13818-3
- AAC-LC audio Encoding / Decoding: MPEG-4 AAC-LC ISO/IEC 14496-3
- HE-AAC audio Encoding / Decoding: MPEG-4 AAC-LC ISO/IEC 14496-3
- AC3 audio Encoding / Decoding: ATSC A/52B
- MPEG2 - TS: ISO/IEC 13818 – 1

### Exceptions and Errors
- Comprehensive error detection, reporting and recovery mechanism
- Video input signal presence detection

### About Ittiam
Ittiam Systems Private Limited, headquartered in Bangalore, India, is a technology company singularly focused on Media-centric systems. Ittiam’s customers include world’s leading electronics companies for its Software and System IPs and semiconductor companies for its system-on-chip IPs. Embedding Ittiam IP inside, the annual volume of customers’ products shipped such as Smartphones, Tablets, Video Communication Devices and Wi-Fi Chipsets is in several tens of millions units.

For licensing information visit [www.ittiam.com](http://www.ittiam.com) or contact us at [mkt@ittiam.com](mailto:mkt@ittiam.com) or your regional local contact listed below