



SDM230, SDM260, SDM280, SDM290 SDM260e, SDM280e & SDM290e Standard Definition MPEG-2 Decoders User Guide

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Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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16 November 2006

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Patent Notice

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This is the list of patents covered by the MPEG-2 Patent Portfolio License as of September 30, 1998.

Columbia University

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Features

With Stradis SDM260, 280, 290, 260e, 280e, 290e and 230 standard definition decoders, your MPEG video application can offer:

- Continuous, seamless back-to-back playback of multiple MPEG streams (which may be in different formats: Transport, Program, System or Elementary streams)
- Frame-accurate, synchronized playback across multiple decoders
- High-speed, random access and display of any I-Frame in an MPEG file for variable speed reverse and forward play, plus seamless switching to any I-frame of another stream
- Complete control over all decoder functions via the API for Microsoft Windows XP, Windows 2000, and Windows NT. Applications can access the API via a C or C++ interface or by using the `__stdcall` calling convention
- API compatibility with all earlier-model Stradis SDM series MPEG Decoders

Additional features for MPEG decoding and output:

- Decodes all MPEG-1 and MPEG-2 stream types and produces NTSC or PAL output
- Still picture display from bit-map files with transition effects and simultaneous audio playback for "slide shows"
- True-color graphics over video or still pictures with keying and 64 levels of blending and shading
- Digital control of video saturation, brightness, contrast, gamma, and hue
- Hardware Audio/Video synchronization
- Two balanced analog audio outputs with line-levels up to 28 dBm
- Vertical Interval Time Code (VITC) based on stream time codes or synthesized by the API
- Closed captions (ATSC and proprietary formats supported)
- Any VBI line can be overwritten with API generated data such as closed-captions or VITC
- API has three interface levels (RateBuffer, Demux, and File Interface)
- DirectShow® filters for compressed data input to the Stradis decoder and uncompressed video output from the Stradis decoder
- Wave file playback and raw PCM audio playback
- Audio "voice-over" capability allows the application to replace the audio from the main multiplexed stream with another audio stream
- Virtual streams based on a single, repeated I-Frame that can be seamlessly played back-to-back with other MPEG streams
- Decryption function for file-based decryption using Stradis-supplied or user-definable algorithms
- Video capture interface for capturing decoded video output and placing it into PC memory
- Video image can be displayed on the computer's VGA monitor, with scan-rate and color conversion
- PC based YUV video frame buffer output capability which allows multi-zone applications containing graphics generated by the PC and full motion video decoded by the decoder

Features of the SDM280, 280e, 290, and 290e:

- Serial Digital Interface (SMPTE 259M-C) video output plus composite video output
- One AES3 digital audio output
- IEC 61937 or SMPTE 337M compressed digital audio output provides a digital output stream compatible with an external Dolby Digital® (AC-3 & ATSC A/52)
- SMPTE 302M-1998 support for uncompressed digital audio in the Transport, Program, and System streams

Features Unique to the SDM290 and 290e:

- Multi-language audio, voice-overs, mixing, and fading using up to eight audio channels
- Two AES3 digital audio outputs
- Four balanced analog audio outputs with line-levels up to 28 dBm
- Serial Digital Interface (SMPTE 259M-C) video output with up to 8 channels of embedded audio, plus composite video output
- Machine Control via remote connector (9-Pin, RS-422A) can be configured as either "Controller" or "Device"
- Linear Time Code (LTC) output

Features Unique to the SDM230, 260e, 280e, and 290e:

- Support for component RGB and YPbPr video

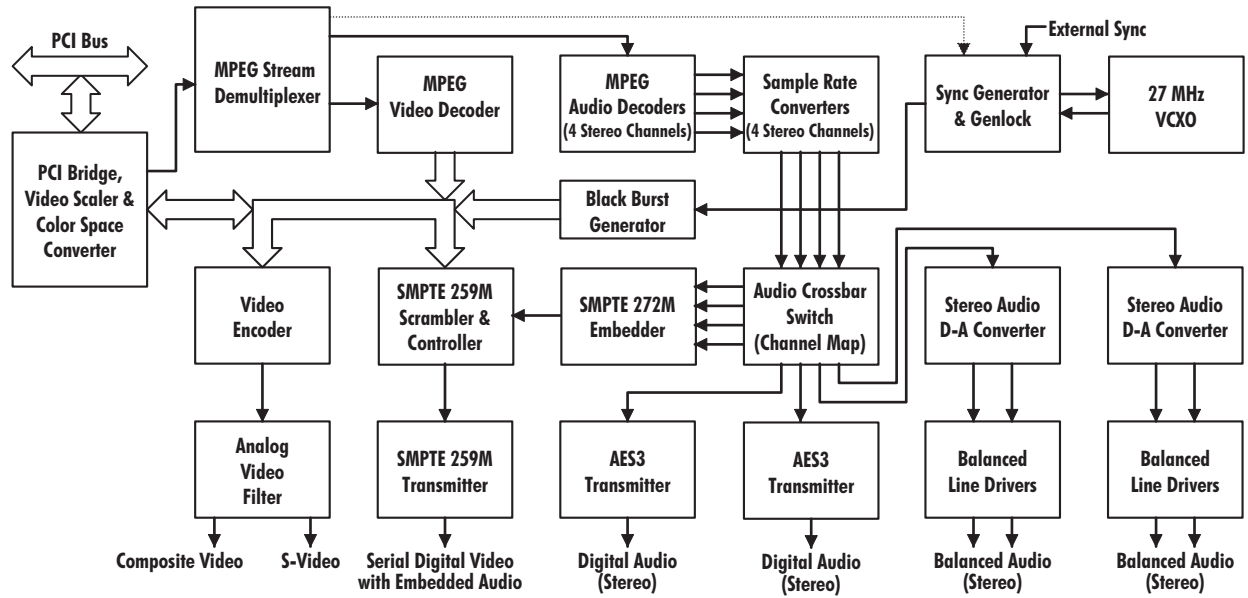
Features Unique to the SDM260e, 280e, and 290e:

- Genlock chroma burst lock in addition to sync lock

Additional features of the SDM230:

- One S/P-DIF digital audio output
- IEC 61937 or SMPTE 337M compressed digital audio output provides a digital output stream compatible with an external Dolby Digital® (AC-3 & ATSC A/52)

SDM290, 290e Block Diagram



Specifications

MPEG Streams	ISO/IEC 13818 and ISO/IEC 11172 compliant. Parses all streams: MPEG-1 Elementary and System streams and MPEG-2 Elementary, Packetized Elementary (PES), Transport, and Program streams.
MPEG Video	Decodes full 4:2:2 profile or MP@ML (4:2:0) up to 50 Mbps.
MPEG Audio	Decodes four stereo channels of MPEG-1 layers 1 and 2, ISO/IEC 11172-3 or MPEG-2 layers 1 and 2, ISO/IEC 13818-3. Also SMPTE 302M-1998 Audio.
Digital bitstream input	Through the PCI bus using bus mastering and burst transfer mode.
Digital video output	Serial Digital Interface (ANSI/SMPTE 259M-1997) with 8 channels of embedded audio (ANSI/SMPTE 272M-1994), BNC connector.
Analog video output	(M) NTSC, (M) NTSC-Japan, (B, D, G, H, I, M, N) PAL. 1V P-P, RS-170-A compliant, BNC connector. DC restored output. Luma and chroma signals are filtered in accordance with the standard requirements of RS-170-A and CCIR 624. In addition, RGB and YPbPr are provided on the SDM260e, SDM290e, and SDM230 decoders.
Digital audio output (SDM290, 290e)	Two AES3 digital audio outputs through a DB-15 connector.
Digital audio output (SDM280, 280e)	One AES3 digital audio output through a DB-15 connector.
Digital audio output (SDM230)	One S/P-DIF (IEC 60958) digital audio output.
Analog audio output (except SDM230)	Four balanced analog audio, 600 ohm, level up to 28 dBm. Nominal output level user selectable. For example, standard 0 dBm or 4 dBm nominal line-level with 20 dB headroom is supported. Balanced analog audio through a DB-15 connector. Also four unbalanced audio outputs through two MPC standard sound card connectors.
Analog audio output (SDM230)	Two unbalanced analog audio outputs (8dBu maximum).
Genlock (SDM290, 280, 260)	Locks to the H-sync and V-sync, allows variable delay about the H-sync in 9.26 ns increments. Chroma phase adjustable in 1.4 degree increments. Composite video input, 1V P-P, BNC connector.
Genlock (SDM290e, 280e, 260e)	Locks to the H-sync, V-sync and chroma burst, allows variable delay about the H-sync in 1 ns increments. Chroma phase adjustable in 0.35 degree (1ns) increments. Composite video input, 1V P-P, BNC connector.
On-Screen Display	8x2 to 740x480 NTSC or 8x2 to 720x576 PAL bitmap, using true-color or a 4-, 16-, or 256-color palette, 64 levels of blending and 64 levels of shading.
Host system requirements	Pentium-based PC with an available PCI short card slot conforming to PCI specification revision 2.1 running Windows NT 4.0, or Windows 2000 or greater, with a VGA supporting Microsoft® Direct Draw mode.
Power requirements (SDM290)	5v (5 W typical), 3.3v (0 W), 12v (2 W typical), -12v (0.3 W typical)
Power requirements (SDM290e)	5v (1.5 W typical), 3.3v (3 W), 12v (2 W typical), -12v (0.3 W typical)
Power requirements (SDM230)	5v (1.2 W typical), 3.3v (1.6 W), 12v (.3 W typical), -12v (0.3 W typical)
Regulatory Approvals	FCC Part 15, Class A. CISPR 22/EN55022, Class A. CISPR 22/EN55024 (98)

Ordering Information

Cables:

- | | |
|--------|---|
| SAC006 | Audio Cable for SDM290 or 290e with 4 XLR connectors for balanced audio outputs and 2 XLR connectors for digital audio outputs. |
| SAC007 | Audio Cable for SDM290 or 290e with 4 XLR connectors for balanced audio outputs and 2 BNC connectors for digital audio outputs. |
| SAC008 | Audio Cable for SDM280 or 280e with 2 XLR connectors for balanced audio outputs and 1 XLR connector for digital audio output. |
| SAC009 | Audio Cable for SDM280 or 280e with 2 XLR connectors for balanced audio outputs and 1 BNC connector for digital audio output. |
| SAC010 | Audio Cable for SDM260 or 260e with 2 XLR connectors for balanced audio output. |
| SAC012 | Sync daisy chain cable when using multiple SDM290, 290e, 280, 280e, 260 or 260e decoders in one chassis |
| SAC013 | Sync daisy chain cable to connect a SDM260, 260e, 280, 280e, 290 or 290e decoder to a SDM250 or SDM275 decoder |
| SAC014 | SDM290 or 290e PC bracket with DB9 for RS422 Machine Control and BNC connector for LTC |
| SAC022 | Audio Cable for SDM230 with 1 RCA connector for S/P-DIF audio output and 2 RCA connectors for unbalanced audio outputs. |



CAUTION

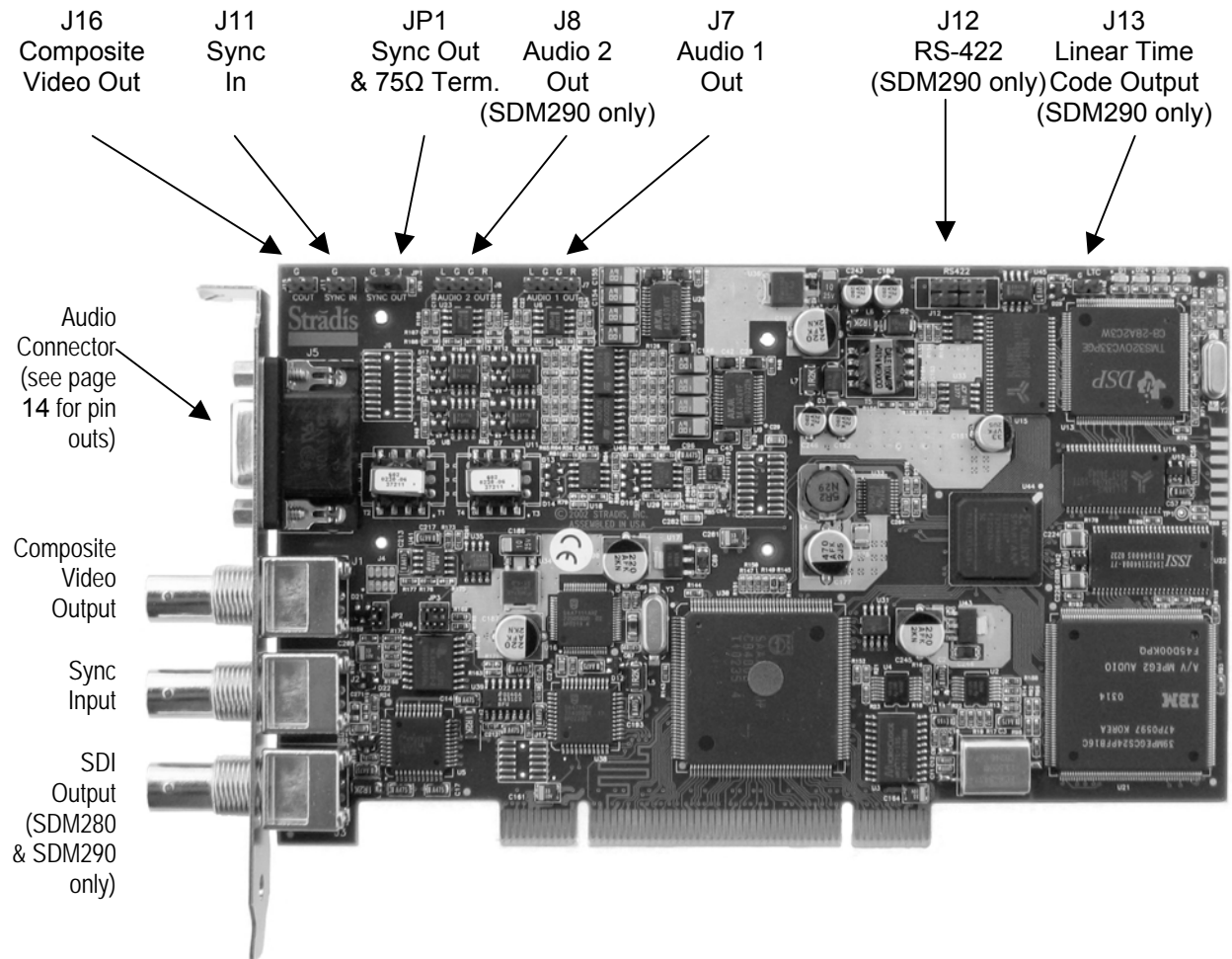
Observe all ESD precautions. Failure to do so could result in damage to the equipment.

Hardware Installation

1. Do not remove card from anti-static bag until you are ready to install it.
2. Turn off power to the computer and any device connected to it, such as a monitor, powered speakers, scanner, etc. Disconnect the power cord from the wall or uninterruptible power supply.
3. Touch a metal surface on the computer to ground yourself and to discharge any static electricity.
4. Remove the computer's cover.
5. Locate an unused PCI expansion slot.
6. Remove the metal cover from the back of the computer adjacent to the slot to be used. Do not lose the screw.
7. While holding the Stradis MPEG-2 Decoder Card by the metal bracket, align it with the PCI slot and press it down into the connector. Avoid touching the board's edge connector. The card must be completely seated into the connector.
8. The Stradis MPEG-2 Decoder Card can be connected to play audio through the PC's sound card. J7 and J8 (SDM290, 290e only) on the upper left corner of the card are outputs for a sound card for channels 1 and 2. They may be plugged into an auxiliary input on the PC sound card. (See photographs, pages 10 & 12.)
9. External sync can be fed into J2 (SDM260, 260e, 280, 280e, 290 and 290e), the center BNC connector. To feed sync to additional cards, or for genlocking cards together, run an SAC012 cable from "SYNC OUT" to "SYNC IN". If multiple boards are to be genlocked together, but not to an external source, designate one board the master. Attach the SAC012 to J16 on the master board. (See photographs, pages 10 & 12.)
10. Secure the Decoder Card into the expansion slot by replacing the screw removed in step 6.
11. Replace the computer's cover and reconnect the power cables.
12. Proceed to "Installing the Device Drivers."

SDM290, SDM280, SDM260

Back Panel and Onboard Connectors



JP1 and J11 are used for sync-in or sync pass-through. JP1 can switch a 75-ohm terminator in or out. If you have multiple boards in one PC chassis that you wish to genlock to an outside sync source, set JP1 to Hi-Z by removing the jumper factory installed between "S" and "T" on the first board. (You may wish to leave the jumper plugged into "T" only so that it will be available for future use.) Using a SAC012 "Sync daisy chain cable" plugged into JP1 ("G" is Ground & "S" is Sync), you can then feed sync to the subsequent boards, J11. Leave JP1 set to 75 Ohms on the last board.

J16 is an unfiltered video output. It is intended for applications where multiple boards need to be synced together, but not to an external source. Use a SAC012 cable from J16 on the first board to J11 on the subsequent boards. Additional boards may be daisy-chained from JP1 to J11. Set the first board (in software) to genlock off and the other boards to genlock on. All boards will now sync to the first board.

J7 and J8 (SDM290 only) can be used to feed audio into a PC sound card. They are unbalanced outputs.

On the SDM290 only, J12 is for RS-422 machine control. Connect it to the Stradis SAC014 or to your own connector. To use the SDM290 as a “Device”, install the cable with the red (pin 1) line to the right side of the board. To use the SDM290 as a “Controller”, install the cable with the red (pin 1) line to the left.

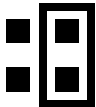
J13 is the Linear Time Code output. Use a Stradis SAC014 or your own connector.
Important: Ground is to the left.

S-Video Option

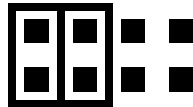
The SDM260, 280, or 290 can be optionally configured to provide a Luma (Y) and Chroma (CrCb) video output compatible with S-video. In this configuration, J1, the top BNC connector, becomes the Luma (Y) output, and J2, the middle BCN connector, becomes the Chroma (CrCb) output. Genlock in is through J11 in this configuration.

To configure the board for this output, set jumpers JP2 and JP3 as follows:

JP2

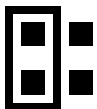


JP3

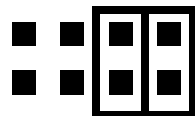


For normal (Composite) operation, jumpers JP2 and JP3 are set as follows:

JP2

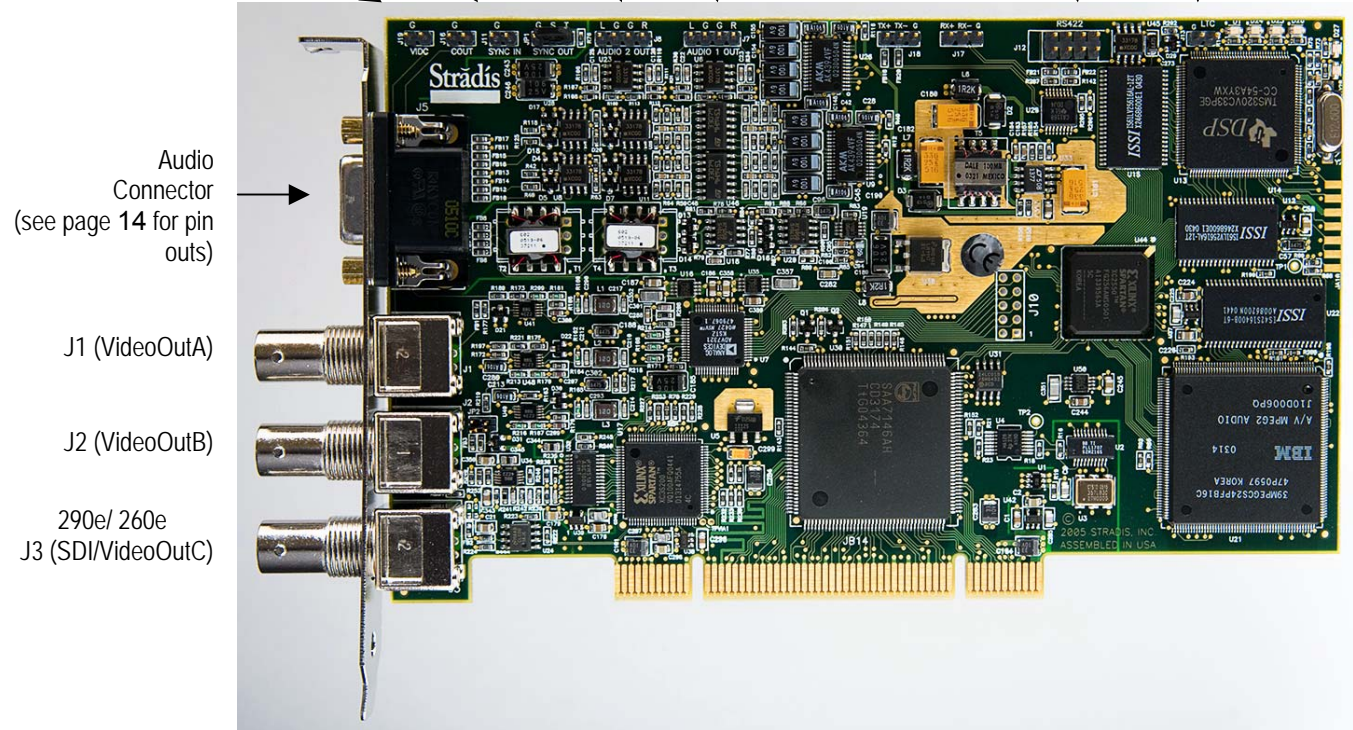
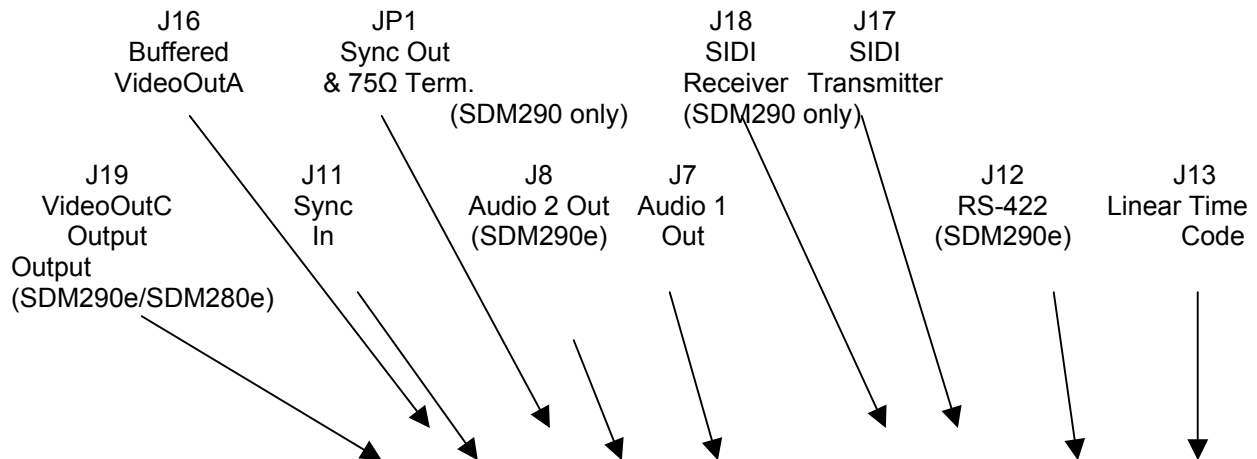


JP3



SDM290e, SDM280e, & SDM260e

Back Panel and Onboard Connectors



Genlock Option

J2 on SDM290e, 280e and 260e can be optionally configured to provide video output (VideoOutB) or serve as genlock input, depending on the JP2 jumper. If the jumper is located at the top, VideoOutB is output on J2. If the jumper is located at the bottom, J2 is used for genlock input. This is the same JP2 jumper functionality as on the SDM290, 280, or 260 except that the orientation of the jumper is rotated. The factory default is set to genlock in.

Video Output: software configurable

	Composite and S Video Output NTSC, NTSC-J or PAL	RGB Component Output 480I/576I RGB	YPbPr Component Output 480I/576I YPbPr
VideoOutA	Composite	G	Y
VideoOutB	Y	B	Pb
VideoOutC	C	R	Pr

J17 and J18 are the transmitter and receiver components of the Stradis InterDevice Interface (SIDI) and can be used to sync boards together using a proprietary standard. These two connectors can be used to frame-lock multiple boards together. They can even be used to lock an SDM230 to SDM260e or any other card with these connectors. Future support will be added so that cards can communicate with each other for synchronization class to run between cards, and over several chassis.

JP1 and J11 are used for sync-in or sync pass-through. JP1 can switch a 75-ohm terminator in or out. If you have multiple boards in one PC chassis that you wish to genlock to an outside sync source, set JP1 to Hi-Z by removing the jumper factory installed between "S" and "T" on the first board. (You may wish to leave the jumper plugged into "T" only so that it will be available for future use.) Using a SAC012 "Sync daisy chain cable" plugged into JP1 ("G" is Ground & "S" is Sync), you can then feed sync to the subsequent boards, J11. Leave JP1 set to 75 Ohms on the last board.

J16 is a buffered copy of the video output on J1 (VideoOutA). Use a SAC012 cable from J16 on the first board to J11 on the subsequent boards if you wish several boards to be chroma-locked together. Additional boards may be daisy-chained from JP1 to J11. Set the first board (in software) to genlock off and the other boards to genlock on. All boards will now chroma-lock to the first board.

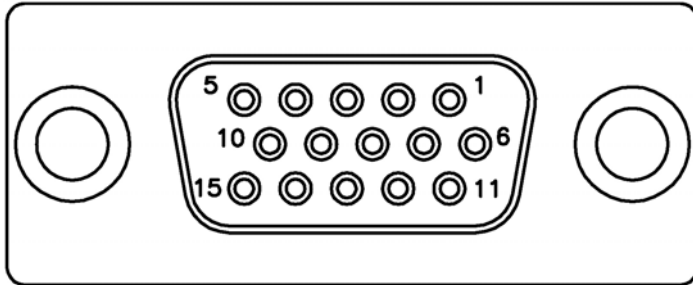
J7 and J8 (SDM290, 290e only) can be used to feed audio into a PC sound card. They are unbalanced outputs.

On the SDM290e only, J12 is for RS-422 machine control. Connect it to the Stradis SAC014 or to your own connector. To use the SDM290 or 290e as a "Device", install the cable with the red (pin 1) line to the right side of the board. To use the SDM290 or 290e as a "Controller", install the cable with the red (pin 1) line to the left.

J13 is the Linear Time Code output. Use a Stradis SAC014 or your own connector.
Important: Ground is to the left.

SDM290, SDM280, SDM260, SDM290e, SDM280e, SDM260e

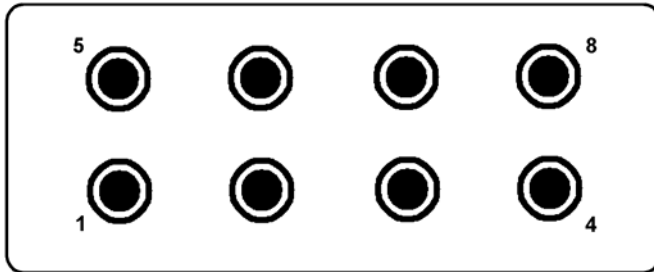
Audio Connector (DB15-HD)



PIN 1	Digital Audio Output 1+ [SDM280, 280e, 290, 290e only]
PIN 2	Analog Ground
PIN 3	Analog Audio Output Left 1+
PIN 4	Analog Audio Output Left 1-
PIN 5	Analog Audio Output Right 1+
PIN 6	Digital Audio Output 1- [SDM280, 280e, 290, 290e only]
PIN 7	Digital Audio Output 2+ [SDM290, 290e only]
PIN 8	Analog Ground
PIN 9	Analog Audio Output Right 2+ [SDM290, 290e only]
PIN 10	Analog Audio Output Right 1-
PIN 11	Digital Audio Output 2- [SDM290, 290e only]
PIN 12	Digital Ground
PIN 13	Analog Audio Output Right 2- [SDM290, 290e only]
PIN 14	Analog Audio Output Left 2+ [SDM290, 290e only]
PIN 15	Analog Audio Output Left 2- [SDM290, 290e only]

SDM290, SDM290e

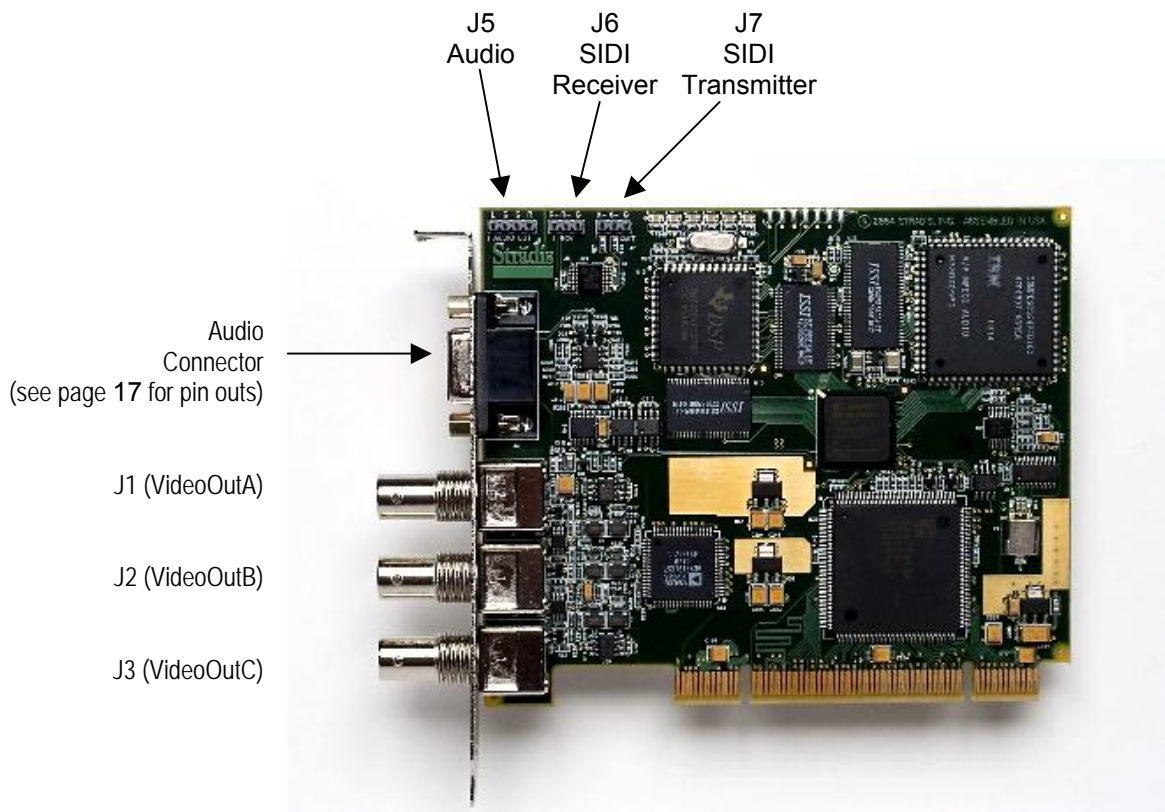
RS422 Connector



PIN 1	Ground
PIN 2	RCV -
PIN 3	XMT +
PIN 4	Ground
PIN 5	Ground
PIN 6	RCV +
PIN 7	XMT -
PIN 8	Ground

SDM230

Back Panel and Onboard Connectors



Video Output: software configurable

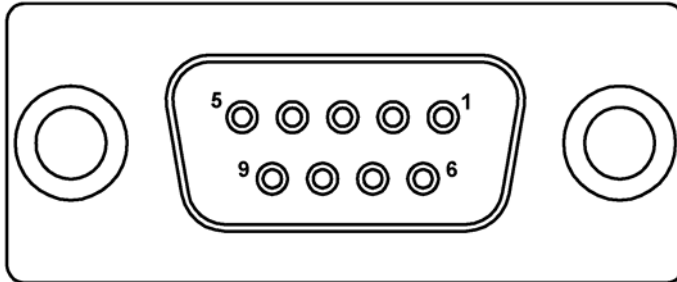
	Composite and S Video Output NTSC, NTSC-J or PAL	RGB Component Output 480I/576I RGB	YPbPr Component Output 480I/576I YPbPr
VideoOutA	Composite	G	Y
VideoOutB	Y	B	Pb
VideoOutC	C	R	Pr

J5 can be used to feed audio into a PC sound card. It is an unbalanced output.

J6 and J7 are the transmitter and receiver components of the Stradis Inter-Device Interface (SIDI) and can be used to sync boards together using a proprietary standard. These two connectors can be used to frame-lock multiple boards together. They can even be used to lock an SDM230 to SDM260e or any other card that has these connectors. Future support will be added so that cards can communicate with each other for synchronization class to run between cards, and over several chassis.

SDM230

Audio Connector (DB9)



PIN 1	S/P-DIF Digital Audio Output
PIN 2	No Connection
PIN 3	No Connection
PIN 4	Analog Ground
PIN 5	Left Analog Audio Output
PIN 6	Digital Ground
PIN 7	No Connection
PIN 8	Analog Ground
PIN 9	Right Analog Audio Output

Installing the Device Drivers and the Stradis MPEG-2 Decoder Application

The Stradis MPEG-2 File Player Application (SMPEGDEC.EXE) is provided for testing and evaluation purposes only. If your Stradis decoder is part of a third-party system, follow the installation instructions provided by your system provider; DO NOT FOLLOW THESE INSTRUCTIONS. Doing so may render the third-party software inoperative.

1. Stradis Decoder Drivers are available at our website: <http://www.stradis.com>
2. Download the appropriate driver installers.
3. It is strongly recommended, for correct installation of the hardware and associated driver, that you reboot the computer and run no other program before using the setup program.
4. Access Device Manager by right-clicking on My Computer, follow the context menu to Properties, and then select the Hardware tab. Click the "Driver Signature" button. You must set "File Signature Verification" to either "Warn" or "Ignore."
5. Run the installer program.
6. Enter the following install password if prompted. The password is case-sensitive: mpeg4u
7. Follow the instructions on the screen to complete the installation.
8. If you are installing this software release on a system that had a Stradis device driver version 0.95 or earlier installed, the installation program will ask you to manually remove it using Device Manager. Expand the "Sound and Video Controller" section, select "Stradis Professional MPEG-2 Decoder," and right-click and select "Uninstall."

Note: If you are asked by the installation software to REMOVE AN OLD DRIVER, it is very important to DO SO BEFORE REBOOTING. Otherwise the installation may become confused and a number of files will need to be manually removed.

9. Reboot the computer. Windows "Plug and Play" will now load the drivers automatically. If you set "Driver Signature" to "Warn", you will be warned that Microsoft has not digitally signed the Stradis Driver. Click "OK" to complete the installation.
10. Proceed to SMpegDec User Guide.

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