

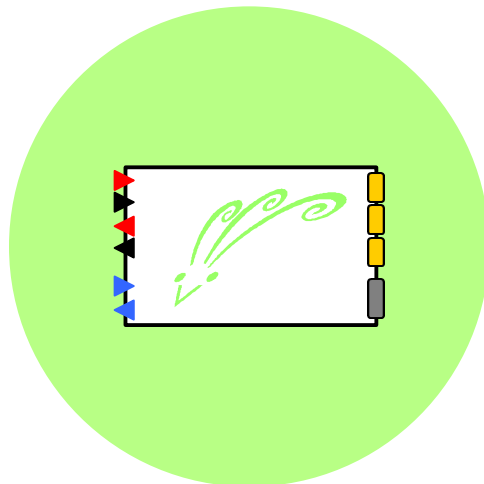


PRODUCT DATA SHEET

PAPAYA™

IEEE 1394 Audio Reference

September 24, 1998
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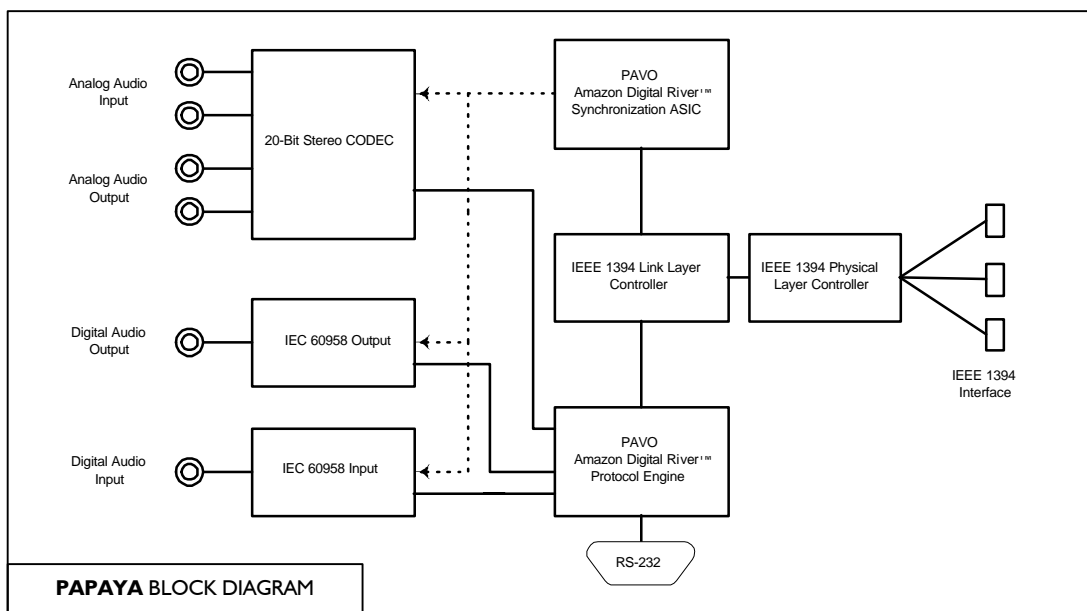
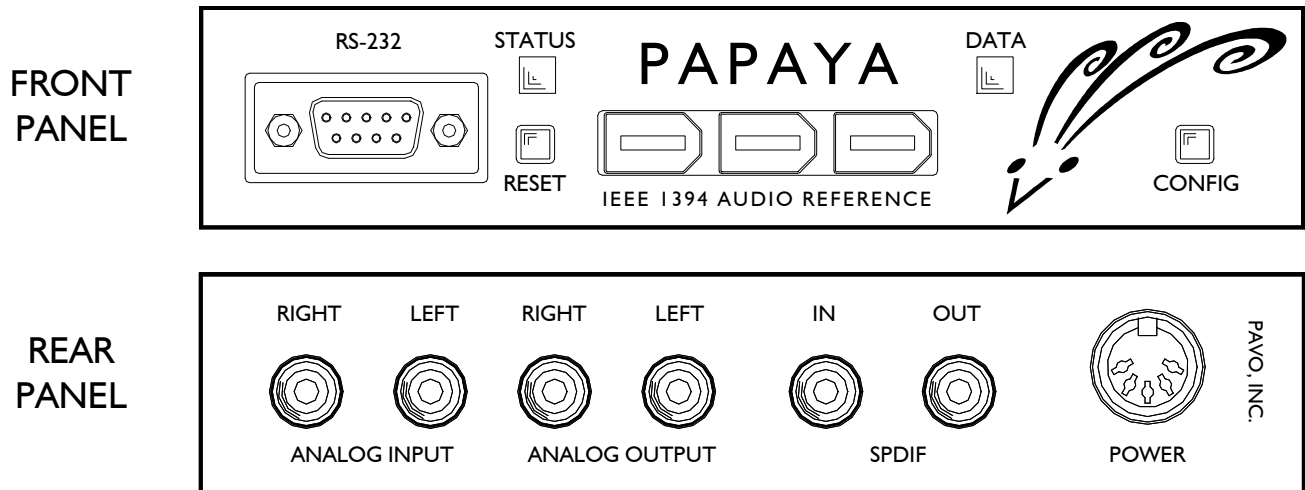
PAPAYA IS

- A PROVEN HARDWARE PLATFORM for demonstrating standards-compliant audio transmission on the IEEE 1394 bus
- MICROSOFT'S I394 AUDIO REFERENCE for creating Win32 Driver Model (WDM) drivers for Windows 98 and NT 5.0
- BE COMPUTER'S I394 AUDIO REFERENCE for creating drivers for BeOS, a new multimedia operating system
- DIGITAL HARMONY TECHNOLOGY'S I394 AUDIO REFERENCE for implementing early versions of their *Digital Harmony Specification for IEEE 1394 Home Entertainment Systems*

USE PAPAYA TO

- CREATE IEEE 1394 DEMONSTRATIONS for trade shows and company meetings
- EDUCATE sales representatives, distributors, associates, and customers about IEEE 1394
- EVALUATE IEEE 1394 — create prototype devices; verify product compliance with IEC 61883-6
- DEVELOP IEC 61883-6 SOFTWARE APPLICATIONS for Windows 98, NT 5.0, MacOS, and/or BeOS

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PAPAYA TECHNICAL SPECIFICATIONS

General Specifications

- Three (3) IEEE 1394 connectors
- Studio-quality audio I/O (digital and analog)
- User-adjustable input and output gains, plus mute, on all inputs and outputs
- All **Papaya** functions comply with both IEC 61883-6 Audio and Music Data Transmission Protocol and Yamaha's mLAN specification
- Hot pluggable (i.e., **Papayas** can be added and removed from the bus while they are operating)
- Transmit or receive two audio channels over one isochronous channel
- S200 (196.608 Mbit/s) bus rate; also supports S100
- Capable of serving as 1394 bus Cycle Master
- Asynchronous quadlet/block reads and writes
- Does not require a PC for operation
- Integrated 9.6-38.4Kbaud debug monitor (via RS-232)
- Configured via RS-232 connection
- On-board Flash ROM (allows firmware to be upgraded via RS-232)

IEEE 1394-1995 Interface

- Texas Instruments TSB21LV03B S200 Physical Layer Controller (PHY) integrated circuit
- Texas Instruments TSB12LV01 Link Layer Controller (Link) integrated circuit

Protocol Engine

- Analog Devices ADSP21060 SHARC DSP running PAVO's *Amazon Digital River™* protocol software
- 32-bit floating point; 120 MFLOPs
- 4Mbits internal memory
- 1KB nonvolatile memory for parameter storage
- RS-232 interface and on-board host monitor for analyzing activity on the IEEE 1394 bus

Synchronization ASIC

- Xilinx XC5206 FPGA running PAVO's *Amazon Digital River™* synchronization software
- Performs sample clock recovery and synchronization using IEC 61883-6 time stamps

Asynchronous Control

- Device parameters controlled via CSR writes

Analog Audio I/O

- AKM AK4520A 20-bit Stereo Codec
- Stereo line-level analog input
- Stereo line-level analog output

Digital Audio I/O

- Crystal Semiconductor CS8401 IEC 60958-compliant transmitter
- Crystal Semiconductor CS8411 IEC 60958-compliant receiver
- Supports linear PCM and compressed audio formats (e.g., Dolby Digital/AC-3 and DTS)
- Dynamic range > 100dB
- Supports 44.1kHz and 48kHz sample rates
- Supports any sample word length up to 24 bits

RS-232 Interface

- Supports 9.6-38.4Kbaud serial communication
- Accesses on-board debug monitor
- Used to configure **Papaya's** operating modes
- Used to download new **Papaya** firmware

Mechanical Characteristics

- Black plastic enclosure: 9.5 L x 6.33 W x 1.38 D
- Weight: 1.0lb (not including power supply)
- Front Panel: 1394 ports (3); RS-232 port; Reset switch (device reset); Config switch (restore factory defaults, or set serial tunneling mode); Status and Data indicator LEDs
- Back Panel: power supply input; line-level inputs (L,R); line-level outputs (L,R); IEC 60958 (SPDIF) digital input and output

Power Supply (provided)

- External, UL-approved
- 110VAC version only
- +5VDC@3A, +12@2A

Pricing

- Standard **Papaya** Pack: US\$2,500
Includes two (2) Papayas and one 1394 cable
- Additional **Papayas**: US\$1,500 each
- Additional IEEE 1394 cables: US\$30


Ordering Information

Contact:	PAVO
	95 Yesler Way
	Seattle WA 98104 USA
Chris Bartlett	+1 206 682 7223 voice
Retail Manager	+1 206 682 7705 fax
chris@pavo.com	

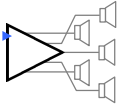
PAPAYA OPERATING MODES

CONFIGURATION GUIDE


Operating Mode Configuration




PAPAYA
IEEE 1394 Audio Reference




Digital Audio Receiver/Decoder



Analog Audio Receiver/Decoder



Digital Audio Source



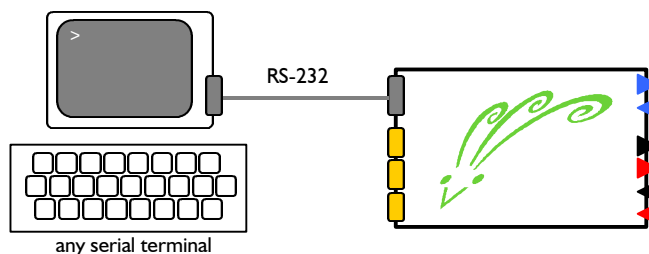
Analog Audio Source


ICON LEGEND

STEP 1: Connect a standard serial cable from your terminal to either **Papaya's** RS-232 port.


STEP 2: Connect the auxilliary equipment (as shown in the following pages) for the desired Operating Mode.

STEP 3: Run a serial terminal program to configure each Papaya for the desired Operating Mode.







= IEEE 1394 Interface



= RS-232 Interface



= Digital Audio IN
= Digital Audio OUT



R
L
R
L
= Analog Audio IN
= Analog Audio OUT

CONNECTOR LEGEND

A NOTE ON 1394 PCI ADAPTER CARDS: *If you wish to use the "PC Playback/Recording Device" Operating Modes, a 1394 PCI adapter card is required. Although **Papaya** has been demonstrated with various adapter cards and operating systems, the specific operating system drivers, hardware drivers, and application software for these Modes are not provided or supported by PAVO.*

*If you have a 1394-enabled computer, call PAVO with your system specifications and requirements. We will provide you with the most recent information about available drivers, applications, and hardware. **Papaya** has been demonstrated with PCs running Win95, Win98/NT5.0, and BeOS, using adapter cards from Texas Instruments and Adaptec.*

PAPAYA OPERATING MODES

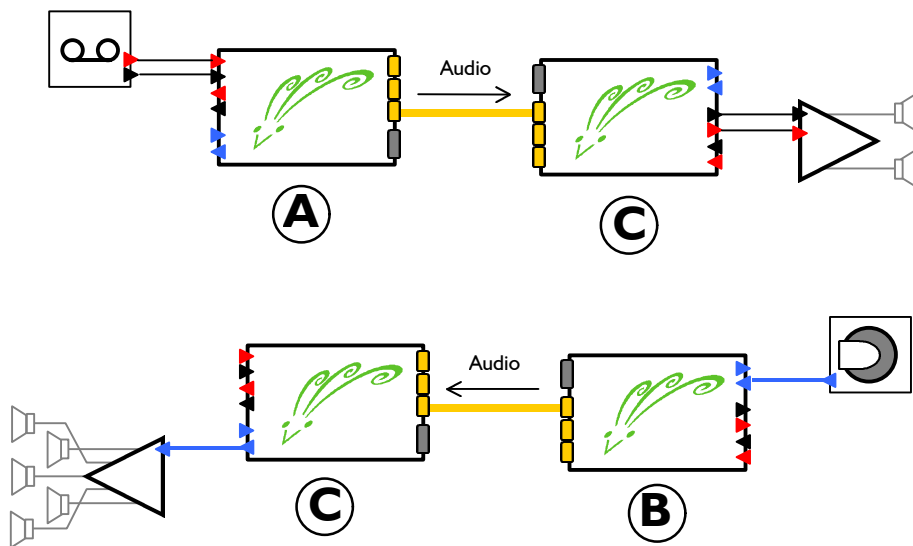
CONFIGURATION GUIDE, cont.

PAPAYA AUDIO MODES

A = Transmit from analog inputs to I394 bus

B = Transmit from digital inputs to I394 bus

C = Receive audio from I394 bus



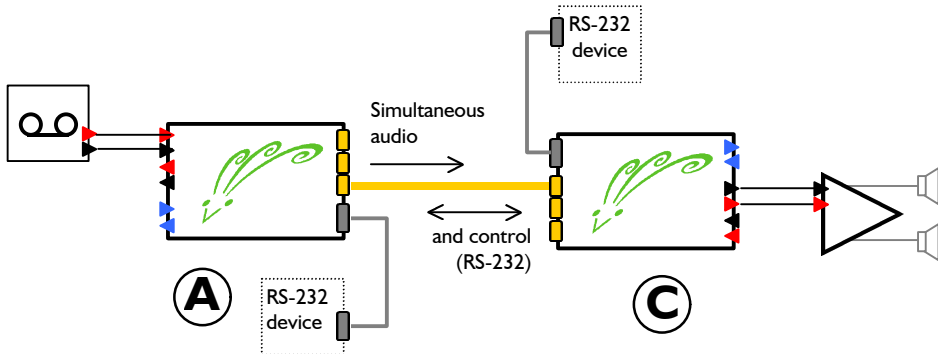
Demonstration: One stereo audio stream is transmitted on the I394 bus, in one direction. The user can choose to use the analog audio I/O or digital I/O.

System Elements:

- **Analog Audio Source:** cassette tape or CD player, etc.
- **Digital Audio Source:** CD or DAT player (PCM); or DVD player (Dolby Digital/AC-3 or DTS) with IEC 60958 output (SPDIF)
- **Transmitting Papaya:** transmits stereo stream on one I394 isochronous channel
- **Receiving Papaya:** receives stream and presents it to both audio outputs
- **Audio Destination:** integrated decoder, amplifier and speakers

LEGACY AUDIO ADAPTER

(2 Audio Channels, Unidirectional)



Demonstration: Audio and RS-232 data are transmitted simultaneously on the I394 bus.

System Elements:

- **Audio Source:** any analog audio playback device
- **RS-232 Device (2):** any device that transmits and receives RS-232
- **Transmitting Papaya:** transmits audio input stream on one I394 isochronous channel while sending/receiving full-duplex RS-232 data using asynchronous transmission
- **Receiving Papaya:** receives audio stream and presents it at both audio outputs, while sending or receiving full-duplex RS-232 data
- **Audio Destination:** analog or digital decoder, amplifier and speakers.

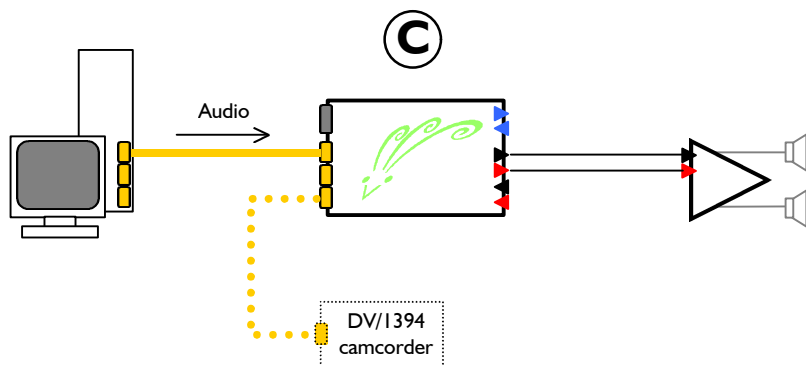
RS-232 TUNNEL w/SIMULTANEOUS AUDIO

PAPAYA OPERATING MODES

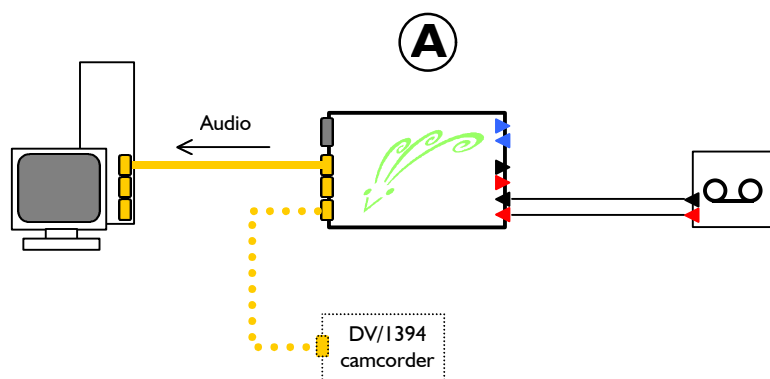
CONFIGURATION GUIDE, cont.

PAPAYA AUDIO MODES

- A = Transmit from analog inputs to I394 bus
- B = Transmit from digital inputs to I394 bus
- C = Receive audio from I394 bus



PC PLAYBACK DEVICE



PC RECORDING DEVICE

NOTE: this demonstration requires a computer with a I394 PCI adapter card and an external software program that processes the audio and video data. **Please read the “Note on I394 PCI Adapter Cards” found on page 4 of this data sheet.**

Demonstration: Computer audio is received and transmitted on the I394 bus. In addition, an optional DV/I394 camcorder can stream video to/from the computer.

System Elements:

- **Digital Audio Source—Playback:** internal CD-ROM with IEC 60958 digital output (PCM, Dolby Digital/AC-3, or DTS) or internal disk drive (WAV) playback through internal sound card with IEC 60958 digital output
- **Audio Source—Recording:** any one digital or analog audio playback device
- **Papaya—Playback:** receives packetized audio stream and presents it at both audio outputs
- **Papaya—Recording:** transmits input stream on one I394 isochronous channel
- **DV/I394 Camcorder (optional):** transmits and receives DV digital video stream to/from the computer
- **Audio Destination - Playback:** integrated decoder, amplifier and speakers
- **Audio Destination - Recording:** computer with I394 PCI adapter card.

NOTE: Product specifications are subject to change without notice.

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