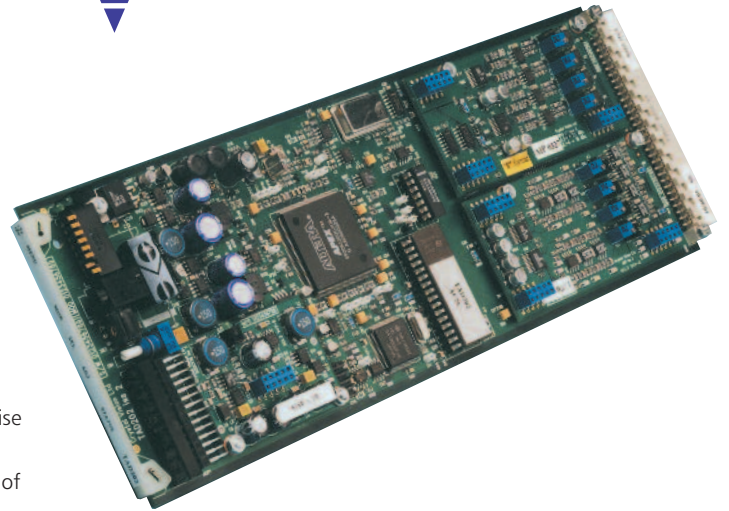


# Crystal Vision

## TAD202

### Tracking Audio Delay



The dual TAD202 incorporates both tracking and system delay to synchronise video and audio sources.

The system fixed delay is used for the manual addition of large amounts of delay, and can be set between 0 and 680ms. The difference in output frequency relative to input frequency is adjustable in steps from 3.2% to 0.05%, with a 0.05% change resulting in minor audio distortion and therefore allowing live adjustment.

In tracking mode TAD202 matches audio delay to the video delay of any synchroniser with TTL tracking pulse outputs, such as Crystal Vision's SYN102, tracking over a range of 40ms. The fixed delay (between 0 and 640ms in tracking mode) is generally set first, with the TAD then intelligently tracking in a predictive manner based on the synchroniser's current performance, pre-compensating for the addition or drop of a video frame to minimise lip-sync errors that would otherwise result. On rapidly changing video sources threatening a degradation in audio, the tracking will disable itself and revert to system delay until the video becomes stable again, so as to always maintain the audio quality.

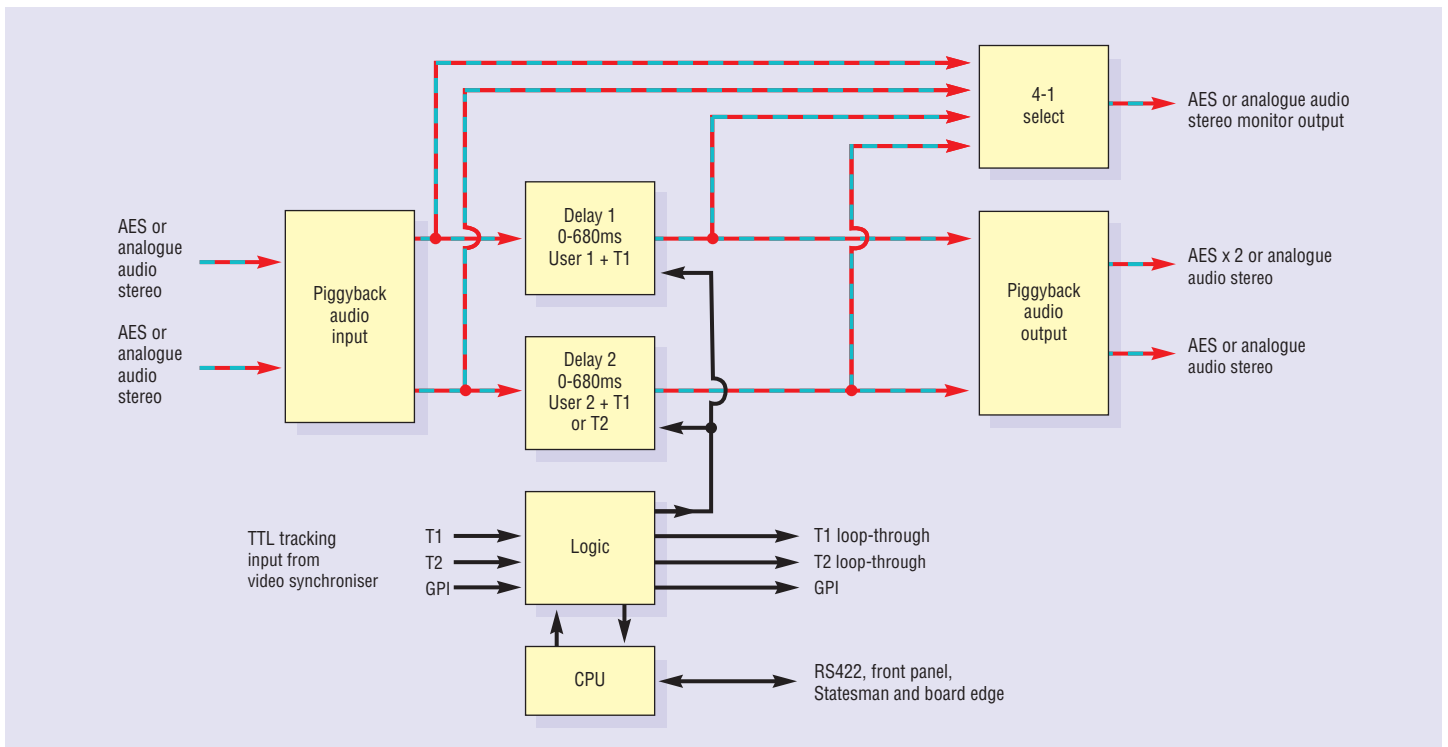
One of the many strengths is TAD202's flexibility. The two stereo inputs and outputs can either be two AES or four mono analogue – configured by the customer using piggybacks. This reduces the need for multiple versions, as TAD can be either analogue or digital – or a mixture of both, making it an A to D or D to A converter. TAD202 shares the TANDEM piggybacks, and uses the input HD-AIP2 and HD-DIP2-RS and the output HD-AOP2, HD-DOP2-75 and HD-DOP2-110.

The two stereo channels can be controlled together or separately by either one or two tracking input pulses from the synchroniser. TAD202 locks the digital output to an AES reference, or if no reference can be switched to lock to either TTL pulse input. It has sophisticated audio error masking with the ability to repair corrupted audio packets, and can accept a wide range of digital audio frequencies, including 44.1kHz sources. Digital output frequency is set to 48kHz.

The stereo channels can be monitored either through the rear module or via a miniature stereo jack socket on the board edge. Control and status monitoring is available via board edge, or remotely using either the active frame front panel, Statesman PC software or SNMP, while up to 16 presets can be stored. The TAD202 can be used with two frame rear modules. The single slot RM04 – which allows 24 tracking audio delays in 2U – should be used for analogue or 110 ohm digital audio, while the two slot RM07 should be used for 75 ohm AES.

Ideal uses include on broadcast station and OB 'lines in' where video synchronisers with associated audio feeds are in use, by broadcasters wanting to make live adjustments to lip sync, as a low-cost way of delaying analogue audio, or where audio delay is required as part of A to D or D to A conversion. For economical fixed digital delay customers are recommended to use the DADA208D.

- ☺ Dual tracking audio delay unit to synchronise video and audio
- ☺ Incorporates tracking and system delay
- ☺ Dual independent stereo channel inputs
- ☺ Uses two tracking input pulses from synchroniser
- ☺ Configure inputs and outputs to be analogue or digital using piggybacks
- ☺ Audio source preview monitoring
- ☺ External AES reference input for digital output piggybacks
- ☺ Audio error masking
- ☺ Use with RM04 and RM07 frame rear modules
- ☺ 100mm x 266mm module allows up to 12 TAD202 (24 tracking audio delays) in 2U
- ☺ Controllable from board edge, frame active front panel, PC control software or SNMP



## SPECIFICATION

### TAD202 MOTHERBOARD

#### MECHANICAL

Standard Crystal Vision module 266mm x 100mm  
Weight (with two piggyback modules fitted): 250g  
Power consumption: 12 Watts

#### AUDIO INPUTS

2 x AES or analogue stereo, depending on piggybacks fitted  
Digital output piggybacks (HD-DOP2-110 and HD-DOP2-75) may have external AES reference

#### AUDIO OUTPUTS

2 x AES or analogue stereo, depending on piggybacks fitted, with two feeds of the first AES channel

#### MONITORING

1 x miniature front mounted audio jack and switch selects individual stereo audio analogue monitoring on both input and output. Also available on rear connector

#### AUDIO DELAY

Dual channel digital audio delay pre-settable in steps from 0-680ms  
Tracking delay auto or off

#### SIGNAL SILENCE

Sustained input level below -50dB with respect to full scale can be set to give error indication

#### PRESETS

16 presets are available to store setup data. Recalled from board control or external GPIs

#### GPI INPUTS

4 x GPI for external recall of setups

#### GPI OUTPUTS

2 x GPI to provide TTL outputs

#### STATUS MONITORING

Front card edge visual monitoring with alphanumeric and LED indicators to indicate:

- ▶ PSU rails present: LED
- ▶ AES audio inputs: Alphanumeric display
- ▶ Audio silence: Alphanumeric display
- ▶ Piggyback card types: Alphanumeric display

### HD-AIP2 DUAL ANALOGUE AUDIO INPUT PIGGYBACK

#### AUDIO INPUT

2 analogue stereo pairs or 4 mono channels. 20 bit quantising A to Ds. High input impedance (20Kohm) balanced

#### INPUT LEVEL RANGE

0dBFS = +28dBu max / 0dBFS = +12dBu min  
Factory set default: 0dBFS = +18dBu or +24dBu by on board link

#### SIGNAL TO NOISE

-82dBu / -100dBFS (+18dBu) rms., 22Hz to 22kHz typ.

#### TOTAL HARMONIC DISTORTION

0.005% THD+N rms., 22Hz to 22kHz typ.

#### INTERCHANNEL CROSSTALK

116dB at 1kHz, -92dB at 20kHz, rms., typ.

#### SYNCHRONISATION

Digitised output of analogue A to D is automatically locked to video

### HD-DIP2-RS DUAL DIGITAL AUDIO INPUT PIGGYBACK

#### AUDIO INPUT

2 x 20 bit stereo pairs. AES3 110 ohm or HiZ (balanced) D-Type, or AES3-id (unbalanced) 75 ohm BNC. Set by on board jumper links

#### SYNCHRONISATION

AES digital audio re-sampling for asynchronous audio or other digital audio sample rates from 30kHz to 100kHz eg. 44.1kHz CD players

#### SIGNAL TO NOISE

-107dBu / -125dBFS (+18dBu) rms., 22Hz to 22kHz typ.

### HD-AOP2 DUAL ANALOGUE AUDIO OUTPUT PIGGYBACK

#### AUDIO OUTPUT

2 analogue stereo pairs or 4 mono channels. 20 bit quantising D to As. Low output impedance (66ohm) balanced

#### INPUT LEVEL RANGE

0dBFS = +28dBu max / 0dBFS = +12dBu min  
Factory set default: 0dBFS = +18dBu or +24dBu by on board link

#### SIGNAL TO NOISE

-80dBu / -98dBFS (+18dBu) rms., 22Hz to 22kHz typ.

#### TOTAL HARMONIC DISTORTION

0.0025% THD+N rms., 22Hz to 22kHz typ.

#### INTERCHANNEL CROSSTALK

-112dB at 1kHz, -98dB at 20kHz, rms., typ.

### HD-DOP2-110 AND HD-DOP2-75 DUAL DIGITAL AUDIO OUTPUT PIGGYBACKS

#### AUDIO OUTPUT

2 x 20 bit AES/EBU stereo pairs (2 buffered outputs of each on some frame rear modules)

AES: HD-DOP2-110 110 ohm balanced D-Type or HD-DOP2-75 75 ohm unbalanced BNC

#### OPTIONAL REFERENCE

Available instead of second buffered output on some frame rear modules. Link select  
a) AES reference b) Word clock

## ORDERING INFORMATION

TAD202	Dual tracking audio delay unit with system delay
HD-AIP2	Analogue audio (two stereo pairs) input piggyback
HD-AOP2	Analogue audio (two stereo pairs) output piggyback
HD-DIP2-RS	AES/EBU, 75 ohm, 110 ohm, HiZ (two stereo pairs) resampling input piggyback
HD-DOP2-110	110 ohm AES/EBU balanced (two stereo pairs) output piggyback
HD-DOP2-75	75 ohm AES/EBU unbalanced (two stereo pairs) output piggyback
HD-DCDCV18	18 Volt regulator for analogue audio configurations (one required if analogue audio piggyback fitted)
Indigo 4	4U frame with passive front panel for up to 24 Crystal Vision modules
Indigo 4SE	4U frame with passive front panel fitted with Statesman CPU for up to 24 Crystal Vision modules
Indigo 2	2U frame with passive front panel for up to 12 Crystal Vision modules
Indigo 2AE	2U frame with active front panel for up to 12 Crystal Vision modules
Indigo 2SE	2U frame with passive front panel fitted with Statesman CPU for up to 12 Crystal Vision modules
Indigo 1	1U frame with passive front panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1-DP
Indigo 1AE	1U frame with active front panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1AE-DP
Indigo 1SE	1U frame with passive front panel fitted with Statesman CPU for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1SE-DP
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTSE	Desk top box with passive front panel fitted with Statesman CPU for up to two Crystal Vision modules
RM04	Single slot frame rear module. Allows maximum number of TAD202 in frame (24 in 4U, 12 in 2U, six in 1U, two in desk top box). Two analogue audio or 110 ohm AES (D-Type) inputs with two outputs of the first channel and one of the second
RM07	Two slot frame rear module. Allows 12 TAD202 in 4U, six in 2U, three in 1U and one in desk top box. Two 75 ohm AES (BNC) inputs with two outputs of the first channel and one of the second
REMIND	19" remote control panel
REMIND-E	19" Ethernet remote control panel
Statesman	PC Control System
SNMP	SNMP monitoring and control

Performance and features are subject to change. Figures given are typical measured values. TAD2020312