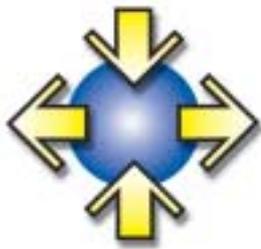


Crystal Vision



TANDEM

Twin ANalogue and Digital EMbedder/de-embedder

Innovative. Versatile. Unmatched. The name TANDEM has become synonymous with embedding and de-embedding across the world, providing the answer for every embedded audio application, from the most basic to the most sophisticated.

Configure it yourself with two sub-boards...to embed or de-embed analogue or digital audio. Save rack space...with the world's only dual system giving you up to 24 embedders/de-embedders in 2U. Make use of the huge range of features...shuffle, replace, delay, bridge, process and monitor your audio - or just embed or de-embed!



The options...

TANDEM-110

Entry level dual embedder/de-embedder for most applications. Now with audio processing.

TANDEM-200

Embed/de-embed and manipulate audio in almost any way you choose. Combine audio already embedded with external input.

TANDEM-300

Single embedder/de-embedder and audio processor. Select your audio from unparalleled number of sources, including from two SDI streams at the same time.

Embed analogue audio

De-embed digital audio



De-embed analogue audio

Embed digital audio

TANDEM-110

GETTING DOWN TO BASICS

Ideal if you require an entry level system, the flexible TANDEM-110 can be configured as a single embedder, a single de-embedder, a dual embedder, a dual de-embedder or a mixed embedder/de-embedder.

WHAT DO I NEED?

Buy the basic 100mm x 266mm motherboard and then select any two piggybacks providing external inputs or outputs from a choice of six to suit your application.

DIP2	Digital audio input piggyback	For embedding AES/EBU
DIP2-RS	Digital audio input piggyback with resampler	For embedding asynchronous AES/EBU
DOP2-110	110ohm balanced digital audio output piggyback	For de-embedding 110ohm AES/EBU
DOP2-75	75ohm unbalanced digital audio output piggyback	For de-embedding 75ohm AES/EBU
AIP2	Analogue audio input piggyback	For embedding analogue audio
AOP2	Analogue audio output piggyback	For de-embedding analogue audio

Combine two DIP2 piggybacks for a dual embedder, or an AIP2 with an AOP2 for a mixed embedder/de-embedder. If you're embedding or de-embedding analogue audio, you must also fit a DCDCV18 PSU. TANDEM-110's kit format means that you can build the exact product you require, wherever you are - just remove one piggyback and fit another.



CHANNEL SHUFFLING

An on board audio router allows you to swap the audio tracks with complete flexibility.

AUDIO PROCESSING

With TANDEM-110 you can change the level of the audio being embedded into or de-embedded from the SDI. Channels can be adjusted independently across a range of -42dB to +18dB meaning you can easily select the desired volume on each one, or even mute them to silence. The board can additionally perform stereo to mono conversion - useful for those transmitting multiple languages, with a mono audio track allowing room for four.

AUDIO DELAY

Each half of TANDEM-110 has a built-in adjustable audio delay of up to 681 milliseconds which will compensate for any video processing, such as a video feed going through an ARC, a DVE or being converted to and from MPEG.

AUDIO MONITORING

A stereo analogue audio monitoring output - available on the frame rear modules or on the headphone socket at the front of the board - can be used to preview any of the sources. It is possible to connect the monitor signals of several TANDEM-110s to allow complete frame monitoring.

QUALITY CONTROL

TANDEM-110 guarantees a high quality output every time with sophisticated audio error masking and contiguous packing of audio data to ensure correct transport of multiple audio groups. A variety of

sophisticated techniques are employed to protect and minimise the effects of cuts to untimed and asynchronous SDI, SDI corruption and TRS loss in the SDI signal.

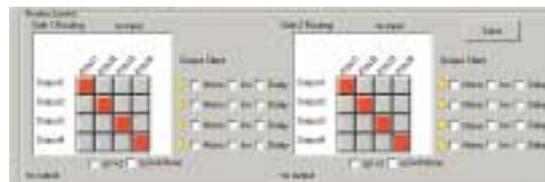
It also has a Toolbox Analyser which can be used to investigate the state of audio and other data embedded within a video signal. This powerful troubleshooting tool allows engineers who are not getting expected results to diagnose the system fault responsible.

When de-embedding digital audio, the TANDEM-110 can continue to produce a valid AES stream (with digital silence) if the selected audio group or SDI stream disappears. Under these circumstances the AES output can be locked to the digital output piggyback's AES reference input. Maintaining a valid AES output is important as it ensures that other AES equipment in the system can remain locked and does not cause audio disruption.

TANDEM-110 is also fully compatible with Dolby E.

CONTROL

Controlling TANDEM-110 is easy. Auto configuration gets you started by detecting which piggybacks are fitted and selecting the basic function (embed/de-embed) and the most common setup for the groups and delays and so on. You can then make any further adjustments from either board edge, the frame active front panel, a remote control panel or the Statesman PC Control System, with settings saved on power down.

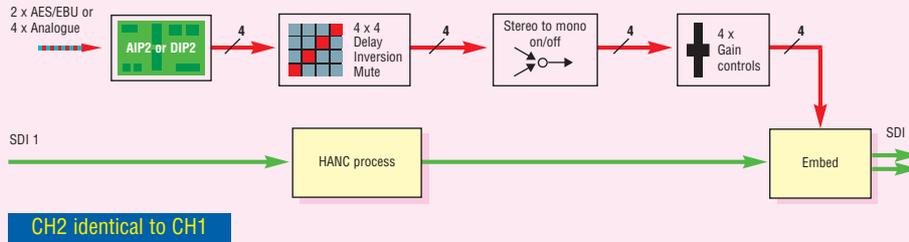


TANDEM-110

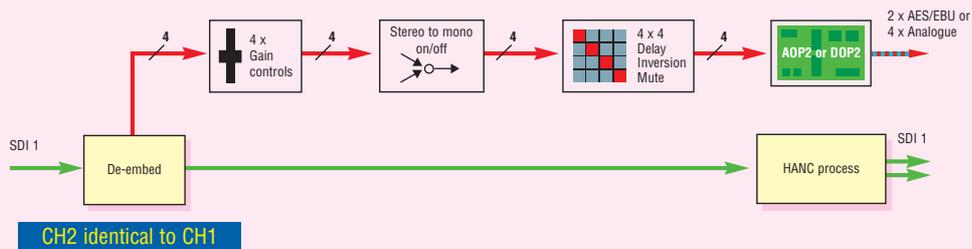
Ideal uses: Most embedding/de-embedding applications.

Configure TANDEM-110 to be a single embedder, single de-embedder, dual embedder, dual de-embedder or mixed embedder/de-embedder by fitting the appropriate piggybacks - AIP2, DIP2 or DIP2-RS for embedding and AOP2, DOP2-110 or DOP2-75 for de-embedding.

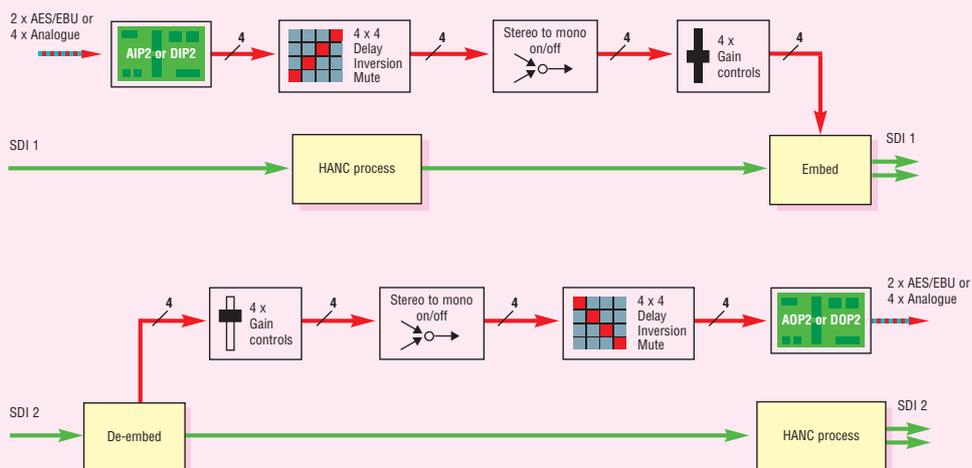
DUAL EMBEDDER



DUAL DE-EMBEDDER



MIXED EMBEDDER/DE-EMBEDDER



**WHERE
NOW?**



- If you need a basic embedder or de-embedder with audio processing you've probably already found the perfect product for your application here.
- If you need more sophisticated audio routing, look at TANDEM-200 on page 4 or TANDEM-300 on page 6.
- Compare TANDEM features by looking at the comparison chart on page 7.
- See page 7 for Specification and page 8 for Ordering Information.

TANDEM-200

GETTING DOWN TO BASICS

TANDEM-200 has all the TANDEM-110 features (with the exception of adjustable gain and stereo to mono conversion), and additionally offers more flexible routing, providing a de-embedder on the SDI input of all embedders to allow partial overwriting of audio groups and channel shuffling.

INTRODUCING THE MODES

TANDEM-200 has four operation modes which allow you to easily perform the exact task you require. The board can use the duplicate signal paths either independently (Mode 1) or together (Modes 2, 3 and 4).

Mode 1 works like the TANDEM-110 but additionally provides simultaneous embedding and de-embedding in each half of TANDEM-200 to allow audio replace.

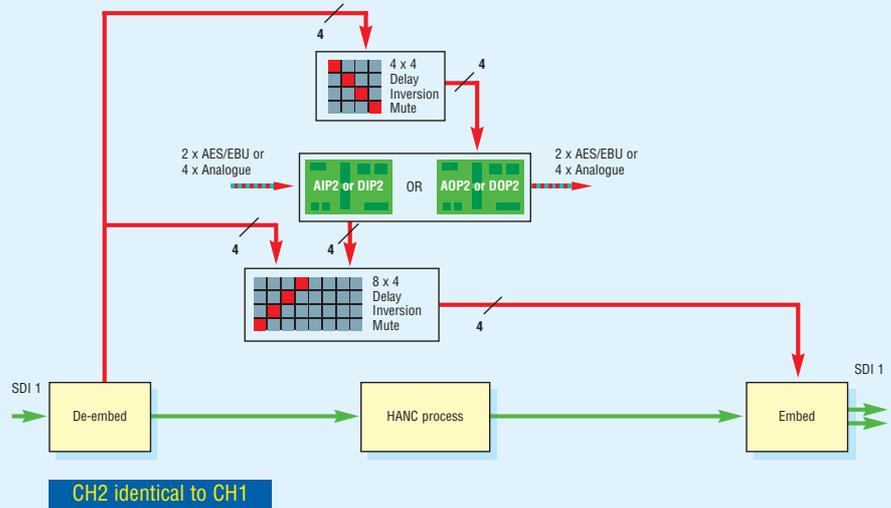
The other three Modes allow you to link the two SDI channels within TANDEM. Mode 2 lets you embed or de-embed two groups. Mode 3 gives an audio bridge with delay between the two SDI inputs, with the ability to de-embed and transfer two groups, shuffled in any way, to two more groups on the second SDI feed. Mode 4 splits the two piggybacks in half so that each side has two external audio inputs and two external audio outputs.

OPERATION MODES

MODE 1 - INDEPENDENT MODE

Ideal uses: Embedding/de-embedding applications requiring channel shuffling or replace, or when you want to de-embed and also change the embedded content.

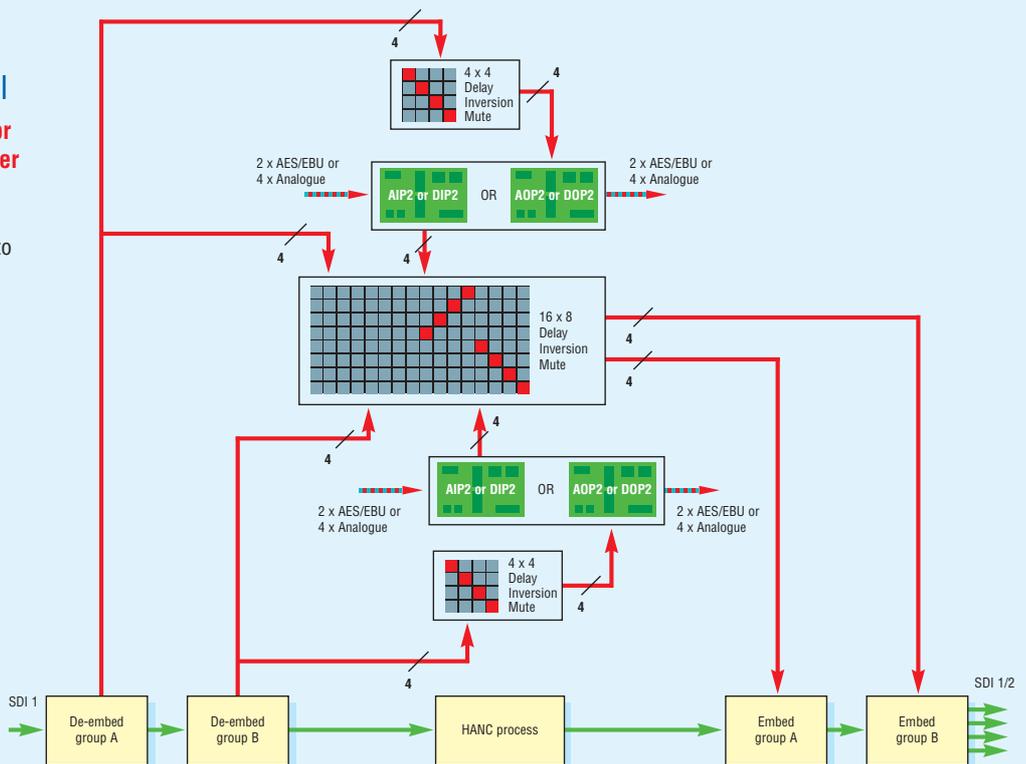
Configure TANDEM-200 to be a single embedder, single de-embedder, dual embedder, dual de-embedder or mixed embedder/de-embedder with additional processing. Both embedder and de-embedder functions are always available on the motherboard irrespective of whether an audio input, audio output or even no piggyback is fitted. This allows audio to be re-embedded on a de-embedder, with shuffling if required, while an embedder can overwrite individual channels of audio present on the SDI input i.e. we have both shuffle and replace.



MODE 2 - TWO AUDIO GROUPS FOR A SINGLE SDI

Ideal uses: Multi-track distribution or dual group embedder or de-embedder when used with two group VTRs.

Combine the two halves of TANDEM-200 to get two group embed and de-embed with shuffle and replace. Any combination of piggybacks allow flexible configuration of eight external mono audio channels.



AUDIO MONITORING

In addition to the audio monitoring of TANDEM-110, TANDEM-200 has an extra four AES outputs that can be used instead of the analogue monitoring.

CONTROL

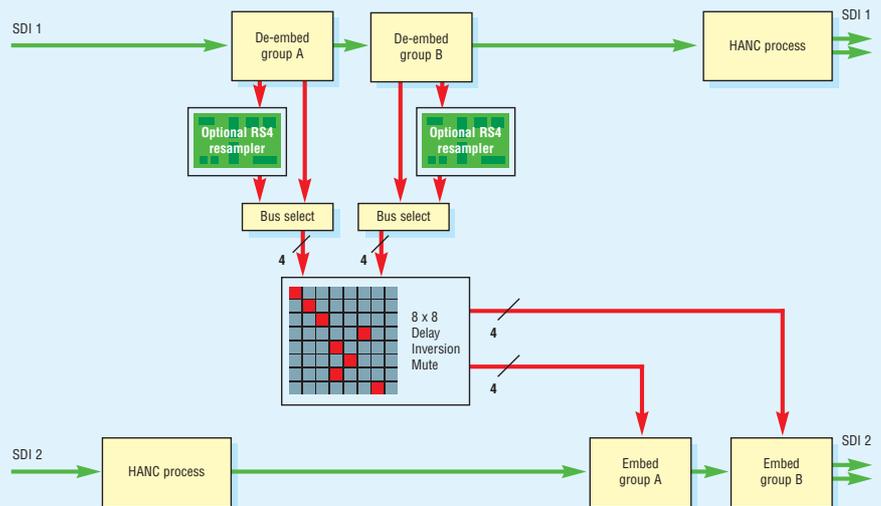
TANDEM-200 offers the same full range of control options as TANDEM-110, with the Statesman PC Control System ideal as it allows very simple selection of options with a click of the mouse.

OPERATION MODES

MODE 3 - AUDIO BRIDGE

Ideal uses: Bypass DVE or ARC that does not process embedded audio or transfer audio from one video source to another.

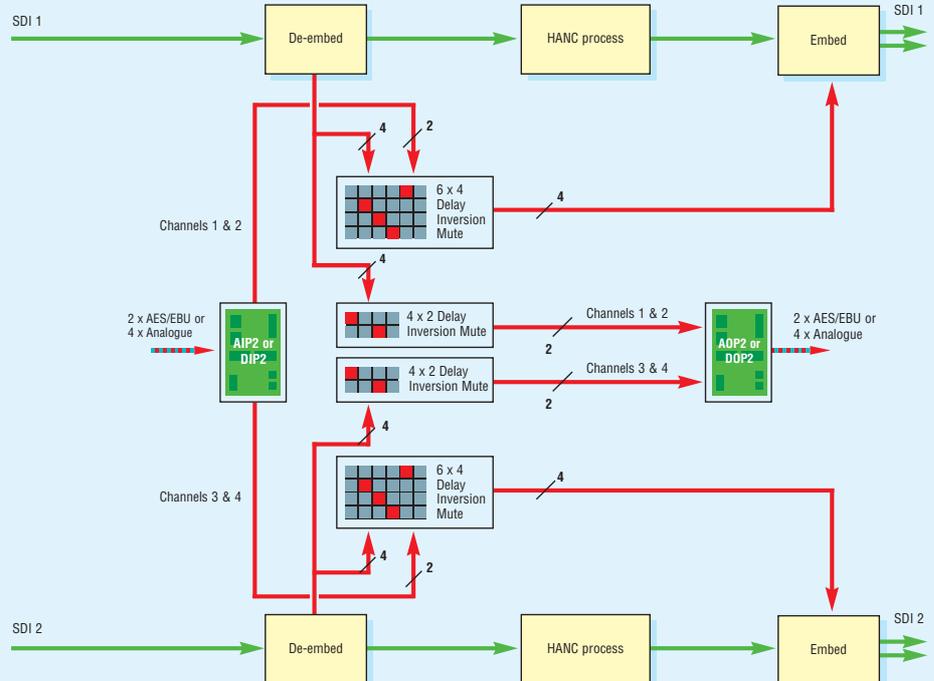
Allows embedded audio to be transferred from one video stream to another with an optional delay of 681 milliseconds. De-embed two groups, shuffled in any way, to two more groups on the second SDI feed. For fully synchronous applications no piggyback modules are required. For asynchronous inputs, such as standards converters and frame synchronisers, one or two RS4 resampler can be fitted. Replaces three boards (de-embedder, delay, embedder) in any other system.



MODE 4 - AUDIO BREAK-OUT AND EMBED

Ideal uses: Monitor background audio of a sports event on two channels (de-embed) and add commentary on other two channels (embed). Uses only half of TANDEM-200 and therefore can be done twice.

Allows embedded audio to be replaced from external source. By using only half of one audio input piggyback each, and half an audio output piggyback each, the two SDI channels can have both the de-embedder and embedder. This replaces four cards (two de-embedders and two embedders) in most systems.



WHERE NOW?



- If TANDEM-200 does far more than you need, have a look at TANDEM-110 on page 2.
- If you need to process your embedded audio, look at TANDEM-110 on page 2 or TANDEM-300 on page 6.
- If you want to take audio from two SDI streams at the same time, turn over to TANDEM-300 on page 6.
- Compare TANDEM features by looking at the comparison chart on page 7.
- See page 7 for Specification and page 8 for Ordering Information.

GETTING DOWN TO BASICS

TANDEM-300 is the product to choose if you need multi-channel inputs with sophisticated audio processing. This single embedder/de-embedder and audio processor allows the final audio to be selected from a wide variety of sources and is the only TANDEM able to take audio from two SDI streams at the same time, making it a very powerful and flexible tool.

WHAT DO I NEED?

The TANDEM-300 motherboard can be fitted with any two of the standard piggyback modules, as detailed in the TANDEM-110 section.

When one or both input piggybacks are not required, output piggybacks can be put in their place to send out de-embedded audio. In some applications, however, the monitoring audio output provided on the motherboard may be usable instead of an output piggyback.

AUDIO SOURCES

TANDEM-300 provides an impressive number of audio sources, giving you a maximum of 16 audio channels from which to select the final four. Audio can be taken from two embedded groups - either two groups from the main SDI or one group from each of the two SDI channels - and from any two external analogue or digital audio sources accessed by using the AIP2, DIP2 or DIP2-RS piggybacks.

SHUFFLE AND REPLACE

Like the TANDEM-200, any channels can be shuffled and replaced for true routing flexibility, with all the audio sources coming into a 16 input router.

AUDIO PROCESSING

As in the TANDEM-110, the audio processing includes stereo to mono conversion and adjustment of gain levels across a range of -42dB to +18dB. Each channel can also be muted to silence.

AUDIO DELAY

Each stereo pair has a built-in adjustable audio delay of up to 681 milliseconds to compensate for any video processing.

QUALITY CONTROL

Like the other versions, TANDEM-300 guarantees a high quality output with sophisticated audio error masking, contiguous packing of audio data, a Toolbox Analyser and full compatibility with Dolby E.

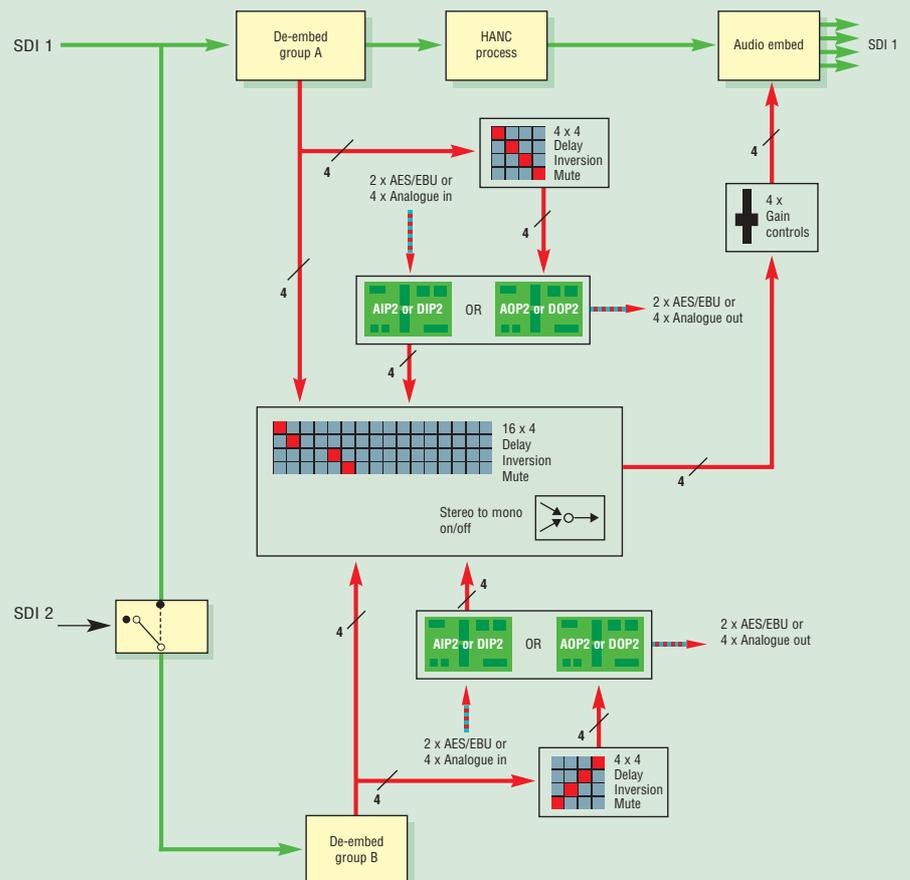
AUDIO MONITORING

A stereo analogue audio monitoring output - available on the frame rear modules or on the headphone socket at the front of the board - can be used to preview any of the sources. It is possible to connect the monitor signals of several TANDEM-300s to allow complete frame monitoring. TANDEM-300 also has four AES outputs that can be used instead of the analogue monitoring.

CONTROL

TANDEM-300 offers you the full range of control options: board edge, the frame active front panel, a remote control panel or the Statesman PC Control System.

Ideal uses: Embedding/de-embedding applications requiring both multi-channel inputs and sophisticated audio processing.



WHERE NOW?



- If you need more of a basic embedder or de-embedder with audio processing, have a look at TANDEM-110 on page 2.
- If you need dual channels with sophisticated audio routing, read about TANDEM-200 on page 4.
- Compare TANDEM features by looking at the comparison chart on page 7.
- See page 7 for Specification and page 8 for Ordering Information.

