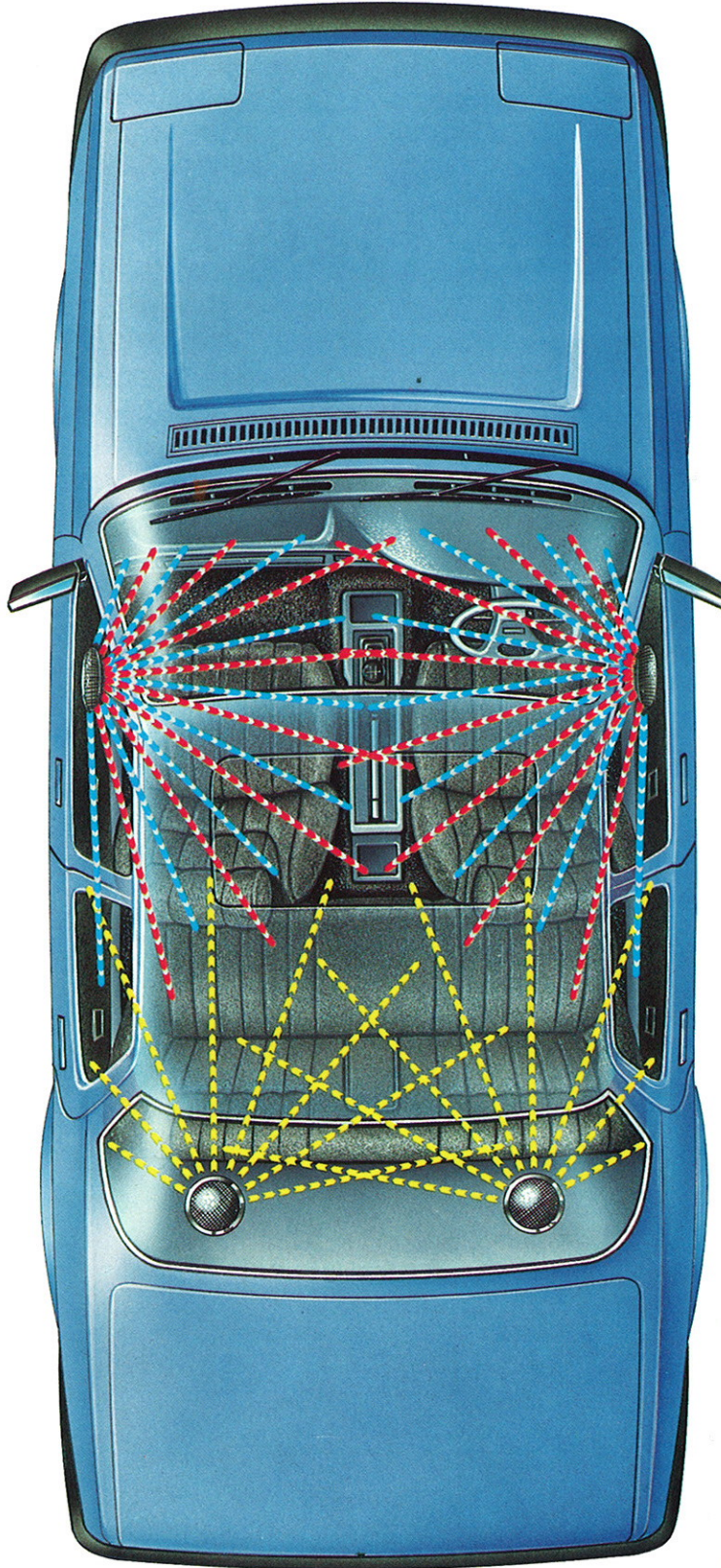

A NEW ERA IN CAR AUDIO

 TROY

AMBISONIC SURROUND SOUND



THE HISTORY

Stereo reproduction has been available in cars since the early 1960's and in its own right can claim almost total responsibility for the growth of the In Car Entertainment Industry with such stereo products as FM radios, cassette units and, more recently, compact disc players. All these products, used singularly or combined, have offered endless sources for enjoyment to the world's automotive environment. For many discriminating listeners though, stereo reproduction from any source has always provided something of a compromise with its inherent narrow and frontal presentation of a recorded piece of music.

Attempts to improve stereo imagery, in the past, have resulted in the use of either complex multi-way speaker systems or the simplistic 'doubling-up' of stereo outputs to duplicate the original sound track through a second pair of speakers. No matter how sophisticated or expensive the playback equipment, the unnatural reproduction when compared to a live concert hall performance leaves much to be desired. 'Poor imagery', albeit an esoteric term, can not elude a discerning ear and would usually leave one dissatisfied. This syndrome can become even more apparent in an unenviable acoustical environment such as the motor car.

THE FUTURE

A NEW DIMENSION TO STEREO – A NEW ERA IN CAR AUDIO. If you thought that the only future left for car audio equipment was to add even more functions and flashing lights – then think again!

AMBISONICS is the latest technology being offered to the world of car audio and hi-fi. TROY AMBISONIC delivers to the world's Automotive Industry its first Ambisonic UHJ Surround Sound Processor creating the most innovative and ambient

sound structure in the History of Car Audio.

The TROY AMBISONIC UHJ SURROUND SOUND PROCESSOR TA-110P is a purpose built unit that forms the basis for an Ambisonic surround sound system in the car. The unit is capable of simulating a reconstruction of the actual sound fields produced during a live musical performance. The system is *not* quadrophonic but in operation does require the use of four speakers.

THE THEORY

Ambisonic UHJ surround sound technology is simple to understand once you realise the structure of sound fields experienced in a concert hall or auditorium. (dig. 1)

Sound waves travel in straight lines and from a stage or performing platform would be emitted as 'direct sound', but as with any normal acoustical environment a certain amount of that sound is eventually reflected giving a 'primary reflection'. Furthermore, the sound wave could continue to bounce off walls, ceilings and other surfaces to give a 'secondary reflection' and so-on until the sound pressure finally dissipates.

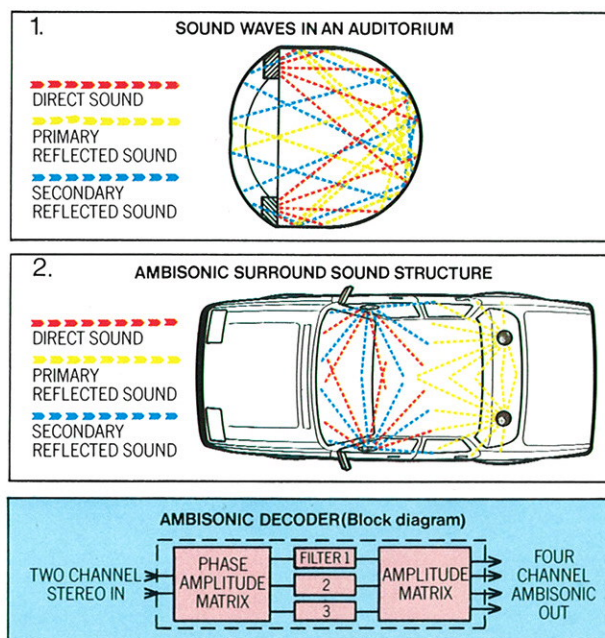
For the Troy Ambisonic UHJ surround sound processor to define these directional sound waves is simply a mathematical function – once completed however, the TA-110P processor can

selectively reproduce those elements and filter them into a desired format. In the car the TA-110P will reconstruct the decoded directional sound

waves into their respective amplifiers and speakers to audibly simulate the music's original imagery and sound fields.

In dig. 2 the vehicle's front speakers emit 'direct sound' as well as 'secondary reflected sound'. The rear speakers, however, are mainly responsible for 'primary reflected sound'. These examples bear a direct relationship to the lines of sound shown in dig.1 and use the same respective colour coding. Extending the projected sequence of

sound emissions would indicate each speaker delivering more and more reflected images – this, however, would only serve to complicate the diagram and make it less explanatory.



THE EXPERIENCE

Ambisonics represents a technology that defines directional sound waves and conveys them around its listener – making 'the listener' the most important factor for this exercise. To the uninitiated the Ambisonic surround sound experience is one not likely to be forgotten. The Troy Ambisonic processor can provide the optimum in-car sound balance for all persons in the vehicle, irrespective of their seating positions. Gone are the days when rear seated passengers have to suffer the indignities of an audio system set solely for the driver's ears and appreciation.

The TA-110P is *not* a graphic equaliser and

does *not* require constant resetting to compensate for a vehicle's changeable internal environment. Neither is it an echo or reverberation unit providing simplistic enhancement.

The Ambisonic UHJ surround sound's effect could be considered '3 dimensional' with a unique introduction of 'height' into the audio picture. The overall effect creates a high degree of ambience which totally surrounds the listener.

Substantiating the Ambisonic Experience means it has to be heard to be believed – for the moment though, here are some of the world's press experiences and comments

“Ambisonics provides all that is needed to put a new dimension into stereo listening”
CAR MAGAZINE.

“... it really seemed to be presented at ear level rather than filtering up through one's boots”
CAR MAGAZINE.

“... it should provide a new dimension to in-car audio bringing about a significant improvement in sound for low cost”
CUSTOM CAR MAGAZINE.

“No one has yet been able to provide every passenger in a car with a decent stereo image but several attempts have been made. One of the most successful auditions of late has been the Ambisonic decoder by TROY” WHICH COMPACT DISC.

“... you are left with a feeling that you are indeed enjoying a far, far richer musical experience” MOTOR MAGAZINE.

“It is only a matter of time before Ambisonics will be heard regularly on record, on the air and perhaps with video”
RECORD PRODUCER MAGAZINE (USA).

“This type of recording (UHJ) will ultimately become very popular” AUDIO (USA).

“It's got to be a contender for a way of listening in the future” STEVE HACKETT.

“All our material will be UHJ encoded”
NIMBUS RECORDS.

THE REALITY



ACTUAL SIZE

The Troy Ambisonic TA-110P is an all British development utilising some of the world's most sophisticated micro-electronics. Innovative circuit designs using high tolerance components ensures optimum performance from a unit that maintains

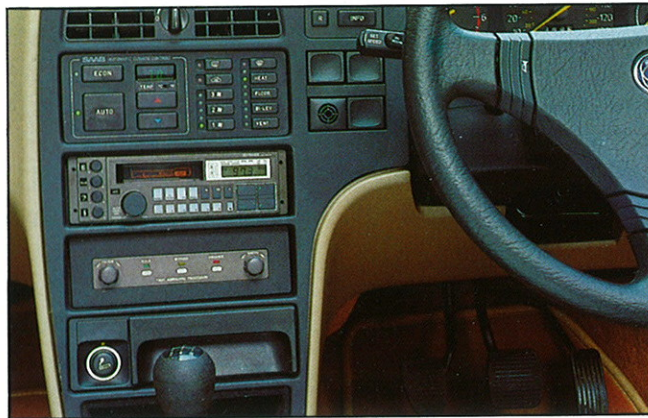
a unity gain factor of 0dB. The TA-110P is *not* a primitive booster unit!

Ergonomically, the TA-110P's thoughtful design and soft touch controls make it simple to operate with clear and decisive features. The unit

is encased within a robust chassis and is designed to cope with all the extremes of a vehicular environment such as vibration, humidity and severe temperature change.

The TA-110P is manufactured to half DIN size for ease of installation and its discrete, yet attractive, styling is sure to compliment any dashboard.

No Compromise Flexibility: It's not unusual for new products to have the compromising effect of only being compatible with its own system and not integrating with older or previously purchased equipment. The Troy Ambisonic surround sound innovation, however, is available to everyone. This uniquely flexible unit is designed to enhance and operate with most brands of car audio products and their associated systems.



The Amplifier: The Troy Ambisonic TA-100W amplifier is a four channel power amplifier built to exacting standards for use with the TA-110P Ambisonic processor.

Using high tolerance integrated circuitry, the amplifier's compact and light-weight design offers convenient installation suitable for trunk, under seat or dashboard mounting.

As a functioning unit in its own right, the TA-100W has the

capacity to transform any regular car stereo output into four channels with a total of 100 Watts of usable music power.

The Troy Ambisonic TA-15F is a four way fader control for use when the amplifier acts solely as a booster.



MODES OF OPERATION

ENHANCE

This primary position takes any regular stereo input and moves it into Ambisonic surround sound enhancement. When the processor is initially switched on it will automatically select this mode.

UHJ

Select this mode when listening to known UHJ encoded material including FM broadcasts, cassettes and compact discs. (see end of brochure for more UHJ details).

BYPASS

This mode negates any effects of the processor on the original audio system offering regular stereo listening. It is particularly useful for detenuating the adverse effects of poor FM

reception as well as a means of system demonstration.

FADER

The fader controls the front to rear speaker balance and should be initially adjusted when in the BYPASS mode.

WIDTH

This control is the one variable setting enabling a personal preference when in the ENHANCE mode. Turning the control clockwise simulates the effect of moving the listener towards the stage in an auditorium. Counter clockwise rotation effects a move towards the rear of the auditorium where the stereo image is narrower and left and right channels seem less defined. Set the control to your preferred listening position.

THE SYSTEM

Due to the extensive range of car audio equipment available in the world today, it would be impossible to assume that there is a common format used for all car audio systems. A major task set for Troy Ambisonic and the TA-110P processor has been to ensure such compatibility levels that the Ambisonic processor could be deemed universal.

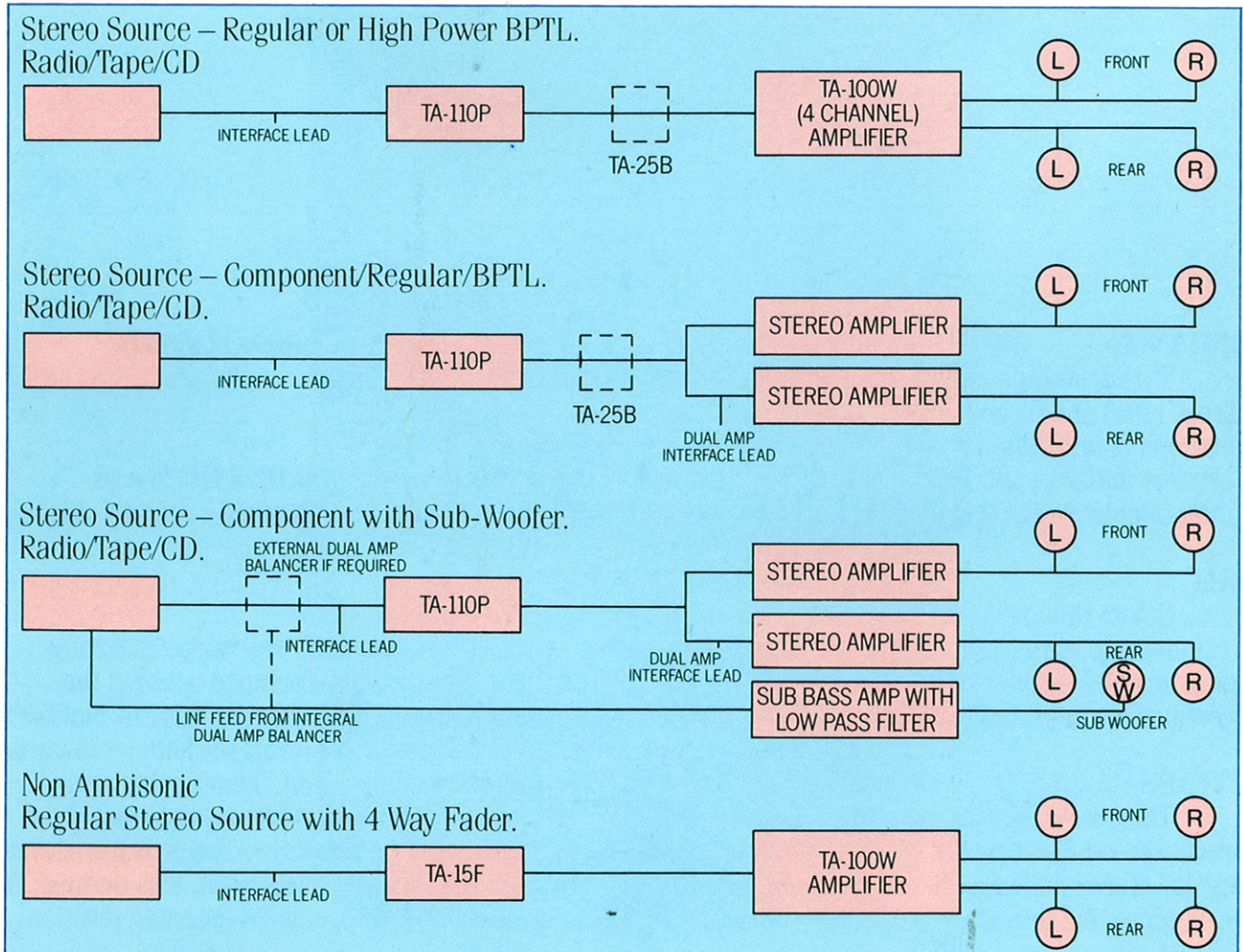
Troy Ambisonic has taken every opportunity to work with the world's top car audio product lines to make it possible for Troy's units to 'interface' both electronically and mechanically with other manufacturers' equipment. The latter element proving the most difficult where units having different types of phono and din leads are impossible to interconnect. To overcome this problem Troy Ambisonic has developed a range of 'interface leads' that are designed to interconnect most popular makes of car audio equipment. Some of the interface leads are universal and can be used with most regular car stereo units. The following list, however, offers some manufacturers' names who specialise in component and line level equipment for which particular interface

leads have been made available.

— SANSUI — PIONEER — CLARION — PANASONIC — TRIO/KENWOOD — FISHER — PHILIPS — BLAUPUNKT — NAKAMICHI — ALPINE — HARMAN/KARDON

Fundamentally, Ambisonic UHJ surround sound systems require the use of FOUR SPEAKERS and a FOUR CHANNEL AMPLIFIER such as the Troy TA-100W. This amplifier, however, could be substituted with a similar four channel amplifier or two regular stereo power amplifiers of your brand choice. A further option from Troy, to comply with certain systems' requirements, is the TA-25B bass enhance unit. This should be used in vehicles where the rear speakers are designed, by virtue of their size or installation, to reproduce a greater bass or low frequency response.

The following diagrams indicate the positioning of the TA-110P when used in conjunction with various audio systems. The last diagram also shows how the TA-100W amplifier can be connected, in its own right, to upgrade a regular car audio system.



THE FUTURE OF AMBISONIC UHJ

As the world's first manufacturer of an in-car Ambisonic UHJ surround sound processor, TROY AMBISONIC is proud of their association and commitment to the future development of Ambisonics.

The abbreviation 'UHJ' represents a simple code that is a recognised format for Ambisonic recording already used by a number of broadcasters, including the BBC, for transmitting music and drama programmes. UHJ encoding is also becoming increasingly used by record companies and artistes who are quite literally singing its praises. There now exists over 150 commercial titles of

Ambisonic UHJ encoded software, ranging from the 'Alan Parsons Project' to 'Brahms', and the list is quickly growing. A major contributory factor of Ambisonic's success concerns its absolute compatibility with all stereo material. The need to use UHJ encoded software is not essential and means that conventional stereo soundtracks can continue to be played, enhanced and enjoyed through the Troy Ambisonic equipment.

Ambisonics is based on sound, and a 'sound base' is precisely what a company like TROY AMBISONIC intends to give this new technology. So, the future looks good—and sounds even better.

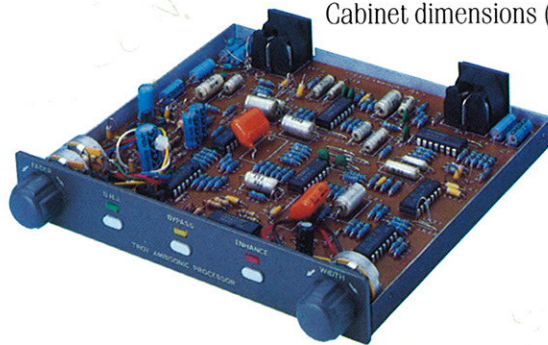
TYPICAL SPECIFICATION

TROY AMBISONIC PROCESSOR TA-110P

Distortion (THD):	0.1%
Signal to Noise Ratio:	65dB
Current consumption:	100mA
Maximum output level:	500mV @1KHz
Input impedance:	17K ohms
Output impedance:	1.5K ohms
Gain:	0dB (unity)
Cabinet dimensions (H x W x D):	25 x 150 x 141 mm

TROY AMPLIFIER TA-100W

Output Power:	4 x 20 Watts RMS continuous 4 x 25 Watts music power
Distortion THD: (All amplifiers driven)	Less than 0.25% up to 12.5 Watts RMS Typical 0.15%
Signal to Noise Ratio:	75dB
Frequency response:	20Hz to 30,000Hz (-3dB)
Load impedance:	4 ohms (2' to 8 allowable)
Maximum current consumption:	8 amps
Input level:	500mV @ 20K ohms
Cabinet dimensions (H x W x D):	50 x 205 x 140 mm



TROY

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Due to Troy Ambisonic's continuous technological developments, specifications may be changed without notice.