CPLD

The CPLD provides an intelligent bi-directional sample rate converter. DSP 1 runs on a high quality 48K clock however the telephone interface runs at 8K. Using this separate device for sample rate conversion helps with the overall digital work flow and prevents either of the DSPs adding unwanted delay by sample rate converting themselves.

DAA

The DAA is an incredibly sophisticated device which has been optimized for demanding voice applications. It safely connects the hybrid to the telephone line and conforms to telephone standards around the world. It has an extremely advanced network of 'Rs' and 'Cs' that allow excellent line impedance matching. Without this correct line matching impedance, the world class results would not be achievable.

DAA

In/ Out

Audio

Analogue & Digital DSP₁

CPLD

DSP 2

Telephone line

DSP no 1 This provides extensive digital Control of the I/O audio.

1) For clear audio on the outgoing telephone circuit it is important not to overload the telephone line. An advanced digital compressor/ limiter circuit makes sure this happens. 2) To keep a constant incoming audio level from the telephone line, an auto gain circuit is provided. This makes sure that consistent audio levels are presented from the telephone line to the studio. (Along with most other functions this

can be turned off if not required). 3) An audio ducking option is provided to allow the presenters voice from the studio to be louder than that of the incoming callers.

4) To keep the overall performance of the hybrid at a premium and unwanted artefacts out of the audio chains making sure that all audio is crystal clear both incoming and outgoing band pass filters are included.

5) The 2 analogue outgoing audio circuits and the outgoing AES3 circuit are all digitally mixed within this DSP ready to be sent to the telephone line.

6) The incoming audio from the telephone line is digitally duplicated to provide the 3 outputs.

DSP no 2

This provides 2 exceptionally important functions.

1) It utilizes probably the worlds most advanced network line echo cancellation algorithm. This is the part that makes the Copper 29 perform so well. Using constantly varying parameters this algorithm successfully removes all the unwanted audio that 'echoes' back from the telephone network. This algorithm is responsible for the amazing separation figures of this hybrid.

2) A second echo cancellation algorithm is included to remove the incoming audio from the telephone line, from the outgoing (to the telephone line) signal. This algorithm means that this hybrid, unlike most, can be used on mixing desks that don't provide a clean feed output (sometimes referred to as 'mix minus')