



AES47.....NETWORK AUDIO THAT WORKS

GlenSound Electronics Ltd has designed & manufactures a range of AES47 equipment for interfacing analogue or digital audio circuits to an ATM network.

IN BRIEF

Asynchronous Transfer Mode (**ATM**) is the back bone of Worlds Data networks.

AES47 is the Audio Engineering Society standard for distribution of audio over an ATM network.

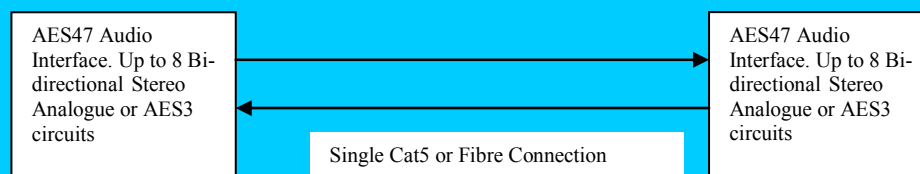
IEC 62365 is the International Electro technical Commission standard that replicates AES47.

For many Years broadcasters have wanted to be able to reliably distribute audio in an expandable network environment, Internet Protocol (IP) due to it's low hardware cost and common standard should be the ideal audio network solution, however it's collision based packet architecture makes it unable to offer the reliability of service that is required for real time audio applications.

Like IP, ATM is a packet based network, where it differs from IP (and what makes it perfect for audio distribution) is that ATM offers a guaranteed bandwidth across the network. This means that when an audio packet is sent into the network you can be certain that it will emerge at it's destination with little delay and in the correct order in relation to other packets.

POINT TO POINT AUDIO DISTRIBUTION

In the simplest situation 2 pieces of our AES47 equipment can be directly connected together by a single cat5 cable (or fibre) without an ATM switch. This offers the ability to transmit and receive up to 8 off AES3 signals at a maximum of 192k sampling (24 bit).

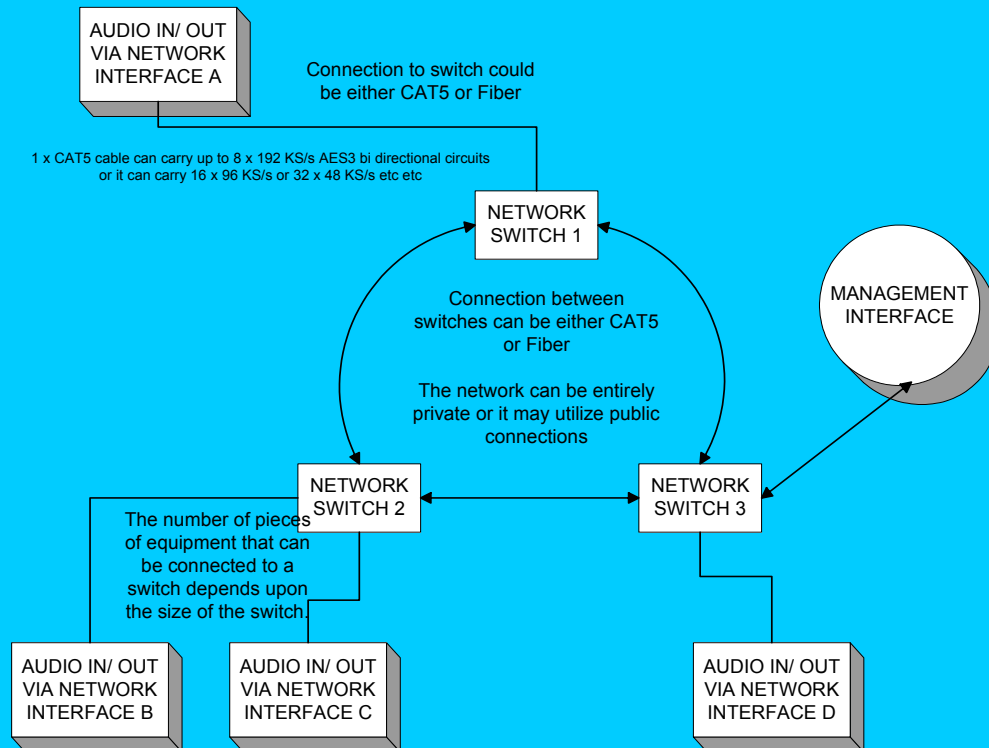


This is an ideal solution when 2 studios/ locations require a very high quality direct link of multiple audio sources by a single cable.

If the studios/ locations to be joined together are some distance apart, then our AES47 audio interfaces can be connected to an ATM circuit provided by a telecoms company and then 2 studios can be joined together that are in different cities or even in different countries.

MORE COMPLEX AUDIO DISTRIBUTION

AES47 can of course be distributed over a large ATM network. AES47 allows for point to point, point to multipoint **AND** multipoint to point working. There is no limit to the theoretical maximum size of an AES47 network.



AES47 allows for a mixture of AES3 sample rates across the network.

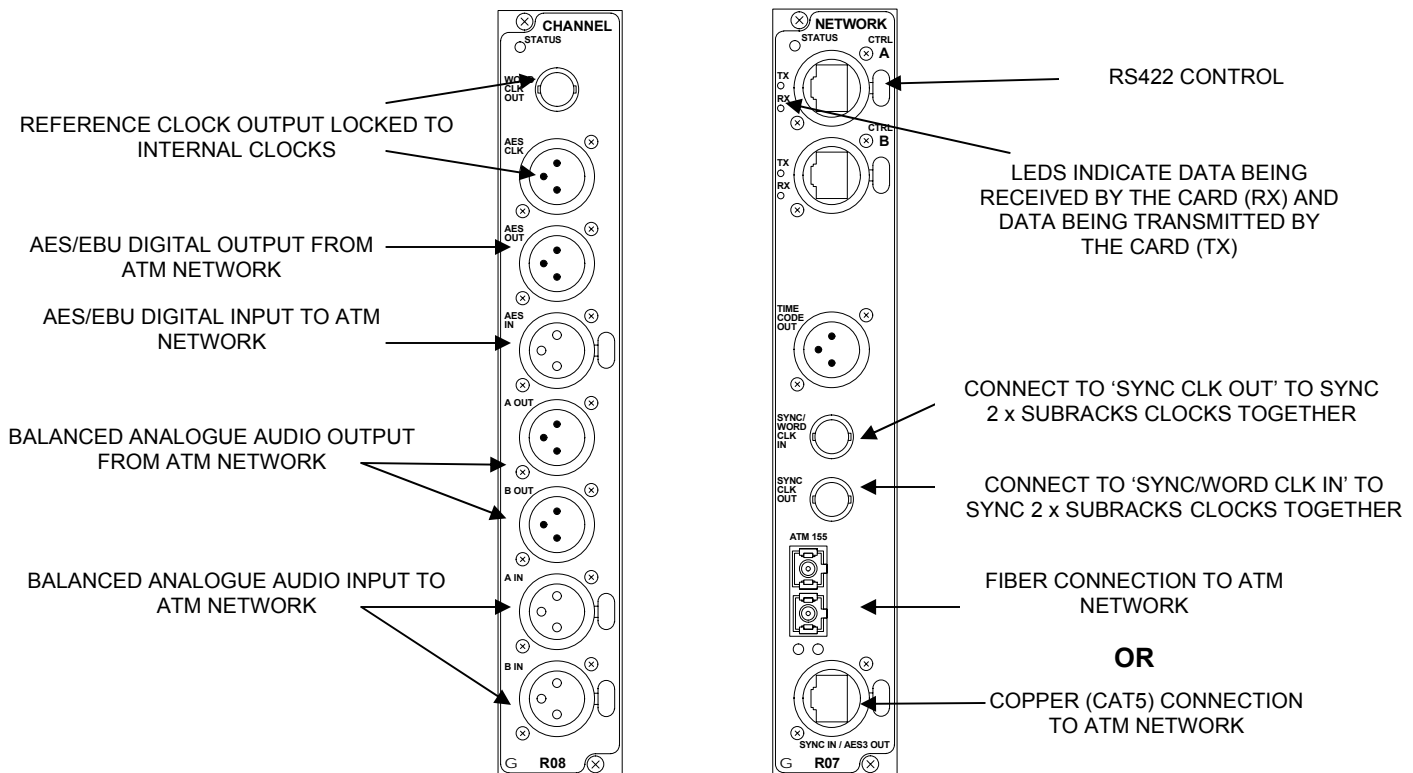
OTHER ADVANTAGES OF AN ATM NETWORK

The advantages of networks in general are their expandability. Because of its guaranteed bandwidth this is particularly true of an ATM network. When an ATM network reaches capacity it does not slow down and allows more users to join, it continues with the guaranteed level of service for the existing users and only allows new users to join when a space becomes available. If the network needs expanding then more network switches or larger circuits between switches can easily be added.

ATM is also a fast distribution medium for data, with network latency of a few milliseconds 2 different sites really can be joined together in real time.

GLENSOUND AES47 HARDWARE

We have designed and manufacture a common set of ATM printed circuit boards (pcbs) that are available in a number of different packages. There are 2 main pcbs the network card and the channel card. The network card interfaces with the ATM network (or directly connects to another network card) and provides connectivity for up to 8 channel cards. The channel cards connect to your existing audio equipment either AES3 or stereo analogue.



HARDWARE Cont...

As well as the network and channel cards the equipment requires a power supply. There are 2 basic different power supplies 1 running from 100 to 250 Volts AC and 1 running from 50 Volts DC. Equipment can be fitted with any combination of the 2 power supplies. The equipment will run from just a single power supply fitting the 2nd is for redundancy. The power inlet panel also gives relay loop outputs to indicate alarm conditions, the type of faults indicated by the alarm can be user programmed by software.

The AES47 equipment is available in 1, 3 and 5RU 19 Inch subracks.

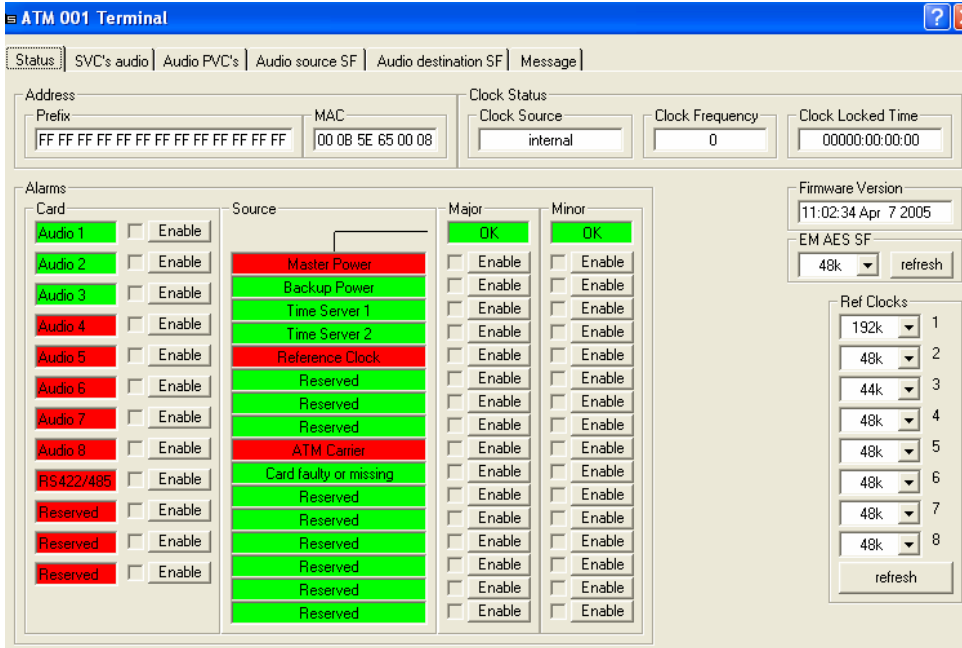
The 1RU subrack houses just 1 network card and 1 channel card.

The 3RU subrack houses 1 network and up to 4 channel cards.

The 5RU subrack houses 1 network and up to 8 channel cards.

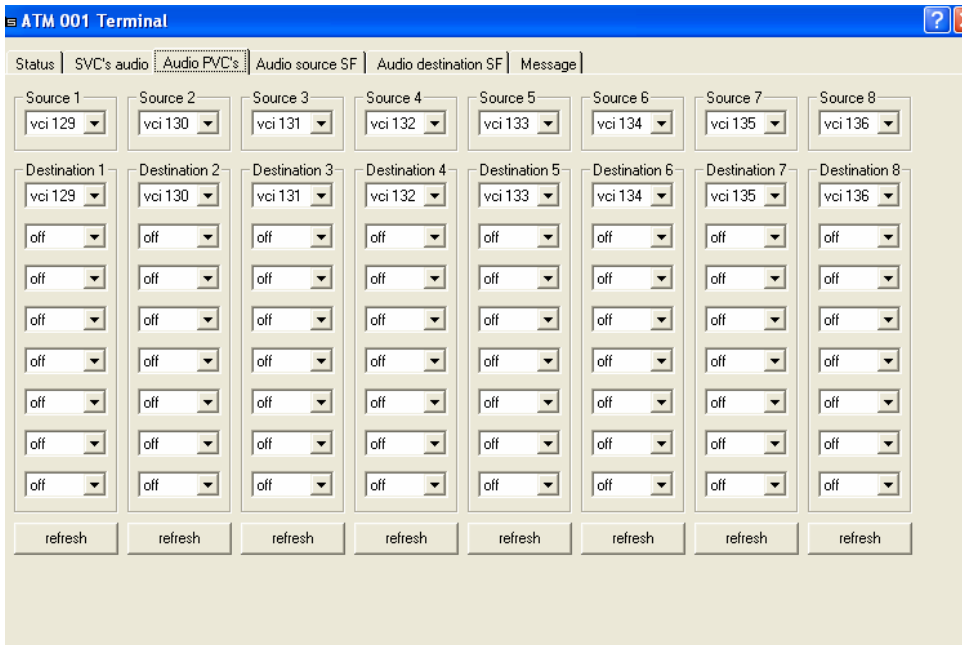
SOFTWARE

A comprehensive setup program is supplied with each AES47 subrack. This windows based software allows a user to set up and configure the ATM connection, the Audio connections and to control alarm conditions. The hardware does not require a permanent connection to a PC and once the initial parameters have been set no PC connection is required.



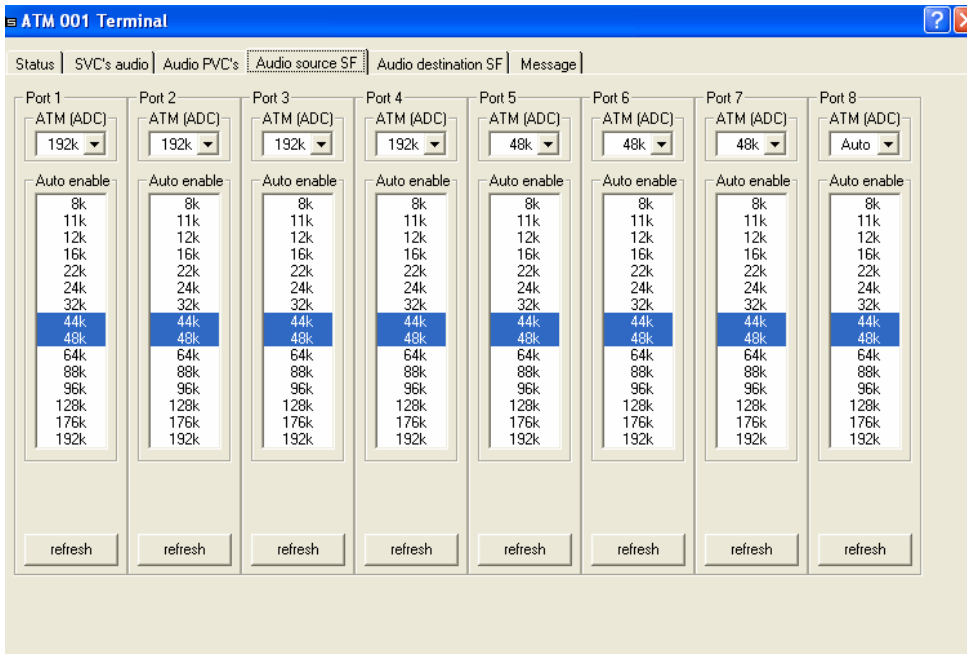
STATUS

This shows some basic information about the AES47 subrack, including the MAC address (a unique identifier for all pieces of ATM equipment) and allows the user to set the operation of the alarm relays.



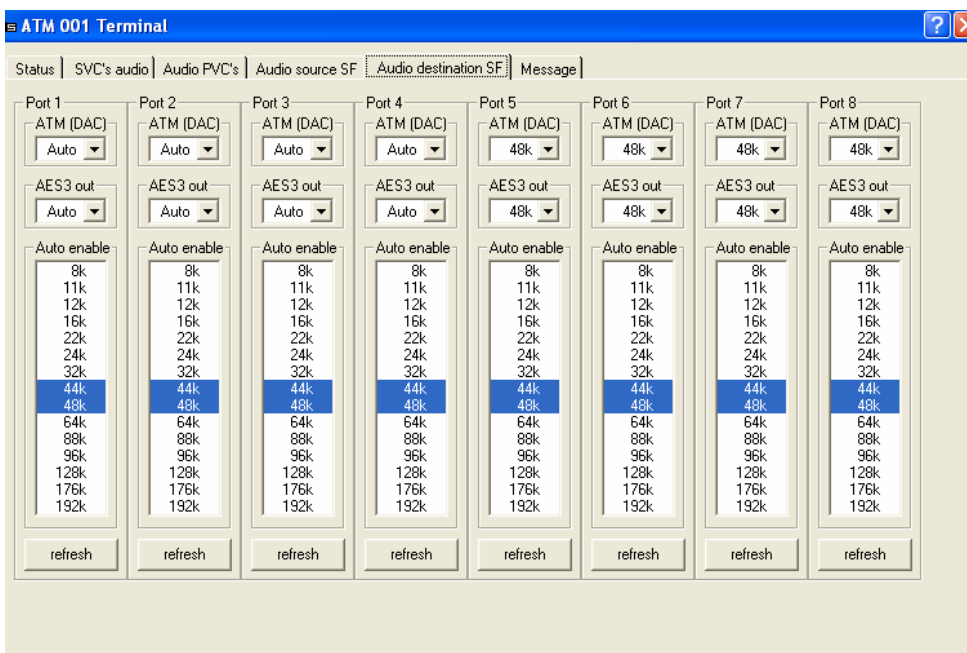
AUDIO PVC's

Currently we only support Permanent Virtual Circuits (PVC's). A PVC is one method of setting up a route across an ATM network. Each channel card can receive audio on one vci and transmit audio on up to 8 vci's. If a number of channels are all transmitting on the same vci, then the channel receiving that vci will mix the signals together.



Audio Source SF
 Comprehensive sample rate settings & converters are available. For the analogue inputs ADC conversion can be set at any rate from 8 to 192 kHz. For the AES3 inputs the sample rate being sent to the AES47 network can be fixed, in which case if the incoming AES3 sample rate does not match then sample rate converters will automatically switch in.

Alternatively an AUTO mode is available where a range of acceptable sample rates can be set, if the AES3 input sample frequency matches one of the set rates then the AES3 signal will be transparently sent across the network, if the sample frequency does not match then sample rate converters will be switches in. This is a particularly useful facility if bandwidth across the ATM network needs to be managed carefully.



AUDIO DESTINATION SF
 Sample rate conversion can also be set for audio being received from the AES47 network. DAC can be set for the analogue outputs (an AUTO mode is available to prevent incompatible rates being set). Sample rate converters can also be set for the incoming AES3 signals, these can be permanently fixed or

like the Source SF an AUTO mode is available. The software is intelligent and will prevent unusable settings being programmed by the operator.

SOLUTIONS FOR ASYNCHRONEOUS NETWORKS

As with any digital environment with lots of digital audio equipment the coherent locking of equipments clocks is important to prevent jitter. Single sites generally have a master clock, therefore 2 separate sites have 2 master clocks and although these 2 clocks are likely to be working to a high degree of accuracy they will inevitably not be completely in sync with each other. Joining up equipment on these 2 clocks via an ATM network could therefore potentially cause jitter. The technically correct solution is to lock all 'master' clocks at different sites together using satellites or a telecoms clock.

Inevitably sites are not always locked together. To cope with this our AES47 equipment incorporates a clever algorithm that is capable of realising that two clocks are not locked together and then as necessary to prevent audible jitter the equipment will drop or repeat samples during periods of silence in the audio or if not available during periods of consistent similar frequency and level.



VIEW OF 5U HARDWARE PACKAGE

This is fully modular, allowing extra channels to be added in the future if required.



VIEW OF 3U HARDWARE PACKAGE

This is fully modular, allowing extra channels to be added in the future if required.



VIEW OF 1U HARDWARE PACKAGE



VIEWS OF NETWORK AND CHANNEL CARDS