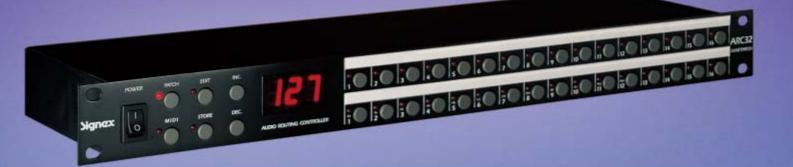# A NEW ERA IN AUDIO ROUTING

SMARTPATCH

from

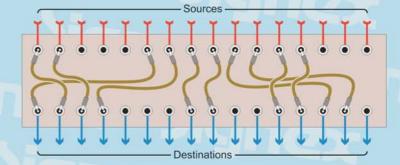**PRO AUDIO PRODUCTS**

Why use a patchbay?

If you have progressed beyond the basic 'cassette machine and microphone' set-up, you are probably all too familiar with the problems caused by the spaghetti of connecting cables which can grow around, across and between instruments and processors: having to reach around the back of mixing desks; precariously balanced processors; tripping over cables - these are just some of the problems that arise as the demands upon the studio become more sophisticated. Introducing a patchbay cuts out many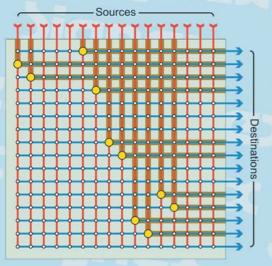 of the interruptions to the creative process and transforms this sprawling mess into a relaxed and organised working environment. A patchbay is simply an area (consisting of one or more patch panels) where all of your inputs and outputs are grouped together so that connections can be made with short 'patch leads' and you can see at a glance what's connected to where. It might sound obvious, but until you have experienced the benefits of using a patchbay, it's difficult to imagine how much time and frustration it saves.

Conventional Patchbay or Smartpatch ?

A conventional patchbay arranges audio signals in two rows of sockets, with outputs (sources) on the top row and inputs (destinations) along the bottom. Connections are then made between the sockets as required using patch leads. We have designed the Smartpatch so that it is like a conventional patchbay to use, with two rows of pushbuttons controlling sources and destinations. Making or breaking connections is simply a matter of pressing the relevant buttons.

On a conventional patchbay, connections are made with patch leads, the only restriction being that a source may be connected to one destination only (unless sockets are normalled or commoned). In order to patch signals electronically with the same degree of freedom, all possible connections must be allowed for and the Smartpatch achieves this by using a matrix of electronic switches, arranging sources and destinations as crossing lines or 'busses' with a switch at each crosspoint. Closing a switch connects a source bus to a destination bus, thereby routing the signal.
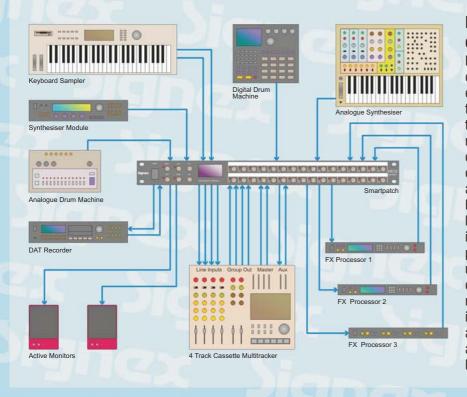
When supplied, the Smartpatch will allow only 'one-to-one' connections, like a conventional patchbay, but can easily be reprogrammed to allow a source to be routed to up to four destinations simultaneously (MDR mode). This feature should be used with caution, however, because the Smartpatch makes direct connections between the equipment connected to it and this could cause problems or even damage if implemented in the wrong situation. Like a conventional patchbay, the Smartpatch will also not allow routing of multiple sources to one destination - this has to be done with a mixer. The Smartpatch also prevents direct connections between sources.

The Smartpatch - more than just a pushbutton patchbay

Although the conventional patchbay is a simple and cost-effective way to manage your signal routing, it does not offer any means of storing and recalling the different patterns of connections used in each situation and is unable to make patch changes 'on the fly'. The Smartpatch makes connections using electronic switches rather than patch leads and so offers instantaneous pushbutton control of your signal routing. But the Smartpatch is much more than just a pushbutton patchbay. By controlling the switch matrix with a microprocessor, the Smartpatch can save patterns of connections in its memory for recall at any time. It can also be controlled remotely using MIDI, enabling real-time patch changes to be made. Whether used as a stand-alone unit or under MIDI control, the Smartpatch unleashes an enormous range of creative possibilities by giving you a degree of control over your audio routing which has so far not been available. One of the features that make the Smartpatch such a powerful and creative tool is its ability to re-route not just one, but a whole group of up to sixteen connections (we call this a 'patch') at once, either at the touch of a button, or with a MIDI command. The Smartpatch can store up to 128 patches internally and any one of these may be recalled at any time. If you need to, you can dump individual patches or the whole set of 128 patches via MIDI.
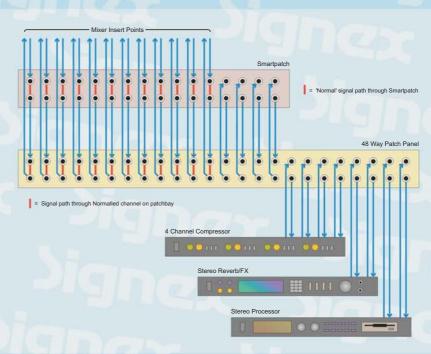
There are two ways in which the Smartpatch can be used to make routing changes: by changing from one patch to another or by making/breaking the individual connections within a patch. Either method can be controlled from the front panel or via MIDI. This means that simple or complex routing changes can be written or recorded into your sequencer or recording software and will then be executed in real time upon playback! Perhaps the most surprising aspect of the Smartpatch is that it is so easy to use. With all functions available at the touch of a button and no complex menu structures to navigate, everything about the Smartpatch is simple and straightforward, making it intuitive and quick to use whether you are a musician or an engineer.

Although we couldn't possibly list all the ways in which the Smartpatch can be used, the following examples give a good idea of its versatility.

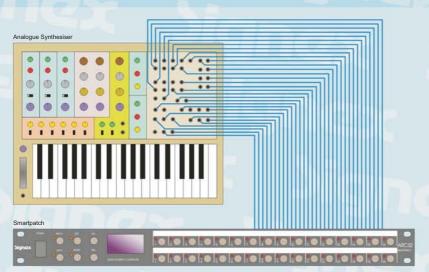## Example 1: Central routing controller/Input expander

Here we see the Smartpatch in a typical configuration controlling signal sources, outboard effects, monitoring and recording around a basic four-track cassette multitracker. In this situation, the limited inputs of the multitracker can be a major restriction, but with the Smartpatch, any source can be instantly routed to any input, allowing different sources to be recorded or even routed to an auxiliary return to use this as an extra input. Processors can be chained and may be patched 'in-line' on recording, or used for individual instrument/tape track/sample treatment on playback. Auxiliary sends and returns may be used in the normal way or processors can be connected to line inputs. The DAT recorder may be routed to the sampler for sample recording, to line inputs as a sound source, straight to the monitors and so on. Any of these configurations is instantly available by 'on-cue' manual selection or with a MIDI command.

Example 2: Channel muting/effects routing system

In this example, the Smartpatch is operating in conjunction with a conventional patch panel to provide MIDI controlled muting of twelve mixer channels, whilst still leaving the insert points accessible for manual repatching. Up to four outboard effects can be patched simultaneously into any four channel inserts, either manually or automatically via MIDI. This truly versatile system provides automated placement of outboard effects, but does not compromise their availability for manual connection into other parts of the system such as auxiliary sends/returns.

Note: If fewer processors need automated placement, more channels of the Smartpatch are available for muting. If only manual connection of processors is required, a single Smartpatch can be used as a sixteen channel muting system.
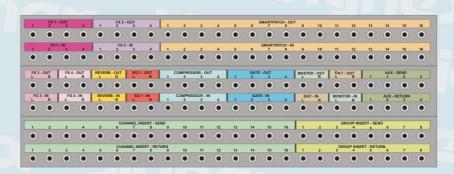

Example 3: Patch memory for analogue synthesiser

In this unusual application, the Smartpatch is acting as a 'patch-recall' system for a modular analogue synthesiser. Users of this type of synthesiser will be familiar with the need to re-patch every time a new sound is required.

By connecting points on the synthesiser's patchbay to a Smartpatch, any patch may be stored and recalled when required, either manually or under MIDI control. Because the inputs and outputs of the Smartpatch are 'direct coupled', it can patch control and trigger signals in addition to audio. This opens up a whole range of possibilities for these powerful and versatile instruments.

Example 4: Integrated manual/automated patching system

Although it seems like a great idea to have your whole system under automated control, the cost and complexity of such a system makes it prohibitive in most cases. Closer analysis usually shows that not all points will benefit from automated control and that an integrated system is often a better option. The Smartpatch can be easily integrated into a conventional patchbay providing an automated routing 'subsystem'. The inputs and outputs of the Smartpatch are wired up to sockets on the patchbay so that items requiring automated control during a session are simply patched in as required.

Multiple Smartpatch systems

For larger scale automated routing control, up to sixteen Smartpatch units may be used together by simply linking them with MIDI cables. When a patch is selected and loaded, all Smartpatches load their respective patches (of the same patch number) and each unit executes its part of the patch. The system can be controlled via MIDI, but if this is not required, one unit is designated as the master and the others act as slaves. A limitation of this configuration is that sources on one Smartpatch cannot be routed to destinations on another.

Specifications

Channel Separation	92dBu at 1KHz, 69dBu at 20KHz	Insertion loss	<0.02dBu
R_S = 600R, R_L = 10K, V_{IN} = +10dBu		Switch in-line resistance	150R
		Rear Connectors	1/4" A gauge TRS jack sockets
Frequency Response	-3dBu at 20MHz	Mains supply	110/220V, 50/60Hz
R_S = 600R, R_L = 10K, V_{IN} = 2V P-P		Power consumption	6VA
Total harmonic distortion	<0.01%	Dimensions (mm)	483(W) x 44(H) x 133(D) Min. rack aperture - 445
R_S = 600R, R_L = 10K, V_{IN} = 2V P-P			
Input impedance	47K	Weight, net [gross]	2120g [2780g]
Input signal	±12V	Accessories included	User guide IEC mains lead Ident card pack
Noise	-102dBu		

Any other questions?

Applications for the Smartpatch are too diverse to cover in this brochure, but we hope that it has helped to give you some idea of what can be achieved with this unique and versatile tool. If you need more information or would simply like to know how the Smartpatch can help you, please don't hesitate to contact us.

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