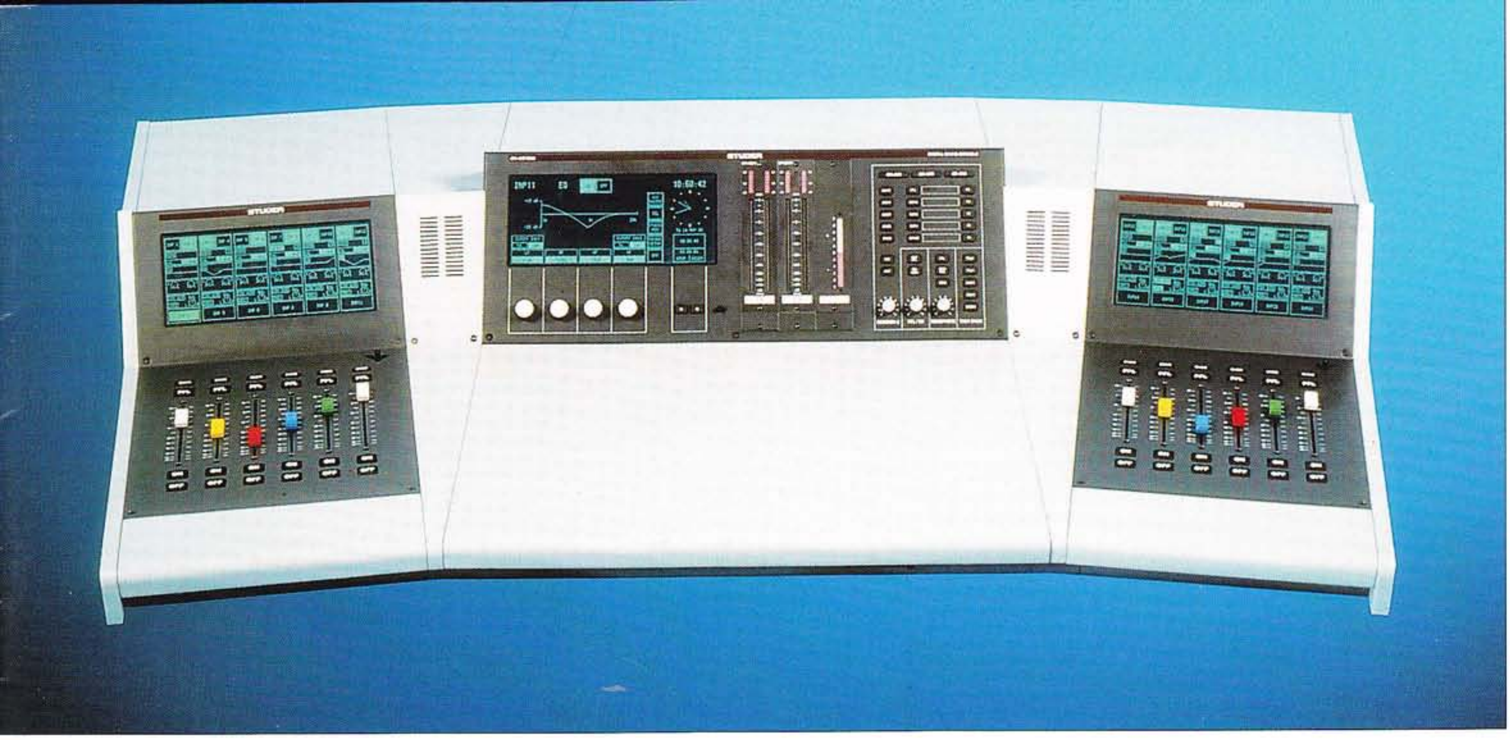


STUDER ON-AIR 2000

Announced at the recent Copenhagen AES, the On-Air 2000 digital radio broadcast console from Studer features custom-made DSP chips and shaft encoders with brakes! HUGH ROBJOHNS takes it for a test drive.

Studer recently showed the pre-production prototype of their new digital On-Air 2000 self-op radio console at the Copenhagen AES this year (available early next year). This is an extremely innovative product and rather than borrow technology from their existing range of large digital consoles (which would become disproportionately expensive in a small stand-alone self-op desk), Studer have designed the On-Air 2000 from scratch, with custom-made DSP chips and a number of unique operational features.

Hardware

The desk is a modular design, comprising a central control panel with up to four channel units. Each of these has six input modules, so the smallest desk has just six input channels, while the largest may have 24. Inputs cards are available to accommodate stereo analogue line sources, mono microphones (both with A/B changeover facility), stereo digital inputs (with sample rate converter as standard), or a six-way analogue line selector matrix.

Mechanically, the desk has a very low profile, occupying a remarkably small amount of space. The top surface has been designed to accept PC monitors for radio automation systems and the like, and all the audio and control electronics are contained within the console itself. The desk upstand provides space for three standard DIN-sized meter modules, normally allocated for Mix Buss A (on-air), Buss B (record output), and a phase display.

Apart from the pluggable input modules, the entire digital audio and control circuitry is mounted on a single circuit board, which runs under the full width of the console. Digital signal processing is provided by up to four PUMA (Parallel Universal Music Architecture) chips, which are Studer's own design of optimized DSPs. Each PUMA chip can accommodate six input channels, and the last one in the chain can be optionally equipped with additional memory to provide a built-in profanity delay system. The desk is controlled by a Motorola 68360 CPU and a PCMCIA slot provides storage and retrieval of user configurations and software upgrades.

The monochrome LCD display screens use pressure-sensitive panels (resistive technology rather than capacitive), which are sub-divided into relatively large 1.5cm square zones for easier, less restrictive operational use.

Control Surface

The six-input channel units are equipped with only the essential knobs and buttons, such as ON, OFF, and PFL buttons, as well as the faders of course. There is no master output fader or sub-groups as these are generally unnecessary in this kind of DJ-operated application. All aspects of the desk configuration, and the more elaborate control functionality for each channel, are made available through patented 'Touch'n'Action' LCD display panels mounted behind each fader module, in the desk upstand. These panels provide a continuous and comprehensive display of each channel's settings, and provide instant access to the central assignable control panel by simply touching the appropriate part of the screen.

Touch'n'Action

The idea of the 'Touch'n'Action' panels is that the operator does not have to fight the technology or remember complex operating instructions — it is all very intuitive. The LCD displays provide information about eight key elements of each channel's signal path. Starting at the top, the A and B input labels are shown (the active one being highlighted), and immediately below this is an indication for the phase (normal or invert) and mode for stereo inputs (LR/RL/RR/LL).

Next is the gain setting and then a symbolic representation of the frequency response created by the EQ section. On the assignable control panel, the frequency response is shown with greater accuracy, but the symbolic display actually tells you all you need to know for most purposes.

The next section contains two 'virtual' auxiliary send pots (with pre or post-fade indicators), and these are followed by a balance or pan-pot and indicators for the two output bus routings (on-air bus and recording bus). Finally, at the bottom of the panel (directly in front of each fader) is a large repeater of the input label, which is highlighted when the fader is open.

To adjust a parameter for a particular channel, the operator just has to touch the screen in the area of the required channel's control. This recalls the relevant settings to the central display screen where they are shown in greater resolution and where four shaft encoders are available for precise adjustment.

The system is brilliantly intuitive, and it works superbly well. The only training anyone needs is to be told 'if you want to adjust something, poke at it, then tweak the clearly labelled knobs in the centre panel!' Clever though it is, this 'Touch'n'Action' idea is not the best bit of the On-Air 2000!

Shaft Encoders With Brakes

The problem with shaft encoders is that by their very nature, you have to look at some form of display to see what the setting is, since the knob has no end-stops to provide physical feedback. Studer decided that this was an important feature of conventional control knobs, and set about designing their own shaft encoders — with end-stops. The clever bit is that the end-stops are virtual — that is to say the computer decides where they should be, rather than the physical construction. Basically, after a certain degree of knob rotation (taking into account the previously set position), a magnetic brake is activated to simulate an end-stop — and it is completely believable. The strength of the magnetic brake can be set to represent either a real end-stop or a detent so that it can be used to simulate a centre-detent for things like the EQ gain controls.

These magnetically braked shaft encoders have been patented by Studer, and they are quite simply brilliant! I hadn't realized just how important the bio-feedback of a mechanical end-stop was to the way I operate rotary controls, but these knobs are so much easier to operate than ordinary shaft encoders, because you don't have to look at what you are doing, yet you always know where you are on the scale. This idea is so simple and obvious, yet so clever — every digital desk should have this style of shaft encoder! Definitely one up for Studer!

Central LCD Panel

When not being used to adjust some assignable parameter, the central panel normally displays information like the time (both analogue and digital displays) and a stopwatch function. In fact, all the LCD panel displays can be configured to suit the users' requirements. A hierarchical system provides for basic, normal, and super-users, where various displays and functions are concealed to prevent inappropriate use and a user log-on system determines the appropriate mode. At its simplest, the channel displays show little more than the input labels and output busses for example.

The desk incorporates user preset memories, which may be used to completely reconfigure the entire desk, or just recall a suitable EQ setting for the DJ's mic channel. Additional or 'transportable' storage is via PCMCIA cards.

There are eight configuration sub-menus, and to open a menu page, the operator just has to poke at the appropriate screen label. In the channel page for example, nominal levels and headroom can be adjusted, and things like fader start, button start, and auto-start when the PFL is active can all be customized. The desk even incorporates an auto-locate system to re-cue the source after PFL'ing and an automatic PFL cancel function when a channel becomes live on-air.

The Output page allows the desk outputs to be configured for mono or stereo, various flavours of digital output format, and which part of the signal path the metering is derived from. The EQ page provides a frequency response plot and labels the shaft encoders to control HF, LF (shelves), and a sweeping mid-range. Other pages provide a detailed system diagnostics menu and a System Dump function used to download global or specific configuration data to a PCMCIA card mounted in a slot on the right-hand side in the front of the desk.

To the right of the central LCD are the monitoring controls which provide access to the auxiliary outputs, audition bus, the two main mix busses, PFL, three external sources, and a dedicated external off-air monitor feed (there are a further five unspecified external monitoring buttons). There is even a dedicated external PFL input for use with radio automation systems. Separate level controls are available for the headphones, loudspeakers, and PFL/talkback signals, all of which may be remoted. Talking of talkback, direct access is provided to the telephone hybrid cue lines, the auxiliary outputs, and the studio.

At the top of this module, illuminated indicators show when the studio is on-air, and when either the studio or DJ microphones are live (there is in-built control circuitry to extend these signals of course).

Broadcasting Tools

The desk provides two clean-feed busses and an audition bus. These can all be configured in the set-up menus to determine which channels feed which busses, making the system unusually flexible.

The remote controls for telephone hybrids allow all the usual functions such as hold, on-air, drop, and talkback facilities, and the profanity delay functions are controlled from the same page (on the assumption that PF-delay will be required with external phone-line contributions). The profanity system is very good, with inaudible delay build-up and delete functions, and a clear 'CUT' button. There is also a useful display of available delay time.

A separate timer (independent of the normal stopwatch display) can be used to automatically track needle time and the set-up menu selects which channels will be timed while the fader is open (and/or the start button is active).

The desk has four insert points available, and these can be positioned in any part of any signal path, with either digital or analogue I/Os.

The desk also contains a timecode reader for external synchronization and an RS-232 interface. All control logic interfaces are either optical or open-collector for compatibility with existing studio infrastructures, and the monitoring outputs are all VCA driven, which again makes for easy remote control. As you would expect, the essential trivia of loudspeaker muting, microphone muting, and other sundry broadcast features are all available and properly integrated into the console.

Conclusion

I liked the On-Air 2000 a lot. It is extremely easy to use, yet provides all the flexibility and versatility of a much more complicated desk. It will suit a wide range of customers from the wealthy community stations to the independent and public service broadcasters, and it will also accommodate a wide range of programme styles. Simple DJ self-op music shows or elaborate chat shows with studio guests, phone-ins, competitions, and a variety of music sources can all be handled with remarkable ease and accurate control. Now if we'd only had one of these in my days in student radio... ❑

INFORMATION

£ On-Air 2000 £20,000 + VAT.

A Studer Pro Audio (UK), Unit 2, Borehamwood Industrial Park, Rowley Lane, Borehamwood, Hertfordshire WD6 5PZ, UK.

T +44 (0)1707 665000.

F +44 (0)1707 665723.

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's and are not necessarily those of his employer.

Studer D940

DIGITAL CONSOLE

Designed as a general purpose, digital broadcast console, the D940 is a stable and mature product with a very creditable performance and reliability record. HUGH ROBJOHNS spreads the word.

If like me, you have always associated Studer with tape machines and CD players, then you will be as surprised as I was to discover that by far the biggest part of Studer's business is actually in audio consoles. Of course, we all know that analogue consoles are dead, and the real future is in digital consoles (it must be true — I read it somewhere), and naturally Studer have been working on digital sound desks for some time.

So would you be surprised to know that their D940 general purpose, fully digital broadcast console has been available for over a year? Would you also be surprised to find that there are over 20 D940s installed (mainly in Europe and the Far East), plus about eight self-op radio versions of the desk too (the D941 variant)?

These may sound like small numbers, but they actually represent quite a significant proportion of the total number of digital consoles in use around the world — especially in the broadcasting sector. Bearing this in mind, a slightly less surprising fact is that in terms of worldwide digital sound desk sales, Studer are currently the third largest manufacturer! It is a source of complete amazement to me that this side of Studer's business is virtually unknown in the UK, but hopefully this is about to change.

Digitec

Studer's involvement with digital audio consoles really started when they bought the French company, Digitec, in 1993. At that time, Digitec had already amassed considerable experience in designing and building digital audio systems, including an impressive DSP-based MADI routing system (MADI is a 56-channel digital audio interface format, which has a very similar data structure to the more common two-channel AES/EBU interconnection system).

The boffins at Studer realized that the hardware core used in the MADI router was actually capable of a much wider range of applications, and set about designing a broadcast-orientated console based on the router's technology. The complete process from the initial ideas to the first sale took around two and a half years, and the end result is a very creditable sound desk indeed. I was recently able to spend some time with the desk in a training suite at Studer's Regensdorf Head Office in Switzerland and talked to the Product Manager, Rudolf Kiseljak.

Design And Technology

The D940 desk has been designed to be a general purpose console, but with an obvious bias towards the needs of the broadcasting market or high-end theatre productions, rather than music recording or post-production work, although the desk would work equally well in those roles too. To date however, sales have been split pretty equally between television and radio installations, and there has also been a 50/50 split between live on-air and post-production applications. As we have come to expect from Studer over the years, the D940 desk has extensive possibilities for customization, which ensures that it compares very favourably with any other current digital desk in terms of facilities, usability, price, and fitness-for-purpose.

The D940 has been designed from the outset to look and operate in a very similar manner to a conventional analogue desk, which eases the learning curve and reduces the potential reluctance to accept this kind of technology. According to Studer, most operators are up and running with as little as 15 minutes of instruction, and I would have to agree with this view as I found the desk very logical and intuitive to operate. In fact, after only a short time, I felt sufficiently confident of it that I would have been happy to tackle a live broadcast!

Of course, any digital desk brings with it an enormous range of user-configurable features, and these inevitably take some time to learn and become completely familiar with. It's a bit like using your favourite word processor — they can all do a hell of a lot, but most people only learn how to drive the bits they actually need for their day-to-day tasks. The same is true of the D940, some of its facilities will never be used by some people, although other users will undoubtedly rely heavily on those same features. The important point is that all aspects of the desk and its configuration are entirely logical and are easily mastered — you don't need to get a degree in computer science before sitting in front of this desk.

A key word used to describe the D940 is 'modularity'. The desk is built in a made-to-measure format by combining the appropriate numbers and types of channels, fader strips, I/O interfaces and so on. If, at a later stage, the desk needs to be enlarged or modified, it can grow to match the needs of the installation with relative ease. Additional channels does not necessarily mean a larger control surface either since 'fader layering' is used to enable a small number of faders to control a large number of channels.

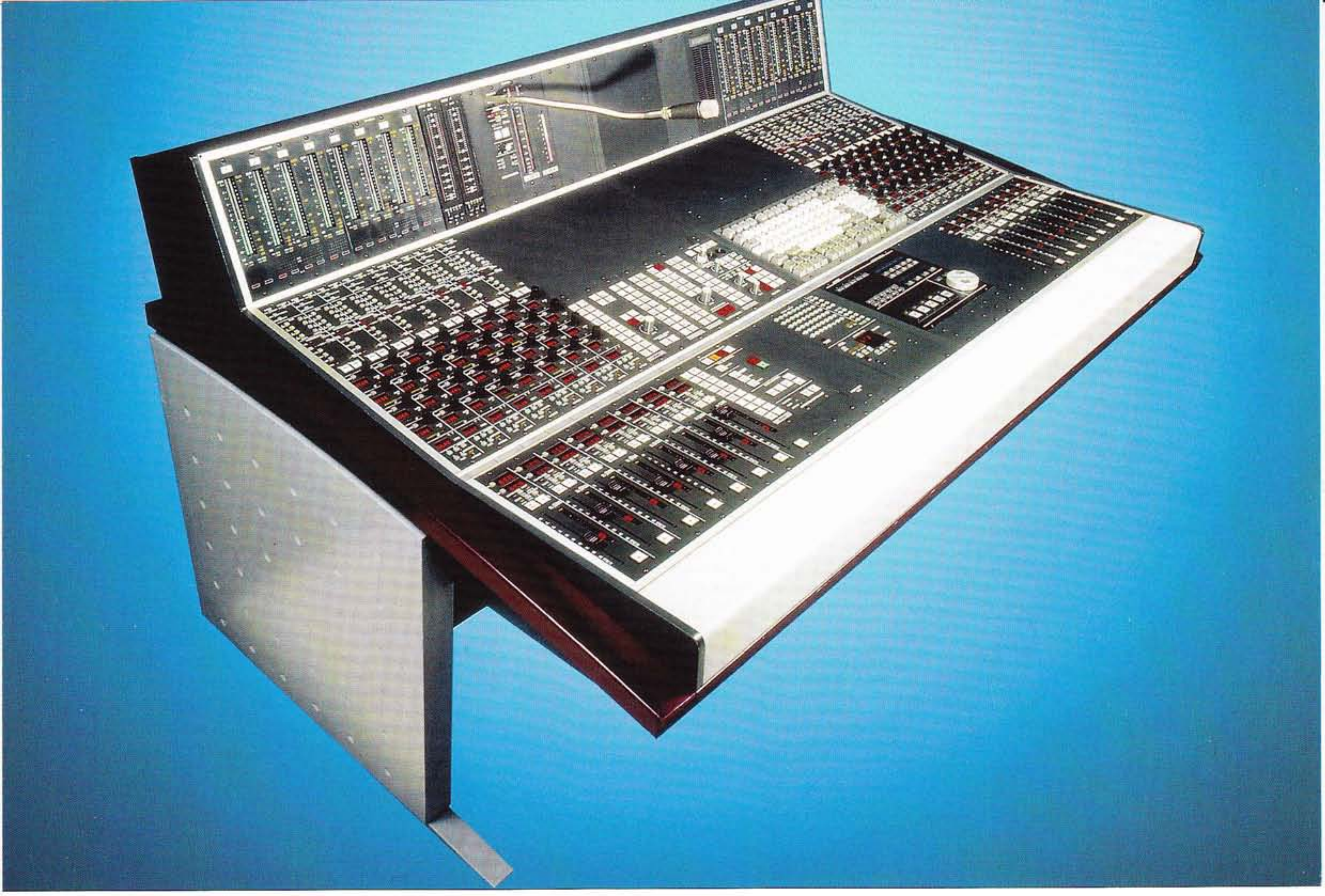
Unlike many current designs of digital console, the DSP processing is permanently sub-divided and allocated between the available channels, rather than being pooled centrally. This was an active decision on the part of Studer, who reasoned that in a live broadcast situation, the requirements can change quickly and there is rarely time to reconfigure the desk to incorporate extra facilities, which were not defined in the original user setup. Consequently, the D940 is a true WYSIWYG sound desk, all facilities, inputs, outputs, busses, and signal processes are available at all times. As well as being more appropriate for broadcast applications, this approach also makes the software much easier to design and de-bug, and it is therefore more likely to work reliably (extremely important when live on-air)!

A further advantage is that this approach also removes the need to route digital audio between multiple DSP cards in order to find a free processor to implement a particular function. This reduces the complexity of the hardware considerably and (perhaps more importantly) minimizes the overall processing delay (the D940 has a total processing delay of 11 samples between digital input and digital output).

Each DSP card can accommodate the processing needs of either four input channels or eight output channels, and in every system, one DSP card is dedicated to handling things like talkback, metering, and internal calibration tones etc. All internal processing uses fixed-point arithmetic, and the system is capable of multi-precision working, providing word lengths of up to 56 bits for the processing that requires it (eg. equalization). All digital audio transfers between the various racks is at 24-bit resolution, and since the DSP cards are derived from the Digitec MADI routing hardware, MADI is used as the system's standard multi-channel interface format. The desk can also contain a fully integrated MADI router to handle all the source and destination plugging that would otherwise require a digital jackfield.

Co-axial and optical fibre connections are provided on

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's own and are not necessarily those of his employer.



each DSP card, and these allow direct connections to either multitracks (ie. Sony or Studer DASH machines), or the I/O racks. The optical fibre connections allow racks to be separated by up to two kilometres if necessary and the dual format interfacing allows daisy-chaining between racks so that sources from one I/O rack can be shared between a number of consoles (or one console and a router) in large multi-studio installations!

The I/O racks contain multiplex and de-multiplex cards which convert between the 56-channel MADI data stream and the individual mono or stereo signals. These individual signals may be presented in either AES/EBU digital or analogue formats. To meet the demands of a particular installation, truncation and re-dithering is generally done by independent external units rather than the desk's own DSPs, but the digital inputs can be equipped with asynchronous sample rate converters to handle non-locked or incompatible sample rate sources. In fact, every digital input has a buffer memory, which provides a one frame (AES/EBU frame) tolerance of fixed timing errors, simplifying the requirements for system timing.

The desk's control surface is completely self-contained and only has five connections to the DSP racks. It contains its own power supplies and so requires a feed of mains as well as two fibre-optic interconnects with the central processor unit. One fibre is used to carry the control data to the DSP racks and the other returns the metering signals to the bridge. A fourth connection (through a 12-way multi-pin plug) handles the few analogue signals which are required such as the various loudspeaker monitoring feeds and the output from the talkback microphone. Finally, the graphical display screen uses an ethernet link to connect with the CPU.

One aspect of the D940 that was quite impressive is that installation is merely a matter of screwing the various racks into bays in the machine room and plugging all the wires up. There is no manual software configuration or subtle optimization to be done, because the entire system is pre-programmed at the factory to suit the particular installation's specifications. Basically, once on site, the desk is plugged in, turned on, and it works straight out of the box!

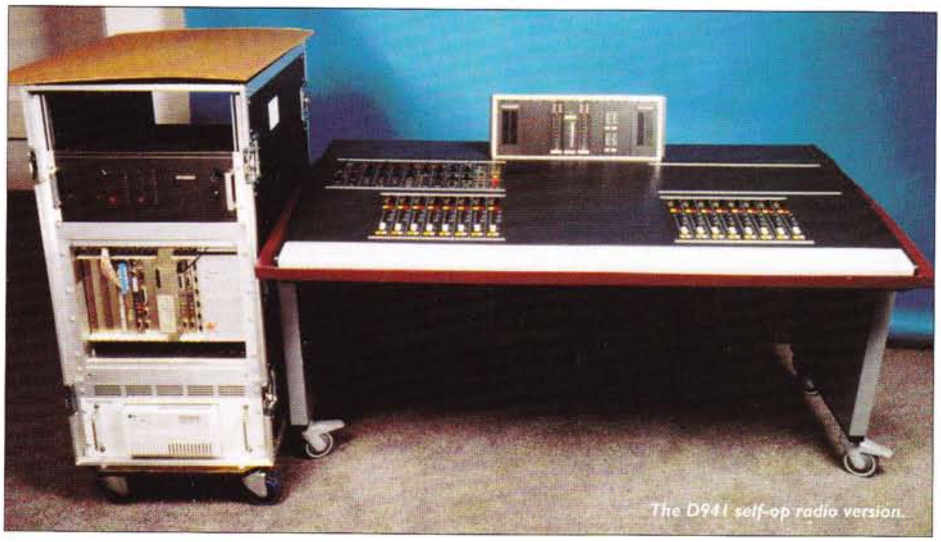
As far as the machine room hardware is concerned, each DSP rack (which can accommodate up to nine cards providing 36-channel inputs) is 9U high. Each DSP card carries 14 Motorola 56000 chips, and the boards are 8-layer fabrications. Assuming the DSP cards are used for input channels, the DSPs are allocated as three DSPs per channel for general signal processing (EQ, dynamics and so forth, providing four channels in total). The remaining two DSPs are used for all the summing or mixing functions associated with those four channels, for the various tape sends, auxiliary outputs, groups, and main mix busses.

The I/O racks are 3U high and can accommodate a variety of interface cards for analogue (64 times delta-sigma converter technology) or digital inputs. They also contain the multiplexer cards to combine the individual channels into the 56-channel MADI format for onward connection to the DSP cards or MADI router. Microphone inputs are handled by the eight-channel mic amps from the Studer D19 range, which incorporate 20-bit AD conversion. The gain, phase, and phantom power settings are remotely controlled via RS-422 comms lines from the desk.

The central CPU for the desk is an industrial unit (often used to control important parts of nuclear power stations apparently), and this oversees the activity of three other units which coordinate and manage the metering, desk control surface, and DSP operations. All D940s come complete with a battery backup system to ensure that if the power fails, the system will shut down sensibly.

The largest possible desk configuration has 120 active inputs and 224 outputs (including MTR sends, auxiliary busses, and all other miscellaneous outputs), although the ➤

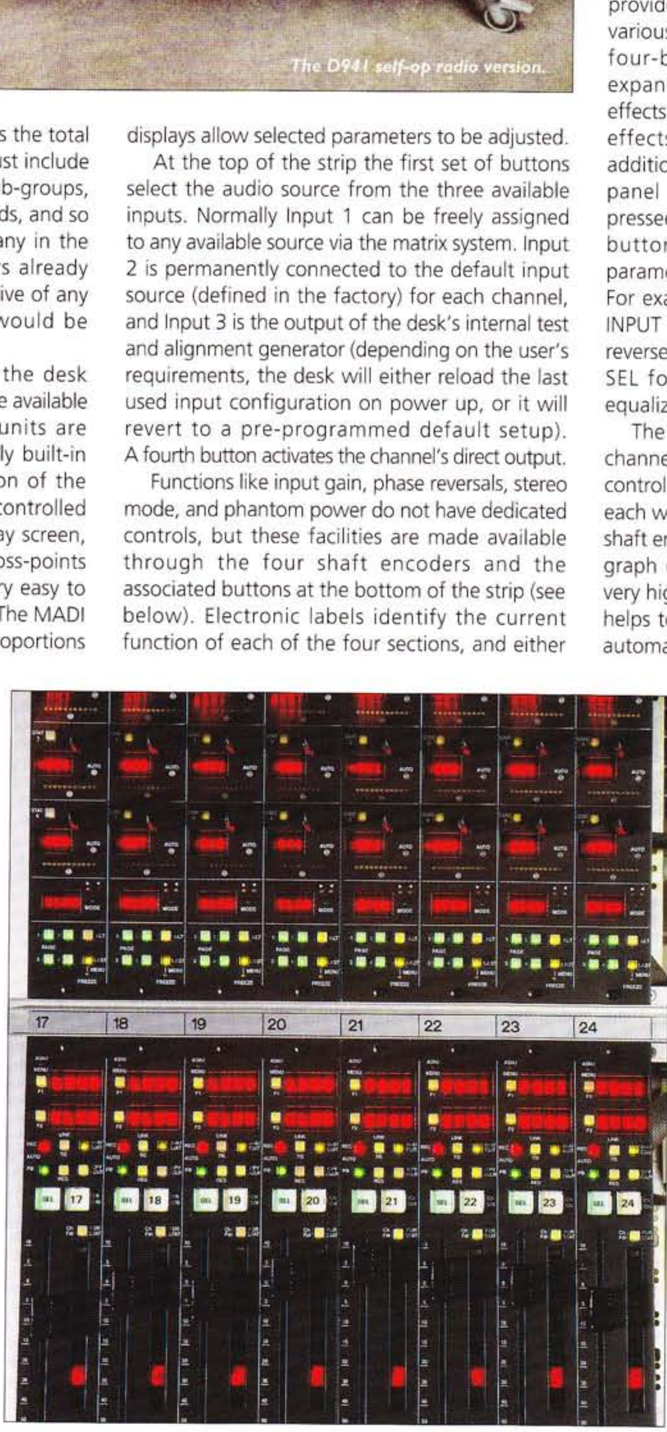
Studer D940



The D941 self-op radio version.

hardware design of the DSP cards limits the total number of mix-busses to 64 (which must include all mix processes, ie. main outputs, sub-groups, auxiliary outputs, clean-feeds, tape sends, and so on). Now this may not sound very many in the company of the other large numbers already mentioned, but it is very hard to conceive of any situation where more mix busses would be required.

All the inputs and outputs from the desk (including the insert points), as well as the available sources, destinations, and effects units are interconnected via the desk's optionally built-in matrix system — an integrated version of the original Digitec MADI router. This is controlled through a page on the graphical display screen, which effectively shows the matrix cross-points as U-links. In practice, this makes it very easy to configure the appropriate connections. The MADI router can be expanded to enormous proportions such that it can accommodate over a thousand inputs and outputs. This is probably enough sources and destinations for most installations!



The Channel Strip

The D940 channel strip is almost conventional in its appearance, and unlike many digital desks, there is no central assignable control panel for things like equalization, dynamics or auxiliary sends. Instead, almost everything can be driven directly from the channel strip. Like most digital desks, all the channel strips are identical and it is only their input selection that determines whether the strip is an input, a sub-group, an auxiliary master or a main output (in the case of the last three, the strip inputs would be an appropriate mix-bus).

The channel strip is basically divided into two, with dedicated function buttons in the top half, which are used to activate the channel's processing functions. The lower half contains an assignable section where four shaft encoders, associated buttons, and displays allow selected parameters to be adjusted.

At the top of the strip the first set of buttons select the audio source from the three available inputs. Normally Input 1 can be freely assigned to any available source via the matrix system. Input 2 is permanently connected to the default input source (defined in the factory) for each channel, and Input 3 is the output of the desk's internal test and alignment generator (depending on the user's requirements, the desk will either reload the last used input configuration on power up, or it will revert to a pre-programmed default setup). A fourth button activates the channel's direct output.

Functions like input gain, phase reversals, stereo mode, and phantom power do not have dedicated controls, but these facilities are made available through the four shaft encoders and the associated buttons at the bottom of the strip (see below). Electronic labels identify the current function of each of the four sections, and either the shaft encoder or the button (or both depending on which is the most appropriate) is used to modify the various parameters. Current desks use red LED labels, but user feedback and some additional research into the man/machine interface has lead Studer into modifying the design such that all future desks will be shipped with more restful green LED label displays!

Next down, the channel strip provides instant access to the first four mono and first four stereo auxiliary busses via more illuminated buttons. If additional auxiliary busses are required, they can be accessed from the Central Assign Panel in the middle of the desk. Up to eight mono and eight stereo busses are available in total.

The final section of the upper half of the strip provides dedicated buttons used to activate the various signal processing functions such as the four-band EQ, filters, compressor/limiter, expander/gate, insert return, delay, optional effects (possibly reverberation or other time-based effects yet to be designed), and pan pot. In addition, a button labelled ASN SEL (assignable panel selector) is used as a 'shift' key and is pressed in advance of one of the other process buttons to call the appropriate adjustable parameters onto the assignable shaft encoders. For example, pressing ASN SEL followed by the INPUT 1 button calls up the input gain, phase reverse, and stereo mode functions. Pressing ASN SEL followed by the EQ button calls up the equalizer controls.

The assignable panel at the bottom of each channel strip is called the LACP (local assignable control panel) and contains four identical sections, each with a four-character electronic label strip, a shaft encoder, a button, and a small horizontal bar graph display. The endless shaft encoder has a very high resolution and is touch sensitive, which helps to make operation of the built-in dynamic automation system very simple and intuitive since to update a setting is as simple as touching the control and moving it to the desired position. The function of the push-button varies with the specific parameter being adjusted, but in the case of an auxiliary send for example, the shaft encoder sets the level and the button selects the pre or post-fader option.

The LED label display initially shows the current function of each assignable section, such as GAIN or PAN, but when the shaft encoder is adjusted, it changes to show the numerical value, making precise setting of the controls very easy. After four seconds, the display normally reverts back to the function label (although this facility can be disabled). The simple bar graph display provides an analogue-style indication of each control's position, and a separate LED is used to show the precise centring of controls like the Pan or EQ gains.

Obviously, some functions require more than just four shaft encoders (the EQ for example), and this is accommodated by the use of 'pages'. At the bottom of the strip are four

Page buttons, which recall one of the four layers of control functions for each of the four shaft encoders. In the case of the EQ, the first page shows the frequencies of the four bands, the second the gains, the third the Q settings. Alternatively, the EQ parameters can be displayed so that the first page shows all the available control parameters for the HF section, page two covers the HMF, page three the LMF, and page four the LF section.

As with most software driven products, the D940 provides multiple ways of performing any given function. For example, in the case of the assignable panels, an alternative to using the strip's own ASN SEL button is to use a set of dedicated buttons on the central Menu Selector panel. These 20 buttons configure all the channel strips LACP's at once to show the selected parameters. A 'freeze' button on each strip immediately below the ASN SEL button isolates the channel from this global override. This could be a useful facility, for example, if the operator wishes to retain instant access to the auxiliary send controls on one particular strip, whilst adjusting the EQ or other parameters on the remaining channels.

Faders And Layering

Like most digital desks, the D940 uses 'fader paging' or 'layering' to increase the number of channels that can be controlled by a small number of physical faders. The Studer approach to this concept is to provide ten layers per channel strip, grouped into five more manageable banks of two layers each. Two four-character electronic labels above the fader show the sources for the layers of the currently selected bank, and small buttons next to the labels provide instant access to the required layer.

Channels can exist in more than one layer, so that sub-groups and master faders can be allocated to the same strip on every layer to make overall control a bit more practical. Configuring the layering is not an on-line function, but it can be performed from the console itself and does not require the use of the graphical interface (ie. PC and mouse). It is all done by simple button presses on the console's central panels in conjunction with the relevant channel strips.

To recall a different bank, the required bank is selected on the central Bank Select Unit. This panel provides buttons to recall any of the five banks, plus keys to force all channel strips to show layer one or layer two within the chosen bank. In addition to these keys, other buttons provide user memory stores to recall specific sub-sets and combinations of layers and banks. It is important to realize that recalling different banks does not affect the sound through the desk, all it does is bring 'unreachable' faders within reach!

The channel legends used to identify the signals being processed through each layer of the fader are organized in a hierarchical manner. The desk is shipped with a factory default labelling system which forms the basic level — for example, the third mono input is labelled 'Im-3'. The next level up is the 'User Inherited' label and this can be any four-character label the user wishes, such as 'Sax'. The top-most level is the 'System Name' and this is derived from the routing matrix source description, so in this example it might be 'Mic4', meaning the fourth microphone preamp and AD converter.

The fader module carries most of the display and control functions for the automation system, as well as the usual buttons for PFL, channel On, and an SEL key to access centrally assignable functions such as the mix-bus and output routing in conjunction with the Central Assign Unit (CAU). The allocation of channels to outputs is performed by simply pressing the SEL button on the channel fader, followed by the appropriate destination button(s) on the CAU. The selected output busses are indicated at the bottom of the bar graph meters for each channel strip, and an interrogation mode is available by pressing the individual output or tape send buttons on the CAU, which causes the contributing channels to illuminate their SEL keys.

A display strip adjacent to the fader carries a number of back-lit legends to show the current status of the channel strip. Displays are provided for the audio role, including input channel, monitor channel, group fader, auxiliary master, or main output as well as the dynamic automation status.

Graphical Display

Although Studer have tried to make as many features and facilities directly controllable from the desk itself, inevitably some must be configured through the PC screen. The good news though is that each screen is very clear and straightforward, with a limit of two levels, and only four secondary pages. Apparently, having specified the requirements, Studer employed a specialist company to write the software for the graphical ➤

Studer D940

displays, and this appears to have paid off in terms of reliability and a professional appearance.

The most important page is probably the Patch screen, which controls the input and output Matrix router. The visual analogy used here is of a 'jackfield' and U-links connecting the sources and destinations with the desk inputs and outputs. Like a real jackfield, individual sources can be paralleled to any number of destinations and stereo sources can be split between mono channel paths. The matrix cross-points can be protected from accidental disconnection (with passwords if required), and the complete patch configuration can be saved as part of the desk Snapshot automation, which makes changeovers between complex shows a complete doddle!

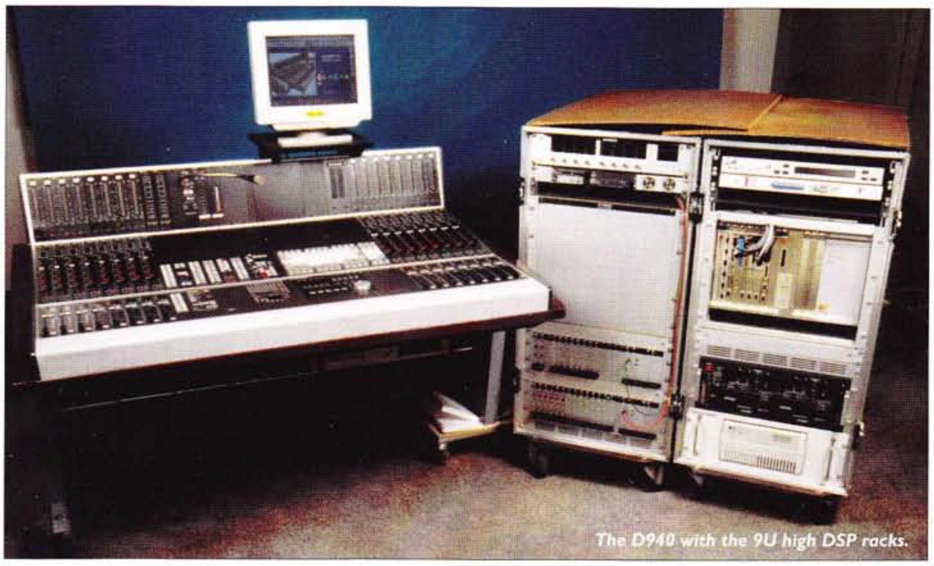
A pool of external effects devices (ie. favourite valve dynamics or EQ units, reverbs and the like) can be called up from the patch screen and inserted into any channel path. The effects units can be daisy-chained too. The insert returns to the channel strip have an associated wet/dry control, which allows the operator to bleed through some of the direct signal if required. This facility is also rather useful in providing an additional input point to the strip, and it can be used to create a kind of quasi-in-line desk configuration for multitrack working (direct outputs are used to derive the MTR sends and the monitor returns are brought in through the insert returns).

The second most useful screen is the Channel Structure. On this page, a block diagram of the channel structure is displayed, and a simple process of dragging and dropping allows the user to reorder the various signal processing blocks to suit any possible requirement. Some functions are limited to a few predetermined positions in the signal path, such as the Direct Output signal which can be derived from post-input module, pre-EQ or pre/post-fader. Similarly the metering can be switched between post-input, post-fader or on the direct output. In practice, rather than impose restrictions which limit the functionality of the desk, these actually serve to simplify the configuration process slightly.

Metering & Monitoring

Above each channel strip in the upstand is a meter module with two bar graph columns, each having 100-segment resolution covering a range of 60dB. If the associated channel strip is handling a mono signal, the two columns are identical, if it is a stereo signal however, the columns show the left and right legs. The ballistics of the bar graphs can be centrally switched between PPM and VU modes, and a rather useful feature is that the right-hand bar graph can be switched to provide a gain reduction meter to show how hard the dynamics processors are working. In this latter mode, the left bar graph column continues to show the signal level (the higher of left or right in the case of stereo channels).

The monitoring arrangements are derived from the input and output selection matrix, so every possible source and destination is always available for monitoring if required. In fact, up to 200 different sources can be directly accessible from push buttons if you really want that many! There are three different monitoring panels providing facilities for the control room, the studio, and headphones (the latter also provides controls for the talkback and PFL systems). All the standard loudspeaker controls are provided, plus — on the studio control panel — facilities for controlling the various signal lights (reds, rehearsals etc).



The D940 with the 9U high DSP racks.

Automation

The standard snapshot automation facility allows a global desk-wide reconfiguration, and in addition, a 'clipboard' allows individual channels to be copied and pasted to other strips. This function works by swapping the source and destination settings so that if a channel strip is copied to the clipboard and then pasted onto a new strip, the clipboard is left storing the second strip's previous settings. This allows a very easy AB comparison between new and original settings by simply pasting and re-pasting the clipboard settings. A 'Clear' button resets the entire channel strip to a default start-up mode, which is normally configured to perform the usual requirements of setting the EQ gains to the centre, turning off all the auxiliary sends and aligning the fader to the nominal zero position for you! The entire desk can be totally reset in about one second, and individual channel strips can be isolated from the reset mode so that a live microphone remains on-air during the re-boot.

Aside from the standard snapshot automation, the desk may be optionally fitted with full dynamic automation and full machine control. The latter is based around the MotionWorker system but uses Studer's own control panel. The dynamic automation system is reasonably simple to use, and all the usual operational modes are provided. Writing or updating a mix pass is a simple as touching the desired control since all controls (faders, assignable shaft encoders, and all buttons) are touch sensitive. To record all the control functions, the system has merely to be armed, and this is probably the standard automation mode.

To restrict the automation record pass to just the faders and mutes requires the additional press of one button, since this mode may also be used frequently. More sophisticated selection of specific parameters (such as recording the EQ controls, but not the Dynamics or auxiliary sends) requires use of the automation page on the graphical control screen, but even this is pretty obvious to use and the extra hindrance of needing to access the graphical page is balanced by the rarity of needing to do it!

Conclusion

The D940 is a completely finished, stable, and mature product, with a very creditable performance and reliability record. It has clearly been designed and optimized for use in live broadcasting situations, and it manages to retain a very high degree of instant access to virtually every function. The local assignability approach may well be appreciated by users who are sceptical of, or unhappy with, the concept of central assignability, and I certainly found it a very natural and convenient way of working.

This desk is certainly different from the majority of current digital consoles in many aspects of its design, but in light of its intended use, I think these are wholly appropriate and innovative. Although Studer consoles are probably little known in the UK (if not the rest of Europe), the D940 must be a definite short-listed product for any broadcast studio refurbishment. If you are in the business of self-op radio broadcasting (particular in a multi-studio or continuity/studio environment), the D941 sibling has specially designed control panels, which make it absolutely ideal for this application too! I understand that the D940 will be on the Studer stand at most of the forthcoming trade shows, and I heartily recommend you arrange to have a look at it if you can — I'm sure you will be as intrigued and impressed as I was. ❑

INFORMATION

£ **D940 from £200,000 + VAT.**

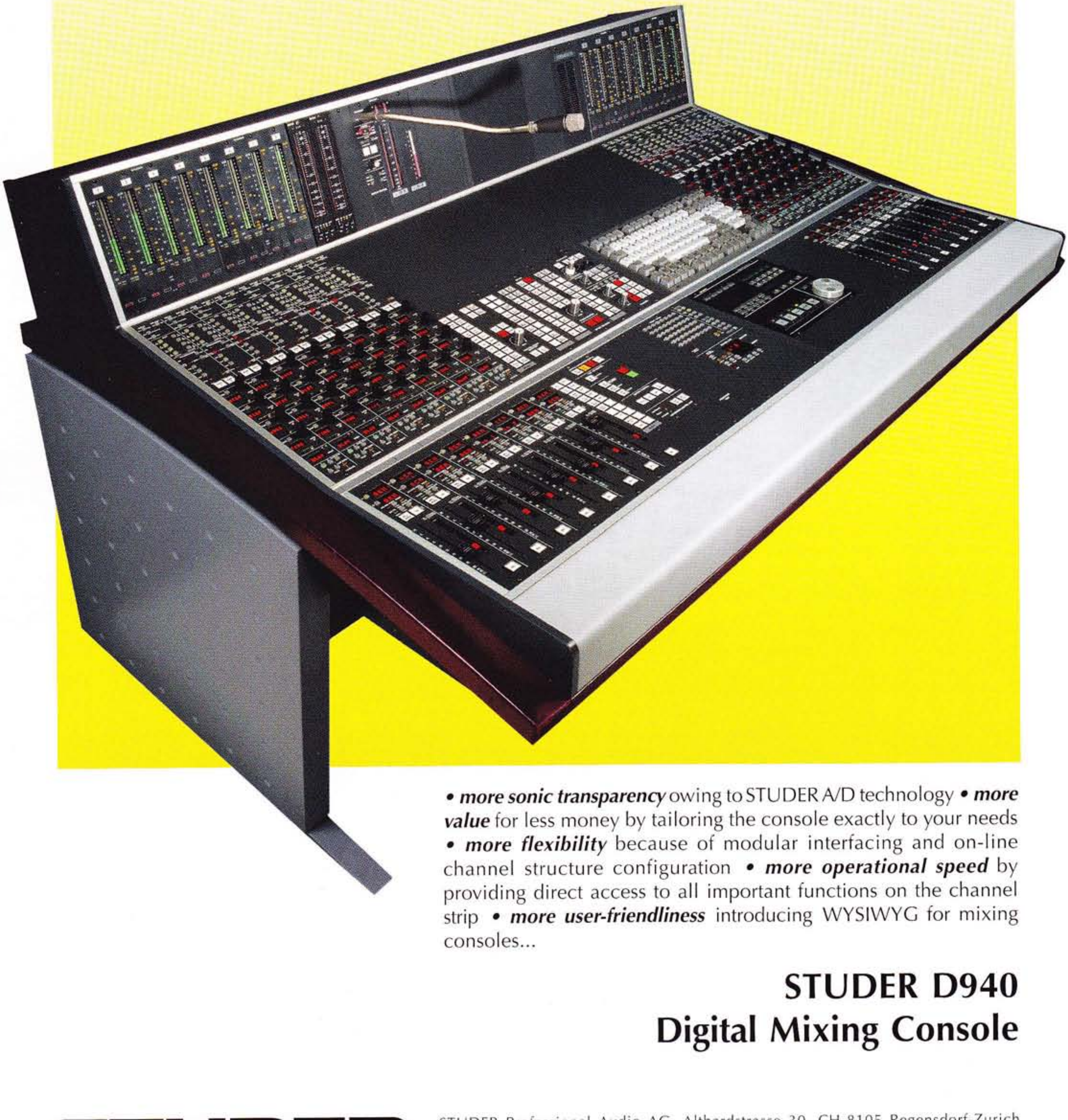
A **Studer Pro Audio (UK),**
Unit 2, Borehamwood Industrial Park,
Rowley Lane, Borehamwood, Hertfordshire
WD6 5PZ, UK.

T **+44 (0)181 207 5050.**

F **+44 (0)181 207 4572.**

CUSTOMISATION

The new D940 Digital Mixing Console from STUDER offers you more ...



• ***more sonic transparency*** owing to STUDER A/D technology • ***more value*** for less money by tailoring the console exactly to your needs • ***more flexibility*** because of modular interfacing and on-line channel structure configuration • ***more operational speed*** by providing direct access to all important functions on the channel strip • ***more user-friendliness*** introducing WYSIWYG for mixing consoles...

STUDER D940
Digital Mixing Console

STUDER
PROFESSIONAL AUDIO EQUIPMENT

STUDER Professional Audio AG, Althardstrasse 30, CH-8105 Regensdorf-Zurich
Switzerland, Telephone +41 1 870 75 11, Telefax +41 1 840 47 37

For more information please contact:

Austria: +43 1 866 54-0
France: +33 1 45 14 47 86
Germany: +49 30 72 39 34-0
U.K.: +44 181 207 50 50
or your local representative

Canada: +1 416 510 13 47
Japan: +81 3 34 65 22 11
Singapore: +65 225 51 15
USA: +1 615 399 21 99

H A Harman International Company