Studer OnAir 3000 in Radio 24, Zurich.
The parameters of the selected function are displayed immediately on the colour main screen. On the left-hand side there are two stereo bargraph meters with correlators, a studio clock and two stop watches. On the upper part of the screen are menu buttons and on the right-hand side eleven freely assignable function keys.

In contrast to radio on air applications where a clean and uncluttered surface is advantageous, in a production application the operator usually wants direct access to a number of parameters on the surface. In this situation one or more Rotary Modules can be added and parameters such as all EQ gains, AUX send levels etc become instantly accessible.

Modules of three or six faders can be added up to a total of 48 faders if required. The fader strip includes input level metering, five freely configurable push buttons, a rotary encoder and an alphanumeric display. Using only the fader modules and fader screens gives the operator an excellent overview of the console while presenting a very clean surface with the minimum necessary elements.

The four rotary encoders used for parameter settings feature a patented system for tactile feedback. The end stops and detent points are set individually in accordance with the currently selected function. A slot for compact flash cards allows for data backup or data transfer if the consoles are not connected into a network. Completely silent rubber push buttons are used throughout the console, including the stop watch controls.

Studer has developed a completely new and powerful DSP engine, the Compact SCore, based on SHARC processors. It uses the same digital algorithms for signal processing as the Vista series of broadcast and production consoles, thus guaranteeing the highest level the renowned Studer sound quality. Signal interfacing uses the same D21m I/O system used on the Vista and D950 large frame consoles.
Monitoring and Talkback Module including freely assignable buttons, red light and on air indication. The incorporated loudspeaker is used for talkback, PFL and MPX monitoring. A gooseneck microphone can be added if desired. The module is available either in a drop-in version for inclusion into custom studio furniture, integrated in the fixed frame version, or as shown here in a table-top housing.

The displays in the Rotary Assign Module show the chosen parameter active in the respective row of the Rotary Assign Modules. For fast changeover the sets of four parameters can be pre-configured and recalled via the push buttons. In large consoles two or more assign modules of each type, working in parallel or per fader module, may be combined for good overview and ergonomics.

The Fader Assign Module is completely at the operator’s disposal. The buttons can be configured for console-internal functions such as routing, snapshot recall and channel level meter functions or for console-external functions such as GPIO control, red light control, etc.

The fixed frame variant of the Ondir 3000 uses the same drop-in modules as the Modulo version. All combinations are possible from a minimum desk with 6 faders, monitoring and talkback module and main screen up to a maximum size of 48 faders with rotaries, assign modules and fader screens. The main control section, which houses the monitoring and talkback module, may be fitted either centrally or anywhere between fader sections, as required. A script space may be specified, and a group of 3 or 6 faders may be fitted for group or master bus control. For smaller applications a compact table-top housing for fader modules is available resulting in a very flexible and space saving desk.
Ultimate flexibility in specification

The Studer OnAir 3000 extends Studer’s range of digital broadcast consoles with a completely new design aimed at the medium to upper segment of the radio market including private and public network broadcast stations. The operating concept of the OnAir 3000 will be totally familiar to Studer users, as the wide range of compact and elegant control surface modules incorporates the same patented “Touch’n’Action” philosophy as the highly successful Studer OnAir 2000, using colour GUI screens.

The OnAir 3000 design is based on a completely modular desk and a new DSP engine. The fader module includes six fader strips, and up to eight fader modules may be fitted, giving a maximum console size of 48 channel faders. Layout options range from a highly comprehensive engineer-operated continuity console to a single fader panel for DJ and newsroom use or even a PC-operated system with no physical desk controls. Modules may be fitted into the customer’s own furniture or mounted in a Studer fixed frame table-top housing.

The OnAir 3000Net, which is an option to the OnAir 3000, offers the possibility to network several SCores. This allows not only sharing of the audio sources as if they were virtually connected to the local SCore but also of the respective controls like red light, loudspeaker dim and cut or mic gain. The OnAir 3000Net architecture introduces a completely new topology for broadcast installations.

The Studer OnAir 3000 at a Glance

- Ergonomic, easy to learn “Touch’n’Action” user interface
- Completely modular and configurable desk surface
- Immediate system overview and fast parameter access via colour fader screens
- From 3 up to 48 channel faders
- Based on new powerful SCore DSP engine and D21m I/O system
- Programmable user authorization system (V2.1)
- Extensive monitoring and talkback system
- OnAir 3000Net: Networking of consoles with sharing of audio resources
- Complete integration with Radio Playout systems
- Available as OnAir 3000 Modulo, in fixed frame or compact version
The control surface of this 3rd generation Studer digital on air mixing console, the OnAir 3000, is a logical evolutionary progression based on extensive experience gained in many more than a thousand on air installations throughout the world. It combines the philosophies of the well proven OnAir 5000, OnAir 2000 and OnAir 1000 control surfaces and uses the most modern software and hardware architecture to allow the greatest possible freedom in configuring the system and fulfilling every conceivable user requirement.

The operation of the desk is based on Studer’s well proven and worldwide accepted “Touch’n’Action” user interface concept. Only the most important functions have hardware control elements in the channel strip making the operation of the console very simple and stress-free. Above every fader module a colour touch screen displays all the relevant settings and configurations for each related channel. A simple touch on the respective symbol of a channel function, e.g. equalizer, dynamics, AUX send, immediately opens the corresponding page on the main screen, allowing for quick and easy adjustment. This can be done either by the four rotary encoders below the main screen or directly by touching a selection list within the main screen display.

The most important functions are just one finger stroke away, accessible virtually instantly - vital in a hectic live on air situation. The user interface is designed in the same symbolic language as the Vistonics™ system, and adjusted in a very flat hierarchy, without the use of multi-level menus.

The OnAir 3000 offers input parameter settings, such as phase, gain, HPF, pan/balance, 4 band parametric equalizer and additional high pass and low pass filters, full dynamics, i.e. limiter, compressor, expander, noise gate and de-esser in every channel all the time. In addition the contribution to the four stereo AUX sends and the 16 N-X, which can also be configured as stereo AUX sends, is very easily done.

The OnAir 3000 provides fully featured input and output routers displayed on the colour screens and operated via the rotary encoders and touch fields; the crosspoints can be locked against unintentional manipulation and displayed in various ways. Shared audio sources in the OnAir 3000Net network, connected physically to remote SCores, are also visible in the routing pages as if they virtually were local sources, once defined in the Configuration menu. The Configuration GUI can be run on the same Main Screen or on a remote PC, e.g. in a support department or MCR over a network.

When the console is being operated in a multi user environment, restrictions may be imposed on the availability of selected functions by setting up user accounts with specific user profiles and access rights, installed by an administrator (V2.1). Global and private snapshots for control surface set-ups, audio related parameters and routing set-ups can also be stored either locally in the console, via the external compact flash (CF) card reader in the Main Screen or over a network centrally to a file server.
It is also possible to operate the OnAir 3000 in a split mode where for example one part of the desk runs a national programme and the other physically distant part a regional programme. It is also possible to have a single fader module mounted remotely in a voice booth or news suite or to have a control surface in an OB vehicle working in parallel with the desk in the studio.

All buttons on the surface can be freely configured and assigned a specific function, such as On/Off, TB, locate, etc. For example, the On/Off button can be assigned to be either above or below the fader to suit the working practice and the convenience of the operator. All settings, including dynamics, are input source related and follow the source if the routing is changed.

**Fader Module**

The Fader Module comprises 6 fader strips, and up to 8 fader modules can be combined to give the maximum configuration of a 48 fader desk. In extension to these 48 channel faders, additional fader modules may be connected for bringing the bus signals to the control surface, e.g. PGM outputs, groups, AUX masters, etc.

Every fader strip includes five illuminated keys, the fader, an LED input level meter which may be set for AF/PF and N-X send level, with overload indication, an LED gain reduction meter, and an 8 digit alphanumeric channel label display.

A touch sensitive rotary control with one button is available in every fader strip. The function of these elements can be assigned/configured via the Fader Assign Module. If the Rotary is touched the Channel Label display shows the corresponding value, e.g. in dB, according to the function selected.

Several functions such as input routing, input gain, balance, N-X level, AUX level, are selectable from a predefined list. The button has e.g. an Enter, ON/OFF or AF/PF function depending on the chosen function.

**Fader Assign Module**

Via the rotary encoder a function can be assigned to the row of rotaries in the Fader Module(s). Turning the rotary shows a predefined sequence of the available functions (e.g. gain, Bal, input routing) in the display next to the rotary.

All other buttons on the module are freely configurable via the console set-up, either for console internal functions such as snapshot recall or routing preset recall or for external GPIO functions such as green/red light control, play next tune in a play list of a playout system, stop, play, record, etc.

**Fader Screen Module**

The colour 12” touch sensitive fader screens display the input settings, equalizer and dynamics settings, AUX send levels, N-X contribution, input, output and insert routing, bus and group assign, Pan/Bal and channel label, all in real time with real values. The Fader Screen exists also in a multi functional version with additional DVI input and two buttons on the front to switch between the standard channel display and any external video source (600x800). This can be used together with the touch functionality to integrate the Studer CMS system or e.g. display CNN or football games for live transmissions for example.

Highest flexibility to fit your requirements

The control surface of the OnAir 3000 and OnAir 3000Net consists of a selection of modules which can be combined to most closely fit the user requirements. In total a theoretical maximum of 64 modules may be connected, with the distance between one module and the distribution point being up to 50 m. Alternatively the modules may be mounted in one of the fixed frame options according to customer requirements resulting in the table-top OnAir 3000.
**Rotary Module**

The rotary module comprises a 6x4 array of rotaries each with an LED ring and two buttons, aligned in rows which are vertically aligned with the fader strips. The assignment of functions is made via the Rotary Assign Module, where a display shows the respective parameter actually active in one row. The Rotary Module is intended to provide quick access to a large number of functions via dedicated controls, e.g. in production applications. The function of the buttons depends on the parameter chosen and can be e.g. AF/PF, AUX On/Off or no function.

The exact value of the respective parameter is visible either in the channel label display when touching the touch sensitive knob or via the main screen, and also graphically via the fader screen, if available. The user can choose a set of parameters through the Rotary Assign Module. It is possible to combine more than one Rotary Module per Fader Module.

**Rotary Assign Module**

The button array enables predefined functions such as EQ LF parameters, AUX 1..4, N-X 5..8 send level, etc. to be recalled quickly and accessed directly on the rotary modules. The four displays in the Rotary Assign Module display the parameter name for the respective row of rotaries, whereby for example the EQ curve can be displayed in the Main Screen simultaneously for direct observation of the settings. More than one Rotary Assign Module may be included in a desk surface even with isolated functions per fader bay.

**Monitoring and Talkback Module**

The Monitoring and Talkback Module for the control room includes on the left side an array for monitoring a configured selection of signal sources. In addition, via the add button, one source can be monitored via e.g. the left CR loudspeaker and a second source on e.g. the right one. This facility may be used when synchronising two external programmes to the local contribution. It is also possible to listen to every source connected to the system in real time by activating and turning the rotary encoder below the buttons.

Located below are the CR loudspeaker controls, the DJ headphone controls and the PFL/TB/MPX loudspeaker controls.

On the right side are the buttons for talkback to destinations other than the input channels (these are accessible via buttons in the fader strip), Slate and configurable buttons for user-definable talkback groups.

On-Air, CR-Mic, Studio1-Mic, Studio2-Mic and Studio3-Mic lamps indicate red light for on-air and open microphones respectively. An optional gooseneck microphone for talkback may be fitted on the right of the lamps.

The Monitoring and Talkback Module also includes an ADAT interface for easy audio connection between the desk and the DSP core. The eight channels carried via the fibre cable are used for the DJ and guest headphones, TB microphone, PFL/TB loudspeaker and the control room monitors, if fitted. In the fixed frame version of the OnAir 3000, the ADAT connector is at the rear of the console housing.

**Main Screen Module**

The Main Screen Module includes the central 12" TFT touch screen and four Rotaries with tactile feedback (patented) below the screen; in addition two buttons for control of the stop watch and a slot for a memory card are provided.

The screen includes a studio clock, two stereo bargraph meters each with phase correlators, two stop watches, menu buttons and eleven freely assignable buttons on the right border of the screen. These buttons can be used in the same way as the buttons in the Fader Assign Module.

By touching the label below the meters another predefined source can be monitored.

If the desk is operated without the Fader Screens, the user can access all menus via menu buttons at the top end of the display, i.e. Channel parameters, Bus settings, Monitor settings (used e.g. if the desk is emulated on a PC), input/output Routing settings, Administration and user management. Direct access to channel parameters may also be given by configuration of a SEL button in the fader strip.

**Distribution Box**

The Distribution Box includes the power supply for the desk and serves as a star point to connect all desk modules via RS422 on CAT 5 connections. Each module may be up to 50m away from the Distribution Box, and even further if a local power supply is fitted. For larger desk configurations, or if redundant power supplies are required, the Distribution Box is also available in a 19" 2U size including two power supplies. For the fixed frame version of the OnAir 3000 the Distribution Box is mounted within the console.
The OnAir 3000 and OnAir 3000Net support three studios with separate monitoring and talkback next to the control room and feature two PFL circuits, PFL 1 for the CR and PFL 2 for Studio 1.

In contrast to the CR Monitoring and Talkback Module, the Studio 1 module does not support the MPX (conferencing facility, V2.2) but includes control of the PFL 2 circuit, the add mode and the rotary for free selection of monitoring sources. This allows the use of Studio 1 as a completely independent studio e.g. in split mode or A/B mode for production of a separate program.

The Monitoring Module with Timer Extension

From V2.1, every fader channel has a separate fader stop watch, displayed in the label field of the Fader Screen. This timer value can be brought by the technician to the producer or host in the Studio via this extended Studio Monitoring Module. Next to the stop watch display is an additional local stop watch and time of day display.

Editor Module

The Editor Module is an extended three fader module including a subset of monitoring and talkback functionality and buttons for the assignment of the rotary function. Eight freely configurable buttons each for monitoring source selection and talkback destination, four configurable buttons for rotary functions like input routing, gain, etc.

Headphone Amplifier

This headphone amplifier can be fitted on top of the table or under the table with respective mounting brackets, next to a guest. It can be connected directly to a line output of the D21m I/O system and features a local amplifier with volume control. In addition a talkback signal with separate volume control can be enabled and brought to the guest headphone, heard in split mode and controlled via a GPO signal.

GPIO Boxes

Two types of general purpose desk top boxes in the OnAir 3000 design both with an illuminated button and one box with three additional LEDs are available for many different applications, e.g. cough key, control of external devices, etc. The buttons may be connected to GPIs and the LEDs to GPOs directly and configured for the respective task in the Configuration menu.

XL Module

The XL Module allows for direct communication to up to twelve outside sources. It features 12 eight digit alphanumeric displays for source label indication, 12 buttons each for PFL of and TB to these individual destinations and a rotary control for individual and sum volume control. In a typical application during e.g. a sports event or elections communication with many outside locations needs to be controlled whereby the XL Module gives a fast and ergonomic way to fulfilling this task (V2.1)
Off the Shelf

When fast and simple operation is a priority and the flexibility of the OnAir 3000 Modulo system, with its range of individual modules, is not required, the OnAir 3000 fixed frame and compact versions provide the ideal solution, enabling a complete desk surface to be installed quickly and easily either for fixed studio operation or in mobile environments.

Both the fixed frame and the compact versions incorporate the same hardware modules and function blocks as the Modulo version, allowing users to choose any required combinations according to their individual requirements. From the minimum system of one fader block with the Monitoring and Talkback block and the Main Screen in a single frame, up to the full complexity of 48 faders, Rotary blocks, Assign blocks and Fader Screens, any logical combination is possible.

The connection between the fixed frame desk surface and the DSP core consists of one TCP/IP CAT 5 cable and an ADAT fibre link for the audio signals including talkback microphone, headphones, PFL/TB loudspeaker, control room monitors, etc. The desk is powered separately from the core and may include redundant power supplies if required. The Compact version includes an external Distribution bix whereas in the fixed frame version it is included within the frame.

The OnAir 3000 system allows two desk surfaces to operate simultaneously in parallel on the same DSP core. As the system features two independent PFL circuits and supports three studios with separate monitoring and talkback facilities, the two surfaces can be used to produce two different programmes at the same time, with separate snapshots and routings for the two individual desk units.

Example of a fully equipped console with 12 channel faders, including Rotaries, Assign modules, Fader Screens, Monitoring and Talkback, Master Screen and a 3 fader Master section, e.g. used for the three main output buses. In general it is quite possible to assign any master bus to any fader on the console or as another example to use a 6 fader module for group faders or AUX master bus controls.

Variant with 12 channel faders and 3 master faders, Monitoring and Talkback and Main Screen. This configuration, with its very simple control surface, is ideal for on air applications. It may also be offered without the 3 master faders and have six of the channel faders fitted in the main section, making the console smaller. Alternatively the section with the Main Screen may be fitted in the middle of the desk to make a central script tray with six faders on each side.

The OnAir 3000 desk surface is also available in a Compact version for less demanding applications or where space is restricted. The Fader Modules are fitted in a similar table top housing as the Monitoring and Talkback Module and combined with a Modulo Main Screen giving a complete Desk. All modules are connected via CAT 5 cable to the Distribution Box similar to the Modulo version.

Part of the desk may be detached and for example mounted in a news studio either as a table top unit or in the Modulo version as a drop-in module in the studio furniture.
The OnAir 3000 is much more than a digital on air and production mixing console – it is a future proof investment in an integral part of a broadcast system. The modular structure of both the hardware and the software design allows for an open architecture permitting new levels of data exchange and remote control. Hence it is not only possible to integrate radio automation systems seamlessly to an up to now unimaginable extent, but also to exchange data and control with other desks and systems.

**Stand-alone operation**

In stand-alone operation the OnAir 3000 is an extremely powerful and flexible digital mixer for radio and production applications, whether in DJ self-op or engineering-op mode. The OnAir 3000 supports up to three studios with separate monitoring and talkback facilities and features two separate PFL circuits. The OnAir 3000 system consists of the desk surface and the rack frame including the DSP and I/O interfaces. The link between the desk surface and the core is provided by a TCP/IP link over a standard CAT 5 cable for the control signals and by a fibre optical ADAT link for the audio signals. The ADAT cable is connected to the Monitoring and Talkback Module for the Modulo version or to the back panel for the table top version.

The OnAir 3000 can be set-up in a split desk mode where a section of the surface such as a fader module is located in a studio, for example.

**Remote, Parallel and PC only operation**

It is also possible to operate the OnAir 3000 remotely. The standard graphical user interface (GUI) which is used on the Main Screen of the OnAir 3000 can be emulated in parallel on any PC or Laptop having network access to the console. It is thus possible to access all parameters including the faders and rotary controls of the physical console from the PC, with the two systems working completely in parallel. This is extremely useful for the service department both for setting configurations and for dealing with exceptional situations. The technician can check the set-up at any time and make alterations or a fault diagnosis if necessary, reacting more quickly than previously possible even from home. It is also possible for the factory to enter a system anywhere on the world, assuming access permission is given, and provide assistance.

**A/B desk operation**

The OnAir 3000 supports also two independent desk surfaces on the same SCcore at the same time. In this case the two surfaces are isolated and two users can produce two completely independent programs. Loading a snapshot on one desk does not affect the other desk. Sources can be used by both users, however, buses must be shared between both desks.
OnAir 3000Net – the Future now

The capability for distributed, networked systems is inherent in the architecture of the OnAir 3000 and the SCore platform, enabling many mixing consoles to be interconnected not only with audio but also with the corresponding control and signalling links. Thus the audio resources of the individual mixing consoles within the network become transparent to all participants and are accessible independently of their geographical location.

The Studer OnAir 3000 is not only a most versatile and flexible digital mixing console but it is also part of a new architecture in the networking of mixing consoles. Modern studio complexes can include several studios, control rooms and audio sources such as play-out systems, CD players or microphones. Digitised audio is in fact just digital data. Data with special qualities, of course, but still data. Very much like in the familiar office IT network, data can be exchanged and shared through the IT network from many local and distant users. Similarly the optional Studer OnAir 3000Net software extension allows for the interconnection of many OnAir 3000Net systems into a broadcast network either within a broadcast centre or in a larger context. In doing so, signal sources like microphones and codecs can not only be shared from any OnAir 3000Net mixing console within the network but all the respective signalling, control and GPIO circuits follow the use of the source. The OnAir 3000Net is an option to the OnAir 3000 and can be retrofitted any time.

A typical set-up may be two control rooms and one shared studio. In interconnecting the SCores the whole system becomes transparent to both mixing desks. Control room A may for example use the microphones in the studio or the microphone in control room B very much as if it were a local microphone. If the fader in control room A is opened the red light in the Studio or Control room B goes on and the monitors are cut. This operational principle is still valid for a set-up where control room A is for example in city A and the microphone is in city B.

In defining the sources which shall become accessible to both SCores in the Configuration GUI they become “known” to both control systems and appear now as regular audio sources in the input router page.

Consequently, for the user they appear as virtually local sources and can be connected to a fader channel very much the same way as physically local sources via the patch matrix and the connect button. As with local sources the administrator can lock also networked sources to a channel if wanted. To make remote sources recognizable it would be possible for example to build an input source group named “Studio” or “CR B”.

Networked sources are also part of a routing snapshot like local sources. All channel settings to networked sources like gain, dynamics settings or GPIO assignments follow the source when it is routed to another channel strip.

Distributed, Virtual Router Topology

If we apply this architecture to a whole broadcast system we see that the classic set-up whereby all signals are connected to and distributed from a central star router changes into a de-centralized cluster of local SCore platforms handling inputs and outputs locally and making them available to all users within the network. Here also the control and signalling of each individual source, e.g. fader start, remains attached to the respective source within the whole network. If for example a CD player is located in city A or studio A and the user accesses it from city B or studio B by opening the fader, the fader start signal is automatically routed to the correct location.

The topology from a centralized star router merges into a de-centralized “virtual” router. The advantages of this topology are a much greater flexibility and transparency, much less cabling effort and last but not least improved cost efficiency as the infrastructure can be used more effectively.

An extension of the system has not to be planned and prepared, hence paid for, from the very beginning as with the star router topology. An additional SCore or SCore cluster can be added to the system at any time when needed giving much more flexibility over time.
The distributed topology allows also you to consolidate central resources like codecs or telephone hybrids to a central SCore without a desk and make these resources accessible to all OnAir 3000Net in the network. This gives additional freedom in designing a system architecture and room for additional redundancy.

When migrating an existing system to the new topology a standalone SCore may be used as a gate way to the existing infrastructure.

In the picture below an example of a larger broadcast installation is shown where workgroups including several OnAir 3000Net and SCores are built per floor. These clusters are interconnected via a separate SCore making the individual sources within the clusters accessible also between the workgroups. Central resources are concentrated to one dedicated SCore making them accessible in the whole network and another SCore builds the gateway to the former system.

The Studer OnAir 3000Net system is basically independent of the network protocol used as long as the quality of service and the necessary bandwidths are guaranteed. In the minimum case of one shared microphone the audio interconnection between the SCores can be provided via a simple XLR cable and the control exchanged via TCP/IP. If more signals need to be connected/exchanged a multi-channel protocol such as ADAT or MADI may be sufficient. For large and complex applications a high speed large bandwidth protocol will become necessary.

Generally the control information and the audio connections between the SCores are done deliberately independently. The control information is done via TCP/IP protocol whereas the audio interconnection can be done theoretically via any format as the control software architecture is done generically.

The OnAir 3000Net software extension is an option to the OnAir 3000 and requires a software upgrade and, depending on the network protocol used, a D21m network interface card.
Compact SCore – digital horsepower unlimited

The audio heart of the Studer OnAir 3000 and OnAir 3000Net is a completely new and revolutionary Studer in-house development which was conceived for a much broader range of requirements than “only” a digital radio console. Hence its capabilities are far beyond what one might expect but are nevertheless delivered with the OnAir 3000!

The Compact SCore is the new implementation of the established SCore platform for the OnAir 3000 and OnAir 3000Net. It is housed in a 6U frame which can be equipped in the upper part with up to six DSP cards, the controller card, time and clock synchronization interfaces and GPIO cards. The lower 3U part includes the standard D21m I/O system.

Audio Processing

A single DSP card of the SCore platform uses six SHARC DSP chips in a cluster arrangement and the DSP cards are connected to a high-speed backplane capable of a data throughput of more than 6 Gbps or an equivalent of 4000 audio channels. The audio data is processed with a resolution of 40 bit floating point guaranteeing absolute Studer high end audio quality. The SCore and consequently the OnAir 3000 use the same DSP audio algorithms, e.g. for equalisation and dynamics, as are used in the large frame Vista and D950 mixing consoles resulting in unparalleled Studer audio quality.

Clock Synchronisation

The Clock Synchronisation board allows the internal clock frequency of the OnAir 3000 to be synchronised to an external master clock. Synchronisation to the following external signals is possible:

- AES/EBU: 32 kHz, 44.1 kHz, 48 kHz
- Wordclock: 32 kHz, 44.1 kHz, 48 kHz
- Video sync.: 25 fps, 29.97 fps, 30 fps

System Management

The system management of the OnAir 3000 and OnAir 3000Net is provided by a single board computer which also provides the communication within the system and to the desk and the network. For both cost and reliability, the best and most up-to-date solution is an industry standard processor which is produced in high volumes and can be relied upon for consistent operation and the highest quality standards. The processor runs the embedded real time industry operating system Windows CE which is also used in car navigation systems, high reliability tooling machines, military applications and aerospace applications. This approach has clear advantages over either an in-house development or a highly specific commercial operating system in that it has been thoroughly tested by a large number of users and proven in very critical applications — either in high tech environments or in the case of the car industry in high volume products with probably the most severe quality requirements in the industry. The embedded Windows CE also provides inherently all the necessary facilities for stable and reliable network communication as is used in the OnAir 3000Net audio network.

Time Synchronisation

If the SCore is equipped with the Time Synchronisation board, the OnAir 3000’s internal clock can be synchronised with an external time reference signal such as DCF 77, a GPS receiver, a Mobatime clock or many other protocols providing a serial output signal. Another possibility is to use the Radio Automation System (CAB) for time synchronisation or the network clock.
D21m I/O System

The OnAir 3000 and OnAir 3000Net use Studer’s high density D21m I/O system which is also used in the large frame digital mixing consoles Studer Vista and D950. It is located in the lower 3U part of the SCore frame. Its 12 slots can be equipped individually to the system requirements with different D21m I/O cards. The D21m I/O frame is connected via the High Density (HD) link to the DSP card in the upper part of the SCore frame.

If more inputs or outputs are needed, up to another five external D21m frames may be added and connected to additional DSP cards per D21m frame to the maximum of 6 DSP cards. This results in a theoretical maximum of 576 physical input and 576 output signals.

For connection of remote signals MADI stageboxes may be connected. A remote stand alone D21m I/O frame is connected via an optical MADI link to the SCore whereby remote D21m cards, such as mic cards are fully supported by the OnAir 3000 control system.

The Studer MADI card also allows also tunnelling a serial connection between the SCore and the stagebox. This serial connection can be used for any information but most beneficially used in a studio environment to connect remote OnAir 3000 desk modules. As an example an Editor Module may be located in the same place as the MADI stagebox and such be used as a journalist suite. The serial RS422 control of the 3 fader Editor Module is tunnelled together with the audio data to the SCore giving a very elegant solution.
Studer has produced and delivered far more than a thousand time-tested and proven digital OnAir mixing consoles throughout the world, many of which are in use 24 hours a day, seven days a week. Due to the modular design and the self-configuring software, individual hardware items can easily and quickly be exchanged at the customer’s site.

We at Studer know that reliability is vital to our customers. Therefore Studer offers worldwide service and support for its products.

Studer also offers operator training and service on-site or in the factory. Please consult your local Studer representative.

Input and output modules

The following D21m input and output cards are available:

- **Microphone/line card, 4 channels**
  With analogue insert extension connector
- **Analogue Insert card**
  Provides 4 balanced insert send and return paths
- **Line In card, 8 channels**
  24 bit Delta-Sigma A/D converter card
- **Line Out card, 8 channels**
  24 bit Delta-Sigma D/A converter card
- **AES/EBU card, 8 channels AES/EBU in, 8 channels AES/EBU out**
  Available either with i/p SFC, with i/p and o/p SFC, or without SFC
- **ADAT card, 2x8 channels i/p and 2x8 channel o/p**
  With optical interfaces
- **TDIF card**
  Provides 2 TDIF interfaces
- **MADI card**
  Provides optical 64 ch MADI interface
- **GPIO card**
  16 opto-coupler general purpose inputs
  16 open collector general purpose outputs
  also available with relays
- **HD card**
  Core connection card for up to 96 stereo inputs and 96 stereo outputs

The D21m system automatically detects newly inserted cards in real time and sends the appropriate information to the main controller. Additionally, in the case of a card failure an error message is transmitted and displayed on the GUI.

Reliability

Reliability is one of the most important elements in a live broadcasting environment, but in the real world there is no such thing as absolute reliability. Studer has therefore designed the OnAir 3000 with strict regard to all potential modes of failure:

- All desk modules are hot swappable. If a module fails, the CAT 5 cable can be disconnected during operation and a replacement module connected. After approximately 6 to 8 seconds the new module will have started up and work can continue with exactly the same settings as before the event.
- The desk and the SCore feature optionally redundant power supplies which are monitored from the control software
- All D21m I/O modules are hot swappable and can be exchanged if necessary during operation
- The DSP cards are hot swappable
- The Controller card is hot swappable; a failure does not interrupt the audio signal
- Error messages are displayed on the GUI and recorded in a log file which can be monitored and analysed from anywhere in the network allowing for immediate action
- Error messages may generate an external alarm signal, activate a pager or generate SMS messages on a mobile phone
- The network switch is optionally available in a redundant version with redundant power supplies

Service and Support

Studer has produced and delivered far more than a thousand time-tested and proven digital OnAir mixing consoles throughout the world, many of which are in use 24 hours a day, seven days a week. Due to the modular design and the self-configuring software, individual hardware items can easily and quickly be exchanged at the customer’s site.

We at Studer know that reliability is vital to our customers. Therefore Studer offers worldwide service and support for its products.

Studer also offers operator training and service on-site or in the factory. Please consult your local Studer representative.
Networking and remote control: Studer OnAir 3000 and Studer DigiMedia can be operated via the screen of a remote workstation. It makes no difference whether the workstation is connected via a LAN or a modem, e.g. the high-speed transmission protocol from a GSM modem.

This Studer DigiMedia display shows the sequence control of the on-air program. In addition to the playback and prelistening of the selections from the play list, access to the entire database is possible. Jingles, format elements or reports can be played directly even if they are not planned in the play list. Access to supplementary functions such as RDS or matrix control is also possible.

A professional two-channel or multitrack editor with or without mixing tools is built into the Studer DigiMedia software. Edited elements can be stored directly in the database. Elements stored as “Hotnews” are displayed on the On-Air Station and are ready for immediate playback through the Studer OnAir 3000 console.

For this purpose, the radio automation system Studer DigiMedia has been developed by Studer in cooperation with radio professionals bringing extensive hands-on experience. Studer DigiMedia is a worldwide proven, reliable and very easy-to-use system. The OnAir 3000 can be fully controlled by Studer DigiMedia and allows for either completely automated operation, semi-automatic operation or manual use.

The Studer DigiMedia allows for various RDS signals and messages to be sent out. In addition to the automated output of RDS data, instant messages can be transmitted, even images in jpg/gif format can be added, which may be important in view of future digital radio formats.

For scheduling, a play list can be generated either automatically or manually on the Edit Station. Modifications are possible any time on the Edit Station as well as on the On-Air Station. The play list may be assembled well in advance or shortly before broadcasting. Integration of 3rd party schedules is available.

The Studer DigiMedia is ideally suited for integration into a radio automation or Computer Assisted Broadcast (CAB) system. It can be integrated in a network of several computer workstations, and a variety of data storage devices. The whole system can also be remote controlled from virtually anywhere by a combination of notebook computer and mobile phone.

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Dimensions OnAir 3000 Fixed Frame

The OnAir 3000 in the fixed frame is assembled mechanically mainly out of module bays with 6E or 8E width. Depending on the number of faders and if Fader Screen Modules are included (Fader Screen Modules imply 8E module bays) the resulting dimensions can be calculated accordingly.

Dimensions OnAir 3000 Compact

The OnAir 3000 Compact consists of a table top fader housing for 6 or 12 faders, a table top housing for the Monitoring and Talkback Module, a standard Module Main Screen and a standard Module Distribution Box.
OnAir 3000 and OnAir 3000Net Main Features:

- Ergonomic, easy to learn “Touch’n’Action” user interface
- Complete system overview and fast parameter access via fader screens
- 3 master buses PRG A, PGM B, REC
- 16 weighted stereo mix-minus buses configurable as AUX sends
- 4 AUX stereo buses (max. 20 AUX if no mix-minus)
- 8 assignable inserts (stereo) plus analogue mic inserts
- 8 stereo groups with 4 band EQ and limiter (optional)
- Multiplex talkback, (MPX), conferencing (optional, V2.2)
- Each Channel with
  - 4 band parametric EQ plus HP, LP filters
  - Limiter, Compressor, Expander, Gate
  - De-Esser
  - Mic Inputs with High Pass Filter and analogue insert
- 2 PFL circuits (Main PFL and Extended Studio Desk PFL)
- External PFL function (e.g. for playout system), Audition bus
- CR monitoring with quick listen function on all inputs and outputs
- 3 independent studio monitoring/talkback circuits
- Different audio I/O modules, standard D21m series
- Configurable control signals (GPIOs)
- All buttons freely assignable
- Snapshots (V2.1), user management, user logins
- Graphical user interface with colour TFT touch screen
- Interface to radio automation system(s) (e.g. Monitora)
- Remotely controllable via remote GUI or Probel protocol
- Two box design with all audio and control signals connected to the SCore
- No fans, no hard disks
- Redundant power supplies
- Input and output router with graphical display
- Modular desk surface, scalability of complexity
- Fixed Frame version for easy and fast installation
- Completely adaptable to customer needs
- Upgradeable to OnAir 3000Net
- I/O sharing of audio sources
OnAir 3000 Installations

- CBC Saint John, New Brunswick, Canada
- BBC Leicester, UK
- BBC Leicester, UK
- Radio Zürichsee, Rapperswil, Switzerland
- Radio Notre Dame, Paris, France
- Danish Radio, Denmark
- Newsbeat Studios, London, UK
- RTÉ, Dublin, Ireland
- Institut National de L'Audiovisuel (INA), Paris, France
### Technical Specifications

#### General

Level specs, digital, in dBFS:
- dB, referenced to full modulation (dBFS, dB Full Scale)
Level specs, analogue, in dBu:
- 0 dB = 0.775 Vrms
Sampling rate:
- 48 kHz ±50 ppm (internally synchronized)
Headroom adjustable:
- 0 to 20 dB
Output Level:
- 15 dBu @ 0 dBFS

All input faders set to their 0 dB position. External analogue sources: source impedance < 200 Ohm. Frequency range: 20 Hz to 20 kHz, if not stated otherwise.

All input and output cards are standard Studer D21m cards. For detailed description and specifications please refer to the D21m data sheets.

#### Microphone inputs

Input sensitivity:
- –60 dBu…26 dBu for 0 dBFS
Gain setting:
- in steps of 1 dB
Frequency response:
- 30 Hz…20 kHz –0.3 dB
High pass filter (12 dB/Octave):
- 75 Hz
Input impedance:
- 1.8 kΩ
Insert level (for 0 dBFS):
- +15 dBu
Dynamic range:
- 107 dB
THD+N (30 Hz…20 kHz, –1 dBFS):
- –95 dBFS
THD+N (1 kHz, –30 dBFS):
- –111 dBFS
Equivalent input noise (200 Ω R, max gain):
- –124 dBu
Crosstalk, 1 kHz:
- –110 dBu
Phantom power, switchable:
- 48 V

#### Line level inputs

Level (for full scale): 15 or 24 dBu fixed (jumper), or 7…26 dBu adjustable
Input impedance:
- min. 10 kΩ
Frequency response 20 Hz…20 kHz:
- –0.2 dB
THD & N (35 Hz…20 kHz, –1 dBFS), input level fixed:
- max. –97 dBu
THD & N (1 kHz, –30 dBFS), input level fixed:
- max. –111 dBu
Crosstalk, 1 kHz:
- –110 dB

#### Digital inputs/outputs

Input/Output impedance:
- 110 Ω
Output level (into 110 Ω):
- 5V
Input Sampling rate with SFC:
- 32…108 kHz

#### Analogue outputs

Level (for full scale): 15 or 24 dBu fixed (jumper), or 7…26 dBu adjustable
Output Impedance:
- 40 Ω
min. Load at +24 dBu:
- 6000 Ω
Frequency response 20 Hz…20 kHz:
- –0.2 dB
THD & N (20 Hz…20 kHz, –1 dBFS), input level fixed:
- max. –90 dBu
THD & N (1 kHz, –30 dBFS), input level fixed:
- max. –110 dBu
Crosstalk, 1 kHz:
- –110 dB

#### Equalizer

4 Band, each band sweepable 20 Hz…20 kHz:
- ±18 dB
Q-factor:
- 0.27…8.7
HP and LP filter, each sweepable 20 Hz…20 kHz:
- 12/18/24 dB/Oct

#### Dynamics

Dynamic level:
- 0 dB…+24 dB
Dynamics:
- ON/OFF

#### Limiter

Threshold:
- -39 … +9 dB
Attack time:
- 0.2 msec … 1 msec
Release time:
- 10 msec … 10 sec

#### Compressor

Threshold:
- -87 … +9 dB
Ratio:
- 20:1 … 1:1
Attack time:
- 0.2 msec … 20 msec
Release time:
- 10 msec … 10 sec

#### Expander

Threshold:
- -87 … +9 dB
Ratio:
- 20:1 … 1:1
Attack time:
- 0.2 msec … 1 msec
Release time:
- 10 msec … 10 sec

#### Noise Gate

Frequency range:
- 4 kHz…14 kHz
Q-factor:
- 0.27…8.7
Threshold:
- –87 dB…+8 dB Auto Mode
Ratio:
- 20:1 … 1:1

#### De-esser

Frequency range:
- 4 kHz…14 kHz
Q-factor:
- 0.27…8.7
Threshold:
- –87 dB…+8 dB
Ratio:
- 20:1 … 1:1

#### Power supply

Mains voltage:
- 100 to 240 V, 50/60 Hz (auto-ranging)
Power consumption:
- Scoring: typ. 120 W
- Desk: typ. 150 W

#### Weight

OnAir 3000 fixed frame 12 fader with Screens:
- 42 kg
OnAir 3000 fixed frame 18 fader with Screens:
- 47 kg

#### Note:

Depending on the application, the OnAir 3000 and OnAir 3000Net can have different configurations. For this reason the values mentioned above are applicable only to a typical configuration; in individual cases, the values may differ. We reserve the right to change specifications as technological progress may warrant.

Data subject to change without notice.