

USER MANUAL

PROFESSIONAL PORTABLE MIXING CONSOLE

SONOSAX SX-ST / SX-VT

Audio equipment manufacturer

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INTRODUCTION

Congratulations !!! by purchasing your SONOSAX SX-ST or SX-VT professional mixing console, you have acquired a product of the highest quality, manufactured to deliver many years of outstanding performances. The SONOSAX SX-ST or SX-VT Series are the most compact modular mixing consoles on the market. Meanwhile their reduced size, they offer a maximum of possibilities to suit each user needs, with unequaled characteristics.

As with all SONOSAX products, the SX-ST and SX-VT series are built without any compromise in quality. Our 25 years of experience have helped us to develop and build this mixer which is designed to last a minimum of 12 to 15 years. The reliability of the SONOSAX SX-ST or SX-VT is due to a high-tech design, the choice of the best components available, a meticulous hand assembly and a severe quality control.

Each stage of the modules has been extensively studied to give the highest in quality and performances. The result of the research and development is an ergonomic mixing console with extraordinary characteristics.

Key Features

- Compact and fully modular construction
- Uncompromised choice of components
- Ultra-low noise mic preamps with +48V phantom power available on all input channels
- Electronically balanced, transformerless inputs and outputs
- Wide bandwidth 10Hz to 200kHz, suitable for SACD and next converters generations
- High dynamic range and large headroom
- Direct Outputs selectable Pre-EQ, Post-EQ or Post Fader
- 8 Groups individually selectable Pre or Post Pan
- 4 Auxiliaries individually selectable Pre or Post Fader
- Limiter on each input channel
- High quality conductive plastic linear fader
- Dual peak meters on each input for Pre and Post Fader level indications
- Triple Monitoring section with 2 Private Lines for communications
- Large scale level-meter indicators switchable to level and phase correlation meter
- Internal 8 channels of high quality A to D converter (optional)
- Integrated 8 track Hard disk and Compactflash Card recorder (optional)
- Compact size and low weight
- Low consumption

The information contained in this manual is subject to change without notice.

All specifications mentioned in this manual apply to standard models only.

SONOSAX SAS SA reserves the right to modify these characteristics at any time without prior notice.

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1. GENERAL DESCRIPTION

The **SONOSAX SX-ST** and **SX-VT** Series is a line of extremely compact, portable, self-contained mixing consoles, designed for professional mobile and studio applications.

Built in a strong, rugged and anodized aluminum chassis, the **SONOSAX SX-ST** and **SX-VT** Series provide the best solution whenever top performances, reduced size and low consumption are important. Due to its versatility, the **SONOSAX SX-ST** and **SX-VT** are the ideal mixing consoles for numerous applications, such as:

- video, television and cinema production and post-production
- fixed and mobile recording studio and broadcast
- OB Van
- digital or analog sound recording
- very high quality sound systems for concert halls, theaters, etc.

The **SONOSAX SX-ST** and **SX-VT** have been created taking into consideration the possibility of working with digital sound recording, as well as synchronization and automation with other existing or future equipment.

1.1 SONOSAX SX-ST series

Battery or DC powered, the **SX-ST** series are available with configurations of up to 10 inputs modules. The Master & Monitoring module provides with 8 Master outputs, 4 Auxiliaries, 3 independent Monitoring selectors, two independent Private Line for communication

Two frame sizes for the **SX-ST** series are available:

SX-ST8D, for up to 8 input modules with space provided for optional Digital or Recorder module

SX-ST10, for up to 10 input modules, or up to 9 inputs and one Digital or Recorder module

The **SX-ST** series being fully modular you can purchase with a few number of modules and add more modules or options at a later date.

1.2 SONOSAX SX-VT series

The **SX-VT** series is derived from the **SX-ST** series but is available with configurations from 10 to 48 inputs. Thus, the technology and the modules are similar, the battery pack have been removed as the **SX-VT** series can only be AC powered from its external main power supply. The AC voltage range varies from 100 to 260V AC, 40Hz to 60Hz, thus allowing the use of the console worldwide, without any modification.

For OB-Van applications, we can provide a special power supply to power the mixer from the 12V or 24 V vehicle battery bank.

The **SX-VT** series comes with the same Master & Monitoring module as the **SX-VT**.

Each **SONOSAX SX-VT** mixing console is composed of standard modules combined and assembled according to the needs and desires of the user. In this way, it is adapted as closely as possible to the required specifications and at the same time, remains expandable.

1.2.1 VCA and Compressor options

As an option, the **SX-VT** series input modules can be equipped with VCA's (voltage controlled amplifier) and/or a Compressor instead of plain faders.

A DB25 computer type connector allows control of the VCA with an external DC voltage source (for example a video editor or an automation system) thus allowing individual level control for each input.

The compressor is of a very particular type and does not have the "pumping" effect so often found with this kind of circuitry. The user is therefore assured at all times, particularly when working with digital systems, that there will be no saturation that could lead to catastrophic effects.

NOTE: When used with external controllers, faders must be positioned at 0 dB.

Due to power consumption of VCA's, these options are not available on the **SX-ST** serie

2. INSTALLATION

2.1 Safety Instructions

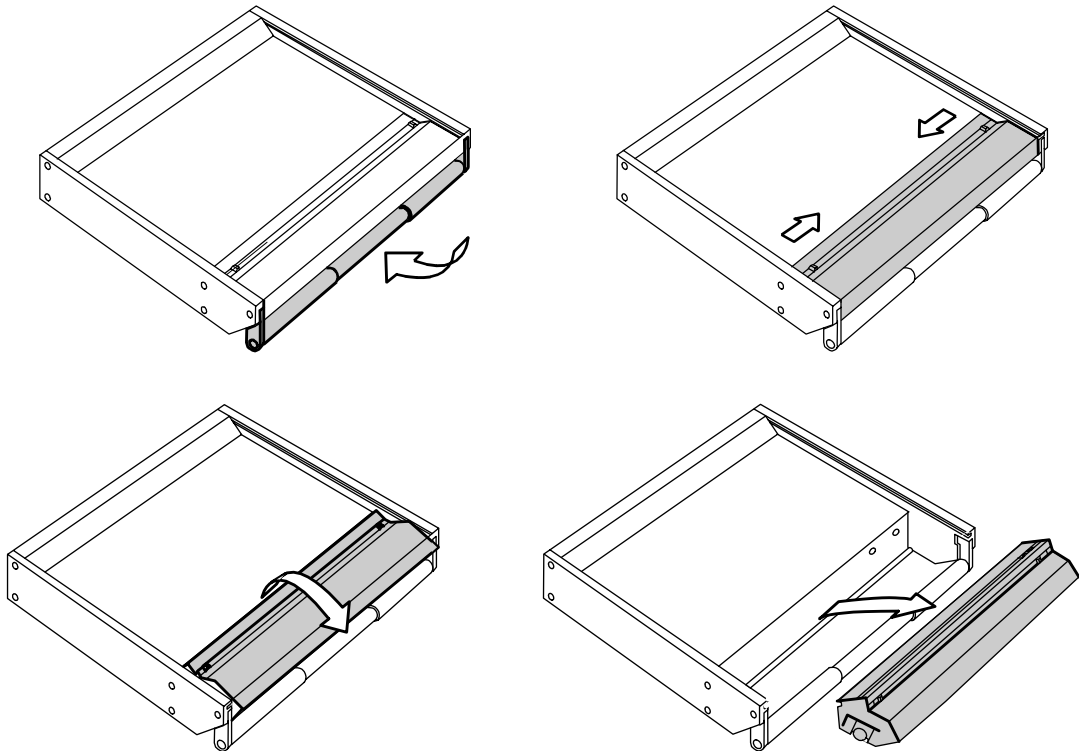
- Read all the safety and operation instructions before operating the SX-ST / SX-VT console and its power supply.
- Keep the instructions for further reference.
- Follow all warnings, notes and instructions in this operation manual.
- Do not use the SX-ST / SX-VT console and its power supply near water, avoid moisture.
- Keep the SX-ST / SX-VT console and its power supply away from heat sources such as radiators or other devices that produce heat.
- Connect the SX-ST / SX-VT console only to the original power supply included with the console or to one with same characteristics as described in these instructions.
- Route power supply cords so that they are not likely to be walked on or pinched by items placed on or against them, paying particular attention to cords at plugs, inlets and the point where they exit the console. Keep power cords away from audio cords.
- Do not drop objects or spill liquids onto the SX-ST / SX-VT console and its power supply.
- The SX-ST / SX-VT console and its power supply should only be serviced by qualified service personnel. Please contact factory or your nearest **SONOSAX** authorized reseller.
- Do not defeat the grounding or polarization of the SX-ST / SX-VT console or its power supply.
- Line voltage selectors should only be set and equipped with a proper plug for alternate voltage by a qualified service technician.
- To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.
- Internal settings must be executed by an authorized SONOSAX distributor or reseller. There is no user serviceable parts inside the mixer. Damage due to manipulations inside the unit cancels the SONOSAX warranty immediately..

2.2 Battery Power Mode (SX-ST Series only)

2.2.1 Removing the battery compartment

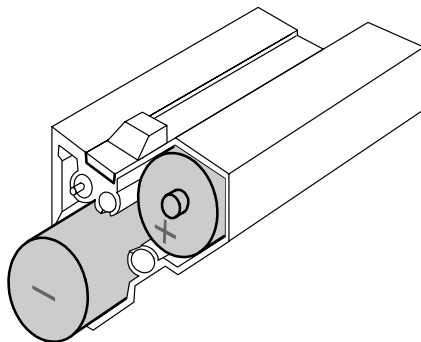
Remove the battery pack by releasing the two slide-locks, tilting the compartment diagonally towards you and lifting it out.

IMPORTANT: Keep the slide-locks pressed towards the center till the battery compartment is completely lifted out of the mixer.



2.2.2 Opening the battery compartment

The battery compartment may now be opened by un-tightening the screw on the left side. Remove the plastic side cover and insert 12 alkaline D-cells or 12 rechargeable Nickel-Cadmium (NiCd) or Nickel-Metal-Hydride (NiMH) batteries.



NOTE: On the left side of the battery compartment, you will find the hexagonal wrench (2 mm) which enable you to completely disassemble the SX-ST without using any other tool.

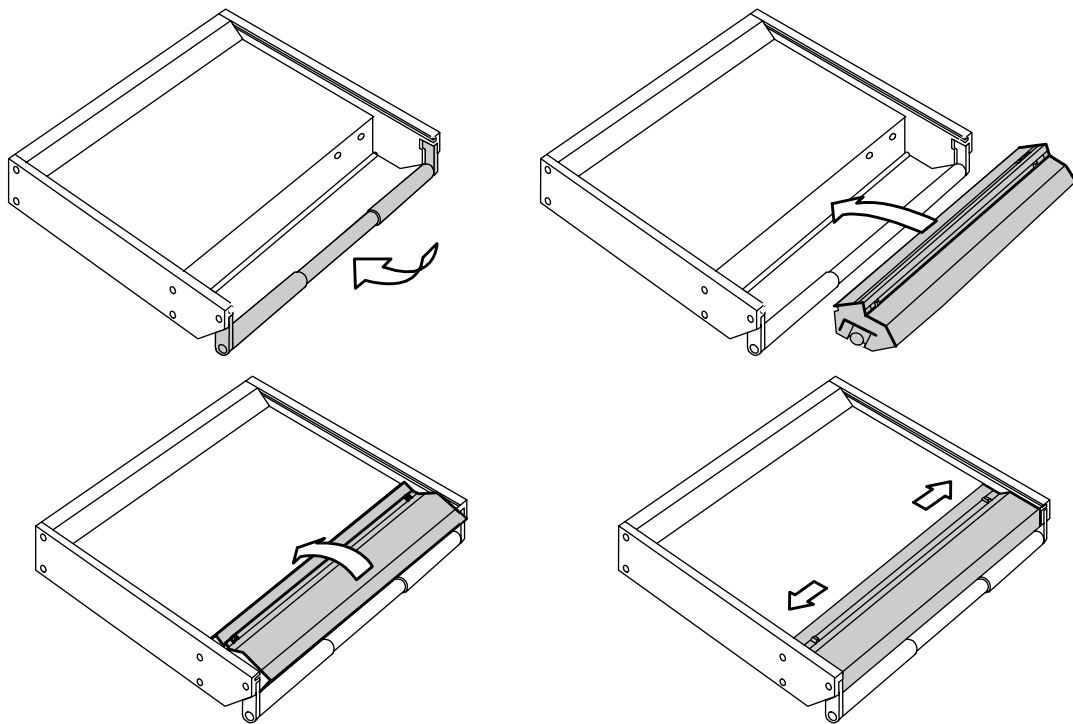
WARNING: Never leave discharged batteries in your SX-ST. Make sure that your SX-ST only contains rechargeable NiCd or NiMH batteries before charging. When using dry cells, use only professional alkaline batteries to ensure optimal autonomy,. Also check the manufacture date

2.2.3 Closing the battery compartment

Replace the plastic side cover and tighten the screw. (Do not over tighten)

NOTE: Certain D-Cells are longer than standard D-Cell batteries and slight difficulty may be found in closing the compartment if such batteries are used. Your nearest **SONOSAX** agent or the manufacturer in Switzerland can provide assistance if a problem arise due to this difference in length.

Replace the battery compartment while holding in the slide-locks and make sure the power contacts are correctly positioned. The battery compartment is in place when the slide-locks return easily to their original position.



2.2.4 Batteries charger (option for SX-ST Series only)

An external NiCd or NiMH batteries charger is available for the SX-ST Series. (part nr SX 008415)

You do not need to remove the cells from the battery tray to individually recharge the batteries.

A connector located at the right side of the battery tray is provided to recharge all 12 cells at once. Simply remove the battery compartment as described at section 2.2.1 and connect appropriate charger to the battery pack.

WARNINGS:

- Never attempt to charge alkaline D-Cell batteries (high risk of explosion !)
- Charger must be suitable for 14,4 V batteries
- Make sure that your NiCd or NiMh batteries accept high current charge when using a fast charger

2.3 External DC Power Mode (SX-ST Series only)

The **SONOSAX SX-ST** mixer can be powered from an external 10 to 18 Volts regulated DC power supply, capable of delivering at least 2.5A. The average power consumption is approximately 2A.

The **SX-ST** series is supplied with an auto-ranging power supply 100 to 240 VAC 50 or 60 Hertz, that can be used worldwide without modification or setting changes.

The DC power supply input connector (XLR 4 pin, **SONOSAX** Part Number xxxxxxxx) is located on the rear panel of the SX-ST mixer. Pin 1 is 0V or negative / Pin 4 is positive +10 to +18VDC

2.4 AC Power Mode (SX-VT Series only)

The connection of mains the power supply is made by using a mains cable and a standard IEC receptacle. It meets all of the international safety certification requirements.

Please make sure that the unit has a proper ground connection. For your own safety, it is advisable not to remove the ground connection at the power supply or fail to make this connection at all.

2.4.1 Operating voltage switch

The external Main Power Supply is designed for an AC voltage range from 100 to 260V AC, 40Hz to 60Hz without any modification.

3. OPERATING INSTRUCTIONS

3.1 Switching ON your SONOSAX SX-ST / SX-VT mixer

The POWER ON switch is located on the Master Module at the right side of the lower level meter. Turn to Power position to activate the internal DC/DC Converter that will power up your mixer. The green LED should lit up within 2 to 3 seconds, if not:

- Check that batteries have been inserted correctly inside the battery compartment.
- If necessary change the batteries.
- Check the external DC Power supply

3.2 Using an External DC Power Supply

Apply External DC Voltage from 10,5 to 18VDC (see 1.6) between points 4 (+Vdc) and 1 (0V) of the XLR-4 connector. The external DC power supply must be regulated and capable to deliver a continuous current of at least 2,5 Amp

3.3 Battery Test

When the BATT TEST momentary switch, located below the Level Meters, is depressed, the lower level meter will indicate the average charge per cell (minimum 1V, maximum 1.5V).

3.4 Low Battery Alarm

When the average charge per cell reaches 1.05V, the **Low Batt** LED will automatically start to blink. This alarm means that about 10 to 20 minutes remain before the mixer automatically turns off. This auto-stop protects the accumulators from excessive discharge.

3.5 Automatic changeover of power source (SX-ST Series only)

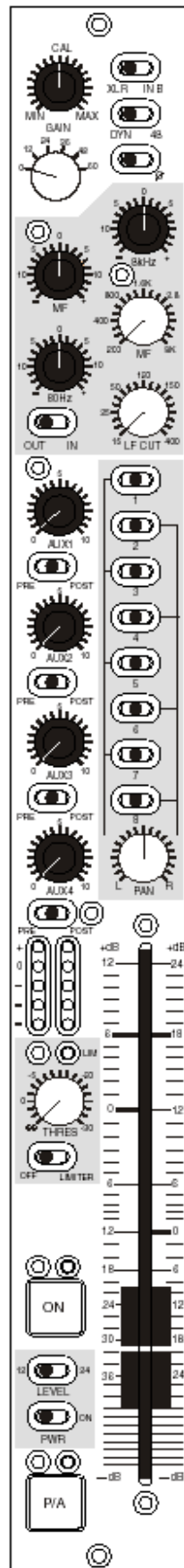
The internal DC/DC converter circuitry is designed to automatically changeover between the internal batteries and the external DC power supply. You do not need to power OFF the SX-ST to change the power source.

While powering up the mixer, when both the external DC power supply is connected and the internal batteries are installed, the internal DC/DC converter will first connect to the external DC power supply even if the external DC voltage is lower than the battery pack voltage. If the external power voltage drops below 10.5 Volts then the DC/DC converter will automatically switch to the battery pack

When the voltage of the internal batteries drops below 1.00V per cell the DC/DC converter will switch automatically to the external DC power supply if connected to the mixer after the power up procedure.

NOTE: there is absolutely no noise, pops or clicks during a power source changeover

INPUT MODULE



4. INPUT MODULE

Traditional professional mixing consoles are generally based on the same input structure. The signal from the microphone goes through a phase reversal switch and then to a pad to attenuate the signal before going to the first amplification stage. Some mixers even introduce a transformer before the first stage to simplify the circuits. Reducing the signal level before amplifying it increases noise. It also limits the range of input signal that can be accommodated before overload distortion occurs. Some consoles even add a LF Cut before the transformer to avoid saturating it in presence of low frequencies at high level, meanwhile this might be useful under certain conditions, like strong wind noise, this causes phase shifting.

For ages this type of circuit has been used for analog recording and nowadays ...

The new **SONOSAX SX-ST & SX-VT** input stages do not reduce the microphone level before amplification. Instead we control the amount of amplification and therefore no additional noise is introduced by this method. Using transformerless circuitries avoids unnecessary phase shifting, eliminate the risk of transformer saturation at low frequencies, offers a much better slew rate and allows very wide bandwidth with a flat frequency response as required for SACD

With a careful design of the input amplifier stages and selecting only the best of today's available components, it is now possible to handle a significant increase in the input level before overload. Conventional input stages require the operator to do a delicate balancing act between the input gain control and the channel fader to prevent unexpected input overload or so much gain that the noise comes up. Thus, heretofore unattainable low noise input figures and high input headroom figures are a reality.

4.1 Input Select Switch

The SX-ST provides with two different connections type per input: one is on a conventional XLR-3F receptacle and the "B" input on a multi-lines 25pin Sub-D connector. This is useful when different sources are frequently swapped (e.g. a set of microphones and a multi-track recorder/player) or when a set of microphones are connected using a stage box and a multi-ways cable

Position XLR: the XLR input is selected
Position IN B: the 25pin Sub-D connector is selected

NOTE: The 25pin Sub-D connector is NOT a Line level input only, it provides with the same facilities as on the XLR's like phantom power and phase reverse. The wiring conforms with most popular equipments to allow the use of "standard" ready made multi-ways cables - see also section **xxxx** for pin assignment. All XLR's are wired with pin#2 High (1 = Gnd / 2= High / 3 = Low)

4.2 Mic power switch

Used to turn ON or OFF the phantom power:

Position DYN: 48V phantom power is OFF – for use with dynamic mics or line
Position 48: 48V phantom power is ON – for use with condenser mics

WARNING: The 48V will be applied to either the XLR or the 25pin Sub-D according to the Input Select switch position. Caution must be taken when equipments other than a condenser microphone is connected to the 25pin Sub-D.

NOTE: The SX-ST / SX-VT mixers do not provide with T12 and P12 voltage supply. Some 48V phantom to T12 or P12 adapters are available on the market

4.3 Ø Phase reversal switch

This switch reverses the phase of the input signal without affecting the microphone powering. It reverses the phase of any audio signal connected to the either the XLR or the 25p Sub-D connector.

4.4 Gain Controls

The primary input stage allows a wide range of gain setting, from - 20 dB up to +80 dB.

The rotary switch is used to set a primary fixed gain of: 0, 12, 24, 36, 48 or 60 dB.

Then, the rotary potentiometer is used for a progressive and fine adjustment of the input gain, within a range of -20dB to +20 dB from the center CAL position.

An additional +12dB or +24dB of gain is available on the linear Fader (see also section xx)

NOTE: Gain controls should be used with care since the adjustment range is extensive. Check input level using the LED's Pre-Fader Level Meter and/or activate the PFL mode to avoid an overload or a weak signal level. A signal level set too high can causes distortions and will leave you with less headroom, a level sets too low causes a bad signal to noise ratio.

4.5 LF Cut and Equalizer

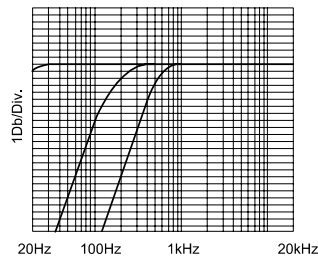
The **SONOSAX SX-ST / SX-VT** series input module is equipped with a powerful filtering and equalization section. Its design is derived from our previous model **SONOSAX SX-S** on which the efficiency and sonic integrity have been well proven in practice for decades.

The Equalizer IN or OUT switch activates or bypasses the filtering of 80 Hz, 8 kHz and MF tones. It is also used for instant comparison of filtered and non-filtered audio.

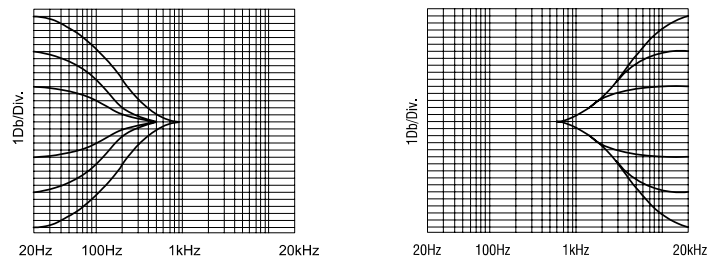
NOTE: The EQ IN/OUT switch can be configured to include the LF Cut or not, depending on the position of the jumper S-7 on the circuit board. By default, the LF Cut is not dependant of the EQ In/Out switch.

Following filters are available:

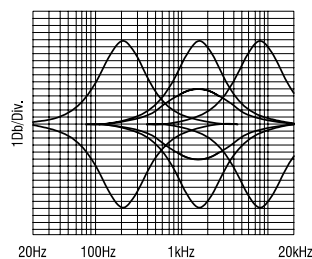
- **LF CUT:** also called High Pass Filter, this Low Frequencies filter has a fixed slope of 18 dB per octave. The cutoff frequency is progressively adjustable from 15 Hz up to 400 Hz. This filter is commonly used to remove unwanted low frequency noises such as room rumble, wind noise, popping, etc. For quality reasons, the LF Cut is located after the pre-amp stage, however in cases of extreme high wind noise or loud room rumble, it may becomes difficult to capture clear sound. In such cases, we recommend to use an external LF Filter like e.g. the LC60 or LC120 made by Shoeps.



- **80 Hz and 8 kHz:** bass and treble adjustments are achieved using two ± 15 dB knobs.



- **MF:** is a semi-parametric (sweepable) equalizer with a broad fixed bandwidth. (Q Factor: xx) Medium frequencies adjustment is achieved using one knob to progressively adjust the central frequency from 200 Hz to 8 kHz, the other to adjust the amplitude within a range of ± 15 dB.



4.6 Mix busses 1 to 8 assignment

The **SX-ST / SX-VT** series are equipped with eight groups (or tracks) mix busses. Channels can be assigned to mix busses Pre or Post PAN Pot using the advanced routing selector switches to create either 8 individual mono groups or up to 4 stereo groups or free combinations of mono and stereo groups.

Logically, an individual group is Mono and therefore should not be affected by the PAN Pot. Alternatively, the PAN Pot is needed to build a stereo group.

This advanced bus assignment selector allows complex routing configurations. For example, channels can be individually assigned or mixed Pre Pan to a mono group for multi-track recording and simultaneously mixed Post Pan onto a stereo group for e.g pre-mix purposes

The 3 positions switches of the routing selector 1 to 8 are used to individually assign channels to the mix busses 1 to 8 either Pre or Post PAN Pot as follow:

Switches 1 to 8 in Center Position : OFF , no audio is fed to the corresponding mix bus

Switches 1-3-5-7 in Left position : assign the channel to Odd busses Post PAN

Switches 1-3-5-7 in Right position : assign the channel to Odd busses Pre PAN

Switches 2-4-6-8 in Right position : assign the channel to Even busses Post PAN

Switches 2-4-6-8 in Left position : assign the channel to Even busses Pre PAN

The two lines drawn either sides of the selector give a clear view of the Pre/Post PAN assignment: when the switches are set toward the drawn line, corresponding busses are assigned Post Pan.

A good tip is to remember that, conventionally, Odd busses are defined as Left channels and Even buses are defined as Right channel in a stereo group. Therefore, by setting Odd switches to the Left and Even switches to the Right you logically assign the busses Post Pan.

On the Master module, the eight tracks are grouped per pairs: 1/2 – 3/4 - 5/6 – 7/8 thus allowing to control the output levels of a stereo group by mean of a single Master Fader.

4.6.1 Pan Pot (Panoramic Potentiometer)

The PAN Pot. knob progressively balances the modulation from left to right when used in conjunction with the Mix Busses Selector switches located above.

4.7 AUX Sends 1 to 4

The **SX-ST / SX-VT** mixers provide with 4 Auxiliary Sends mix busses. AUX 1 to 4 are used to create mixes for headphone cueing, effect sends, stage monitor mixes and all kinds of different sub-mixes.

When turned fully clockwise, an additional 10dB gain is added to the Aux send bus.

4.7.1 AUX 1 to 4 PRE/OFF/POST switches

A 3 positions switch Pre/Off/Post assigns the modulation to the Aux busses before (PRE) or after (POST) the channel fader. In its center OFF position, no signal is sent to the corresponding AUX bus.

NOTE: the internal jumper Sxx sets the Pre Fader Aux sends either Pre or Post EQ (factory default)

4.8 Dual Peak Level Meters

A dual 5 Leds Peak Meter provided on each input module, shows the Pre and Post Fader levels:

- Red : +6dB lights on xx dB before overload
- Orange : 0dB nominal level
- Green : -10dB
- Green : -20dB
- Green : -40dB

When an overload occurs, all Leds turn Red

NOTE: the PRE fader level can still be monitored even if the channel is turned Off (Muted)

4.9 Limiter (non VCA version only)

Each input module is equipped with a Limiter switchable ON or OFF. The THRES knob (threshold) sets the level above which the limiter becomes active. This threshold level can be progressively adjusted between infinite and - 30dB.

The attack time is very fast (half alternance only) and the release time is program dependant.

NOTE: The limiter will be automatically activated when the level applied at the input exceeds 25dBu, even if the Limiter is switched Off. This will protect the input stage, avoid saturation and ensure a supplementary margin of 6 dB over the maximum input level.

4.9.1 Limiter LED

The green LED above the threshold knob lights ON only when the modulation reaches the level sets with the threshold knob, indicating that the limiter becomes active. As long as the LED remains dark, the Limiter is inactive and has absolutely no effect on the audio signal.

4.10 ON Push button

It turns all the mix bus sends and channel outputs ON or OFF (Mute). This function is absolutely noiseless and affects the mix busses 1 to 8, the Pre and Post fader Aux Sends, the channel solo, the direct output and the Insert send/return.

NOTES: - While powering up the mixer, all channels are turned OFF by factory default. Channels can be turned ON during power up by implementing jumper S8. (see section xx)
- For monitoring purposes, the PFL signal and Pre Fader level meter remain available even if the channel is turned OFF (Muted)
- The ON/OFF push button can be controlled from an external device. (SX-VT and VCA's type only)

4.10.1 ON status LED

The LED lits ON to indicate the "ON" status of the input module (factory default).

NOTE: By implementing jumper S9, this Led will turn ON to indicate the OFF (or MUTE) status. This status may also displayed on a remote control panel for a better global view. (SX-VT serie only)

4.11 Channel Fader

The 100mm channel Fader precisely controls the level of the signal sent to mix busses 1 to 8, to the Post Fader Auxiliary Sends 1 to 4 and also to the direct Line Out post-fader signal.

The Fader has a logarithmic course and, to match with the level switch setting (see chapter below) two different scales in dB's are printed either side of the Fader for exact and repeatable level adjustments.

The scale on the left is conventional from minus infinite to +12dB, on the right side it goes up to +24dB.

4.11.1 Level switch 12 / 24 (SX-ST series only)

The 12 / 24 level switch lets you choose between two maximum gain on the channel Fader.

In position 12, the fader has a conventional course from minus infinite up to +12dB of gain. In position 24, an additional amplification of 12dB is applied BEFORE the fader for total gain of up to +24dB on the fader.

While recording "on location" huge dynamic jumps are very common and sometime difficult to handle as the input gain must be rapidly adjusted to avoid either overloads or weak audio levels. This forces the sound engineer to frequently use both hands on one channel to make a delicate adjustment between the input gain and the mix level on the fader.

The input stage in the SX-ST / SX-VT is having such a significant headroom that it is normally not necessary to reduce the input gain. However, when the ambiance sounds become more silent, it may be necessary to increase the level so much that the traditional +12dB fader gain is not enough. Switching to the +24 position ensure sufficient gain margin on the fader to keep hands and concentration for the mix rather than loosing attention in controlling the input gain.

NOTES: the level switch should not be used during recording as it causes a level jump of 12dB. The additional 12dB of gain apply to all post fader signals.

4.12 Channel Power switch (SX-ST series only)

It powers ON or OFF the entire input module. This function is useful to save the battery power when only a few numbers of channels are being used. An audible pop will be introduced in the mixer's outputs if this switch is used during normal operation.

4.13 PFL/AFL push button

The P/A push button is used to monitor the channel signal Pre-Fader PFL or After-Fader AFL and to check its level on the main level meters. A mode selector located on the Master/Monitoring Module let you choose between the 3 operating modes of the P/A button: SOLO/AFL/PFL (see also section xxx)

NOTES:

- you can still monitor the PFL signal even if the channel is turned OFF (Muted)
- Jumper S12 (L) and S13(R) determine whether the AFL is taken Pre or Post PAN pot

4.13.1 P/A LED

The P/A LED lights ON to indicate when the PFL/AFL push button is depressed. This LED is blinking to warn you when the SOLO Mode is selected.

4.14 VCA 1 to 8 Group Selector (SX-VT Series with VCA input module only)

This selector sets the VCA Group 1 to 8 for the channel fader. VCA groups are created on the Master Output Module and the signal level of selected inputs will follow the control voltage derived from a VCA Group Fader on the console or from an external device.

NOTE: A VCA Group allows to use just one fader to control a larger group of channels (drums, horns, backing vocals) and thus, providing an easier control (especially without automation).

4.15 Compressor (SX-VT series with VCA input module only)

This switch enables or disables the channel compressor. The compressor is used to limit the dynamic range of an instrument or sound. If you experience extreme amplitudes or signal peaks, heavy distortion may occur, especially with digital recording equipment. To avoid this kind of distortion or, for example, to avoid loudspeakers getting damaged by overload, use the compressor. Compressors can also be used to change the sound of an instrument by applying extreme settings. The principle function used in these devices is dependent on an automatic gain control which reduces the amplitude of loud passages and therefore restricts the original dynamics to a desired range.

4.15.1 Threshold

This control sets the threshold level for the compressor. It has a range of -30 to +infinity. Generally threshold levels for compressors are set below the normal operating level to allow upper dynamics to be musically compressed. For high ratio settings (limiter function), the threshold point is set above the normal operating level in order to provide reliable signal limiting and thus, protects subsequent equipments.

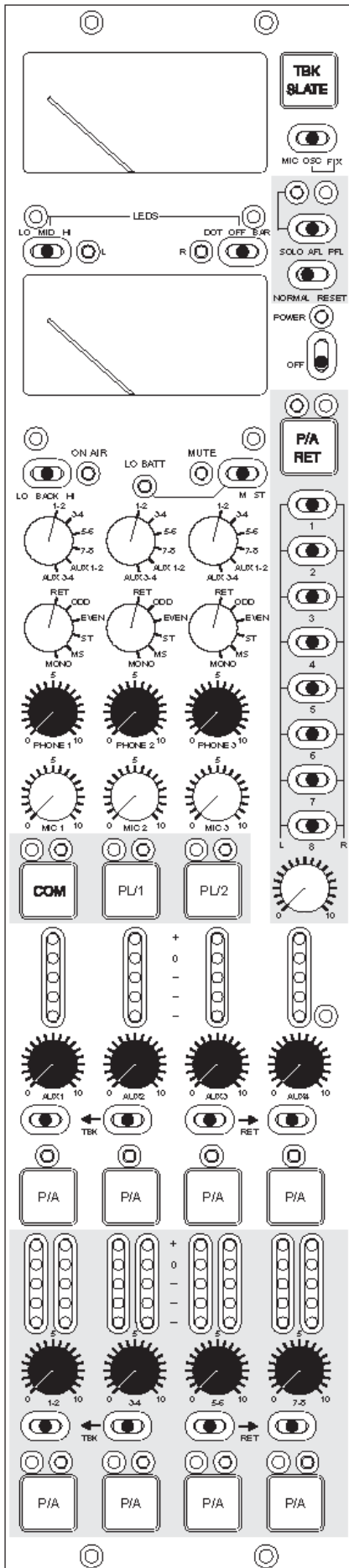
4.15.2 Ratio

It controls the compression ratio between the input and output levels for all signals exceeding the threshold point. The control range can be adjusted with the RATIO knob from a 1:1 ratio to an infinity:1 ratio.

4.15.3 Compressor LED

This Led will light ON only when the compressor becomes active and turns OFF when the compressor is inactive, depending if the signal level is equal to or higher than the threshold point.

5. MASTER & MONITORING MODULE



5.1 Meters

Two high precision moving coil Peak Meters read the audio levels selected by the Main Monitor rotary switch, offering a wide range of 44dB from -32dB up to +12dB.

The upper meter shows the Left channel or the phase correlation,

The lower meter shows the Right channel or the battery level.

When any P/A button is depressed, the meters show the corresponding AFL/PFL signal

5.1.1 ST / M / Low Batt switch

This 3 positions switch lets you choose the operating mode of the Meters.

ST (stereo) : the meters display on a conventional way the Left and Right audio.

M (mono) : the upper or Left meter shows the phase correlation of the selected mix to easily detect a phase error and check for mono compatibility. The lower or Right meter reads the highest level of either the L or R channel. The two red Led's between the meters indicate which one of the Left or the Right peak signal is being displayed.

Low Batt : Press the switch to its momentary left most position to check the battery level. The lower will then indicate the average voltage per cell.

5.1.2 Meter's Backlight switch

This three positions switch allows you to dim or to turn off the backlight of the two moving coil meters:

OFF position: Backlights are OFF.
MID position: Medium backlight intensity (dim).
HI position: Maximum backlight intensity.

5.1.3 LEDS switches

Two switches between the Meters define the operation mode and intensity of all Led's and Bargraph meters present in the console.

The left switch sets the LED's intensity:

LO position: Minimum (low) LED's light intensity.
MID position: Medium LED's light intensity.
HI position: Maximum (high) LED's light intensity.

The right switch sets the operating mode of the meters:

DOT position: Only the last LED is lighting to show the level
OFF position: all meters are turned OFF.
BAR position: meters operate as Bargraph

5.1.4 ON AIR and MUTE Leds

On Air signaling and Monitor Mute are two functions commonly found in Broadcast applications. These functionalities can be activated by the dip switches located under the channel fader. When a channel is turned ON, the On Air and the Mute functions will be activated as soon as the Channel Fader is opened.

5.2 Talkback/SLATE and Oscillator

The SX-ST/SX-VT mixers feature an advanced Talkback/Slate functionalities. Pressing the Talkback/Slate push button located on the upper right corner of the Master & Monitoring module will send either the external Communication / Slate microphone signal or the internally generated 1kHz tone to a bus that can be individually routed and mixed to any of the Mains and the Auxiliaries outputs.

For clarity reason we call it the "Talkback Bus". The switch position labeled ←TBK underneath the Mains and Auxiliaries Master Faders refers to this "talkback bus" (see section xx)

NOTE: the Talkback/Slate bus is totally independent of the Communication and Private Line circuitries, meanwhile they are using the same external microphone

5.2.1 MIC/OSC/FIX switch

This three positions switch selects which of the two possible sources is assigned to the talkback bus:

- MIC position: the (external) talkback/slate microphone signal is momentary sent to the talkback bus when the TBK/Slate button is depressed
- OSC position: the internal oscillator generates a 1 kHz sine wave tone which is momentary sent to talkback bus when the TBK/Slate button is depressed
- FIX position: the 1 kHz sine wave tone is permanently sent to the talkback bus. (for calibration or test procedures).

5.3 PFL/AFL/SOLO and operating mode

These are new features of the SX-ST/SX-VT series that allow users to configure the functionalities and the operating modes of all the P/A push buttons available on the input channels, the Mains and Aux sends.

- PFL position: P/A buttons are configured for PFL (Pre Fader Listening)
- AFL position: P/A buttons are configured for AFL (After Fader Listening)
- SOLO : P/A buttons are configured for SOLO (true SOLO In Place) It is used for "soloing" one (or more) channel "In Place" of the others. When one or more P/A buttons is depressed, all other channels are muted ! Therefore the red Led above the switch starts flashing, warning you that the SOLO function is selected.

5.3.1 Normal/Reset switch

- Normal : This mode is additive, so one or more P/A buttons can be individually activated.
- Reset : This will automatically reset and override any previously activated P/A buttons.

5.4 Power ON/OFF

Turns On and Off the internal DC/DC converter that powers the entire mixer. Please refer to chapter 4.

5.5 Returns 1 to 8

A 25 pin Sub-D "Return" receptacle is available to connect up to 8 "Return" to the SX-ST / SX-VT mixer.

It can be used to monitor and/or assign and re-mix the return of a multi-track recorder or any external lines to any of the Groups or Auxiliary sends. A row of eight switches is used to individually assign and mix the return channels to a stereo "Return" bus:

- Left position: assign the track to the left channel of the return mix bus
- Middle OFF position: the return is not assigned
- Right position: assign the track to the right channel of the return mix bus

The switch position labeled →RET underneath the Mains and Aux Master Fader refer to this "Return Bus".

5.5.1 Return Mix master level

The rotary potentiometer underneath the switches adjusts the level of the Return Mix bus between –infinite to +10dB

5.5.2 P/A RET push button

The P/A push button is used to monitor the return tracks Pre- (PFL) or Post- (AFL) the Return Fader depending of the P/A mode selector.

5.6 Monitoring

The **SONOSAX SX-ST** and **SX-VT** offers 3 identical and independent stereo Monitoring sections.

The left most Monitor section (the Main Monitor) is dedicated to the sound engineer working on the mixer. The upper rotary switch selects the source for the phone output, the monitor output and the peak-meters. As soon as a PFL/AFL button is depressed, the monitor outputs and the modulo-meters automatically switch over from the monitor source to the selected P/A.

The lower rotary switch changes the listening mode (mono –stereo – M/S) of the selected source.

The two additional middle and right most monitor sections are available for independent remote monitoring and communication purposes, both having an separate communication system (Private Lines). They can be used to return different monitoring selections to e.g. the boom operator and the director/producer while on location recording, or to a speaker cabin and to the video control room in broadcasting applications.

5.6.1 Monitor Source Selector

The upper three rotary switches select the source to be monitored:

- 1-2 to 7-8 : select Master Groups per pair 1 (Left) – 2 (Right) / 3 (Left) – 4 (Right) etc
- AUX 1-2 : select Aux Sends 1 (Left) and 2 (Right)
- AUX 3-4 : select Aux Sends 3 (Left) and 2 (Right)

5.6.2 Monitor Mode selector

The lower three rotary switches define the listening mode of the selected source:

- RET : monitors the after fader stereo mix of the 8 Return tracks
- ODD : the odd channel only of the selected stereo source is monitored in Mono
- EVEN : the even channel only of the selected stereo source is monitored in Mono
- ST : the selected source is monitored in stereo
- M : the selected stereo source is summed in Mono to easily check the Mono compatibility and to detect phase errors
- MS: decode a MS signal for monitoring purposes.

The decoder is for monitoring purpose only and does not affect the main. The M-(left) channel is applied to both L & R channels in phase and the S-(right) channel is applied in phase to the left channel and out of phase to the right channel. The M/S decoder has a fixed ratio of 50%

NOTE: in Odd, Even and Mono modes, the signal is monitored in mono on both left and right sides.

5.6.3 Phones Level 1 to 3

Set the level of the corresponding monitor output (1 to 3) from - infinite (Mute) to +15 dBu

5.7 Communication and Private Lines

The SX-ST / SX-VT offers three independent communication systems: a main COM for general purposes and 2 full duplex Private Lines used for communication within the 2nd and 3rd monitoring sections.

- COM : talk to all communications lines, incl. PL and PL2
- PL1 : talk to second monitor section
- PL2 : talk to third monitor section

An external electret or condenser microphone must be connected to the 5 pin binder COM connector. The Talkback/Slate is using the same microphone. (see section xx for pin assignment)

NOTE: The internal switch S3 selects the mic. powering voltage: 48V phantom or 6VDC for electret

5.7.1 Mic 1 to 3

Adjust the send level of the external Communication/Slate microphone that will be fed into the respective COM, PL1 or PL2 lines. from - infinite (Mute) to +10 dB.

5.8 Groups and Aux Master Sections

5.8.1 Group Master rotary faders

The outputs levels of the Groups 1 to 8 are controlled per pairs. The four rotary Master Faders adjust the output level of the corresponding pair of Groups from - infinite (Mute) to 0dB (unity gain).

5.8.2 Master Auxiliary sends 1 to 4

These four rotary faders are used to control the output level of the corresponding Auxiliary sends within a range from - infinite dB (Mute) to 0 dB (unity gain).

5.8.3 Peak Level Meters

A 5 Led's Peak Meter shows Post Fader levels of each of the Main and Auxiliary output:

- Red : + 6dB lights on xx dB before overload
- Orange : 0dB nominal level
- Green - 10dB
- Green - 20dB
- Green - 40dB

When an overload occurs, all Leds turn Red

5.8.4 P/A push buttons

The P/A buttons in the Groups and Auxiliary master sections are used to monitor the corresponding buses Pre- (PFL) or Post- (AFL) Fader, depending of the PFL/AFL mode selector.

NOTE: The Main Groups are monitored in stereo, the Auxiliaries are monitored in mono

5.8.5 P/A Led's

The corresponding P/A LED lights ON to indicate when its respective PFL/AFL push is depressed.

5.8.6 Talkback / Off / Return → switches

Theses three states switches underneath Groups and Auxiliaries master faders assign and mix either the "Talkback/Slate bus" or the "Return bus" to the corresponding pair of Groups and Auxiliary busses:

- Left ← TBK position: assign the talkback/Slate bus to the Main or Aux mix bus
- Middle OFF position: No assignment to mix bus.
- Right → RET position: assign the Return bus to the Main or Aux mix bus

6. SPECIFICATIONS

General and notes

All specifications mentioned hereafter apply to standard models only.

SONOSAX SAS SA reserves the right to modify these characteristics at any time without prior notice.

For measures and/or settings the reference is: 0dBu = 0.775V (i.e. +6dBu = 1.55V).

Summary of characteristics

Frequency response :	10Hz to 200kHz \pm 0.5dB <i>20Hz to 200kHz \pm 0.1dB</i>
Equivalent input noise :	-128dBu (20Hz to 200kHz - 150 Ω source @ 60dB gain)
Input gain Fixed Steps :	60dB 48dB 36dB 24dB 12dB 0dB
Input gain Fine :	\pm 20dB from CAL Position (40dB end to end)
Fader gain :	selectable +12dB or +24dB
Global gain range:	fader @ 0dB - 20dB to +80dB fader @ +12dB - 8dB to +92dB fader @ +24dB +4dB to +104dB
Overall dynamic range :	128dB
Input headroom :	24 dB
Crosstalk between 2 channels :	better than 100dB 10Hz to 1kHz better than 90dB 10Hz to 20kHz
Overall THD+N :	
Main Level meters:	moving coil Peak Meters IEC-268-10 type 1 (factory default) internally selectable to IEC-268-10 type 2 or absolute Peak large level scale from -32dB to +12dB reading 0dB at nominal level switchable to Level and Phase Correlation meter battery level indication
LED's Level indicators :	red +6dB yellow 0dB nominal level green - 10dB green - 20dB green - 40dB overload indication: turns all leds ON 6dB before clipping Led level reading accuracy: \pm 0.1dB
Nominal output level :	+6dBu or +4dBu 0dB reading on all Peak level meters reflect the nominal level An internal jumper sets the global nominal level of the entire mixer. It automatically affects the setting of all peak-meters, output levels, the internal 1kHz ref tone, the 0 setting of the limiters.

Mic/Line inputs

Input type: electronically balanced
 Input impedance: 6.8k Ω , linear from 10 Hz to 200 kHz
 RF filters: standard

Microphone power: +48V (phantom power)

GAIN :	60dB	48dB	36dB	24dB	12dB	0dB
Nominal level:	-54dBu	-42dBu	-30dBu	-18dBu	- 6dBu	+ 6dBu
Maximum input level:	-30dBu	-18dBu	-6dBu	+6dBu	+18dBu	+25dBu
THD* (Fader version) :						
THD* (VCA version) :						
CMRR* @ 1kHz:	>100dB	>100dB	>100dB	>90dB	>65dB	>60dB
CMRR* 22Hz - 22kHz:	>100dB	>100dB	>100dB	>90dB	>65dB	>60dB
Noise LIN 22Hz - 22kHz:	-68dBu	-79.8dBu	-90.4dBu	-96.9dBu	-98.5dBu	-100.3dBu
Equivalent Input noise :	-128dB	-127.8dB	-126.4dB	-120.9dB	-110.5dB	-100.3dB

* 20 Hz to 22 kHz, at maximum input level

** Equivalent input noise from a 150 Ω source

Low frequency Filter (LF Cut) : 18dB/octave, 15Hz to 400Hz
 Low frequencies Equaliser : 4 dB/octave, \pm 12dB at 80 Hz, \pm 15dB at 40 Hz??
 High frequencies Equaliser : 4 dB/octave, \pm 12dB at 8 kHz, \pm 15dB at 16 kHz ??
 Mid sweep Equaliser : 6 dB/octave, \pm 11dB 200 Hz to 8 kHz

Direct Output Level: internally selectable Pre EQ, Pre Fade or Post Fader
 +6dBu or +4dBu *depending on global nominal level setting*
 electronically balanced, output impedance <50 Ω
 typical output noise if Pre-Eq selected -130dBu

Insert Output Level (optional) : +0dBu unbalanced, output impedance <50 Ω
 Insert Return Level (optional) : +0dBu unbalanced, input impedance 10k Ω

Limiter : from infinite to -30dB below internal nominal level
 attack time:us, release time: ..ms (*programm dependent?*)

Compressor (VCA version) : attack time: us, release time: ms

Main outputs

Output type:	electronically balanced
Output impedance:	<50 \bullet .
Nominal output level:	+6dBu or +4dBu <i>depending on global nominal level setting</i>
Maximum output level:	+25dBu (+22.5dBm Z-load 600)
Output Noise :	unweighted 20Hz to 22kHz
Master faders closed:	-1xx dBu
Master faders at max:	-100.0dBu
One input ch. at unity gain:	- 92.0dBu
Frequency response :	10Hz to 200kHz \pm 0.5dB
Distortion THD+N :	0.03% at 10 Hz / 0.005% 100Hz to 22kHz
Crosstalk (stereo pair) :	100dB 10Hz to 1kHz / 90dB at 22kHz

Auxiliary outputs

Output type:	electronically balanced
Output impedance:	<50 \bullet .
Nominal output level:	+6dBu or +4dBu <i>depending on global nominal level setting</i>
Maximum output level:	+25dBu (+22.5dBm Z-load 600)
Output Noise :	unweighted 20Hz to 22kHz
Master faders closed:	-1xx dBu
Master faders at max:	- 84.0dBu
One input ch. at unity gain:	- 84.0dBu
Frequency response :	10Hz to 200kHz \pm 0.5dB
Distortion THD+N :	0.035% at 10 Hz / 0.005% 100Hz to 22kHz
Crosstalk:	87dB 10Hz to 1kHz / 80dB at 22kHz

Monitor outputs

Output type:	stereo, unbalanced, transformerless
Output impedance:	<xx \bullet .
<i>Maximum output level:</i>	+20dBu
<i>Headphones output level:</i>	0dBu in position 3, +11dBu@75. and max. +13dBu @150 \bullet .
Load impedance :	xx \bullet minimum for each monitor output

Return Inputs

Input type:	electronically balanced
Input impedance:	6.8k \bullet , linear from 10 Hz to 200 kHz
Nominal input level:	+6dBu or +4dBu

OSC ref tone

Frequency:	1kHz
Level :	nominal level , according the global level setting
Distortion THD+N :	xxx

Slate/Comm Mic Input

Input type:	electronically balanced
Input Gain:	
Mic powering:	selectable 6Vdc for Electret or 48V for Condenser microphone

Power requirements

- Supply voltage, internal : 18,0V nominal with 12x LR20 (D) standard 1.5V alkaline batteries
or 14,4V nominal with 12x LR20 (D) 1.2V NiCd or NiMH accumulators
- Estimated battery life : approx. with 12x LR20 (D) standard alkaline batteries
approx. with 12x LR20 (D) 4Ah NiCd accumulators
approx. with 12x LR20 (D) 8Ah NiMh accumulators
- External power supply : 10V to 20V DC, mA peak, mA average
- Power consumption : average watts
maximum 22 watts, all channel On with nominal level modulation
all Led's Meters and Meters backlight

Operating temperature : -25°C (-13°F) to 70°C (158°F)

Dimensions and weight

- SONOSAX SX-ST8D (w*d*h) : 409mm x 437mm x 74mm (16.10" x 17.20" x 2.91")
Net weight (without battery) : 7,930 kg (17.5 lbs)
Weight with batteries ** : 9,400 kg (20.7 lbs) with 12x D cells batteries
- SONOSAX SX-ST10 (w*d*h) : 441mm x 437mm x 74mm (17.36" x 17.20" x 2.91")
Net weight (without battery) : kg (..... lbs)
Weight with batteries ** : kg (..... lbs) with 12x LR20 (D) batteries

** indicative only as battery weight greatly depends on type and manufacturing

- | | | | | |
|--------------------|-------|-------------------|--------|-------------------|
| SONOSAX SX-VT 10 : | width | 441mm (17.36") | weight | xxxx kg (xxxlbs) |
| SONOSAX SX-VT 12 : | width | 513mm (20.20") | | |
| SONOSAX SX-VT 16 : | width | 657mm (25.87") | | |
| SONOSAX SX-VT 24 : | width | 945mm (37.68") | | |
| SONOSAX SX-VT 32 : | width | 1233mm (48.54") | | |
| SONOSAX SX-VT 40.: | width | 1521mm (59.88") | | |

Standard depth and height: D: 437mm (17.20") x H: 74mm (2.91")

Other version can be made according to user specifications.

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