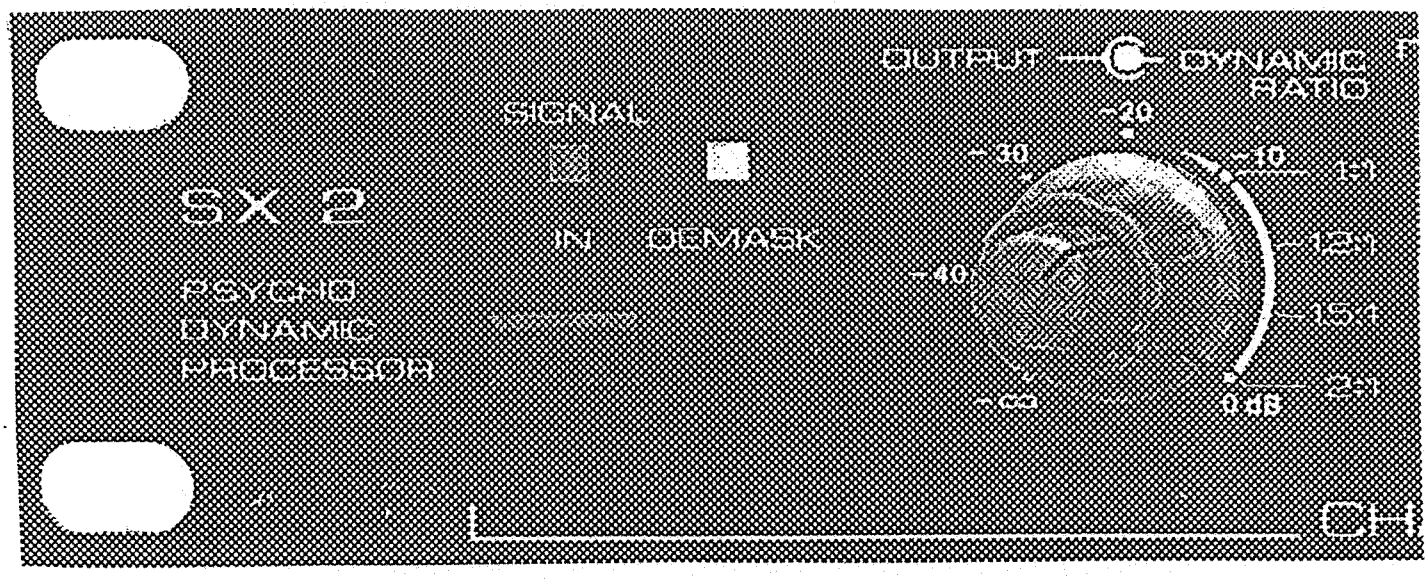


SX 2

PSYCHO DYNAMIC PROCESSOR

OWNERS MANUAL

&

APPLICATIONS

spl audiologic

CONTENTS

INSTALLATION

In this section we'll discuss some general considerations for setting up and installing the SX 2 PRO-PSYCHO DYNAMIC PROCESSOR.

In chapter 1 you'll find an introduction which will lead you to a detailed understanding of the SX 2 PRO as a new and revolutionary equaliser-system, its controls and its handling.

In chapter 2.1 we'll start off with the setting of the rear panel controls and the connectors which, normally, are set once and are thus not part of the day-to-day operation of the unit.

In chapter 2.2 we'll discuss the controls and switches of the front panel and chapter 3 will give some applications and wiring tips.

The SX 2 PRO is designed for rack mounting in a standard EIA 19"-rack and occupies one vertical position (1.75 inches high.)

As with any rack equipment , especially single high units, care must be taken to support the rear of the unit if the rack might be subjected to mechanical shock (in a touring case for example).

The mounting location is not critical, but for greater reliability we recommend that you do not place the unit to power amps, power supplies, or sources of heat, as well as neon light and dimmer.

Note: Throughout the rest of this manual, wherever we refer to actual labels, we will indicate them by using all upper case letters (e.g. DYNAMIC RATIO control).

INTRODUCTION

SX 2
PSYCHO DYNAMIC PROCESSOR

What is the SX 2 PSYCHO DYNAMIC PROCESSOR?

The SX 2 represents the new generation of analogue sound equalisation. Its operation and performance are based on newly developed equlalisation principles.

The SX 2 has been developed from psychoacoustic research. The EQ-operations provide a new way of combining high order filters and intelligent controlled phase shift effects. The interactions of the different filters are controlled and corrected by the spl LOGIC PROCESSOR™.

The perceived sound quality created by the SX 2 is closely related to the human sensation of hearing.
"... the results are more like you'd always wished an equaliser would do - but it never did..."

(Paul White, Home & Studio Recording; GB 4/89)

In comparison to conventional parametric or graphic equalisers, the SX 2 is much easier to use, offering surprisingly effective and creative sound processing.

The SX 2 also delimits from socalled *Exciters* which generate distortion and mix this to the input signal suggesting an increase in harmonics.
Exciters only work on a small part of the audio spectrum, whereas the SX 2 offers psychoacoustical treatment of the audio signal that contains far more than processing the harmonical structure. What precisely that is, we will talk about in the following paragraphs:

What does the SX 2 PSYCHO DYNAMIC PROCESSOR do?

The SX 2 works on the two most difficult frequency bands in audio production.

First, the low bass end of the audio range (herein called SUBSONIC) with a frequency range covering 20 Hz to 250 Hz.
Second, the upper mid and high frequency band from 1 kHz to 22 kHz. This frequency band is described as PSYCHO-ACOUSTIC MASKING because of the underlying principles in use.

The LOGIC PROCESSOR™ controls the separate filter sections and corrects phase relation with respect to the perceived loudness and critical band structure of the human sensation of hearing.

SUBSONIC

The SUBSONIC filter section offers four different bass timbres. Turning the VARIATION-control from the centre zero position to the right side will enhance a harder bass emphasising the percussive edges, while left gives a smoother, wider sound suited to double basses, organ pedal notes, synthesizer sounds, etc.

Pressing the SHIFT-switch alters the frequency characteristics of both VARIATIONs, so in all, the SX 2 provides four bass timbres giving your input signal an extremely solid and groovy low bass end that does not interfere with mid frequencies and which is far less woolly than boosted by mere EQ.

PSYCHOACOUSTIC MASKING

Masking Frequency

The SX 2 provides two separate equalisations filters for processing the upper mid and high frequencies. This section is described as PSYCHOACOUSTIC MASKING and allows processing the upper mid and top end as well as enhancing the harmonical structure. The word MASKING is used, because both filters add a variable frequency band covering the original signal at the desired frequencies.
The FREQUENCY-control sets the frequency at which "masking" begins. It is variable between 1 kHz and 22 kHz.

- Q -

A screwdriver preset allows to vary the bandwidth (-Q-) of the Masking Frequency This let's you peak up the filter response to make the processing more selective and can effectively be used to really tune hi-hats and suchlike.
The Masking Frequency is best set by ear to level out attenuated or suppressed sound elements of the input source.

HARMONICS

The second 4th-order filter processes the harmonical structure. The HARMONICS-control determines the mix between original input source and increased harmonics.
The HARMONICS-filter derives his input signal from both the input source and the Masking Frequency filter. So the harmonical structure of the already improved input source will be enhanced!

The PSYCHOACOUSTIC MASKING filter operation is extremely noiseless and clean Both filter actions complement each other perfectly.
The degree of brightness and transparency that can be added is impressive; and attempt to do the same using conventional EQ just makes the sound harsh end edgey.

DYNAMIC RATIO

The DYNAMIC RATIO-control provides even more psychoacoustical treatment of the input source.
First, this control determines the intensity of the SUBSONIC VARIATION and the Masking Frequency band. When operating, the Masking Frequency is set first and its intensity is defined with the DYNAMIC RATIO-adjustment. Then you select one of the four SUBSONIC VARIATIONs and determine its amplitude.
When following this procedure you will achieve a perfect levelling of high and low frequency processing.

Second, the DYNAMIC RATIO defines the attenuation of dominating mit frequencies by phase cancellation.
The human ear is more sensitive to mid frequencies than to high and low frequencies (see Fletcher-Munson curve). Typically this frequency band is attenuated as common adjustments on graphic equalisers show. The SX 2 attenuates this frequency band simply by moving one control:

When moving the DYNAMIC RATIO-control from 1:1 to 2:1 ratio the dominating mid frequencies get cancelled more and more while the selected SUBSONIC VARIATION and the Masking Frequency band get dynamically boosted.

This procedure realizes a sound processing closely related to the human sensation of hearing.

SURROUND PROCESSOR

Additionally the SX 2 provides a circuit to spread the stereowidth of the input. Turning the STEREOWIDTH control of the SURROUND PROCESSOR clockwise has the effect of positioning off-centre sounds even further to the sides than normal and the subjective soundstage appears to be wider than the speakers themselves.
This effect also gives an extra dimension to reverb and can for example be used for a better positioning of sounds within the stereo image when working in small control rooms with monitors standing rather close together.

The SX 2 offers you a potential for creative sound processing like no other EQ-systems.

How to use the SX 2 PSYCHO DYNAMIC PROCESSOR ?

For the following example please use a stereo source in CD or DAT quality. Set the controls and switches for both channels identically to assure correct processing of the stereo source.

The steps mentioned below show a method for efficient and quick handling of the SX 2:

1. Set-up Procedure:
Set controls and switches for both channels at the following starting positions:

SET-UP

IN	DEMASK	OUTPUT	DYNAMIC RATIO	SUBSONIC		PSYCHOACOUSTIC MASKING			SURROUND PROCESSOR
				SHIFT	VARIATION	Frequency	HARMONICS	- Q -	STEREOWIDTH
in switch in	off switch out	0dB fully clockwise	*1:1*	off switch out	0 center zero position	22kHz fully counter clockwise	0% fully counter clockwise	⎍ factory preset	OFF fully counter clockwise

Set-Up Positions of the SX 2

All controls and switches will be in a "neutral" position. There will be no audible processing when depressing the IN-switch in and out.
Use the IN-function to calibrate input and output levels (see also step *7*).

2. The DYNAMIC RATIO-control is set at the 1:1 ratio position to drive the processor.
Now you can start to process your input source with the SUBSONIC VARIATIONs and the PSYCHOACOUSTIC MASKING filters.
The 1:1 ratio position should be regarded as the initial setting. In step 6 we discuss the variation of that control and explain the influence on the sound.

3. First we process the input source with the Masking Frequency. The below stopband of the Masking Frequency is set at 22 kHz (set-up position). Moving clockwise selects lower frequencies where masking begins. The intensity of equalisation is set by the DYNAMIC RATIO-control which we vary in step 6.
For our example we choose a Masking Frequency of *8 kHz.*

4. In this step we will choose between the SUBSONIC VARIATIONs:
Moving the VARIATION-control to the right will enhance a harder bass sound stressing the percussive edges of the sound, while left gives you a smoother and wider sound.
The decision which bass timbre suits best to your input depends on your personnel taste.
Select the one you like best and set the desired boost. You can try the SHIFT-function now. This will "strengthen" the bass timbre you just selected. It might be necessary to reduce the VARIATION's boost to keep a good leveling.

5. To process the harmonical structure move the HARMONICS-control clockwise. Again it depends on your taste and the quality of your input source how much harmonic enhancement you choose.
For our example lets choose the *50%* position.

6. Now we will select a higher DYNAMIC RATIO. When moving to control from the 1:1 to the 2:1 position the adjusted SUBSONIC VARIATION and the Masking Frequency band get dynamically boosted while dominating mid frequencies are attenuated by phase cancellation.

There are two ways of increasing the psycho dynamical equalisation:
a.) You can set a "low" DYNAMIC RATIO-position (1:1 RATIO) according to a higher boost of your selected SUBSONIC VARIATION and a lower Masking Frequency (e.g. 5 kHz) by moving the frequency control clockwise.
b.) You can increase the DYNAMIC RATIO (1,5:1 ratio) according to a reduction of the SUBSONIC VARIATION. The Masking Frequency might then be set at 10 kHz.

You surely have realized that you cannot consider one control isolated from others. The controls are subtle interactive and resetting one control will slightly change the effect of another. The SX 2- circuitry works on internal feedback where the output of one filter controls the dynamic response of another.

7. The processing -especially the SUBSONIC VARIATION- has increased the total output level. To keep the unprocessed and the processed signal comparable we have to assure that both input and output level have the same amplitude.

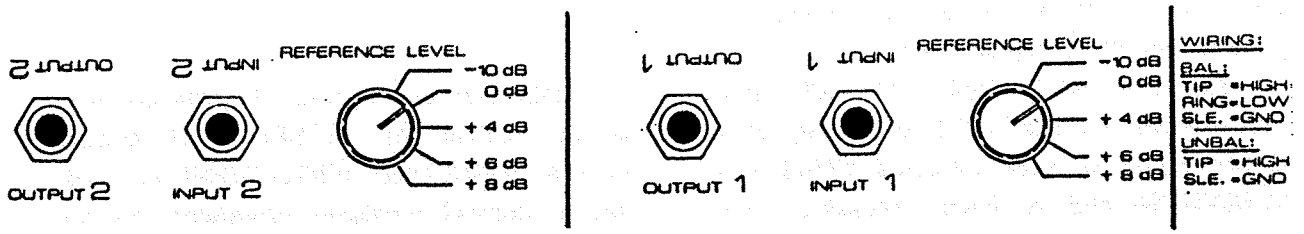
Push the IN-switches of both channels. Now both channels are in bypass and you listen to the unprocessed input source. Keep this level in mind and press both IN-switches. If the output level of the processed signal is higher than your input level you can set equal levels by reducing the OUTPUT-control.

8. Finally you can spread the stereo image by turning the STEREOWIDTH-control of the SURROUND PROCESSOR clockwise. In normal mixdown situations do not use more effect than the 2h-position of the control.

After a short time you will become a feeling for the interactions of the controls and the SX 2 will become very easy to use and a great help in the studio.
The more you work with it, the more applications you will find.

1. The Rear Panel

standard SX 2 with 1/4"-jacks



1. 1 INPUT

The "standard" SX 2 is equipped with 1/4" input jacks for balanced and unbalanced operation.
If a stereo-jack is used the SX 2 operates in balanced input mode.
TIP should be connected to (+)= high and RING should be connected to (-) = low, whereas the shield is GND.
The SX 2 automatically operates unbalanced if mono-jacks are used.
In this case RING = (-) is grounded.

On request we deliver the SX 2 with Neutrik NC 3–XLR-connectors. Its operation is balanced only.

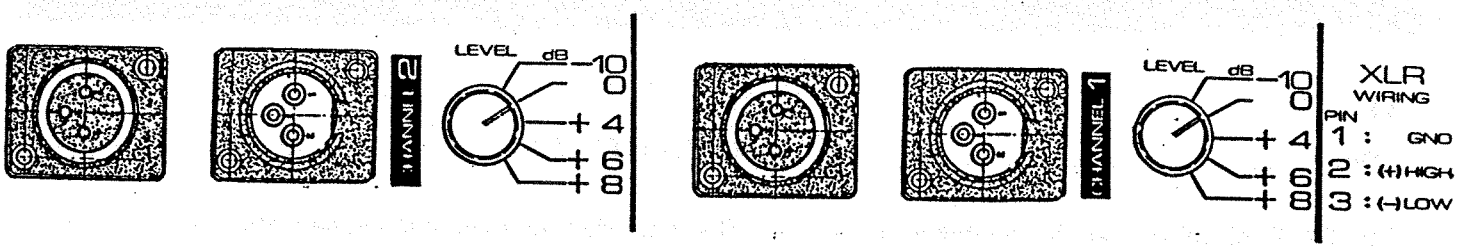
The XLR-wiring is: PIN 1 = GND
PIN 2 = (+) high
PIN 3 = (-) low

The *Nominal Input Level* is switch selectable between five levels for each input.
Proper input level is necessary to assure optimum SX 2- processing.
If your nominal input level is unknown, follow the simple guidelines listed below.

If special needs arise, it is possible to operate the SX 2 with the REFERENCE LEVEL selector at a level below your actual nominal input level.
For example if your nominal input level is 4 dBv, the REFERENCE LEVEL selector should be in the < +4 dB > position.

- 10 dBv	"Consumer"	=	homerecording and hifi equipment
0 dBv	"Semi-Pro"	=	small studios, sound reinforcement
+ 4 dBv	"Professionals"	=	large studios, production facilities
+ 6 dBv	"Professionals"	=	large studios, production facilities
+ 8 dBv	"Broadcast"	=	Radio/TV station equipment

SX 2 with XLR-connectors



However, you can select the ‹0 dB› position. In this case, the circuit's level detectors think the input is 4 dB "hotter". This intensifies the onset of the SX 2 LOGIC PROCESSOR™ while also keeping the filters' bandwidths more open.
You can as well operate the SX 2 at a nominal input level above your actual level. For example you select the ‹+ 6 dB› position. In this case the input level detectors sense a lower input level resulting in a delayed onset of the LOGIC PROCESSOR™ with a very smooth SX 2 process.

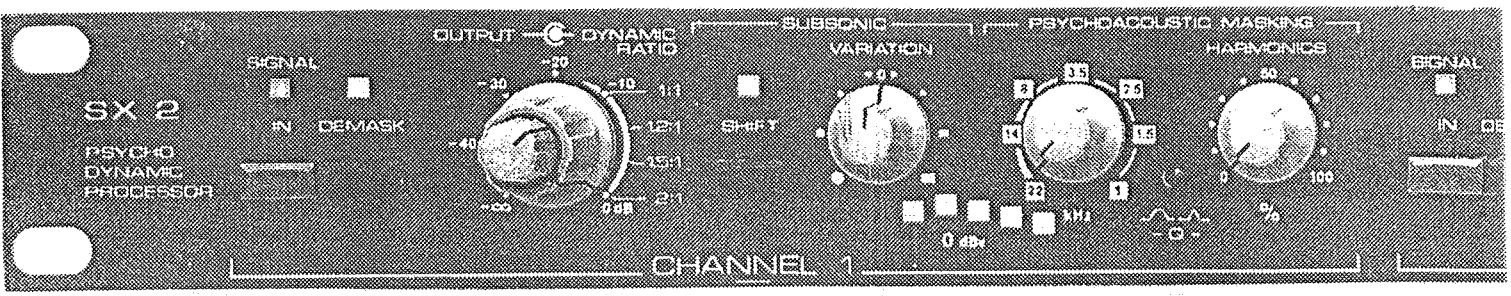
I. 2 OUTPUT

According to the INPUT section we deliver the "standard" SX 2 with 1/4" output jacks whereas the XLR-version is equipped with Neutrik NC 3 male output connectors.
Refer to the chapter I. 1 INPUT for XLR- and 1/4" jack-wiring.

I. 3 POWER SUPPLY

The SX 2 is equipped with a toroidal transformer that guarantees a minimum of electronically induced hum and acoustic noise due to the non-existence of an air gap.
The SX 2 XLR-version allows to select the primary voltage between 220V/50Hz and 115V/60Hz by the rear panel switch. Countries with 240V/60Hz primary voltage will be provided with custom-made transformers.
The "standard" SX 2 has no such switch and will be delivered according the customers actual primary voltage.
Both SX 2 versions have different power plugs:
The "standard" SX 2 has a non-detachable 2-wire power cord.
The SX 2 XLR-version is equipped with a non-detachable 3-wire, U-ground power cord.
The circuit ground is jumpered to chassis. Earth can be lifted with GND LIFT switch.

II. The Front Panel



II. 1 IN

The SX 2 circuitry can be switched in or out of the signal path for instant comparison and calibration.

II. 2 SIGNAL

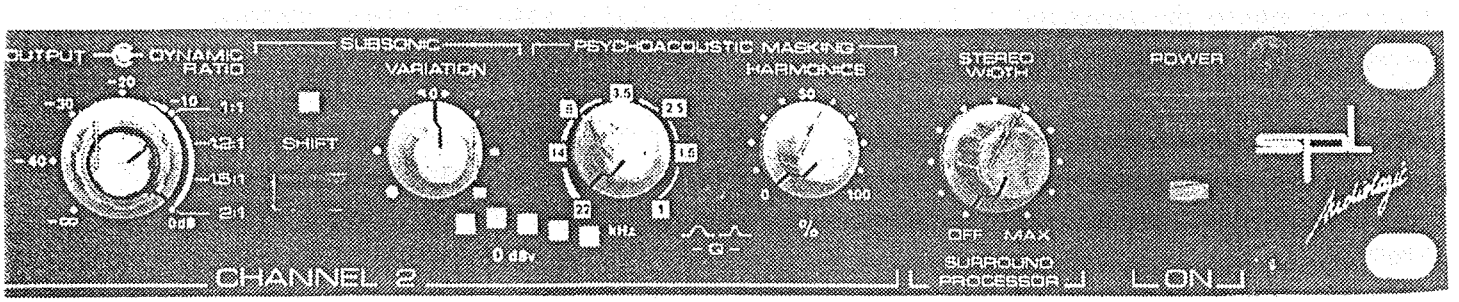
The SIGNAL-LED flashes to indicate a correct input signal level.
The SX 2 circuitry is kalibrated on a processing level of 0 dB. The SIGNAL-LED starts flashing at +1,5 dB. The REFERENCE LEVEL switch selector (see chapter I.1) should be set on a position to keep the LED going on and off. It should be avoided to keep to LED constantly on. This indicates a potential overload condition which might result in a peak.

II. 3 OUTPUT

The OUTPUT control determines the output level of the SX 2 which is variable between $-\infty$ and 0 dB.

The SET-UP position (see page -6-, introduction) of this control is 0 dB. You use this control only to attenuate the output level, if it has been boosted by using the SUBSONIC VARIATION (chapter II.6.1) to keep input and output levels equal for comparison.

The five dot LED-bar displays the output level. It works as a VU-meter but it is more an effect display than a true level meter, because the display flashes over twice.
A flashing of the red LED does not indicate, that the output level is too hot!



II. 4 DEMASK

The DEMASK-mode is used to monitor the *psychodynamical filter signal (effect).*

The status-LED indicates that the DEMASK-mode is active and that your original input source is switched off.
In this status you can precisely monitor what actually is "add" to the input.

When using the SX 2 on the *aux* or *cue send/return* of the console the DEMASK-mode should always be active and the SX 2 can be used like a reverb unit.

In the DEMASK-mode you can split up the the psychodynamical filter signal into its components for monitoring or recording: *If the SUBSONIC VARIATION should be monitored simply set the Masking-Frequency control at 22kHz and the HARMONICS control at 0% (both fully counter clockwise).*
For monitoring the PSYCHOACOUSTIC MASKING set the VARIATION control to 0 (center zero position).

You can also monitor the pure HARMONICS signal: Set the DYNAMIC RATIO control fully counter clockwise which mutes the SUBSONIC VARIATION and the Masking Frequency band. Now you monitor the harmonic enhancement.

In the following chapters you will find two NEUTRIK diagrams to each parameter.
The first one shows the frequency response of your original input after being processed while the second diagram is recorded in the DEMASK mode to show just what has been "added" to your input (pure effect signal).

II. 5 PSYCHOACOUSTIC MASKING

The PSYCHOACOUSTIC MASKING section consists of two independent equalisation filters.
The Masking Frequency control is used to equalise frequencies between 1 kHz and 22 kHz with bandwidth (-Q-) variation.
The HARMONICS control allows adding restored harmonics to increase brilliance, transparency and intelligibility.

II. 5. 1

Masking Frequency

The Masking Frequency control sets the frequency where the passband of the masking begins.

Fully counter clockwise will set the below stopband at an inaudible band at 22 kHz. Moving clockwise selects lower masking beginnings.

The audible level in the range between 3,5 kHz down to 1 kHz increases due to the level dependent sensation of hearing. Fully clockwise sets the below stopband at 1 kHz.

The intensitiy of the selected Masking Frequency band is determined with the DYNAMIC RATIO control (see chapter II.7).

TEST SET-UP

PSYCHOACOUSTIC MASKING

IN	DEMASK	OUTPUT	DYNAMIC RATIO	SUBSONIC		PSYCHOACOUSTIC MASKING			SURROUND PROCESSOR
				SHIFT	VARIATION	Frequency	HARMONICS	-Q-	STEREOWIDTH
in	1. out 2. in	0dB	2:1	out	0	α. 1 k β. 3.5 k γ. 14 k δ. 22 k	0%	⎍	OFF

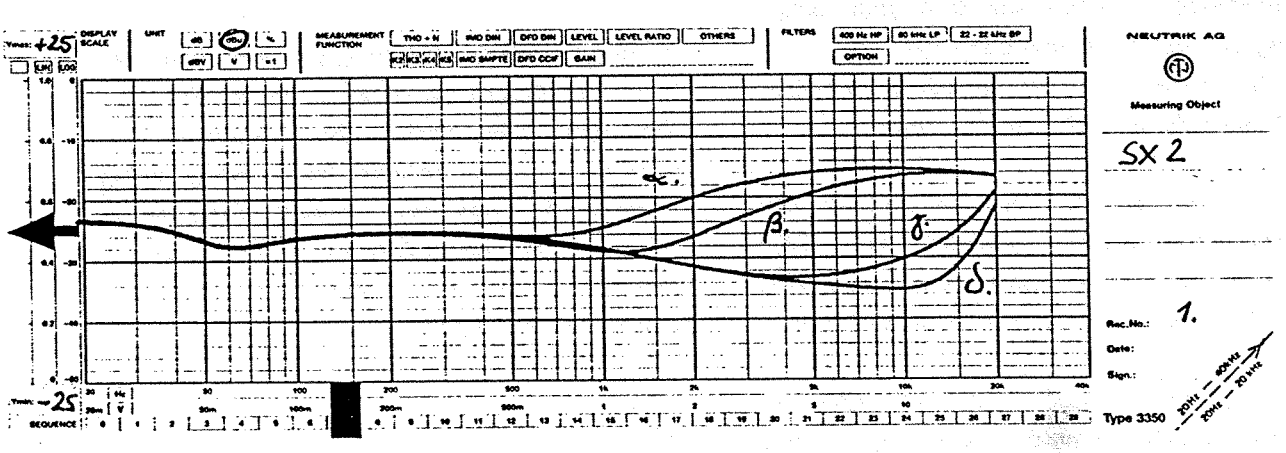


Diagram 1: PSYCHOACOUSTIC MASKING; Variation of the below stopband

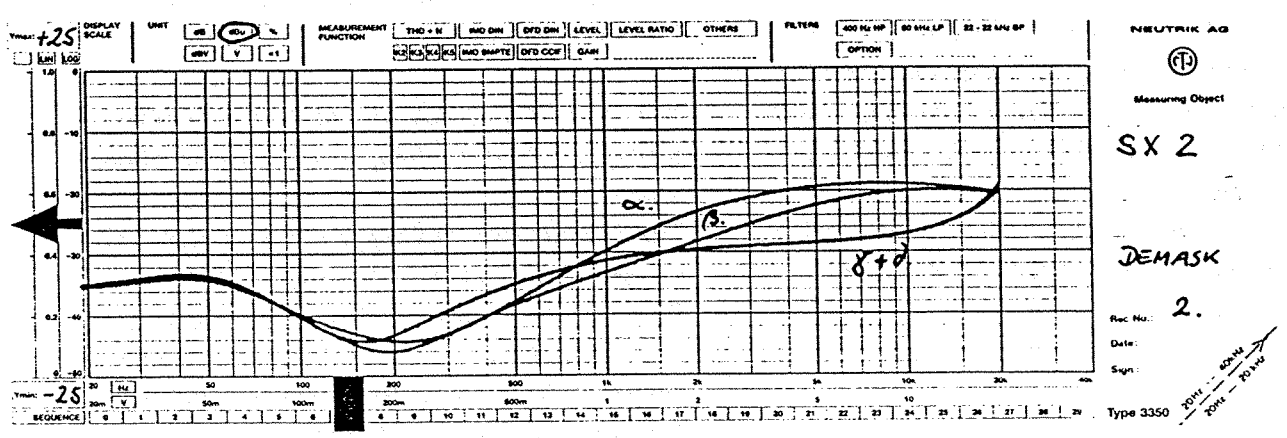


Diagram 2: PSYCHOACOUSTIC MASKING, Variation of the below stopband, DEMASK-mode

II. 5. 2
HARMONICS

The HARMONICS control allows restoring the harmonical structure which has gone lost during recording due to generation loss.
The harmonical restoration is achieved by equalisation of a 4th order filter combined with sophisticated phase shift effects which will give the mix or the single instrument natural brilliance yet reducing the listener ear fatigue and harshness. A sound lacking upper harmonics can be brightened with effective restoration of clarity, presence and intelligibility.

The HARMONICS control determines the amount of restored harmonics being fed back to the original signal measured in per cent.
The HARMONICS filter is driven by the side-chain signal (original input) and the selected Masking Frequency band.

The spl filter design to restore the harmonical structure of any input is less noisy and more natural sounding than the "generator" design in common Exciters. The achieved sound quality contains more warmth and less harshness.

Care should be taken to use input signals with a minimum of acoustic noise.

TEST SET-UP — HARMONICS

IN	DEMASK	OUTPUT	DYNAMIC RATIO	SUBSONIC		PSYCHOACOUSTIC MASKING			SURROUND PROCESSOR
				SHIFT	VARIATION	Frequency	HARMONICS	-Q-	STEREOWIDTH
in	3. out 4. in	0dB	*1:1*	out	0	1 kHz	α. 0% β. 50% γ. 100%	⎍	OFF

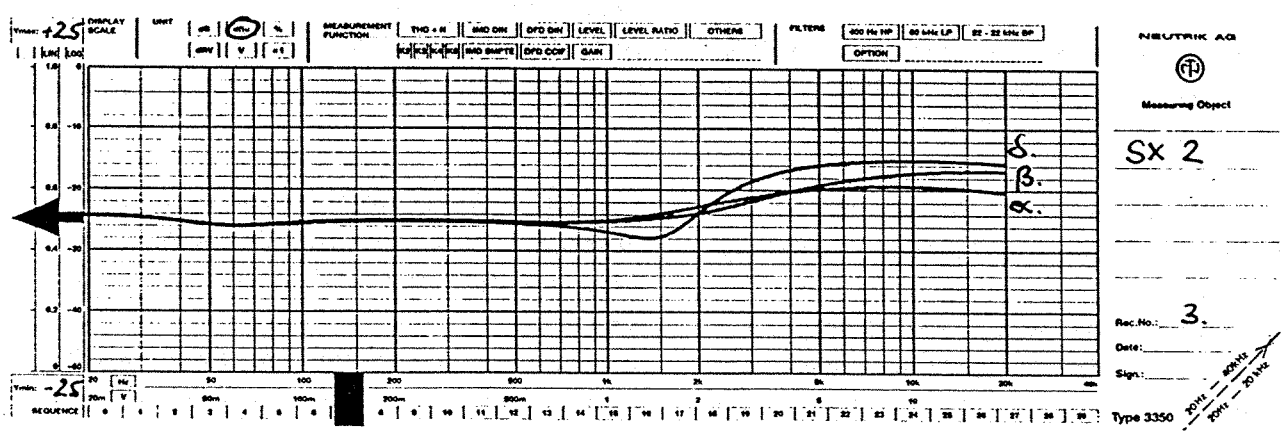


Diagram 3: HARMONICS

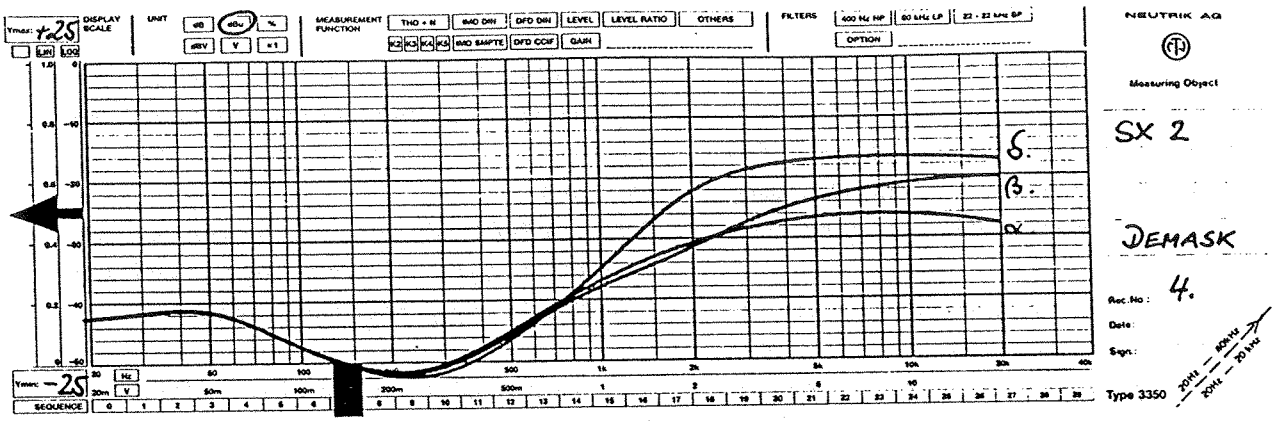


Diagram 4 : HARMONICS , DEMASK - mode

II. 5. 3
- Q -

The -Q- trimmer behind the front panel allows changing the bandwidth of the Masking Frequency from low -Q- to high -Q-.
spl delivers their units with the -Q- trimmer set fully counter clockwise which is appropriate for almost any mixdown situation.

Selecting a higher -Q- can be interesting when recording single instruments or if their is the need to emphasize a certain instrument such as Hi-Hat in a stereo master while cutting.

Caution: Very high -Q- (trimmer set fully clockwise) can cause oscillation!! Reduce -Q- trimmer until oscillation stops.

Selecting higher -Q- changes the sound characteristic of the Masking Frequency control.
When driving the Masking Frequency control from 22 kHz to 1 kHz in a high -Q- position it is clearly audible that the frequency goes down whereas in low -Q- it seems to be just the opposite.

II. 6
SUBSONIC

II. 6 . 1
VARIATION

The SX 2 provides the unique opportunity to chose between different bass timbres (herein called SUBSONIC VARIATIONs).

The original bass remains unprocessed when the VARIATION control is set at the center (0) position.

Moving clockwise selects a percussive bass sound while moving counter clockwise will emphasize a smooth and deep bass timbre.
Both SUBSONIC VARIATIONs have their maximum amplitude at about 50 Hz.

CAUTION: In a stereo mixdown situation never mix both SUBSONIC VARIATIONs!! Your stereo signal will be ‹ out of phase ›.
If your are processing two mono signals while recording two instruments for example both SUBSONIC VARIATIONs can be used. Be sure to keep the SURROUND PROCESSOR control in the OFF-position.

II. 6. 2
SHIFT

The SHIFT switch allows varying the frequency response as well as the amplitude of both SUBSONIC VARIATIONs.

So, both VARIATION can be altered which results in four different bass timbres.

The status-LED indicates that the SHIFT function is active.

TEST SET-UP — SUBSONIC VARIATION / SHIFT

IN	DEMASK	OUTPUT	DYNAMIC RATIO	SUBSONIC		PSYCHOACOUSTIC MASKING			SURROUND PROCESSOR
				SHIFT	VARIATION	Frequency	HARMONICS	-Q-	STEREOWIDTH
in	5. out 6. in	0dB	*2:1*	α. in β. in γ. out δ. out	left right left right	3.5 kHz	0%	⊓	OFF

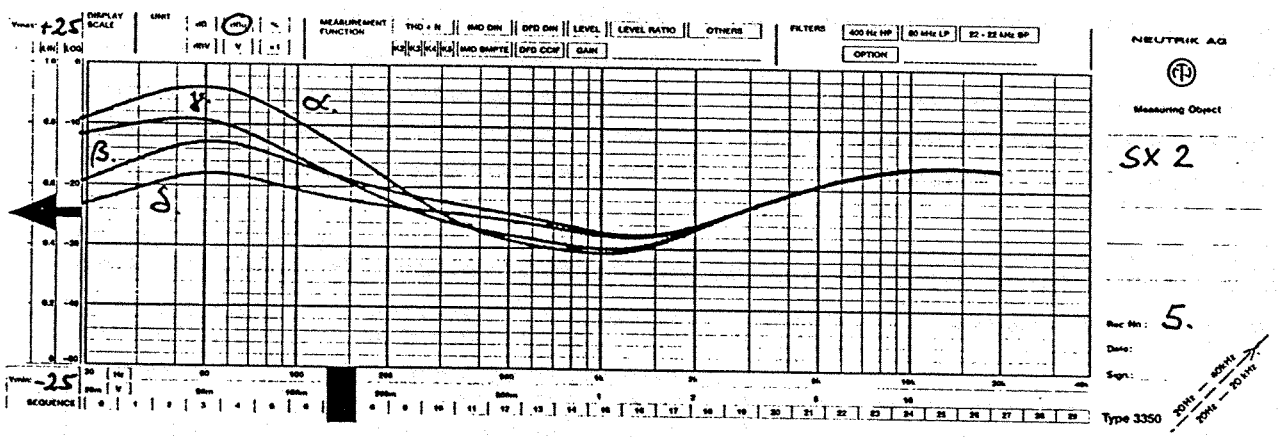


Diagram 5 : SUBSONIC VARIATION / SHIFT

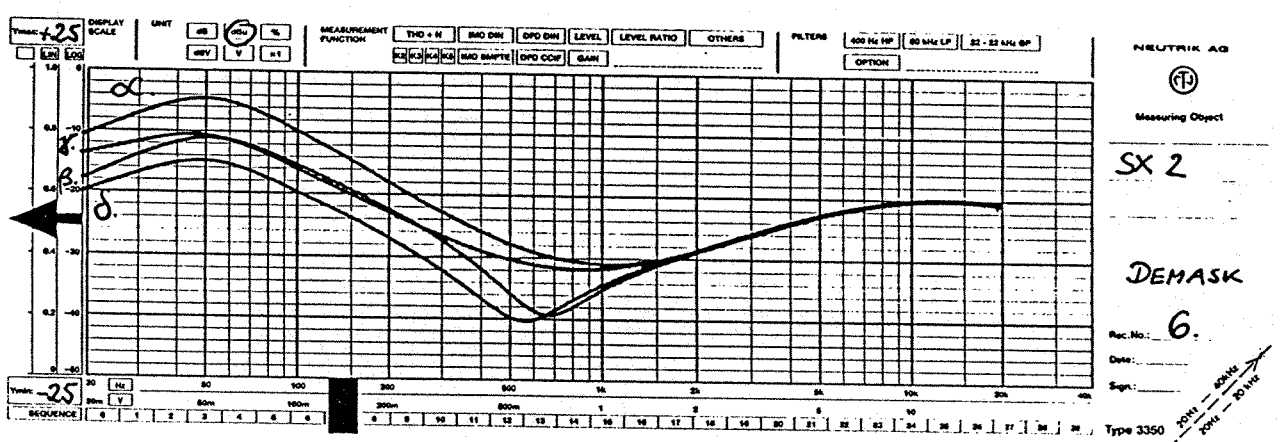


Diagram 6 : SUBSONIC VARIATION / SHIFT ; DEMASK - mode

II. 7
DYNAMIC RATIO

The DYNAMIC RATIO control offers you the psychodynamical treatment of the input. This control changes two parameters at a time:

First, the control determines the mix of SUBSONIC VARIATION and Masking Frequency to the input. Second, it defines the attenuation of dominating mid frequencies by phase cancellation.

The human ear is more sensetive to mid frequencies than to bass and high frequencies (see Fletcher-Munson curve). Typically this frequency band is attenuated as common adjustments on graphic EQs show.
The SX 2 attenuates this frequency band simply by moving the DYNAMIC RATIO control from 1:1 to 2:1 ratio.

The mid frequencies get cancelled more and more while the selected SUBSONIC VARIATION and the Masking Frequency band get dynamically boosted.

Set the DYNAMIC RATIO control at the 1:1 ratio position first. Now start to process your input by selecting one SUBSONIC VARIATION and an appropriate Masking Frequency to improve the bottom and top end.
After an initial setting has been found vary the DYNAMIC RATIO and trust your ears.
When ending up with a high DYNAMIC RATIO position it might be necessary to reduce the SUBSONIC VARIATION before the bottom end is booming.
In any case it is subject to experimentation to comprehend the interactions between DYNAMIC RATIO, SUBSONIC VARIATION and Masking Frequency.

TEST SET-UP — DYNAMIC RATIO

IN	DEMASK	OUTPUT	DYNAMIC RATIO	SUBSONIC		PSYCHOACOUSTIC MASKING			SURROUND PROCESSOR
				SHIFT	VARIATION	Frequency	HARMONICS	-Q-	STEREOWIDTH
in	7. out	0dB	α. < 1:1 β. 1,2:1 γ. 2:1	in	left	22 kHz 1 kHz	0 %	⊓	OFF

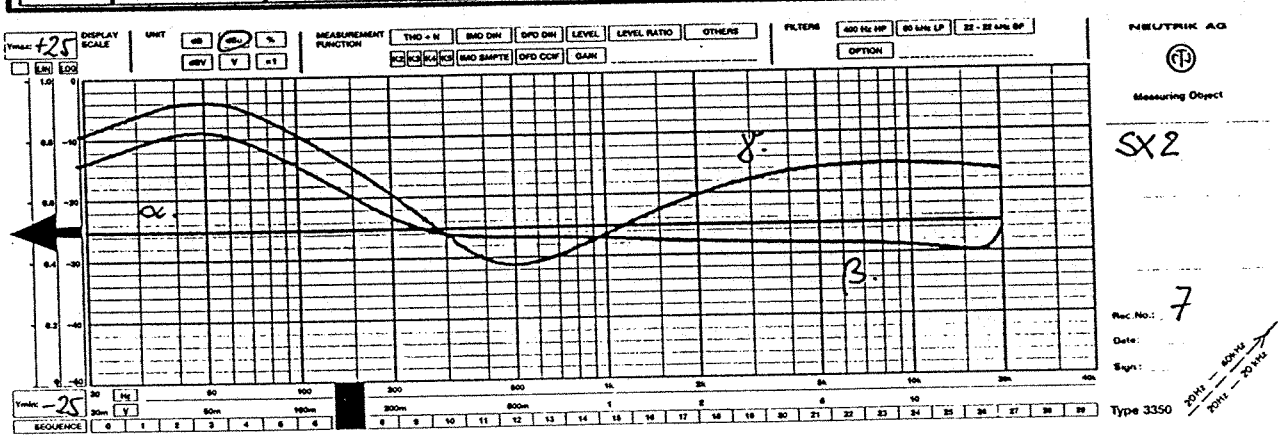


Diagram 7 : DYNAMIC RATIO

11. 8
SURROUND PROCESSOR

The SX 2 provides a circuit to spread the stereowidth of the input. Turning the STEREOWIDTH control clockwise has the effect of positioning off centre sound even further to the sides than normal and the subjective soundstage appears to be wider than the speakers themselves.

The SURROUND PROCESSOR is bypassed when the STEREOWIDTH control is set fully counter clockwise (OFF position).

III. APPLICATIONS

III. 1 GENERAL APPLICATIONS

III. 1. 1 *RECORDING STUDIOS*

The SX 2 is typically used in stereo mix-down situations on the master outputs.
The SX 2 can also be used in effect-loop applications or inserted to tracks to complement to your on-board EQ.

An interesting application is the processing of reverb. Feed your reverb signal to the SX 2 and you will gain a much clearer and richer reverb sound even at very long delay times. Your reverb literally opens up.

The SX 2 complements perfectly to your on-board and out-boards EQs. Feed, for example, the SX 2 outputs to your one/ two third octave graphic EQ. Your graphic deals with an extended frequency range, thus achieving better room-EQ without ringing and coloration and even with less noise.

Furthermore your samples will gain naturalness and a full, rich tone. Formants of strings and brass will be enhanced resulting in better separation.
Double bass recordings will contain the full wooden sound and the instrument's "breathing" which you always wished to record.

The SX 2 performance provides consistenly satisfying results extremely quick and natural sounding and without complications or unpleasant surprises. It really lives up the sound of almost any instrument without making it sound at all false.

III. 1. 2 *BROADCAST*

In contemporary audio broadcast processing high value is placed on the loudness and impact of a station compared to its competition.

The SX 2 will make a major contribution to your competitiveness. Your "on-air" signal will be psychodynamically processed letting your station stand out with greater perceived loudness, dynamics, clarity, and depth.

The SX 2 will satisfy the most demanding audiophile and at the same time grap the attention of the rush-hour commuter.

It will also be a welcome addition to your production studio to enhance in-house promos, spots and call-in phone lines for greater listenability, as well as processing the announce mic for maximum presence, warmth, intelligibility, and persuasive power.

The incorporated SURROUND PROCESSOR is an effective tool to enhance the spatial definition of braodcast audio. Your station's stereo image will become magnified and intensified achieving a more dramatic and more listenable sound.

III. 1. 3 *SOUND REINFORCEMENT*

A P.A.-system may be greatly enhanced by using the SX 2 to increase intelligibility of the loudspeakers, thus improving penetration of the sound around corners and in areas usually difficult to fill.

The SX 2 can offer the management of clubs and dance bars exactly the desired sound - a solid and punchy bass free from muddiness and boom and a brilliant and clear top free from ringing and coloration typical of graphic equalisers.

III. 1. 4. VIDEO & FILM POST PRODUCTION

The SX 2 can be used to "fatten-up" or enrichen dialogue, music, and effects for maximum punch and clarity.

Mixing audio in Video & Film Post Production can be a brutally demanding, time pressured process. The SX 2 offers you an EQ-system which is very easy to use subsequently giving you an almost immediate improvement of your audio source. Instead of dwiddling around with twenty or more controls of conventional EQ-designs, you just have to work with five controls per channel resulting in significant time savings.

An important application of the SX 2 has become the equalisation and enhancement of time compressed audio.
Digital audio processing allows time compression to large extents while maintaining proper pitch, but the natural timbre of the narrator's voice diminishes.
The SX 2 restores naturalness and warmth of the time compressed voice giving it even more persuasive power. The computer voice will sound human again.

III. 2. APPLICATIONS & WIRING TIPS

III. 2. 1 *Using the SX 2 in the Effect-Loop*

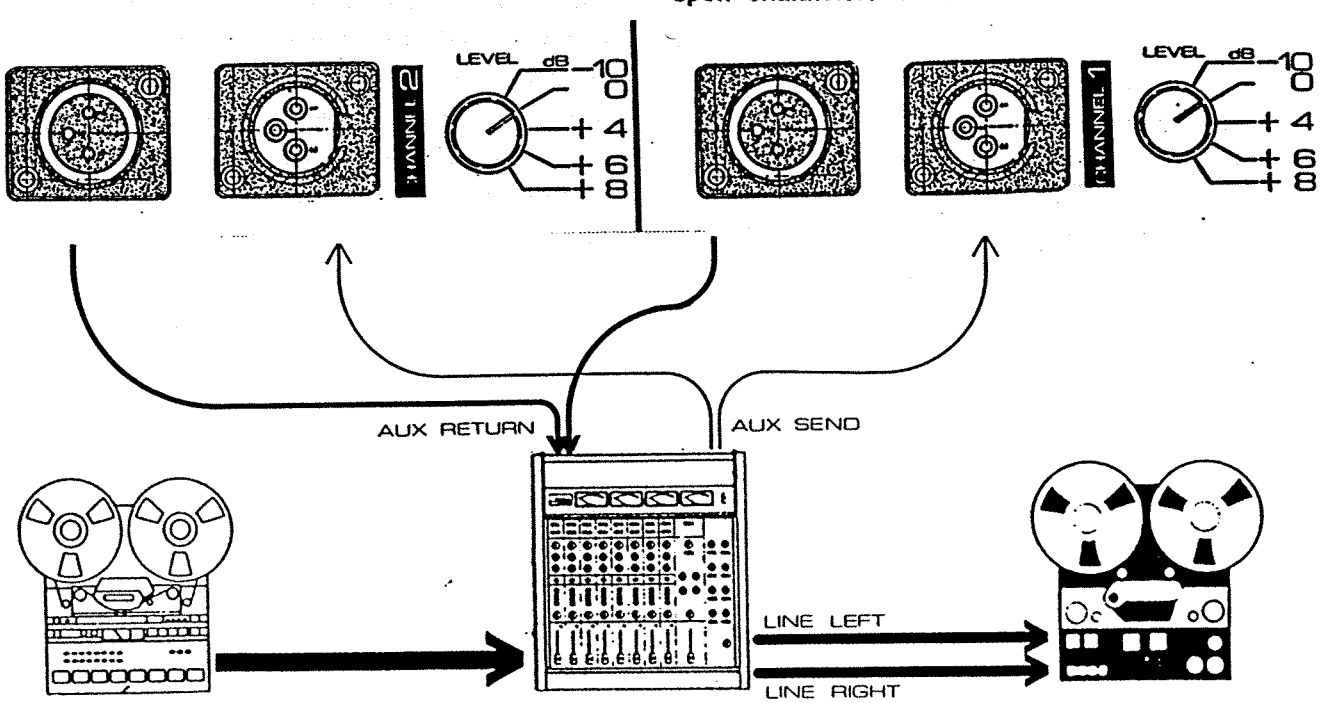
The SX 2 can be used in the effect-loop exactly like a reverb unit is used. A *cue, monitor* or *aux send* on each channel can be used to add varying amounts of the SX 2-process to different instruments and vocals.

When using the SX 2 in the *aux send* applications be sure to have the DE-MASK-switches pressed, so that only the pure effect without original source is returned to the console. In some cases it might be useful to connect the OUTPUT(S) of the SX 2 to two open channels on the console. This allows a more precise mix between processed and unprocessed signal.

If two *aux sends* are available, you can use both channels of the SX 2. The SX 2 channels should be set identically and returned to the console left and right in stereo, or, each SX 2 channel is set differently and independently returned to the console center or split.

Use the SX 2 in the effect chain right behind a reverb! The SX 2 will bring dynamic, brilliance, and presence into your reverb sound. Even very long reflections will have solidity and naturalness.

Connect the *cue, monitor or aux send(s)* of the console to the INPUT(S) of the SX 2. Connect the OUTPUT(S) of the SX 2 either to the corresponding *send return* input(s) on the console, or return it to open channel(s) on the console.



III. 2. 2 *Using the SX 2 on the Overall Mix of a Multi-Track Mixdown*

The SX 2 can be connected between the console and master stereo recorder. The SX 2-process is then added to the overall mix.

The SX 2 is used to enhance to overall mix, to eliminate the generation losses and to improve low end solidity and the dynamic response corresponding with the human sensation of hearing.

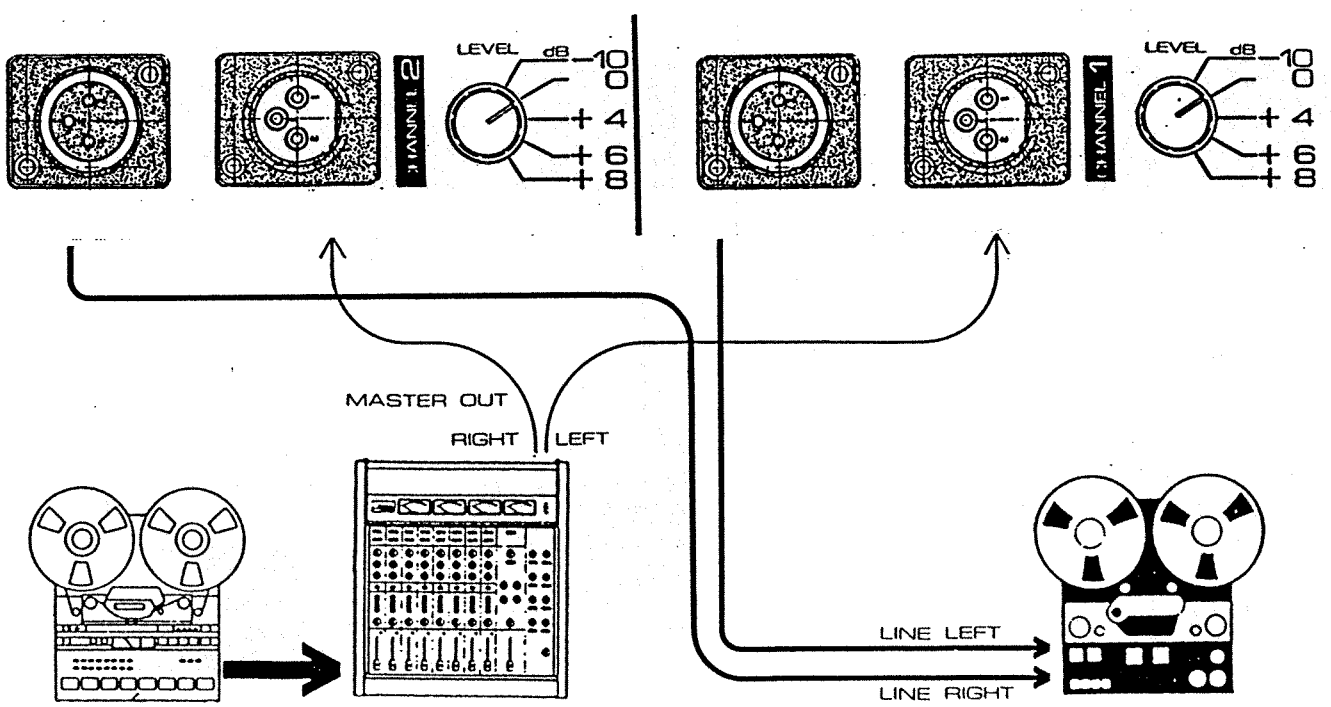
Once the SX 2 is connected and the controls and switches are set, you can go on with your mix as usual. You will notice that you will have much better separation, transparency as well as a very stable subsonic frequency band that does not interfere with mid frequencies.
You will be using less upper mid and high frequency EQ-ing which reduces coloration and additional noise.

The SUBSONIC VARIATIONs created by the SX 2 open up possibilities for a new dimension of low frequency recording.

If you want to check the amount of SX 2-process being mixed to the overall mix, simply press the IN-switch in and out. Do not do this on final mix, because it will be on tape.

Your final mix will master onto disk far better by using the SX 2 for subsonic sound, dynamics, presence, clarity and intelligibility instead of using conventional equalisation.

Connect the consoles stereo outputs to the corresponding INPUTs of the SX 2. Connect the OUTPUTs of the SX 2 to the corresponding line inputs of the master recorder.

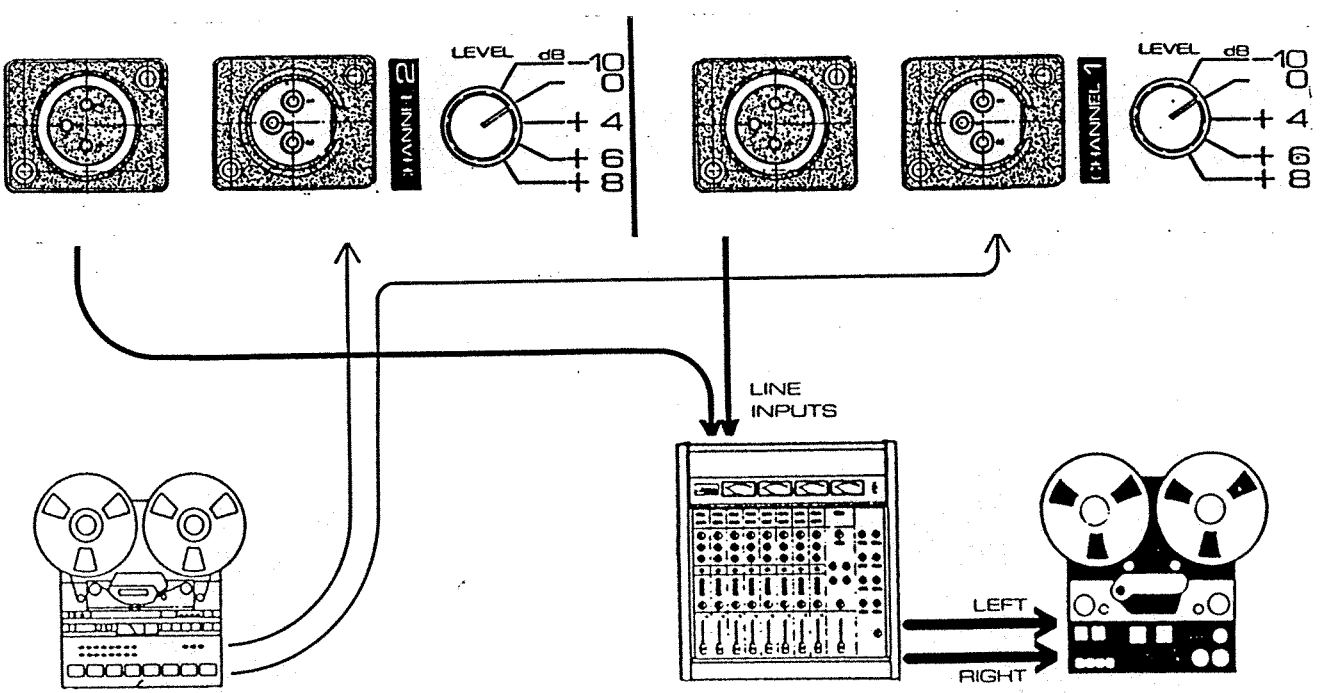


III. 2. 3 *Using the SX 2 In-Line on a Track during Mixdown*

If a single track (or two) is to be SX 2 processed during mixdown, this track should be running through the SX 2 before it goes to the console, if possible. This will allow the SX 2 to process the track before additional console noise and distortion is present.

NOTE: Whenever possible, to preserve delicate aspects of the original that would otherwise be lost, critical basic tracks should be cut using the SX 2 !

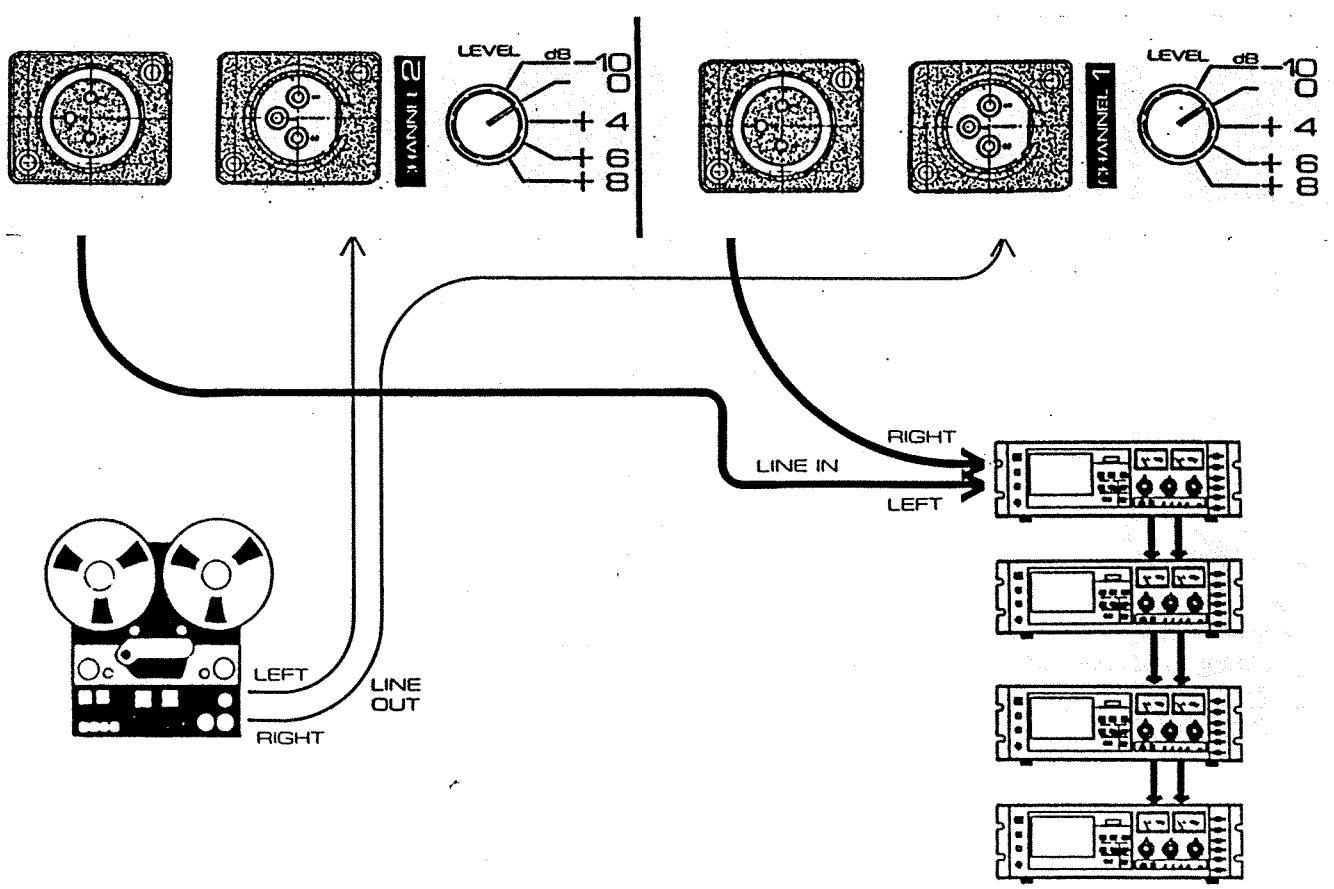
The multi-track channel line output should be connected to the SX 2 INPUT. The SX 2 OUTPUT should be connected to the assigned channel line input of the console. If the direct line output of the Multi-Track recorder is inaccessible, patch the SX 2 into the console's channel right after the input amp. If no on-board EQ is used, patch the SX 2 OUTPUT back into the console's channelright after the equaliser. This will avoid additional noise.



III. 2. 4 *Using the SX 2 on Tape Duplications*

The SX 2 will give dynamic response, bottom end solidity, separation to tape duplications, while conventional duplications suffer from generation losses.
For optimum results, do not go through the mixing console.

Connect the line outputs of the tape recorder to the INPUTS of the SX 2.
Connect the SX 2 OUTPUTS to the line inputs of the 2nd tape recorder.



III. 2. 5 *Using the SX 2 in Disc-Mastering*

The SX 2 can be used during disc mastering to make use of the extended dynamic recording capacity.

It might sometimes be a great help to make use of the -Q- trimmer. This gives you a very precise and selective means to peak out Hi-Hats and suchlike and to correct a final mix .

Connect the line outputs of the two track master recorder to the INPUTS of the SX 2.
Connect the OUTPUTS of the SX 2 to the line inputs of the disc mastering system .