

6TRK MULTI RECORDER / 8 CHANNEL MIXER

WS-X1

OPERATING INSTRUCTIONS

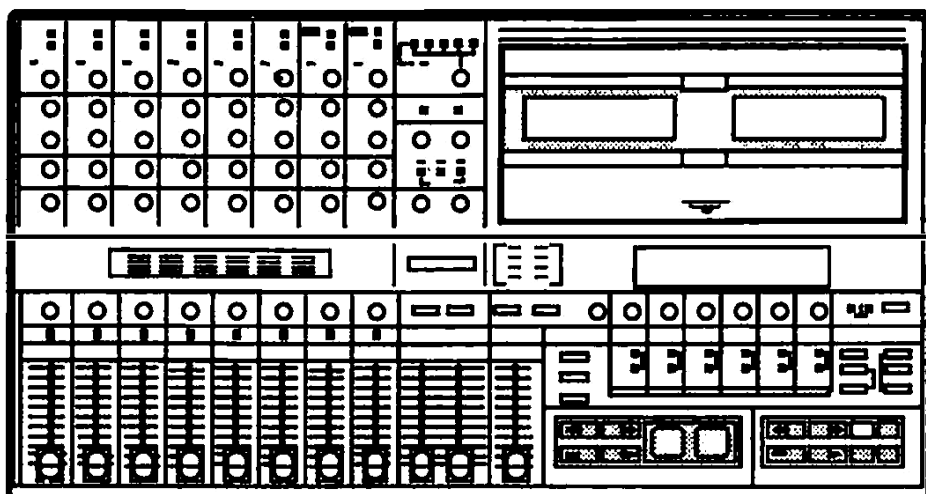
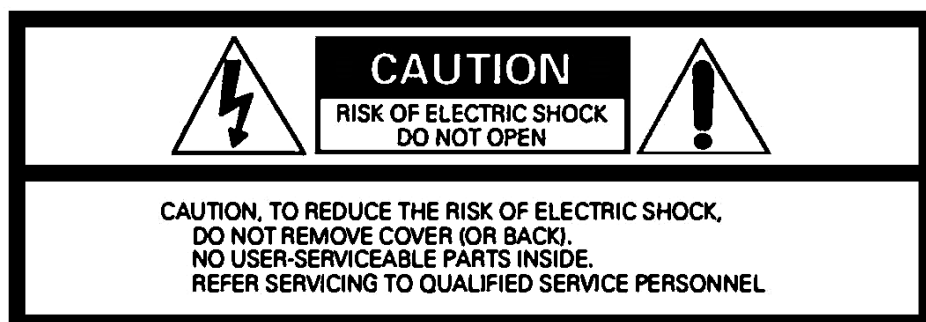


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The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

* This model is designed for professional music productions.

* Das WS-X1 ist für die professionelle Musikproduktion konzipiert, kann aber auch von anspruchsvollen Amateuren komplikationslos genutzt werden.

BESCHEINIGUNG DES HERSTELLERS/ IMPORTEURS

Hiermit wird bestaetigt, das WS-X1 In Uebereinstimmung mit den Bestimmungen der Amtsblatt No. 163/1984, Veruegung 1046 funkentstoart ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Geraetes angezeigt und die Berechtigung zu Ueberpruefung der Serie auf Einhaltung der Bestimmungen eingeraeumt.

WARNING: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

- The model No. and Serial No. of your unit are shown on its back panel.
- The appliance conforms with EEC directive 87/308/EEC regarding interference suppression



Congratulations on the purchase of your new Sansui WS-X1. If you'll take the time to read through the "OVERVIEW" section of this manual, you will become acquainted with the major features of this high quality audio production facility. Further reading will explore some of the finer features of the WS-X1 as well as offer some useful recording tips.

Warnings

Power Plug

When disconnecting the power cord from the AC outlet, be sure to hold the power plug. Never hold by the power cable as this may lead Electric shock. Also, NEVER handle power cables with wet hands as this will further increase the risk of electric shock.

NOTE

It is best to unplug the WS-X1 from the wall when it is not going to be used for prolonged periods of time.

DO NOT REMOVE CASE!

Removal of the case may lead to internal malfunction and therefore void the factory warranty. Any service related problems should be referred to qualified service personnel.

INSTALLATION

Avoid installing your WS-X1 in any of the following circumstances:

- * Direct sunlight or heat. (Open windows, Heat lamps, Etc.)
 - * Moisture or Humidity
 - * Areas with poor ventilation
 - * Dusty or dirty areas
 - * Unstable surfaces (Surfaces that are not perfectly flat, or that may be subject to unusual amounts of vibration.)
- Installation in any of these circumstances may cause inconsistent performance or malfunction.

MAINTENANCE

When cleaning your WS-X1, use only a soft, damp cloth and wipe gently. Any kind of thinner, detergent, or abrasive cleaner will damage the surface. Also, avoid using insecticide sprays in the vicinity of your WS-X1, as this too can cause damage. It is advisable to gently clean your tape heads with a tape head cleaner (available at most music stores) before each use of your WS-X1's tape decks.

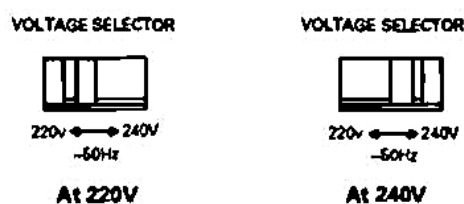
IMPORTANT!

BEFORE CONNECTING AC POWER PLUG

Be sure to check that your WS-X1 is set to the proper voltage for your area. If the voltage of the unit is improperly set, fire hazard or damage to the unit may result. Should you find that your WS-X1 is not set to the proper voltage for your area, change the position of the voltage selector by following the instructions below:

• Units with 220V/240V VOLTAGE SELECTOR switch.

To change the voltage setting, use a standard slot head screwdriver or similar device to slide the switch to the proper setting.



• Units WITHOUT voltage selector switch**.

Because local laws in some areas prohibit such switches, units shipped to these regions do not include voltage selector switches. If for some reason you should need to use such a unit in an area with different power requirements than your WS-X1 is set for, please have the voltage switched by your nearest authorized SANSUI Service Station.

Specifications

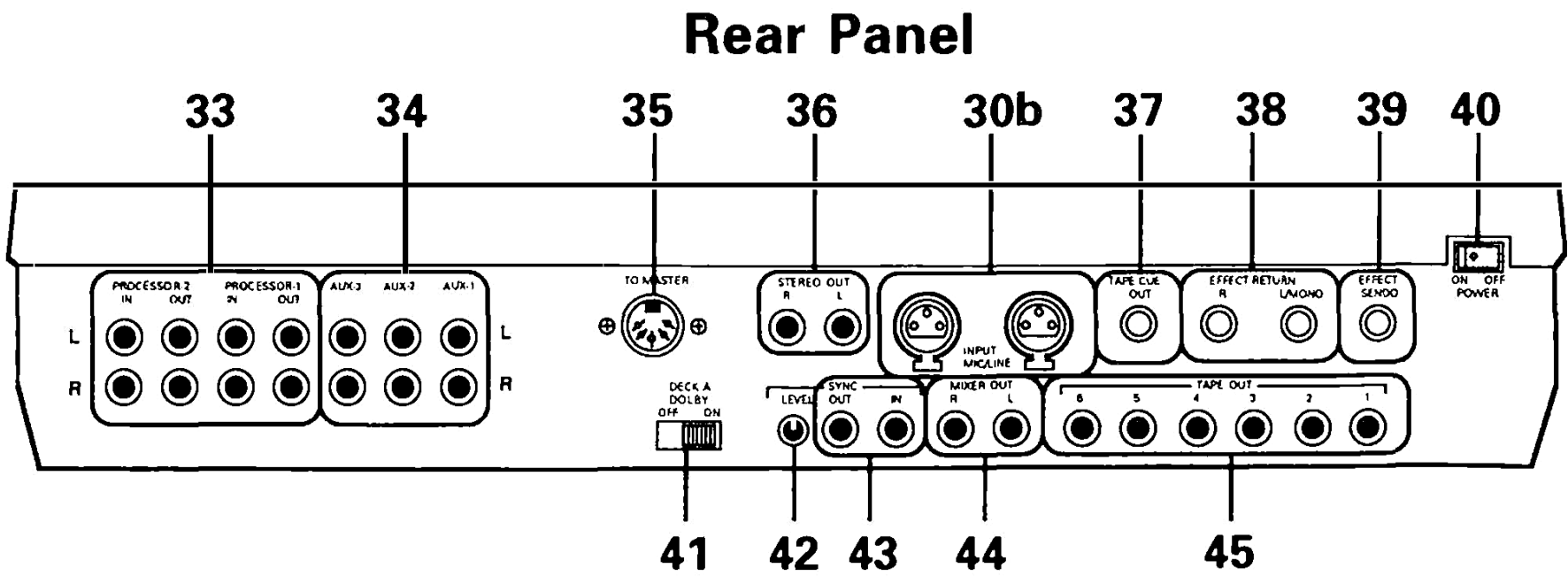
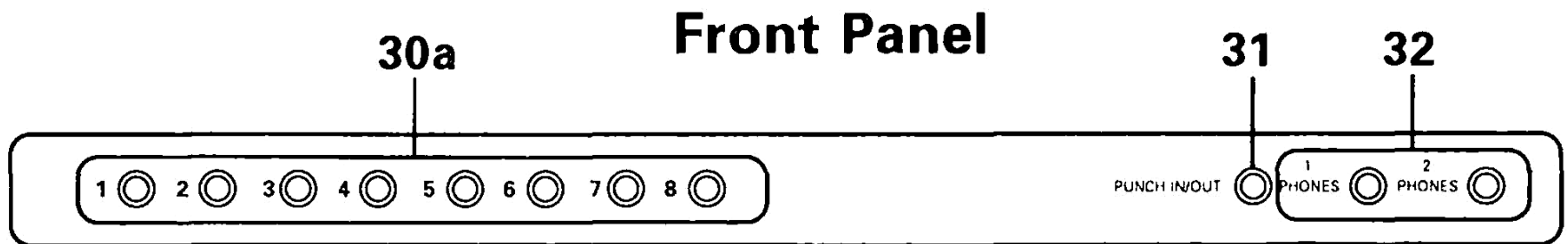
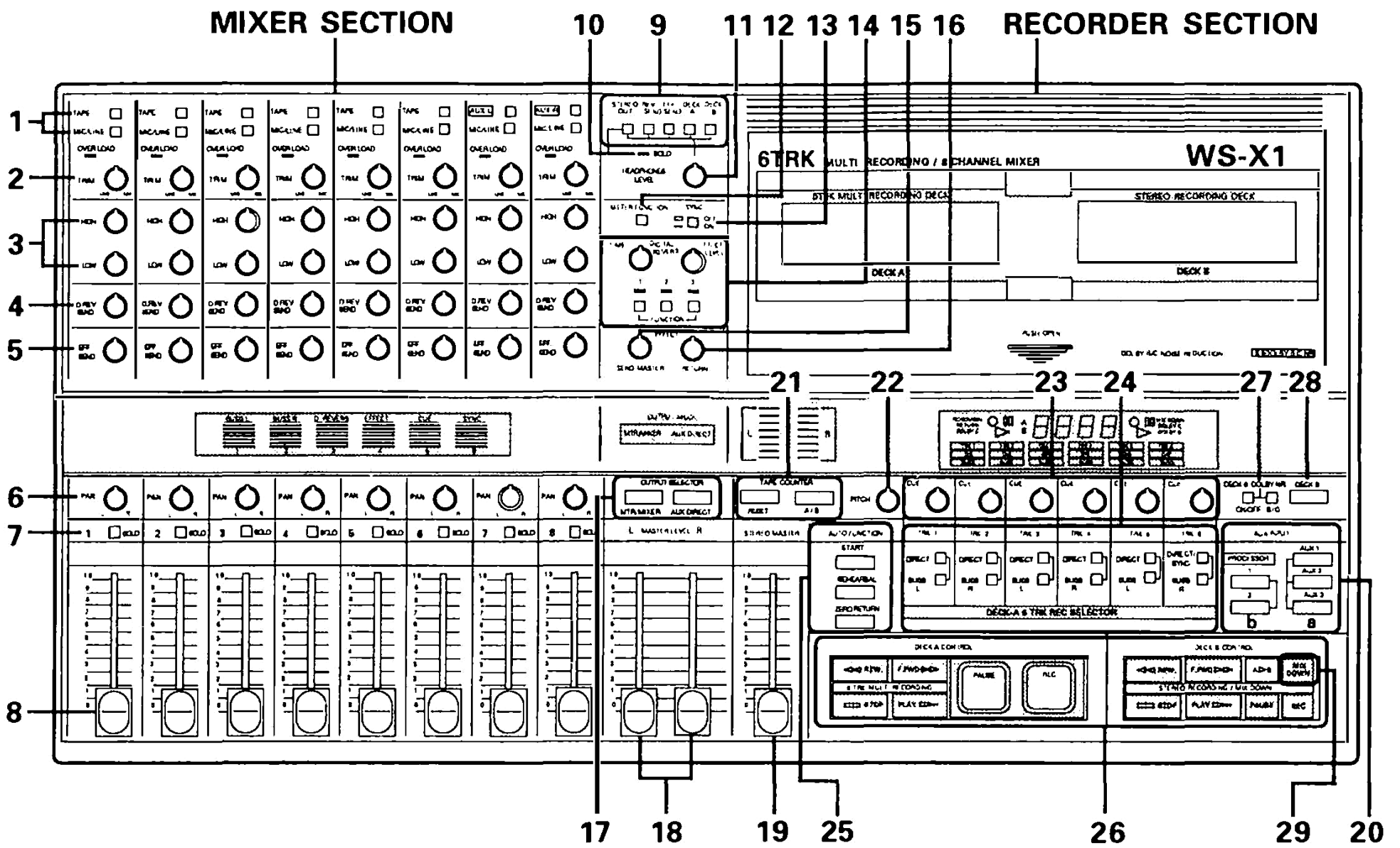
Tape Recorder Section:

Tape type	(Deck A).....C30-C60 Cassette Tape (Chrome)
	(Deck B).....C30-C90 Cassette Tape (Chrome/Normal)
Track format	(Deck A).....6 Track, 6 Channel Record-Play
	(Deck B).....4 Track, 2 Channel Record-Play
Tape speed/deviation	(Deck A).....9.5 cm±1% per second
	(Deck B).....4.75 cm±1% per second
Pitch control	(Deck A).....±20%
Wow & flutter	.....0.06 (NAB Weighted)
Sync out	.....-10 dBV/100 Ohms
Frequency response	.....40 to 15,000 Hz, ±3 dB
Channel Separation	.....50 dB (1 kHz, 0 VU, NR on)
Erasure	.....70 dB (1 kHz)

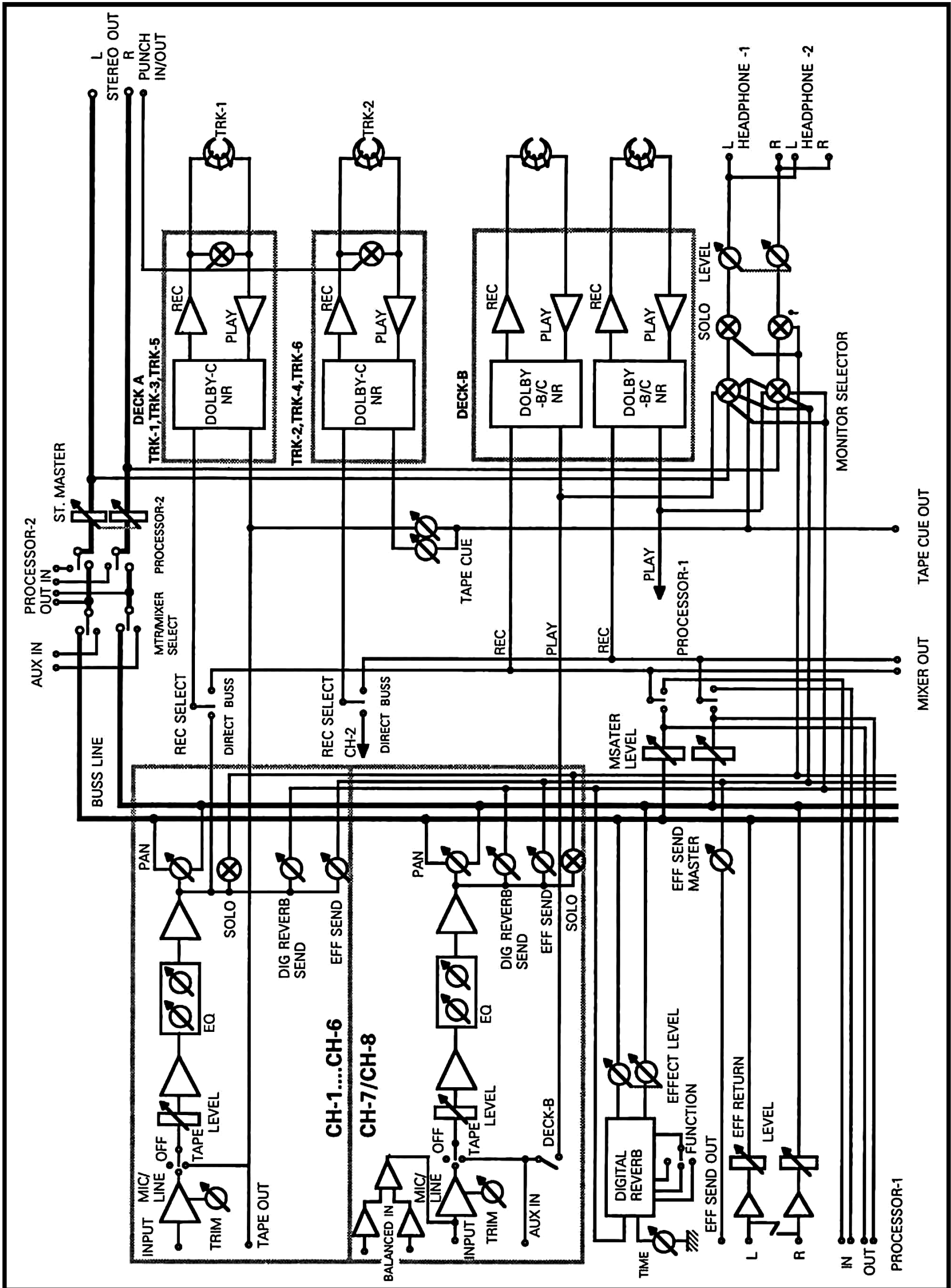
Mixer Section:

Distortion	.....0.06% (Amplifier)
Signal-to-noise ratio	.....72 dB
Frequency response	.....10 to 60,000 Hz
Separation	.....65 dB
Mic/Line input (x8)	
Input level (Mic)	.....-50 dBV at trim max.
Input level (Line)	.....-10 dBV at trim min.
Impedance	.....50 kOhms
Effects return (Stereo)	
Level	.....-10 dBV/5 kohms
Effects output (Mono)	
Level	.....-10 dBV/100 ohms
Equalizer	
Low	.....100 Hz ±12 dB
High	.....10 kHz ±12 dB
Power requirements	
For U.S.A. & Canada models	.....AC 120V, 60Hz
For European Models	.....AC 220/240V, 50Hz
Power consumption	.....45 Watts
Dimensions	.....625 mm (245/8") W
	.....110 mm (43/8") H
	.....343 mm (139/16") D
Weight	.....9 kg (19.8 lbs) net
	.....11.5 kg (25.4 lbs) packed

- * Design and specifications are subject to change without notice for the purpose of improvements.
- ** Due to local laws and regulations, this unit is sold in some areas without variable voltage selectors.



Block diagram



OVERVIEW

WS-X1 FEATURES

Below is an outline of some of the many features found on your new SANSUI WS-X1.

COMPLETE AUDIO PRODUCTION IN ONE HIGH QUALITY UNIT FEATURING:

- The world's first 6 Track cassette format recording system.
- Built-in 2 Track cassette deck for "Mix-Down" or 2 Track playback
- Built-in digital signal processing
- Built-in 8 Channel mixing console
- More flexible "Track Bouncing" (Ping-Pong) using the "Mix-Down" deck

BUILT-IN RECORDING CONSOLE FEATURING:

- 8 Mic/Line inputs for connection with microphones, electric guitars, keyboards, drum machines, etc.
- 2 Balanced XLR type inputs
- Stereo Effects Loop
- 6 Individual Track Outputs
- 2 Separate Stereo Outputs for monitoring and for use with external 2 Track recorders. (DAT machines, etc.)
- 2 Headphone Outputs for monitoring
- Mono Tape Cue Output
- Separate Sync In/Out jacks for use with synchronizers
- 3 Stereo AUX inputs for the connection of DAT machines, CD players, sub mixers, effects returns, etc.
- Built-in digital signal processing providing 3 different digital reverbs and stereo echo.

AUTOMATED TAPE TRANSPORT CONTROL FEATURING:

- Auto rehearsal function
- Zero return
- One touch "Mix-Down" control

EXPANDABILITY.

- Your SANSUI WS-X1 can be combined with a SANSUI MR-6 MTR and SY-1 Sync Controller to provide 10 Track recording capability.

About MULTI-TRACK Recording

Following is a **BASIC** explanation of the Multi-Track recording process. This process can be broken down into four major steps as follows:

1. The "Tracking Process"

The first step in the multi-track recording process is the "Tracking Process." During this time all "Basic" or original tracks are recorded (printed) on the 6 Track MTR.

For example, if a live band is being recorded, it might be desirable to first record the bass, drums, and rhythm guitar to provide a foundation for the recording. Or if MIDI sequencers are being used, one might wish to record (print) a "Sync" tone on one track of the MTR. This "Sync" tone would then tell the sequencer when to start/stop as well as what tempo to go. In this way, keyboards and drum machines never have to be recorded onto the MTR, leaving more track space for other instruments or vocals.

During the "Tracking Process," all tracks are recorded simultaneously.

2. THE "OVERDUB PROCESS"

Once the "Basic" tracks have been recorded, the "Overdub" process can begin. In this step, new tracks are added to the tracks already recorded during the "tracking process." In order to do this, it is first necessary to monitor the playback of the existing tracks. In the case of the WS-X1, this monitoring takes place via the gray "Tape Cue" controls(23)* on the front panel of the WS-X1. The signal from the "Tape Cue" controls can be monitored through the "Headphone" Outputs(32) by depressing the "Deck A" button(9) in the "Headphone" section of your WS-X1. Monitoring the existing tracks in this fashion leaves the 8 channel inputs(1-8) for additional input signals.

Once playback of the existing channels has been established, recording of new tracks (Overdubbing) can begin. "Overdubs" can continue until there are no more tracks left. It is important to be sure to monitor the playback of all recorded tracks through the "Tape Cue" (23) controls until the "Overdub Process" is completed.

3. THE "BOUNCING (PING-PONG) PROCESS"

Very often, it is desirable to record more overdubs than there is track space for. In order to do this, your WS-X1 has the ability to "Bounce" or "Ping-Pong" tracks. In this process, recorded material that occupies many tracks are mixed onto 1 (or 2) open track(s) in order to provide free track space for additional overdubs.

For example, if 5 of the WS-X1's 6 tracks have recorded material on them, those 5 tracks could be mixed together onto track 6. At that point, tracks 1-5 are once again available for additional overdubs.

Track "Bounces" may also be performed in stereo on the WS-X1. For instance, if 4 of the WS-X1's 6 tracks have material recorded on them, they could be mixed in stereo onto tracks 5 AND 6. In this way, stereo imaging for drums, keyboards, etc. remains intact.

If that isn't enough, there is one further method of "Bouncing" available on the WS-X1. That is to mix 6 tracks of recorded material (In Stereo) to the built-in "Mix-Down" deck, and then return the mixed tracks to 2 new tracks of the MTR (Deck A). Once again, "Bouncing" tracks in this fashion maintains stereo imaging.

Having completed the "Bouncing Process," the "Overdub Process" may be repeated as necessary.

4. THE "MIX-DOWN" PROCESS

Once all of the overdubbing and bouncing has been completed, it is time to create a finished 2 Track (Stereo) product. This is done in the "Mix-Down" process. Though this is a fairly simple step, it often requires the largest amount of time and effort.

In the "Mix-Down" process, all 6 tracks of the MTR (Deck A) are transferred in stereo to the "Mix-Down" deck (Deck B). It is important to take time and care when "Mixing-Down" as this will determine the outcome of your final product.

- * Detailed instructions on Multi-Track recording with the SANSUI WS-X1 can be found later in this manual.

- * Numbers in brackets [] refer to the diagrams on page 3.

About Tapes

Deck A

Deck A of your WS-X1 is a high speed, 6-track MTR (Multi-Track Recorder). Because tapes in Deck A travel at twice the speed of normal cassettes, the amount of recording time per tape side is cut in half. Also, in order to fit 6 tracks of recorded material on an ordinary cassette, it is necessary to use the entire width of the tape. Therefore, tapes in Deck A can only travel in one direction. By taking both of these factors into consideration, it is easy to see that the recording time of a cassette placed in Deck A will be reduced to one-fourth its indicated recording time. For example, if you use a C-60 length cassette tape in Deck A, the actual amount of recording time that you will end up with is 15 minutes. Please be sure to keep this in mind when choosing cassette tapes to be used in Deck A.

Deck B

Deck B of your WS-X1 is normal speed, high quality 2-track cassette player/recorder. Deck B functions in the same way as any standard cassette deck. Because of this, cassettes used in Deck B will actually have the indicated amount of recording time available.

Recommendations

Deck A

Deck A is designed to use High Position Chrome tapes with a length of C-60.
DO NOT USE METAL or NORMAL TAPES in Deck A.
DO NOT USE C-90 or C-120 cassettes as they are easily stretched and may adversely affect your recordings.

Deck B

Deck B is designed to use either High position or Normal tapes with a length of C-90 or lower.
DO NOT USE METAL TAPES in Deck B.

Connections

Connection precautions

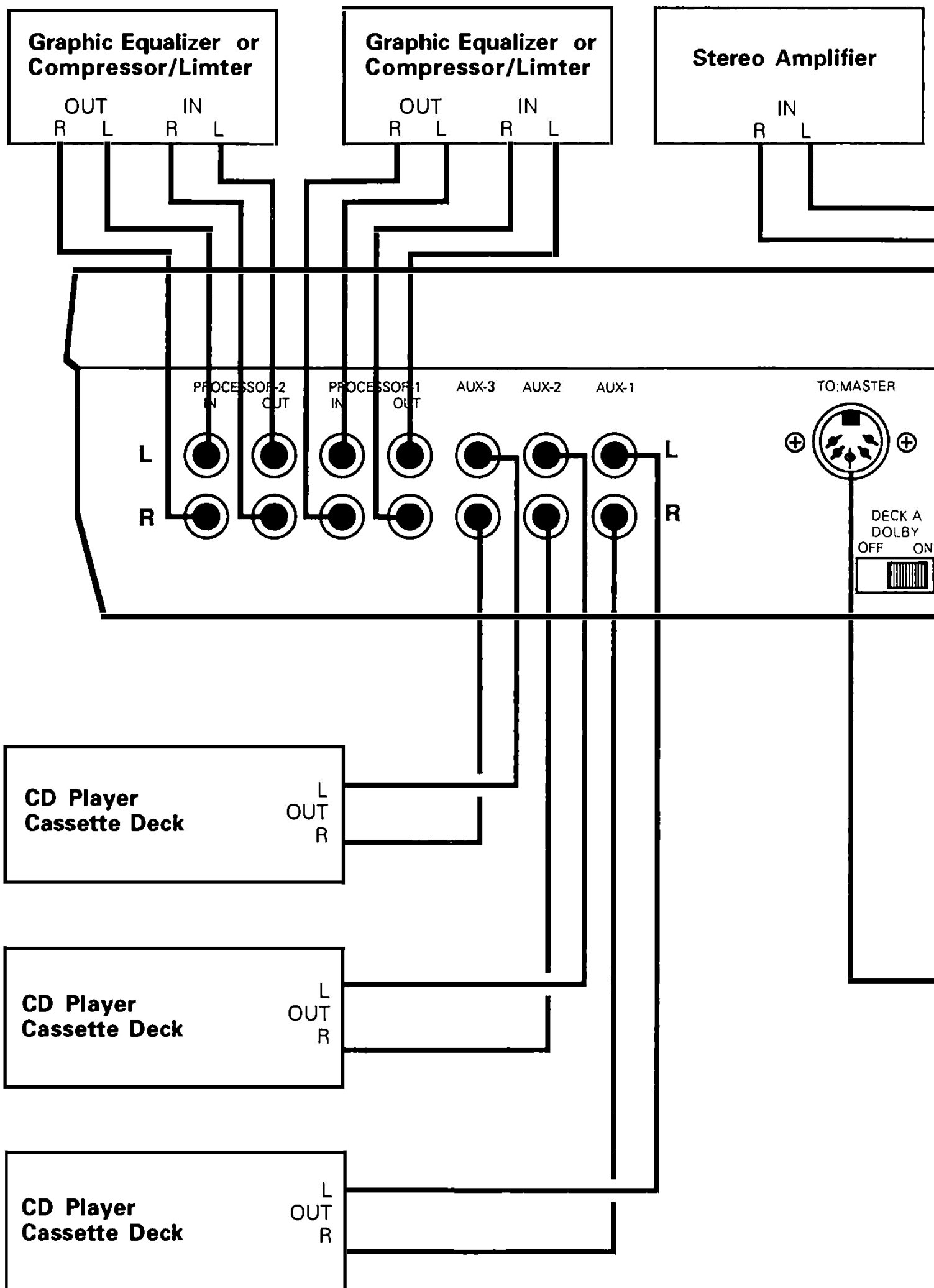
Be sure that your WS-X1's power is turned off when making connections to it. This can be done by either unplugging the unit, or by switching the unit's power off at the POWER SWITCH. [40]

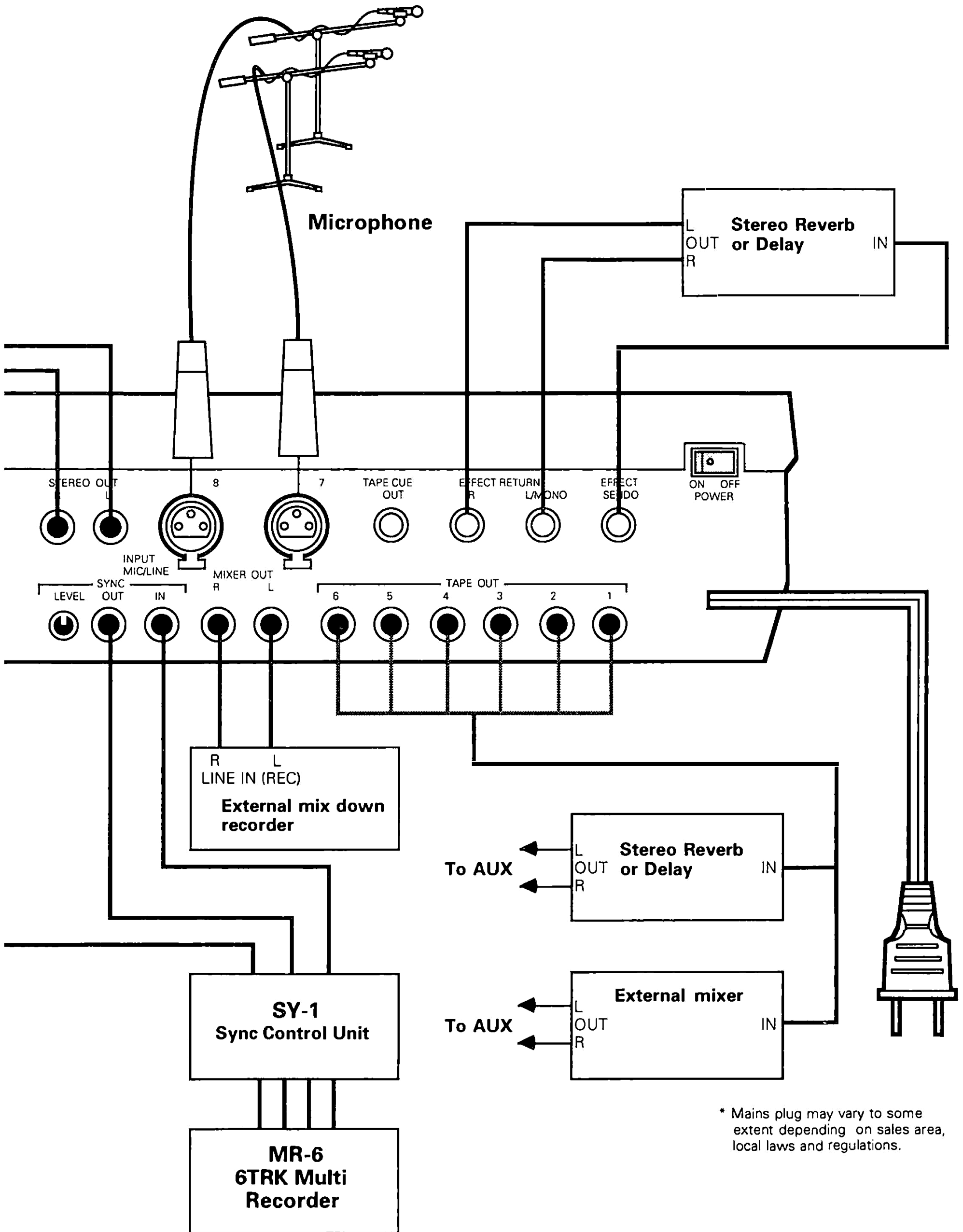
Be sure that your left output cable is connected to the left output jack and that your right output cable is connected to the right output jack.

Be sure to connect all cables securely improper connection may cause noise.

Connections to the PROCESSOR LOOPS [33]

Processor loops 1 and 2 behave slightly differently. For detailed information regarding the proper use of the processor loops, see '20b PROCESSOR 1 and 2 Switches' on page 9 of this manual.





Part Names and Functions

* Numbers in brackets [] refer to the diagrams on page 3.

MIXER SECTION

1. Input Selector

These buttons choose which signals will be routed through the input channels [1-8].

TAPE position (TAPE button down): Playback from Deck A (MTR) is routed through the input channel. This is the proper setting for "Bouncing" and "Mixing-Down."

MIC/LINE position (MIC/LINE button down): Signals connected to either the 8 front panel or 2 rear panel connectors are routed to the input channels. This is the proper setting for listening to live signals from microphones, keyboards, drum machines, electric guitars, etc.

AUX-L/AUX-R (Channels 7-8): Signals connected to the auxiliary buss (AUX 1-3 or Deck B) are routed to input channels 7 and 8 (Left side to channel 7/ right side to channel 8). This is the proper setting for combining AUX signals with the other input channels. Also for routing Deck B playback to Deck A.

NOTE: If both the TAPE and MIC/LINE buttons are depressed simultaneously, they will cancel each other out. Therefore, NO SIGNAL WILL COME THROUGH the input channel.

2. Trim (Master volume) Control

This is the Master gain control for each input channel. It is functional only when the input selector is in the MIC/LINE position. The TRIM control provides the extra gain needed for microphones or other devices with lower output levels. When the TRIM control is at minimum, the channel input level is -10dB, and when the TRIM control is at maximum, the channel input level is -50dB.

3. EQ (Equalization) High/Low Controls

These controls are used to "shape" the signals coming through the input channels. They allow you to Cut (Decrease) or Boost (Increase) certain frequencies according to your taste. There is one control on each channel for high frequencies and one for low frequencies as well.

HIGH: This control affects frequencies of 10kHz or higher.

LOW: This control affects frequencies of 100Hz or lower.

The maximum amount of cut or boost available through the EQ controls is ± 12 dB. That means that you can choose to cut or boost your high or low frequencies by as much as 12dB.

4. Digital Reverb Send Control (D. REV SEND)

This control allows you to determine the amount of each channel's signal to be sent to the built-in digital signal processor. Simply stated, this control determines how much of the internal digital reverb will be applied to each channel.

5. Effect Send Control (EFF. Send)

This control allows you to determine the amount of each channel's signal to be sent to the effect send master. From there, the signal can be sent to an external signal processor (Reverb, Delay, Etc.).

6. PAN Control

This control allows you to distribute each channel's signal between the left and right record and output channels of your WS-X1. Simply stated, this control allows you to position the channel's signal in the stereo field.

7. SOLO Button

This button allows you to isolate one or more input channels without having to change any of your fader positions. For example, if you were listening to all 8 input channels, but wanted to hear one specific channel by itself (without having to pull all of the other faders down), you could do so by depressing the SOLO button. You may "SOLO" as many channels at one time as you like. When any channel is in SOLO, the SOLO indicator will light up.

NOTE: The SOLO function works only in the headphone outs. This is to avoid any problems in "Mixing-Down" to external 2 Track machines. Also, the PAN control is not active while in SOLO.

8. Input Level Control (Fader)

This fader allows you to control the "over-all" level of each input channel.

9. Headphone Monitor Selectors

These buttons determine which signals will be routed to the 2 Headphone Outputs. These buttons may be used individually OR simultaneously.

STEREO OUT: Allows monitoring of the Stereo Output of your WS-X1 through the Headphone Outputs.

REV SEND: Allows monitoring of the signals being sent to the internal digital reverb.

EFF. SEND: Allows monitoring of the signals being sent to the EFFECT SEND jack.

DECK A: Assigns the output of the TAPE CUE controls to the Headphones. This is the proper setting for monitoring playback of recorded tracks during the "Overdub Process."

DECK B: Allows monitoring of Deck B (2 Track) through the Headphone Outputs.

10. SOLO Indicator Light

This LED indicates that one or more channels are being SOLO'd in the Headphone Outputs.

11. HEADPHONES LEVEL Control

This control allows you to adjust the volume in the headphones. This control also adjusts the SOLO level in the headphones.

12. METER FUNCTION Switch

This button allows you to choose between the two meter functions of the WS-X1.

When the METER FUNCTION button is in the UP position, your WS-X1 gives you visual monitoring of the STEREO RECORD BUSS, the DIGITAL REVERB LEVEL, the EXTERNAL EFFECT RETURN LEVEL, the TAPE CUE OUTPUT LEVEL, and the SYNC LEVEL.

When the METER FUNCTION button is in the DOWN position, your WS-X1 gives you visual monitoring of the individual track input/output levels.

13. SYNC On/Off Switch

This button activates the SYNC function of your WS-X1. When SYNC is activated (Button in the DOWN position), signals connected to the SYNC In/Out jacks on the rear panel are routed directly to/from track 6. In order to avoid problems with your SYNC signals, when the SYNC function is activated, Noise Reduction on track 6 is automatically bypassed. Finally, activating the SYNC function also diverts the SYNC signal away from the Stereo Output so that you don't have to listen to the irritating sound of the SYNC tone.

NOTE: The SYNC meter is active only when the SYNC function is activated.

14. DIGITAL REVERB Controls/FUNCTION Switches

These controls are used together to obtain a variety of digital effects.

TIME: This control allows you to adjust the decay times of the various reverb/delay programs found in your WS-X1's built-in digital signal processor. Turning this control to the left decreases the decay time while turning the control to the right increases decay time.

EFFECT LEVEL: This control allows you to adjust the amount of the built-in digital signal processor to be sent to Stereo Record/Output buss. This control is similar to the "Effect Return" control [16] found below.

FUNCTION: These buttons allow you to select between the four different digital reverb/delay programs offered on the WS-X1. The FUNCTION buttons work as follows:

FUNCTION 1: (LED Illuminated) This button selects a "SMALL ROOM" digital reverb program.

FUNCTION 2: (LED Illuminated) This button selects a "MEDIUM PLATE" digital reverb program.

FUNCTION 3: (LED Illuminated) This button selects a "LARGE HALL" digital reverb program.

FUNCTION 4: (No LED Illuminated) This function (All Buttons UP) selects a "STEREO ECHO" digital delay program.

NOTE: The four Digital Effects built-in to the WS-X1 cannot be used simultaneously. Therefore, if more than one button is depressed, the FUNCTION # corresponding to the illuminated LED is the active FUNCTION #.

15. EFFECT SEND MASTER Control

This control allows you to adjust the overall amount of signal being sent to your external signal processor. The signal sent by this control is the sum of the signals sent by the EFF. SEND control [5].

16. EFFECT RETURN Control

This control allows you to adjust how much of the processed (effected) signal will be mixed with the "dry" signals from the input channels. Simply stated, this control is a "master volume" control for the external effects.

17. OUTPUT SELECTOR Switches

These switches allow you to select which signals will be heard at the STEREO OUTPUT of your WS-X1. There are two modes available:

MTR/MIXER: In this position (MTR/MIXER indicator is illuminated), Signals from Deck A (MTR) and the mixer are combined and can be monitored at the STEREO OUTPUTS. When the OUTPUT SELECTOR Switch is in the MTR/MIXER mode, AUX signals must be assigned to channels 7 and 8 in order to be heard.

AUX DIRECT: In this position, (AUX DIRECT indicator is illuminated), the AUX buss (including Deck B) is routed directly to the STEREO OUTPUTS bypassing the mixer entirely. This is to provide completely accurate monitoring of AUX signals.

NOTE: If the DECK B Switch [28] is depressed, AUX 1-3 will be canceled out. This is to provide playback directly from DECK B to the STEREO OUTPUTS.

NOTE: If both the MTR/MIXER switch and the AUX DIRECT switch are depressed simultaneously, they will cancel each other out (no indicator will be illuminated) and NO SIGNAL WILL BE AUDIBLE at the STEREO OUTPUTS. Therefore, if no OUTPUT MODE indicator is illuminated, it will be necessary to check the position of the OUTPUT SELECTOR switches.

18. MASTER LEVEL (Master Record Level) Faders

These faders allow you to adjust the levels of the STEREO RECORD BUSS. These faders will be used to adjust recording levels when recording to the MTR in "BUSS" mode [24] as well as when "Mixing-Down" to Deck B. The MASTER LEVEL faders also determine the amount of signal being sent to the MIXER OUT terminals [44] on the rear panel of your WS-X1.

19. STEREO MASTER Fader

This fader controls your overall monitoring level in the Headphones when the STEREO OUT button [9] is depressed. The STEREO MASTER Fader also controls the levels being sent to the STEREO OUT Terminals [36] on the rear panel of your WS-X1.

20a. AUX Inputs (1-3)

These switches allow you to activate/deactivate any or all of the 3 stereo AUX Inputs which are found on the rear panel of your WS-X1. These inputs may be used for anything you like such as:

- Submixers
- DAT Machines
- CD Players
- Effect Returns
- Other types of 2 Track Machines
- Etc.

Though it is possible to use all three of these AUX Inputs simultaneously, it is recommended that you use only one AUX Input at a time.

20b. PROCESSOR 1 and 2 Switches

These switches activate/deactivate the WS-X1's two STEREO PROCESSOR LOOPS. These STEREO PROCESSOR LOOPS allow you to apply signal processors such as Graphic EQ's, Compressor/Limiters, Exciters, Etc. to the entire stereo buss without having to do any rewiring. When the PROCESSOR Switches are down, the STEREO PROCESSOR LOOP is activated. When the PROCESSOR Switches are up, the STEREO PROCESSOR LOOPS are deactivated.

NOTE: The two STEREO PROCESSOR LOOPS are used in slightly different ways:

PROCESSOR 1: This STEREO PROCESSOR LOOP affects the STEREO RECORD BUSS and the MIXER OUT terminals [44]. This processor loop should be used when you wish to apply processing to signals being recorded through the STEREO RECORD BUSS (recording to the MTR in "BUSS" mode or "Mixing-Down") or signals being sent to the MIXER OUT terminals.

PROCESSOR 2: This STEREO PROCESSOR LOOP affects signals being sent to the STEREO OUT terminals [36] on the rear panel of your WS-X1. This processor loop is best suited for applying EQ for monitoring purposes.

- The STEREO PROCESSOR LOOPS may be used individually or simultaneously.

RECORDER SECTION

21. TAPE COUNTER Switches

These switches allow you to reset the counter for either Deck A or Deck B.

RESET: This switch resets the counter reading for the current deck (A or B) to "0000"

A/B: This switch toggles between the counter readings for Deck A (MTR) and Deck B.

22. DECK A PITCH Control

This control allows you to increase or decrease the tape speed of Deck A by $\pm 20\%$. The DECK A PITCH Control is used mostly for "Special Effects." It is recommended that you leave this control set to the '0' (Center) position whenever possible.

23. TAPE CUE Volume Controls (MTR)

These controls allow you to construct a "Headphone Cue" mix of the tracks being played back from Deck A (MTR). Simply stated, the 6 gray controls correspond to the 6 tracks of the WS-X1. Each control allows you to adjust a playback level for the corresponding track.

NOTE: The output from the TAPE CUE section appears only in the HEADPHONE OUTPUTS or at the TAPE CUE OUT terminal on the rear panel of your WS-X1. In order to hear the TAPE CUE mix in your headphones, you must first depress the DECK A button [9] in the MONITOR SELECT section of the mixer.

It is recommended that you always use the TAPE CUE Controls to monitor the playback from Deck A (MTR) during the "Overdub Process."

24. Deck A (MTR) Record Selectors

These buttons enable the RECORD FUNCTION for each of the WS-X1's 6 tracks. The 2 RECORD SELECTORS corresponding to each of the 6 tracks allow you to choose between two different methods of recording. These methods are:

DIRECT: When the record selector for any given track is in the DIRECT position ('DIR' is shown in the track display), that track will only receive signal from the corresponding input channel. (Track 1 will receive signal from input channel 1, track 2 will receive signal from input channel 2, etc.). By using DIRECT recording, all 6 tracks can be recorded simultaneously.

BUSS L/R: When the record selector for any given track is in the BUSS L/R position ('BUSS' is shown in the track display), that track will receive signal from the corresponding MASTER LEVEL Fader [18]. For example, if the record selector for Track 1 is in the BUSS L position, any signals that are assigned to the LEFT MASTER LEVEL fader (anything panned left) will be sent to Track 1 for recording. On the other hand, if the record selector for Track 2 is in the BUSS R position, any signals that are assigned to the RIGHT MASTER LEVEL fader (anything panned right) will be sent to Track 2 for recording.

By using BUSS recording, it is possible to mix several input channels onto 1 or 2 tracks. Tracks 1,3, and 5 receive signals from the LEFT record buss, while tracks 2,4, and 6 receive signals from the RIGHT record buss.

25. AUTO FUNCTION Buttons (MTR Only)

These buttons are used to "automate" some of the tasks that you will use most often during the Multi-Track Recording process.

ZERO RETURN: This button automatically rewinds the tape in Deck A to counter marking '0000' from anywhere in the tape. To activate ZERO RETURN, simply press the ZERO RETURN button at any time.

START: This button automatically marks the beginning point of an AUTO REHEARSAL loop. To activate an AUTO REHEARSAL loop, simply press the START button. The counter will automatically be reset to '0000' and playback will begin.

REHEARSAL: Once the START function has been activated, the REHEARSAL button can be used to mark the ending point of an AUTO REHEARSAL loop. To do this, simply press the REHEARSAL button. Your WS-X1 will memorize the counter position and then automatically rewind the tape to the START point ('0000'), where it will begin playing again until it reaches the REHEARSAL point. At this time, the process will repeat until the STOP button [26] is pressed.

If you wish to make your WS-X1 play to a certain point, then rewind and STOP, you may do so by pressing the ZERO RETURN button instead of the REHEARSAL button after the START function has been activated. The WS-X1 will retain the rewind point in its memory until the STOP button [26] is pressed.

26. CONTROL Buttons (Deck A and Deck B)

These buttons control the operation of the WS-X1's two tape decks.

PLAY: This button initiates the playback or recording.

RECORD: This button places the WS-X1 in RECORD STAND-BY mode when the tape is not moving. When the tape is moving, the RECORD button initiates the "Punch-In" procedure.

NOTE: The RECORD function for Deck A will not work unless at least one RECORD SELECTOR Switch [24] has been enabled. Also, the RECORD function will not work for either Deck A or Deck B if the RECORD TABS have been removed from the top of the cassette tape.

PAUSE: This button temporarily stops the tape during RECORDING or PLAYBACK. To initiate the PAUSE function, simply press the PAUSE button. To turn the PAUSE function off, press the PAUSE button again.

F.FWD. (Fast Forward): this button causes the tape to wind forward quickly. Pressing this button while PLAYBACK is engaged allows you to cue the tape audibly.

REWIND: this button causes the tape to wind backward quickly. Pressing this button while PLAYBACK is engaged allows you to cue the tape audibly.

NOTE: It is recommended that you turn your STEREO MASTER fader [19] down while cueing the tape in either direction.

STOP: This button causes the tape to stop. Also, pressing STOP will disengage the AUTO FUNCTION for Deck A.

27. Dolby* NR Switch (For Deck B)

ON/OFF: This button turns the built-in Dolby Noise Reduction Circuit ON and OFF. When the button is in the DOWN position, the noise reduction circuit is ON (Dolby B/Dolby C indicator is illuminated in the Deck B display). When the ON/OFF button is in the UP position, the noise reduction circuit is turned OFF (No indicator).

DOLBY B/C: This button allows you to switch between Dolby B and Dolby C types of noise reduction. This button has no effect if the ON/OFF button is in the OFF position.

* **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.**
"DOLBY" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

28. DECK B Switch

This button allows you to monitor the playback from DECK B over the AUX buss. When the DECK B Switch is down, playback from DECK B is enabled and signals attached to the AUX 1-3 terminals [20a] are overridden.

NOTE: See OUTPUT SELECTOR Switches [17] for information on monitoring AUX buss signals.

29. MIX DOWN Button

This button is used to initiate a "Mix-Down" from Deck A to Deck B. Pressing the MIX DOWN button places Deck B in record pause and places Deck A in play pause. To start the MIX DOWN, simply press the PLAY button [26] on either Deck A or Deck B. Doing this will simultaneously start Deck B recording and Deck A playing. Initiating a MIX DOWN in this fashion automatically resets the counter for Deck A to '0000.'

FRONT and REAR PANELS

30a. Unbalanced Mic/Line Input Jacks

These input terminals correspond to input channels 1-8. They are designed to accept a wide range of input levels ranging from low microphone levels to higher line levels from keyboards, drum machines, electric guitars, etc.

30b. Balanced Mic/Line Input Jacks

These XLR type input terminals correspond to input channels 7-8. These too are designed to accept a wide range of input levels, but from sources with balanced outputs (microphones, submixers, etc.).

31. PUNCH IN/OUT Jack

This terminal allows you to connect a foot pedal switch enabling you to PUNCH IN/OUT remotely. The PUNCH IN/OUT terminal will accept any MOMENTARY CONTACT, NORMALLY CLOSED foot pedal. To use this foot pedal, you must first enable the RECORD SELECTOR [24] for one or more tracks. Once this is done, simply begin the playback of the tape. When you reach the point in the tape that you wish to correct (PUNCH IN), simply depress the PUNCH IN/OUT pedal. Your WS-X1 will instantly begin recording over the desired material. When you reach the point in the tape where you wish to stop making corrections, simply press the PUNCH IN/OUT pedal again and your WS-X1 will automatically switch out of RECORD mode. PUNCH IN/OUT can also be executed manually.

32. Headphones Jacks

These are standard stereo Headphone Jacks. Since there are two of them, it is possible for two people to monitor the sound simultaneously. Headphone volume is controlled by the HEADPHONES LEVEL Control [11].

NOTE: It is also possible to use one of the WS-X1's two headphone jacks as a "Monitor Output." By monitoring in this fashion, the "TAPE CUE" and "SOLO" functions can be monitored through stereo speakers. To monitor through the Headphone Jack, connect the stereo end of a standard 1/4" insert cable (1/4" stereo phono plug to {2}1/4" mono phono plugs) to the Headphone Jack. The two mono ends of the insert cable can then be connected to a stereo amplifier.

33. PROCESSOR In/Out Jacks

These terminals allow you to connect signal processors such as Graphic EQ's, Compressor/Limiters, Exciters, Etc. to the stereo buss lines of your WS-X1. For more information on using the PROCESSOR Loops and how they work, see PROCESSOR Switches [20b].

34. AUX IN 1-3 Jacks

These terminals are designed to accept signals from external audio devices such as CD Players, DAT Machines, External 2 Track Machines, Effects Returns, Etc. Each of the three AUX Inputs is Stereo. For more information on using the AUX IN terminals, see AUX INPUT Switches [20a].

35. TO MASTER Terminal

This 5 pin DIN connector is used to connect your WS-X1 to its optional SY-1 Sync Controller. The TO MASTER terminal on the WS-X1 connects directly to the MASTER terminal on the SY-1. This connection is necessary to synchronize the SANSUI MR-6 Remote MTR to the WS-X1.

NOTE: When the WS-X1 and MR-6 are synchronized together, the WS-X1 is considered to be the "MASTER" unit.

36. STEREO OUT Jack

These terminals are the output jacks for the STEREO MASTER fader. The STEREO OUT terminals are normally used as output jacks to Stereo Monitor Amplifier. However, these jacks may also be connected to an external mix down deck such as a DAT machine, Reel to Reel 2 track, Etc.

37. TAPE CUE OUT Jack

This jack is where the mono sum of the TAPE CUE Controls [23] is output from the WS-X1. Simply stated, playback signals from Deck A are mixed together (via the TAPE CUE Controls) and sent out of the TAPE CUE OUT Jack.

NOTE: During Mix Down, the TAPE CUE OUT can be used as an additional effects send. To use the TAPE CUE OUT in this fashion, connect the TAPE CUE OUT jack to the input of a signal processor. Then connect the outputs of the signal processor to any of the 3 AUX inputs. The TAPE CUE Controls [23] can then be used as individual "Effects Send" controls for each tape track.

38. EFFECT RETURN Jacks

These jacks are where the outputs from external signal processors (Reverbs, Delays, Etc.) are connected. For more information on using the WS-X1's Effects Loop, see EFFECTS SEND MASTER [15] and EFFECTS RETURN [16].

39. EFFECT SEND Jack

This jack is where the summed signal from the EFFECTS SEND MASTER [15] is sent. From this jack, the signal goes to the input of a signal processor (Reverb, Delay, Etc.) where the signal is effected. The effected signal is then returned to the EFFECT RETURN Jacks [38] where it is mixed together with the original dry signal.

40. POWER Switch

This switch turns your WS-X1 ON and OFF.

41. Dolby-C Noise Reduction Switch (Deck A)

This enables and disables the Dolby-C noise reduction circuit for Deck A (MTR). In the ON position, noise reduction is ENABLED. In the OFF position, noise reduction is DISABLED.

42. SYNC LEVEL Control

This control allows you to adjust the amount of SYNC signal being sent from the SYNC OUT Jack [43] to your Synchronizer. This control is provided to accommodate the various levels that different synchronizers operate best with.

43. SYNC IN/OUT Jacks

These jacks are used for connection with synchronizer units such as the SANSUI SY-1. The SYNC OUT Jack from the WS-X1 connects to the SYNC IN Jack of the synchronizer unit. In turn, the SYNC OUT Jack of the synchronizer unit connects to the SYNC IN Jack on the WS-X1.

44. MIXER OUT Jacks

These terminals are designed to be connected to an external Mix Down recorder. The signal that is found at these jacks is the sum of the signals controlled by the MASTER LEVEL Faders [18].

45. Individual TAPE OUT Jacks

The direct outputs from tape tracks 1-6 (MTR) are sent to these jacks. The 6 TAPE OUTS correspond to the 6 tracks on the WS-X1's MTR. These jacks are used to make direct duplications from your WS-X1 to another Multi-Track Recorder. Also, the TAPE OUT Jacks can be used to directly send the WS-X1's track outputs to an external submixer.

NOTE: If you should find that one or more of your tracks (MTR) has insufficient level for Mix Down, it is possible to connect a cable from the TAPE OUT jack for that track to the corresponding CHANNEL INPUT [30a]. At that point, you can use that channel's INPUT SELECTOR [1] to select MIC/LINE. This gives you the ability to use the WS-X1's TRIM Control [2] to boost the level of the track in question.

Operating procedures

* Numbers in brackets [] refer to the diagrams on page 3.

Examples

A. Direct Recording

In this example, we will go through the process of recording a "live" band directly to the 6 tracks of the WS-X1. For the purpose of this example, we'll assume this session to be instruments only consisting of: Drums, Bass, Guitar, and Keyboards.

Because we want to record all 6 tracks simultaneously, we will be recording in "DIRECT" mode. This means that the audio signals coming to input channels 1-6 will be routed directly to the corresponding tape tracks. (i.e. Input Channel 1 is routed to Tape Track 1, Input Channel 2 is routed to Tape Track 2, etc.) Keeping this in mind, we can begin assigning our instruments to the various Input Channels/Tape Tracks.

Because it is generally better to assign lower frequencies to edge tracks (1 or 6), we'll assign the Bass to Tape Track 1 by plugging the audio cable from the Bass Guitar into Input Channel 1. Next, we'll assign the remaining instruments as follows:

GuitarTrack 2 (Input Channel 2)
Keyboards (Left).....Track 3 (Input Channel 3)
Keyboards (Right).....Track 4 (Input Channel 4)
Drums (Left).....Track 5 (Input Channel 5)
Drums (Right).....Track 6 (Input Channel 6)

The next step is to set the proper recording levels for the various instruments. We'll start with Bass, which should now be connected to Input Channel 1. Your WS-X1 should be set up as follows:

1. Set the OUTPUT SELECTOR switch [17] to the "MTR/MIXER" mode by depressing the "MTR/MIXER" button. (The "MTR/MIXER" indicator should be illuminated.)
2. Set the "HEADPHONE MONITOR SELECTOR" switch [9] to the "STEREO OUT" position by making sure that the "STEREO OUT" button is down.
3. Adjust the "HEADPHONE LEVEL" control [11] to approximately "5" or "6".
4. Make sure that the "STEREO MASTER" fader [19] is up at least slightly.
5. Set the "METER FUNCTION" button [12] to the "TRACK" position by making sure that the "METER FUNCTION" button is in the down position.
6. Set the INPUT SELECTOR switch [1] to the "MIC/LINE" position by making sure that the "MIC/LINE" button is down and the "TAPE" button is up.
7. Set the record selector for Track 1 for "DIRECT" mode by depressing the "DIRECT" button [24]. (The "DIR" indicator should be illuminated.)
8. Set the "CHANNEL INPUT FADER" [8] to the "7" or "8" position.
9. Play the instrument. The Track 1 Meter should be "jumping" indicating that the signal is getting to the desired track. As you play, the signal should be "Peaking" (Reaching its highest level) at "0" or just slightly above "0" on the Track Meter. If your signal is higher than this, compensate by pulling the "INPUT FADER" [8] back until the signal is at an appropriate level. If your signal is too low, then compensate by adjusting the "TRIM" control [2] slowly to the right until the signal reaches the desired level.
10. Adjust the "EQ" controls [3] to achieve the sound that you desire.

Repeat steps 6-10 (Above) for the remaining instruments. Once this is done, you are ready to begin recording your "Basic" tracks.

To record: Simply press the "RECORD" button on your WS-X1.

When you are satisfied that all of your levels are correct: Press the "PLAY" button. Your WS-X1 will begin recording.

When you are finished recording: Press the "STOP" button.

Then: Press either the "REWIND" button or the "ZERO RETURN" button [25].

B. Listening to Playback

Once your "Basic Tracks" have been recorded, you will need to hear them back. This is accomplished by these simple steps:

1. Turn off the "RECORD SELECTORS" [24] for each track by returning them to the up position. (No indicators should be illuminated.) This will prevent accidental erasure of the tracks that were just recorded.
2. Turn the "TAPE CUE" controls [23] for each track to approximately the "6" or "7" position. These controls will allow you to adjust the playback volume for each track so that you can create a "CUE MIX".
3. In the "HEADPHONE MONITOR" section of your WS-X1, depress the "DECK A" button [9]. This will allow you to monitor (Hear) the playback of your tracks through the HEADPHONES ONLY.
4. Press the "PLAY" button [26] to begin the playback of your tracks.
5. Adjust the Overall playback volume with the "HEADPHONES LEVEL" control [11].

C. Overdubbing

Though the "Direct" method of recording (Example "A") is a quick and easy way to record several tracks simultaneously, it is not the only way to record tracks on your WS-X1. In fact, it is often desirable to record new tracks while listening to previously recorded tracks. This is called OVERDUBBING. For the purpose of this example, we'll assume that tracks 1-4 contain prerecorded material, and that the Overdubs will be recorded onto tracks 5 and 6.

To prepare for Overdubbing, you must first be able to monitor your existing tracks. To do this, follow the steps below:

1. Turn off the "RECORD SELECTORS" [24] for each of the prerecorded tracks by returning them to the up position. (No indicators should be illuminated.) This will prevent accidental erasure of the tracks that were just recorded.
2. Turn the "TAPE CUE" controls [23] for each of the prerecorded tracks to approximately the "6" or "7" position. These controls will allow you to adjust the playback volume for each track so that you can create a "CUE MIX".
3. In the "HEADPHONE MONITOR" section of your WS-X1, depress the "DECK A" button [9] and the "STEREO" button. This will allow you to monitor (Hear) the playback of your tracks as well as your Overdub source through the HEADPHONES ONLY.
4. Adjust the Overall playback volume of the prerecorded tracks with the "HEADPHONES LEVEL" control [11].

Once you have set your WS-X1 to monitor the playback of your prerecorded tracks, you can prepare to Overdub on the remaining tracks. This can be done either in the "Direct Mode" as described in Example "A", or in "BUSS MODE."

To Overdub in the "Direct" mode:

1. Connect your audio source to the Channel Inputs that correspond to the track(s) on which you wish to record. (Tracks 5 and 6 for this example.)
2. Press The "DIRECT" RECORD SELECTOR [24] for the tracks on which you wish to record. (Tracks 5 and 6 for this example.)
3. Make sure that the "METER FUNCTION" button [12] is in the down position.
4. Make sure that the Channel "INPUT SELECTOR" [1] for the desired Channel(s) (Channels 5 and 6 for this example.) are set to the "MIC/LINE" position. ("MIC/LINE" button is down and the "TAPE" button is up.)
5. Set the "INPUT FADER" [8] for each of the desired channels to approximately the "7" or "8" position.
6. Play the audio source. The meters for tracks 5 and 6 should be "jumping" indicating that the signal is getting to the desired track. As you play, the signal should be "Peaking" (Reaching its highest level) at "0" or just slightly above "0" on the Track Meter. If your signal is higher than this, compensate by pulling the "INPUT FADER" [8] back until the signal is at an appropriate level. If your signal is too low, then compensate by adjusting the "TRIM" control [2] slowly to the right until the signal reaches the desired level.
7. Adjust the "EQ" controls [3] to achieve the sound that you desire.
8. Press the "RECORD" button [26]. (Your WS-X1 will be in "RECORD-PAUSE")
9. Press The "PLAY" button. Your WS-X1 will begin recording on the new tracks (5 and 6 for this example.) as your prerecorded tracks playback through your headphones.
10. Press "STOP" when your Overdub is complete.
11. Press "REWIND."
12. Listen to the playback of all your tracks as described in Example "B" above.

To record in the "BUSS" mode:

1. Connect your audio source(s) to any or all of the WS-X1's Channel Inputs.
2. Press The "BUSS" RECORD SELECTOR [24] for the tracks on which you wish to record. (Tracks 5 and 6 for this example.)
3. Make sure that the "METER FUNCTION" button [12] is in the down position.
4. Make sure that the Channel "INPUT SELECTOR" [1] for the desired Channel(s) are set to the "MIC/LINE" position. ("MIC/LINE" button is down and the "TAPE" button is up.)
5. Set the "INPUT FADER" [8] for each of the desired channels to approximately the "7" or "8" position.
6. Set both of the gray "MASTER LEVEL" Faders [18] to approximately the "7" or "8" position.
7. Play the audio source. The meters for tracks 5 and 6 should be "jumping" indicating that the signal is getting to the desired track. As you play, the signal should be "Peaking" (Reaching its highest level) at "0" or just slightly above "0" on the Track Meter. If your signal is higher than this, compensate by adjusting the gray "MASTER LEVEL" faders. [18]
8. Make adjustments to the "Mix" of your new audio source(s) using the Channel Input Faders [8].
9. Use the "EQ" section [3] to get the desired sound for your new audio source(s).
10. Make adjustments to the overall level of your mix using the gray "MASTER LEVEL" Faders [18].
11. Press the "RECORD" button [26]. (Your WS-X1 will be in "RECORD-PAUSE")
12. Press The "PLAY" button. Your WS-X1 will begin recording on the new tracks (5 and 6 for this example.) as your prerecorded tracks playback through your headphones.
13. Press "STOP" when your Overdub is complete.
14. Press "REWIND."
15. Listen to the playback of all your tracks as described in Example "B" above.

D. Bouncing (Ping-Ponging) Tracks

Very often, even 6 tracks aren't enough to get all of your ideas on tape. To deal with this problem, your WS-X1 allows you to combine prerecorded tracks in order to create more track space. (See "The Bouncing Process" in the "About Multi-Track Recording" section of this manual for a more detailed description of Bouncing tracks.) In fact, your WS-X1 is so flexible, that it allows you to "BOUNCE" tracks in two different ways.

The first method of "Bouncing" tracks involves mixing material recorded on tracks 1-4 together in stereo and then recording the "mix" of those tracks onto tracks 5 and 6. For the purpose of this example, we'll assume that there is prerecorded material on tracks 1-4. To set your WS-X1 to Bounce tracks, do the following:

1. Set the Channel "INPUT SELECTORS" [1] for Channels 1-4 to the "TAPE" position by making sure that the "TAPE" button is down and the "MIC/LINE" button is up.
2. Set tracks 5 and 6 to record in "BUSS" mode by making sure that the "BUSS" button [24] is down and the "DIRECT" button is up. ("BUSS" indicator should be illuminated.)
3. Set "INPUT FADERS" [8] for Channels 1-4 to approximately the "7" or "8" position.
4. Set both of the gray "MASTER LEVEL" Faders [18] to approximately the "7" or "8" position.

Now that your WS-X1 has been set to Bounce Tracks, you have the option to add another "Live" track to the prerecorded tracks that you will be mixing. If you wish to do this:

1. Connect your "Live" audio sources to any or all of Channels 5-8.
2. Set the "Live" Channels to the "MIC/LINE" position by making sure that the "MIC/LINE" button [1] is down and the "TAPE" button is up.
3. Set levels as in the "Overdub" process. (Example "C")

At this point, you are completely ready to Bounce to Tracks 5 and 6. To execute your Bounce, do the following:

1. Adjust the "Mix" of your Individual Channels (Both prerecorded and live) using the Channel "INPUT FADERS" [8].
2. Adjust the overall level of your "Mix" using the gray "MASTER LEVEL" Faders [18].
3. Play your prerecorded tracks. The meters for tracks 5 and 6 should be "jumping" indicating that the signal is getting to the desired track. As you play, the signal should be "Peaking" (Reaching its highest level) at "0" or just slightly above "0" on the Track Meter. If your signal is either higher or lower than this, compensate by adjusting the gray "MASTER LEVEL" Faders.

Once you are satisfied with the "Mix" of both your prerecorded tracks and your new "Live" tracks:

4. Press the "RECORD" button. (Your WS-X1 will be in "RECORD-PAUSE.")
5. Press the "PLAY" button. (Your WS-X1 will begin recording both your prerecorded tracks and your new "Live" tracks to tracks 5 and 6.)
6. Once your Bounce is complete, press "STOP."
7. Press either "REWIND" or "ZERO RETURN."

Because you will want to listen back only to your "Bounced" tracks, (Tracks 5 and 6 for this example.) you will need to make a few adjustments to your normal monitoring set up. These adjustments are:

1. In the "HEADPHONE MONITOR SELECT" section of your WS-X1, make sure that ONLY the "DECK A" button [9] is depressed. All of the other buttons in this section should be in the up position.
2. Make sure that the "TAPE CUE" Controls [23] for Tracks 1-4 are completely off. (Turned all the way to the left.)
3. Set the "TAPE CUE" Controls [23] for Tracks 5 and 6 to approximately the "7" or "8" position.
4. Listen to the playback of your "Bounced" Tracks as in Example "B." If you are satisfied with the outcome of your "Bounce" you may "Overdub" new material onto Tracks 1-4. (See Example "C" for Overdub procedures.)

The second type of Bounce involves doing a "MIX-DOWN" to DECK B of your WS-X1 (See Example "E" for "MIX-DOWN" procedures.) and then transferring that "Mixed" product back to any 2 tracks on DECK A. This is accomplished by taking the following steps:

1. Press the "DECK B" button [28] which is located directly above the "AUX INPUT" section of your WS-X1.
2. Press the "AUX-L" and "AUX-R" buttons [1] which are located at the top of Input Channels 7 and 8. Make sure that the "AUX-L/R" buttons are in the down position and the "MIC/LINE" buttons are in the up position.
3. Set the Channel "INPUT FADERS" [8] for Channels 7 and 8 to approximately the "7" or "8" position.
4. Set the gray "MASTER LEVEL" Faders [18] to approximately the "7" or "8" position.
5. Make sure that the "METER FUNCTION" button [12] is in the down position.
6. Choose any 2 Tracks on DECK A to which the "MIXED-DOWN" material will be transferred. (Make sure that the 2 tracks which you select are adjacent.) We'll use tracks 1 and 2 for this example.
7. Press the "BUSS L/R RECORD SELECTORS" [24] for the 2 tracks which you have selected on DECK A. (Make sure that the "BUSS" indicator is illuminated.)
8. Playback DECK B. The meters for tracks 1 and 2 should be "jumping" indicating that the signal is getting to the desired track. As you play, the signal should be "Peaking" (Reaching its highest level) at "0" or just slightly above "0" on the Track Meter. If your signal is either higher or lower than this, compensate by adjusting either the gray "MASTER LEVEL" Faders [18] or the Channel 7-8 "INPUT FADERS" [8].
9. Once you are satisfied with the levels, press stop on DECK B.
10. "REWIND" DECK B to the beginning of the "MIXED-DOWN" section of your tape.
11. Press "RECORD" on DECK A. (Your WS-X1 will be in "RECORD-PAUSE.")
12. Press "PLAY" on DECK A. (Your WS-X1 will start recording on the selected tracks.)
13. Press "PLAY" on DECK B.

At this point, your WS-X1 begin transferring the "MIXED-DOWN" material from to DECK B to the 2 selected tracks on DECK A.

14. Once the transfer is complete, press "STOP" on both DECK A and DECK B.
15. Press either "REWIND" [26] or "ZERO RETURN" [25] on DECK A.
16. Listen to the playback of DECK A as in example "B."

If the transferred material is satisfactory, you may "Overdub" new material onto the remaining tracks as in Example "C."

E. Mixing Down

In the MIX-DOWN process, all 6 tracks from DECK A are "Mixed" together onto DECK B. It is during the MIX-DOWN process that you can apply signal processing, EQ and fader moves to your recorded materials in order to achieve a professional sounding demo.

MIX-DOWN is accomplished by taking the following steps:

1. Set the Channel "INPUT SELECTORS" [1] for Channels 1-6 to the "TAPE" position. Make sure that the "TAPE" button is in the down position and the "MIC/LINE" button is in the up position. (This will assign the playback of tracks 1-6 to Input Channels 1-6.)
2. Set Channel "INPUT FADERS" [8] 1-6 to approximately the "7" or "8" position.
3. Set the gray "MASTER LEVEL" Faders [18] to approximately the "7" or "8" position.
4. Set the "METER FUNCTION" button [12] to the up position so that you can meter the "Record Busses."
5. Adjust the "EQ" controls [3] for each Channel in order to achieve the desired sound from each track.
6. Adjust the "D.REV SEND" [4] and "EFF. SEND" [5] controls for each channel in order to achieve the desired "EFFECTS" for each channel.
7. Adjust the "PAN" controls [6] for each Channel in order to place that Channel's signal in the "STEREO" field. (Left or Right Side.)
8. Make sure that the "STEREO OUT" button [9] is the only button down in the "HEADPHONE MONITOR SELECT" section of your WS-X1. (All other buttons should be in the up position.)
9. Make sure that the "STEREO MASTER FADER" [18] is at least slightly up.

10. Make sure that the "OUTPUT MODE SELECTOR" [17] is in the "MTR/MIXER" position. (The "MTR/MIXER" button should be down and the "AUX DIRECT" button should be up.)
 11. Play DECK A in order to adjust the sound of each Channel as necessary.
 12. When DECK A is playing, the "BUSS L" and "BUSS R" meters should be peaking at approximately "0" or just slightly above that. If your meters are showing lower levels, compensate by raising the gray "MASTER LEVEL" Faders [18]. If your meters are showing higher levels, compensate by lowering the gray "MASTER LEVEL" Faders.
- NOTE:** It is sometimes necessary to increase all of your Channel "INPUT FADERS" in order to achieve the proper "MIX-DOWN" levels.

At this point, you have the option to add "Live" audio signals to "MIX." If you wish to do this:

14. Connect your "Live" audio source(s) to Channel 7 and/or 8.
15. Adjust the various controls on Channels 7-8 so that they "MIX" well with your recorded tracks.

When you are satisfied with the sound quality of each Channel:

16. "REWIND" DECK A to the beginning of your recorded material.
17. Press the "MIX DOWN" button [29] in the DECK B CONTROL section of your WS-X1. (This will place DECK B into "RECORD-PAUSE" mode and DECK A into "PLAY-PAUSE" mode.)
18. If you are confident that your "MIX" is ready, press "PLAY" on either DECK A or DECK B. (This will begin your "MIX-DOWN" automatically.)
19. During your "MIX-DOWN" you can change FADER positions, PAN positions, etc. to suit your taste.)
20. Once your "MIX-DOWN" is complete, press "STOP" on both DECK A and DECK B.
21. "REWIND" both DECK A and DECK B to the beginning of your recorded material.

F. Listening Back to "DECK B"

Once your "MIX-DOWN" has been completed, you will want to listen to the playback of your "MIX" directly from DECK B. To do this, follow these simple steps:

1. Set the "OUTPUT MODE SELECTOR" [17] to "AUX DIRECT." (The "AUX DIRECT" button should be down and the "MTR/MIXER" button should be up.)
2. Press the "DECK B" button [28] which is located directly above the "AUX INPUT" section of your WS-X1. (The "DECK B" button should be in the down position.)
3. Make sure that the "STEREO MASTER" Fader [19] is at least slightly up.
4. Make sure that the "STEREO OUT" button [9] is down in the "HEADPHONES MONITOR SELECT" section of your WS-X1.
5. Adjust the overall headphones volume with the "HEADPHONES LEVEL" Control [11].
6. Press "PLAY" [26] on DECK B.

G. Punching In/Out

The PUNCH IN/OUT feature of your WS-X1 allows you to correct mistakes in the middle of any given track. For example, we'll assume that you recorded a guitar solo which is perfect except for a small mistake that the guitarist made in the middle of the solo. You can correct this mistake as follows:

1. Enable the "DIR" RECORD FUNCTION for the track in question.
2. Connect the output of the guitar (Audio Source) to the Input Channel corresponding to the Track in question. (If the mistake is on Track 3, then plug the guitar into Input Channel 3.)
3. If you have a Momentary Contact, Normally Closed foot pedal, connect it to the PUNCH IN/OUT Jack [31] on the front panel of your WS-X1.
4. Monitor your existing tracks just as if you were Overdubbing. (Example "C").
5. Begin playing back your tape from the beginning of the guitar solo.
6. Have the guitarist play along to the old guitar track.

When you reach the part of the guitar solo that is just before where the mistake occurred:

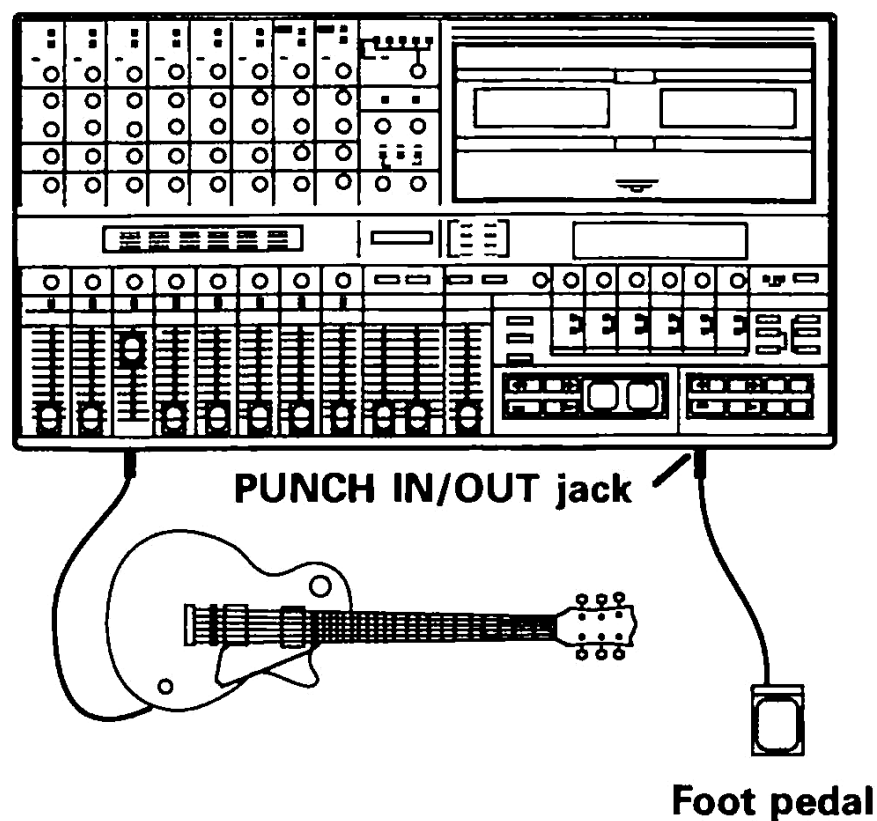
7. Either press your PUNCH IN/OUT pedal or press the DECK A "RECORD" button on your WS-X1. Your WS-X1 will instantly begin recording what the guitar player is playing over the old mistake.

When you have successfully corrected the old mistake:

8. Press your foot pedal again (if you're using one) and then press "STOP".

"REWIND" to the beginning of the guitar solo and listen to your PUNCH IN to make sure that it is satisfactory.

NOTE: The above examples are meant to be guidelines only. However, if you take the time to read through them carefully, you should be able to apply the steps in these examples to your own circumstances.



H. Tape sync.

The sync In/Out jacks on the rear panel of your WS-X1 are provided to enable you to synchronize your unit with other devices such as MIDI sequencers and even other MTR's. To Synchronize your WS-X1 to a MIDI sequencer or drum machine follow the steps below

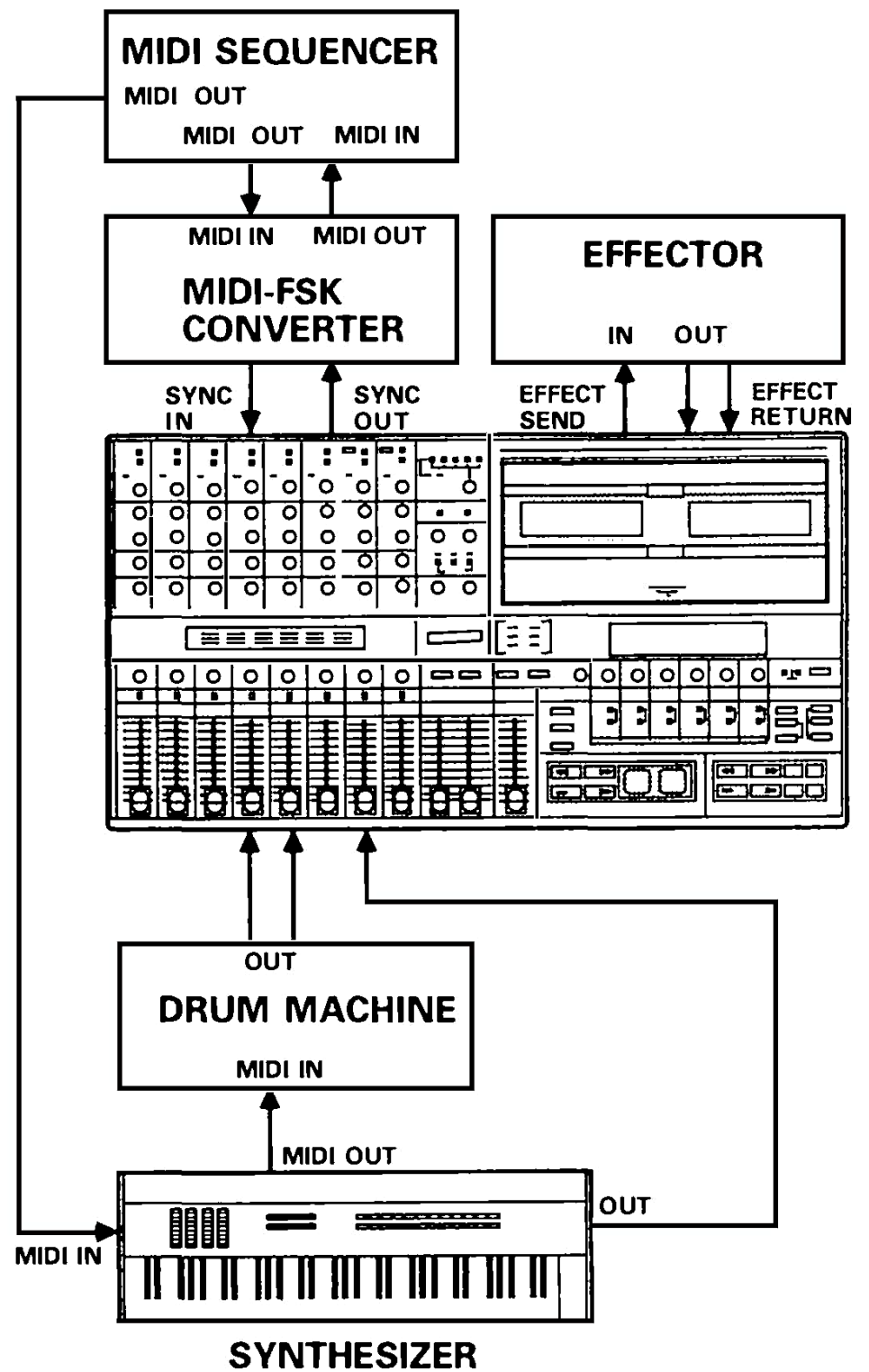
1. Make sure that the SYNC button [13] is in the 'ON' (Down) position.
2. Connect the Sync Out jack of your Sync Box (Such as the Sansui MD-R7) to the Tape Tape Sync In Jack of your WS-X1.
3. Connect the Sync In jack of your Sync Box (Such as the Sansui MD-R7) to the Tape Tape Sync Out Jack of your WS-X1.
4. Make sure that the METER FUNCTION Button [12] is in the UP position.
5. Connect the MIDI Out from your sequencer or drum machine to the MIDI In of your Sync Box.
6. Connect the MIDI In of your sequencer or drum machine to the MIDI Out of your Sync Box.
7. Press the DIR/SYNC Record function button [24].
8. Press RECORD and then PLAY [26] on DECK A of your WS-X1. This will cause the WS-X1 to begin recording.
9. Start your MIDI sequencer or drum machine. At this time, your Sync Box will convert the timing signals from your MIDI sequencer or drum machine into "Tape Sync" which will be recorded onto track 6 of your WS-X1. The Sync Meter on your WS-X1 should be showing signal indicating that the Tape Sync signal is being recorded properly.
10. When your sequence has finished, Press STOP [26].
11. Place the DIR/SYNC Record Function Selector [24] in the UP position.
12. REWIND your tape to the beginning.
13. Press PLAY [26] on DECK A.
14. The SYNC Meter of your WS-X1 should be reading approximately -3. If it is reading either higher or lower than this. Adjust the SYNC Output with the SYNC LEVEL Control. [42]
15. When you are satisfied with the SYNC level, REWIND to the beginning of your tape again.
16. Set your MIDI sequencer or drum machine to "MIDI Clock" or "Slave to external Sync".
17. Start your WS-X1 by pressing PLAY [26]. your Sync Box will convert the Tape Sync recorded on the WS-X1 back into MIDI timing signals that your sequencer or drum machine can understand. These timing signals will tell your MIDI instruments when to start, when to stop, and how fast to go.

By using this Tape Sync System, you will be able to use as many MIDI instruments as you like while leaving the remaining 5 tracks on your WS-X1 for acoustic tracks. (i.e. Vocals, Guitars, etc.)

Your WS-X1 can also be synchronized to other MTR's such as the Sansui MR-6 using a synchronizer such as the Sansui SY-1. To perform these operations, please refer to the instruction manuals for these other products.

NOTE

The above examples are meant to be guidelines only. However, if you take the time to read through them carefully, you should be able to apply the steps in these examples to your own circumstances.



Track Sheet

Production

Title

Director

Date: / /

M-	1	2	3	4	5	6
<i>Time</i>						
M-	1	2	3	4	5	6
<i>Time</i>						
M-	1	2	3	4	5	6
<i>Time</i>						
M-	1	2	3	4	5	6
<i>Time</i>						
M-	1	2	3	4	5	6
<i>Time</i>						
M-	1	2	3	4	5	6
<i>Time</i>						
<i>Tape Speed:</i> <i>Reference:</i> <i>Hz</i> <i>VU</i> <i>Recorders</i>						<i>Remarks</i>
<i>NR System</i> <i>Yes,</i> <i>No</i> <i>Mixer</i> <i>Assist</i>						



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