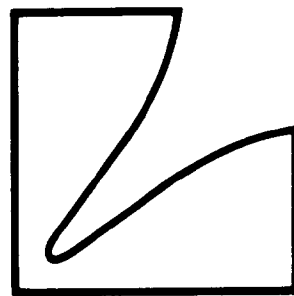
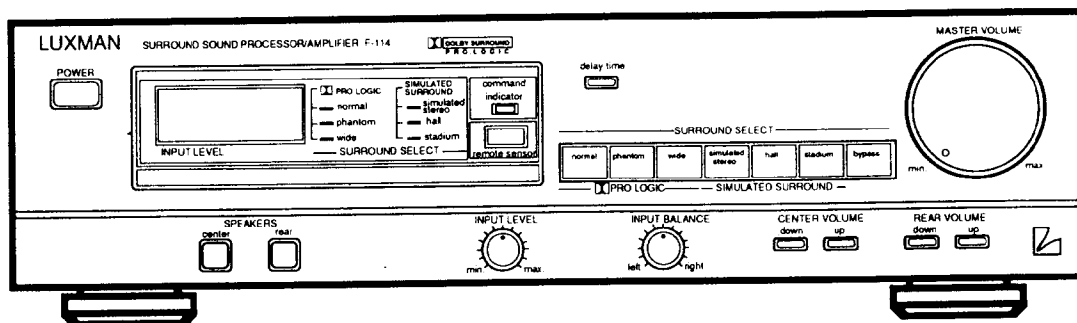


SERVICE MANUAL



Surround Sound Processor/Amplifier **F-114**

Owners Manual Section



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Specifications

<Power Amplifier Section>

Output Power (20Hz~20kHz, 8ohms)	Rear-Left & Rear-Right Ch.: 50 + 50W Center Ch.: 50W
Dynamic Power, both Ch. driven (1kHz)	Rear-Left & Rear-Right Ch. 8ohms: 60 + 60W 4ohms: 90W 2ohms: 120W Center Ch. 8ohms: 70W 2ohms: 120W
Total Harmonic Distortion	Rear-Left & Rear-Right Ch. (20Hz~15kHz/8ohms): 0.05% Center Ch. (20Hz~20kHz/8ohms): 0.03%
Frequency Response (-3dB, 1W/8ohms)	5Hz~70kHz
MAIN-IN Input Sensitivity (1kHz)	1V \pm 10%
MAIN-IN Input Impedance (1kHz)	30kohms \pm 15%

<Pre Amplifier & Surround Section>

Input Sensitivity (Pre-out 1V, 1kHz)	150mV \pm 20%
Input Impedance (1kHz)	40kohms \pm 10%
Frequency Response (-3dB)	Front-Left & Front-Right Ch. (By-pass): 5Hz~150kHz (Pro-logic): 20Hz~20kHz Center Ch. (Wide-mode): 20Hz~20kHz Rear-Left & Rear-Right Ch. (Pro-logic): 50Hz~6kHz
Signal to Noise Ratio (Input 500mV)	Front-Left & Front-Right Ch. (By-pass): 90dB Center Ch. (Wide mode): 65dB Rear-Left & Rear-Right Ch. (Pro-logic): 55dB
Total Harmonic Distortion (Pro-logic)	Front/center: 0.15% Rear: 0.9%
Separation (1kHz)	Front L/R: 40dB Other Ch.: 25dB
Output Level (Fixed Pre-out, 1kHz)	By-pass: 300mV \pm 10%
Output Level (Variable Pre-Out, 1kHz)	By-pass: 1V \pm 10%
Residual Noise	1.2mV

<Video Section>

Output Level (1Vp-p Input)	1Vp-p \pm 5%
Frequency Response (-3dB)	50Hz~6MHz

<General>

Power Supply	AC. 120V/60Hz
Power Consumption	50W
Semiconductors	36 IC's 71 Transistors, 70 Diodes, 6 Zener Diodes
Dimensions	438 (W) \times 123 (H) \times 369 (D)mm
Weight	8.3kg

NOTE : Due to continuing product improvement, specifications and are subject to change without notice.

Specifications

<Power Amplifier Section>

Output Power (20Hz~20kHz, 8ohms)	Rear-Left & Rear-Right Ch. : 50 + 50W Center Ch. : 50W
Dynamic Power, both Ch. driven (1kHz)	Rear-Left & Rear-Right Ch. 8ohms : 60 + 60W 4ohms : 90W 2ohms : 120W Center Ch. 8ohms : 70W 2ohms : 120W
Total Harmonic Distortion	Rear-Left & Rear-Right Ch. (20Hz~15kHz/8ohms) : 0.05% Center Ch. (20Hz~20kHz/8ohms) : 0.03%
Frequency Response (-3dB, 1W/8ohms)	5Hz~70kHz
MAIN-IN Input Sensitivity (1kHz)	1V ± 10%
MAIN-IN Input Impedance (1kHz)	30kohms ± 15%

<Pre Amplifier & Surround Section>

Input Sensitivity (Pre-out 1V, 1kHz)	150mV ± 20%
Input Impedance (1kHz)	40kohms ± 10%
Frequency Response (-3dB)	Front-Left & Front-Right Ch. (By-pass) : 5Hz~150kHz (Pro-logic) : 20Hz~20kHz Center Ch. (Wide-mode) : 20Hz~20kHz Rear-Left & Rear-Right Ch. (Pro-logic) : 50Hz~6kHz
Signal to Noise Ratio (Input 500mV)	Front-Left & Front-Right Ch. (By-pass) : 90dB Center Ch. (Wide mode) : 65dB Rear-Left & Rear-Right Ch. (Pro-logic) : 55dB
Total Harmonic Distortion (Pro-logic)	Front/center : 0.15% Rear : 0.9%
Separation (1kHz)	Front L/R : 40dB Other Ch. : 25dB
Output Level (Fixed Pre-out, 1kHz)	By-pass : 300mV ± 10%
Output Level (Variable Pre-Out, 1kHz)	By-pass : 1V ± 10%
Residual Noise	1.2mV

<Video Section>

Output Level (1Vp-p Input)	1Vp-p ± 5%
Frequency Response (-3dB)	50Hz~6MHz

<General>

Power Supply	AC. 120V/60Hz
Power Consumption	50W
Semiconductors	36 IC's / 1 Transistors, 70 Diodes, 6 Zener Diodes
Dimensions	438 (W) × 123 (H) × 369 (D)mm
Weight	8.3kg

NOTE : Due to continuing product improvement, specifications and are subject to change without notice.

In Case of Difficulty

If you encounter a problem, please review the items in the following checklist. Also, be sure to thoroughly

check other connected components, such as speakers, amplifier or receiver, etc.

PROBLEM	PROBABLE CAUSE AND SOLUTION
Power does not come on.	<ul style="list-style-type: none"> • Check AC power cord to ensure good connection at AC outlet.
No sound.	<ul style="list-style-type: none"> • "INPUT LEVEL" control (item #12) is set at the minimum position. • "MASTER VOLUME" control (item #8) is set at the minimum position. • When a signal source is connected to the TAPE REC/PLAY terminals on your receiver or amplifier, the REC SELECTOR switch on the receiver or amplifier is not set to the correct source position.
No sound from the front speakers.	<ul style="list-style-type: none"> • The volume control on your receiver or amplifier is set at the minimum position. • When a signal source is connected to the TAPE REC/PLAY terminals on your receiver or amplifier, the TAPE MONITOR button on the receiver or amplifier is not turned on.
No sound from the rear speakers.	<ul style="list-style-type: none"> • The "SPEAKER rear" button (item #13) is in the off position. • The "REAR VOLUME" is set at the minimum position. • The "SURROUND SELECT" button (item #6) is set in the bypass mode. • The input signal is monaural (in the Dolby pro-logic mode only).
No sound from the center speaker.	<ul style="list-style-type: none"> • The "SPEAKER center" button (item #13) is in the off position. • The "CENTER VOLUME" is set at the minimum position. • The Dolby pro-logic mode is not selected. • The "ON/OFF CENTER" button (item #20) on the remote control is set in the off position. • The phantom mode is selected with the "SURROUND SELECT" buttons (item #6).
Remote control inoperative.	<ul style="list-style-type: none"> • Check "AAA" batteries. See page 13.

Care and Maintenance

Cleaning

The durable finish of the knobs and heavy aluminium front panel will last indefinitely with proper care and cleaning. Never use scouring pads, steel wool, scouring powders, or harsh chemical agents, such as lye solution. These will mar the finish. Clean with a soft, lint-free cloth or cotton swab slightly dampened with a mild solution of detergent and water.

Repacking for Shipment

Should it become necessary to ship your F-114 for any reason, use the original packing materials. If these are no longer available, be sure that adequate materials, at least equivalent to the original, are used.

Repairs

Only the most competent and qualified service technicians should be allowed to service the F-114. The Luxman company and its factory-trained warranty station personnel have the knowledge and special equipment needed for repair and calibration of this precision instrument.

In the event of difficulty, call the toll free telephone number listed on the Warranty to obtain the name and address of the Luxman Authorized Service Station nearest your home or business. In many cases, the dealer where you purchased your Luxman unit will be equipped to provide service.

Special Features

The F-114 employs some of the most refined and advanced technology available to achieve Luxman's constant quest for sonic purity. Examples are as follows:

Digital Delay Surround Sound Processor

Four different sound field modes are provided in the F-114 as follows:

Dolby Pro Logic: This mode is a full implementation of the Dolby Pro Logic Surround Sound decoding process. It provides superior sound field and directional effects from Dolby Surround encoded video movie soundtracks (VCR tapes or video discs). It has three selection positions on the F-114 front panel as follows:

Normal: This position takes the low bass from the center channel and distributes it instead to the L and R front channel speakers. This should be used when the center speaker is smaller than the main L and R speakers and is therefore less capable of handling the lowest frequencies.

Phantom: If a center speaker cannot be used, this position creates a "phantom" or "image" channel between the L and R speakers.

Wide: This position is used when the center speaker is large enough to handle the low bass frequencies. The low bass from the center in this case is not fed to the L and R speakers, thus giving "wide" or best stereo separation.

Simulated Stereo: This mode takes a monaural source, such as old soundtracks or records and distributes special effects into the L and R speakers. It creates a surprisingly spacious sound from monaural sources.

Hall: This position introduces reverb and delay constants into the L, R and rear channels to give a sound characteristic that is typical of concert halls.

Stadium: Longer delay constants are used in this mode to be representative of large stadiums.

Three High Current, High Speed, Darlington Connected Power Amplifiers

The power amplifier topology uses discrete driver and output devices in a Darlington full complementary configuration. This arrangement allows the highly linear, high speed voltage amplification mode for optimum dynamic performance free of T.I.M. and slew induced distortion. A special finned, black anodized heat sink insures rapid heat dissipation.

With an FTC power output rating of 50 watts per channel into 8 ohm loads, these amplifiers have the ability to handle real-life low impedance reactive speaker loads without instability. Each can deliver over 140 watts into 2 ohm loads for short periods.

High Energy Power Supply

A heavy double shielded power transformer, fast recovery rectifier diodes and large filter capacitors, maintain a supply of energy to power the dynamic and steady state demands of even the most taxing of music conditions.

Remote Motor Driven Master Volume Control

The remote operable motor drive is used to eliminate the possibility of digital switching noise and to provide quick and smooth remote volume settings for all channels.

On Screen Video Display

Video IN and OUT jacks are provided on the back panel. When the video cable to the video input of a TV monitor is routed through these jacks, an on-screen display of the F-114 surround modes, rear channel delay and channel volume settings can be displayed.

Pre-Out/Main-In Jacks

Pre-Out jacks, both fixed and variable level, are provided for front L & R, rear and center channel outputs. Main-in jacks for the rear and center channel outputs are also provided. Use of these jacks allows the connection of higher powered amplifiers, sub-woofer satellite systems or other special configurations.

Serial Remote Jacks

These jacks provide input and output connections for the simple "daisy chain" connection of the serially encoded RC signal of Luxman's unified remote control systems.

Bus Line Jacks

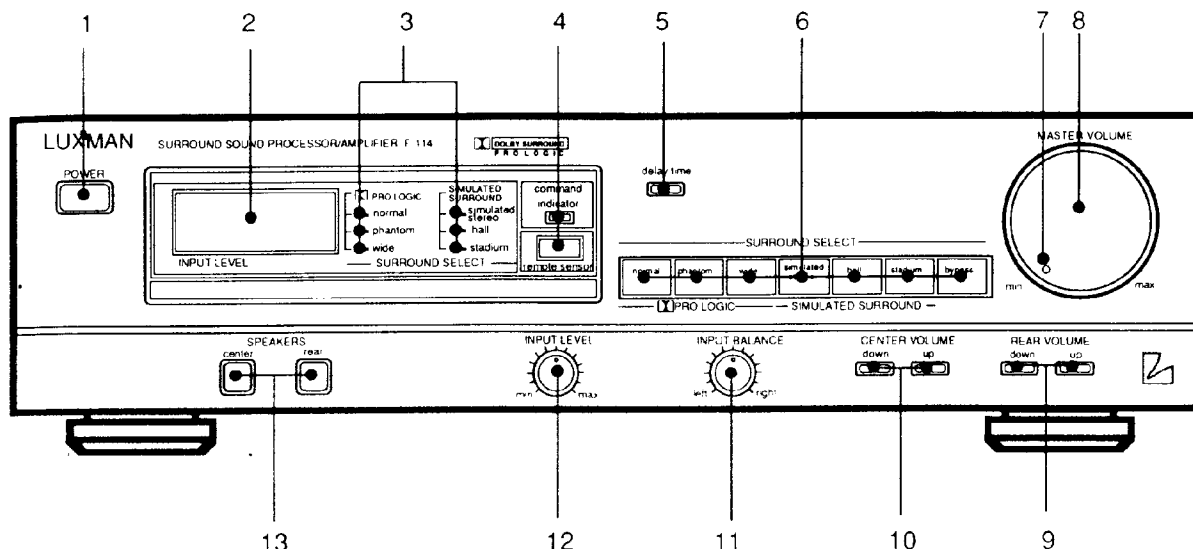
When used with other Luxman components having Bus Line jacks, simplified interactive control of certain operations is possible in addition to the unified remote control system.

5-Way Speaker Terminals

These speaker output binding posts may be used with any of the normal speaker lead terminations, including dual and single banana plugs, spade lugs, pin connectors and bare wires.

Controls and Switches

Front Panel



1. "POWER" button

Pressing this button turns the power on and off. When the power is turned on for the first time, the F-114 will be placed in the "normal" mode. The unit memorizes and maintains your settings of the controls and switches when the power is turned off, and the unit will automatically set the controls and switches to the original positions when the power is turned on again. Even when the power is off, the video signals will be passed through but without the on-screen video display.

2. Display (digital readout)

Indicates the delay time in ms (milliseconds) or output level in dB. Output level is only indicated while the center or rear volume levels are being adjusted. It will default to delay time after about 7 seconds. In the bypass mode, all display indicators are turned off, except the Input Level LEDs. See Display, page 9, for more details.

3. "SURROUND SELECT" indicators

The indicator to the left of the mode selected with the "SURROUND SELECT" buttons (item #6) will light up.

4. "Remote Sensor" and "Command Indicator"

When using the hand held remote control, it must be pointed toward this sensor to activate operational functions. The "command indicator" will blink when the remote signal is actually received.

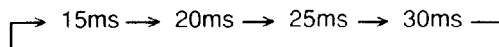
5. "delay time" button

Pressing this button increases the delay time. When the power is turned on, the unit is set at the initial value for the surround mode selected as shown below. Each time this button is pressed it increases the delay time in 5 msec increments within the range shown below, and the display (item #2) indicates the selected delay time.

Surround Mode	Delay Time Range	Initial Value
simulated stereo	5 - 80 ms	30 ms
hall	5 - 80 ms	30 ms
stadium	5 - 80 ms	30 ms
Dolby PRO LOGIC	15 - 30 ms	20 ms

Example:

When a Dolby PRO LOGIC mode is selected, the delay time changes as follows.



6. "SURROUND SELECT" buttons

Use these buttons to choose the desired surround mode; Dolby pro-logic surround, simulated stereo, hall or stadium mode as described below.

- **Dolby PRO-LOGIC Surround**

Use these modes when viewing and playing back Dolby Surround encoded video movie soundtracks (VCR tapes or video discs). The three Dolby Surround mode buttons are intended for use as follows:

1) **Normal:** This position takes the low bass from the center channel and distributes it instead to the L and R front channel speakers. This should be used when the center speaker is smaller than the main L and R speakers and is therefore less capable of handling the lowest frequencies.

2) **Phantom:** If a center speaker cannot be used, this position creates a "phantom" or "image" channel between the L and R speakers.

3) **Wide:** This position is used when the center speaker is large enough to handle the low bass frequencies. The low bass from the center in this case is not fed to the L and R speakers, thus giving "wide" or best stereo separation.

- **Simulated Surround**

1) **Simulated Stereo**

Use this mode for monaural sources, such as old soundtracks or records. It distributes special effects into the L and R speakers. It creates a surprisingly spacious sound from monaural sources.

2) **Hall**

This position introduces reverb and delay constants into the L, R and rear channels to give a sound characteristic that is typical of concert halls.

3) **Stadium**

Longer delay constants are used in this mode to be representative of large stadiums and could be used when listening to live sports broadcasts, etc.

- **Bypass**

In this mode, normal stereo operation occurs, with only the left and right speakers operating. It may be used to quickly deactivate a surround mode for comparison or demonstration purposes, or for maximum sonic quality without surround effects when listening to high quality CDs, for example.

All display items turn off in this mode, except the input level indicators (item #14). Also, only video on-screen DISPLAY (item #25), MASTER VOLUME (items #8 and #24), INPUT LEVEL (item #12) and INPUT BALANCE (item #11) functions will operate

7. **Volume Level indicator**

When the power is turned on to the unit, this indicator blinks for 3 seconds then lights continuously to indicate that the unit is ready to be operated. When the remote control is operated to adjust the volume level, the indicator blinks during the operation.

8. **"MASTER VOLUME" control**

This control adjusts the volume levels for the left and right channels of the front and rear speakers, and for the center channel speaker. This control can also be operated with the hand held remote control.

9. **"REAR VOLUME up and down" buttons**

Pressing these buttons adjusts the volume level of the rear speakers up or down. When pressed the display (item #2) will indicate the output level in dB. Each press increases or decreases the output level by 1 dB, and a continuous press changes the level in a continuous manner. When 7 seconds elapse after the operation of these buttons, the display will automatically indicate delay time again.

10. **"CENTER VOLUME up and down" buttons**

Pressing these buttons adjusts the volume level of the center speaker. It operates in the same fashion as item 9 above.

11. **"INPUT BALANCE" control**

Rotate this control to balance the input signal levels of the left and right channels in all surround modes. It is particularly important in the Dolby PRO LOGIC modes. See page 12 for details.

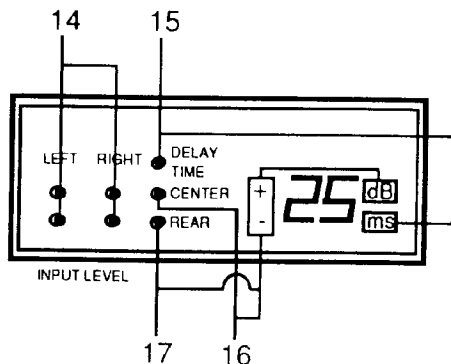
12. **"INPUT LEVEL" control**

Rotate this control to adjust the input level. To prevent distortion, adjust as noted on page 12.

13. **"SPEAKER center and rear" buttons**

Pressing these buttons turns the center channel speaker or the rear speakers on and off.

Display



14. "INPUT LEVEL" indicators (LEDs)

These green and red LEDs provide a visual reference when making input level adjustments with the input level control (item #12). See page 12 for details.

15. "DELAY TIME" indicators

The DELAY TIME LED and "ms" (milliseconds) indicators will light up when Delay Time is shown.

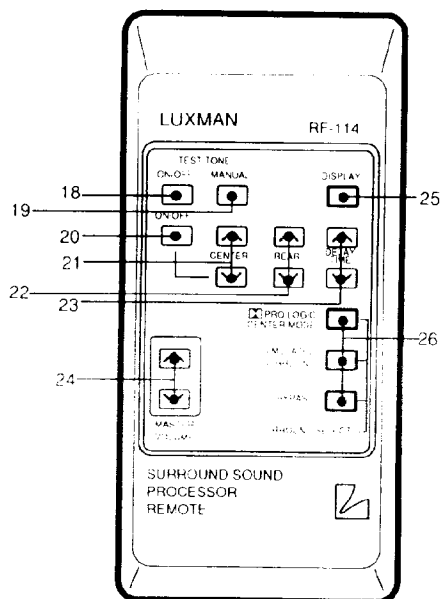
16. "CENTER" indicators

The "CENTER" LED, "dB" and "+" or "-" indicators will light up when center channel output level is shown.

17. "REAR" indicators

The "REAR" LED, "dB" and "+" or "-" indicators will light up when rear channel output level is shown.

Remote Control Unit



18. "TEST TONE ON/OFF" button

Press this button to generate test tone signals for adjusting the levels of each channel for Dolby pro-logic surround. The test signal is 2 seconds long for each channel. See page 12 for details. This button is functional only when the Dolby pro-logic surround mode is activated. To cancel the test tone mode, press this button again. See page 12 for details.

19. "TEST TONE MANUAL" button

Press this button for manual scrolling of the test signal. Press the ON/OFF button to release the test signal. This button is operative only when Dolby pro-logic surround is chosen.

20. "ON/OFF - CENTER" button

Press this button to turn ON or OFF the center channel. This button functions only in the Dolby pro-logic surround mode.

21. "CENTER" level control buttons (▲, ▼)

Use these buttons to increase or decrease the center channel output level.

22. "REAR" level control buttons (^, v)

Use these buttons to increase or decrease the rear speaker output level.

23. "DELAY TIME" control buttons (^, v)

Pressing these buttons increases or decreases the delay time in 5 msec steps.

24. "MASTER VOLUME" control buttons (^, v)

Press these buttons to turn the "MASTER VOLUME" (item #8) on the main unit up or down. During the operation of these buttons, the volume level indicator (item #7) blinks.

25. "DISPLAY" button

Press this button when you desire to display the functional status on a connected TV video monitor.

26. "SURROUND SELECT" buttons

Use these buttons to choose the desired surround modes; Dolby pro-logic or simulated surround or bypass modes as follows:

- **"PRO LOGIC CENTER MODE" button**

Use this button to select the Dolby pro-logic surround modes. Pressing this button change the modes as follows.

→ normal → phantom → wide →

- **"SIMULATED SURROUND" button**

Use this button to choose the simulated surround modes. Pressing this button changes the modes as follows.

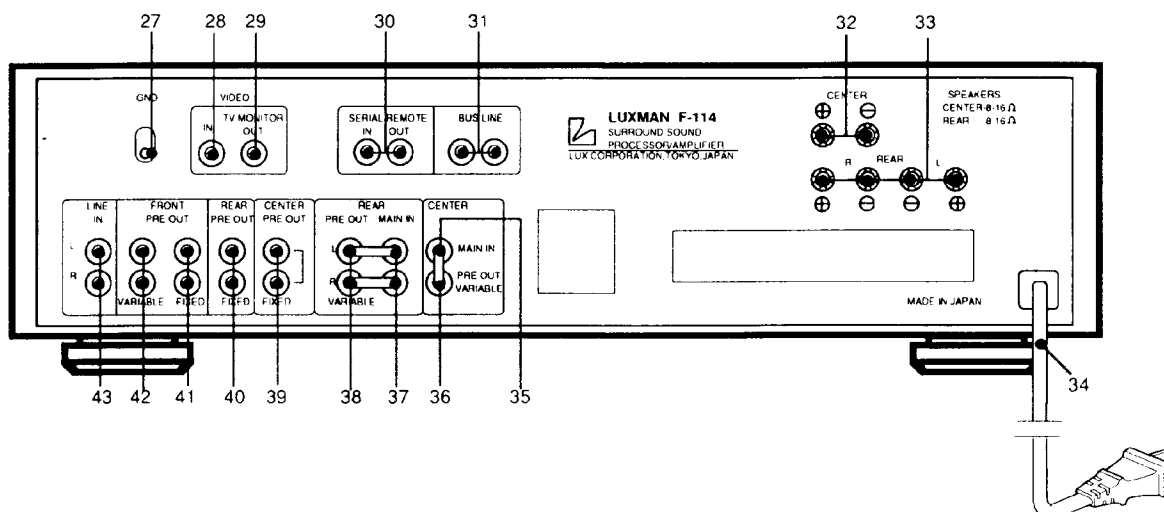
→ Pro-Logic → hall → stadium → simulate →

- **"BYPASS" button**

Use this button for normal stereo operation. See "Bypass Mode," page 8 for further details.

Jacks and Terminals

Rear Panel

**27. "GND" terminal**

Connect this terminal to the GND (ground) terminal on your receiver or amplifier, if needed.

28. "VIDEO IN" jack

Connect this jack to the video output terminal of your receiver, amplifier, VCR or video disc player.

29. **"VIDEO TV MONITOR OUT" jack**
Connect to the video input terminal on your TV monitor.
30. **"SERIAL REMOTE IN and OUT" jacks**
For connection of Luxman's serial "Daisy Chain" unified remote control system, using Luxman models such as the R-114, R-115, R-117, and other models equipped with serial jacks.
31. **"BUS LINE" jacks**
These jacks may only be used with Luxman models that also have Bus Line jacks, such as the R-351, R371 and other future units. They allow simplified interactive control of certain operations in addition to the unified remote control system.
When interconnecting units, the mini phone cables may be inserted into either jack (the control signals are bidirectional, therefore no "IN OUT" protocol is required).
32. **"CENTER SPEAKER" output terminals**
Connect these terminals to your center speaker by observing the polarity marks (+ and -).
The center speaker may be switched on or off by the front panel "SPEAKER center" button (item #13) or item #20 on the remote.
33. **"REAR SPEAKER" output terminals**
Connect these terminals to your rear speakers. When connecting, be sure to observe correct PHASING by connecting the RED (+) and the BLACK (-) terminals of the F-114 to the corresponding RED (+) and BLACK (-) terminals of your speakers on each channel. The rear speaker systems may be switched on and off by the front panel "SPEAKER rear" button (item #13).
34. **AC power cord**
Insert the polarized plug of the F-114 into any 120 Volt AC, 60 Hz wall outlet. The wider contact side of the plug is the ground side.
35. **"CENTER MAIN IN" jack**
This is the input jack for the built-in power amplifier. When you drive your center speaker by the built-in power amplifier, connect this jack to the "CENTER PRE OUT VARIABLE" jack (item #36) with the jumper bar.
36. **"CENTER PRE OUT VARIABLE" jack**
This is the output jack for the center channel signals. It may be used to drive a higher powered amplifier, if desired. The output level is adjusted with the "MASTER VOLUME" control (item #8).
37. **"REAR MAIN IN" jacks**
These are the input jacks for the built-in power amplifier. When you drive your rear speakers by the built-in power amplifier, connect these jacks to the "REAR PRE OUT VARIABLE" jacks (item #38) with the jumper bars.
38. **"REAR PRE OUT VARIABLE" jacks**
These are the output jacks for the rear channel signals. They may be used to drive a higher powered amplifier, if desired. The output level is adjusted by the "MASTER VOLUME" control (item #8).
39. **"CENTER PRE OUT FIXED" jacks**
These are the fixed-level output jacks for the center channel signals. The output level cannot be adjusted with the "MASTER VOLUME" control (item #8).
40. **"REAR PRE OUT FIXED" jacks**
These are the fixed-level output jacks for the rear channel signals. The output signal level cannot be adjusted with the "MASTER VOLUME" control (item #8).
41. **"FRONT PRE OUT FIXED" jacks**
These are the fixed-level output jacks for the front L and R channel signals. The output signal level cannot be adjusted with the "MASTER VOLUME" control (item #8).
42. **"FRONT PRE OUT VARIABLE" jacks**
These are the output jacks for the front channel L and R signals. They would normally be connected to the Signal Processor or Tape MONITOR input jacks on your receiver, integrated amp, preamp, etc. The signal level at these jacks is controlled by the MASTER VOLUME control (item #8).
43. **"LINE IN" jacks**
Connect these jacks to the Signal Processor or Tape REC OUTPUT jacks on your Receiver, Integrated amp or Preamp.

It is best to connect to these types of jacks on your receiver, etc., rather than Pre-Out jacks, so that the input level to the F-114 is not affected by the receiver's volume control setting.

Operation Guidelines

Power and Source Switching

To prevent the possibility of excessive, sudden sound levels, it is recommended that the volume control be placed at a low level position each time the "POWER" button (item #1) is turned on or when switching between sources.

Input Level Adjustment

To prevent excessive input levels from causing distortion, it is necessary to adjust the INPUT LEVEL control as follows:

1. Select and play the desired source through the system.
2. Using the loudest passages, adjust the INPUT LEVEL control on the front panel (item #12) so that the RED LED indicators (item #14) just begin to flash.
3. Now back down the INPUT LEVEL control until the RED LEDs just stop flashing. Only the green LEDs should then flash on the highest passages throughout the material.

Volume Level Adjustment for Each Channel (Dolby Pro Logic Modes Only)

This procedure ensures that each channel level is adjusted to the proper level for the best Dolby surround field reproduction.

1. Set the volume control on your Receiver, Integrated amp or Preamplifier to the center or 12 o'clock position. (It should be left in this position for all subsequent surround listening.)
2. Set the MASTER VOLUME on the F-114 to a low setting (to avoid high sound levels when the test tone signal is turned on).
3. Press the TEST TONE ON/OFF button (item #18) to generate the test signal. This noise type signal will cycle or scroll continuously through each channel for a period of 2 seconds each in the following sequence:

→ Front Left → Center → Front Right → Rear →

4. Adjust the CENTER and REAR level buttons (item #10 and #9 or #21 and #22) so that the sound level match that of the Left and Right speakers.

Note:

If you wish to spend more time at each speaker when setting these levels, you may do so by pressing the MANUAL button (item #19). You may then manually advance through the same sequence with each press of this button.

5. Turn the test tone signal off by pressing the ON/OFF button (item #18).

Input Balance Adjustment

To ensure the best logic steering in the Dolby Pro Logic modes, the INPUT BALANCE control, with some program material, may need to be set for optimum performance as follows:

1. Press the Dolby Pro Logic "wide" button on the F-114.
2. Select and play the desired Dolby surround encoded source (VCR Tape, Laser Disc) through the system.
3. Turn the center speaker off by pressing the SPEAKER center button (item #13 or #20) to the off position.

Note:

When the center off button on the front panel is activated, it will not show on the video on-screen display.

4. Adjust the Input Balance control (item #11) so that sounds coming from the L and R speakers that are intended for the center, such as speech dialogue, singing, etc., are at a minimum. (Normally, with good source material, the balance control setting, after this adjustment, will be in the center detent position.)
5. Turn the center speaker back on. The system is now ready for surround listening.

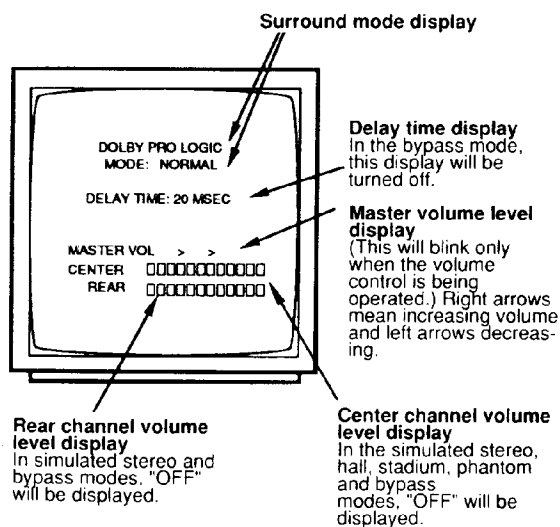
Delay Time Setting

The length of the delay time for the rear channel can be changed by pressing the "delay time" button (item #5) or the "DELAY TIME" control buttons (item #23). Depending upon the room size or the speaker placement, you may get better surround effects by changing the length of the delay time.

Monitor Display

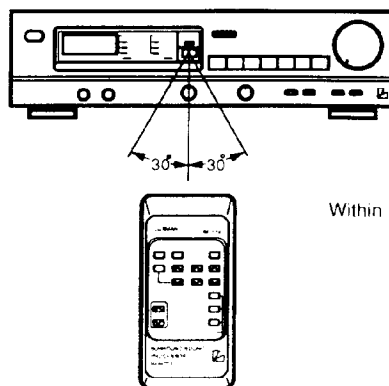
If you connect a TV monitor to the "MONITOR OUT" jack (item #29), you can display the unit's operational status such as the current surround mode, delay time, center channel level and rear channel level on the TV monitor screen.

1. Press the "DISPLAY" button.
2. The unit's operational status will be displayed on the TV monitor screen with white characters on a blue background.



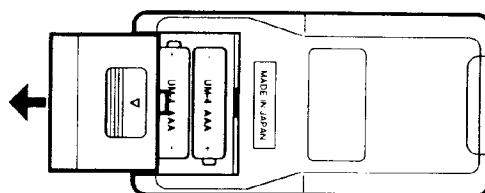
Remote Operations

For reliable operation, use the hand-held remote control within the recommended dimensional area. See below:



Battery Replacement

1. Open the battery compartment cover on the rear of the remote control unit. The cover should open easily if you press on it with your thumb and slide it in the direction of the arrow.



Batteries: (size AAA) x 2

2. Place two "AAA" size dry batteries in the battery compartment in accordance with the diagram in the compartment, then replace the cover.

Incorrect use of batteries may lead to leakage or rupture. Be sure to follow these guidelines:

- A. Always insert batteries into the battery compartment correctly matching the positive (+) and negative (-) polarities as shown in the diagram inside the compartment.
- B. Never mix new and used batteries together.
- C. Both rechargeable and non-rechargeable batteries are available. Be sure to use your batteries in accordance with the instructions provided on the cells.