



H A Harman International Company

960L

LOGIC7™ UpMix Algorithm Package

Owner's Manual Addendum



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DOCUMENTATION CONVENTIONS

This document is an addendum to the 960L Owner's Manual (Rev 2). It contains information about the optional LOGIC7™ UpMix Algorithm Package available for Software Versions 4.0 and above. Refer to the owner's manual for general safety, installation, and operating instructions.

The following symbols are used in this document:

Note: Calls attention to information that is essential to highlight.

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ABOUT THE LOGIC7 UPMIX ALGORITHM PACKAGE

The LOGIC7 UpMix Algorithm is an optional package available for 960L Software Versions 4.0 and above. An extension of Lexicon’s proprietary LOGIC7 technology, it creates surround (5-channel) program material from stereo (2-channel) input sources. It also includes additional features that allow active engineering of the resulting surround output.

The LOGIC7 UpMix algorithm includes a wide front image and surround channel envelopment. Surround channels are distinct (not monaural), and preserve the full bandwidth of stereo input sources.

Like other 960L algorithms, the LOGIC7 UpMix algorithm is user-configurable. The placement of program material elements as well as the rolloff and delay applied to surround channels can be adjusted. The Sens parameter adjusts LOGIC7 UpMix algorithm processing to suit variations in stereo input sources. With the single exception of the RDelay parameter, all parameters are artifact-free, allowing them to be silently used when running the LOGIC7 UpMix algorithm.

ENABLING INSTRUCTIONS

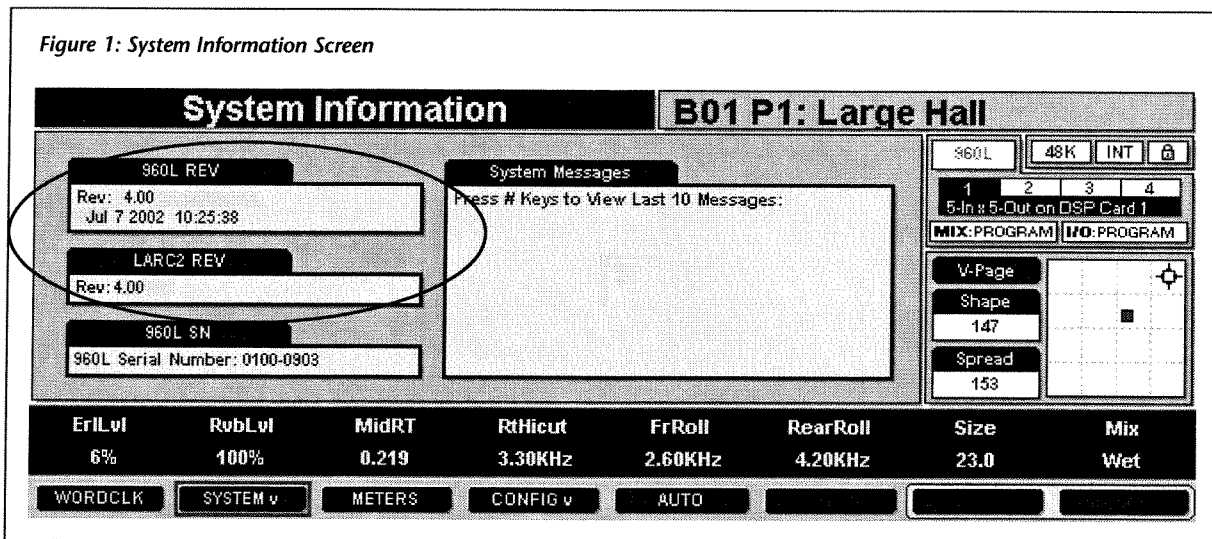
Before the LOGIC7 UpMix Algorithm Package can be enabled, Software Version 4.0 or above must be installed on the 960L.

To confirm that Software Version 4.0 or above is installed on the 960L:

1. Press the CONTROL button on the LARC2 to enter Control Mode.
2. Press the SYSTEM▼ soft button to access the System Information screen shown in Figure 1 (below). The 960L REV field indicates the software version that is installed on the 960L, and the LARC2 REV field indicates the software version that is installed on the LARC2. (Both fields are circled in Figure 1.)

If Software Version 4.0 or above is installed, proceed to the enabling instructions that begin on the next page. If not, Software Version 4.0 or above must be installed before the LOGIC7 UpMix Algorithm Package can be enabled. Refer to the appropriate software installation instructions for assistance.

Figure 1: System Information Screen



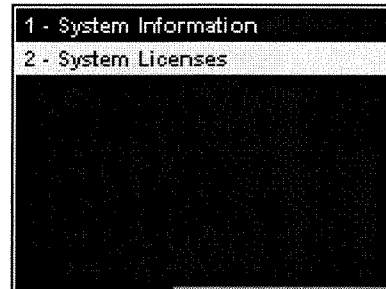
Note the following before proceeding to the enabling instructions that begin below:

- Use the front panel standby button whenever the instructions call for the 960L to be powered on or off. Do not use the rear panel power switch.
- The enabling process requires the 12-digit license key that came with the LOGIC7 UpMix Algorithm Package. Make sure this key is on hand before beginning.
- The enabling process will take about 5 minutes.

To enable the LOGIC7 UpMix Algorithm Package:

1. Press the CONTROL button on the LARC2 to enter Control Mode.
2. Press the SYSTEM▼ soft button twice in succession to access the SYSTEM▼ Menu shown in Figure 2 at the top of the next column.
3. Select the System Licenses option to access the System Licenses screen shown in Figure 3 (below).

Figure 2: SYSTEM▼ Menu



4. Locate LOGIC7 UpMix in the OPTION NAME field. If a Yes appears to the left in the ENABLED field, the LOGIC7 UpMix Algorithm Package has been enabled. Disregard the remaining instructions, and proceed to page 7 to learn more about this package. If a No appears in the Enabled field, proceed to step 5.
5. Use the up and down arrow keys on the LARC2 to select LOGIC7 UpMix in the OPTION NAME field. Then, press the ENTER button on the LARC2 to access the License Key Entry screen shown in Figure 4 at the top of page 6.

... Enabling Instructions continue on page 6

Figure 3: System Licenses Screen

System Licenses

B01 P1: Large Hall

| ID | ENABLED | OPTION NAME | LICENSE KEY |
|----|---------|---------------------------------|-------------------|
| 0 | YES | V3 Standard Package | Standard |
| 1 | YES | Multichannel Package | Standard |
| 2 | YES | Delays & Additional 96K Reverbs | XXXXXXXXXXXX |
| 3 | YES | Automation Package | XXXXXXXXXXXX |
| 4 | | LOGIC7 UpMix | Call for Demo Key |
| 5 | | | |

This is the standard set of capabilities included in all 960L systems.

LICENSED FOR USE

960L

48K

INT

1

2

3

4

5-In x 5-Out on DSP Card 1

MIX: PROGRAM I/O: PROGRAM

V-Page

Shape

147

Spread

153

ErILvl
6%

RvbLvl
100%

MidRT
0.219

RtHicut
3.30KHz

FrRoll
2.60KHz

RearRoll
4.20KHz

Size
23.0

Mix
Wet

WORDCLK

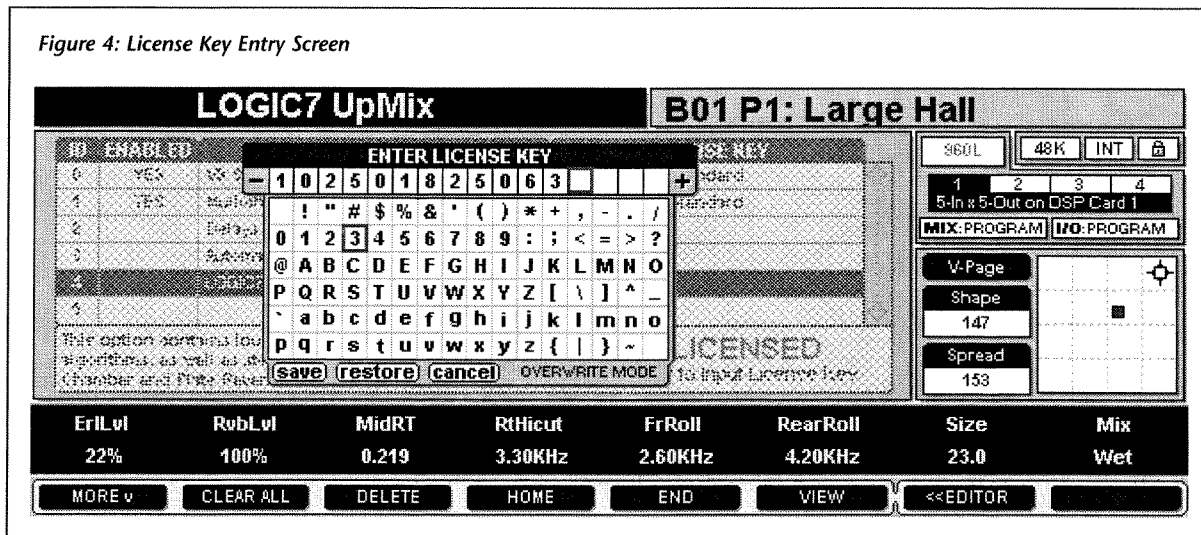
SYSTEM ▼

METERS

CONFIG ▼

AUTO

Figure 4: License Key Entry Screen



Enabling Instructions (continued from page 5)

6. Use the numeric keypad on the LARC2 to enter the 12-digit license key that came with the LOGIC7 UpMix Algorithm Package. If an incorrect digit is entered, press the – button on the LARC2 to move the cursor back to the appropriate square. Then, enter the correct digit.
7. When all 12 digits have been entered, use the down arrow key on the LARC2 to select the **save** button located at the bottom of the text editor. Then, press the ENTER button on the LARC2 to enable the LOGIC7 UpMix Algorithm Package.

The following message will display if a valid license key has been entered: "LOGIC7 UpMix has been Successfully Enabled! When all license keys have been entered, please power cycle the 960L." If this occurs, press the OK soft button that appears at the bottom of the LARC2 display. Then, proceed to step 8.

An "Invalid package key" message will display in the top-left corner of the LARC2 display if an invalid license key has been entered. If this occurs, begin again with step 1 (page 5). If the problem persists, contact Lexicon Professional Customer Service at 801-568-7660 or email at support@lexiconpro.com.

8. If desired, enter additional license keys at this time. Refer to the documentation enclosed with the license key for specific enabling instructions. If no additional license keys need to be entered, proceed to step 9.
9. When all license keys have been entered, use the front panel standby button to power cycle the 960L.
10. When the 960L powers on, follow steps 1 to 4 on page 5 to confirm that the LOGIC7 UpMix Algorithm Package has been enabled. If a No appears in the ENABLED field next to LOGIC7 UpMix, begin again with step 1 (page 5). If the problem persists, contact Lexicon Professional Customer Service at 801-568-7660 or email at support@lexiconpro.com.

RUNNING THE LOGIC7 UPMIX ALGORITHM

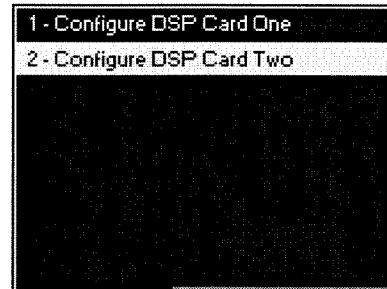
The LOGIC7 UpMix algorithm is available with 44.1, 48, 88.2, and 96kHz word clock rates. Refer to pages 3 and 4 in the 960L Owner's Manual (Rev 2) for instructions to select the desired word clock rate.

To run the LOGIC7 UpMix algorithm, the system must be configured for 2-in/5-out operation.

To configure the system for 2-in/5-out operation:

1. Press the CONTROL button on the LARC2 to enter Control Mode.
2. Press the CONFIG/CONFIG▼ soft button to access the Control Mode screen shown in Figure 5 (below).
3. For systems with one DSP card, skip ahead to step 7. For systems with two DSP cards, continue with step 4.
4. Press the CONFIG▼ soft button again to access the CONFIG▼ Menu shown in Figure 6 at the top of the next column.

Figure 6: CONFIG▼ Menu

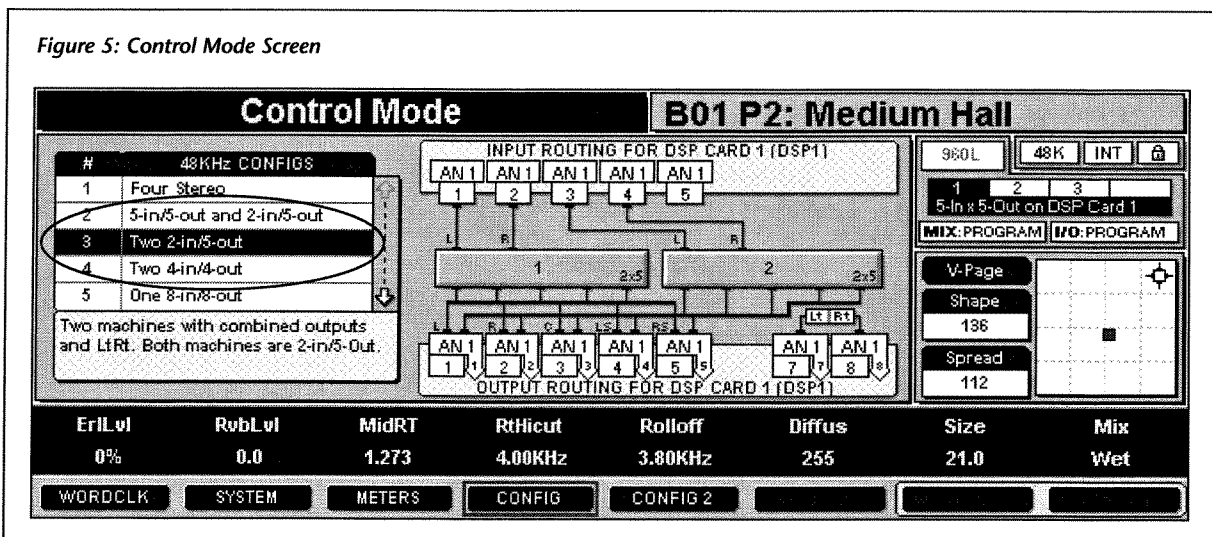


5. Select the desired DSP card for configuration. (The LOGIC7 UpMix algorithm can be run with either DSP card.)
6. Use the left and right arrow keys on the LARC2 to select the 48kHz CONFIG control on the LARC2 display.
7. Use the up and down arrow keys on the LARC2 to select configuration 3: 2-in/5-out. (This configuration is circled in Figure 5.) The number 3 can also be entered directly using the numeric keypad on the LARC2.

Note:

Refer to pages 3-5, 3-6, and 4-9 in the 960L Owner's Manual (Rev 2) for more information about system configuration.

Figure 5: Control Mode Screen



LOGIC7 UPMIX ALGORITHM PARAMETERS

SENS (SENSITIVITY)

The Sens (Sensitivity) parameter can be used to optimize the LOGIC7 UpMix process. Careful adjustment of this parameter is critical to achieving the desired results. There is no "nominal" setting for the Sens parameter. Rather, each setting is useful in particular program-dependent contexts. In some cases, the Sens parameter can be set to the same value throughout the entire program. In other cases, the setting will need to be adjusted to suit varied program material elements.

The goal of adjusting the Sens parameter is to achieve the best possible surround separation, while avoiding unnatural fluctuations in the surround image. It is recommended to audition program material using a mid-range setting of about 7. During highly dynamic sections of program material, raise the setting to determine if additional surround separation can be obtained. During less dynamic sections of program material, listen for program elements that move unnaturally from channel to channel. If this occurs, lower the setting to decrease the amount of surround separation applied to these elements.

LOCK

To adapt to various program material, the LOGIC7 UpMix algorithm constantly adjusts internal values – which can become a liability when brief, quiet sections punctuate program material. The Lock parameter can be used to maintain the state of internal LOGIC7 UpMix adaptation during these quiet sections.

The Lock parameter can also be used to "pre-adapt" the LOGIC7 UpMix process to the first few seconds of program material.

To do this:

1. Set the Lock parameter to Unlocked.
2. Audition the first 5-10 seconds of program material.
3. While program material is still being auditioned, set the Lock parameter to Locked.
4. Process program material from the beginning.
5. After the first few seconds of processing, set the Lock parameter back to Unlocked.

Note:

The Lock parameter should be set to Unlocked, except in the situations described in the Parameter Glossary that begins below.

PARAMETER GLOSSARY

| Parameter | Values |
|-----------|----------------------|
| Bypass | Normal, Bypass |
| Diverge | LR, 1 to 44, Center |
| RDynRoll | 2.2/4.9 to 9.0/20.0 |
| Lock | Unlocked, Locked |
| RDelay | 0 to 80 |
| Sens | Low, 1 to 14, High |
| Stage | Rear, Neutral, Front |
| Width | Normal, Wide |

Bypass (Normal, Bypass)

Disables the LOGIC7 UpMix process, passing the stereo input signal to the front left and right channels. When set to Normal, the LOGIC7 UpMix process is enabled. When set to Bypass, the LOGIC7 UpMix process is disabled.

Diverge (LR, 1 to 44, Center)*Full Name: Divergence*

Adjusts the placement of center channel information across the front left, center, and front right channels. Higher settings place higher amounts of center channel information in the center channel. Lower settings place higher amounts of center channel information in the front left and right channels.

RDynRoll (2.2/4.9 to 9.0/20.0)*Full Name: Rear Dynamic Rolloff*

Adjusts the range of cutoff frequencies used by a 6dB per-octave lowpass filter. Filtering is applied at the output of all processing, affecting the surround channels only.

A pair of cutoff frequencies is specified. The lower frequency defines the cutoff used when the surround channels are inactive. The upper frequency defines the cutoff used when the surround channels are fully active. A range of cutoff values, between the specified lower and upper frequencies, are dynamically applied during intermediate levels of surround activity based on program material dynamics.

Lock (Unlocked, Locked)

Prevents changes to several internal program-adaptive values that would otherwise affect response to program material. When set to Locked, program-adaptive internal values are maintained in optimal states during gaps in program material or after previewing the first few seconds of program material. In all other cases, the Lock parameter should be set to Unlocked. See page 8 for more information.

RDelay (0 to 80)*Full Name: Rear Delay*

Adjusts the amount of delay applied to surround channels. Typical RDelay settings fall in the 8-12 milliseconds range. When working with live program material, increasing the setting up to 20 milliseconds can result in more natural-sounding crowd noise. Settings over 20 milliseconds are used as effects.

Note:

Some surround codecs add intrinsic delay to the rear channels during operation. Depending on the specific monitoring method, the total delay at the rear speakers might be more than the delay specified by the RDelay parameter.

Adjusting the RDelay parameter does not affect level or pitch, but will cause obvious comb filtering that lasts up to 1 second after the adjustment is made.

Sens (Low, 1 to 14, High)*Full Name: Sensitivity*

Adjusts the response of the LOGIC7 UpMix algorithm to specific program material, allowing adjustments to maximize surround separation and avoid undesirable fluctuations in the surround image. In general, higher settings are recommended for dynamic program material with high levels or transient activity and lower settings are recommended for less dynamic program material. See page 8 for more information.

Stage (Rear, Neutral, Front)*Full Name: Sound Stage*

Places the most predominant surround image in the selected location – Rear, Neutral, or Front.

Width (Normal, Wide)

Adjusts the internal panning rule used by the LOGIC7 UpMix algorithm. In the Normal position, the algorithm uses a pan rule that results in material panning more toward the center. In the Wide position, the algorithm uses a pan rule that results in material panning slightly wider.

LOGIC7 UPMIX ALGORITHM PROGRAM BANKS**BANK 18: UPMIX CLASSICAL**

Classical presets, including Symphonic, Chamber, Concerto, Opera, and Chorale.

Orchestral (B18, P1)

Front Stage and low RDynRoll create a natural concert hall ambience. Long RDelay avoids "boxiness."

Chamber 1 (B18, P2)

Front Stage allows audience perspective. Low Diverge keeps instruments from bunching in the middle.

Chamber 2 (B18, P3)

Similar to Chamber 1, but with more relaxed settings that are forgiving on different types of material.

Chorale (B18, P4)

High Diverge keeps soloists properly centered amid large choruses. Adjust RDelay to complement vocal intelligibility.

Solo Piano (B18, P5)

Good starting point for many solo piano pieces. Low Diverge and Normal Width keep natural front image. Neutral Stage lends intimacy.

Granada (B18, P6)

Geared toward solo nylon-string guitar. High Sens works well on transients. Normal Width focuses soloists.

Sostenuto (B18, P7)

Relaxed Sens and low RDynRoll are forgiving on slow, sustained textural passages.

Chamber Orch. (B18, P8)

Normal Width keeps front sound stage tight on rapid transients. Vary RDelay to alter chamber size.

Oratorio (B18, P9)

For solo vocalists with minimal accompaniment. Center Diverge maintains soloist's image.

Adagio (B18, P0)

Good for when percussive attacks are well-blended into long, sustained symphonic layers.

BANK 19: UPMIX JAZZ

Jazz presets ranging between Swing, Bop, Blues, Cool, Hot, Smooth, Fusion, and more.

Old School 1 (B19, P1)

Low Diverge, Low Sens, and Rear Stage maximize surround from the limited amount of stereo info on older recordings.

Old School 2 (B19, P2)

Similar to Old School 1, but lower RDynRoll keeps image more stable and lower RDelay accommodates fast tempos.

Old School 3 (B19, P3)

Similar to Old School 1 & 2, but a little more aggressive to take advantage of the presence of more stereo information.

Nightclub (B19, P4)

High Diverge keeps a tighter focus on soloists. High RDynRoll and long RDelay capture a little of the back wall.

The Smokalist (B19, P5)

High Diverge keeps vocalist centered. Relaxed Sens and low RDynRoll are forgiving on quiet, reverberant passages.

Somewhat Azure (B19, P6)

Relaxed Diverge lets all instrumentalists have enough room for solos. Low Sens works on quieter passages.

Meteorologist (B19, P7)

Low Diverge maintains instrument perspective. Medium Sens works on a variety of signals. Low RDelay keeps it tight.

Fusion 1 (B19, P8)

High Sens keeps separation during rapid transients. Short RDelay preserves clarity during fast passages.

Fusion 2 (B19, P9)

Similar to Fusion 1, but lower Diverge and Neutral Stage are tailored for more ambient sources.

Smooth Ambience (B19, P0)

Relaxed Sens and low RDynRoll are forgiving on quieter, more reverberant passages.

BANK 20: UPMIX POP 1

Pop presets for the 50's-70's. Covers Rockabilly, early R&B, Soul, Rock, Pop, Country, and Psychedelic.

The Fun Sessions (B20, P1)

Early 50's Rock n' Roll. Low Diverge keeps vocalist from being overbearing. Low Sens is forgiving on extreme dual mono panned mixes.

Crooner (B20, P2)

50's-60's Pop. Medium Diverge keeps centered vocal image fairly true to original. Low RDynRoll prevents ambience from being obtrusive.

Balladeer (B20, P3)

Mid-60's Pop. High Diverge helps retain vocal clarity in the presence of complex orchestration and reverb.

Detroit Soul (B20, P4)

Early 60's R&B. Low RDynRoll tames brightness from tambourine/perc. Low Diverge is compatible with solo/duet vocals.

Flower Power (B20, P5)

Psychedelic music. Rear Stage brings pan and effect elements around the listener. High RDynRoll and RDelay maximize "space."

Lover Man (B20, P6)

Late 60's/early 70's R&B. Rear Stage emphasizes smooth ambiances and lush strings.

Wriggly Field (B20, P7)

Good starting point for Pop horn bands with big vocal harmonies.

Pop Rocks (B20, P8)

Good starting point for most Classic Rock/Pop from the 60's to present. Works well on many compilations.

City Ballad (B20, P9)

Similar to Balladeer, but tailored for the 70's and 80's pop ballads. High Diverge showcases lead vocalist.

FM (B20, P0)

Jazzy Pop. High Diverge retains vocalist/soloist center focus. High RDynRoll lets other elements surround the listener.

BANK 21: UPMIX POP 2

Pop presets for 70's through present. Covers later R&B, Metal, Pop, Grunge, Punk, and more.

Funky Chic (B21, P1)

Late 70's/early 80's R&B with high-range female vocals, layered percussion, and staccato horn parts. High Sens accentuates rapid transients.

Chain Male (B21, P2)

Metal. High Sens maximizes guitar impact. Rear Stage puts the listener into the mix. Med/Low RDelay makes things big yet tight.

Let it Pop (B21, P3)

From Disco to modern Pop and "boy bands." High Sens works well with a lot of rapid transients.

Ambya (B21, P4)

As the name implies, this one was built with very steady "ambient" material in mind: long, sustained string beds and large washes of reverb.

Spiked (B21, P5)

High Sens and low RDelay keep up with the frantic pace of upbeat Punk styles.

Plaid Flannel (B21, P6)

For 90's Guitar Pop/Grunge. Medium Sens works on the quiet sections.

Extrapolate 1 (B21, P7)

When the producer has included many elements in the mix. High Diverge and RDelay help each element find its place.

Extrapolate 2 (B21, P8)

Similar to Extrapolate 1, but with higher RDelay and lower RDynRoll.

Techno (B21, P9)

Good starting point for Techno/Dance music.

House (B21, P0)

Similar to Techno, but with more aggressive Diverge.

BANK 22: UPMIX POST

Presets tailored for post-production applications.

House'n Around (B22, P1)

High RDelay gives this preset the feeling of a small to mid-sized club.

Big House (B22, P2)

Very high RDelay gives this preset the feeling of a large club.

Live Radio Drama (B22, P3)

High Diverge provides front stage separation. High RDelay for natural applause ambience.

Radio Hour (B22, P4)

High Diverge provides front stage separation. Low RDynRoll stabilizes the rears in the face of challenging microphone dynamics.

News Hour (B22, P5)

High Diverge, low RDelay, and Front Stage maximize front stage articulation.

Car Chase (B22, P6)

Low Diverge leaves room for dialogue. High RDelay is big enough for three cruisers and a helicopter.

Stand Up (B22, P7)

Admittedly, a little over the top, but if you've ever spent time in a comedy club, you'll agree this is just about right.

Spoken Word (B22, P8)

Center Diverge to keep speaker centered. Vary Stage and RDelay to gauge intimacy.

Board Mix 1 (B22, P9)

Good starting point for live board mixes.

Board Mix 2 (B22, P0)

Similar to Board Mix 1, but lower RDynRoll tames excessive reverb.

BANK 23: UPMIX MIX TOOLS

Presets tailored for full multi-track-to-surround mixing applications.

Figure 8 (B23, P1)

Use with stereo 90 degree coincident figure of 8 mic with reflective back surface for natural room ambience.

Figure 8 Plus (B23, P2)

Same as Figure 8 but add a single cardioid room mic milted to 2 channels panned wide with polarity flipped. Mix 3 to 6 dB down.

Spaced Omnis (B23, P3)

Extends the sound of the room into the rear channels.

Bright Omnis (B23, P4)

Same as Spaced Omnis, but with higher RDynRoll and Sens for better separation. Works well in bright studio rooms.

Percussion Hall (B23, P5)

Good starting point for drums and instruments with similar transient characteristics. Cascade a stereo Hall program through here.

Brass Hall (B23, P6)

Good starting point for brass instruments. Cascade a stereo Hall program through here.

Kick Ambience (B23, P7)

Diverge set to Center to keep kick image solid. Cascade a stereo Ambience program through here.

Drum Plate (B23, P8)

Good starting point for drums and overheads. High Sens works on a variety of sources. Cascade a stereo Plate program through here.

Guitar Chamber (B23, P9)

Good starting point for guitar. Cascade a stereo Chamber program through here.

Your Reverb Here (B23, P0)

If your favorite stereo reverb isn't available in surround, use this.

WORKING WITH LOGIC7 UPMIX ALGORITHM PROGRAMS***Adjusting the Sens Parameter***

When working with LOGIC7 UpMix programs, consider the character of the existing stereo mix. This will impact the Sens parameter setting, which should be the first adjustment made when the program is loaded. In general, higher settings work well with more dynamic program material and lower settings work well with less dynamic program material.

Adjusting the Sens parameter is similar to adjusting compressor settings when mastering a stereo mix. When a mix lends itself to slower attack or release compressor settings, set the Sens parameter to a lower setting. Otherwise, set the Sens parameter to a higher setting. Often, riding the Sens parameter setting through variations in program material provides the optimal surround image.

... Adjusting the Sens Parameter continues on page 14

Adjusting the Sens Parameter

(continued from page 13)

When auditioning stereo program material, listen for sections of program material that contain discrete surround information. Increase the Sens parameter setting in these sections to achieve optimal separation. When surround information is more ambient, listen for pumping artifacts that can be eliminated by decreasing the Sens parameter setting.

Modern pop mixes respond well when the Sens parameter is set to High. For ambient program material, a Sens parameter setting of 4 or 5 is a good "set and forget" setting.

Adjusting the Surround Image

The Diverge, Stage, RDynRoll, and Width parameters combine to form the presentation of the surround image – although each setting is independent. Typically, these parameters are set once to establish a particular presentation. However, each is glitch-free, allowing its use with the LOGIC7 UpMix algorithm.

Set the Stage parameter to Front for program material suited for an ambient surround presentation, and to Neutral or Rear for program material that presents a more discrete sound. Set the RDynRoll parameter to a lower pair of frequencies when the Stage parameter is set to Front, and to a higher pair of frequencies when the Stage parameter is set to Neutral or Rear. The wider the spread between the RDynRoll frequencies, the more the surround channels will jump out when active. The most dramatic presentation of highly-discrete material is achieved when the Stage parameter is set to Rear and the RDynRoll is set to 9.0/20.0 (the highest pair of frequencies).

Higher Diverge settings provide the most separation between center and side channels, which is useful for film dialog or for center program material that must be localized in the center channel. High levels of separation can also be useful for other applications, but can become unnatural. When adjusting the Diverge parameter, listen to prominent center channel program material such as lead vocals or (possibly) snare drums. Decrease the setting to see if the sound improves. Set the Width parameter to Wide when matching the original stereo pan location is critical.

Adjusting the Rear Delay Parameter

The RDelay parameter provides up to 80 milliseconds of delay time between front and surround channels – in addition to any delay intrinsic to the monitoring system. Adjusting RDelay causes audible comb filtering for up to one second after the adjustment is completed. A total delay of 8-12 milliseconds is typical for use with the LOGIC7 UpMix algorithm.

For program material with prominent crowd noise, a total delay of 16-20 milliseconds creates a more natural sound. Modern ambient material with muted transient elements works well with a total delay of 30-40 milliseconds. RDelay parameter settings of 40-60 milliseconds create convincing nightclub ambience.

Adjusting the Lock Parameter

Consider adjusting the Lock parameter when the selected settings work well with the program material, but sound different during the first few seconds or after quiet sections. See page 8 for more information.

FREQUENTLY ASKED QUESTIONS

Why are 2-channel stereo input levels 3dB higher than 5-channel surround output levels?

The LOGIC7 UpMix Algorithm reserves 3dB of headroom to avoid clipping the surround outputs. It is capable of generating signals that require this headroom. In practice, this rarely occurs.

What is the delay through the UpMix process?

Delays through the UpMix process are shown in the table below. These delays are in addition to the group delays specified in the 960L Owner's Manual.

| Word Clock | Delay |
|--------------|----------|
| 44.1/88.2kHz | 28.48ms |
| 48/96kHz | 26.166ms |

How is center channel information determined?

Center channel information includes a full-range mix of information with relatively equal levels in the front left and right channels. The Diverge and Width parameters control the panning rule that determines the placement of this information.

The Diverge parameter can be used to create phantom center panning, hard center panning, or a combination of the two. These panning methods are described in the bulleted items below.

- When the Diverge parameter is set to LR, phantom center panning is performed. This panning method is done from left to right, allowing information with relatively equal levels in the front left and right channels to be heard at equal levels in the front left, center, and front right channels.

- When the Diverge parameter is set to Center, hard center panning is performed. This panning method is done from left to center, then center to right, allowing information with relatively equal levels in the front left and right channels to be heard only in the center channel.
- When the Diverge parameter is set within its 1-44 range, these two panning methods are mixed together.

The Width parameter can be used to control panning levels. When set to Normal, a constant energy pan is used to maintain overall panning levels. When set to Wide, the constant energy panning rule is relaxed, allowing panning to be performed based on empirically derived rules that simulate real-world pan pot behavior.



Lined writing area consisting of 25 horizontal lines.

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