

RAMSA

WR-8716 SOUND REINFORCEMENT MIXING CONSOLE



Panasonic®

Sound Reinforcement: An Essential Tool in the Production of Live Performances

The Ramsa story began several years ago when Panasonic elected to start a new division. It was geared towards the working professional. This means that we are truly interested in the needs of the user. We also chose to market a full line of equipment, with all the advantages inherent in a system approach, developed by our extensive research facilities.

Primarily, though, we wanted to provide functional equipment, designed for the most versatile and convenient operation, while providing tremendous value. Given this strategy, the most effective way to proceed is to include the features which users find most valuable. And the best way to determine what these features are is to talk to the people in the field — the users and their dealers.

So our engineer in charge of product development personally visited professional users throughout the country to find the information we needed. He brought plans with him, blueprints of mixers which we intended to produce, and he asked for specific comments and suggestions. He returned with the dealers' and users' ideas for building the most functional mixers representing the best value for the money.

Then, we put our research and development

team to work on executing the ideas of the American users. What were some of the suggestions? Modular design for reliability and ease of service. A sophisticated, versatile set of EQ controls. A fast, effective, visible metering system. Compact size, with a separate, external power supply. And Ramsa mixers are designed for their tasks — a recording board for recording engineers and a sound reinforcement console for performances.

At this point, we had all the technical information we needed. All that remained was to actually build the mixers. Creative engineering produced three new mixers, each includes the most appropriate features for its application. And each represents a new standard of the marketplace. Because we listened to you.

Of course, this is not the easiest way to develop new products. But we weren't looking for an easy way to add just another mixer to the marketplace. We wanted to build a contemporary line of mixers with unique features and outstanding value. We feel we've been very successful. And we have you, our dealers and users, to thank.

The mixer for the new sound reinforcement technology

Today, the demands on sound reinforcement equipment are heavier and more varied than ever before. For one thing, different microphones are designed specifically for the ideal properties of the kind of music they will be called upon to pick up. And each type of music has its own tonal characteristics. It is desirable, therefore, to have

a mixing console with extensive, versatile equalization facilities, to compensate for the wide variety of tonal characteristics which microphones exhibit.

And, of course, the sound engineer must have full control over every performer on the stage, and over the total sound balance. So the mixer must allow individual control over all inputs. In addition, extensive group and master controls should be available. Furthermore, these controls should be easy to operate, since many adjustments often need to be made quickly. Reliability is also a critically important consideration.

With the widespread use of amplification for all types of music, musicians today frequently have difficulty hearing — not only one another, but themselves as well. Therefore, it is essential that complete and versatile monitoring facilities are included in the mixing console. Naturally, the monitoring system should be designed and equipped to avoid any acoustic feedback, which could be caused by the monitor speaker's proximity to the stage microphones.

The Ramsa WR-8716, a mixer designed specifically for sound reinforcement applications, is perfectly suited for meeting the wide range of requirements for music in the 80's.



Ramsa WR-8716: Special Features



10-line Variable Mixing Busses

With 4 Group, 2 Master, 2 Send, and 2 Echo busses — a total of 10 outputs — the WR-8716 is capable of versatile operation with a wide variety of echo and sound enhancement equipment. This gives the operator all the flexibility needed for the sophisticated demands of contemporary music.

Master out, for example, provides control over the volume of the sound actually heard by the audience, whereas Group out allows grouping of similar signals, such as drum mics, or also may send the signal to the echo unit. A third option for routing the output signal, Send out, assigns the mixed signals to a speaker on stage for monitoring by the performers.

In addition, the 16 Input modules and 4 Group modules are equipped with individual insertion jacks, to allow connection of external equipment. This means that the WR-8716 is adaptable to larger-scale mixing needs through interconnection of a second mixing board, via the Sub in inputs.

Effective Instrument Grouping

Because Ramsa has designed this unit with left and right channel assign capability, it can transmit signals directly from the Input modules to the Master modules. Therefore, the input from a particular mic — a vocalist, for example — can be sent directly to the Master fader controls, bypassing the Group modules. Thus, the 4 Group modules may be used exclusively for creating the most desirable instrumental balance, while still allowing the desired effects from a particular solo performer to be achieved.

The Group bypass capability is an example of Ramsa's new approach to mixer design. Naturally, the Master modules still provide total fade in/fade out control of the Input and Group signals. This means that the completed instrumental balance adjustments can be left intact, while all volume changes are made with the two Master faders. This single example demonstrates the creative flexibility of the WR-8716.

Flexible Equalizer Controls

Equalization is an invaluable tool for assuring that instruments are heard by the audience with their desired tonality. The flexible equalizer controls in the

WR-8716 mixer provide full control of the inputs. Plus, an extra equalizer section is included for the stage monitor signal as well.

1) INPUT EQ

Three rotary knobs for High, Mid, and Low provide ± 12 dB of boost or cut at their respective frequency settings. The High and Low knobs are 3-position "shelving" type controls, while the midrange provides continuously variable peak-dip adjustment. These not only give precise tonal control over each input, but can also be used effectively to suppress feedback.

2) SEND EQ

To ensure that the stage performers can monitor whatever specific signals they require, a 3-band EQ section with the Master Send control is provided. With other mixers, a separate equalizer system is often required for stage monitoring — at extra cost and inconvenience, the WR-8716 provides the same facility with its Send EQ function.

Highly Reliable Design

The 22 fader controls on the Input, Group, and Master modules are constructed of special conductive plastic material for high reliability. The long 100 mm stroke, along with the dB calibration scale, greatly facilitates precise operation. We've incorporated ICs and transistors, which provide good value and increase reliability. Unlike the potentially problematic soldered connections found on many mixer units, the rear panel connectors are wire-wound with tough lapping coils (the same type of connectors that are utilized in computers and test instruments) to reduce the likelihood of malfunction during use. Of course, the discrete design of the Individual modules themselves makes it easy to pinpoint and remedy any problem quickly and easily.

Superior Sound Quality

Because balanced electronic circuitry is employed at the inputs, the all-important frequency response specs are outstanding:

MIC	20—20,000 Hz ± 1 dB (-60 dB Input, Gain = 64 dB)
LINE	20—20,000 Hz ± 0.5 dB (-20 dB Input, Gain = 24 dB)
Input Noise	-128 dB ("A" WTD, 150 ohm source)

Since the external power supply is highly regulated, the undesirable effects of hum or blurred low frequency response (noticeable with weak transformers) is avoided. Furthermore, there is no interference from flux leakage.

As shown in the specification chart, harmonic distortion and residual noise figures are also superb for models of this class. Other relevant performance figures include:

Crosstalk:	60 dB at 1 kHz
CMRR:	70 dB at 1 kHz
Max Output Level:	+22 dB/600 ohm

Functional Monitor Capability

Each Input module is equipped with a lockable solo button that permits pre-fader monitoring. On the 4 Group modules however, the solo button operates post-fader. And, since the Solo control has priority, other settings may be monitored without disturbing the Master output signal. Either headphones or speakers may be employed for monitoring the Master (L, R), Send (L, R), and Echo (L, R) busses.

Operator-Oriented Design

There are several design features which contribute to quick, easy operation of the WR-8716. These include:

1) COMPACT SIZE

The overall dimensions are ideal for a one-man operation and the 1-1/4" width of each module makes the WR-8716 amazingly compact, especially considering its wide variety of features. It is also extremely easy to transport and set up this mixer, because it is designed to operate off an external power supply; the entire console weighs only 107 lbs.

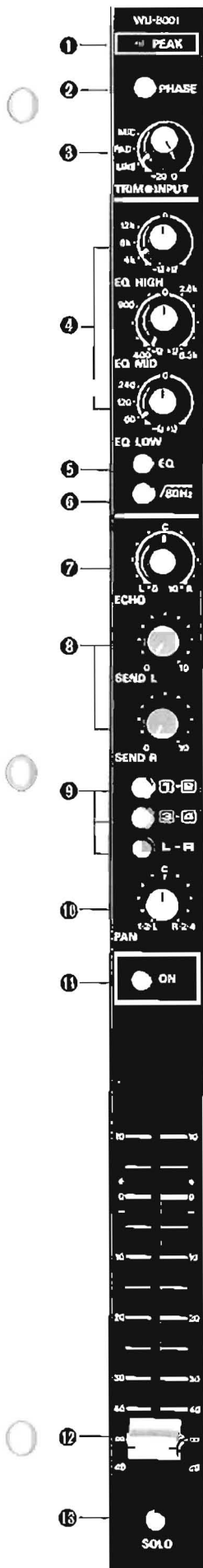
2) EXTRA VISIBILITY

The low profile won't obscure or block the operator's view of the stage, yet the meters are large, and placed for easy visibility.

3) COLOR CODING

Separate functions are easily recognized by the color-coded knobs, which also assist in positive identification when working in poorly lit areas.

INPUT MODULE (WU-8001)



The WR-8716 can accommodate up to 16 microphone inputs, each includes its own individual equalizer, echo, and send functions. In addition, up to 4 groups are available, for combining related sound elements into separate sections (i.e., vocals, strings, woodwinds, drums, etc.). These groups may then be reprocessed together in the Group or Master modules.

1. Peak LED

The peak LED indicates that 6 dB of headroom remains in the pre-amp section. By adjusting the input/trim control as high as it can go before the LED flashes during peaks, you can obtain the optimum S/N ratio, while retaining low distortion. The LED's indication applies to pre-EQ, pre-fader signals.

2. Phase Switch

This switch allows instant phase reversal of the microphone connected at each input. If an out-of-phase condition exists (a possibility if two microphones are miking the same instrument, or if the cables are connected in reverse), this convenient switch can return the mic to normal phase. This is an enormous time-saver, especially when compared to re-soldering the mic cables (required by some mixers to reverse the phase).

3. Input/Trim

To keep input signals below the clipping level of the pre-amp, input sensitivity level can be set as high as -80 dB, in three increments of -20 dB each. Since the trim takes effect before the insertion jack, it allows adjustment to the optimum level for connection of external equipment.



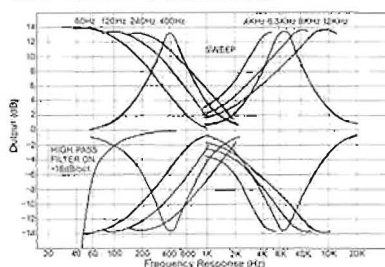
3-band variable frequency equalizer

4. Equalizer

These controls offer the engineer maximum flexibility in tonal adjustment — a sophisticated 3-band variable frequency equalizer section is included. The center knob controls the level adjustment and includes 0 dB center detent. The outer knob adjusts the frequency.

These rotary pots provide the input signals with three bands of EQ adjustment:

Input equalizer characteristics



CONTROL	FREQUENCY	LEVEL ADJUSTMENT	ADJUST
HIGH	4K/8K/12KHz	±12dB	(Shelving)
MID	400—6.3KHz	±12dB	(Peaking)
LOW	60/120/240Hz	±12dB	(Shelving)

For the midrange control, a continuously variable rotary knob permits precise frequency adjustments, covering about one octave around the center frequency. The Low and High EQ settings are 3-position shelving-type controls.

5. Equalizer On Switch

Using this switch, you can turn the equalizer on or off without resetting the level adjustment positions.

6. High Pass Filter Switch

In comparison with the lowest EQ setting (a maximum attenuation of -12 dB at 60 Hz), this filter provides a sharper -18 dB/octave cutoff at 80 Hz. This is useful for eliminating low frequency vibration (which may occur when using hand held mics) or to provide greater microphone isolation.

7. Echo Control

The echo controls utilize a novel, highly practical approach. Rather than a cumbersome system involving two separate echo level controls, a single level control with a concentric pan pot is provided. This arrangement makes it simple to position the echo signal, so that it precisely follows the position of the instruments or vocalists, when using a stereo echo or effects unit. If mono effects devices are used instead, the pan pot may be rotated either left or right, which assigns it to one of the two Master Echo Send controls. The echo signal is derived post-EQ, post-fader, as the echo level will ride up or down with the input fader, while still maintaining the same chosen percentage of Echo signal.



Echo controls

8. Send L, R Control

This control adjusts the amount of pre-fader, pre-EQ signal sent to the musicians' stage monitor speakers, via the Master Send controls.

9. Program Buss Assign Switch

This section assigns the input signal to any of the four Group outputs, or directly to the L, R output section.

10. Pan Control

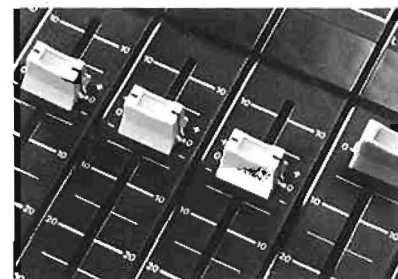
The Pan control, used in conjunction with the program buss assign switch, adjusts the amount of input signal sent to any of the assigned channels. Turning the pan control to the left assigns channels 1, 3, L and turning to the right assigns channels 2, 4, R. In the center position the input signal will be sent to all assigned channels.

11. Channel On Switch

When this switch is engaged, the input signal is sent to any of the assigned output channels. When it is switched out, the signal to the output is muted. Mic leakage or noise caused by a mic not in use will thus be eliminated.

12. Input Fader

These conductive plastic, professional input faders permit independent adjustment of the volume level for each input module. The extra-long, 100 mm stroke assures precise level settings, reference dB levels are also indicated.



Conductive-plastic input faders

13. Solo Switch

This switch is used to monitor the pre-fader signal at each input module individually. Since it can be locked in the "on" position, simultaneous monitoring with other modules can be performed. Activation of the solo button is indicated by the solo-on LED.

In addition to headphone monitoring, a separate amp and speaker may be connected to the L and R Monitor out jacks. The solo setting has priority over other monitoring modes, so even if the fader volume must be attenuated, the input levels may still be monitored. This is especially useful during final sound checks prior to actual performance.

GROUP MODULE (WU-8012)

After the sound sources have been assigned to one of the 4 Group modules, they are combined and given their Left or Right positioning with the Pan pot control. They are then sent to the Master modules.

1. Pan

This knob determines the left or right positioning of the signals in each group, before they are routed to the Master module mixing busses.

2. L, R

When sending group programs to the Master module, this control is used to determine their left and right orientation. To fix the positioning of instrumental grouping in the overall mix, it adjusts the left-right orientation of the group programs — before they are sent to the Master modules.

For example, assigning the vocalist to a "center" spot and the keyboard off to the singer's right will increase the overall "presence" of the mix.

3. Group Fader

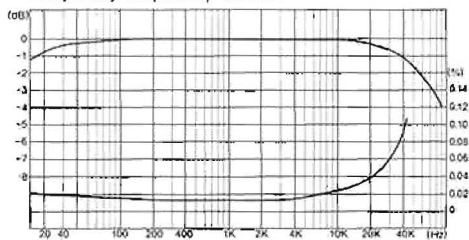
This single fader control is used to vary settings for the entire group. Example: instead of having to make separate adjustments for the Input modules receiving cello, violin, and contrabass, a complete string section can be controlled with one fader. This makes it easy to set the orchestral balance.

4. Solo

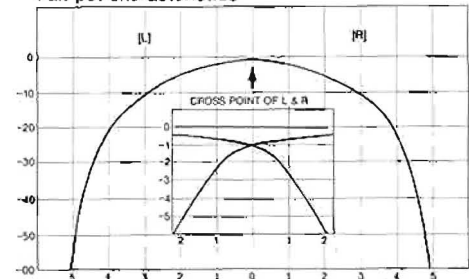
This is used to confirm that the setting of an individual group module is correct. This post-fader signal can be monitored through headphones or via line out to the monitor speakers.



Frequency response/ T.H.D.



Pan pot characteristics



MASTER MODULE (WU-8013)

The flexible design of the WR-8716 gives you the option of direct Input-to-Master connection, in addition to the conventional signal routing through the Group modules for pre-mixing. The signals from both sources are then adjusted in the 2 Master modules. These Master modules provide the following features:

1. Meter Switch

Depending upon the setting of this switch, the VU meter reads either the levels of the Master module's output or of the master send signals. (Depress for Send, release for Master.)

2. Master Echo Control

These control the Master level of the signal being sent to the echo unit.

3. Send Equalizer

These controls can be used to add EQ to the Send signal going directly to the performer on the stage.

The midrange frequencies on this buss are adjustable with a 3-position control, while the highs and lows are adjusted with fixed "shelves" at 10 kHz and 100 Hz, respectively.

4. Master Send Controls

These control the master output level from the Send busses on the Input modules.

5. Echo Return Assign Switch

Once the pans on the mixing busses of the Input modules are set, this switch is used to return the echo signals to each group or directly to the left/right channels.

6. Pan

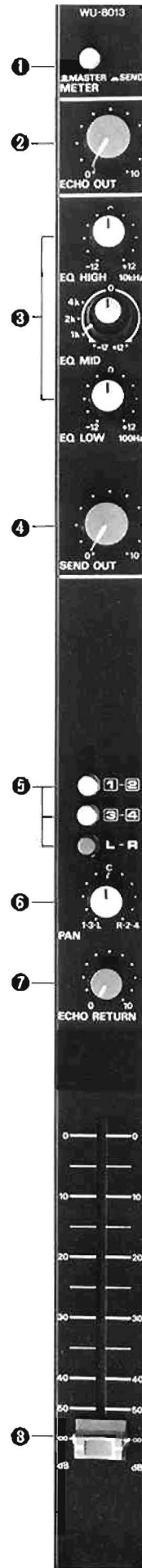
After the program mixing buss is selected (using #5 above), the pan pot enables you to select either group 1-2, or 3-4, or channel L-R. Selecting 1-3 or L will assign the signal to the left position, and 2-4 or R to the right.

7. Echo Return

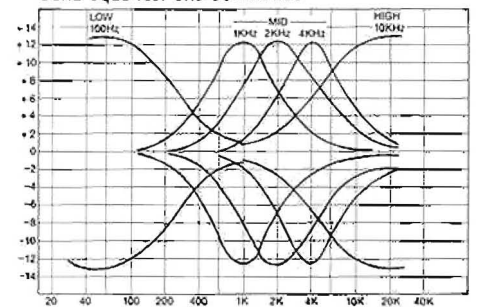
This controls the level of the echo signals being returned to the Output modules from an external echo unit.

8. Master Fader

The output level from the Master mixing buss can be adjusted using this control. One is provided for each Left and Right.



Send equalizer characteristics



MONITOR MODULE (WU-8014)

This module is designed to allow the operator maximum flexibility in monitoring, to confirm that all the controls are properly set.

1. Light Connector

This terminal can accommodate a DC 12 V lamp unit (light optional). In low light applications, when a light must be used to illuminate the board, it is very convenient to be able to connect it directly to the mixer.

2. Monitor Select Switch

These 4 lock-release type switches permit convenient monitoring in the following modes (listening modes are shown in parentheses):

L, R: Master L, R (stereo)
 Echo: Echo L, R (stereo)
 Send L: Send L (mono)
 Send R: Send R (mono)

(All modes are available for either headphone or speaker monitoring)

3. Monitor Level Control

This control sets the listening levels for either headphones or external monitor speakers.

4. Solo LED

The position of the solo switches (in or out) on each Input or Group module is indicated by this display.

5. Phones

Standard 1/4" (6.3 mm) stereo plug accepts most headphones.

Send equalizer



TB/OSC MODULE (WU-8015)

In addition to talkback provision, which can simplify communication with the stage performers, this module also incorporates an oscillator — It allows you to check the status of the equipment, quickly and easily.

1. OSC Select Switch

The oscillator produces either a signal of pink noise or a 1kHz tone — this switch allows you to select which you prefer.

2. Oscillator Output Level Control

3. Talkback Microphone Connector

Standard 3-pin XLR type plug

4. TB/OSC Assign Switch

- Send L
- Send R
- Group 1-2
- Group 3-4
- Master L-R

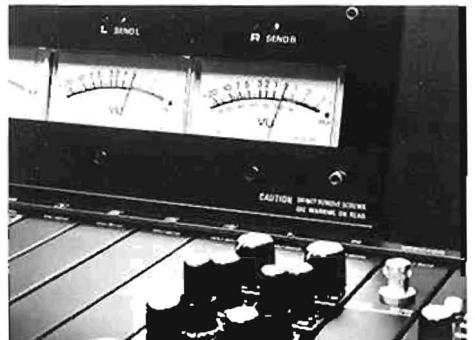
5. TB Mic Level Control

This control adjusts the talkback volume level.

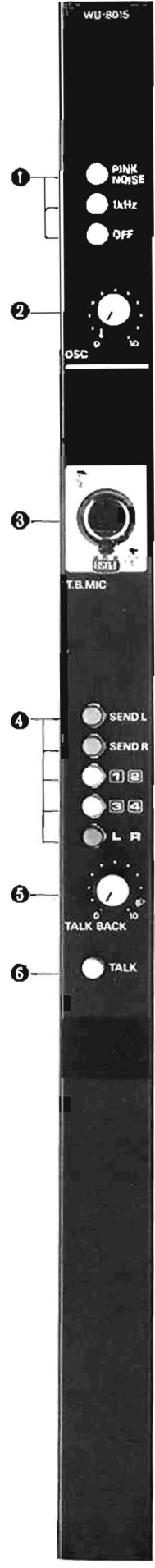
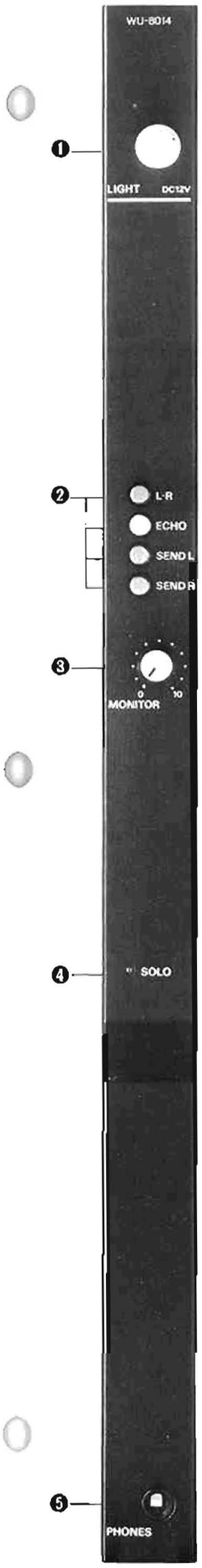
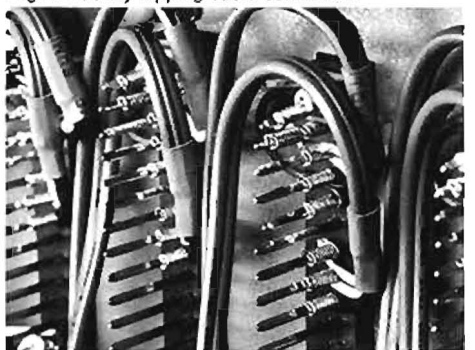
6. Talk Switch

With the OSC select switch in the OFF position, you can press this non-locking switch to speak with the people on the stage.

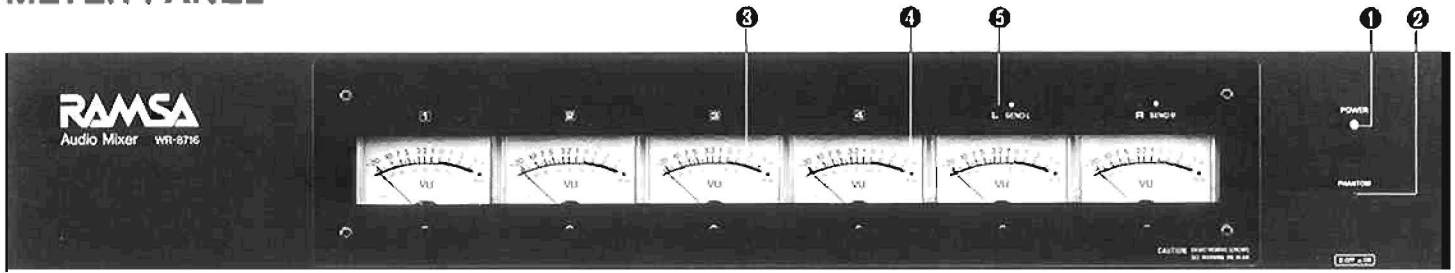
VU meter



High-reliability lapping cable connectors



METER PANEL



1. Power Indicator Lamp

Indicates that the power supply unit is turned on and the mixing board is supplied with $\pm 20V$ DC power.

2. Phantom Power Indicator Lamp

Indicates DC 48V is supplied.

3. VU Meters

For monitoring Group, Master and Send outputs.

4. Peak LED

Lights when Group, Master and Send outputs exceed +16dB level.

5. Meter Select Lamp

Indicates monitoring Master or Send outputs.

REAR PANEL



1. Input

Standard XLR type connectors ensure wide compatibility with peripheral equipment and positive, slip-free connections.

2. Input Insertion Jack

External sound enhancement units (compressors, limiters, equalizers, etc.) may be connected to these input modules. Each Jack accepts a 1/4" phone plug, using the RTS format.

3. Sub-Input

For using a WR-8716 in combination with a second mixing board.

4. Echo Out

Connected to the input of an echo unit, harmonizer, delay unit, phase shifter, etc.

5. Phantom Power On/Power Off Switch

Supplies power (up to 48 V) to condenser microphones.

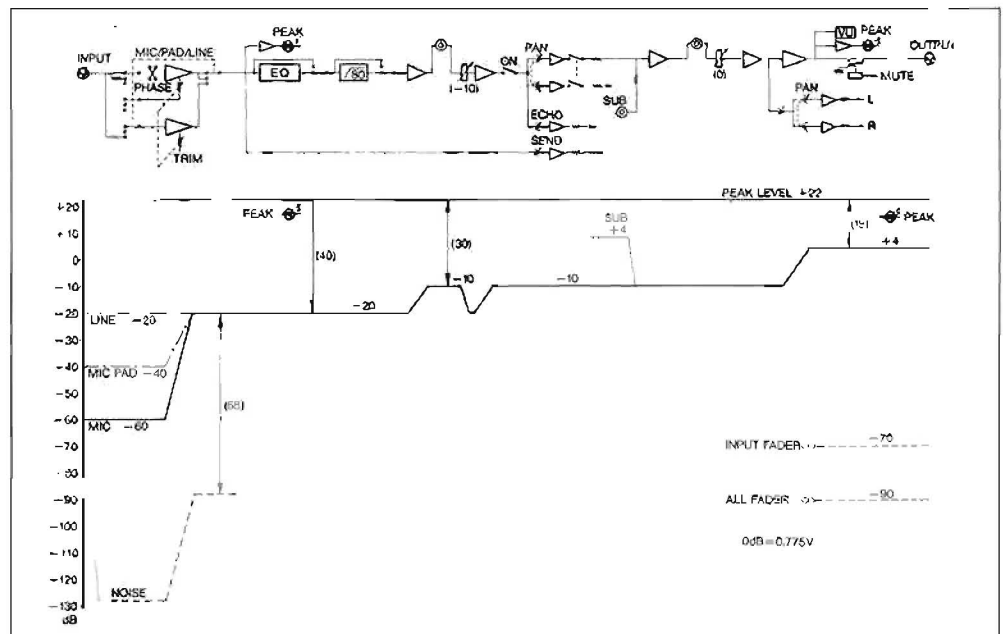
6. Send Out

Connected to the stage monitor speakers via the stage monitor amplifier.

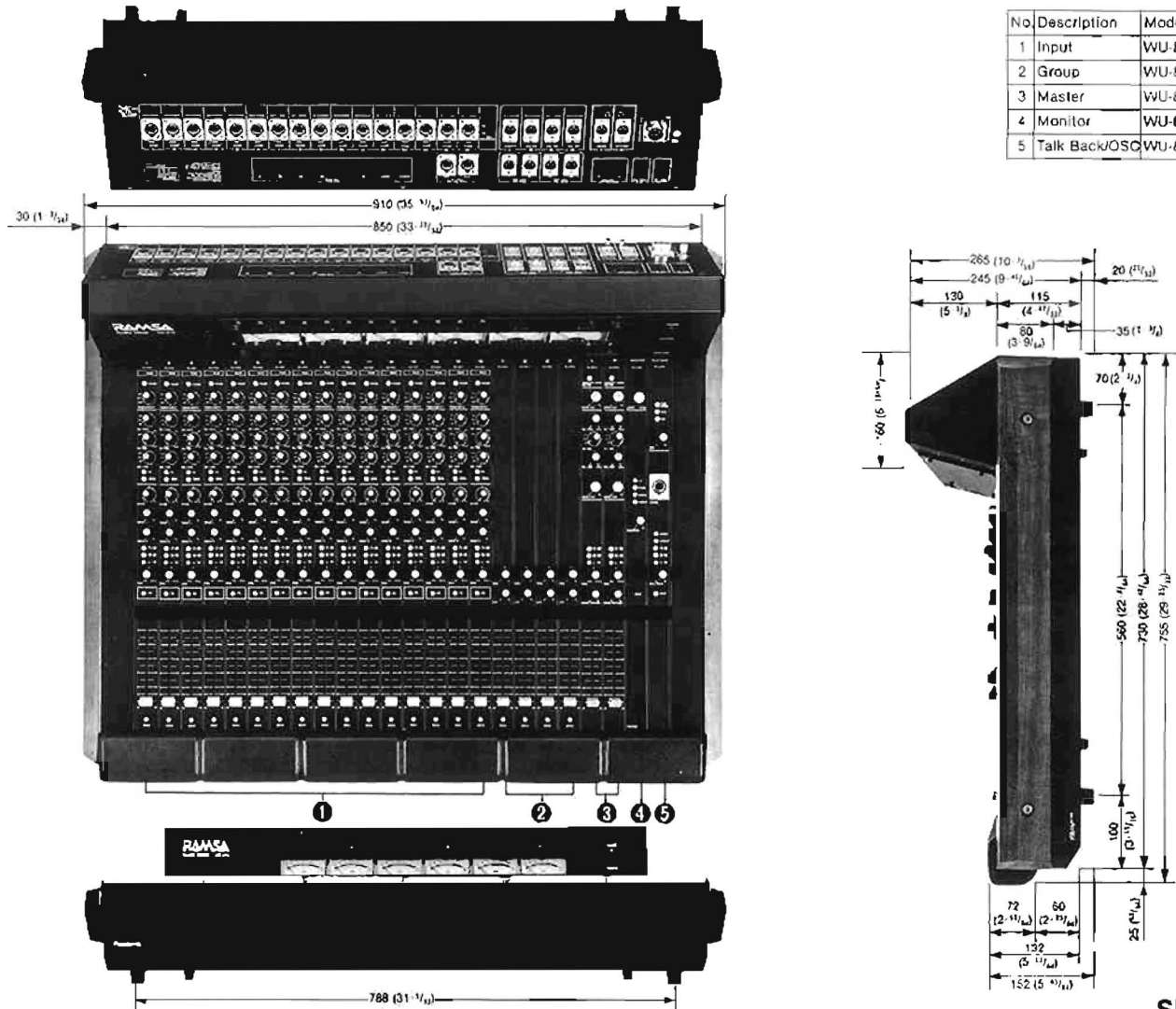
7. Group Insertion Jack

Used to connect external equipment (compressors, limiters, equalizers) to process the signal of any given group.

LEVEL DIAGRAM



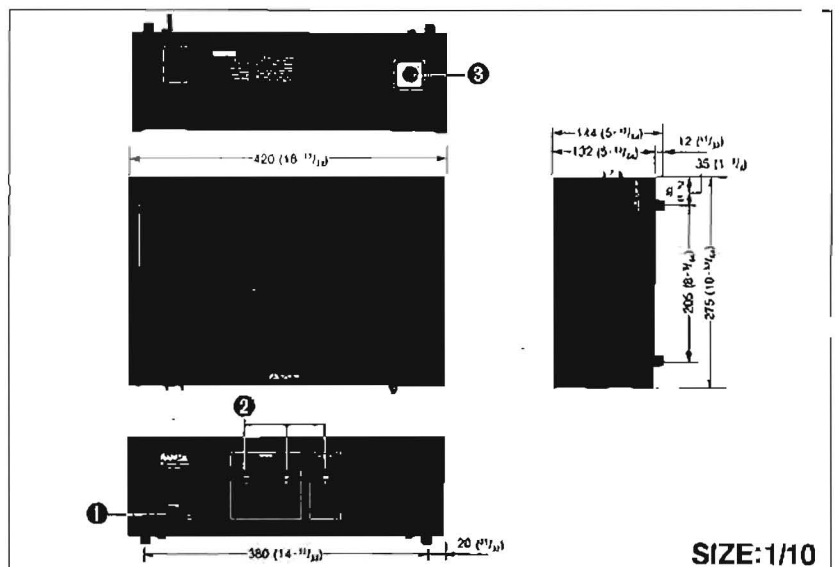
No	Description	Model No.	QNT
1	Input	WU-8001	16
2	Group	WU-8012	4
3	Master	WU-8013	2
4	Monitor	WU-8014	1
5	Talk Back/OSC	WU-8015	1



SIZE: 1/10

POWER SUPPLY

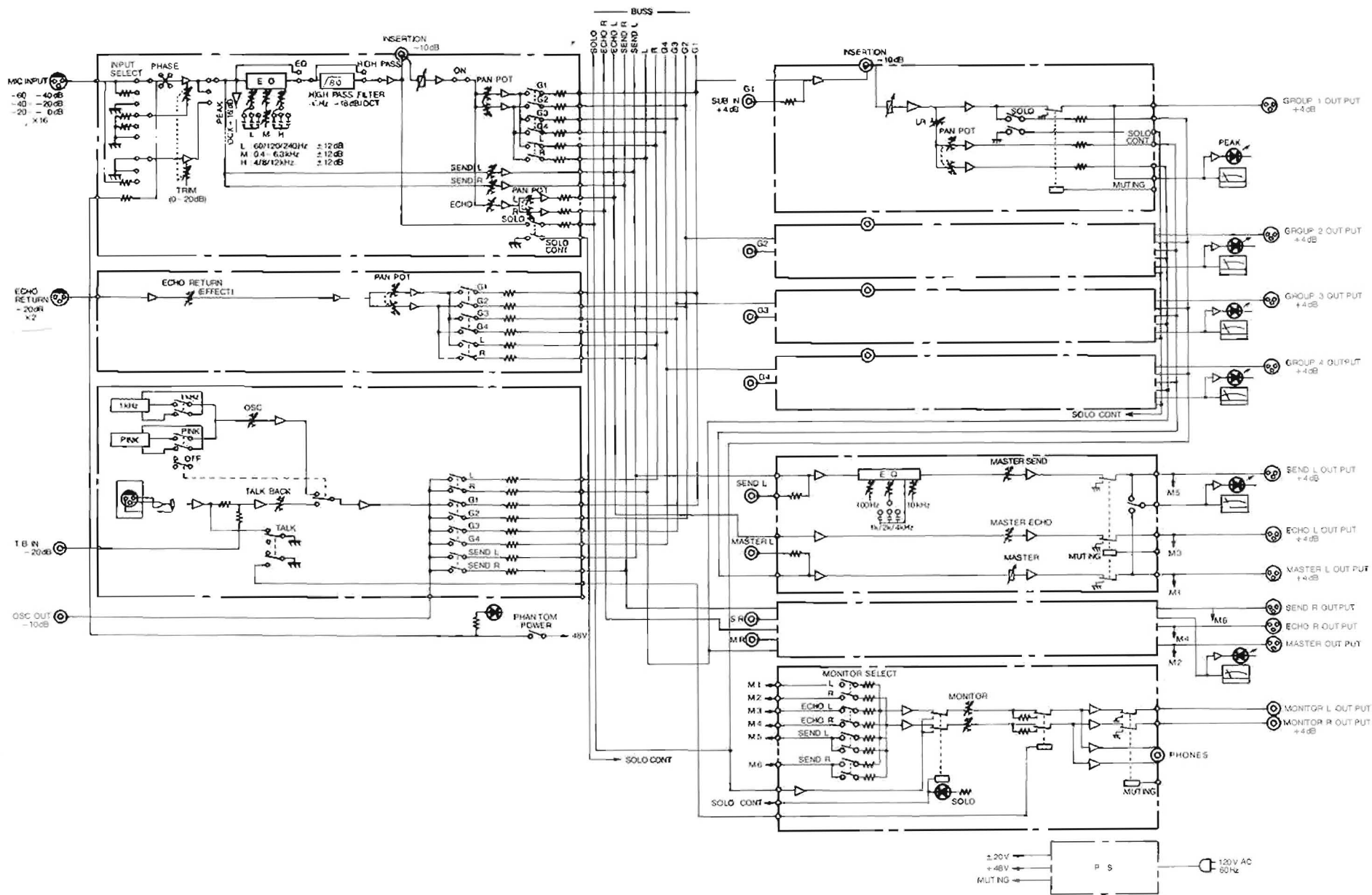
WU-8081



SIZE: 1/10

1. Power On/Off Switch
2. DC +20V, -20V, Phantom Indicator LED Indicates regulated DC voltages as: +20V -20V +48V (phantom power)

3. Power Supply Connector
DC +20V, -20V, +48V and Mute Control Signal are supplied through this connector. The supplied connection cable should be connected.



WR-8716 / ARCHITECTURAL SPECIFICATIONS

1. The mixing console shall have a main frame which accepts the following plug-in modular assemblies: 16 input channel modules (WU-8001), 4 group modules (WU-8012), 2 master control modules (WU-8013), 1 monitor control module (WU-8014) and 1 talkback/oscillator modules (WU-8015).

The main frames shall be capable of mounting upon a table or shelf, shall be entirely self contained (with the exception of power supply), and shall not rely on a pedestal to house any electronics, etc.

2. The main frame shall include 6 large illuminated meters having VU ballistics and built-in LED peak level indicators. 4 meters shall display the group output level and the other 2 meters shall each be switchable to display the Master or Send output levels.

3. The main frame shall also include, on its rear panel, electronically balanced Mic inputs using female XLR-3 type connector to accept nominal levels of from -60 to -20 dB. These connectors shall also be used for line inputs and will accept nominal levels of from -20 to 0 dB.

The main frame also shall have 16 standard tip/ring/sleeve phone jacks (nominal -10 dB level) for patching (insertion) of auxiliary equipment between each channel equalizer and fader.

The ring (hot) and sleeve (shield) shall be used to send the signal output and the tip (hot) and sleeve (shield) shall be used for return signal input from auxiliary equipment.

The main frame shall also have phone jacks, with a nominal +4 dB level, sub inputs (inputs directly to the mixing busses) for the 4 group busses, 2 master busses (L & R), and 2 send busses. Similarly, there shall be 2 female XLR-3 type connectors for echo return signal input, nominal -20 dB level. There shall be phantom power switch to supply 48 V DC to all mic input connectors for remote powering of condenser microphones.

4. The console output shall be male XLR-3 type connectors with +4 dB nominal output level; there shall be 4 group outputs, 2 master outputs, 2 send outputs, and 2 echo outputs. In addition, there shall be 2 monitor outputs, +4 dB nominal output level, and 1 oscillator output, -10 dB nominal output level with phone jacks.

5. The main frame shall be equipped with a padded arm rest, simulated SOLID NUT-WOOD sideboards, and the exterior metal

panel shall be black aluminum. The dimensions shall be 265 mm (10-7/16") high x 755 mm (29-23/32") deep x 910 mm (35-13/16") wide (with sideboards), and the weight shall be 107 lbs without power supply.

6. Each input module shall include the following features: a peak-indicating LED which signals when the pre-EQ level is 6 dB below clipping; phase reversal switch for the mic input; a three position input level switch and trim control knob, a dual concentric switch selects from mic (-60 to -40 dB nominal level), mic-pad (-40 to -20 dB nominal level), and line (-20 to 0 dB nominal level), the inner trim control knob allows precise continuous level adjustment within a 20 dB range. The 3-knob channel equalizer (see subsequent paragraph on EQ) shall include: an EQ on-off button to bypass or insert the channel equalizer; a high pass switch to obtain an 18 dB/octave rolloff below 80 Hz (-3 dB point), 1 stereo echo send level control with pan pot and level control (post-EQ, post-fader), 2 send level controls for foldback (pre-EQ, pre-fader); program assign buttons; 1 stereo pan pot for odd-even group panning and stereo L & R panning; channel on-off pushbutton to defeat all channel outputs except send outputs and solo; a linear stroke (100 mm) dB-calibrated fader, a latching type solo button which places that channel input in the headphone output and monitor outputs regardless of the mix previously selected for headphone monitoring.

7. Each channel equalizer knob shall provide 12 dB of boost or cut, and shall have center detent so that "flat" response may be quickly and accurately achieved. A concentric knob on each EQ control shall select the center (or knee) frequency, LOW range adjustment — 60, 120, 240 Hz, shelving characteristics, MID range adjustment — 400 to 6.3 kHz continuously variable, peaking characteristics, HIGH range adjustment — 4, 8, 12 kHz, shelving characteristics.

8. Each group module shall have 1 level control and 1 stereo panpot for master L & R busses in order to use the mixing console as a 16 x 4 x 2 mixing console. This level control knob shall be adjustable fully counterclockwise so the mixing console can operate as a 16 x 6 mixing console; 100 mm stroke dB-calibrated fader and a latching type solo button.

9. The master modules shall have a VU meter selector switch selecting from

Master level or send level, echo level master control knob, 3-knob send EQ which provides 12 dB of boost or cut over 3 frequency ranges — LOW 100 Hz, shelving characteristics, MID range selecting from 1, 2, or 4 kHz, peaking characteristics, HIGH 10 kHz, shelving characteristics; send level master control knob; buss assignment buttons and panpot for echo return signal to mix echo signal to group and master busses; echo return level control and a 100 mm stroke dB-calibrated Master fader.

10. The monitor module shall include a lamp connector to illuminate the above panel (DC 12 V), monitor select switches for master L and R echo, send L and send R, and also shall have monitor level control, a solo indication LED and a phone jack.

11. The talkback/oscillator module shall have oscillator switches for pink noise, 1 kHz test tone, and off switch. The talkback/oscillator module shall have female XLR-3 connectors for a nominal -50 dB input level. Talkback mic input shall be activated only when TB pushbutton is depressed. Assignment switches of talkback or oscillator signal to master L, R busses, group 1, 2, 3, 4 and send L, R shall be included. In addition, on the rear panel, TB input jack, phone jack, nominal -20 dB level and oscillator output phone jack, nominal -10 dB level shall be available for test, set up, or intercom.

12. The power supply (WU-8081) shall be housed in a rack-mountable package measuring 480 mm (19") wide x 132 mm (5-3/16") high x 270 (10-13/16") deep, and weighting 22 lbs, the power supply shall be connected to the main frame via a multi-conductor cable with locking connector.

13. In addition to the various specifications previously cited, the mixing console shall meet or exceed the following performance criteria: frequency response; 20 — 20,000 Hz \pm 1dB; total harmonic distortion of less than 0.05% at +20dB group output, 20—20,000Hz; -128 dB equivalent input noise; -90 dB residual output noise with all faders down, 60 dB crosstalk at 1 kHz on adjacent input or input-to-output; at least 18 dB headroom throughout; +22 dB output drive capability for all XLR outputs, channel patch outputs, and interstage patch outputs. The mixing console shall be approved for electrical and fire safety by U.L. (Underwriters Laboratories) in the United States. The mixing console shall be a Ramsa model WR-8716.

TECHNICAL SPECIFICATIONS

Frequency Response:	MIC INPUT — $\pm 1.0\text{dB}$ 20Hz to 20kHz 64dB Gain at trim control max + 4dB at Group Output LINE INPUT — $\pm 0.5\text{dB}$ 20Hz to 20kHz 24dB Gain at trim control max + 4dB at Group Output
THD:	MIC INPUT 0.02% at 20Hz 0.02% at 1kHz 0.05% at 20kHz (74dB Gain, + 20dB at Group Output) LINE INPUT 0.05% 20Hz to 20kHz (34dB Gain, + 20dB at Group Output)
SMPTE IM Distortion:	0.02% (Mic or Line Inputs + 20dB at Group Output)
Equivalent Input Noise:	-128dB Maximum -132dB Typical HF "A" WTD (74dB Gain 150 ohm Source)
Maximum Input Level:	MIC: + 10dB at MIC PAD position LINE: + 30dB
Maximum Gain:	MIC: 74dB $\pm 1.5\text{dB}$ LINE: 34dB $\pm 1.5\text{dB}$
Cross Talk:	60dB at 1kHz
CMRR:	70dB Minimum at 1kHz 80dB Typical
Phantom Power:	+ 48V DC Regulated 100mA Maximum Current
Input Channel Equalizer:	High 4k/8k/12kHz $\pm 12\text{dB}$ (Shelving) ($\pm 11\text{dB}$ minimum) Mid 400 to 6.3kHz $\pm 12\text{dB}$ (Peaking) ($\pm 11\text{dB}$ minimum) Low 60/120/240Hz $\pm 12\text{dB}$ (Shelving) ($\pm 11\text{dB}$ minimum)

Send Master Equalizer:	High 10kHz $\pm 12\text{dB}$ (Shelving) Mid 1k/2k/4kHz $\pm 12\text{dB}$ (Peaking) Low 100Hz $\pm 12\text{dB}$ (Shelving)
Inputs:	MIC IN 16 MIC -60dB to -40dB 5k Ω PAD -40dB to -20dB 5k Ω LINE IN 16 -20dB to 0dB 10k Ω -10dB 20k Ω ECHO RETURN IN 2 SUB IN 8 + 4dB 100k Ω
Mixing Busses:	GROUP 4 MASTER 2 SEND 2 ECHO 2 SOLO 1
Outputs:	GROUP 4 + 4dB 600 Ω MASTER 2 + 4dB 600 Ω SEND 2 + 4dB 600 Ω ECHO 2 + 4dB 600 Ω MONITOR 2 + 4dB 3k Ω HEAD PHONES 2 Watts/8 Ω
Maximum Output:	+ 22dB
Meters:	6 x VU Meter with Peak LED
Fader:	100mm stroke Professional Straight Line Fader
Peak Factor:	Headroom 30dB Program 18dB
Power Consumption:	AC 120V 60Hz, 140W
Dimensions:	35-53/64" (W) x 10-7/16" (H) x 29-23/32" (D) (910mm) (265mm) (755mm)
Weight:	Approx. 107 lbs (48kg)

*0dB is referenced to 0.775V
Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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PROFESSIONAL AUDIO DIVISION

Professional Audio Division
Panasonic Company, Division of
Matsushita Electric Corporation of America
One Panasonic Way
Secaucus, N.J. 07094 (201) 346-7000

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