

5.1 BASS MANAGEMENT POWERED SUBWOOFER SYSTEM



APPLICATIONS:

Recording Studio
Mastering Lab
Professional Surround Systems
Screening Rooms
Discriminating Home Theater

ISUB-18 DESCRIPTION:

The ISUB-18 is a self powered professional subwoofer system. It employs bass management, hi pass filtered outputs, a sealed front firing 18" cone loudspeaker, and the INFRA dual integrator driving a 700 watt power amplifier. This provides a flat acoustical response down to 8 Hertz. Six inputs allow the combining of all the bass information on 5.1 surround programs and 2 level controls and a 10dB attenuator provide relative adjustment of the bass information from the 5 full range channels and the dedicated low frequency effect channel. 5 hi pass line level filtered outputs are provided for the upper range loudspeakers and a line level INFRA output is provided for additional INFRA bass speakers. Internally set Dynamic Filter protection maintains undistorted audio reproduction under accidental overload conditions. A remote indicator module is provided and may be placed in a convenient visible location to indicate the dynamic filter protection threshold has been reached.

INFRA™ TECHNOLOGY DESCRIPTION:

The INFRA driver is operated below resonance and flattened with an electrical boosting circuit, the INFRA dual integrator.

Operating below resonance the INFRA system exhibits predictable, uniform response and reproduces each note with the same emphasis, reducing the influence of the resonances found in conventional above resonance bass systems. In addition, the use of a low pass filter is eliminated (and with it the associated long variable delay) and replaced with the INFRA dual integrator with its short uniform delay.

Upon close listening, it is clear that the impression of power and impact is greater with an INFRA system when compared to conventional bass systems. This is true even when the two systems will measure the exact same Sound Pressure Level on a calibrated SPL meter. This is because the INFRA subwoofer maintains the bass energy in a tight packet, aligned with the upper range signal, providing a greater body impact and a seamless musical connection with the main loudspeakers.

Objectively, the INFRA system exhibits superior frequency and phase response.

DYNAMIC FILTER:

The Dynamic Filter circuit is a complimentary technology to the INFRA dual integrator. It insures that unexpectedly large signals will not overload the system resulting in possible damage or audible distortion. This allows high level operation close to the maximum system capabilities without fear of accidental overload.

The Dynamic Filter circuit dynamically reduces the bass extension to prevent overload. It is inherent in the INFRA design that an overload condition will occur with the lowest notes first, as they require the greatest amount of amplifier power and driver excursion. In an overload condition, the Dynamic Filter circuit will reduce the lowest frequencies to their maximum safe level while not affecting the bass content above the frequency that exceeded the threshold.

The Dynamic Filter threshold is not user adjustable. It has been factory set to 3 dB below the amplifier overload point.

The Dynamic Filter is fundamentally different from the commonly used limiter which reduces the level of the entire subwoofer out-

SPECIFICATIONS

Input Configuration:

6 Balanced XLR female line level

Output Configuration:

5 Balanced hi-pass XLR male line level
1 Balanced INFRA XLR male line level

Hi-Pass Filter Frequency:

- 3 dB @ 130 Hz/-6 dB @ 95 Hz

Hi Pass Filter Slope:

12 dB/octave

Hi Pass Gain: Unity in balanced mode

INFRA Output Mode:

Sum of all inputs

INFRA Module:

8 Hz dual integrator

INFRA Frequency Response:

±3 dB 8 Hz to 95 Hz (2 π Steradians)

INFRA system -6 dB frequency 95 Hz (not adjustable)

INFRA Level Control:

Adjustable level control and 10 dB attenuator on Input F

INFRA Cutoff Frequency:

Switchable 8 Hz or 20 Hz

INFRA Overload Protection:

Preset threshold Dynamic Filter circuitry

RTI: Remote Threshold Indicator

Threshold exceeded indication red LED

Amplifier Output Power:

700 Watts continuous sine wave

Low Frequency Transducer:

EL-18R 18" Cone

Enclosure: 13 ply birch plywood

Finish: Black textured finish or optional high gloss automotive finish

Grille: Black nylon cloth on frame

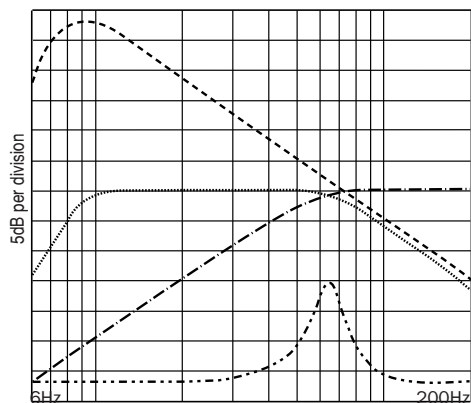
Dimensions:

22"h x 21"w x 18"d
55.8cm x 53.3cm x 45.7cm

Weight: 75lbs. - 34kg

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put and is much more audible when engaged. It is more natural not to hear the lowest frequencies and still hear the upper bass unaffected, as often there are sounds in nature without low bass content. It is very noticeable when the entire bass range limits to protect itself. When used in moderation the Dynamic Filter is very subtle and conceals the overload condition very well. When the system is turned up too far, the low bass is reduced to the point that only the upper bass is heard. If the user requires this much sound pressure, more amplifiers and speakers are required to achieve the desired level along with the extended low frequency response.



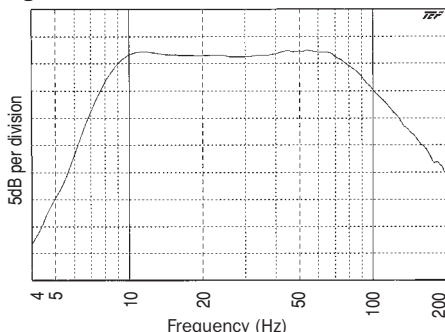
- Electrical frequency response of the INFRAs™ dual integrator
- Acoustical output of the INFRAs™ system
- .-.-.- Acoustical frequency response of the INFRAs™ loudspeaker in a sealed box
- Impedance amplitude of INFRAs™ loudspeaker in a sealed box

In a playback system used for personal enjoyment or professional presentation it is reasonable and acceptable to allow some Dynamic Filter protection to occur without noticeable reduction in bass extension or overall fidelity. In a Studio environment during mixing or mastering it is not acceptable for the Dynamic Filter protection to occur without the knowledge of the mixing engineer. For this reason the remote indicator is provided and may be placed in a convenient location for visual monitoring.

RESPONSE DOWN TO 8 HERTZ:

The INFRAs is a no compromise technology with a great degree of flexibility. By extending the frequency response down a full octave

Fig. 1



below what is considered to be the lowest musical note, low C on a pipe organ (16 Hz), we improve the phase response and reduce the delay throughout the entire audible bass range. This excellent phase response and short signal delay is why, subjectively, the INFRAs system is known for its quick, tight and musically connected bass sound throughout the entire bass range, not just the lowest frequencies. With its excellent phase response and extended frequency response, it can more accurately represent the character of the sound being fed into the system when compared to conventional designs and their long signal delays.

HOW LOUD AT 8 HERTZ:

While the ISUB-18 will reproduce 8 Hz, it is not audible nor does it have enough acoustical power for you to feel it. The measurements are taken at close range with sensitive instruments. To achieve a flat response, as shown in figure 1, full amplifier power is used at the lowest frequencies and very little (<1 Watt) in the upper frequency range. The INFRAs dual integrator provides the correct signal strength and therefore amplifier power at each frequency. As the frequency is lowered, the power and excursion required to maintain a flat acoustical system at high SPL become enormous and not practically attainable for a single driver system. Fortunately, the improved phase response, one of the main benefits of an extended subsonic acoustical response, is preserved because the music content is typically not demanding high power subsonic reproduction.

The ideal listening scenario is to have a full bandwidth 8 Hz playback system and play a good recording without low frequency noise present on it. The playback system can then benefit from the improved phase response without requiring excessive power in the lowest octave or engaging the Dynamic Filter circuit.

OPERATING INSTRUCTIONS:

Connect a line level source such as a professional mixing console or surround processor output to send a full frequency range signal via shielded cables to the XLR line level inputs A through F. The ISUB-18 will send the channels A through E signals to the built in Hi Pass filters and to the A through E line level hi pass outputs. Connect these signals, via shielded cables, to the inputs of their corresponding power amplifiers for the upper range speakers.

The bass signal from inputs A through E are combined, then adjusted by the level control before going to the INFRAs dual integrator, to the built in amplifier and to the bass speaker. The signal from input F goes through a separate level control and a 10dB attenuator switch to allow wide adjustment in combining this level with the summed signal from inputs A through E. You will achieve a higher fidelity sound by sending a full range signal to all inputs. We do not recommend any low pass filters in front of the inputs. When using the output from a surround sound processor you have the option to set the bass management mode in the surround sound processor so there is no subwoofer output. This directs the bass information on the effects channel to the other outputs bypassing the low pass filter. This setting has demonstrated a significant improvement in fidelity.

Use the LEVEL control to match the level of the ISUB to your satellite speakers. Use the POLARITY SWITCH, if necessary, to reverse the polarity of the ISUB-18. Reversing polarity can, in some cases, be helpful to achieve a seamless blend between the sound of the subwoofer and your satellite speakers. The normal INFRAs CUTOFF setting is 8 Hertz. The 20 Hertz INFRAs CUTOFF is available for playback of problem recordings containing excessive low frequency noise.

The slave output is an integrated bass output level matched for additional bass speaker systems.

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The Dynamic Filter XLR connector is connected via a standard XLR microphone cord to the remote threshold indicator intended to be placed near the mixing console for visual Dynamic Filter threshold monitoring.

SETTING THE BASS LEVEL:

If your application is in a recording studio, you should use professional acoustical measurement instrumentation to set the bass level correctly. For other applications, you can set the bass level as desired for your personal taste. You will probably find large variations in the amount of bass energy on various recordings. Until recently, there has not been enough attention to low bass monitoring in the recording studio, post production and mastering process to insure a low noise, uniform low bass response on the recording. With an INFRA subwoofer system, you are able to hear the bass with definition and clarity never before available, making it easier to identify not only the basic level discrepancies, but also the subtleties of the recording environment ambiance and the bass instrument character.



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