

BENCHMARK MEDIA SYSTEMS, INC.

The MicroFrame Series

The Need

As systems continue to grow in complexity and available real estate generally remains static, the need for higher density system functions becomes ever more pressing. Interfacing various large systems such as routing switchers, intercom systems, etc. that do not have individual channel level controls, can be a frustrating problem, particularly in light of the current space requirements.

The Solution

The Benchmark MicroFrame Series was designed with this problem in mind. The MicroFrame Series consists of a modular rack mount chassis that is only 1 Rack Unit high. It houses 16 modular amplifiers, with front panel access, and two power supply electronics modules. The amplifier modules are ≈ 0.8 " wide and the power supply modules are ≈ 2 " Wide, providing a total of 18 modules in a 16.8" wide chassis.

The MF-1 Modular Frame

The MF-1 is a single rack unit Modular Frame that is designed to house two power supply modules, as well as the amplifier modules, and operate them in a redundant configuration from a common power transformer and power entry module. The IEC type power entry device at the rear of the frame is a combination line filter, mains voltage selector (120-240 volt 50/60 Hz operation) and power plug allowing for all international power cords.

Audio interconnect is left to the end user, as each user has their own preference. Provision is made at the rear of the MF-1 for your choice of multi-pin connectors. A removable flat rear panel allows easy punch and wiring of the multi-pin connectors of your choice. 0.025" sq. posts are provided on the backplane for three ports at each module position. PL-2 pre-connectorized wire assemblies are available. These assemblies consist of a three position Molex[®] SL housing and pins attached to a two-foot length of Gepco #24 solid shielded pair, ready for your multi-pin connector at the rear of the chassis. Alternately, wire wrap connections may be made to the 0.025" posts and attached to the rear panel connectors of your choice. Benchmark can also provide the MF-1C, pre-wired with insulation displacement 50 pin D connectors. Other connectors are available to your specifications. Check with the sales department for pricing.

The MF-1 is finished with a high quality black paint. The modules are held in place by the anti-vibration nylon card guides and the edge card connector, forming a very secure arrangement suitable even for mobile environments.

Modules

The plug-in modules have attached front panels that correspond to the module itself, and form a contiguous attractive front view of the frame. The finish on the panels is the same black paint with white silk-screen graphics. Each module has a small extruded-aluminum handle that has a bright anodize finish, and provides an ideal location for attaching labels as to the use of the module.

The PS-2 Power Supply

The PS-2 is the power supply module for the MicroFrame Series. It provides a linearly regulated bipolar (\pm) 15 volts, at a maximum of 1.5 amps, to power the system. Linear regulators are used to ensure ultra low-noise amplifier performance. Two power supply modules are needed for each MF-1. The module has combining diodes at the output to the backplane allowing redundant regulator operation. The MF-1 uses a common power transformer and power entry module to feed the two PS-2 power

supply modules. Individual voltage trim potentiometers are provided to allow for load balancing between the two supply modules. The power supply regulator modules have transformer secondary fuses to isolate them from the transformer, in the highly unlikely event of a catastrophic failure in one of the modules.

Operation of the MicroFrame Series should be done with forced air cooling, as 80 watts of power may be dissipated by the system. Operation without forced air is permitted for short time periods, but regular operation in this manner is not recommended.

The LA-1 Line Amplifier

The LA-1 is the first in a series of very high performance audio amplifier and processing modules. It is characterized as a one in, two out line/distribution amplifier with front panel adjustable variable gain from + 20 to - 20 dB. Unity gain has a center detent position on the potentiometer. The input to the amplifier is a common mode filter that ensures very high RF rejection to common mode RF energy. The filter in turn feeds an instrumentation amplifier with a gain of -6 dB. Common mode rejection of the instrumentation amplifier is approximately 100 dB to 3 kHz and 75 dB at 20 kHz. The variable gain stage follows and has active adjustment of the amplification for the most optimum noise performance. A trim potentiometer allows the detent position of the front panel gain potentiometer to be set precisely at unity.

The module has a balanced output section that utilizes a current boost integrated circuit, that in and of itself is almost totally free from crossover distortion. However, when placed in the feedback loop of a NE5532, it provides all of the very desirable qualities of the NE5532 but with 300 mA of output current capability. This is essential for driving long capacitive transmission lines. This high output current capability allows 150 Ω true power matched transmission lines, for instance, to be driven to + 26 dBm or higher, with very low Total Harmonic Distortion. Each LA-1 has two 60 ohm outputs unless the module was ordered specifically with a 150 Ω output impedance. The output stage gain is +6 dB. Input and output clip points, at unity gain, are +26 dBu. The modules bandwidth is greater than 200 kHz for excellent transient and square wave response (without overshoot or ringing). This carefully compensated wide bandwidth also provides low phase shift at 20 kHz (- 8.6°), while exhibiting outstanding RF immunity. On board fuses assure the continued operation of the system in the highly unlikely event of a catastrophic failure on an amplifier module.

A bi-colored signal indicating LED provides a green indication when a signal of a pre-determined threshold is present, and a flashing red/green indication when the module approaches overload at the output. The threshold for the peak indication is factory set to trip at +20 dBu, but may be set at any level from \approx +16 to \approx +26 dBu. The signal presence threshold is adjustable from - 10 dBu to +8 dBu, average, (-2 to +16 dBu peak) and is factory set at -10 dBu (-2 dBu peak).

The MP-1 Microphone Preampfier

The MP-1 is the second in the series of very high performance audio amplifier and signal processing modules for the MicroFrame. The MP-1 uses the same topology that is found in the now famous MP-4 microphone preamplifier from Benchmark. Benchmark preamplifiers are used by Telarc Records, The Boston Symphony, Deutsche Grammophon, National Public Radio, NBC's "Nightly News", among many others.

The performance of the MP-1 is *the* state of the art, and features; A gain range of 6 to 75 dB, (including 20 dB pad) with an adjustable maximum gain limit trim, to limit the gain range when using high sensitivity microphones. It has a noise floor that is within one dB of the theoretical limit, a bandwidth greater than 200 kHz, THD @ 20 kHz = 0.0009% (A = 40 dB), a maximum input level of +21 dBu, CMRR @ 2 kHz =100 dB, and @ 10 kHz = 65 dB. It has outstanding RF immunity due to it's common

mode input filter, and the dynamic range is greater than 120 dB. Transient Intermodulation Distortion is virtually nonexistent, with the 1 kHz difference twin tone CCIF curve flat to 70 kHz. All electrolytic capacitors are paralleled with large film capacitors. The preamplifier is ultra transparent! See the review of the MP-4 (formerly the MIA-4) by the late Hugh Ford of Studio Sound Magazine, for further information.

In addition to having the extraordinary performance of the MP-4, the MP-1 incorporates a switchable 70 Hz low cut filter, and the bi-colored signal presence and onset of overload indicators found in the LA-1. The signal indicating LED can be strapped to indicate either pre or post filter. The module also has the same balanced output section found in the LA-1 described above.

The EX-1 Extender Board

The EX-1 is an extender board for the MF-1 frame. This unit allows servicing of a module at the frame rather than removing it to a test bench.

The BP-1 Blank Panel

Blank panels are available to fill any unused module positions providing a continuous front panel for the MF-1

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