MB Dynamics
TECHNOLOGY, TEST PROCESSES & ENGINEERING SERVICES

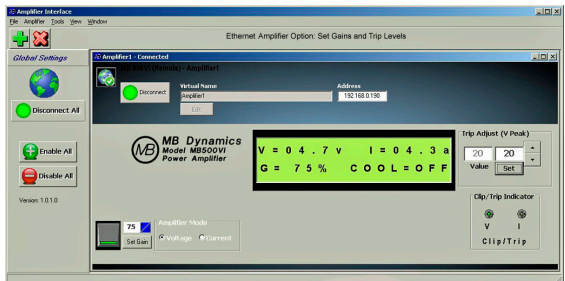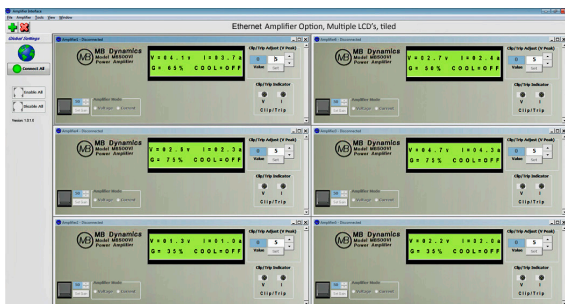# MB500VI and MB1000VI Power Amplifiers
Specifications and Options

SPECIFICATIONS	MB500VI	MB1000VI
Frequency Range	DC-20,000 Hz, -3 dB, useable to 60kHz at reduced output power	DC-20,000 Hz, -3 dB, useable to 60kHz at reduced output power
Input Coupling	AC or DC	AC or DC
Feedback Mode	Voltage or Current, switchable with external toggle switch	Voltage or Current, switchable with external toggle switch
Input Impedance	>10kΩ	>10kΩ
Input Power Requirements	100 -- 240 VAC; 48-62 Hz	100 – 240 VAC; 48/62 Hz
Input Power Required	1,000 VA (max)	2,000 VA (max)
Max. Output Volts	25 V RMS	45 V RMS
Max. Output Amps	25 A RMS (35 A Pk)	25 A RMS (35 A Pk)
Over Current & Voltage Protection	User-adjustable trips and clipping	User-adjustable trips and clipping
Over Temperature Protection	Yes	Yes
Ethernet Amplifier Operation over LAN using Network PC	See Options on following pages	See Options on following pages
Shaker Cooling & Overtravel	See Options on following pages	See Options on following pages
Current Measurement	BNC, 250 mV/A; front panel LCD	BNC, 250 mV/A; front panel LCD
Phase Invert Input to Output	Yes	Yes
Total Harmonic Distortion	0.1% @ 1kHz, 20kHz BW	0.5% @ 1kHz, 20kHz BW
Dimensions (rack mount)	3 ½" H (2HE); 19" W (482 mm); 14 ¼" D (362 mm)	7" H (4HE); 19" W (482 mm); 14 ¼" D (362 mm)
Signal In for Full Power Out	± 3 V pk (Factory) (Int. switch: ± 1, 3, 5, 10 Vpk)	± 3 V pk (Factory) (Int. switch: ± 1, 3, 5, 10 Vpk)
Signal-to-Noise Ratio	>90dB, 20kHz BW	>90dB, 20kHz BW
Weight or Mass	33 lbs (15 kg)	73 lbs (33 kg)
CE Mark	Yes	Yes
Application Note (Manual)	Yes	Yes

Specifications subject to change without notice

Options for the MB500VI and MB1000VI Amplifiers

Option 1: Ethernet Amplifier Operation

Each amplifier with this option has an embedded microcontroller with an internal Ethernet adapter that communicates with a Windows app allowing an operator to remotely setup, operate, gain-adjust, and monitor one or any number of microcontroller-based amplifiers up to 16, especially beneficial in a multi-exciter modal test. The amplifier's gain and other settings can be adjusted and reset either locally at the amplifier's front panel or remotely through the Windows app via a standard Ethernet network (wireless or wired) -- duplicate and parallel functionality for all features in this option.

TWO MODAL 25's with MB500VI's and ETHERNET AMPLIFIER OPTION

JOBS-TO-BE-DONE with this Option

1) Set-up and operate the amplifier from the modal data acquisition and analysis PC (networked, Windows-based, 32/64-bit) through an Ethernet network (wireless or wired) when amplifier is close to the exciter but at a distance from user (remote, safely up to 100m distant); 2) Remotely change amplifier output gain; adjust current & voltage clip and shutdown (trip) values; switch between voltage & current mode operation; ENABLE /DISABLE amplifier status; 3) Remotely mimic or duplicate same amplifier functions as are available at amplifier front panel; 4) Remotely monitor amplifier running status / faults as well as output voltage, current, gain, error messages; 5) Perform all the above using 1-16 amplifier/exciter combinations distributed around a test structure.

User Value

1) Eliminate need to physically be at each amplifier to set it up, operate and monitor its status; 2) Optimize and change output gains for each amplifier based on structure's response by adjusting gains from modal analysis PC without physically changing gain settings at each amplifier -- individual gains for each amp/exciter combination -- to prevent over driving any particular exciter; 3) Set current and voltage max values to protect from over-driving a particular exciter or driving point; 4) Manage experimental modal survey by observ-ing operating status and diagnostics of each amplifier on one PC monitor, not at many individual amplifier front panels; 5) Minimize voltage drops along exciter drive cables and

the associated loss of available force by locat-ing an amplifier close to its exciter not distant from the exciter but convenient to user; 6) Data logging (at user intervals) of gain setting, output voltage, output current, trip settings, etc. to support restarts at current set points or returns to previous set points.
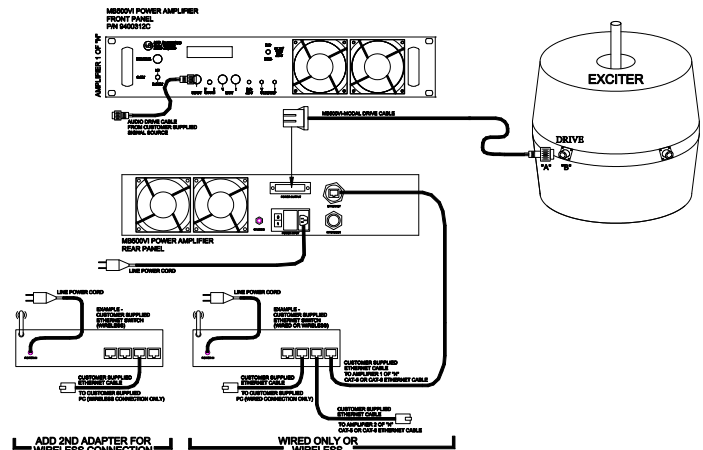
Deliverables

Ethernet Amplifier interface hardware with internal network adapter having unique static IP address; PIC micro-controller and software; Ethernet cables and network switch; and Windows PC-based Remote Amplifier Operation software. User may provide additional standard Ethernet hardware & cabling as desired to customize Ethernet amplifier network layout for wireless connectivity.

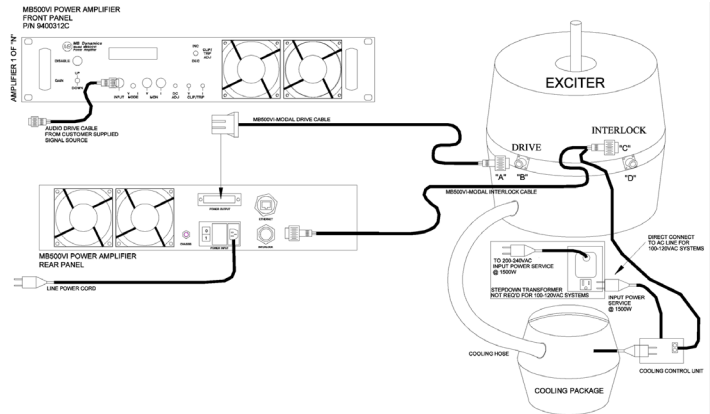## Option 2: Exciter Cooling ON/OFF with Overtravel Shutdown

Each amplifier with this option monitors the temperature of the exciter coil and turns ON or OFF the cooling package. The amplifier also shuts down when an exciter over-travel condition occurs.

JOBS-TO-BE-DONE with this Option

1) Turns ON the AC-line-powered portable cooling package (if one is present) for MODAL 25, MODAL 50, MODAL 110, MODAL 250; CAL 50, PM25, PM50, PM250, Energizer BLUE, and Energizer RED when exciter coil temperature exceeds COOLING NEEDED set point; 2) Turns OFF amplifier when its exciter's coil exceeds its OVER-TEMPERATURE set point; 3) Displays exciter temperature on amplifier LCD display in 3 ranges: <50 degC or <120 degF (no cooling required); 50 degC to 75 degC or 120 degF to 165 degF (cooling required); >75 degC or >165 degF (amplifier shuts down exciter due to OVERTEMPERATURE); 4) Shuts down amplifier when exciter exceeds max allowable internally-preset peak-to-peak displacement limits.

User Value

PROTECTS EQUIPMENT: 1) No risk of burning-up moving element coil; 2) Automatically turns ON cooling when coil is hot & turns OFF cooling when coil cools down; 3) Automatically turns amplifier OFF when exciter coil gets too hot; 4) Automatically turns OFF amplifier when exciter moving element exceeds max displacement. USER CONVENIENCE 5) Minimizes annoying blower noise because cooling package runs only when needed; 6) Minimizes user worry about whether exciter needs to be cooled to deliver force commanded and whether exciter coil risks failure due to overheating -- not necessary for user to manually intervene to control exciter cooling package.

Deliverables

Exciter AC-line-powered cooling package, cooling control switch, RTD on exciter coil, overtravel switches on exciter moving element, PIC microcontroller and software, amplifier internal parts included. PCBs, and interlock cables. The diagram to the right shows an example of Option 2.

Options 1 & 2 Combined: Remote Amplifier & Exciter Cooling ON/OFF with Overtravel Shutdown
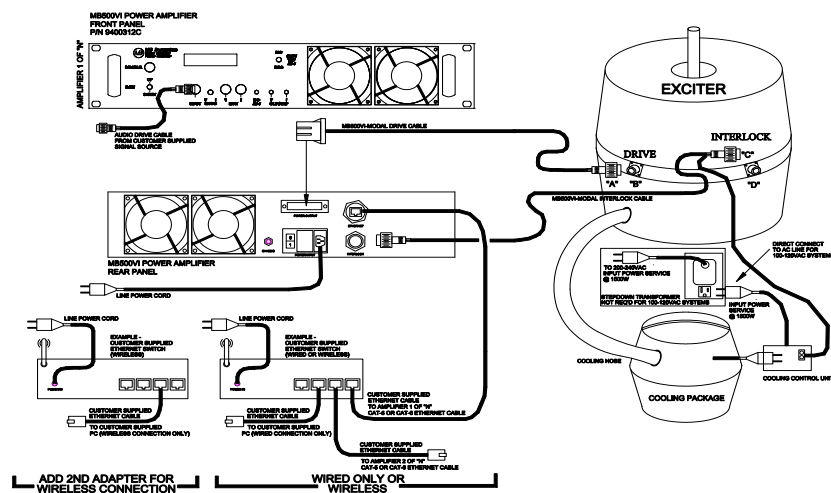
Option 3: Exciter ON/OFF with Overtravel Shutdown

Each amplifier with this option monitors the temperature of the exciter coil and turns OFF the exciter if this temperature exceeds a pre-set threshold and there is no cooling package. The amplifier also shuts down when an exciter over-travel condition occurs. Except for references to the cooling package, the description in Option 2 applies to Option 3.