MLE300LE1A

1 GHz Series

- **1GHz High Gain "Drop In" module upgrade increasing available bandwidth.**
- **Eliminate cost of replacing entire housings and LOWERS construction costs.**
- **Reduced power consumption.**
- **Field upgradeable plug-in diplex filter (various band splits available)**
- **Very low noise.**
- **"Green Solution" (recycled chassis and use of existing housing)**
- **Universal accessories equalizers, pads, diplex filters, AGCs etc.**
- **Best consistency/operating levels (state of the art diplex filter design) very low insertion loss less than < 1dB; very high isolation greater than > 35dB.**
- **Pad controlled slope with thermal option (patent pending) available for LEs without AGC module.**

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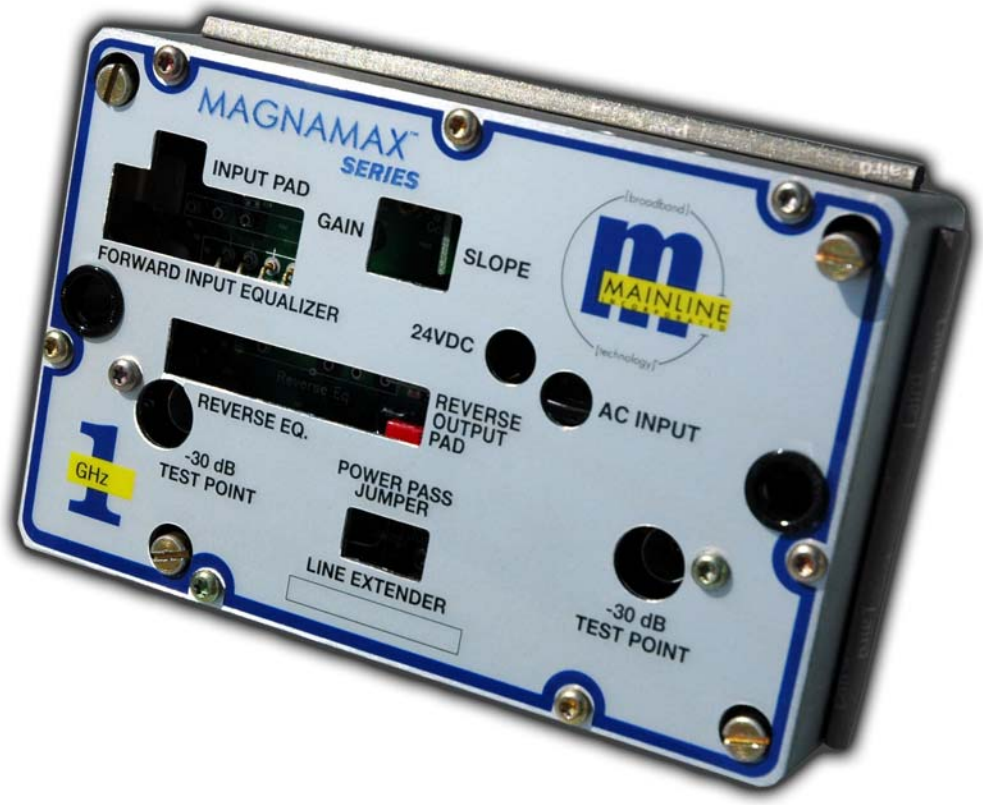
MLE300LE1A Magnamax Line Extender

(Legacy "LE90" Style)

The 1 GHz Magnamax series broadband line extender is essentially a "drop-in-upgrade" module that allows the customer to perform system upgrades without suffering extensive construction costs. The revolutionary MLE300LE1A provides better performance and enhanced features at low cost.

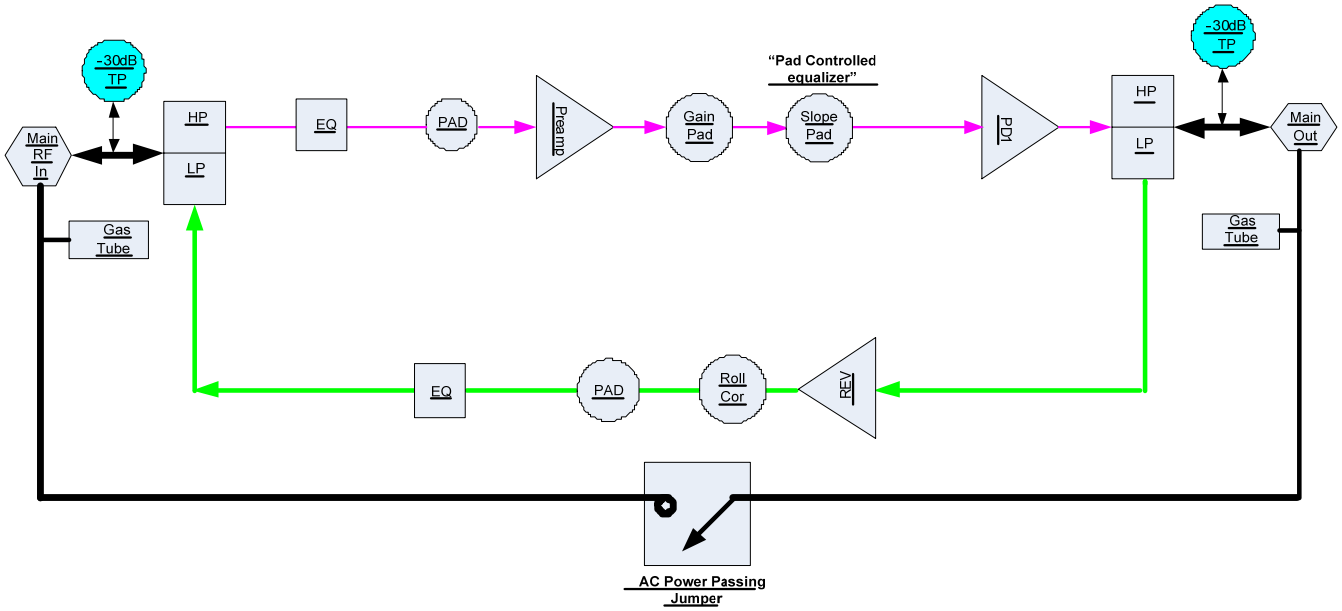
The MLE300LE1A is designed to re-use the existing power supply, the original amplifier chassis, and fit into the same LH series housing as before. The MLE300LE1A includes a newly manufactured state-of-the-art PCB assembly that is installed in the original chassis and fully tested as new. The original power supply is re-tested and refurbished to ensure years of reliable service.



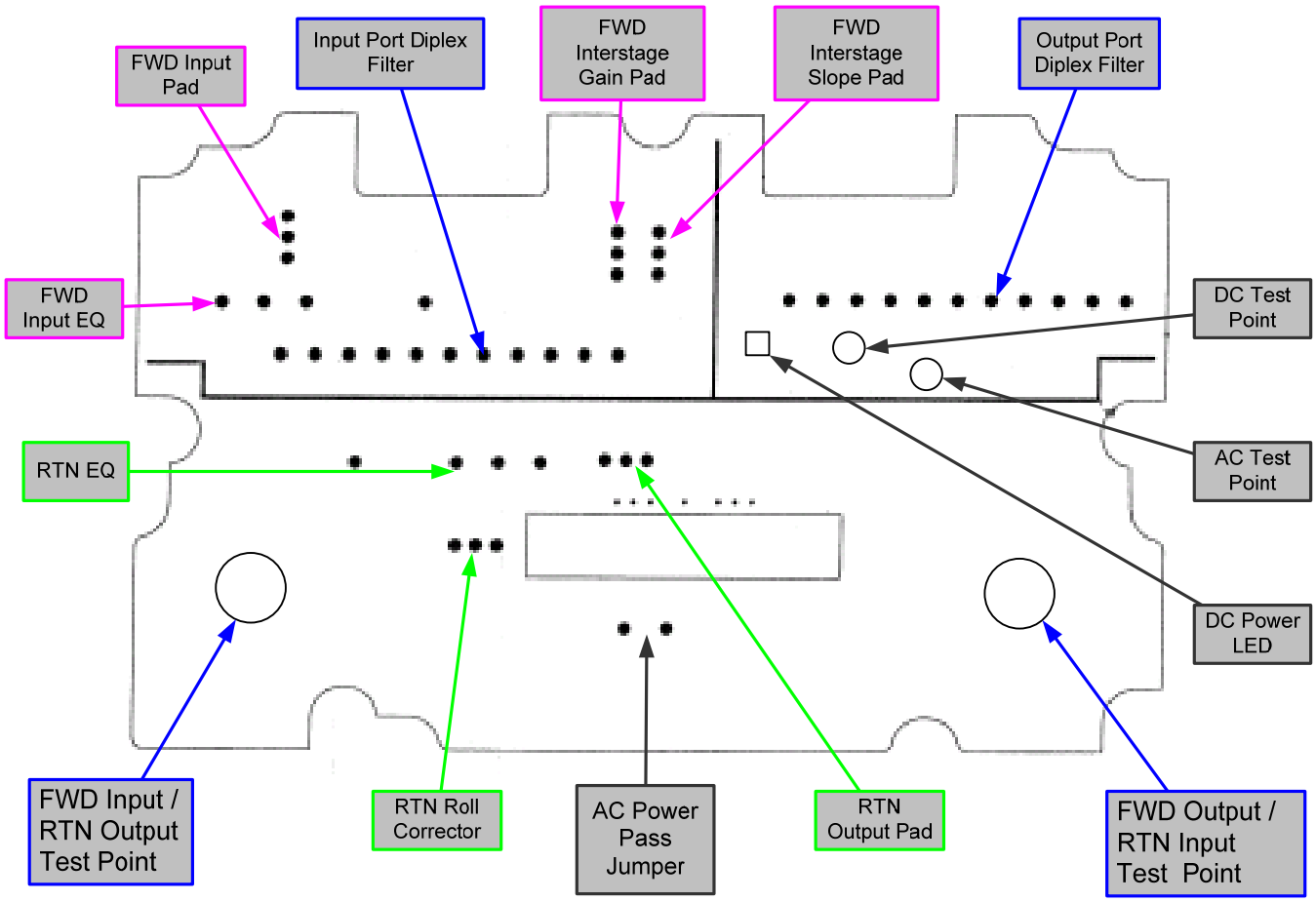
Features:

- The industry's first 1GHz Philips/Magnavox style line extender that is backwards compatible!
- Low-cost, easy-to-install, drop-in-upgrade unit that fits into existing housing offers increased gain to allow for existing spacing. Eliminates new construction altogether, or greatly reduces construction costs!
- High performance GaAsFET gain stages deliver Lowest 2nd and 3rd Order distortions, superior CNR, and low noise figure, while maintaining highest gain and excellent flatness in both forward & return bands.
- Computer designed, fixed component diplex filters exhibit the highest stop band isolation (>40 dB), the best return loss (>24 dB), and the lowest insertion loss available (< 0.75 dB).
- Plug and play diplex filters allow quick and low cost changes to both forward & return bands.
- Use your existing accessories and plug-ins at 750 MHz or 870 MHz as replacements or plant extensions.
- Dual port gas tubes provide surge protection.
- Similar layout and look as the original Philips/Magnavox line extender, is technician friendly, and will require minimal training.
- Increase your existing modules MTBF and reduce service outages by letting us completely disassemble and rebuild your existing amplifier. This is not a modification to your existing amplifier! We install newly manufactured electronic assemblies that upgrade your module in every way.
- Line extender module includes a complete 2-year warranty on all installed electronic assemblies.

Magnamax MLE300LE1A Functional Block Diagram



Magnamax MLE300LE1 Accessory Locations



Amplifier Setup

The MLE300LE1A line extender is a 2-way capable single output amplifier that provides more Forward and Return path gain, higher output levels, lower noise figure, better distortion performance, and wider bandwidth than the original module. The extra bandwidth your system will achieve with this direct drop-in-upgrade module, assuming no additional amplifiers are cut in, will depend on several loss factors that the improved performance must compensate for. This includes increased dB losses due to system configuration, taps, the type and length of coax, that are encountered based upon the original amplifier dB spacing. Although the physical length of the coax cable span has not increased, the dB losses and the cable dB changes due to temperature at the highest frequency channels will increase. The module's extra RF gain will help compensate for additional cable loss as the bandwidth increases, the lower noise figure improves the C/N, and the improved distortion performance increases the channel capacity.

The RF test points on the input and output ports are bi-directional and provide a -30 dB monitor. The AC power director can be left in or removed to provide AC power to the output port as needed. There are AC and DC voltage test points accessible thru the cover as well as a power LED to ensure proper function of the power supply. Dual port gas tubes provide surge protection. The MLE300LE1A line extender can be made backward compatible with the Philips/ Magnavox 5-LH, 7-LH, 7-LH/TP, and 9-LH series housing. Before installing the MLE300LE1A into the existing housing, replace the seizure screw assemblies as needed. *Please refer to the "Line Extender Housing Upgrade Instructions" on the MLE300LE1A specification sheet listed below.*

Forward Path Alignment

The forward operational gain of the MLE300LE1A is 40.8 dB with an output "cable" tilt of 7.5 dB. The gain is controlled using a plug-in Input Pad as well as an Interstage Gain Pad *(MPBNP9A-*)*. The tilt is controlled using a plug-in Input EQ *(MLE1000-*)* as well as an Interstage Slope Pad *(MPBNP9A-*)*. The Interstage Slope Pad location utilizes a pad value, which provides the same function as an equalizer.

1. Connect a signal-level meter to the forward input test point, measure and document the tilt and RF input level at the highest and lowest system carrier. *Note: Both carriers should be at standard analog levels, non-scrambled.*

2. Install the correct Input Pad and Input EQ to achieve the designed input level and tilt. *Note: The RF input level at the highest frequency should not exceed +10 dBmV.*

3. Connect the signal-level meter to the forward output test point, measure and document the tilt and RF output level at the highest and lowest system carrier.

4. If the RF output level at the highest frequency is too high and the input is padded correctly, install the correct Interstage Gain Pad. *Note: The RF output level at the highest frequency should not exceed the maximum operating level of +49.5 dBmV.*
5. If the output tilt is less than required, install a higher value Interstage Slope Pad.

6. If the output tilt is greater than required, install a lower value Interstage Slope Pad.

Return Path Alignment

The return operational gain of the MLE300LE1A is 25.2 dB. The gain is controlled using a plug-in Return Output Pad *(MPBNP9A-*)*. The tilt is controlled using a plug-in Return EQ *(MPBN6REF42-*)*.

1. Set up the return optical link using the design input reference levels for the return transmitter and the system design output levels of the return path receiver. This must be done before you balance any return amplifiers.

2. Document what the amplifier's RF input reference levels are.

3. Use the -30 dB Forward Output/Return Input test point to inject the return carriers or sweep.

4. Install the design value Return Output Pad.

5. Install the design value Return EQ.

6. Set the sweep output to the design reference level and set the sweep output for a -30 dB test point.

7. Change the Return Output Pad and/or Return EQ until the swept response matches, as close as possible, the stored reference sweep taken at the optical node.

8. Document sweep levels used as well as the Return Output Pad and Return EQ values.

Using Amplifiers In Lower Frequency Systems

When using the MLE300LE1A line extender in a 1 GHz distribution system, you must use an *MLE1000-** equalizer. For use in lower frequency systems, such as 870 MHz or 750 MHz, you must consider the best method for handling the reduced bandwidth and channel-loading requirement. If you use 1 GHz equalizers in lower frequency systems, you will need to take into account the reduced gain from 1 GHz. Due to the amplifier tilt, there will be some loss in gain from the published operational gain specification at 1 GHz. *Note: Please refer to the "MLE1000-* Triple Specification Sheet" listed below.*

To avoid any additional loss in gain, it is optimal to use the equalizers that match the system frequency. For an 870 MHz system, use 870 MHz equalizers. For a 750 MHz system, use 750 MHz equalizers.

MLE1000-* Triple Specification Sheet

Part Number	EQ Value @ Stated Frequency	Insertion Loss (dB)
MLE1000-01	1.0 dB @ 1000 MHz 0.9 dB @ 862 MHz 0.8 dB @ 750 MHz	1.0 1.0 1.0
MLE1000-02	2.0 dB @ 1000 MHz 1.9 dB @ 862 MHz 1.8 dB @ 750 MHz	1.0 1.0 1.0
MLE1000-03	3.0 dB @ 1000 MHz 2.9 dB @ 862 MHz 2.8 dB @ 750 MHz	1.0 1.0 1.0
MLE1000-04	4.0 dB @ 1000 MHz 3.9 dB @ 862 MHz 3.8 dB @ 750 MHz	1.0 1.0 1.1
MLE1000-05	5.0 dB @ 1000 MHz 4.8 dB @ 862 MHz 4.6 dB @ 750 MHz	1.0 1.0 1.2
MLE1000-06	6.0 dB @ 1000 MHz 5.5 dB @ 862 MHz 5.2 dB @ 750 MHz	1.0 1.0 1.3
MLE1000-07	7.0 dB @ 1000 MHz 6.6 dB @ 862 MHz 6.3 dB @ 750 MHz	1.0 1.0 1.4
MLE1000-08	8.0 dB @ 1000 MHz 7.5 dB @ 862 MHz 7.2 dB @ 750 MHz	1.0 1.0 1.4
MLE1000-09	9.0 dB @ 1000 MHz 8.5 dB @ 862 MHz 8.0 dB @ 750 MHz	1.0 1.4 2.1
MLE1000-10	10.0 dB @ 1000 MHz 9.2 dB @ 862 MHz 8.8 dB @ 750 MHz	1.0 1.3 2.0
MLE1000-11	11.0 dB @ 1000 MHz 10.3 dB @ 862 MHz 9.6 dB @ 750 MHz	1.0 1.3 2.1

Part Number	EQ Value @ Stated Frequency	Insertion Loss (dB)
MLE1000-12	12.0 dB @ 1000 MHz 11.2 dB @ 862 MHz 10.6 dB @ 750 MHz	1.0 1.4 2.2
MLE1000-13	13.0 dB @ 1000 MHz 12.2 dB @ 862 MHz 11.4 dB @ 750 MHz	1.0 1.6 2.5
MLE1000-14	14.0 dB @ 1000 MHz 13.0 dB @ 862 MHz 12.2 dB @ 750 MHz	1.0 1.6 2.6
MLE1000-15	15.0 dB @ 1000 MHz 13.9 dB @ 862 MHz 13.0 dB @ 750 MHz	1.0 1.8 2.8
MLE1000-16	16.0 dB @ 1000 MHz 14.8 dB @ 862 MHz 13.8 dB @ 750 MHz	1.0 2.4 3.4
MLE1000-17	17.0 dB @ 1000 MHz 15.6 dB @ 862 MHz 14.4 dB @ 750 MHz	1.0 2.2 3.4
MLE1000-18	18.0 dB @ 1000 MHz 16.6 dB @ 862 MHz 15.6 dB @ 750 MHz	1.0 2.6 3.7
MLE1000-19	19.0 dB @ 1000 MHz 17.4 dB @ 862 MHz 16.4 dB @ 750 MHz	1.0 2.6 3.7
MLE1000-20	20.0 dB @ 1000 MHz 18.5 dB @ 862 MHz 17.1 dB @ 750 MHz	1.0 2.5 3.9
MLE1000-21	21.0 dB @ 1000 MHz 19.6 dB @ 862 MHz 18.4 dB @ 750 MHz	1.0 2.9 4.3

Module only specifications unless noted

Parameter	Units	Forward	Reverse	Notes
Pass Band	MHz	54-1002	5-40	
Amplifier Type	-	GaAsFET PD	Silicon	
Flatness	dB	+/-0.75	+/-0.5	1,2
Minimum Full Gain	dB	41.8	26.2	3
Operational Gain	dB	40.8	25.2	4
Return Loss (typical)	dB	-16	-16	2
Noise Figure	dB	7.5	6.5	5
Test Points	dB	-30 (+/-1.5)	-30 (+/-1.5)	2
Loop Isolation (40-54 MHz)	dB	Better than -35		5
Hum Modulation @ 15 A	dBc	-60 (54-870 MHz) -58 (870-1002 MHz)	-60 (5-12 MHz) -65 (12-40 MHz)	
Distortion Measurements @ Rated Level				
Reference Frequencies	MHz	1002 / 870 / 750 / 550 / 54	T7-T12	
Output Levels	dBmV	49.5 / 48.5 / 47.7 / 45.2 / 36.5	35 (flat out)	
Channel Loading	NTSC	130	6	6
CTB	dBc	-67	-84	7
CSO (high side)	dBc	-77	-87	7
Cross Modulation	dBc	-66	-78	7,8
Powering Data				
DC Current Draw (maximum)	mA	800		
AC Bypass Current (continuous)	A	15		
AC Input Voltage Range	VAC	42-90		

	AC Voltage (quasi-square wave)									
	90	85	80	75	70	65	60	55	50	42
AC Current Draw (A)	0.34	0.35	0.38	0.40	0.44	0.48	0.55	0.63	0.73	0.99

Notes:

1. Measured with 22.5 dB of simulated cable.
2. Measured using an Input EQ = MLE1000-15, Interstage Slope Pad = MPBNP9A-05, and 0 dB plug-ins for all remaining forward and return locations.
3. Measured using an Interstage Slope Pad = MPBNP9A-05 and 0 dB plug-ins for all remaining forward and return locations.
4. Includes a 1 dB loss from the Input EQ and a 1 dB loss from the Return EQ.
5. Measured using 0 dB plug-ins for all forward and return locations.
6. Distortions with 130 NTSC analog channels (no digital).
7. Measured using an Input EQ = MLE1000-09, Interstage Slope Pad = MPBNP9A-05, and 0 dB plug-ins for all remaining forward and return locations.
8. X-mod (@ 15.75 KHz) specified using 100% synchronous modulation.

Accessories

Factory Installed Plug-ins	Plug-in Series
Diplex Filters (not accessible thru the cover, field upgradeable)	MLE300XDF-01
Interstage Gain Pad = MPBNP9A-00	MPBNP9A-*
Interstage Slope Pad = MPBNP9A-05	MPBNP9A-*
Return Roll Corrector (not accessible thru the cover, field upgradeable)	MLE1202RRC
AC Power Pass Jumper = 18 AWG buss wire jumper	COI100101
Required Plug-ins	**Plug-in Series**
Input Pad	MPBNP9A-*
Input EQ	MLE1000-*
Return Output Pad	MPBNP9A-*
Return EQ	MPBN6REF42-*
Optional Plug-ins	**Plug-in Series**
Plug-in diplex filter options include 40/51, 42/54, 55/70, 65/86 and 85/105 MHz.	-

Line Extender Housing Upgrade Instructions

Original LE Housing Specifications

Housing Part Number	Frequency Range	Side-mounted Housing Test Points
5-LH	5-450 MHz	Yes

Upgrade Instructions:

1. Always replace the LE housing input seizure assembly with part number 0910693-801.
2. Always replace the LE housing output seizure assembly with part number 0910694-801.

Housing Part Number	Frequency Range	Side-mounted Housing Test Points
7-LH	5-870 MHz	No
7-LH/TP	5-870 MHz	Yes

Upgrade Instructions:

1. Replace the LE housing input seizure assembly with part number 0910693-801 if the desired bandwidth is above 870 MHz.
2. Replace the LE housing output seizure assembly with part number 0910694-801 if the desired bandwidth is above 870 MHz.

Housing Part Number	Frequency Range	Side-mounted Housing Test Points
9-LH	5-1000 MHz	No

Upgrade Instructions:

Nothing needs to be done.

Upgraded LE Housing Specifications

Housing Part Number	Frequency Range	Side-mounted Housing Test Points
5-LH, 7-LH, 7-LH/TP	5-1000 MHz	No

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