



C-COR® Flex Max331

1 GHz Multipurpose Line Extender



- 1 GHz technology
- Supports future 85/105 MHz architectures
- 35dB operational gain
- ALC, TLC, and NLC options
- Supports major EMS protocols
- 1 GHz module upgrade for legacy E700, Flex Max330, and Flex Max340 platforms
- Optional surge protection available

ARRIS introduces the Flex Max331 Multipurpose Line Extender, a 1 GHz strand-mount line extender with the superior quality and exceptional performance customers have come to expect with C-COR RF amplifiers. The 1GHz capability will enable broadband service providers to increase forward capacity for HDTV over previous program offerings, thereby allowing typically a 40% increase over current HDTV channels in a lineup.

Flex Max331 Multipurpose Line Extenders are available as both complete units for customers designing new system builds and as drop-in RF modules for a 1 GHz upgrade of legacy FlexNet 750MHz/870MHz 700 series line extenders, Flex Max330 870MHz line extenders or Flex Max340 line extenders. Operating specifications, such as gain and tilt, are maintained at 750MHz and 870MHz, with extended gain and tilt out to 1002MHz. These unique design considerations enable reuse of legacy line extender housings and existing spacing, which in turn eliminates the additional cost of resplicing, making the Flex Max331 Line Extender drop-in RF module an ideal choice for 1 GHz system upgrades.

Flex Max331 Line Extenders are available with three level control options: automatic level control (ALC), thermal level control (TLC), and no level control (NLC). To further facilitate upgrades when the Flex Max331 Line Extender is purchased as a drop-in module, the ALC model has two pilot levels common to legacy line extenders as well as three new QAM pilot channels to choose from.

In addition, Flex Max331 Line Extenders will be available with an 85/105MHz option, which will double return bandwidth for ever-expanding broadband networks.

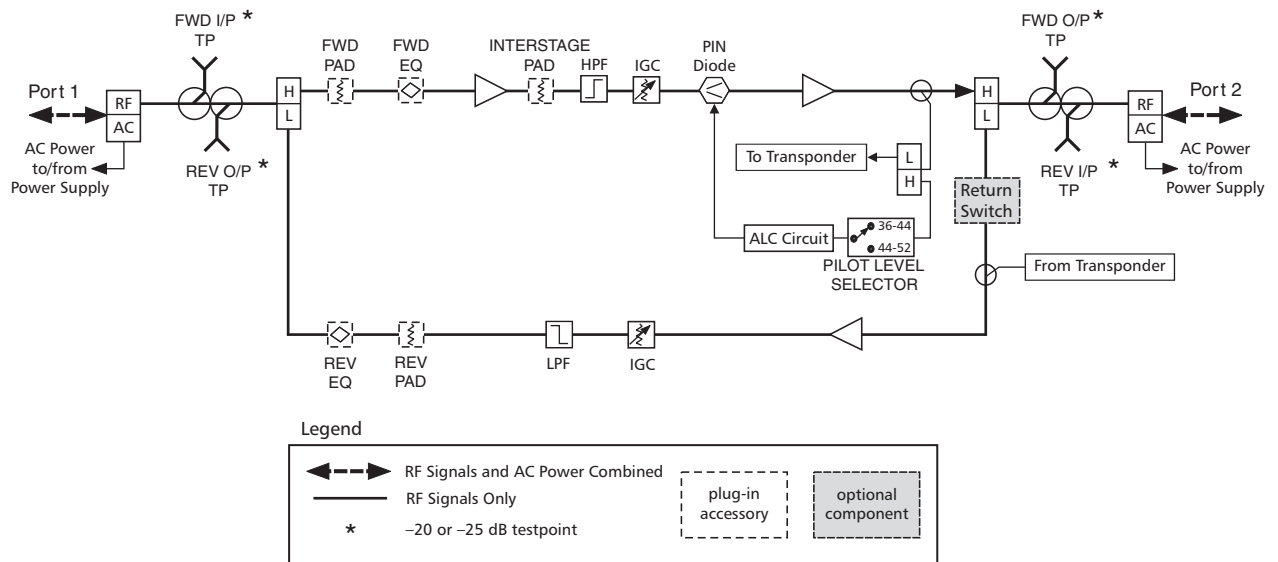
Features

- Economical choice for both legacy system upgrades and new builds
- 85/105MHz option for future architectures
- GaAs technology results in fewer active components, improved system performance, and reduced total system costs
- High performance push-pull return amplifier for a wide range of signals on the return path
- Capable of handling 15A of AC through-current for new builds and 13A for upgrades
- Optional surge protection module decreases amplifier failure rates by dissipating surges due to lightning, power transients, and other causes
- Three-position return switch for ingress troubleshooting
- -20dB or -25dB forward and return testpoints for accurate and repeatable measurements
- Ability to use CW signal or QAM signal for pilot level frequency

New Feature—Flex Max340 Housing Kit

You can economically upgrade your legacy 750/870MHz Flex Max340 line extenders to 1GHz capability without needing to splice the coaxial cable or respace your system by using our uniquely designed Flex Max340 housing kit which includes an adapter plate to retrofit the RF module, and a new housing deep lid with external testpoint access. Contact your ARRIS sales professional for more information.

Functional Block Diagram for ALC



Specifications (ALC Version)

	Forward	Return	
General			
Bandwidth, MHz	54 to 1002	5 to 42	
AC Current Passing, A (Note 1)	15	15	
Typical Operating Conditions			
Operational Gain, dB (Note 2)	35	18	
Channels, Number of NTSC (Note 3)	79	6	
Operating Levels (recommended)			
Frequency, MHz	1002/870/750/550/54	42/5	
Input, dBmV, min. (Note 4)	17/15.4/14.4/12.6/10.2	17/17	
Output, dBmV (Notes 5, 6)	52/49.5/47.5/44/35	35/35	
Performance Specifications @ Recommended Levels			
(Temperature Range: -40 to 60°C)			
Carrier-to-Interference Ratio, dB			
Composite Triple Beat	77	84	
Second Order Beat (F1 ± F2)	—	—	
Cross Modulation (per NCTA std.) (Note 7)	72	74	
Third Order Beat (F1 ± F2 ± F3)	—	—	
Composite 2IM	75	80	
Composite Intermodulation Noise (CIN) (Note 8)	73	—	
Composite Intermodulation Noise (CIN) (Note 9)	79	—	
Noise, 4MHz, 75Ω (Note 10)	68/66.4/65.4/63.6/59.2	70.5	
Noise Figure, dB (without EQ) (Note 10)	7/7/7/7/9	5.5	
Full Gain, dB (without EQ and ALC)	39.5	19	
Factory Alignment (with ALC reserve, without EQ)			
Cable Loss, dB @ 1002MHz	13	—	
Flat Loss, dB	23	19	
Gain Slope, dB	-0.25 to 0.75	-0.5 to 0.5	
Flatness, dB	±0.5	±0.5	
Return Loss, dB, min., all entry ports (Note 11)	16	16	
Powering Requirements, max./typ. (Note 12)			
	With Active Return, EMT, and Return Switch		With Active Return
	@ 90V	@ 60V	@ 90V @ 60V
AC Voltage, 60Hz			
AC Power, Watts	26.7/26.1	26.2/25.6	24.9/24.4 24.4/23.9
AC Current, mA	370/355	600/570	340/335 535/520
DC Current, mA @ 24V ± 0.5V	935/915	935/915	870/850 870/850
Automatic Level Control			
Range, dB @ 1002MHz	+3.5/-4.5	—	—
Accuracy (-40 to 60°C), dB	±0.5	—	—
Operating Level Range (from specified levels), dB	±4.5	—	—
Pilot Frequency Band (recommended), MHz	499.25 (single channel)	—	—

Specification Document Number 1500171 Rev N

Notes:

- AC current passing is shown with factory complete line extenders. AC current passing is 13A for Flex Max331 RF modules used to upgrade E700 series line extenders.
- Spacing is at the highest frequency with SEQ-1G-xx installed. Return spacing includes losses due to housing, diplex filters, and MEQ-42-xx.
- NTSC video channels occupying the appropriate frequency spectrum per specified number of channels.
- Recommended minimum forward input level at 1002MHz including loss due to equalizer.
- Recommended maximum return output level at 42MHz including loss due to equalizer.
- At specified Operational Tilt, maximum Output Level for 1GHz or 870MHz loading is 56.5dBmV@HF.
- Cross modulation specification number indicates typical cascade performance.
- System operating with digitally compressed channels or equivalent broadband noise from 550 to 1002MHz at levels 6dB below equivalent video channels will experience a composite distortion (CIN) appearing as noise in the 54 to 550MHz frequency spectrum.
- System operating with digitally compressed channels or equivalent broadband noise from 550 to 870MHz at levels 6dB below equivalent video channels will experience a composite distortion (CIN) appearing as noise in the 54 to 870MHz frequency spectrum.
- The Noise Figure and C/N specifications are typical within the specified passband.
- Return loss can be degrade by as much as 1.5dB when used with housing option M or N and also when using kit assembly number 1504044-001.
- Power supply is internal to RF module. Refer to drawing #333995-32. For 60VAC powering: AC Power consumption in Watts divided by a factor of 43 = Amps required. For 90VAC powering: For £ 67VAC, 1.03 x (AC power consumption in watts divided by voltage) = Amps required. For 67 - 90VAC, AC power consumption in Watts divided by 65 = Amps required.
- TLC specifications (P/N 1500417) and NLC specifications (P/N 1500519) are also available. Contact your ARRIS sales professional.

Specifications are subject to change without notice

C-COR® Flex Max331 1 GHz Multipurpose Line Extenders

Ordering Information

			1	2	3	4		5	6	7	8	9	10	11	12
F	M	L	1	G	x	x	-	x	x	x	x	x	x	x	N

1 Series
1 Flex Max331 series

2 Bandwidth
G 1002 MHz

3 Spacing	
4 32dB	a, d
7 35dB	c, d
8 38dB	b, d
<i>a) Only available with ALC or TLC in #5-6 block, Level Control</i> <i>b) Must select "NA" in #5-6 block, Level Control.</i> <i>c) Available with ALC, TLC or No Level Control in #5-6 block, Level Control</i> <i>d) 13dB factory equalization.</i>	

4 Frequency Split
J 42/54 MHz
N 65/85 MHz

5-6 Level Control
A1 TLC (thermal level control)
KB 439.25 MHz TV (automatic level control)
LO 499.25 MHz TV (automatic level control)
NA No level control (manual)
MB 645.00 MHz TV (automatic level control)
RM 711.00 MHz TV (automatic level control)
SD 609.00 MHz TV (automatic level control)

7 Return	
4 18dB active gain	a
6 18dB active gain with return switch	b
<i>a) Select "6" if future element management transponder is desired.</i> <i>b) Operation of return switch requires a transponder.</i>	

8 Output Configuration
M One output, -20dB Internal testpoints
N One output, -25dB Internal testpoints

9 Powering	
P 1.0A, 60-90V, 50/60Hz power supply (non-surge)	a
S 1.0A, 60-90V, 50/60Hz power supply (surge protection included)	
<i>a) An optional surge protector (P/N 162355-03) is available and must be ordered separately.</i>	

10 Housing	
A None (Flex Max331 module only)	a
M None, (FM331 module with NL/FM340 Adapter Plate, and 1 GHz deep lid with external testpoint access)	
R 2-port Flex Max331, 1 GHz Housing, flat lid, Internal testpoints	
<i>a) Select "1" #11 block, Housing Finish. Required when ordering RF module only.</i>	

11 Housing Finish	
1 Standard (or N/A)	a
4 Corrosion protected	
<i>a) Required when ordering RF module only.</i>	

12 Element Management	
N EMS capable	a
<i>a) Transponder sold separately: AM protocol (P/N 810-0354-01A) HMS protocol (P/N 810-0354-01H)</i>	

An HMS/AM protocol Value Max transponder is available to monitor and control the Flex Max331 line extender module. Contact your ARRIS sales professional for details and to discuss how our exciting new 1 GHz products can add value to your network.



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