DATA SHEET

STARLINE® Series

MB120

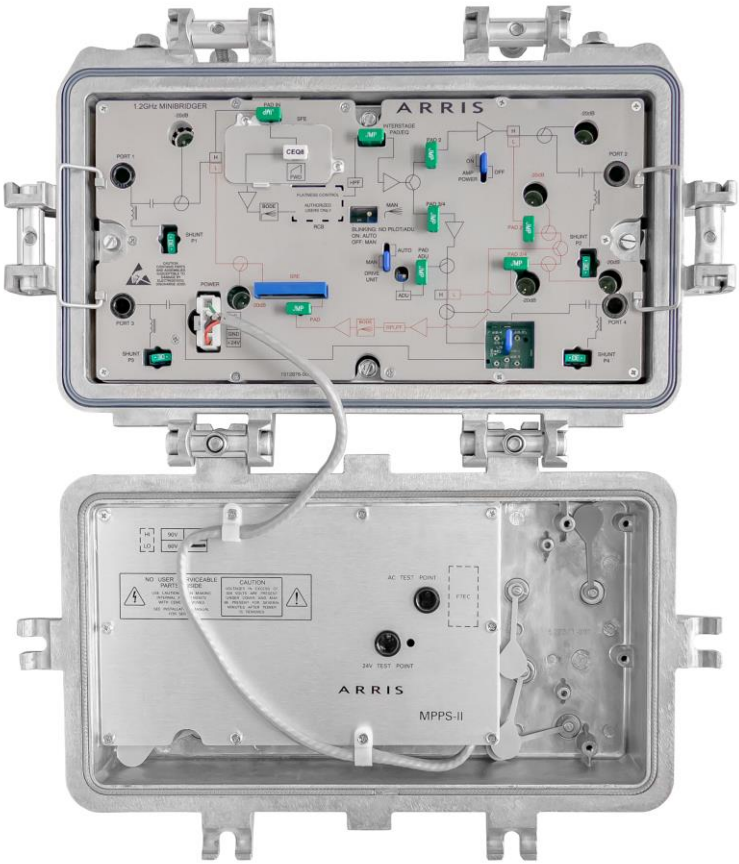
1.2 GHz MiniBridger™ Amplifier

FEATURES

- Supports 1.2 GHz Downstream and 204 MHz Upstream bandpass for DOCSIS® 3.1 migration
- Modular RF Electronics package with upgradable frequency split options
- Increased gain to allow drop in upgrades for ≥ 750 MHz spacing
- Mechanically compatible with legacy MiniBridger housings
- Expand return path bandwidth with support up to 204 MHz
- Analog and QAM ADU options for automatic gain control (AGC). AGC mode will revert to gain hold mode in the event of pilot loss.

For cable operators looking to ensure maximum backward compatibility, scalability, and protect network investments, CommScope offers solutions that deliver new services with minimal CAPEX, enhance network efficiency, and increase subscriber satisfaction.

The new CommScope 1.2 GHz MB120 MiniBridger Amplifier enables cable operators to take advantage of DOCSIS 3.1 efficiencies while maintaining backward compatibility of existing 750 MHz, 870 MHz, and 1 GHz systems.



MB120 with 27 dB Return Gain Shown

Downstream

The new MB120 amplifier is equipped with Gallium Nitride (GaN) technology with two driven RF outputs. A plug-in jumper now allows Port 2 to be enabled/disabled as required for network designs. Port 3 or 4 can also be enabled with the optional Splitter or Directional Coupler plug-ins. New 1.2 GHz Forward Cable Equalizers (CE-120-*) and Cable Simulators (CS-120-*) are available to optimize system designs. These new plug-ins are in the JXP-style form factor and plug into a carrier board with a backward compatible footprint so that operators who want to use the new amplifiers in older 870 MHz or 1 GHz systems can re-use their standard accessories. The MB120 utilizes pluggable diplex filters, which provides operators the flexibility to change band splits in the future.

The following frequency splits are available:

- 5 to 42 MHz/54 to 1218 MHz (042 split)
- 5 to 65 MHz/85 to 1218 MHz (065 split)
- 5 to 85 MHz/102 to 1218 MHz (085 split)
- 5 to 204 MHz/258 to 1218 MHz (204 split)

The MB120 is available pre-configured with multiple Automatic Level Control (ALC) options that include 499.25 MHz for analog pilots or 711 MHz for QAM pilot frequencies. These new pluggable Drive units are not backward compatible with previous Starline amplifiers. All amplifiers feature an Automatic/Manual mode jumper that can be set to enable the amplifier to operate in a Manual Level Control (MLC) or Thermal Gain Control (TGC) mode. The amplifier utilizes a gain hold feature in the event of pilot loss for added system reliability. There is an LED indicator to provide visual confirmation of the selected mode and pilot presence.

Upstream

MB120 models are available with 24 dB or 27 dB of gain in the upstream. There is an attenuator location prior to the input test points, as well as one following the output test point, that allows operators to achieve the desired levels. The return path equalizer maintains the SRE-* form factor from the MB100, and operators can select SRE return path equalizers in 2 dB increments based on their network design.

Backward Compatibility

The MB120 RF Module is backward compatible with the MB87 and MB100 amplifier housings. MB-750 and MB86 housings were rated at 10 Amps and will require the installation of the MB-15AII-KIT, which allows for the amplifier to carry 15 Amperes continuous through its input or output ports.

COMPATIBILITY

Platform	MB-550	MB-750D	MB-750SH	MB86	MB87	MB100
Upgrade to MB120	No	No	Yes*	Yes*	Yes	Yes

* Requires MB-15AII-KIT

RELATED PRODUCTS

ADU/QADU	SRE Return Equalizers
BLE120 1.2 GHz Line Extender	Forward Signal Correction Plug-in Accessories

SPECIFICATIONS

General		Specification
Operating Temperature Range		-40° to +60°C -40° to +140°F
Housing Dimensions, L x W x D		15.4 x 9.6 x 5.5 inches 292 x 244 x 140 mm
Weight		15 lbs 6.8 kg
Powering		**Specification**
AC Input Voltage Range, VAC		38–90
AC Input Current (typical)		1.0 A/40.8 W @ 44 V 0..71 A/39.6 W @ 60 V 0.47 A/38.8 W @ 90 V
AC Bypass Current, A		15
Downstream Parameter		**Specification**
Frequency Split, MHz[1]	042 Split 065 Split 085 Split 204 Split	54–1218 85–1218 102–1218 258–1218
Flatness, dB[2]		± 0.75
Operational Gain, dB[3]		47
Internal Slope (Slope Option X), dB[4]	042 Split 065 Split 085 Split 204 Split	16.1 15.2 14.7 11.5
Internal Slope (Slope Option L), dB[5]	042 Split 065 Split 085 Split 204 Split	16.1 15.3 14.9 12.0
Noise Figure, dB[6]		8.0
Test Points, dB		20 ± 1.0
Return Loss, dB[7]		16
Hum Modulation @ 15A, dBc[8]	F_{minfwd} to 1003 MHz 1003 MHz to 1218 MHz	< 60 < 50
Group Delay		
042 Split	54 to 55 MHz	18 ns max
065 Split	85 to 86 MHz	7 ns max
085 Split	102 to 103 MHz	13 ns max
204 Split	258 to 259 MHz	3 ns max
Distortion: 1.2 GHz Analog/Digital, 30 Analog, 160 Digital Channels[9]		
Reference Frequency, MHz		1218/258/54
Reference Input Level, Slope Option X, dBmV		8/5.5/7.1 (virtual)
Reference Input Level, Slope Option L, dBmV		8/6/7.1 (virtual)
Reference Output Level (17 dB Slope), dBmV		55/41/38 (virtual)
Composite Triple Beat (CTB), dBc[10]		74
Composite Second Order (CSO), dBc[10]		78
Carrier to Composite Noise (CCN), dB		56
Distortion: All Digital (1.2 GHz), Number of Digital Channels[9]		
Reference Frequency, MHz		1218/550/54
Reference Input Level, Slope Option X, dBmV		2/-0.6/1.1 (actual)
Reference Input Level, Slope Option L, dBmV		2/0.1/1.1 (actual)
Reference Output Level (17 dB Slope), dBmV		49/39.2/32 (actual)
CCN, dB[10]		49
BER, dB[10]		< $1x10^{-6}$

NOTES:
1. Operating passband of station, determined by the diplex filters, forward correction board and high pass filter installed in the amplifier.
2. Flatness is measured with respect to slope. Slope is calculated using best fit.
3. Includes the gain control back-off of 4.9 ± 0.1 dB and forward equalizer loss.
4. Calculated for 19.7 dB of cable loss at 1218 MHz. Internal slope with 0 dB EQ installed.
5. Calculated with 5.0 dB of linear slope and 13.6 dB of cable loss at 1218 MHz. Internal slope with 0 dB EQ installed.
6. Specified at the housing cable entry facility and includes the loss of 1 dB for the equalizer. May derate up to 1 dB over temperature.
7. Measured with a jumper in the Distribution accessory location.
8. Hum modulation is measured at 15 Arms AC current passing through the port under test.
9. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel.
10. Output level is 49 dBmV (actual) at 1218 MHz with 17 dB tilt from 54 MHz to 1218 MHz. CCN is measured by turning off the QAM channel under test and inserting a CW test signal at the corresponding QAM RF level in its place.

SPECIFICATIONS

Upstream Parameter		Specification
Frequency Split, MHz[1]	042 Split 065 Split 085 Split 204 Split	5–42 5–65 5–85 5–204
Flatness, dB[2]		± 0.5
Operational Gain, dB[3]		24 27
Reference Operating Slope, dB		± 0.75
Noise Figure, dB[4]		8.0
Test Points, dB		20 ± 1.0
Return Loss, dB[5]		16
Hum Modulation @ 15A, dBc[6]		< -50, 5–10 MHz < -60, 11–$F_{maxreturn}$ MHz
Group Delay		
All Splits	6 to 7 MHz	30 ns max
042 Split	41 to 42 MHz	30 ns max
065 Split	64 to 65 MHz	19 ns max
085 Split	84 to 85 MHz	18 ns max
204 Split	203 to 204 MHz	4 ns max
Distortion: All Digital, 6 Digital Channels[9]		
Reference Frequency, MHz		42/5
Reference Input Level, dBmV		12/12
Reference Output Level (24 dB Gain, 0 dB Slope), dBmV		36/36
NPR Dynamic Range, dB[7]		32
BER Dynamic Range, dB[8]		38
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV		39/39
NPR Dynamic Range, dB[7]		29
BER Dynamic Range, dB[8]		35
Distortion: All Digital, 10 Digital Channels[9]		
Reference Frequency, MHz		65/5
Reference Input Level, dBmV		10/10
Reference Output Level (24 dB Gain, 0 dB Slope), dBmV		34/34
NPR Dynamic Range, dB[7]		30
BER Dynamic Range, dB[8]		36
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV		37/37
NPR Dynamic Range, dB[7]		27
BER Dynamic Range, dB[8]		33
Distortion: All Digital, 13 Digital Channels[9]		
Reference Frequency, MHz		85/5
Reference Input Level, dBmV		8/8
Reference Output Level (24 dB Gain, 0 dB Slope), dBmV		32/32
NPR Dynamic Range, dB[7]		29
BER Dynamic Range, dB[8]		35
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV		35/35
NPR Dynamic Range, dB[7]		26
BER Dynamic Range, dB[8]		32
Distortion: All Digital, 33 Digital Channels[9]		
Reference Frequency, MHz		204/5
Reference Input Level, dBmV		5/5
Reference Output Level (24 dB Gain, 0 dB Slope), dBmV		29/29
NPR Dynamic Range, dB[7]		25
BER Dynamic Range, dB[8]		31
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV		32/32
NPR Dynamic Range, dB[7]		22
BER Dynamic Range, dB[8]		28

NOTES:
1. Operating passband of station, determined by the diplex filters, Return Path Low Pass Filter and Return Equalizer installed in the amplifier.
2. Flatness is measured with respect to slope.
3. Includes return equalizer (SRE) loss.
4. Specified at the housing cable entry facility and includes the loss of 1 dB for the equalizer. May derate up to 1 dB over temperature.
5. The return loss from 5 to 15 MHz may degrade by up to 1 dB over the operating temperature range.
6. Hum modulation is specified from 10 MHz to F_{maxret} and is measured with 15 Arms AC current passing through the port under test.
7. The NPR dynamic range is specified for an NPR greater than or equal to 40 dB.
8. The BER dynamic range is specified for an uncorrected (Pre-FEC) BER less than or equal to 1.0×10^{-6}.
9. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel.

1.2 GHZ MB120 ORDERING GUIDE

Key	Technology
120	1.2 GHz GaN Output

Key	Reference Slope
X	16.1 dB Cable (54–1218 MHz)
L	16.1 dB Total (11.1 dB Cable + 5.0 dB Linear)

Key	Housing
F	Standard (Full Station)
E	Electronic Package only

MB — 120 — 085 — S — L — H — F — X

Key	Bandpass Split
042	5 - 42 MHz/54–1218 MHz
065	5 - 65 MHz/85–1218 MHz
085	5 - 85 MHz/102–1218 MHz
204	5 - 204 MHz/258-1218 MHz

Key	Level Control
X	Manual Level Control (MLC)
A	ADU-499.25/S
Q	QADU-609.00/S
S	QADU-711.00/S

Key	Upstream Gain
X	24 dB
H	27 dB
8	24 dB preconfigured with 8 dB return input pad

Key	Reserved
X	Reserved for Future Use
T	Triple Output

NOTE: Not all combinations of options are valid. Contact your CommScope representative for assistance.

REQUIRED ACCESSORIES

Model Name	Description
CE-120-* CS-120-*	Forward 1218 MHz Cable Equalizer 1 to 20 dB in 1 dB steps -or- Forward 1218 MHz Cable Simulator 1 to 10 dB in 1 dB steps
SRE-*-*	Return Equalizer, 5–42 MHz (042 Split), 5–65 (065 Split), 5–85 (085 Split), 5–204 (204 Split), values 0 to 10 dB in 2 dB steps
NPB-*	Plug-in attenuator/pad (values 0 to 26 dB in 1 dB steps)

OPTIONAL ACCESSORIES

Model Name	Description
SP120	Splitter to activate Port 3/4
DC120/8	Directional coupler (8 dB) to activate Port 3/4
DC120/10	Directional coupler (10 dB) to activate Port 3/4
DC120/12	Directional coupler (12 dB) to activate Port 3/4
1512727-002	609.00 MHz QAM Automatic Drive Unit for 1.2 GHz Amplifiers
1512727-001	711.00 MHz QAM Automatic Drive Unit for 1.2 GHz Amplifiers
1512731-001	499.25 MHz Automatic Drive Unit for 1.2 GHz Amplifiers
1513728-001	MB120-42/54-DF-UPG-KIT 42/54 MHz Frequency Split Upgrade Kit
1513728-002	MB120-65/85-DF-UPG-KIT 65/85 MHz Frequency Split Upgrade Kit
1513728-003	MB120-85/102-DF-UPG-KIT 85/102 MHz Frequency Split Upgrade Kit
1513728-004	MB120-204/254-DF-UPG-KIT 204/254 MHz Frequency Split Upgrade Kit
MB15AII-KIT	15 Amp platform kit to upgrade older 10 Amp housings

Contact Customer Care for product information and sales:
- United States: 866-36-ARRIS
- International: +1-678-473-5656

COMMSCOPE®

1513666_MB120 1.2 GHz MiniBridger Amplifier_RevL