DATA SHEET

STARLINE® Series

BLE120

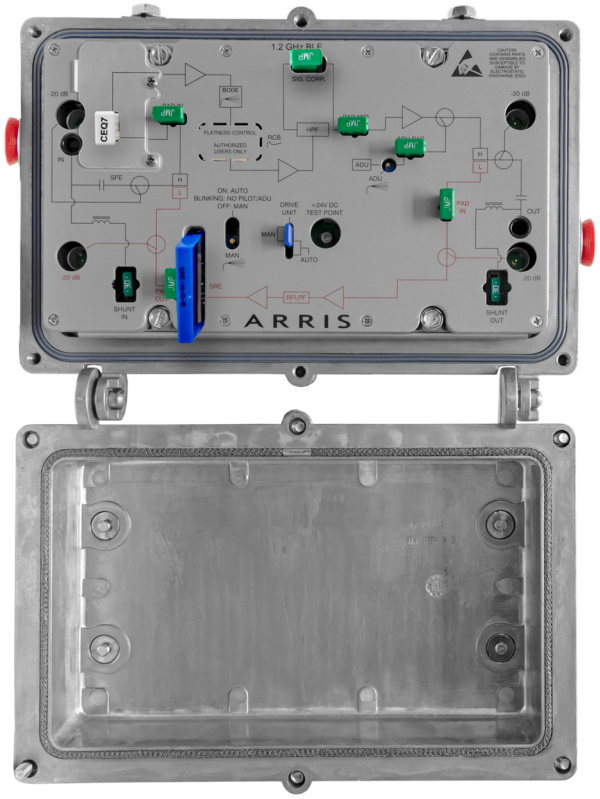
1.2 GHz Line Extender

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 BLE™ amplifier 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 BLE120 Broadband Line Extender 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.



BLE with 27 dB Return Gain Shown

Downstream

The BLE120 configuration is equipped with Gallium Nitride (GaN) hybrid technology and a single driven RF output. 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 BLE120 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 BLE120 is available pre-configured with multiple Automatic Level Control (ALC) options that include 499.25 MHz for analog pilots or 609 MHz and 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 Automatic Level Control (ALC) mode. If ALC is selected but no ADU or QADU is installed, the BLE120 will default to Thermal Gain Control (TGC). 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

BLE120 models are available with 24 dB or 27 dB of gain in the upstream. Both models are equipped with plug-in pad locations and input and output test points to simplify upstream setup and monitoring. The return path equalizer maintains the SRE-* form factor from the BLE100, and operators can select SRE return path equalizers in 2 dB increments based on their network design.

Backward Compatibility

The BLE120 RF Module is backward compatible with the previous versions of BLE amplifier ergonomic housings in the table below. Fielded housings will require the installation of the BLE-120-KIT, which contains new seizure platform assemblies to optimize performance for the extended bandwidth above 1 GHz.

COMPATIBILITY

Platform	SLR	JLE	XLE	JLX	BLE-75SH	BLE-87	BLE100
Upgrade to BLE120	No	No	No	Yes*	Yes*	Yes*	Yes*

* Requires BLE-120-KIT

DOWNSTREAM SPECIFICATIONS

General		Specification
Operating Temperature Range		-40° to +60°C (-40° to +140°F)
Housing Dimensions, L x W x D		10.6 x 8.0 x 4.7 inches (270 x 204 x 120 mm)
Weight		7.2 lbs (3.3 kg)
Powering		**Specification**
AC Input Voltage Range (Powering Option X, All Models), VAC		38–90
AC Input Voltage Range (Powering Option B, All Models), VAC		44–90
AC Input Voltage Range (Powering Option C, All Models), VAC		45–90
AC Input Current (Powering Option X, All Models)		0.71 A/22.7 W @ 44 V 0.63 A/23.1 W @ 60 V 0.51 A/24.4 W @ 90 V
AC Input Current (Powering Option B, All Models)		0.70 A/24.5 W @ 44 V 0.60 A/23.9 W @ 60 V 0.47 A/23.7 W @ 90 V
AC Input Current (Powering Option C, All Models)		0.76 A/22.8 W @ 44 V 0.48 A/22.1 W @ 60 V 0.35 A/22.6 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]		38
Internal Slope (Slope Option X), dB[4]	042 Split 065 Split 085 Split 204 Split	10.4 9.8 9.5 7.4
Internal Slope (Slope Option L), dB[5]	042 Split 065 Split 085 Split 204 Split	10.4 10.0 9.7 8.0
Noise Figure, dB[6]		7.0 @ F_{min}FWD 9.0 @ 1218 MHz
Test Point, dB		-20 ± 1.0
Return Loss, dB		16
Hum Modulation @ 15A, dBc[7]	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[8, 9]		
Reference Frequency, MHz		1218/258/54
Reference Input Level, Slope Option X, dBmV		17/10.4/10.4 (virtual)
Reference Input Level, Slope Option L, dBmV		17/11/10.4 (virtual)
Reference Output Level (17 dB Slope), dBmV		55/41/38 (virtual)
Composite Triple Beat (CTB), dBc[9]		74
Composite Second Order (CSO), dBc[9]		78
Carrier to Composite Noise (CCN), dB		56

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 4.5 ± 0.1 dB and forward equalizer loss.
4. Calculated for 12.7 dB of cable loss at 1218 MHz. Internal slope with 0 dB input EQ installed.
5. Calculated with 5.0 dB of linear slope and 6.59 dB cable loss at 1218 MHz. Internal slope with 0 dB input 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. Hum modulation is measured at 15 Arms AC current passing through the port under test.
8. SC-QAM channels (256 QAM Annex B).
9. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel. Near Noise correction is applied to compensate for the source MER contribution. The BER is specified without any forward error correction.

DOWNSTREAM SPECIFICATIONS

Downstream Parameter	Specification
Distortion: All Digital (1.2 GHz), Number of Digital Channels[1]	
Reference Frequency, MHz	1218/550/54
Reference Input Level, Slope Option X, dBmV	11/5.9/4.4 (actual)
Reference Input Level, Slope Option L, dBmV	11/6.5/4.4 (actual)
Reference Output Level (17 dB Slope), dBmV	49/39.2/32 (actual)
CCN, dB[1,2]	50
BER, dB[1]	< $1x10^{-6}$
MER, dB[1,3]	48

NOTES:
1. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel. Near Noise correction is applied to compensate for the source MER contribution. The BER is specified without any forward error correction.
2. 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.
3. MER is calculated from the measured CCN.

UPSTREAM 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		0.0 ± 0.75
Noise Figure, dB[4]		6.0
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]		32
BER Dynamic Range, dB[8]		38
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]		30
BER Dynamic Range, dB[8]		36

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 x 10^{-6}.
9. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel.

UPSTREAM SPECIFICATIONS

Upstream Parameter	Specification
Distortion: All Digital, 13 Digital Channels[3]	
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[1]	29
BER Dynamic Range, dB[2]	35
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV	35/35
NPR Dynamic Range, dB[1]	29
BER Dynamic Range, dB[2]	35
Distortion: All Digital, 33 Digital Channels[3]	
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[1]	25
BER Dynamic Range, dB[2]	31
Reference Output Level (27 dB Gain, 0 dB Slope), dBmV	32/32
NPR Dynamic Range, dB[1]	25
BER Dynamic Range, dB[2]	31

NOTES:
1. The NPR dynamic range is specified for an NPR greater than or equal to 40 dB.
2. The BER dynamic range is specified for an uncorrected (Pre-FEC) BER less than or equal to 1.0×10^{-6}.
3. The QAM load is 256 QAM, J.83 Annex B, 5.360537 MS/s; 6 MHz/channel.

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
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
1513727-001	BLE120-42/54-DF-UPG-KIT 42/54 MHz Frequency Split Upgrade Kit
1513727-002	BLE120-65/85-DF-UPG-KIT 65/85 MHz Frequency Split Upgrade Kit
1513727-003	BLE120-85/102-DF-UPG-KIT 85/102 MHz Frequency Split Upgrade Kit
1513727-004	BLE120-204/254-DF-UPG-KIT 204/254 MHz Frequency Split Upgrade Kit
BLE-120-KIT	15 Amp platform kit to upgrade older Line Extender housings for improved performance to 1.2 GHz

1.2 GHZ BLE120 ORDERING GUIDE

Key	Technology
120	1.2 GHz GaN Output w/38 dB Gain

Key	Reference Slope
X	10.4 dB Cable (54–1218 MHz)
L	10.4 dB Total (5.4 dB Cable + 5.0 dB Linear)

Key	Housing
F	Standard (Full Station)
E	Electronic Module Only

BLE 120 — 085 — S X — H F C

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
B	Power Supply -004
C	Power Supply -005

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

RELATED PRODUCTS

ADU/QADU	SRE Return Equalizers
MB120 1.2 GHz MiniBridger™ Amplifier	Forward Signal Correction Plug-in Accessories

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

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1514537_BLE120 1.2 GHz Line Extender DS_RevD