

## VDSL2 Broadband Reach Extender (BRX-VDSL2)



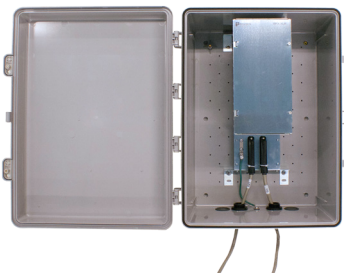
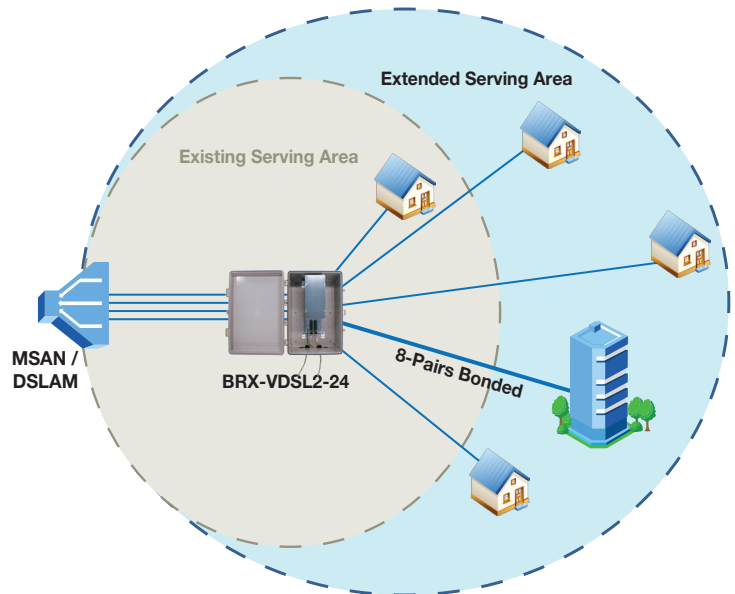
BRX-VDSL2-2

The BRX-VDSL2 is a performance and distance (reach) amplifier that **extends the reach of VDSL2 DSLAMs / MSANs by up to 2,250 feet (685 m)** and significantly expands the Customer Serving Area (CSA). **It delivers 25/3 Mbps up to 6,500 feet (2 km) on one pair and 50/8 Mbps up to 6,500 feet (2 km) on 2 pairs.** It is installed between the DSLAM and the remote CPE and increases the bandwidth available to business and residential customers. The BRX-VDSL2 has a broad placement flexibility to efficiently re-use existing splice points in the copper Outside Plant (OSP).

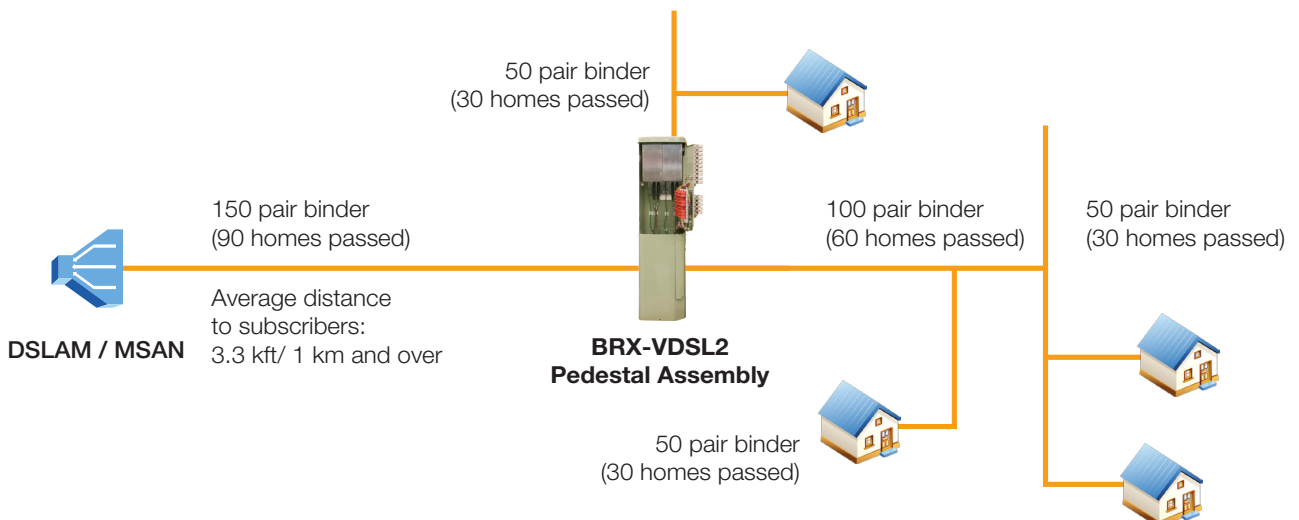


BRX-VDSL2-8

The BRX-VDSL2 fills the gap when fiber is not cost effective. It can be used on single pairs and is fully transparent to pair bonding. It delivers a fiber-like user experience so customers can enjoy top quality video streaming with multiple HD feeds and still have enough bandwidth to simultaneously surf the web and use other applications. The increase in the available bandwidth capacity on existing last mile infrastructure results in higher ARPU, lower attrition and increased customer satisfaction at a low cost.



BRX-VDSL2-24



**The BRX-VDSL2 is available in two (2) versions:**

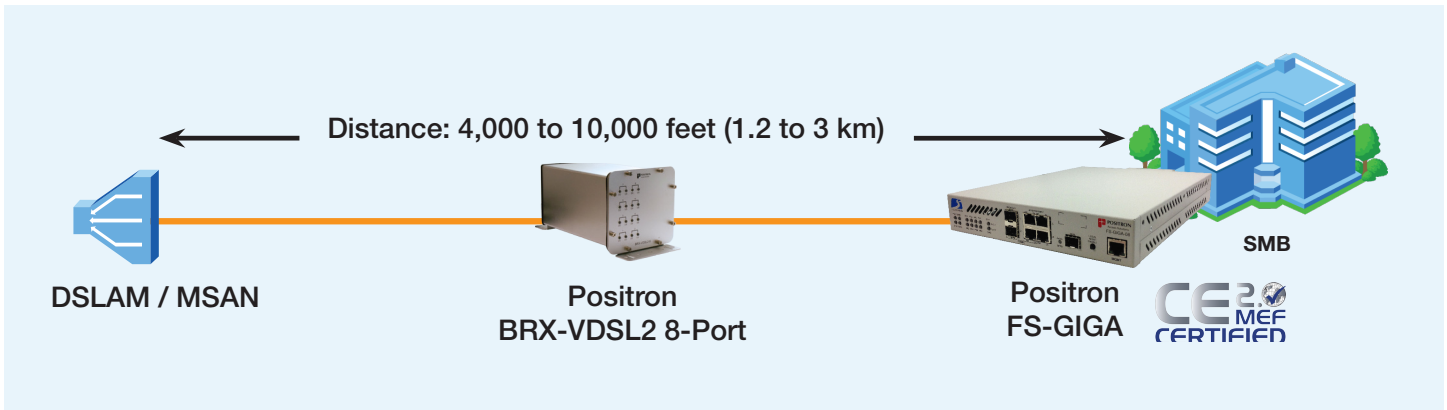
- **BRX-VDSL2:** Operates on sealing current found on pairs with POTS service and provides excellent amplification of the VDSL2 service in the Downstream and Upstream directions.
- **BRX-VDSL2-X:** Extended reach and performance version. It requires the use of a Positron BRX power injector and is 100% compatible with POTS devices. It provides superior amplification and extra reach of the VDSL2 service in the Downstream and Upstream directions.

Both models operate and are installed in the same way and are available in the same packaging options. They are powered from -48 Vdc on each pair. When used with dry pairs, both models require the use of the Positron Power Injector.

Feature	BRX-VDSL2	BRX-VDSL2-X
<b>Amplification Range</b>	4,000 – 8,500 feet (1.2 – 2.6 km) (24 AWG)	4,000 – 10,000 feet ( 1.2 – 3 km) (24 AWG)
<b>Distance for 25/3 Mbps on single pair 24 AWG (0.51 mm)</b>	6,000 feet (1.8 km) (Non-Vectored and Vectored)	6,500 feet (2 km) (Non-Vectored and Vectored)
<b>Distance for 50/8 Mbps on 2 pairs 24 AWG (0.51mm)</b>	6,000 feet (1.8 km) (Non-Vectored and Vectored)	6,500 feet (2 km) (Non-Vectored and Vectored)
<b>VDSL2 Range Extension</b>	1,500 feet (457 meters)	Up to 2,250 feet (685 meters)
<b>CSA Expansion</b>	77%	200%
<b>Amplification Ratio</b>	Up to 1.2 Downstream / up to 4.0 Upstream	1.2 to 1.9 Downstream / up to 4.1 Upstream
<b>Form Factor</b>	Same form factor, each pair has two (2) LEDs to indicate presence of current and loop status	
<b>Enclosure Options</b>	Available in 1, 2, 8, 24 and 48 pairs enclosures	
<b>Management</b>	Manageable (Detection, Location, Alerting, Troubleshooting) via integration with ASSIA DSL Expresse® and with Nokia Network Analyzer Copper (NAC)®	
<b>Operation over POTS Pairs</b>	100% compatible with presence of active POTS line. Limited current consumption to guarantee 100% compliance with POTS devices	Requires BRX Power Injector to guarantee 100% compliance with POTS devices
<b>Operation over Dry Pairs (no -48 Vdc Sealing Current Present)</b>	BRX power injector can be used to power the BRX-VDSL2 models	

**Typical Business Application**

There are a growing number of both symmetric and asymmetric applications where operators are bonding up to 8 pairs of VDSL2. For instance, using a Positron FS-GIGA-08, you can deliver a 50 Mbps symmetrical Ethernet service up to 5,000 feet (1.5 km). You can deliver much higher asymmetrical services when you take full advantage of the 300 Mbps of bandwidth in the downstream direction for the same service. Examples of such applications are Business High Speed Internet (HSI), Managed Business Ethernet, MTUs/ MDUs, Small Cell Backhaul and DSLAM/ MSAN Backhaul.



## Other Benefits of the BRX-VDSL2

### 100% Transparent Support for Vectoring and Pair Bonding

The BRX-VDSL2 is fully transparent to Vectoring and pair-bonding applications. Installing a BRX-VDSL2 on a copper pair makes it possible to extend the benefit of vectoring up to 6,000 feet (1.8 km) from the DSLAM, well beyond the typical range of 3,000 feet (1 km) where vectoring is usually effective.

While the use of vectoring is strongly recommended, amplification of a pair with the BRX-VDSL2 offers better performance than vectoring alone. Bonding two pair together enables the delivery of 50 / 8 Mbps service to customers located over 6,500 feet (2 km) from the DSLAM.

### More than Signal Amplification

In addition to delivering a significant increase in performance, field testing has shown that the BRX-VDSL2 will help mitigate some of the common problems impacting the performance in the Outside Plant (OSP).

As it amplifies the VDSL2 signal, it filters out some of the accumulated noise on the copper pair which improves the signal-to-noise ratio (SNR). It also mitigates the impact of bridge taps, including those resulting from inadequate in-house wiring. The BRX-VDSL2 automatically detects and supports the EU-32 mode (equivalent to ADSL2+ Annex A) and the EU-64 mode (equivalent to ADSL2+ Annex M) for the U0 band where there is a need for more upstream bandwidth.

### Assorted Packaging, Flexible Mounting and Powering Options

The BRX-VDSL2 is available in weatherproof (IP65) form factors of 1, 2, 8, 24 and 48 pairs. It is designed to be easily installed at existing splicing points in the copper OSP. They can be easily mounted on a pole (including an optional strand mounting kit) or on the outside of an existing cabinet. The BRX-VDSL2 card shelves are designed to be easily mounted inside most splicing pedestal models in use in the OSP.

The cards can be powered by the -48V POTS sealing current on the lines, or via a Positron BRX Power Injector when operating over dry VDSL2 pairs.

## Specifications / Features

Feature	Description
xDSL Standards	ITU-T G.993.2 VDSL2 (supports EU-32 and EU-64 modes) ITU-T G.993.5 (G.vector) ITU-T G.997.1 (G.ploam) ITU-T G.998.4 (G.INP) ITU-T G.992.5 ADSL2+ Annex A and Annex-M ITU-T G.992.3 ADSL2 Annex A and Annex-M ITU-T G.992.1 ADSL Annex A and Annex-M
PSD Mask Compliance	Compliant with ANSI T1.413 and ETSI TS 101 830-1
Signal to Noise Ratio	Improves the Signal to Noise Ratio (SNR) up to 14 dB
Power Draw	Maximum power consumption is 400 mW per pair @ -48 V
Enclosure	Flexible IP65 design allows more subscribers to be added as needed. Available in 1, 2, 8, 24 and 48 pair configurations
Over-current Protection	8/20 µsec, 10 kA (1 operation) 10/700 µsec, 6 kV, 300A (50 operations)
Regulatory Compliance	Tested to IP65, UL/CSA and FCC part 15 Class A WEEE and ROHS compliant
Operating Temperature	-40 to +65 °C
Relative Humidity	5% to 95%, non-condensing
Dimensions	BRX-VDSL2-M: 8" x 5" (203 mm x 127 mm) BRX-VDSL2-2: 9.25" x 5.5" x 1.5" (235 mm x 140 mm x 38 mm) BRX-VDSL2-8: 11.5" x 5.5" x 4.7" (292 mm x 140 mm x 120 mm) BRX-VDSL2-24: 21.5" x 17" x 11" (546 mm x 432 mm x 280 mm)
Installation Location	Installed adjacent to a splice point or at cross connect cabinet in the Outside Plant (OSP)
Auto-Provisioning	Automatic gain control with no software or hardware configuration needed It self-adjusts to optimize the bandwidth based on loop length and line conditions
Number of Ports per Module	Each BRX-VDSL2-M has two (2) independent copper pairs, 100% transparent to vectoring and pair bonding (if used)

## Ordering Part Numbers and Description for Most Popular Configurations

Part Number	Description
BRX-VDSL2-M	Two-pair card (for use in the 8, 24 and 48 pair BRX-VDSL2 IP65 enclosures). Embedded Primary Lightning Protection for each pair. No need for external gas tube protection
BRX-VDSL2-2	BRX-VDSL2 two-pair module with primary protection in an IP65 enclosure
BRX-VDSL2-8	Includes 4 x BRX-VDSL2-M two-pair modules (total 8 pairs) in an IP65 enclosure
BRX-VDSL2-24	Includes 12 x BRX-VDSL2-M two-pair modules (total 24 pairs) in an IP65 enclosure
BRX-VDSL2-24-1SXPF	Emerson CAD-12 pedestal factory installed with a BRX-VDSL2-24S shelf loaded with 12 x BRX-VDSL2-M for a total of 24 pairs
BRX-VDSL2-48-1SXPF	Emerson CAD-12 pedestal factory installed with two (2) BRX-VDSL2-24S shelves loaded with a total of 24 x BRX-VDSL2-M for a total of 48 pairs

### Notes:

The BRX-VDSL2 product family comes with a 2-year hardware warranty.

For the extended reach and performance versions, **add "-X" after the part numbers above.**