



APPLICATION NOTE:

Migrating to BR-500AC

From SX-BR-4600WAN2, BR-300AN and BR-310AC

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Introduction

The purpose of this application note is to explain the advantage of the BR-500AC over SX-BR-4600WAN2, BR-300AN, and BR-310AC. The application note provides:

- Valued customers of SX-BR-4600WAN2, BR-300AN, and BR-310AC with the migration guidance to BR-500AC
- Valued customers who look for the right Ethernet to Wi-Fi bridge product with the BR-500AC information

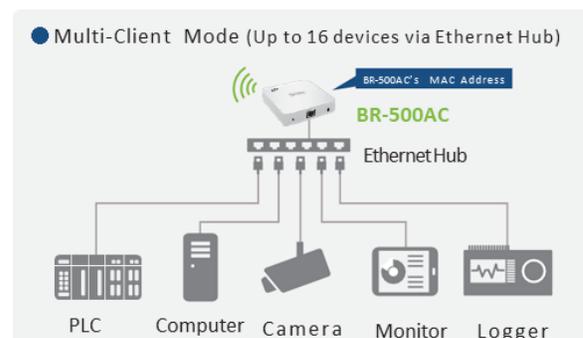
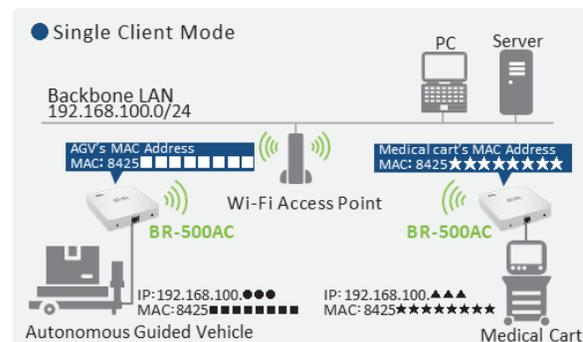
Overview of BR-500AC

The BR-500AC is the silex's latest enterprise-grade Ethernet to Wi-Fi bridge supporting 802.11ac wave2 standards. The BR-500AC inherits silex's expertise and knowledge accumulated through all predecessors such as SX-BR-4600WAN2, BR-300AN, and BR-310AC. It also enhances the feature set for better security and QoS (Quality of Service).



Feature set

- Wi-Fi security
 - WPA/WPA2-Personal
 - WPA2-Personal
 - WPA3-Personal
 - WPA/WPA2-Enterprise
 - WPA2-Enterprise
 - WPA3-Enterprise (128-bit security mode)
- IEEE 802.1X Authentication
- 802.11ac wave2 features
 - 2x2 MU-MIMO
 - Beamforming
 - Up to 867Mbps Wi-Fi bit rate
- 802.11r Fast BSS Transition when operating in WPA2
- 802.11ai Fast Initial Link Setup when operating in WPA2-Enterprise
- Roaming support in all Wi-Fi security mode
- WME (Wireless Multimedia Extensions) support for QoS management
- Dual-band radio support (2.4GHz / 5GHz)
- Single client mode and Multi-client mode
- Integrated web server for the device configuration
- Remote device management by AMC Manager®



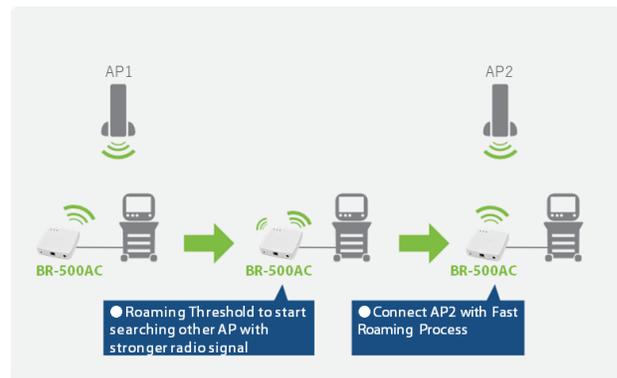
New Features

WPA3 Wi-Fi security

The BR-500AC supports WPA3-Personal and WPA3-Enterprise with 128-bit security mode. The use of Simultaneous Authentication of Equals (SAE) is in direct response to an identified weakness in the WPA2 4-way handshake discovered by Vanhoef in 2017 (Known as KRACK). Although there are available patches to protect from the "KRACK attack," the use of SAE improves the key management process used for encryption of the link and provides several other benefits. Since encryption keys are session-based, not linked to a static PSK, hackers will no longer capture wireless traffic and work offline to determine the shared password. Similarly, any brute force attack will be limited to a single session. As a result, any historical data is protected should a key be hacked for any specific session.

Fast BSS Transition: 802.11r

Fast BSS transition allows the BR-500AC to reestablish existing security and/or QoS parameters before reassociating to a new access point. The reassociation process as per 802.11r significantly reduces the link downtime between the BR-500AC and the Wi-Fi infrastructure when the BR-500AC connects to a new AP within the same ESS (Extended Service Set) domain.



WME (Wireless Multimedia Extensions)

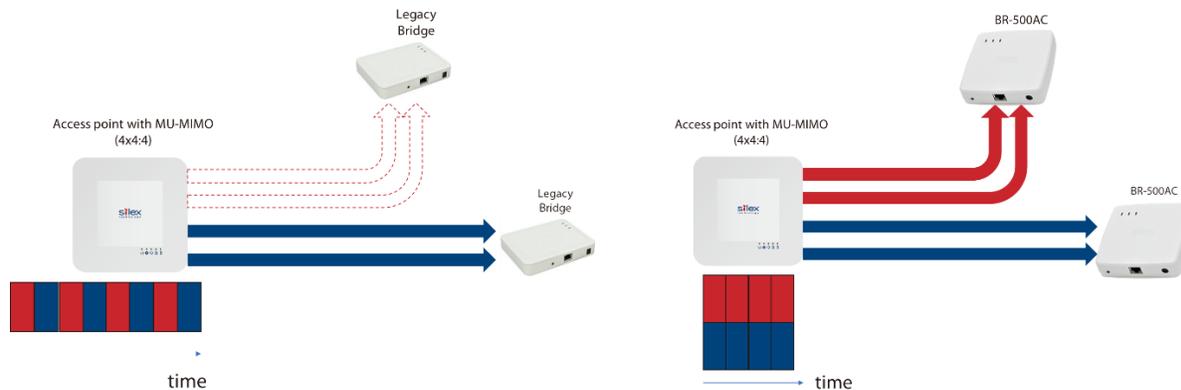
The BR-500AC can set an access category to packets based on the data packets' priority from the Ethernet device(s). If there is no priority in the data packets from the Ethernet device(s), the BR-500AC can add a default access category according to the setting. It supports AC_BK, AC_BE, AC_VI, and AC_VO. The BR-500AC offers a better QoS over the wireless network by supporting WME.

MU-MIMO and Beamforming

The BR-500AC supports MU-MIMO and beamforming as a beamformee. The BR-500AC achieves more efficient downlink data transfer with 4x4 (or more spatial streams) MU-MIMO capable access point. Unlike the legacy bridges supporting SU-MIMO, the access point can transmit the data to multiple BR-500ACs simultaneously.

SU-MIMO

MU-MIMO



Feature Set Comparison

Features	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
Product picture				
size	110mmx109mmx27mm	110.5mmx79mmx27.6mm	100mmx100mmx25.5mm	130mmx100mmx26mm
weight	140g	130g	120g	148g
DC jack	EIAJ Class4	EIAJ Class2	EIAJ Class2	EIAJ Class2
Power supply	12V(primary)or 5V(optional)	5V	5V	5V
Max power consumption	6W	3.75W	5.5W	6.5W
Wi-Fi standard	802.11a/b/g/n/ac wave2	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n/ac
Antenna	2x2 MU-MIMO (internal)	2x2 SU-MIMO (internal)	2x2 SU-MIMO (internal)	3x3 SU-MIMO (internal)
Wi-Fi Authentication	Open WPA/WPA2-Personal WPA2-Personal WPA3-Personal WPA/WPA2-Enterprise WPA2-Enterprise WPA3-Enterprise IEEE 802.1X	Open Shared WPA/WPA2-Personal WPA2-Personal WPA/WPA2-Enterprise WPA2-Enterprise IEEE 802.1X	Open Shared WPA/WPA2-Personal WPA2-Personal WPA/WPA2-Enterprise WPA2-Enterprise IEEE 802.1X	Open Shared WPA/WPA2-Personal WPA2-Personal WPA/WPA2-Enterprise WPA2-Enterprise IEEE 802.1X
IEEE802.1X	EAP-TLS EAP-TTLS PEAP EAP-FAST LEAP	EAP-TLS EAP-TTLS PEAP EAP-FAST LEAP	EAP-TLS EAP-TTLS PEAP EAP-FAST LEAP	EAP-TLS EAP-TTLS PEAP EAP-FAST LEAP
Wi-Fi Encryption	AUTO/TKIP/AES	AUTO/TKIP/AES	AUTO/TKIP/AES	AUTO/TKIP/AES
Radio band	2.4GHz/5GHz US SKU (US2): ch 120-128 and 144 are supported	2.4GHz/5GHz	2.4GHz/5GHz	2.4GHz/5GHz
Theoretical max bit rate	867Mbps	300Mbps	300Mbps	1.3Gbps
Roaming	802.11r (WPA2) Normal roaming	Normal roaming	Normal roaming	Normal roaming
Fast Initial Link Setup	WPA2-Enterprise mode	Not supported	Not supported	Not supported

WME	Supported	Not supported	Not supported	Not supported
Ethernet	10BASE-T/100BASE-TX/ 1000BASE-T	10BASE-T/100BASE-TX/ 1000BASE-T	10BASE-T/100BASE-TX/ 1000BASE-T	10BASE-T/100BASE-TX/ 1000BASE-T
MAC address filtering	Supported	Supported	Supported	Supported
Address Management Table	Supported	Supported	Supported	Not supported
NTP	Supported	Not supported	Supported	Supported
Configuration method	Integrated web page AMC Manager® (Version 4.0.1 and later) BR Kitting tool	Integrated web page AMC Manager®	Integrated web page AMC Manager® BR Kitting tool	Integrated web page AMC Manager®

Device Management

The BR-500AC's device management is the same except for new features available in the BR-500AC. Additional options for the BR-500AC's configuration are highlighted by light green in the table below.

Web configuration procedure				
Step	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
1	Connect the bridge to a computer via an Ethernet cable	Connect the bridge to a computer via an Ethernet cable	Connect the bridge to a computer via an Ethernet cable	Connect the bridge to a computer via an Ethernet cable
2	Put the bridge to "Configuration mode" by pressing and holding a push switch until WLAN LED and STATUS LED start blinking together	Put the bridge to "Configuration mode" by pressing and holding a push switch until WLAN LED and STATUS LED start blinking together	Put the bridge to "Configuration mode" by pressing and holding a push switch until WLAN LED and STATUS LED start blinking together	Put the bridge to "Configuration mode" by pressing and holding a push switch until WLAN LED and STATUS LED start blinking together
3	Access the web configuration page from a web browser (http://silex)	Access the web configuration page from a web browser (http://silex)	Access the web configuration page from a web browser (http://silex)	Access the web configuration page from a web browser (http://silex)
4 (only for initial installation)	Set a password for the bridge			
5	Login	Login	Login	Login
6	Wireless setup through Easy Configuration (choose SSID and enter PSK if necessary)	Wireless setup through Easy Configuration (choose SSID and enter PSK if necessary)	Wireless setup through Easy Configuration (choose SSID and enter PSK if necessary)	Wireless setup through Easy Configuration (choose SSID and enter PSK if necessary)

	Otherwise, go to Detailed Configuration to set - SSID - Wi-Fi authentication - Necessary credential information	Otherwise, go to Detailed Configuration to set - SSID - Wi-Fi authentication - Necessary credential information	Otherwise, go to Detailed Configuration to set - SSID - Wi-Fi authentication - Necessary credential information	Otherwise, go to Detailed Configuration to set - SSID - Wi-Fi authentication - Necessary credential information
7	Select the operation mode from Single Client mode or Multi-Client mode	Select the operation mode from Single Client mode or Multi-Client mode	Select the operation mode from Single Client mode or Multi-Client mode	Select the operation mode from Single Client mode or Multi-Client mode
8 (optional)	TCP/IP configuration DHCP client, or static IP address			
9 (optional)	Roaming threshold configuration (receiver power level)			
10 (optional)	NTP configuration	N/A	NTP configuration	NTP configuration
11 (optional)	MAC address filtering / Address Management table configuration	MAC address filtering / Address Management table configuration	MAC address filtering / Address Management table configuration	MAC address filtering configuration
12 (optional)	802.11r enable/disable (when Wi-Fi authentication is WPA2) 802.11ai enable/disable (when Wi-Fi authentication is WPA2-Enterprise)	N/A	N/A	N/A
13 (optional)	WME configuration	N/A	N/A	N/A
14	Restart the bridge	Restart the bridge	Restart the bridge	Restart the bridge
Smart Wireless Setup Procedure (Initial pairing with WPS capable access point/router)				
Step	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
1	Connect Ethernet device and the bridge. Turn on the bridge.	Connect Ethernet device and the bridge. Turn on the bridge.	Connect Ethernet device and the bridge. Turn on the bridge.	Connect Ethernet device and the bridge. Turn on the bridge.
2	Turn on the Ethernet device(s)			
3	Push the WPS button of a Wi-Fi access point/router as directed by the Wi-Fi access point/router's manual	Push the WPS button of a Wi-Fi access point/router as directed by the Wi-Fi access point/router's manual	Push the WPS button of a Wi-Fi access point/router as directed by the Wi-Fi access point/router's manual	Push the WPS button of a Wi-Fi access point/router as directed by the Wi-Fi access point/router's manual
4	When the WLAN LED turns on after the POWER LED turns on, press and hold the push switch, the WLAN LED and STATUS LED will start blinking together. Release the push switch when the STATUS LED turns off while the WLAN LED keeps blinking.	When the WLAN LED turns on after the POWER LED turns on, press and hold the push switch, the WLAN LED and STATUS LED will start blinking together. Release the push switch when the STATUS LED turns off while the WLAN LED keeps blinking.	When the WLAN LED turns on after the POWER LED turns on, press and hold the push switch, the WLAN LED and STATUS LED will start blinking together. Release the push switch when the STATUS LED turns off while the WLAN LED keeps blinking.	When the WLAN LED turns on after the POWER LED turns on, press and hold the push switch, the WLAN LED and STATUS LED will start blinking together. Release the push switch when the STATUS LED turns off while the WLAN LED keeps blinking.
5	The bridge will start to communicate with the wireless router. When the wireless configuration is successful, the WLAN LED	The bridge will start to communicate with the wireless router. When the wireless configuration is successful, the WLAN	The bridge will start to communicate with the wireless router. When the wireless configuration is successful, the WLAN	The bridge will start to communicate with the wireless router. When the wireless configuration is successful, the WLAN

	turns on, and the STATUS LED turns on or blinks.	LED turns on, and the STATUS LED turns on or blinks.	LED turns on, and the STATUS LED turns on or blinks.	LED turns on, and the STATUS LED turns on or blinks.
Firmware Update				
Method	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
Web page	Supported	Supported	Supported	Supported
AMC Manager	Supported	Supported	Supported	Supported
Factory Reset				
Method	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
Push switch	Supported	Supported	Supported	Supported
Web page	Supported	Supported	Supported	Supported
AMC Manager	Supported	Supported	Supported	Supported
Device Restart				
Method	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
Web page	Supported	Supported	Supported	Supported
AMC Manager	Supported	Supported	Supported	Supported
System Log with Time Synchronization with NTP server				
Method	BR-500AC	SX-BR-4600WAN2	BR-300AN	BR-310AC
Web page	Supported	Not supported	Supported	Supported

Resources

Setup Guide: https://www.silextechnology.com/hubfs/Resource%20PDF/br-500ac_setupguide_eng_xx.pdf

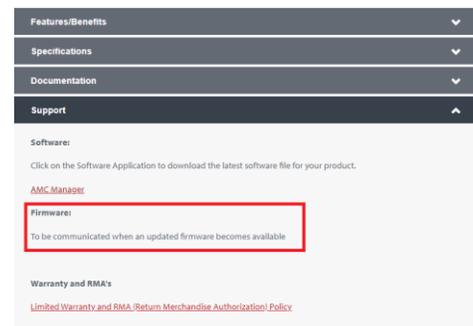
User Manual: https://www.silextechnology.com/hubfs/Resource%20PDF/br-500ac_manual_eng_xx.pdf

AMC Manager®: <https://www.silextechnology.com/connectivity-solutions/device-connectivity/amc-manager>

Latest firmware:

<https://www.silextechnology.com/connectivity-solutions/ethernet-2-wifi-bridge/br-500ac>

(Under "Support" tab in the product website)



AMC Manager® Software for Remote Management

Silex offers our AMC Manager® software. It allows network administrators to manage a large number of Silex products from a Windows computer.

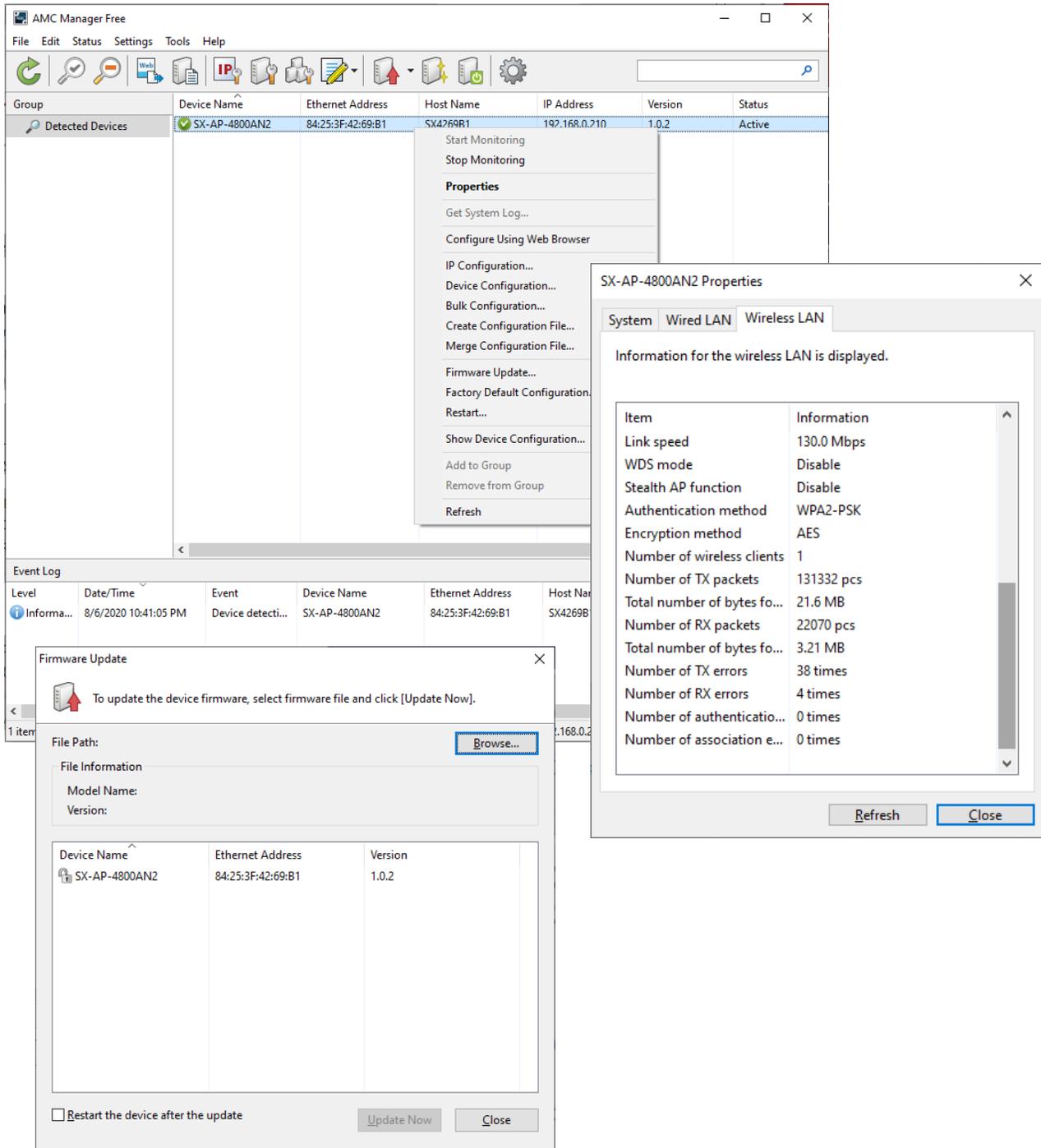
AMC Manager® software allows remote monitoring of Silex wireless products, including RSSI value, noise level, number of DFS channels being used, and more that can help maintain a healthy wireless environment. It also enables users to configure, manage easily, and monitor Silex products connected to a wired or wireless network remotely, including status monitoring, configuration changes, firmware update, and device rebooting. AMC Manager® optimizes operation management of multiple wired and wireless devices installed at multiple locations, detects issues early, and helps to reduce support costs for troubleshooting your network and wireless devices.



Features:

- Integrated user interface listing of your Silex products on the network.
- Remote configuration and monitoring of wireless and network parameters, including detailed wireless signal analysis of each node, RF channel usage, Wi-Fi and TCP/IP network settings, and more.
- Efficient batch configuration allowing configuration updates and firmware upgrades for multiple Silex products simultaneously.

Supported OS: Windows 7 SP1 (32bit / 64bit), Windows 8 (32bit / 64bit), Windows 8.1 (32bit / 64bit), Windows 10 (32bit / 64bit), Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, and Windows Server 2016



For more resources about AMC Manager®, please visit <https://www.silextechnology.com/connectivity-solutions/device-connectivity/amc-manager> or contact us <https://www.silextechnology.com/contact-us>.