

Home



# How do I upgrade my ESA-E Series Spectrum Analyzer?



**Please Note: The information provided on this page is for reference only. The upgrades for these products are no longer available.**

Most of the **ESA-E** Series options are available for post-sale retrofit. The upgrades are normally either a **hardware option** or **measurement personality**. Many of the measurement personalities are application specific and require additional hardware options.

Hardware upgrade kits contain installation instructions and the desired assembly. **Adjustments** or **performance verifications** may be required to ensure the instrument meets the published specifications.

- Some performance verification tests can be performed manually as explained in the [calibration guide](#). The [ESA Series Calibration Application Software](#) contains details about each test and the equipment needed to check ESA-E series options. The N7800A Calibration & Adjustment Software can be used to run performance verification tests and make adjustments. All adjustments must be performed using the N7800A Calibration & Adjustment Software.
- More involved upgrades require the instrument be shipped to a Keysight Service Center to have the upgrade installed. Make sure to obtain a quote for the installation before sending the instrument and upgrade kit to a Keysight Service Center to get installed. A full calibration is the only way to guarantee specifications are being met.

The table below provides an **Installation Note** for each upgrade. The installation note includes a list of the performance verification tests and adjustments required as well as the test equipment and test software necessary to complete the upgrade. Customers with a large inventory of instruments may have the equipment available to complete the process, but in most cases the instrument will need to be sent to and Keysight Service Center. Performing the tests listed in the installation note guarantees the newly installed option is functioning, but a full instrument calibration is the only way to guarantee specifications are being met.

Hardware upgrades may require that a **minimum firmware** is already installed. Up-to-date firmware can be downloaded for free from the [ESA-E Firmware Upgrade Center](#).

Some hardware upgrades may also require the redemption and installation of a **license key** before they will be activated. Once a redemption certificate is received, the license key(s) can be redeemed at the [Software License Redemption Web Site](#).

The upgrades listed below do not work on all Spectrum Analyzers. Find the **serial prefix** on the Spectrum Analyzers to determine if it is compatible. The serial prefix is the first six alpha-numeric characters of the serial number.

Below are the upgrade tables for:

1. ESA-E Series Internal Hardware Upgrades (Option 000 - 999)
2. ESA-E Series Internal Hardware Upgrades (Option A00 - ZZZ)
3. ESA Series Available External Hardware Option Upgrades
4. ESA Series Available Firmware & Measurement Personality Upgrades

ESA-E Series Internal Hardware Upgrades (Option 000 - 999)												
Option	Models	Description	Order As	eDelivery	Installation Note	Upgrade Contents	Minimum Firmware	Adjustments Required	Additional Requirements	Incompatible With	Installed By - Installation Time	Option Slots Needed <sup>1</sup>
060	E4402B E4404B E4405B E4407B	Low emissions	E440xBU-060	No	Available	Hardware, License key	A.06.00	No	None	B7B, 1DP	Advanced User - 3.0 Hrs	0

106	E4402B E4404B E4405B E4407B	Bluetooth™ demodulation	E440xBU-106	No	Available	Hardware	A.09.00	No	228, B72	BAA	Advanced User - 1.0 Hrs	1 Analog
120	E4402B E4404B E4405B E4407B	Dynamic range extension	E440xBU-120 or E4402-60064	No	Available	Hardware	None	No	None	None	Service Center Recommended - 1.5 Hrs	1 Analog
1AX	E4402B E4404B E4405B E4407B	RS-232 / parallel interface	E440xBU-1AX or E4401-60370	No	Available	Hardware	None	No	None	A4H	Advanced User - 1.0 Hrs	1 Digital
1D5	E4402B E4404B E4405B E4407B	High stability frequency reference	E440xBU then select E440xBK-1D5	No	Available	Hardware	None	Yes	Serial Prefix < US/MY/SG4421	None	Service Center Only - 5.0 Hrs	0
	E4402B E4404B E4405B E4407B	High stability frequency reference	E440xBU then select E440xBL-1D5	Yes	Available	License key	A.14.00	Yes	Serial Prefix ≥ US/MY/SG4421	None	Service Center Recommended - 1.0 Hrs	0
1D6	E4402B E4404B E4405B E4407B	Time gating	E440xBU-1D6	Yes	Available	License key	A.04.00	No	None	None	Advanced User - 1.0 Hrs	0
1DN	E4402B E4404B E4405B E4407B	3.0 GHz tracking generator	E440xBU-1DN or E4403-60046	No	Available	Hardware	None	No	None	H26	Service Center Only - 3.0 Hrs	0
1DR	E4402B E4404B E4405B E4407B	Narrow resolution bandwidths	E440xBU-1DR	Yes	Available	License key	A.04.00 A.08.02 for 3 Hz and 1 Hz NRBW's	No	1D5 (If 3 Hz and 1 Hz bandwidths are needed).	None	Advanced User - 1.5 Hrs	0
1DS	E4402B E4404B E4405B E4407B	Internal 3.0 GHz RF preamp	E440xBU-1DS	Yes	Available	License key	A.04.00	Yes	None	None	Service Center Recommended - 1.5 Hrs	0
219	E4402B E4404B E4405B E4407B	Noise figure	E440xBU-219	No	Available	Hardware, Software, License key	A.12.00	No	1DS <sup>2</sup> , B72	1DP	Advanced User - 1.0 Hrs	1 1 Analog + Digital

**ESA-E Series Internal Hardware Upgrades (Option A00 - ZZZ)**

Option	Models	Description	Order As	eDelivery	Installation Note	Upgrade Contents	Minimum Firmware	Adjustments Required	Additional Requirements	Incompatible With	Installed By - Installation Time	Option Slots Needed <sup>1</sup>
A4H	E4402B E4404B E4405B E4407B	GPIB / parallel interface	E440xBU-A4H or E4401-60382	No	Available	Hardware	None	No	None	1AX	Advanced User - 1.0 Hrs	1 Digital
A4J	E4402B E4404B E4405B E4407B	IF and sweep ports	E440xBU-A4J or E4401-60179	No	Available	Hardware	None	No	None	AYX	Advanced User - 1.0 Hrs	1 Analog
AYQ <sup>1</sup>	E4402B E4404B E4405B E4407B	EMI detectors and FM Demodulation	E440xBU-AYQ	No	Available	Hardware	A.14.00	No	1DR, B72	BAA	Advanced User - 1.0 Hrs	1 1 Analog + Digital
AYX	E4402B E4404B E4405B E4407B	Fast zero Span sweep times	E440xBU-AYX or E4401-60152	No	Available	Hardware	None	No	None	A4J, B7D <sup>3</sup>	Advanced User - 2.0 Hrs	1 1 Analog + Digital
AYZ	E4407B	External mixing	E4407BU-AYZ	No	Available	Hardware, License key	A.04.00	Yes	Input <sup>4</sup>	None	Service Center Only - 5.0 Hrs	0
B72	E4402B E4404B E4405B E4407B	Expanded memory  <b>Included in Serial Prefix ≥ US/MY/SG4144</b>	E440xBU-B72 or E4401-60384	No	Available	Hardware, Software	None	No	None	None	Advanced User - 1.5 Hrs	0
B7B	E4402B E4404B E4405B E4407B	TV trigger / picture	E440xBU-B7B	No	Available	Hardware, License key	A.04.00	No	BAA	060	Advanced User - 2.0 Hrs	0
B7D & B7E	E4402B E4404B E4405B E4407B	Comms hardware - DSP + RF Downconverter	E440xBU-B7D and E440xBU-B7E or E4402-60067  <b>B7D &amp; B7E must be ordered together</b>	No	Available	Hardware	A.04.00	Yes	1D5, B72	AYX <sup>3</sup>	Service Center Only - 3.0 Hrs	2 1 Analog, 1 Analog + Digital
BAA	E4402B E4404B E4405B E4407B	FM demodulation	E440xBU-BAA or E4401-60337	No	Available	Hardware	None	No	None	BAA	Advanced User - 1.0 Hrs	1 Analog
BAB	E4407B	3.5 mm APC RF input	E4407BU-BAB	No	Available	Hardware,	A.04.00	Yes	None	H26	Service Center	0

						License key					<b>Recommended - 2.0 Hrs</b>	
H70	E4402B E4404B E4405B E4407B	70 MHz IF output	E440xBU-H70	No	Available	Hardware	None	Yes	ESA Service Guide (0BW) or ESA CBT (E4401-90262)	None	Advanced User - 4.0 Hrs	1 Analog
HSB	E4402B E4407B	LO out on rear panel for use with sideband adaptor, tek 1405 or aerodynex	<del>OBSOLETE</del> replaced with H3B	No	Available	Hardware	None	No	1DN	None	Advanced User - 2.0 Hrs	1 Analog
H3B	E4402B	Provide 1 <sup>st</sup> LO output on rear panel	E4402BU-H3B	No	Available	Hardware	None	No	None	1DN	Advanced User - 2.0 Hrs	1 Covered by Output
UKB	E4402B	Low frequency extension	E4402BU-UKB	No	Available	Hardware, License key	A.05.00	Yes	1DR, Input <sup>5</sup>	None	Service Center Only - 3.0 Hrs	0
	E4404B E4405B	Low frequency extension	E440xBU-UKB	No	Available	Hardware, License key	A.05.00	Yes	1DR, Input <sup>5</sup>	None	Service Center Only - 3.0 Hrs	0
	E4407B	Low frequency extension	E4407BU-UKB	No	Available	Hardware, License key	A.06.00	Yes	1DR, Input <sup>5</sup>	None	Service Center Only - 3.0 Hrs	0

<sup>1</sup>Before upgrading with option AYQ view this [comparison table](#) to see exactly what you get on an ESA-E Series with option AYQ.

ESA-E Series Available External Hardware Option Upgrades											
Option	Models	Description	Order As	eDelivery	Installation Note	Upgrade Contents	Minimum Firmware	Adjustments Required	Additional Requirements	Incompatible With	Installed By -Installation Time
1CP	E4402B E4404B E4405B E4407B	Rackmount kit	E440xB-1CP or E4401-60385	No	Available	Hardware	None	No	None	AYT, AYU, AXT, UK9	Advanced User - 0.5 Hrs
1D7	E4402B E4404B E4405B E4407B	50 to 75Ω minimum loss pad	E440xB-1D7 or 0955-1020	No	None	Hardware	None	No	None	1DP, BAB	User - 0.0 Hrs
A5D	E4402B E4404B E4405B E4407B	12V DC cable	E440xB-A5D or E4401-60066	No	Available	Hardware	None	No	None	None	User - 0.5 Hrs
AXT	E4402B E4404B	Transit case	E440xB-AXT or E4401-60386	No	Available	Hardware	None	No	None	1CP	User - 0.0 Hrs

	E4405B E4407B										
AYT	E4402B E4404B E4405B E4407B	Gray soft case	E440xB-AYT or E4401-60117	No	Available	Hardware	None	No	None	1CP, AYU	User - 0.5 Hrs
AYU	E4402B E4404B E4405B E4407B	Yellow soft case	E440xB-AYU or E4401-60118	No	Available	Hardware	None	No	None	1CP, AYT	User - 0.5 Hrs
UK9	E4402B E4404B E4405B E4407B	Front panel protective cover	E440xB-UK9 or E4401-60193	No	None	Hardware	None	No	None	1CP	User - 0.0 Hrs

**Firmware & Measurement Personalities:**

- All Measurement Personality Options have a specific instrument firmware requirement. To view these requirements see: [ESA Software & Firmware Revisions](#)
- All Measurement Personality upgrades require the redemption and installation of a license key to be activated. Once a redemption certificate is received they can be redeemed at the [Keysight Software License Redemption Web Site](#).
- All Measurement Personality upgrades only require that a license key and software be installed before the personality will function, however, there may also be additional hardware requirements. Since the measurement personality upgrades only require a software installation, these installations are meant to be done by the customer, and no adjustments or performance verification are required.

ESA Series Available Firmware & Measurement Personality Upgrades											
Option	Models	Description	Order As	eDelivery	Installation Note	Upgrade Contents	Minimum Firmware	Additional Requirements	Recommended Options	Incompatible With	Installed By - Installation Time
225	E4402B E4404B E4405B E4407B	Cable fault location <b>Included in BAH</b>	E440xBU-225	Yes	None	Software, License key	≥ A.07.01	1DN, B72	1DN, B72, B7K	None	User - 1.0 Hrs
226	E4402B E4404B E4405B E4407B	Phase noise	E440xBU-226	Yes	None	Software, License key	≥ A.08.02	B72	B72, 1D5, 1DR	None	User - 1.0 Hrs
227	E4402B E4404B E4405B E4407B	Cable TV	E440xBU-227	Yes	None	Software, License key	≥ A.07.06	B72	B72, AYX, B7B, BAA	None	User - 1.0 Hrs
228	E4402B E4404B E4405B E4407B	<i>Bluetooth</i> <sup>™</sup> measurement personality	E440xBU-228	Yes	None	Software, License key	≥ A.09.00	106, AYX, B72	106, B72, B7D, B7E, 1D5	None	User - 1.0 Hrs

229	E4402B E4404B E4405B E4407B	Modulation Analysis	E440xBU-229	Yes	None	Software, License key	≥ A.08.04	B72, B7D, B7E, 1D5	B72, B7D, B7E, 1D5	None	User - 1.0 Hrs
231	E4402B E4404B E4405B E4407B	ESA to 89601A software link utility <b>Included in 229</b>	E440xBU-231	Yes	None	Software	≥ A.08.04	B7D, B7E, 1D5, A4H, B72	None	None	User - 1.0 Hrs
252	E4402B E4404B E4405B E4407B	EDGE upgrade to GSM/GPRS	E440xBU-252	Yes	None	Software, License key	≥ A.14.01	BAH, B7D, B7E, 1D5, 1D6, B72	BAH, B7D, B7E, 1D5, 1D6, 1DS, B72, 1DR	None	User - 1.5 Hrs
266	E4402B E4404B E4405B E4407B	8566/68B programming compatibility	E440xBU-266	Yes	None	Software	≥ A.14.00	A4H, B72	A4H	290	User - 1.0 Hrs
290	E4402B E4404B E4405B E4407B	8590 series programming compatibility	E440xBU-290	Yes	None	Software	≥ A.07.00	A4H	A4H	266	User - 1.0 Hrs
BAC	E4402B E4404B E4405B E4407B	cdmaOne	E440xBU-BAC	Yes	None	Software, License key	≥ A.07.02	B72	B72, B7D, B7E, 1D5	None	User - 1.5 Hrs
BAH	E4402B E4404B E4405B E4407B	GSM/GPRS	E440xBU-BAH	Yes	None	Software, License key	≥ A.14.01	1D6, B72	1D6, B72, B7D, B7E, 1D5	None	User - 1.5 Hrs
J35	E4402B E4404B E4405B E4407B	ESA FM deviation measurements	E440xBU-J35	Yes	None	Software, License key	≥ A.07.05	BAA	BAA	None	User - 1.0 Hrs
J36	E4402B E4404B E4405B E4407B	ESA flexible FM deviation measurements	E440xBU-J36	Yes	None	Software, License key	≥ A.09.00	BAA, B72	BAA	None	User - 1.0 Hrs
UE2	E4402B E4404B E4405B E4407B	Firmware upgrade (A.14.06)	E440xBU-UE2 or E4401-60403	Yes	Available	Software	None	B72	B72	Instruments with serial prefix < US/MY/SG4144 <b>and</b> without option B72	User - 1.0 Hrs

1. Option Slots 1, 2, 3, & 4 have both analog and digital bus connection, while slots 5 & 6 have only analog. To see what slots are available for a given instrument press [System][More]{Show System}

2. These are recommended options, but not required to install the software option. However, performance may be limited without the recommended option.

- 3. If both options B7D and AYX are present in the unit at the same time, the firmware will give priority to option B7D due to it's higher ADC speed. Upgrade with options B7D and AYX in the unit together only if you want the capability of the sweep ports that option AYX gives.
- 4. AYZ requires "50Ω 3GHz Input" part number E4403-60033 or later. See [System]{More}{Show Hdwr}
- 5. UKB requires "50Ω 3GHz Input" part number E4403-60036 or later. See [System]{More}{Show Hdwr}
- 6. To determine upgrade by Customer or Service Center go to [RF compatibility verification for B7D/B7E upgrade](#)

Connectivity Options:

- [Upgrading your ESA with option 230, Web Remote Control Software](#)
- [E4444A BenchLink Spectrum Analyzer Connectivity Software](#)
- [ESA-E Link to 89601A VSA Software](#)

**Available Accessories:**

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