



The Synaptics® SL-Series of embedded processors are highly integrated AI-Native Linux® and Android™ systems on chip (SoCs) optimized for multimodal consumer, enterprise, and industrial IoT workloads with hardware accelerators for edge inferencing, security, video, graphics, and audio. The SL1640 product line—including the SL1640 and SL1641 families—are cost and power optimized secure SoCs with high-performance compute engines including a quad-core Arm® Cortex®-A55, 1.6+ TOPS NPU, GE9920 GPU, Ultra HD video encode and decode pipelines, and dual DSP.

The SL1640 product line supports the Synaptics Astra™ IoT platform, delivering a unified experience combining standards-based open software frameworks, full-featured AI toolkits, and Synaptics' best-in-class wireless connectivity portfolio.



HIGH PERFORMANCE PER WATT



AI-NATIVE EDGE SOC



LINUX / ANDROID SDK



PROVEN SECURITY MODEL

### Benefits

- Multimodal IoT SoC for cost and power sensitive designs
- Heterogeneous accelerators enable out-of-the-box AI
- Pairs with best-in-class Synaptics wireless connectivity
- Enables fast time to market

### Applications

- Smart home appliances
- Enterprise conferencing
- Smart audio
- Consumer and industrial control systems
- Signage and displays



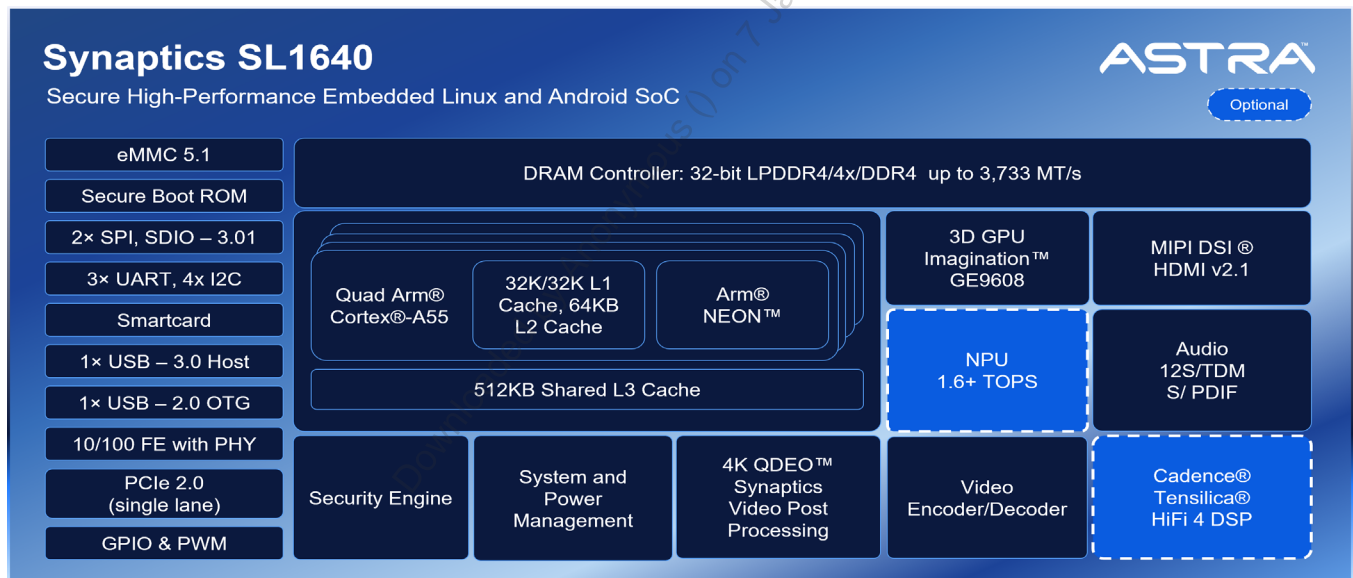
## Features

- Quad-core Arm® Cortex®-A55 processor with cryptographic extensions
- DRAM controller: 32/16-bit DDR4-3200 LPDDR4/LPDDR4x-3733
- Integrated GPU for 3D/2D graphics with concurrent execution and support for general-purpose compute
- 1.6+ TOPS NPU for edge inferencing
- Multi-standard video decoding with support for AV1, H.265/264 MVC, VP8, VP9, MPEG-2
- H.264 single 1080p30 8-bit encoding
- eMMC 5.1 controller
- Video, audio via MIPI® DSI, HDMI®-TX, I2S/TDM
- 10/100 networking, PCIe® connectivity
- SPI, SDIO, UART, USB, GPIO, ADCs
- Video, graphics post-processing and display pipeline with Synaptics® QDEO®
- Audio processing with far-field voice, keyword detection, decompression and post-processing
- Base Crypto Module (BCM) security processor
- Memory scrambling and integrity checking
- True random number generator (TRNG)
- Physical attack mitigation
- On-chip 32 Kbit OTP
- Cadence® Tensilica® Dual HiFi 4 DSP
- System and power management unit
- Always-on (AON) domain for multi-protocol wake-up events

The SL1641 is consumer grade only and includes a dedicated security boot segment of Synaptics secure boot firmware, with Dolby Audio enabled, and NPU & HiFi DSP disabled.

## Synaptics SL1640

Secure High-Performance Embedded Linux® and Android™ SoC



System Block Diagram



### Copyright

Copyright© 2024-2025 Synaptics Incorporated. All rights reserved.

### Trademarks

Synaptics, the Synaptics logo, the AI Native Synaptics logo, Astra, the Astra logo, QDEO, and SynAP are trademarks or registered trademarks of Synaptics Incorporated in the United States and/or other countries.

All other trademarks are the property of their respective owners.

### Contact

Visit our website at [www.synaptics.com](http://www.synaptics.com) to locate the Synaptics office nearest you.

PN: 190-000418-01 REV D

### Notice

Use of the materials may require a license of intellectual property from a third party or from Synaptics. This document conveys no express or implied licenses to any intellectual property rights belonging to Synaptics or any other party. Synaptics may, from time to time and at its sole option, update the information contained in this document without notice.

INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED "AS-IS," AND SYNAPTICS HEREBY DISCLAIMS ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES OF NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT SHALL SYNAPTICS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OF THE INFORMATION CONTAINED IN THIS DOCUMENT, HOWEVER CAUSED AND BASED ON ANY THEORY OF LIABILITY, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, AND EVEN IF SYNAPTICS WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. IF A TRIBUNAL OF COMPETENT JURISDICTION DOES NOT PERMIT THE DISCLAIMER OF DIRECT DAMAGES OR ANY OTHER DAMAGES, SYNAPTICS' TOTAL CUMULATIVE LIABILITY TO ANY PARTY SHALL NOT EXCEED ONE HUNDRED U.S. DOLLARS.