Big performance, small footprint multichip packages

The Internet of Things (IoT) and 5G are driving new innovations in the way we interact, do business, and improve our quality of life. An explosion of new connected and mobile solutions has emerged in a broad range of applications critical in industrial, energy, retail, transportation, home automation, personal healthcare, automotive and video security.

These embedded IoT systems are primarily space constrained and require the lowest power consumption. At the same time, these endpoints need to support an increasing amount of data as well as real-time analytics. This increases the need for high-performance memory solutions in smaller packages at lower power across a wide range of wireless and close-range networks.

Why MCPs?

Multichip package (MCP) memory has been the de facto memory and storage solution for cellular mobile solutions due to the optimized combination of low power DRAM and NAND-based technologies. With the onset of 5G targeting 20X the bandwidth versus its 4G predecessor, and the need to support sub-1ms latency and meet low power requirements of technologies such as NB-IoT and RedCap™, memory and storage have played a critical role in enabling these new connected devices.

Along with selecting the right technologies, density combination, and packages, designers must consider several other critical factors to effectively optimize memory in their application, including performance, power, cost, size, scalability, voltage, reliability and product lifecycle. As a result, designers are increasingly turning to MCP solutions.

Micron MCP offerings

Product	Components
NAND MCP	SLC NAND + LPDDRx
eMCP	e.MMC + LPDDRx
ePoP	eMCP in a package-on-package (PoP) configuration

Advantages of Micron MCPs

Space saving

Free up space on your printed circuit board (PCB) versus using multiple discrete packages, leaving room for further application enhancements.

High quality and performance

With Micron-fabricated silicon components, you get top-notch quality and performance backed by our rigourous testing techniques.

High durability

Withstand extreme temperatures with IT, AIT, and AAT temperature options.

One-stop shop

Select from a broad portfolio of reliable, high-density MCP solutions to meet your embedded IoT application needs.

Long-term support

Meet the needs of your long-lifecycle products with Micron's 5-year+ product longevity commitments on select MCP products.

Systems expertise

Rely on Micron's system expertise to optimize your application and bring it to market faster.

Key features for embedded IoT designs

Micron MCP key features can help enhance your next embedded IoT innovation:

- **Broad portfolio:** Get NAND and e.MMC based MCP solutions in a broad range of densities and JEDEC-compliant packages (VFBGA, WFBGA/PoP) to meet all your design needs.
- **Small package sizes:** Save more than 50% space on the PCB versus using more than one discrete memory package thanks to stacked components, shared pins and reduced ball pitch, reducing your memory footprint.
- **Tight coupling of memory components:** Enhance overall system performance with shortened interconnection of tightly coupled components.
- **Product longevity:** Get 5-year+ availability on select MCP products to meet product demand both now and in the future.
- **Reduced bill of materials:** Save costs thanks to reduced bonding wire, assembly and packaging costs.
- **Low voltage:** Build with 1.8V or 3.0V MCPs, ideal for low-power applications.
- **Industrial and automotive temperatures:** Design for extreme-temperature operating conditions with IT (–40°C to 85°C), AIT (–40°C to 85°C), and AAT (–40°C to 105°C) options.
- **High P/E cycles:** Provide reliability for high PROGRAM/ERASE (P/E) cycle field use conditions with up to 100,000 P/E cycles.

Why Micron for MCPs?

With Micron, you benefit from the expertise of a total memory solution provider. We have decades of experience designing NAND, e.MMC and LPDRAM technologies. We offer a broad product portfolio of industrial- and automotive-grade MCP memory solutions that meet your application needs across all wireless network generations.

As the supplier of all memory within our MCPs, Micron is able to provide quality product development support so you can spend less time and fewer resources to interface multiple memory devices with different timing parameters.

Micron MCPs	Bus Width	Voltage	Temperature Grade*	Package
eMCP/ePOP MCPs				
32GB e.MMC + 16Gb LPDDR4	NAND: x8; DRAM I/O: x32	3.3V	IT	254b VFBGA (11.5mm x 13mm)
32GB e.MMC + 16Gb LPDDR4	NAND: x8; DRAM I/O: x16	3.3V	WT	144b WFBGA (8mm x 9.5mm)
SLC NAND + LPDDR4				
16Gb NAND + 16Gb LPDDR4	NAND: x8; LP4: x16	1.8V	AIT, AAT	149b VFBGA (8mm x 9.5mm)
8Gb NAND + 8Gb LPDDR4	NAND: x8; LP4: x16	1.8V	IT, AIT, AAT	149b VFBGA (8mm x 9.5mm)
4Gb NAND + 4Gb LPDDR4	NAND: x8; LP4: x16	1.8V	IT, AIT, AAT	149b VFBGA (8mm x 9.5mm)
SLC NAND + LPDDR2				
4Gb NAND + 4Gb LPDDR2	NAND: x8; LP2: x32	1.8V	IT, AIT, AAT	162b VFBGA (9.5mm x 10.5mm)
4Gb NAND + 2Gb LPDDR2	NAND: x8; LP2: x32	1.8V	AIT, AAT	162b VFBGA (8mm x 10.5mm)

*Temperature grade:
-40°C to 85°C (IT)
-25°C to 85°C (WT)
-40°C to 85°C (AIT)
-40°C to 105°C (AAT)

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