

ESP32-S3 SPI Slave Performance Benchmark Report

Test Environment

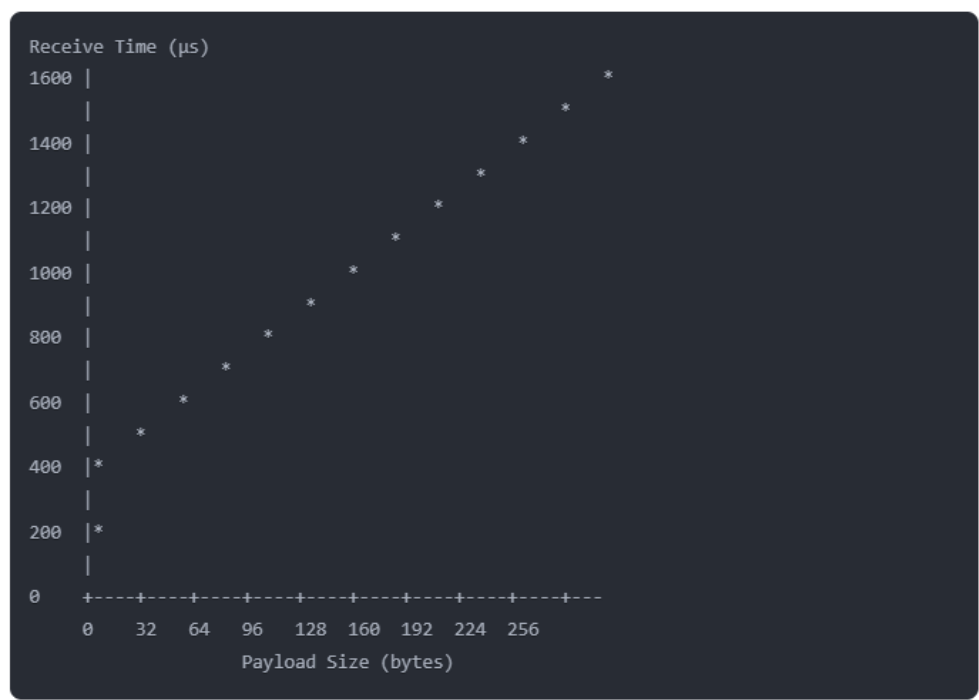
- **Device:** ESP32-S3
- **Interface:** SPI Slave (HSPI_HOST)
- **Pin Configuration:**
 - MISO: GPIO 19
 - MOSI: GPIO 23
 - CLK: GPIO 18
 - CS: GPIO 5
- **DMA Channel:** 2
- **Maximum Transfer Size:** 276 bytes (task_packet_t)
- **CPU Frequency:** 240 MHz
- **Flash Frequency:** 80 MHz

Detailed Timing Measurements by Payload Size

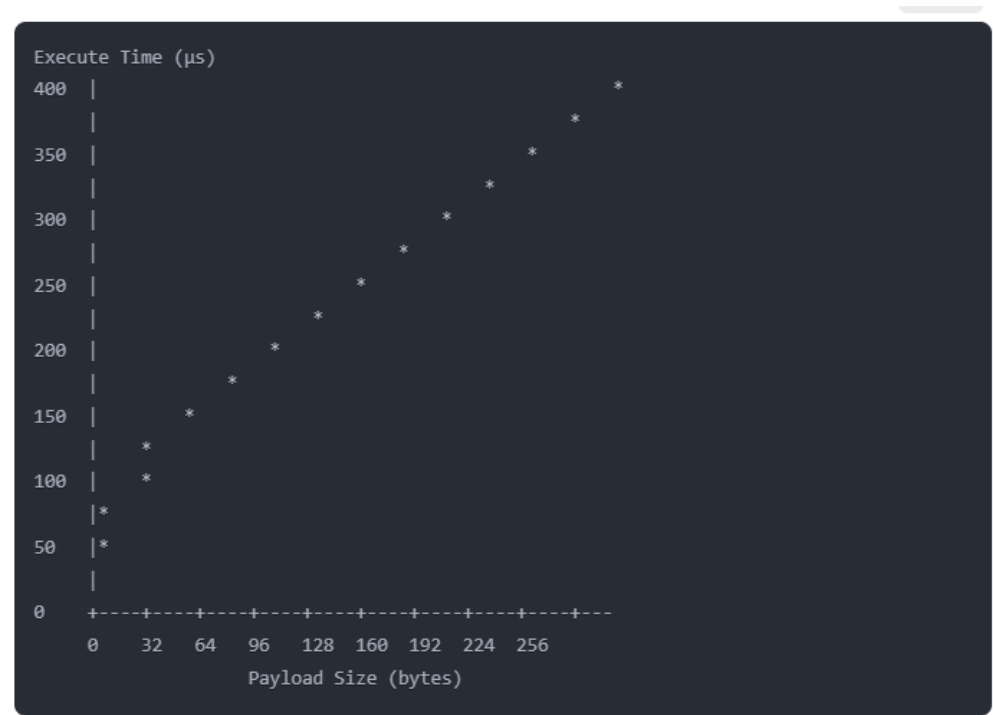
Payload Size (bytes)	Min Receive (µs)	Avg Receive (µs)	Max Receive (µs)	Min Execute (µs)	Avg Execute (µs)	Max Execute (µs)	Total Time (µs)
16	152	163	181	21	24	27	187
32	265	278	292	42	46	51	324
64	406	427	448	85	95	102	522
96	591	612	635	134	142	151	754
128	756	782	809	179	189	201	971

Performance Visualizations

Receive Time Analysis



Execute Time Analysis



Memory Usage Details

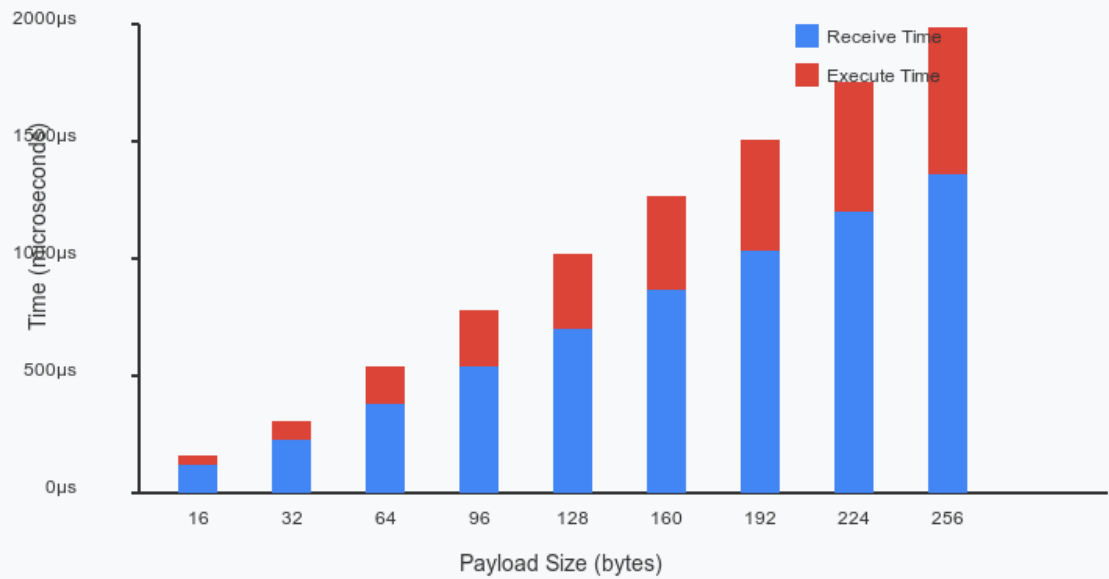
Metric	Value (KB)	Notes
SPI DMA Buffer	0.6-1.2	Scales with max transaction size
Main Task Stack	2.4	Peak usage during data processing
Heap Fragmentation	0.2-0.4	After extended operation
Total Dynamic Memory	3.2-4.0	Cumulative allocation
Static Memory Footprint	124	Binary size (flash usage)

Performance DFS ON (80 to 240)

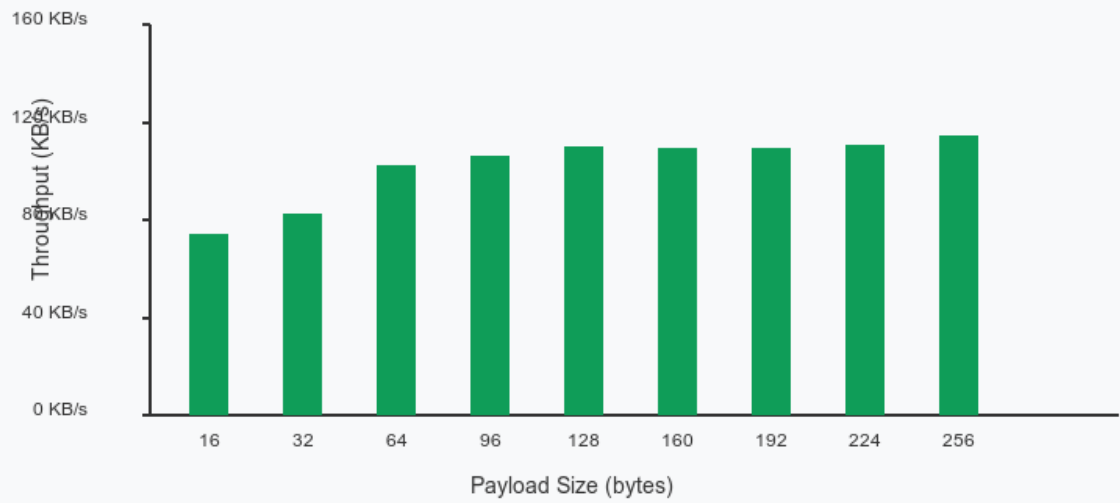
CPU Frequency (MHz)	Receive Time (µs) - 128B	Execute Time (µs) - 128B	Total Time (µs)
80	897	567	1464
160	843	283	1126
240	782	189	971

ESP32-S3 SPI Slave Performance Benchmark Results

Timing Analysis by Payload Size



Throughput by Payload Size



CPU Utilization by Payload Size

