GPUpartner

VALIDATION REPORT · TEXT GENERATION

DeepSeek R1

on M3 Ultra 512 GB · 3-bit (Q3_K_M) · Ollama / LM Studio · Chat

STATUS · NOV 22, 2026

Not validated

4 of 5 checks pass

DeepSeek R1 at 3-bit runs on the M3 Ultra 512 GB with 160K of context at about 22 tokens a second.

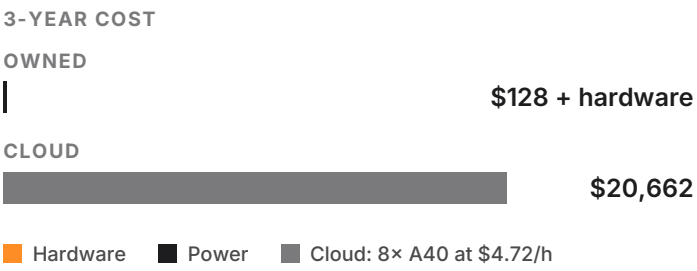
VALIDATION

CHECK	TARGET	RESULT	STATUS
Fits in GPU memory	384 GB usable	323 GB needed	PASS
Headroom	5% free	61.0 GB free (16%)	PASS
Context for chat	16K or more	160K	PASS
Writing speed	15 tok/s or more	22 tok/s	PASS
First reply	under 3 s, 2K prompt	25 s	FAIL

Targets: a reply you can read along with, a first reply the use case tolerates, and 5% of memory left free. Calculated from published specs, not benchmarked.

BUDGET

HARDWARE, ONE-TIME	MSRP not entered
POWER, PER YEAR	$43 · 162 W at the wall
CLOUD INSTEAD, PER YEAR	$6,887
3-YEAR TOTAL, OWNED	Hardware + $128 power
3-YEAR TOTAL, CLOUD	$20,662
BREAK-EVEN	Needs the hardware MSRP



Budget basis: 4 h a day, power at $0.18 per kWh, cloud at RunPod on-demand prices as of Nov 22, 2026. Hardware at the MSRP entered in the calculator, not a GPU Partner quote. A 3-year view; resale value, staff time and taxes aren't counted.

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TECHNICAL DETAIL · TEXT GENERATION

DeepSeek R1

on M3 Ultra 512 GB · 3-bit (Q3_K_M) · Ollama / LM Studio · Chat

SETUP

PARAMETERS	684B, 40.1B active
PRECISION	3-bit (Q3_K_M)
CONTEXT	160K, auto
CHATS AT ONCE	1
USE	Chat
RUNS IN	Ollama / LM Studio
HARDWARE	M3 Ultra 512 GB
GPU CAN USE	384 GB of 512 GB

SAME MODEL, OTHER MACHINES

RTX 4090	Too big
RTX 5090	Too big
RTX PRO 6000 BLACKWELL	Too big
M5 MAX 128 GB	Too big
DGX SPARK 128 GB	Too big
RYZEN AI MAX+ 395 128 GB	Too big
DGX STATION GB300	2-bit · 150 tok/s

MEMORY

WEIGHTS	312 GB
CONTEXT	10.7 GB
RUNTIME	733 MB
SYSTEM	128 GB
FREE	61.0 GB

HOW TO RUN IT

LLAMA.CPP	`llama-server -hf unsloth/DeepSeek-R1-GGUF`
VLLM	`vllm serve deepseek-ai/DeepSeek-R1`
MLX (MAC)	`mlx_lm.chat --model mlx-community/DeepSeek-R1-4bit`
MODEL CARD	huggingface.co/deepseek-ai/DeepSeek-R1

METHOD AND ASSUMPTIONS

Memory is the weights (parameters times bits per weight, read from each model's config.json), the context cache for every chat, and the runtime, against the memory this GPU can use after the OS and display take theirs. Writing speed is memory bandwidth over the bytes read per token, plus a per-layer latency, calibrated against llama.cpp benchmarks. First reply is the prompt's FLOPs over the chip's dense 16-bit TFLOPS at the runtime's measured efficiency. Running cost is power at the wall at your rate and hours; the cloud figure is the cheapest RunPod on-demand GPU that runs the same job. Accuracy: memory lands within about a gigabyte; speeds and times are rough, about ±25%. Model data and hardware specs checked Nov 2026; cloud prices are RunPod's on-demand list as of Nov 22, 2026. Report VR-0HLGJ7Q, generated November 22, 2026.