

Ignoring empty loop time

CPU Core	Cortex A72			Neoverse N1			Neoverse V1		Apple M1		
Frequency (assume boost)	1.80 GHz			3.00 GHz			2.60 GHz		3.20 GHz		
Mean instruction time	ns	inst/cycle	ref V1	ns	inst/cycle	ref V1	ns	inst/cycle	ns	inst/cycle	ref V1
NOP	0.560	0.992	+977%	0.093	3.584	+198%	0.036	10.684	0.045	6.944	+54%
ADD	0.298	1.864	+108%	0.115	2.899	+34%	0.099	3.885	0.070	4.464	-13%
ADC	0.296	1.877	+107%	0.115	2.899	+34%	0.099	3.885	0.108	2.894	+34%
ADDS	0.315	1.764	+65%	0.120	2.778	+5%	0.132	2.914	0.108	2.894	+1%
ADCS	0.558	0.996	-0%	0.334	0.998	-0%	0.387	0.994	0.313	0.998	-0%
MUL	1.671	0.332	+499%	1.001	0.333	+498%	0.193	1.993	0.156	2.003	-1%
UMULH	2.228	0.249	+699%	1.335	0.250	+698%	0.193	1.993	0.156	2.003	-1%
DIV	5.571	0.100	+0%	3.003	0.111	-10%	3.851	0.100	0.628	0.498	-80%
MUL UMULH	1.950	0.285	+599%	1.168	0.285	+598%	0.193	1.993	0.156	2.003	-1%
MUL ADCS UMULH ADCS	0.975	0.570	+130%	0.584	0.571	+129%	0.294	1.308	0.156	2.003	-35%
MUL ADD	0.836	0.665	+451%	0.501	0.665	+451%	0.105	3.663	0.105	2.976	+23%
MUL ADC	0.836	0.665	+451%	0.501	0.665	+451%	0.105	3.663	0.104	3.005	+22%
MUL ADDS	0.836	0.665	+462%	0.501	0.665	+461%	0.103	3.734	0.104	3.005	+24%
MUL ADCS	0.836	0.665	+195%	0.501	0.665	+195%	0.196	1.962	0.156	2.003	-2%
MUL ADCS (alt)	0.836	0.665	+197%	0.501	0.665	+196%	0.195	1.972	0.156	2.003	-2%
UMULH ADD	1.114	0.499	+489%	0.667	0.500	+487%	0.131	2.936	0.105	2.976	-1%
UMULH ADC	1.114	0.499	+489%	0.667	0.500	+487%	0.131	2.936	0.104	3.005	-2%
UMULH ADDS	1.114	0.499	+428%	0.667	0.500	+427%	0.146	2.634	0.104	3.005	-12%
UMULH ADCS	1.114	0.499	+127%	0.667	0.500	+126%	0.340	1.131	0.157	1.990	-43%
UMULH ADCS (alt)	1.114	0.499	+128%	0.667	0.500	+127%	0.339	1.135	0.156	2.003	-43%
MUL ADD UMULH ADD	0.975	0.570	+449%	0.584	0.571	+448%	0.123	3.127	0.105	2.976	+5%
PACIA							0.385	0.999	0.313	0.998	+0%
AUTIA							0.385	0.999	0.313	0.998	+0%
PACIA AUTIA							0.385	0.999	0.313	0.998	+0%
PACIA ... AUTIA ...							0.385	0.999	0.313	0.998	+0%

UMULH vs. MUL

+33.3%

+33.4%

+0.0%

+0.0%

UMULH ADCS vs. MUL ADCS

+33.3%

+33.1%

+73.5%

+0.6%

ref V1 = comparison of execution time with Neoverse V1, frequency ratio included