GDD310 Optimized DSP/Vector library for TMS320C67xx/TMS320C67xxPLUS benchmarks.

The performance figures (with function call overhead) shown are given in the number of CPU cycles. The figures without call overhead are approximately 10 cycles lesser.

Performance figures were obtained on a TMS320C6747 CPU cycle accurate simulator that does not model the memory subsystem. The figures would be different on a real hardware, however the speedup shown shall be approximately the same.

Performance figures measured correspond to three different library models, namely TMS320C6713 (Cycle count 1), TMS320C6727 (Cycle count 2) and TMS320C6747 (Cycle count 3). All the three were measured with the same TMS320C6747 CPU Cycle accurate simulator. All the three library models are fully interruptible.

Whenever cycle counts vary for different arguments, the corresponding argument range is shown to the left in the Argument column.

1. TRANSFORMS

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
cfftinit	m=10 (n=1024)	2876	2278	1335	
cfftf	m=10 (n=1024)	30619	21338	17906	
cffti	m=10 (n=1024)	33590	19262	18026	
cfftfbr	m=10 (n=1024)	33605	18936	17360	
cfftibr	m=10 (n=1024)	29238	21582	17657	
rfftinit	m=10 (n=1024)	1625	1617	690	
rfftf	m=10 (n=1024)	19999	17511	16786	
rffti	m=10 (n=1024)	21581	18275	17987	
fhtinit	m=10 (n=1024)	1625	1617	690	
fht	m=10 (n=1024)	25123	22246	17948	
fht2fft	m=10 (n=1024)	3087	3085	1047	
fft2fht	m=10 (n=1024)	3082	3082	1043	
fctinit	m=10 (n=1024)	19593	13446	8399	
fctf	m=10 (n=1024)	96399	100165	52771	
fcti	m=10 (n=1024)	88689	83246	52488	

2. DSP

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
autocov	n=512, m=1024	792354	790803	526619	
crosscov	n=512, m=1024	795426	790804	526619	
diffeq	n=1024, m=10, k=10	83481	82452	57876	
diffeq22	n=1024	8741	8740	8739	
convoltn	n=1024, m=512	799781	795670	530970	
decmfir	n=1024, m=256	409636	400418	268325	
x20db	n=1024	61589	16524	15516	
hist	n=1024, kp2=102	10292	7224	4159	
autospec	n=1024	3107	3104	1571	

crosspec	n=1024	7714	3110	2599	
coherfct	n=1024	5717	4163	4160	
transfct	n=1024	6217	3639	3133	
expavrg	n=1024	3145	3143	1614	
linavrg	n=1024	3145	3145	1611	
hanning2	n=1024	5730	3684	3687	
hamming2	n=1024	6768	3692	3697	
blackmn2	n=1024	11343	3697	3695	
bartlet2	n=1024	3123	3117	2102	
parzen2	n=1024	3131	3127	2113	
welch2	n=1024	3136	3130	2112	

3. VECTOR OPERATIONS (REAL data)

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
isamax	n=1024	3130	3116	1077	
isamin	n=1024	3130	3116	1077	
ismax	n=1024	3120	3119	1075	
ismin	n=1024	3120	3119	1075	
sasum	n=1024	842	828	574	
svsum	n=1024	839	826	576	
snrm2	n=1024	1272	889	638	
scopy	n=1024	3093	3098	1052	
sswap	n=1024	3105	3615	2079	
sfill	n=1024	3095	3095	537	
sdot	n=1024	2365	1588	1080	
dotprod	n=1024	4791	1579	1074	
saxpy2	n=1024	3115	3118	1583	
sscal2	n=1024	3108	3107	1059	
sshift2	n=1024	3109	3107	1059	
svadd2	n=1024	3105	3105	1574	
svsub2	n=1024	3104	3105	1574	
svmpy2	n=1024	3105	3105	1574	
svdiv2	n=1024	6213	3641	2621	
srotg		134	126	131	
srot2	n=1024	6187	6179	3115	

4. VECTOR OPERATIONS (COMPLEX data)

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
icamax	n=1024	4159	3642	1599	
icamin	n=1024	4159	3642	1599	
scasum	n=1024	1595	1590	1084	
cvsum	n=1024	3626	1581	1072	
scnrm2	n=1024	2187	1654	1143	
ccopy	n=1024	3103	3097	1566	
cswap	n=1024	6174	6164	3099	
cfill	n=1024	6164	6165	1046	
cdotc	n=1024	4157	3128	2108	
cdotu	n=1024	4157	3128	2108	
caxpy2	n=1024	6193	6182	3112	

caxcpy2	n=1024	6192	6181	3111	
cscal2	n=1024	4150	3113	2087	
csscal2	n=1024	3112	3618	1576	
cshift2	n=1024	3119	3105	1573	
cvadd2	n=1024	6172	6170	2079	
cvsub2	n=1024	6173	6171	2080	
cvmpy2	n=1024	6185	6177	2085	
cvdiv2	n=1024	12360	7238	7231	
crotg		129	117	121	
csrot2	n=1024	8236	6180	4137	

5. DATA CONVERSIONS

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
dec2plr	n=1024	243435	228093	233209	
plr2dec	n=1024	129360	125202	126240	
r2cmplx	n=1024	6164	6164	2073	
cmplx2r	n=1024	3108	3098	1567	
Q12_2_IEEE754	n=1024	3118	3117	1068	
IEEE754_2_Q12	n=1024	3117	3117	1068	
Q15_2_IEEE754	n=1024	3117	3117	1068	
IEEE754_2_Q15	n=1024	3117	3117	1068	
INT8_2_IEEE754	n=1024	3117	3119	1067	
IEEE754_2_INT8	n=1024	3115	3115	1068	
INT16_2_IEEE754	n=1024	3117	3119	1068	
IEEE754_2_INT16	n=1024	3112	3111	1063	
INT32_2_IEEE754	n=1024	3119	3119	1069	
IEEE754_2_INT32	n=1024	3113	3115	1063	

6. SCALAR OPERATIONS

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
pythag	zero arguments non-zero arguments	55 100	49 95	52 93	
ibitrev16		25	25	25	
ibitrev32		27	27	27	
cabs1		24	23	23	
cabs2	zero argument non-zero argument	59 102	55 98	56 100	
conj		14	14	14	
csroot	zero argument pure real argument pure imaginary arg complex argument	31 125 89 204	30 114 79 188	31 121 82 201	
csign	first argument zero non-zero arguments	195 239	186 230	192 237	
cadd		20	20	20	
ccadd		21	20	20	
caddc		20	20	20	
csub		20	20	20	
ccsub		22	18	18	
csubc		20	20	20	

cmpy		26	22	22	
ccmpy		26	22	22	
cmpyc		24	23	23	
cmac		28	27	27	
ccmac		28	26	27	
cmacc		28	27	27	
cdiv		93	89	92	
ccdiv		94	86	89	
cdivc		93	89	92	
cpowi	input power	30÷251	18÷196	19÷199	
cpowf	input power	394÷623	402÷585	406÷602	
cpowz	input power	407÷636	413÷596	420÷616	
clog	zero argument pure real argument pure imaginary arg complex argument	121 233 231 330	121 223 223 316	125 227 228 323	
cexp	zero argument pure real argument pure imaginary arg complex argument	86 166 235 315	104 167 224 287	101 168 230 297	
csin	zero argument pure real args pure imaginary args complex args	175 260÷324 165÷414 390÷565	191 258÷280 254÷431 321÷520	191 258÷280 254÷431 321÷520	
ccos	zero argument pure real args pure imaginary args complex args	182 267÷331 172÷421 393÷565	185 252÷274 248÷425 315÷514	185 252÷274 248÷425 315÷514	

7. LIMITS

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
vclip2	n=1024	3106	3096	1569	
vthresh2	n=1024	3096	3093	1051	

8. MISCELLANEOUS FUNCTIONS

Function name	Argument	Cycle count 1	Cycle count 2	Cycle count 3	Notes
sbitrv16	m=10 (n=1024)	2325	2074	1821	
sbitrv32	m=10 (n=1024)	2843	2069	2078	
cbitrv16	m=10 (n=1024)	4894	2579	2587	
cbitrv32	m=10 (n=1024)	5402	3348	2851	
sbrcpy16	m=10 (n=1024)	1831	1563	1313	
sbrcpy32	m=10 (n=1024)	2597	1821	1572	
cbrcpy16	m=10 (n=1024)	3367	2080	1824	
cbrcpy32	m=10 (n=1024)	6197	2335	2083	
sscalrp2	m=10 (n=1024)	3091	1045	1043	
cscalrp2	m=10 (n=1024)	3094	1555	1556	
cvconj2	n=1024	3102	3097	1567	
svneg2	n=1024	6170	6170	1051	
cvneg2	n=1024	3103	3100	1569	
svsqrt2	n=1024	8775	4168	4165	

svabs2	n=1024	3103	3106	1055	
cvmagn	n=1024	11861	5734	5743	
svrcpr2	n=1024	3663	3128	2618	
cvrcpr2	n=1024	9290	7232	6207	
smach		13	12	12	
cmach		13	12	12	

9. DATA GENERATION

Function name	Argument	Count C6713	Count C6727	Count C6747	Notes
sinwave	m=10 (n=1024)	1663	1650	886	
coswave	m=10 (n=1024)	1663	1651	886	
set_seed		17	17	18	
get_seed		19	19	19	
get_rmx		5	5	5	macro
irandom		24	24	24	
srandom		31	31	31	
urandom		39	39	39	
rndvect	n=1024	6183	6173	5153	