TO: MTB Distribution

FROM: George T. Williams

DATE: November 14, 1977

SUBJECT: Multics Performance Test Results as of System 32.4

The attached are the performance test results through system 32.4 (MR 6.0). The figures paint a scene which is a little rosier than is, in fact, the case. Although system performance has improved, in general, since MSS 31.9, when compared with MSS 30.10, the figures pale significantly. The primary area for concern has got to be pagefaults which have gone up 24.3% since MSS 30.10 and 11.7% since MSS 31.9. The increase in memory units is obviously attributable to the increased pagefaults, and, I suspect, the increase in elapsed time is, at least partially, also attributable to the pagefault increase.

Current Status (MSS 32.4)

	30.10	32.4	% change
Elapsed Time:	57.1 min	61.7 min	8.1%
Virtual CPU:	1963 sec	1689 sec	-13.6%
Total CPU:	3088 sec	3180 sec	3.0%
Page Faults:	482276	599288	24.3%
Memory Units:	35956	45912	27.7%

	31.9	32.4	% change
Elapsed Time:	60.5 min	61.7 min	2.0%
Virtual CPU:	1850 sec	1689 sec	-8.7%
Total CPU:	3227 sec	3180 sec	-1.5%
Page Faults:	536614	599288	11.7%
Memory Units:	40174	45912	14.4%

related MTB's:
MTB-126 Revision of Multics Performance Tests
MTB-087 Multics Performance Goals for 1974

Metering Comparisons for 31.9, 31.10, 31.11, 31.12, 31.14, 31.13d, 31.15, 31.16, 31.17, 32.0

System:	31.9	31.10	31.11	31.12	31.14	31.13d	31.15	31.16	31.17	32.0
Date:	07/27/77	08/03/77	08/09/77	08/18/77	09/13/77	09/13/77	09/18/77	09/23/77	09/28/77	10/02/77
Write-through status:	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw	dirw
SYST:	none	none	none	none	none	none	none	none	none	none
TELAST:	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec
CPU:	A	A	A	A	A	A	A	A	A	A
Cache:	on	on	on	on	on	on	on	on	on	on
Memories:	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B	A,B
External Interface:	off	off	off	off	off	off	off	off	off	off
Disk Channels:	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8
Elapsed Time:	60.5 min	60.9 min	60.1 min	61.4 min	58.2 min	61.4 min	59.6 min	58.9 min	59.9 min	59.8 min
Costs (shift 1):	$557.52	$553.20	$553.58	$549.24	$539.06	$551.02	$569.20	$575.83	$569.68	$590.66
Costs (shift 2):	$302.70	$300.34	$300.55	$298.18	NA	NA	NA	NA	NA	NA
Costs (shift 3):	$199.23	$197.66	$197.80	$196.22	NA	NA	NA	NA	NA	NA
CPU, total:	3227 sec	3212 sec	3228 sec	3228 sec	3100 sec	3145 sec	3152 sec	3153 sec	3145 sec	3167 sec
CPU, virtual:	1850 sec	1848 sec	1851 sec	1850 sec	1740 sec	1744 sec	1740 sec	1738 sec	1739 sec	1742 sec
CPU, good (1)	2341 sec	2337 sec	2341 sec	2347 sec	2232 sec	2316 sec	2271 sec	2254 sec	2257 sec	2266 sec
Memory Units:	40174	39789	39811	39418	39118	40185	41860	42471	41907	43797
Page Faults:	536614	525976	527500	526755	515914	528335	550704	556104	551128	563275
ttm meters:										
Page Faults:	20.91%	20.88%	21.08%	20.91%	21.24%	21.61%	21.86%	21.84%	21.48%	22.00%
Network:	1.42%	1.43%	1.44%	1.44%	1.48%	1.51%	1.49%	1.46%	1.48%	1.50%
Seg Faults:	3.02%	2.93%	2.96%	3.02%	3.48%	3.61%	3.43%	3.45%	3.45%	3.35%
Bound Faults:	0.30%	0.31%	0.35%	0.32%	0.35%	0.40%	0.28%	0.35%	0.29%	0.26%
Interrupts:	3.89%	3.87%	4.01%	3.99%	4.07%	4.30%	3.95%	3.83%	3.90%	3.94%
Idle, zero:	0.30%	0.66%	0.15%	0.40%	0.69%	0.63%	0.49%	0.37%	0.70%	0.21%
Idle, MF:	4.94%	5.55%	4.83%	5.79%	4.43%	4.75%	4.72%	4.76%	5.45%	5.39%
Idle, NMP:	0.30%	0.23%	0.13%	0.24%	0.23%	0.19%	0.15%	0.12%	0.27%	0.06%
Idle, Loading:	0.14%	0.16%	0.15%	0.17%	0.11%	0.13%	0.11%	0.10%	0.13%	0.13%
Idle, total:	5.97%	6.60%	5.26%	6.60%	5.46%	5.70%	5.47%	5.35%	6.55%	5.79%
Other (good):	64.48%	63.99%	64.89%	63.74%	63.93%	62.86%	63.54%	63.74%	62.85%	63.16%
dvm meters:										
Bulk Prior Page I/O:	262177	260411	259347	263962	256496	276277	270023	266427	266376	269507
Bulk Other Page I/O:	544206	535429	537641	537198	524583	563437	566572	564635	560362	572158
Bulk ATE I/O:	4.5	4.6	4.5	4.6	4.5	4.4	4.3	4.3	4.3	4.3
DSKA Prior Page I/O:	36178	35732	36489	37687	33989	37837	35532	34068	35567	36338
DSKA Other Page I/O:	30448	29603	30775	31097	28985	31233	29514	28844	29671	29976
DSKA ATE I/O:	40.8	41.6	40.4	40.2	39.3	38.3	39.0	39.7	39.1	38.7
DSKA Avg. Page Wait:	40.3	40.8	41.5	42.6	40.2	39.6	38.8	40.6	40.0	39.2

Notes:

(1) Based on Elapsed Time * percentage good (from ttm meters)

Metering Comparisons for 32.0, 32.0a, 32.1, 32.2, 32.3, 32.4

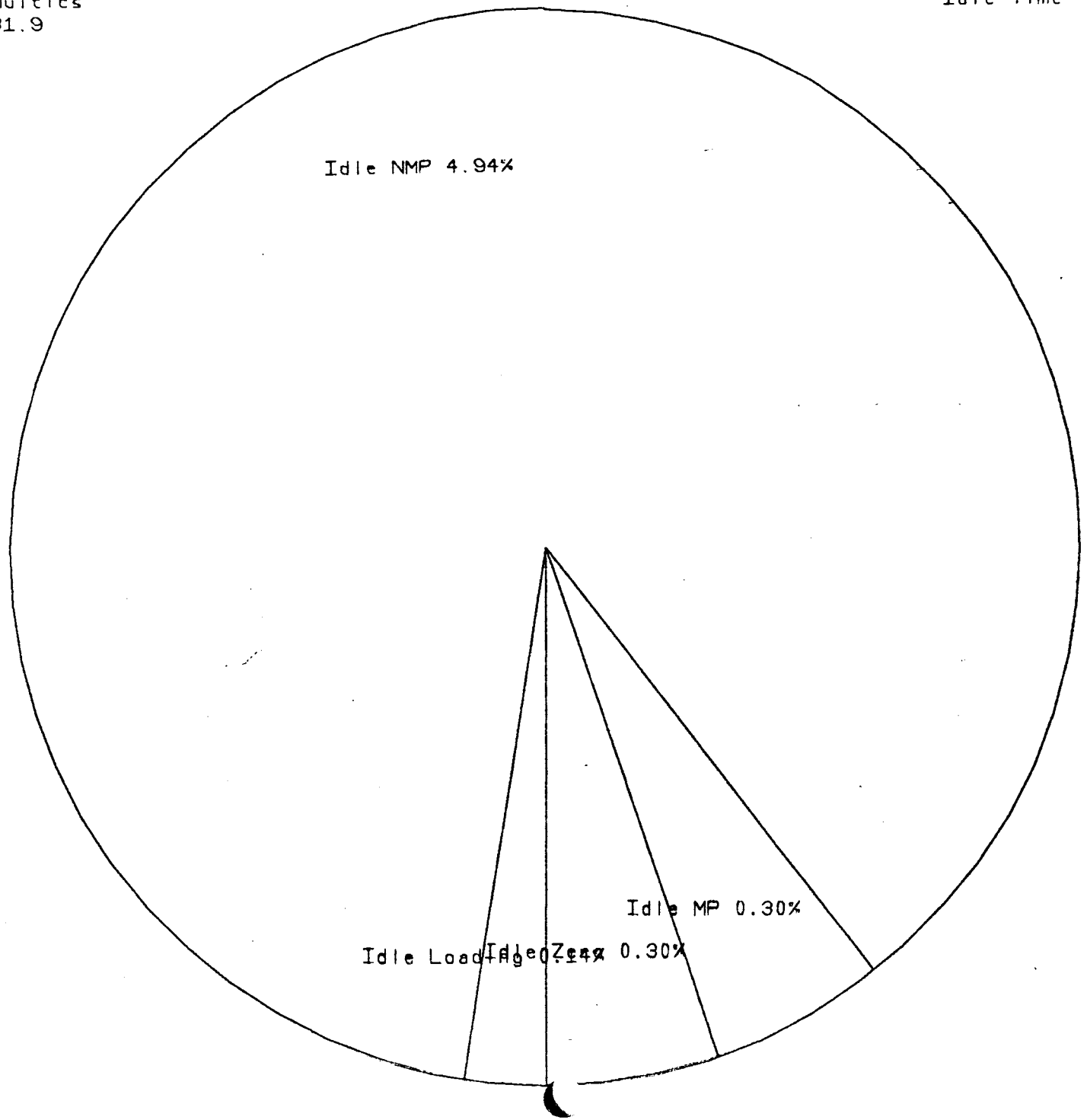
System:	32.0	32.0a	32.1	32.2	32.3	32.4
Date:	10/02/77	10/26/77	10/26/77	10/13/77	11/03/77	11/11/77
Write-through status:	dirw	dirw	dirw	dirw	dirw	dirw
SYST:	none	none	none	none	none	none
TELAST:	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec
CPU:	A	A	A	A	A	A
Cache:	on	on	on	on	on	on
Memories:	A,B	A,B	A,B	A,B	A,B	A,B
External Interface:	off	off	off	off	off	off
Disk Channels:	2,8	2,8	2,8	2,8	2,8	2,8
Elapsed Time:	59.8 min	56.2 min	60.5 min	60.6 min	62.1 min	61.7 min
Costs (shift 1):	$569.68	$553.44	$615.81	$612.42	$623.82	$610.61
CPU, total:	3167 sec	3004 sec	3175 sec	3184 sec	3230 sec	3180 sec
CPU, virtual:	1742 sec	1682 sec	1685 sec	1685 sec	1692 sec	1689 sec
CPU, good (1)	2266 sec	2167 sec	2231 sec	2233 sec	2250 sec	2229 sec
Memory Units:	43797	40757	46409	46099	47099	45913
Page Faults:	563275	527610	597650	598941	613828	599288
ttm meters:						
Page Faults:	22.00%	22.01%	22.96%	23.09%	23.26%	22.72%
Getwork:	1.50%	1.46%	1.61%	1.63%	1.65%	1.64%
Seg Faults:	3.35%	2.81%	3.03%	3.11%	3.04%	3.06%
Bound Faults:	0.26%	0.33%	0.34%	0.28%	0.32%	0.31%
Interrupts:	3.94%	3.76%	3.88%	3.88%	4.11%	3.79%
Idle, zero:	0.21%	0.52%	1.97%	1.51%	1.65%	1.63%
Idle, MP:	5.39%	4.61%	4.34%	4.70%	5.28%	6.34%
Idle, NMP:	0.06%	0.12%	0.32%	0.28%	0.21%	0.16%
Idle, Loading:	0.13%	0.11%	0.09%	0.11%	0.13%	0.15%
Idle, total:	5.79%	5.36%	6.72%	6.60%	7.27%	8.28%
Other (good):	63.16%	64.28%	61.46%	61.41%	60.36%	60.19%
dvm meters:						
Bulk Prior Page I/O:	269507	251516	284345	284620	292229	285664
Bulk Other Page I/O:	572158	537093	613432	615917	630568	611925
Bulk ATB I/O:	4.3	4.28	4.05	4.05	4.04	4.13
DSKA Prior Page I/O:	36338	33180	36991	36909	40367	38948
DSKA Other Page I/O:	29976	28857	31187	30986	34501	33412
DSKA ATB I/O:	38.7	40.5	39.8	39.9	37.9	38.7
DSKA Avg. Page Wait:	39.2	40.9	40.1	39.2	41.2	41.6

Notes:

(1) Based on Elapsed Time * percentage good (from ttm meters)

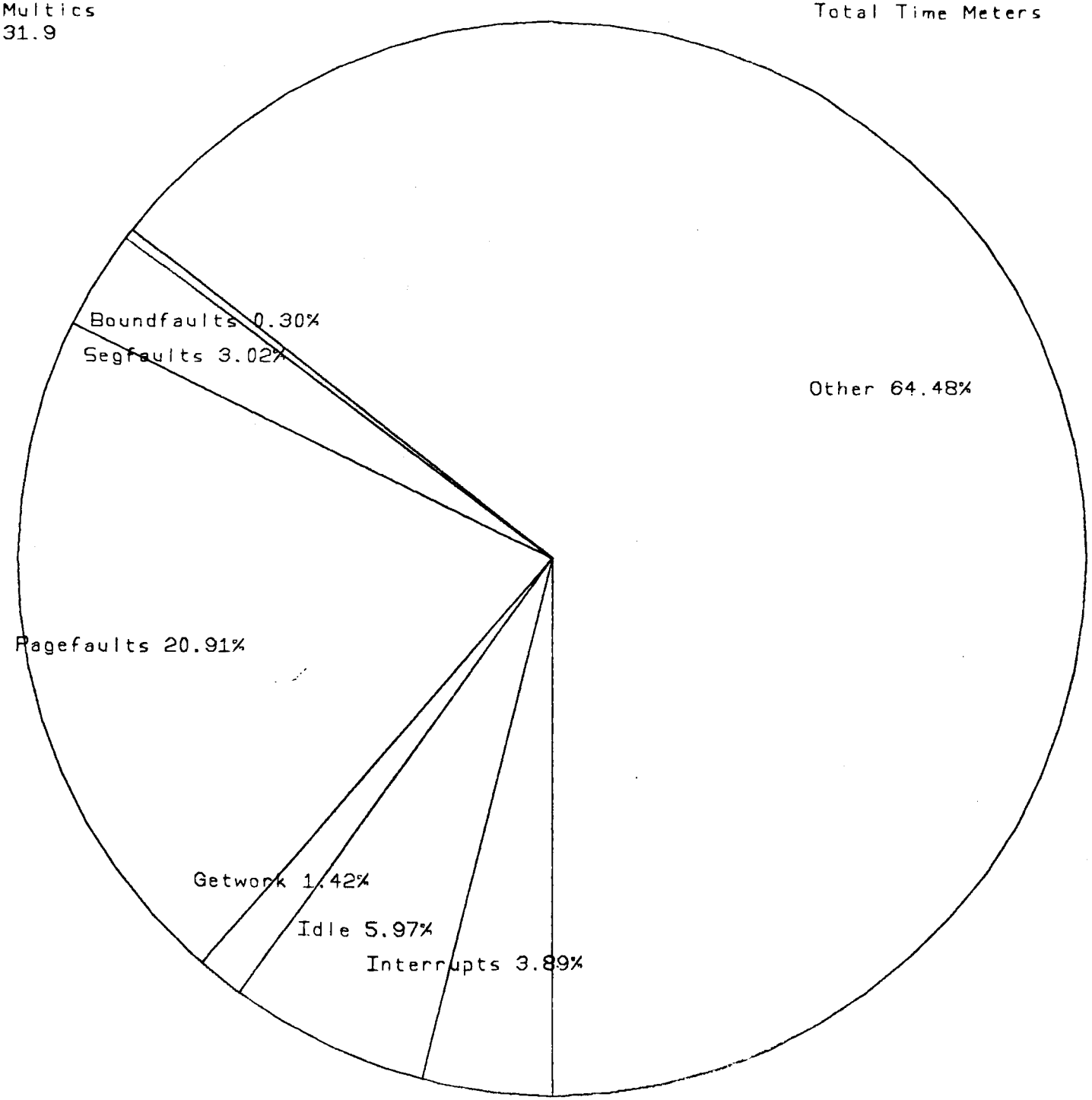
PAGE FAULTS 10¹
45000
47500
50000
52500
55000
57500
60000
62500
65
MSS 28.0 - 32.4

Idle Time



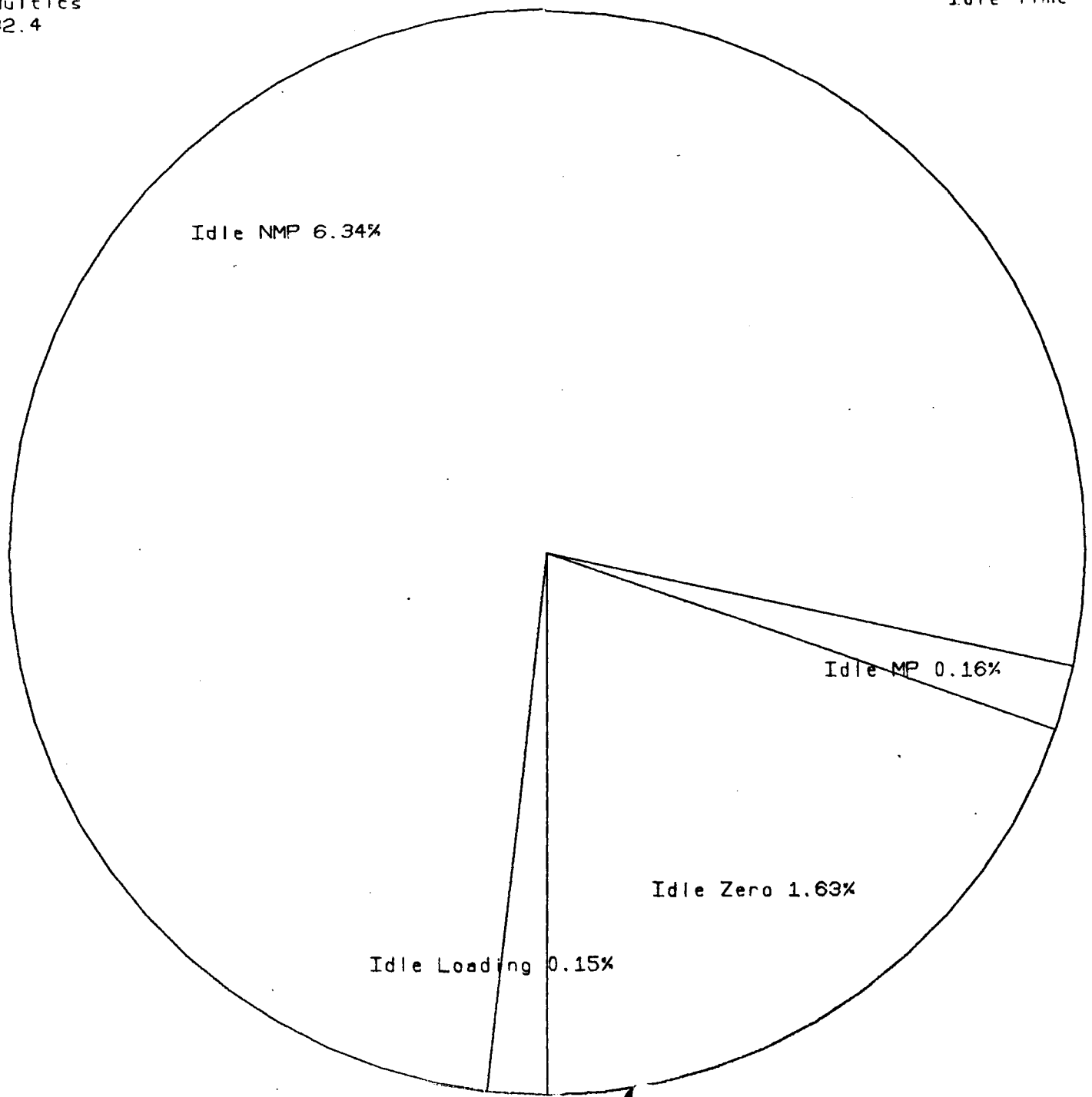
Multics
31.9

Total Time Meters



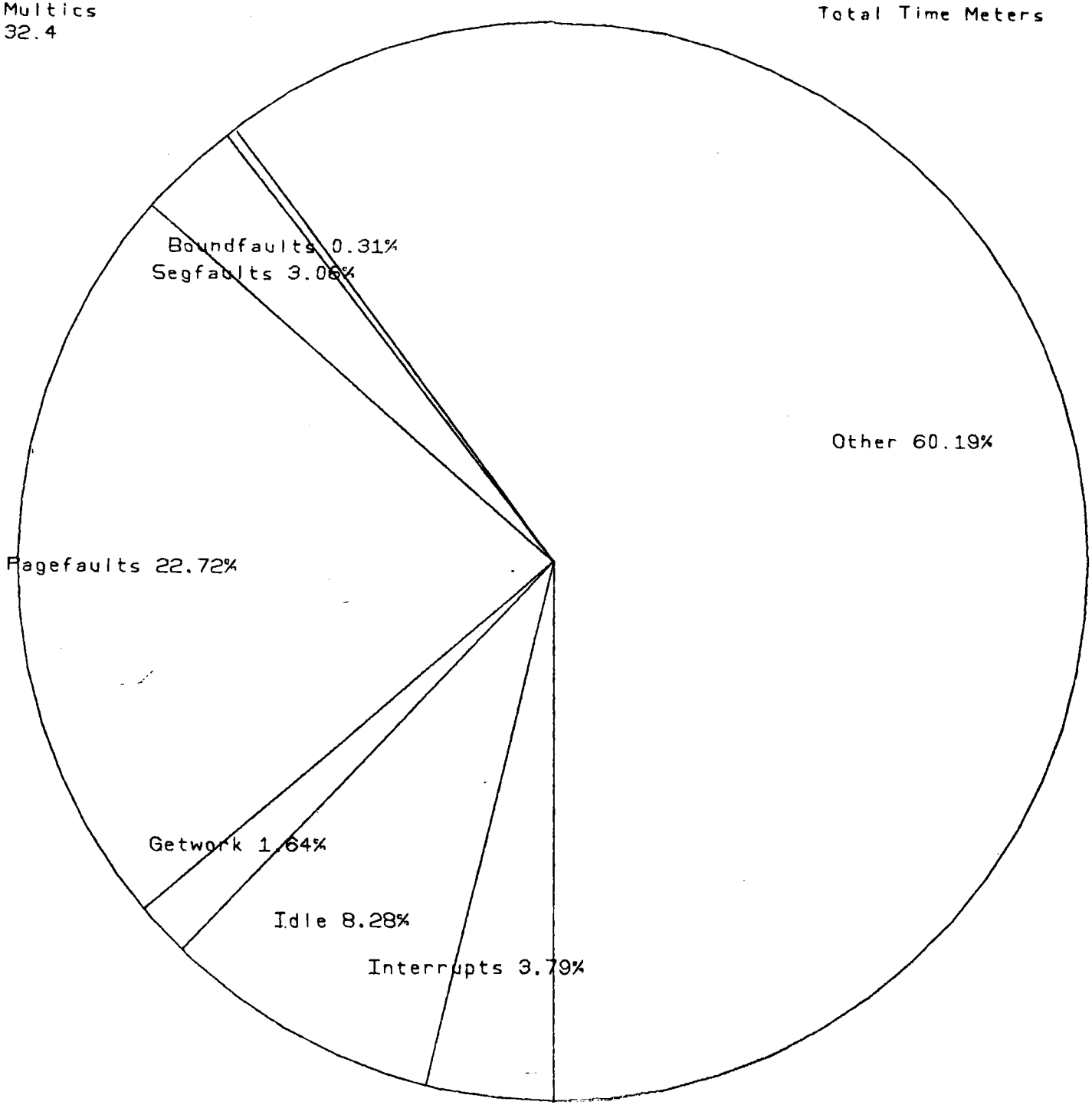
Multics
32.4

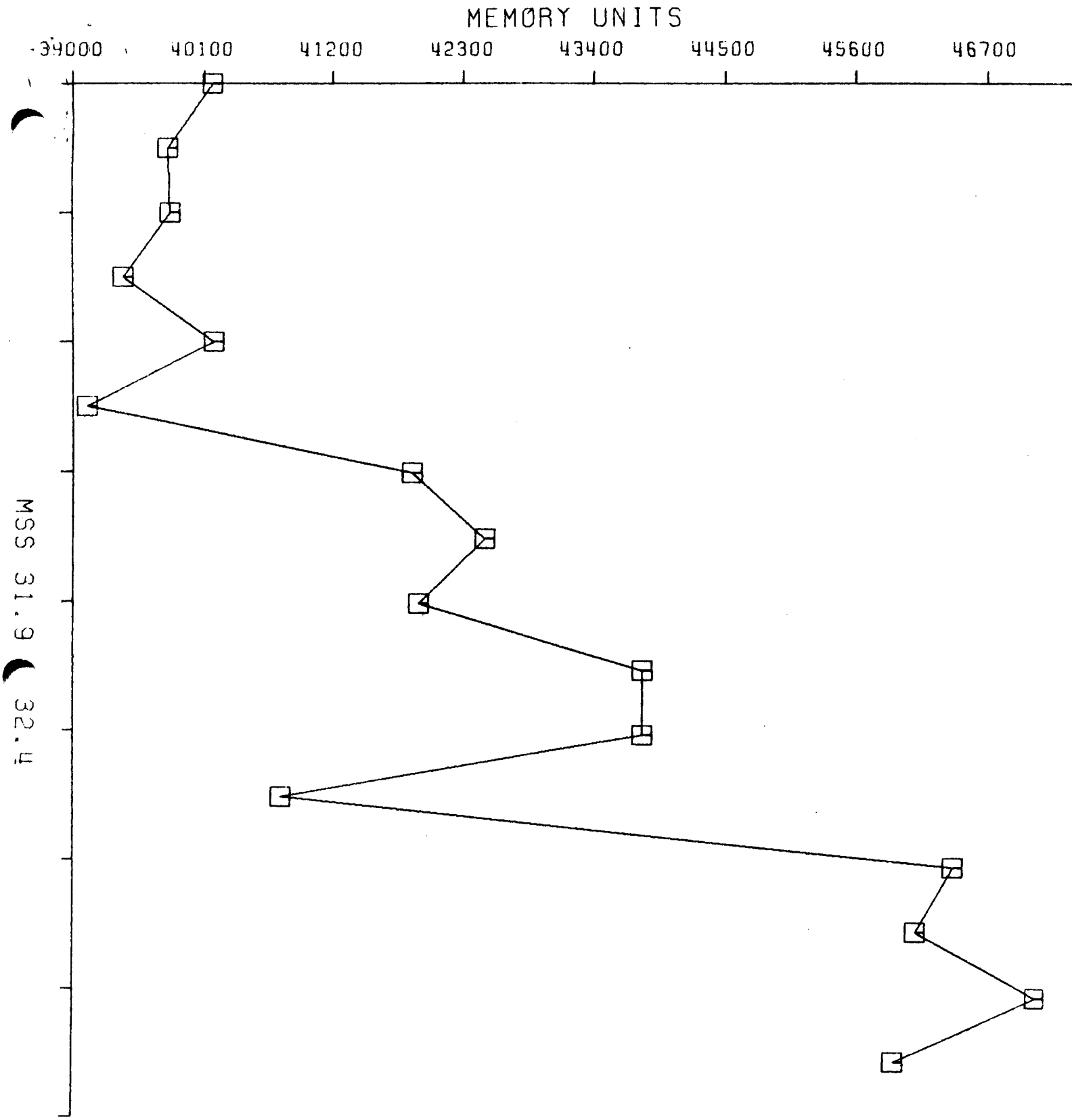
Idle Time

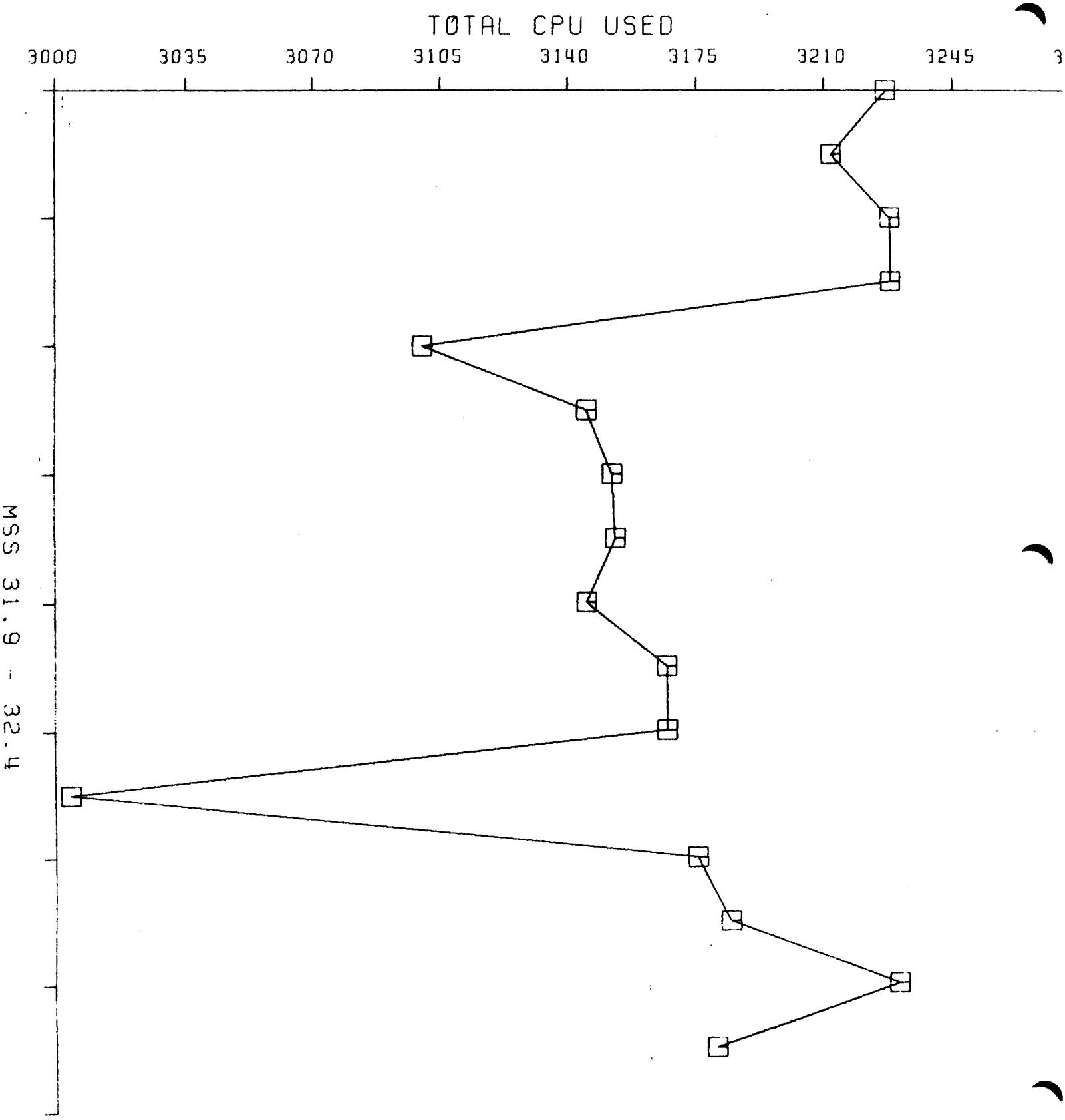


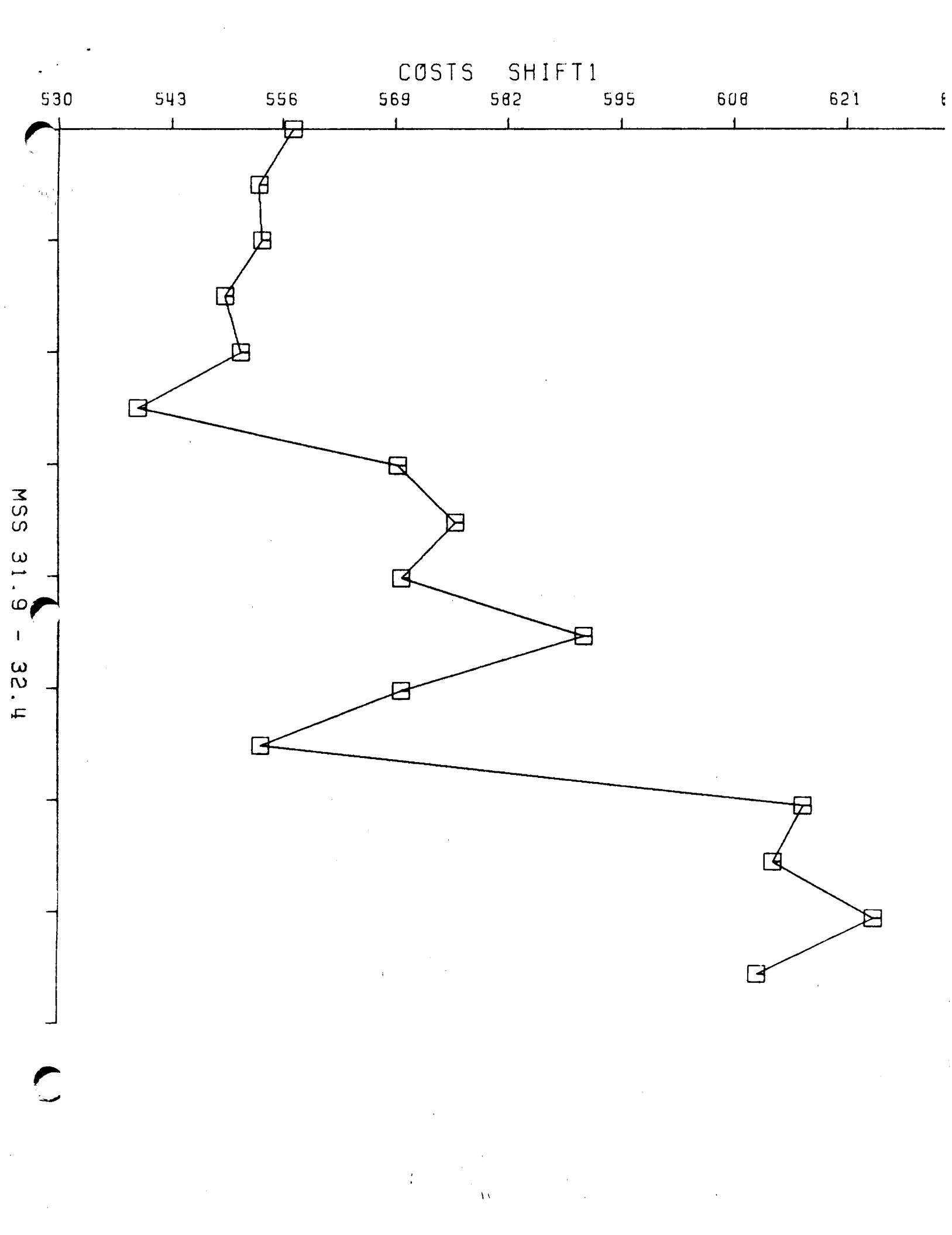
Multics
32.4

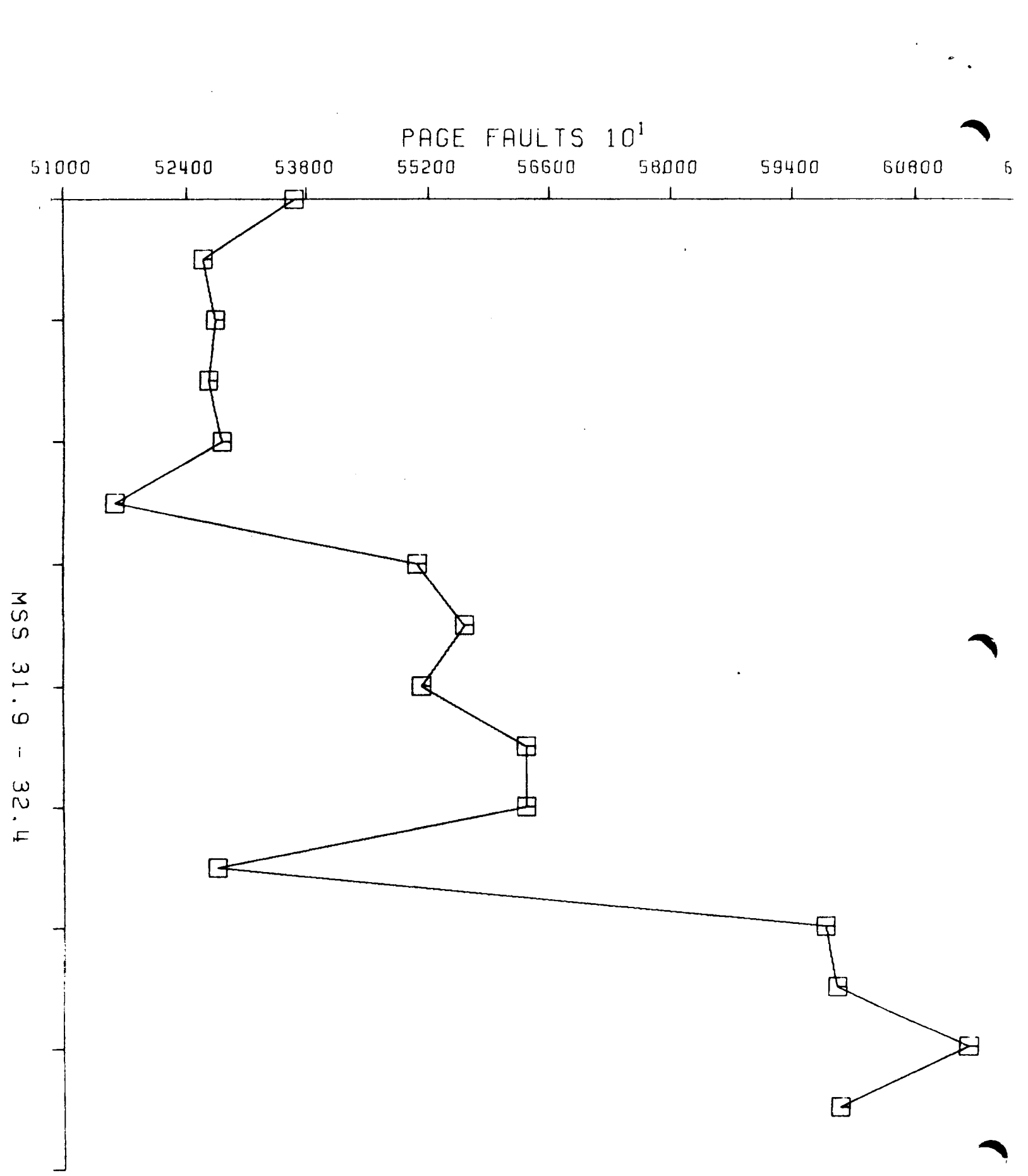
Total Time Meters

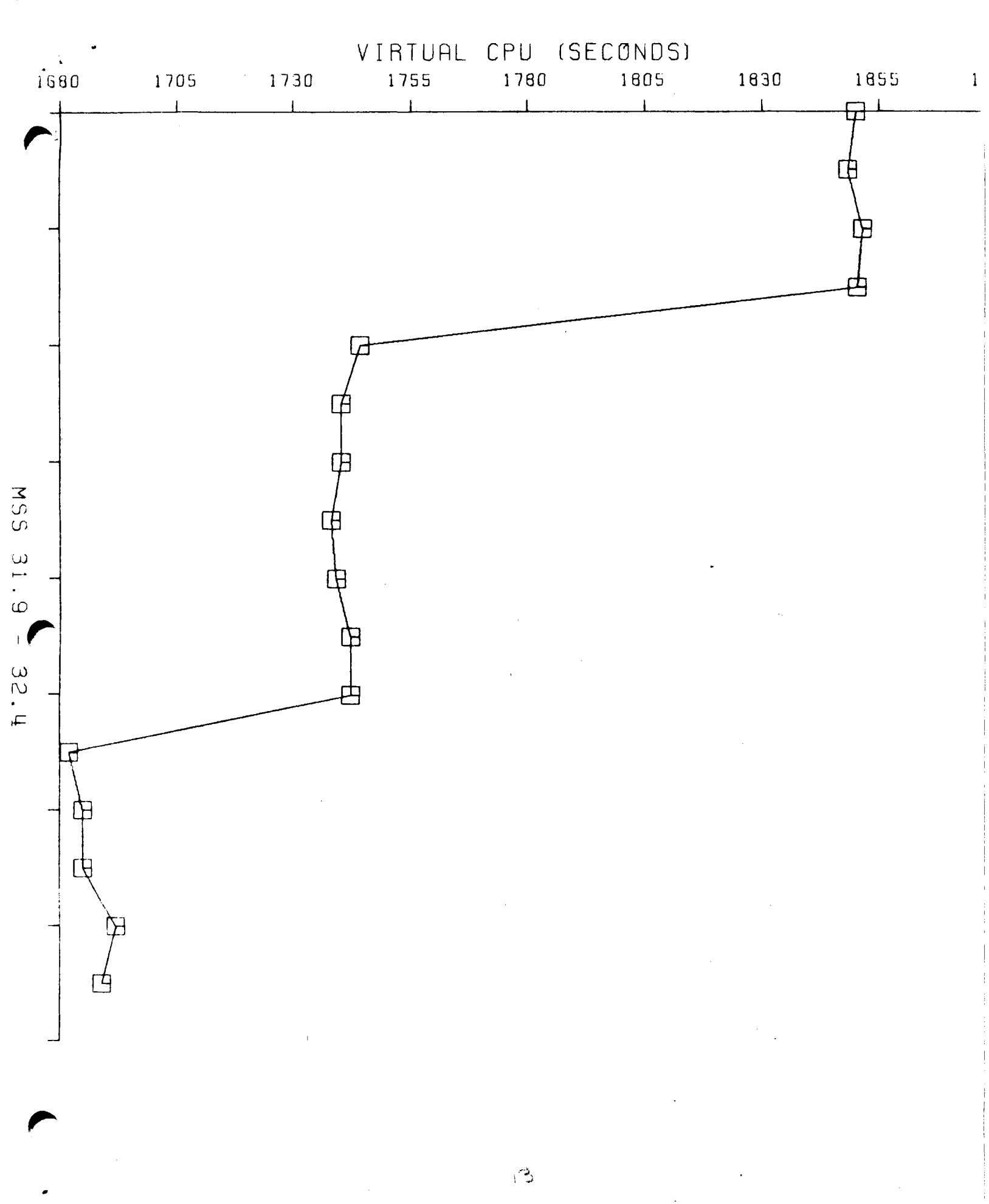


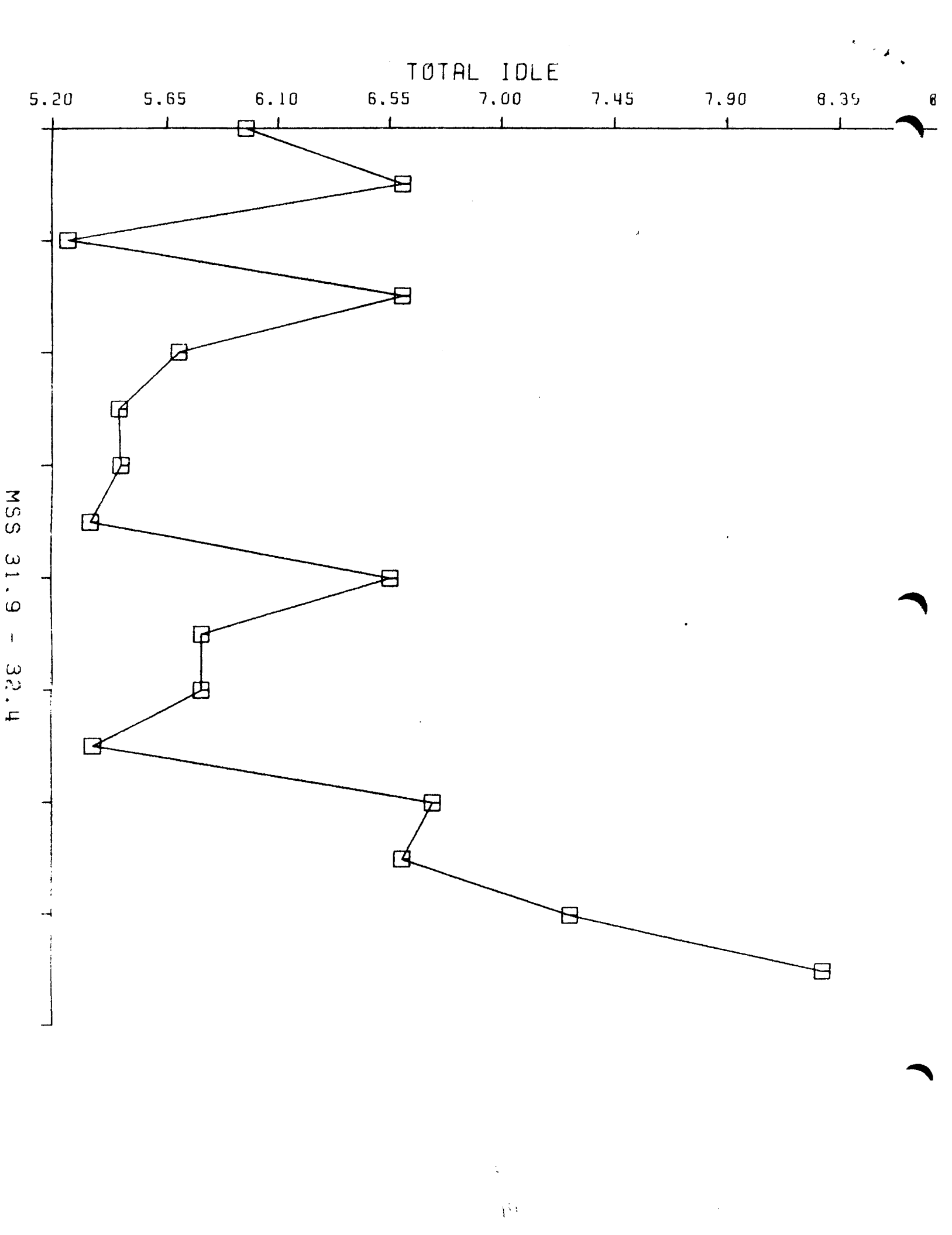

MEMORY UNITS
39000
40100
41200
42300
43400
44500
45600
46700
MSS 31.9 32.4

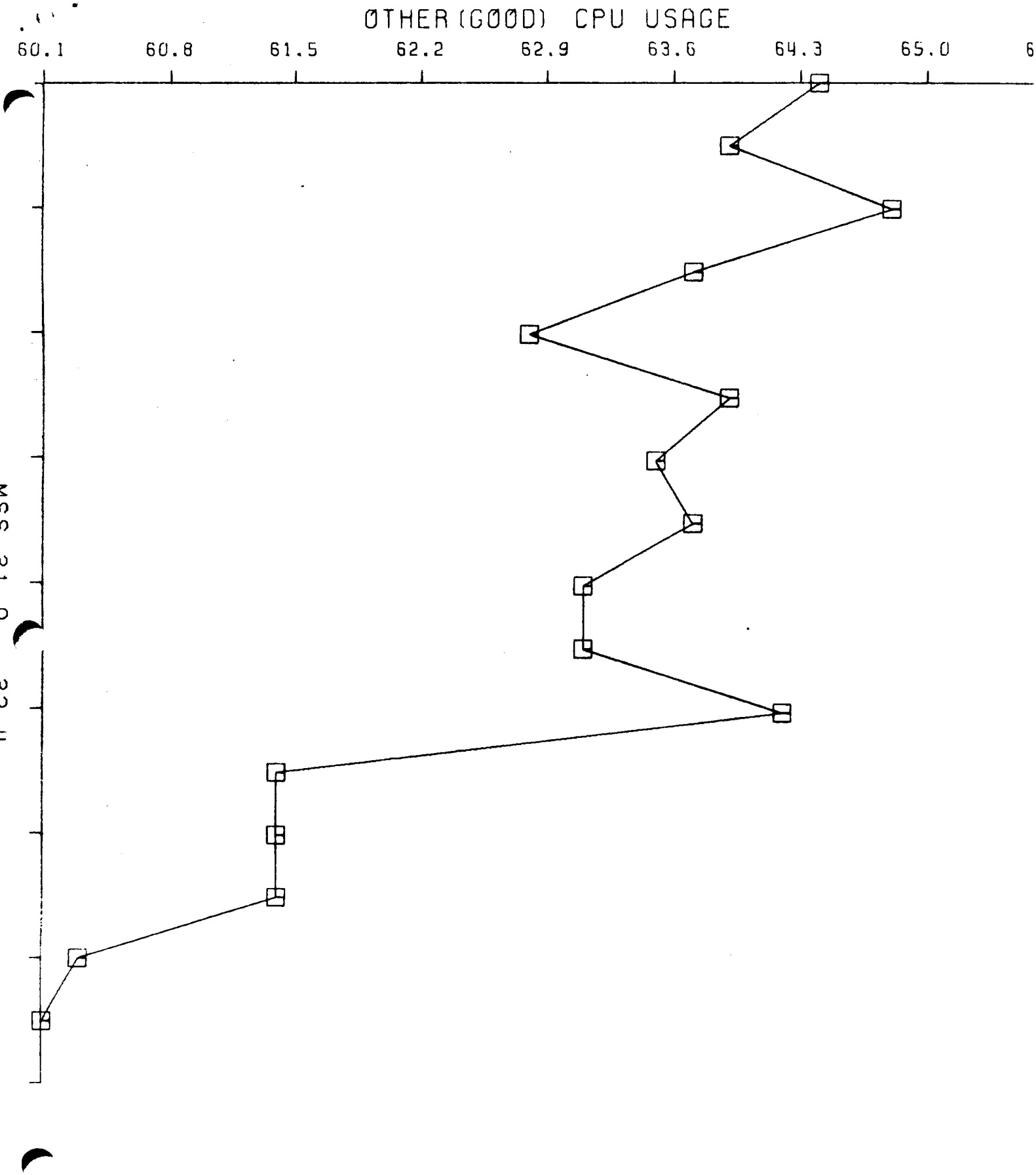

TOTAL CPU USED
3000
3035
3070
3105
3140
3175
3210
3245
MSS 31.9 - 32.4


COSTS SHIFT1
530
543
556
569
582
595
608
621
MSS 31.9 - 32.4


PAGE FAULTS 10¹
51000
52400
53800
55200
56600
58000
59400
60800
MSS 31.9 - 32.4


VIRTUAL CPU (SECONDS)
1680
1705
1730
1755
1780
1805
1830
1855
1
MSS 31.9 - 32.4


TOTAL IDLE
5.20
5.65
6.10
6.55
7.00
7.45
7.90
8.35
MSS 31.9 - 32.4


OTHER(GOOD) CPU USAGE
60.1
60.8
61.5
62.2
62.9
63.6
64.3
65.0
MSS 31.9 - 32.4