

# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	0.81	0.27	0.52	1.04	2.04	4.14	8.25	16.42	32.55
0.3	0.81	0.27	0.52	1.04	2.04	4.14	8.26	16.43	32.56
0.5	0.81	0.27	0.52	1.04	2.04	4.15	8.26	16.44	32.57
1	0.82	0.27	0.52	1.04	2.04	4.14	8.25	16.43	32.56
5	0.84	0.27	0.52	1.04	2.04	4.14	8.25	16.43	32.55
10	0.84	0.27	0.52	1.04	2.04	4.14	8.25	16.42	32.55
50	0.84	0.27	0.52	1.03	2.03	4.12	8.22	16.39	32.52
100	0.87	0.27	0.52	1.04	2.04	4.13	8.23	16.40	32.53
200	0.90	0.26	0.52	1.03	2.04	4.13	8.23	16.40	32.52
300	0.92	0.26	0.52	1.04	2.04	4.14	8.25	16.42	32.53
400	0.95	0.26	0.52	1.04	2.05	4.14	8.25	16.42	32.53
500	0.98	0.26	0.52	1.04	2.05	4.14	8.25	16.42	32.53
600	1.01	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
700	1.05	0.26	0.52	1.04	2.05	4.15	8.26	16.42	32.53
800	1.08	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.52
900	1.11	0.26	0.52	1.04	2.05	4.15	8.26	16.42	32.52
1000	1.14	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1100	1.17	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1200	1.20	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1300	1.23	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1400	1.26	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1500	1.29	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1600	1.31	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.56
1700	1.34	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.57
1800	1.36	0.26	0.52	1.04	2.05	4.15	8.26	16.44	32.58
1900	1.39	0.26	0.52	1.04	2.05	4.15	8.26	16.44	32.59
2000	1.42	0.26	0.52	1.04	2.05	4.14	8.26	16.43	32.60
2100	1.44	0.26	0.52	1.04	2.05	4.14	8.26	16.44	32.62
2200	1.46	0.26	0.52	1.04	2.05	4.15	8.27	16.46	32.66
2300	1.48	0.26	0.52	1.04	2.06	4.16	8.29	16.48	32.69
2400	1.50	0.26	0.52	1.04	2.06	4.16	8.29	16.49	32.72
2500	1.53	0.26	0.52	1.05	2.06	4.17	8.30	16.50	32.75
2600	1.56	0.26	0.52	1.05	2.06	4.17	8.30	16.51	32.77
2700	1.59	0.26	0.52	1.05	2.06	4.16	8.30	16.51	32.79
2800	1.62	0.26	0.52	1.04	2.05	4.16	8.29	16.50	32.79
2900	1.65	0.26	0.52	1.04	2.05	4.15	8.28	16.50	32.79
3000	1.67	0.26	0.52	1.04	2.05	4.15	8.28	16.50	32.79
3200	1.71	0.27	0.52	1.05	2.05	4.15	8.30	16.51	32.82
3400	1.77	0.27	0.52	1.05	2.05	4.17	8.33	16.57	33.03
3600	1.81	0.27	0.53	1.05	2.06	4.19	8.36	16.62	33.11
3800	1.84	0.27	0.53	1.06	2.07	4.20	8.38	16.65	33.16
4000	1.89	0.27	0.53	1.06	2.07	4.23	8.42	16.70	33.21
4200	1.95	0.28	0.53	1.07	2.08	4.24	8.44	16.73	33.25
4400	2.00	0.28	0.54	1.08	2.10	4.28	8.50	16.80	33.31
4600	2.05	0.29	0.55	1.08	2.10	4.30	8.52	16.82	33.32
4800	2.13	0.30	0.55	1.08	2.11	4.31	8.54	16.84	33.38
5000	2.20	0.30	0.56	1.09	2.11	4.32	8.56	16.87	33.48
5200	2.30	0.31	0.56	1.09	2.11	4.33	8.57	16.91	33.66
5400	2.32	0.31	0.57	1.10	2.12	4.36	8.61	16.95	33.62
5600	2.38	0.32	0.57	1.11	2.13	4.38	8.64	16.97	33.44
5800	2.49	0.33	0.58	1.11	2.13	4.38	8.64	16.96	33.38
6000	2.59	0.33	0.58	1.11	2.13	4.39	8.64	16.96	33.32
6200	2.70	0.34	0.59	1.11	2.13	4.39	8.64	16.95	33.26
6500	2.91	0.35	0.59	1.11	2.11	4.37	8.61	16.91	33.17
7000	3.19	0.35	0.59	1.12	2.09	4.35	8.59	16.88	32.97

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- C. The parts covered by this specification document are subject to Mini-Circuits' standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



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# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE								
	(dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	21.83	22.40	23.41	25.77	50.74	22.91	18.19	15.62	17.09
0.3	21.91	22.47	23.49	25.86	47.97	22.86	18.16	15.62	17.10
0.5	21.66	22.22	23.23	25.56	53.15	22.97	18.19	15.63	17.10
1	21.58	22.13	23.13	25.45	57.76	23.05	18.21	15.63	17.12
5	21.64	22.23	23.22	25.56	56.39	23.02	18.21	15.65	17.12
10	21.62	22.20	23.19	25.52	52.91	23.04	18.22	15.66	17.13
50	21.41	21.96	22.91	25.11	42.64	23.37	18.45	15.84	17.35
100	21.19	21.71	22.60	24.66	41.99	24.03	18.89	16.19	17.78
200	21.05	21.54	22.40	24.34	37.03	24.18	19.03	16.33	17.93
300	21.45	21.99	22.93	25.05	36.03	23.08	18.33	15.79	17.28
400	22.15	22.73	23.76	26.18	39.52	22.60	18.02	15.56	17.01
500	22.28	22.85	23.91	26.44	41.05	22.49	17.92	15.49	16.93
600	22.87	23.46	24.59	27.33	39.84	22.15	17.75	15.39	16.82
700	22.92	23.50	24.64	27.42	39.96	22.13	17.74	15.39	16.82
800	23.63	24.22	25.45	28.55	36.84	21.69	17.49	15.23	16.63
900	24.24	24.82	26.13	29.53	35.05	21.41	17.36	15.15	16.55
1000	24.19	24.77	26.06	29.44	35.33	21.45	17.38	15.17	16.58
1100	24.68	25.28	26.68	30.46	33.55	21.03	17.09	14.95	16.33
1200	24.74	25.25	26.62	30.48	32.15	20.84	16.99	14.86	16.22
1300	23.99	24.43	25.65	29.05	33.08	21.28	17.28	15.10	16.51
1400	24.30	24.69	25.93	29.46	32.00	21.11	17.22	15.08	16.49
1500	24.29	24.63	25.83	29.25	31.05	21.02	17.20	15.07	16.49
1600	24.37	24.63	25.77	29.10	29.77	20.78	17.10	15.00	16.42
1700	24.34	24.52	25.60	28.79	29.02	20.71	17.12	15.05	16.49
1800	24.54	24.64	25.70	28.84	28.35	20.53	17.05	15.02	16.46
1900	24.56	24.60	25.61	28.71	28.25	20.57	17.11	15.07	16.54
2000	24.47	24.46	25.43	28.48	28.20	20.67	17.22	15.18	16.68
2100	24.73	24.72	25.75	29.03	28.76	20.79	17.29	15.26	16.79
2200	25.36	25.26	26.30	29.76	28.00	20.36	17.01	15.05	16.54
2300	25.48	25.29	26.28	29.63	27.25	20.06	16.81	14.90	16.37
2400	24.76	24.48	25.33	28.12	26.07	19.79	16.71	14.82	16.29
2500	24.13	23.81	24.58	27.06	25.43	19.69	16.70	14.83	16.30
2600	23.29	22.96	23.62	25.81	24.67	19.61	16.74	14.86	16.34
2700	22.61	22.27	22.87	24.88	24.00	19.49	16.77	14.90	16.39
2800	21.85	21.53	22.12	24.08	23.88	19.82	17.11	15.19	16.75
2900	21.42	21.14	21.72	23.74	24.40	20.57	17.69	15.64	17.32
3000	21.62	21.37	21.98	24.21	25.74	21.55	18.29	16.13	17.95
3200	22.55	22.30	23.04	25.77	28.06	21.97	18.25	16.13	18.00
3400	22.93	22.70	23.46	26.49	29.82	22.25	18.24	16.15	18.04
3600	23.69	23.38	24.22	27.66	29.37	21.33	17.56	15.64	17.44
3800	23.47	23.18	24.06	27.65	30.24	21.41	17.49	15.61	17.44
4000	24.42	23.94	24.87	29.02	28.86	20.29	16.65	14.93	16.62
4200	23.38	22.96	23.91	27.82	28.56	20.20	16.49	14.79	16.47
4400	24.61	23.97	25.05	29.67	27.23	18.89	15.41	13.88	15.38
4600	21.65	21.09	21.89	24.87	24.58	18.70	15.47	13.88	15.43
4800	20.36	19.81	20.52	23.01	22.89	18.09	15.11	13.57	15.08
5000	19.23	18.75	19.42	21.60	21.75	17.86	15.08	13.58	15.13
5200	18.76	18.20	18.80	20.49	20.04	16.59	14.28	12.96	14.43
5400	18.47	17.92	18.49	20.00	19.52	16.31	14.18	12.95	14.44
5600	17.30	16.73	17.16	18.15	17.53	14.77	13.05	12.02	13.38
5800	14.96	14.55	14.97	15.88	15.75	13.98	12.74	11.75	13.08
6000	13.93	13.59	13.93	14.62	14.49	12.99	12.03	11.19	12.46
6200	12.69	12.45	12.80	13.51	13.58	12.60	12.01	11.24	12.53
6500	11.20	11.05	11.38	11.96	12.11	11.46	11.20	10.60	11.83
7000	9.91	9.89	10.19	10.75	11.02	10.93	11.20	10.79	12.09

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000	0000001	0000010	0000100	0001000	0010000	0100000	1000000	1111111
	0 dB	0.25 dB	0.5 dB	1.0 dB	2.0 dB	4.0 dB	8.0 dB	16 dB	31.75 dB
0.1	21.80	21.84	21.95	22.31	22.52	24.35	26.55	31.15	40.29
0.3	21.87	21.91	22.03	22.37	22.61	24.46	26.67	31.32	40.41
0.5	21.68	21.73	21.85	22.24	22.51	24.41	26.72	31.48	40.27
1	21.64	21.69	21.82	22.21	22.50	24.40	26.73	31.52	40.40
5	21.71	21.78	21.91	22.28	22.57	24.46	26.78	31.55	40.61
10	21.69	21.76	21.88	22.26	22.55	24.43	26.75	31.50	40.73
50	21.50	21.55	21.66	22.01	22.25	23.99	26.10	30.32	44.61
100	21.37	21.40	21.48	21.77	21.93	23.45	25.23	28.80	60.02
200	21.29	21.32	21.41	21.68	21.87	23.30	24.97	28.13	36.09
300	21.30	21.38	21.53	21.87	22.26	23.98	26.05	29.62	33.32
400	21.60	21.68	21.86	22.23	22.71	24.58	26.88	30.71	32.43
500	22.17	22.26	22.46	22.84	23.39	25.38	27.86	31.96	31.61
600	22.33	22.42	22.64	23.03	23.66	25.71	28.34	32.50	31.12
700	22.79	22.90	23.13	23.53	24.22	26.35	29.08	32.93	30.06
800	23.04	23.16	23.41	23.82	24.59	26.81	29.68	33.58	29.70
900	23.17	23.29	23.55	23.93	24.73	26.90	29.61	32.76	28.98
1000	23.81	23.95	24.23	24.58	25.50	27.77	30.42	32.27	27.55
1100	24.39	24.57	24.88	25.28	26.36	28.96	31.83	32.54	26.74
1200	25.39	25.57	25.92	26.38	27.58	30.57	33.70	32.84	26.20
1300	26.83	26.97	27.35	27.82	29.10	32.52	36.12	33.60	26.07
1400	27.00	27.11	27.51	28.02	29.36	33.05	37.16	33.88	26.01
1500	27.92	28.01	28.44	29.01	30.42	34.58	38.76	33.49	25.64
1600	28.51	28.53	29.00	29.71	31.15	35.96	41.66	33.71	25.51
1700	28.79	28.72	29.20	29.97	31.33	36.23	43.03	33.96	25.52
1800	29.31	29.21	29.70	30.57	31.96	37.27	43.42	33.31	25.19
1900	30.30	30.12	30.68	31.72	33.12	39.27	45.10	32.87	24.89
2000	31.16	30.78	31.34	32.54	33.74	39.93	46.90	33.05	24.88
2100	32.04	31.64	32.21	33.20	34.54	41.16	44.76	32.65	24.68
2200	31.74	31.44	32.05	33.12	34.72	42.37	42.65	31.77	24.24
2300	31.96	31.61	32.32	33.64	35.44	45.00	40.86	30.92	23.78
2400	32.74	32.13	32.90	34.88	36.51	47.81	38.94	30.12	23.34
2500	33.38	32.51	33.32	36.02	37.39	45.63	37.14	29.38	22.92
2600	31.97	30.96	31.71	34.78	35.30	39.46	36.21	29.09	22.70
2700	30.75	29.75	30.42	33.40	33.67	36.98	35.90	29.07	22.64
2800	30.92	29.78	30.39	33.71	33.45	35.40	34.14	28.33	22.22
2900	31.21	29.98	30.46	33.70	32.77	33.05	32.01	27.46	21.75
3000	31.09	29.89	30.25	33.10	31.88	31.58	30.96	27.13	21.57
3200	30.91	29.54	29.73	32.22	30.66	30.01	29.70	26.68	21.31
3400	34.55	32.21	32.38	35.89	32.93	31.70	31.08	27.53	21.59
3600	38.33	35.16	35.01	38.65	34.40	31.39	29.38	25.82	20.51
3800	33.99	32.85	32.40	33.65	31.25	28.50	26.67	23.86	19.32
4000	32.05	30.99	30.46	31.17	28.95	26.31	24.56	22.17	18.21
4200	26.81	26.25	25.90	26.34	24.85	23.03	21.81	20.12	16.87
4400	24.86	23.83	23.54	24.04	22.42	20.75	19.71	18.45	15.79
4600	22.70	21.63	21.45	22.05	20.65	19.41	18.75	17.90	15.57
4800	20.07	19.17	19.10	19.72	18.70	17.87	17.52	16.99	15.02
5000	18.85	17.98	17.94	18.50	17.57	16.90	16.71	16.46	14.83
5200	17.61	16.81	16.82	17.39	16.67	16.26	16.30	16.27	14.86
5400	17.65	16.80	16.81	17.34	16.55	16.11	16.15	16.23	14.94
5600	16.35	15.57	15.62	16.13	15.52	15.20	15.32	15.43	14.29
5800	14.38	13.77	13.83	14.28	13.85	13.72	13.96	14.24	13.50
6000	13.61	13.07	13.16	13.61	13.32	13.36	13.76	14.20	13.64
6200	12.55	12.10	12.19	12.61	12.41	12.59	13.10	13.67	13.38
6500	11.13	10.79	10.91	11.31	11.25	11.62	12.30	13.05	13.08
7000	9.63	9.40	9.53	9.90	9.94	10.47	11.29	12.23	12.69

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	0.94	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.31
0.3	0.94	0.26	0.52	1.02	2.00	4.06	8.13	16.25	32.32
0.5	0.94	0.26	0.51	1.02	2.00	4.06	8.13	16.25	32.32
1	0.95	0.26	0.51	1.02	2.00	4.06	8.13	16.25	32.32
5	0.97	0.26	0.51	1.02	2.00	4.05	8.12	16.24	32.31
10	0.97	0.26	0.51	1.02	2.00	4.05	8.12	16.24	32.31
50	0.97	0.26	0.51	1.02	1.99	4.05	8.11	16.23	32.30
100	1.00	0.26	0.51	1.02	2.00	4.06	8.13	16.24	32.31
200	1.03	0.26	0.51	1.02	2.00	4.06	8.13	16.24	32.31
300	1.07	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.30
400	1.11	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.29
500	1.15	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
600	1.19	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
700	1.23	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
800	1.27	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.27
900	1.31	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1000	1.35	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1100	1.38	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1200	1.42	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.28
1300	1.45	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.28
1400	1.48	0.26	0.51	1.02	2.01	4.06	8.12	16.24	32.29
1500	1.51	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.30
1600	1.54	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.31
1700	1.56	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.32
1800	1.60	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.33
1900	1.63	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.34
2000	1.66	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.36
2100	1.70	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.37
2200	1.73	0.26	0.51	1.02	2.01	4.06	8.14	16.26	32.40
2300	1.75	0.26	0.51	1.02	2.01	4.06	8.14	16.27	32.42
2400	1.78	0.26	0.51	1.02	2.01	4.06	8.14	16.27	32.44
2500	1.82	0.26	0.51	1.02	2.01	4.06	8.14	16.28	32.47
2600	1.85	0.26	0.51	1.02	2.00	4.06	8.14	16.28	32.49
2700	1.88	0.26	0.51	1.02	2.00	4.06	8.15	16.29	32.51
2800	1.92	0.26	0.51	1.02	2.00	4.06	8.15	16.29	32.53
2900	1.95	0.26	0.51	1.02	2.00	4.06	8.15	16.30	32.54
3000	1.97	0.26	0.51	1.03	2.00	4.06	8.16	16.31	32.54
3200	2.03	0.26	0.51	1.03	2.01	4.07	8.17	16.32	32.60
3400	2.08	0.27	0.52	1.03	2.01	4.08	8.19	16.36	32.77
3600	2.13	0.27	0.52	1.04	2.02	4.09	8.21	16.40	32.85
3800	2.18	0.27	0.52	1.04	2.02	4.11	8.24	16.43	32.92
4000	2.23	0.28	0.53	1.04	2.03	4.13	8.27	16.47	32.97
4200	2.29	0.28	0.53	1.05	2.03	4.14	8.29	16.50	33.01
4400	2.34	0.28	0.53	1.05	2.04	4.16	8.32	16.54	33.05
4600	2.40	0.29	0.54	1.06	2.05	4.19	8.36	16.58	33.10
4800	2.47	0.29	0.55	1.07	2.07	4.21	8.39	16.62	33.21
5000	2.56	0.30	0.55	1.07	2.07	4.23	8.42	16.66	33.34
5200	2.66	0.31	0.56	1.08	2.08	4.26	8.45	16.72	33.54
5400	2.74	0.31	0.57	1.08	2.09	4.27	8.47	16.73	33.41
5600	2.83	0.32	0.57	1.09	2.09	4.28	8.48	16.73	33.28
5800	2.93	0.33	0.58	1.09	2.09	4.28	8.48	16.72	33.24
6000	3.03	0.33	0.58	1.10	2.08	4.29	8.49	16.73	33.20
6200	3.16	0.34	0.59	1.10	2.08	4.29	8.49	16.72	33.15
6500	3.35	0.35	0.60	1.11	2.07	4.29	8.49	16.70	33.10
7000	3.61	0.36	0.60	1.13	2.07	4.30	8.51	16.70	32.97

**Notes**

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	18.79	20.44	21.29	22.58	31.50	29.93	22.58	18.98	21.32
0.3	18.60	20.52	21.36	22.66	31.62	29.79	22.53	18.97	21.32
0.5	18.55	20.37	21.22	22.52	31.28	29.99	22.55	18.97	21.32
1	18.59	20.36	21.19	22.49	31.18	30.07	22.57	18.99	21.33
5	18.59	20.42	21.27	22.58	31.36	29.96	22.55	18.99	21.33
10	18.59	20.41	21.26	22.56	31.31	30.00	22.56	19.00	21.34
50	18.61	20.32	21.17	22.46	31.06	30.18	22.62	19.03	21.38
100	18.59	20.28	21.14	22.43	30.95	30.25	22.65	19.06	21.39
200	18.62	20.36	21.21	22.51	31.08	30.21	22.65	19.08	21.43
300	18.57	20.52	21.36	22.68	31.42	30.02	22.61	19.07	21.43
400	18.53	20.71	21.54	22.87	31.81	29.77	22.52	19.05	21.40
500	18.53	20.97	21.80	23.18	32.53	29.31	22.35	18.96	21.29
600	18.51	21.25	22.09	23.52	33.38	28.80	22.14	18.85	21.15
700	18.56	21.62	22.47	23.96	34.61	28.20	21.89	18.71	20.98
800	18.56	21.99	22.85	24.41	35.96	27.65	21.65	18.57	20.81
900	18.54	22.28	23.14	24.76	36.96	27.28	21.51	18.50	20.72
1000	18.58	22.48	23.32	25.00	37.55	27.01	21.39	18.43	20.65
1100	18.58	22.82	23.65	25.40	38.69	26.61	21.22	18.34	20.54
1200	18.62	23.12	23.95	25.78	39.10	26.21	21.05	18.25	20.43
1300	18.57	23.53	24.36	26.28	39.16	25.73	20.86	18.14	20.31
1400	18.46	23.67	24.49	26.46	37.78	25.43	20.75	18.08	20.25
1500	18.45	23.68	24.45	26.45	36.85	25.32	20.72	18.06	20.24
1600	18.42	23.58	24.29	26.28	35.34	25.16	20.66	18.03	20.21
1700	18.48	23.50	24.17	26.18	33.99	24.95	20.61	18.01	20.19
1800	18.38	23.49	24.11	26.12	32.67	24.66	20.54	17.99	20.17
1900	18.23	23.29	23.85	25.80	31.35	24.50	20.57	18.04	20.25
2000	18.27	22.98	23.47	25.35	30.30	24.47	20.67	18.14	20.40
2100	18.20	22.83	23.26	25.12	29.82	24.48	20.77	18.24	20.54
2200	18.25	22.67	23.06	24.88	29.26	24.40	20.81	18.30	20.64
2300	18.18	22.49	22.83	24.63	28.73	24.33	20.86	18.37	20.74
2400	18.22	22.26	22.57	24.33	28.21	24.32	20.98	18.49	20.91
2500	18.17	22.00	22.30	24.03	27.88	24.44	21.17	18.65	21.14
2600	18.09	21.81	22.10	23.81	27.69	24.64	21.37	18.82	21.39
2700	18.08	21.84	22.11	23.85	27.86	24.82	21.50	18.94	21.57
2800	17.96	21.86	22.10	23.85	27.83	24.85	21.55	19.00	21.68
2900	17.95	21.89	22.09	23.86	28.05	25.18	21.75	19.16	21.93
3000	17.85	22.10	22.30	24.12	28.63	25.44	21.78	19.18	21.99
3200	17.75	22.13	22.35	24.23	29.70	26.42	22.03	19.33	22.22
3400	17.15	21.90	22.17	24.10	29.68	26.46	21.93	19.27	22.18
3600	16.51	22.18	22.45	24.54	30.77	26.20	21.51	18.98	21.81
3800	16.02	22.65	22.92	25.23	32.37	25.64	20.92	18.56	21.25
4000	15.55	23.31	23.64	26.31	34.71	24.73	20.11	17.96	20.46
4200	14.91	24.23	24.68	28.00	35.78	23.16	19.01	17.10	19.37
4400	14.35	24.34	24.57	28.03	31.66	21.83	18.22	16.45	18.57
4600	14.21	23.50	23.66	26.71	28.53	20.82	17.62	15.97	18.00
4800	14.17	23.24	23.20	25.81	26.19	19.62	16.80	15.30	17.21
5000	14.24	21.74	21.62	23.44	23.29	18.24	15.92	14.59	16.36
5200	14.10	19.66	19.67	21.11	21.28	17.45	15.54	14.28	16.00
5400	13.98	17.61	17.72	18.90	19.36	16.62	15.24	14.11	15.83
5600	13.83	15.99	16.10	17.03	17.48	15.40	14.46	13.53	15.16
5800	14.19	14.57	14.72	15.54	16.06	14.57	14.03	13.24	14.82
6000	16.22	13.65	13.88	14.65	15.23	14.10	13.85	13.19	14.77
6200	19.09	12.88	13.15	13.87	14.48	13.59	13.56	13.03	14.61
6500	23.41	11.76	12.05	12.72	13.40	12.94	13.29	12.94	14.51
7000	23.01	10.82	11.25	11.90	12.59	12.56	13.37	13.29	14.93

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000	0000001	0000010	0000100	0001000	0010000	0100000	1000000	1111111
	0 dB	0.25 dB	0.5 dB	1.0 dB	2.0 dB	4.0 dB	8.0 dB	16 dB	31.75 dB
0.1	20.40	20.19	20.07	19.99	19.54	19.91	20.26	21.71	26.97
0.3	20.46	20.26	20.14	20.05	19.61	19.99	20.33	21.77	26.95
0.5	20.28	20.09	20.00	19.92	19.54	19.96	20.37	21.84	27.05
1	20.20	20.03	19.94	19.88	19.52	19.96	20.38	21.87	27.05
5	20.27	20.11	20.01	19.95	19.58	20.02	20.43	21.90	27.03
10	20.27	20.11	20.01	19.95	19.58	20.01	20.42	21.90	27.01
50	20.17	20.01	19.91	19.86	19.50	19.93	20.36	21.82	26.84
100	20.08	19.93	19.84	19.80	19.46	19.91	20.35	21.81	26.75
200	20.15	19.99	19.91	19.86	19.54	19.97	20.39	21.83	26.58
300	20.25	20.09	20.02	19.96	19.66	20.08	20.50	21.91	26.44
400	20.52	20.35	20.28	20.21	19.92	20.29	20.69	22.06	26.34
500	20.70	20.52	20.46	20.39	20.14	20.51	20.91	22.27	26.28
600	21.08	20.88	20.83	20.74	20.50	20.84	21.22	22.55	26.28
700	21.31	21.12	21.07	20.97	20.79	21.12	21.51	22.82	26.24
800	21.73	21.52	21.48	21.36	21.19	21.50	21.85	23.12	26.19
900	22.12	21.92	21.88	21.74	21.60	21.87	22.22	23.45	26.14
1000	22.68	22.48	22.44	22.26	22.13	22.36	22.66	23.84	26.14
1100	23.05	22.85	22.82	22.63	22.54	22.77	23.08	24.24	26.13
1200	23.57	23.35	23.32	23.10	23.01	23.22	23.50	24.61	26.11
1300	24.03	23.78	23.75	23.51	23.42	23.62	23.89	24.96	26.05
1400	24.57	24.30	24.25	23.99	23.87	24.04	24.26	25.28	25.97
1500	25.10	24.79	24.72	24.43	24.30	24.44	24.63	25.59	25.89
1600	25.62	25.27	25.19	24.87	24.74	24.85	25.00	25.89	25.76
1700	26.15	25.77	25.69	25.34	25.20	25.29	25.38	26.17	25.59
1800	26.64	26.22	26.16	25.79	25.64	25.72	25.76	26.42	25.34
1900	27.35	26.87	26.82	26.42	26.23	26.26	26.22	26.72	25.12
2000	28.11	27.57	27.53	27.11	26.87	26.90	26.80	27.14	24.93
2100	28.73	28.14	28.10	27.71	27.43	27.50	27.39	27.61	24.82
2200	29.42	28.74	28.69	28.33	27.96	28.08	27.96	28.05	24.73
2300	30.01	29.21	29.14	28.86	28.37	28.57	28.46	28.48	24.68
2400	30.60	29.65	29.56	29.35	28.73	28.98	28.87	28.75	24.56
2500	31.44	30.32	30.20	30.02	29.24	29.49	29.27	28.86	24.28
2600	32.71	31.39	31.23	31.00	30.06	30.25	29.79	28.96	23.90
2700	34.16	32.58	32.41	32.14	31.00	31.19	30.50	29.10	23.51
2800	36.14	34.02	33.83	33.71	32.17	32.45	31.50	29.44	23.21
2900	38.72	35.67	35.48	35.62	33.50	33.97	32.73	29.86	22.95
3000	42.04	37.50	37.30	37.56	34.88	35.51	33.92	30.10	22.68
3200	48.40	39.83	40.00	42.29	37.55	39.63	36.91	30.36	22.05
3400	41.59	38.45	38.83	54.89	38.25	45.56	42.96	30.37	21.33
3600	35.20	34.71	34.78	40.14	34.76	37.83	40.47	30.02	20.78
3800	32.97	32.70	32.57	35.98	32.09	33.38	34.77	28.93	20.21
4000	31.03	30.53	30.25	32.64	29.30	29.71	30.32	27.17	19.48
4200	28.76	27.84	27.64	29.54	26.59	26.73	27.26	25.76	19.00
4400	26.70	25.55	25.46	26.99	24.41	24.45	24.93	24.35	18.57
4600	24.93	23.70	23.56	24.75	22.40	22.32	22.63	22.55	17.91
4800	22.52	21.34	21.17	22.08	20.20	20.15	20.49	20.86	17.36
5000	20.55	19.48	19.33	20.08	18.57	18.58	18.99	19.69	17.10
5200	18.70	17.79	17.74	18.40	17.18	17.31	17.83	18.76	16.85
5400	17.06	16.29	16.29	16.87	15.89	16.10	16.69	17.80	16.59
5600	15.58	14.92	14.96	15.48	14.74	15.04	15.73	16.96	16.35
5800	14.49	13.92	13.94	14.40	13.81	14.16	14.88	16.19	16.11
6000	13.47	12.97	13.00	13.43	12.96	13.37	14.13	15.52	15.94
6200	12.52	12.10	12.18	12.59	12.23	12.72	13.55	15.02	15.88
6500	11.54	11.22	11.35	11.72	11.45	12.00	12.87	14.40	15.83
7000	10.47	10.25	10.32	10.64	10.50	11.11	12.02	13.64	15.96

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	1.04	0.26	0.52	1.02	1.98	4.02	8.06	16.13	32.15
0.3	1.04	0.26	0.52	1.02	1.98	4.02	8.07	16.14	32.16
0.5	1.04	0.26	0.52	1.03	1.99	4.02	8.07	16.14	32.16
1	1.05	0.26	0.52	1.02	1.98	4.02	8.06	16.14	32.15
5	1.07	0.26	0.52	1.02	1.98	4.02	8.06	16.13	32.15
10	1.07	0.26	0.51	1.02	1.98	4.02	8.06	16.14	32.15
50	1.07	0.26	0.51	1.02	1.98	4.01	8.05	16.12	32.14
100	1.09	0.26	0.52	1.02	1.98	4.02	8.07	16.14	32.16
200	1.12	0.26	0.51	1.02	1.99	4.02	8.07	16.15	32.16
300	1.17	0.26	0.51	1.02	1.99	4.02	8.06	16.14	32.14
400	1.21	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.13
500	1.25	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.13
600	1.29	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.12
700	1.33	0.26	0.51	1.02	1.99	4.02	8.06	16.12	32.12
800	1.37	0.26	0.51	1.02	1.99	4.01	8.06	16.12	32.12
900	1.41	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1000	1.45	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1100	1.49	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1200	1.53	0.26	0.51	1.03	1.99	4.02	8.06	16.12	32.13
1300	1.56	0.26	0.51	1.03	1.99	4.02	8.06	16.13	32.13
1400	1.59	0.26	0.51	1.03	2.00	4.02	8.06	16.13	32.14
1500	1.62	0.26	0.51	1.03	2.00	4.02	8.06	16.13	32.15
1600	1.65	0.26	0.51	1.03	2.00	4.02	8.07	16.14	32.16
1700	1.67	0.26	0.51	1.03	2.00	4.02	8.07	16.14	32.17
1800	1.70	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.19
1900	1.74	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.20
2000	1.77	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.22
2100	1.80	0.26	0.52	1.03	2.00	4.03	8.08	16.16	32.23
2200	1.83	0.26	0.52	1.03	2.00	4.03	8.09	16.17	32.25
2300	1.85	0.26	0.52	1.03	2.01	4.03	8.09	16.18	32.28
2400	1.88	0.26	0.52	1.03	2.01	4.04	8.10	16.18	32.30
2500	1.92	0.26	0.52	1.03	2.01	4.04	8.10	16.19	32.33
2600	1.95	0.26	0.52	1.03	2.01	4.04	8.10	16.19	32.35
2700	1.98	0.26	0.52	1.03	2.01	4.04	8.10	16.20	32.37
2800	2.02	0.26	0.52	1.03	2.01	4.04	8.11	16.21	32.40
2900	2.05	0.27	0.52	1.03	2.01	4.04	8.11	16.21	32.41
3000	2.07	0.27	0.52	1.04	2.01	4.04	8.11	16.22	32.40
3200	2.13	0.27	0.52	1.04	2.01	4.05	8.12	16.23	32.47
3400	2.20	0.27	0.53	1.04	2.01	4.05	8.13	16.26	32.61
3600	2.26	0.27	0.53	1.04	2.02	4.07	8.16	16.29	32.70
3800	2.31	0.28	0.53	1.05	2.02	4.08	8.17	16.32	32.77
4000	2.37	0.28	0.54	1.05	2.03	4.09	8.19	16.35	32.83
4200	2.42	0.28	0.54	1.06	2.04	4.11	8.22	16.38	32.88
4400	2.46	0.29	0.55	1.06	2.05	4.13	8.26	16.43	32.93
4600	2.52	0.29	0.55	1.07	2.06	4.15	8.29	16.46	33.00
4800	2.60	0.30	0.55	1.07	2.06	4.17	8.31	16.49	33.11
5000	2.67	0.30	0.56	1.08	2.07	4.19	8.35	16.54	33.28
5200	2.77	0.31	0.57	1.09	2.08	4.23	8.39	16.60	33.41
5400	2.85	0.32	0.57	1.09	2.09	4.24	8.41	16.62	33.30
5600	2.95	0.33	0.58	1.10	2.09	4.26	8.43	16.62	33.22
5800	3.06	0.33	0.59	1.10	2.09	4.26	8.44	16.62	33.19
6000	3.19	0.34	0.59	1.11	2.09	4.27	8.45	16.62	33.17
6200	3.30	0.35	0.60	1.11	2.09	4.28	8.45	16.61	33.13
6500	3.52	0.35	0.60	1.12	2.07	4.27	8.45	16.60	33.11
7000	3.75	0.36	0.61	1.14	2.07	4.30	8.49	16.62	33.05

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE								
	(dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	19.53	19.61	20.74	26.16	54.67	28.87	23.09	23.09	27.43
0.3	19.63	19.68	20.82	26.24	53.61	28.77	23.06	23.06	27.42
0.5	19.46	19.53	20.68	26.01	57.71	28.81	23.05	23.05	27.40
1	19.40	19.47	20.62	25.91	61.61	28.82	23.06	23.06	27.39
5	19.46	19.56	20.70	26.03	57.46	28.77	23.06	23.06	27.38
10	19.44	19.53	20.68	25.99	56.30	28.76	23.06	23.06	27.37
50	19.33	19.43	20.60	25.88	46.48	28.55	22.93	22.93	27.11
100	19.29	19.41	20.63	26.01	44.03	27.92	22.54	22.54	26.47
200	19.49	19.61	20.90	26.58	43.41	27.26	22.16	22.16	25.88
300	19.50	19.59	20.83	26.23	40.17	27.84	22.60	22.60	26.60
400	19.74	19.80	20.99	26.35	40.34	28.24	22.92	22.92	27.17
500	19.84	19.89	21.08	26.47	41.92	28.27	22.97	22.97	27.24
600	20.12	20.14	21.35	26.86	40.64	28.02	22.90	22.90	27.16
700	20.34	20.33	21.55	27.11	39.33	27.90	22.91	22.91	27.22
800	20.75	20.71	21.95	27.71	38.61	27.65	22.84	22.84	27.14
900	21.00	20.95	22.21	28.10	37.88	27.45	22.77	22.77	27.06
1000	21.36	21.28	22.57	28.70	37.34	27.14	22.65	22.65	26.85
1100	21.79	21.68	23.01	29.50	35.58	26.63	22.39	22.39	26.48
1200	22.10	21.96	23.33	30.04	34.62	26.34	22.26	22.26	26.30
1300	22.11	21.97	23.32	29.94	35.46	26.50	22.38	22.38	26.48
1400	22.54	22.37	23.80	30.90	33.66	25.91	22.05	22.05	25.99
1500	22.48	22.30	23.75	30.68	33.39	25.97	22.11	22.11	26.13
1600	22.93	22.72	24.29	31.86	31.99	25.29	21.69	21.69	25.48
1700	22.98	22.74	24.37	31.91	31.10	25.01	21.51	21.51	25.24
1800	23.00	22.75	24.46	31.95	30.33	24.69	21.30	21.30	24.95
1900	22.86	22.58	24.35	31.46	29.88	24.61	21.28	21.28	24.94
2000	22.54	22.25	24.01	30.36	29.36	24.68	21.38	21.38	25.12
2100	22.10	21.83	23.52	29.32	29.52	25.10	21.70	21.70	25.65
2200	22.11	21.82	23.57	29.20	28.83	24.83	21.55	21.55	25.45
2300	22.00	21.69	23.46	28.90	28.55	24.80	21.57	21.57	25.50
2400	21.65	21.32	23.04	27.95	28.03	24.86	21.69	21.69	25.68
2500	21.63	21.30	23.03	27.98	28.24	25.01	21.80	21.80	25.89
2600	21.65	21.30	23.09	27.94	27.76	24.72	21.63	21.63	25.66
2700	21.60	21.25	23.07	27.83	27.54	24.64	21.60	21.60	25.63
2800	21.45	21.10	22.91	27.54	27.45	24.71	21.69	21.69	25.79
2900	21.42	21.06	22.85	27.48	27.62	24.87	21.82	21.82	26.06
3000	21.40	21.03	22.79	27.43	28.07	25.22	22.09	22.09	26.54
3200	21.29	20.89	22.68	27.32	28.05	25.10	21.96	21.96	26.34
3400	20.84	20.48	22.21	26.70	28.71	25.82	22.48	22.48	27.33
3600	21.21	20.79	22.66	27.47	28.55	25.14	22.01	22.01	26.60
3800	21.08	20.65	22.58	27.40	28.27	24.80	21.78	21.78	26.28
4000	21.80	21.32	23.54	29.13	28.04	23.88	21.11	21.11	25.22
4200	22.48	21.91	24.53	30.82	26.28	22.46	20.09	20.09	23.70
4400	24.16	23.45	26.88	36.91	25.33	21.14	19.05	19.05	22.09
4600	23.37	22.60	26.07	32.22	23.53	20.26	18.39	18.39	21.31
4800	23.24	22.35	25.81	28.33	21.12	18.62	17.09	17.09	19.61
5000	22.22	21.36	24.36	26.26	20.24	18.06	16.65	16.65	19.07
5200	20.13	19.46	21.74	22.87	18.51	16.92	15.72	15.72	17.88
5400	17.81	17.31	19.13	20.26	17.22	16.21	15.25	15.25	17.33
5600	16.34	15.97	17.56	18.70	16.40	15.83	15.07	15.07	17.12
5800	14.34	14.09	15.36	16.33	14.74	14.60	14.10	14.10	15.89
6000	13.66	13.48	14.75	15.80	14.55	14.68	14.32	14.32	16.19
6200	12.67	12.54	13.75	14.82	13.96	14.38	14.20	14.20	16.02
6500	11.98	11.96	13.14	14.24	13.71	14.46	14.50	14.50	16.39
7000	11.14	11.21	12.39	13.51	13.45	14.71	15.13	15.13	17.09

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# Digital Step Attenuator

# ZX76-31R75PP+

## Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE								
	(dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	19.52	19.18	18.93	18.60	17.85	17.65	17.39	18.10	21.13
0.3	19.59	19.26	19.00	18.67	17.92	17.71	17.43	18.14	21.12
0.5	19.46	19.14	18.90	18.58	17.88	17.71	17.47	18.20	21.18
1	19.44	19.12	18.88	18.58	17.88	17.72	17.49	18.22	21.17
5	19.51	19.20	18.97	18.65	17.95	17.77	17.54	18.25	21.16
10	19.49	19.19	18.95	18.64	17.94	17.77	17.54	18.25	21.17
50	19.45	19.16	18.93	18.63	17.96	17.82	17.62	18.36	21.29
100	19.51	19.23	19.02	18.74	18.11	18.01	17.86	18.63	21.65
200	19.61	19.34	19.14	18.88	18.28	18.22	18.11	18.93	22.04
300	19.57	19.28	19.07	18.79	18.17	18.04	17.88	18.63	21.53
400	19.68	19.38	19.16	18.86	18.23	18.03	17.80	18.48	21.15
500	20.03	19.71	19.50	19.17	18.54	18.28	18.02	18.66	21.20
600	20.33	19.99	19.78	19.43	18.82	18.53	18.24	18.86	21.32
700	20.56	20.21	20.00	19.63	19.02	18.68	18.35	18.93	21.24
800	20.82	20.46	20.24	19.84	19.24	18.84	18.47	18.99	21.11
900	21.23	20.85	20.62	20.18	19.58	19.11	18.69	19.16	21.11
1000	21.58	21.19	20.97	20.48	19.91	19.39	18.93	19.36	21.16
1100	21.84	21.45	21.22	20.71	20.16	19.61	19.12	19.51	21.13
1200	22.13	21.73	21.50	20.97	20.44	19.84	19.32	19.66	21.06
1300	22.55	22.15	21.92	21.32	20.83	20.15	19.57	19.85	21.03
1400	22.74	22.35	22.12	21.51	21.08	20.39	19.83	20.06	21.02
1500	23.42	22.98	22.74	22.05	21.58	20.80	20.15	20.31	21.03
1600	23.74	23.32	23.07	22.34	21.93	21.12	20.45	20.56	21.02
1700	24.28	23.86	23.60	22.81	22.42	21.56	20.83	20.88	21.08
1800	24.72	24.30	24.03	23.22	22.85	21.98	21.23	21.23	21.16
1900	25.39	24.94	24.65	23.77	23.38	22.45	21.64	21.58	21.23
2000	26.18	25.65	25.32	24.36	23.90	22.89	22.01	21.88	21.31
2100	27.04	26.41	26.02	24.97	24.44	23.33	22.37	22.17	21.36
2200	27.53	26.84	26.44	25.39	24.80	23.71	22.72	22.46	21.40
2300	28.22	27.48	27.08	25.94	25.32	24.17	23.10	22.77	21.38
2400	29.17	28.33	27.87	26.66	25.93	24.68	23.49	23.03	21.30
2500	30.01	29.09	28.59	27.29	26.51	25.20	23.95	23.40	21.32
2600	30.64	29.55	29.08	27.85	26.96	25.73	24.46	23.83	21.37
2700	31.41	30.12	29.63	28.43	27.42	26.25	24.96	24.28	21.42
2800	32.27	30.74	30.23	29.10	27.88	26.78	25.47	24.67	21.40
2900	33.63	31.77	31.18	29.96	28.50	27.34	25.92	25.01	21.37
3000	35.08	32.86	32.19	30.84	29.19	27.94	26.38	25.34	21.30
3200	37.48	34.39	33.74	32.57	30.47	29.50	27.78	26.20	20.97
3400	45.17	38.55	38.14	39.28	33.56	33.12	30.60	27.54	20.59
3600	37.07	35.32	35.48	43.45	33.25	36.24	35.30	29.80	20.43
3800	32.20	31.21	31.33	36.11	30.42	34.38	40.91	32.58	20.35
4000	29.85	28.82	28.78	31.99	27.76	30.46	35.78	35.81	20.36
4200	28.43	27.53	27.45	30.09	26.23	28.22	31.64	35.45	20.19
4400	27.35	26.24	26.06	28.09	24.56	25.87	27.98	31.75	19.94
4600	25.26	24.14	23.93	25.46	22.52	23.44	24.95	28.23	19.72
4800	23.36	22.13	21.96	23.09	20.70	21.40	22.63	25.75	19.70
5000	21.85	20.75	20.60	21.51	19.39	19.92	20.88	23.60	19.38
5200	19.70	18.70	18.60	19.33	17.74	18.26	19.22	21.76	19.11
5400	17.79	16.95	16.88	17.47	16.18	16.66	17.54	19.82	18.66
5600	16.06	15.38	15.35	15.85	14.89	15.40	16.28	18.52	18.68
5800	14.81	14.24	14.23	14.69	13.92	14.48	15.40	17.61	18.58
6000	13.63	13.13	13.15	13.58	13.00	13.59	14.56	16.73	18.45
6200	12.77	12.36	12.38	12.76	12.26	12.85	13.77	15.85	18.29
6500	11.73	11.42	11.47	11.82	11.48	12.11	13.06	15.13	18.53
7000	10.96	10.74	10.80	11.11	10.85	11.46	12.36	14.39	19.13

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