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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 75 (1994 April 25)

1 - Coordinated Universal Time UTC. Computed values of UTC-UTC(k) (1).

(From 1993 July 1, 0h UTC, to 1994 July 1, 0h UTC, TAI-UTC = 28 s)
(From 1994 July 1, 0h UTC, until further notice, TAI-UTC = 29 s)

Date 1994 0h UTC	Feb 26	Mar 8	Mar 18	Mar 28
MJD	49409	49419	49429	49439
Laboratory k	UTC-UTC(k) (Unit = 1 microsecond)			
AOS (Borowiec)	-0.772	-0.840	-1.020	-1.151
APL (Laurel)	1.353	1.336	1.295	1.251
AUS (Canberra)	0.627	0.605	0.563	0.500
BEV (Wien)	-	-	-	-
CAO (Cagliari)	-6.090	-6.360	-6.590	-6.870
CH (Bern)	1.655	1.750	1.838	1.931
CRL (Tokyo)	2.114	2.096	2.074	2.055
CSAO (Lintong)	-0.583	-0.520	-0.502	-0.475
CSIR (Pretoria)	-3.271	-3.449	-3.172	-3.059
FTZ (Darmstadt)	-0.061	-0.036	0.002	0.042
IEN (Torino)	0.015	0.043	0.051	0.067
IFAG (Wettzell)	-0.623	-0.638	-0.627	-0.596
IGMA (Buenos Aires)	-2.88	-3.02	-3.11	-3.13
INPL (Jerusalem)	-0.940	-1.005	-1.102	-1.133
JATC (Lintong)	-3.222	-3.121	-2.539	-1.889
KRIS (Taejon)	-0.353	-0.336	-0.309	-0.274
LDS (Leeds)	-0.181	-0.192	-0.227	-0.280
MSL (Lower Hutt)	-0.561	-0.480	-0.521	-0.432
NAOM (Mizusawa)	-1.403	-1.403	-1.425	-1.434
NAOT (Tokyo)	-0.148	-0.289	-0.482	-0.659
NIM (Beijing)	7.25	7.55	7.72	7.78
NIST (Boulder)	0.013	-0.005	-0.027	-0.049
NMC (Sofiya)	-	-	-	-
NPL (Teddington)	0.135	0.125	0.126	0.121
NPLI (New-Delhi)	-3.317	-	-	-
NRC (Ottawa)	4.956	5.076	5.171	5.267
NRLM (Tsukuba)	-8.736	-9.032	-9.336	-9.639
OMH (Budapest)	6.530	6.548	6.489	6.491
ONBA (Buenos Aires)	4.24	4.76	5.35	5.65
ONRJ (Rio de Janeiro)	-12.437	-12.782	-13.341	-13.875
OP (Paris)	-0.088	-0.079	-0.057	-0.045
ORB (Bruxelles)	-1.509	-1.636	-1.684	-1.671
PKNM (Warszawa)	0.374	0.582	0.504	0.456
PTB (Braunschweig)	2.749	2.746	2.748	2.750
RC (Habana)	-3.12	-	-	-
ROA (San Fernando)	2.622	2.608	2.603	2.617
SCL (Hong Kong)	-0.070	-0.034	0.018	0.036
SNT (Stockholm)	0.103	0.111	0.077	0.067
SO (Shanghai)	2.11	2.15	2.11	2.14
SU (Moskva)	-3.116	-3.205	-3.285	-3.373
TL (Chung-Li)	-3.184	-3.258	-3.184	-3.104
TP (Praha)	-1.191	-1.178	-1.156	-1.145
TUG (Graz)	4.247	4.322	4.412	4.483
USNO (Washington DC)(USNO MC)	0.056	0.049	0.047	0.047
VSL (Delft)	-0.025	0.032	0.076	0.096

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2 - International Atomic Time TAI and local atomic time scales TA(k).

The following table gives the computed values of TAI-TA(k) (1).

Date 1994 0h UTC		Feb 26	Mar 8	Mar 18	Mar 28
MJD		49409	49419	49429	49439
Laboratory k		TAI-TA(k) (Unit = 1 microsecond)			
APL (Laurel)		2.816	2.799	2.758	2.714
AUS (Canberra)		-50.442	-50.562	-50.673	-50.847
CH (Bern)		-75.685	-75.530	-75.382	-75.229
CRL (Tokyo)		35.384	35.813	36.233	36.658
CSAO (Lintong)		15.288	15.208	15.097	14.994
F (Paris)		126.720	127.094	127.475	127.853
INPL (Jerusalem)		-188.603	-190.496	-192.447	-
JATC (Lintong)		8.129	8.104	8.588	9.417
KRIS (Taejon)		-4.093	-3.906	-3.719	-3.484
NIM (Beijing)		-9.32	-9.01	-8.81	-8.73
NISA (Boulder)	(2)	-45110.064	-45110.452	-45110.844	-45111.236
NRC (Ottawa)		21.025	21.145	21.240	21.336
PTB (Braunschweig)		-360.651	-360.654	-360.652	-360.650
RC (Habana)	(3)	-326.48	-	-	-
SO (Shanghai)		-45.48	-45.42	-45.44	-45.43
SU (Moskva)	(4)	27246.884	27246.795	27246.715	27246.627
USNO (Washington DC)	(5)	-34693.826	-34694.504	-34695.181	-34695.856

3 - Notes on sections 1 and 2.

(1) Values UTC-UTC(k) and TAI-TA(k) are published within 1 ns except for laboratories which are not linked through GPS common views.

(2) NIST. TA(NISA) designates the scale AT1 of NIST.

(3) RC . Listed values are TAI-TA(RC) - 18 seconds.

(4) SU . Listed values are TAI-TA(SU) - 2.80 seconds.

(5) USNO. TA(USNO) designates the scale A1(MEAN) of USNO.

4 - UTC - GPS time and TAI - GPS time.

UTC - GPS time = -9 s + C0 (until 1994 July 1, 0h UTC)
UTC - GPS time = -10 s + C0 (from 1994 July 1, 0h UTC)
TAI - GPS time = 19 s + C0.

Daily values of C0 are given in the following table. They are obtained as follows: the GPS data taken at the Paris Observatory, from Block I only, are first corrected for the precise satellite ephemerides and for the measured ionospheric delays, and then smoothed to obtain daily values of UTC(OP) - GPS time at 0h UTC; daily values of C0 are derived from them using linear interpolation of UTC - UTC(OP).

This procedure also allows the computation of daily standard deviations obtained from Block I and Block II data from Paris Observatory according to the International GPS Common-View Schedule. They are given in the following table in order to show the quality of the dissemination of GPS time from Block I and Block II satellites.

Date 1993 0h UTC	MJD	C0 (ns)	σ(ns) Block I	σ(ns) Block II
Feb 26	49409	94	4	25
Feb 27	49410	91	6	55
Feb 28	49411	90	4	42
Mar 1	49412	87	4	46
Mar 2	49413	86	2	35
Mar 3	49414	94	2	48
Mar 4	49415	100	4	39
Mar 5	49416	101	5	48
Mar 6	49417	101	3	47
Mar 7	49418	101	4	39
Mar 8	49419	96	9	40
Mar 9	49420	89	7	32
Mar 10	49421	85	8	38
Mar 11	49422	86	7	36
Mar 12	49423	84	3	40
Mar 13	49424	81	-	33
Mar 14	49425	78	1	30
Mar 15	49426	78	7	41
Mar 16	49427	79	-	77
Mar 17	49428	79	8	52
Mar 18	49429	81	2	54
Mar 19	49430	84	1	39
Mar 20	49431	85	4	39
Mar 21	49432	84	1	40
Mar 22	49433	78	3	44
Mar 23	49434	69	3	46
Mar 24	49435	66	2	32
Mar 25	49436	68	1	43
Mar 26	49437	67	4	47
Mar 27	49438	63	1	35
Mar 28	49439	63	1	52

5 - UTC - GLONASS time.

UTC - GLONASS time = C1 (modulo 1 s).

From his current observations of both the GPS and GLONASS satellite systems Prof. P. Daly, University of Leeds, establishes and reports GPS time - GLONASS time at ten-day intervals, together with the standard deviation s of his daily GLONASS data. C1 is then derived using UTC - GPS time of section 4.

Date 1994 0h UTC	MJD	C1 (μs)	σ (μs)
Feb 26	49409	-18.44	0.04
Mar 8	49419	-18.33	0.04
Mar 18	49429	-18.21	0.04
Mar 28	49439	-18.12	0.04

6 - Difference between the normalized frequencies of EAL and TAI.

Interval of validity		f(EAL)-f(TAI)
1993 Apr. 22 - 1994 Mar. 28	49099-49439	7.40×10^{-13}

7 - Duration of the TAI scale interval.

The following table gives the departure D of the duration of the TAI scale interval from the SI second on the rotating geoid as realized by a given primary standard occasionally evaluated or continuously operating as a clock. In the later case the chosen two-month period of observation is also indicated. The last communicated estimate of the inaccuracy of the standard provides the uncertainty σ of the D value.

D and σ are expressed in units of 10^{-14} second.

Standard	Obs. period	D	σ
PTB-CS1	49379-49439	+1.6	3.0
PTB-CS2	49379-49439	-0.2	1.5

The estimate of the duration of the TAI scale interval, computed by the BIPM, from all the available measurements of the TAI frequency, obtained by comparison with primary frequency standards continuously observed or occasionally evaluated (CRL, LPTF, NIST, NRC, PTB, SU), is:

$$1 + 0 \times 10^{-14} \pm 2 \times 10^{-14}$$

in SI second on the rotating geoid, for the two-month interval 49379-49439 .