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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 74 (1994 March 28)

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

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

Date 1994 0hUTC		Jan 27	Feb 6	Feb 16	Feb 26
MJD		49379	49389	49399	49409
Laboratory k		UTC-UTC(k) (Unit = 1 microsecond)			
AOS (Borowiec)		-1.582	-1.642	-1.252	-0.772
APL (Laurel)		1.306	1.363	1.370	1.353
AUS (Canberra)		0.529	0.594	0.634	0.627
BEV (Wien)		9.37	9.17	9.29	-
CAO (Cagliari)		-5.451	-5.655	-5.843	-6.090
CH (Bern)		1.354	1.472	1.564	1.655
CRL (Tokyo)		2.210	2.179	2.143	2.114
CSAO (Lintong)		-0.727	-0.663	-0.626	-0.583
CSIR (Pretoria)	(2)	-3.418	-3.103	-3.109	-3.271
FTZ (Darmstadt)		-0.019	-0.050	-0.058	-0.061
IEN (Torino)		-0.054	-0.032	-0.036	0.015
IFAG (Wettzell)		0.212	-0.083	-0.380	-0.623
IGMA (Buenos Aires)		-2.52	-2.61	-2.72	-2.88
INPL (Jerusalem)		-0.722	-0.799	-0.873	-0.940
JATC (Lintong)		-3.065	-2.912	-3.330	-3.222
KRIS (Taejon)		-0.361	-0.402	-0.378	-0.353
LDS (Leeds)		-0.089	-0.146	-0.160	-0.181
MSL (Lower Hutt)		-0.801	-0.796	-0.581	-0.561
NAOM (Mizusawa)		-1.357	-1.371	-1.382	-1.403
NAOT (Tokyo)		0.167	0.119	-0.046	-0.148
NIM (Beijing)		7.36	7.37	7.37	7.25
NIST (Boulder)		0.042	0.040	0.026	0.013
NMC (Sofiya)		-	-	-	-
NPL (Teddington)		0.117	0.126	0.127	0.135
NPLI (New-Delhi)		-3.652	-3.546	-3.430	-3.317
NRC (Ottawa)		4.630	4.736	4.845	4.956
NRLM (Tsukuba)		-7.830	-8.130	-8.425	-8.736
OMH (Budapest)		6.122	6.184	6.321	6.530
ONBA (Buenos Aires)		2.64	3.35	3.84	4.24
ONRJ (Rio de Janeiro)		-10.780	-11.462	-11.878	-12.437
OP (Paris)		-0.133	-0.117	-0.102	-0.088
ORB (Bruxelles)		-1.593	-1.573	-1.543	-1.509
PKNM (Warszawa)		0.025	0.028	0.190	0.374
PTB (Braunschweig)		2.742	2.739	2.742	2.749
RC (Habana)	(3)	-3.19	-3.19	-3.18	-3.12
ROA (San Fernando)		2.605	2.617	2.628	2.622
SCL (Hong Kong)		-0.399	-0.412	-0.192	-0.070
SNT (Stockholm)		0.180	0.155	0.141	0.103
SO (Shanghai)		2.14	2.18	2.13	2.11
SU (Moskva)		-2.850	-2.942	-3.032	-3.116
TL (Chung-Li)		-2.507	-2.719	-2.952	-3.184
TP (Praha)		-1.237	-1.222	-1.217	-1.191
TUG (Graz)		4.052	4.110	4.179	4.247
USNO (Washington DC)	(USNO MC)	0.071	0.067	0.061	0.056
VSL (Delft)		-0.219	-0.145	-0.061	-0.025

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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 0hUTC		Jan 27	Feb 6	Feb 16	Feb 26
MJD		49379	49389	49399	49409
Laboratory k		TAI-TA(k) (Unit = 1 microsecond)			
APL (Laurel)		2.769	2.826	2.833	2.816
AUS (Canberra)		-50.011	-50.122	-50.272	-50.442
CH (Bern)		-76.126	-75.988	-75.836	-75.685
CRL (Tokyo)		34.125	34.545	34.960	35.384
CSAO (Lintong)		15.663	15.554	15.418	15.288
F (Paris)		125.575	125.964	126.348	126.720
INPL (Jerusalem)		-182.905	-184.803	-186.706	-188.603
JATC (Lintong)		8.514	8.749	8.098	8.129
KRIS (Taejon)		-4.551	-4.402	-4.238	-4.093
NIM (Beijing)		-9.26	-9.23	-9.22	-9.32
NISA (Boulder)	(4)	-45108.920	-45109.297	-45109.681	-45110.064
NRC (Ottawa)		20.699	20.805	20.914	21.025
PTB (Braunschweig)		-360.658	-360.661	-360.658	-360.651
RC (Habana)	(3)(5)	-326.32	-326.40	-326.46	-326.48
SO (Shanghai)		-45.45	-45.43	-45.48	-45.48
SU (Moskva)	(6)	27247.150	27247.058	27246.968	27246.884
USNO (Washington DC)	(7)	-34691.785	-34692.464	-34693.146	-34693.826

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) CSIR. Apparent time step of UTC-UTC(CSIR) of 0.250 µs on MJD = 49383 due to change of equipment.

(3) RC .

MJD	UTC-UTC(RC)	TAI-TA(RC) - 18s
49359	-3.35	-326.47
49369	-3.53	-326.66

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

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

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

(7) 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, 0hUTC)
UTC - GPS time = -10 s + C0 (from 1994 July 1, 0hUTC)
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 0hUTC; 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 1994 0hUTC	MJD	C0 (ns)	SD(ns) Block I	Block II
Jan 27	49379	100	3	36
Jan 28	49380	107	6	41
Jan 29	49381	112	4	49
Jan 30	49382	113	4	65
Jan 31	49383	111	3	51
Feb 1	49384	113	1	39
Feb 2	49385	114	3	40
Feb 3	49386	113	7	41
Feb 4	49387	109	3	48
Feb 5	49388	104	2	53
Feb 6	49389	100	5	37
Feb 7	49390	96	2	38
Feb 8	49391	90	3	41
Feb 9	49392	89	1	40
Feb 10	49393	93	4	38
Feb 11	49394	96	4	39
Feb 12	49395	90	7	46
Feb 13	49396	87	5	36
Feb 14	49397	96	5	48
Feb 15	49398	108	5	57
Feb 16	49399	110	3	38
Feb 17	49400	107	2	56
Feb 18	49401	105	3	47
Feb 19	49402	104	5	35
Feb 20	49403	104	4	38
Feb 21	49404	103	6	52
Feb 22	49405	105	3	46
Feb 23	49406	107	4	41
Feb 24	49407	103	2	50
Feb 25	49408	99	4	45
Feb 26	49409	94	5	25

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 SD of his daily GLONASS data. C1 is then derived using UTC - GPS time of section 4.

Date 1994 0hUTC	MJD	C1 (μs)	SD (μs)
Jan 27	49379	-18.74	0.03
Feb 6	49389	-18.62	0.04
Feb 16	49399	-18.52	0.04
Feb 26	49409	-18.44	0.04

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

Interval of validity		f(EAL)-f(TAI)
1993 Apr. 22 - 1994 Feb. 26	49099-49409	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	49349-49409	-1.0	3.0
PTB-CS2	49349-49409	-0.3	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 49349-49409 .