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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 91 (1995 August 28)

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

(From 1994 July 1, 0hUTC, to 1996 January 1, 0hUTC, TAI-UTC = 29 s)
(From 1996 January 1, 0hUTC, until further notice, TAI-UTC = 30 s)

Date 1995 0h UTC	Jun 21	Jul 1	Jul 11	Jul 21	Jul 31
MJD	49889	49899	49909	49919	49929
Laboratory k	UTC-UTC(k) (Unit is one nanosecond)				
AOS (Borowiec)	-1938	-1760	-1809	-1669	-1768
APL (Laurel)	1874	1954	2036	2104	2134
AUS (Canberra)	-394	-433	-450	-483	-461
BEV (Wien)	-	-	-31289	-31930	-32539
CAO (Cagliari)	-9019	-9211	-9497	-9795	-
CH (Bern)	276	232	209	207	206
CRL (Tokyo)	915	882	854	836	802
CSAO (Lintong)	-398	-297	-302	-300	-306
CSIR (Pretoria)	-193	141	450	743	1080
FTZ (Darmstadt)	-154	-158	-	-	-
GUM (Warszawa)	-154	-157	-168	-185	-206
IEN (Torino)	39	34	24	26	6
IFAG (Wettzell)	-2321	-2450	-2590	-2705	-2850
IGMA (Buenos Aires) (1)	-2217	16	-41	-160	-270
INPL (Jerusalem)	-1959	-1777	-1734	-1695	-1567
JATC (Lintong)	28	248	484	748	776
KRIS (Taejon)	174	181	193	220	194
LDS (Leeds) (2)	453	-	281	283	604
MSL (Lower Hutt)	-3338	-3381	-3439	-3532	-3683
NAOM (Mizusawa)	-2965	-3038	-3116	-3182	-3254
NAOT (Tokyo)	-2318	-2554	-2800	-3075	-3342
NIM (Beijing)	7392	7422	7432	7451	7472
NIST (Boulder)	38	41	35	28	19
NMC (Sofiya)	-	-	-	-	-
NPL (Teddington)	115	110	104	98	92
NPLI (New-Delhi)	-	-	-	-	-
NRC (Ottawa)	482	517	452	359	290
NRLM (Tsukuba)	-8034	-7885	-7744	-7606	-7457
OMH (Budapest)	10474	10666	10680	10684	10783
ONBA (Buenos Aires)	-	-	-	-	-
ONRJ (Rio de Janeiro)	-18393	-17298	-16207	-15200	-14175
OP (Paris)	-93	-72	-65	-54	-42
ORB (Bruxelles)	41	92	100	134	144
PTB (Braunschweig)	2434	2424	2402	2377	2363
RC (Habana)	-	-388	-541	-524	-765
ROA (San Fernando)	2202	2186	2204	2168	2184
SCL (Hong Kong)	-667	-813	-894	-940	-1007
SO (Shanghai)	1982	2017	1994	1969	1984
SU (Moskva)	-6839	-6852	-6874	-6892	-6917
TL (Chung-Li)	-184	-181	-201	-248	-190
TP (Praha)	-557	-538	-530	-504	-469
TUG (Graz)	-540	-522	-508	-498	-494
UME (Gebze-Kocaeli)	-3430	-3410	-3398	-3372	-3366
USNO (Washington DC)(USNO MC)	5	7	4	2	3
VSL (Delft)	-198	-200	-212	-213	-202

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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).

Date 1995 0h UTC		Jun 21	Jul 1	Jul 11	Jul 21	Jul 31
MJD		49889	49899	49909	49919	49929
Laboratory k		TAI-TA(k) (Unit is one nanosecond)				
APL (Laurel)		3337	3417	3499	3567	3597
AUS (Canberra)		-61192	-61426	-61678	-61980	-62232
CH (Bern)		-68151	-67952	-67748	-67535	-67320
CRL (Tokyo)		55695	56112	56531	56956	57368
CSAO (Lintong)		9094	9065	8930	8803	8667
F (Paris)		144074	144422	144775	145144	145488
IEN (Torino)		-280	-299	-323	-345	-383
INPL (Jerusalem)		-290876	-293189	-295650	-298124	-300026
JATC (Lintong)		13369	13386	13333	13250	13155
KRIS (Taejon)		1246	1233	1244	1259	1202
NIM (Beijing)		-8191	-8137	-8110	-8064	-8024
NISA (Boulder)	(3)	-45130229	-45130656	-45131092	-45131529	-45131968
NRC (Ottawa)		24379	24441	24489	24506	24550
PTB (Braunschweig)		-360966	-360976	-360998	-361023	-361037
RC (Habana)	(4)	-	-324988	-324021	-322884	-322005
SO (Shanghai)		-45633	-45635	-45697	-45692	-45641
SU (Moskva)	(5)	27243161	27243148	27243126	27243108	27243083
USNO (Washington DC)	(6)	-34725998	-34726662	-34727328	-34727992	-34728655

3 - Notes on sections 1 and 2.

(1) IGMA. Time step of UTC(IGMA) of - 2300 ns on MJD = 49898.5

(2) LDS . UTC(LDS) clock reset on MJD = 49925

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

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

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

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

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

[UTC - GPS time] = -10 s + C0 (until 1996 January 1, 0h UTC)
[UTC - GPS time] = -11 s + C0 (from 1996 January 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, for highest elevation, are first corrected for precise satellite ephemerides and for 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)].

For a given day, where N measurements are used for estimation of C0 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C0 value is characterized by the standard deviation of the mean σ/√N.

Date 1995 0h UTC	MJD	C0 (ns)	σ (ns)	σ/√N (ns)
Jun 21	49889	22	38	9
Jun 22	49890	26	42	10
Jun 23	49891	29	56	13
Jun 24	49892	31	42	10
Jun 25	49893	22	37	9
Jun 26	49894	29	30	7
Jun 27	49895	28	57	19
Jun 28	49896	25	58	17
Jun 29	49897	26	45	12
Jun 30	49898	31	41	10
Jul 1	49899	32	47	11
Jul 2	49900	29	43	11
Jul 3	49901	28	50	12
Jul 4	49902	28	49	11
Jul 5	49903	26	37	8
Jul 6	49904	29	46	10
Jul 7	49905	34	41	10
Jul 8	49906	36	41	9
Jul 9	49907	33	33	7
Jul 10	49908	30	45	10
Jul 11	49909	29	42	9
Jul 12	49910	26	39	9
Jul 13	49911	26	41	9
Jul 14	49912	28	62	15
Jul 15	49913	29	52	13
Jul 16	49914	28	37	9
Jul 17	49915	27	34	8
Jul 18	49916	27	52	12
Jul 19	49917	29	42	9
Jul 20	49918	34	41	9
Jul 21	49919	38	35	7
Jul 22	49920	43	44	12
Jul 23	49921	44	37	8
Jul 24	49922	43	41	8
Jul 25	49923	38	43	9
Jul 26	49924	37	33	8
Jul 27	49925	43	40	9
Jul 28	49926	46	45	10
Jul 29	49927	45	47	11
Jul 30	49928	42	37	9
Jul 31	49929	42	28	6

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

Date 1995 0h UTC	MJD	C1 (ns)	σ (ns)
Jun 21	49889	-17967	46
Jul 1	49899	-18339	38
Jul 11	49909	-18691	43
Jul 21	49919	-19088	40
Jul 31	49929	-19436	40

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

Interval of validity		f(EAL)-f(TAI)
1995 Jun. 21 - 1995 Aug. 30	49889-49959	7.37×10^{-13}

New steering correction foreseen for September-October 1995

1995 Aug. 30 - 1995 Oct. 29	49959-50019	7.36×10^{-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 latter 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
NIST-7	49689-49699	+2.0	1.0
NIST-7	49699-49709	+2.5	1.0
NIST-7	49789-49799	+2.0	1.0
NIST-7	49809-49819	+3.0	1.0
NIST-7	49819-49829	+2.9	1.0
NIST-7	49829-49839	+2.0	1.0
NIST-7	49839-49849	+2.2	1.0
NIST-7	49899-49909	+2.2	1.0
PTB-CS1	49859-49929	+2.6	3.0
PTB-CS2	49859-49929	+1.7	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:

$$1 + 1.8\times10^{-14} \pm 2.0\times10^{-14}$$

in SI second on the rotating geoid, for the two-month interval 49859-49929 .

* The frequencies of the primary frequency standards Cs1 from CRL, JPO from LPTF, and NIST-7 from NIST, are corrected for the black body radiation shift.