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BIPM

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 53 (1992 July 1)

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

(From 1991 January 1, 0hUTC, to 1992 July 1, 0hUTC, TAI-UTC=26s)
(From 1992 July 1, 0hUTC, until further notice, TAI-UTC=27s)

Date 1992 0hUTC		Apr 27	May 7	May 17	May 27
MJD		48739	48749	48759	48769
Laboratory k		UTC-UTC(k) (Unit = 1 microsecond)			
AOS (Borowiec)		-1.35	-0.67	-1.19	-1.35
APL (Laurel)		-0.50	-0.32	-0.14	0.04
AUS (Canberra)		-0.08	-0.09	-0.07	-0.06
BEV (Wien)		9.06	7.95	6.90	5.87
CAO (Cagliari)		-16.82	-17.17	-17.49	-17.90
CH (Bern)		1.08	1.05	1.04	0.97
CRL (Tokyo)		2.43	2.39	2.37	2.32
CSAO (Lintong)		-1.24	-1.01	-0.87	-0.76
DPT (Pretoria)		-23.41	-23.28	-23.05	-22.87
FTZ (Darmstadt)		24.52	24.65	24.75	24.86
IEN (Torino)		-0.76	-0.75	-0.75	-0.73
IFAG (Wettzell)		-0.21	-0.21	-0.19	-0.15
IGMA (Buenos Aires)		-1.59	-1.75	-1.79	-1.81
INPL (Jerusalem)		-2.97	-2.92	-2.85	-2.79
JATC (Lintong)		-0.20	0.15	0.41	0.61
KRIS (Taejon)		0.32	0.46	0.49	0.48
LDS (Leeds)		-30.73	-31.60	-32.78	-33.93
NAOM (Mizusawa)		-5.56	-5.36	-5.14	-4.94
NAOT (Tokyo)		0.91	0.89	0.86	0.80
NIM (Beijing)		7.58	7.40	7.39	7.50
NIST (Boulder)		-0.04	0.01	0.05	0.10
NMC (Sofiya)		0.92	1.93	2.64	3.01
NPL (Teddington)		0.00	0.03	0.06	0.05
NPLI (New-Delhi)		29.41	31.18	32.70	34.22
NRC (Ottawa)	(1)	0.21	0.11	-0.37	-0.48
NRLM (Tsukuba)	(2)	-0.82	-1.13	-1.46	-1.53
OMH (Budapest)		2.30	-	-	-
ONBA (Buenos Aires)		-49.96	-51.32	-52.36	-53.77
ONRJ (Rio de Janeiro)		0.61	0.17	-0.35	-1.02
OP (Paris)		-0.82	-0.80	-0.83	-0.85
ORB (Bruxelles)		0.88	0.86	0.78	0.68
PEL (Lower Hutt)		-1.60	-1.77	-1.81	-2.06
PKNM (Warszawa)		0.71	0.75	0.74	0.71
PTB (Braunschweig)		3.19	3.18	3.17	3.15
RC (Habana)		-3.06	-3.04	-3.16	-3.23
ROA (San Fernando)		3.68	3.62	3.52	3.43
SNT (Stockholm)		0.12	0.16	0.17	0.12
SO (Shanghai)		1.88	2.03	1.87	1.89
SU (Moskva)		3.34	3.25	3.15	3.05
TL (Chung-Li)		1.10	1.15	1.20	1.23
TP (Praha)		-0.66	-0.56	-0.45	-0.33
TUG (Graz)		-2.41	-2.06	-1.71	-1.36
USNO (Washington DC)(USNO MC)		-0.08	-0.09	-0.07	-0.06
VSL (Delft)		1.45	1.39	1.32	1.25

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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 1992 0hUTC			Apr 27	May 7	May 17	May 27
MJD			48739	48749	48759	48769
Laboratory k			TAI-TA(k) (Unit = 1 microsecond)			
APL	(Laurel)		-1.01	-0.83	-0.65	-0.46
AUS	(Canberra)		-40.11	-40.17	-40.32	-40.48
CH	(Bern)		-72.75	-72.80	-72.84	-72.93
CRL	(Tokyo)		11.22	11.49	11.78	12.05
CSAO	(Lintong)		22.00	22.04	21.97	21.88
F	(Paris)		102.04	102.35	102.65	102.94
JATC	(Lintong)		1.33	1.47	1.59	1.70
KRIS	(Taejon)		-30.92	-31.41	-31.87	-32.31
NIM	(Beijing)		-10.30	-10.46	-10.45	-10.31
NISA	(Boulder)	(3)	-45085.45	-45085.79	-45086.14	-45086.47
NIST	(Boulder)		-45188.33	-45188.98	-45189.60	-45190.23
NRC	(Ottawa)		16.28	16.18	16.10	15.99
PTB	(Braunschweig)		-360.21	-360.22	-360.23	-360.25
RC	(Habana)	(4)	-301.83	-302.16	-302.67	-303.26
SO	(Shanghai)		-45.56	-45.44	-45.61	-45.62
SU	(Moskva)		2827253.34	2827253.25	2827253.15	2827253.05
USNO	(Washington DC)	(5)	-34648.39	-34649.05	-34649.72	-34650.39

3 - Notes on sections 1 and 2.

(1) NRC . Time step of UTC(NRC) of 0.400 µs on MJD=48749.8

(2) NRLM. Time step of UTC(NRLM) of - 0.270 µs on MJD=48768.9

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

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

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

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

UTC - GPS time = -7s + C0 (until 1992 July 1, 0hUTC)
UTC - GPS time = -8s + C0 (from 1992 July 1, 0hUTC)
TAI - GPS time = 19s + C0.

The GPS data are taken at the Paris Observatory, from Block I satellites, and are usually corrected for the measured ionospheric delays. They are smoothed to obtain daily values of UTC(OP) - GPS time at 0hUTC. UTC - GPS time is derived from them using linear interpolation of UTC - UTC(OP).

The r values are the residuals to the smoothed data for the middle of the 13-minute tracking period. The reference times are given for the first date of the table only. The r values are reported here only to show the quality of the synchronization.

UTC may be derived at any site from observation of any listed satellite, by interpolating C0 to the tracking time. The quality of the access to UTC mainly depends upon local conditions of observation.

			r(ns) Block I				
Date 1992 0hUTC	MJD	C0 (ns)	PRN 3 NAV11 16h20m	PRN11 NAV 8 20h52m	PRN13 NAV 9 2h48m	PRN 6 NAV 3 8h24m	PRN12 NAV10 11h20m
Apr 27	48739	-66	5	-16	-6	-18	5
Apr 28	48740	-71	11	-	0	13	5
Apr 29	48741	-74	15	-14	-9	-	-1
Apr 30	48742	-81	7	-	-10	-	-5
May 1	48743	-83	8	2	-9	-	5
May 2	48744	-84	13	-5	-3	-	-11
May 3	48745	-84	4	-	-2	-	-4
May 4	48746	-78	8	-20	-7	-	2
May 5	48747	-68	16	-	-4	-	0
May 6	48748	-59	6	-14	-11	-	4
May 7	48749	-51	5	-	0	-	0
May 8	48750	-42	10	0	-5	-	3
May 9	48751	-29	-4	-	-11	15	-4
May 10	48752	-20	3	-1	-13	-10	-8
May 11	48753	-17	14	-8	-8	-	3
May 12	48754	-15	-1	-3	-9	7	-1
May 13	48755	-16	6	10	-5	-	2
May 14	48756	-20	-6	4	1	-18	-2
May 15	48757	-27	-	-	-	-	-
May 16	48758	-30	-	-	-	-	-
May 17	48759	-28	-	-	-	-	-
May 18	48760	-27	-2	7	-2	-	0
May 19	48761	-28	8	-14	-2	-	-3
May 20	48762	-30	5	9	-9	-	0
May 21	48763	-33	12	-13	-12	-	4
May 22	48764	-40	15	0	-11	-	1
May 23	48765	-49	-6	-	-1	-	0
May 24	48766	-56	3	11	-5	-	0
May 25	48767	-60	5	-	-7	-	3
May 26	48768	-63	-1	-5	-5	-	3
May 27	48769	-69	8	-	-3	-	-1

Section 4 (Cont.)

For Block II satellites, the r values are computed with respect to C0 obtained from Block I only.

			r(ns) Block II					
Date 1992 0hUTC	MJD	C0 (ns)	PRN23 NAV23 19h 0m	PRN17 NAV17 19h48m	PRN21 NAV21 20h 4m	PRN15 NAV15 21h56m	PRN14 NAV14 0h56m	PRN18 NAV18 2h 0m
Apr 27	48739	-66	133	15	63	-11	-59	47
Apr 28	48740	-71	-10	82	35	66	-10	24
Apr 29	48741	-74	-	-76	93	52	-26	-38
Apr 30	48742	-81	67	-	31	-98	32	12
May 1	48743	-83	-30	-1	28	77	-16	-14
May 2	48744	-84	55	-	-11	88	6	-22
May 3	48745	-84	29	11	-21	-20	21	3
May 4	48746	-78	33	-20	18	41	42	61
May 5	48747	-68	-44	26	-96	20	-3	16
May 6	48748	-59	19	7	-75	122	-20	11
May 7	48749	-51	-67	-16	23	101	-18	-67
May 8	48750	-42	-11	31	-14	44	-55	-105
May 9	48751	-29	-31	-18	28	-18	30	-1
May 10	48752	-20	-14	38	-73	-28	-	-35
May 11	48753	-17	-111	30	86	63	40	-45
May 12	48754	-15	-46	66	32	46	-28	97
May 13	48755	-16	6	-2	-13	28	-39	64
May 14	48756	-20	19	2	-6	-133	81	-80
May 15	48757	-27	-	-	-	-	-	-
May 16	48758	-30	-	-	-	-	-	-
May 17	48759	-28	-	-	-	0	22	-
May 18	48760	-27	-1	4	-60	1	-77	39
May 19	48761	-28	35	-66	-32	102	20	83
May 20	48762	-30	-47	22	-116	-1	-47	-
May 21	48763	-33	-14	-74	-	12	100	-
May 22	48764	-40	-9	86	-	-3	-4	22
May 23	48765	-49	-37	-53	-31	71	70	1
May 24	48766	-56	9	-28	-5	114	58	-47
May 25	48767	-60	6	5	-85	1	-8	16
May 26	48768	-63	32	66	48	-9	-	-
May 27	48769	-69	-59	99	50	11	1	27

Section 4 (Cont.)

Date 1992 0hUTC	MJD	C0 (ns)	PRN24 NAV24 4h24m	PRN19 NAV19 4h40m	PRN16 NAV16 6h48m	PRN 2 NAV13 10h16m	PRN20 NAV20 13h28m
			r(ns)	Block II			
Apr 27	48739	-66	9	-17	88	-54	9
Apr 28	48740	-71	39	-7	-23	43	-10
Apr 29	48741	-74	-18	-8	-49	-45	-5
Apr 30	48742	-81	41	-27	85	5	10
May 1	48743	-83	21	18	-40	3	-1
May 2	48744	-84	33	7	-58	-59	-11
May 3	48745	-84	-32	112	-12	-48	5
May 4	48746	-78	-43	-5	-	80	-13
May 5	48747	-68	54	-3	0	-26	-4
May 6	48748	-59	-10	38	-45	-48	-5
May 7	48749	-51	-70	-120	-54	35	-25
May 8	48750	-42	60	31	122	-39	0
May 9	48751	-29	-25	-9	69	79	15
May 10	48752	-20	-24	44	-17	66	-2
May 11	48753	-17	31	-70	-96	89	4
May 12	48754	-15	-27	36	-45	77	-1
May 13	48755	-16	12	15	-24	-19	-8
May 14	48756	-20	-19	-20	93	-25	-1
May 15	48757	-27	-	-	-	-	-
May 16	48758	-30	-	-	-	-	-
May 17	48759	-28	-	-	-	-	-
May 18	48760	-27	42	-29	-67	-17	-3
May 19	48761	-28	-24	-44	-1	-44	4
May 20	48762	-30	88	-62	40	22	4
May 21	48763	-33	5	23	-17	34	8
May 22	48764	-40	78	-	-31	-46	7
May 23	48765	-49	-34	-72	93	-6	-14
May 24	48766	-56	-	-	-70	-18	3
May 25	48767	-60	-10	32	-14	-1	-14
May 26	48768	-63	33	-33	62	-	12
May 27	48769	-69	-17	-43	50	24	5

5 - UTC - GLONASS time.

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

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 1992 0hUTC	MJD	C1 (μs)	SD (μs)
Apr 27	48739	-8.76	0.05
May 7	48749	-8.83	0.05
May 17	48759	-8.91	0.05
May 27	48769	-8.99	0.05

6 - 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 s of the D value.

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

Standard	Obs. period	D	s
NRC-CsV	48709-48769	+18.9	10.0
PTB-CS1	48709-48769	-1.1	3.0
PTB-CS2	48709-48769	+0.7	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, NIST, NRC, PTB, SU), is:

$$1 + 1\times10^{-14} \pm 2\times10^{-14}$$

in SI second on the rotating geoid, for the two-month interval 48709-48769 .