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BIPM

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 52 (1992 June 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		Mar 28	Apr 7	Apr 17	Apr 27
MJD		48709	48719	48729	48739
Laboratory k		UTC-UTC(k) (Unit = 1 microsecond)			
AOS (Borowiec)		-1.70	-1.53	-1.20	-1.35
APL (Laurel)		-0.72	-0.64	-0.58	-0.50
AUS (Canberra)		-0.05	-0.05	-0.07	-0.08
BEV (Wien)		12.12	11.08	10.05	9.06
CAO (Cagliari)		-15.11	-15.83	-16.39	-16.82
CH (Bern)		1.12	1.13	1.10	1.08
CRL (Tokyo)		2.51	2.55	2.45	2.43
CSAO (Lintong)		-1.70	-1.54	-1.41	-1.24
DPT (Pretoria)		-23.62	-23.48	-23.39	-23.41
FTZ (Darmstadt)		24.19	24.30	24.37	24.52
IEN (Torino)		-0.86	-0.81	-0.80	-0.76
IFAG (Wettzell)		0.47	-0.02	-0.15	-0.21
IGMA (Buenos Aires)		-1.70	-1.70	-1.63	-1.59
INPL (Jerusalem)		-2.93	-2.94	-2.98	-2.97
JATC (Lintong)		-0.27	-0.27	-0.32	-0.20
KRIS (Taejon)		-0.35	-0.15	0.06	0.32
LDS (Leeds)		-27.69	-28.81	-29.68	-30.73
NAOM (Mizusawa)		-6.18	-5.96	-5.77	-5.56
NAOT (Tokyo)	(1)	0.99	0.99	0.94	0.91
NIM (Beijing)		8.04	8.04	7.87	7.58
NIST (Boulder)		-0.23	-0.15	-0.10	-0.04
NMC (Sofiya)		-1.22	-1.56	0.14	0.92
NPL (Teddington)		-0.06	-0.05	-0.05	0.00
NPLI (New-Delhi)		26.44	27.30	28.76	29.41
NRC (Ottawa)		0.50	0.39	0.29	0.21
NRLM (Tsukuba)	(2)	-189.44	-0.22	-0.53	-0.82
OMH (Budapest)		3.00	-	-	2.30
ONBA (Buenos Aires)		-44.38	-47.52	-48.86	-49.96
ONRJ (Rio de Janeiro)		2.33	1.76	1.23	0.61
OP (Paris)		-0.90	-0.88	-0.85	-0.82
ORB (Bruxelles)		1.10	0.95	0.90	0.88
PEL (Lower Hutt)		-1.34	-1.48	-1.50	-1.60
PKNM (Warszawa)		0.80	0.78	0.78	0.71
PTB (Braunschweig)		3.19	3.20	3.19	3.19
RC (Habana)		-3.07	-3.14	-3.05	-3.06
ROA (San Fernando)		3.83	3.77	3.74	3.68
SNT (Stockholm)		0.11	0.05	0.08	0.12
SO (Shanghai)		2.25	2.10	2.05	1.88
SU (Moskva)		3.61	3.52	3.43	3.34
TL (Chung-Li)		1.01	1.01	1.03	1.10
TP (Praha)		-0.80	-0.75	-0.69	-0.66
TUG (Graz)		-3.44	-3.09	-2.76	-2.41
USNO (Washington DC)(USNO MC)		-0.05	-0.05	-0.07	-0.08
VSL (Delft)		1.73	1.62	1.50	1.45
YUZM (Beograd)		-	-	-	-

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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			Mar 28	Apr 7	Apr 17	Apr 27
MJD			48709	48719	48729	48739
Laboratory k			TAI-TA(k) (Unit = 1 microsecond)			
APL	(Laurel)		-1.22	-1.15	-1.09	-1.01
AUS	(Canberra)		-39.71	-39.83	-39.97	-40.11
CH	(Bern)		-72.63	-72.65	-72.70	-72.75
CRL	(Tokyo)		10.43	10.74	10.93	11.22
CSAO	(Lintong)		22.14	22.10	22.03	22.00
F	(Paris)		101.12	101.45	101.74	102.04
JATC	(Lintong)		1.01	1.13	1.22	1.33
KRIS	(Taejon)		-29.50	-29.94	-30.45	-30.92
NIM	(Beijing)		-9.91	-9.91	-10.04	-10.30
NISA	(Boulder)	(3)	-45084.44	-45084.77	-45085.12	-45085.45
NIST	(Boulder)		-45186.40	-45187.04	-45187.69	-45188.33
NRC	(Ottawa)		16.57	16.46	16.36	16.28
PTB	(Braunschweig)		-360.21	-360.20	-360.21	-360.21
RC	(Habana)	(4)	-300.68	-301.10	-301.44	-301.83
SO	(Shanghai)		-45.20	-45.35	-45.42	-45.56
SU	(Moskva)		2827253.61	2827253.52	2827253.43	2827253.34
USNO	(Washington DC)	(5)	-34646.38	-34647.04	-34647.72	-34648.39

3 - Notes on sections 1 and 2.

(1) NAOT. National Astronomical Observatory, Tokyo (Japan), formerly TAO.

(2) NRLM. Change of master clock on MJD = 48718.9

(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, 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 18h20m	PRN11 NAV 8 22h52m	PRN13 NAV 9 4h48m	PRN 6 NAV 3 10h24m	PRN12 NAV10 13h20m
Mar 28	48709	-10	-6	0	-18	2	1
Mar 29	48710	-15	8	-1	-12	3	2
Mar 30	48711	-19	5	1	-20	16	2
Mar 31	48712	-24	-1	-9	-6	-12	3
Apr 1	48713	-31	10	-4	-11	11	4
Apr 2	48714	-39	10	-19	-5	-1	4
Apr 3	48715	-47	17	-28	-20	6	3
Apr 4	48716	-54	13	351	-6	-1	-4
Apr 5	48717	-64	-2	-93	-7	-6	4
Apr 6	48718	-78	8	-61	-9	1	10
Apr 7	48719	-90	5	30	-12	0	-5
Apr 8	48720	-97	13	-22	-9	0	5
Apr 9	48721	-101	4	-58	-6	3	12
Apr 10	48722	-104	2	-9	-6	-6	10
Apr 11	48723	-107	6	5	-2	-5	-7
Apr 12	48724	-108	11	-41	0	-12	-2
Apr 13	48725	-104	6	76	-1	8	-1
Apr 14	48726	-103	3	16	-19	2	-4
Apr 15	48727	-105	0	2	-6	0	-
Apr 16	48728	-105	12	-17	-14	-12	1
Apr 17	48729	-97	2	17	-12	-7	4
Apr 18	48730	-82	18	7	-9	9	-4
Apr 19	48731	-73	-7	-35	-15	-	1
Apr 20	48732	-69	11	30	-16	-	2
Apr 21	48733	-67	5	3	-9	-	1
Apr 22	48734	-65	7	37	-3	-	-1
Apr 23	48735	-61	-2	0	-14	-8	0
Apr 24	48736	-55	12	-	-15	11	9
Apr 25	48737	-51	-3	-1	-21	13	4
Apr 26	48738	-57	5	-9	-1	46	6
Apr 27	48739	-65	5	-16	-6	-18	5

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 21h 0m	PRN17 NAV17 21h48m	PRN21 NAV21 22h 4m	PRN15 NAV15 0h 0m	PRN14 NAV14 2h56m	PRN18 NAV18 4h 0m
Mar 28	48709	-10	-19	-47	77	-	18	58
Mar 29	48710	-15	58	-11	83	-5	-16	-48
Mar 30	48711	-19	-40	-38	1	73	22	-36
Mar 31	48712	-24	24	-38	131	13	96	-
Apr 1	48713	-31	23	42	-35	-45	-31	12
Apr 2	48714	-39	92	-74	14	13	-60	-
Apr 3	48715	-47	-52	-5	73	93	-22	29
Apr 4	48716	-54	-5	-37	54	-38	-5	10
Apr 5	48717	-64	81	24	-42	-70	41	26
Apr 6	48718	-78	21	11	-2	4	33	0
Apr 7	48719	-90	-42	84	-40	21	-3	-9
Apr 8	48720	-97	44	1	74	1	1	4
Apr 9	48721	-101	38	5	-39	-5	-12	38
Apr 10	48722	-104	-88	-71	26	26	37	-73
Apr 11	48723	-107	20	-107	43	2	-65	-55
Apr 12	48724	-108	-21	98	-55	73	30	3
Apr 13	48725	-104	-61	2	-32	-5	-16	-130
Apr 14	48726	-103	13	50	-69	75	-58	2
Apr 15	48727	-105	46	-30	-40	-33	-5	-82
Apr 16	48728	-105	-	-44	-43	-9	45	26
Apr 17	48729	-97	-23	-38	131	-11	-	-9
Apr 18	48730	-82	-100	-6	7	-89	6	65
Apr 19	48731	-73	35	-5	-35	-18	-41	56
Apr 20	48732	-69	-1	8	4	-91	76	-55
Apr 21	48733	-67	-10	-85	-23	-43	49	-13
Apr 22	48734	-65	20	-38	-27	-13	-32	-22
Apr 23	48735	-61	-61	17	67	15	-	-4
Apr 24	48736	-55	10	20	-17	16	-34	-47
Apr 25	48737	-51	11	-74	-9	11	-156	-40
Apr 26	48738	-57	21	-19	47	-4	18	9
Apr 27	48739	-65	133	15	63	-11	-58	48

Section 4 (Cont.)

r(ns) Block II

Date 1992 0hUTC	MJD	C0 (ns)	PRN24 NAV24 6h24m	PRN19 NAV19 6h40m	PRN16 NAV16 8h48m	PRN 2 NAV13 12h16m	PRN20 NAV20 15h28m
Mar 28	48709	-10	59	-17	-78	-26	-18
Mar 29	48710	-15	58	-	23	-54	50
Mar 30	48711	-19	-36	33	46	-82	-25
Mar 31	48712	-24	4	-73	45	21	-
Apr 1	48713	-31	-16	35	-10	1	-7
Apr 2	48714	-39	-26	1	46	33	5
Apr 3	48715	-47	-3	50	-128	3	-10
Apr 4	48716	-54	-4	-91	-37	-8	3
Apr 5	48717	-64	-62	-115	20	-22	-1
Apr 6	48718	-78	1	-15	-49	-1	16
Apr 7	48719	-90	6	-12	-13	3	-18
Apr 8	48720	-97	8	-14	7	9	5
Apr 9	48721	-101	-41	-7	-69	-13	-15
Apr 10	48722	-104	-35	4	40	-40	-8
Apr 11	48723	-107	-64	34	-36	4	10
Apr 12	48724	-108	29	-9	31	3	-2
Apr 13	48725	-104	-60	45	-21	55	15
Apr 14	48726	-103	-17	7	43	17	-3
Apr 15	48727	-105	13	-1	-65	85	12
Apr 16	48728	-105	-88	66	-40	-64	-3
Apr 17	48729	-97	14	-100	-72	-	3
Apr 18	48730	-82	3	-28	12	-19	-4
Apr 19	48731	-73	-15	-5	-68	77	11
Apr 20	48732	-69	-32	-55	7	-36	11
Apr 21	48733	-67	74	8	-38	49	-18
Apr 22	48734	-65	28	44	26	10	3
Apr 23	48735	-61	-61	20	-44	7	-13
Apr 24	48736	-55	57	10	-100	47	5
Apr 25	48737	-51	10	15	-7	-	-8
Apr 26	48738	-57	15	-39	-52	11	5
Apr 27	48739	-65	10	-16	89	-54	10

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)
Mar 28	48709	-8.66	0.07
Apr 7	48719	-8.66	0.05
Apr 17	48729	-8.73	0.06
Apr 27	48739	-8.76	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	48679-48739	+13.4	10.0
PTB-CS1	48679-48739	-0.8	3.0
PTB-CS2	48679-48739	+0.9	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:

$$1 + 0\times10^{-14} \pm 2\times10^{-14}$$

in SI second on the rotating geoid, for the two-month interval 48679-48739 .