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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 111 (1997 April 10)
Circulaire T 111

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

(From 1996 January 1, 0h UTC, to 1997 July 1, 0h UTC, TAI-UTC = 30 s)
(From 1997 July 1, 0h UTC, until further notice, TAI-UTC = 31 s)

Date 1997 0h UTC		Feb 25	Mar 2	Mar 7	Mar 12
MJD		50504	50509	50514	50519
Laboratory k		UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)		592	457	392	354
APL (Laurel)		-	-	-	1031
AUS (Canberra)		89	117	116	151
BEV (Wien)		-	-	-	-
BIRM (Beijing)		-4864	-4920	-4967	-5033
CAO (Cagliari)		-215	-251	-271	-310
CH (Bern)		246	236	223	198
CNM (Queretaro)		-4067	-4036	-4006	-3949
CRL (Tokyo)		-26	-27	-22	-28
CSAO (Lintong)		1	1	-7	-4
CSIR (Pretoria)		8609	8628	8574	8484
DLR (Oberpfaffenhofen)		613	601	590	571
DTAG (Darmstadt)		-705	-709	-696	-692
GUM (Warszawa)		67	84	102	118
IEN (Torino)		517	524	523	533
IFAG (Wettzell)		-3042	-2986	-2931	-2869
IGMA (Buenos Aires)		170	168	159	170
INPL (Jerusalem)		-1251	-1307	-1356	-1427
IPQ (Monte de Caparica)		297	302	317	328
JATC (Lintong)		3552	3547	3552	3572
KRIS (Taejon)		-225	-195	-178	-183
LDS (Leeds)		-9	-28	-32	-21
MSL (Lower Hutt)		-5590	-5644	-5579	-5546
NAO (Mizusawa)	(1)	-3670	-3715	-3667	-3618
NIM (Beijing)		-1404	-1449	-1467	-1474
NIST (Boulder)		22	20	13	12
NPL (Teddington)		71	68	69	68
NRC (Ottawa)		90	80	64	55
NRLM (Tsukuba)		12	17	23	25
OMH (Budapest)		-	-	-	-
ONBA (Buenos Aires)		-16552	-16636	-16811	-16961
ONRJ (Rio de Janeiro)		36142	36448	36846	37333
OP (Paris)		6	2	4	7
ORB (Bruxelles)		183	179	193	190
PTB (Braunschweig)		1819	1816	1811	1805
ROA (San Fernando)		-41	-50	-49	-38
SCL (Hong Kong)		-105	-104	-81	-88
SO (Shanghai)		1120	1110	1086	1087
SP (Boras)		243	255	254	263
SU (Moskva)		871	859	852	850
TL (Chung-Li)		465	464	397	438
TP (Praha)		144	120	120	125
TUG (Graz)		1548	1577	1609	1651
UME (Gebze-Kocaeli)		358	377	388	400
USNO (Washington DC)(USNO MC)		15	18	12	11
VSL (Delft)		-440	-443	-440	-450

ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU MÈTRE

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1 - Coordinated Universal Time UTC. (Cont.)

Date 1997 0h UTC	Mar 17	Mar 22	Mar 27
MJD	50524	50529	50534
Laboratory k	UTC-UTC(k)	(Unit is	one nanosecond)
AOS (Borowiec)	283	220	133
APL (Laurel)	1058	1085	1100
AUS (Canberra)	171	191	188
BEV (Wien)	-	-	-
BIRM (Beijing)	-5098	-5166	-5206
CAO (Cagliari)	-338	-355	-386
CH (Bern)	163	140	118
CNM (Queretaro)	-3896	-3845	-3793
CRL (Tokyo)	-29	-29	-24
CSAO (Lintong)	-2	7	-5
CSIR (Pretoria)	8352	8260	8168
DLR (Oberpfaffenhofen)	549	533	512
DTAG (Darmstadt)	-705	-704	-712
GUM (Warszawa)	128	149	163
IEN (Torino)	534	544	544
IFAG (Wettzell)	-2800	-2744	-2641
IGMA (Buenos Aires)	173	175	184
INPL (Jerusalem)	-1519	-1600	-1686
IPQ (Monte de Caparica)	335	344	348
JATC (Lintong)	3578	3594	3595
KRIS (Taejon)	-195	-195	-211
LDS (Leeds)	-22	-18	-36
MSL (Lower Hutt)	-5593	-5543	-5562
NAO (Mizusawa)	-3571	-3529	-3476
NIM (Beijing)	-1485	-1482	-1504
NIST (Boulder)	13	10	8
NPL (Teddington)	64	68	68
NRC (Ottawa)	48	37	24
NRLM (Tsukuba)	34	43	46
OMH (Budapest)	-	-	-
ONBA (Buenos Aires)	-17208	-17466	-17681
ONRJ (Rio de Janeiro)	37830	38289	38713
OP (Paris)	3	1	-6
ORB (Bruxelles)	192	213	228
PTB (Braunschweig)	1796	1798	1793
ROA (San Fernando)	-39	-39	-38
SCL (Hong Kong)	-85	-71	-62
SO (Shanghai)	1103	1084	1081
SP (Boras)	268	274	271
SU (Moskva)	836	830	820
TL (Chung-Li)	445	427	390
TP (Praha)	118	115	124
TUG (Graz)	1688	1731	1768
UME (Gebze-Kocaeli)	408	420	431
USNO (Washington DC)(USNO MC)	15	11	9
VSL (Delft)	-456	-457	-460

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

The following tables give the computed values of TAI-TA(k).

Date 1997 0h UTC		Feb 25	Mar 2	Mar 7	Mar 12
MJD		50504	50509	50514	50519
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		-	-	-	2494
AUS (Canberra)		-76498	-76602	-76685	-76805
CH (Bern)		-50548	-50372	-50198	-50030
CRL (Tokyo)		81232	81441	81641	81851
CSAO (Lintong)		1518	1454	1381	1320
F (Paris)		163291	163281	163270	163262
IEN (Torino)		2462	2513	2560	2609
INPL (Jerusalem)		-376100	-376875	-377633	-378404
JATC (Lintong)		13455	13442	13438	13444
KRIS (Taejon)		5547	5584	5597	5594
NIM (Beijing)		-	-	-	-
NISA (Boulder)	(2)	-45157021	-45157235	-45157456	-45157670
NRC (Ottawa)		27178	27170	27155	27147
PTB (Braunschweig)		-361581	-361584	-361589	-361595
SO (Shanghai)		-46398	-46408	-46434	-46436
SU (Moskva)	(3)	27241871	27241859	27241852	27241850
USNO (Washington DC)	(4)	-34766451	-34766771	-34767099	-34767423

Date 1997 0h UTC		Mar 17	Mar 22	Mar 27
MJD		50524	50529	50534
Laboratory k		TAI-TA(k) (Unit is one nanosecond)		
APL (Laurel)		2521	2548	2563
AUS (Canberra)		-76904	-77007	-77110
CH (Bern)		-49872	-49702	-49532
CRL (Tokyo)		82055	82259	82462
CSAO (Lintong)		1257	1201	1124
F (Paris)		163247	163236	163225
IEN (Torino)		2640	2681	2718
INPL (Jerusalem)		-379187	-379949	-380705
JATC (Lintong)		13461	13489	13498
KRIS (Taejon)		5581	5580	5568
NIM (Beijing)		-	-	-
NISA (Boulder)	(2)	-45157883	-45158099	-45158315
NRC (Ottawa)		27141	27130	27118
PTB (Braunschweig)		-361604	-361602	-361607
SO (Shanghai)		-46424	-46451	-46466
SU (Moskva)	(3)	27241836	27241830	27241820
USNO (Washington DC)	(4)	-34767742	-34768068	-34768392

3 - Notes on sections 1 and 2.

(1) NAO . Change of master clock on MJD = 50511.01

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

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

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

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

Interval of validity		f(EAL)-f(TAI)
1997 Feb. 25 - 1997 Apr. 26	50504-50564	7.250×10^{-13}

New steering correction foreseen for May-June 1997

1997 Apr. 26 - 1997 June 30	50564-50629	7.230×10^{-13}

5 - Duration of the TAI scale interval.

The following table gives the duration uTAI of the TAI scale interval expressed as its departure d from the SI second on the rotating geoid, together with its relative uncertainty σ : uTAI = 1 + d in SI second. This is obtained, on the given period of estimation, by comparison of the TAI frequency :

- with the frequency, corrected for the black-body radiation shift, of a given individual primary frequency standard (σ is then the last communicated estimate of the uncertainty of the standard frequency), and

- with a combination computed by the BIPM of all available measurements from PTB CS2, PTB CS3, NIST-7, SU MCsR 102 and LPTF-F01 consistently corrected for the black-body radiation shift (σ is then estimated by the BIPM taking into account the individual uncertainties and parameters characteristic of TAI stability).

Standard	Period of estimation	d (10^{-14} s)	σ (10^{-14})
PTB-CS2	50504-50534	+2.7	1.5
PTB-CS3	50504-50534	+5.6	1.4
BIPM estimate	50474-50534	+2.6	1.0

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

[UTC - GPS time] = -11 s + C0 (until 1997 July 1, 0h UTC)
[UTC - GPS time] = -12 s + C0 (from 1997 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, 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 $\sigma/\sqrt{N}$.

Date 1997 0h UTC	MJD	C0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Feb 25	50504	40	50	10
Feb 26	50505	41	32	6
Feb 27	50506	38	50	10
Feb 28	50507	42	41	8
Mar 1	50508	46	53	11
Mar 2	50509	43	45	9
Mar 3	50510	38	45	9
Mar 4	50511	32	47	9
Mar 5	50512	25	42	8
Mar 6	50513	24	39	8
Mar 7	50514	25	43	9
Mar 8	50515	30	45	9
Mar 9	50516	29	45	10
Mar 10	50517	26	45	9
Mar 11	50518	26	36	7
Mar 12	50519	34	44	9
Mar 13	50520	40	47	9
Mar 14	50521	38	32	6
Mar 15	50522	36	43	9
Mar 16	50523	41	44	9
Mar 17	50524	43	43	10
Mar 18	50525	40	47	9
Mar 19	50526	40	38	8
Mar 20	50527	46	51	11
Mar 21	50528	45	44	9
Mar 22	50529	38	53	11
Mar 23	50530	33	40	8
Mar 24	50531	31	46	9
Mar 25	50532	32	53	11
Mar 26	50533	26	59	12
Mar 27	50534	16	47	10

7 - [UTC - GLONASS time] and [TAI - GLONASS time].

[UTC - GLONASS time] = 0 s + C1
[TAI - GLONASS time] = +30 s + C1 (until 1997 July 1, 0h UTC)
[TAI - GLONASS time] = +31 s + C1 (from 1997 July 1, 0h UTC)

Daily values of C1 are given in the following table. They are obtained as follows: the GLONASS data taken at the NMi Van Swinden Laboratorium, Delft, The Netherlands, for highest elevation, are smoothed to obtain daily values of [UTC(VSL)-GLONASS time] at 0h UTC; daily values of C1 are then derived from them using linear interpolation of [UTC-UTC(VSL)]. A time correction of + 1285 ns is also applied in order to ensure continuity of C1 estimates on 1997, January 1 (MJD = 50449).

For a given day, where N measurements are used for estimation of C1 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C1 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$.

Date 1997 0h UTC	MJD	C1 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Feb 25	50504	-34918	19	3
Feb 26	50505	-34912	27	5
Feb 27	50506	-34909	20	10
Feb 28	50507	-34913	24	4
Mar 1	50508	-34914	18	3
Mar 2	50509	-34916	17	3
Mar 3	50510	-34916	23	4
Mar 4	50511	-34913	20	3
Mar 5	50512	-34906	23	4
Mar 6	50513	-34904	24	4
Mar 7	50514	-34909	32	6
Mar 8	50515	-34913	23	4
Mar 9	50516	-34915	21	3
Mar 10	50517	-34914	23	5
Mar 11	50518	-34911	21	4
Mar 12	50519	-34906	21	3
Mar 13	50520	-34899	38	7
Mar 14	50521	-34896	38	7
Mar 15	50522	-34906	24	4
Mar 16	50523	-34916	22	4
Mar 17	50524	-34917	22	4
Mar 18	50525	-34914	24	5
Mar 19	50526	-34912	25	5
Mar 20	50527	-34915	22	4
Mar 21	50528	-34914	20	4
Mar 22	50529	-34909	26	5
Mar 23	50530	-34906	28	5
Mar 24	50531	-34908	21	3
Mar 25	50532	-34912	15	5
Mar 26	50533	-34911	23	5
Mar 27	50534	-34908	21	4