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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 119 (1997 December 12)
Circulaire T 119

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

(From 1997 July 1, 0h UTC, *TAI-UTC* = 31 s)

Date 1997 0h UTC		Oct 28	Nov 2	Nov 7	Nov 12
MJD		50749	50754	50759	50764
Laboratory k		*UTC-UTC(k)* (Unit is one nanosecond)			
AOS (Borowiec)		-1290	-1395	-1357	-1291
APL (Laurel)		3410	3448	3485	3538
AUS (Canberra)		154	155	163	170
BEV (Wien)		-	-	-	-
BIRM (Beijing)		-7570	-7608	-7644	-7692
CAO (Cagliari)		-1729	-1757	-1800	-1817
CH (Bern)		147	151	165	172
CNM (Queretaro)		-1392	-1331	-1276	-1225
CRL (Tokyo)		-46	-49	-58	-64
CSAO (Lintong)		-7	-74	-33	-1
CSIR (Pretoria)		-1132	-1217	-1288	-1363
DLR (Oberpfaffenhofen)		-1183	-1226	-1281	-1327
DTAG (Darmstadt)		-522	-509	-501	-480
GUM (Warszawa)		1006	1013	1010	1010
IEN (Torino)		-4	-3	8	26
IFAG (Wettzell)		-1065	-1072	-1105	-1158
IGMA (Buenos Aires)		99	110	96	93
INPL (Jerusalem)		-85	-64	-42	-15
IPQ (Monte de Caparica)		861	889	910	925
JATC (Lintong)		3459	3385	3419	3446
KRIS (Taejon)		-20	-2	5	-5
LDS (Leeds)		35	39	49	41
MSL (Lower Hutt)		-6078	-6097	-6093	-6121
NAO (Mizusawa)		-807	-736	-671	-617
NIM (Beijing)		-2411	-2429	-2431	-2458
NIST (Boulder)		16	14	8	6
NML (Sydney)		802	814	838	838
NPL (Teddington)	(1)	87	88	89	94
NRC (Ottawa)		-25	-27	-33	-19
NRLM (Tsukuba)		252	265	275	285
OMH (Budapest)		1212	1246	1280	1280
ONBA (Buenos Aires)		-	-	-	-
ONRJ (Rio de Janeiro)		78	107	116	133
OP (Paris)		-1	-3	1	6
ORB (Bruxelles)		312	321	310	293
PSB (Singapore)		607	635	659	677
PTB (Braunschweig)		1791	1802	1812	1822
ROA (San Fernando)		20	32	37	44
SCL (Hong Kong)		-	-	-	-
SO (Shanghai)		874	870	864	847
SP (Boras)		575	588	597	614
SU (Moskva)		461	454	454	444
TL (Chung-Li)		539	529	520	523
TP (Praha)		217	217	227	227
TUG (Graz)		3455	3500	3555	3611
UME (Gebze-Kocaeli)		839	846	862	880
USNO (Washington DC)(USNO MC)		10	9	6	5
VSL (Delft)		-76	-76	-77	-66

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1 - Coordinated Universal Time UTC. (Cont.)

Date 1997 0h UTC	Nov 17	Nov 22	Nov 27
MJD	50769	50774	50779
Laboratory k	*UTC-UTC(k)*	(Unit is one	nanosecond)
AOS (Borowiec)	-1233	-1108	-966
APL (Laurel)	3565	3610	3650
AUS (Canberra)	169	162	165
BEV (Wien)	-	-	-
BIRM (Beijing)	-7730	-7823	-7869
CAO (Cagliari)	-1848	-1882	-1912
CH (Bern)	157	159	129
CNM (Queretaro)	-1144	-1086	-1030
CRL (Tokyo)	-63	-68	-64
CSAO (Lintong)	-15	5	-43
CSIR (Pretoria)	-1441	-1515	-1599
DLR (Oberpfaffenhofen)	-1377	-1426	-1472
DTAG (Darmstadt)	-452	-461	-446
GUM (Warszawa)	1005	1005	1024
IEN (Torino)	31	48	47
IFAG (Wettzell)	-1195	-1259	-1316
IGMA (Buenos Aires)	97	94	91
INPL (Jerusalem)	0	19	33
IPQ (Monte de Caparica)	938	953	967
JATC (Lintong)	3434	3441	3389
KRIS (Taejon)	-8	-5	-6
LDS (Leeds)	39	50	42
MSL (Lower Hutt)	-6149	-6152	-6199
NAO (Mizusawa)	-533	-458	-403
NIM (Beijing)	-2491	-2481	-2488
NIST (Boulder)	3	3	1
NML (Sydney)	876	888	891
NPL (Teddington)	89	89	87
NRC (Ottawa)	-12	-5	-9
NRLM (Tsukuba)	287	292	296
OMH (Budapest)	1301	1317	1344
ONBA (Buenos Aires)	-	-	-
ONRJ (Rio de Janeiro)	157	178	178
OP (Paris)	6	4	11
ORB (Bruxelles)	279	288	269
PSB (Singapore)	704	733	764
PTB (Braunschweig)	1827	1836	1840
ROA (San Fernando)	45	46	46
SCL (Hong Kong)	-	-	-
SO (Shanghai)	848	852	858
SP (Boras)	618	628	628
SU (Moskva)	438	424	417
TL (Chung-Li)	520	518	509
TP (Praha)	223	225	227
TUG (Graz)	3660	3707	3747
UME (Gebze-Kocaeli)	883	889	902
USNO (Washington DC)(USNO MC)	2	2	1
VSL (Delft)	-79	-63	-56

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		Oct 28	Nov 2	Nov 7	Nov 12
MJD		50749	50754	50759	50764
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)			
AMC (Col. Springs)		-365058	-365064	-365067	-365072
APL (Laurel)		4873	4911	4948	5001
AUS (Canberra)		-81654	-81781	-81868	-81971
CH (Bern)		-42203	-42012	-41810	-41612
CRL (Tokyo)		91594	91804	92012	92223
CSAO (Lintong)		-1625	-1749	-1765	-1790
F (Paris)		162837	162830	162822	162817
IEN (Torino)		4658	4694	4744	4800
INPL (Jerusalem)		-396535	-396281	-396022	-395757
JATC (Lintong)		12800	12623	12528	12434
KRIS (Taejon)		5277	5289	5286	5272
NIST (Boulder)		-45167493	-45167705	-45167921	-45168133
NML (Sydney)		837	850	874	874
NRC (Ottawa)		27016	27007	26995	27002
PTB (Braunschweig)		-361609	-361598	-361588	-361578
SO (Shanghai)		-46604	-46606	-46617	-46640
SU (Moskva)	(2)	27241461	27241454	27241454	27241444
USNO (Washington DC)		-34782155	-34782475	-34782794	-34783113

Date 1997 0h UTC		Nov 17	Nov 22	Nov 27
MJD		50769	50774	50779
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)		
AMC (Col. Springs)		-365078	-365083	-365086
APL (Laurel)		5028	5073	5113
AUS (Canberra)		-82085	-82190	-82276
CH (Bern)		-41419	-41209	-41031
CRL (Tokyo)		92434	92645	92853
CSAO (Lintong)		-1861	-1898	-2003
F (Paris)		162812	162808	162805
IEN (Torino)		4844	4895	4929
INPL (Jerusalem)		-395504	-395249	-394990
JATC (Lintong)		12314	12230	12068
KRIS (Taejon)		5262	5260	5257
NIST (Boulder)		-45168346	-45168556	-45168768
NML (Sydney)		913	924	927
NRC (Ottawa)		27003	27004	26998
PTB (Braunschweig)		-361573	-361564	-361560
SO (Shanghai)		-46644	-46648	-46650
SU (Moskva)	(2)	27241438	27241424	27241417
USNO (Washington DC)		-34783431	-34783749	-34784067

3 - Notes.

Erratum. Circular T 118, Section 5.

Standard	Period of estimation	d (10^{-14})	σ (10^{-14})
PTB-CS2	50689-50749	+1.4	1.5
PTB-CS3	50689-50749	+3.8	1.4

(1) NPL . Change of master clock on MJD = 50759.48

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

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

Interval of validity		*f(EAL)-f(TAI)*
1997 Oct. 28 - 1997 Dec. 27	50749-50809	7.170×10^{-13}

New steering correction foreseen for January 1998

1997 Dec. 27 - 1998 Jan. 31	50809-50844	7.160×10^{-13}

5 - Duration of the TAI scale interval.

The following table gives the duration u_{TAI} of the TAI scale interval expressed as its relative departure d from the SI second on the rotating geoid, u_0, together with its uncertainty σ : $d = (u_{TAI} - u_0)/u_0$. 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 LPTF-FO1, NIST-7, PTB CS2, PTB CS3 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})	σ (10^{-14})
PTB-CS2	50749-50779	-0.2	1.5
PTB-CS3	50749-50779	+2.5	1.4
LPTF-FO1	50754-50779	+0.93	0.22
BIPM estimate	50719-50779	+0.8	1.0

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

[*UTC-GPS time*] = -12 s + C_0, [*TAI-GPS time*] = 19 s + C_0.

Daily values of C_0 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 C_0 are derived from them using linear interpolation of [*UTC-UTC(OP)*]. The global uncertainty of daily C_0 values is of order 10 ns.

In the following table, the standard deviation σ characterizes the dispersion of individual measurements, and N is the number of measurements used on a given day for estimation of the corresponding daily C_0 value.

Date 1997 0h UTC	MJD	C_0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Oct 28	50749	1	38	7
Oct 29	50750	-1	40	8
Oct 30	50751	4	41	8
Oct 31	50752	14	49	9
Nov 1	50753	14	49	9
Nov 2	50754	7	35	6
Nov 3	50755	4	42	8
Nov 4	50756	8	42	8
Nov 5	50757	13	41	8
Nov 6	50758	10	35	6
Nov 7	50759	3	39	9
Nov 8	50760	-1	47	9
Nov 9	50761	-8	49	9
Nov 10	50762	-10	37	7
Nov 11	50763	-1	47	9
Nov 12	50764	8	50	9
Nov 13	50765	5	58	11
Nov 14	50766	-1	50	11
Nov 15	50767	-5	38	7
Nov 16	50768	-4	42	8
Nov 17	50769	-2	49	9
Nov 18	50770	0	42	8
Nov 19	50771	1	47	9
Nov 20	50772	1	43	8
Nov 21	50773	0	39	7
Nov 22	50774	0	39	7
Nov 23	50775	0	45	8
Nov 24	50776	2	42	8
Nov 25	50777	5	40	7
Nov 26	50778	5	39	7
Nov 27	50779	0	45	8

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

[*UTC-GLONASS time*] = 0 s + C_1, [*TAI-GLONASS time*] = +31 s + C_1.

Daily values of C_1 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 C_1 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 C_1 estimates on 1997, January 1 (MJD = 50449). The global uncertainty of daily C_1 values is of order several hundreds of nanoseconds.

In the following table, the standard deviation σ characterizes the dispersion of individual measurements, and N is the number of measurements used on a given day for estimation of the corresponding daily C_1 value.

Date 1997 0h UTC	MJD	C_1 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Oct 28	50749	327	35	11
Oct 29	50750	359	29	6
Oct 30	50751	362	32	7
Oct 31	50752	357	24	4
Nov 1	50753	354	23	4
Nov 2	50754	357	25	5
Nov 3	50755	362	19	3
Nov 4	50756	366	20	3
Nov 5	50757	369	21	4
Nov 6	50758	374	19	3
Nov 7	50759	371	15	3
Nov 8	50760	366	15	3
Nov 9	50761	367	15	3
Nov 10	50762	372	29	5
Nov 11	50763	378	21	3
Nov 12	50764	392	18	3
Nov 13	50765	405	23	4
Nov 14	50766	412	26	4
Nov 15	50767	408	18	4
Nov 16	50768	406	25	4
Nov 17	50769	406	15	3
Nov 18	50770	404	26	5
Nov 19	50771	396	19	3
Nov 20	50772	397	19	3
Nov 21	50773	408	12	2
Nov 22	50774	413	16	3
Nov 23	50775	404	20	3
Nov 24	50776	399	16	3
Nov 25	50777	400	23	3
Nov 26	50778	398	14	3
Nov 27	50779	394	15	2