BIPM

ISSN 1143-1393

BUREAU INTERNATIONAL DES POIDS ET MESURES
Circular T 101 (1996 June 13)

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

(From 1996 January 1, 0hUTC, TAI-UTC = 30 s)

Date 1996 0h UTC		Apr 26	May 1	May 6	May 11
MJD		50199	50204	50209	50214
Laboratory k		UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)		74	83	169	282
APL (Laurel)		2121	2054	1988	1930
AUS (Canberra)		-458	-424	-368	-335
BEV (Wien)		5890	5716	5557	5350
BIRM (Beijing)		-1422	-	-	-1611
CAO (Cagliari)		-	-	-	-
CH (Bern)		362	348	319	300
CNM (Mexico)		-42	-68	-116	-150
CRL (Tokyo)		-22	-32	-38	-41
CSAO (Lintong)		-229	-	-	-
CSIR (Pretoria)		6250	6335	6469	6575
DLR (Oberpfaffenhofen)		-2138	-2144	-2146	-2154
DTAG (Darmstadt)	(1)	-352	-360	-373	-377
GUM (Warszawa)		-339	-337	-330	-330
IEN (Torino)		165	166	164	166
IFAG (Wettzell)		-4842	-4842	-4812	-4747
IGMA (Buenos Aires)		87	79	78	91
INPL (Jerusalem)		-1492	-1368	-1226	-1076
IPQ (Monte de Caparica)		-9404	-9466	-9521	-9583
JATC (Lintong)		2300	-	-	-
KRIS (Taejon)		160	142	129	114
LDS (Leeds)		103	116	116	118
MSL (Lower Hutt)		-4962	-4923	-4860	-4874
NAOM (Mizusawa)		-3037	-3033	-3037	-3038
NAOT (Tokyo)		-2004	-1887	-1767	-1666
NIM (Beijing)		8336	8352	8365	8377
NIST (Boulder)		0	-1	-2	-4
NPL (Teddington)		12	12	14	16
NRC (Ottawa)		-4	-19	-27	-32
NRLM (Tsukuba)		-3690	-3620	-3546	-3472
OMH (Budapest)		-	-	-	-
ONBA (Buenos Aires)		-9898	-10165	-10350	-10526
ONRJ (Rio de Janeiro)		8704	9218	9722	10171
OP (Paris)		42	51	60	56
ORB (Bruxelles)		74	65	61	52
PTB (Braunschweig)		2106	2097	2091	2079
ROA (San Fernando)		118	113	124	130
SCL (Hong Kong)		-41	-86	-159	-219
SO (Shanghai)		1409	1386	1360	1337
SP (Boras)		-6490	-6582	-6659	-6747
SU (Moskva)		-	-	-	-
TL (Chung-Li)		107	114	125	191
TP (Praha)		-116	-96	-76	-58
TUG (Graz)		104	118	136	154
UME (Gebze-Kocaeli)		-2939	-2942	-2937	-
USNO (Washington DC)(USNO MC)		1	-1	-4	-3
VSL (Delft)		-365	-379	-382	-391

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1 - Coordinated Universal Time UTC. (Cont.)

Date 1996 0h UTC		May 16	May 21	May 26	May 31
MJD		50219	50224	50229	50234
Laboratory k		UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)		223	170	198	222
APL (Laurel)		1870	1815	1782	1743
AUS (Canberra)		-291	-245	-225	-176
BEV (Wien)		5174	5001	4836	4648
BIRM (Beijing)		-1682	-1731	-1782	-1836
CAO (Cagliari)		-	-	-	-
CH (Bern)		281	254	234	213
CNM (Mexico)		-156	-180	-199	-221
CRL (Tokyo)		-46	-47	-46	-54
CSAO (Lintong)		-	-	-	-
CSIR (Pretoria)		6687	6791	7040	7165
DLR (Oberpfaffenhofen)		-2160	-2166	-2168	-2177
DTAG (Darmstadt)	(1)	-389	-407	-397	-411
GUM (Warszawa)		-317	-306	-305	-305
IEN (Torino)		169	185	188	199
IFAG (Wettzell)		-4712	-4690	-4640	-4603
IGMA (Buenos Aires)		95	99	92	89
INPL (Jerusalem)		-937	-789	-642	-516
IPQ (Monte de Caparica)		-9628	-9689	-9740	-
JATC (Lintong)		-	-	-	-
KRIS (Taejon)		116	111	114	106
LDS (Leeds)		116	119	85	101
MSL (Lower Hutt)		-4827	-4786	-4830	-4830
NAOM (Mizusawa)		-3040	-3032	-3019	-3004
NAOT (Tokyo)		-1542	-1435	-1336	-1230
NIM (Beijing)		8385	8399	8395	8399
NIST (Boulder)		-4	-7	-9	-16
NPL (Teddington)		14	15	17	15
NRC (Ottawa)		-34	-36	-40	-45
NRLM (Tsukuba)		-3411	-3353	-3288	-3223
OMH (Budapest)		-	-	-	-
ONBA (Buenos Aires)		-10776	-11229	-11717	-12230
ONRJ (Rio de Janeiro)		10693	11533	12337	13013
OP (Paris)		56	54	51	40
ORB (Bruxelles)		62	75	47	36
PTB (Braunschweig)		2076	2070	2069	2071
ROA (San Fernando)		137	130	124	114
SCL (Hong Kong)		-306	-374	-400	-
SO (Shanghai)		1338	1347	1304	1294
SP (Boras)		-6832	-6924	-7013	-7112
SU (Moskva)		-	-	-	-
TL (Chung-Li)		196	220	208	224
TP (Praha)		-41	-32	-19	-12
TUG (Graz)		172	189	211	222
UME (Gebze-Kocaeli)		-	27	36	39
USNO (Washington DC)(USNO MC)		-9	-9	-10	-13
VSL (Delft)		-399	-411	-422	-445

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

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

Date 1996 0h UTC		Apr 26	May 1	May 6	May 11
MJD		50199	50204	50209	50214
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		-	3517	3451	3393
AUS (Canberra)		-69399	-69491	-69598	-69722
CH (Bern)		-60458	-60308	-60173	-60026
CRL (Tokyo)		68571	68775	68986	69192
CSAO (Lintong)		5243	-	-	-
F (Paris)		154433	154609	154778	154953
IEN (Torino)		-151	-128	-101	-74
INPL (Jerusalem)		-334133	-334834	-335517	-336191
JATC (Lintong)		12876	-	-	-
KRIS (Taejon)		3201	3233	3272	3305
NIM (Beijing)		-6146	-6109	-6076	-6055
NISA (Boulder)	(2)	-45143732	-45143950	-45144169	-45144388
NRC (Ottawa)		26110	26134	26157	26182
PTB (Braunschweig)		-361294	-361303	-361309	-361321
SO (Shanghai)		-46043	-46147	-46176	-46203
SU (Moskva)		-	-	-	-
USNO (Washington DC)	(3)	-34746507	-34746837	-34747161	-34747489

Date 1996 0h UTC		May 16	May 21	May 26	May 31
MJD		50219	50224	50229	50234
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		3333	3278	3245	3206
AUS (Canberra)		-69827	-69951	-70069	-70191
CH (Bern)		-59872	-59726	-59573	-59420
CRL (Tokyo)		69399	69607	69822	70030
CSAO (Lintong)		-	-	-	-
F (Paris)		155131	155323	155504	155686
IEN (Torino)		-44	-7	27	72
INPL (Jerusalem)		-336872	-337538	-338199	-338874
JATC (Lintong)		-	-	-	-
KRIS (Taejon)		3356	3391	3439	3482
NIM (Beijing)		-6025	-5996	-5990	-5965
NISA (Boulder)	(2)	-45144606	-45144826	-45145046	-45145270
NRC (Ottawa)		26211	26238	26264	26290
PTB (Braunschweig)		-361324	-361330	-361331	-361329
SO (Shanghai)		-46203	-46197	-46245	-46256
SU (Moskva)		-	-	-	-
USNO (Washington DC)	(3)	-34747821	-34748152	-34748478	-34748808

3 - Notes on sections 1 and 2.

(1) DTAG. Deutsche Telekom AG, Darmstadt, Germany, formerly FTZ.

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

(3) 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)
1996 Apr. 26 - 1996 Jun. 30	50199-50264	7.32×10^{-13}
New steering correction foreseen for July-Agust 1996		
1996 Jun. 30 - 1996 Aug. 29	50264-50324	7.31×10^{-13}

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

[UTC - GPS time] = -11 s + C0, [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 1996 0h UTC	MJD	C0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Apr 26	50199	25	36	8
Apr 27	50200	21	39	8
Apr 28	50201	17	40	8
Apr 29	50202	17	32	7
Apr 30	50203	20	45	10
May 1	50204	23	56	11
May 2	50205	28	45	9
May 3	50206	30	49	10
May 4	50207	30	45	9
May 5	50208	30	47	10
May 6	50209	25	55	11
May 7	50210	20	62	13
May 8	50211	26	45	9
May 9	50212	32	79	17
May 10	50213	28	57	12
May 11	50214	24	30	6
May 12	50215	26	52	11
May 13	50216	30	31	6
May 14	50217	31	48	10
May 15	50218	28	55	11
May 16	50219	24	42	9
May 17	50220	23	45	9
May 18	50221	23	44	9
May 19	50222	25	34	7
May 20	50223	27	43	9
May 21	50224	28	51	10
May 22	50225	26	39	8
May 23	50226	26	43	9
May 24	50227	21	48	10
May 25	50228	15	40	8
May 26	50229	13	41	9
May 27	50230	18	54	11
May 28	50231	24	46	10
May 29	50232	22	48	10
May 30	50233	14	42	9
May 31	50234	11	41	9

6 - [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 five-day intervals, together with the standard deviation σ of his daily GLONASS data. C1 is then derived using [UTC - GPS time] of section 5.

Date 1996 0h UTC	MJD	C1 (ns)	σ (ns)
Apr 26	50199	-28046	41
May 1	50204	-28194	44
May 6	50209	-28328	38
May 11	50214	-28455	44
May 16	50219	-28567	35
May 21	50224	-28720	39
May 26	50229	-28850	41
May 31	50234	-28974	42

7 - 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})
SU MCsR 102	50094-50124	+8.4	5.0
SU MCsR 102	50124-50154	+2.4	5.0
SU MCsR 102	50154-50184	+1.9	5.0
LPTF-F01	50212-50220	+1.9	0.3
PTB-CS2	50199-50234	+2.9	1.5
BIPM estimate	50169-50234	+2.2	1.0