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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 106 (1996 November 14)

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

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

Date 1996 0h UTC		Sep 28	Oct 3	Oct 8	Oct 13
MJD		50354	50359	50364	50369
Laboratory k		UTC-UTC(k)	(Unit is one nanosecond)		
AOS (Borowiec)		-41	-50	-72	-73
APL (Laurel)		-515	-	-	-
AUS (Canberra)		-35	-42	-70	-89
BEV (Wien)		-	-	-	-
BIRM (Beijing)		-3021	-3081	-3151	-3219
CAO (Cagliari)		-	-1136	-1261	-1375
CH (Bern)		98	94	87	80
CNM (Mexico)		-2989	-3105	-3252	-3405
CRL (Tokyo)		-58	-61	-57	-54
CSAO (Lintong)		-4	5	16	5
CSIR (Pretoria)		6912	6890	6915	6906
DLR (Oberpfaffenhofen)		-2294	-2291	-2285	-2283
DTAG (Darmstadt)		-493	-493	-487	-492
GUM (Warszawa)		-197	-190	-178	-166
IEN (Torino)		388	392	394	391
IFAG (Wettzell)		-4462	-4470	-4439	-4413
IGMA (Buenos Aires)		132	130	124	118
INPL (Jerusalem)		592	521	436	362
IPQ (Monte de Caparica)		143	142	157	141
JATC (Lintong)		3391	3404	3418	3412
KRIS (Taejon)		-39	-48	-39	-54
LDS (Leeds)		80	98	91	79
MSL (Lower Hutt)		-5172	-5251	-5325	-5276
NAOM (Mizusawa)		-2742	-2769	-2774	-2797
NAOT (Tokyo)		266	311	349	388
NIM (Beijing)		8551	8574	8591	8634
NIST (Boulder)		0	0	0	2
NPL (Teddington)		16	18	25	27
NRC (Ottawa)		-85	-103	-97	-91
NRLM (Tsukuba)		-1696	-1635	-1572	-1521
OMH (Budapest)	(1)	79	98	120	127
ONBA (Buenos Aires)		-12230	-12525	-12846	-12896
ONRJ (Rio de Janeiro)		25005	25354	25804	26235
OP (Paris)		10	16	12	5
ORB (Bruxelles)		67	75	58	94
PTB (Braunschweig)		1970	1967	1969	1966
ROA (San Fernando)		96	97	97	91
SCL (Hong Kong)		-614	-608	-598	-600
SO (Shanghai)		1195	1231	1218	1208
SP (Boras)		-40	-40	-36	-37
SU (Moskva)		-7886	-7895	-7904	-7913
TL (Chung-Li)		-	-	-	-
TP (Praha)		46	46	53	52
TUG (Graz)		694	717	748	767
UME (Gebze-Kocaeli)		265	269	275	280
USNO (Washington DC)(USNO MC)		-1	1	2	7
VSL (Delft)		-388	-392	-389	-396

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1 - Coordinated Universal Time UTC. (Cont.)

Date 1996 0h UTC	Oct 18	Oct 23	Oct 28
MJD	50374	50379	50384
Laboratory k	UTC-UTC(k)	(Unit is one	nanosecond)
AOS (Borowiec)	-91	-112	-71
APL (Laurel)	-	-	-
AUS (Canberra)	-91	-110	-78
BEV (Wien)	-	-	-
BIRM (Beijing)	-3295	-3361	-3409
CAO (Cagliari)	-1514	-1630	-1757
CH (Bern)	70	63	57
CNM (Mexico)	-3543	-3648	-3708
CRL (Tokyo)	-44	-51	-46
CSAO (Lintong)	1	-3	11
CSIR (Pretoria)	6888	6886	6867
DLR (Oberpfaffenhofen)	-2275	-2271	-2265
DTAG (Darmstadt)	-498	-514	-514
GUM (Warszawa)	-155	-138	-131
IEN (Torino)	399	397	401
IFAG (Wettzell)	-4392	-4360	-4336
IGMA (Buenos Aires)	118	119	116
INPL (Jerusalem)	302	209	117
IPQ (Monte de Caparica)	145	149	155
JATC (Lintong)	3402	3408	3430
KRIS (Taejon)	-49	-53	-83
LDS (Leeds)	69	66	85
MSL (Lower Hutt)	-5299	-5402	-5435
NAOM (Mizusawa)	-2819	-2845	-2858
NAOT (Tokyo)	416	441	484
NIM (Beijing)	8605	8584	8629
NIST (Boulder)	7	6	8
NPL (Teddington)	34	36	37
NRC (Ottawa)	-73	-61	-43
NRLM (Tsukuba)	-1455	-1384	-1311
OMH (Budapest)	145	-	-
ONBA (Buenos Aires)	-13240	-13549	-13893
ONRJ (Rio de Janeiro)	26599	26861	27278
OP (Paris)	7	11	13
ORB (Bruxelles)	66	87	81
PTB (Braunschweig)	1962	1959	1953
ROA (San Fernando)	92	87	90
SCL (Hong Kong)	-578	-587	-568
SO (Shanghai)	1207	1180	1219
SP (Boras)	-32	-29	-25
SU (Moskva)	-7921	-7931	-7939
TL (Chung-Li)	-	-	-
TP (Praha)	53	65	61
TUG (Graz)	791	824	853
UME (Gebze-Kocaeli)	296	308	324
USNO (Washington DC)(USNO MC)	11	11	9
VSL (Delft)	-386	-379	-383

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		Sep 28	Oct 3	Oct 8	Oct 13
MJD		50354	50359	50364	50369
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		948	-	-	-
AUS (Canberra)		-73104	-73195	-73318	-73423
CH (Bern)		-55675	-55513	-55355	-55198
CRL (Tokyo)		75027	75233	75444	75654
CSAO (Lintong)		3458	3402	3348	3272
F (Paris)		160006	160185	160368	160554
IEN (Torino)		1175	1229	1278	1317
INPL (Jerusalem)		-354469	-355137	-355815	-356481
JATC (Lintong)		13707	13699	13695	13670
KRIS (Taejon)		4715	4768	4842	4900
NIM (Beijing)		-5422	-5393	-5353	-5295
NISA (Boulder)	(2)	-45150548	-45150769	-45150989	-45151207
NRC (Ottawa)		26933	26944	26959	26950
PTB (Braunschweig)		-361430	-361433	-361431	-361434
SO (Shanghai)		-46303	-46263	-46267	-46270
SU (Moskva)	(3)	27242114	27242105	27242096	27242087
USNO (Washington DC)	(4)	-34756703	-34757031	-34757359	-34757685

Date 1996 0h UTC		Oct 18	Oct 23	Oct 28
MJD		50374	50379	50384
Laboratory k		TAI-TA(k) (Unit is one nanosecond)		
APL (Laurel)		-	-	-
AUS (Canberra)		-73550	-73680	-73831
CH (Bern)		-55043	-54886	-54728
CRL (Tokyo)		75866	76074	76275
CSAO (Lintong)		3204	3135	3084
F (Paris)		160740	160925	161112
IEN (Torino)		1365	1420	1479
INPL (Jerusalem)		-357132	-357821	-358513
JATC (Lintong)		13639	13623	13623
KRIS (Taejon)		4972	5032	5072
NIM (Beijing)		-5316	-5316	-5259
NISA (Boulder)	(2)	-45151422	-45151643	-45151861
NRC (Ottawa)		26970	26983	27002
PTB (Braunschweig)		-361438	-361441	-361447
SO (Shanghai)		-46263	-46286	-46241
SU (Moskva)	(3)	27242079	27242069	27242061
USNO (Washington DC)	(4)	-34758010	-34758338	-34758667

3 - Notes on sections 1 and 2.

(1) OMH .

MJD	UTC-UTC(OMH)
50334	68 ns
50339	66 ns
50344	68 ns
50349	80 ns

(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)
1996 Aug. 29 - 1996 Oct. 28	50324-50384	7.295×10^{-13}

New steering correction foreseen for November-December 1996

1996 Oct. 28 - 1996 Dec. 27	50384-50444	7.280×10^{-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)
Sep 28	50354	16	56	11
Sep 29	50355	21	46	9
Sep 30	50356	24	40	8
Oct 1	50357	28	42	9
Oct 2	50358	32	40	8
Oct 3	50359	36	52	11
Oct 4	50360	37	45	9
Oct 5	50361	39	62	13
Oct 6	50362	44	45	9
Oct 7	50363	47	44	9
Oct 8	50364	46	40	9
Oct 9	50365	42	42	9
Oct 10	50366	39	26	5
Oct 11	50367	38	39	8
Oct 12	50368	33	52	11
Oct 13	50369	30	40	8
Oct 14	50370	32	40	8
Oct 15	50371	37	56	12
Oct 16	50372	36	38	8
Oct 17	50373	32	40	8
Oct 18	50374	29	44	9
Oct 19	50375	26	37	8
Oct 20	50376	26	44	9
Oct 21	50377	23	50	10
Oct 22	50378	17	44	9
Oct 23	50379	16	46	9
Oct 24	50380	25	45	9
Oct 25	50381	39	41	8
Oct 26	50382	49	53	11
Oct 27	50383	52	38	8
Oct 28	50384	51	42	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)
Sep 28	50354	-32241	41
Oct 3	50359	-32342	42
Oct 8	50364	-32474	48
Oct 13	50369	-32628	47
Oct 18	50374	-32735	39
Oct 23	50379	-32899	47
Oct 28	50384	-33078	46

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, 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	50324-50384	+2.2	1.5
PTB-CS3	50324-50384	+2.6	1.4
BIPM estimate	50324-50384	+2.0	1.0