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BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 108 (1997 January 14)

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 1996 0h UTC	Nov 27	Dec 2	Dec 7	Dec 12
MJD	50414	50419	50424	50429
Laboratory k	UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)	121	271	388	519
APL (Laurel)	286	320	363	401
AUS (Canberra)	-79	-84	-87	-76
BEV (Wien)	-	-	-	-
BIRM (Beijing)	-3805	-3870	-3905	-3978
CAO (Cagliari)	-2388	-2501	-2611	-2724
CH (Bern)	81	101	116	125
CNM (Queretaro)	-4230	-4312	-4412	-4487
CRL (Tokyo)	-31	-30	-24	-23
CSAO (Lintong)	-3	28	45	6
CSIR (Pretoria)	6932	6919	6923	6931
DLR (Oberpfaffenhofen)	380	399	411	429
DTAG (Darmstadt)	-566	-563	-571	-566
GUM (Warszawa)	-60	-51	-43	-33
IEN (Torino)	443	453	452	445
IFAG (Wettzell)	-4095	-4078	-4041	-3985
IGMA (Buenos Aires)	162	167	176	172
INPL (Jerusalem)	-346	-378	-422	-464
IPQ (Monte de Caparica)	175	177	174	178
JATC (Lintong)	3489	3526	3552	3505
KRIS (Taejon)	-142	-138	-145	-156
LDS (Leeds)	55	44	14	28
MSL (Lower Hutt)	-5583	-5555	-5611	-5621
NAOM (Mizusawa)	-2965	-2985	-3001	-3027
NAOT (Tokyo)	745	796	865	890
NIM (Beijing)	-	-2097	-2084	-2049
NIST (Boulder)	38	44	47	49
NPL (Teddington)	72	73	74	77
NRC (Ottawa)	99	117	138	154
NRLM (Tsukuba)	-30	-24	-28	-33
OMH (Budapest)	-	-	-	-
ONBA (Buenos Aires)	-14786	-14941	-14910	-15172
ONRJ (Rio de Janeiro)	29511	29850	30144	30438
OP (Paris)	39	50	59	58
ORB (Bruxelles)	90	83	70	83
PTB (Braunschweig)	1930	1929	1919	1915
ROA (San Fernando)	75	76	62	54
SCL (Hong Kong)	-411	-393	-360	-366
SO (Shanghai)	1191	1193	1190	1188
SP (Boras)	-20	-23	-32	-25
SU (Moskva)	1022	1015	1003	994
TL (Chung-Li)	-	-	-	-
TP (Praha)	92	96	86	81
TUG (Graz)	1007	1042	1065	1091
UME (Gebze-Kocaeli)	164	181	188	198
USNO (Washington DC)(USNO MC)	21	22	21	21
VSL (Delft)	-380	-382	-375	-374

ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU MÈTRE

PAVILLON DE BRETEUIL F-92312 SÈVRES CEDEX TÉL. + 33 1 45 07 70 70 FAX + 33 1 45 34 20 21

1 - Coordinated Universal Time UTC. (Cont.)

Date 1996 0h UTC	Dec 17	Dec 22	Dec 27
MJD	50434	50439	50444
Laboratory k	UTC-UTC(k)	(Unit is one nanosecond)	
AOS (Borowiec)	541	518	529
APL (Laurel)	433	474	507
AUS (Canberra)	-85	-62	-58
BEV (Wien)	-	-	-
BIRM (Beijing)	-4043	-4111	-4134
CAO (Cagliari)	-2852	-2959	-3047
CH (Bern)	138	154	172
CNM (Queretaro)	-4578	-4664	-4662
CRL (Tokyo)	-23	-28	-24
CSAO (Lintong)	28	33	9
CSIR (Pretoria)	6994	7082	7122
DLR (Oberpfaffenhofen)	447	466	487
DTAG (Darmstadt)	-582	-607	-601
GUM (Warszawa)	-29	-15	-9
IEN (Torino)	441	448	459
IFAG (Wettzell)	-3938	-3893	-3847
IGMA (Buenos Aires)	167	184	197
INPL (Jerusalem)	-520	-575	-611
IPQ (Monte de Caparica)	176	193	218
JATC (Lintong)	3536	3553	3543
KRIS (Taejon)	-151	-161	-166
LDS (Leeds)	15	13	6
MSL (Lower Hutt)	-5662	-5668	-5631
NAOM (Mizusawa)	-3069	-3106	-3133
NAOT (Tokyo)	936	947	982
NIM (Beijing)	-2050	-2028	-1988
NIST (Boulder)	54	50	49
NPL (Teddington)	78	81	87
NRC (Ottawa)	179	194	189
NRLM (Tsukuba)	-30	-23	-16
OMH (Budapest)	-	-	-
ONBA (Buenos Aires)	-15121	-15124	-15258
ONRJ (Rio de Janeiro)	30786	31103	31428
OP (Paris)	64	64	61
ORB (Bruxelles)	102	99	99
PTB (Braunschweig)	1905	1897	1882
ROA (San Fernando)	38	26	27
SCL (Hong Kong)	-322	-287	-243
SO (Shanghai)	1156	1166	1176
SP (Boras)	-21	-22	-13
SU (Moskva)	985	976	964
TL (Chung-Li)	-	-	-
TP (Praha)	90	94	81
TUG (Graz)	1117	1147	1173
UME (Gebze-Kocaeli)	205	222	232
USNO (Washington DC)(USNO MC)	19	19	16
VSL (Delft)	-381	-387	-391

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		Nov 27	Dec 2	Dec 7	Dec 12
MJD		50414	50419	50424	50429
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		-	-	-	-
AUS (Canberra)		-74535	-74659	-74775	-74884
CH (Bern)		-53753	-53577	-53405	-53235
CRL (Tokyo)		77518	77730	77941	78144
CSAO (Lintong)		2681	2647	2599	2495
F (Paris)		162170	162348	162524	162701
IEN (Torino)		1733	1777	1802	1821
INPL (Jerusalem)		-362665	-363334	-364024	-364715
JATC (Lintong)		13580	13603	13616	13562
KRIS (Taejon)		5234	5271	5296	5316
NIM (Beijing)		-	-	-	-
NISA (Boulder)	(1)	-45153151	-45153365	-45153581	-45153798
NRC (Ottawa)		27151	27170	27191	27209
PTB (Braunschweig)		-361470	-361471	-361481	-361485
SO (Shanghai)		-46272	-46285	-46290	-46292
SU (Moskva)	(2)	27242022	27242015	27242003	27241994
USNO (Washington DC)	(3)	-34760616	-34760939	-34761266	-34761591

Date 1996 0h UTC		Dec 17	Dec 22	Dec 27
MJD		50434	50439	50444
Laboratory k		TAI-TA(k)	(Unit is one nanosecond)	
APL (Laurel)		1896	1937	1970
AUS (Canberra)		-75015	-75102	-75202
CH (Bern)		-53062	-52886	-52707
CRL (Tokyo)		78349	78557	78764
CSAO (Lintong)		2453	2393	2304
F (Paris)		162878	163056	163237
IEN (Torino)		1848	1893	1942
INPL (Jerusalem)		-365427	-366145	-366855
JATC (Lintong)		13572	13575	13550
KRIS (Taejon)		5349	5367	5388
NIM (Beijing)		-	-	-
NISA (Boulder)	(1)	-45154012	-45154229	-45154443
NRC (Ottawa)		27235	27268	27264
PTB (Braunschweig)		-361495	-361503	-361518
SO (Shanghai)		-46323	-46315	-46314
SU (Moskva)	(2)	27241985	27241976	27241964
USNO (Washington DC)	(3)	-34761917	-34762241	-34762567

3 - Notes on sections 1 and 2.

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

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

(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 Oct. 28 - 1996 Dec. 27	50384-50444	7.280×10^{-13}

New steering correction foreseen for January-February 1997

1996 Dec. 27 - 1997 Feb. 25	50444-50504	7.265×10^{-13}

5 - Information. UTC time step on the 1st of July 1997.

Bulletin C 13 of the International Earth Rotation Service informs that a positive leap second will be intrduced at the end of June 1997. The sequence of dates of the UTC second markers will be :

1997 June 30, 23h 59m 59s
1997 June 30, 23h 59m 60s
1997 July 1, 0h 0m 0s

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 1996 0h UTC	MJD	C0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Nov 27	50414	68	43	9
Nov 28	50415	68	43	9
Nov 29	50416	62	41	9
Nov 30	50417	56	40	9
Dec 1	50418	55	48	10
Dec 2	50419	55	48	10
Dec 3	50420	56	40	9
Dec 4	50421	59	43	9
Dec 5	50422	57	57	12
Dec 6	50423	54	43	9
Dec 7	50424	49	48	10
Dec 8	50425	40	48	10
Dec 9	50426	41	38	8
Dec 10	50427	53	35	7
Dec 11	50428	59	41	9
Dec 12	50429	55	46	10
Dec 13	50430	50	51	11
Dec 14	50431	49	48	10
Dec 15	50432	48	44	10
Dec 16	50433	45	42	9
Dec 17	50434	44	53	11
Dec 18	50435	40	46	10
Dec 19	50436	36	56	12
Dec 20	50437	43	36	8
Dec 21	50438	54	35	7
Dec 22	50439	51	55	12
Dec 23	50440	38	44	9
Dec 24	50441	39	31	7
Dec 25	50442	49	36	8
Dec 26	50443	59	47	10
Dec 27	50444	60	51	11

7 - [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 6.

Date 1996 0h UTC	MJD	C1 (ns)	σ (ns)
Nov 27	50414	-33829	43
Dec 2	50419	-34001	51
Dec 7	50424	-34153	48
Dec 12	50429	-34286	47
Dec 17	50434	-34402	44
Dec 22	50439	-34543	42
Dec 27	50444	-34681	54

8 - 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	50384-50444	+2.9	1.5
PTB-CS3	50384-50444	+5.0	1.4
BIPM estimate	50384-50444	+1.6	1.0