ISSN 1143-1393

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 112 (1997 May 13)
Circulaire T 112

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	Mar 27	Apr 1	Apr 6	Apr 11
MJD	50534	50539	50544	50549
Laboratory k	*UTC-UTC(k)* (Unit is one nanosecond)			
AOS (Borowiec)	133	-31	-212	-257
APL (Laurel)	1100	1150	1191	1259
AUS (Canberra)	188	226	252	270
BEV (Wien)	-	-	-	-
BIRM (Beijing)	-5206	-5246	-5270	-5305
CAO (Cagliari)	-386	-422	-440	-497
CH (Bern)	118	92	76	61
CNM (Queretaro)	-3793	-3740	-3689	-3632
CRL (Tokyo)	-24	-27	-31	-35
CSAO (Lintong)	-5	-1	-12	-6
CSIR (Pretoria)	8168	8156	8148	8216
DLR (Oberpfaffenhofen)	512	486	462	436
DTAG (Darmstadt)	-712	-709	-714	-718
GUM (Warszawa)	163	176	192	200
IEN (Torino)	544	545	544	536
IFAG (Wettzell)	-2641	-2575	-2509	-2428
IGMA (Buenos Aires)	184	174	191	188
INPL (Jerusalem)	-1686	-1802	-1927	-2075
IPQ (Monte de Caparica)	348	359	370	376
JATC (Lintong)	3595	3608	3600	3612
KRIS (Taejon)	-211	-215	-220	-224
LDS (Leeds)	-36	-27	-35	-59
MSL (Lower Hutt)	-5562	-5518	-5502	-5505
NAO (Mizusawa)	-3476	-3426	-3375	-3329
NIM (Beijing)	-1504	-1526	-1529	-1536
NIST (Boulder)	8	5	4	6
NPL (Teddington)	68	67	69	70
NRC (Ottawa)	24	12	-2	-4
NRLM (Tsukuba)	46	47	49	46
OMH (Budapest)	-	-	-	-
ONBA (Buenos Aires)	-17681	-17757	-18059	-18357
ONRJ (Rio de Janeiro)	38713	39087	39485	39892
OP (Paris)	-6	-8	-14	-6
ORB (Bruxelles)	228	233	224	225
PTB (Braunschweig)	1793	1788	1786	1777
ROA (San Fernando)	-38	-34	-33	-33
SCL (Hong Kong)	-62	-43	-19	-17
SO (Shanghai)	1081	1060	1084	1057
SP (Boras)	271	277	277	276
SU (Moskva)	820	812	804	796
TL (Chung-Li)	390	473	446	415
TP (Praha)	124	107	108	91
TUG (Graz)	1768	1805	1848	1892
UME (Gebze-Kocaeli)	431	445	445	452
USNO (Washington DC)(USNO MC)	9	8	9	10
VSL (Delft)	-460	-463	-453	-441

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1 - Coordinated Universal Time UTC. (Cont.)

Date 1997 0h UTC	Apr 16	Apr 21	Apr 26
MJD	50554	50559	50564
Laboratory k	*UTC-UTC(k)*	(Unit is one	nanosecond)
AOS (Borowiec)	-315	-364	-441
APL (Laurel)	1312	1362	1417
AUS (Canberra)	287	293	287
BEV (Wien)	-	-	-
BIRM (Beijing)	-5351	-5403	-5438
CAO (Cagliari)	-513	-533	-546
CH (Bern)	46	48	44
CNM (Queretaro)	-3582	-3532	-3473
CRL (Tokyo)	-29	-22	-14
CSAO (Lintong)	-20	-26	3
CSIR (Pretoria)	8265	8311	8330
DLR (Oberpfaffenhofen)	408	381	353
DTAG (Darmstadt)	-731	-747	-743
GUM (Warszawa)	218	241	268
IEN (Torino)	525	527	528
IFAG (Wettzell)	-2327	-2249	-2181
IGMA (Buenos Aires)	184	206	222
INPL (Jerusalem)	-2250	-2461	-2671
IPQ (Monte de Caparica)	387	391	401
JATC (Lintong)	3605	3610	3652
KRIS (Taejon)	-221	-227	-219
LDS (Leeds)	-63	-66	-65
MSL (Lower Hutt)	-5564	-5630	-5615
NAO (Mizusawa)	-3263	-3210	-3170
NIM (Beijing)	-1557	-1562	-1573
NIST (Boulder)	2	-3	-2
NPL (Teddington)	71	72	72
NRC (Ottawa)	-10	-9	-1
NRLM (Tsukuba)	50	59	63
OMH (Budapest)	634	640	663
ONBA (Buenos Aires)	-18638	-18874	-19130
ONRJ (Rio de Janeiro)	40299	40717	41195
OP (Paris)	-12	-8	-4
ORB (Bruxelles)	245	241	250
PTB (Braunschweig)	1770	1762	1760
ROA (San Fernando)	-36	-47	-57
SCL (Hong Kong)	-3	-1	20
SO (Shanghai)	1022	1038	1039
SP (Boras)	278	293	296
SU (Moskva)	790	783	771
TL (Chung-Li)	446	445	492
TP (Praha)	104	118	120
TUG (Graz)	1923	1960	1994
UME (Gebze-Kocaeli)	463	467	475
USNO (Washington DC)(USNO MC)	9	10	13
VSL (Delft)	-438	-429	-418

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		Mar 27	Apr 1	Apr 6	Apr 11
MJD		50534	50539	50544	50549
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)			
APL (Laurel)		2563	2613	2654	2722
AUS (Canberra)		-77110	-77236	-77374	-77481
CH (Bern)		-49532	-49365	-49189	-49015
CRL (Tokyo)		82462	82670	82884	83095
CSAO (Lintong)		1124	1063	987	928
F (Paris)		163225	163214	163203	163192
IEN (Torino)		2718	2753	2790	2818
INPL (Jerusalem)		-380705	-381480	-382253	-383038
JATC (Lintong)		13498	13504	13512	13517
KRIS (Taejon)		5568	5557	5543	5528
NIM (Beijing)		-	-	-	-
NISA (Boulder)	(1)	-45158315	-45158531	-45158745	-45158955
NRC (Ottawa)		27118	27108	27095	27085
PTB (Braunschweig)		-361607	-361612	-361614	-361623
SO (Shanghai)		-46466	-46502	-46486	-46523
SU (Moskva)	(2)	27241820	27241812	27241804	27241796
USNO (Washington DC)	(3)	-34768392	-34768715	-34769036	-34769357

Date 1997 0h UTC		Apr 16	Apr 21	Apr 26
MJD		50554	50559	50564
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)		
APL (Laurel)		2775	2825	2880
AUS (Canberra)		-77557	-77684	-77803
CH (Bern)		-48841	-48651	-48466
CRL (Tokyo)		83317	83532	83746
CSAO (Lintong)		849	778	742
F (Paris)		163179	163169	163159
IEN (Torino)		2852	2888	2929
INPL (Jerusalem)		-383835	-384646	-385461
JATC (Lintong)		13521	13533	13556
KRIS (Taejon)		5517	5497	5490
NIM (Beijing)		-	-	-
NISA (Boulder)	(1)	-45159172	-45159389	-45159601
NRC (Ottawa)		27071	27065	27065
PTB (Braunschweig)		-361630	-361638	-361640
SO (Shanghai)		-46544	-46508	-46491
SU (Moskva)	(2)	27241790	27241783	27241771
USNO (Washington DC)	(3)	-34769680	-34770002	-34770321

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)*
1997 Feb. 25 - 1997 Apr. 26	50504-50564	$7{,}250\times10^{-13}$

New steering correction foreseen for May-June 1997

1997 Apr. 26 - 1997 June 30	50564-50629	$7{,}230\times10^{-13}$

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 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})	σ (10^{-14})
PTB-CS2	50504-50564	+2,8	1,5
PTB-CS3	50504-50564	+4,5	1,4
BIPM estimate	50504-50564	+2,6	1,0

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

[*UTC-GPS time*] = -11 s + C_0 (until 1997 July 1, 0h UTC)
[*UTC-GPS time*] = -12 s + C_0 (from 1997 July 1, 0h UTC)
[*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)*].

For a given day, where N measurements are used for estimation of C_0 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C_0 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$.

Date 1997 0h UTC	MJD	C_0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Mar 27	50534	16	47	10
Mar 28	50535	14	52	10
Mar 29	50536	19	47	10
Mar 30	50537	27	40	8
Mar 31	50538	30	40	8
Apr 1	50539	30	56	11
Apr 2	50540	26	55	11
Apr 3	50541	28	38	8
Apr 4	50542	37	36	7
Apr 5	50543	42	53	11
Apr 6	50544	42	33	7
Apr 7	50545	43	42	8
Apr 8	50546	36	45	9
Apr 9	50547	28	38	8
Apr 10	50548	24	42	9
Apr 11	50549	27	43	9
Apr 12	50550	27	47	9
Apr 13	50551	24	40	8
Apr 14	50552	25	41	8
Apr 15	50553	27	43	9
Apr 16	50554	26	48	10
Apr 17	50555	30	36	7
Apr 18	50556	36	50	10
Apr 19	50557	36	39	8
Apr 20	50558	31	37	7
Apr 21	50559	25	51	10
Apr 22	50560	28	44	9
Apr 23	50561	38	50	10
Apr 24	50562	42	45	9
Apr 25	50563	42	43	9
Apr 26	50564	38	48	10

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

[*UTC-GLONASS time*] = 0 s + C_1
[*TAI-GLONASS time*] = +30 s + C_1 (until 1997 July 1, 0h UTC)
[*TAI-GLONASS time*] = +31 s + C_1 (from 1997 July 1, 0h UTC)

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).

For a given day, where N measurements are used for estimation of C_1 :
- the dispersion of individual measurements is characterized by a standard deviation σ,
- the daily C_1 value is characterized by the standard deviation of the mean $\sigma/\sqrt{N}$

Date 1997 0h UTC	MJD	C_1 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Mar 27	50534	-34908	21	4
Mar 28	50535	-34906	22	3
Mar 29	50536	-34905	23	4
Mar 30	50537	-34909	30	6
Mar 31	50538	-34911	28	5
Apr 1	50539	-34909	21	4
Apr 2	50540	-34906	27	5
Apr 3	50541	-34907	23	4
Apr 4	50542	-34909	24	4
Apr 5	50543	-34913	21	4
Apr 6	50544	-34919	27	5
Apr 7	50545	-34926	28	5
Apr 8	50546	-34934	25	5
Apr 9	50547	-34936	23	4
Apr 10	50548	-34935	14	3
Apr 11	50549	-34944	23	5
Apr 12	50550	-34954	18	3
Apr 13	50551	-34955	19	3
Apr 14	50552	-34952	24	4
Apr 15	50553	-34952	42	7
Apr 16	50554	-34951	25	5
Apr 17	50555	-34950	32	5
Apr 18	50556	-34948	15	3
Apr 19	50557	-34949	19	3
Apr 20	50558	-34952	22	4
Apr 21	50559	-34952	17	3
Apr 22	50560	-34949	20	4
Apr 23	50561	-34947	20	4
Apr 24	50562	-34944	23	5
Apr 25	50563	-34943	31	5
Apr 26	50564	-34946	34	6