ISSN 1143-1393

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 116 (1997 September 11)
Circulaire T 116

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

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

Date 1997 0h UTC	Jul 30	Aug 4	Aug 9	Aug 14
MJD	50659	50664	50669	50674
Laboratory k	*UTC-UTC(k)* (Unit is one nanosecond)			
AOS (Borowiec)	-346	-478	-608	-768
APL (Laurel)	2455	2509	2573	2625
AUS (Canberra)	271	256	261	225
BEV (Wien)	-	-	-	-
BIRM (Beijing)	-6555	-6609	-6606	-6724
CAO (Cagliari)	-1145	-1186	-1223	-1250
CH (Bern)	-110	-95	-50	-13
CNM (Queretaro)	-2450	-2391	-2341	-2284
CRL (Tokyo)	11	7	12	5
CSAO (Lintong)	-25	-32	-11	-8
CSIR (Pretoria)	344	252	133	40
DLR (Oberpfaffenhofen)	-357	-396	-448	-490
DTAG (Darmstadt)	-629	-621	-625	-622
GUM (Warszawa)	669	686	702	718
IEN (Torino)	600	605	611	617
IFAG (Wettzell)	-1115	-1040	-955	-905
IGMA (Buenos Aires)	48	60	66	57
INPL (Jerusalem)	-	-	-1698	-908
IPQ (Monte de Caparica)	610	616	634	652
JATC (Lintong)	3434	3439	3474	3477
KRIS (Taejon)	-130	-112	-120	-127
LDS (Leeds)	-40	-27	-13	-20
MSL (Lower Hutt)	-5828	-5838	-5838	-5809
NAO (Mizusawa)	-1954	-1900	-1834	-1764
NIM (Beijing)	-1957	-1965	-1979	-2034
NIST (Boulder)	18	18	21	25
NML (Sydney)	584	589	613	605
NPL (Teddington)	61	62	62	63
NRC (Ottawa)	-18	-14	-11	-3
NRLM (Tsukuba)	138	148	152	155
OMH (Budapest)	958	970	999	1033
ONBA (Buenos Aires)	-9130	-9511	-10186	-10815
ONRJ (Rio de Janeiro)	-222	-205	-187	-165
OP (Paris)	82	81	67	67
ORB (Bruxelles)	291	297	344	322
PTB (Braunschweig)	1723	1727	1731	1741
ROA (San Fernando)	-23	-24	-21	-25
SCL (Hong Kong)	-	-	-	-
SO (Shanghai)	950	937	948	944
SP (Boras)	399	-	413	425
SU (Moskva)	624	614	604	595
TL (Chung-Li)	707	695	689	675
TP (Praha)	144	149	162	173
TUG (Graz)	2686	2727	2778	2824
UME (Gebze-Kocaeli)	623	638	644	659
USNO (Washington DC)(USNO MC)	8	8	11	12
VSL (Delft)	-236	-229	-221	-215

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 1997 0h UTC	Aug 19	Aug 24	Aug 29
MJD	50679	50684	50689
Laboratory k	*UTC-UTC(k)*	(Unit is one	nanosecond)
AOS (Borowiec)	-872	-1003	-987
APL (Laurel)	2676	2732	2796
AUS (Canberra)	230	238	251
BEV (Wien)	-	-	-
BIRM (Beijing)	-6775	-6827	-6885
CAO (Cagliari)	-1284	-1332	-1370
CH (Bern)	9	37	82
CNM (Queretaro)	-2224	-2160	-2109
CRL (Tokyo)	7	16	3
CSAO (Lintong)	-31	-9	-40
CSIR (Pretoria)	-24	-69	-142
DLR (Oberpfaffenhofen)	-536	-578	-625
DTAG (Darmstadt)	-608	-603	-601
GUM (Warszawa)	741	753	766
IEN (Torino)	616	613	611
IFAG (Wettzell)	-816	-731	-698
IGMA (Buenos Aires)	59	49	55
INPL (Jerusalem)	-833	-767	-695
IPQ (Monte de Caparica)	662	688	704
JATC (Lintong)	3460	3478	3458
KRIS (Taejon)	-123	-130	-115
LDS (Leeds)	-6	0	16
MSL (Lower Hutt)	-5815	-5816	-5743
NAO (Mizusawa)	-1714	-1644	-1588
NIM (Beijing)	-2053	-2069	-2093
NIST (Boulder)	26	28	29
NML (Sydney)	612	633	634
NPL (Teddington)	66	67	71
NRC (Ottawa)	1	2	6
NRLM (Tsukuba)	162	170	177
OMH (Budapest)	1042	1053	1066
ONBA (Buenos Aires)	-11445	-	-
ONRJ (Rio de Janeiro)	-151	-123	-117
OP (Paris)	56	53	44
ORB (Bruxelles)	338	308	316
PTB (Braunschweig)	1752	1756	1771
ROA (San Fernando)	-28	-19	-12
SCL (Hong Kong)	-	-	-
SO (Shanghai)	927	941	946
SP (Boras)	422	427	437
SU (Moskva)	587	582	572
TL (Chung-Li)	654	655	636
TP (Praha)	180	192	184
TUG (Graz)	2869	2897	2936
UME (Gebze-Kocaeli)	681	690	702
USNO (Washington DC)(USNO MC)	11	10	9
VSL (Delft)	-198	-193	-192

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		Jul 30	Aug 4	Aug 9	Aug 14
MJD		50659	50664	50669	50674
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)			
AMC (Col. Springs)		-364999	-365005	-365009	-365014
APL (Laurel)		3918	3972	4036	4088
AUS (Canberra)		-79736	-79831	-79989	-80118
CH (Bern)		-45290	-45123	-44943	-44770
CRL (Tokyo)		87793	88006	88218	88425
CSAO (Lintong)		-518	-590	-634	-695
F (Paris)		162970	162961	162951	162947
IEN (Torino)		3823	3868	3916	3968
INPL (Jerusalem)		-	-	-400471	-400250
JATC (Lintong)		13051	13032	13044	13031
KRIS (Taejon)		5313	5325	5311	5298
NIST (Boulder)		-45163663	-45163878	-45164090	-45164301
NML (Sydney)		620	625	649	641
NRC (Ottawa)		27052	27050	27049	27053
PTB (Braunschweig)		-361677	-361673	-361669	-361659
SO (Shanghai)		-46573	-46616	-46600	-46603
SU (Moskva)	(1)	27241624	27241614	27241604	27241595
USNO (Washington DC)		-34776418	-34776739	-34777057	-34777377

Date 1997 0h UTC		Aug 19	Aug 24	Aug 29
MJD		50679	50684	50689
Laboratory k		*TAI-TA(k)* (Unit is one nanosecond)		
AMC (Col. Springs)		-365019	-365022	-365026
APL (Laurel)		4139	4195	4259
AUS (Canberra)		-80211	-80239	-80429
CH (Bern)		-44612	-44448	-44267
CRL (Tokyo)		88638	88853	89064
CSAO (Lintong)		-783	-826	-922
F (Paris)		162942	162935	162929
IEN (Torino)		4011	4055	4106
INPL (Jerusalem)		-400002	-399764	-399519
JATC (Lintong)		12988	12965	12923
KRIS (Taejon)		5293	5280	5287
NIST (Boulder)		-45164515	-45164728	-45164942
NML (Sydney)		648	669	670
NRC (Ottawa)		27053	27049	27049
PTB (Braunschweig)		-361648	-361644	-361629
SO (Shanghai)		-46616	-46588	-46567
SU (Moskva)	(1)	27241587	27241582	27241572
USNO (Washington DC)		-34777697	-34778018	-34778337

3 - Note on section 2.

(1) 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 June 30 - 1997 Aug. 29	50629-50689	$7{,}210 \times 10^{-13}$

New steering correction foreseen for September-October 1997

1997 Aug. 29 - 1997 Oct. 28	50689-50749	$7{,}190 \times 10^{-13}$

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 NIST-7, PTB CS2 and 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	50629-50689	+0,4	1,5
PTB-CS3	50629-50689	+3,4	1,4
BIPM estimate	50629-50689	+1,9	1,0

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

[*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)*]. 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)
Jul 30	50659	20	40	9
Jul 31	50660	19	45	12
Aug 1	50661	18	51	11
Aug 2	50662	17	57	12
Aug 3	50663	19	50	11
Aug 4	50664	21	30	7
Aug 5	50665	20	55	13
Aug 6	50666	20	41	9
Aug 7	50667	19	52	11
Aug 8	50668	20	51	11
Aug 9	50669	24	48	10
Aug 10	50670	30	-	-
Aug 11	50671	31	35	10
Aug 12	50672	24	51	12
Aug 13	50673	20	52	16
Aug 14	50674	23	43	10
Aug 15	50675	25	43	10
Aug 16	50676	26	44	10
Aug 17	50677	29	42	10
Aug 18	50678	27	53	12
Aug 19	50679	17	48	11
Aug 20	50680	10	32	8
Aug 21	50681	9	38	9
Aug 22	50682	13	49	13
Aug 23	50683	15	40	10
Aug 24	50684	15	45	11
Aug 25	50685	20	50	12
Aug 26	50686	24	42	10
Aug 27	50687	23	37	8
Aug 28	50688	22	49	11
Aug 29	50689	25	53	12

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

[*UTC-GLONASS time*] = 0 s + C_1
[*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). 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)
Jul 30	50659	133	23	7
Jul 31	50660	143	-	-
Aug 1	50661	141	21	6
Aug 2	50662	137	22	7
Aug 3	50663	142	21	6
Aug 4	50664	139	16	5
Aug 5	50665	142	12	4
Aug 6	50666	154	24	7
Aug 7	50667	155	29	11
Aug 8	50668	146	13	4
Aug 9	50669	145	29	10
Aug 10	50670	151	21	7
Aug 11	50671	156	20	7
Aug 12	50672	155	17	5
Aug 13	50673	150	16	5
Aug 14	50674	154	22	7
Aug 15	50675	164	22	7
Aug 16	50676	168	9	3
Aug 17	50677	152	23	9
Aug 18	50678	-	-	-
Aug 19	50679	-	-	-
Aug 20	50680	-	-	-
Aug 21	50681	-	-	-
Aug 22	50682	157	13	4
Aug 23	50683	180	17	6
Aug 24	50684	184	15	5
Aug 25	50685	187	20	7
Aug 26	50686	194	12	4
Aug 27	50687	182	25	8
Aug 28	50688	-	-	-
Aug 29	50689	-	-	-