BIPM ISSN 1143-1393

BUREAU INTERNATIONAL DES POIDS ET MESURES
Circular T 93 (1995 October 17)

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

(From 1994 July 1, 0hUTC, to 1996 January 1, 0hUTC, TAI-UTC = 29 s)
(From 1996 January 1, 0hUTC, until further notice, TAI-UTC = 30 s)

Date 1995 0h UTC		Aug 30	Sep 9	Sep 19	Sep 29
MJD		49959	49969	49979	49989
Laboratory k		UTC-UTC(k) (Unit is one nanosecond)			
AOS (Borowiec)		-1916	-1589	-1546	-1845
APL (Laurel)		2111	2092	2074	2060
AUS (Canberra)		-543	-506	-496	-489
BEV (Wien)		-34323	-34829	-35314	-35883
CAO (Cagliari)		-	-	-	-
CH (Bern)		191	185	181	159
CRL (Tokyo)		701	668	639	607
CSAO (Lintong)		-351	-233	-229	-258
CSIR (Pretoria)		1898	2056	2291	2422
FTZ (Darmstadt)		-230	-225	-224	-232
GUM (Warszawa)		-282	-293	-301	-306
IEN (Torino)		0	-7	-9	-11
IFAG (Wettzell)		-3283	-3443	-3686	-3824
IGMA (Buenos Aires)		-336	-206	-46	124
INPL (Jerusalem)		-2121	-2212	-2277	-2351
JATC (Lintong)		820	982	1034	1020
KRIS (Taejon)		195	192	194	195
LDS (Leeds)	(1)	580	561	388	372
MSL (Lower Hutt)		-4091	-4222	-4420	-4549
NAOM (Mizusawa)		-3429	-3401	-3374	-3352
NAOT (Tokyo)	(2)	-4069	-4346	-4580	-4539
NIM (Beijing)		7502	7579	7604	7646
NIST (Boulder)		7	-5	-9	-11
NMC (Sofiya)		-	-	-	-
NPL (Teddington)		66	61	54	53
NPLI (New-Delhi)		-	-	-	-
NRC (Ottawa)		98	23	-41	-83
NRLM (Tsukuba)		-7036	-6907	-6766	-6619
OMH (Budapest)		10902	11169	11386	11525
ONBA (Buenos Aires)		5349	6043	7204	8238
ONRJ (Rio de Janeiro)		-11755	-10384	-8529	-7657
OP (Paris)		-7	3	7	15
ORB (Bruxelles)		245	262	244	277
PTB (Braunschweig)		2321	2313	2314	2310
RC (Habana)	(3)	-1010	-1043	-898	-807
ROA (San Fernando)	(4)	2040	2055	2038	172
SCL (Hong Kong)		-942	-792	-638	-579
SO (Shanghai)		1970	1974	1947	1942
SU (Moskva)		-6990	-7018	-7033	-7051
TL (Chung-Li)	(5)	-225	-94	-94	-123
TP (Praha)		-431	-423	-406	-405
TUG (Graz)		-457	-435	-411	-379
UME (Gebze-Kocaeli)		-3317	-3300	-3280	-3252
USNO (Washington DC)(USNO MC)		10	4	5	6
VSL (Delft)		-168	-179	-193	-201

PAVILLON DE BRETEUIL F - 92312 SÈVRES CEDEX
TÉL. (CENTRAL) : + 33 1 45 07 70 70 TELEX : BIPM 631351 F TÉLÉCOPIE : + 33 1 45 34 20 21

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

The following table gives the computed values of TAI-TA(k).

Date 1995 0h UTC		Aug 30	Sep 9	Sep 19	Sep 29
MJD		49959	49969	49979	49989
Laboratory k		TAI-TA(k) (Unit is one nanosecond)			
APL (Laurel)		3574	3555	3537	3523
AUS (Canberra)		-62978	-63277	-63551	-63815
CH (Bern)		-66673	-66452	-66226	-66018
CRL (Tokyo)		58605	59017	59434	59848
CSAO (Lintong)		8233	8221	8096	7937
F (Paris)		146484	146820	147161	147507
IEN (Torino)		-452	-476	-489	-504
INPL (Jerusalem)		-303424	-304520	-305632	-306774
JATC (Lintong)		12839	13267	13244	13125
KRIS (Taejon)		1322	1364	1415	1463
NIM (Beijing)		-7909	-7791	-7713	-7636
NISA (Boulder)	(6)	-45133270	-45133712	-45134146	-45134578
NRC (Ottawa)		24694	24732	24780	24816
PTB (Braunschweig)		-361079	-361087	-361086	-361090
RC (Habana)	(3)(7)	-319750	-318993	-318058	-317177
SO (Shanghai)		-45592	-45577	-45624	-45611
SU (Moskva)	(8)	27243010	27242982	27242967	27242949
USNO (Washington DC)	(9)	-34730641	-34731312	-34731976	-34732639

3 - Notes on sections 1 and 2.

(1) LDS . Power failure from MJD = 49969.29 to MJD = 49971.38

(2) NAOT. Change of master clock on MJD = 49979.29

(3) RC .

MJD	UTC-UTC(RC)	TAI-TA(RC) - 18 s
49939	-618 ns	-320938 ns
49949	-792 ns	-320322 ns

(4) ROA . Time step of UTC(ROA) of + 1930 ns on MJD = 49980.51

(5) TL . Apparent time step of UTC(TL) due to a change of GPS receiver between MJD = 49959 and MJD = 49969.

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

(7) RC . Listed values are TAI-TA(RC) - 18 seconds.

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

(9) USNO. TA(USNO) designates the scale A1(MEAN) of USNO.

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

[UTC - GPS time] = -10 s + C0 (until 1996 January 1, 0h UTC)
[UTC - GPS time] = -11 s + C0 (from 1996 January 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 1995 0h UTC	MJD	C0 (ns)	σ (ns)	$\sigma/\sqrt{N}$ (ns)
Aug 30	49959	12	52	12
Aug 31	49960	7	50	13
Sep 1	49961	8	34	8
Sep 2	49962	16	53	11
Sep 3	49963	27	51	12
Sep 4	49964	36	46	10
Sep 5	49965	40	37	8
Sep 6	49966	41	39	8
Sep 7	49967	41	45	10
Sep 8	49968	44	42	11
Sep 9	49969	48	45	10
Sep 10	49970	51	40	9
Sep 11	49971	52	43	10
Sep 12	49972	46	64	15
Sep 13	49973	41	51	11
Sep 14	49974	37	50	10
Sep 15	49975	37	46	12
Sep 16	49976	40	43	11
Sep 17	49977	40	50	12
Sep 18	49978	40	46	11
Sep 19	49979	37	38	10
Sep 20	49980	34	33	9
Sep 21	49981	35	30	8
Sep 22	49982	38	39	11
Sep 23	49983	41	33	8
Sep 24	49984	37	30	9
Sep 25	49985	35	51	13
Sep 26	49986	37	54	14
Sep 27	49987	38	35	8
Sep 28	49988	38	36	8
Sep 29	49989	36	32	9

5 - [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 ten-day intervals, together with the standard deviation σ of his daily GLONASS data. C1 is then derived using [UTC - GPS time] of section 4.

Date 1995 0h UTC	MJD	C1 (ns)	σ (ns)
Aug 30	49959	-20549	55
Sep 9	49969	-	-
Sep 19	49979	-21323	49
Sep 29	49989	-21697	52

6 - Difference between the normalized frequencies of EAL and TAI.

Interval of validity		f(EAL)-f(TAI)
1995 Aug. 30 - 1995 Oct. 29	49959-50019	7.36×10^{-13}

New steering correction foreseen for November-December 1995

1995 Oct. 29 - 1995 Dec. 28	50019-50079	7.35×10^{-13}

7 - Duration of the TAI scale interval.

The following table gives the duration of the TAI scale interval, expressed as its departure d from the SI second on the rotating geoid, together with its relative uncertainty σ. 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 and NIST-7 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})
NIST-7	49959-49969	+3.3	1.0
PTB CS2	49929-49989	+2.9	1.5
BIPM estimate	49929-49989	+2.6	1.0