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BUREAU INTERNATIONAL DES POIDS ET MESURES
ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU METRE
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1 - Coordinated Universal Time UTC and its local realizations UTC(k). Computed values of [*UTC-UTC*(*k*)].
From 1999 January 1, 0h UTC, *TAI-UTC* = 32 s.

Date 2003 0h UTC	JUN 29	JUL 4	JUL 9	JUL 14	JUL 19	JUL 24	JUL 29	
MJD	52819	52824	52829	52834	52839	52844	52849	
Laboratory *k*				[*UTC-UTC*(*k*)]/ns				
AOS (Borowiec)	79.2	91.8	111.3	112.3	111.1	119.9	127.3	
AUS (Sydney)	-277.5	-274.2	-293.4	-311.0	-306.4	-325.1	-329.2	
BEV (Wien)	-8.0	-12.7	-14.3	-12.7	-12.1	-10.5	-6.7	
BIRM (Beijing)	1091.3	1100.6	1112.3	1127.3	1128.7	1136.4	1150.9	
CAO (Cagliari)	-4086.3	-4101.1	-4092.1	-4094.8	-4093.6	-4090.1	-4079.4	
CH (Bern)	38.2	39.4	37.5	28.5	30.6	24.4	22.8	
CNM (Queretaro)	50.3	53.6	51.5	56.3	57.8	55.1	45.4	
CRL (Tokyo)	-6.6	-9.6	-8.4	-11.1	-13.8	-13.3	-14.1	
CSIR (Pretoria)	-	-2247.6	-2286.1	-2325.7	-2356.4	-2400.7	-2436.8	
DLR (Oberpfaffenhofen)	-324.3	-220.2	-115.5	-41.4	-11.3	10.5	6.8	
DTAG (Darmstadt)	353.7	338.2	337.6	316.2	325.0	322.8	313.6	
IEN (Torino)	45.3	46.9	45.6	48.8	52.9	46.4	51.4	
IFAG (Wettzell)	-2105.7	-2114.4	-2126.9	-2133.9	-2143.2	-2142.7	-2147.5	
IGMA (Buenos Aires)	-89.8	-89.5	-81.9	-88.9	-92.0	-90.0	-81.2	
INPL (Jerusalem)	-8039.3	-	-8090.2	-8117.9	-8153.4	-8184.2	-8221.5	
IPQ (Monte de Caparica)	-	-	-	-	-	-	-	
JATC (Lintong)	-11611.1	-11593.0	-11581.8	-11557.4	-11542.4	-11525.7	-11495.1	
JV (Kjeller)	-8306.7	-8418.8	-8522.6	-8643.4	-8760.3	-8894.8	-9016.8	
KRIS (Daejon)	-70.3	-94.8	-119.6	-133.1	-142.4	-160.6	-181.2	
LDS (Leeds)	3617.9	3653.9	3672.5	3688.7	3702.4	3732.2	3733.8	
LT (Vilnius)	-150.1	-170.6	-173.5	-176.9	-166.7	-148.3	-131.5	
MSL (Lower Hutt)	182.9	196.8	214.9	235.0	240.3	215.4	219.3	
NAO (Mizusawa)	8.8	14.0	15.1	14.0	8.4	9.5	11.6	
NIM (Beijing)	-2625.4	-2627.0	-2620.2	-2625.1	-2632.2	-2627.9	-2624.9	
NIMB (Bucharest)	-555.0	-579.3	-599.4	-622.2	-646.4	-663.8	-671.3	
NIMT (Bangkok)	50.4	24.1	2.0	-14.9	-19.5	-36.3	-51.1	
NIST (Boulder)	9.2	10.3	12.6	11.7	12.7	13.7	10.7	
NMC (Sofiya)	-2887.4	-2912.7	-2910.4	-2939.7	-2943.2	-2948.1	-2976.5	
NMIJ (Tsukuba)	-15.1	-15.8	-11.8	-7.9	-6.7	-7.1	-14.9	
NMLS (Shah Alam)	400.0	200.1	219.2	226.7	236.6	280.9	298.4	(1)

Date 2003 0h UTC	JUN 29	JUL 4	JUL 9	JUL 14	JUL 19	JUL 24	JUL 29
MJD	52819	52824	52829	52834	52839	52844	52849
Laboratory *k*				[*UTC-UTC*(*k*)]/ns			
NPL (Teddington)	23.6	21.4	20.6	20.7	20.5	20.7	22.1
NPLI (New-Delhi)	-	-	-	-	-	-	-
NRC (Ottawa)	17.7	16.0	24.1	30.2	27.7	22.3	27.9
NTSC (Lintong)	33.2	28.8	24.4	27.7	22.0	20.4	23.8
OMH (Budapest)	8040.6	-	-	8125.3	8150.2	8174.3	8203.3
ONBA (Buenos Aires)	-394.4	-370.9	-475.3	-508.4	-516.5	-551.9	-486.3
ONRJ (Rio de Janeiro)	5566.4	5578.8	5591.0	5601.2	5609.1	5627.0	5629.2
OP (Paris)	47.6	43.0	45.3	45.9	43.3	40.9	37.0
ORB (Bruxelles)	-8.4	-14.1	64.2	55.4	23.2	-36.4	-33.4
PL (Warszawa)	2.2	-18.0	-33.5	-43.2	-59.9	-65.4	-75.6
PTB (Braunschweig)	-3.7	-6.7	-2.8	-6.4	-9.0	-7.6	-5.3
ROA (San Fernando)	52.2	54.6	55.5	53.1	53.4	59.6	57.7
SCL (Hong Kong)	20.6	29.6	37.4	35.8	29.9	34.3	45.9
SG (Singapore)	298.3	272.6	202.7	126.2	43.6	-17.7	-20.1
SMU (Bratislava)	-8319.8	-8350.2	-8381.6	-8411.7	-8448.8	-8466.5	-8494.6
SP (Boras)	-133.7	-139.4	-134.6	-128.4	-125.0	-119.8	-105.0
SU (Moskva)	33.5	31.5	32.0	32.5	35.5	30.0	25.6
TCC (Concepcion)	-3522.8	-3584.3	-3616.6	-3681.3	-3732.0	-3768.1	-3850.0
TL (Chung-Li)	-52.1	-49.3	-45.5	-43.6	-41.1	-41.4	-41.1
TP (Praha)	42.5	51.3	64.8	72.4	69.3	76.8	68.7
UME (Gebze-Kocaeli)	-12.8	-20.7	-17.4	-19.2	-9.7	-0.7	-2.3
USNO (Washington DC)	-3.4	-1.1	-1.4	-1.3	-2.0	-2.4	-1.8
VSL (Delft)	34.3	39.1	40.6	37.1	31.4	37.3	31.6

- Note on section 1:

(1) NMLS: Apparant time step of [*UTC* - *UTC*(*NMLS*)] between MJD 52819 and 52824 due to GPS receiver failure.

2 - International Atomic Time TAI and Local atomic time scales TA(k). Computed values of [*TAI*-*TA*(*k*)].

Date 2003 0h UTC	JUN 29	JUL 4	JUL 9	JUL 14	JUL 19	JUL 24	JUL 29	
MJD	52819	52824	52829	52834	52839	52844	52849	
Laboratory *k*				[*TAI*-*TA*(*k*)]/ns				
AUS (Sydney)	-121917.5	-	-	-	-	-	-	
CH (Bern)	33653.2	33826.7	34002.1	34170.3	34349.6	34520.7	34696.3	
CRL (Tokyo)	174568.4	174768.5	174968.4	175167.1	175369.7	175572.6	175773.1	
F (Paris)	169126.0	169133.9	169145.8	169153.1	169161.6	169171.8	169179.2	
IEN (Torino)	28328.3	28447.9	28566.6	28560.8	28677.9	28801.4	28925.4	
JATC (Lintong)	-30875.1	-30975.0	-31086.8	-31183.4	-31289.4	-31394.7	-31491.1	
KRIS (Taejon)	6040.0	6041.4	6062.5	6090.8	6124.3	6152.1	6176.5	
NIST (Boulder)	-45251385.0	-45251582.6	-45251779.1	-45251978.7	-45252176.5	-45252373.2	-45252573.7	
NRC (Ottawa)	28557.2	28559.9	28572.3	28582.6	28584.5	28583.1	28593.7	
NTSC (Lintong)	82.5	87.5	90.4	100.9	104.8	111.5	119.6	
PL (Warszawa)	-1504.8	-1521.0	-1533.5	-1548.2	-1558.9	-1568.4	-1583.6	
PTB (Braunschweig)	-359464.1	-359462.0	-359453.0	-359451.5	-359449.0	-359442.6	-359435.2	
SU (Moskva)	27241033.5	27241031.5	27241032.0	27241032.5	27241035.5	27241030.0	27241025.6	(1)
USNO (Washington DC)	-34911822.0	-34912130.1	-34912440.6	-34912749.6	-34913059.8	-34913369.5	-34913679.0	

- Note on section 2:

(1) SU : Listed values are *TAI*-*TA*(*SU*) - 2.80 seconds.

3 - Difference between the normalized frequencies of EAL (free atomic time scale) and TAI.

Interval of validity		*f*(EAL)-*f*(TAI)
2003 May 30 - 2003 Aug 28	52789-52879	6.960×10^{-13}
No new steering correction foreseen for September 2003		
2003 Aug 28 - 2003 Sep 27	52879-52909	6.960×10^{-13}

4 - Duration of the TAI scale interval.

TAI is a realization of coordinate time TT. The following tables give the fractional deviation d of the scale interval of TAI from that of TT (the SI second on the geoid), i.e. the fractional frequency deviation of TAI with the opposite sign: $d = -y_{TAI}$. In this section, a frequency over a time interval is defined as the ratio of the end-point phase difference to the duration of the interval. Whenever needed, the instability of EAL should be expressed as the quadratic sum of three components with τ in days: (1) a white frequency noise of $6.0 \times 10^{-15} / \sqrt{\tau}$, (2) a flicker frequency noise of 0.6×10^{-15} and (3) a random walk frequency noise of $1.6 \times 10^{-16} \times \sqrt{\tau}$. The relation between EAL and TAI is given in *Circular T* and the *Annual Report of the BIPM Time Section*.

In the first table, d is obtained, on the given periods of estimation by comparison of the TAI frequency with that of the given individual Primary Frequency Standards (PFS). In this table: u_A is the uncertainty originating in the instability of the PFS, u_B is the combined uncertainty from systematic effects, Ref(u_B) is a reference giving information on the stated value of u_B or is the *Circular T* where this reference was first given, $u_{l/lab}$ is the uncertainty in the link between the PFS and the clock participating to TAI, including the uncertainty due to the dead-time, $u_{l/TAI}$ is the uncertainty in the link to TAI, u is the quadratic sum of all four uncertainty values. All values are expressed in 10^{-15}.

Standard	Period of estimation	d	u_A	u_B	Ref(u_B)	$u_{l/lab}$	$u_{l/TAI}$	u	Note
SYRTE-FOM	52794 52819	3.9	1.5	0.8	T184	1.0	1.2	2.3	(1)
SYRTE-JPO	52824 52834	11.4	1.0	6.5	T160	0.3	3.0	7.2	(2)
SYRTE-JPO	52839 52849	16.6	1.0	6.5	T160	0.3	3.0	7.2	(2)
PTB-CS1	52819 52849	7.6	5.0	8.0	T148	0.0	1.0	9.5	(3)
PTB-CS2	52819 52849	5.8	3.0	12.0	T148	0.0	1.0	12.4	(3)

Notes:
(1) Report 18 July by BNM-SYRTE.
(2) Report 5 August by BNM-SYRTE.
(3) Continuously operating as a clock participating to TAI.

The second table gives the BIPM estimate of d, based on all available PFS measurements over the period MJD 52459-52849, taking into account their individual uncertainties and characterizing the instability of EAL as noted above. u is the computed standard uncertainty of d.

Period of estimation	d	u
52819-52849	$+5.0 \times 10^{-15}$	1.6×10^{-15}

5 - Relations of UTC and TAI with GPS time and GLONASS time.

[*UTC-GPS time*] = -13 s + C_0, [*TAI-GPS time*] = 19 s + C_0, global uncertainty is of order 10 ns.
[*UTC-GLONASS time*] = 0 s + C_1, [*TAI-GLONASS time*] = 32 s + C_1, global uncertainty is of order hundreds ns.

The C_0 values are obtained using the values [*UTC-UTC*(*OP*)] and the GPS data taken at the Paris Observatory, corrected for IGS precise orbits and ionosphere maps. The C_1 vaules are obtained using the values [*UTC-UTC*(*VSL*)] and the GLONASS data taken at the NMi Van Swinden Laboratorium (VSL). The standard deviations σ_0 and σ_1 characterize the dispersion of individual measurements. *N*0 and *N*1 are the numbers of measurements.
For this circular, σ_0 = 2.9 ns, σ_1 = 25.9 ns

Date 2003	0h UTC	MJD	C_0/ns	N_0	C_1/ns	N_1
JUN	29	52819	-6.7	43	162.9	32
JUN	30	52820	-3.3	42	134.4	23
JUL	1	52821	-2.7	44	161.3	72
JUL	2	52822	-2.1	44	172.9	37
JUL	3	52823	-5.3	44	167.7	56
JUL	4	52824	-8.3	42	164.3	72
JUL	5	52825	-8.0	42	161.8	61
JUL	6	52826	-5.2	42	161.8	20
JUL	7	52827	-0.7	44	170.2	57
JUL	8	52828	-0.6	43	182.8	37
JUL	9	52829	-1.9	40	144.3	26
JUL	10	52830	-3.0	11	140.4	57
JUL	11	52831	-2.8	37	161.5	62
JUL	12	52832	-4.2	43	158.0	73
JUL	13	52833	-6.6	43	149.0	56
JUL	14	52834	-8.6	43	159.0	21
JUL	15	52835	-6.4	42	156.2	58
JUL	16	52836	-6.1	42	154.3	13
JUL	17	52837	-8.4	39	156.9	61
JUL	18	52838	-11.6	42	146.2	64
JUL	19	52839	-11.0	42	143.1	50
JUL	20	52840	-11.1	43	159.7	60
JUL	21	52841	-12.4	43	156.6	21
JUL	22	52842	-12.4	43	156.2	55
JUL	23	52843	-9.7	42	152.3	53
JUL	24	52844	-10.1	42	149.7	71
JUL	25	52845	-7.9	41	148.1	64
JUL	26	52846	-5.9	41	137.9	54
JUL	27	52847	-1.9	40	132.5	65
JUL	28	52848	-1.3	43	130.9	59
JUL	29	52849	-1.1	41	142.3	42

6 - Time links used for the computation of TAI.

The time links used in the elaboration of this *Circular T* are listed in this section. The type of link is indicated as follows: GPS SC for GPS common-view single-channel C/A data; GPS MC for GPS common-view multi-channel C/A data; GPS P3 for GPS common-view multi-channel dual-frequency P code data; GPS GT for 'GPS time' observations; INT LK for internal cable link and TWSTFT for two-way satellite time and frequency transfer data.

Link	Type
AOS /NPL	GPS MC
AUS /CRL	GPS MC
BEV /NPL	GPS MC
BIRM/CRL	GPS MC
CAO /PTB	GPS SC
CH /PTB	GPS SC
CNM /NIST	GPS SC
CRL /PTB	GPS SC
CSIR/NPL	GPS MC
DLR /PTB	GPS P3
DTAG/PTB	GPS SC
IEN /PTB	TWSTFT
IFAG/PTB	GPS SC
IGMA/NIST	GPS GT
INPL/PTB	GPS SC
IPQ /PTB	GPS SC
JATC/NTSC	INT LK
JV /PTB	GPS GT
KRIS/CRL	GPS SC
LDS /PTB	GPS SC
LT /NPL	GPS MC
MSL /CRL	GPS MC
NAO /CRL	GPS SC
NIM /CRL	GPS SC
NIMB/PTB	GPS SC
NIMT/CRL	GPS MC
NIST/PTB	GPS SC
NMC /PTB	GPS GT
NMIJ/CRL	TWSTFT
NMLS/CRL	GPS MC
NPL /PTB	TWSTFT
NPLI/PTB	GPS SC
NRC /USNO	GPS SC
NTSC/CRL	TWSTFT
OMH /PTB	GPS SC
ONBA/USNO	GPS MC
ONRJ/NIST	GPS SC
OP /PTB	GPS SC
ORB /PTB	GPS SC
PL /NPL	GPS MC
ROA /PTB	TWSTFT
SCL /CRL	GPS SC
SG /CRL	GPS MC
SMU /PTB	GPS SC
SP /PTB	GPS SC
SU /PTB	GPS SC
TCC /NIST	GPS SC
TL /CRL	TWSTFT
TP /PTB	GPS SC
UME /PTB	GPS SC
USNO/PTB	TWSTFT
VSL /PTB	TWSTFT