BIPM

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 13 (1989 March 1)

1 - COORDINATED UNIVERSAL TIME UTC. Computed values of UTC-UTC(k)

(Since 1988 January 1, 0h UTC, TAI-UTC = 24s)

Date 1989 (0h UTC)		JAN 3	JAN 13	JAN 23
MJD		47529	47539	47549
Laboratory k		UTC-UTC(k)	(Unit = 1 microsecond)	
AOS (Borowiec)		-	-	-
APL (Laurel)	(1)	-	-	-
ASMW (Berlin)		0.34	0.20	0.07
AUS (Canberra)	(2)	-	-	-
BEV (Wien)		-4.67	-5.26	-5.75
CAO (Cagliari)		4.87	5.16	5.16
CH (Berne)		0.72	0.71	0.70
CRL (Tokyo)		-1.69	-1.66	-1.61
CSAO (Shaanxi)		1.29	1.32	1.16
FTZ (Darmstadt)		17.58	17.51	17.45
IEN (Torino)		0.15	-0.31	-0.74
IFAG (Wettzell)		0.07	0.29	0.55
INPL (Jerusalem)		94.80	96.18	97.54
JATC (Xian)	(3)	3.00	2.85	2.48
KSRI (Daejeon)		-19.39	-19.69	-19.99
NAOM (Mizusawa)		-34.81	-34.89	-35.03
NIM (Beijing)		7.65	7.52	7.41
NIST (Boulder)		-0.11	-0.13	-0.14
NPL (Teddington)		2.41	2.11	1.85
NPLI (New-Delhi)		-11.43	-11.20	-11.16
NRC (Ottawa)		-12.98	-13.18	-13.34
NRLM (Tsukuba)		-32.59	-33.05	-33.57
OMH (Budapest)		-8.82	-9.24	-9.45
OP (Paris)		-1.89	-1.85	-1.84
ORB (Bruxelles)		-12.69	-12.89	-13.04
PKNM (Warsaw)		4.59	5.17	5.55
PTB (Braunschweig)		4.10	4.08	4.08
ROA (San Fernando)		7.47	7.51	7.48
SO (Shanghai)		2.42	2.61	2.58
STA (Stockholm)		-0.17	0.10	0.45
SU (Moscow)		-	-	-
TAO (Tokyo)		-2.59	-2.62	-2.65
TL (Taiwan)	(4)	-6.02	1.13	1.31
TP (Praha)		-0.86	-0.95	-0.79
TUG (Graz)		-4.22	-4.00	-3.76
USNO (Washington)	(USNO MC)	-1.34	-1.30	-1.25
VSL (Delft)	(5)	0.83	0.86	0.88
YUZM (Beograd)		6.72	6.39	6.14
ZIPE (Potsdam)		-0.05	-0.13	-0.16

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2 - INTERNATIONAL ATOMIC TIME TAI AND LOCAL ATOMIC TIME SCALES TA(k)

Computed values of TAI-TA(k)

Date 1989 (Oh UTC)		JAN 3	JAN 13	JAN 23
MJD		47529	47539	47549
Laboratory k		TAI-TA(k)	(Unit = 1 microsecond)	
AOS (Borowiec)		-	-	-
APL (Laurel)	(1)	-	-	-
AUS (Canberra)	(2)	-18.00	-18.08	-18.34
CH (Berne)		-54.18	-54.37	-54.56
CRL (Tokyo)		-3.27	-3.24	-3.18
CSAO(Shaanxi)		40.27	40.30	40.14
DDR (Berlin)		-29.59	-29.47	-29.31
F (Paris)		64.72	65.10	65.47
JATC(Xian)	(3)	1.21	1.18	1.04
NIM (Beijing)		-9.83	-9.75	-9.78
NISA(Boulder)	(6)	-45053.15	-45053.37	-45053.60
NIST(Boulder)		-45119.51	-45119.92	-45120.33
NRC (Ottawa)		18.09	17.88	17.73
PTB (Braunschweig)		-359.30	-359.32	-359.32
SO (Shanghai)		-44.73	-44.55	-44.52
SU (Moscow)		-	-	-
USNO(Washington)	(7)	-34571.33	-34571.94	-34572.54

3 - NOTES ON SECTIONS 1 AND 2

(1) APL will not be reporting clock data for the next few months, the masers being taken off line for experiments.

(2) AUS . The time scale previously designated as UTC(AUS) became TA(AUS) on 1st of January 1989,without time and frequency step. A new time scale UTC(AUS) has been created, but the data on UTC(AUS) for January 1989 were not available at BIPM.

(3) JATC.

MJD	UTC-UTC(JATC)	TAI-TA(JATC)
47499	3.48	1.63
47509	3.32	1.53
47519	3.21	1.46

(4) TL . Time step of UTC(TL) of -7 μs on MJD = 47535.125

(5) VSL . Time step of UTC(VSL) of 3 μs on MJD = 47524.42

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

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

4 - UTC-GPS TIME and TAI-GPS TIME

UTC-GPS TIME = -5 seconds + Co
TAI-GPS TIME = 19 seconds + Co

Co is obtained from measurements made at Paris Observatory, usually corrected for the measured ionospheric delay, and from a linear interpolation of UTC-UTC(OP).
DC is the synchronization offset between satellites, as measured at Paris Observatory at the instant T of the tracking. T is given for the middle of the tracking period of 13 minutes, for the first tabular date and must be decremented by 4 minutes per day (8 minutes when moving from 0h.. to 23h..).

For most of the applications it is sufficient to derive UTC from the observations of any of the listed satellites, at any time, by interpolating Co. However, in case of large values of DC, one might obtain better values of UTC by using, instead of Co, C=Co+DC.

		Co	DC(ns)					
		(ns)	PRN 3	PRN 6	PRN 9	PRN11	PRN12	PRN13
Date			NAV11	NAV 3	NAV 6	NAV 8	NAV10	NAV 9
1988/89	MJD	0hUTC	23h42m	19h22m	20h22m	14h10m	23h 2m	22h46m
DEC 24	47519	-1413*	-6	-1	7	-2	9	-5
DEC 25	47520	-1403	3	5	8	2	-18	-5
DEC 26	47521	-1400	-5	6	14	5	9	-16
DEC 27	47522	-1394	16	3	-3	-12	-7	-8
DEC 28	47523	-1389	4	13	2	-1	-6	-5
DEC 29	47524	-1381	13	-7	3	-3	7	-12
DEC 30	47525	-1378	13	7	3	-6	-5	-6
DEC 31	47526	-1377	38	4	8	9	2	-14
JAN 1	47527	-1375	55	-3	3	-4	9	-3
JAN 2	47528	-1376	47	-12	-10	-1	-12	6
JAN 3	47529	-1378	74	4	1	10	-30	-3
JAN 4	47530	-1364	-	16	18	24	-9	-7
JAN 5	47531	-1343	-	2	12	-9	-10	-9
JAN 6	47532	-1354	-	4	13	3	-18	-3
JAN 7	47533	-1351	-	6	15	3	-19	-3
JAN 8	47534	-1349	-7	6	13	8	-3	-12
JAN 9	47535	-1339	-	1	8	11	-16	-4
JAN 10	47536	-1343	-7	11	3	7	-3	1
JAN 11	47537	-1345	1	-18	-4	7	-3	2
JAN 12	47538	-1349	-2	5	8	8	2	-10
JAN 13	47539	-1343	4	8	8	6	-11	-15
JAN 14	47540	-1349	8	8	17	3	-27	-30
JAN 15	47541	-1353	-2	13	9	8	5	-15
JAN 16	47542	-1340	-1	8	6	0	-17	5
JAN 17	47543	-1342	0	-1	3	18	-17	-21
JAN 18	47544	-1346	-2	21	4	18	-12	-7
JAN 19	47545	-1340	-6	-1	-3	-4	-5	-2
JAN 20	47546	-1340	11	-5	6	7	0	1
JAN 21	47547	-1327	0	0	-5	7	2	-14
JAN 22	47548	-1332	0	-7	5	10	-12	-3
JAN 23	47549	-1328						

* Difference with the value published in T 12, for the same date, due to an improvement of antenna coordinates.

5 - MEASUREMENT OF UTC(j)-UTC(k)

Date 1988	MJD	Time comparisons (Unit : 1 microsecond)	uncert.	source	meth. (1)
NOV 15	47480.54	UTC(PKNM) - UTC(SU) = 13.010		PKNM telex	CT

(1) method : CT clock transportation

6 - DURATION OF THE TAI SCALE INTERVAL : 1 second + D

D and its standard deviation s are expressed in 1*10*-14 second.

The following data are given :
- for continuously operating primary standards (primary clocks), the average of D for the two previous months, with the last available estimate of the inaccuracy of the standard;
- for occasional measurements, the value of D for the measurement interval, as computed by BIPM (the BIPM uncertainty may be larger that the reported uncertainty on account of the time comparisons);
- the BIPM evaluation from all available measurements (from CRL, NBS, NRC, PTB, SU), with the uncertainty based on those of individual measurements, as reported.

Standards	Interval(MJD)	D	s
PTB-CS1	47489 - 47549	+0.6	3.0
PTB-CS2	47489 - 47549	+1.6	1.5
BIPM estimate	47489 - 47549	+1	2

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BUREAU INTERNATIONAL DES POIDS ET MESURES

1989 mars 1

Circulaire T du BIPM

La "Circulaire T" du BIPM, mensuelle, a pris la suite de la partie "temps" de la Circulaire D du Bureau international de l'heure (BIH).

La Circulaire T fournit les données nécessaires pour accéder au Temps universel coordonné UTC et au Temps atomique international TAI, par l'intermédiaire des échelles de temps des laboratoires nationaux et par l'intermédiaire du temps diffusé par les satellites du Global Positioning System (GPS). Seuls sont rapportés les résultats dont les incertitudes sont inférieures à 1 µs environ.

Les résultats contenus dans la Circulaire T seront rassemblés annuellement et éventuellement améliorés dans un "Rapport annuel de la section du temps" du BIPM qui fournit, en outre,

- des explications sur les méthodes de calcul,
- des résultats intermédiaires et complémentaires,
- des informations sur les signaux horaires,
- des renseignements divers utiles pour la mesure du temps.

Le Rapport annuel pour l'année a est publié vers juin de l'année a + 1.

Au début de 1989 la Circulaire T contient les rubriques suivantes.

1. Temps universel coordonné UTC

UTC(k) désigne une échelle de temps conservée par le laboratoire "k". Cette échelle est presque toujours ajustée par correction de phase ou de fréquence pour rester voisine de l'UTC.

Le tableau donne les valeurs de UTC-UTC(k) à 10 jours d'intervalle. Les notes renvoient à la rubrique 3.

On rappelle que tous les signaux horaires décrits dans le Rapport annuel du BIH pour 1987 sont émis dans le système de l'UTC avec des erreurs négligeables vis à vis des incertitudes sur le calcul du temps de propagation. Les exceptions sont : UTC - ATA = -50 ms, UTC - BPM = -20 ms.

2. Temps atomique international TAI et temps atomiques locaux TA(k)

TA(k) désigne une échelle de temps atomique, indépendante, réalisée par le laboratoire "k".

Le tableau donne les valeurs de TAI - TA(k) à 10 jours d'intervalle. Les notes renvoient à la rubrique 3.

3. Notes sur les rubriques 1 et 2

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BUREAU INTERNATIONAL DES POIDS ET MESURES

1989 March 1

BIPM Circular T

In 1988 the BIPM monthly "Circular T" replaced the "time" part of Circular D previously issued by the Bureau International de l'Heure (BIH).

Circular T provides the necessary data to make available Coordinated Universal Time UTC and International Atomic Time TAI, through the time scales of national institutes and of satellites of the Global Positioning System (GPS). Only data having uncertainties less than about 1 μs are reported.

The results contained in Circular T (with slight improvements or corrections if necessary) will be gathered together in an "Annual Report of the Time Section" of the BIPM. In addition, this Annual Report will contain

- explanations of the computation methods,
- intermediate and complementary results,
- information on time signals,
- miscellaneous information on the measurement of time.

The Annual Report for year y is issued about June of year y + 1.

At the beginning of 1989, Circular T contains the following sections.

1. Coordinated Universal Time UTC

UTC(k) designates a time scale as realized by institute "k", kept in close agreement with UTC by phase and/or frequency adjustments.

Table 1 gives the values of UTC - UTC(k) at 10-day intervals. The notes are given in section 3.

You are reminded that all time signal emissions described in the BIH Annual Report for 1987 are in the UTC system with errors which are negligible when compared with the uncertainty of the evaluation of the propagation delay. Exceptions are: UTC - ATA = -50 ms, UTC - BPM = -20 ms.

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

TA(k) designates an atomic time scale as realized independently by institute "k".

Table 2 gives the values of TAI - TA(k) at 10-day intervals. The notes are given in section 3.

3. Notes on Sections 1 and 2

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